

MONTANA WETLANDS  
MANAGEMENT STUDY

ATTACHMENTS

VOLUME I



# ATTACHMENTS

## ATTACHMENT

## TITLE

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- A National Food Security Act Manual (Selected Sections of the Sixth Amendment)
- B Montana's EPA State Wetlands Protection Grant Application - Components and Tasks
- C Federal Wetlands Delineation Manuals
  - C-1 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands
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- L Swampbusting: Wetland Conversion and Farm Programs
- M Directory of Federal Land Management Agency Wetland Contacts

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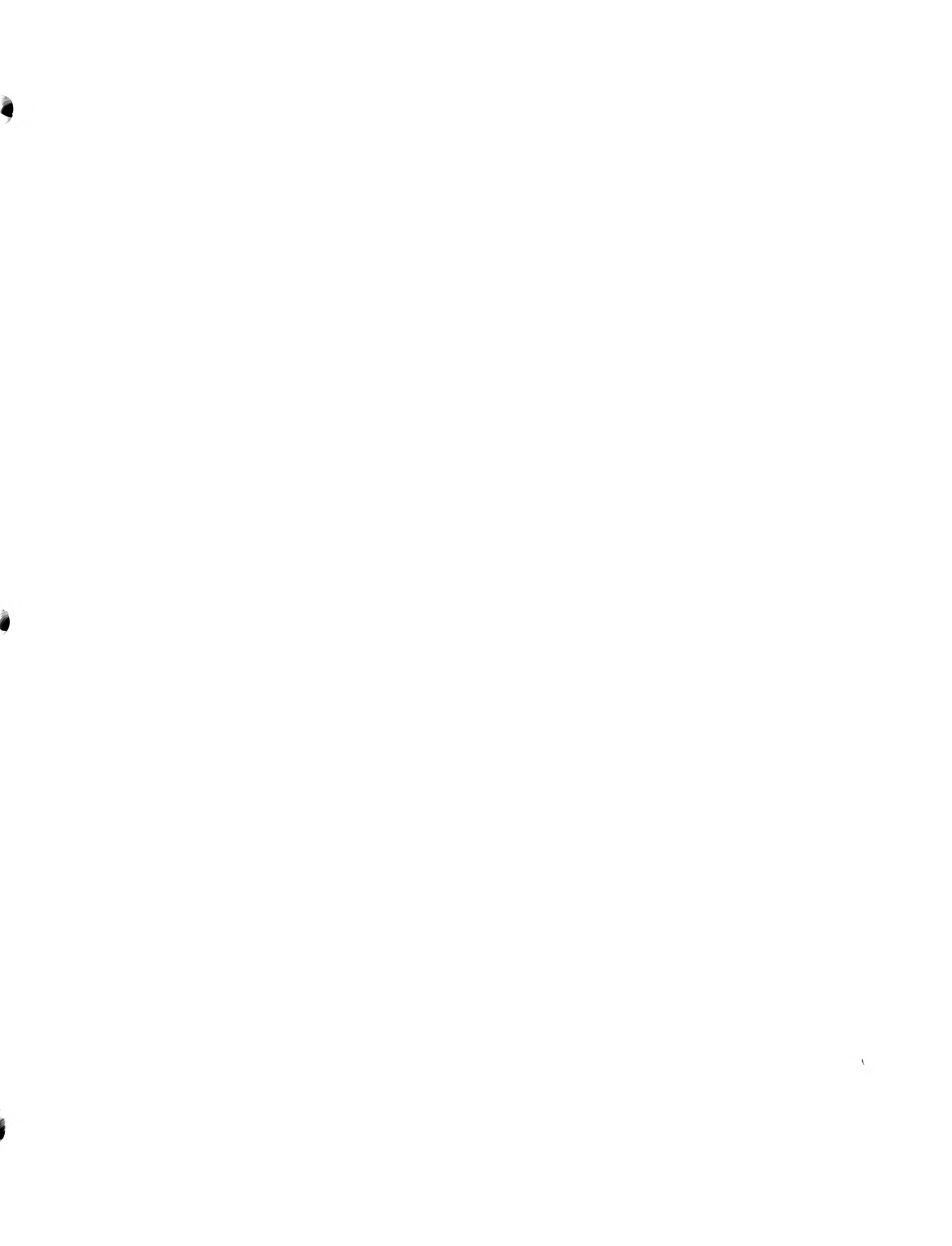
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## ATTACHMENT

## TITLE

### Volume II (Continued)

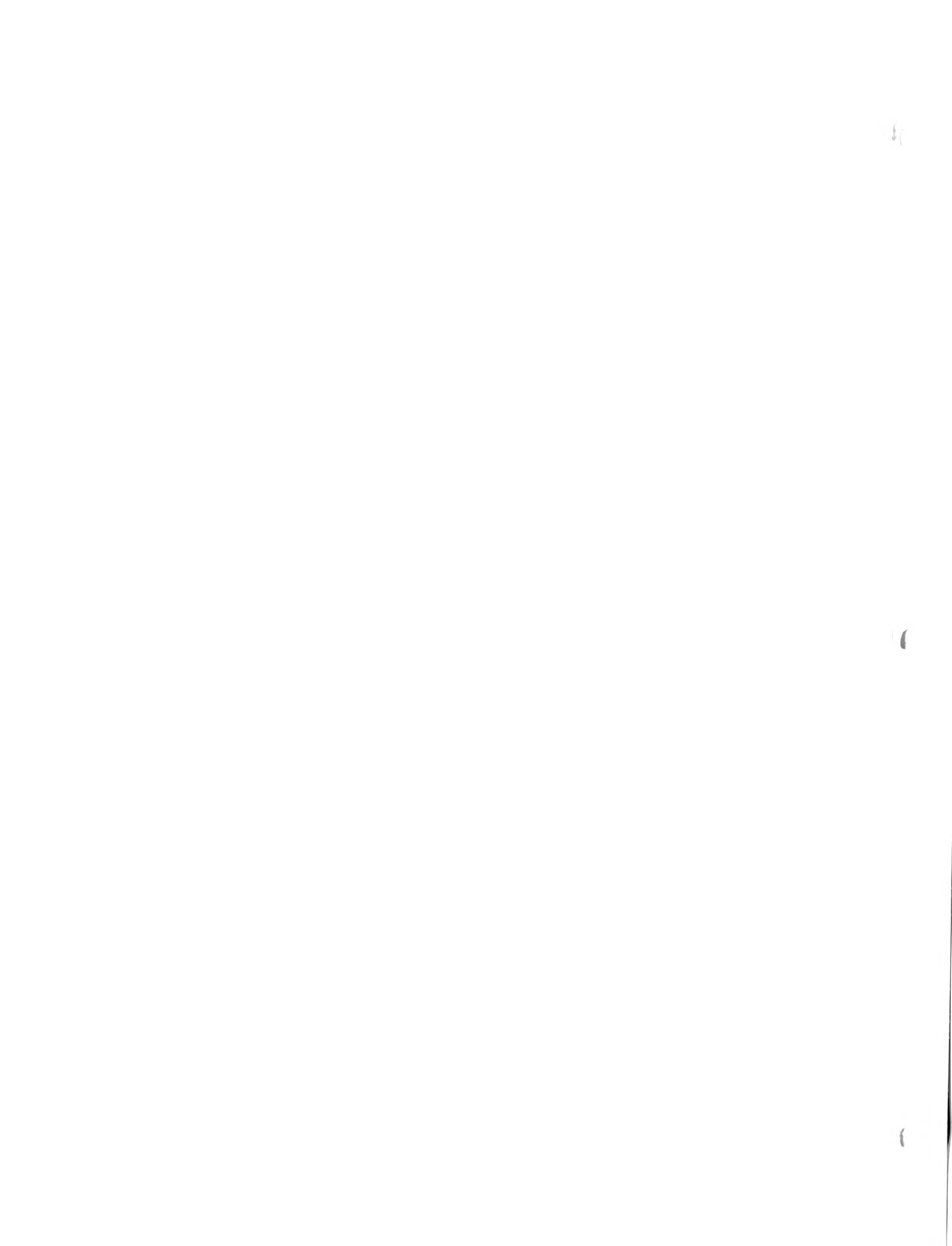
- N State Acts, Policies, and Executive Orders Pertaining to Wetlands
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P

**ATTACHMENT A**

**NATIONAL FOOD SECURITY ACT MANUAL  
(SELECTED SECTIONS OF THE SIXTH AMENDMENT)**





TO: State Conservationists  
NTC Directors

August 5, 1991

Enclosed is one copy of Amendment 6 to the National Food Security Act Manual. Amendment 6 is being sent to the printer today, and we will make general distribution directly to field offices as soon as we receive the printed copies.

*E. E. Andreuccetti*

EUGENE E. ANDREUC CETTI  
Director, Conservation Planning Division

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NATIONAL FOOD SECURITY ACT MANUAL (NFSAM), Second Edition  
180-V-NFSAM, Amendment 6

SUBJECT: CPA - NATIONAL FOOD SECURITY ACT MANUAL (NFSAM)

Purpose. To transmit revised pages of the NFSAM.

Effective date. This amendment is effective when received.

Explanation of changes. To provide more detailed guidance on 1990 changes to the Food Security Act, status reviews, quality control, and FSA plan content.

Vertical lines in the margins indicate where the policy stated in the text is changed. Minor editorial and typographical changes are not indicated by vertical lines.

Several pages are included as part of Amendment 6 that have no policy changes. This was done to maintain the sequence of pages and to make replacement of pages easier.

Policy revisions to the second edition of the NFSAM made by Amendment 6, May 1991:

Section 510.00 and 510.01: Added new programs in the 1990 Food, Agriculture, Conservation, and Trade Act (FACTA).

Section 510.13 (b): Added summary of requirements of FACTA.

Section 510.14: Lists new programs now subject to loss of benefits.

Section 510.16: Adds Wetland Reserve Program.

Section 510.20: Adds new responsibilities of the Agricultural Stabilization and Conservation Service (ASCS) with regard to tenant exemptions and good faith.

Section 510.21: Adds new responsibilities of the Soil Conservation Service (SCS) with regard to new wetland delineation types, plan application and variances, abandonment, scope and

-MORE-

DIST: NFSAM

effect determinations, restoration plans, handling violations, SCS misinformation, coordination with Fish and Wildlife Service (FWS), haying and grazing plans, and information for tenant exemptions.

Section 510.24: Coordination with Fish and Wildlife Service.

Section 510.35: Revised joint responsibilities of conservation districts and USDA agencies involved in FSA implementation to more effectively utilize conservation district resources.

Subpart E: Changed several statements to be consistent with Form AD-1026.

Section 510.44(c)(1) and (2): Changed due dates of required status review actions.

Section 510.44(c)(2): Changed to state that a person will not be notified of the selection of his/her land for a status review until an appointment is made for the status review. Added requirements for status reviews on FmHA borrowers tracts.

Section 510.44(c)(3): Clarified requirements for status reviews on ASCS and SCS employees tracts.

Section 510.44(c)(7): Added to require that status reviews be completed by November 15 each year.

Section 510.44(d)(1): Changed to require that appointments for status reviews be made not more than 30 days before the time that SCS will conduct the status review.

Section 510.44(d)(2): Changed to require that technical assistance not be provided during the course of a status review.

Section 510.44(d)(6): Changed to delete clause on ensuring that the person understands the plan. The expectation is that if the plan narrative is clear and technically sound, there should be no problem with the person understanding the plan.

Section 510.44(d)(6)(i)(A) 1. and 2: Clarified statements on application of planned and substitute practices.

Section 510.44(d)(6)(i)(A) 4: Added a clause to specify planned erosion reduction requirement for years beyond 1992.

Section 510.44(d)(6)(i)(A) 5: Added a clause regarding temporary variances for unusual occurrences and requiring state conservationist approval of this type of variance.

Section 510.44(d)(9) and (10): Clarified use of a letter to inform persons of SCS status review determinations.

Section 510.44(d)(13): Clarified required actions when a significant number of persons are found in violation during status reviews.

Section 510.44(h): Revised to clarify report requirements and require frequent monitoring of status review activity by state conservationists.

Section 510.45: Rewritten to clarify ASCS role in notifying new operators of the existence of HEL and FSA plans, and responsibilities of persons when changing tracts.

Section 510.48(f) & (2) & (3): Strengthens producer responsibilities in informing USDA of planned actions.

Section 510.50: New instructions for filling out Form SCS-CPA-026, June 1991.

Section 510.52: Revised to conform to new Form ASCS-569.

Section 510.53: Procedures for good faith exemptions.

Section 510.62: Retention of superseded AD-1026 and SCS-CPA-026 and appeal files.

Section 510.64: New progress reporting codes for FSA.

Section 510.70(a) and (b): Rewritten to clarify state conservationists' responsibility in quality control and state quality control plan requirements.

Section 510.70(f): Rewritten to clarify the national compliance control activity.

Section 510.70(j): Clarified reporting requirements.

Section 510.71(a)(2): Rewritten to include the use of Form ASCS-569 on SCS observed cases of potential compliance deficiencies.

Section 510.71(b): Revised to require that the state conservationist turn over all cases of suspected SCS employee fraud to the OIG investigation branch.

Section 510.72(d): Rewritten to clarify SCS action on reports on items that are not an SCS responsibility.

Section 510.72(f): Rewritten to clarify filing and use of reports of investigations resulting from information from confidential sources.

Section 511.42: Rewritten to clarify erosion reduction requirements for conservation systems.

Section 511.44(b)(10): Moved statement from former section 511.44(b)(13) into the statement signed by the producer to emphasize that the FSA plan does not necessarily include all of the fields on the tract.

Section 511.44(d)(2)(iii): Added a statement on obtaining crop history information.

Section 511.49(c): Clarified requirements for revising FSA plans.

Section 511.50(a), (b), and (c): Revised to reflect policy on dealing with participants who did not have an approved plan by January 1, 1990.

Wetland Conservation, has been rewritten entirely to incorporate changes made by the Food, Agriculture, Conservation, and Trade Act of 1990. Because of extensive changes, vertical lines have been omitted.

Exhibit 516.01: Revised Form AD-1026, February 1991.

Exhibit 516.03(a): Revised Form SCS-CPA-026, June 1991.

Exhibit 516.15: A sample letter to a person who is determined to be "not actively applying the approved conservation plan."

Exhibit 516.16: A sample letter to a person who is determined to be "not using an approved conservation system."

Exhibit 516.17: A decision table for status reviews in 1991.

Exhibit 516.18: Form ASCS-569.

Exhibit 516.19: Form AD-1069.

Exhibit 516.20: Information that must be submitted by the person to assess a post-conversion minimal effects determination.

Exhibit 516.21: Delineation labels.

Exhibit 516.22: Standard easement.

Exhibit 516.23: Minimal Effect Determination key for short-term conversions.

Exhibit 516.24: Wetland Restoration Evaluation Procedures for minimal effects

Filing Instructions:

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WILLIAM RICHARDS  
Chief





## PART 510 - GENERAL OPERATING PROCEDURES

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- §510.01 Content.

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### Subpart E - Detailed Procedures for Highly Erodible Land (HEL) and Wetland Conservation Provisions

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## Part 510 General Operating Procedures

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- §510.45 Certification of actively applying an approved conservation plan and/or using an approved conservation system.
- §510.46 Use of Form AD-1026.
- §510.47 ASCS processing of the Form AD-1026.
- §510.48 SCS servicing of requests for determinations.
- §510.49 Form SCS-CPA-026.
- §510.50 Instructions for completing Form SCS-CPA-026.
- §510.51 Instructions for completing Form SCS-CPA-027.
- §510.52 Instructions for SCS use of Form ASCS-569.
- §510.53 Good Faith exemptions - HEL.

### Subpart F - Files, Records, and Reports

- §510.60 Files.
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- §510.64 Progress reporting for FSA..
- §510.65 Incorrect conservation plans.
- §510.66 Prohibitions.

### Subpart G - Quality Control

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### Subpart H - Appeals

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Subpart A - Purpose and Content

PART 510 - GENERAL OPERATING PROCEDURES

SUBPART A - PURPOSE AND CONTENT

510.01(c)

510.00 Purpose.

(a) The purpose of this manual is to set forth the basic operating policy and procedures used by the Soil Conservation Service (SCS) in working with other agencies and conservation districts involved in implementing the conservation provisions of the Food Security Act (FSA) of 1985 as amended by the Food, Agriculture, Conservation, and Trade Act (FACTA) of 1990, the related Department of Agriculture (USDA) rules, and the Tax Reform Act of 1986.

(b) This manual is designed to serve as a ready reference and training aid for SCS and conservation district personnel who have specific responsibilities for the implementation of these provisions.

(c) Since this manual is based on the published rule in the Federal Register, state supplements to this manual must be approved by the Director of the Conservation Planning Division (CPD) before they are issued. Bulletins, technical notes and criteria guidelines are to be sent to CPD within 15 days after issuance.

(d) While the manual focuses primarily on SCS responsibilities, it provides an overview of other agency roles to make SCS employees aware of the coordination and cooperation required for practical implementation.

510.01 Content.

The procedures contained herein relate to SCS implementation of:

- (a) Highly erodible land conservation provisions.
- (b) Wetland conservation provisions.

(c) Environmental Conservation Acreage Reserve Program (ECARP). Procedures for the Conservation Reserve Program (CRP) are in the National Manual for Assisting ASCS Cost-Sharing Programs (NMCSF), Part 539.

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

Part 510 - General Operating Procedures

510.01(d)

(d) Conservation easements relative to Farmers Home Administration (FmHA) inventory properties and certain FmHA borrowers.

(e) Tax Reform Act of 1986 provisions.

(f) Wetland Reserve Program (WRP).

## Subpart B - General Provisions

### SUBPART B - GENERAL PROVISIONS

510-11(c)

#### 510.10 Authorities.

(a) Legal authority for the policy and procedures contained herein is Public Law 99-198 (16 U.S.C. 3801 et seq., Titles 12 and 13), the Food Security Act of 1985 (FSA), and Public Law 101-624, Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA). See Section 518.01.

(b) USDA rules to implement the highly erodible land and wetland conservation provisions of the law are in 7 CFR Part 12. The Conservation Reserve Program regulations are in 7 CFR Part 704 and the Conservation Easement regulations are in 7 CFR Parts 1951 and 1955. See 518.02 through 518.08 of this manual.

(c) The information in this manual expands and further explains the procedures USDA and SCS use to implement these rules. All SCS personnel assigned responsibility under the highly erodible land and wetland conservation provisions are to have a working knowledge of 7 CFR Part 12, including the interim rules published June 27, 1986, and the final rules published September 17, 1987, February 11, 1988, and April 23, 1991.

#### 510.11 Applicability.

(a) The USDA rule, 7 CFR Part 12, applies to all Federal, state, and local government, private, and Indian lands determined to be highly erodible, wetland, or converted wetland in the 50 states, the Commonwealth of Puerto Rico, Guam, the Virgin Islands of the United States, American Samoa, the Commonwealth of the Northern Mariana Islands, and the Trust Territory of the Pacific Islands.

(b) The rules and regulations apply to all persons who participate in any of the USDA programs listed under Section 510.14. "Person" means an individual, partnership, association, corporation, cooperative, estate, trust, joint venture, joint operation, or other business enterprise or other legal entity and, whenever applicable, a State, a political subdivision of a State, or any agency thereof and such person's affiliates as provided in 12.8 of the rule.

(c) All determinations, exemptions, conditions, and decisions made regarding FSA remain with the land. If a person purchases land on which determinations were made, and the prior owner did not appeal such determinations, the new owner does not have appeal rights regarding those decisions. However, in those cases where a field is

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Part 510 - General Operating Procedures

510.11(c)

subdivided between owners, each new field will require a new HEL determination. A request for a conservation plan revision can be made at any time. All wetland determinations that have not been certified are appealable.

(d) In addition, a person who converts a wetland after November 28, 1990, will be ineligible for USDA program benefits. That person would be ineligible for USDA program benefits on all land owned, rented, or share cropped by him/her or affiliates. The person would remain ineligible if the land is sold and not restored. The new owner would become ineligible when planting an agricultural commodity on the converted wetland.

(e) Conservation easement provisions apply only to FmHA inventory lands and certain FmHA borrower properties, and the Conservation Reserve Program applies only to non-federal lands.

510.12 Highly Erodible Land and Wetland Conservation Provisions.

The objectives of the highly erodible land and wetland conservation provisions are to:

(a) Remove certain incentives for persons bring highly erodible land into production, or to convert wetland so as to make possible the production of agricultural commodities.

(b) Reduce soil loss due to wind and water erosion,

(c) Protect the Nation's long term capability to produce food and fiber,

(d) Reduce sedimentation and improve water quality, and

(e) Assist in preserving the Nation's wetlands.

510.13 Summary of the requirements of the FSA and FACTA.

(a) FSA. The highly erodible land and wetland conservation provisions of FSA impose restrictions on persons who participate in certain USDA programs and who plant agricultural commodities on highly erodible land or converted wetlands after December 23, 1985. To maintain eligibility for participation in USDA programs:

(1) Persons must apply an approved conservation system on all highly erodible land used to produce an agricultural commodity.

(i) Highly erodible lands broken out for the production of an agricultural commodity must have an approved conservation system fully in use the first crop year planted after June 27, 1986, except for alfalfa in a crop rotation. (See 511.03, 511.04, and 511.05)

(ii) For highly erodible crop fields that were planted to an agricultural commodity during any of the 1981-1985 crop years, persons must have developed an approved conservation plan by January 1, 1990, and have the plan fully applied by January 1, 1995, except where no soil survey is available to identify highly erodible land. In such cases, persons have 2 years after a soil survey is completed on the highly erodible cropland to develop a conservation plan.

(2) Persons must not plant an agricultural commodity on wetlands that were converted after December 23, 1985, unless the wetland was exempt.

(b) FACTA. Summary of the Requirements of the Conservation Provisions of the Food, Agriculture, Conservation, and Trade Act (FACTA) of 1990.

(1) The 1990 FACTA amended the 1985 FSA and changed the criteria under the wetland conservation provision to include restrictions on persons who participate in certain USDA programs for any conversion of wetland after November 28, 1990.

(2) Persons must not plant an agricultural commodity on wetlands which were converted between December 23, 1985, and November 28, 1990, unless the wetland was exempt. Persons who convert a wetland after November 28, 1990 will be ineligible for USDA program benefits until the converted wetland is restored, unless the activity is exempt under the wetland conservation provisions of the 1990 FACTA.

#### 510.14 Denial of program benefits.

(a) Persons who do not comply with the above requirements are denied benefits in the following USDA programs:

- |   |        |
|---|--------|
| (1) Commodity Loans and Purchases--10.051   | (ASCS) |
| (2) Cotton Production Stabilization--10.052 | (ASCS) |
| (3) Emergency Conservation Program--10.054  | (ASCS) |

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- |      |   |        |
|------|---|--------|
| (4)  | Emergency Loans--10.404   | (FmHA) |
| (5)  | Farm Operating Loans--10.406  | (FmHA) |
| (6)  | Farm Ownership Loans--10.407  | (FmHA) |
| (7)  | Feed Grain Production Stabilization--10.055   | (ASCS) |
| (8)  | Storage Facilities Equipment Loans--10.056  | (ASCS) |
| (9)  | Wheat Production Stabilization--10.058  | (ASCS) |
| (10) | National Wool Act Payment--10.059   | (ASCS) |
| (11) | Beekeeper Indemnity Payments--10.05   | (ASCS) |
| (12) | Rice Production Stabilization--10.065   | (ASCS) |
| (13) | Federal Crop Insurance--10.450  | (FCIC) |
| (14) | Soil and Water Loans--10.416  | (FmHA) |
| (15) | Loans to Indian Tribes and Tribal Corporations--10.421  | (FmHA) |
| (16) | Emergency Conservation Program--10.054  |        |
| (17) | Conservation Reserve Program--10.069  | (ASCS) |
| (18) | Watershed Protection and Flood Prevention loans and<br>cost share payments--10.054  | (SCS)  |
| (19) | Great Plains Conservation Program cost share payments--10.900<br>(SCS)  |        |
| (20) | Agricultural Conservation Program cost share payment--10.063<br>(ASCS) (including dairy refunds)  |        |
| (21) | Disaster Assistance payments--10.052, 10.058, 10.065, and 10.440<br>(ASCS)  |        |
| (22) | Agricultural Credits Act payments--10.054   | (ASCS) |
| (23) | Agricultural Water Quality Incentives Program payments  | (ASCS) |
| (24) | Environmental Easement Program payments   | (ASCS) |
| (25) | Payments for storage of agricultural commodity acquired<br>by the Commodity Credit Corporation under the Commodity<br>Credit Corporation Charter Act. | (ASCS) |

These programs are listed in the Catalog of Federal Domestic Assistance. Specific details on these programs are available from the administering agency.

(b) SCS has responsibility under the GPCP and PL-566 financial assistance components to ensure that the participant is determined by ASCS to be in compliance with FSA requirements for the calendar year for which GPCP and/or PL-566 benefits are to be paid. This includes the determination by ASCS that all affiliated tracts are also in compliance.



(c) Before SCS processes a payment for a GPCP or a PL-566 financial assistance participant, SCS will request ASCS to provide a copy of any notice to the participant that ASCS has determined that the person is not in compliance. If no such notice exists, SCS will accept the person's certification on the current Form AD-1026 that the person is in compliance, and SCS will process the payment.

#### 510.15 Conservation Reserve Program.

Upon successful bid, a person may remove highly erodible and environmentally sensitive cropland from crop production by entering into a Conservation Reserve Program (CRP) contract. See Part 539 of the National Manual for Assisting ASCS Cost Sharing Programs for CRP procedures.

#### 510.16 Wetland Reserve Program.

Upon successful bid, a person may restore and protect farmed wetlands and prior converted wetlands together with adjacent lands that are functionally dependent upon such wetlands by entering into the Wetland Reserve Program (WRP). See Part 540 of the National Manual for Assisting ASCS Cost Sharing Programs for WRP procedures.

#### 510.17 Conservation easements.

Certain FmHA borrowers may place highly erodible lands, wetlands, and certain other lands under a 50-year or longer conservation easement in return for some debt forgiveness. Deed restrictions may be placed on FmHA inventory properties containing similar types of land. See Part 514.

#### 510.18 Tax Reform Act of 1986.

Public Law 99-514 removes certain tax benefits associated with production of agricultural commodities on highly erodible land or wetlands as follows:

(a) Expenses associated with drainage of wetland or land clearing are not deductible for Federal income tax purposes (Sec. 175 and 402 of Federal Tax Code);

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510.18(b)

(b) Gains from the sale of highly erodible land or converted wetland are treated as ordinary income, and losses must be treated as long term capital losses (Sec. 403 of Federal Tax Code); and

(c) Deductible conservation expenses must be consistent with a conservation plan as approved by the Soil Conservation Service or comparable state agency (Sec. 175 of the Federal Tax Code and GM 180, Part 403).

Subpart C - FSA Administration

Subpart C - FSA Administration

SUBPART C - FSA ADMINISTRATION

510.20(f)

510.20 Agricultural Stabilization and Conservation Service (ASCS).

Agricultural Stabilization and Conservation Service (ASCS) has primary responsibility through State Committees and County Office Committees for administering the following FSA provisions.

- (a) Establish field boundaries.
- (b) Determine whether a person is a producer on a HEL field or converted wetland.
- (c) Determine whether in any year 1981 through 1985 the land was:
  - (1) Designated as Agricultural Conservation Reserve (ACR) or Conservation Use (CU)
  - (2) Not cultivated under a program to reduce production of an agricultural commodity.
- (d) Determine whether a tenant or sharecropper is required to produce an agricultural commodity on HEL converted wetland under the terms and conditions of an agreement between the landlord and the tenant or sharecropper.
- (e) Determine when a tenant is eligible for the tenant restrictions provision. Tenants who produce agricultural commodities on land owned by others will not be subject to loss of all USDA benefits if they made a good faith effort, but are prevented from actively applying the approved conservation plan by the actions or inactions of the owner of a tract, and the lack of compliance is not a part of a scheme or device to avoid compliance. The tenant will be subject to loss of benefits only on the tract(s) on which the tenant was prevented by the owner from actively applying the approved conservation plan, and will continue to be eligible for USDA benefits on all other tracts on which the tenant actively applies the approved conservation plan.
- (f) Determine whether an agricultural commodity was planted on HEL before December 23, 1985.

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510.20(g)

(g) Determine whether the conversion of wetland commenced before December 23, 1985.

(h) Determine whether the conversion of a wetland was caused by a third party.

(i) Determine whether to allow a producer to exchange acreage between certain Commodity Acreage Bases with crops that leave a high residue. SCS must recommend the exchange for inclusion in the farm plan.

(j) Determine whether an agricultural commodity was planted on converted wetland after December 23, 1985.

(k) Determine good faith.

510.21 Soil Conservation Service (SCS).

SCS will:

(a) Prepare, maintain and make available to the public, lists of highly erodible soil map units and hydric soils.

(b) Maintain a list of hydrophytic vegetation derived from the "National List of Plant Species That Occur in Wetlands."

(c) Provide technical assistance for soil surveys, conservation planning, and applying conservation systems to the land.

(d) Make the following technical determinations:

(1) Whether land is highly erodible land, wetland, converted wetland, farmed wetland, artificial wetland, prior converted cropland, farmed wetland/pasture, replacement wetlands, minimal effect converted wetland or converted wetland/technical error.

(2) Whether highly erodible land is predominant in a field.

(3) Whether production of an agricultural commodity on a wetland is possible under natural conditions without action by the person that destroys a natural wetland characteristic.

(4) Whether the production of an agricultural commodity on certain converted wetlands would have a minimal effect on the hydrological and biological aspects of the wetland. This will be done in agreement with the U.S. Fish and Wildlife Service (FWS).  
See 512.40.

(5) Determine soil suitability for trees.

(6) Whether an approved conservation plan is being actively applied.

(7) Whether a person qualifies for a temporary variance from the requirements of the plan.

(8) Whether an approved conservation system is being used.

(9) Whether the conversion of a wetland was for the purpose or has the effect of making the production of an agricultural commodity possible.

(10) Whether a prior converted cropland is abandoned.

(11) Whether maintenance of existing drainage exceeds scope and effect of the original drainage.

(12) Whether plan and schedule for restoration of a converted wetland is adequate and whether the restoration is accomplished according to the approved restoration plan and schedule.

(13) Whether all pertinent data relating to the determination of a violation and severity of a violation has been provided to ASCS for making graduated sanctions determinations.

(14) Whether an action was caused by SCS misaction or misinformation.

(e) Certify that conservation plans and conservation systems for highly erodible fields conform with the SCS Field Office Technical Guides (FOTG).

(f) Inform conservation districts that conservation plans or conservation systems conform with the FOTG in order that the conservation district may approve the plans or systems.

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510.21(g)

(g) Consult with the FWS on matters relating to wetland and converted wetland identification, abandonment, quality reviews, restoration plans, and mitigation. See 512.50.

(h) Coordinate technical assistance provided to conservation districts in the discharge of these responsibilities with the other Federal, State, and local agencies involved in implementation of these provisions of the Acts.

(i) Provide technical assistance to identify suitable lands for FmHA, FWS and other conservation easements.

(j) Provide technical services to persons regarding the requirements of the Tax Reform Act of 1986, relative to highly erodible land and wetland.

(k) Conduct environmental evaluations, including cultural resource considerations, in compliance with the National Environmental Policy Act of 1969, PL 91-190 (NEPA) and the National Historic Preservation Act of 1966, PL 89-665 (NHPA), as amended relative to applicable highly erodible land and wetland activities.

(l) Monitor and report progress regarding highly erodible land and wetland conservation implementation.

(m) Develop a haying or grazing plan on the forage production area with FWS.

(n) Help ASCS determine whether the tenant made a good faith effort to actively apply the approved conservation plan.

(1) This determination will be based in part on whether the person promptly developed an approved conservation plan and has attempted to actively apply that plan to a reasonable extent. The determination of good faith is an ASCS decision.

(2) ASCS is developing a form for the tenant to request exemption at the time of program sign-up. If ASCS determines that the person is a tenant who may be considered eligible for the good faith exemption, SCS will respond to the ASCS request for information regarding the date that the conservation plan was developed, and for information on previous accomplishments in the active application of the approved conservation plan. If there is no approved conservation plan for the tract, the tenant is not eligible for the good faith exemption.

Subpart C - FSA Administration

510.25(a)

510.22 Farmers Home Administration (FmHA).

FmHA will:

- (a) Determine whether the proceeds of a farm program loan made, insured, or guaranteed by FmHA will be used for a purpose that will contribute to excessive erosion (not having an approved conservation plan) on highly erodible land or to the conversion of wetland.
- (b) Administer the conservation easement provisions on FmHA inventory properties and on certain FmHA borrowers' lands that qualify for debt forgiveness on a portion of their land.
- (c) Require FmHA borrowers to develop conservation plans and apply conservation systems on highly erodible land.
- (d) Ensure that highly erodible land, wetland, frequently cropped wetland, prior converted cropland, wetland in forage production and converted wetland are identified by SCS on FmHA inventory farms.

510.23 Federal Crop Insurance Corporation (FCIC).

FCIC will determine when crop insurance should be denied to a person for having produced an agricultural commodity on highly erodible land without a conservation system or on converted wetland.

510.24 Extension Service (ES).

ES will coordinate the USDA information and education activities relative to the FSA conservation provisions.

510.25 Fish and Wildlife Service (FWS)

FWS responsibilities:

- (a) ASCS and SCS shall consult with FWS on wetland determinations.

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510.25(b)

(b) Provide consultation assistance to ASCS county office committees on each request for:

- (1) Commenced conversion determination
- (2) Third party exemption.
- (3) Determining seriousness of the violation.



Subpart D - SCS/FSA Responsibilities By Organizational Level

SUBPART D - RESPONSIBILITIES BY ORGANIZATIONAL LEVEL

510.31(b)

510.30 National Office.

(a) The Deputy Chief for Programs has national leadership for policy and coordination within SCS, with other agencies relative to FSA, and for rulings on appeals made to the Chief.

(b) The Deputy Chief for Programs has delegated policy formulation responsibility for the Conservation Reserve Program to the Director of the Land Treatment Program Division, and the responsibility for highly erodible land, wetland conservation, conservation easements, Tax Reform Act, and coordination with conservation districts to the Director of the Conservation Planning Division.

(c) The Deputy Chief for Technology is responsible for policy related to establishment and maintenance of technical criteria, standards, procedures, and related requirements applicable to FSA, including consulting with the Fish and Wildlife Service (FWS) on use of The National List of Plant Species That Occur in Wetlands and Hydric Soils of the United States relative to wetland and converted wetland identification and resolving issues on minimal effect.

(d) The Directors of the National Technical Centers are responsible for technical coordination and assistance among the states.

510.31 State office.

The state conservationist (STC) has overall responsibility for FSA implementation, within his/her state including:

(a) Coordinating SCS responsibilities with other USDA agencies, the FWS regional office, conservation districts, and others;

(b) Consulting with FWS on matters relating to wetlands as described in 512.50 including state-level wetland appeals, minimal effects determinations, and problems with wetland identification or conversions as mutually agreed with the FWS Director or designee.

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510.31(c)

(c) Delegating responsibilities for FSA implementation to state, area, or field office staff, including responsibility for conservation plan or system approval in the absence of a conservation district and for making determinations on SCS employees' farms;

(d) Developing state supplements to this manual where authorized and with prior approval of the Director of the Conservation Planning Division;

(e) Approving acceptable conservation systems for the Field Office Technical Guide;

(f) Establishing, approving, and maintaining current lists of highly erodible soil mapping units, hydric soils, and hydrophytic vegetation;

(g) Distributing lists of hydrophytic vegetation and National Wetland Inventory maps to field offices;

(h) Establishing a quality control policy, maintaining high quality work, and currency of training;

(i) Ensuring completion of environmental evaluations that include cultural resource considerations; and

(j) Ruling on FSA appeals at the state level.

510.32 Area office.

The area conservationist (AC) is responsible for the management of FSA activities within the area, ruling on appeals at the area level, and carrying out other responsibilities as delegated by the state conservationist.

510.33 Field office.

The district conservationist (DC) is responsible for:

(a) Coordinating technical assistance with the conservation district and county offices of the other USDA agencies.

Subpart D - Responsibilities by Organizational Level

510.34(c)(2)

(b) Making technical determinations and notifying the person of such determinations.

(c) Providing technical assistance in the development of conservation plans and the application of conservation systems.

(d) Making minimal effect determinations where SCS and FWS have agreed on minimal effect.

(e) Maintaining records and providing reports, including environmental evaluations. See the National Reporting Codes Handbook for a more specific listing of SCS reporting responsibilities.

(f) Responding to requests for reconsideration under the appeals process.

(g) Maintaining in the field office the approved county lists of highly erodible soil map units, hydric soils, hydrophytic vegetation, and, where available, National Wetland Inventory maps. These materials may be provided to the public upon request.

(h) Providing technical services relating to the Tax Reform Act of 1986.

§510.34 Conservation district.

(a) Conservation districts are responsible for approving conservation plans under the FSA highly erodible land conservation provisions after SCS certifies that the plans conform to the FOTG.

(b) In the absence of a conservation district, or in the event a conservation district refuses its responsibility under the law in this regard, SCS will approve conservation plans.

(c) Conservation districts, in approving conservation plans, are to consider, in consultation with the ASC county committee:

(1) The degree of control that the person has over the land for the period of the crop rotation and other practices specified in the conservation plan;

(2) The practicability and feasibility of the conservation systems included in the conservation plan;

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510.34(c)(3)

(3) Other unusual situations regarding land use, treatment, or operation of the conservation system.

§510.35 Joint responsibilities.

(a) Responsibilities. Conservation districts and USDA agencies administering FSA provisions are encouraged to expand cooperative working arrangements and establish joint responsibilities for helping to achieve the conservation objectives of the FSA provisions by:

(1) Consulting with ASC county committees regarding approval of conservation compliance plans.

(2) Assisting in the servicing of the FSA workload where the conservation objectives of FSA are consistent with the objectives of conservation districts.

(3) Keeping fully informed of progress in servicing the FSA workload.

(4) Consulting with SCS on the implementation of approved conservation plans and assisting USDA participants in resolving problems of noncompliance with approved conservation plan.

(5) Encouraging FSA participants to voluntarily become district cooperators and develop, as resources permit, a conservation plan for the entire farm.

(6) Coordinating Federal, state and local resources to achieve common conservation goals and objectives relative to erosion reduction and wetland protection.

(b) Conservation easements. Conservation districts have the option to be designated by FmHA as the enforcement authority and/or management authority for conservation easements.

(c) Plan disapproval. If the conservation district disapproves a specific conservation plan, the conservation district is expected to state the reason(s) for the disapproval. The person can then develop and submit an amended conservation plan or request reconsideration of the original disapproved plan.

Subpart D - Responsibilities by Organizational Level

510.35(d)

(d) SCS approval. Where the conservation district refuses to carry out its approval responsibility on a specific category or group of conservation plans that SCS has determined meet FOTG requirements, SCS will approve these plans without requiring the person to use the appeal process.

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Subpart E - Detailed Procedures for  
Highly Erodible Land And Wetland Conservation Provisions

SUBPART E - DETAILED PROCEDURES FOR  
HIGHLY ERODIBLE LAND AND WETLAND CONSERVATION PROVISIONS

510.41(c)(2)

§510.40 USDA program assistance.

(a) When a person enrolls for any of the USDA programs listed in §510.14 after June 27, 1986, the program agency requires the person to initiate a Highly Erodible Land and Wetland Conservation Certification Form AD-1026 (Exhibit §516.01) at the local ASCS office.

(b) The person certifies on Form AD-1026 that the person is in full compliance with FSA. Also, the AD-1026 requires answering questions to determine if additional SCS determinations are required.

(c) ASCS will forward the Form AD-1026 to SCS for determinations of highly erodible land, wetland, and converted wetland and conversions of wetland to nonagricultural uses if the producer indicates such intention.

(d) Where the cropland in a county or a contiguous part of a county is all HEL, all non-HEL, or all non-wetland, the state conservationist may develop a method to reduce or avoid the need for individual determinations.

§510.41 Technical determination priority.

(a) Upon receipt of a Form AD-1026, SCS will enter information about it on a register such as Exhibit §516.02(a), and make a technical determination documented on Form SCS-CPA-026.

(b) The technical determination will be made in the office or onsite depending on the specific circumstances involved.

(c) The SCS order of priority for processing Form AD-1026 is:

(1) FmHA borrowers and FmHA inventory properties and where a program agency indicates that a determination is needed before the person can complete the certification;

(2) Persons who answer "Yes" to determination-related questions on Form AD-1026;

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

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510.41(c)(3)

(3) Persons for which ASCS specifically requests determinations for compliance checking;

(4) All other program participants; and

(5) Persons who are not USDA program participants. ASCS will issue a Form AD-1026 if requested by non-program participants. For non-program participants, SCS will make HEL or wetland determinations but no other FSA services are provided.

§510.42 Technical assistance.

(a) Purpose. SCS will schedule technical assistance as needed and requested to:

(1) Develop a conservation plan for highly erodible fields, and

(2) Apply the conservation practices contained in the plan to highly erodible fields.

(b) Conservation plans. SCS will assist persons to develop a conservation plan or revise an existing conservation plan as requested. Existing conservation systems are to be reviewed to determine if requirements of the FOTG are met for HEL fields.

(c) Conservation district cooperator. There is no requirement for persons requesting FSA assistance to become a conservation district cooperator; however, they are encouraged to consider becoming a conservation district cooperator.

(d) Assisting ASCS. SCS will assist ASCS by making wetland and HEL determinations on areas requested by ASCS.

(e) Assisting FmHA. SCS will complete wetland and HEL determinations when preparing conservation plans for FmHA easement farms. The U.S. Fish and Wildlife Service (FWS) will be consulted on wetland management concerns in the development of conservation plans for FmHA easement farms.

§510.43 Approval of conservation plans.

(a) Conservation plans are submitted by the district conservationist to the conservation district for review and approval.



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510.44(a)(2)

(1) The district conservationist certifies to the conservation district that the conservation plan conforms to FOTG criteria.

(2) Conservation district plan approval is based on the feasibility and practicality of the conservation plan and system and related considerations.

(3) Form SCS-CPA-027 will be used to inform ASCS of all conservation plans approved on HEL after January 1, 1990.

(b) SCS approves the conservation plan in the absence of a conservation district or on the refusal of a conservation district to accept FSA responsibilities. In these cases, SCS indicates on the conservation plan and in the remarks section of the Form SCS-CPA-027 that SCS approved the plan.

§510.44 Status reviews of conservation compliance plans.

(a) General. USDA program agencies (ASCS, FmHA, and FCIC) are responsible for ensuring that an AD-1026 is filed by the producer certifying FSA compliance before providing program benefits. SCS assists USDA program agencies in this determination by making status reviews of selected FSA conservation compliance plans.

(1) A necessary requirement for a status review is an understandable and implementable conservation plan that clearly states what, where, when, and how much is to be done. SCS needs to help the person understand the provisions of the conservation plan so that it can be implemented. Field office staffs are strongly encouraged to inform all participants of the need to apply practices as scheduled and to maintain existing practices.

(2) If the existing conservation compliance plan does not meet the requirements of §511.44(b), the first step on all plans selected for status review is to correct the deficiencies to meet the requirements of §511.44(b). Conservation compliance plans that meet requirements of §511.44(b) will be revised if needed according to §511.49.

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510.44(a)(3)

(3) In those cases where SCS is working with clients who have difficulty understanding written materials, SCS will make a reasonable effort to ensure that the person clearly understands what is expected so that the status review can be made on the basis of the person's full understanding of what is needed to meet active application requirements.

(b) Policy. Beginning with the 1990 calendar year, the district conservationist (DC) is responsible for making an annual status review of 5 percent of all tracts that have HEL and an approved conservation plan. The purpose of the status review is to determine whether or not persons are applying and maintaining conservation practices as specified in their approved conservation plan. Additionally, status reviews provide feedback to USDA agencies and the conservation district which helps evaluate whether the conservation objectives of FSA are being achieved. This status review policy is applicable to FSA conservation compliance plans only. However, conservation compliance plans may include fields that were initially planned under the sodbuster provision, and these fields will be included in the status review for the tracts selected.

(c) Selection of tracts for status review. Procedures for selecting tracts for the status review are as follows:

(1) By January 15 of each year, the DC will prepare a sequential listing, by tract number, of all the tracts with approved FSA conservation compliance plans for each county served by the field office. This list will then be numbered 1 through N. N will equal the total number of tracts with FSA conservation compliance plans. The list will be retained as part of the documentation of the status review. Exceptions can be made to the use of tracts for the status review list if ASCS has not established tract numbers.

(2) By February 1 of each year, the DC will select the specific tracts for which status reviews are to be made. Persons owning and/or operating the selected tracts will not be notified of the selection until an appointment is made for the status review. This selection is a 5 percent random sample from the list developed in §510.44(c)(1), using the national random number set developed specifically for each calendar year. The national random number set will be sent by NHQ to each state by January 15 of each year. SCS will ensure that at least 5 percent of FmHA borrowers tracts are selected for a status review.

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510.44(d)(1)

(3) In addition to the tracts selected at random for annual status reviews, all tracts owned or operated by SCS employees, ASCS state and county committee members and county executive directors who are USDA program participants are to be reviewed at least once between now and December 31, 1994. State conservationists are to develop a plan for accomplishing and monitoring this responsibility. NHQ is exploring developing a policy to require an annual self-certification disclosure statement for SCS employee farms and tracts. Additional guidance will follow as this policy is developed and cleared. A joint national release regarding ASCS employees will be issued by ASCS and SCS relative to status reviews.

(4) Tracts owned and/or operated by Federal, state, or local government employees involved in FSA implementation will have a status review each year if requested by the employing agency. Otherwise, such tracts will be part of the total tracts considered for the 5 percent random sample.

(5) SCS will conduct status reviews on tracts identified by ASCS or FmHA as potential violators. These status reviews are in addition to the required 5 percent, and will be requested by ASCS on Form ASCS-569. See §510.52 for instructions on SCS use of Form ASCS-569.

(6) SCS will respond to complaints made to SCS by persons and organizations by conducting a status review on the tract against which the complaint is made. SCS will ask the ASCS County Office to issue a Form ASCS-569 to SCS for the person and tract against whom the complaint is made. SCS employees need to be aware of their responsibilities with regard to potential compliance deficiencies as stated in §510.71 and §510.72.

(7) Status reviews will be scheduled so that each year's status reviews are completed by November 15. The state quality control plan should provide specific guidance as to when status reviews are to be conducted.

(d) Conducting the status review.

(1) No more than 30 days before SCS will conduct the status review, SCS will make an appointment with each person whose tract has been selected for a status review. The status review should be scheduled at a time that will provide the best opportunity to

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determine if the planned practice(s) has been applied. The person should be encouraged, but not required, to be present for the status review. It should be made clear to the person that the objective of the status review is to make a single determination for each tract of either:

(i) Actively applying the approved conservation plan, and/or using an approved conservation system, or

(ii) Not actively applying the approved conservation plan, and/or not using an approved conservation system.

(2) A separate distinct visit to the tract will be scheduled for the purpose of a complete status review. Technical assistance for plan modification, revision, or practice application assistance will not be provided during the visit to the tract until after the status review is completed.

(3) For each tract selected for a status review, SCS will determine if the tract contains HEL fields for which active application of the approved conservation plan is required, or HEL fields for which use of an approved conservation system is required (sodbusting situations), or if both situations exist on the tract.

(4) A field visit is required for a status review when the plan has a conservation practice or treatment scheduled for application prior to the time of the status review. A field visit made within the past three months is considered adequate for a status review if the case file contains adequate information on the status of application of the plan or system.

(5) The status review for each HEL field on each selected tract will consist of an onsite comparison of the actual application of conservation practices and treatments with the planned conservation practices and treatments documented in the approved conservation plan.

(6) For 1991 status reviews only, SCS will review the plan narrative prior to making the status review. If the narrative is determined to be unclear in terms of what is expected of the person or is technically inadequate, the plan will be revised and the status review scheduled for the next calendar year unless authorized

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510.44(d)(6)(i)(A)3.

otherwise in writing by the appropriate assistant chief. The person will not be adversely affected by this decision for the 1991 year, but is expected to comply with the revised plan in the following crop years. Conduct the status review for 1991 if the plan is determined to be clear and technically adequate. SCS will also recheck the HEL and wetland determinations applicable to the tract during the status review. The variances in paragraphs 3., 4., and 5. below apply only to conservation compliance fields, not to sodbuster fields.

(i) Each highly erodible field requiring active application of the approved conservation plan will be examined to determine the following:

(A) Are all required practices in place that are scheduled to be applied as of the date of the status review? Acceptable situations for each required practice to be considered as being actively applied or acceptable under a temporary variance for 1991 are as follows:

1. The planned practice is applied, or will be applied before the end of the calendar year, according to SCS standards and specifications, and the planned conservation treatment is applied according to Field Office Technical Guide (FOTG) requirements. If practices such as field borders, grassed waterways, or terraces will be applied later in the year, delay completion of the status review until later in the year.

2. An acceptable substitute practice or crop sequence that meets the requirements of the FOTG was applied prior to the time of the status review. In such cases, document the plan to indicate that an acceptable substitute practice was applied.

3. Conditions that were beyond the person's control prohibited the application of the required planned practice. These conditions tend to be weather-related, such as flood or drought, or are a result of a severe disease or pest infestation, and involve more than one farm in a region. Conditions must be severe and unusual (not routinely occurring). The state conservationist will determine if this variance applies and the region affected.

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510.44(d)(6)i)(A)4.

4. The impacts of not applying the planned practice were minimal in terms of not achieving the planned erosion reduction. Minimal impacts for 1991 means that application of all practices scheduled for 1991 has commenced and that those practices achieve at least 75% of the erosion reduction planned for 1991. For 1992, it means that at least 85% of the erosion reduction planned for 1992 is achieved, and for 1993 and 1994, 100% of the erosion reduction planned for those years is achieved.

5. An extreme personal hardship or an unusual occurrence exists that affects the farm operation. Extreme personal hardship means a severe physical condition or death of the farm operator or family member that prevents the application of the scheduled practice(s). Unusual occurrence includes destruction of a building or equipment by tornado, fire, or other similar situation to the extent that the person was prevented from applying the scheduled practices. The state conservationist will make the determination for each case where this variance is granted.

(B) Are all applied practices being properly operated and maintained?

(ii) Each highly erodible field requiring use of an approved conservation system will be examined to determine if the person is using an approved conservation system documented in the approved conservation plan. Using an approved conservation system means that all planned structural, supporting, and management practices and treatments are installed, operated, and maintained in accordance with the FOTG, and that the approved crop rotation is being used on each HEL field. If an HEL field requiring use of an approved conservation system is determined to have the system in use, future status reviews on that field will be for the purpose of determining if the conservation system is still in use.

(7) The district conservationist will use careful judgment in answering the above questions to determine whether the practice(s) and treatment(s) applied reasonably carry out the requirements of the conservation plan. The situation will be fully documented if there is any question as to whether the conservation plan is being actively applied or an approved conservation system is being used. See Exhibit §516.17 for a 1991 status review decision table.

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510.44(d)(12)(i)

(8) Any tract on which SCS determines that the person is actively applying the approved conservation plan because of a temporary variance granted under §510.44(d)(6)(i)(A)3., 4., or 5. is to have a status review in 1992. SCS may schedule followup assistance prior to the status review to help the person apply the practice(s) as planned and scheduled.

(9) If either 510.44(d)(6)(i)(A), or (B), is answered "No" for any HEL conservation compliance field, SCS will make a determination of "not actively applying the approved conservation plan". SCS will inform the person by letter of the determination, the reason for the determination, appeal rights, and that a report of "not actively applying the approved conservation plan" will be provided to ASCS after appeal rights are exercised or forfeited. Copies of this letter are to be provided to the conservation district, and as appropriate to FmHA and FCIC. See §516.15 for a sample letter.

(10) If the tract being reviewed contains HEL fields subject to sodbuster provisions an additional determination of "using or not using an approved conservation system" is required. If the person is not using an approved conservation system inform the person by letter as specified in paragraph 9 above, but indicate a report of "not using an approved conservation system" will be provided to ASCS. Distribute copies of letter as specified in paragraph (9). See §516.16 for a sample letter.

(11) After SCS has informed a person by letter that SCS has determined that the person is "not actively applying the approved conservation plan" or "not using an approved conservation system" on one or more tracts, SCS will ask the ASCS County Office to issue a Form ASCS-569 to SCS for the tract(s) and person(s) involved. This provides SCS with a specific document to inform ASCS of the final determination at the appropriate time, and provides the ASCS office with notice that the person is potentially not actively applying the approved conservation plan and/or not using an approved conservation system. §510.52 gives detailed guidance on SCS use of Form ASCS-569.

(12) When the appeal process has been completed, SCS will use Form ASCS-569 to report to ASCS a final determination. The appeal process is completed when:

(i) The person has not made an initial appeal within 45 days of receipt of the determination notification, or

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510.44(d)(12)(ii)

(ii) The person has not appealed to the next level within 45 days of receipt of the decision on the previous appeal, or

(iii) A decision is made in response to an appeal that reverses the determination of "not actively applying the approved conservation plan" or "not using an approved conservation system," or

(iv) A final decision has been made on the appeal by the Chief of SCS.

(13) If in the course of an annual status review a significant number of persons in a county are found to be "not actively applying the approved conservation plan," or "not using an approved conservation system," additional status reviews are required. The state conservationist will determine what is a significant number considering the summary of status reviews for the entire state and National averages, and specify the number of additional status reviews required.

(e) Recording. Status review findings will be documented in the participant's case file in CAMPS or on Form SCS-CPA-6, SCS-LTP-013, or similar documents. The entry should begin with "status review, calendar year 199\_", followed by a thorough documentation of the findings, the date of the status review, and the initials of the person making the status review.

(f) Appeals. Persons determined to be "not actively applying the approved conservation plan" or "not using an approved conservation system" as a result of an SCS status review may appeal that determination to SCS in writing through existing FSA appeal procedures (NFSAM Part 510, Subpart H), stating why the person does not agree with the determination.

(g) ASCS responsibility. ASCS will use completed Forms ASCS-569 that report SCS status review determinations that a field does not meet the requirements of the HELC provisions to make determinations of FSA noncompliance for USDA program participants. ASCS will notify other agencies regarding ineligible producers.



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510.44(h)(3)

(h) Reports.

(1) A status review data base will be compiled by the state conservationist and monitored frequently to determine if status reviews are being completed in a timely manner. The data base format will be prescribed by the NHQ. The data base will contain:

(i) The number of status reviews made during the calendar year.

(ii) The number of tracts determined to be:

(A) Actively applying the approved conservation plan and/or using an approved conservation system as a result of installing and maintaining the planned or substitute practices.

(B) Actively applying the approved conservation plan because conditions beyond the person's control prevented the application of one or more planned practices.

(C) Actively applying the approved conservation plan because the impacts of not properly applying the planned practice were minimal in not achieving the planned erosion reduction.

(D) Actively applying the approved conservation plan because an extreme personal hardship of the operator or an unusual occurrence affected the farm operation to the extent that it prevented application of one or more planned practices.

(E) Not actively applying the approved conservation plan and/or not using an approved conservation system, indicating the principal reasons for persons not actively applying the approved conservation plan and/or not using an approved conservation system.

(2) The state conservationist will provide for at least quarterly reviews of the progress in accomplishing data base items.

(3) The state conservationist will prepare a state narrative status review report describing successes, problems and any concerns relative to status reviews and submit it and the finalized data base to the Director of the Conservation Planning Division by January 15 of the following year, with a copy to the NTC Director.

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## Part 510 - General Operating Procedures

510.45

§510.45 Certification of actively applying an approved conservation plan and/or using an approved conservation system.

(a) After January 1, 1990, a person applying for USDA program benefits is required to certify annually to ASCS on a current Form AD-1026 that a conservation plan is being actively applied to the land as scheduled, and/or that the person is using an approved conservation system.

(b) When a person purchases or rents an additional tract, ASCS informs the person of the existence of HEL and the status of the conservation plan for the tract. ASCS encourages the person to contact SCS regarding the adoption and application of the plan. The person must file a revised AD-1026 with ASCS to include the additional land.

(c) A plan developed by the previous producer continues in effect unless the new producer prepares an approved revised plan.

(d) It is the responsibility of the person to file a revised AD-1026 and inform SCS of the purchase or rental of a new tract. SCS is not obligated to make the initial effort to contact the new owner or operator of a tract.

§510.46 Use of Form AD-1026.

(a) A person who applies for benefits under any of the USDA programs listed under §510.14(a) after June 27, 1986, must complete Form AD-1026 (Exhibit §516.01) at the ASCS county office. Non-program participants who desire an HEL or wetland determination may complete a Form AD-1026 at the ASCS county office.

(b) A new Form AD-1026 is to be completed at the ASCS county office whenever a person plans any change in the farm operation.

§510.47 ASCS processing of Form AD-1026.

(a) ASCS will assure that all blocks on the Form AD-1026 are completed and the person signed the form.

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510.48(c)(2)(i)

(b) If any of the determination questions on the Form AD-1026 are answered "yes," ASCS will send SCS a copy of the completed Form AD-1026 together with 3 photocopies of the aerial photograph of the farms or tracts. All fields without cropping history during 1981 through 1985 for which determinations are needed will be marked with an "X" on the photocopies of the aerial photographs. All fields with cropping history during 1981 through 1985 for which determinations are needed will be marked with a "/" on the photocopies of the aerial photographs.

§510.48 SCS servicing of requests for determinations.

(a) SCS will date the Form AD-1026 when it is received from ASCS, log it into a tracking register, and assign it to a priority category as specified in §510.41(c). Forms AD-1026 may be sequentially numbered for purposes of tracking if needed.

(b) FmHA. If the Form AD-1026 is for an FmHA inventory farm or FmHA borrower land, HEL and wetland determinations will be made for all crop fields marked with a "✓" or an "X" within 45 calendar days of receipt. Also, for all non-cropland areas, SCS will determine the presence or absence of highly erodible and hydric soil map units.

(c) FmHA inventory farms. Section 1314 of the FSA of 1985 requires FmHA to secure the services of SCS on all farms held in FmHA inventory to:

(1) Identify all highly erodible cropland fields, all cropland that is wetland or converted wetland, and for non-cropland fields, the presence or absence of highly erodible and hydric soil map units.

(2) Prepare a set of recommendations or a conservation plan that, as a minimum, protects the highly erodible cropland fields and wetlands. For FmHA inventory farms, SCS should include the following recommendations:

(i) Where highly erodible cropland fields are now in permanent protective vegetation, maintain the vegetation as part of the lease, and possibly make a condition of the sale that the vegetation be maintained.

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510.48(c)(2)(ii)

(ii) Where highly erodible cropland fields are currently being cropped, seed these fields to permanent vegetation, and maintain this cover to provide protection from erosion.

(iii) Where it is necessary to produce crops on highly erodible cropland fields, require that this land be cropped according to an approved conservation system.

(3) Decisionmakers for FmHA inventory properties.

(i) On FmHA inventory property that will not be sold or leased during the current year, the decisionmaker is the FmHA county supervisor.

(ii) On FmHA inventory farms that are or will be leased, the decisionmaker is FmHA and the lessee jointly.

(iii) On FmHA inventory farms that are sold, the decisionmaker is the new owner.

(d) FmHA borrowers' farms. The following guidelines apply to FmHA borrowers' farms:

(1) HEL and wetland determinations on FmHA borrowers' lands are to be made according to §510.48(c)(1).

(2) If there is insufficient time to develop a conservation plan for the highly erodible cropland, SCS will provide information to the FmHA County Supervisor that will indicate whether the implementation of the anticipated conservation plan will be low-, medium-, or high-cost relative to other conservation plans in the county. (See FmHA AN No. 1689, dated December 10, 1987.) The conservation plan will become part of the terms of FmHA long-term loan(s).

(e) HEL and wetland determinations.

(1) When Form AD-1026 contains a "yes" answer to one or more determination questions, SCS will make an HEL and a wetland determination for those fields indicated by an "X". If SCS has previously completed a determination for a field, SCS will not make another determination for the same field unless there is evidence that the conditions on which the original determination was based have changed.

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510.48(f)(2)

(2) An office determination is to be made within 15 calendar days, or an onsite determination within 60 calendar days unless weather conditions do not permit, in which case the determinations will be made as soon as practical. HEL determinations in a sodbusting situation are made with best available soil information.

(f) Others. If Form AD-1026 has a "no" answer to all determination questions, SCS will make an HEL and wetland determination within the established priority system but not necessarily at the same time. A highly erodible determination will be made for all cropland fields marked with a "/" or an "X." A wetland determination will be made for the cropland and potential cropland adjacent to cropland fields on the farm.

(1) SCS may make a wetland determination for the entire farm if requested by the person. If a large part of a farm is in woodland or rangeland with a low potential for conversion to cropland, the district conservationist should make a wetland determination for all cropland and potential cropland adjacent to cropland fields on the farm. If the decision is not to make a wetland determination on the remainder of the woodland or rangeland area, the following items must be done:

(i) A determination is made for all cropland and potential cropland adjacent to cropland areas;

(ii) The area to be excluded from the wetland determination must be outlined on the aerial photograph and a note entered, "wetland determination not made for this area";

(iii) A note is entered in the remarks section of the Form SCS-CPA-026 that a wetland determination was not made for the area outlined on the aerial photograph; and

(iv) The farmer is informed that a request for a wetland determination should be made for an area that is being converted to cropland on which a wetland determination was not made.

(2) All persons who plan to maintain, improve, or alter a drainage system are expected to indicate this intent on Form AD-1026 each time they plan to maintain, improve, or alter a drainage system.

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510.48(f)(3)

(3) Persons who plan to alter a wet area are responsible for contacting SCS well in advance of the intended alteration to enable SCS to make a wetland determination prior to the time the alteration activities are planned.

§510.49 Form SCS-CPA-026.

(a) SCS will use Form SCS-CPA-026 to record the results of the determination requested on Form AD-1026. (See Exhibit §516.03)

(1) SCS will complete a Form SCS-CPA-026 for each tract on which highly erodible field or wetland determinations are made. SCS will use Forms SCS-CPA-026 and SCS-CPA-026A to provide information to ASCS and the person on the results of the determinations made.

(2) SCS will make as many office determinations as possible for HEL, wetland, or converted wetland.

(3) SCS will record the results of each determination on the photocopies of the aerial photographs and on Form SCS-CPA-026.

(4) SCS will indicate determinations on aerial photographs using the labels in 516.21.

(5) After SCS has completed the Form SCS-CPA-026 for each tract identified on the Form AD-1026, SCS will send the ASCS copy of the Form SCS-CPA-026 and one aerial photocopy for each tract for which a determination was made to the ASCS office.

(6) SCS will provide a copy of the SCS-CPA-026 and an aerial photocopy that shows the field determinations to the person who signed the Form AD-1026 (as well as the landowner where ASCS provides the name and address) and inform the person of the need to develop a conservation plan for any highly erodible cropland fields identified on Form SCS-CPA-026. See Exhibit §516.04 for a sample letter of transmittal.

(7) SCS will maintain one copy of the Form SCS-CPA-026, the aerial photocopy containing determinations, and the SCS copy of the Form AD-1026 in the case file for the tract.

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(b) Checking information.

(1) Before completing Form SCS-CPA-026, the district conservationist ensures that:

(i) Three ASCS aerial photocopies for each farm number listed on the Form AD-1026 have been transmitted to SCS.

(ii) ASCS has placed a "/" or an "X" on all crop fields for which a determination is needed.

(iii) Each aerial photocopy has the ASCS tract number, the field boundaries, the field number, and the field acres clearly entered for each field that is identified with a "/" or an "X".

(2) If any of the above items are missing or incomplete, the District Conservationist will request ASCS to furnish the missing information. SCS will not service the Form AD-1026 request until all of the needed materials and information have been furnished by ASCS.

§510.50 Instructions for completing Form SCS-CPA-026.

(a) Information for Items 1 through 5 is obtained from the Form AD-1026 provided to SCS. Specific entries for each item on the Form SCS-CPA-026 (6-91 revision) are to be made as follows:

Item 1: Enter the name and address of the person shown on Form AD-1026.

Item 2: Enter the date the Form AD-1026 was received in the SCS office.

Item 3: Enter the name of the county in which the farm is located. ASCS will send a Form AD-1026 to any other county for tracts the person operates in that county.

Item 4: Enter the name of the agency or person requesting the determination if different from the entry in item 1.

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- Item 5: Enter the ASCS farm number and the tract number. Only one tract number is to be entered on each Form SCS-CPA-026. If the farm has more than one tract, use additional Forms SCS-CPA-026 or Forms SCS-CPA-026A (continuation sheet). If several tracts included on one Form AD-1026 are all non-HEL and non-wetland, they can be combined on one Form SCS-CPA-026.

Section I - HIGHLY ERODIBLE LAND

- Item 6: Check "yes" or "no" regarding soil survey availability for at least part of the tract. If "yes," continue to complete all appropriate blocks. If "no," go to Section II unless the request is for sodbusting or FmHA, in which case a determination will be made based on the best available information. See §510.48(c).
- Item 7: For those areas of the tract having a soil survey, check "yes" or "no." If "yes," proceed to Items 8 and 9. (See §511.23 for criteria on highly erodible soil map units.) If "no," go to Section II.
- Item 8: Of the fields identified with a "/" on the ASCS photocopy, list the field numbers of those fields that are highly erodible, and the total acres in those fields. Mark "HEL" on each such field on each aerial photocopy. Include on this line any acreages of highly erodible fields on this tract that are included on any attached Form SCS-CPA-026A. See §511.33 for determining highly erodible fields.
- Item 9: Of the fields marked with an "X" on the ASCS photocopy, list the field numbers of those fields that are highly erodible, and the total acres in those fields. Mark "HEL" on each such field on each aerial photocopy. Include on this line any acreages of highly erodible fields on this tract that are identified on any attached Forms SCS-CPA-026A. See §511.33 for determining highly erodible fields.
- Item 10: Enter a mark in the appropriate box to document whether this HEL determination was made in the office or in the field.



SECTION II - WETLAND

- Item 11: For those tracts having a soil survey, check "yes" or "no" for the existence of hydric soils or hydric inclusions on this tract. If "yes" is checked, proceed to Item 12 below. Enter in the space provided the field numbers that apply and the acreage of the wetland condition. (Refer to Part 512, Subpart B for wetland determination criteria.) If "no," skip to Item 27. If neither "yes" nor "no" is checked, state the reason in the remarks section so that it is clear that this item was deliberately left incomplete.
- Item 12: Outline the wetland areas within the fields on the ASCS photocopies. Mark with "W" for natural wetland and "FW" for farmed wetland or FWP (Farmed Wetlands Pasture). List in the spaces provided the field number(s) of the fields and total acreage of wetlands that have been outlined.
- Item 13: Place "PC" (prior conversion) on those wetland fields or wetland parts of fields that were converted prior to December 23, 1985. Note: SCS may elect to place "PC" for an entire field to avoid having to outline the PC areas in detail. This will not effect the abandonment policy since only those areas that meet the wetland criteria will be considered wetland if abandoned. If a field contains both hydric and nonhydric soils, the district conservationist may place "PC and NW" in the field to note that the field contains both prior converted cropland and nonwetlands.
- Item 14: Outline the artificial wetland areas within the fields on the ASCS photocopies; mark those areas with "AW" for artificial and irrigation-induced wetland; and list in the spaces provided the numbers of the fields where the artificial wetland areas have been outlined.
- Item 15: Outline the areas within the fields on the ASCS photocopies that have been granted a minimal effect determination by SCS and mark with "MW." List in the space provided the field numbers and total acreage of minimal effect converted wetland outlined.

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- Item 16: List the field numbers and acres of the wetland that was converted but have been mitigated. In the Remarks section indicate the location and acres of the mitigated area that has been restored and is protected by an easement.
- Item 17: List the field numbers and acres and year of restoration for any restored wetland that was previously in violation because of conversion after 1990 or because of the planting of an agricultural commodity or forage crop on an area converted between December 23, 1985, and November 28, 1990.
- Item 18: List the field numbers and acres of wetlands that were converted between December 23, 1985, and November 28, 1990, and subsequently restored, on which no violation occurred.
- Item 19: List the field numbers and acres of wetlands converted under an agreement approved before the conversion and replaced at another site. In the Remarks section indicate the location and acres of the wetland that was restored to replace this converted wetland.
- Item 20: List the field numbers and acres of wetlands on which a violation occurred that were determined by ASCS to be in good faith and have been restored. Indicate the year of restoration.
- Item 21: Wetlands that were converted between December 23, 1985, and November 28, 1990, should be outlined on the ASCS photocopies and marked "CW" for converted wetland. List these field numbers and total acreage of converted wetland that have been outlined in the spaces provided. Inform persons of the penalties for producing agricultural commodities on converted wetland.
- Item 22: List the field numbers and acres of converted wetlands that were converted or discovered after November 28, 1990. Outline the areas on the ASCS photocopies and mark them "CW + year." Inform persons of the penalties related to conversions after November 28, 1990.

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- Item 23: List the field numbers and acres of wetlands that were converted for the non-agricultural uses listed (no other uses) under an agreement approved before the conversion.
- Item 24: List the field numbers and acres of wetlands that were converted as a result of an incorrect determination by SCS.
- Item 25: Enter the appropriate field number(s) in the space provided. The planned alteration measures on wetlands in fields (as listed) are considered to be maintenance and are in compliance with FSA.
- Item 26: Enter the appropriate field numbers in the space provided. If the planned alteration measures on wetlands in fields (as listed) are not considered to be maintenance, inform the person that if the planned measures are installed the area will become a converted wetland (CW + year).
- Item 27: Enter a mark in the appropriate box to document whether this wetland determination was made in the office or in the field. Enter a mark in the appropriate box to document that this determination was delivered, or mailed, to the person, and enter the date that this action took place.
- Item 28: Enter any needed remarks in this section that will help the person, another agency, or another SCS employee understand the situation that concerns this HEL and/or wetland determination. If it is necessary for FmHA or other valid requests to identify highly erodible or hydric map units on non-crop areas, this information can be entered in the remarks section.
- Item 30: The district conservationist's (DC) signature certifies that this was an official SCS determination of the HEL and wetland conditions identified in Sections I and II.
- Item 31: Enter the date that the DC signed the form.

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§510.51 Instructions for completing Form SCS-CPA-027.

(a) Use. Prior to January 1, 1990, the use of Form SCS-CPA-027 was optional with the states, except for sodbusting situations. After January 1, 1990, the form will be used to inform ASCS that an approved conservation plan has been developed on one or more highly erodible fields. Several Forms SCS-CPA-027 may be needed to cover all of the tracts and/or fields over a period of time.

(b) Specific entries for each item on the Form SCS-CPA-027 are to be made as follows:

Item 1: Enter the name and address of the person shown on Form AD-1026 for which the conservation plan is developed.

Item 2: Enter the ASCS farm number.

Item 3: Enter the name of the county where the farm is located.

Item 4: Enter the number of the tract on which one or more fields have an approved conservation plan. Use a separate line for each tract or field as needed.

Item 5: Enter the field number(s) that have an approved conservation plan.

Item 6: Enter the total acres in the field(s) in the tract identified in Item 4 that have an approved conservation plan.

Item 7: Enter the date that the plan for the identified tract was approved by the conservation district or representative.

Item 8: If applicable for sodbusting situations, enter the date that the planned conservation system was applied for the tract. This column is not needed in normal circumstances since ASCS will assume that the person is using the conservation system unless SCS informs ASCS otherwise.

Items 9 and 10: Enter any applicable remarks that are specific to any line entry or to the entire farm.

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Item 11: Enter the district conservationist's signature in this space to document that a conservation plan has been developed for the HEL cropland fields listed in Item 5 and that the plan is in conformance with the FOTG and has been approved by the conservation district. If a date is entered in Item 8 for any fields or tracts, the district conservationist's signature documents that the conservation system and the conservation practices contained in the conservation system meet FOTG requirements.

Item 12: Enter the date the district conservationist signed the form.

§510.52 Instructions for SCS use of Form ASCS-569.

(a) The purpose of Form ASCS-569 (Exhibit 516.18) is to provide a means of transmitting information between ASCS and SCS regarding potential and actual non-compliance situations.

(b) ASCS will issue Form ASCS-569 to SCS in the following circumstances:

(1) When ASCS learns of a potential violation, and ASCS requires a technical determination from SCS. ASCS may learn of a potential violation from:

(i) A complaint made by a person,

(ii) An ASCS finding that:

(A) An area previously determined to be wetland appears to have been manipulated, or

(B) An area not cropped during the 1981 through 1985 period appears to have an agricultural commodity planted on it.

(C) An area for which an HEL determination has not been made has an agricultural commodity planted on it.

(2) When SCS requests ASCS to issue the form because SCS:

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(i) Has made a determination on a tract of "not actively applying the approved conservation plan" and/or "not using an approved conservation system."

(ii) Has observed a potential HEL or wetland violation.

(iii) Needs the form to respond to a complaint.

(c) ASCS will complete Part A of the Form ASCS-569, attach pertinent aerial photocopies, identify applicable field(s) or area(s) with a red "X," and issue the Form ASCS-569 and attachments to SCS.

(1) If the field(s) or area(s) on which the potential violation is noted have not had an HEL or wetland determination made as a result of an existing Form AD-1026, SCS will make an HEL and wetland determination as part of the SCS response to Form ASCS-569.

(2) ASCS will indicate in item 6 of Part A whether the Form ASCS-569 is for (A) an HELC compliance determination, (B) a wetland classification on land that was planted to an agricultural commodity, or (C) a determination that an area is a wetland that was converted after November 28, 1990.

(d) SCS will complete Part B of the Form ASCS-569, entering the date the potential violation was reviewed in the space provided, and:

(1) For HEL (Item 6A),

(i) Place an "X" in the block identifying "The field does NOT meet the requirements of the HELC provisions" if the SCS determination is that "The person is NOT actively applying the approved conservation plan, or is NOT using an approved conservation system" on the field for which the determination was requested, and enter the date the person's appeal rights with SCS ended, or

(ii) Place an "X" in the block identifying "The field meets the requirements of the HELC provisions" if the SCS determination is that "The person is actively applying the approved conservation plan, or is using an approved conservation system" on the field for which the determination was requested.

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(2) For wetland (Item 6B),

(i) Place an "X" in the block identifying "The area identified is a CW" if that is the determination for ANY wetland in the field or area for which the determination was requested, and enter the date the person's appeal rights with SCS ended, or

(ii) Place an "X" in the block identifying "The area identified is NOT a CW" if that is the determination for ALL wetlands in the field or area for which the determination was requested.

(3) For wetland (Item 6C),

(i) Place an "X" in the block identifying "The area identified is a wetland that was converted after 11/28/90" if that is the determination for ANY wetland in the field or area for which the determination was requested, and enter the date the person's appeal rights with SCS ended, or

(ii) Place an "X" in the block identifying "The area identified is NOT a wetland that was converted after 11/28/90" if that is the determination for ALL wetlands in the field or area for which the determination was requested.

(4) The district conservationist will sign and date the Form ASCS-569 after the person's appeal rights with SCS ended, and then send the ASCS copy of the form to the ASCS office.

(i) Keep the SCS copy in the case file for the land unit involved if the Form ASCS-569 was generated as a result of an ASCS or an SCS request.

(ii) Keep the SCS copy of the Form ASCS-569 in the "Report of Possible Violations" file if the form was initiated as a result of a complaint or a report from a confidential source. See §510.72.

510.53 Good Faith Exemptions - HEL

(a) A person who inadvertently violates the conservation compliance provision is eligible for a reduced penalty no more often than once in five years. Inadvertent means without intent to violate

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(accidentally or unintentional) and acting in good faith to comply. The graduated sanction provision provides that the penalty shall be a reduction in program benefits of no less than \$500 and no more than \$5000, depending upon the severity of the violation. This provision does not apply to sodbusted land.

(b) SCS will help ASCS determine the severity of the violation. ASCS and SCS have established a table of penalties based on the seriousness of the violation and the size of the field in violation. ASCS will determine the size of the field in violation. SCS will determine whether the violation is in a low, medium, or high severity category, based on the Erodibility Index (EI) of the field in violation.

(c) ASCS will determine whether the person made a good faith effort. SCS will be asked to help the County ASC Committee determine whether the failure of the person to actively apply the approved conservation plan was inadvertent or accidental. Note that this does not apply to situations where the person is required to be using an approved conservation system.

(d) ASCS will maintain records of persons given graduated sanctions to ensure that the once-in-five years rule is followed.

(e) SCS will determine the Erodibility Index (EI) of the field in violation. This determination will be made only after SCS has completed a Form ASCS-569 and transmitted it to ASCS with an "X" in the block identifying that the person is NOT actively applying the approved conservation plan, and after ASCS has notified SCS that ASCS has determined that the graduated sanction applies to this case because ASCS has determined that the person acted in good faith and that the person is eligible under the 5-year rule. The EI for a field will be determined by identifying the EI for the predominant soil map unit in the field. The predominant soil map unit in a field is the soil map unit that has the greatest acreage within the field. If there is no soil map unit that clearly has the largest acreage within the field, a weighted average EI will be calculated for the two largest soil map units within the field. The EI for the field will not be a weighted average of all soils map units within the field, because fields with many soil map units will require detailed calculations that may be subject to error.



Subpart F - Files, Records, and Reports

SUBPART F - FILES, RECORDS, AND REPORTS

510.61(c)

510.60 Files.

The SCS Records Guide (GM 120 - Part 408) applies to FSA documentation.

(a) A case file folder is to be made for every Form AD-1026 received where HEL is determined, or if the person has answered "yes" to HEL or wetland items on the Form AD-1026. Alternately, case files may be established by ASCS farm number or tract number, and the Form AD-1026 filed in a separate alphabetical file.

(b) A case file may also be initiated as a result of a non-USDA participant's request for an HEL or wetland determination.

(c) Negative HEL and wetland determinations and related supporting data may be filed in one file folder that is labeled "Form AD-1026 determinations not requiring follow up."

(d) More than one completed Form SCS-CPA-026 and conservation plan, based on combinations of farm ownership and/or tracts may be developed and filed in the case file.

510.61 Case file documentation.

Contents of case file. The following items are to be maintained in the SCS case file, preferably in CAMPS, to provide a basis for SCS determinations, for use in follow up activities, and to use in responding to requests for reconsideration and appeals:

(a) Highly Erodible Land and Wetland Conservation Certification, Form AD-1026;

(b) Forms SCS-CPA-026, SCS-CPA-026a, SCS-CPA-027, and other items documenting the determinations, approved conservation plans, fully applied conservation systems, status reviews, and adequacy of plan documents;

(c) ASCS aerial photocopies that indicate farm location, tracts, field boundaries of the cropland, designated areas as outlined in 510.49(a)(4);

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- (d) Predicted erosion rates on HEL cropland before and after treatment;
- (e) Worksheets, maps, lists, calculations, soils information, and other documentation for making determinations;
- (f) The conservation plan;
- (g) Conservation assistance notes recorded on SCS-CPA-6, including a statement that a Basic Conservation System (BCS) was discussed when the person decided to use an Alternative Conservation System (ACS);
- (h) Environmental evaluations and assessments including cultural resource considerations required for determining minimal effect;
- (i) Documentation of reconsiderations and appeal decisions, including consultation with Fish and Wildlife Service (FWS) and related records; and
- (j) Other related information, data, or correspondence.

510.62 Records.

- (a) Field offices are to maintain case files to fully document technical determinations, appeal decisions, and reports requested by National Headquarters or state offices, and to maintain efficient field office management.
- (b) An FSA tracking record as provided in CAMPS 1.3 or later versions, a manual record as shown in 6516.02, or other suitable record is to be maintained as a cross reference to the case files.
- (c) Case files are maintained according to the SCS Records Guide, 120-408. Forms AD-1026 and SCS CPA-026 are maintained for 13 years after superseded.
- (d) FSA appeals are maintained at the highest level the appeal reached (field, area, state, or national). Appeal files are maintained for 6 years after date of final decision or after date of adjudication by a court if applicable.

510.63 Reports.

Progress is reported in accordance with the SCS National Reporting Codes Handbook using the codes in 510.64.

510.64 Progress Reporting Codes for FSA.

170 Farms or Tracts With No Highly Erodible Fields

Number of farms or tracts if appropriate that have no highly erodible fields. This code is reported independently of any wetland determinations. Report with status code.

171 Farms or Tracts With Highly Erodible Fields

Number of farms or tracts if appropriate and the acreage of the fields subject to the Food Security Act. Report the "number" portion of this code after all Highly Erodible Land (HEL) determinations have been made on that farm or tract. If determinations of only a portion of the farm or tract are made, report only the acres determined to be HEL. For efficiency, we encourage whole farm or tract determinations, but a sobdusting situation or Conservation Resource Planning situation may dictate doing a partial farm evaluation for HEL. Report with status code.

172 Farms With Approved Conservation System Applied

Before a code 172 is reportable, a code 173 must have been reported previously or will be reported simultaneously on this farm, tract, or the HEL field. Report the number of farms or tracts if appropriate with conservation systems applied on fields identified as HEL that meet SCS technical guide requirements. Acres under CRP that are on lands meeting the HEL definition are to be reported under this code after the contract has been implemented. Report acreage as systems are applied on HEL fields. Report the number only once per farm or tract if appropriate, after all of the HEL fields have systems applied. Report with a status code.

173 Farms or Tracts With Approved Conservation Plan

Number of farms or tracts if appropriate with a conservation plan on fields that have been identified as HEL, that have been approved by the Conservation District and/or SCS and the acreage of the fields covered by the plan. Report the acreage as HEL fields are planned. Report the "number" only once per farm or tract if appropriate after all the HEL fields have been planned. Acres under CRP that are on lands meeting the HEL definition are to be reported under this code.

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174 Positive Wetlands - No. and Acres (W) (FW) (FWP)

Farms on which wetlands, farmed wetlands, or farmed pasture and hayland wetlands are found. Report the total number of farms and total acres of wetlands on the farm.

175 Converted Wetland - No. and Acres (CW)

Farms on which wetlands were converted between December 23, 1985 and November 28, 1990. Report number of farms and acres converted.

176 Minimal Effects - No. and Acres (MW)

Farms on which a minimal effects exemption has been granted. Report the number of farms and acres.

177 Negative Wetlands - No.

Farms on which a completed determination was made according to policy and a wetland was not found. Report the number of farms.

178 Good Faith Wetlands - No and Acres (GFW + Year)

Farms on which ASCS has granted a good faith exemption, and the person has signed an agreement to restore the wetland. Report the numbers of farms and acres

179 Mitigation Wetlands - No. and Acres (MW)

Farms on which a person is actively mitigating a frequently cropped wetland or a wetland converted between December 23, 1985 and November 28, 1990. Report the number of farms and acres.

180 Restored Wetlands with Violation - No. and Acres (RVW + Year)

Report the number of farms on which a wetland has been restored that was in violation as result of conversion after November 28, 1990, or the planting of an agricultural commodity. Show the year of restoration. Report the number of acres restored.

181 Restored Wetlands no Violation - No. and Acres (RSW + Year)

Report the number of farms and acres on which a wetland converted between December 23, 1985, and November 28, 1990 was restored.

182 Replacement of Wetland Values - No. and Acres (RPW)

Farms on which wetlands that are not frequently cropped are converted for purposes other than to increase production, where the wetland values are being replaced at a second site. Report the number of farms and acres.

183 Converted Wetland Non-Agricultural - No. and Acres (CWNA)  
Report the number of farms and acres on which a wetland will be converted for trees, shrubs, agricultural, roads, buildings, or other non-agricultural uses that are approved in advance.

184 Converted Wetlands Technical Error - No. and Acres (CWTE)  
Report the number of farms on which a wetland was converted as a result of misinformation from SCS. Report the number of farms and acres.

185 Converted Wetlands converted after November 28, 1990. (CW + Year) - No. and Acres - Report the number of farms on which wetlands were converted after November 28, 1990.

186 Wetland Appeals at Field Office - No.  
Report the number of farms on which a person has requested a formal reconsideration to start the appeal process at the field office level.

187 Wetland Appeals at Area Office - No. -  
Report the number of farms on which appeal has been field at the area office level.

188 Wetland Appeals at the State Office Level - No. -  
Report the number of farms on which an appeal has been filed at the state office level.

510.65 Incorrect conservation plan.

If a conservation plan is developed by a person for FSA purposes and is approved by the conservation district, and then later the plan is found to be technically incorrect:

(a) SCS will explain to the person and the conservation district why the plan is incorrect and help the person develop a new conservation plan for conservation district approval.

(b) SCS will inform ASCS by letter that the conservation plan can no longer be used for FSA compliance purposes. A conservation plan that meets conservation compliance requirements must be developed before the next crop year.

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510.66

510.66 Prohibitions.

SCS employees are prohibited from making any FSA technical determinations on lands which they, their spouse, any direct relative, or business associate have an interest. Form SCS-CPA-001 is used to identify SCS employee farms.

Subpart G - Quality Control

SUBPART G - QUALITY CONTROL

510.70(c)(4)

§510.70 Quality control.

(a) State conservationists are responsible for implementing quality control procedures consistent with policy contained in GM 330-405.3 and for making certain that all aspects of SCS technical assistance provided under FSA provisions meet SCS criteria and standards. The purpose of FSA quality control is to assess the performance of SCS in carrying out FSA duties. These quality control procedures are in addition to GM 330-405.3, and are intended to monitor quality of SCS FSA work only.

(b) State conservationists will develop a quality control plan for the state, approved by the assistant chief, that provides for periodic, adequate assessment of positive and negative determinations, and of conservation plan quality, implementability, and feasibility. The quality control plan will generally state how the state conservationist expects quality control activities for FSA to happen in addition to GM requirements. The quality control plan will provide for quality control review of an adequate number of the tracts that were selected for the annual status review to cover FSA HEL, wetland, and CRP determinations, status reviews, conservation plans approved, conservation plans revised, and conservation systems applied. Quality control reviews will be made by persons from outside the field office being reviewed. The specific tracts to be used for the state quality control review will be selected by NHQ from among the tracts selected for the field office status review.

(c) The state conservationist will specifically assign the state quality control function in writing to one or more members of the state staff. This assignment includes the following:

(1) Reports to and advises the state conservationist on concerns relating to FSA quality control, status reviews, training needs, and efforts to prevent fraud, waste, and abuse.

(2) Manages status reviews and quality control activities related to FSA within the state.

(3) Develops and maintains a tracking system of status reviews and quality control activities related to FSA in the state.

(4) Ensures that the national random number set is used for selecting tracts for status reviews in each county in the state.

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510.70(c)(5)

(5) Maintains, analyzes, and monitors all quality control and status review reports prepared at all levels within the state.

(6) Conducts oversight reviews of all quality control activities, status reviews, and prevention of fraud, waste, and abuse efforts within the state. If fraud is found, checks related work.

(7) Provides guidance to field offices on release of FSA information under the Freedom of Information Act (FOIA) and Privacy Act in conjunction with the state FOIA officer.

(8) Provides recommendations on need for training or change in procedures that result from quality control and status reviews.

(9) Assures that USDA policy on servicing FSA appeals is followed.

(10) Assures that USDA policy on servicing complaints is followed, and field checks a sample of reported complaints after SCS completes the response to the complaint.

(11) Reviews state and area level appeals to assure that quality and compliance requirements are met.

(12) Maintains a list of SCS employees who own and/or operate farms or farm-related businesses in the state.

(13) Assists the state conservationist in assuring that FSA deficiencies that are documented in inspection, appraisal, or quality control reports are corrected.

(d) Each area conservationist will assign similar quality control functions in writing to a member of the area staff.

(e) Within-state quality control reviews shall be conducted throughout the year. State conservationists may request NTC and NHQ staff assistance to participate in state quality control reviews.

(f) A sample of the tracts selected each year in each state for the state quality control review will be selected for the national compliance control review conducted by NHQ. National Technical Center (NTC) directors and NTC staff members will conduct the national compliance control review as assigned by the assistant chief in consultation with the Deputy Chief for Programs. All national compliance control review data will be collected by the Director of the Conservation Planning Division.



(g) All FSA determinations, conservation plans, revised conservation plans, and applied conservation systems that are on farms owned and/or operated by SCS employees are to be reviewed during the year in which the activity took place.

(h) Assistant chiefs are responsible for ensuring that state conservationists carry out adequate quality control.

(i) FSA appraisals will be carried out in a state when requested by the assistant chief or by the state conservationist.

(j) Reports.

(1) The status review data base developed as required by §510.44(h) will be used to meet national quality control reporting requirements.

(2) The CPD Director will use state data base reports to determine if FSA appraisals, additional reviews, or additional training are needed.

§510.71 Prevention of fraud, waste, and abuse.

(a) The compliance aspects of the HEL, wetland, and Conservation Reserve Program (CRP) provisions are such that there are opportunities for fraud, waste, and abuse to occur. The following guidelines will allow SCS line officers who are responsible for quality control to give special attention to prevention of fraud, waste, and abuse.

(1) Quality reviews should be increased in those areas where determinations are inconsistent with the extent of HEL, hydric soil, and wetland known to occur.

(2) SCS employees who observe possible compliance deficiencies while providing onsite assistance are to call these items to the attention of the person. SCS will then request ASCS to issue a Form ASCS-569 to SCS for the person on whose land the possible compliance deficiency was observed. SCS will use status review procedures in NFSAM §510.44(d) to reach a decision for the tract. See §510.52 for SCS use of Form ASCS-569, and 516.18 for exhibit of the form.

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### 510.71(a)(3)

(3) All offers of bribes are to be immediately reported by the employee in accordance with GM 360-413 Subpart E.

(4) Entering false information into Government records constitutes participation in fraud.

(b) The state conservationist will ensure that each case where an SCS employee is suspected of fraud is turned over to the Office of Inspector General (OIG) investigation branch.

### §510.72 Responding to reports of possible violations or incorrect determinations.

SCS will investigate possible violations by persons, or potential incorrect SCS determinations, reported to SCS. See §510.65.

(a) SCS will request ASCS to issue a Form ASCS-569 to SCS for the tract and the person against whom the report has been made. As part of the investigation, SCS will check with ASCS to make sure that the person involved has completed a Form AD-1026 for the field in question. ASCS will provide aerial photocopies and records of cropping history as needed. SCS will use status review procedures in §510.44(d) to investigate and process these reports. SCS will furnish a report to ASCS using Form ASCS-569. See §510.52 for SCS use of Form ASCS-569.

(b) The person, organization, or agency, if known, making the report of the possible violation will be informed that the report has been received and is being investigated.

(c) ASCS will use Form ASCS-569 to request SCS to make determinations and review decisions with regard to reports made to ASCS of possible violations or potential incorrect determinations.

(d) The DC will transmit to the state office any report on an item that is not an SCS responsibility. The state office will provide a copy of the report to the agency responsible for the concerns raised. SCS will inform the person making the report, if known, that the report has been received and is being investigated.

(e) SCS will establish a register of reports received in each field office, recording the date of the report, name of person if known, organization or agency making the report, action taken on the report, and date the action was taken.

(f) The register of reports, the actual report provided to SCS by a confidential source, and the report by SCS of the results of the inquiry will be placed in a "Report of Possible Violations" file. This file is used by SCS employees only. The register of reports and the report of violation provided to SCS by a confidential source are not available to the public under the Freedom of Information Act (FOIA). If requested, these records can be denied under Exemption 7(D), which protects the identity of confidential sources. The final report of SCS's decision regarding the possible violation, however, is available under the FOIA. The name of the confidential source should not appear in the final report, but if it does it can be redacted from the record before release, citing Exemption 7(D). Under no circumstances should the name of the confidential source be entered in the case file of the possible violator. In handling complaints and reports, assume that the person providing the information expects confidentiality unless the person specifically states in writing that confidentiality is not expected.

(g) If a new HEL or wetland determination results from the investigation, the new determination will be documented in the case file for the tract, and the person(s) involved will be notified.

(h) Cases of misinformation, incorrect information, or potential fraud will be reported to the state conservationist (through the AC) with a copy to ASCS. The state conservationist will be informed of results of the reviews of reports of violations or incorrect determinations.

(i) The DC should seek advice from his or her supervisor when large numbers of reports are received that could exceed staff hours available to service or if other potential problems are surfaced.

(j) The state conservationist will inform the Director of the Conservation Planning Division of major concerns relating to these reports.

#### 510.73 Incorrect information.

(a) SCS will delay providing any FSA-related services for persons who have provided incorrect information. Where a person checks "no" for questions on wetland items on the AD-1026. SCS will complete determinations on Form SCS-CPA-026.

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510.73(b)

(b) Where SCS finds that a person has provided incorrect information, SCS will:

- (1) Inform the person of SCS findings.
- (2) Complete Form ASCS-569 and send to ASCS.
- (3) Send a letter documenting SCS findings to ASCS with a copy to the person and a copy to the state conservationist through channels. (See 6516.06 for sample letter)
- (4) Place a copy of the letter and the ASCS-569 in the person's case file.

Subpart H - Appeals

SUBPART H - APPEALS

510.80 Purpose.

510.82(a)

Appeal procedures provide a mechanism for reviewing disapprovals of a conservation plan by a conservation district or of technical FSA determinations or assistance by SCS. The purpose of an appeal is to determine if technical decisions were correctly made and if the rule was properly interpreted and applied in a specific situation. Appeal procedures are published in the Code of Federal Regulations 7 CFR 614.

510.81 Determinations subject to reconsideration and appeal.

(a) The following determinations are subject to reconsideration and appeal:

- (1) Highly erodible land determinations;
- (2) Wetland determinations;
- (3) Disapproval of a conservation plan or system;
- (4) Improper use of SCS's policy and procedures in developing the conservation plan (e.g., not presenting alternatives for erosion control treatment to the person);
- (5) CRP determinations; and
- (6) SCS determinations of "not actively applying the approved conservation plan" and SCS determinations of "not using an approved conservation system."

510.82 Requirements for appeals.

(a) A determination or decision on a tract of land is made as a result of a request for FSA compliance purposes on a fully executed Form AD-1026 or other official USDA application form.

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

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### 510.82(b)

(b) The determination or decision being appealed must have been a CRP determination, a decision using Form SCS-CPA-026, decisions regarding planning procedures and documents, or decisions regarding the person's lack of adequate performance in actively applying the approved conservation plan and/or an approved conservation system.

(c) The determination or decision must have actual or potential adverse effect on the person who files the appeal. Actual or potential adverse effect occurs when:

(1) The person has been denied participation in one or more USDA programs; or

(2) The determinations and/or decisions made may result in the person's being denied participation in USDA programs. Where a determination is made that the subject lands are HEL or converted wetlands, it is not necessary for the person to complete the conversion and/or plant an agricultural commodity and be denied USDA benefits in order to be considered adversely affected. The fact that such determinations are made or conservation plans were not approved will be considered adverse effects;

(d) Only the person that is adversely affected by the determination or decision can appeal; and

(e) All appeals and/or requests for reconsideration shall be in writing and shall state the reason for the request. The person is to provide records, evidence, pictures, and supporting statements for the appeal and requested reconsideration. The district conservationist must make a field visit on all requests for reconsideration.

### 510.83 Role of line officers and staff in the appeals process.

(a) After an appeal is on record, the role of line officers and staff must be in accordance with the following:

Subpart H - Appeals

510.83(a)(6)

(1) An independent evaluation and decision will be made at each level of appeal based on the administrative record and any additional information gathered from a field visit, if made, and/or additional information provided by the appellant.

(2) Line officers at the next higher level of appeal may provide staff technical assistance and policy interpretations to the SCS person making the determination.

(3) Except for appeals to the Chief, the staff at each level of the appeal should strongly consider a site visit. Site visits are required at the field level.

(4) A line officer may not be directly involved in, or influence, an appeal decision being made at a lower appeal level. For example, an area conservationist (AC) may advise a DC of appeal procedures or answer questions concerning SCS technical policy, but the AC cannot be directly involved in the actual appeal (reconsideration) decision. Area staff may assist the DC to verify that technical procedures were properly followed; however, the same technical staff member cannot participate in the appeal decision at the next higher appeal level. Staff at the next higher level may assist the lower level decision maker with technical assistance in the field. Those staff members cannot then be involved in appeals at any higher level.

(5) Line officers at the next higher level should not visit the site in question or get directly involved in the appeal until the appeal is received at that level. The line officer and his or her staff should not direct the lower level staff to make or change any determination or decision.

(6) Once an appeal reaches a higher level, lower levels must not make additional decisions on the appeal unless the appeal is sent back to consider new information.

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510.84

510.84 General procedures for appeals.

(a) Persons who feel they have been adversely affected by a determination or decision and who choose to appeal the determination or decision shall make an appeal within 45 calendar days of being notified of the original determination. The 45 calendar day requirement should not be used as an absolute cut-off date as long as the person appeals within a reasonable time. If the person is making an informal effort to resolve the issue, the 45 calendar day period should not start until SCS makes it clear that SCS has made a final decision. All appeals received must be recorded, and the reason for not considering the appeal must be noted in the case file.

(1) The person shall be informed in writing at the time that the determination and/or decisions are made that he or she may appeal the action.

(2) The person will be provided the procedures for requesting reconsideration and pursuing the action, including the right to request a meeting at the reconsideration level. A meeting is encouraged.

(3) A letter of decision will be sent to the person making the appeal and a copy of that letter of decision will also be sent to each lower level SCS line officer involved in the appeal and to the appropriate office of the other USDA agencies involved.

(4) Inform the local soil and water conservation district that the appeal has been received.

(b) Use national codes to record the number of reconsiderations and appeals received at each appeal level.

(1) Field offices will report appeal when letter of response to a reconsideration request is completed and mailed to the person.

(2) Area and state offices will report appeal when appeal decision is finalized.

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)



## Subpart H - Appeals

510.86(a)

### 510.85 Appeal process - Level I.

(a) The first level of the appeal process is the reconsideration. This is a review of the original determination or decision by the DC or conservation district, considering any additional information provided by the appellant.

(b) The reconsideration should attempt to review all issues related to the reconsideration request to avoid the need for multiple reconsiderations of different issues in the same decision.

(c) Reconsiderations should normally be completed within 20 calendar days of the receipt of the request for the reconsideration. An administrative record is created for documentation of the reconsideration.

(d) After reconsideration, the decision may be mailed or hand delivered to the producer. Decisions made as a result of a reconsideration must state:

(1) The basis for the decision, including all factors, technical criteria, and facts relied upon;

(2) The additional evidence that was considered;

(3) All items that are applicable to the original determination or decision;

(4) The right of the person to appeal to the next level and to request a meeting or informal hearing, and

(5) The name and address of the office to which the next appeal should be made within 45 calendar days. (See 6516.08 for sample letter.)

### 510.86 Appeal process - Level II.

(a) The next appeal level is the second level in states with area conservationists (AC). Appeals at the second level should normally be completed within 30 days of the receipt of the appeal.

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510.86(a)(1)

(1) Any person who is adversely affected by a determination or decision that has been reconsidered by a DC or a conservation district may appeal that decision to the AC.

(2) The AC will only consider an appeal that has been through the reconsideration process. The AC may base the appeal decision on the present record, additional field finding, meeting, or hearing. If an appeal is received by the AC that has not been reconsidered by the DC or conservation district, the AC will return the appeal to the person, and request the DC to consider this as a request for reconsideration.

(3) The AC will inform the person of the decision in writing, of his or her rights to appeal to the state conservationist (STC), and of his or her rights to request a meeting or informal hearing. The AC also will provide the name and address of the STC and inform the person that the next appeal must be made within 45 calendar days.

(b) In states without area offices the next appeal level is the third level.

510.87 Appeal process - Level III.

(a) Any person who is adversely affected by the decision of the area conservationist, or the DC in states without AC's, may appeal to the STC.

(1) The STC may base the appeal decision on the current administrative record, additional field findings, and/or a hearing. Appeals at the third level should normally be completed within 45 calendar days of the receipt of the appeal.

(2) The STC will inform the person of his or her rights to appeal to the Chief within 45 calendar days and will provide the name and address of the Chief.

(b) Before a wetland appeal goes beyond the state level, the STC must certify that the appropriate technical specialists have certified that hydric soils, wetland hydrology, and hydrophytic vegetation under normal circumstances exist.

Subpart H - Appeals

510.89(b)

510.88 Appeal process - Level IV.

Any person who is adversely affected by the decision of the STC may appeal to the SCS Chief. The Chief will only accept appeals arising from decisions made by the STC.

(a) The Chief will make a decision on the appeal based on the administrative record only. A hearing shall not be held.

(b) The decision by the Chief is the final decision of the Department of Agriculture. There is no further administrative appeal.

510.89 Processing appeals to the Chief.

Decisions made by the Chief on appeals are based solely on the administrative record. When an appeal is received by the Chief, the following procedure will be used to process the appeal.

(a) The Director, Land Treatment Program Division (LTPD) for the Conservation Reserve Program, or the Director, Conservation Planning Division (CPD) for all other FSA activities, will request the state conservationist to send one copy of the administrative record to the Director of the appropriate National Technical Center (NTC) and one copy to the LTPD or CPD Director via overnight mail. The director responsible for processing the appeal will send a copy of the appeal letter to the appropriate NTC.

(b) The NTC is to complete a technical review of the administrative record within 25 calendar days of receipt, including the identification of any deficiencies in the record that supports technical determinations. The NTC will make a copy of the administrative record for the NTC file. Procedural and non-technical issues identified by the NTC are to be referred to the Deputy Chief for Programs for resolution with the STC.

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510.89(c)

(c) The NTC will send the administrative record and its findings, comments, and recommendations to the Deputy Chief for Technology via overnight mail. The NTC recommendation will be based on an independent evaluation of the administrative record, and will not be simply a concurrence or non-concurrence with the prior decision of the STC. The appropriate division director(s) in Technology will review, comment, and forward the record to the Director of LTPD or CPD within 10 calendar days of receipt.

(d) The Director of CPD or LTPD will coordinate with the Deputy Chief for Technology and Office of General Counsel and develop a response for consideration by the Chief. Decisions on appeals generally will be rendered within 60 working days of the receipt of the appeal by the Chief.

510.90 Administrative record.

(a) The administrative record is started when a person requests a reconsideration. The administrative record is that part of the case file that contains materials related to appeals. The administrative record for all appeal cases shall contain all of the materials used to make the decision as well as the support materials. It should not be necessary to add materials to the administrative record at the time it is requested by the next higher level. It should already be complete.

(b) The original of the administrative record is to be forwarded to the appeal office at the next higher level when requested. Failure to do so will delay the appeal decision. The DC will retain a copy of the administrative record in the case file.

(c) Content of the administrative record. Review: During the state-level review, the state staff specialists (state soil scientist, state engineer, and state resource conservationists or other qualified technical staff) should review the administrative record and sign off that all necessary documentation is present before the state conservationist provides a decision to the appellant.

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510.90(c)(9)

The state conservationist should not sign a response letter until the documentation is complete. Each administrative record will contain:

(1) Form AD-1026, Highly Erodible Land and Wetland Conservation Certification, completely filled out, for each year person requested benefits since 1986;

(2) Form SCS-CPA-026 and SCS-CPA-026a (Highly Erodible Land and Wetland Conservation Determination) completely filled out for the area in question, including superseded determinations. Revised determinations should be clearly identified. The superseded forms are a part of the permanent record and should not be destroyed. Explain any changes in farm number and tract number.

(3) Notes and records of telephone calls, office visits and field trips should be signed and dated to clearly identify persons involved and the individual making the review. SCS-CPA-6, Conservation Assistance Notes, should document all assistance provided since 1985.

(4) Aerial photocopies or maps must clearly identify the area in question, including field and tract boundaries, farm and tract numbers, wetland boundaries, wetland numbers, and symbols to show the determinations made. Mark the area being appealed in color. If different wetland delineations are identified at county, area office, or state office appeal levels, they must be sufficiently documented to show when they were identified, who identified them, and what features were observed.

(5) Soil map and legend with the area in question clearly identified;

(6) County list of highly erodible and/or hydric soil map units;

(7) Compliance-plan; status reviews.

(8) CRP data;

(9) All letters of request for reconsideration and appeals and any information, photographs, or other data the person has to support the appeal;

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510.90(c)(10)

(10) Letters documenting all decisions made on reconsiderations and appeals;

(11) Record of hearing or summary of meetings; Include persons present, data presented, decisions reached.

(12) Any other materials such as photographs that may have a bearing on the appeal decision; and

(13) A copy of information listed in 510.90(d) or 510.90(e) as appropriate.

(d) Additional information that needs to be included for appeals involving HEL determinations, sodbuster, and conservation compliance:

(1) Form SCS-CPA-027, when required

(2) Conservation plan

(3) Name and acres of each HEL soil map unit by field

(4) Name and acres of each non-HEL soil map unit by field

(5) Predominance determinations with calculations shown

(6) Dates of HEL determinations and reviews at the various levels of appeal

(7) Who made the determinations and who did reviews at the various levels of appeal

(8) The following erosion prediction factors used in the Erodibility Index calculation as appropriate:

(i) Rainfall and runoff factor (R)

(ii) Soil erodibility factor (K)

(iii) Minimum LS value required for HEL

(iv) Actual slope length and slope percent of all potentially HEL soil map units and the appropriate LS factor

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510.90(e)(2)(i)

(v) Climatic factor (C)

(vi) Soil erodibility factor (I)

(vii) Soil loss tolerance value (T)

(e) Additional information needed for appeals for wetland/converted wetland determinations:

(1) For office determinations

(i) A copy of the soil survey sheet clearly delineating the soil map unit(s) in question;

(ii) A copy of the FWS National Wetland Inventory map, if available, delineating the area in question; NWI legends

(iii) Other information (documentation of personal knowledge, copies of state wetland maps, copies of ASCS aerial photos or slides, etc.) used in the office determination;

(iv) Documentation for any artificial wetland that indicates that the area was initially a nonwetland or a prior converted cropland.

(v) Record of consultation with FWS.

(2) For field determinations

(i) Hydric soils: the whole map unit name, the name and acres of the hydric soil included in the map unit determined to be wetland; or the unnamed miscellaneous area or inclusion within a soil map unit, the hydric soil criterion met and acres involved. The fact that the soil is mapped as a hydric soil is not sufficient for an appeal decision; a soil scientist or other qualified technical specialist must make an onsite determination that it is a hydric soil, and this determination must be documented with the name of the technical specialist, the date of the onsite visit, and what specific soil series or inclusions were observed to support the hydric soil determination. Documentation must include hydric soil features and hydric soil criteria that were met.

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510.90(e)(2)(ii)

Make certain that the county hydric soil list is current and includes any mapping units with hydric soil inclusions that were identified during the appeal process. When soil lines are changed, make certain they are recorded, initialed, and dated on the official copy of the soil survey and on any maps included in the appeal files. If spot symbols are used, they should be taken from the published soil survey or the National Map Symbols Handbook, or they may be cross referenced to the Field Office Technical Guide.

(ii) Hydrology: The seasonal weather conditions and water regime, including field documentation of prior drainage or manipulation if appropriate by the appropriate specialist. It is not sufficient to indicate that the area is wetland without documentation that the area is subject to sufficient flooding, ponding, or saturation to meet the wetland hydrology criteria. For example, if the area floods, cite flood years used for data or cite interviews with local people who attest to the flooding, giving names and dates of interviews. Describe the topography, such as depression, pothole, playa, or floodplain, and give periods of ponding, flooding, or saturation or the combination of these. The engineer's report should mention any factors affecting the flow of surface or subsurface water.

(iii) Hydrophytic vegetation. Unless the area is cropped, documentation should include a list of the dominant species and their relative abundance in order to determine plant prevalence. Photo documentation is very useful. Include documentation of visual or transect determinations:

(A) Visual determination should include a list of the most abundant plant species with their respective indicator status that occur within the hydric soil boundary (or similar area if vegetation has been removed). Estimate the percent coverage of each, and include enough information to document that the percent coverage was greater for either obligate and facultative wet species, or upland and facultative for upland species. Delineate on the ASCS aerial photo the area that supports or would support a prevalence of hydrophytic vegetation.



(B) Transect determinations should include the location of the transects on the ASCS aerial photo; a copy of the completed prevalence index worksheet; and a copy of the calculations to document that an adequate percentage of plants had been identified and that a reasonable number of transects were completed.

(3) Abandonment: If abandonment is an issue, fully document the information that led to that determination. Cite Agricultural Stabilization and Conservation Service (ASCS) slides to indicate cropping history. Use ASCS Form 578, if possible.

(4) Drainage: If drainage is present or suspected, an engineer or other qualified technical specialist must make an onsite determination. Document the findings, the name of the technical specialist, the date, and any other pertinent information. Describe activities affecting the natural flow of water and any evidence of drainage activities. Include the dates and sequence of drainage activities. Record engineering surveys completed during the site visit, and document the results of any scope-and-effect determinations that have been completed. Scope-and-effect determinations should be done by an area or state engineer, along with other specialist, following a field visit. The determinations should document observations and measurements or data provided by the landowner. The narrative report must clearly state the rationale for all conclusions. Drawings and onsite and aerial photographs can help document the conditions. The file must include copies of ASCS 35-mm aerial slides and/or copies of all aerial or onsite photographs used to establish that an area is a converted wetland.

(5) Minimal effect (as appropriate)

(i) Documentation of the date that FWS was consulted;

(ii) Documentation of the opinion of FWS concerning the minimal effect determination;

(iii) Documentation of the basis for the minimal effect determination; and

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510.90(e)(5)(iv)

(iv) A copy of the signed agreement with the person to indicate that no action is permitted which would diminish wetland values beyond those for which the minimal effect was granted, including mitigation features. (See 512.12)

(f) Organization of file: The file should be in chronological order and clearly indicate the sequence and date of significant events in the appeal process. When the appeal goes to the state level, include a brief chronology of events, and be sure to document any significant meetings, telephone conversations, and interviews that pertain to the appeal. Make sure that every item in the file is legible and dated. Arrange the administrative record in a six-part file folder.

(g) Response letter: On response letters at all levels, make certain that every item mentioned in the appellant's letter is addressed. If the appellant's initial letter does not specifically state the reasons for the appeal, schedule an informal hearing or interview with the appellant to ascertain why he/she believes that our initial decision was wrong. Document the reasons in the file. Many appeals might be avoided if the appellant's questions are fully addressed at the first level. Take every opportunity to explain the program requirements, both in person and in the response letter. Don't assume that the program is fully understood. For example, criteria for abandonment is often not understood. The response letter should fully explain the reason for the decision; for example, on wetland appeals the response letter must cite documentation of hydric soils, hydrology, and hydrophytic vegetation, as well as abandonment and drainage when applicable.

510.91 Appeal hearings and meetings.

All persons making appeals must be informed that they may request a meeting or an informal hearing at the local, area, and state appeal levels. (The appeal process procedures are printed on the back side of the person's copy of Form SCS-CPA-026.) The purpose of the hearing or meeting is to provide an opportunity to exchange information and to get a clear understanding of the issues involved.

Subpart H - Appeals

510.92(b)

(a) An informal hearing is one in which information is exchanged and informal procedures are followed. The informal hearing can range from one in which minutes are made of the hearing to one where a verbatim transcript is made.

(1) A verbatim transcript will be made at the request and expense of the person, or

(2) A verbatim transcript may be made at the direction of the hearing authority (STC or AC) in which case SCS will pay the cost of the transcript.

(b) The hearing authority will determine the time and place of the hearing and provide adequate notice to the appellant. The hearing authority will normally be the SCS line officer to whom the appeal was made.

(c) The person or authorized representative shall be given an opportunity to present oral or written facts and relevant information.

(d) A meeting can be held at the local, area, and state level. The case file or administrative record shall be documented to reflect the meeting.

510.92 Appeal decisions.

The line officer at any appeal level may affirm, modify, or reverse a decision or may send the appeal back to a lower reviewing line officer for additional information or further consideration.

(a) The person will be notified in writing of the decision (See 516.08), the basis for the decision and the right to appeal the case to the next higher level. On request, the person will be given copies of documents, information, and evidence used to make the decision.

(b) The AC or STC may reopen any appeal for any reason deemed appropriate, unless the matter has been appealed to a higher line officer.

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510.92(c)

(c) When a decision has been changed as a result of an appeal, the case file record will be revised and ASCS will be notified of the change(s).

PART 511 - HIGHLY ERODIBLE LAND CONSERVATION

SUBPART E - CONSERVATION PLANS AND CONSERVATION SYSTEMS

511.41

(511.40 Conservation plans.

(a) A conservation plan documents the conservation system applied or scheduled to be applied to one or more fields.

(b) The goal for conservation planning on highly erodible fields is to reduce soil erosion to an acceptable level as specified for the soil and crop in the FOTG, and which ultimately will lead to an RMS for the field(s).

(c) All persons who plant agricultural commodities on highly erodible fields and participate in USDA programs listed in (510.14(a) must have an approved conservation plan for those fields. The conservation plan may be:

(1) A newly developed conservation plan;

(2) An existing conservation plan that has been applied or is being actively applied; or

(3) The documentation of an existing conservation system that meets the requirements of Section III of the FOTG.

(d) Conservation plans are to contain Resource Management Systems (RMS), Basic Conservation Systems (BCS), and/or Alternative Conservation Systems (ACS) as appropriate. (See Part 517 - Glossary)

(e) The conservation plan will include, as a minimum, an acceptable conservation system for all highly erodible cropland fields that are or will be used to produce agricultural commodities.

(511.41 Conservation system.

A conservation system is the part of a cropland resource management system (RMS) that is applied to a field or group of fields to provide cost-effective and practical erosion reduction based upon standards contained in the SCS FOTG. A conservation system may be a single practice or a combination of practices. Alternative conservation systems will be offered to the producer during the planning process along with any resource management system options.

511-11

(511.42 Conservation plan and system requirements.

(a) Acceptable conservation systems are required to be used to produce agricultural commodities on highly erodible cropland fields for the person to remain eligible for USDA program benefits, unless the person is actively applying an approved conservation plan that will be fully applied by December 31, 1994.

(b) Acceptable conservation systems are resource management systems (RMS), basic conservation systems (BCS), and alternative conservation systems (ACS). All RMS, BCS, and ACS that are included in a conservation plan must be described in the technical guide for that field office.

(c) The planned conservation system must provide for a significant reduction in erosion from the level (the "non-treatment" condition) that would occur if conservation measures were not applied. The plan must document the erosion rate on each field that existed before development of the FSA plan (the pre-plan condition). The plan must also document the erosion rate that is predicted with the planned conservation system applied on each field (the post-plan condition).

(d) The acceptable maximum average annual erosion rate on any HEL field shall not exceed the average annual erosion rate resulting from the application of an alternative conservation system described in the FOTG.

(e) An approved conservation plan that is fully applied results in an approved conservation system on the land.

(f) Conservation plans developed for highly erodible cropland fields that were converted from native vegetation (rangeland or woodland) must include erosion control to the level specified by a resource management system or a basic conservation system. See Part 517, Glossary, for applicable definitions of rangeland and woodland.

(g) Each field that was converted from native vegetation will be identified with the following statement in the plan document: "This field was converted from native vegetation in 19\_\_, and the erosion rate for the approved conservation system for this field must not exceed the soil loss tolerance for the soils in this field."

(h) Conservation plans developed for all other highly erodible cropland fields may contain RMS, BCS, or ACS for the soil and crop conditions of the planned fields. A person may include ACS in the conservation plan to be in compliance with FSA requirements.

(i) All conservation plans will conform with Section III of the FOTG that is in effect at the time the plan is developed or revised.

(511.43 Resource management systems.

In the process of developing each conservation plan, the person will be encouraged to use a resource management system or a basic conservation system where it is reasonable and practical to do so.

(511.44 Conservation plan format and content.

(a) The conservation plan is to be developed according to the policy and procedures in the National Conservation Planning Manual (NCPM), the General Manual-450, Part 401, and the following specific guidelines to provide for adequate plan documentation for FSA purposes.

(b) Conservation plan guidelines for HEL fields.

(1) A conservation plan for highly erodible fields identifies each highly erodible cropland field by using or referencing the ASCS assigned field number to the extent possible and by placing the symbol "HEL" on the conservation plan map.

(2) The plan contains statements regarding erosion reduction treatment for all forms of erosion encountered within the highly erodible cropland fields. These decisions may include treatments that are identified in Section III of the FOTG. Treatment is required that will produce a substantial reduction in sheet and rill, wind, and ephemeral cropland gully erosion. Erosion estimated by the Universal Soil Loss Equation (USLE) and erosion estimated by the Wind Erosion Equation (WEQ) must each be treated in accordance with Section III of the FOTG. All conservation practices included in the conservation plan will be installed according to the standards and specifications for that conservation practice in Section IV of the FOTG. The plan should clearly specify the minimum requirements for FSA compliance, and clearly indicate that the person must continue to use the conservation systems(s) described in the plan to maintain eligibility for USDA program benefits.

(3) The plan schedules the application of all planned erosion reduction practices in an orderly manner to ensure that each practice is fully functional before January 1, 1995.

(4) All FSA conservation compliance plans will be entered into the Computer Assisted Management and Planning System (CAMPS).

(5) The district conservationist will ensure that the conservation plan includes the following five elements for each planned conservation practice:

(i) The field number(s) where the practice is to be implemented.

(ii) The month and year that the practice is to be implemented. The entry in the 'PLANNED' column of the conservation plan document will always be the date (month and year) (pmo and pyr in the CAMPS planaply table) that the practice is to be installed or completed for the first time.

(iii) The units of the practice planned to be implemented.

(iv) The SCS practice code number for the practice. The practice code number does not need to appear on the person's copy of the plan.

(v) A practice narrative that:

(A) Identifies the practice using the official practice name.

(B) Describes specifically what is to be done to carry out and maintain the practice, or refers to a job sheet or to the practice specification.

(C) Describes the criteria that SCS will use to determine when the practice is satisfactorily implemented.

(D) Does not conflict with any other practice narrative in that plan.

(E) For new plans and for revised plans, identifies the purpose of the practice, indicating what conservation problem will be solved or reduced by implementing the practice. This will be increasingly important as practices are added to a conservation plan to deal with water quality and other needs.

(6) The conservation plan must contain equivalent information for each planned management measure or conservation treatment (that is not a conservation practice) to that shown in (511.44(b)(5)). Use a code number established at the state level instead of the practice code number.

(7) Any "PLANNED" date that does not meet the criteria in (511.44(b)(5)(ii) is to be changed to meet the criteria.

(8) Any practice recorded in an FSA plan that does not meet the requirements in (511.44(b)(5) will be corrected to meet these requirements. This correction will be made either globally in CAMPS or as the person is provided technical assistance to implement the plan.

(9) In cases where a practice is currently recorded in an FSA conservation compliance plan indicating that the practice will be



installed "if needed," a specific decision will be made by the person either to include the needed practice or to exclude it from the plan because it is not needed. The decision on each practice is needed so that the practice documentation can conform to 511.44(b)(5). The person will be expected to make the decision when SCS provides the necessary technical information on which to base the decision. These practices must be installed and functioning before the January 1, 1995 deadline. If the "if needed" practice is a planned substitute practice to be used when the original planned practice cannot be applied, the conditions under which the substitute practice is needed are to be clearly stated.

(10) The plan contains the following statement or a similar statement conveying the same ideas: "I (We) concur in the conservation practices and installation schedules indicated in this conservation plan for all fields labeled HEL. I (We) understand that, when this conservation system for HEL fields is applied to the land and maintained on a continuing basis, the conservation system will meet all of the Food Security Act of 1985 requirements for conservation compliance. Furthermore, I (we) understand that if any fields other than those HEL fields specified in this plan will be used for the production of agricultural commodities, I (we) will contact ASCS and SCS for an HEL determination."

(i) The above statement is signed by the landowner or person having control of the land for at least the time period of the crop rotation and conservation practice installation period that is specified in the plan. The signature indicates that the conservation plan documents the decisions made by the person.

(11) The plan contains a specific statement that the plan meets requirements of the FOTG. This statement is signed by the district conservationist or another SCS employee designated by the district conservationist.

(12) The plan contains a specific statement to indicate conservation district approval. This statement is signed by a representative of the conservation district. If there is no conservation district, SCS will approve the conservation plan, using a specific statement to indicate that SCS is providing this approval in the absence of a conservation district.

(c) Soil map unit descriptions used in conservation plans will identify highly erodible (HE), potentially highly erodible (PHE), not highly erodible (NHE), and hydric soil map units.

(d) Following are special considerations for review and implementation of FSA conservation compliance plans.

511.44(d)(1)

(1) Special Considerations For Management Practices

Management practices in FSA conservation compliance plans usually consist of crop rotation, conservation tillage, and crop residue use. Management practices require that the person will take some action each scheduled year to apply or to use the crop rotation, tillage practice, and/or crop residue. Management practices are to be recorded as applied when they are first applied, and will be used each year in the future as the person continues to use the approved conservation system described in the approved conservation plan.

(2) Special Considerations For Crop Rotations

(i) The planned crop rotation must be started far enough before January 1, 1995, so that it is evident that the crop rotation is being used on each field for which the crop rotation is planned. Using the crop rotation means that the planned sequence of crops (or acceptable substitute crops) to achieve the required USLE "C" factor and/or the WEQ "V" factor is being planted.

(ii) It may not always be possible to get a full cycle of the crop rotation completed before January 1, 1995, but the practice narrative should be clear as to when the rotation is to be started so that the crop rotation will be in use before January 1, 1995.

(iii) Crop sequences are determined by obtaining crop history for the field from ASCS, from evidence provided by the person, and/or by SCS observation. Paragraph 345E of ASCS 6-CP states that a farmer's failure to report eligible crop history on land planted to an agricultural commodity will result in non-compliance if the land is classified as HEL and an approved conservation system is not being used.

(3) Special Considerations For Conservation Tillage And Crop Residue Use

(i) The planned crops must be capable of producing enough residue after harvest to provide the needed amounts of residue. The practice narrative must specify the residue requirements.

(ii) SCS should be satisfied that the person can do the required tillage and planting operations and that the available equipment is capable of achieving the results specified in the plan.

(iii) If the planned residue amounts are not achievable, SCS will determine the additional practices needed to accomplish the required level of erosion reduction.

(4) Special Considerations For Supporting Practices

Supporting practices, such as contouring, strip cropping, and field borders, specified in the plan must be applied before the conservation system is considered to be in use.

(511.45 Technical assistance.

Upon the request of a landowner or operator who crops or plans to crop highly erodible fields, SCS will provide technical assistance for purposes of developing a conservation plan and applying a conservation system. Technical assistance should be provided to the landowner whenever possible to ensure continuity of the conservation plan. As the first step in responding to a request for a conservation plan, SCS will review any existing conservation plans in the case file for the tract, and utilize the existing conservation plan to the extent possible. Persons who have requested technical assistance, but are unwilling or unable to develop conservation plans at the time that SCS is able to provide technical assistance will be provided with one or more alternatives for acceptable conservation systems for the person's highly erodible fields at the time SCS provides technical assistance.

(511.46 Active application of a conservation plan.

(a) Active application of a conservation plan means:

(1) The conservation practices and treatments described in the approved conservation plan are being applied in each HEL cropland field according to the schedule specified in the plan, and

(2) All applied practices are properly operated and maintained.

(b) Certification of active application. After January 1, 1990, when applying for benefits, the landowner or responsible person will annually certify to ASCS on Form AD-1026 that the approved conservation plan is being actively applied and/or an approved conservation system is being used. SCS personnel will conduct status reviews each year on 5 percent of the tracts with conservation plans to determine active application.

(c) Using the conservation system means that all planned structural, supporting, and management practices and treatments are installed, operated, and maintained in accordance with the FOTG, and that the approved crop rotation is being used in each HEL cropland field.

(d) Crop rotations. A crop rotation is considered as being used each year that the crops (or approved substitute crops) specified in the approved conservation plan are grown in the planned sequence with the needed tillage and residue management practices to achieve the required USLE "C" factor and/or WEQ "V" factor.

(1) A full cycle of the crop rotation does not need to be completed to consider that the crop rotation is being used. SCS must be satisfied that the person is producing the crops in rotation in a sequence and manner that will meet FSA erosion reduction requirements.

(2) Documentation of the planned crop rotation in the FSA plan must be specific enough regarding crops to be grown to assure that the person knows what is needed to achieve the required USLE "C" factor and/or the required WEQ "V" factor. The documentation should be general enough to permit some substitution of crops without the need for a plan revision when weather or other circumstances make some cropping changes necessary.

(3) The amount of crop residue needed to achieve the planned USLE "C" factor and/or WEQ "V" factor needs to be identified in the conservation plan.

(e) Notification to ASCS. SCS may use Form SCS-CPA-027 to notify ASCS and others that the person has completed application of all scheduled practices and is using the conservation system. This will usually not be necessary because ASCS will consider that the person is either actively applying the approved conservation plan or using an approved conservation system unless SCS informs ASCS otherwise. It will be the responsibility of the person to annually certify to ASCS the continued use of the conservation system in any year that USDA benefits are requested. SCS will conduct annual status reviews on 5 percent of the tracts with plans to determine continued use of the approved conservation system.

511.47 Certification of existing conservation plans and conservation systems.

(a) Existing conservation plans.

(1) SCS will use the existing conservation plan to the extent possible, rather than develop a new plan. SCS will determine the technical adequacy of existing conservation plans and conservation systems with respect to current standards.

(2) SCS must determine if there are highly erodible fields on the farm and review the conservation plan to determine if it meets requirements of the FOTG for HEL.

(3) If the conservation plan for the highly erodible field(s) does not meet FOTG requirements, the district conservationist will inform the person of additional treatment alternatives that are required to complete the conservation plan for the FSA, and will provide the needed technical assistance to revise the conservation plan.

(b) Existing conservation systems.

(1) SCS will document the existing conservation system(s) by describing the system(s) in a conservation plan if the system(s) meets the requirements of Section III of the FOTG, or

(2) SCS will inform the person of additional cost-effective practice alternatives that may be planned and applied to meet FOTG requirements. If the existing system does not meet the requirements of Section III of the FOTG, SCS will provide the requested technical assistance to develop the needed conservation plan.

(c) Notification to ASCS. After January 1, 1990, SCS will use Form SCS-CPA-027 to inform ASCS that a newly developed conservation plan conforms with the FOTG and has been approved by the conservation district. A copy of this form can be provided to the person to verify that the information on the form has been given to ASCS.

## (511.48 Crop acreage base (CAB) exchange.

(a) In providing technical assistance in conservation planning, SCS employees need to be aware of the opportunity that persons have to exchange crop acreage bases in order to produce high-residue crops in exchange for low-residue crops, or to produce high-residue crops in a different season from the current high-residue crops.

(1) The purpose of CAB exchange is to add high-residue crops that are not included in the crop base for the farm to achieve conservation compliance.

(2) SCS and ASCS personnel in each county where the CAB exchange is offered will need to meet and establish guidelines within which SCS can assist persons to reach decisions on the use of CAB exchange.

(3) The person will have only one opportunity to request CAB exchange. This means that any and all CAB exchanges that are anticipated during the life of the conservation plan must be included in the initial request to ASCS for approval of a CAB exchange.

(4) SCS will help the person determine the acreage of crops that must be grown to provide the degree of erosion reduction necessary to meet the requirements of the ACS in Section III of the FOTG. This information will be included as part of the conservation plan for the HEL fields on the farm.

(5) The conservation plan involving CAB exchange cannot be implemented until the CAB exchange is approved by ASCS.

511-17.b

(6) CAB exchange of two high-residue crops must be approved by the state conservationist.

(7) CAB exchanges cannot be used to achieve a BCS or an RMS.

511.49 Conservation plan revisions.

(a) A person may request assistance from SCS at any time in revising an approved conservation plan. SCS will provide assistance in revising the plan consistent with local priorities.

(b) A conservation plan revision occurs when an existing plan is changed because of a change in farm size, farm enterprise, conservation system, farm owner, or farm operator. A revised plan normally results in a new conservation plan document.

(c) A person may revise his/her conservation plan to provide for the ACS level of treatment when the original plan provided for a BCS or RMS level of treatment, as long as the plan revision is not done as part of a status review. All plan revisions and practice schedule changes should plan for achieving some erosion reduction in each calendar year so that the conservation system will be fully in use by January 1, 1995. This requirement is particularly intended to accommodate changes in ownership, farm enterprise, and/or the substitution of management practices for structural practices.

(d) Revised conservation plans will be in conformance with the FOTG that is in effect at the time the revision is made, and will need to be approved by the conservation district in order to replace an existing approved conservation plan.

(e) All persons will be required to be using an approved conservation system by January 1, 1995 on all highly erodible fields that are used to produce agricultural commodities, regardless of the number of conservation plan revisions.

(f) Revisions of conservation plans for sodbusted fields must provide for continued use of an approved conservation system on the sodbusted fields, even if the sodbusted field was recently acquired by the person.

(g) All persons who have rescheduled practices will be scheduled for followup assistance during the following calendar year to assist in applying the rescheduled practice(s).

511.50 Conservation plans requested and approved after January 1, 1990.

(a) Policy. Conservation compliance land is land that was planted to an agricultural commodity one or more of the 1981 to 1985 crop years. Conservation compliance land, except as provided for in paragraphs (b) and (c) below, loses its "compliance" status if it was not included in an approved conservation plan the later of January 1, 1990 or 2 years after a soil survey of the farm is available. HEL land that loses its compliance status must have an approved conservation system applied and used the first year an agricultural commodity is planted after January 1, 1990.

(b) Plan exception. An approved conservation plan may be developed after the deadline date for a plan, thereby retaining the January 1, 1995 application deadline, in the following situations:

(1) Neither the person nor the land was enrolled for USDA program benefits prior to between December, 23, 1985, and January 1, 1990. In this case the conservation plan must be approved prior to the first planting of an agricultural commodity after USDA benefits are requested. ASCS will determine the person to be "new". Such persons will be required to show evidence that an agricultural commodity was planted on the land involved during one or more of the 1981 to 1985 crop years.

(2) An existing USDA program participant is subjected to the conservation provisions of FSA solely as the result of the 1990 FACTA. This situation includes persons who participate only in the agricultural conservation program or the dairy assessment program. Such persons have until April 23, 1992, to develop an approved conservation plan for HEL compliance fields. Such persons will be required to show evidence that an agricultural commodity was planted on the land involved during one or more of the 1981 to 1985 crop years. Many of these persons may already be using a conservation system which will meet FSA requirements. In such cases the plan will document that an approved conservation system is being used by indicating that the practices were applied in previous years. Enter a dash in the planned year column and show a prior year in the applied column in the FSA conservation compliance plan.

511.50(c)

(c) Plan revision and transfer exceptions. An approved conservation plan may be revised to add HEL compliance acreage or the plan may be transferred to a new owner/operator, thereby retaining the December 30, 1994, practice application date in the following situations:

(1) A USDA participant who was not required to have an approved conservation plan by January 1, 1990, purchases, leases, rents, or sharecrops HEL compliance land after, January 1, 1990. Such a participant may adopt the previous operator's approved plan by agreeing to continue practice application as scheduled. In this case SCS will transfer the original plan to the participant by changing the operator I.D. and requiring the participant to sign a new certification statement: "(I)(we) agree to adopt this approved plan and to continue practice application as scheduled." If necessary, an adopted conservation plan may be revised for future years subject to availability of SCS resources and the practicability of achieving a fully applied conservation system by December 30, 1994.

(2) A USDA participant who has an approved conservation plan purchases, leases, rents or sharecrops additional HEL compliance land after January 1, 1990. Such a participant may adopt a previous participant's plan as specified in (c)(1) above or may revise the original plan to include the additional acreage. This decision should be based on whether a new tract is added or whether two or more tracts are merged into one unit. If the participant opts to revise the original plan, the revision must be approved before an agricultural crop is planted on the newly acquired HEL.

(d) Procedures. SCS will use a Form SCS-CPA-027 to individually identify plans approved after January 1, 1990, so that ASCS will know when a conservation plan has been developed and approved for the tract.

(e) The situation with regard to sobusting will not change, so that a person who:

(1) has not produced an agricultural commodity on a HEL field during the period 1981-85, and

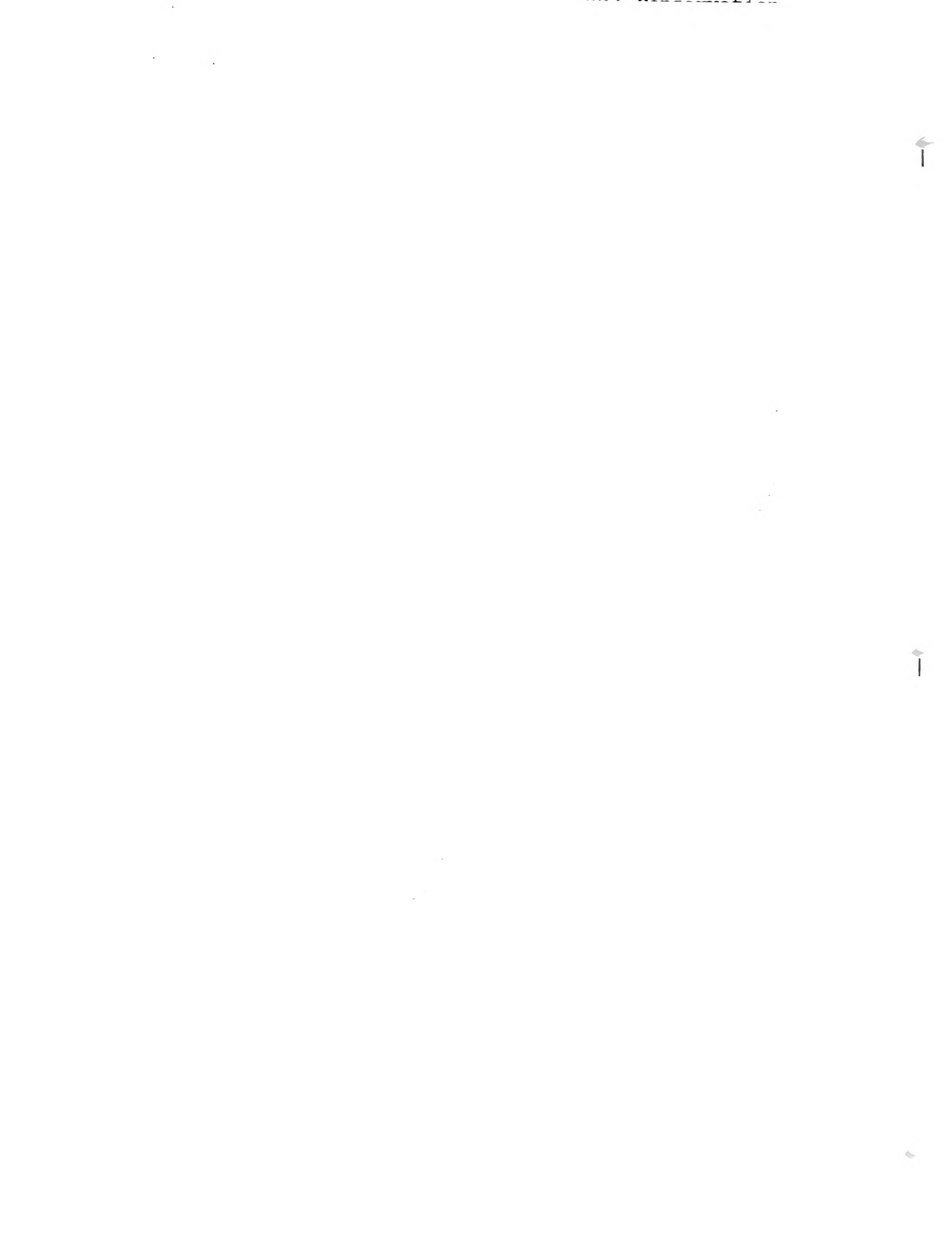


(2) applies for USDA program benefits after January 1, 1990, will need to develop an approved conservation plan providing for the use of acceptable conservation systems on all HEL and use the conservation systems while producing the first commodity crop after applying for USDA benefits on HEL in order to be eligible for USDA benefits the year the conservation system is used. For fields converted from native vegetation, the plan must provide for the use of basic conservation systems.

(f) The soil survey exemption applies to a farm on which a soil survey is not completed until after January 1, 1988.

(1) In this case, the person will be eligible for USDA benefits without an approved conservation plan for up to two years after the soil survey is completed. No later than two years after the soil survey is completed, the person must develop and begin implementing the approved conservation plan.

(2) Such persons will be eligible for USDA benefits after the conservation plan is developed and approved and in each succeeding year that the conservation plan is being actively applied. The conservation plan will provide for all required practices and treatments on HEL to be applied before January 1, 1995, so that the person is using the conservation system before January 1, 1995.



## Part 512 - Wetland Conservation

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- (512.01 Definitions.
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## Part 512 - Wetland Conservation

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Subpart A - General  
Part 512 - WETLAND CONSERVATION  
SUBPART A - GENERAL

512.01(a)

512.00 Requirements of the law.

(a) Actions causing ineligibility. A person is ineligible for USDA program benefits if the person:

(1) Plants an agricultural commodity on a wetland that was converted after December 23, 1985; or

(2) Converts a wetland after November 28, 1990 for the purpose, or to have the effect, of making possible the planting of an agricultural commodity, sugarcane, or forage crop. EXCEPTION: A person is not ineligible if prior to the conversion SCS approved the planting of trees, shrubs, vines, or cranberries; fish production; or building and road construction; and no agricultural commodity was produced on the land; or

(3) Refuses to allow an SCS official access to the property for purposes of making determinations under this part after filing an AD-1026.

(4) However, a person is not ineligible for USDA program benefits for a crop that was planted between December 23, 1985, and June 27, 1986.

(b) Authority. The Soil Conservation Service (SCS) is responsible for determining if a specific area is wetland or converted wetland and whether certain wetland exemptions apply.

512.01 Definitions.

(a) Converted wetland -- means wetland that has been drained, dredged, filled, leveled, or otherwise manipulated, including any activity that results in impairing or reducing the flow, circulation, or reach of water, that makes possible the production of an agricultural commodity without further application of the manipulations described herein if:

- the manipulation took place after December 23, 1985.
- the production or degree of production would not have been possible but for such action, and

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512.01(a)

- before the action the land was wetland and was neither highly erodible land nor highly erodible cropland. (See further explanation in Section 512.14(b)(3), (4))

(b) Wetland -- (except when such term is a part of the term converted wetland), means land that

- has a predominance of hydric soils;  
- is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and

- under normal circumstances does support a prevalence of such vegetation, except that this term does not include lands in Alaska identified as having a high potential for agricultural development and a predominance of permafrost soils. Note: Cropping history is not a criterion for wetland determination.

(c) Manipulation. Alteration of the hydrology or removal of woody vegetation for the purpose or to have the effect of making the production of an agricultural commodity possible. See section 512.14(c).

512.02 Wetland determinations.

(a) Documentation. Record wetland determinations on Form SCS-CPA-026, Highly Erodible Land and Wetland Conservation Determination.

(b) Obvious wetlands. Areas are considered wetland if they are continuously ponded or saturated for long duration during the growing season such that access by foot to make hydric soil or hydrophytic vegetation determinations is impossible. (Exhibit 516.09, Precedent Diagram on Use of Wetlands.) In most cases, wetland determinations can be made in the field without rigorous sampling of soils, hydrology, or vegetation.

(c) Applicability. All wetland determinations, conditions, and exemptions remain with the land. In addition, a person who converts a wetland after November 28, 1990, remains ineligible for USDA program benefits until that wetland is restored.

(d) Scope. Make wetland determinations for all cropland, hayland, pasture, and rangeland that has potential for wetland conversions. Determinations may be made for entire farms. If a large part of a farm is in woodland or rangeland with low potential for conversion to cropland, the DC may limit wetland determinations to all cropland, and potential cropland adjacent to or between cropland fields. If wetland determinations are not made on the remainder of the woodland or rangeland area, follow Section 510.48(f) of this manual.

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

Notify the producer that no determination was made for these lands and that there may be wetland on these areas.

(e) Use of offsite procedures. Where adequate information exists, the use of offsite procedures is encouraged to make wetland determinations. Document the information used for offsite determinations, such as aerial photographs, wetland maps, soil surveys, and other data as well as the interpretations made from such information. SCS wetland inventory maps may be used to make office wetland determinations.

(f) Use of onsite determinations.

(1) Make onsite determinations if information is inadequate to make offsite wetland determinations; and for all converted wetland violations.

(2) Point Intercept Sampling Techniques. Where wetland vegetation cannot be determined through routine investigations, use the Point Intercept Sampling Procedure in 7 CFR Part 12 (Appendix 518.03). Keep the worksheet and calculations to facilitate future determinations and to form a basis for the wetland soil plant correlation data base.

(g) Use of wetland inventories. State conservationists may authorize wetland inventories in areas that have significant scattered areas of wetlands. Inventories can facilitate making individual wetland determinations in a consistent and timely manner. Wetland inventories are usually prepared by trained photo interpretation teams using a combination of ASCS 35 mm slides, aerial photographs, soil surveys, U.S. Fish and Wildlife Service (FWS) wetland maps, and other data. States should give special attention to ensure that inventory tools provide the high degree of quality necessary to make correct wetland determinations in the office. If this is not the case, onsite determinations must be made.

(1) Mapping conventions. States should develop mapping conventions for wetland inventories, with FWS consultation (See Section 512.50) and national technical center (NTC) concurrence, prior to starting the inventory. Wetland inventories must be based on field tested mapping conventions used to interpret offsite information.

(2) Review. District conservationists (DC's) must review wetland inventories for completeness and accuracy. The DC may add, revise, or delete wetlands based on local knowledge, input from farmers, and additional information. The state conservationist (STC) must approve the inventory in writing for each field office before it is used in making wetland determinations.

Part 512 - Wetland Conservation

512.02(g)(2)

The STC will ensure that quality control reviews of wetland determinations are made in accordance with 510.70 for each field office before wetland determinations are sent to producers.

(h) Appeal rights. Inform the person who signed the AD-1026 that the person has 45 days to appeal the determination.

(i) Correcting determinations. If information is obtained by SCS from outside sources (other agencies, organizations, or private individuals) or from internal reviews (quality control or appeals) that indicate that wetland determinations were incorrect, conduct a review to determine if applicable policy and procedures were followed. Determinations are subject to review and revision if SCS policy and procedures were not followed.

(1) Consider the following factors to determine if SCS policies and procedures were followed:

- Were the tools adequate?
- Were all available tools used?
- Were approved mapping conventions used?
- Did the inventories (if used) and determination process have appropriate prior approval?
- Were determinations made for entire fields?
- If the same tools and mapping conventions used for the initial determination were applied, would the determination be the same?

(2) If the answer to all of the above questions is yes, SCS will correct the determination if needed, and revisions to final wetland determinations on other tracts are not necessary. If not, then a revision must be made of the subject tract and other tracts in the area must be reviewed. The revised wetland determination becomes effective when the new decision is made. The producer may appeal the portion of the determination that has been revised.

(j) Required training. Only SCS employees who have completed approved wetland training may make wetland determinations. Each state conservationist will maintain a list of employees who are qualified to make wetland determinations.

(k) Consultation with FWS. SCS will consult with the Fish & Wildlife Service (FWS) on development of wetland mapping conventions, and will involve FWS in quality control procedures to ensure accuracy of wetland identification at the state, regional, and national levels. Allow FWS to participate on wetland inventory teams



wherever practicable. SCS will make certified wetland determinations available to the U.S. Environmental Protection Agency (EPA) and the U.S. Corps of Engineers (COE) on request. Determinations provided to other agencies must be the same as those provided to ASCS.

(512.03 Technical changes.

Technical changes may result from additional research or experience that support changes in the criteria for hydric soils, hydrophytic vegetation, or hydrology. These changes may be determined by interagency technical committees and must be approved by the STC. Other technical changes define properties of soils, plants, or hydrology that would cause a soil to be classified as hydric or nonhydric, or would cause a change in the indicator status for a plant, or would provide new information on the hydrology of a site. The changes apply to determinations made after the date of notice of the change.

(a) Changes in wetland criteria. Technical changes in the criteria for hydric soils, hydrophytic vegetation, or hydrology often affect policy and procedures in other parts of this manual. Changes that affect policy and procedures throughout the manual will not become effective until the manual is revised and the changes are incorporated into the policy and procedures. For example, if the length of time for saturation is changed for hydric soils, the change will not be effective until this manual has been amended to include the change.

(b) Changes in hydric soil list and hydric vegetation indicator status. Technical changes that affect the list of hydric soils or the indicator status of hydrophytic vegetation become effective as soon as the new list of hydric soils or new indicator status for hydrophytic vegetation is published and available to the public. These changes are then incorporated in the Field Office Technical Guide or other documents available at the field office.

(1) Hydric Soils of the United States is updated annually. The new list becomes effective in January. Field office official lists of hydric soil map units will be updated in January to reflect changes. Other technical changes in the field office list of hydric soil map units must be documented and reviewed by the National Technical Center in accordance with Part 512.11 of this manual. The STC is responsible for updating the field office official lists of hydric soils.

(2) The indicator status of plants must be agreed on by the regional plant committees and published before they are effective for use in wetland determinations.

Part 512 - Wetland Conservation

512.04

(512.04 Wetland certification.

(a) Documentation. SCS will delineate all wetlands on a photocopy of the ASCS official aerial photography. Label the delineated areas according to 510.49(a)(4) and appendix 516.21. If requested by the person, SCS will make a field visit prior to delineating the wetlands on the map.

(b) Procedure for certification. SCS will certify that the wetland delineations on each tract are sufficient to make determinations of eligibility for USDA program benefits, and are in accordance with 510.49 and 510.50.

(1) Notify the person that a wetland determination has been made, and that the determination has been certified as correct and sufficient for determining eligibility for USDA programs.

(2) Provide Form SCS-CPA-026 to the person along with the map showing the location of wetlands.

(3) SCS will certify the determination after a final appeal decision is issued or 45 days after notification if not appealed.

(c) Requirements for certification.

(1) The area must meet all criteria for wetlands.

(2) Determination must be made for the entire tract, with this exception: If a large part of a tract is in woodland or rangeland with a low potential for conversion to cropland, the district conservationist may make a wetland determination for all cropland, hayland, pasture, and rangeland that has high potential for wetland conversion, and potential cropland adjacent to cropland fields on the tract. If a decision is made not to make a wetland determination on the remainder of the woodland or rangeland area, the following items must be done:

(i) Make a determination for all cropland, hayland, pasture, rangeland, woodland, and potential cropland adjacent to the cropland on the tract that has a high potential for wetland conversion;

(ii) Outline the area to be excluded from the wetland determination on the aerial photo and write, "Wetland determination not made for this area";

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

Subpart A - General

512.04(f)

(iii) Note in the remarks section on Form SCS-CPA-026 that a wetland determination was not made for the area outlined on the aerial photo; and

(iv) Inform the farmer that a request for a wetland determination should be made for any wet area that is being manipulated on which a wetland determination was not previously made.

(3) Hydric soils are present on all wetland sites.

(4) Hydrophytic vegetation is prevalent on the site or would have been prevalent had it not been removed.

(5) Wetland hydrology exists on the site.

(6) All wetland (W), converted wetlands (CW), farmed wetlands (FW), and minimal effects wetland (MW) are outlined on the ASCS photos, and prior converted cropland (PC) is outlined or noted for each field.

(d) Certification of prior determination. SCS will certify all wetland determinations made prior to November 28, 1990, if they were made according to SCS policy in Section 512.04(c). If the determination was made prior to November 28, 1990, it may be certified for all cropland and potential cropland adjacent to cropland on the tract.

(1) Notify the person by letter that his or her prior wetland determination is certified and is sufficient for determining eligibility for USDA program benefits under FSA.

(2) If the person does not appeal the determination within 45 days of the notice, SCS will certify the determination and provide the needed information to ASCS.

(3) If the person appeals the determination, certification will be made after a final decision is issued on the appeal.

(e) Notification to other agencies. FWS, EPA, and COE must be notified of wetland certifications upon request.

(f) Public list. ASCS maintains a public list of certified wetland determinations. The ASCS list is limited to those certified determinations that are provided by SCS after following the procedures in this section. Maps and other information on determinations are available to the public on request.

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Part 512 - Wetland Conservation

512.05

(512.05 Periodic reviews and updates of wetland delineations.

Periodic reviews will be made of wetlands to correct delineations, and to reflect conditions that might have changed since the last delineation, such as abandonment or conversions. NHQ will provide additional guidance on conducting periodic reviews.

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

Subpart B - Wetland Criteria  
PART 512 - WETLAND CONSERVATION  
SUBPART B - WETLAND CRITERIA

512.11(c)

512.10 Wetland criteria.

(a) Definition. Wetlands are lands that:

- (1) have a predominance of hydric soils;
- (2) are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
- (3) under normal circumstances do support a prevalence of such vegetation.

All three criteria must be met for an area to be identified as wetland, unless interrupted by temporary weather conditions or if hydrophytic vegetation is removed by farming or ranching practices.

(b) "Normal circumstances" refers to the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed.

512.11 Hydric soil criteria.

(a) Definition. Hydric soil is a soil that meets the criteria set forth in (g) below.

(b) Acceptable soil surveys. Soil surveys prepared according to standards of the National Cooperative Soil Survey (NCSS) are used to delineate hydric soils. Published soil surveys, cooperator soil maps, and other soil surveys acceptable to SCS may be used. If no reliable soil survey is available and if it cannot clearly be determined whether an area meets the hydric soil criteria, a soil scientist will inventory and map the area.

(c) FOTG official list. Maintain an official list of hydric soil map units in Section II of the Field Office Technical Guide. The list must include (1) all soils from the National List of Hydric Soils that are in that field office area; and (2) any soil units or areas that the state conservationist determines to meet hydric soil criteria.

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Part 512 - Wetland Conservation

512.11(d)

(d) Deleting soils from list. To delete a hydric soil unit from the list, use the procedure contained in the current Hydric Soils of the United States for deleting soils from the National List of Hydric Soils. The deletion is not made until the notice of change is published in the Federal Register.

(e) Use and maintenance of lists. State offices will maintain a copy of the county list of map units. States will maintain a printed list and are encouraged to store the lists electronically in the State Soil Survey Database. The county lists should be used in making wetland inventories and determinations. The lists must be available to persons making wetland inventories and determinations.

(f) Determining predominance of hydric soils. Determine whether an area of a field or other parcel of land has a predominance of hydric soils that are inundated or saturated as follows:

(1) If a soil map unit has hydric soil as all or part of its name, that soil map unit or portion of the map unit related to the hydric soil has a predominance of hydric soils;

(2) If a soil map unit is named for a miscellaneous area that meets the criteria for hydric soils (i.e., riverwash, playas, beaches, or water) the soil map unit has a predominance of hydric soils; or

(3) If a soil map unit contains inclusions of hydric soils, that portion of the soil map unit identified as hydric soil has a predominance of hydric soils.

(g) Criteria for hydric soils.

(1) Criteria for hydric soils is found in Hydric Soils of the United States as published in the Federal Register.

(2) In many cases, areas of hydric soils may not coincide with map unit delineations. The DC or soil scientist normally interprets aerial photographs to delineate areas of hydric soils within map unit delineations by using landscape position information provided on the list of hydric soil map units for the county. In some cases an onsite visit will be needed to determine the location of hydric soils within a map unit delineation. The following are methods for locating areas of hydric soils.

Subpart B - Wetland Criteria

512.11(h)(4)(i)

(i) Consociations are soil map units named for a single kind of soil (taxon) or miscellaneous area. Seventy five percent of the area is similar to the taxon for which the unit is named. When named for a hydric soil, the soil map unit is considered a hydric soil map unit for wetland determinations. However, small areas within these map units may not be hydric and should be avoided when determining prevalence of hydrophytic vegetation.

(ii) Complexes and associations are soil map units named for two or more kinds of soils (taxa) or miscellaneous areas. If all taxa for which a complex or association is named are hydric, the soil map unit may be considered a hydric soil map unit for wetland determinations. If only part of the map unit is made up of hydric soils, only those portions of the map unit delineation that are hydric soil are considered in wetland determinations. Prevalence of hydrophytic vegetation is completed on only the areas of hydric soils within the delineation, and only those portions of the area that meet wetland criteria are shown on the ASCS aerial photocopy as wetland.

(iii) Undifferentiated groups are soil map units named for two or more kinds of soil (taxa) or miscellaneous areas. Undifferentiated groups do not have a regular pattern of occurrence of the soils for which the group is named. If all components are hydric soil, the map unit may be considered a hydric soil map unit. If one or more of the soils for which the map unit is named are nonhydric, each delineation must be evaluated for presence of hydric soil.

(h) Elements of the county hydric soil map unit list.

(1) The soil map unit symbol and name;

(2) The name of the hydric soil part or parts of the soil map unit and information on whether the hydric soil composes all, a part, or a minor inclusion of the soil map unit; and

(3) Probable landscape position of hydric soils within the soil map delineation if only part of the map unit is hydric soil.

(4) Additional items to be added to the list are those areas of hydric soil map units that:

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Part 512 - Wetland Conservation

512.11(h)(i)

(i) Contain hydric soils that are hydric only because of saturation (Section 512.11(b)). These soils are hydric due to water tables at or near the surface.

(ii) Support woody vegetation under natural conditions. (These areas will be considered prior converted croplands if an agricultural commodity has been produced prior to December 23, 1985, and these areas are not potholes, playas, or seasonally flooded or ponded.)

(iii) Contain potholes or playas. (These areas will be considered wetlands regardless of cropping history if they meet wetland criteria.)

(iv) Are seasonally flooded or ponded. (Information other than soil survey data may need to be used to help make this determination. These areas will be considered wetlands if they meet wetland criteria.)

(v) Can be farmed under natural conditions without removing woody vegetation or other manipulation.

(i) Preparation of lists of hydric soil map units.

(1) Initial lists of hydric soil map units for a soil survey area may be computer generated at the Iowa State University Computer Center using the "HYDSUR" job control language. This initial list will include all soil map units in the survey area that are named by hydric soils. To ensure that this list is current, the state must have an updated Map Unit Use File for the survey area (see National Soils Handbook 603.12(d)).

(2) Lists of hydric soil map units may be manually prepared by comparing all soil map unit names and names of included soils against Hydric Soils of the United States.

(3) Include additional soil map units on the initial list if they:

(i) contain inclusions of hydric soils or wet miscellaneous areas.

(ii) are named for higher categories in "Soil Taxonomy" that meet hydric soil criteria. (Examples include "Aquents, flooded," or "Haplaquolls, ponded.")



## Subpart B - Wetland Criteria

512.13(a)

(iii) are named for wet miscellaneous areas that meet hydric water table, ponding, or flooding criteria. Examples include riverwash, beaches, playas, or water (these are only examples and may not meet hydric water table, flooding, or ponding criteria for a particular county.)

(4) To compile the list of hydric soil map units in counties that do not have a soil survey, use the soil identification legend.

(5) In some survey areas soils have been renamed to match current data and interpretations. If the updated map unit names do not match published names, include justification statements for those name changes that have moved the map unit from hydric to nonhydric or vice versa. These statements must address the reason and data that support the name change. Include the supporting data in Section II of the Field Office Technical Guide or the official copy of the soil survey report. The procedures for updating maps and names are described in Part 602 of the National Soils Handbook.

(6) Include a list of spot symbols that indicate small areas of wetness in map unit delineations. These lists of spot symbols further identify map units that may contain hydric soil inclusions. These symbols are shown on the Conventional and Special Symbols Legend (SCS-SOI-37A) for a county.

### 512.12 Criteria for wetland hydrology.

An area exhibits wetland hydrology if during a significant part of the growing season in years of normal precipitation, the area is permanently or periodically inundated, or soil is saturated to the surface.

### 512.13 Prevalence of hydrophytic vegetation.

#### (a) Determining prevalence.

(1) A prevalence of hydrophytic vegetation is determined by visually estimating the percent cover of obligate or facultative wet plant species (as provided in the National List of Plant Species That Occur in Wetland) as compared to those that are classified as facultative upland or upland species. If obligate and facultative wet plant species cover a greater percent of the area than facultative upland and upland plants, the area has a prevalence of hydrophytic vegetation. Document the basis for this a determination.

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Part 512 - Wetland Conservation

512.13(2)

(2) If it cannot be determined by visual observation whether hydrophytic vegetation is prevalent, use prescribed transect techniques to calculate a prevalence index value as described in Section 516.11. A prevalence index value of less than 3.0 indicates a prevalence of hydrophytic vegetation.

(3) If human activity has altered the natural plant community in an area that meets hydric soil criteria, prevalence can be determined by comparison to a nearby area that contains the same hydric soil under similar hydrological conditions and the natural plant community typically found on that soil map unit.

(4) An area such as hemlock swamp, pothole, playa, or vernal pool is also considered to have a prevalence of hydrophytic vegetation if it meets the criteria for hydric soil and wetland hydrology.

(b) Vegetation transects. Transect determinations of vegetation for hydric soil areas are based on a 200-foot line transect as described in Exhibit 516.11.

(512.14 Criteria for identifying Converted Wetland (CW) after December 23, 1985.

(a) A wetland is converted if:

(1) Excess water has been removed with dams, subsurface drains, ditches, terraces, diversions, dikes, or other physical manipulation to make production of an agricultural commodity possible. These measures may cause a conversion even if they are installed offsite from the affected wetlands. Offsite is any measure that is installed on land other than the wetland being evaluated and that has some effect on the subject wetland.

(2) Woody vegetation (stems and stumps) has been removed from a wetland after December 23, 1985, permitting the production of an agricultural commodity or forage crop. If hydrology is manipulated, the area is considered CW even if it still meets wetland criteria. On land where the natural vegetation is woody, and crop history for the area cannot be documented, the following exceptions apply:

(i) If the stems and stumps were not removed prior to December 23, 1985, the area is wetland, and cannot be farmed under natural conditions,

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512.14(b)(4)

(ii) If the stems were removed but the stumps remain to the extent that the land cannot be farmed without further stump or brush removal, the area is a wetland that cannot be farmed under natural conditions.

(iii) If the woody vegetation (including stems and stumps) was removed prior to December 23, 1985, the area is a wetland that can be farmed under natural conditions if it is not necessary to manipulate or remove additional woody vegetation (including stumps or brush) after December 23, 1985.

(3) If maintenance activities exceed prior scope and effect, or a wet area is manipulated.

(4) If maintenance takes place on a wetland FW or FWP and the person did not indicate intent to do maintenance on the AD-1026. Person may appeal and provide proof that it was maintenance.

(b) A wetland is not considered to be converted if:

(1) The area continues to meet wetland criteria despite having been cropped but not drained or otherwise altered. Cropping or cropping history are not criteria for converted wetland.

(2) Production of an agricultural commodity on the land is possible as a result of a natural condition, such as drought, and it is determined that the production of the agricultural commodity does not permanently alter or destroy natural wetland characteristics. Destruction of herbaceous (non-woody) hydrophytic vegetation as a result of cultivation is not considered to be destruction of a natural wetland characteristic, unless the cultivation is designed specifically to alter the hydrological condition, such as use of a chisel on a vernal pool.

(3) The manipulation that caused the conversion was needed to control erosion on highly erodible land. However, the wetland is considered converted if done for purposes other than erosion control on HEL; or

(4) The manipulation that caused the conversion was installed on HEL adjacent to the wetland area and caused the conversion by reducing water. Evaluate the structures used against alternative measures and document justification for the measures used. The measure used must be a practicable alternative for erosion control in accordance with the FOTG.

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## Part 512 - Wetland Conservation

### 512.14(c)

(c) Manipulation, as used in this manual, is the alteration of the hydrology or removal of woody vegetation for the purpose or to have the effect of making commodity production possible. Manipulation includes any action which removes excess water from a wetland, such as hydrological alterations with dams, dikes, ditches, diversions, subsurface drains, pumps, or filling that is sufficient to affect the flow, circulation, or reach of water within the wetland or farmed wetland. The following examples would not be considered manipulation and therefore will not require a minimal effect evaluation:

- Placing less than a cubic yard of fill in a 10-acre wetland if there is no apparent effect on the hydrology of the wetland. However, additional placement of fill may be considered manipulation if there is a detectable effect on hydrology.

- Undercutting of a ditch bottom which was already below the outlet prior to the action.

- Construction of a diversion which outlets back into the wetland.

- Replacement of a few feet of damaged tile, on areas that have not been abandoned.

- Construction of a ditch that brings additional water into a wetland and does not provide additional drainage.

Actions that exceed the above examples or similar practical limits will be considered manipulation and will be considered converted wetland if agricultural commodities, hay, or pasture can be grown.

Manipulations that will not make possible the production of an agricultural commodity: Certain manipulations, however, will not have the effect of making the production of an agricultural commodity possible, as illustrated by the following examples:

- The removal of woody vegetation without removal of stumps such that the area cannot be cropped or established to hay or pasture.

- The removal of woody vegetation from an area so small that production is not practical, such as clearing a fence line in a manner that will not permit the use of conventional tillage equipment on the cleared area.

Subpart B - Wetland Criteria

512.14(c)

- Construction of a dugout pond that does not affect the water table and the fill materials are transported out of the wetland.
- Impoundment of a stream that does not significantly affect downstream wetlands and the dam is constructed so that production of an agricultural commodity or forage crop is not practical.
- Construction of a small ramp through a wetland to permit wheels of an irrigation system to turn.

These and other similar manipulations will not be considered converted wetland and will therefore not need to be assessed under minimal effect.

512.15 Criteria for identifying prior converted croplands (PC) converted prior to December 23, 1985.

(a) Definition. Prior converted croplands were wetlands that were drained, dredged, filled, leveled, or otherwise manipulated before December 23, 1985, for the purpose, or to have the effect of, making the production of an agricultural commodity possible. This applies if (i) such production was not possible before the action, (ii) an agricultural commodity has been produced (planted) at least once before December 23, 1985, and (iii) the area has not been abandoned. This includes the following:

(1) Potholes or playas that have been drained to make possible the production of an agricultural commodity and no longer meet the hydrology criteria or hydrophytic vegetation criteria. Potholes and playas that were drained before December 23, 1985, by ditches or tiles are prior converted cropland if the ditch or tile was installed at an elevation or grade below the bottom of the wetland sufficient to remove water so that it no longer meets wetland hydrology criteria. These prior converted croplands are subject to abandonment criteria.

(2) Areas other than potholes or playas that were manipulated prior to December 23, 1985, to make possible the production of an agricultural commodity.

(3) Flooded and ponded areas that are less than seasonally flooded that have been drained, diked, or otherwise altered so that they do not flood or pond for extended periods during the growing season.

(4) Hydric soils that met only the water table (saturation) criteria, if prior to December 23, 1985, they were either drained or otherwise manipulated or had the woody vegetation removed, and:

(i) have been used to produce an agricultural commodity, and

(ii) have not been abandoned, and

(iii) do not currently flood or pond seasonally.

Subpart B - Wetland Criteria

512.15(a)(5)

(5) Areas of hydric soils that were manipulated prior to December 23, 1985, to the extent that they did not and do not currently meet hydrology criteria, but were never cropped, are considered non-wetland (NW). The abandonment provision applies to such lands, even if they have not been cropped, and they are considered wetland if wetland criteria are met after the appropriate period of abandonment. However, areas that meet the wetland criteria and where crop history cannot be documented are considered wetlands (W) and not prior converted cropland (PC). These areas can be farmed under natural conditions if it is not necessary to manipulate or remove additional woody vegetation (including stumps or brush) after December 23, 1985.

(6) Pocosins and other similar areas are prior converted cropland only if prior to December 23, 1985:

- (i) the woody vegetation was removed,
- (ii) a drainage system was installed that altered the hydrology to the extent the wetland criteria is no longer met,
- (iii) an agricultural commodity has been produced, and
- (iv) they have not been abandoned.

(b) Areas not considered to be prior converted croplands.

(1) Potholes and playas that were manipulated prior to December 23, 1985, but otherwise continue to meet wetland criteria shall not be determined to be prior converted croplands. Where potholes and playas were drained prior to December 23, 1985, to make possible the production of an agricultural commodity by ditches or tiles, they will be determined to be prior converted cropland if the ditch or tile was installed at an elevation or grade below the bottom of the wetland and has removed the wetland hydrology. These prior converted croplands are subject to abandonment criteria.

(2) Other wetland areas that are seasonally flooded or ponded and were manipulated before December 23, 1985, to make agricultural production possible, but otherwise continue to meet wetland criteria, are not prior converted croplands. (With maintenance considered and documented as outlined in 512.35(c)(6)).

Part 512 - Wetland Conservation

512.16(c)(1)

(i) Surface water must be present for extended periods in the growing season to qualify as seasonally flooded or ponded. "Extended periods" is defined as the continued presence of surface water for at least 15 consecutive days or 10 percent of the growing season, whichever is less under average conditions (50 percent chance of occurrence using all existing precipitation records). Growing season is defined in Hydric Soils of the United States.

(ii) States, with NTC concurrence and in consultation with FWS, are authorized to determine locations where extended periods will be longer than the definition above. Such determinations will be based on the degree of ponding or flooding required to protect seasonal wetland wildlife values. The purpose of defining seasonally flooded or ponded areas as wetlands despite previous manipulations (e.g., clearing woody vegetation, planting an agricultural commodity) is to maintain remaining seasonal wetland wildlife values.

512.16 Criteria for identifying Converted Wetlands (CW+year) after November 28, 1990.

(a) Converted wetlands after November 28, 1990, will be determined using the criteria for converted wetlands in 512.14.

(b) Persons who convert a wetland after November 28, 1990, for the purpose, or to have the effect, of making possible the production of an agricultural commodity will be ineligible for USDA program benefits.

(c) The conversion of a wetland for any purpose other than vineyards, shrubs, fish production, trees, cranberries, roads, and buildings is considered as converted for crop production.

(1) Wetland converted for pasture or hayland is considered a converted wetland because it is assumed a conversion to allow the planting of grass or legumes also would make the production of an agricultural commodity possible.



Subpart B - Wetland Criteria

512.16(c)(2)

(2) If trees and stems are removed only in part, but grasses and/or legumes are planted, the area is considered a converted wetland unless the planting is approved in advance by SCS.

(3) The removal of brush and stems from wet areas that have not been maintained in the past 5 years, making it possible to plant grasses or legumes, causes the area to be a converted wetland if the actions are not minimal effect.

(4) Clear cutting when stems and stumps are removed prior to replanting trees requires prior approval as outlined in 512.17.

(5) Construction of outlets through wetlands in order to maintain prior converted cropland, farmed wetlands, and farmed wetlands pasture causes the wetland to become a converted wetland if effects are not minimal.

(6) Construction of dugouts or other ponds in wetlands resulting in fill being placed in a wetland, cause the area to be a converted wetland if effects are not minimal.

(7) The following apply to wetlands converted after November 28, 1990, by mining and other major land disturbing activities:

(i) Wetlands converted as a result of a mining permit require a wetland reclamation plan that provides for the restoration or replacement of all wetlands converted as a result of the mining activity.

(ii) The operator holding the surface rights will be permitted to resume agricultural production without loss of benefits when the wetland reclamation plan is fully applied.

(iii) The restoration or replacement of wetlands on mined areas does not have to be located on prior converted cropland.

(iv) The use of mitigation banks is permitted under the guidelines in 512.22(a)(5)(iv).

Part 512 - Wetland Conservation

512.17(a)(1)

(d) The person will remain ineligible for all programs and all lands which the person has an interest, for that year forward, if the land is not restored. Any other person will become ineligible in any year in which the person plants an agricultural commodity or forage crop on the land.

(e) All converted wetlands that were not PC on December 23, 1985, and that are found after November 28, 1990, on farms enrolled in USDA programs for which an AD-1026 is signed, will be presumed to have been converted after November 28, 1990, and therefore must be restored in order for the person to regain eligibility for USDA program benefits. The person will be issued a determination of CW+year, which the person may appeal. Request ASCS to provide an ASCS-569 form, SCS Report of Conservation Compliance for Spotcheck Purposes. SCS will consider changing the CW+year determination if the person can document that the wetland was converted prior to November 28, 1990. If the area has been planted to an agricultural commodity, or the person provided incorrect information, inform ASCS.

(f) Wetlands converted after November 28, 1990, will be labeled CW plus the year in which the conversion took place or was found.

(g) Manipulation of a wet area that makes production of an agricultural commodity possible will cause the area to become a converted wetland.

(512.17 Criteria for converted wetlands for non-agricultural purposes (CWNA).

(a) Persons who plan to convert a wetland for purposes other than production of an agricultural commodity or forage crops must have such plans approved before the conversion takes place. The plan must be approved by the SCS in consultation with FWS. Any person who converts a wetland is considered to have converted the wetland for agricultural production unless the person got prior approval for conversion. Persons must indicate on the AD-1026 that a wetland will be converted for non-agricultural use. The wetland will be labeled "CWNA" exempted converted wetlands, non-agricultural use.

(1) Persons who plan to do maintenance on hayland, pasture, or other wetlands that will not lead to a land use change must also get prior approval under this section by indicating intent on an AD-1026.

## Subpart B - Wetland Criteria

512.17(a)(2)

(2) For purposes of this section, agricultural production includes the planting of any crop, hay, or pasture. Fruit trees, trees, vineyards, shrubs, fish production, and cranberries are not considered agricultural production if the conversion follows an approved plan.

(3) Before approving a plan, SCS will advise the person that 404 or other wetland-related permits may be required.

(4) SCS will conduct an annual review of all wetlands that are converted for non-agricultural use, until the planned use is installed. At any time that the plans are not being followed, or a hay, pasture or agricultural commodity is planted on the area, the area will be changed to a converted wetland and will be in violation of the wetland provisions.

(b) Persons who plan to convert wetlands for non-agricultural uses must check yes to appropriate question on form AD-1026 and must submit a plan to SCS for approval before converting the wetland.

(1) The plan must include present condition, planned alterations to the wetland, planned land use, date of conversion, date the plan will be fully implemented, and the planned cover for subject area.

(2) The DC will review the plan and note any additional conditions for the conversion.

(3) Have the person sign the plan and inform them that not following the plan will cause the area to become a converted wetland and be in violation of the FSA provision.

(4) The DC will sign the plan.

512.18 Criteria for Converted Wetland Technical Error (CWTE)

Incorrect wetland determinations made by SCS officials will be corrected any time such incorrect determinations become known. The new determinations become effective when made; however, no person shall be adversely affected by actions based on a prior determination. Promptly notify the land owner of the corrected determination.

(a) If the person has taken no actions to convert the wetland, label the area wetland and all USDA policies apply.

(b) Obvious wetlands will not be exempt.

(c) If wetlands have been converted as the result of good faith reliance upon misinformation from SCS or if conversion has commenced before the person receives the corrected determination, the person shall be granted relief for the actions taken based on the incorrect determination. Any further conversion activities would result in a loss of benefits unless the action were determined to have minimal effect.

(d) The state conservationist must approve relief granted for actions taken because of incorrect determinations by SCS in consultation with FWS. The documentation provided by the field office and reviewed by the area office must include a reviewable record, consisting of:

- Data supporting incorrect information provided to person.
- Date conversion was started.
- Date conversion was completed.
- Total cost of conversion.
- Total amount spent on conversion as of date correct determination was provided to a person.
- Explanation of the events and circumstances leading to the error.
- Statement of actions taken to correct the error and prevent reoccurrences.
- Documentation of FWS consultation.

(e) If a small investment was made to convert the area, the person shall not be considered in violation for past actions, but will not be permitted to plant agricultural commodities on the area in the future unless the wetland is restored.

(f) If a substantial investment was made to convert the wetland, label the area "CWTE" (converted wetland technical error), and permit the person to plant agricultural commodities and maintain existing drainage in the future. Any additional conversion of the area would result in a loss of benefits unless the action were determined to be minimal.

(g) If an agricultural commodity is planted or the action related to the conversion of a wetland takes place after SCS informs the person of the error, or if the person knew or should have known that the determination was in error, no exemption is allowed.

Subpart B - Wetland Criteria

512.18(h)

(h) FWS must be consulted on all misinformation determinations.

(i) Inform the producer that Section 404 permits and other federal, state, and local permits may still be required.

(j) Within 15 days after the state conservationist decides that misinformation was provided, forward the entire reviewable record to the Director, Conservation Planning Division.

(k) Each state conservationist must report quarterly to the Director, Conservation Planning Division, the cumulative number of CWTE exemptions granted as of that quarter and the number of acres converted due to technical error. Reports are due April 15, July 15, October 15, and January 15; negative reports are required.

512.19 Criteria for abandonment.

(a) Abandonment is the cessation of cropping, management, or maintenance operations on prior converted cropland (PC), farmed wetland (FW), or farmed wetland pasture or hayland (FWP). If cropping, management, or maintenance operations have ceased for 5 successive years, prior converted cropland, farmed wetland, or pasture or hayland wetlands are considered abandoned if wetland criteria are present, unless it is shown that there was no intent to abandon; however, if there is no crop production for 5 successive years, the land is abandoned if it meets wetland criteria.

(1) Cropping means the use of the area for the production of an agricultural commodity, but also includes the use of the area for aquaculture, grasses, or legumes, or pasture production in a commonly used rotation related to the production of an agricultural commodity. Management or maintenance means carrying out those operations that support the production of the agricultural commodity, hay, or pasture.

(2) A person may provide a written declaration of a decision to cease cropping, management, or maintenance operations and allow the land to revert from cropland, farmed wetland, or farmed pasture or hayland wetland to natural wetland. Indicating

an intent to sell or develop land for non-agricultural uses does not constitute an intent to abandon, without a written declaration.

(b) A prior converted cropland (PC) or farmed wetland (FW) is considered abandoned if wetland criteria are met, and

(1) the prior converted cropland or farmed wetland has not been planted to an agricultural commodity for 5 successive years; and

(2) it was not enrolled in a USDA set-aside or similar program of conserving use or wetland restoration approved by FWS or a state wildlife agency. However, if it is clear that the area was not farmable for the preceding 5-year period and was not farmable at the time it designated as set-aside, the area is considered wetland (W). The DC will request ASCS to determine whether the land was eligible for set-aside when it was designated, and ASCS will document its determination. The DC should inform ASCS, the farmer, and the state conservationist, through appropriate channels, that the area is now determined to be wetland due to abandonment of crop production, or

(3) the person indicates an intent to abandon. However, after 5 successive years of no crop production or participation in USDA set-aside or similar programs, the area is automatically considered abandoned regardless of intent. The farmer may request a reconsideration or appeal of the wetland determination based on the inability of the farmer to maintain production on the area due to circumstances beyond the farmer's control, such as where production on the area has been abandoned and not used as set-aside due to lack of maintenance of a related drainage facility by the drainage district or county. Using the information provided by the farmer, with the concurrence of the Fish and Wildlife Service (FWS), the DC may determine that the presumption of abandonment has been rebutted by this showing of an intention not to abandon.

(c) Farmed wetland pasture or hayland (FWP) is considered abandoned if wetland criteria are met, and

(1) the farmed pasture or hayland wetland has not been used, managed, or maintained, and has not been harvested (hayed, cropped or grazed) at least once in the preceding 5-year period; and

Subpart B - Wetland Criteria

512.19(c)(2)

(2) the requirements of 512.19 (b) (2) or (3) are also met.

(d) Prior converted croplands, farmed wetlands and pasture and hayland wetlands that SCS determines are abandoned and reverted to wetlands are classified as wetland and all wetland provisions apply. For lands that have been abandoned and meet wetland criteria the district conservationist will change designations to wetlands (W) upon becoming aware that such conditions exist. Persons may produce agricultural commodities on abandoned wetland only if water regimes are not altered or woody vegetation removed.

Part 512 - Wetland Conservation



Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

SUBPART C - WETLAND EXEMPTIONS, MITIGATION, RESTORATION, AND REPLACEMENT

512.20(e)

512.20 Wetland exemptions.

Record the following wetland exemptions on Form SCS-CPA-026. Delineate these areas on the ASCS aerial photocopies and return the photos to ASCS with Form SCS-CPA-026. ASCS will outline these areas on their official maps. This process eliminates the need for persons to complete a new Form AD-1026 each year that maintenance is done on prior converted croplands or other exempted wetlands. Wetland exemptions include the following:

(a) Prior converted cropland (PC). A prior converted cropland is an area that was wetland that was manipulated before December 23, 1985, for the purpose, or to have the effect of, making the production of an agricultural commodity possible. The area is PC if production was not possible before the action, an agricultural commodity has been planted at least once, and the area has not been abandoned. PC's are exempt from FSA.

(b) Artificial wetlands (AW). An area is an artificial wetland if the area was formerly nonwetland or prior converted cropland, but now exhibits wetland characteristics because of human activities.

(c) Irrigation-induced wetlands (AW). An area is an irrigation-induced wetland if it was created by irrigation or seepage from an irrigation delivery system, but was nonwetland in its natural state.

(d) Wetlands (W) farmed under natural conditions. If the production of an agricultural commodity is possible on wetland as a result of a natural condition, such as drought, without the person destroying a natural wetland characteristic, label the wetland (W).

(e) Minimal effect (MW). Label the area MW if the production of an agricultural commodity on a converted wetland, in connection with all other similar actions in the area, would have minimal effect on the hydrological and biological functions of the wetland.

512.20(f)

(f) Farmed wetlands (FW). Use FW to identify wetlands that were manipulated and used to produce an agricultural commodity before December 23, 1985, but still meet wetland criteria, and therefore are not prior converted croplands. These areas include potholes and playas that still meet the wetland criteria, or areas that are seasonally ponded or flooded for an extended period.

(g) Farmed Wetland Pasture (FWP). Use FWP to identify wetlands that were manipulated and used to produce hay and/or pasture before December 23, 1985, but still meet wetland criteria, and are therefore still wetlands.

(h) Good Faith Wetlands (GFW). Wetlands which ASCS has determined were converted in good faith and with no intent on the part of the person to violate the wetland provisions.

(i) Mitigation Wetlands (MIW). Frequently cropped wetlands or wetlands converted between December 23, 1985, and November 28, 1990, for which the person has signed an agreement with SCS/FWS to mitigate the values lost or to be lost by the conversion. Mark MIW on the converted area and "Easement" with "W" on the PC that is restored for mitigation.

(j) Converted Wetlands Technical Error (CWTE). Wetlands that were converted by the person as result of incorrect information provided to the person by SCS.

(k) Converted Wetland, Non-agricultural Use (CWNA). Wetlands that are converted for trees, shrubs, cranberries, vineyards, fish production, roads, buildings and other non-agricultural uses that have been approved by SCS prior to the conversion.

512.21 Minimal effect determination (MW)

(a) Definition. Minimal effect is an exemption that can be granted by SCS in agreement with FWS for converted wetland or proposed conversions that will have minimal effects on the hydrological and biological functions of a wetland.

(b) Approval authority.

(1) The state conservationist must approve:

- All minimal effect agreements that allow the removal of woody vegetation;
- All minimal effect agreements for which the conversion was completed before the agreement; and
- All minimal effect agreements for which agreement was not reached between SCS and FWS at the local level.

(2) The district conservationist may approve minimal effect agreements:

- For proposed conversions which have not yet been manipulated, and
- Do not require the removal of woody vegetation, and
- Have been signed by FWS.

(c) Requirements.

(1) FWS agreement. SCS will consult with Fish and Wildlife Service (FWS) on each minimal effect determination. The SCS district conservationist and FWS will complete the minimal effect evaluation form for each site. If SCS and FWS do not agree at the field office level, refer the decision to the state conservationist, who will make a decision in consultation with FWS. The state conservationist will report to the Director of the Conservation Planning Division all decisions made at the state level without concurrence of FWS at the local level. The local FWS will report to their National office when agreement cannot be made with SCS at the local level.

(2) Area of consideration for minimal effect. In making minimal effect determinations, the environmental evaluation will assess the effects of the conversion on the wetland as well as the cumulative effect of the conversion on other wetlands in the area that will be affected.

(3) Violations. If a person violates the minimal effect agreement, the minimal effects exemption is withdrawn and the area becomes a "converted wetland".

(4) Agreement. A minimal effect determination is granted only after the person agrees to and signs the minimal effect agreement (Exhibit 516.12) if there are future requirements. If there are no future requirements, SCS may grant a minimal effect determination by signing the evaluation form with FWS and noting that the determination was granted with no future requirements.

(d) Procedures for making a minimal effect determination - Prior approval. If the conversion has not occurred, the district conservationist will process a request for a minimal effect determination by completing an on-site environmental evaluation using the procedures in Section 516.13. Conduct minimal effect evaluations only if requested by the person prior to the beginning of activities that would convert the wetland except as noted in (e)(7) below. If, after completing the evaluation, it is determined that a minimal effect determination is appropriate, the DC may make a minimal effect determination with agreement from FWS.

512.21(d)

If FWS does not agree, follow procedures in (c)(1) of this section. If the DC determines that a minimal effect determination is not appropriate, the data will not be forwarded to the STC, and the person's only recourse is through the SCS appeals process. Minimal effect determinations where effects are minimal on the hydrological and biological values of the wetland without future restoration or mitigation will be effective from the date of the action that caused the conversion, and as long as the minimal effects agreement is followed. Wetlands having such minimal effect determinations are considered exempt.

(e) Procedures for making a minimal effect determination - Post approval. If a person converts a wetland after December 23, 1985, and then seeks a determination that the effect of the conversion is minimal, the burden of proof is on the person to demonstrate to the satisfaction of SCS that the effects were minimal.

(1) Do not make an onsite minimal effect environmental evaluation for wetlands converted after November 28, 1990, or for converted wetlands on which an agricultural commodity was planted after December 23, 1985.

(2) Provide the person a copy of the SCS evaluation form and sections of this manual relating to minimal effect.

(3) The person must document pre-conversion conditions, date of conversion, conversion action, weather conditions prior to and since the conversion, and other details needed to permit SCS to evaluate the effects of the conversion. Exhibit 516.20 is a list of information that the person must provide.

(4) Forward the person's documentation (and restoration plans, if needed) through the area office to the state office. No consultation with FWS will be made and no decision will be made at the field office level.

Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

512.21(e)(7)(iv)

(5) The state conservationist will create a minimal effects committee to review the applications for wetland converted prior to a minimal effect request and evaluation.

(i) The minimal effects committee will consist of State and Federal agencies with responsibility in wetland protection.

(ii) Minimal effects determinations will only be granted by the state conservationist if there is consensus by the technical committee that the effects are minimal and FWS agrees.

(6) Minimal effect determinations where the person can prove the past actions have had only minimal effects on the hydrological and biological characteristics of the wetland will be effective from the date of conversion and continue as long as the MW agreement is followed.

(7) Minimal effect may be granted for conversions that have already taken place if restoration is applied quickly enough to result in insignificant loss of wetland values and the person can prove to SCS and FWS that the effects are minimal. An exemption for "converted wetlands" that have already been restored may be made by the state conservationist as outlined below:

(i) Minimal effects will not be considered until the wetland is completely restored as outlined in Appendix 516.13.

(ii) If restoration is required (Note: mitigation will not be permitted) the restoration actions must take place before the application for minimal effects is processed. The period between the conversion and the complete restoration of the converted wetland will be the period considered for a minimal effect determination.

(iii) In order for SCS to assess the effects during the period of conversion the person must provide the information listed in appendix 516.20.

(iv) If the state technical review committee requires additional measures before granting a truly minimal effect (MW) exemption, the person must complete those measures prior to reconsideration of the appeal. The person should restore all values as soon as possible and prior to the first review by the state technical review committee, because a rainfall with runoff might occur while the person is making an application and prior to completely restoring the wetland, that would cause the conversion to have more than minimal effects.

512.21(e)(7)(iv)

Since the period of consideration for minimal effects is from the date of conversion until completely restored, the wetland must be completely restored prior to determination of minimal effects so that the period and conditions are known.

512.22 Mitigation (MIW).

(a) Requirements. Mitigation for lost wetland values, acreage, and function on frequently cropped wetlands and wetlands converted between December 23, 1985, and November 28, 1990, will be effective for the crop year noted in the agreement. The effective date cannot be earlier than one crop year after the agreement is signed by SCS, FWS, and the person and an easement is recorded for the mitigated area. Mitigation can only be used to regain USDA program benefits for future crop years.

(b) Applicability. Exemptions for future crop production may be granted for areas that are mitigated through the restoration of another "prior converted cropland." This exemption applies to frequently cropped converted wetlands as well as to wetlands converted between December 23, 1985, and November 28, 1990, that have not had an agricultural commodity planted on them in any year that the person was enrolled in USDA programs. Such mitigation will permit a person to plant on the converted wetland without being ineligible for future USDA benefits. Frequently cropped wetlands are areas that were farmed more years than not, as determined from ASCS records. Persons requesting mitigation must follow the following:

(1) Timing of request. The person must request the mitigation exemption prior to violation of the wetland provision.

(i) For frequently cropped wetlands, the request for mitigation must be made before the conversion activity is commenced.

(ii) For wetlands converted between December 23, 1985, and November 28, 1990, the request for mitigation must be made before an agricultural commodity is planted on the converted wetland.

(2) Restoration plan. A restoration plan for the mitigation must be approved by SCS in agreement with FWS prior to the restoration.

Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

512.22(b)(5)

(i) The person may develop a plan or employ a third party to develop a restoration plan or,

(ii) The person may request that SCS and/or FWS develop the restoration plan.

(iii) If the area was converted between December 23, 1985, and November 28, 1990, the person must document pre-conversion conditions.

(iv) The plan must state measures to be taken to restore the wetland, and when each measure will be installed.

(3) Restrictions. The mitigation action must not be at the expense of the Federal government, for either the direct or indirect costs of the restoration or costs associated with acquiring the easement,

(i) CRP wetlands cannot be used.

(ii) Federal lands or lands on which Federal funds were used to acquire an easement cannot be so used.

(iii) State, local, and private funds may be used if the government unit or private organization or person agrees to have such funds used.

(iv) Federal cost sharing cannot be used.

(4) Location of the mitigated area. The mitigated area should be on the farm or as close to the farm as possible. If the mitigation area is off the farm, it must be in the same hydrologic unit or watershed. The maximum size watershed for these purposes is 250,000 acres.

(5) Mitigation banks. Mitigation banks may be used for mitigation for converted wetlands, or wetlands to be converted. However, all other requirements listed in this section must be followed, as well as the following:

(i) Mitigated wetlands cannot be used if federal assistance is directly responsible for their creation, restoration, assessment, or land cost.

512.22(b)(5)(ii)

(ii) Mitigated wetlands cannot be used without the written consent and agreement to maintain by the entity responsible for their creation or restoration.

(iii) If off-farm wetlands are used for mitigation, a comprehensive wetland evaluation system must be developed and used to document that restored or created wetlands fully compensate for the biological and hydrological values of converted wetlands.

(A) Regional mitigation banks may be outside the local watershed, but must be within the general region that provides equivalent wetland values.

(B) The mitigation bank must be within the state. Exceptions require approval of the Deputy Chief for Programs.

(iv) The mitigation agreement information must state that local, state, and other federal permits may be required prior to construction. Note that mitigation agreement relates to FSA only.

(v) A monitoring system must be developed by the state conservationist to ensure that off-farm mitigation measures are being fully implemented annually.

(vi) A tracking system must be developed by the state conservationist to ensure that converted wetlands are tied to specific mitigated wetlands in the bank with the same wetland values and acreage.

(vii) The third party providing the mitigated wetlands must sign the mitigation agreement and agree to maintain the subject lands according to conditions outlined.

(viii) SCS will annually review third party restored mitigation sites. If the third party fails to meet the conditions of the agreement, withdraw the exemption from the wetland that was converted and label the area CW + year.



Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

512.22(b)(7)(iii)

(6) Easement. The person must provide an easement to USDA for the restored wetland.

(i) Term. The term of the easement is as follows:  
For less than frequently cropped wetlands: Easement will be for length of time to restore the wetland characteristics OR the length of time the converted wetland is in production, whichever is greater.

For frequently cropped wetlands and wetlands converted between December 23, 1985, and November 28, 1990: Easement will be for length of time the converted wetland is in production only.

(ii) Administration. Easements will be administered by the Commodity Credit Corporation (CCC).

(iii) Recording. The easement must be recorded on public land records. The landowner must pay recording fee and certify that there is no lien on the land. If the land is mortgaged, the mortgage holder must agree to subordinate its interest to the CCC easement.

(iv) Enforcement. If terms of the agreement are violated or the restored area is converted, SCS will issue a determination that the area for which the restored area mitigated is a Converted Wetland, and the person will be ineligible for USDA benefits.

(v) Easement instrument. Use the standard easement language shown in exhibit 516.22.

(7) Required area. Restored area must meet the following criteria:

(i) Replacement must be on prior converted (PC) cropland.

(ii) Functional values lost must be replaced.

(iii) Generally, replacement will be on a one-to-one acreage; less than or greater than one-to-one may be approved if the state conservationist and the FWS delegated authority at the state level concur.

Part 512 - Wetland Conservation

512.24(b)(7)(iii)(A)

(A) <1:1. If a landowner offers less than one-to-one acreage but offers to return the restored area to its pristine (nonfarmed) condition, this may be accepted if approved by SCS and FWS at the state level.

(B) >1:1. If SCS and FWS feel that a greater than one-to-one restoration is required, the person will be permitted to appeal the requirement that the restoration be more than one to one.

(8) Review. The state conservationist must develop a review policy for all mitigated wetlands.

(512.23 Restoration of wetlands converted after November 28, 1990 that are NOT in good faith.(RVW+year)

(a) Persons may restore a wetland in order to produce under natural conditions in the future on wetlands converted between December 23, 1985, and November 28, 1990; and to regain eligibility on converted wetlands that are converted after November 28, 1990, which ASCS determined were not in good faith. Restored wetlands can only be farmed under natural conditions if they were farmed prior to conversion.

(b) Restoration will not enable a person to recoup USDA program benefits for past years.

(c) Agreements to restore wetland values may be approved for all converted wetlands. The restoration must be on the converted site and all lost values must be restored. The person who converted the wetland must document pre-conversion conditions.

(d) The effective date of the restoration will be the first crop year after the "agreed-to-items" have been restored as outlined in the agreement. Restoration cannot be used retroactively to have past benefits restored. Restoration can be used to permit a person to farm the converted area under natural conditions if it was farmed before the conversion and to help a person regain eligibility if a wetland was converted after November 28, 1990, and was found not to be in good faith.

Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

512.24(d)

(1) If a person plants an agricultural commodity on a converted wetland, or has converted the wetland after November 28, 1990, and ASCS determines the conversion not to be in good faith, the person may restore the wetland and the area will be labeled RVW+91, with the number representing the year of the violation. This is to track the year for which a violation took place, and note that the person will not be eligible for a good faith exemption for another 10 years.

(2) In cases of restoration, the person must provide documentation of prior conversion conditions.

(3) Permitted use of the area will be noted in the plan.

(4) Restoration plan must be approved by SCS with agreement with FWS.

512.24 Restoration of wetlands converted between December 23, 1985, and November 28, 1990. (RSW)

(a) Persons may restore a wetland in order to produce under natural conditions in the future on wetlands converted between December 23, 1985, and November 28, 1990. If a person restores a wetland that was converted between December 23, 1985, and November 28, 1990, (on which no violation has occurred), the area will be labeled as "RSW" after restoration.

(b) Restoration will not enable a person to recoup USDA program benefit for past years

(c) Agreements to restore wetland values may be approved for all converted wetlands. The restoration must be on the converted site and all lost values must be restored. The person who converted the wetland must document pre-conversion conditions.

(d) The effective date of the restoration is the first crop year after the wetland is restored as outlined in the agreement. Use of the area will be noted in the plan. Restoration plan must be approved by SCS with agreement of FWS. The restored area can be farmed under natural conditions if it was farmable prior to conversion. Use of the area will be noted in the plan.

512.24(e)

(e) Restoration plan must be approved by SCS with agreement of FWS. If the DC and FWS cannot agree on the restoration plan at the local level, the decision will be referred to the state conservationist. The state conservationist may approve the restoration plan in consultation with a representative of FWS. If SCS and FWS do not agree on the restoration plan at the state level, the state conservationist may approve the plan, but will report the lack of agreement to the Director of the Conservation Planning Division within 30 days and send a copy to the NTC. FWS will report the lack of agreement to their national office.

(512.25 Replacement of wetland values (RPW).

(a) An agreement to replace lost wetland values at another site can be made for non-frequently cropped wetlands if the proposed replacement values are as good as or better than the values that would be lost due to the conversion. The effective date of the replacement agreement is stated in the agreement and will not be before the agreement is signed by SCS, FWS, and the person. Replacement cannot be used retroactively to have past lost benefits restored. Replacement can only be used to permit a person to farm a converted wetland in future years as outlined in the agreement. Replacement can be used under some very limited conditions. Inform the person that 404 and other Federal, state, and local permits may be required. All replacements must be accomplished according to the following guidelines:

(1) All of the conditions and requirements for mitigation in 512.22 must be met. In addition:

(2) The replacement area must be on the same farm; wetland banks are not to be used;

(3) the area converted does not have to be frequently cropped or to have been converted between December 23, 1985, and November 28, 1990.

(4) Replacement of wetlands not frequently cropped will be used only where the purpose of the conversion is not solely the increase of production of an agricultural commodity on the converted wetland, such as where removal of woody vegetation will allow center pivot systems to function. Replacement cannot be used for the squaring-off of corners of fields or for convenience of operating large equipment.

Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

512.26(b)

- (5) Wetland functions and values lost must be replaced;
- (6) Restoration for replacement must be granted before the conversion, never after the conversion.
- (7) Replacement must take place on prior converted cropland;
- (8) All necessary Federal, State, and local permits must be obtained prior to approval of the plan by SCS to replace lost values. The plan shall state it does not exempt the producer from any other wetland protection rules and regulations outside FSA;
- (9) The plan to replace lost values must be concurred with by SCS and agreed to by FWS at all levels; Forward a copy of the signed restoration agreement to the national offices and NTCs of SCS.
- (10) USDA will require an easement on the replacement wetland.

512.26 Good faith exemptions (GFW+year).

(a) Requirements. A person who has violated the wetland provision of FSA by converting a wetland after November 28, 1990, or by planting an agricultural commodity on a wetland converted after December 23, 1985, is eligible for graduated sanctions if:

- (1) The person is actively restoring the wetland under a plan approved by SCS and the Fish and Wildlife Service (FWS), and
- (2) ASCS determines that the person converted the wetland or produced an agricultural commodity on a converted wetland, in good faith and without the intent to violate the wetland provision, and
- (3) There was no prior wetland violation in the past 10 years.

(b) Good faith determination: Persons who have violated the wetland conservation provisions and want graduated sanctions must apply to ASCS for a determination of Good Faith. ASCS will make a decision based on the following:

512.26(b)(1)

(1) Information provided by the person regarding the circumstances surrounding the violation and any evidence indicating the violation was in good faith, and not a scheme or device to avoid compliance, and

(2) Information provided by SCS including:  
- facts relating to the case  
- whether the person was officially informed of the wetland determination  
- whether there was direct consultation by SCS with the person concerning the wetland prior to the violation  
- whether there was a previous violation of the wetland conservation provision by the person.

(c) Graduated payment reductions. When a restoration plan has been approved by SCS, FWS and the person, ASCS will be informed on Form AD-1069 and the person will be eligible for graduated sanctions. The entire restoration must be completed within 12 months. The person's USDA benefits shall be reduced by not less than \$750 or more than \$10,000. The amount of the graduated payment reduction shall be based on the Graduated Payment Reduction Worksheet (AD-1069) outlined in (b) above. Persons who have had benefits withheld will have those benefits restored, less the amount of the graduated payment reduction will be based on the seriousness of the violation as determined from the Graduated Payment Reduction Worksheet which provides the following information: (See Form AD-1069, Exhibit 516.19.)

(1) the amount of wetland (acres) (CW+year) that was converted that made possible agricultural production, or the acreage of converted wetland (CW) planted to an agricultural commodity,

(2) the information available to the person prior to the violation,

(3) the previous land-use patterns in and around the wetland basin, and

(4) the amount of time required to restore hydrologic and vegetative functions and values to the basin's pre-conversion condition as determined by SCS with FWS.

Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

512.27(b)

(d) Approval of restoration plan: If ASCS determines that the violation was in Good Faith, SCS and FWS will approve a developed plan to restore the wetland basin to its pre-conversion condition. Plans will be developed within 90 days after ASCS sends AD-1069 to SCS. See Section 512.27 for detail on content of restoration plan; also, all requirements stated in 512.24 apply.

(e) Determination. When the person is actively restoring the wetland, the converted wetland plus year (CW+year) will be changed to "GFW+year" (Good faith, plus the year the wetland was converted). Persons may plant on the GFW area under natural conditions if the wetland area was farmable under natural conditions prior to conversion and planting activities would not reduce or impair the restoration structures or improvements required in the restoration plan. The person would not be eligible for another Good Faith exemption for a 10-year period from the time of the "GFW" determination. If the person violates the restoration agreement, or fails to install restoration measures as planned, the "GFW" determination will be removed and replaced with a "CW" plus year that the person failed to meet the restoration requirements. If the wetland was converted after November 28, 1990, the person will be ineligible for all USDA program benefits until the wetland is restored to conditions that existed prior to conversion.

(f) Notifying ASCS. Notify ASCS when the wetland has been fully restored according to the agreement.

(512.27 Restoration plans.

Conversion of wetlands usually involves the loss of wetland functions and values; therefore, restoration means the full recovery of all lost values and functions.

(a) Under the good faith exemption, SCS and FWS will develop a restoration plan that fully restores all of the converted wetland's lost functions and values that have been lost as a result of conversion. Plans will be developed within 90 days after ASCS notifies SCS that the producer is eligible for a good faith exemption. The plan will include the restoration of hydrology and hydrophytic vegetation to its pre-conversion condition.

(b) SCS and FWS will approve restoration plans that fully restore all of the converted wetland's functions and values that have been lost as a result of conversion activity.

512.27(b)

Plans will be approved within 90 days after ASCS notifies SCS that a plan is necessary. The plan will include the restoration of hydrology and hydrophytic vegetation to its pre-conversion condition.

(1) Restoration of hydrology will include the establishment of the hydrological conditions (e.g. duration, frequency, and timing of ponding, flooding, or saturation) that existed prior to the conversion of the wetland.

(2) Restoration of vegetation means the establishment of the wetland species present prior to the conversion. If a seed or tuber source for herbaceous vegetation is present in the soil, then planting may not be necessary. In the case of woody species, a revegetation plan will be developed that restores a plant community similar to that present before the conversion. The restored plant community will approximate the same species and percent species composition. This information can be obtained from personal knowledge, photos, and existing wetlands within the area. Follow up assistance will be provided to ensure that the wetland is revegetated as planned. If the plants fail to establish, the area will be replanted. The area will not be considered fully restored until the vegetation is established.

(c) The restoration plan will include structures needed to restore the hydrology, land shaping to restore previous gradients and other topographical features, the species of plants to be established, percent species composition, planting schedules and seeding/planting rates, and management needed to ensure that the wetland is fully restored to its previous condition.

(d) If the wetland was cropped before to the conversion, the plan will allow cropping after restoration.

(e) SCS will inform ASCS that the producer is actively restoring the wetland once it is signed by SCS, FWS, and the producer.

(f) The plan must be implemented within 12 months. If circumstances beyond the control of the producer occur which prevent full implementation of the plan within the specified time, then an extension can be granted if ASCS, SCS, and FWS are in agreement.



Subpart C - Wetland Exemptions, Mitigation, Restoration, and Replacement

512.28(a)

(g) The restoration plan may be approved by the district conservationist and a representative of FWS. If agreement between the DC and FWS on the restoration plan cannot be reached at the local level, such determinations will be referred to the state conservationist. The state conservationist may approve the plan, but will report the lack of agreement to the Director of the Conservation Planning Division within 30 days. FWS will report the lack of agreement to their national office.

(h) Determination: When the person is actively restoring the wetland, the Converted Wetland plus year (CW+year) will be changed to either MIW+year (Mitigation), RPW+year (Replacement), RSW+year (Restoration), or GFW+year (Good Faith Wetland). If the person violates the restoration agreement, or fails to install restoration measures as planned, the new determination will be removed and replaced with a CW+year that the person failed to meet the restoration requirements. If the wetland was converted after November 28, 1990, the person will be ineligible for all USDA program benefits until the wetland is restored to conditions that existed prior to conversion.

(512.28 Wetland exemptions determined by ASCS.

(a) Third party conversion (TP). FSA exempts wetlands that are converted after December 23, 1985, by actions of persons other than the person applying for USDA benefits, or any of the person's predecessors in interest, if the conversion is not the result of a scheme or device. Further drainage improvements cannot be made without loss of USDA benefits. The third party conversion must be for purposes other than to increase agricultural production. If the conversion is done by a drainage district, watershed district, or similar entity, the action will be attributed to the person assessed by the drainage district or similar entity, and the person applying for benefits will be considered to have caused or permitted the drainage. These are not considered third-party conversions. However, if a wetland is converted by a drainage district after November 28, 1990, and the conversion is beyond the person's control, the person will not become ineligible for USDA program benefits unless an agricultural commodity is planted or, hay, or forage crop is harvested by mechanical means.

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512.28(b)

(b) Commenced conversions (CC). If the conversion of a wetland began before December 23, 1985, a person may apply for a determination that would enable the person to complete the conversion and produce an agricultural commodity on the converted wetland without losing USDA benefits.

(1) The conversion of a wetland may be determined by ASCS to have commenced if:

(i) any of the construction activities including flood water reductions that would convert wetland were actually started; or

(ii) the person applying for benefits has expended or legally committed substantial funds either by entering into a contract or by purchasing construction supplies or material for the direct purpose of converting the wetland.

(2) For lands that are within the boundaries of a drainage district or similar entity, the conversion of a wetland is considered to have been commenced if before December 23, 1985:

(i) a project drainage plan which includes detailed planned drainage measures has been officially adopted, and

(ii) the district or other entity started installation of the drainage measures, or legally committed substantial funds toward the conversion of wetlands by entering into a contract or by purchasing construction supplies and/or materials to convert wetland(s), and

(iii) the person applying for benefits can show that the wetland conversion with which the person is associated was the basis of a financial obligation to the district or other entity and a specific assessment for the project construction or a legal obligation to pay a specific assessment was made for the person's land prior to December 23, 1985.

(3) The following requirements apply to all commenced determinations:

Subpart C - Wetland Exemptions, Mitigation, Restoration, and  
Replacement

512.28(b)(3)(vii)

(i) All persons who have a wetland or converted wetland on which conversion began before December 23, 1985, may, by September 19, 1988, request ASCS to make a determination of commencement. Otherwise, the person forfeits the right to have such a determination made in the future.

(ii) The person must show that the commenced activity has been actively pursued. "Actively pursued" means that efforts to complete the conversion have actively continued on a regular basis since initiation of the conversion, except for delays due to circumstances beyond the person's control.

(iii) Any commenced conversion must be completed by January 1, 1995, or the exemption will be lost unless there are justifiable circumstances.

(iv) Only those wetlands for which the construction has begun or to which the contract or purchased supplies and materials relate may qualify for a determination of commencement.

(v) ASCS must consult FWS on each commenced determination.

(vi) Federally assisted projects that convert wetlands or provide outlets to convert wetlands for the production of an agricultural commodity may cause a person to become ineligible for USDA program benefits. Federally assisted projects started before December 23, 1985, require a commenced determination from ASCS. In addition to the commenced determination for the project, individuals within the project must request a commenced determination and/or a third party determination on their own land in addition to the commenced determination for the project.

(vii) SCS will make a technical determination on the extent of the area on which conversion has commenced. The extent of work allowed is limited to the physical extent of work done, contracted for, or materials purchased before December 23, 1985.

Part 512 - Wetland Conservation

Subpart D - Use and Requirements of Wetlands

PART 512 - WETLAND CONSERVATION

SUBPART D - USE AND REQUIREMENTS OF WETLANDS

512.31(a)(1)

512.30 Use of prior converted croplands (PC).

(a) Except for potholes, playas, and seasonally flooded or ponded areas that still meet the wetland criteria, wetlands that were converted prior to December 23, 1985, are not subject to the provisions of FSA. Therefore, drainage facilities installed on prior converted croplands may be improved or maintained as desired by the person, provided no additional wetland is converted and cropping or management of the prior converted cropland is not abandoned. See Exhibit 516.09 for a precedent diagram.

(b) Wetlands that have a commenced conversion determination are considered prior converted cropland when the commenced activities are completed and the area meets the criteria for prior converted croplands. Otherwise, map the area according to the conditions found. All commenced activities must be completed before January 1, 1995, to receive the (PC) determination.

(c) The person may not convert additional wetland acres beyond that which was determined to be commenced.

512.31 Use of converted wetlands (CW, CW+year, CWTE, and CWNA).

(a) Converted wetlands between FSA and FACTA (CW)

(1) Wetlands that were converted between December 23, 1985 and November 28, 1990, and are not subject to an exemption cannot be used to produce an agricultural commodity without causing the person to lose eligibility for USDA benefits. These areas may be used for production of crops that are not agricultural commodities, such as perennial forage crops, pears, apples, or oranges. However, wetlands converted for production of crops that are not agricultural commodities but that are later used for production of agricultural commodity crops will cause the producer to become ineligible.

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512.31(a)(2)

(2) Once a wetland has been converted and the person abandons the production of an agricultural commodity, eligibility may be restored for any crop year that an agricultural commodity is not planted on a converted wetland.

(b) Converted Wetland after November 28, 1990 (CW+year)

The person is ineligible for USDA benefits after conversion regardless of use of land. The person remains ineligible until the wetland is restored. After being restored, areas may be used consistent with their use prior to conversion.

(c) Converted Wetland Technical Error (CWTE). If the person has converted or commenced conversion of the wetland as a direct result of misinformation provided by SCS, the person shall be granted relief for the actions taken based on the incorrect determination by SCS. An incorrect determination or decision which was based on misinformation provided by the person is not considered a technical error on the part of SCS. If a small investment was made to convert the area, the person shall be exempted from past violations, but will not be permitted to plant agricultural commodities on the area in the future, and the area is labeled CW. If a substantial investment was made to convert the wetland, the wetland will be labeled CWTE, and the person will be permitted to produce on the area in the future. Any additional drainage on a CWTE area will be considered a conversion unless a minimal effect determination applies.

(d) Converted Wetlands for Non-Agricultural Use (CWNA).

Persons who plan to convert a wetland after November 28, 1990, for purposes other than production of an agricultural commodity, must get such plans approved before the conversion takes place. The plan must be approved by SCS in consultation with FWS.

(1) Non-agricultural use includes trees, shrubs, cranberries, vineyards, fish production, roads, and buildings. Trees, shrubs, vineyards, and cranberries must be established according to the proposed plan and in a manner that is customary to the region. Such vegetation must be planted or seeded and not allowed to establish naturally, and must be done in such a way that an agricultural commodity or forage crop cannot be produced when the established vegetation is harvestable or produces harvestable products. Fish production facilities, roads, and buildings must be designed in a manner that is customary to the region and must include features to avoid or minimize the effect on the wetland and adjacent wetlands.

Subpart D - Use and Requirements of Wetlands

512.32(b)

(2) If the implementation of the plan fails because of conditions beyond the person's control, the person must present a new plan and get approval prior to revising the plan.

(3) Prior to approving a plan, advise the person that Section 404 or other wetland related permits may be needed.

(4) Label the wetland CWNA (exempted converted wetland, non-agricultural use.)

512.32 Use of converted wetland with minimal effect (MW).

For areas where the conversion of wetland has been determined to have minimal effect and there are future requirements, the person shall check with SCS prior to taking any additional action that will change the hydrological or biological characteristics of wetland. SCS will determine, in consultation with FWS, whether the effect continues to be minimal. The loss of a minimal effect determination will cause a person who produces an agricultural commodity on the converted wetland to be ineligible for USDA benefits. The person will sign the minimal effect agreement, and will agree with the stated stipulations as applicable according to 512.21.

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512.33

### (512.33 Use of third-party-converted wetlands (TP)).

A third party is any person, organization, or unit of government other than the person applying for USDA benefits or the person's predecessors in interest. Wetlands that are converted by actions of a third party may be used to produce an agricultural commodity without loss of USDA benefits.

(a) Further drainage improvement on such lands is not permitted by the person without loss of eligibility for USDA program benefits, unless SCS determines that further drainage activities applied to such lands would have minimal effect on any remaining wetland values.

(b) Converted wetlands are presumed to have been converted by the person applying for USDA program benefits unless the person can show that the conversion was caused by a third party with whom the person was not associated through a scheme or device.

(c) The person is responsible for providing support information on the extent to which a third party drained subject wetlands.

(d) The district conservationist will document the scope and effect of third-party conversions of wetland in the case file at the time the wetland determinations are made.

(e) Actions of a water resource district, drainage district, or similar entity are not considered third-party actions. If the conversion was beyond the control of the person and the area was not used by the person for the production of an agricultural commodity or forage crops are not harvested by mechanical means, the person will not be ineligible for USDA program benefits.

### (512.34 Use of other wetlands..

(a) Natural wetland (W). These are wetlands that have not had the water regime altered or woody vegetation removed. Persons may farm such wetlands and maintain eligibility only if water regimes are not altered or the woody vegetation is not removed. An agricultural commodity may be produced on wetlands where the production was made possible as a result of natural conditions, such as drought, and the production is possible without an action by the person that destroys a natural wetland characteristic.

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512.35(b)

Persons may continue to farm such wetlands under natural conditions as they did prior to December 23, 1985. However, no action can be taken to alter the water regime beyond that which existed on or before December 23, 1985. When determinations are made on wetland that is being used to produce agricultural commodities, SCS will document the conditions other than natural conditions (drained, dredged, leveled, filled, pumped or otherwise manipulated) under which the wetlands are being farmed.

(b) Abandoned wetlands (W). Abandoned wetlands are those that have resulted from the abandonment of cropping and/or management on prior converted cropland or farmed wetland. Persons may produce agricultural commodities on such wetlands only if water regimes are not altered or woody vegetation removed.

(512.35 Use of farmed wetland (FW) and farmed wetland pasture (FWP).

(a) Farmed wetlands (FW) are wetlands that were manipulated and used to produce an agricultural commodity prior to December 23, 1985, but had not been converted prior to that date and, therefore, are not prior converted croplands. These areas still meet the wetland criteria and include potholes and playas that still meet the wetland criteria, or areas that are seasonally ponded or flooded for an extended period of time. These areas can be farmed and maintained as they were prior to December 23, 1985, if they are not abandoned.

(b) Farmed wetland pasture or hayland (FWP) are wetlands that have been manipulated to make pasture or hay production possible prior to December 23, 1985, but that still meet wetland criteria. Such areas may have never been planted to an agricultural commodity, or may have had an agricultural commodity produced, but not in the preceding 5-year period, therefore not meeting the criteria for farmed wetland nor prior converted cropland. These areas can be farmed as they were prior to December 23, 1985, including the maintenance of drainage systems, if they are not abandoned. Such areas may be planted to agricultural commodities only if agricultural commodities have been planted as part of a previously established rotation or where production is possible under natural conditions without additional drainage or maintenance.

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512.36

(512.36 Use of Mitigated Wetlands (MIW)

(a) Mitigation for the conversion of frequently cropped wetland.

(1) Frequently cropped wetlands may be converted after November 28, 1990 if prior converted cropland is restored. Such restoration will be outlined in a restoration plan. Restoration will generally be acre for acre, and only more if additional land is required to replace lost wetland values as a result of the conversion.

(2) Such mitigation must take place prior to the conversion and must be executed by an easement. The exemption (W) is effective once the easement is recorded.

(3) The converted wetland will then be labeled MIW and the person will be exempted from the wetland conservation provisions as long as the mitigation area is maintained within the provisions of the easement.

(4) The PC are on which the restoration takes place will be changed to "W" plus easement.

(b) Mitigation for Wetlands Converted between December 23, 1985, and November 28, 1990.

(1) Such converted wetlands may be mitigated by offsite restoration on prior converted cropland. Such mitigation must fully restore lost wetland values as described in a restoration plan.

(2) Such mitigation must be executed by an easement. The exemption is effective once the easement is recorded.

(3) The converted wetland will then be labeled as MIW and the person will be exempted from the wetland conservation provisions as long as the mitigation area is maintained within the provisions of the signed easement.

(4) The PC area on which the restoration takes place will be changed to W.

(512.37 Use of replacement wetlands (RPW).

Replacement wetlands are areas restored to replace a wetland converted to improve farming efficiency. Such replacement must meet the requirements contained

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(180-V-NFSAM, Second Ed., Amend. 6, May, 1991)

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512.38(b)(1)

in Section 512.25. The restored PC area on which replacement takes place will be labeled W and may be used within the provisions contained in the replacement easement. The converted wetland will be labeled RPW and the persons will be exempted from the wetland conservation provisions as long as the replacement area is maintained within the provisions of the easement.

(512.38 Use of restored wetlands (RVW + year) (RSW)

(a) Restored wetlands with violation (RVW+year).

(1) These are wetlands converted after November 28, 1990 (regardless of whether they were planted) or between December 23, 1985, and November 23, 1990, (on which an agricultural commodity was planted) that have been fully restored. The producer will be able to crop the wetland according to the restoration agreement with SCS and FWS. The restored wetland may be farmed under natural conditions if it was farmed under natural conditions prior to conversion and if planting activities would not reduce or impair the restoration structures or improvements required in the restoration plan.

(2) If the person violates the restoration agreement, or fails to install restoration measures as planned, the RVW+year label will be removed and replaced with a CW+year, indicating the year that the person failure to meet the restoration requirements. If the wetland was converted after November 23, 1990, the person will be ineligible for all USDA program benefits until the wetland is restored to conditions that existed prior to the conversion.

(b) Restored wetland without violation (RSW)

(1) These are wetlands converted between December 23, 1985 and November 23, 1990, on which no agricultural commodities were produced that have been fully restored. The producer will be able to crop the wetland according to the restoration agreement with SCS and FWS. The restored wetland may be farmed under natural conditions if it was farmed under natural conditions prior to the conversion and planting activities would not reduce or impair the restoration structures or improvements required in the restoration plan.

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512.38(b)(2)

(2) If the person violates the restoration agreement, or fails to install restoration measures as planned, the RSW determination will be removed and replaced with a CW+year, indicating the year that the person failed to meet the restoration requirements.

(512.39 Use of Good Faith Exemption Wetlands (GFW+year)).

(a) When the person is actively restoring the wetland, the Converted Wetland plus year (CW+year) will be changed to GFW+year. Persons may plant on the GFW area under natural conditions if the wetland area was farmable under natural conditions prior to conversion and planting activities would not reduce or impair the restoration structures or improvements required in the restoration plan.

(b) If the person violates the restoration agreement, or fails to install restoration measures as planned, the GFW+year determination will be removed and replaced with a CW+year that the person failed to meet the restoration requirements. If the wetland was converted after November 28, 1990, the person will be ineligible for all USDA program benefits until the wetland is restored to conditions that existed prior to conversion.

Subpart E - Maintenance and Improvements

SUBPART E - MAINTENANCE AND IMPROVEMENTS

512.40(a)(2)(ii)(B)

512.40 Maintenance and improvement of drainage.

Maintenance and improvement of drainage refers to the modification or manipulation of hydrology on farmed wetlands and/or farmed wetland pastures. These offsite modifications, such as roads, terraces, ponds, etc., that may affect the wetland, need to be included in the scope and effect determinations.

(a) Persons may maintain drainage systems on farmed wetlands and farmed wetland pastures in the same manner as they did prior to December 23, 1985, without loss of USDA benefits as long as such actions do not bring additional wetland into production. The scope and effect of the original drainage system is the major consideration. These conditions apply:

(1) The person is responsible for providing data to support the existence of a prior drainage system and the extent of the system.

(2) SCS will document the prior or existing extent of drainage on farmed wetlands and farmed wetland pastures when wetland determinations are made. As long as the area has not been abandoned, the original scope and effect of drainage are to be documented. In cases where staff hours are not available to document the scope and effect on all farmed wetlands and farmed wetland pastures at the time the initial determination is made, the documentation may be delayed beyond December 31, 1991. Priorities for documentation will be as follows:

(i) All areas where the person's appeal relates to a farmed wetland or farmed wetland pasture determination.

(ii) All areas where the person plans to do maintenance.

(A) The person must indicate on Form AD-1026 if he/she intends to perform maintenance on existing drainage systems.

(B) If the person indicates such intent, ASCS will forward the AD-1026 to SCS. The district conservationist will review the person's file.

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512.40(a)(2)(ii)(B)(I)

(I) If the producer has a drainage worksheet or other acceptable information on file and a site review has been made, maintenance will be allowed without an additional field review, providing the proposed maintenance does not exceed scope and effect of previous drainage as documented by SCS. The district conservationist will notify ASCS that the activity is maintenance.

(II) If no drainage worksheet or other acceptable information is on file, the producer will be required to complete one and SCS will document the scope and effect of the drainage system. The district conservationist will generate a new CPA-026 if necessary. A new CPA-026 will be generated in all cases except when a CPA-026 for this maintenance activity is the same as indicated on a previous CPA-026 for the same wetland. If a new CPA-026 is not necessary, the district conservationist will notify ASCS that the activity is maintenance using a copy of the previous CPA-026. A field visit will be necessary to verify information provided by the landowner and to document the scope and effect of prior drainage.

(III) If the person has not received a wetland determination, the district conservationist will follow standard procedures and provide a wetland determination to the person and ASCS. All farmed wetlands and farmed wetlands pasture require drainage documentation.

(IV) SCS will make an on-site review of all proposed maintenance activities; however, when this can not be done in a timely manner, prioritization of field documentation on farmed wetlands (FW) and farmed wetlands pasture (FWP) will be as follows:

1. Proposed changes to drainage systems such as deepening, enlarging, or relocation of drainage ditches and tile lines. (Field Visits 100%)

Subpart E - Maintenance and Improvements

512.40(a)

2. Maintenance of earth ditches by scrapers, drag lines, or other similar equipment.

3. Replacement of sections of tile systems when no or vague documentation of previous systems is on file.

4. Farm ditches maintained by tractor pulled scraper or similar equipment.

5. Maintenance of shallow ditches using plows or similar pulled equipment.

6. Replacement of small sections of a tile system when documentation of previous system is available.

(V) When SCS cannot make a field visit to review all proposed maintenance activities, the district conservationist will provide the area/state conservationist with a fiscal year summary of Forms AD-1026 with maintenance planned by each priority. The district conservationist will note the Forms AD-1026 by priority for which field visits were made and those for which farmer information was accepted without a field visit.

1. All cases where a request for commenced, third party, or minimal effects exemption have been filed relating to farmed wetlands. (Note: For items 1, 2, and 3 above, the documentation will be completed within 60 working days of the request).

2. All cases where a person requests that the scope and effect of prior maintenance be documented, and

3. All other areas as soon as staff time will permit.

4. SCS will determine whether the planned actions are maintenance or additional drainage.

5. For documentation of prior drainage facilities on farmed wetlands, the following facts are considered:

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512.40(a)

- i. Use of notes in case files,
- ii. Field borings to define original construction limits,
- iii. Aerial photos to verify location and effectiveness, and
- iv. Data provided by landowners or contractors.
- v. Field surveys
- vi. Depth of ponding in potholes or playas.

(b) Documented prior drainage facilities may or may not meet SCS standards and specification criteria, but in either case the person may reconstruct or maintain the original system. However, a redesigned system is appropriate only as long as it is within the scope and effect of the original system. If the person would rather reinstall a more permanent or lower-maintenance-cost system in line with present farming operations, a modified proposal can be designed.

(c) Maintenance only or reconstruction having the same scope and effect as original drainage activities is appropriate for third party drainage.

(d) A person may maintain, improve, replace, or install new drainage systems on prior converted croplands (PC) and artificial wetlands (AW), including irrigation-induced wetlands, because prior converted croplands and artificial wetlands are not subject to the wetland provisions of the FSA. Drainage facilities may be installed on commenced conversion (CC) or minimal effect (MW) areas as may be stipulated on a site-specific basis.

(e) Abandonment applies to the land area involved and not to the drainage or other system that caused the prior conversion. Therefore, drainage systems can be reinstalled or maintained to the original extent and scope as installed prior to the FSA, providing the land area has not been abandoned.

(f) Maintenance of the removal of woody vegetation is allowed to the condition prior to December 23, 1985.



## 512.41 Maintenance of farmed wetlands (FW).

(a) Farmed wetlands are certain wetlands that were manipulated and used to produce an agricultural commodity prior to December 23, 1985, but had not been converted prior to that date and, therefore, are not prior converted croplands. These areas still meet the wetland criteria and include potholes and playas that still meet the wetland criteria, or areas that are seasonally ponded or flooded for an extended period of time. These areas can be farmed and maintained as they were prior to December 23, 1985, if they are not abandoned.

(b) Persons may maintain drainage systems on farmed wetland but cannot expand the scope and extent of the original drainage on such areas without loss of USDA program benefits. If manipulation or maintenance activities take place after December 23, 1985, and prior to the time SCS makes a wetland determination, the area will be identified as a converted wetland if the soils are hydric, unless the person provides information that supports that activities were maintenance and did not exceed original scope and effect.

(c) The person is responsible for providing information to support the extent to which those areas have been drained.

(d) SCS will document the extent of drainage in the case file when farmed wetland determinations are made.

(e) Potholes and playas that were manipulated and farmed prior to the Act and currently meet the wetland criteria will be considered farmed wetland in order to protect their remaining biological and hydrological values. Maintenance can be performed on such lands. However, the farmed wetland label will not be changed to prior converted cropland prior to the time the maintenance is completed except as noted in (6) below. An area will be relabeled to a prior converted cropland if a field visit confirms that the pothole or playa does not meet wetland criteria as result of maintenance being performed to the original scope and effect. If drainage systems on such farmed wetland have been maintained to function as they did originally and the land still meets the wetland criteria after the drainage facilities have been maintained, the land shall continue to be designated farmed wetland.

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512.41(f)

(f) Farmed wetland determinations may be changed to prior converted cropland during the reconsideration or appeal process. In those cases where a farmed wetland is changed to a prior converted cropland, the following documentation, as applicable, will be included in the case file for each farmed wetland designation that is changed:

- (1) The type of existing or original drainage system to include size, spacing, depth, grade, and outlet conditions.
- (2) Surface inlets.
- (3) Drainage area to the pothole or playa.
- (4) Condition of present drainage system.
- (5) Crop history for the farmed wetland area.
- (6) How surface water is removed.
- (7) How saturation is removed, to include the bottom width of the basin, location of the drainage system within the basin, and the distance of the lateral effect of the drainage system.
- (8) Maps of the following:
  - (i) Drainage area to the basin
  - (ii) The basin itself
  - (iii) Location of drainage system
- (9) Soil type and related drainage information.
- (10) Based on the above documentation, if the drainage system has removed the ponding and saturation to the point that the area is not saturated or ponded for 7 days or more during the growing season, the area is prior converted cropland.

(g) Available data and maps from flood frequency studies, such as flood insurance surveys, may be used to document the seasonally flooded condition for extended periods in the growing season (a 50 percent chance of occurrence). Depending on local conditions, normal snowmelt volume may dominate. This may be a 2 year, 24 hour runoff volume. (See Chapter 2 of the SCS Engineering Field Manual).

Subpart E - Maintenance and Improvements

512.41(h)

(h) Documentation of seasonally ponded areas may be handled by reviewing a series of growing season photos to verify the percent chance of occurrence along with analytical evaluations to determine length of ponding for a single occurrence. The average depth of ponding in a depression can be evaluated using DRAINMOD for length of time required for water to be used by evapotranspiration.

512-63

## Subpart E - Maintenance And Improvements

§512.42 Summary of use, maintenance and improvements of various wetland conditions.

<u>Wetland condition</u>	<u>Use</u>	<u>Maintenance</u>	<u>Improvement</u>
Prior converted cropland (PC) converted prior to 12/23/85, but not abandoned	Produce ag commodities	Yes	Yes
Farmed wetland (FW) that still meets the wetland criteria including seasonally ponded wetland, seasonal flooded wetland, potholes, and playas	May be farmed as it was prior to 12/23/85	May maintain the degree of drainage that existed prior to 12/23/85	None
Wetland (W) includes natural conditions and abandoned wetland	May be used to produce ag commodities when weather permits without removing woody vegetation	None	None
Commenced conversion (CC)	Based on criteria met when completed	Yes	Yes if PC
Third party	Produce ag commodities	May maintain degree of drainage that existed as of date of third party action.	None unless determined by SCS to have minimal effects
Converted wetland (CW) converted after 12/23/85	Production of ag commodities will cause a person to be ineligible for USDA benefits	None	None
Minimal Effect (MW)	Produce ag commodities	As per minimal effect agreement	As per minimal effect agreement if applicable
Artificial (AW) including irrigation induced wetland	Produce ag commodities	Yes	Yes

Subpart F - Coordination With Other Wetland Protection Policies

PART 512 - WETLAND CONSERVATION  
SUBPART F - COORDINATION WITH OTHER AGENCIES AND PROGRAMS

512.50(c)

512.50 Coordination with FWS.

(a) In FSA implementation, USDA is required to consult with the Department of the Interior, Fish and Wildlife Service (FWS), on determinations and actions that involve:

- (1) wetland identification;
- (2) exemptions;
- (3) issuance of regulations;
- (4) mitigation; and,
- (5) restoration.

(b) National, NTC, state, and local SCS officials should consult, agree, contact, or inform FWS representatives on implementation of the wetland conservation provision as it relates to the above. This will include involvement of the FWS in quality control procedures, wetland inventories, wetland determinations, minimal effect exemptions, and any other exemptions under the wetland conservation provision. SCS will notify FWS in writing for an application for an exemption or technical determinations within 7 days after being notified by the person applying for the exemption or determination. FWS will have 30 days to respond to SCS. If FWS fails to respond within 30 days, SCS will have fulfilled its responsibility for consultation or agreement with FWS. Where FWS does not respond, SCS may proceed as if FWS coordination has occurred but must report such actions to the state conservationist who will in turn keep a record of such "non-responses by FWS."

(c) Where there is lack of agreement between SCS and FWS at the field level on determinations where agreement is required, the decision will be made by the state conservationist in consultation with FWS. Where there is lack of agreement between SCS and FWS they will be reported to both the SCS and FWS National offices, although the final decision will be made by the state conservationist.

Part 512 - Wetland Conservation

512.50(c)

(512.51 Compliance with other wetland protection policies.

(a) Some wetlands, such as prior converted cropland, artificial wetlands, irrigation-induced wetlands, commenced conversions, minimal effect wetlands, and farmed wetlands are exempted, either totally or in part, from the wetland conservation provisions of FSA. However, these wetlands may still be subject to other local, state and Federal wetland protection policies. Persons who indicate that they plan to manipulate wetlands that are exempted, totally or in part, from FSA must be informed that exemptions do not necessarily apply to other local, state, and Federal wetland protection policies, and therefore a permit or other approval may be required prior to taking action that would affect the wetland.

(b) Prior to providing any type of SCS assistance that could assist a person in manipulating a wetland, a wetland determination will be made and placed in the person's case file. SCS will not provide assistance to persons that will knowingly cause a person to violate the wetland provisions of FSA.

(c) Where minimal effect, restoration, or replacement have been proposed or completed, inform the person that such activities may require a Section 404 permit.

(d) For cropped areas that have previously been designated as prior converted cropland or farmed wetland by the SCS, the SCS will provide such determinations to the Corps of Engineers (COE) upon request. Where PCs have not been delineated, it is not necessary to make additional delineations for COE use. For those cropped areas that have not been designated prior converted cropland or farmed wetland by the SCS, the SCS will make the appropriate data available to the COE for making a determination of prior converted cropland or farmed wetland for Section 404 purposes.

(e) Although every effort should be made at the field level to resolve COE/SCS differences in opinion on the proper designation of wetlands, the SCS will make the final determination as it relates to FSA. Where the COE and SCS fail to agree on designation of prior converted cropland or farmed wetlands, the case should be documented and a copy of the documentation forwarded to SCS National Headquarters, Conservation Planning Division.

- §516.01 Form AD-1026 (02-01-91), Highly Erodible Land and Wetland Conservation Certification.
- §516.02(a) SCS FSA Tracking Register.
- §516.02(b) SCS FSA Tracking Register Instructions.
- §516.03(a) Form SCS-CPA-026 (6/91).
- §516.03(b) Form SCS-CPA-026A (1-88).
- §516.03(c) Appeals statement on Form SCS-CPA-026 (6/91).
- §516.04 Sample letter of transmittal of a completed Form SCS-CPA-026.
- §516.05 Form SCS-CPA-027 (11-87).
- §516.06 Sample letter to ASCS regarding incorrect information provided on Form AD-1026.
- §516.07(a) Sample letter to State Conservationist about compliance deficiencies.
- §516.07(b) Revised Form SCS-CPA-026 to accompany compliance deficiency letter.
- §516.08(a) Sample letter conveying a reconsideration decision.
- §516.08(b) Sample letter conveying an appeal decision.
- §516.09 Precedent diagram on use of wetlands.
- §516.10(a) Wetland delineated on a copy of an aerial photograph (potholes and playas).
- §516.10(b) Wetland delineated on a copy of an aerial photograph (seasonally ponded area).
- §516.10(c) Wetland delineated on a copy of an aerial photograph (cropped wetland in dry year).
- §516.11(a) Transect technique for determining prevalence of hydrophytic vegetation.
- §516.11(b) Prevalence Index Worksheet (blank).
- §516.11(c) Prevalence Index Worksheet (completed sample).
- §516.12 Minimal effect agreement.
- §516.13 Sample onsite evaluation for minimal effect.
- §516.14 Memorandum of Understanding between ASCS and SCS.
- §516.15 Sample letter to a person who is determined to be "not actively applying the approved conservation plan."
- §516.16 Sample letter to a person who is determined to be "not using an approved conservation system."
- §516.17 Decision table for conducting status reviews in 1991.
- §516.18 Form ASCS-569, SCS Report of Conservation Compliance for Spotcheck Purposes (06-19-90).
- §516.19 Form AD-1069, Graduated Payment Reduction, Wetland Violations.
- §516.20 Information that must be submitted by the person to assess a post-conversion minimal effects determination.
- §516.21 Delineation labels.
- §516.22 Standard easement.
- §516.23 Minimal Effect Determination key for Short-term Conversions.
- §516.24 Wetland Restoration Evaluation Procedure for Minimal Effect.





AD-1026 (02-01-91)

UNITED STATES DEPARTMENT OF AGRICULTURE

Form Approved - OMB No. 0560-0004

**HIGHLY ERODIBLE LAND CONSERVATION (HELIC) AND WETLAND CONSERVATION (WC) CERTIFICATION**

1. Name of Producer	2. Identification Number	3. Crop Year
4. Do the attached AD-1026A(s) list all your farming interests by county, and show current SCS determinations? <i>If "No", contact your County ASCS Office before completing this form</i>		
5. Are you now applying for, or do you have a FmHA insured or guaranteed loan?		
6. Do you have a crop insurance contract issued or reinsured by the Federal Crop Insurance Corporation?		
7. Are you a landlord on any farm listed on AD-1026A that will not be in compliance with HELC and WC provisions?		
8. Has a HELC exemption been approved on any farms listed on AD-1026A because the landlord refuses to comply?		
9. List here or attach a list of affiliated persons with farming interests. <i>See reverse for an explanation. Enter "None", if applicable.</i>		

If items 7 or 8 are answered "YES", circle the applicable farm number on AD-1026A.

During either the crop year entered in item 3 above, or the term of a requested USDA loan:

10. Will you plant or produce an agricultural commodity on land for which a highly erodible land determination has not been made?	YES	NO
11. Will you plant or produce an agricultural commodity on any land that is or was a wet area on which planting was made possible by draining, dredging, filling, or leveling or any other means after December 23, 1985?		
12. Will you, or have you since November 28, 1990, made possible the planting of any crop, pasture, agricultural commodity, or other such crop by: (a) converting any wet areas by draining, dredging, filling, leveling, or any other means, or, (b) improving or modifying a drainage system?		
13. Will you convert any wet areas for fish production, trees, vineyards, shrubs, building construction, or other non-agricultural use?		

If answers to items 10, 11, 12, or 13 are:

"YES" for any one of these items, sign and date in item 14 below. Circle the applicable tract number on AD-1026A, or list in item 12 on AD-1026A. ASCS will refer this AD-1026 to SCS for a determination. DO NOT sign in item 16 until SCS determination is complete.

"NO" for all of these items or SCS determinations are complete, complete item 16.

14. Signature of Producer <i>I hereby certify that the above information, and the information on attached AD-1026A's, is true and correct to the best of my knowledge and belief.</i>		
Date		
15. Referral To SCS (Completed by ASCS)	Enter a <input checked="" type="checkbox"/> if a SCS determination is needed because "Yes" is answered in item 10, 11, 12, or 13.	Date Referred Signature of ASCS Representative

NOTE: Before signing in item 16, Read AD-1026 Appendix.

16. Signature of Producer <i>I hereby certify that the above information, and the information on attached AD-1026A's, is true and correct to the best of my knowledge and belief. It is my responsibility to file a new AD-1026 in the event there are any changes in my farming operation(s). In signing this form, I also certify that I have received and will comply with the compliance requirements on AD-1026 Appendix.</i>		
Date		

17. Remarks:

ORIGINAL - ASCS COPY

Part 516 - Exhibits

516.02(a)

§516.02(a) SCS FSA Tracking Register.

This type of tracking register can be used to track FSA activities at the field office.

Additional columns may be needed for minimal effect determinations (code 176), negative wetland determinations (code 177), and any other items needed to track FSA activities.

A tracking system exists in CAMPS (managing FSA records) that should be used to track FSA activities and make progress reports, where the hardware and software are available.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
FSA Code	Name	FSA Farm Number	Date 40-1076 Received	Date 07-16 Returned	SWCD (Operator Date)	Planning Needs Determined 15 Days	Planning Plan by 1990	Highly Erodible Land Determination (110/111)	Acres Conservation Systems (112)	Acres Conservation Plan (113)	Acres Conservation (114)	Acres Wetland Determination (115)	Acres Conserved Wetland Determination (115)	Requests for Reconsideration Date Received	Requests for Reconsideration Date of Disposition	Special Date Received	Special Date of Disposition	

Field Office:

FOOD SECURITY ACT OF 1985 WORKSHEET  
U S DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

TX-CPA-001  
(12/86)

INSTRUCTIONS FOR FOOD SECURITY ACT WORKSHEET

For each Form AD-1026 there may be several farm numbers which require a separate Form SCS-CPA-026. Each line of the worksheet represents a different farm number.

1. Enter the number of the Form AD-1026, based on the numerical order of Forms AD-1026 as received.
2. Enter the name of producer listed on Form AD-1026.
3. Enter the ASCS farm number, listing each farm number on a separate line.
4. Enter the date the Form AD-1026 was received in the field office.
5. Enter the date the Form SCS-CPA-026 was completed for each ASCS farm number and sent to ASCS and the producer.
6. Enter the date the producer became a conservation district cooperator.
7. Enter the number(s) of the fields that need a determination within 15 days.
8. Enter the number(s) of the fields that need a plan by 1990.
9. Enter no if block 7 of Form SCS-CPA-026 is checked no, or blocks 8 and 9 are blank. (Progress code 170) If blocks 8 or 9 of Form SCS-CPA-026 contain entries, enter the acres of fields listed in these blocks. (Progress code 171)
10. Enter the total acres of highly erodible fields of approved conservation systems containing acres treated to levels above T value certified on Form SCS-CPA-027. (Progress code 172 with class code 22).
11. Enter the total acres of highly erodible fields of approved conservation systems containing acres treated to levels at or below T value certified on Form SCS-CPA-027. (Progress code 172 with class code 0).
12. Enter the total acres of highly erodible fields with approved conservation plans containing acres treated to levels above T value certified on Form SCS-CPA-027. (Progress code 173 with class code 22).
13. Enter the total acres of highly erodible fields with approved conservation plans containing acres treated to levels at or below T value certified on Form SCS-CPA-027. (Progress code 173 with class code 0).
14. Enter the total acres of wetland (farmed wetland) determinations listed in Block 12 of Form SCS-CPA-026. (Progress code 174)
15. Enter the total acres of converted wetland listed in Block 16 of the Form SCS-CPA-026. (Progress code 175)
16. Enter the date a request for reconsideration is received in the field office.
17. Enter the date of disposition of the producer's request for reconsideration.
18. Enter the date an appeal is received in the field office.
19. Enter the date of disposition of the producer's appeal.

Note: Add lines for minimal effect and negative wetland determination.

516-3

(180-V-NFSAM, Second Ed., Amend. 5, Jan. 1991)

Part 516 - Exhibits

516.03(a)

§516.03(a) Form SCS-CPA-026 (June 91).

U.S.D.A. Soil Conservation Service	SCS-CPA-026 (June 91)	1. Name and Address of Person	2. Date of Request
HIGHLY ERODIBLE LAND AND WETLAND CONSERVATION DETERMINATION			3. County
		4. Name of USDA Agency or Person Requesting Determination	5. Farm No. and Tract No.

SECTION I - HIGHLY ERODIBLE LAND

	FIELD NO. (S)	TOTAL ACRES
6. Is soil survey now available for making a highly erodible land determination? Yes <input type="checkbox"/> No <input type="checkbox"/>		
7. Are there highly erodible soil map units on this farm? Yes <input type="checkbox"/> No <input type="checkbox"/>		
8. List highly erodible fields that, according to ASCS records, were used to produce an agricultural commodity in any crop year during 1981-1985		
9. List highly erodible fields that have been or will be converted for the production of agricultural commodities and, according to ASCS records, were not used for this purpose in any crop year during 1981-1985; and were not enrolled in a USDA set-aside or diversion program.		
10. This Highly Erodible Land determination was completed in the Office <input type="checkbox"/> Field <input type="checkbox"/>		

SECTION II - WETLAND

	FIELD NO. (S)	TOTAL ACRES
11. Are there hydric soils on this farm? Yes <input type="checkbox"/> No <input type="checkbox"/>		
12. Wetlands (W), including abandoned wetlands, or Farmed Wetlands (FW) or Farmed Wetlands Pasture (FWP). Wetlands may be farmed under natural conditions. Farmed Wetlands and Farmed Wetlands Pasture may be farmed and maintained in the same manner as they were prior to December 23, 1985, as long as they are not abandoned.		
13. Prior Converted Cropland (PC). Wetlands that were converted prior to December 23, 1985. The use, management, drainage, and alteration of prior converted cropland (PC) are not subject to the wetland conservation provisions unless the area reverts to wetland as a result of abandonment.		
14. Artificial Wetlands (AW). Artificial wetlands includes irrigation-induced wetlands. These wetlands are not subject to the wetland conservation provisions.		
15. Minimal Effect Wetlands (MW). These wetlands are to be farmed according to the minimal-effect agreement signed at the time the minimal-effect determination was made.		
16. Mitigation Wetlands (MIW). Wetlands on which a person is actively mitigating a frequently cropped area or a wetland converted between December 23, 1985 and November 28, 1990.		
17. Restoration with Violation (RWV-year). A restored wetland that was in violation as a result of conversion after November 28, 1990 or the planting of an agricultural commodity or forage crop.		
18. Restoration without Violation (RSW). A restored wetland converted between December 23, 1985 and November 28, 1990, on which an agricultural commodity has not been planted.		
19. Replacement Wetlands (RPW). Wetlands which are converted for purposes other than to increase production, where the wetland values are being replaced at a second site.		
20. Good Faith Wetlands (GFW-year). Wetlands on which ASCS has determined a violation to be in good faith and the wetland has been restored.		
21. Converted Wetlands (CW). Wetlands converted after December 23, 1985 and prior to November 28, 1990. In any year that an agricultural commodity is planted on these Converted Wetlands, you will be ineligible for USDA benefits.		
22. Converted Wetland (CW-year). Wetlands converted after November 28, 1990. You will be ineligible for USDA program benefits until this wetland is restored.		
23. Converted Wetland Non-Agricultural use (CWNA). Wetlands that are converted for trees, fish production, shrubs, cranberries, vineyards or building and road construction.		
24. Converted Wetland Technical Error (CWTE). Wetlands that were converted as a result of incorrect determination by SCS.		
25. The planned alteration measures on wetlands in fields _____ are considered maintenance and are in compliance with FSA.		
26. The planned alteration measures on wetlands in fields _____ are not considered to be maintenance and if installed will cause the area to become a Converted Wetland (CW). See item 22 for information on CW-year.		
27. The wetland determination was completed in the office <input type="checkbox"/> field <input type="checkbox"/> and was delivered <input type="checkbox"/> mailed <input type="checkbox"/> to the person on _____		
28. Remarks.		

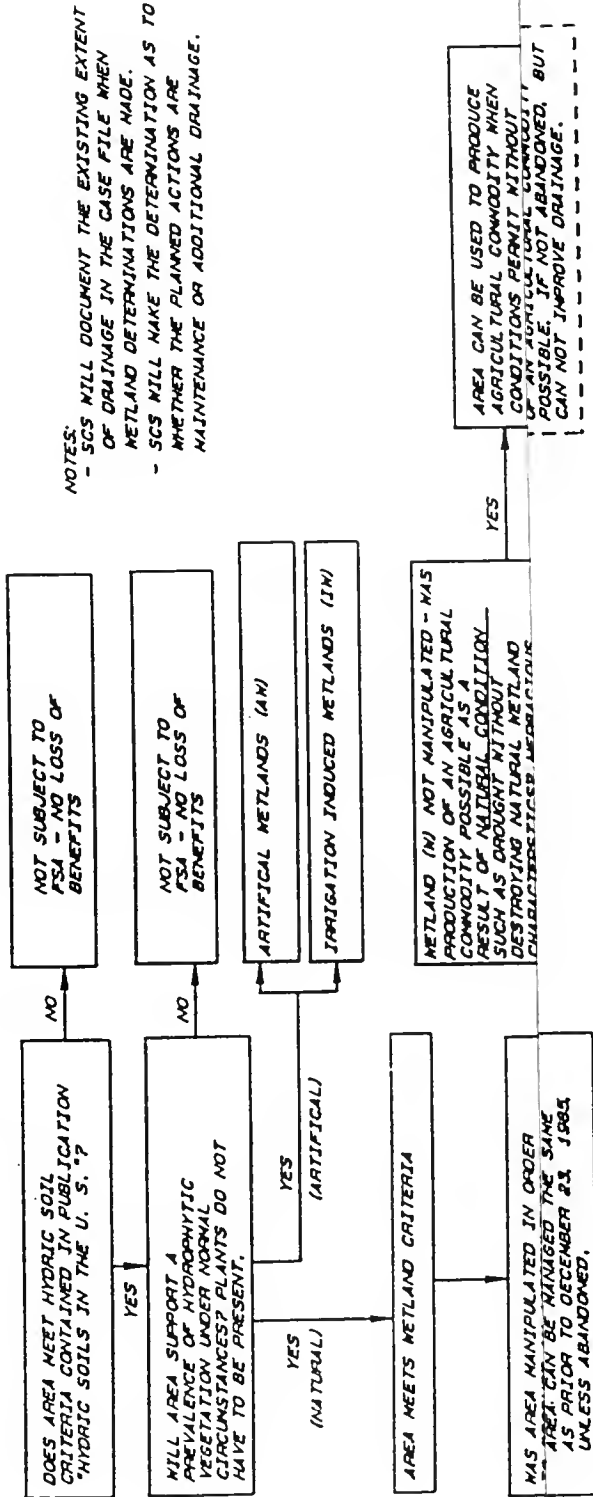
29. I certify that the above determination is correct and adequate for use in determining eligibility for USDA program benefits, and that wetland hydrology, hydric soils, and hydrophytic vegetation under normal circumstances exist on all areas outlined as Wetlands, Farmed Wetlands and Farmed Wetlands Pasture.	30. Signature of SCS District Conservationist	31. Date
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Assistance and programs of the Soil Conservation Service available without regard to race, religion, color, sex, age, or handicap.

9-8-88

# WETLAND CONSERVATION (PART 512)

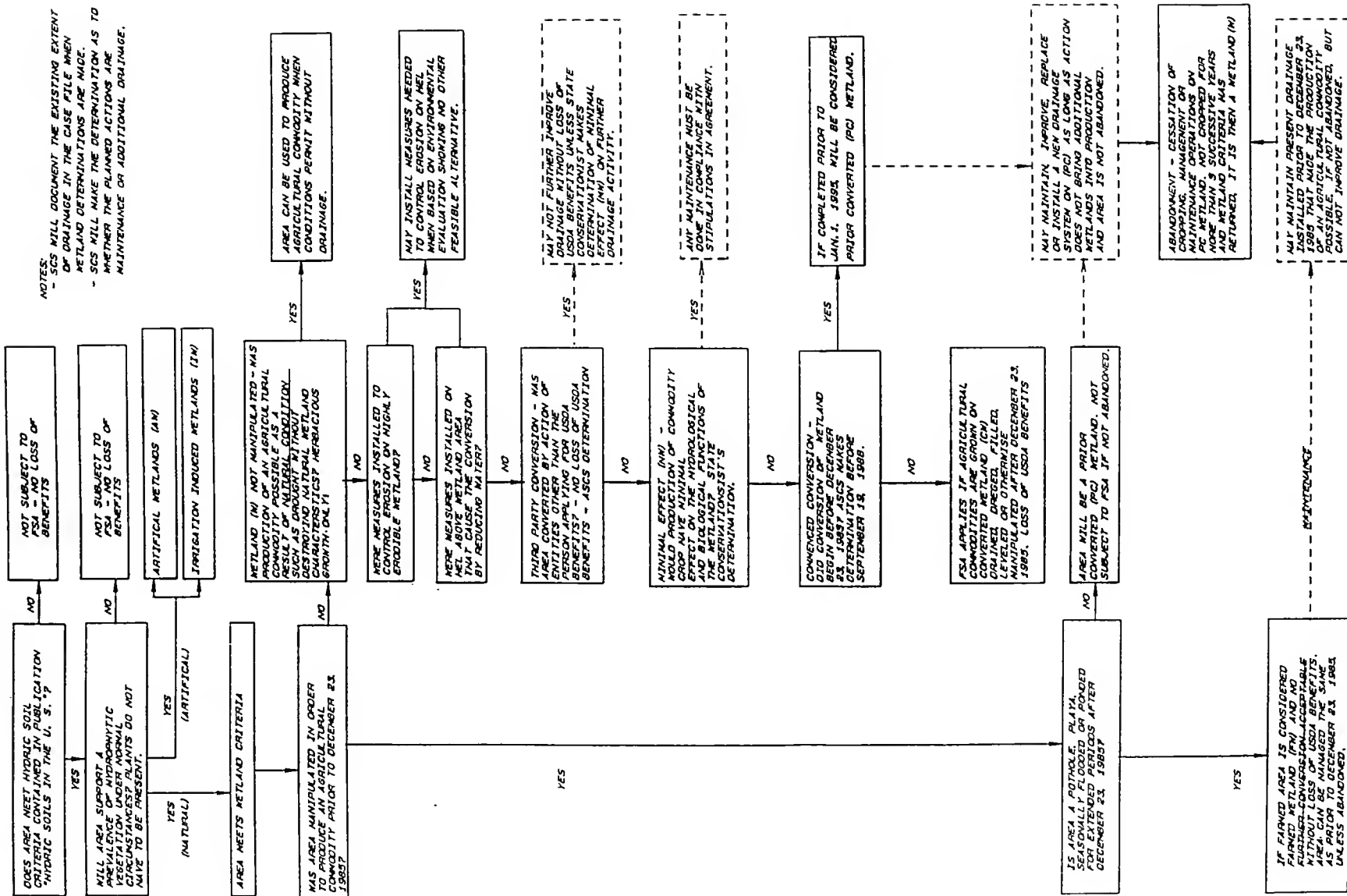
§516.09 Precedent diagram on use of



WETLAND CONSERVATION (PART 512)

3-8-88

§516.09 Precedent diagram on use of wetlands.



§516.15 SAMPLE LETTER TO A PERSON WHEN SCS HAS DETERMINED THAT THE PERSON IS NOT ACTIVELY APPLYING THE APPROVED CONSERVATION PLAN.

Dear \_\_\_\_\_:

The Food Security Act of 1985 requires that, after January 1, 1990 all persons must be actively applying an approved conservation plan to produce agricultural commodities on highly erodible land (HEL) that was cropped during the 1981 through 1985 period in order to be eligible for U.S. Department of Agriculture (USDA) program benefits. You developed an approved conservation plan and signed it on \_\_\_\_\_, 19\_\_\_. Your signature indicated your agreement that this plan represented the decisions you made for tract No. \_\_\_\_\_, and indicated your understanding that the active application of this plan is required to be eligible for USDA programs.

The Soil Conservation Service (SCS) conducted a status review on this tract on \_\_\_\_\_, 199\_, and determined that you are not actively applying the approved conservation plan because (Give Reason, such as a scheduled practice was not applied, required residue levels were not met, a low-residue crop was planted where a high-residue crop was required, an applied practice was not maintained, etc.).

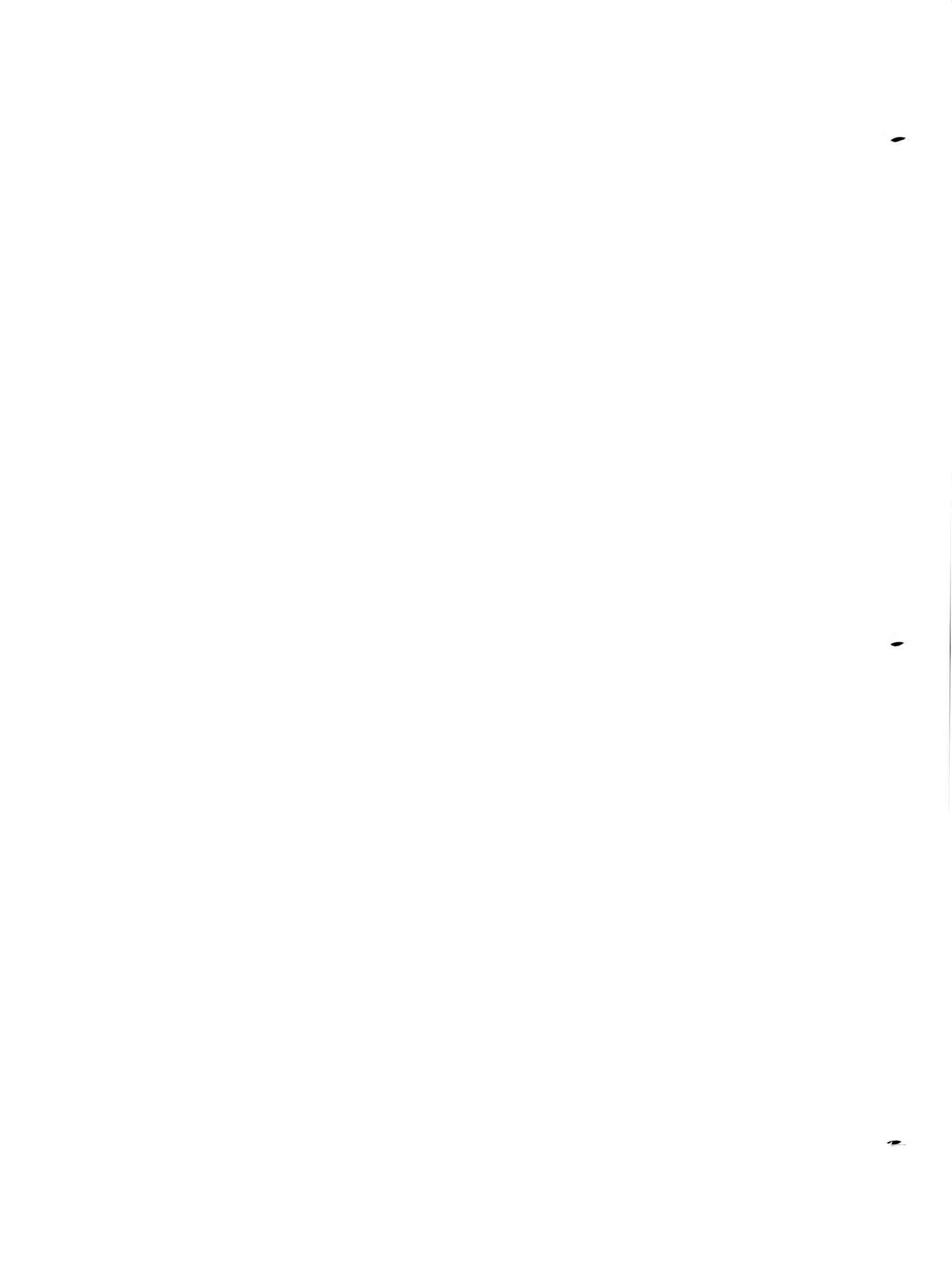
You have the right to appeal this determination to SCS at this office within 45 days of the date of this letter. If you have not made an appeal before the 45 days has expired, SCS will officially inform the \_\_\_\_\_ County ASCS Office on Form ASCS-569 that you are "not actively applying the approved conservation plan" on tract No. \_\_\_\_\_.

/s/  
District Conservationist

cc:

\_\_\_\_\_, Conservation District  
\_\_\_\_\_, Area (or State) Conservationist  
\_\_\_\_\_, County Supervisor, Farmers Home Administration  
\_\_\_\_\_, Federal Crop Insurance Corporation

516-31





§516.15 SAMPLE LETTER TO A PERSON WHEN SCS HAS DETERMINED THAT THE PERSON IS NOT ACTIVELY APPLYING THE APPROVED CONSERVATION PLAN.

Dear \_\_\_\_\_:

The Food Security Act of 1985 requires that, after January 1, 1990 all persons must be actively applying an approved conservation plan to produce agricultural commodities on highly erodible land (HEL) that was cropped during the 1981 through 1985 period in order to be eligible for U.S. Department of Agriculture (USDA) program benefits. You developed an approved conservation plan and signed it on \_\_\_\_\_, 19\_\_\_. Your signature indicated your agreement that this plan represented the decisions you made for tract No. \_\_\_\_\_, and indicated your understanding that the active application of this plan is required to be eligible for USDA programs.

The Soil Conservation Service (SCS) conducted a status review on this tract on \_\_\_\_\_, 199\_, and determined that you are not actively applying the approved conservation plan because (Give Reason, such as a scheduled practice was not applied, required residue levels were not met, a low-residue crop was planted where a high-residue crop was required, an applied practice was not maintained, etc.).

You have the right to appeal this determination to SCS at this office within 45 days of the date of this letter. If you have not made an appeal before the 45 days has expired, SCS will officially inform the \_\_\_\_\_ County ASCS Office on Form ASCS-569 that you are "not actively applying the approved conservation plan" on tract No. \_\_\_\_\_.

/s/  
District Conservationist

cc:

\_\_\_\_\_ Conservation District  
 \_\_\_\_\_, Area (or State) Conservationist  
 \_\_\_\_\_, County Supervisor, Farmers Home Administration  
 \_\_\_\_\_, Federal Crop Insurance Corporation

Part 516 - Exhibits

516.16

§516.16 SAMPLE LETTER TO A PERSON WHEN SCS HAS DETERMINED THAT THE PERSON IS NOT USING AN APPROVED CONSERVATION SYSTEM.

Dear \_\_\_\_\_:

The Food Security Act of 1985 requires that all persons must be using an approved conservation system to produce agricultural commodities on highly erodible land (HEL) that was not cropped during the 1981 through 1985 period in order to continue to be eligible for U.S. Department of Agriculture (USDA) program benefits. You developed a conservation plan that included an approved conservation system for tract No. \_\_\_\_\_, and signed it on \_\_\_\_\_, 19\_\_\_. Your signature indicated your agreement that you would use this conservation system on tract No. \_\_\_\_\_, and indicated your understanding that the use of this conservation system is required to be eligible for USDA programs.

The Soil Conservation Service (SCS) conducted a status review on this tract on \_\_\_\_\_, 199\_, and determined that you are not using an approved conservation system on this tract because (Give Reason, such as required residue levels were not met, a low-residue crop was planted where a high-residue crop was required, an applied practice was not maintained, etc.).

You have the right to appeal this determination to SCS at this office within 45 days of the date of this letter. If you have not made an appeal before the 45 days has expired, SCS will officially inform the \_\_\_\_\_ County ASCS Office on Form ASCS-569 that you are "not using an approved conservation system" on tract No. \_\_\_\_\_.

/s/

District Conservationist

cc:

\_\_\_\_\_ Conservation District  
\_\_\_\_\_, Area (or State) Conservationist  
\_\_\_\_\_, County Supervisor, Farmers Home Administration  
\_\_\_\_\_, Federal Crop Insurance Corporation

516-32

(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

§516.17 Decision Table for conducting status reviews in 1991 only.

This decision table applies only to fields included in a conservation compliance plan and for which the person is required to be actively applying the plan. It does not apply to fields where the person is required to be using a conservation system. This does not change SCS policy stated in NFSAM, §510.44(d)

If the status review indicates:	and the situation below exists:	then the review determination is:
1. All planned practices are applied, or the person attempted to apply all planned practices.	1a. All practices are being used and maintained according to the FOTG.	1a. A fully applied conservation system is being used. Advise producer of any improvements that may be needed to assure future compliance.
	1b. One or more practices do not fully meet FOTG requirements but the applied practices achieve 75 percent or more of the erosion reduction that would have been achieved if the applied practices fully met FOTG requirements.	1b. A minor technical variance to actively applying the conservation plan is granted for 1991, and the producer is expected to achieve at least 85% of the erosion reduction that is to be achieved in the 1992 crop year. Schedule a status review in 1992.
	1c. One or more practices do not meet FOTG requirements and the applied practices achieve less than 75 percent of the erosion reduction that would have been achieved if the applied practices fully met FOTG requirements.	1c. Not actively applying the conservation plan. If this is the first violation in 5 years, producer may be eligible for good faith exemption.

516.17

§516.17 Decision Table for conducting status reviews in 1991 only  
(continued).

If the status review indicates:	and the situation below exists:	then the review determination is:
2. All planned practices scheduled for application prior to status review are applied, or the person attempted to apply all scheduled practices.	2a. All practices meet FOTG requirements.	2a. Actively applying the conservation plan. Advise producer of any improvements that may be needed to assure future compliance.
	2b. One or more practices do not fully meet FOTG requirements but the applied practices achieve 75 percent or more of the erosion reduction that would have been achieved if the applied practices fully met FOTG requirements.	2b. A minor technical variance to actively applying the conservation plan is granted for 1991, and the producer is expected to achieve at least 85% of the erosion reduction that is to be achieved in the 1992 crop year. Schedule a status review in 1992.
	2c. The applied practices achieve less than 75 percent of the erosion reduction that would have been achieved if the applied practices fully met FOTG requirements, but the person indicates that a special circumstance or personal hardship prevented proper practice application.	2c. Make an initial determination of not actively applying the conservation plan and request state conservationist approval for variance. If variance is granted, change determination to actively applying and notify producer. Producer is expected to achieve at least 85% of the erosion reduction that is to be achieved in the 1992 crop year. Schedule a status review in 1992.

516-34

§516.17 Decision Table for conducting status reviews in 1991  
(continued).

If the status review indicates:	and the situation below exists:	then the review determination is:
<p>3. Some but not all, planned practices scheduled for application prior to status review are applied, OR none of the planned practices scheduled for application prior to status review are applied.</p>	<p>3a. Substitute practices were used by the producer which achieve the same results in 1991 as the planned practices would have achieved in 1991.</p>	<p>3a. Actively applying the conservation plan.</p>
	<p>3b. Producer indicates special circumstances or personal hardship prevented practice application.</p>	<p>3b. Same as determination "2c" on previous page.</p>
	<p>3c. No special circumstances or personal hardship prevented practice application.</p>	<p>3c. Not actively applying the conservation plan. Producer is unlikely to be eligible for a good faith exemption.</p>
	<p>2d. The applied practices achieve less than 75 percent of the erosion reduction that would have been achieved if the applied practices fully met FOTG requirements, and no special circumstances or personal hardship prevented proper practice application.</p>	<p>2d. Not actively applying the conservation plan. If this is the first violation in 5 years, producer may be eligible for good faith exemption.</p>

516.17

Part 516 - Exhibits

516.18

§516.18 Form ASCS-569, SCS Report of Conservation Compliance for Spotcheck Purposes (6-19-90)

REPRODUCE LOCALLY. Include farm number and date on reproductions

ASCS-569  
(06-19-90)

U.S. DEPARTMENT OF AGRICULTURE  
Agriculture Stabilization and Conservation Service

SCS REPORT OF CONSERVATION COMPLIANCE FOR SPOTCHECK PURPOSES

PART A - TO BE COMPLETED BY ASCS

COUNTY OFFICE NAME AND ADDRESS	PRODUCER'S NAME
	STATE
	FARM NUMBER
	CROP YEAR
	TRACT NUMBERS

The above farm has been identified as having a potential violation of the conservation compliance provisions of the Food Security Act of 1985, for the crop year indicated above. Applicable field(s) or area(s) are marked with a red "X" on the attached photocopies.

Please make applicable review(s) for: HEL  Wetland

Complete Part B below, and return to the ASCS Office promptly so the producer's eligibility for program benefits can be determined.

ASCS COUNTY OFFICE REPRESENTATIVE

DATE REFERRED TO SCS

PART B - TO BE COMPLETED BY SCS

SCS reviewed the field(s) or area(s) requested for the subject farm on \_\_\_\_\_ as indicated below:  
(DATE)

HEL

WETLAND

The person is NOT actively applying the conservation plan, or is NOT using the conservation system. Producer was notified on \_\_\_\_\_  
(DATE)

The wetland area is a converted wetland. Producer was notified on \_\_\_\_\_  
(DATE)

SCS-CPA-026 and photocopy attached.

The person is actively applying the conservation plan, or is using the conservation system.

The wetland area is NOT a converted wetland.

SCS DISTRICT CONSERVATIONIST

DATE

REMARKS

This program or activity will be conducted on a nondiscriminatory basis without regard to race, color, religion, national origin, sex, age, marital status, or handicap.

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

§516.19 Form AD-1069, Graduated Payment Reduction - Wetland Violations

REPRODUCE LOCALLY. Include form number and date of reproduction.

Form Approved - Old No. 0560-0001

AD-1069  
(02-20-81)

UNITED STATES DEPARTMENT OF AGRICULTURE

GRADUATED PAYMENT REDUCTION - WETLAND VIOLATIONS

STATE \_\_\_\_\_

COUNTY \_\_\_\_\_

**NOTE:** The following statements are made in accordance with the Privacy Act of 1974 (5 USC 552a). The authority for requesting the information to be furnished on the form is the Food, Agriculture Conservation, Trade Act of 1972 and regulations promulgated under the Act (7 CFR 2 PART 12). The information will be used to determine eligibility for program benefits and other financial obligations administered by USDA agencies. The information may be furnished to other USDA agencies, IRS, Department of Justice, or other State and Federal or international agencies, and is required in order of a court reporter to administer the program. Furnishing the Social Security Number is voluntary. Furnishing the other requested information is voluntary however, failure to furnish the correct, current information will result in a determination of ineligibility for certain program benefits and other financial assistance administered by USDA agencies. The provisions of criminal and civil laws, including 18 USC 208, 207, 271, 841, 1001, 18 USC 714a, and 31 USC 3729, may be applicable to information provided by the producer on the form. Public reporting burden for the collection of information is estimated to average 8 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing the burden, to Department of Agriculture, Compliance Office, OMB, Room 3040 at Washington, D.C. 20250 and to the Office of Management and Budget, Paperwork Reduction Project (048) No. 0560-0001, Washington, D.C. 20503. RETURN THIS COMPLETED FORM TO YOUR COUNTY SCRS OFFICE. IT IS BEING FORWARDED TO THE NATIONAL SCRS OFFICE FOR REVIEW AND COMPLIANCE WITH THE PRIVACY ACT.

PART A - PRODUCER'S REQUEST

1. NAME AND ADDRESS	3. IDENTIFICATION NUMBER	4. FARM NUMBER WITH THE VIOLATION
5. PHONE NUMBER (area code)		6. CROP YEAR OF VIOLATION

8. Request for graduated payment reduction. (State the circumstances surrounding the violation. Include any evidence that the violation was made in good faith and not as a scheme or device to avoid compliance.)

NOTE TO PRODUCER: If a graduated payment reduction is approved by the County Committee, benefits will not be restored until an agreement is signed to restore the converted wetland according to SCS requirements.

TO BE COMPLETED BY  
ASCS ONLY

SIGNATURE OF PRODUCER \_\_\_\_\_ DATE \_\_\_\_\_ 7. DATE REQUEST REFERRED TO SCS \_\_\_\_\_

PART B - SCS INFORMATION

9. Describe any pertinent facts relating to the case that may affect the COC determination.

	YES	NO
9. Was the producer informed of the wetland determination made by SCS through personal contact?		
10. Does SCS have knowledge that the producer was involved in a previous swampbuster violation issue?		
11. Did SCS have discussion at any time with the producer concerning the wetland before the violation occurred? If "Yes", describe the situation.		

PART C - PAYMENT REDUCTION INFORMATION (SCS AND ASCS)

12. ACRES AFFECTED			13. INFORMATION AVAILABLE			14. PREVIOUS LAND USE			15. TIME TO FULLY RESTORE					
√	ACRES	REDUCTION	√	WETLAND INFORMATION	REDUCTION	√	LAND USE	REDUCTION	√	TIME	REDUCTION			
	0.1 - 0.5	\$ 750.00		(a) No SCS wetland inventory available on the property.	NONE		(a) The wetland was planted to an agricultural commodity 8 or the past 8 years.	NONE		(b) 1 year.	NONE			
	0.51 - 1.0	\$ 1,000.00				(b) 5 years.			\$500					
	1.1 - 2.0	\$ 1,250.00				(c) 10 years.			\$2,000					
	2.1 - 3.0	\$ 1,500.00				(d) more than 10 years.			\$4,000					
	3.1 - 4.0	\$ 1,750.00		(b) SCS wetland inventory available, but a final wetland determination has not been provided to the landowner.	\$500		(b) The wetland was planted to an agricultural commodity 1 or 2 of the past 8 years.	\$250	16. TOTAL REDUCTION IF GOOD FAITH APPLIES:					
	4.1 - 5.0	\$ 2,000.00				12.								
	5.1 - 6.0	\$ 2,250.00				13.								
	6.1 - 7.0	\$ 2,500.00				14.								
	7.1 - 8.0	\$ 2,750.00		(c) Final SCS wetland determination has been provided to the landowner, but not certified by SCS.	\$1,000		(c) The wetland is a field that was planted to an agricultural commodity, but the wetland has not been planted to an agricultural commodity in the past 8 years.	\$500	15.					
	8.1 - 10.0	\$ 3,000.00				TOTAL			\$					
	10.1 - 15.0	\$ 4,000.00				(d) SCS has given the producer appeal rights, and certified the wetland determination.			\$2,000		(d) The wetland is a field that was planted to an agricultural commodity, and the wetland has not been planted to an agricultural commodity in the past 8 years.	\$1,000	*NOTE: ENTER \$10,000 IF TOTAL EXCEEDS \$10,000.	
	15.1 - 20.0	\$ 5,000.00								16.				
	20.1 - 25.0	\$ 6,000.00												
	25.1 - 30.0	\$ 7,000.00												
	30.1 - 35.0	\$ 8,000.00												
	35.1 - 40.0	\$ 9,000.00												
	40.1 and over	\$10,000.00												

This program or activity will be conducted on a nondiscriminatory basis without regard to race, color, religion, national origin, age, sex, marital status, or handicap.

Part 516 - Exhibits

516.19

§516.19 Form AD-1069, Graduated Payment Reduction - Wetland Violations (continued)

AD-1069 (Reverse) (02-20-91)

PART D - GOOD FAITH DETERMINATION		YES	NO
17. Does ASCS have knowledge that the producer was involved in a previous swampbuster issue?			
18. The COC determined that a good faith effort was made to comply:			
18. Reasons for COC determination:			

20. SIGNATURE OF COC \_\_\_\_\_ DATE \_\_\_\_\_

21. DD Concurrence. (Required if items 9, 10, 11 or 17 is "yes", 13(d) or 14(d) is checked.) SIGNATURE OF DD \_\_\_\_\_  
 \_\_\_\_\_ Concur with COC      \_\_\_\_\_ Do Not Concur with COC

22. Producer was notified  
 DATE \_\_\_\_\_

PART E - RESTORATION AGREEMENT

23. Referred to SCS because the COC determined good faith. DATE \_\_\_\_\_  
 24. A restoration plan was agreed upon by the producer and signed on: DATE \_\_\_\_\_

25. SIGNATURE OF SCS EMPLOYEE \_\_\_\_\_ DATE \_\_\_\_\_  
 26. RETURNED TO ASCS DATE \_\_\_\_\_

PART F - MULTI-COUNTY INFORMATION

27. AMOUNT WITHHELD FROM EARNED BENEFITS \$ \_\_\_\_\_  
 28. CONTROL COF: STATE \_\_\_\_\_ COUNTY \_\_\_\_\_  
 29. MAILED TO CONTROL COF DATE \_\_\_\_\_

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§516.20 Information that must be submitted by the person to assess a post-conversion minimal effects determination:

- (1) Type of wetland converted (Cowardin classification).
- (2) Hydrological condition of the wetland at the time of conversion and at present.
  - quantity of water present
  - outlet information (elevation and type)
  - condition of the drainage system (if present)
  - size of the contributing watershed
  - size of the basin
  - depth of water
- (3) Climatological data prior to the conversion
  - precipitation records for the year of the conversion
  - precipitation records available for all previous years
  - precipitation records for period during the conversion.
- (4) Vegetative condition at the time of conversion
  - species composition
  - plant density
  - community diversity
  - age of community
- (5) Available maps, photographs or slides depicting the wetland prior to, during, and after the conversion.
- (6) Crop history information
  - crop history of wetland for 5 years prior to conversion.
  - crop history of contributing watershed 5 years prior to conversion
- (7) Soils information
  - soils of the contributing watershed
  - soils of the converted wetland
- (8) Records on reestablishment (seeding, planting, or natural reestablishment) of vegetation during the period of conversion.
- (9) Efforts to restore the converted wetland.
  - method of restoring wetland hydrology
  - method of restoring wetland vegetation
  - management of wetland to restore former conditions

Part 516 - Exhibits

516.21

§516.21 Delineation labels.

- NHEL Fields that are determined not to be highly erodible.
- NW Fields that do not contain wetland.
- HEL All fields determined to be highly erodible.
- W Each area that is a non-farmed wetland or a wetland farmed under natural conditions.
- CW Each area converted between 12/23/85 and 11/28/90.
- CW+year Each area converted after 11/28/90.
- MW Each area determined to be minimal effect.
- PC Each area or entire area that is prior converted cropland, which was drained, filled, or manipulated before 12/23/85, sufficient to make production possible, and has been cropped.
- AW Each area that is artificial or irrigation induced wetland.
- PC&NW Fields that contain both PC and NW.
- MIW Each frequently cropped converted area or area converted between 12/23/85 and 11/28/90, for which a prior converted cropland was restored as per agreement or easement. (Wetlands restored through mitigation may or may not be protected by an easement.
- RPW A wetland converted to improve efficiency. A PC must be restored to replace it.
- CWTE An area converted or commenced based on an incorrect SCS determination.
- CWNA An area converted to other than agricultural commodity production if the other use was approved before the conversion.
- RVW+year An area converted after 12/23/85, on which a violation occurred that has been restored to pre-conversion conditions. Add year of restoration.
- RSW An area converted between 12/23/85, and 11/28/90, on which no violation occurred that has been restored to pre-conversion conditions.

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

516.21

§516.21 Delineation labels. (continued)

FW Each area that is farmed wetland; was manipulated and planted before 12/23/85 but still meets wetland criteria.

FWP Each area that is pasture or hayland converted before 12/23/85, still meets wetland criteria, and is not abandoned.

GFW An area that was formerly CW but has been restored under Good Faith provisions.

Easement An area on which an easement is held.

NHEL/NW, NHEL/W - Fields that are not highly erodible and do not contain wetland.

HEL/PC&NW Combinations of symbols that may be used on each field.

516.22

§516.22 Standard easement.

[The following is standard wetland conservation easement language. In several instances brackets have been placed around portions of the language with guidance provided as to when the bracketed language will be used.]

**CONSERVATION EASEMENT DEED  
WETLAND CONSERVATION PROVISION**

County Office Address and Telephone Number:	ASCS Farm No.:	
	Restoration No.:	
	County of:	
Current month, day, and year:		State of:

THIS CONSERVATION EASEMENT, is made this \_\_\_\_\_ day of \_\_\_\_\_, 199\_\_, by and between -

\_\_\_\_\_ whose address is \_\_\_\_\_

(hereafter referred to as the "Grantor"), and the UNITED STATES OF AMERICA, (hereafter referred to as "United States") by and through the Commodity Credit Corporation (hereinafter referred to as "CCC"), an instrumentality of the United States Department of Agriculture. The Landowner and the United States are jointly referred to as the "Parties".

This conveyance is in conjunction with a Wetland Restoration Agreement No. \_\_\_\_\_.

FOR AND IN CONSIDERATION of the above referenced agreement, and/or other good and valuable consideration, receipt of which is hereby acknowledged, the Landowner does hereby grant and convey, with general warranty of title, a conservation easement with appurtenant rights of access to the United States of America, by and through the Commodity Credit Corporation (CCC), an instrumentality of the United States Department of Agriculture, on and over the Property described in Part I-C of this document. By this easement, the Landowner covenants compliance with the terms and conditions herein enumerated for the use of lands, and will refrain from any activity which is prohibited hereunder or which is inconsistent with achieving the wetland conservation purposes of this easement or with the exercise of the rights granted to the United States herein.

§516.22 Standard easement (continued).

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PART I - GENERAL TERMS

A. Authority. This easement is acquired by the United States under the authority of Title XII of the Food Security Act of 1985 (Public Law 99-198), as amended by Subtitle C of Title XIV of the Food, Agriculture, Conservation, and Trade Act of 1990 (Public Law 101-624; 104 Stat. 3574-3575; 16 U.S.C. §§ 3821, et seq.).

B. Purposes. The purposes of this easement are to effect the referenced Wetland Restoration Agreement, to assure that equivalent functions and values of a converted wetland are replaced and maintained in order to meet the objectives of the Wetland Conservation Provision and, in particular, to assure that the mitigation/replacement wetland areas identified in this easement will be maintained for the period of the easement as specified in this document.

C. The Property Encumbered by this Easement. The Easement Area as described and defined below is encumbered with the conservation easement. The Easement Farm as described and defined below is hereby encumbered with a grant to the United States of a right of access across the Easement Farm to the Easement Area (the Easement Area being part of the Easement Farm):

1. Easement Area. The property encumbered by this conservation easement is described as follows:

*[Described here by reference to an appended plat (EXHIBIT A) the farmed wetland or the wetland and adjacent buffer to which this easement will apply. The easement area may be subdivided to provide for specific conditions applicable to each subdivision if both frequently cropped wetlands and less than frequently cropped wetlands are to be mitigated/replaced on the same parcel.]*

2. Easement Farm. In addition, the Easement Farm is encumbered with a right of access for/by United States, as described herein, to the Easement Area. The Easement Farm is all of that land conveyed by \_\_\_\_\_ to the Landowner by deed dated \_\_\_\_\_, and recorded in Deed Book \_\_\_\_\_, at page \_\_\_\_\_, in the land records of \_\_\_\_\_ County (Borough, Parish, etc), and more specifically described as follows:

D. Definitions. For purposes of this easement:

1. "Wetland Restoration Agreement" (WRA) means an agreement between the Grantor and the Soil Conservation Service (SCS) and the Fish and Wildlife Service (FWS) to mitigate (or replace) wetland values that would be lost as the result of the conversion of another wetland in order for the Grantor to remain eligible for U.S. Department of Agriculture (USDA) farm program benefits under the Wetland Conservation Provisions of the 1985 Food Security Act as amended by the 1990 Food Agriculture, Conservation and Trade Act. The WRA shall be on file and available for inspection at the county office of the USDA's Agricultural Stabilization and Conservation Service (ASCS) for the county identified above.

2. "Easement Area" means that portion or portions of the Easement Farm upon which certain wetland restoration activities are required. The Easement Area is as generally depicted on EXHIBIT A which is attached to

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(180-V-NFSAM, Second Ed., Amend. 6, May 1991)

and incorporated into this easement. To the extent of any conflict with EXHIBIT A, the land descriptions in this document shall control.

3. "Easement Farm" is that property of the Landowner described herein which includes all of the Easement Area and all other lands of the Landowner necessary to provide reasonable access to the Easement Area.

4. "Landowner" means the Grantor, who has record title to the Easement Area and Easement Farm, and shall also include such Grantor's heirs, successors and assigns.

5. "Maintenance" means the maintenance of the restored wetland, including re-establishment of the wetland area if deemed necessary or desirable by the SCS and FWS, or other maintenance as may be required under the provisions of this easement; provided further that the obligation of maintenance shall include an obligation to provide access on the Easement Farm as may be needed by United States and its representatives, agents and assigns.

6. "Property" means all of the lands and appurtenant rights constituting the Easement Area and Easement Farm, which lands are described in Part I-C of this document.

E. Duration of Easement. This easement shall remain in effect until such time as the United States or its successors conveys and quitclaims to the Landowner the rights herein conveyed. The easement shall remain in effect as described in subparagraphs [ I-E(1) and I-E(2) ]<sup>1</sup> below. In the event that the Landowner believes that the conditions necessary to keep the easement in force are not longer applicable to the land, then the Landowner may request a termination of the easement from the United States which will, at its discretion, make a determination and terminate the easement if, in its opinion, the conditions for termination are met.

[ This easement will remain in force for as long as the Converted Wetland Area identified in PART III of this document, for which the restoration is to mitigate, remains available for production of agricultural commodities or is not returned to its original wetland condition with equivalent functions and values. ]<sup>2</sup> [ and; ]

[ This easement will remain in force for the length of time required to replace the functions and values on the restored wetland identified in PART I of this document that were lost as a result of the conversion of the Converted Wetland Area identified in PART III of this document as set forth in the Wetland Restoration Agreement or for as long as the Converted Wetland Area for which the restoration is to mitigate remains available for production of agricultural commodities or is not

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<sup>1</sup> Use either one or both of these references, as the case may be.

<sup>2</sup> Use this provision for the mitigation of frequently cropped wetlands.

§516.22 Standard easement (continued).

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returned to its original wetland classification with equivalent functions and values, whichever is greater. ]<sup>3</sup>

F. United States and its Representatives. All rights of the United States under this instrument may be exercised by the CCC, the SCS, FWS, or other instrumentality, agent or assign thereof. Specific reference to CCC, SCS, or FWS herein shall not limit the ability or flexibility of the United States Government to exercise rights herein by whatever instrumentality, agent or assign necessary or desirable to effect the purposes and objectives of this easement. Unless otherwise indicated or unless modified at some future time, the CCC shall be the representative of the United States under this easement.

G. Access. The Landowner hereby grants to the United States and its representatives, assigns and successors a right of access from a public road over the Easement Farm to the Easement Area. Such access shall be for any and all purposes necessary or desirable as determined by United States, in the administration of this easement or the Wetland Restoration Agreement as applied to the Property. Establishment and maintenance of such access shall be the responsibility of the Landowner and all costs shall be borne by the Landowner. Except, that United States will pay, as determined by the United States, the fair market value of any loss of an annually planted crop destroyed by reason of actual use of the right of access by the United States, but only if the access provided by the landowner is designed to minimize such loss. The landowner is otherwise free to locate the place of access at such location as the landowner deems desirable, provided that such location is sufficient and suitable for the purpose, as determined by United States, and may change such location from time to time. In addition, to the maximum extent allowed by law, the United States or its authorized representatives shall be afforded all rights-of-way and other rights of ingress and egress to the Easement Area and Easement Farm which the Landowner has over other properties as may be necessary or appropriate, as determined by the United States in the administration and enforcement of the easement and related rights, including the right of access granted herein to the United States. Such access as is established shall be sufficient for access of personnel, machinery and equipment as may be deemed needed by the United States to accomplish the purposes of this easement.

## PART II - COVENANTS BY THE LANDOWNER

A. Prohibitions. The following are prohibited within the Easement Area:

1. No dwellings, barns, outbuildings shall be built.
2. No other structure may be built.
3. Land use restrictions:

[ The vegetation or hydrology of the Easement Area will not be altered through: (1) harvesting wood products; (2) burning; (3) placing of refuse, wastes, chemicals, sewage, or other debris, (4) draining, dredging, channeling, filling, leveling, pumping, diking, impounding

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<sup>3</sup> Use this provision for the replacement of less than frequently cropped wetlands. If both frequently cropped and less than frequently cropped wetlands are to be mitigated/replaced on the same parcel, then, use both provisions with the introductory phrase "For Subdivision A of the Easement Area," and "For Subdivision B of the Easement Area,".

and related activities, or (5) diverting or affecting the natural flow of surface or underground waters into, within, and out of the easement area. The landowner shall have the right to carry on farming practices such as grazing, hay cutting, plowing, working and cropping the Easement Area when it is dry of natural causes. ]

[ The vegetation or hydrology of the Easement Area will not be altered through: (1) cultivation; [(2) cutting or mowing;] [(3) grazing;] <sup>5</sup> (2) harvesting wood products; (3) burning; (4) placing of refuse, wastes, chemicals, sewage, or other debris, (5) draining, dredging, channeling, filling, leveling, discing, pumping, diking, impounding and related activities, or (6) diverting or affecting the natural flow of surface or underground waters into, within, and out of the Easement Area. The landowner shall have the right to graze domestic livestock and harvest hay by cutting or mowing, under such terms and conditions as the United States deems necessary and desirable to protect and further the purposes of this easement in accordance with the WRA, provided:

(i) hay cutting or mowing is conducted not more than one time per year between July 15 and September 1 of any given year; and

(ii) grazing does not exceed 25 percent harvest efficiency in any given year. ] <sup>6</sup>

B. Wetland Restoration Agreement. Further:

1. Covenant of Compliance with WRA. The Landowner covenants compliance with all the terms and conditions of the WRA which is appended and made a part of this easement as Exhibit A. Nothing herein shall preclude the Landowner and the United States, through the SCS and with agreement from the FWS, from amending the WRA in the future and recording the same in the appropriate land records.

2. Determination of Exemption under the Wetland Conservation Provision. The SCS, in agreement with FWS, shall determine the necessary and appropriate wetland mitigation/replacement requirements on the Easement Area including duration. The mitigation/replacement wetland is delineated on the attached EXHIBIT A, which is appended to this easement

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<sup>4</sup> Use this provision for the mitigation of frequently cropped wetlands.

<sup>5</sup> Use either or both of these optional prohibitions if managed haying and/or grazing is not consistent with protecting and restoring wetland functions and values (i.e., reestablishment/maintenance of woody vegetation). If both haying and grazing is prohibited, then delete the last sentence and provisions that follow. If either haying or grazing is to be allowed, then use the corresponding provision(s) below.

<sup>6</sup> Use this provision for the replacement of less than frequently cropped wetlands. If both frequently cropped and less than frequently cropped wetlands are to be mitigated/replaced on the same parcel, then, use both provisions but replace the term "the Easement Area" with the terms "Subdivision A of the Easement Area" and "Subdivision B of the Easement Area".



and made a part thereof, subject to such further delineation by CCC as may be needed.

3. In the event of a conflict or ambiguity between the WRA or this easement, the provisions of this easement shall prevail.

4. Maintenance of the Restored Wetland. Maintenance shall be as specified by the SCS in agreement with the FWS in accordance with the provisions of the WRA, and as needed to enforce this easement and accomplish its purposes, as determined by CCC. All costs involved in the establishment and maintenance of the restored wetland and the right of access granted to the United States herein, or otherwise incurred with respect to the maintenance of the property in accordance with this easement, shall, together with all other charges associated with the Property (including taxes), be the responsibility of the Landowner.

5. Rights of the United States to Inspect Property and Perform Work on the Property. The United States and its authorized representatives may enter upon the Easement Area from time to time to:

(a) inspect and insure compliance with the terms of the easement, and

(b) perform work on the property as may be necessary or desirable to establish or maintain the wetland restoration agreement or access to the Easement Area, which CCC deems desirable if: (1) the Landowner fails to establish or maintain the restored wetland within the Easement Area or otherwise fails to comply with the terms of this easement, or (2) the CCC determines, in its discretion, to perform such work in lieu of the Landowner.

C. Rights of the United States Run with the Land and Bind the Landowner's Successors. Subject to any unsubordinated prior rights of record, the rights granted to the United States in this instrument run with the land and shall be superior to the rights of all others in the Property. All obligations of the Landowner under this easement shall also bind the Landowner's heirs, successors and assigns.

D. Use of the Easement Area. No use of the Easement Area will be specifically allowed under this easement without the approval of SCS and FWS, which approval shall be granted by SCS and FWS only to the extent such use is consistent with the terms of this easement and the regulations governing the implementation of the Wetland Conservation Provision operated by USDA.

E. Violations. If there is any failure to provide access to the Easement Area, meet the requirements of the wetland restoration agreement, or maintain the wetland functions and values provided by the restored wetland, the landowner would lose eligibility for USDA farm program benefits until the wetland is restored and the United States or its authorized representatives may perform the work needed for such establishment or maintenance or may seek specific performance at law or may employ any other remedy available to it, and, in any case, all expenses of the United States or its authorized representative, including any legal fees or attorney fees, thereby incurred shall be charged against the Landowner. Such charges shall also be a charge against the Easement Area if the failure relates to the conservation measures or the Easement Farm if such failure relates to access to the Easement Area and shall constitute a lien on such land enforceable by foreclosure or other

method in which case the chargeable fees and costs under this clause shall include all costs, including legal fees, associated with the lien, the foreclosure, and other collection expenses.

F. Successors to the United States. Rights granted under this easement to the United States shall accrue in its favor and in the favor of its successors of any kind.

G. Covenants. The Grantor covenants that the Landowner is vested with the Property and will warrant and defend unto the United States same against all claims and demands including, but not limited to, claims and demands against quiet and peaceable use and enjoyment of the Property and interest in the land herein granted the United States.

H. Costs of the mitigation/replacement of wetland area functions and values: Federal funds shall not be used in the implementation of such physical wetland mitigation/replacement actions. Federal funds may be used for technical assistance, monitoring, and administrative activities associated with the mitigation/restoration project.

### PART III - CONVERTED WETLAND

The Property Containing the Wetland Converted. As described herein, a change in the land use of the Converted Wetland Area as described below can affect the duration of the conservation easement provided for in this document. The Converted Wetland Farm as described below is the farm containing the Converted Wetland Area (the Converted Wetland Area being part of the Converted Wetland Farm):

1. Converted Wetland Area. The property containing the Converted Wetland Area, the use of which can affect the duration of the conservation easement provided for in this document is the following property which is referred to herein as the "Converted Wetland Area":

*[Describe here or by reference to an appended plat (Exhibit A) the converted wetland area.]*

2. Converted Wetland Farm. In addition, the Converted Wetland Farm, as described herein, is all of that land conveyed by \_\_\_\_\_ to the Landowner by deed dated \_\_\_\_\_, and recorded in Deed Book \_\_\_\_\_, at page \_\_\_\_\_, in the land records of \_\_\_\_\_ County (Borough, Parish, etc), and more specifically described as follows:

§516.22 Standard easement (continued).

IN WITNESS WHEREOF, the Landowner hereunto sets hand(s) and seal(s) on the day of year first written above.

}

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\_\_\_\_\_  
Grantor(s) }  
                  }  
                  }

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(Acknowledgment in accordance with State or Local Practice)

Part 516 - Exhibits

516.23

(516.23 MINIMAL EFFECT DETERMINATION KEY FOR SHORT TERM CONVERSIONS  
Wetlands must be considered completely restored before procedure  
applies.

(1) Herbaceous wetlands

(a) Wetland farmed, or had no vegetation or only annual  
herbaceous vegetation at the time of conversion..... c.

(b) Wetland not farmed and had perennial herbaceous  
vegetation at time of conversion..... d.

(c)

(1) No significant precipitation events occurred  
during the period of conversion to enable the detection of  
measurable runoff or recharge.....Minimal effect

(2) Significant precipitation events occurred during  
the period of conversion to enable the detection of runoff or  
recharge..... f.

(d)

(1) Perennial herbaceous wetland vegetation  
considered fully restored..... e.

(2) Perennial herbaceous wetland vegetation not  
considered fully restored.....Minimal effect not possible

(e)

(1) No significant precipitation events occurred  
during the period of conversion to enable the detection of  
measurable runoff or recharge...Minimal Effect \*

(2) Significant precipitation events occurred during  
the period of conversion to enable the detection of measurable  
runoff or recharge..... Minimal effect not possible  
\*

\* Significance of effects must be considered by interagency team  
to determine if effects are minimal.

516.23 MINIMAL EFFECT DETERMINATION KEY FOR SHORT TERM CONVERSIONS  
(continued)

2. Wooded wetlands

(a) Woody wetland vegetation considered fully restored..... c.

(b) Woody wetland vegetation considered not fully restored.....Minimal effect not possible

(c)

(1) No significant precipitation events occurred during the period of conversion to enable the detection of measurable runoff or recharge.....Minimal Effect \*

(2) Significant precipitation events occurred during the period of conversion to enable the detection of measurable runoff or recharge..... \*

\* Significance of the effects must be considered by interagency team to determine if effects are minimal.









ATTACHMENT B

MONTANA WETLANDS PROTECTION GRANT APPLICATION



DEPARTMENT OF  
HEALTH AND ENVIRONMENTAL SCIENCES



STAN STEPHENS, GOVERNOR

COGSWELL BUILDING

STATE OF MONTANA

FAX # (406) 444-2606

HELENA, MONTANA 59620

January 27, 1992

John Peters  
U. S. EPA, Region VIII  
999 18th Street, Suite 500  
Denver, CO 80202-2405

RE: State Wetlands Protection Grant Application

Dear John,

Enclosed is an interagency wetlands grant application submitted by the State of Montana under the lead of the Department of Health & Environmental Science, Water Quality Bureau. The grant application consists of six components. Components 1 & 2 were composed by the Department of Health and Environmental Sciences, Water Quality Bureau; components 3 & 4 by the Department of Natural Resources and Conservation, Conservation Districts Bureau and Montana Watercourse at MSU; component 5 by the Department of Transportation, Environmental Section; and component 6 by the Montana Riparian Association.

The application includes the development, implementation and monitoring of a state wetlands conservation/protection strategy (DHES); establishment of a wetlands monitoring program (DHES); wetlands education (DNRC/MT Watercourse); coordinated resource management in river corridors (DNRC); an evaluation and expansion of the existing program for highways impacts (DOT); and an expansion of the Riparian Association's wetlands program. Cumulatively, implementation of the various components will ensure diverse wetlands programs to be coordinated by a cooperative interagency wetlands strategy for the state.

The required state match has been identified within each component and is at least 25 percent for all components. The requested funding and identified match for each component is as follows:



GRANT APPLICATION FOR STATE WETLAND PROTECTION PROGRAMS  
UNDER SECTION 104 (b) (3) OF THE CLEAN WATER ACT. SUBMITTED  
BY THE STATE OF MONTANA, DEPARTMENT OF HEALTH AND  
ENVIRONMENTAL SCIENCES, WATER QUALITY BUREAU

Catalog of Federal Domestic Assistance No. 66.461  
Wetlands Protection - State Development Grants

COMPONENT NO. 1

DEVELOPMENT AND IMPLEMENTATION OF A STATE WETLANDS  
CONSERVATION STRATEGY

SUMMARY

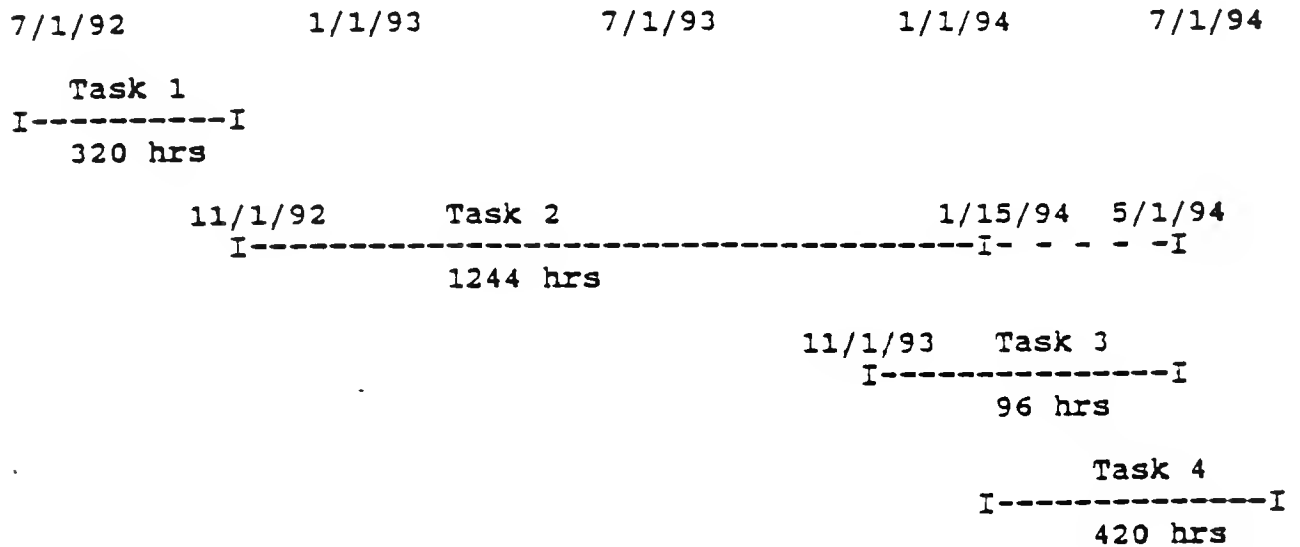
It has been estimated that over half of our nations original wetland acreage has been lost to development and conversion to cropland. Wetlands in Montana were not immune and many suffered same fate. Only recently have programs have been put in place on the federal and state levels to reduce these losses. The coordination of the many wetland conservation and protection programs is critical to preserve the important functional values that wetlands serve.

This component will provide for the development and implementation of a state wetlands conservation strategy (the strategy). Montana currently has no formal mechanism to coordinate all the activities or programs of different agencies and user groups that may impact wetlands. It is our goal to develop and begin implementation of a strategy over the next two years that will clearly define the role(s) of each agency in administering regulatory and non-regulatory programs, examine the effectiveness of existing programs for the protection and improvement of wetland resources, propose policy or legislative changes for those found to be partially or fully ineffective, identify voids that are not addressed by existing programs, propose institutional changes to fill those voids and require the coordination of wetland conservation programs on a statewide basis. A MOU will be developed upon finalization of the strategy that will signify the approval of each council member (agency or organization) and their commitment to implement those segments for which they may be responsible.

Under the lead of the Department of Health and Environmental Sciences, Water Quality Bureau (WQB), an interagency wetlands council composed of all the natural resource agencies in Montana,

state and federal, with interest or statutory responsibility for wetlands conservation will jointly develop the strategy. In addition to the agencies who will each have an administrative member and a technical member, selected conservation groups will be invited to be members of the council to participate in deliberations. A new half-time position at the WQB will be informally titled the state wetlands coordinator. The position will act as staff for the wetlands coordinator in the collection, assessment and inventory of existing information and data (Task 1), the development, revision and adoption of the strategy (Task 2), the drafting and revision of the MOU (Task 3), and monitoring the effectiveness of the strategy (Task 4). The position will spend half time on wetlands issues and half time on the nonpoint source pollution control program, a linkage that we expect will be beneficial to both programs. The funding requested in this component will provide funding for the half-time position for a two year period - the NPS program will fund the other half of the position.

TIMEFRAME



## TASKS

### Task 1. COMPILE EXISTING WETLANDS INFORMATION

- A. Objective: Complete an inventory and assessment of existing wetland information and data.
- B. Work Activities.
- 1) Meet with state and federal agencies and conservation organizations to explain the process, gather available wetland data and information on agency's role in wetland protection and conservation, extent and function of program(s), staffing, funding, priority within agency and the availability and interest in serving on wetlands council.
  - 2) Review information obtained. Refine and categorize.
  - 3) Compile existing information into useable format and database, draft report to wetlands council.
- C. Output: Report to wetlands council for their use in ascertaining exactly what information is available, where it can be obtained, and what additional information may be needed prior to and during the development of the strategy. Such information will be critical in the process of defining existing and future roles of each agency.
- D. Budget:

<u>Item</u>	<u>State</u>
<u>Federal</u>	
Environmental Specialist III - DHES Salaries, Benefits & Indirect Operating Expenses *	
DNRC,DFWP,DSL,DOA **	

#### Totals

\* Operating expenses include travel, rent, supplies and materials, repairs and maintenance, communications, training, and computer equipment, network and software.

\*\* State match is provided through salaries, benefits and indirect of personnel employed by the Department of Natural Resources and Conservation (DNRC), Department of Fish, Wildlife and Parks (DFWP), Department of State Lands (DSL), and Department of Agriculture (DOA) who have wetlands responsibilities and are administrative or technical members of the wetlands council.

**TASK 2. DEVELOP STATE WETLANDS CONSERVATION STRATEGY**

A. Objective: To develop a coordinated statewide strategy for the conservation and protection of wetlands in Montana.

B. Work Activities:

1) Organize and convene a state wetlands council to include a administrative and technical member from each state and federal agency and interested conservation organization.

2) Draft a preliminary coordinated wetlands conservation and protection strategy based on information compile in Task 1.

3) Meet at least bimonthly with the wetlands council to discuss wetland strategy development - including establishment of specific goals and objectives for the council, examination of existing policy and statutes, the voids and gaps of those policies and statutes, defining the existing and future roles of resource agencies for regulatory and non-regulatory programs, specific actions that need to be taken to accomplish the council's goals and objectives, establish target dates, implementations mechanisms, and methods for intra and inter program coordination.

4) Prepare revisions and drafts of the strategy to reflect discussions by council at meetings.

5) Adopt interim strategy at 12-14 months, and evaluate - 12-18 month stage.

6) Revise & amend strategy --- adopt final strategy at 18-20 month stage.

C. Output: Final wetland conservation strategy document.

D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
DHES - Environmental Specialist III Salaries, Benefits & Indirect Operating Expenses Publish document		
DNRC, DFWP, DSL, DOA		
Totals		



**TASK NO. 3 STATE WETLANDS CONSERVATION MEMORANDUM OF UNDERSTANDING**

A. Objective: Develop a memorandum of understanding (MOU) between all involved organizations and agencies that designates their approval of the state wetlands strategy and guides it's implementation.

B. Work Activities:

- 1) Prepare the initial draft MOU. Send out to council for review.
- 2) Meet with council to accept comments and recommendations for revisions.
- 3) Prepare final draft MOU. Send out to council for final review.
- 4) Meet with council to adopt final version of MOU.
- 5) Circulate for signatures.

C. Outputs: Final Memorandum of Understanding binding each agency or organization to implementation of strategy.

D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
DHES - Environmental Specialist III Salaries, Benefits & Indirect Operating expenses		
DNRC, DFWP, DSL, DOA		
Total		

**TASK 4. IMPLEMENT AND MONITOR WETLANDS CONSERVATION STRATEGY**

A. Objective: Begin the implementation of the state wetlands strategy and develop a method to monitor the effectiveness of the strategy and it's components.

B. Work Activities:

1) Begin implementation of strategy.

2) Develop evaluation criteria that can be used to monitor the effectiveness of the strategy. Design agency-specific reporting requirements on various strategy components. Track wetland losses, gains, mitigation, improvement projects, etc.

3) Develop and implement a statewide database to track progress in fulfilling goals and objectives of the strategy.

4) Refine and amend strategy as needed with concurrence of council.

C. Output:

1. Criteria to judge effectiveness of strategy.

2. Database to track wetlands on a statewide basis.

D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
DHES - Environmental Specialist III Salaries, Benefits & Indirect Operating Expenses		
DNRC, DFWP, DSL, DOA		
Total		

## COMPONENT NO. 2

### WATER QUALITY/BIOLOGICAL CRITERIA AND BIOASSESSMENT PROTOCOLS

Prepared by: Loren L. Bahls, Ph.D.

Montana Department of Health and Environmental Sciences

#### SUMMARY

This component will establish baseline water quality and biological conditions in a representative sample of unimpaired or least-impaired wetlands in Montana. This information will be used to develop chemical and biological water quality criteria for Montana wetlands and bioassessment techniques that will be used to measure impairment to wetlands that have been exposed to environmental contamination and other stressors.

#### BACKGROUND

Relatively little information is available regarding water quality in Montana wetlands. Elevated concentrations of salts, trace elements, and pesticides are the principal water quality concerns in Montana wetlands (MDHES 1990). Investigations of these contaminants have been conducted by the Montana Department of Fish, Wildlife and Parks, Montana Bureau of Mines, U. S. Geological Survey, and U. S. Fish and Wildlife Service (see REFERENCES for partial listing).

Wetlands are implicitly included in the definition of "Surface Waters" in Montana's Surface Water Quality Standards. Although the general prohibitions in these standards serve well to protect wetland water quality, specific criteria and waterbody classifications, including designated uses, are often technically incorrect for wetlands.

Biological surveys of Montana wetlands tend to emphasize aquatic and semi-aquatic macrophytes, birds and mammals (e.g., Habeck 1988). While these are the most conspicuous inhabitants of wetlands, they are among the least sensitive and responsive to changes in water quality. Sanville (1991) suggests that microbiota (algae) and macroinvertebrates may be used as surrogate measures of the general health and ecological integrity of wetlands. These groups are very sensitive to changes in water quality and other ecological perturbations, and serve as useful indicators of ecosystem health (Plafkin et al. 1989).

The Montana Department of Health and Environmental Sciences routinely uses the structure and composition of benthic algae (periphyton) and benthic macroinvertebrate communities to assess water quality in rivers and streams. A recent statewide survey of the structure and composition of periphyton and macroinvertebrate communities in selected least-impaired reference streams will enable the Department to develop ecoregion-specific biological criteria and bioassessment protocols for lotic ecosystems in Montana (Bahls et al. in prep.).

This project will establish ecoregion-specific biological criteria and bioassessment protocols for wetlands and apply them to Montana wetlands that have been exposed to environmental contamination and other stressors. Our approach will follow the one recommended by Sanville (1991):

- o Wetland classification,
- o Selection of reference sites based on spatial considerations and/or wetland types,
- o Collection of biological data from the reference wetlands,
- o Development of biological measures to analyze the reference sites,
- o Assignment of a range of acceptability to the biological measures,
- o Collection of biological data from impaired wetlands, and
- o Comparison of biological measures from impaired wetlands to the acceptable ranges for those measures derived from reference sites.

#### ECOREGIONS AND MONTANA WETLANDS

Montana includes parts of seven ecoregions that have been proposed by the U. S. Environmental Protection Agency (Figure 1.) Superimposed on these ecoregions are four major wetlands areas:

1. Glaciated Plains (Prairie Pothole Region). This area includes the Northern Montana Glaciated Plains Ecoregion and the Northwestern Glaciated Plains Ecoregion in Montana.
2. Unglaciated Plains. This area includes the Montana portion of the Northwestern Great Plains Ecoregion.
3. Rocky Mountains. This area includes the Northern Rockies and Middle Rockies Ecoregions in Montana.
4. Intermountain Valleys. This area corresponds to the Montana Valley and Foothill Prairies Ecoregion.

These ecoregions and wetland areas are based on patterns of land use, land-surface form, potential natural vegetation, and soils (Omernik and Gallant 1987).

## OBJECTIVES

1. Establish baseline water quality and biological conditions in a representative sample of unimpaired or least-impaired wetlands in Montana.
2. Develop water quality and biological criteria and bioassessment protocols for Montana wetlands.
3. Assess water quality and biological conditions in a representative sample of impaired wetlands using the protocols and criteria developed under objective #2 above.

## SCOPE AND TIMEFRAME

Ten unimpaired and five impaired wetlands will be sampled in each of the four major wetland areas of the state. Water quality parameters will include pH, conductivity, alkalinity, common ions, nutrients, and selected trace elements and pesticides. Biological sampling will be of the benthic algae (periphyton) and macroinvertebrate communities. EPA-approved methods will be used for all sampling and analyses.

This project would run for two years beginning July 1, 1992. The 1992 field season will be devoted to sampling least-impaired wetlands. Samples will be analyzed and criteria and assessment protocols will be developed during the fall and winter of 1992-1993. Impaired wetlands will be sampled during the 1993 field season. Data will be analyzed and impaired wetlands assessed during the fall and winter of 1993-1994. A final report will be prepared in the spring of 1994 and completed by July 1, 1994.

## TASKS

### TASK 1. SAMPLE LEAST-IMPAIRED WETLANDS

- A. Objective: Collect and analyze water quality and biological samples from 40 least-impaired wetlands in Montana.
- B. Work Activities: Ten wetlands in each of the four major wetland areas will be sampled for water quality parameters and benthic algal and macroinvertebrate communities.
1. Wetland selection: Wetlands to be sampled will be selected in consultation with state and federal wetlands experts and published literature. (See lists of PERSONS CONTACTED and REFERENCES, attached.)
  2. Parameter selection: Water quality parameters will be selected as in #1 above.
  3. Sample collection: One set of water quality and biological samples will be collected from each wetland. (Wetlands may be located and mapped using GPS.)
  4. Sample analysis and data management: Water quality samples will be analyzed by the Chemistry Laboratory Bureau of the Department of Health and Environmental Sciences. Water quality data will be entered into the Department's LIMS System and transferred to STORET monthly. Biological samples will be analyzed by contract biologists and selected metrics (e.g., species richness) will be calculated.
  5. QA/QC: A description of QA/QC procedures will be provided in a QA/QC Project Plan upon award of the grant.
- C. Outputs: Baseline water quality and biological conditions for 40 least-impaired wetlands in Montana.
- D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
Salaries & Benefits		
Environmental Specialist II		
Indirect (20.75% salaries & benefits)		
Travel/Per Diem		
Laboratory Analyses		
Biological Contractors		
Equipment (Boat)		
Supplies		
Totals		

**TASK 2. DEVELOP CRITERIA AND PROTOCOLS**

- A. Objective: Develop preliminary water quality and biological criteria and bioassessment protocols for Montana wetlands.
- B. Work Activities: Baseline water quality and biological data generated by Task 1 will serve as preliminary criteria for protecting beneficial uses of Montana wetlands. Differences in natural water quality and biological conditions within and between ecoregions will be assessed for the purpose of establishing ecoregion- and subecoregion-specific criteria. Various bioassessment protocols using individual metrics and multi-metric indices will be evaluated for use with wetlands. These protocols will be patterned after Plafkin et al. (1989).
- C. Outputs: Preliminary water quality and biological criteria and bioassessment protocols for Montana wetlands.
- D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
Salaries & Benefits		
Environmental Program Manager II		
Indirect (20.75% salaries & benefits)		
Biological Contractor		
Totals		

TASK 3. SAMPLE IMPAIRED WETLANDS

- A. Objective: Collect and analyze water quality and biological samples from 20 impaired wetlands in Montana. These will include National Wildlife Refuges where contamination has occurred or where beneficial uses have been impaired.
- B. Work Activities: Five wetlands in each of the four major wetland areas will be sampled for water quality parameters and benthic algal and macroinvertebrate communities.
  - 1. Wetland selection: Wetlands to be sampled will be selected in consultation with state and federal wetlands experts and published literature. (See lists of PERSONS CONTACTED and REFERENCES, attached.)
  - 2. Parameter selection: Water quality parameters will be selected as in #1 above, from among those measured under Task 1 for least-impaired wetlands.
  - 3. Sample collection: One set of water quality and biological samples will be collected from each wetland. (Wetlands may be located and mapped using GPS.)
  - 4. Sample analysis and data management: As in Task 1.
  - 5. QA/QC: A description of QA/QC procedures will be provided in a QA/QC Project Plan upon award of the grant.
- C. Outputs: Water quality and biological conditions for 20 impaired wetlands in Montana.
- D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
Salaries & Benefits		
Environmental Specialist II		
Indirect (20.75% salaries & benefits)		
Travel/Per Diem		
Laboratory Analyses		
Biological Contractors		
Supplies		
Totals		



#### TASK 4. ASSESS IMPAIRMENT AND REFINE PROTOCOLS

- A. Objective: Assess impairment to wetlands sampled in Task 3 using preliminary criteria and bioassessment protocols developed in Task 2; refine bioassessment protocols.
- B. Work Activities: The assessment of impaired wetlands and refinement of bioassessment protocols will be an iterative process supported by ecoregion-specific criteria generated in Task 2. The biological measures (metrics) developed in Task 2 will be assigned ranges of acceptability. The degree of impairment will be judged by the extent to which measured values exceed the acceptable range for that metric. Protocols will be adjusted to increase their sensitivity to environmental changes and to improve the accuracy of assessment. Chemical data and other environmental information will be used to support the bioassessments.
- C. Outputs:
1. Water Quality Assessments for 60 wetlands (20 impaired, 40 unimpaired).
  2. Bioassessment protocols for wetlands.
- D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
Salaries & Benefits		
Environmental Program Mgr. II		
Indirect (20.75% salaries & benefits)		
Biological Contractor		
Totals		

TASK 5. PREPARE REPORTS

- A. Objective: Summarize project findings in a format that makes them usable to agencies having responsibility for water pollution control and wetlands protection.
- B. Work Activities: Interpret and summarize information generated by each of the project tasks outlined in this proposal. Enter data into STORET, map data and prepare assessments for the Waterbody System.
- C. Outputs:
  - 1. Interim annual progress report.
  - 2. Final report.
  - 3. Updated GIS, STORET file and waterbody assessments for Montana wetlands.
- D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
Salaries & Benefits		
Environmental Program Mgr. II		
Environmental Specialist III		
Indirect (20.75% salaries and benefits)		
Printing		
GIS/Biological Contractors		
Totals		

TASK 6. PROJECT ADMINISTRATION

- A. Objective: Provide project oversight and supervision.
- B. Work Activities:
  - 1. Order supplies; schedule and direct field work.
  - 2. Supervise project staff and contractors.
  - 3. Prepare requests for bids, contracts, budget amendment reports, etc.
  - 4. Consult with individuals in other agencies.
  - 5. Meet project milestones.
- C. Outputs: Project plans, contracts, contractor reports, performance appraisals, budget amendment reports, State Budget and Accounting System reports.
- D. Budget:

<u>Item</u>	<u>State</u>	<u>Federal</u>
Salaries & Benefits		
Environmental Program Manager II		
Indirect (20.75% salaries & benefits)		
 Totals		

BUDGET SUMMARY

<u>Task</u>	<u>State</u>	<u>Federal</u>
1. SAMPLE LEAST-IMPAIRED WETLANDS		
2. DEVELOP CRITERIA AND PROTOCOLS		
3. SAMPLE IMPAIRED WETLANDS		
4. ASSESS IMPAIRMENT AND REFINE PROTOCOLS		
5. PREPARE REPORTS		
6. PROJECT ADMINISTRATION		
 TOTALS		
 GRAND TOTAL		

## REFERENCES ACQUIRED

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PERSONS CONTACTED REGARDING THIS PROPOSAL

Angela Evenden, Natural Areas Coordinator, U. S. Forest Service,  
Region One, Missoula.

George Swanson, U. S. Fish and Wildlife Service, Jameson.

Don Palawski, U. S. Fish and Wildlife Service, Helena.

Gary Woods, U. S. Fish and Wildlife Service, Billings.

Thad Fuller, U. S. Fish and Wildlife Service, Medicine Lake Refuge.

Jeff Herbert, Montana Department of Fish, Wildlife and Parks,  
Helena.

Jon Reiten, Montana Bureau of Mines and Geology, Billings.

Jim Lazorchak, U. S. Environmental Protection Agency, Newtown,  
Ohio.

Jim Luey, U. S. Environmental Protection Agency, Denver.

Dave Rathke, U. S. Environmental Protection Agency, Denver.

John Peters, U. S. Environmental Protection Agency, Denver.

Bill Sanville, U. S. Environmental Protection Agency, Duluth.

John Jarvie, Natural Resources Information System, Montana State  
Library, Helena. (Re: GIS and GPS)

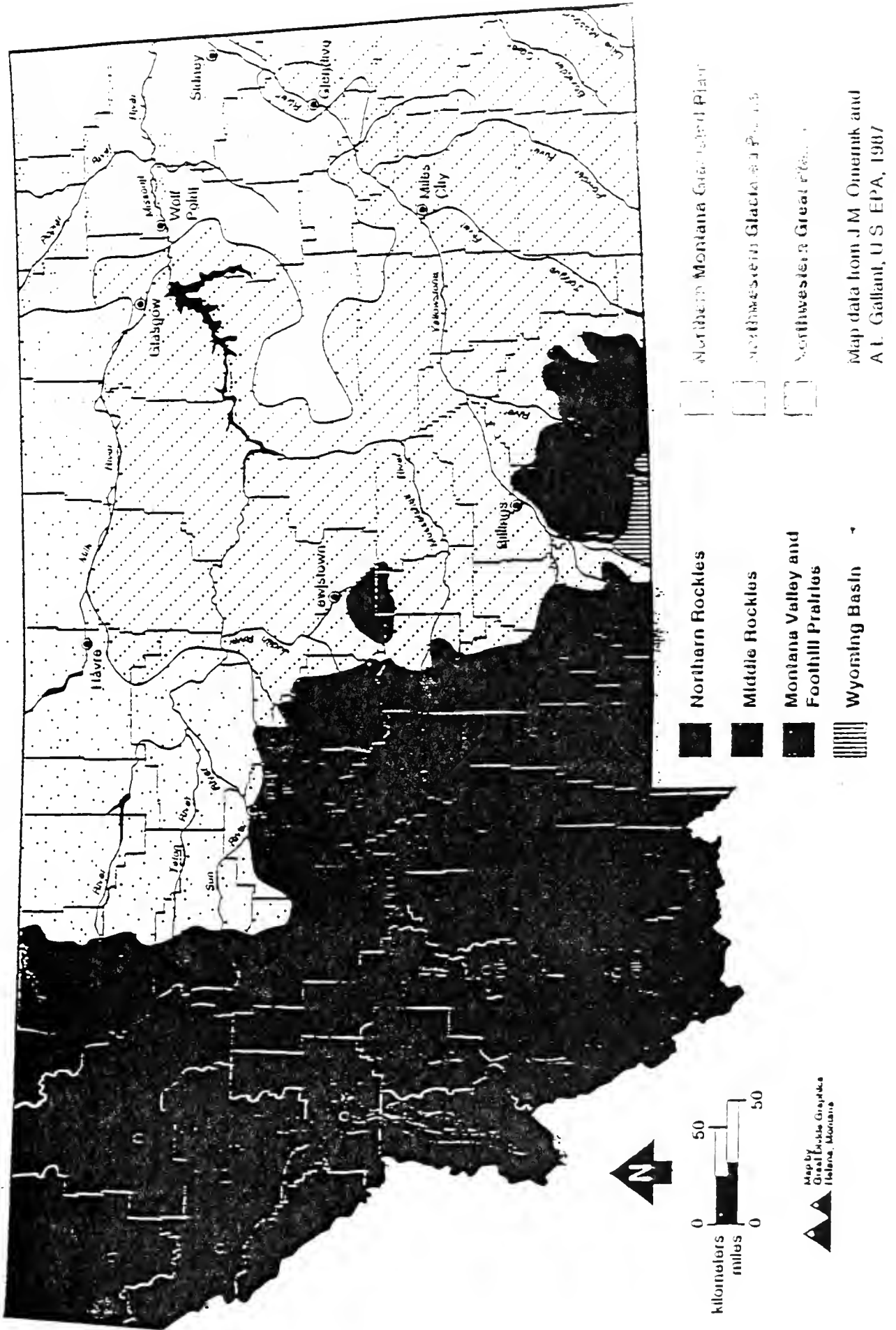
Peter Langen, Natural Resources Information System, Montana State  
Library, Helena. (Re: Retrieval of Water Quality Data for  
Montana Wetlands)

Kathy Brown, Reference Section, Montana State Library, Helena.  
(Re: Survey of Literature on Wetlands/Water Quality)

Diane Cline, Confederated Salish and Kootenai Tribes, Pablo,  
Montana.

Jack Thomas, Nonpoint Source Coordinator, Montana Department of  
Health and Environmental Sciences, Helena.

# Ecoregions of Montana





IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Fish and Wildlife Enhancement  
Federal Bldg., U.S. Courthouse  
301 S. Park, P.O. Box 10023  
Helena, Montana 59626

January 9, 1992

Dr. Loren Bahis  
MT Dept. of Health and Environmental Sciences  
Water Quality Bureau  
Cogswell Bldg.  
Helena, Montana 59620

Dear Loren:

In response to our telephone conversation yesterday, I am enclosing some in-house U.S. Fish and Wildlife Service reports pertaining to contaminant biomonitoring at National Wildlife Refuges in Montana. The reports mainly focus on contaminant residues detected in various biological samples collected at the refuges. I am very interested in expanding the scope of our studies to include other bioassessment techniques to evaluate the status and trends of wetland habitat quality at our refuges. I found your ideas to be very enlightening, and hope that we can continue to exchange information in the future.

If I can be of further assistance, please give me a call at 449-5225.

Sincerely,

Donald Palawski  
Environmental Contaminant Specialist

RECEIVED

JAN 10 1992

MONTANA DEPT. OF HEALTH & ENV. SCIENCE  
WATER QUALITY BUREAU



## COMPONENT 3. WETLANDS EDUCATION

### TASK 1. DEVELOP AN INTEGRATED POND LIFE/WETLAND CURRICULUM FOR CHILDREN IN PRE-SCHOOL THROUGH 3rd GRADE

#### Introduction and Project Description.

The Clark Fork School, a pre-school through 3rd grade learning center in Missoula, Montana, proposes to develop an integrated curriculum to instill in Montana students, and students throughout the western United States, an appreciation for the complexity, importance, and fragility of our precious water resources.

The goal of this project is to develop an integrated curriculum for children ranging in developmental age from preschool through third grade. The curriculum will be designed to enable children to develop an understanding and appreciation of the complexity, importance and fragility of water resources. The curriculum will focus specifically on pond life/wetland areas. It will provide teachers with everything needed to teach a two to three week unit on pond life. It will also give children the materials, projects and opportunities to enhance their skills at math, science and the arts as they learn about water. The curriculum will be developed for and tested on students at Clark Fork School in Missoula. It will be disseminated to other early childhood educational facilities in the state of Montana, and ultimately, to teachers in other western states as well.

#### A. Objectives.

1. Develop 5 educational trunks for teachers, containing audio tapes with music and environmental sounds, children's literature (both fiction and non-fiction) on insect life and other related subjects, puppets, costumes, games, and other tools, to help children learn about the natural processes associated with pond life and wetlands. The trunks will be circulated throughout Montana and other western states.

2. Develop a curriculum guide that will contain activities and directions for integrating math, science and art into the process of learning about pond life.

a) Math skills incorporated into the curriculum will include such activities as sorting, graphing, and counting various animals and objects associated with ponds/wetlands.

b) Science activities detailed in the curriculum guide will teach children simple classification of plants and animals and basic concepts of the food chain and life cycles. The curriculum will use games and experiments to enhance the enjoyment and effectiveness of the learning process for children.

c) Art activities included in the curriculum will involve drawing; constructing pond-related animals, plants and objects; and using music and literature to learn about water resources.

### B. Work Activities.

1. Develop five education boxes or trunks containing materials that will assist with pond life/wetland instructional activities.

2. Develop pond life/wetland curriculum guide to accompany each box.

3. Advertise and disseminate boxes to providers of early childhood education through several existing educational institutions, including Western Watercourse (at Montana State University), the wilderness Institute (in the School of Forestry at the University of Montana), and the Montana Natural History Center (also affiliated with the University of Montana). Each of these organizations has contacts throughout the state of Montana and/or the western United States.

TASK 2. PROVIDE INFORMATION TO PRIVATE LANDOWNERS ON  
RIPARIAN/WETLAND MANAGEMENT

Introduction and Project Description.

The Montana Riparian Education Committee was formed in 1988 to promote information and awareness of the economic and water quality benefits of healthy riparian/wetland areas. The Committee is coordinated by the Conservation Districts Bureau of the Montana Department of Natural Resources and Conservation and associated with the Montana Riparian Association. The Committee is composed of state and federal agencies and agricultural/conservation organizations concerned with riparian/wetland management.

For 1992-93, the Committee is requesting EPA funding to conduct 10 riparian/wetland workshops; purchase a continuous play TV/VCR to accompany our two riparian/wetland management displays; develop and distribute a riparian/wetland newsletter three times per year to organizations and agencies involved in their management and protection; develop and distribute an informational fact sheet/brochure on forest stewardship of wetland/riparian areas; and develop a video on successful riparian grazing programs currently being conducted by private landowners in Montana.

The Riparian Education Committee has been very successful at reaching the private landowner. Since 1988, the Committee has (1) sponsored 22 riparian/wetland workshops; (2) produced and distributed 80,000 riparian brochures; (3) developed two displays that have been used at more than 80 different functions in Montana and nationwide; and (4) produced a riparian management video and distributed 150 copies to date.

A. Objectives.

1. Conduct 10 riparian/wetland workshops throughout Montana.

Work Activities:

- a. Advertise and encourage conservation districts, grazing districts, and agricultural organizations to sponsor a riparian workshop for local landowners.

- b. Work with sponsor to develop agenda and identify appropriate speakers.

- c. Contract with sponsor to provide reimbursement for publicity; speaker stipend, transportation, and per diem; room rental; participants' per diem; and any other costs associated with conducting the workshop.

2. Purchase a continuous play TV/VCR to accompany riparian/wetland management displays.

Work Activities:

- a. Select most cost-effective model to purchase.
- b. Arrange for display users to use new video machine to show variety of riparian/wetland management videos available.

3. Develop and distribute riparian/wetlands newsletter three times per year (February, June and October) to more than 300 agencies, organizations, and interested individuals that provide information on current research and education activities, legislation, definitions, upcoming training and events, successful management programs, cooperative management efforts, etc.

Work Activities:

- a. Arrange with a variety of organizations, agencies, and individuals to provide timely contributions to the newsletter.
- b. The Montana Riparian Association Education Committee would edit, assemble, and distribute the newsletter.

4. Develop and publish an informational fact sheet/brochure for private landowners on forest stewardship management practices appropriate in streamside/wetland areas.

Work Activities:

- a. Contract with Montana Forest Stewardship Program to produce fact/sheet brochure.
- b. The brochure would summarize the riparian/wetland information presented at the stewardship workshops, and encourage landowners to attend the workshop series.
- c. Distribute through conservation districts, cooperative extension offices, Montana Logging Association, Montana Tree Farmers, etc.

5. Develop a video on successful livestock management programs in streamside areas on private lands. The video will consist of personal interview with landowners describing their management program and the economic and water quality benefits associated with their program.

Work Activities:

- a. Identify ranchers with successful grazing programs and request an interview and site visit.
- b. Contract with video production company to work with Education Committee to produce video.
- c. Conduct 12 interviews and site visits.
- d. Write video script, incorporating the best interviews.
- e. Present draft video to Riparian Education Committee for review and comment.
- f. Incorporate suggested changes and present to Education Committee for final approval.
- g. Distribute 150 videos to conservation districts, grazing districts, agricultural organizations, conservation organizations, and land management agencies.

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COMPONENT 3. WETLANDS EDUCATION MONTANA DEPT. OF HEALTH & ENV. SCIENCE  
(continued) WATER QUALITY BUREAU

Proposed Project:

THE WETLANDS DISCOVERY ACTIVITY AND MANAGEMENT GUIDES

Submitted to.

The Montana Department of Natural Resources and Conservation  
by  
The Western Watercourse Water Education Program, MSU  
as part of the  
State Wetlands Development Grant Proposal to EPA

January, 1992

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The Western Watercourse is an adult and youth water education program located on the campus of Montana State University. Along with its regional/national endeavors, such as National Project WET and a variety of adult education workshops and projects, it guides pilot programs in three states – Montana, Idaho, and Arizona. Funding for this program is achieved through a variety of small grants from local sponsors, and the federal government.

The project proposed herein, the **Wetlands Discovery Activity and Management Guides**, would have applications initially in Montana, then be delivered regionally and perhaps national. It is designed for eventual delivery and use in each of the western states. Thus, the residents of the sponsor state, Montana, will most certainly benefit from these guides which are described below. Another feature of this work is the way in which it will interface with complimentary work of the Clark Fork School, described later.

The goal of this project is to produce and widely distribute a **wetlands reference manual and an activity guide** for land owners, resource managers, interested citizens, teachers, and youth. They will be of significant use to wetland refuge managers, nature center staff, interpreters and conservation leaders as they work with youth and adults in the field. The guides will include clear and **concise** information and high-quality photographs and illustrations on the **ecology, management, function, classification, regulation, and protection** of wetlands. As envisioned, the guide will have two components:

- I. A **Comprehensive Reference Manual** with chapters on wetland classification and distribution, ecology, regulation (legislation), functions, and management; and **appendices** with wetlands definitions and lists of state-by-state regulations. This comprehensive, easy-to-use manual will be issued to resource managers and educators for use in adult education workshops and classes, and to hundreds of interested landowners. The manual will first be tested by using it in training and adult education workshops throughout the State of Montana.

II. **An Activity Guide** for teachers and youth providing teachers with field, lab, and classroom activities about the value and function of wetlands, all designed to build in students an environmental ethic toward wetlands. Each activity in the series of lesson plans will contain background information -- highlights of the information kids should acquire during the activity. All activities will be cross-referenced to the more detailed information in the companion reference manual. This component will include instructions for building or purchasing basic wetlands sampling equipment. The Watercourse proposes to develop six kits containing manuals and sampling materials for circulation -- one of these will be issued to the EPA Region 8 office. This guide and the companion reference manual will be made available to all school libraries in Montana.

The ultimate purpose of these user-friendly materials is to effectively link resource professionals and educators with adult and youth audiences. Wetland values, although well documented by wetland managers and resources specialists, are still misunderstood by most people. As the EPA and other private and public organizations place greater emphasis on citizen participation in shaping future wetlands policy, the importance of an informed public becomes paramount.

Although resource professionals at the Western Watercourse will manage and contribute to this project, its success will rely on written contributions and advice from leaders in the field who will be brought together for concept development and writing meetings. Another note: This project is linked with the work proposed by the Clark Fork School which plans to develop a pond life/wetlands curriculum for pre-school and kindergarten-aged kids. If these projects are funded, the Watercourse invites the Clark Fork School curriculum developers to condense their work into one chapter of the Wetlands Activity Guide proposed by the Watercourse. Following are the specifics of the project:

**TASK 1. ESTABLISH A COMMITTEE OF EXPERT WRITERS; ORGANIZE THE WRITING WORKSHOPS.**

A. **Objective:** To consult a professional cross-section of experts in the field (wetland ecologists, science educators, wetland managers, etc.), assuring technical accuracy and broad vision in both the children's activity guide and the wetlands management manual. (This objective to include the work of the Clark Fork School as a condensed chapter in the Activity Guide.)

B. **Work Activity:** One two-day writers' meeting will be coordinated for each booklet, during which six writers for each of the two companion manuals will be invited to comment on and modify a first draft of outlines prepared by Watercourse staff. Invited expert contributors will include wetlands educators, managers, researchers, and curriculum developers from various universities, agencies, and refuges, all identified through a careful search. A consulting text design artist will be asked to attend both meetings.

C. **Output:** This activity will produce two writers' meetings either at Watercourse headquarters or in a more central location to prepare and revise drafts of the Wetlands Activity Guide and the Wetlands Management Manual.

D. **Budget:** (please see attached)

**TASK 2. PREPARE THE DRAFTS, ARTWORK, AND PHOTOGRAPHY; PREPARE A TRAINING SCHEDULE**

A. **Objective:** To have camera-ready drafts ready for printing

B. **Work Activities:**

- Continued coordination with the writing teams as the Western Watercourse staff prepares a series of drafts for team review by mail.

- To compliment the technical and scientific accuracy of these guides, **commission a graphics artist** to manage the artistic production. These guides will embrace a professional, creative look that draws readers to explore their pages.

- Set up a delivery system for the guides in advance of printing; plan to conduct a series of workshops in Montana and at least one workshop in each state choosing to utilize the guides. **The guides will first be tested in the sponsor state, Montana; and achieve broad distribution thereafter.**

C. **Outputs:** 1) camera-ready drafts ready for printing; and 2) a training workshop schedule in place.

D. **Budget:** (please see attached)

(YEAR TWO: **TASK 3.** Print the guides. Order companion water quality testing kits. Help distribute wetlands trunks developed by the Clark Fork School's Integrated Curriculum on Pond Life/Wetlands {see proposal within}, and circulate companion Wetlands Discovery trunks to be developed by the Watercourse.)

(YEAR TWO: **TASK 4.** Distribute the guides, provide training at refuges, water management agencies, schools.)

**TIMELINE:** The Western Watercourse proposes to initiate the project in May 1992, with completion of all workshops by April, 1994. During the latter part of FY94, the Western Watercourse, with sponsor states, would like to conduct additional workshops for educators and wetland managers on the use of the manual and guide. As well, our offices would pursue wide distribution of the materials through a variety of outreach programs such as state Extension Services, state and federal resource agencies, libraries, and schools.



#### COMPONENT 4. RIVER CORRIDOR MANAGEMENT.

##### Introduction and Project Description.

The Conservation Districts Bureau of the Montana Department of Natural Resources and Conservation proposes to organize a grassroots level river corridor "coordinated resource management planning (CRMP)" effort that will attempt to develop solutions to critical water quality or quantity (dewatering) problems in selected watersheds.

The Conservation Districts Bureau will hire a natural resource management/CRM professional to work half-time on river corridor identification, group organization, and solution development. This position would be combined with the state's Rangeland Resource Management Program coordinator within the Conservation Districts Bureau to further develop the resource management and coordination capabilities within the program.

The involvement of all elements of the affected public and government resource management agencies will be necessary to effectively address the water management problem and successfully implement the solution. The CRMP effort will be spearheaded through the local CDs. CDs have strong ties to local land users and serve as local natural resource educators and problem solvers in their communities.

The project will be implemented through the state's Rangeland Resource Program housed at CDB/DNRC. This program has successfully promoted CRMP as an effective method to address natural resource management issues throughout the state. The Conservation Districts Bureau receives range program activity guidance and direction from the Governor's Rangeland Resource Executive Committee which is comprised of citizen leaders interested in sound range management. The range program also has nine advisors representing the Montana Department of Fish, Wildlife and Parks, the Montana Department of State Lands, the Montana Department of Agriculture, the Montana Stockgrowers and Grazing Districts, Conservation Districts, the Nature Conservancy, the U.S. Forest Service, the Soil Conservation Service, and the Bureau of Land Management.

TASK 1. ORGANIZE A RIVER CORRIDOR MANAGEMENT CRM TEAM TO ADDRESS A CRITICAL WATER MANAGEMENT ISSUE.

A. Objectives.

1. Identify candidate river corridors with a critical water quality or quantity (dewatering) problem.

Work Activities:

- a. Ask CDs to nominate watersheds with critical water management problems that could benefit from a CRM effort.
  - b. Gather data on the problem.
2. Set up local CRM team.

Work Activities:

- a. Invite all interested private organizations and public government entities to be a part of the CRM team.
  - b. Provide training to participants in the CRM protocol and procedures.
3. Work to develop a solution to the problem over a two-year period.

Work Activities:

- a. Examine alternative solutions and their potential outcomes.
- b. Select a solution that is acceptable to the CRM participants and that has a high likelihood of success.
- c. Present preferred solution to watershed residents/landowners. Modify solution, as necessary.

## Component #5

The Montana Department of Transportation's (MDT) portion of this interagency grant proposal to the Environmental Protection Agency (EPA) is composed of five tasks. The tasks all originate from needs we have identified in our MDT wetlands program and consider to be applicable to the development of a state program. Currently, MDT's ability to effectively manage for wetland resources is impeded by several factors: the absence of a program review or audit, lack of project monitoring, an incomplete ledger accounting system, and the need for an updated action plan. We are unable to answer critical questions. What is the success rate of our mitigation program? Why are the projects failing? How many acres and what type of wetlands are being lost statewide? What types are gained? Are we complying with wetland regulations and agreements? We feel that assessing and monitoring programs and projects to determine their abilities to meet pre-determined goals is key to the success of any program. Our proposal focusses on this belief.

Tasks 1 & 2 involve auditing and criticizing MDT's wetland and mitigation programs. Lessons learned will be used in forming a new MDT wetlands management action plan and will be freely shared so that others may benefit from our mistakes and successes. Tasks 3 & 4 entail the development of tools to help managers manage the wetlands resource. The development of a statewide wetlands data base/tracking system will help answer many pressing questions and provide a method to organize growing amounts of data and mitigation sites. Integral to this is the development and implementation of a monitoring plan and methodology for wetland mitigation sites. The lessons learned, techniques developed, and action plans proposed will be compiled and shared through Task 5.

The outcomes and benefits of successful completion of the proposal will have immediate and long term positive affects on wetland conservation and management for MDT, for the state of Montana, and for other states. Immediate remedial actions will be taken, where practicable, on those MDT mitigation sites proven to be ineffective wetlands. MDT is committed to learn from the findings and is committed to implement a progressive wetland management plan. Other agencies, in and outside of Montana, will have the opportunity to learn from MDT's audit and experiences. Additionally, completion of this proposal would help assure continues compliance with Section 404 of the Clean Water Act, enabling the Corps of Engineers to expedite issuance of a General Permit for most state highway construction projects.

Completion of these tasks in combination with the other proposal components will enable Montana, her state agencies, and the private sector manage and conserve the wetlands resource more effectively and comprehensively.

While MDT has not received EPA grant funding previously, and therefore can not respond to our ability to successfully complete EPA grants, MDT can attest to the growth and commitment of our wetlands management program to this point. In the mid-1980's MDT formed an interagency wetlands working group to provide for more effective wetlands reviews and management relating to MDT projects. Currently, this formal agreement is under revision and may function as a prototype for an interagency group in the statewide plan. MDT strives to provide progressive and pertinent training and support for staff and programs, as demonstrated by sponsoring two weeks of wetland training for staff, state and federal agencies, and private consultants. MDT's overall commitment to environmental issues is increasing. The recent elevation of the Environmental Section to the Environmental and Hazardous Wastes Bureau and doubling of staff reflects this evolution. MDT's intentions, both in policy and on the ground, are to manage, mitigate, and conserve wetlands to our best abilities. To do this, we need assistance, both monetarily and technically, to improve our current program.

MDT proposes a five task plan that would help alleviate factors impeding MDT's program, contribute to a statewide wetlands plan, and assist other agencies in wetland management. An outline of the five tasks, associated work activities, outcomes, and estimated budget follows.

TASK 1. Audit of MDT Wetland Program

A. Objective: To conduct a thorough audit of MDT's wetland program to identify program deficiencies and strengths. To disclose status of MDT's wetland program; and to begin developing an action plan to improve MDT's program.

B. Work Activities: To provide for an unbiased, objective audit, an outside consultant will be hired. The audit will be comprehensive, entailing both office and field time. Principal work activities include:

1. MDT hire qualified consultant. MDT staff would be available for assistance if/when needed.

2. Audit would most likely investigate items such as:

- a. accuracy of wetland evaluations and delineations
- b. compliance with pertinent environmental regulations and legal requirements
- c. completeness and accuracy of ledger
- d. effectiveness of mitigation projects (done concurrently with Task 2)

3. Completion of report disclosing findings of audit.

4. Draft a preliminary MDT wetland action plan addressing program deficiencies. The final action plan will be developed in Task 5. Consultants and MDT staff will work together on this plan.

C. Outputs: A report revealing results of MDT wetland program audit; information gained will be used to form MDT action plan to improve MDT's wetland management program.

D. Budget: This task would primarily be conducted by a outside auditor/consultant. The budget reflects the average of informal estimates provided by several consulting firms and includes estimated time of MDT staff.

Audit of MDT's wetland program:  
MDT's contribution.....  
federal contribution.....

TASK 2. CRITIQUE OF COMPLETED MITIGATION PROJECTS

A. Objective: To conduct a one-time thorough examination of completed MDT mitigation projects (including construction and enhancement projects) to determine project success rate and reasons for successes or failures.

B. Work Activities: Mitigation projects not covered in program audit (Task 1) will be reviewed in office and field. Reasons for project success or failure will be identified and examined, and a draft report on findings will be produced. The critique will be coordinated with the program audit to eliminate redundancy and increase efficiency.

1. Clarify techniques used in defining and classifying wetlands and wetland types (also for use in other tasks).

2. Review office files on project. Where possible, information gathered will include:

- a. original project goals
- b. construction plans
- c. pre-construction photos, maps, etc.

2. Field review project:

- a. determine if definitional wetland was constructed
- b. determine wetland classification type
- c. compare original goals and plans with results
- d. identify reasons for failures or successes
- e. propose plan or action necessary to rectify failed projects

3. Compile a draft report on findings of critique.

C. Outputs: Reasons for failed and successful projects will be identified and documented in a report; measures to correct problems will be identified; and the success rate of wetland mitigation projects will be determined.

D. Budget: This budget estimate is based on conducting 30 site critiques not covered in audit. MDT staff, with guidance from audit consultant, will perform critique.

Grade 14 biologist (incl. wages & benefits) = \$15.00/hr  
field days = 22.5 days = 225 hrs  
office days = 22.5 days = 225 hrs  
report writing = 5.0 days = 50 hrs  
travel expense = \$200  
total hrs 500 @ \$15.00/hr = \$7500

MDT's contribution.....  
federal contribution.....

### TASK 3. Tracking/Accounting Program

A. Objective: To provide a system to track wetland losses and gains (by acreage, types, functions, etc) at department/agency levels and at statewide level.

B. Work Activities: Different computerized methods for tracking wetlands, mitigation projects and program success will be explored. Development and implementation of the tracking/accounting system will be tested using MDT's data and refined for statewide use. A draft use/operations manual will be developed.

1. Determine goals of tracking system and identify items to be tracked. Types of items to track may include:
  - a. acreage involved
  - b. type of wetland lost or gained
  - c. mitigation costs
  - d. success of mitigation projects

2. Review current systems/techniques used for wetland tracking/accounting in the U.S.

3. Design tracking/accounting system and develop program software.

4. Implement and test method on MDT's program.

5. Refine method and initiate use on statewide level.

6. Produce preliminary report on use and operation of the computerized tracking/accounting system.

C. Outputs: A tested computerized tracking/accounting program for wetland programs and mitigation projects for both state and individual agency/department application. This process will enable individual agencies to follow their wetlands program and will provide a statewide picture of wetland management. The preliminary report will be refined in Task 5.

D. Budget: The complexity of the tracking system could range from a simple PC program to acquisition of a complex GIS system. A preliminary plan entails working with the Natural Resources Information System (NRIS)\*, to help design, develop, and implement software. A PC program would be created for agency/department use and would tie into a statewide data base. The system would provide the opportunities to access the GIS capabilities of NRIS. A preliminary budget based on this option is offered.

Program design, software development, instillation, technical support	
GIS service	
MDT data entry & staff support time = unknown	
MDT contribution .....	
federal contribution.....	
	Total

\*NRIS, a special state program under Montana State Library, operates as clearing house and referral for natural resource information. One of the many services provided is software and GIS development/operation for management of natural resources.



#### TASK 4. MONITORING PLAN

A. Objective: Develop a plan and methodology to monitor wetland mitigation sites in a easy, repeatable and cost-effective manner over time. Parameters measured will be tied to wetland functions and project goals.

B. Work Activities: The monitoring methodology will be developed through field tests, review of current methods used nationwide, and input from wetland specialists.

1. Review current literature/resources on wetland monitoring.
2. Select ecological parameters to monitor such as:
  - a. vegetative composition
  - b. wetland function & values
  - c. classification type
  - d. hydrology
3. Select project goal parameters to monitor such as:
  - a. completion of site according to plan
  - b. cost-effectiveness
4. Develop field forms
5. Field test monitoring technique on selected MDT projects and refine as necessary.
6. Produce preliminary monitoring reports describing methodology.

C. Outputs: A methodology or methodologies for monitoring wetland mitigation projects for use by managers statewide. Results will be used in computerized tracking system. The preliminary report will be finalized in Task 5.

D. Budget: The budget estimate is based on the assumption that a state grade 14 biologist will take 15 10-hour days to accomplish the described work activities.

## TASK 5. Reporting

A. Objective: To present results and findings of tasks 1 - 4 in an effective media for use by interested parties (state agencies, federal agencies, private sector, etc); to develop an action plan for the improvement of MDT's wetland program

B. Work Activities: Information and findings will be compiled and formatted into several documents (or other forms of media if more effective). The reports generated would include:

1. MDT's wetland action plan.
2. Results of MDT audit and mitigation critique
3. Reasons for successes or failures of mitigation projects and how to avoid making same mistakes.
4. Description of wetland monitoring methods.
5. Description of use and implementation of computer tracking/accounting system for wetland mitigation.

C. Outputs: Documents (or other media forms) that communicate findings and information gained through completion of numerous tasks 1 -4.

D. Budget: The majority of costs associated with this segment are encompassed in the other tasks. It is anticipated that additional costs will primarily include editing, printing, graphic design, and distribution.

## **COMPONENT 6. MONTANA RIPARIAN ASSOCIATION: CLASSIFICATION AND MANAGEMENT INFORMATION, TRAINING, AND WORKSHOPS**

The Montana Riparian Association (MRA), an Interagency Cooperative, was formally established in 1988 to develop: 1) a riparian-wetland dominance type classification, 2) a riparian-wetland vegetation-based ecological site classification (e.g., habitat types), 3) an interagency data base for riparian-wetland areas, 4) a process for information exchange on managing riparian-wetland sites, and 5) a training and continuing education program in identification, function, and proper management of riparian-wetland ecosystems.

The following seven formal goals were recently established for the second five years (1992-1996) of the Montana Riparian Association:

- 1) Complete the statewide riparian-wetland habitat type classification (i.e., a vegetation-based ecological site classification).
- 2) Refine and expand management information for riparian-wetland areas.
- 3) Provide training and continuing education in identification, function, and management of riparian-wetland ecosystems.
- 4) Refine and expand our knowledge on successional relationships and pathways (i.e., community types) and vegetation-physical site relationships for riparian-wetland habitat types. The work will assist resource managers by providing the following information: A) geographic, topographic, edaphic, functional, and floristic features of riparian-wetland ecosystems, B) successional information and prediction of vegetative potential on disturbed riparian-wetland sites, and C) current information on a wide variety of resource values (resource value ratings) and management opportunities.
- 5) Continue development of a coordinated riparian-wetland data base.
- 6) Develop a better understanding of the cumulative effects of land use management activities (at the watershed level) on riparian-wetland ecosystems.
- 7) Inform private landowners of the benefits of properly functioning riparian-wetland areas, and sources of financial and technical assistance available to aid them.

## TASK 1. MRA ANNUAL DUES

- A. **Objective:** Provide regular annual services of the MRA to the EPA including a revised Montana Riparian-Wetland Habitat Type Classification, annual training sessions, and annual workshops.
- B. **Work Activities:** The MRA will provide to a designated representative of the EPA the following full-member cooperative services documented in the 1992-1996 program plan.
  - 1. Voting Membership in the MRA Steering Committee.
  - 2. Reserved space in annual training sessions.
  - 3. Reserved space in annual workshops.
  - 4. Copies of publications and reports from the base program.
- C. **Outputs:** The formal outputs include mailings to members, minutes of meetings, training materials, workshop proceedings and publications from the base program documented in the 1992-1996 program plan.
- D. **Budget Total Cost**

## TASK 2. JURISDICTIONAL WETLAND TRAINING COURSE

- A. **Objective:** Provide training for an additional member of the MRA staff to become a trainer on jurisdictional wetlands. This will ensure the capability of conducting these courses in Montana on a self-sustaining basis.
- B. **Work Activities:**
  - 1. MRA staff member will attend an EPA approved regional training course as an "instructor - trainee."
  - 2. Trainee will help develop and organize Montana training sessions.
  - 3. Trainee will help instruct the training sessions.
- C. **Outputs:** The MRA will offer a minimum of one annual jurisdictional wetland training course in Montana.
- D. **Budget Total Cost**

### **TASK 3. STATE-WIDE WETLAND JURISDICTIONAL DELINEATION TEST**

- A. Field testing of alternative wetland jurisdictional criteria for major wetland habitat types and major wetland community types (e.g., seral vegetation) found throughout Montana. This state-wide project would involve using the three criteria of hydrophytic plants, hydric soils, and wetland hydrology in order to determine which wetland habitat types and community types from Hansen and others (1991) meet existing and proposed federal and jurisdictional criteria.
- B. Work Activities: Installation of simple water table monitoring wells will be required in a representative sample of wetland transects throughout the state.
  - 1. Design for type and regional distribution will be documented in a formal study plan during year one.
  - 2. Collect hydrophytic plant data, wetland habitat type/community type identification, and hydric soil data for each water table installation site.
  - 3. The first major set of wells will be installed in year one and monitored for two years.
  - 4. Supplemental sites will be established in year two.
  - 5. Data analysis will begin in year one and continue in year two.
  - 6. Final report will be prepared for publication in year two.
- C. Outputs:
  - 1. Study plan.
  - 2. Annual progress reports
  - 3. Final publication.
- D. Budget Total Cost

### **TASK 4. GIS MAPPING OF THE UPPER MISSOURI NATIONAL WILD AND SCENIC RIVER**

- A. Develop a geographical information system (GIS) with baseline information on wetlands, riverine habitats, and other aquatic resources found within the Upper Missouri National

Wild and Scenic River from Fort Benton, Montana to James Kipp State Park, Montana (ca. 150 miles).

B. Work Activities:

1. The area has been previously inventoried and mapped by the Montana Riparian Association (MRA) in 1988-89 using a scale of 1:15,840.
2. Using a GIS, the wetlands and non-wetlands within the valley would be digitized using the computer program ARC INFO.
3. The wetlands displayed within the valley would be classified according to two types of criteria: A) cover type, community type, habitat type, as defined and developed by Hansen and others (1991), and B) the U.S. Fish and Wildlife Service's wetland classification system of Cowardin and others (1979).

C. Outputs: The project would be similar to the document titled *Use of a Geographic Information System to Prepare a Wetland Map of the Missouri River Valley in North Dakota* by Sotiros and Seitz (1991).

D. Budget: Total Cost

**TASK 5. PRINTING COSTS FOR FINAL STATE-WIDE CLASSIFICATION AND  
MANAGEMENT DOCUMENT**

A. Provide the printing costs for the state-wide document *Classification and Management of Riparian and Wetland Sites in Montana*. This document will be printed during the summer/fall of 1992.

B. Work Activities:

1. Finish the camera-ready draft.
2. Submit the document to the printer for publication.

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**ATTACHMENT C**

**FEDERAL WETLANDS DELINEATION MANUALS**



ATTACHMENT C-1

1989 Federal Manual for Identifying and Delineating  
Jurisdictional Wetlands



# Federal Manual for Identifying and Delineating Jurisdictional Wetlands



AN INTERAGENCY COOPERATIVE PUBLICATION

Fish and  
Wildlife Service

Environmental  
Protection Agency

Department of  
the Army

Soil Conservation  
Service

January 1989



# Federal Manual for Identifying and Delineating Jurisdictional Wetlands

An Interagency Cooperative Publication

U. S. Army Corps of Engineers

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

U.S.D.A. Soil Conservation Service

JANUARY 10, 1989







# Federal Manual for Identifying and Delineating Jurisdictional Wetlands

We, the undersigned, hereby adopt this Federal Manual as the technical basis for identifying and delineating jurisdictional wetlands in the United States.

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Frank Dunkle  
Director  
Fish and Wildlife Service

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Rebecca Hanmer  
Acting Assistant Administrator for Water  
Environmental Protection Agency

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Robert W. Page  
Assistant Secretary of the Army  
(Civil Works)  
Department of Army

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Wilson Scaling  
Chief  
Soil Conservation Service



January 10, 1989





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# Preface



This manual describes technical criteria, field indicators and other sources of information, and methods for identifying and delineating jurisdictional wetlands in the United States. This manual is the product of many years of practical experience in wetland identification and delineation by four Federal agencies: Army Corps of Engineers (CE), Environmental Protection Agency (EPA), Fish and Wildlife Service (FWS), and Soil Conservation Service (SCS). It is the culmination of efforts to merge existing field-tested wetland delineation manuals, methods, and procedures used by these agencies. This manual draws heavily upon published manuals and methods, specifically *Corps of Engineers Wetlands Delineation Manual*, EPA's *Wetland Identification and Delineation Manual*, and SCS's *Food Security Act Manual* wetland determination procedure.

The manual has been reviewed and concurred in by an interagency committee composed of the four Federal agencies. This committee was established for purposes of reconciling differences in wetland delineation procedures and developing a single interagency manual for identification and delineation of wetlands. The committee consisted of the following individuals: Robert Pierce, Bernie Goode, and Russell Theriot of the Corps of Engineers; John Meagher, Bill Sipple, and Charles Rhodes of the Environmental Protection Agency; David Stout, Ralph Tiner, and Bill Wilen of the Fish and Wildlife Service; and Steve Brady, Maurice Mausbach, and Billy Teels of the Soil Conservation Service. The manual was prepared by Ralph Tiner based on interagency committee decisions. The negotiations were facilitated by Howard Bellman and Leah Haygood.

This report should be cited as follows:

Federal Interagency Committee for Wetland Delineation. 1989. Federal Manual for Identifying and Delineating Jurisdictional Wetlands. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication. 76 pp. plus appendices.

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# Part I.

## Introduction



### Purpose

1.0. The purpose of this manual is to provide users with mandatory technical criteria, field indicators and other sources of information, and recommended methods to determine whether an area is jurisdictional wetland or not, and to delineate the upper boundary of these wetlands. The document can be used to identify jurisdictional wetlands subject to Section 404 of the Clean Water Act and to the "Swampbuster" provision of the Food Security Act, or to identify vegetated wetlands in general for the National Wetlands Inventory and other purposes. *The term "wetland" as used throughout this manual refers to jurisdictional wetlands for use by Federal agencies.* This manual, therefore, provides a single, consistent approach for identifying and delineating wetlands from a multi-agency Federal perspective.

### Organization of the Manual

1.1. The manual is divided into four major parts: Part I — Introduction, Part II — Mandatory Technical Criteria for Wetland Identification, Part III — Field Indicators and Other Available Information, and Part IV — Methods for Identification and Delineation of Wetlands. References, a glossary of technical terms, and appendices are included at the back of the manual.

### Use of the Manual

1.2. The manual should be used for identification and delineation of wetlands in the United States. Emphasis for delineation is on the upper boundary of wetlands (i.e., wetland-upland boundary) and not on the lower boundary between wetlands and other aquatic habitats. The technical criteria for wetland identification presented in Part II are mandatory, while the methods presented in Part IV are recommended approaches. Alternative methods are

offered to provide users with a selection of methods that range from office determinations to detailed field determinations. If the user departs from these methods, the reasons for doing so should be documented.

### Background

1.3. At the Federal level, four agencies are principally involved with wetland identification and delineation: Army Corps of Engineers (CE), Environmental Protection Agency (EPA), Fish and Wildlife Service (FWS), and Soil Conservation Service (SCS). Each of these agencies have developed techniques for identifying the limits of wetlands for various purposes.

1.4. The CE and EPA are responsible for making jurisdictional determinations of wetlands regulated under Section 404 of the Clean Water Act (formerly known as the Federal Water Pollution Control Act, 33 U.S.C. 1344). The CE also makes jurisdictional determinations under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Under Section 404, the Secretary of the Army, acting through the Chief of Engineers, is authorized to issue permits for the discharge of dredged or fill materials into the waters of the United States, including wetlands, with program oversight by EPA. The EPA has the authority to make final determinations on the extent of Clean Water Act jurisdiction. The CE also issues permits for filling, dredging, and other construction in certain wetlands under Section 10. Under authority of the Fish and Wildlife Coordination Act, the FWS and the National Marine Fisheries Service review applications for these Federal permits and provide comments to the CE on the environmental impacts of proposed work. In addition, the FWS is conducting an inventory of the Nation's wetlands and is producing a series of National Wetlands Inventory maps for the entire country. While the SCS has been involved in wetland identification since 1956, it has recently become more deeply involved in wetland determinations through the "Swampbuster" provision of the Food Security Act of 1985.

1.5. The CE and EPA have developed technical manuals for identifying and delineating wetlands subject to Section 404 (Environmental Laboratory 1987 and Sipple 1988, respectively). The SCS has developed procedures for identifying wetlands for

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compliance with "Swampbuster." While it has no formal method for delineating wetland boundaries, the FWS has established guidelines for identifying wetlands in the form of its official wetland classification system report (Cowardin, et al. 1979).

1.6. In early 1988, the CE and EPA resumed previous discussions on the possibilities of merging their manuals into a single document, since both manuals were produced in support of Section 404 of the Clean Water Act. At that time, it was recommended that the FWS and SCS be invited to participate in the talks to take advantage of their technical expertise in wetlands and to discuss the possibilities of a joint interagency wetland identification manual. On May 19-20, 1988, the first meeting was held in Washington, D.C., to discuss technical differences between the CE and EPA manuals. After the meeting, it was decided that a second meeting should be held to resolve technical issues and to attempt to merge the two manuals and possibly develop an interagency manual for the four agencies. This meeting was held on August 29-31, 1988, at Harpers Ferry, West Virginia. Each of the four Federal agencies (CE, EPA, FWS, and SCS) was represented by three persons, with outside facilitators moderating the session. During the three-day meeting, the four agencies reached agreement on the technical criteria for identifying and delineating wetlands and agreed to merge the existing published methods (CE, EPA, and SCS) into a single wetland delineation manual. A draft combined manual was prepared, and then reviewed by the interagency group. On January 10, 1989, the manual was formally adopted by the four agencies as the recommended manual for identifying and delineating wetlands in the United States.

### Federal Wetland Definitions

1.7. Several definitions have been formulated at the Federal level to define "wetland" for various laws, regulations, and programs. These major Federal definitions are cited below in reference to their guiding document along with a few comments on their key elements.

### *Section 404 of the Clean Water Act*

1.8. The following definition of wetland is the regulatory definition used by the EPA and CE for administering the Section 404 permit program:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(EPA, 40 CFR 230.3 and CE, 33 CFR 328.3)

1.9. This definition emphasizes hydrology, vegetation, and saturated soils. The Section 404 regulations also deal with other "waters of the United States" such as open water areas, mud flats, coral reefs, riffle and pool complexes, vegetated shallows, and other aquatic habitats.

### *Food Security Act of 1985*

1.10. The following wetland definition is used by the SCS for identifying wetlands on agricultural land in assessing farmer eligibility for U.S. Department of Agriculture program benefits under the "Swampbuster" provision of this Act:

Wetlands are defined as areas that have a predominance of hydric soils and that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions, except lands in Alaska identified as having a high potential for agricultural development and a predominance of permafrost soils.\*

(National Food Security Act Manual, 1988)

\**Special Note:* The Emergency Wetlands Resources Act of 1986 also contains this definition, but without the exception for Alaska.



1.11. This definition specifies hydrology, hydrophytic vegetation, and hydric soils. Any area that meets the hydric soil criteria (defined by the National Technical Committee for Hydric Soils) is considered to have a predominance of hydric soils. The definition also makes a geographic exclusion for Alaska, so that wetlands in Alaska with a high potential for agricultural development and a predominance of permafrost soils are exempt from the requirements of the Act.

#### *Fish and Wildlife Service's Wetland Classification System*

1.12. The FWS in cooperation with other Federal agencies, State agencies, and private organizations and individuals developed a wetland definition for conducting an inventory of the Nation's wetlands. This definition was published in the FWS's publication "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin, et al. 1979):

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained

hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

1.13. This definition includes both vegetated and nonvegetated wetlands, recognizing that some types of wetlands lack vegetation (e.g., mud flats, sand flats, rocky shores, gravel beaches, and sand bars). The classification system also defines "deepwater habitats" as "permanently flooded lands lying below the deepwater boundary of wetlands." Deepwater habitats include estuarine and marine aquatic beds (similar to "vegetated shallows" of Section 404). Open waters below extreme low water at spring tides in salt and brackish tidal areas and usually below 6.6 feet in inland areas and freshwater tidal areas are also included in deepwater habitats.

#### Summary of Federal Definitions

1.14. The CE, EPA, and SCS wetland definitions include only areas that are vegetated under normal circumstances, while the FWS definition encompasses both vegetated and nonvegetated areas. Except for the FWS inclusion of nonvegetated areas as wetlands and the exemption for Alaska in the SCS definition, all four wetland definitions are conceptually the same; they all include three basic elements - hydrology, vegetation, and soils - for identifying wetlands.



# Part II.

## Mandatory Technical Criteria for Wetland Identification



2.0. Wetlands possess three essential characteristics: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology, which is the driving force creating all wetlands. These characteristics and their technical criteria for identification purposes are described in the following sections. The three technical criteria specified are mandatory and must all be met for an area to be identified as wetland. Therefore, areas that meet these criteria are wetlands.

### Hydrophytic Vegetation

2.1. For purposes of this manual, hydrophytic vegetation is defined as macrophytic plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Nearly 7,000 vascular plant species have been found growing in U.S. wetlands (Reed 1988). Out of these, only about 27 percent are "obligate wetland" species that nearly always occur in wetlands under natural conditions. This means that the majority of plant species growing in wetlands also grow in nonwetlands in varying degrees.

2.2. The FWS in cooperation with CE, EPA, and SCS has published the "National List of Plant Species That Occur in Wetlands" from a review of the scientific literature and review by wetland experts and botanists (Reed 1988). The list separates vascular plants into four basic groups, commonly called "wetland indicator status," based on a plant species' frequency of occurrence in wetlands: (1) *obligate wetland plants* (OBL) that occur almost always (estimated probability >99%) in wetlands under natural conditions; (2) *facultative wetland plants* (FACW) that usually occur in wetlands (estimated probability 67-99%), but occasionally are found in nonwetlands; (3) *facultative plants* (FAC) that are equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%); and (4) *facultative*

*upland plants* (FACU) that usually occur in nonwetlands (estimated probability 67-99%), but occasionally are found in wetlands (estimated probability 1-33%). If a species occurs almost always (estimated probability >99%) in nonwetlands under natural conditions, it is considered an *obligate upland plant* (UPL). These latter plants do not usually appear on the wetland plant list; they are listed only when found in wetlands with a higher probability in one region of the country. If a species is not on the list, it is presumed to be an obligate upland plant. The "National List of Plant Species That Occur in Wetlands" has been subdivided into regional and state lists. There is a formal procedure to petition the interagency plant review committee for making additions, deletions, and changes in indicator status. Since the lists are periodically updated, the U.S. Fish and Wildlife Service should be contacted to be sure that the most current version is being used for wetland determinations. The appropriate plant list for a specific geographic region should be used when making a wetland determination and evaluating whether the following hydrophytic vegetation criterion is satisfied.

### Hydrophytic Vegetation Criterion

2.3. An area has hydrophytic vegetation when, under normal circumstances: (1) more than 50 percent of the composition of the dominant species from all strata are obligate wetland (OBL), facultative wetland (FACW), and/or facultative (FAC) species, or (2) a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0). *CAUTION*: When a plant community has less than or equal to 50 percent of the dominant species from all strata represented by OBL, FACW, and/or FAC species, or a frequency analysis of all species within the community yields a prevalence index value of greater than or equal to 3.0, and hydric soils and wetland hydrology are present, the area also has hydrophytic vegetation. (*Note*: These areas are considered problem area wetlands.)

2.4. For each stratum (e.g., tree, shrub, and herb) in the plant community, dominant species are the most abundant plant species (when ranked in descending order

of abundance and cumulatively totaled) that immediately exceed 50 percent of the total dominance measure (e.g., basal area or areal coverage) for the stratum, plus any additional species comprising 20 percent or more of the total dominance measure for the stratum. All dominants are treated equally in determining the presence of hydrophytic vegetation.

2.5. (Note: The "National List of Plant Species that Occur in Wetlands" uses a plus (+) sign or a minus (-) sign to specify a higher or lower portion of a particular wetland indicator frequency for the three facultative-type indicators; for purposes of identifying hydrophytic vegetation according to this manual, however, FACW+, FACW-, FAC+, and FAC are included as FACW and FAC, respectively, in the hydrophytic vegetation criterion.)

### Hydric Soils

2.6. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (U.S.D.A. Soil Conservation Service 1987). In general, hydric soils are flooded, ponded, or saturated for usually one week or more during the period when soil temperatures are above biologic zero 41° F as defined by "Soil Taxonomy" (U.S.D.A. Soil Survey Staff 1975). These soils usually support hydrophytic vegetation. The National Technical Committee for Hydric Soils has developed criteria for hydric soils and a list of the Nation's hydric soils (U.S.D.A. Soil Conservation Service 1987). (Note: Caution must be exercised in using the hydric soils list for determining the presence of hydric soil at specific sites; see p. 12.)

### Hydric Soil Criterion

2.7. An area has hydric soils when the National Technical Committee for Hydric Soils (NTCHS) criteria for hydric soils are met.

NTCHS Criteria for Hydric Soils (U.S.D.A. Soil Conservation Service 1987):

"1. All Histosols except Folists; or

2. Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:

a. somewhat poorly drained and have water table less than 0.5 feet from the surface for a significant period (usually a week or more) during the growing season, or

b. poorly drained or very poorly drained and have either:

(1) water table at less than 1.0 feet from the surface for a significant period (usually a week or more) during the growing season if permeability is equal to or greater than 6.0 inches/hour in all layers within 20 inches, or

(2) water table at less than 1.5 feet from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 inches/hour in any layer within 20 inches; or

3. Soils that are ponded for long duration or very long duration during the growing season; or

4. Soils that are frequently flooded for long duration or very long duration during the growing season."

(Note: Long duration is defined as inundation for a single event that ranges from seven days to one month; very long duration is defined as inundation for a single event that is greater than one month; frequently flooded is defined as flooding likely to occur often under usual weather conditions - more than 50 percent chance of flooding in any year or more than 50 times in 100 years. Other technical terms in the NTCHS criteria for hydric soils are generally defined in the glossary.)

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## Wetland Hydrology

2.8. Permanent or periodic inundation, or soil saturation to the surface, at least seasonally, are the driving forces behind wetland formation. The presence of water for a week or more during the growing season typically creates anaerobic conditions in the soil, which affect the types of plants that can grow and the types of soils that develop. Numerous factors influence the wetness of an area, including precipitation, stratigraphy, topography, soil permeability, and plant cover. All wetlands usually have at least a seasonal abundance of water. This water may come from direct precipitation, overbank flooding, surface water runoff due to precipitation or snow melt, ground water discharge, or tidal flooding. The frequency and duration of inundation and soil saturation vary widely from permanent flooding or saturation to irregular flooding or saturation. Of the three technical criteria for wetland identification, wetland hydrology is often the least exact and most difficult to establish in the field, due largely to annual, seasonal, and daily fluctuations.

### *Wetland Hydrology Criterion*

2.9. An area has wetland hydrology when saturated to the surface or inundated at some point in time during an average rainfall year, as defined below:

1. Saturation to the surface normally occurs when soils in the following natural drainage classes meet the following conditions:
  - A. In somewhat poorly drained mineral soils, the water table is less than 0.5 feet from the surface for usually one week or more during the growing season; or
  - B. In low permeability (<6.0 inches/hour), poorly drained or very poorly drained mineral soils, the water table is less than 1.5 feet from the surface for usually one week or more during the growing season; or

- C. In more permeable ( $\geq 6.0$  inches/hour), poorly drained or very poorly drained mineral soils, the water table is less than 1.0 feet from the surface for usually one week or more during the growing season; or

- D. In poorly drained or very poorly drained organic soils, the water table is usually at a depth where saturation to the surface occurs more than rarely. (*Note: Organic soils that are cropped are often drained, yet the water table is closely managed to minimize oxidation of organic matter; these soils often retain their hydric characteristics and if so, meet the wetland hydrology criterion.*)

2. An area is inundated at some time if ponded or frequently flooded with surface water for one week or more during the growing season.

(*Note: An area saturated for a week during the growing season, especially early in the growing season, is not necessarily a wetland. However, in the vast majority of cases, an area that meets the NTCHS criteria for hydric soil is a wetland.*)

### Summary

2.10. The technical criteria are mandatory and must be satisfied in making a wetland determination. Areas that meet the NTCHS hydric soil criteria and under normal circumstances support hydrophytic vegetation are wetlands. Field indicators and other information provide direct and indirect evidence for determining whether or not each of the three criteria are met. Sound professional judgment should be used in interpreting these data to make a wetland determination. It must be kept in mind that exceptional and rare cases are possibilities that may call any generally sound principle into question.



# Part III.

## Field Indicators and Other Available Information



3.0. When conducting a field inspection to make a wetland determination, the three identification criteria, listed in Part II of this manual, alone may not provide enough information for users to document whether or not the criteria themselves (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) are met. Various physical properties or other signs can be readily observed in the field to determine whether the three wetland identification criteria are satisfied. Besides these field indicators, good baseline information may be available from site-specific studies, published reports, or other written material on wetlands. In the following sections, field indicators and primary sources of information for each of the three criteria are presented to help the user identify wetlands.

### Hydrophytic Vegetation

3.1. All plants growing in wetlands have adapted in one way or another to life in permanently or periodically inundated or saturated soils. Some plants have developed structural or morphological adaptations to inundation or saturation. These features, while indicative of hydrophytic vegetation, are used as indicators of wetland hydrology in this manual, since they are a response to inundation and soil saturation. Probably all plants growing in wetlands possess physiological mechanisms to cope with prolonged periods of anaerobic soil conditions. Because they are not observable in the field, physiological and reproductive adaptations are not included in this manual.

3.2. Persons making wetland determinations should be able to identify at least the dominant wetland plants in each stratum (layer of vegetation) of a plant community. Plant identification requires use

of field guides or more technical taxonomic manuals (see Appendix A for sample list). When necessary, seek help in identifying difficult species. Once a plant is identified to genus and species, one should then consult the appropriate Federal list of plants that occur in wetlands to determine the "wetland indicator status" of the plant (see p. 5). This information will be used to help determine if hydrophytic vegetation is present.

### *Dominant Vegetation*

3.3. Dominance as used in this manual refers strictly to the spatial extent of a species that is directly discernable or measurable in the field. When identifying dominant vegetation within a given plant community, one should consider dominance within each stratum. All dominants are treated equally in characterizing the plant community to determine whether hydrophytic vegetation is present. The most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceed 50 percent of the total dominance measure for a given stratum, plus any additional species comprising 20 percent or more of the total dominance measure for that stratum are considered dominant species for the stratum. Dominance measures include percent areal coverage and basal area, for example.

3.4. Vegetative strata for which dominants should be determined may include: (1) tree ( $\geq 5.0$  inches diameter at breast height (dbh) and 20 feet or taller); (2) sapling (0.4 to  $< 5.0$  inches dbh and 20 feet or taller); (3) shrub (usually 3 to 20 feet tall including multi-stemmed, bushy shrubs and small trees and saplings); (4) woody vine; and (5) herb (herbaceous plants including graminoids, forbs, ferns, fern allies, herbaceous vines, and tree seedlings). Bryophytes (mosses, horned liverworts, and true liverworts) should be sampled as a separate stratum in certain wetlands, including shrub bogs, moss-lichen wetlands, and wooded swamps where bryophytes are abundant and represent an important component of the community; in most other wetlands, bryophytes should be included within the herb stratum due to their scarcity.

3.5. There are many ways to quantify dominance measures; Part IV provides recommended approaches. Alternatively, one may wish to visually estimate percent coverage when possible or perform a frequency analysis of all species within a

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given plant community. These are accepted methods for evaluating plant communities.

### *Field Indicators*

3.6. Having established the community dominants for each stratum or performed a frequency analysis, hydrophytic vegetation is considered present if:

1) OBL species comprise all dominants in the plant community (*Note:* In these cases, the area can be considered wetland without detailed examination of soils and hydrology, provided significant hydrologic modifications are not evident); or

2) OBL species do not dominate each stratum, but more than 50 percent of the dominants of all strata are OBL, FACW, or FAC species (including FACW+, FACW-, FAC+, and FAC-); or

3) A plant community has a visually estimated percent coverage of OBL and FACW species that exceed the coverage of FACU and UPL species; or

4) A frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0); or

5) A plant community has less than or equal to 50 percent of the dominant species from all strata represented by OBL, FACW, and/or FAC species, *or* a frequency analysis for all species within the community yields a prevalence index value greater than or equal to 3.0, *and* hydric soils and wetland hydrology are present. (*Note:* In other words, if the hydric soil and wetland hydrology criteria are met, then the vegetation is considered hydrophytic. For purposes of this manual, these situations are treated as disturbed or problem area wetlands because these plant communities are usually nonwetlands.)

### *Other Sources of Information*

3.7. Besides learning the field indicators of hydrophytic vegetation presented above, one should also become familiar with the technical literature on wetlands, especially for one's geographic region. Sources of available literature include: taxonomic plant manuals and field guides; scientific journals dealing with botany, ecology, and wetlands in par-

ticular; technical government reports on wetlands; proceedings of wetland workshops, conferences, and symposia; and the FWS's national wetland plant database, which contains habitat information on about 7,000 plant species. Appendix A presents examples of the first four sources of information. In addition, the FWS's National Wetlands Inventory (NWI) maps provide information on locations of hydrophytic plant communities that may be studied in the field to improve one's knowledge of such communities in particular regions.

### **Hydric Soils**

3.8. Due to their wetness during the growing season, hydric soils usually develop certain morphological properties that can be readily observed in the field. Prolonged anaerobic soil conditions typically lower the soil redox potential and causes a chemical reduction of some soil components, mainly iron oxides and manganese oxides. This reduction affects solubility, movement, and aggregation of these oxides which is reflected in the soil color and other physical characteristics that are usually indicative of hydric soils. (*Note:* Much of the background material for this section was taken from "Hydric Soils of New England" [Tiner and Vene-man 1987].)

3.9. Soils are separated into two major types on the basis of material composition: organic soil and mineral soil. In general, soils with at least 18 inches of organic material in the upper part of the soil profile and soils with organic material resting on bedrock are considered organic soils (Histosols). Soils largely composed of sand, silt, and/or clay are mineral soils. (For technical definitions, see "Soil Taxonomy", U.S.D.A. Soil Survey Staff 1975).

3.10. Accumulation of organic matter in most organic soils results from prolonged anaerobic soil conditions associated with long periods of submergence or soil saturation during the growing season. These saturated conditions impede aerobic decomposition (oxidation) of the bulk organic materials such as leaves, stems, and roots, and encourage their accumulation over time as peat or muck. Consequently, most organic soils are characterized as very poorly drained soils. Organic soils typically form in waterlogged depressions, and peat or muck deposits may range from about two feet to more



than 30 feet deep. Organic soils also develop in low-lying areas along coastal waters where tidal flooding is frequent.

3.11. Hydric organic soils are subdivided into three groups based on the presence of identifiable plant material: (1) muck (Saprists) in which two-thirds or more of the material is decomposed and less than one-third of the plant fibers are identifiable; (2) peat (Fibrists) in which less than one-third of the material is decomposed and more than two-thirds of the plant fibers are still identifiable; and (3) mucky peat or peaty muck (Hemists) in which the ratio of decomposed to identifiable plant matter is more nearly even (U.S.D.A. Soil Survey Staff 1975). A fourth group of organic soils (Folists) exists in tropical and boreal mountainous areas where precipitation exceeds the evapotranspiration rate, but these soils are never saturated for more than a few days after heavy rains and thus do not develop under hydric conditions. All organic soils, with the exception of the Folists, are hydric soils.

3.12. When less organic material accumulates in soil, the soil is classified as mineral soil. Some mineral soils may have thick organic surface layers due to heavy seasonal rainfall or a high water table, yet they are still composed largely of mineral matter (Ponnamperuma 1972). Mineral soils that are covered with moving (flooded) or standing (ponded) water for significant periods or are saturated for extended periods during the growing season are classified as hydric mineral soils. Soil saturation may result from low-lying topographic position, groundwater seepage, or the presence of a slowly permeable layer (e.g., clay, confining bedrock, or hardpan).

3.13. The duration and depth of soil saturation are essential criteria for identifying hydric soils and wetlands. Soil morphological features are commonly used to indicate long-term soil moisture regimes (Bouma 1983). The two most widely recognized features that reflect wetness in mineral soils are gleying and mottling.

3.14. Simply described, gleyed soils are predominantly neutral gray in color and occasionally greenish or bluish gray. In gleyed soils, the distinctive colors result from a process known as gleization. Prolonged saturation of mineral soil converts iron from its oxidized (ferric) form to its reduced (ferrous) state. These reduced compounds may be completely removed from the soil, resulting in gleying

(Veneman, *et al.* 1976). Mineral soils that are always saturated are uniformly gleyed throughout the saturated area. Soils gleyed to the surface layer are hydric soils. These soils often show evidence of oxidizing conditions only along root channels. Some nonhydric soils have gray layers (E-horizons) immediately below the surface layer that are gray for reasons other than saturation (e.g., leaching due to organic acids). These soils often have brighter (e.g., brownish or reddish) layers below the gray layer and can be recognized as non-hydric on that basis.

3.15. Mineral soils that are alternately saturated and oxidized (aerated) during the year are usually mottled in the part of the soil that is seasonally wet. Mottles are spots or blotches of different colors or shades of colors interspersed with the dominant (matrix) color. The abundance, size, and color of the mottles usually reflect the duration of the saturation period and indicate whether or not the soil is hydric. Mineral soils that are predominantly grayish with brown or yellow mottles are usually saturated for long periods during the growing season and are classified as hydric. Soils that are predominantly brown or yellow with gray mottles are saturated for shorter periods and may not be hydric. Mineral soils that are never saturated are usually bright-colored and are not mottled. Realize, however, that in some hydric soils, mottles may not be visible due to masking by organic matter (Parker, *et al.* 1984).

3.16. It is important to note that the gleization and mottle formation processes are strongly influenced by the activity of certain soil microorganisms. These microorganisms reduce iron when the soil environment is anaerobic, that is, when virtually no free oxygen is present, and when the soil contains organic matter. If the soil conditions are such that free oxygen is present, organic matter is absent, or temperatures are too low (below 41°F) to sustain microbial activity, gleization will not proceed and mottles will not form, even though the soil may be saturated for prolonged periods of time (Diers and Anderson 1984).

### Soil Colors

3.17. Soil colors often reveal much about a soil's wetness, that is, whether the soil is hydric or non-hydric. Scientists and others examining the soil can determine the approximate soil color by comparing

the soil sample with a Munsell soil color chart. The standardized Munsell soil colors are identified by three components: hue, value, and chroma. The hue is related to one of the main spectral colors: red, yellow, green, blue, or purple, or various mixtures of these principal colors. The value refers to the degree of lightness, while the chroma notation indicates the color strength or purity. In the Munsell soil color book, each individual hue has its own page, each of which is further subdivided into units for value (on the vertical axis) and chroma (horizontal axis). Although theoretically each soil color represents a unique combination of hues, values, and chromas, the number of combinations common in the soil environment usually is limited. Because of this situation and the fact that accurate reproduction of each soil color is expensive, the Munsell soil color book contains a limited number of combinations of hues, values, and chromas. The color of the soil matrix or a mottle is determined by comparing a soil sample with the individual color chips in the soil color book. The appropriate Munsell color name can be read from the facing page in the "Munsell Soil Color Charts" (Kollmorgen Corporation 1975). Chromas of 2 or less are considered low chromas and are often diagnostic of hydric soils. Low chroma colors include black, various shades of gray, and the darker shades of brown and red.

### *Hydric Organic Soils*

3.18. Hydric organic soils can be easily recognized as black-colored muck and/or as black to dark brown-colored peat. Distinguishing mucks from peats based on the relative degree of decomposition is fairly simple. In mucks (Saprists), almost all of the plant remains have been decomposed beyond recognition. When rubbed, mucks feel greasy and leave hands dirty. In contrast, the plant remains in peats (Fibrists) show very little decomposition and the original constituent plants can be recognized fairly easily. When the organic material is rubbed between the fingers, most plant fibers will remain identifiable, leaving hands relatively clean. Between the extremes of mucks and peats, organic soils with partially decomposed plant fibers (Hemists) can be recognized. In peaty mucks up to two-thirds of the plant fibers can be destroyed by rubbing the materials between the fingers, while in mucky peats up to two-thirds of the plant remains are still recognizable after rubbing.

3.19. Besides the dominance of organic matter, many organic soils (especially in tidal marshes) also emit an odor of rotten eggs when hydrogen sulfide is present. Sulfides are produced only in a strongly reducing environment.

### *Hydric Mineral Soils*

3.20. Hydric mineral soils are often more difficult to identify than hydric organic soils because most organic soils are hydric, while most mineral soils are not. A thick dark surface layer, grayish subsurface and subsoil colors, the presence of orange or reddish brown (iron) and/or dark reddish brown or black (manganese) mottles or concretions near the surface, and the wet condition of the soil may help identify the hydric character of many mineral soils. The grayish subsurface and subsoil colors and thick, dark surface layers are the best indicators of current wetness, since the orange-colored mottles are very insoluble and once formed may remain indefinitely as relict mottles of former wetness (Diers and Anderson 1984).

### *National and State Hydric Soils Lists*

3.21. The SCS in cooperation with the National Technical Committee for Hydric Soils (NTCHS) has prepared a list of the Nation's hydric soils. State lists have also been prepared for statewide use. The national and State lists identify those soil series that meet the hydric soil criteria according to available soil interpretation records in SCS's soils database. These lists are periodically updated, so make sure the list being used is the current list. The lists facilitate use of SCS county soil surveys for identifying potential wetlands. One must be careful, however, in using the soil survey, because a soil map unit of an upland (nonwetland) soil may have inclusions of hydric soil that were not delineated on the map or vice versa. Also, some map units (e.g., alluvial land, swamp, tidal marsh, muck and peat) may be hydric soil areas, but are not on the hydric soils lists because they were not given a series name at the time of mapping.

3.22. Because of these limitations of the national and State lists, the SCS also maintains lists of hydric soil map units for each county in the United States. These lists may be obtained from local SCS district offices and are the preferred lists to be used when locating areas of hydric soils. The hydric soil

map units lists identify all map units that are either named by a hydric soil or that have a potential of having hydric soil inclusions. The lists provide the map unit symbol, the name of the hydric soil part or parts of the map unit, information on the hydric soil composition of the map unit, and probable landscape position of hydric soils in the map unit delineation. The county lists also include map units named by miscellaneous land types or higher levels in "Soil Taxonomy" that meet hydric soil criteria.

### *Soil Surveys*

3.23. The SCS publishes county soil surveys for areas where soil mapping is completed. Soil surveys that meet standards of the National Cooperative Soil Survey (NCSS) are used to identify delineations of hydric soils. These soil surveys may be published (completed) or unpublished (on file at local SCS district offices). Published soil surveys of an area may be obtained from the local SCS district office or the Agricultural Extension Service office. Unpublished maps may be obtained from the local SCS district office.

3.24. The NCSS maps four kind of map units: (1) consociations, (2) complexes, (3) associations, and (4) undifferentiated groups. *Consociations* are soil map units named for a single kind of soil (taxon) or miscellaneous area. Seventy-five percent of the area is similar to the taxon for which the unit is named. When named by a hydric soil, the map unit is considered a hydric soil map unit for wetland determinations. However, small areas within these map units may not be hydric and should be excluded in delineating wetlands.

3.25. *Complexes and associations* are soil map units named by two or more kinds of soils (taxa) or miscellaneous areas. If all taxa for which these map units are named are hydric, the soil map unit may be considered a hydric soil map unit for wetland determinations. If only part of the map unit is made up of hydric soils, only those portions of the map unit that are hydric are considered in wetland determinations.

3.26. *Undifferentiated groups* are soil map units named by two or more kinds of soils or miscellaneous areas. These units are distinguished from the others in that "and" is used as a conjunction in the name, while dashes are used for complexes and associations. If all components are hydric, the map

unit may be considered a hydric soil map unit. If one or more of the soils for which the unit is named are nonhydric, each area must be examined for the presence of hydric soils.

### *Use of the Hydric Soils List and Soil Surveys*

3.27. The hydric soils list and county soil surveys may be used to help determine if the hydric soil criterion is met in a given area. When making a wetland determination, one should first locate the area of concern on a soil survey map and identify the soil map units for the area. The list of hydric soils should be consulted to determine whether the soil map units are hydric. If hydric soil map units are noted, then one should examine the soil in the field and compare its morphology with the corresponding hydric soil description in the soil survey report. If the soil's characteristics match those described for hydric soil, then the hydric soil criterion is met, unless the soil has been effectively drained (see disturbed areas section, p. 50). In the absence of site-specific information, hydric soils also may be recognized by field indicators.

### *Field Indicators*

3.28. Several field indicators are available for determining whether a given soil meets the definition and criteria for hydric soils. Other factors to consider in recognizing hydric soils include obligate wetland plants, topography, observed or recorded inundation or soil saturation, and evidence of human alterations, e.g., drainage and filling. Any one of the following may indicate that hydric soils are present:

1) *Organic Soils* – Various peats and mucks are easily recognized as hydric soils. Organic soils that are cropped are often drained, yet the water table is closely managed to minimize oxidation of organic matter. These soils often retain their hydric soil characteristics and, if so, meet the wetland hydrology criterion.

2) *Histic epipedons* – A histic epipedon (organic surface layer) is an 8- to 16-inch organic layer at or near the surface of a hydric mineral soil that is saturated with water for 30 consecutive days or more in most years. It contains a minimum of 20 percent organic matter when no clay is present or a

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minimum of 30 percent organic matter when clay content is 60 percent or greater. Soils with histic epipedons are inundated or saturated for sufficient periods to greatly retard aerobic decomposition of organic matter, and are considered hydric soils. In general, a histic epipedon is a thin surface layer of peat or muck if the soil has not been plowed (U.S.D.A. Soil Survey Staff 1975). Histic epipedons are technically classified as Oa, Oe, or Oi surface layers, and in some cases the terms "mucky" or "peaty" are used as modifiers to the mineral soil texture term, e.g., mucky loam.

3) *Sulfidic material* – When soils emit an odor of rotten eggs, hydrogen sulfide is present. Such odors are only detected in waterlogged soils that are essentially permanently saturated and have sulfidic material within a few inches of the soil surface. Sulfides are produced only in reducing environment. Under saturated conditions, the sulfates in water are biologically reduced to sulfides as the organic materials accumulate.

4) *Aquic or peraquic moisture regime* – An *aquic* moisture regime is a reducing one, i.e., it is virtually free of dissolved oxygen, because the soil is saturated by ground water or by water of the capillary fringe (U.S.D.A. Soil Survey Staff 1975). The soil is considered saturated if water stands in an unlined borehole at a shallow enough depth that the capillary fringe reaches the soil surface, except in noncapillary pores. Because dissolved oxygen is removed from ground water by respiration of microorganisms, roots, and soil fauna, it is also implicit that the soil temperature be above biologic zero (41°F) at some time while the soil is saturated. Soils with *peraquic* moisture regimes are characterized by the presence of ground water always at or near the soil surface. Examples include soils of tidal marshes and soils of closed, landlocked depressions that are fed by permanent streams. Soils with *peraquic* moisture regimes are always hydric under natural conditions. Soils with *aquic* moisture regimes are usually hydric, but the NTCHS hydric soil criteria should be verified in the field.

5) *Direct observations of reducing soil conditions* – Soils saturated for long or very long duration will usually exhibit reducing conditions at the time of saturation. Under such conditions, ions of iron are transformed from a ferric (oxidized) state to a ferrous (reduced) state. This reduced condition can often be detected in the field by use of a colorimetric field test kit. When a soil extract changes to a

pink color upon addition of a-a-dipyridil, ferrous iron is present, which indicates a reducing soil environment at the time of the test. A negative result (no pink color) only indicates that the soil is not reduced at this moment; it does not imply that the soil is not reduced during the growing season. Furthermore, the test is subject to error due to the rapid change of ferrous iron to ferric iron when the soil is exposed to air and should only be used by experienced technicians. (*CAUTION*: This test cannot be used in hydric mineral soils having low iron content or in organic soils. Also it does not determine the duration of reduced conditions.)

6) *Gleyed, low chroma, and low chromal mottled soils* – The colors of various soil components are often the most diagnostic indicator of hydric soils. Colors of these components are strongly influenced by the frequency and duration of soil saturation which leads to reducing soil conditions. Hydric mineral soils will be either gleyed or will have low chroma matrix with or without bright mottles.

A) *Gleyed soils* – Gleying (bluish, greenish, or grayish colors) immediately below the A-horizon is an indication of a markedly reduced soil, and gleyed soils are hydric soils. Gleying can occur in both mottled and unmottled soils. Gleyed soil conditions can be determined by using the gley page of the "Munsell Soil Color Charts" (Kollmorgen Corporation 1975). (*CAUTION*: Gleyed conditions normally extend throughout saturated soils. Beware of soils with gray E-horizons due to leaching and not to saturation; these latter soils can often be recognized by bright-colored layers below the E-horizon.)

B) *Other low chroma soils and mottled soils (i.e., soils with low matrix chroma and with or without bright mottles)* – Hydric mineral soils that are saturated for substantial periods of the growing season, but are unsaturated for some time, commonly develop mottles. Soils that have brightly colored mottles and a low chroma matrix are indicative of a fluctuating water table. Hydric mineral soils usually have one of the following color features in the horizon immediately below the A-horizon:

- (1) Matrix chroma of 2 or less in mottled soils, or
- (2) Matrix chroma of 1 or less in unmottled soils.

(Note: See p. 59 for mollisols exception.)

Colors should be determined in soils that are or have been moistened. The chroma requirements above are for soils in a moistened condition. Colors noted for dry (unmoistened) soils should be clearly stated as such. The colors of the topsoil are often not indicative of the hydrologic situation because cultivation and soil enrichment affect the original soil color. Hence, the soil colors below the A-horizon (usually below 10 inches) often must be examined.

(CAUTION: Beware of problematic hydric soils that have colors other than those described above; see problem area wetlands section, p. 55.)

7) *Iron and manganese concretions* – During the oxidation-reduction process, iron and manganese in suspension are sometimes segregated as oxides into concretions or soft masses. Concretions are local concentrations of chemical compounds (e.g., iron oxide) in the form of a grain or nodule of varying size, shape, hardness, and color (Buckman and Brady 1969). Manganese concretions are usually black or dark brown, while iron concretions are usually yellow, orange or reddish brown. In hydric soils, these concretions are also usually accompanied by soil colors described above.

8) *Coarse-textured or sandy hydric soils* – Many of the indicators listed above cannot be applied to sandy soils. *In particular, soil color should not be used as an indicator in most sandy soils* (see problem area wetlands section, p. 55). However, three soil features may be used as indicators of hydric sandy soils:

A) *High organic matter content in the surface horizon* – Organic matter tends to accumulate above or in the surface horizon of sandy soils that are inundated or saturated to the surface for a significant portion of the growing season. The mineral surface layer generally appears darker than the mineral material immediately below it due to organic matter interspersed among or adhering to sand particles. (Note: Because organic matter also accumulates on upland soils, in some instances it may be difficult to distinguish a surface organic layer associated with a wetland site from litter and duff associated with an upland site unless the species composition of the organic materials is determined.)

B) *Dark vertical streaking of subsurface horizons by organic matter* – Organic matter is moved downward through sand as the water table fluctuates. This often occurs more rapidly and to a greater degree in some vertical sections of a sandy soil containing high content of organic matter than in others. Thus, the sandy soil appears vertically streaked with darker areas. When soil from a darker area is rubbed between the fingers, the dark organic matter stains the fingers.

C) *Wet Spodosols* – As organic matter is moved downward through some sandy soils, it may accumulate at the point representing the most commonly occurring depth to the water table. This organic matter may become slightly cemented with aluminum. Spodic horizons often occur at depths of 12 to 30 inches below the mineral surface. Wet spodosols (formerly called "groundwater podzolic soils") usually have thick dark surface horizons that are high in organic matter with thick, dull gray E-horizons above a very dark-colored (black) spodic horizon. (CAUTION: Not all soils with spodic horizons meet the hydric soil criterion; see p. 58.)

(Note: In recently deposited sandy material, such as accreting sand bars, it may be impossible to find any of the above indicators. Such cases are considered natural, problem area wetlands and the determination of hydric soil should be based on knowledge of local hydrology. See p. 57-58).

## Wetland Hydrology

3.29. The driving force creating wetlands is "wetland hydrology", that is, permanent or periodic inundation, or soil saturation for a significant period (usually a week or more) during the growing season. All wetlands are, therefore, at least periodically wet. Many wetlands are found along rivers, lakes, and estuaries where flooding is likely to occur, while other wetlands form in isolated depressions surrounded by upland where surface water collects. Still others develop on slopes of varying steepness, in surface water drainageways or where ground water discharges to the land surface in spring or seepage areas.

3.30. Numerous factors influence the wetness of an area, including precipitation, stratigraphy, topography, soil permeability, and plant cover. The

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frequency and duration of inundation or soil saturation are important in separating wetlands from non-wetlands. Duration usually is the more important factor. Areas of lower elevation in a floodplain or marsh have longer duration of inundation and saturation and often more frequent periods of these conditions than most areas at higher levels. Floodplain configuration may significantly affect the duration of inundation by facilitating rapid runoff or by causing poor drainage. Soil permeability related to the texture of the soil also influences the duration of inundation or soil saturation. For example, clayey soils absorb water more slowly than sandy or loamy soils, and therefore have slower permeability and remain saturated much longer. Type and amount of plant cover affect both degree of inundation and duration of saturated soil conditions. Excess water drains more slowly in areas of abundant plant cover, thereby increasing duration of inundation or soil saturation. On the other hand, transpiration rates are higher in areas of abundant plant cover, which may reduce the duration of soil saturation.

3.31. To determine whether the wetland hydrology criterion is met, one should consider recorded data, aerial photographs, and field indicators that provide direct or indirect evidence of inundation or soil saturation.

#### *Recorded Data*

3.32. Recorded hydrologic data usually provides both short- and long-term information on the frequency and duration of flooding, but little or no information on soil saturation periods. Recorded data include stream gauge data, lake gauge data, tidal gauge data, flood predictions, and historical flood records. Use of these data is commonly limited to areas adjacent to streams and other similar areas. Recorded data may be available from the following sources:

- 1) CE district offices (data for major waterbodies and for site-specific areas from planning and design documents)
- 2) U.S. Geological Survey (stream and tidal gauge data)
- 3) National Oceanic and Atmospheric Administration (tidal gauge data)

- 4) State, county and local agencies (flood data)
- 5) SCS state offices (small watershed projects data)
- 6) private developers or landowners (site-specific hydrologic data, which may include water table or groundwater well data).

#### *Aerial Photographs*

3.33. Aerial photographs may provide direct evidence of inundation or soil saturation in an area. Inundation (flooding or ponding) is best observed during the early spring in temperate and boreal regions when snow and ice are gone and leaves of deciduous trees and shrubs are not yet present. This allows detection of wet soil conditions that would be obscured by the tree or shrub canopy at full leaf-out. For marshes, this season of photography is also desirable, except in regions characterized by distinct dry and rainy seasons, such as southern Florida and California. Wetland hydrology would be best observed during the wet season in these latter areas.

3.34. It is most desirable to examine several consecutive years of early spring or wet season aerial photographs to document evidence of wetland inundation or soil saturation. In this way, the effects of abnormally dry springs, for example, may be minimized. In interpreting aerial photographs, it is important to know the antecedent weather conditions. This will help eliminate potential misinterpretations caused by abnormally wet or dry periods. Contact the U.S. Weather Service for historical weather records. Aerial photographs for agricultural regions of the country are often available at county offices of the Agricultural Stabilization and Conservation Service.

#### *Field Indicators*

3.35. At certain times of the year in most wetlands, and in certain types of wetlands at most times, wetland hydrology is quite evident, since surface water or saturated soils (e.g., soggy or wetter underfoot) may be observed. Yet in many instances, especially along the uppermost boundary of wetlands, hydrology is not readily apparent. Consequently, the wetland hydrology criterion is

often impracticable for delineating precise wetland boundaries. Despite this limitation, hydrologic indicators can be useful for confirming that a site with hydrophytic vegetation and hydric soils still exhibits wetland hydrology and that the hydrology has not been significantly modified to the extent that the area is now effectively drained. In other words, while hydrologic indicators are sometimes diagnostic of the presence of wetlands, they are generally either operationally impracticable (e.g., in the case of recorded data) or technically inaccurate (e.g., in the case of some field indicators) for delineating wetland boundaries. In the former case, surveying the wetland boundary according to elevation data related to recorded flood data, for example, is generally too time-consuming and may not actually be a true correlation. In the latter case, it should be quite obvious that indicators of flooding often extend well beyond the wetland boundary into low-lying upland areas that were flooded by an infrequent flood. Consequently the emphasis on delineating wetland boundaries should be placed on hydrophytic vegetation and hydric soils in the absence of significant hydrologic modification, although wetland hydrology should always be considered.

3.36. If significant drainage or groundwater alteration has taken place, then it is necessary to determine whether the area in question is effectively drained and is now nonwetland or is only partly drained and remains wetland despite some hydrologic modification. Guidance for determining whether an area is effectively drained is presented in the section on disturbed areas (p. 50). In the absence of visible evidence of significant hydrologic modification, wetland hydrology is presumed to occur in an area having hydrophytic vegetation and hydric soils.

3.37. The following hydrologic indicators can be assessed quickly in the field. Although some are not necessarily indicative of hydrologic events during the growing season or in wetlands alone, they do provide evidence that inundation or soil saturation have occurred at some time. One should use good professional judgement in deciding whether the hydrologic indicators demonstrate that the wetland hydrology criterion has been satisfied. When considering these indicators, it is important to be aware of recent extreme flooding events and heavy rainfall periods that could cause low-lying nonwetlands to exhibit some of these signs. It is, therefore, best to avoid, if possible, field inspections

during and immediately after these events. If not possible, then these events must be considered in making a wetland determination. Also, remember that hydrology varies seasonally and annually as well as daily, and that at significant times of the year (e.g., late summer for most of the country) the water tables are at their lowest points. At these low water periods, signs of soil saturation and flooding may be difficult to find in many wetlands.

1) *Visual observation of inundation* – The most obvious and revealing hydrologic indicator may be simply observing the areal extent of inundation. However, both seasonal conditions and recent weather conditions should be considered when observing an area because they can affect whether surface water is present on a nonwetland site.

2) *Visual observation of soil saturation* – In some cases, saturated soils are obvious, since the ground surface is soggy or mucky under foot. In many cases, however, examination of this indicator requires digging a hole to a depth of 18 inches and observing the level at which water stands in the hole after sufficient time has been allowed for water to drain into the hole. The required time will vary depending on soil texture. In some cases, the upper level at which water is flowing into the hole can be observed by examining the wall of the hole. This level represents the depth to the water table. The depth to saturated soils will always be nearer the surface due to a capillary fringe. In some heavy clay soils, water may not rapidly accumulate in the hole even when the soil is saturated. If water is observed at the bottom of the hole but has not filled to the 12-inch depth, examine the sides of the hole and determine the shallowest depth at which water is entering the hole. Saturated soils may also be detected by a "squeeze test," which involves taking a soil sample within 18 inches (actual depth depends on soil permeability) and squeezing the sample. If free water can be extracted, the soil is saturated at the depth of the sample at this point in time. When applying the soil saturation indicator, both the season of the year and the preceding weather conditions must be considered. (*Note: It is not necessary to directly demonstrate soil saturation at the time of inspection. If the NTCHS criteria for hydric soil are met, it can be assumed that an area is saturated to the surface or inundated at some point in time during an average rainfall year.*)

3) *Oxidized channels (rhizospheres) associated with living roots and rhizomes* – Some plants are

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able to survive saturated soil conditions (i.e., a reducing environment) because they can transport oxygen to their root zone. Look for iron oxide concretions (orangish or reddish brown in color) forming along the channels of living roots and rhizomes as evidence of soil saturation (anaerobic conditions) for a significant period during the growing season.

4) *Water marks* – Water marks are found most commonly on woody vegetation but may also be observed on other vegetation. They often occur as stains on bark or other fixed objects (e.g., bridge pillars, buildings, and fences). When several water marks are present, the highest usually reflects the maximum extent of recent inundation.

5) *Drift lines* – This indicator is typically found adjacent to streams or other sources of water flow in wetlands and often occurs in tidal marshes. Evidence consists of deposition of debris in a line on the wetland surface or debris entangled in above-ground vegetation or other fixed objects. Debris usually consists of remnants of vegetation (branches, stems, and leaves), sediment, litter, and other water-borne materials deposited more or less parallel to the direction of water flow. Drift lines provide an indication of the minimum portion of the area inundated during a flooding event; the maximum level of inundation is generally at a higher elevation than that indicated by a drift line.

6) *Water-borne sediment deposits* – Plants and other vertical objects often have thin layers, coatings, or depositions of mineral or organic matter on them after inundation. This evidence may remain for a considerable period before it is removed by precipitation or subsequent inundation. Sediment deposition on vegetation and other objects provides an indication of the minimum inundation level. When sediments are primarily organic (e.g., fine organic material and algae), the detritus may become encrusted on or slightly above the soil surface after dewatering occurs.

7) *Water-stained leaves* – Forested wetlands that are inundated earlier in the year will frequently have water-stained leaves on the forest floor. These leaves are generally grayish or blackish in appearance, darkened from being underwater for significant periods.

8) *Surface scoured areas* – Surface scouring occurs along floodplains where overbank flooding erodes sediments (e.g., at the bases of trees). The

absence of leaf litter from the soil surface is also sometimes an indication of surface scouring. Forested wetlands that contain standing waters for relatively long duration will occasionally have areas of bare or essentially bare soil, sometimes associated with local depressions.

9) *Wetland drainage patterns* – Many wetlands (e.g., tidal marshes and floodplain wetlands) have characteristic meandering or braided drainage patterns that are readily recognized in the field or on aerial photographs and occasionally on topographic maps. (*CAUTION*: Drainage patterns also occur in upland areas after periods of considerable precipitation; therefore, topographic position also must be considered when applying this indicator.)

10) *Morphological plant adaptations* – Many plants growing in wetlands have developed morphological adaptations in response to inundation or soil saturation. Examples include pneumatophores, buttressed tree trunks, multiple trunks, adventitious roots, shallow root systems, floating stems, floating leaves, polymorphic leaves, hypertrophied lenticels, inflated leaves, stems or roots, and aerenchyma (air-filled) tissue in roots and stems (see Table 1 for examples). As long as there is no evidence of significant hydrologic modification, these adaptations can be used as hydrologic indicators. Moreover, when these features are observed in young plants, they provide good evidence that recent wetland hydrology exists. (*Note*: While some people may consider these morphological adaptations as indicators of hydrophytic vegetation, for purposes of this manual, they are treated as indicators of wetland hydrology because they typically develop in response to permanent or periodic inundation or soil saturation.)

11) *Hydric soil characteristics* – In the absence of the above indicators, if an area meets the field indicators for hydric soils and there is no indication of significant hydrologic modification, then it can be assumed that the area meets the wetland hydrology criterion. If the area has been significantly disturbed hydrologically, refer to the section on disturbed areas (p. 50). (*CAUTION*: Listing of a soil on the NTCHS list of hydric soils does not necessarily mean the wetland hydrology criterion is met, nor does exclusion of a soil from the list demonstrate that the wetland hydrology criterion has not been met. However, soils on the NTCHS list represent those soils which typically meet the wetland hydrology criterion, unless effectively drained or otherwise altered.)



Table 1. Morphological or structural adaptations of plants for growing in permanently or periodically flooded or saturated soils.

Adaptations	Examples of Plants Possessing Adaptation
Buttressed (swollen) Tree Trunk	Bald Cypress ( <i>Taxodium distichum</i> ), Black Gum ( <i>Nyssa sylvatica</i> var. <i>biflora</i> ), Green Ash ( <i>Fraxinus pennsylvanica</i> var. <i>subintegrifolia</i> ), Water Gum ( <i>Nyssa aquatica</i> ), and Ogechee Tupelo ( <i>Nyssa ogechee</i> )
Multiple Trunks	Red Maple ( <i>Acer rubrum</i> ), Silver maple ( <i>Acer saccharinum</i> ), Swamp Privet ( <i>Forestiera acuminata</i> ), and Ogechee Tupelo
Pneumataphores	Bald Cypress, Water Gum, and Black Mangrove ( <i>Rhizophora mangle</i> )
Adventitious Roots (arising from stem above ground)	Box Elder ( <i>Acer negundo</i> ), Sycamore ( <i>Platanus occidentalis</i> ), Pin Oak ( <i>Quercus palustris</i> ), Black Willow ( <i>Salix nigra</i> ), Green Ash, Alligatorweed ( <i>Alternanthera philoxeroides</i> ), Water Primroses ( <i>Ludwigia</i> spp.), Water Gum, Eastern Cottonwood ( <i>Populus deltoides</i> ), and Willows ( <i>Salix</i> spp.)
Shallow Roots (often exposed to ground surface)	Red Maple and Laurel Oak ( <i>Quercus laurifolia</i> )
Hypertrophied Lenticels	Red Maple, Silver Maple, Willows, Black Mangrove, Water Locust ( <i>Gleditsia aquatica</i> ), and Sweet Gale ( <i>Myrica gale</i> )
Aerenchyma (air-filled tissue) in Roots & Stems	Eastern Bur-reed ( <i>Sparganium americanum</i> ), Soft Rush ( <i>Juncus effusus</i> ), Soft-stemmed Bulrush ( <i>Scirpus validus</i> ), Water Shield ( <i>Brasenia schreberi</i> ), Umbrella Sedges ( <i>Cyperus</i> spp.), other Rushes ( <i>Juncus</i> spp.), Spike-rushes ( <i>Eleocharis</i> spp.), Twig-rush ( <i>Cladium mariscoides</i> ), Buckbean ( <i>Menyanthes trifoliata</i> ), Giant Bur-reed ( <i>Sparganium eurycarpum</i> ), and Cattails ( <i>Typha</i> spp.)
Polymorphic Leaves	Arrowheads ( <i>Sagittaria</i> spp.) and Water Parsnip ( <i>Sium suave</i> )
Floating Leaves -	Water Shield, Spatterdock Lily ( <i>Nuphar luteum</i> ), and White Water Lily ( <i>Nymphaea odorata</i> )

Sources: Environmental Laboratory (1987) and Tiner (1988).



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# Part IV.

## Methods for Identification and Delineation of Wetlands



**4.0.** Four basic approaches for identifying and delineating wetlands have been developed to cover situations ranging from desk-top or office determinations to highly complex field determinations for regulatory purposes. These methods are the recommended approaches and the reasons for departing from them should be documented. Remember, however, that any method for making a wetland determination must consider the three technical criteria (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) listed in Part II of this manual. These criteria must be met in order to identify a wetland. In applying all methods, relevant available information on wetlands in the area of concern should be collected and reviewed. Table 2 lists primary data sources.

### Selection of a Method

**4.1.** The wetland delineation methods presented in this manual can be grouped into two general types: (1) offsite procedures and (2) onsite procedures. The offsite procedures are designed for use in the office, while onsite procedures are developed for use in the field. When an onsite inspection is unnecessary or cannot be undertaken for various reasons, available information can be reviewed in the office to make a wetland determination. If available information is insufficient to make a wetland determination or if a precise wetland boundary must be established, an onsite inspection should be conducted. Depending on the field information needed or the complexity of the area, one of three basic onsite methods may be employed: (1) routine, (2) intermediate-level, or (3) comprehensive.

**4.2.** The routine method is designed for areas equal to or less than five acres in size or larger areas with homogeneous vegetation. For areas greater than five acres in size or other areas of any size that are highly diverse in vegetation, the intermediate-level method or the comprehensive method should be applied, as necessary. The comprehensive method is applied to situations requiring detailed documentation of vegetation, soils, and hydrology. Assessments of significantly disturbed sites will often require intermediate-level or comprehensive determinations as well as some special procedures. In other cases where natural conditions make wetland identification difficult, special procedures for problem area wetland determinations have been developed. These procedures are subroutines of the three onsite determination methods. In making wetland determinations, one should select the appropriate method for each individual unit within the area of concern and not necessarily employ one method for the entire site. Thus, a combination of determination methods may be used for a given site.

**4.3.** Regardless of the method used, the desired outcome or final product is a wetland/nonwetland determination. Depending on one's expertise, available information, and individual or agency preference, there are two basic approaches to delineating wetland boundaries. The first approach involves characterizing plant communities in the area, identifying hydrophytic plant communities, examining the soils in these areas to confirm the presence of hydric soil, and finally looking for evidence of wetland hydrology. This approach has been widely used by the CE and EPA and to a large extent by the FWS. A second approach involves first delineating the boundary of hydric soils, and then verifying the presence of hydrophytic vegetation and looking for signs of wetland hydrology. This type of approach has been employed by the SCS and to a limited extent by the FWS. Since these approaches yield the same result, this manual incorporates both approaches into most of the methods presented.

**Table 2. Primary sources of information that may be helpful  
in making a wetland determination.**

Data Name	Source
Topographic Maps (mostly 1:24,000; 1:63,350 for Alaska) National Wetlands Inventory Maps (mostly 1:24,000; 1:63,350 for Alaska)	U.S. Geological Survey (USGS) (Call 1-800-USA-MAPS) U.S. Fish and Wildlife Service (FWS) (Call 1-800-USA-MAPS)
County Soil Survey Reports	U.S.D.A. Soil Conservation Service (SCS) District Offices (Unpublished reports--local district offices)
National Hydric Soils List State Hydric Soils List County Hydric Soil Map Unit List National Insurance Agency Flood Maps	SCS National Office SCS State Offices SCS District Offices Federal Emergency Management Agency
Local Wetland Maps	State and local agencies
Land Use and Land Cover Maps	USGS (1-800-USA-MAPS)
Aerial Photographs	Various sources--USGS, U.S.D.A. Agricultural Stabilization and Conservation Service, other Federal and State agencies, and private sources
Satellite Imagery	EOSAT Corporation, SPOT Corporation, and others
<i>National List of Plant Species That Occur in Wetlands</i> (Stock No. 024-010-00682-0)	Government Printing Office Superintendent of Documents Washington, DC 20402
Regional Lists of Plants that Occur in Wetlands	National Technical Information Service 5285 Port Royal Head Springfield, VA 22161 (703) 487-4650
National Wetland Plant Database	FWS
Stream Gauge Data	CE District Offices and USGS
Soil Drainage Guides Environmental Impact Statements and Assessments Published Reports	SCS District Offices Various Federal and State agencies Federal and States agencies, universities, and others
Local Expertise	Universities, consultants, and others
Site-specific Plans and Engineering Designs	Private developers

## Description of Methods

### Offsite Determinations

4.4. When an onsite inspection is not necessary because information on hydrology, hydric soils, and hydrophytic vegetation is known or an inspection is not possible due to time constraints or other reasons, a wetland determination can be made in the office. This approach provides a best approximation of the presence of wetland and its boundaries based on available information. The accuracy of the determination depends on the quality of the information used and on one's ability and experience in an area to interpret these data. Where reliable, site-specific data have been previously collected, the wetland determination should be reasonably accurate. Where these data do not exist, more generalized information may be used to make a preliminary wetland determination. In either case, however, if a more accurate delineation is required, then onsite procedures must be employed.

### Offsite Determination Method

4.5. The following steps are recommended for conducting an offsite wetland determination:

Step 1. *Locate the area of interest on a U.S. Geological Survey topographic map and delineate the approximate subject area boundary on the map.* Note whether marsh or swamp symbols or lakes, ponds, rivers, and other waterbodies are present within the area. If they are, then there is a good likelihood that wetland is present. Proceed to Step 2.

Step 2. *Review appropriate National Wetlands Inventory (NWI) maps, State wetland maps, or local wetland maps, where available.* If these maps designate wetlands in the subject area, there is a high probability that wetlands are present unless there is evidence on hand that the wetlands have been effectively drained, filled, excavated, impounded, or otherwise significantly altered since the effective date of the maps. Proceed to Step 3.

Step 3. *Review SCS soil survey maps where available.* In the area of interest, are there any map units listed on the county list of hydric soil map units or are there any soil map units with significant hydric soil inclusions? If *YES*, then assume that at least a portion of the project area

may be wetland. If this area is also shown as a wetland on NWI or other wetland maps, then there is a high probability that the area is wetland unless it has been recently altered (check recent aerial photos, Step 4). Areas without hydric soils or hydric soil inclusions should in most cases be eliminated from further review, but aerial photos still should be examined for small wetlands to be more certain. This is especially true if wetlands have been designated on the National Wetlands Inventory or other wetland maps. Proceed to Step 4.

Step 4. *Review recent aerial photos of the project area.* Before reviewing aerial photos, evaluate climatological data to determine whether the photo year had normal or abnormal (high or low) precipitation two to three months, for example, prior to the date of the photo. This will help provide a useful perspective or frame-of-reference for doing photo interpretation. In some cases, aerial photos covering a multi-year period (e.g., 5-7 years) should be reviewed, especially where recent climatic conditions have been abnormal.

During photo interpretation, look for one or more signs of wetlands. For example:

- 1) hydrophytic vegetation;
- 2) surface water;
- 3) saturated soils;
- 4) flooded or drowned out crops;
- 5) stressed crops due to wetness;
- 6) greener crops in dry years;
- 7) differences in vegetation patterns due to different planting dates.

If signs of wetland are observed, proceed to Step 5 when site-specific data are available; if site-specific data are not available, proceed to Step 6.

(*CAUTION:* Accurate photo interpretation of certain wetland types requires considerable expertise. Evergreen forested wetlands and temporarily flooded wetlands, in general, may present considerable difficulty. If not proficient in wetland photo interpretation, then one can rely more on the findings of other sources, such as NWI maps and soil surveys, or seek help in photo interpretation.)

Step 5. *Review available site-specific information.* In some cases, information on vegetation, soils, and hydrology for the project area has been collected during previous visits to the area by agency personnel, environmental consultants or others.

Moreover, individuals or experts having firsthand knowledge of the project site should be contacted for information whenever possible. Be sure, however, to know the reliability of these sources. After reviewing this information, proceed to Step 6.

Step 6. *Determine whether wetlands exist in the subject area.* Based on a review of existing information, wetlands can be assumed to exist if:

1) Wetlands are shown on NWI or other wetland maps, and hydric soil or a soil with hydric soil inclusions is shown on the soil survey; or

2) Hydric soil or soil with hydric soil inclusions is shown on the soil survey, and

A) site-specific information confirms hydrophytic vegetation, hydric soils, and/or wetland hydrology, or

B) signs of wetland are detected by reviewing aerial photos; or

3) Any combination of the above or parts thereof (e.g., vegetated wetland on NWI maps and signs of wetland on aerial photos).

If after examining the available reference material one is still unsure whether wetland occurs in the area, then a field inspection should be conducted, whenever possible. Alternatively, more

detailed information on the site characteristics may be sought from the project sponsor, if applicable, to help make the determination.

4.6. Offsite procedures are dependent on the availability of information for making a wetland determination, the quality of this information, and one's ability and experience to interpret these data. In most cases, therefore, the offsite procedure yields a preliminary determination. For more accurate results, one must conduct an onsite inspection.

### Onsite Determinations

4.7. When an onsite inspection is necessary, be sure to review pertinent background information (e.g., NWI maps, soil surveys, and site plans) before going to the subject site. This information will be helpful in determining what type of field method should be employed. Also, read the sections of this manual that discuss disturbed and problem area wetlands before conducting field work (see p. 50-59). Recommended equipment and materials for conducting onsite determinations are listed in Table 3.

Figures 1, 2, and 3 show the conceptual approaches for making onsite wetland determinations. These figures are *NOT* decision matrices for making wetland determinations.

Table 3. Recommended equipment and materials for onsite determinations.

Equipment	Materials
Soil auger, probe, or spade	Data sheets and clipboard
Sighting compass	Field notebook
Pen or pencil	Base (topographic) map
Penknife	Aerial photograph
Hand lens	National Wetlands Inventory map
Vegetation sampling frame*	Soil survey or other soil map
Camera/Film	Appropriate Federal interagency wetland plants list
Binoculars	County hydric soil map unit list
Tape measure	Munsell soil color book
Prism or angle gauge	Plant identification field guides/manuals
Diameter tape*	<i>National List of Scientific Plant Names</i>
Vasculum (for plant collection)	Flagging tape/wire flags/wooden stakes
Calculator*	Plastic bags (for collecting plants and soil samples as needed)
Dissecting kit	

\* Needed for comprehensive determination

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OBL, FACW, AND/OR FAC  
SPECIES COMPRISE >50%  
OF THE DOMINANTS  
OR  
PLANT COMMUNITY HAS  
A PREVALENCE INDEX <3.0

NO

NONWETLAND

YES

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HYDRIC SOIL PRESENT  
(e.g., field indicators  
and/or soil verified as  
on Hydric Soils List)

NO

JURISDICTIONAL  
WETLAND

YES

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INDICATORS OF WETLAND  
HYDROLOGY PRESENT  
(excluding soil gleying  
and mottling)

NO

HYDRIC  
DI

NONWETLAND

JURISDICTIONAL  
WETLAND

YES

Whether hydrology problem and discussions, professional wetland consult

NONWETLAND

JURISDICTIONAL  
WETLAND

Composite of Conceptual Approaches for Making an  
Jurisdictional Wetland Determination.  
NOTION: This is NOT a Decision Matrix for Making  
and Determination.)

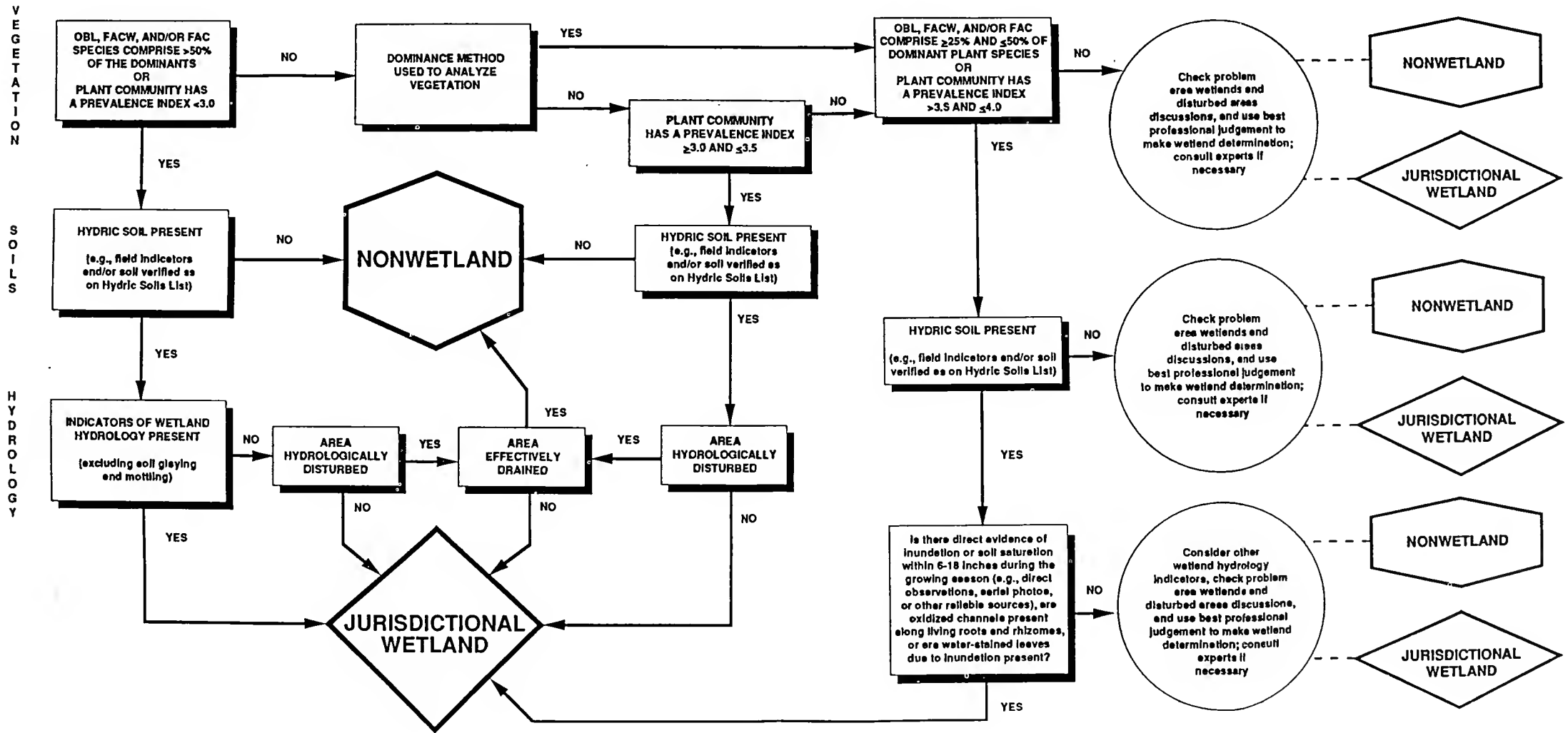
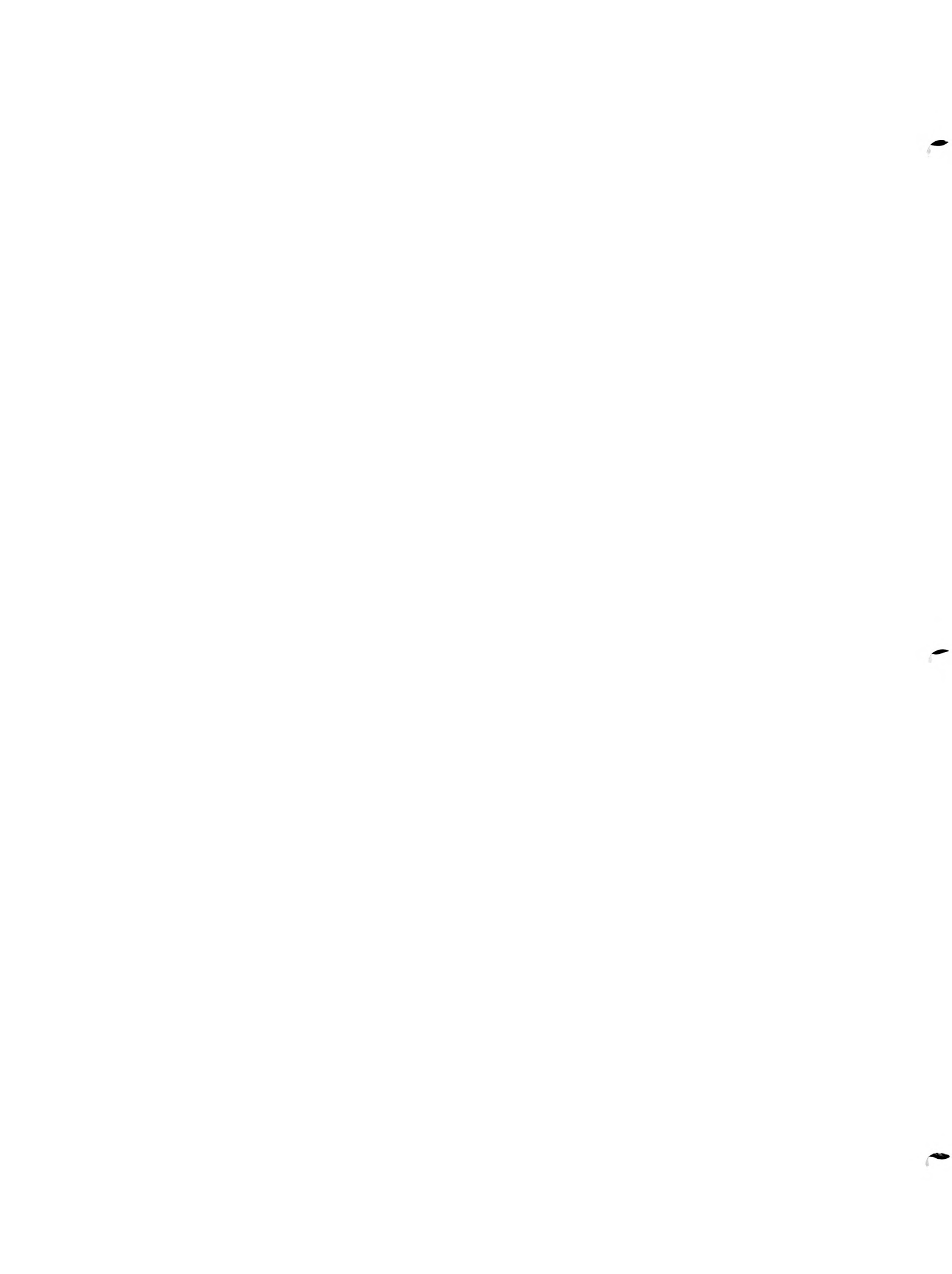
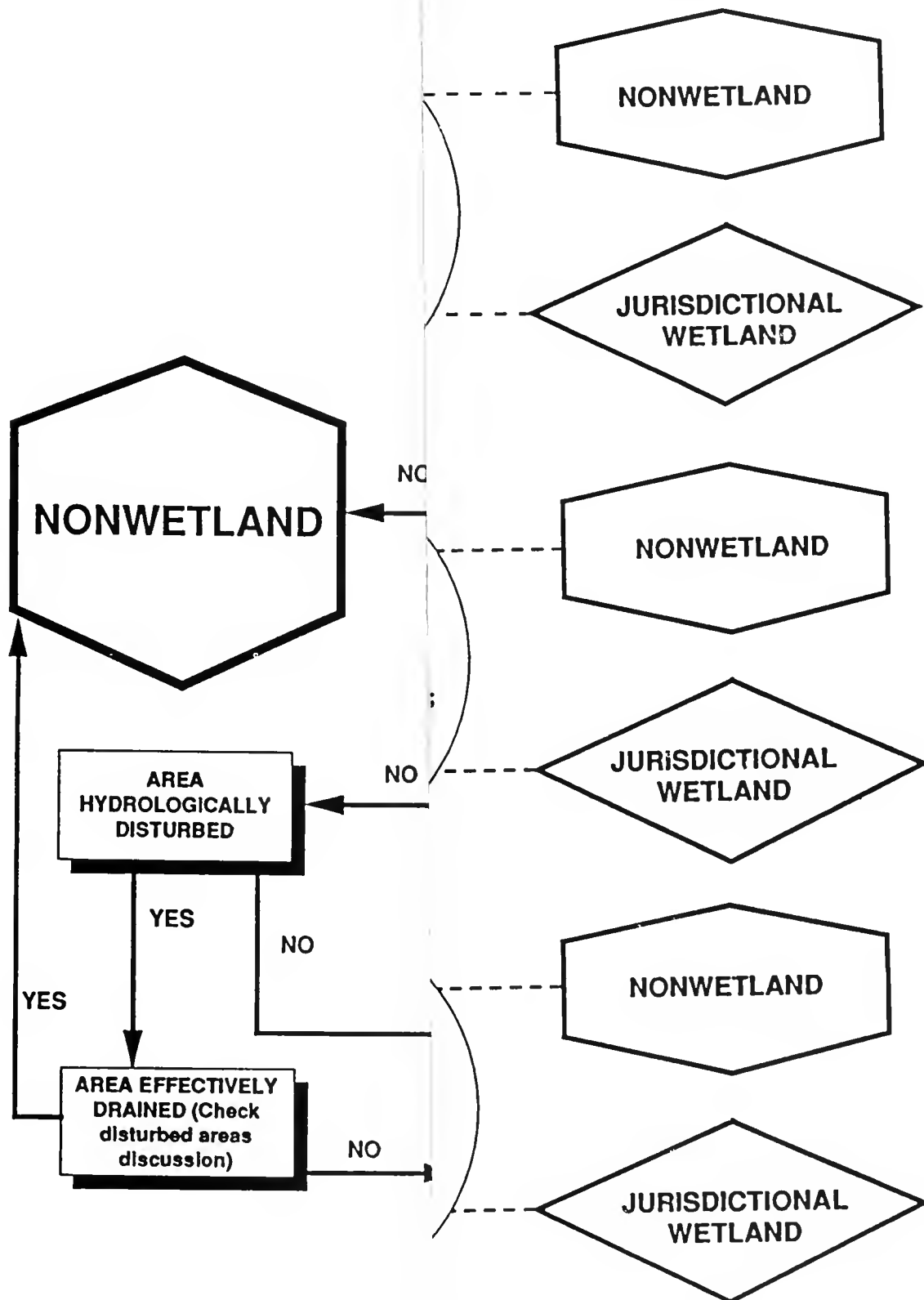


Figure 1. Composite of Conceptual Approaches for Making an Onsite Jurisdictional Wetland Determination. (CAUTION: This is NOT a Decision Matrix for Making a Wetland Determination.)







Conceptual Flow Chart Using Dominance Measures  
 Analyze Vegetation in Making an Onsite  
 Jurisdictional Wetland Determination.  
 CAUTION: This is NOT a Decision Matrix for  
 Using This Approach.)

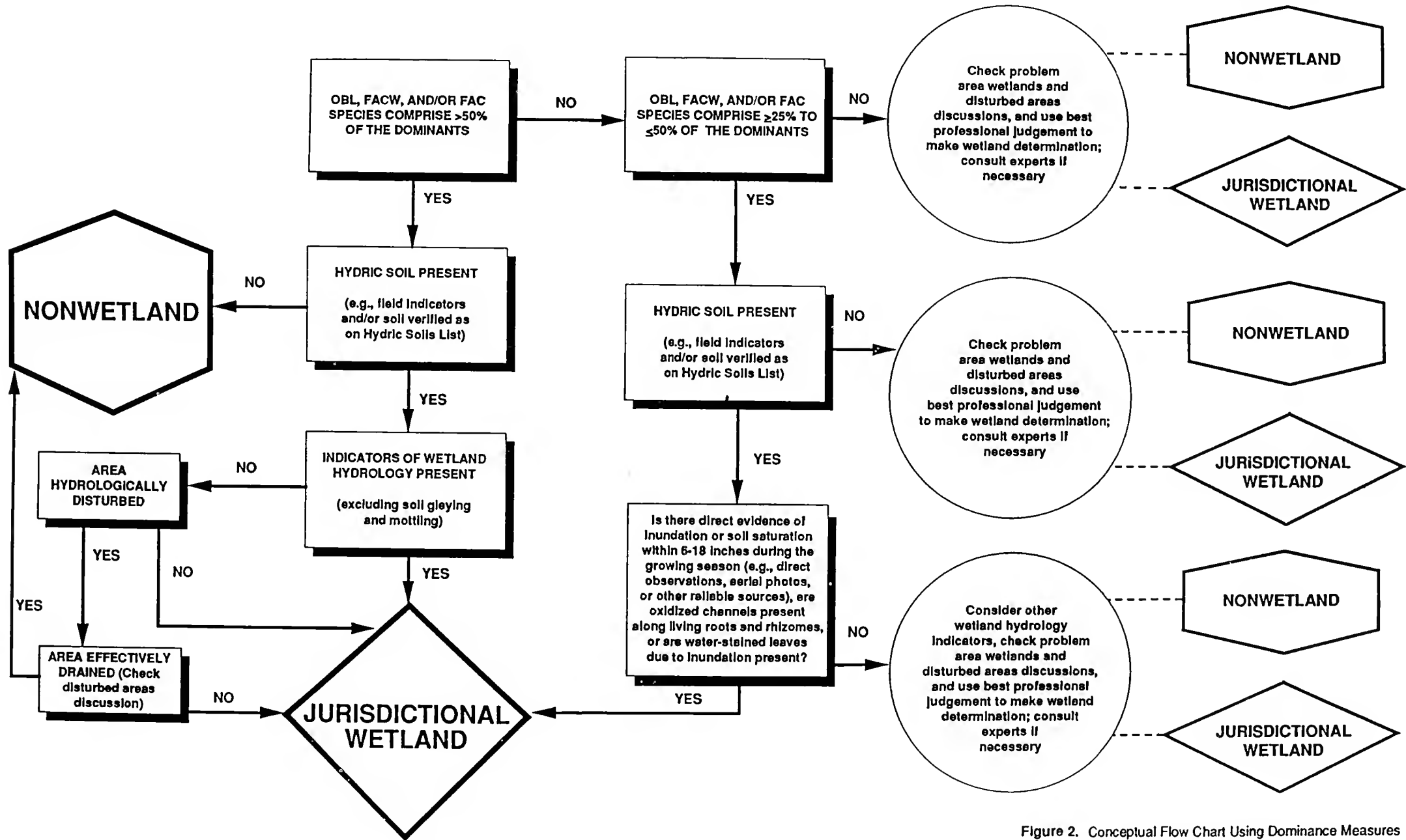
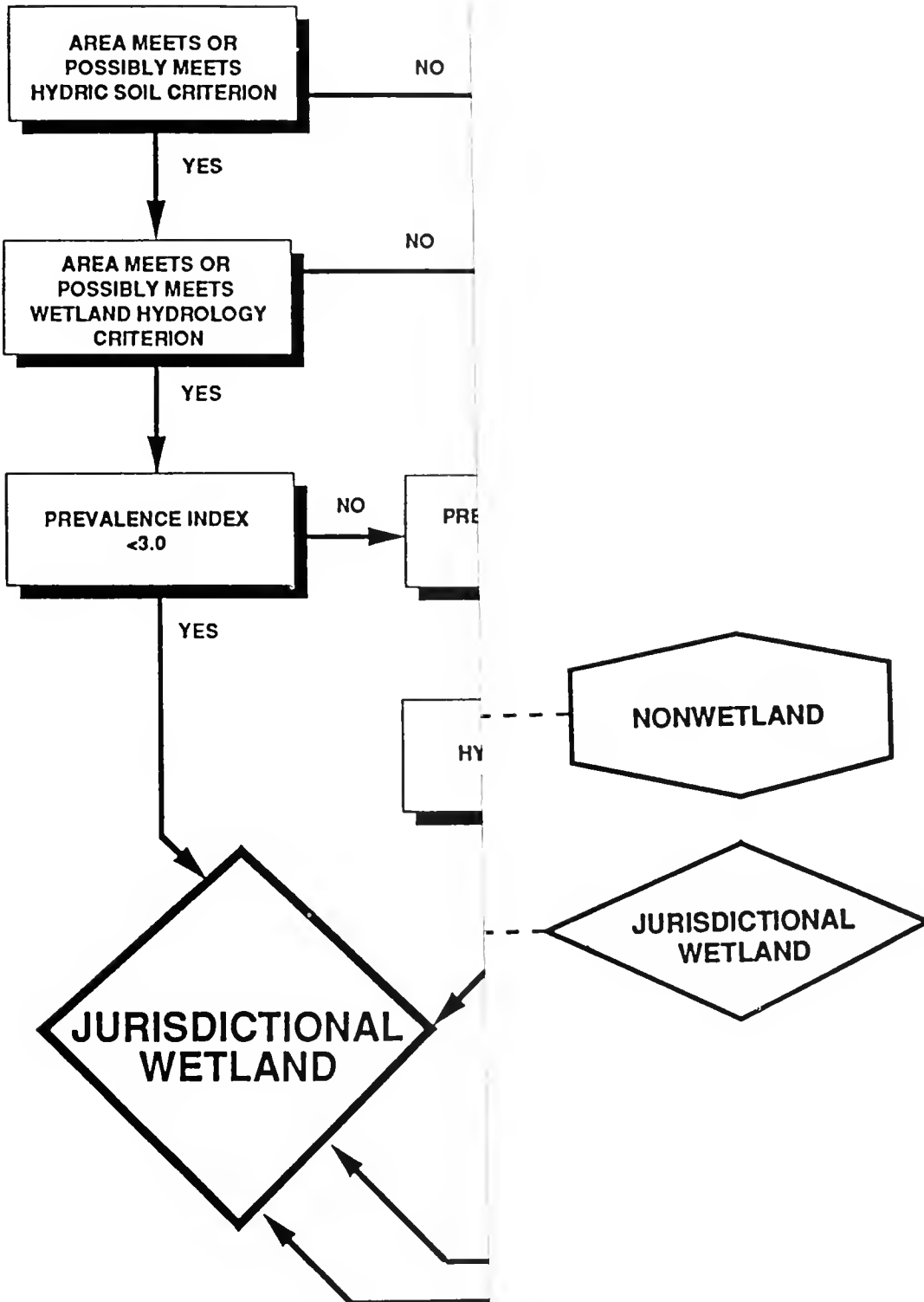
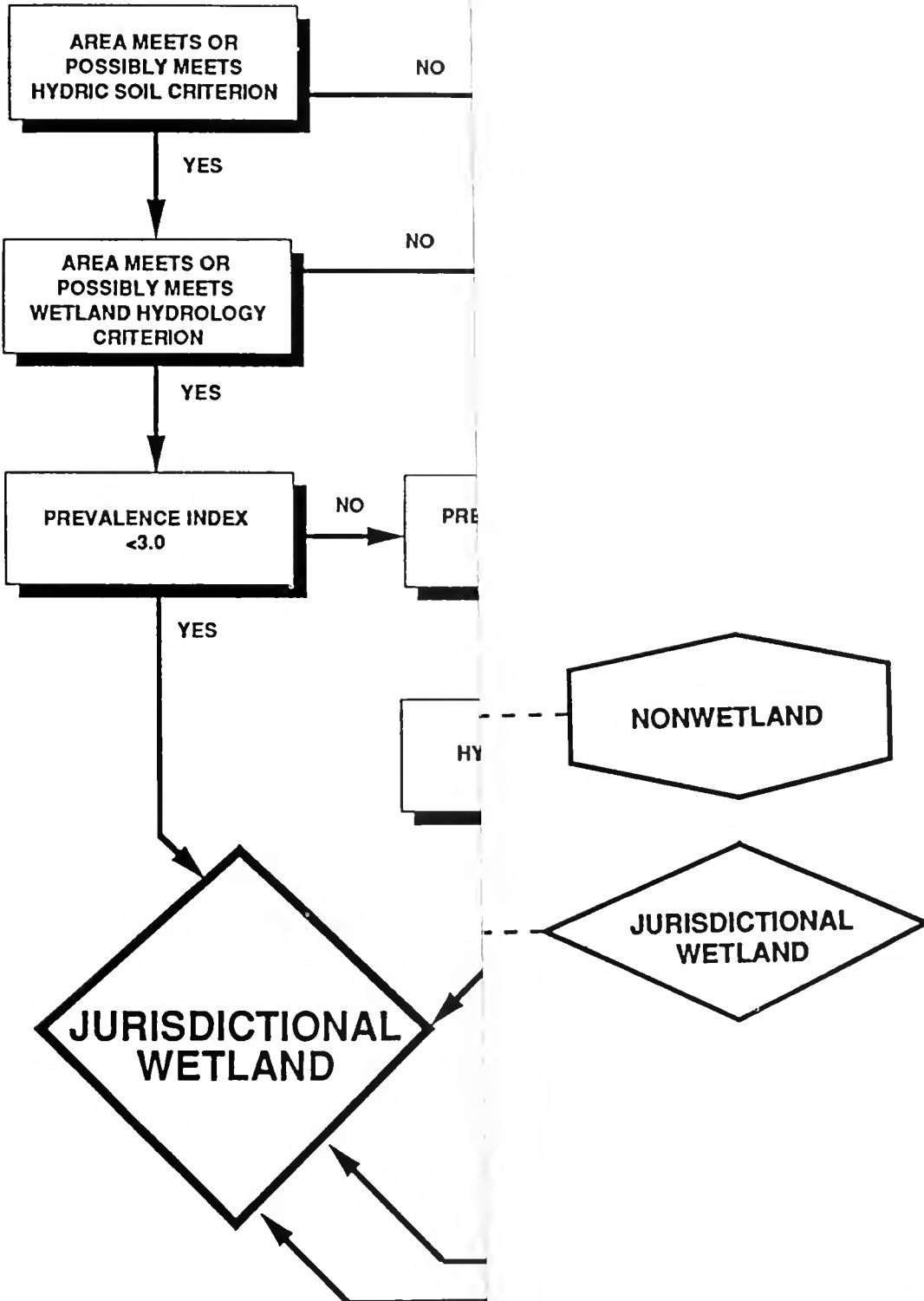


Figure 2. Conceptual Flow Chart Using Dominance Measures to Analyze Vegetation in Making an Onsite Jurisdictional Wetland Determination. (CAUTION: This is NOT a Decision Matrix for Using This Approach.)



Flow Chart Using Frequency Analysis (except Sampling Procedures) of Frequency Analysis in Making an Onsite Jurisdictional Determination. (CAUTION: This is NOT a Decision for Making a Wetland Determination.)





Flow Chart Using Frequency Analysis (Intercept Sampling Procedures) of [unclear] in Making an Onsite Jurisdictional [unclear]. (CAUTION: This is NOT a Decision [unclear] for Making a Wetland Determination.)

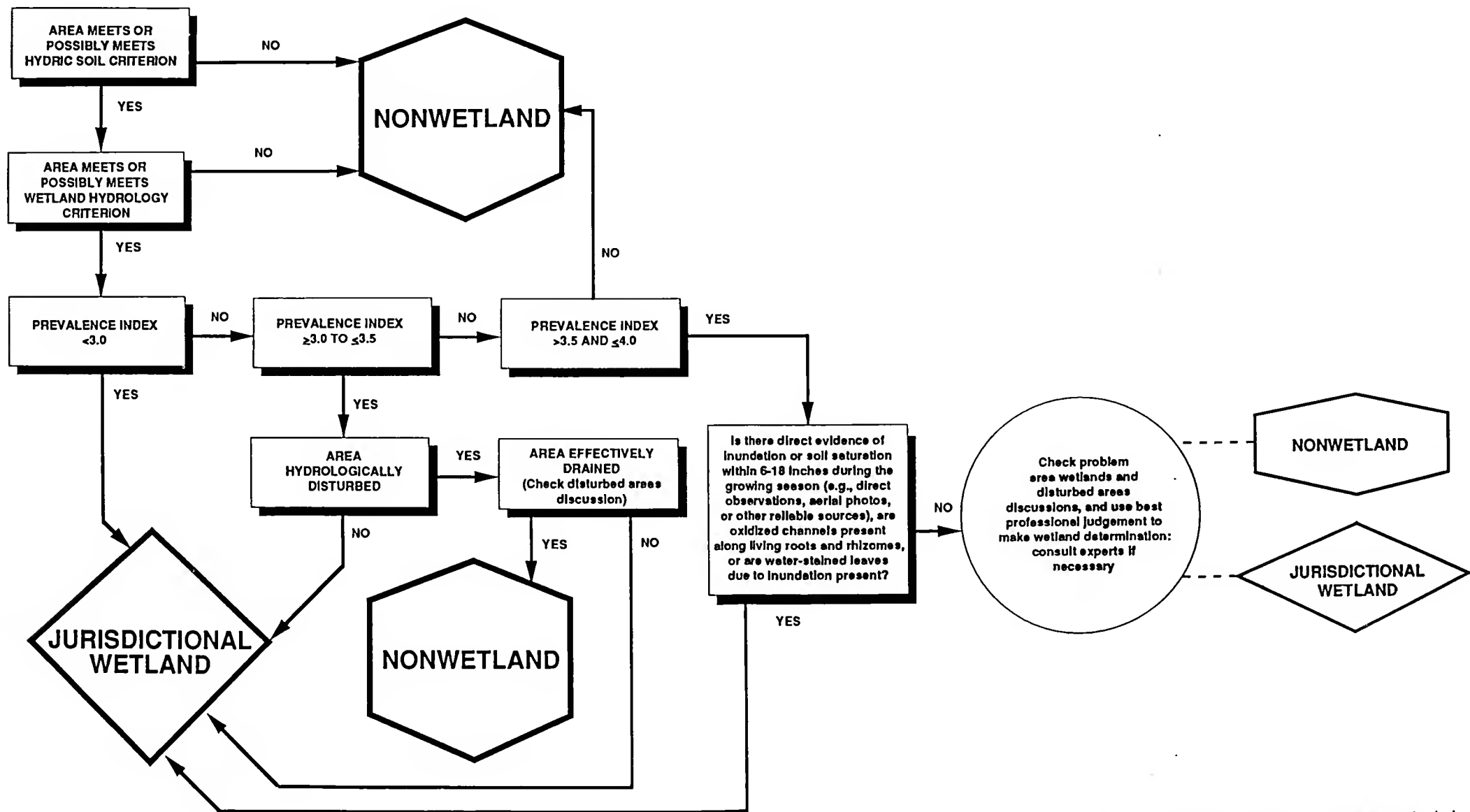


Figure 3. Conceptual Flow Chart Using Frequency Analysis (Point Intercept Sampling Procedures) of Vegetation in Making an Onsite Jurisdictional Determination. (CAUTION: This is NOT a Decision Matrix for Making a Wetland Determination.)

4.8. For every upcoming field inspection, the following pre-inspection steps should be undertaken:

Step 1. *Locate the project area on a map (e.g., U.S. Geological Survey topographic map or SCS soil survey map) or on an aerial photograph and determine the limits of the area of concern.* Proceed to Step 2.

Step 2. *Estimate the size of the subject area.* Proceed to Step 3.

Step 3. *Review existing background information and determine, to the extent possible, the site's geomorphological setting (e.g., floodplain, isolated depression, or ridge and swale complex), its habitat or vegetative complexity (i.e., the range of habitat or vegetation types), and its soils.* (Note: Depending on available information, it may not be possible to determine the habitat complexity without going on the site; if necessary, do a field reconnaissance.) Proceed to Step 4.

Step 4. *Determine whether a disturbed condition exists.* Examine available information and determine whether there is evidence of sufficient natural or human-induced alteration to significantly modify all or a portion of the area's vegetation, soils, and/or hydrology. If such disturbance is noted, identify the limits of affected areas for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). The presence of disturbed areas within the subject area should be considered when selecting an onsite determination method. (Note: It may be possible that at any time during this determination, one or more of the three characteristics may be found to be significantly altered. If this happens, follow the disturbed area wetland determination procedures, as necessary, noted on p. 50.) Proceed to Step 5.

Step 5. *Determine the field determination method to be used.* Considering the size and complexity of the area, determine whether a routine, intermediate-level, or comprehensive field determination method should be used. When the area is equal to or less than five acres in size or is larger and appears to be relatively homogeneous with respect to vegetation, soils, and/or hydrology, use the routine method (see below). When the area is greater than five acres in size, or is smaller but appears to be highly diverse with respect to vegetation, use the intermediate-level method (p. 35).

When detailed quantification of plant communities and more extensive documentation of other factors (soils and hydrology) are required, use the comprehensive method regardless of the wetland's size (p. 39.) Significantly disturbed sites (e.g., sites that have been filled, hydrologically modified, cleared of vegetation, or had their soils altered) will generally require intermediate-level or comprehensive methods. In these disturbed areas, it usually will be necessary to follow a set of subroutines to determine whether the altered characteristic met the applicable criterion prior to its modification; in the case of altered wetland hydrology, it may be necessary to determine whether the area is effectively drained. Because a large area may include a diversity of smaller areas ranging from simple wetlands to vegetatively complex areas, one may use a combination of the onsite determination methods, as appropriate.

### Routine Onsite Determination Method

4.9. For most cases, wetland determinations can be made in the field without rigorous sampling of vegetation and soils. Two approaches for routine determinations are presented: (1) hydric soil assessment procedure, and (2) plant community assessment procedure. In the former approach, areas that meet or may meet the hydric soil criterion are first delineated and then dominant vegetation is visually estimated to determine if hydrophytic vegetation is obvious. If so, the area is designated as wetland. If not, then the site must undergo a more rigorous evaluation following one of the other onsite determination methods presented in the manual. The second routine approach requires initial identification of representative plant community types in the subject area and then characterization of vegetation, soils, and hydrology for each type. After identifying wetland and nonwetland communities, the wetland boundary is delineated. All pertinent observations on the three mandatory wetland criteria should be recorded on an appropriate data sheet.

### 4.10. Hydric Soil Assessment Procedure

Step 1. *Identify the approximate limits of areas that may meet the hydric soil criterion within the area of concern and sketch limits on an aerial photograph.* To help identify these limits use sources of information such as Agricultural Stabili-





4.8. For every upcoming field inspection, the following pre-inspection steps should be undertaken:

Step 1. *Locate the project area on a map (e.g., U.S. Geological Survey topographic map or SCS soil survey map) or on an aerial photograph and determine the limits of the area of concern.* Proceed to Step 2.

Step 2. *Estimate the size of the subject area.* Proceed to Step 3.

Step 3. *Review existing background information and determine, to the extent possible, the site's geomorphological setting (e.g., floodplain, isolated depression, or ridge and swale complex), its habitat or vegetative complexity (i.e., the range of habitat or vegetation types), and its soils. (Note: Depending on available information, it may not be possible to determine the habitat complexity without going on the site; if necessary, do a field reconnaissance.)* Proceed to Step 4.

Step 4. *Determine whether a disturbed condition exists.* Examine available information and determine whether there is evidence of sufficient natural or human-induced alteration to significantly modify all or a portion of the area's vegetation, soils, and/or hydrology. If such disturbance is noted, identify the limits of affected areas for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). The presence of disturbed areas within the subject area should be considered when selecting an onsite determination method. (Note: It may be possible that at any time during this determination, one or more of the three characteristics may be found to be significantly altered. If this happens, follow the disturbed area wetland determination procedures, as necessary, noted on p. 50.) Proceed to Step 5.

Step 5. *Determine the field determination method to be used.* Considering the size and complexity of the area, determine whether a routine, intermediate-level, or comprehensive field determination method should be used. When the area is equal to or less than five acres in size or is larger and appears to be relatively homogeneous with respect to vegetation, soils, and/or hydrology, use the routine method (see below). When the area is greater than five acres in size, or is smaller but appears to be highly diverse with respect to vegetation, use the intermediate-level method (p. 35).

When detailed quantification of plant communities and more extensive documentation of other factors (soils and hydrology) are required, use the comprehensive method regardless of the wetland's size (p. 39.) Significantly disturbed sites (e.g., sites that have been filled, hydrologically modified, cleared of vegetation, or had their soils altered) will generally require intermediate-level or comprehensive methods. In these disturbed areas, it usually will be necessary to follow a set of subroutines to determine whether the altered characteristic met the applicable criterion prior to its modification; in the case of altered wetland hydrology, it may be necessary to determine whether the area is effectively drained. Because a large area may include a diversity of smaller areas ranging from simple wetlands to vegetatively complex areas, one may use a combination of the onsite determination methods, as appropriate.

### Routine Onsite Determination Method

4.9. For most cases, wetland determinations can be made in the field without rigorous sampling of vegetation and soils. Two approaches for routine determinations are presented: (1) hydric soil assessment procedure, and (2) plant community assessment procedure. In the former approach, areas that meet or may meet the hydric soil criterion are first delineated and then dominant vegetation is visually estimated to determine if hydrophytic vegetation is obvious. If so, the area is designated as wetland. If not, then the site must undergo a more rigorous evaluation following one of the other onsite determination methods presented in the manual. The second routine approach requires initial identification of representative plant community types in the subject area and then characterization of vegetation, soils, and hydrology for each type. After identifying wetland and nonwetland communities, the wetland boundary is delineated. All pertinent observations on the three mandatory wetland criteria should be recorded on an appropriate data sheet.

### 4.10. Hydric Soil Assessment Procedure

Step 1. *Identify the approximate limits of areas that may meet the hydric soil criterion within the area of concern and sketch limits on an aerial photograph.* To help identify these limits use sources of information such as Agricultural Stabili-

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zation and Conservation slides, soil surveys, NWI maps, and other maps and photographs. (*Note:* This step is more convenient to perform offsite, but may be done onsite.) Proceed to Step 2.

Step 2. *Scan the areas that may meet the hydric soil criterion and determine if disturbed conditions exist.* Are any significantly disturbed areas present? If *YES*, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas (p. 50), if necessary, to evaluate the altered characteristic(s) (vegetation, soils, or hydrology); then return to this method and continue evaluating characteristics not altered. (*Note:* Prior experience with disturbed sites may allow one to easily evaluate an altered characteristic, such as when vegetation is not present in a farmed wetland due to cultivation.) Keep in mind that if at any time during this determination, one or more of these three characteristics are found to have been significantly altered, the disturbed area determination procedures should be followed. If the area is not significantly disturbed, proceed to Step 3.

Step 3. *Scan the areas that may meet the hydric soil criterion and determine if obvious signs of wetland hydrology are present.* The wetland hydrology criterion is met for any area or portion thereof where it is obvious or known that the area is frequently inundated or saturated to the surface during the growing season. If the above condition exists, the hydric soil criterion is met for the subject area and the area is considered wetland. If necessary, confirm the presence of hydric soil by examining the soil for appropriate field indicators. (*Note:* Hydrophytic vegetation is assumed to be present under these conditions, i.e., undrained hydric soil, so vegetation does not need to be examined. Moreover, hydrophytic vegetation should be obvious in these situations.) Areas lacking obvious indicators of wetland hydrology must be further examined, so proceed to Step 4.

Step 4. *Refine the boundary of areas that meet the hydric soil criterion.* Verify the presence of hydric soil within the appropriate map units by digging a number of holes at least 18 inches deep along the boundary (interface) between hydric soil units and nonhydric soil units. Compare soil samples with descriptions in the soil survey report to see if they are properly mapped and look for hydric

soil characteristics or indicators. In this way, the boundary of areas meeting the hydric soil criterion is further refined by field observations. In map units where only part of the unit is hydric (e.g., complexes, associations, and inclusions), locate hydric soil areas on the ground by considering landscape position and evaluating soil characteristics for hydric soil properties (indicators). (*Note:* Some hydric soils, especially organic soils, have not been given a series name and are referred to by common names, such as peat, muck, swamp, marsh, wet alluvial land, tidal marsh, sulfaquents, and sulfihemists. These areas are also considered hydric soil map units. Certain hydric soils are mapped with nonhydric soils as an association or complex, while other hydric soils occur as inclusions in nonhydric map units. Only the hydric soil portion of these map units should be evaluated for hydrophytic vegetation in Step 7.) If the area meets the hydric soil criterion, proceed to Step 5. (*Note:* These areas are also considered to have met the wetland hydrology criterion.)

Step 5. *Determine whether normal environmental conditions are present.* Determine whether normal environmental conditions are present by considering the following:

1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal or longterm fluctuations in precipitation, surface water, or ground-water levels?

2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuation in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is *YES* or uncertain, proceed to the section on problem area wetland determinations (p. 55). If the answer to both questions is *NO*, normal conditions are assumed to be present, so proceed to Step 6.

Step 6. *Select representative observation area(s).* Identify one or more observation areas that represent the area(s) meeting the hydric soil criterion. A representative observation area is one in which the apparent characteristics (determined visually) best represent characteristics of the entire community. Mark the approximate location of the observation area(s) on the aerial photo. Proceed to Step 7.

Step 7. *Characterize the plant community within the area(s) meeting the hydric soil criterion.* Visually estimate the percent areal cover of dominant species for the entire plant community. (*Note:* Dominant species are the most abundant species in each stratum, see p. 9.) If dominant species are not obvious, use one of the other onsite methods. Proceed to Step 8 or to another method, as appropriate.

Step 8. *Record the indicator status of dominant species within each area meeting the hydric soil criterion.* Indicator status is obtained from the interagency Federal list of plants occurring in wetlands for the appropriate geographic region. Record information on an appropriate data form. Proceed to Step 9.

Step 9. *Determine whether wetland is present or additional analysis is required.* If the estimated percent areal cover of OBL and FACW species exceeds that of FACU and UPL species, the area is considered wetland and the wetland-nonwetland boundary is the line delineated in Step 3. If not, then the point intercept or other sampling procedures should be performed to do a more rigorous analysis of site characteristics.

#### 4.11. Plant Community Assessment Procedure

Step 1. *Scan the entire project area, if possible, or walk, if necessary, and identify plant community types present.* In identifying communities, pay particular attention to changes in elevation throughout the site. (*CAUTION:* In highly variable sites, such as ridge and swale complexes, be sure to stratify properly.) If possible, sketch the approximate location of each plant community on a base map, an aerial photograph of the project area, or a county soil survey map and label each community with an appropriate name. (*Note:* For large homogeneous wetlands, especially marshes dominated by herbaceous plants and shrub bogs dominated by low-growing shrubs, it is usually not necessary to walk the entire project area. In these cases, one can often see for long distances and many have organic mucky soils that can be extremely difficult to walk on. Forested areas, however, will usually require a walk through the entire project area.)

In examining the project area, are any significantly disturbed areas observed? If *YES*, identify their

limits for they should be evaluated separately for wetland determination purpose (usually after evaluating undisturbed areas). Refer to the section on disturbed areas (p. 50) to evaluate the altered characteristic(s) (i.e., vegetation, soils, or hydrology); then return to this method to continue evaluating characteristics not altered. Keep in mind that if at any time during this determination one or more of these three characteristics are found to have been significantly altered, the disturbed area procedures should be followed. If the area is not significantly disturbed, proceed to Step 2.

Step 2. *Determine whether normal environmental conditions are present.* Determine whether normal environmental conditions are present for each plant community by considering the following:

1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal or long-term fluctuations in precipitation, surface water, or ground-water levels?

2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is *YES* or uncertain, proceed to the section on problem area wetland determinations (p. 55). If the answer to both questions is *NO*, normal conditions are assumed to be present, so proceed to Step 3.

Step 3. *Select representative observation area(s).* Select one or more representative observation areas within each community type. A representative observation area is one in which the apparent characteristics (determined visually) best represent characteristics of the entire community. Mark the approximate location of the observation areas on the base map or photo. Proceed to Step 4.

Step 4. *Characterize each plant community in the project area.* Within each plant community identified in Step 1, visually estimate the dominant plant species for each vegetative stratum in the representative observation areas and record them on an appropriate data form. Vegetative strata may include tree, sapling, shrub, herb, woody vine, and bryophyte strata (see glossary for definitions). A separate form must be completed for each plant community identified for wetland determination

purposes. (*Note:* Dominant species are those species in each stratum that, when ranked in decreasing order of abundance and cumulatively totaled, immediately exceed 50 percent of the total dominance measure for that stratum, plus any additional plant species comprising 20 percent or more of the total dominance measure for the stratum.) After identifying dominants within each vegetative stratum, proceed to Step 5.

**Step 5. Record the indicator status of dominant species in all strata.** Indicator status is obtained from the interagency Federal list of plants occurring in wetlands for the appropriate geographic region. Record indicator status for all dominant plant species on a data form. Proceed to Step 6.

**Step 6. Determine whether the hydrophytic vegetation criterion is met.** When more than 50 percent of the dominant species in each community type have an indicator status of OBL, FACW, and/or FAC, the vegetation is hydrophytic. Complete the vegetation section of the data form. Portions of the project area failing this test are usually not wetlands, although under certain circumstances they may have hydrophytic vegetation (follow the problem area wetland determination procedures on p. 55). If hydrophytic vegetation is present, proceed to Step 7.

**Step 7. Determine whether soils must be characterized.** Examine vegetative data collected for each plant community (in Steps 5 and 6) and identify any plant community where: (1) all dominant species have an indicator status of OBL, or (2) all dominant species have an indicator status of OBL and FACW and the wetland boundary is abrupt. For these communities, hydric soils are assumed to be present and do not need to be examined; proceed to Step 9. Plant communities lacking the above characteristics must have soils examined; proceed to Step 8.

**Step 8. Determine whether the hydric soil criterion is met.** Locate the observation area on a county soil survey map, if possible, and determine the soil map unit delineation for the area. Using a soil auger, probe, or spade, make a hole at least 18 inches deep at the representative location in each plant community type. Examine soil characteristics and compare if possible to soil descriptions in the county soil survey report. If soil colors match those described for hydric soil, then record data and proceed to Step 9. If not, then check for hydric

soil indicators below the A-horizon (surface layer) and within 18 inches for organic soils and for mineral soils with low permeability rates (<6.0 inches/hour), within 12 inches for coarse-textured (sandy) mineral soils with high permeability rates ( $\geq 6.0$  inches/hour), and within 6 inches for somewhat poorly drained soils. (*Note:* If the A-horizon extends below the designated depth, look immediately below the A-horizon for signs of hydric soil.) Are hydric soil indicators present (see pp. 13-15)? If so, list indicators present on an appropriate data form and proceed to Step 9. If soil has been plowed or otherwise altered, which may have eliminated these indicators, proceed to the section on disturbed areas (p. 50). If field indicators are not present, but available information verifies that the hydric soil criterion is met, then the soil is hydric. Complete the soils section on the appropriate data sheet. (**CAUTION:** Become familiar with problematic hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplain soils, so that these hydric soils are not misidentified as non-hydric soils; see the problem area wetlands discussion on p. 55.)

**Step 9. Determine whether the wetland hydrology criterion is met.** Examine the area of each plant community type for indicators of wetland hydrology (see pp. 17-19). The wetland hydrology criterion is met when:

- 1) one or more field indicators are present; or
- 2) available hydrologic records provide sufficient evidence; or
- 3) the plant community is dominated by OBL, FACW and/or FAC species or has a prevalence index of less than 3.0, and the area has not been hydrologically disturbed.

If the area is hydrologically disturbed, proceed to the section on disturbed areas (p. 50). Record observations and other evidence on the appropriate data form. Proceed to Step 10.

**Step 10. Make the wetland determination.** Examine data forms for each plant community identified in the project area. Each community meeting the hydrophytic vegetation, hydric soil, and wetland hydrology criteria is considered wetland. If all communities meet these three criteria,

then the entire project area is a wetland. If only a portion of the project area is wetland, then the wetland-nonwetland boundary must be established. Proceed to Step 11.

Step 11. *Determine the wetland-nonwetland boundary.* Where a base map or annotated photo was prepared, mark each plant community type on the map or photo with a "W" if wetland or an "N" if nonwetland. Combine all "W" types into a single mapping unit, if possible, and all "N" types into another mapping unit. On the map or photo, the wetland boundary will be represented by the interface of these mapping units. If flagging the boundary on the ground, the boundary is established by determining the location where hydrophytic vegetation and hydric soils give way to nonhydrophytic vegetation and nonhydric soils. This will often require sampling a few more holes to better define the limits of the hydric soils and thereby establish the limits of hydrophytic vegetation.

#### Intermediate-level Onsite Determination Method

4.12. On occasion, a more rigorous sampling method is required than the routine method to determine whether hydrophytic vegetation is present at a given site, especially where the boundary between wetland and nonwetland is gradual or indistinct. This circumstance requires more intensive sampling of vegetation and soils than presented in the routine determination method. This method also may be used for areas greater than five acres in size or other areas that are highly diverse in vegetation.

4.13. The intermediate-level onsite determination method has been developed to provide for more intensive vegetation sampling than the routine method. Two optional approaches are presented: (1) quadrat transect sampling procedure, and (2) vegetation unit sampling procedure. The former procedure involves establishing transects within the project area and sampling plant communities along the transect within sample quadrats, with soils and hydrology also assessed as needed in each sample plot. In contrast, the vegetation unit sampling procedure offers a different approach for analyzing the vegetation. First, vegetation units are designated in the project area and then a meander survey is conducted in each unit where visual estimates of percent areal coverage by plant species are made. Soil

and hydrology observations also are made as necessary. Boundaries between wetland and nonwetland are established by examining the transitional gradient between them.

4.14. The following steps should be completed:

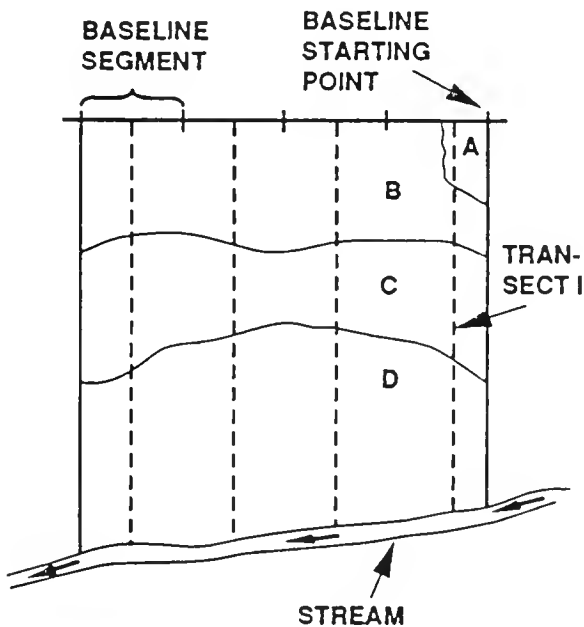
Step 1. *Locate the limits of the project area in the field and conduct a general reconnaissance of the area.* Previously the project boundary should have been determined on aerial photos or maps. Now appropriate ground reference points need to be located to insure that sampling will be conducted in the proper area. In examining the project area, were any significantly disturbed areas observed? If YES, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas (p. 50) to evaluate the altered characteristic(s) (i.e., vegetation, soils, or hydrology); then return to this method to continue evaluating the characteristics not altered. Keep in mind that if at any time during this determination, one or more of these three characteristics is found to have been significantly altered, the disturbed areas procedures should be followed. If the area is not significantly disturbed, proceed with Step 2.

Step 2. *Decide how to analyze plant communities within the project area: (1) by selecting representative plant communities (vegetation units), or (2) by sampling along a transect.* Discrete vegetation units may be identified on aerial photographs, topographic and other maps, and/or by field inspection. These units will be evaluated for hydrophytic vegetation and also for hydric soils and wetland hydrology, as necessary. *If the vegetation unit approach is selected, proceed to Step 3.* An alternative approach is to establish transects for identifying plant communities, sampling vegetation and evaluating other criteria, as appropriate. *If the transect approach is chosen, proceed to Step 4.*

Step 3. *Identifying vegetation units for sampling.* Vegetation units are identified by examining aerial photographs, topographic maps, NWI maps, or other materials or, by direct field inspection. All of the different vegetation units present in the project area should be identified. The subject area should be traversed and different vegetation units specifically located prior to conducting the sampling.

Field inspection may refine previously identified vegetation units, as appropriate. It may be advisable to divide large vegetation units into subunits for independent analysis. (*CAUTION*: In highly variable terrain, such as ridge and swale complexes, be sure to stratify properly.) Decide which plant community to sample first and proceed to Step 7.

**Step 4. Establish a baseline for locating sampling transects.** Select as a baseline one project boundary or a conspicuous feature, such as road, in the project area. The baseline should be more or less parallel to the major watercourse through the area, if present, or perpendicular to the hydrologic gradient (see Figure 4). Determine the approximate baseline length. Proceed to Step 5.



**Figure 4.** General orientation of baseline and transects (dashed lines) in a hypothetical project area. The letters "A", "B", "C" and "D" represent different plant communities. All transects start at the midpoint of a baseline segment except the first, which was repositioned to include community type A.

**Step 5. Determine the required number and position of transects.** Use the following to determine the required number and position of transects (specific site conditions may necessitate changes in intervals):

Divide the baseline length by the number of required transects to establish baseline segments for sampling. Establish one transect in each result-

Baselline length	Number of Transects
Less than one mile	3
One mile to two miles	3-5
Two miles to four miles	5-8
Four miles or longer	8 or more*

\*Transect intervals should not exceed 0.5 mile.

ing baseline segment (see Figure 4). Use the midpoint of each baseline segment as a transect starting point. For example, if the baseline is 1,200 feet in length, three transects would be established: one at 200 feet, one at 600 feet, and one at 1,000 feet from the baseline starting point. *Make sure that all plant community types are included within the transects; this may necessitate relocation of one or more transect lines or establishing more transects.* Each transect should extend perpendicular to the baseline (see Figure 4). Once positions of transect lines are established, go to the beginning of the first transect and proceed to Step 6.

**Step 6. Locate sample plots along the transect.** Along each transect, sample plots are established within each plant community encountered to assess vegetation, soils, and hydrology. When identifying these sample plots, two approaches may be followed: (1) walk the entire length of the transect, taking note of the number, type, and location of plant communities present (flag the location, if necessary), and on the way back to the baseline, identify plots and perform sampling, or (2) identify plant communities as the transect is walked and sample the plot at that time ("sample as you go"). The sample plot should be located so it is representative of the plant community type. When the plant community type is large and covers a significant distance along the transect, select an area that is no closer than 300 feet to a perceptible change in plant community type; mark the center of this area on the base map or photo and flag the location in the field, if necessary. (*CAUTION*: In highly variable terrain, such as ridge and swale complexes, be sure to stratify properly to ensure best results.) At each plant community, proceed to Step 7.

**Step 7. Determine whether normal environmental conditions are present.** Determine whether normal environmental conditions are present by considering the following:

1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal, or long-term fluctuations in precipitation, surface water, or ground-water levels?

2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is *YES* or uncertain, proceed to the section on problem area wetland determinations (p. 55), then return to this method and continue the wetland determination. If the answer to both questions is *NO*, normal conditions are assumed to be present, so proceed to Step 8.

Step 8. *Characterize the vegetation of the vegetation unit or the plant community along the transect.*

*If analyzing vegetation units*, meander through the unit making visual estimates of the percent area covered for each species in the herb, shrub, sapling, woody vine, and tree strata; alternatively, for the tree stratum determine basal area using the Bitterlich method (Dilworth and Bell 1978; Avery and Bürkhart 1983). Then:

1) Within each stratum determine and record the cover class of each species and its corresponding midpoint. The cover classes (and midpoints) are: T = <1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

2) Rank the species within each stratum according to their midpoints. (*Note: If two or more species have the same midpoints and the same or essentially the same recorded percent areal cover, rank them equal; use absolute areal cover values as a tie-breaker only if they are obviously different.*)

3) Sum the midpoint values of all species within each stratum.

4) Multiply the total midpoint values for each stratum by 50 percent. (*Note: This number represents the dominance threshold number and is used to determine dominant species.*)

5) Compile the cumulative total of the ranked species in each stratum until 50 percent of

the sum of the midpoints (i.e., the dominance threshold number), for the herb, woody vine, shrub, sapling, and tree strata (or alternatively basal area for trees) is immediately exceeded. All species contributing areal cover or basal area to the 50 percent threshold are considered dominants, plus any additional species representing 20 percent or more of the total cover class midpoint values for each stratum or the basal area for tree stratum. (*Note: If the threshold is reached by two or more equally ranked species, consider them all dominants, along with any higher ranked species. If all species are equally ranked, consider them all dominants.*)

6) Record all dominant species on an appropriate data sheet and list indicator status of each. Proceed to Step 9.

*If using the transect approach*, sample vegetation in each stratum (e.g., tree, shrub, herb, etc.) occurring in the sample plots using the following quadrat sizes: (1) a 5-foot radius for bryophytes and herbs, and (2) a 30-foot radius for trees, saplings, shrubs, and woody vines. Plot size and shape may be changed as necessary to meet site conditions. Determine dominant species for each stratum by estimating one or more of the following as appropriate: (1) relative basal area (trees); (2) areal cover (trees, saplings, shrubs, herbs, woody vines, and bryophytes); or (3) stem density (shrubs, saplings, herbs, and woody vines). (*Note: Dominant species within each stratum are the most abundant plant species that when ranked in descending order of abundance and cumulatively totaled immediately exceed 50 percent of the total dominance measure for the stratum, plus any additional species comprising 20 percent or more of the total dominance measure.*) Record all dominant species on an appropriate data sheet and list the indicator status of each. Proceed to Step 9.

Step 9. *Determine whether the hydrophytic vegetation criterion is met.* When more than 50 percent of the dominant species in the vegetation unit or sample plot have an indicator status of OBL, FACW, and/or FAC, hydrophytic vegetation is present. If the vegetation fails to be dominated by these types of species, the unit or plot is usually not wetland. However, this vegetation unit or plot may constitute hydrophytic vegetation under certain circumstances (refer to the disturbed areas or problem area wetland determination sections on pp. 50-59). If hydrophytic vegetation is present, proceed



to Step 10 after completing the vegetation section of the data sheet.

Step 10. *Determine whether soils must be characterized.* Examine vegetative data collected for the vegetation unit or plot (in Steps 8 and 9) and identify any units or plots where: (1) all dominant species have an indicator status of OBL, or (2) all dominant species have an indicator status of OBL and FACW, and the wetland boundary is abrupt. For these units or plots, hydric soils are assumed to be present and do not need to be examined; proceed to Step 12. Vegetation units or plots lacking the above characteristics must have soils examined; proceed to Step 11.

Step 11. *Determine whether the hydric soil criterion is met.* Locate the sample plot or vegetation unit on a county soil survey map if possible, and determine the soil map unit delineation for the area. Using a soil auger, probe, or spade, make a hole at least 18 inches deep in the area. (*Note:* In applying the vegetation unit approach, one or more soil samples should be taken.) Examine soil characteristics in the sample plot or vegetative unit and if possible compare them to soil descriptions in the county soil survey report. If soil colors match those described for hydric soil in the report, then record data and proceed to Step 12. If not, then check for hydric soil indicators below the A-horizon (surface layer) and within 18 inches for organic soils and poorly and very poorly drained mineral soils with low permeability rates ( $<6.0$  inches/hour), within 12 inches for poorly and very poorly drained, coarse-textured (sandy) mineral soils with high permeability rates ( $\geq 6.0$  inches/hour), and within 6 inches for somewhat poorly drained soils. (*Note:* If the A-horizon extends below the designated depth, look immediately below the A-horizon for signs of hydric soil.) Are hydric soil indicators present (see pp. 13-15)? If so, list indicators present on data form and proceed to Step 12. If soil has been plowed or otherwise altered which may have eliminated these indicators, proceed to the section on disturbed areas (p. 50), then return to this method to continue the wetland determination. If field indicators are not present, but available information verifies that the hydric soil criterion is met, then the soil is hydric. Complete the soils section on an appropriate data sheet. Proceed to Step 12. (**CAUTION:** Become familiar with problematic hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some flood-

plain soils, so that these hydric soils are not misidentified as nonhydric soils; see the section on problem area wetlands, p.55.)

Step 12. *Determine whether the wetland hydrology criterion is met.* Examine the sample plot or vegetation unit for indicators of wetland hydrology (see pp. 17-19) and review available recorded hydrologic information. The wetland hydrology criteria is met when:

1) one or more field indicators are materially present; or

2) available hydrologic records provide necessary evidence; or

3) the plant community is dominated by OBL, FACW, and/or FAC species, and the area's hydrology is not significantly disturbed.

If the area's hydrology is significantly disturbed, proceed to the section on disturbed areas (p. 50). Record observations and other evidence on an appropriate data form. Proceed to Step 13.

Step 13. *Make the wetland determination for the plant community or vegetation unit.* Examine the data forms for the plant community (sample plot) or vegetation unit. When the community or unit meets the hydrophytic vegetation, hydric soil, and wetland hydrology criteria, the area is considered wetland. Complete the summary data sheet; proceed to Step 14 when continuing to sample the transect or other vegetation units, or to Step 15 when determining a boundary between wetland and nonwetland plant communities or units. (*Note:* Before going on, double check all data sheets to ensure that the forms are completed properly.)

Step 14. *Sample other plant communities along the transect or other vegetation units.* Repeat Steps 6 through 13 for all remaining plant communities along the transect if following transect approach, or repeat Steps 7 through 13 at the next vegetation unit. When sampling is completed for this transect, proceed to Step 15, or when sampling is completed for all vegetation units, proceed to Step 16.

Step 15. *Determine the wetland-nonwetland boundary point along the transect.* When the transect contains both wetland and nonwetland plant communities, then a boundary must be established.

Proceed along the transect from the wetland plot toward the nonwetland plot. Look for the occurrence of UPL species, the appearance of nonhydric soil types, subtle changes in hydrologic indicators, and/or slight changes in topography. When such features are noted, establish a new sample plot and repeat Steps 8 through 13. (*Note:* New data sheets must be completed for this new plot.) If this area is a nonwetland, move halfway back along the transect toward the last documented wetland plot and repeat Steps 8 through 13, varying plot size as appropriate. Continue this procedure until the wetland-nonwetland boundary point is found. It is not necessary to complete new data sheets for all intermediate points, but data sheets should be completed for each plot immediately adjacent to the wetland-nonwetland boundary point (i.e., data sheets for each side of the boundary). Mark the position of the wetland boundary point on the base map or photo and stake or flag the boundary in the field, as necessary. Continue along the transect until the boundary points between all wetland and nonwetland plots have been established. (*CAUTION:* In areas with a high interspersion of wetland and nonwetland plant communities, several boundary determinations will be required.) When all wetland determinations along this transect have been completed, proceed to Step 17.

*Step 16. Determine the wetland-nonwetland boundary between adjacent vegetation units.* Review all completed copies of the data sheets for each vegetation unit. Identify each unit as either wetland (W) or nonwetland (N). When adjacent vegetation units contain both wetland and nonwetland communities, a boundary must be established. Walk the interface between the two units from the wetland unit toward the nonwetland unit and look for changes in vegetation, soils, hydrologic indicators, and/or elevation. As a general rule, at 100-foot intervals or whenever changes in the vegetation unit's characteristics are noted, establish a new observation area and repeat Steps 8 through 13. (*Note:* New data sheets must be completed for this new area.) If this area is nonwetland, move back down the gradient about halfway back toward the wetland unit and make additional observations along the interface until wetland is identified. (*Note:* Soils often are more useful than vegetation in establishing the wetland-nonwetland boundary, particularly if there is no obvious vegetation break or when FAC plant species dominate two adjacent vegetation units.) At each designated boundary point, complete data sheets for areas immediately

upslope and downslope of the wetland-nonwetland boundary (i.e., one set for the wetland unit and one for the nonwetland unit), record the distance and compass directions between the boundary points and their respective pair of soil samples. Mark the position of the wetland boundary point on the base map or photo and stake or flag the boundary in the field, as necessary. Based on observations along the interface, identify a host of boundary points between each wetland unit and nonwetland unit. Repeat this step for all adjacent vegetation units of wetland and nonwetland. When wetland boundary points between all adjacent wetland and nonwetland units have been established, proceed to Step 18.

*Step 17. Sample other transects and make wetland determinations along each.* Repeat Steps 5 through 15 for each remaining transect. When wetland boundary points for all transects have been established, proceed to Step 18.

*Step 18. Determine the wetland-nonwetland boundary for the entire project area.* Examine all completed copies of the data sheets, and mark the location of each plant community type along the transect on the base map or photo, when used. (*Note:* This has already been done for the vegetation unit approach.) Identify each plant community as either wetland (W) or nonwetland (N), if it has not been done previously. If all plant communities are wetlands, then the entire project area is wetland. If all communities are nonwetlands, then the entire project area is nonwetland. If both wetlands and nonwetlands are present, identify the boundary points on the base map and connect these points on the map by generally following contour lines to separate wetlands from nonwetlands. Confirm this boundary by walking the contour lines between the transects or vegetation units, as appropriate. Should anomalies be encountered, it will be necessary to establish short transects in these areas to refine the boundary; make any necessary adjustments to the boundary on the base map and/or on the ground. It also may be worthwhile to flag these boundary points, especially when marking the boundary for subsequent surveying by engineers.

### **Comprehensive Onsite Determination Method**

**4.15.** The comprehensive determination method is the most detailed, complex, and labor-intensive

approach of the three recommended types of onsite determinations. It is usually reserved for highly complicated and/or large project areas, and/or when the determination requires rigorous documentation. Due to the latter situation, this type of onsite determination may be used for areas of any size.

**4.16.** In applying this method, a team of experts, including a wetland ecologist and a qualified soil scientist, is often needed, especially when rigorous documentation of plants and soils are required. It is, possible, however, for a highly trained wetland boundary specialist to singly apply this method.

**4.17.** Two alternative approaches of the comprehensive onsite determination method are presented: (1) quadrat sampling procedure and (2) point intercept sampling procedure. The former approach establishes quadrats or sampling areas in the project site along transects, while the latter approach involves a frequency analysis of vegetation at sampling points along transects. The point intercept sampling procedure requires that the limits of hydric soils be established prior to evaluating the vegetation. In many cases, soil maps are available to meet this requirement, but in other cases a qualified soil scientist may need to inventory the soils before applying this method. The quadrat sampling procedure, which involves identifying plant communities along transects and analyzing vegetation, soils, and hydrology within sample plots (quadrats), may be the preferred approach when soil maps are unavailable or the individual is more familiar with plant identification.

### Quadrat Sampling Procedure

**4.18.** Prior to implementing this determination procedure, read the sections of this manual that discuss disturbed area and problem area wetland determination procedures (pp. 50-59); this information is often relevant to project areas requiring a comprehensive determination.

*Step 1. Locate the limits of the project area in the field.* Previously, the project boundary should have been determined on aerial photos or maps. Now appropriate ground reference points need to be located to ensure that sampling will be conducted in the proper area. Proceed to Step 2.

*Step 2. Stratify the project area into different plant community types.* Delineate the locations of these types on aerial photos or base maps and label each community with an appropriate name. (**CAUTION:** In highly variable terrain, such as ridge and swale complexes, be sure to stratify properly to ensure best results.) In evaluating the subject area, were any significantly disturbed areas observed? If **YES**, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas (p. 50) to evaluate the altered characteristic(s) (i.e., vegetation, soils, and/or hydrology); then return to this method to continue evaluating the characteristics not altered. Keep in mind that if at any time during this determination, it is found that one or more of these three characteristics have been significantly altered, the disturbed areas wetland determination procedures should be followed. If the area is not significantly disturbed, proceed to Step 3.

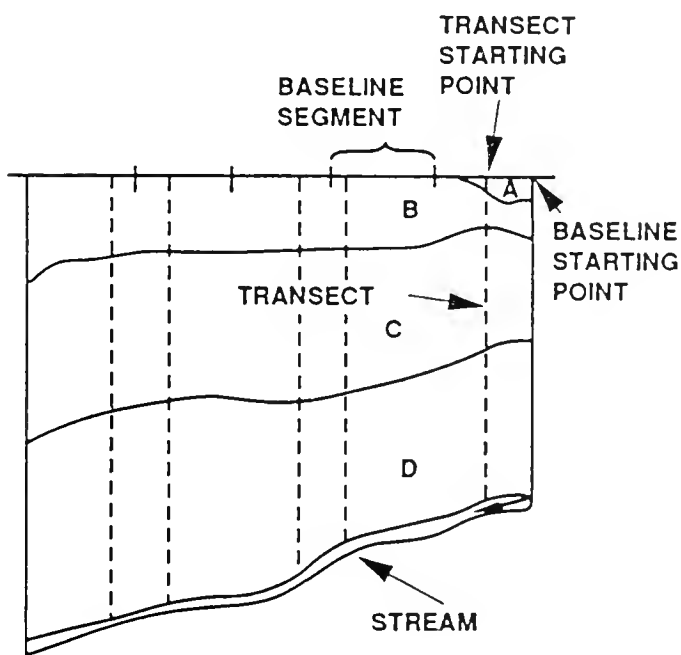
*Step 3. Establish a baseline for locating sampling transects.* Select as a baseline one project boundary or a conspicuous feature, such as a road, in the project area. The baseline ideally should be more or less parallel to the major watercourse through the area, if present, or perpendicular to the hydrologic gradient (see Figure 5). Determine the approximate baseline length and record its origin, length, and compass heading in a field notebook. When a limited number of transects are planned, a baseline may not be necessary provided there are sufficient fixed points (e.g., buildings, walls, and fences) to serve as starting points for the transects. Proceed to Step 4.

*Step 4. Determine the required number and position of transects.* The number of transects necessary to adequately characterize the site will vary due to the area's size and complexity of habitats. In general, it is best to divide the baseline into a number of equal segments and randomly select a point within each segment to begin a transect (see Figure 5).

Use the following as a guide to determine the appropriate number of baseline segments:

Baseline Length (ft)	Number of Segments	Baseline Segment (ft)
<1,000	3	18 - 333
≥1,000 - 5,000	5	200 - 1,000
≥5,000 - 10,000	7	700 - 1,400
>10,000*	variable	2,000

\*If the baseline exceeds five miles, baseline segments should be 0.5 mile in length.



**Figure 5.** General orientation of baseline and transects in a hypothetical project area. The letters "A", "B", "C", and "D" represent different plant communities. Transect positions were determined using a random numbers table.

Use a random numbers table or a calculator with a random numbers generation feature to determine the position of a transect starting point within each baseline segment. For example, when the baseline is 4,000 feet, the number of baseline segments will be five, and each baseline segment length will be 800 feet (4,000/5). Locate the first transect within the first 800 feet of the baseline. If the random numbers table yields 264 as the distance from the baseline starting point, measure 264 feet from the baseline starting point and establish the starting point of the first transect. If the second random number selected is 530, the starting point of the

second transect will be located at a distance of 1,330 feet (800 + 530) from the baseline starting point. Record the location of each transect in a field notebook. When a fixed point such as a stone wall is used as a starting point, be sure to record its position also. *Make sure that each plant community type is included in at least one transect; if not, modify the sampling design accordingly.* When the starting points for all required transects have been located, go to the beginning of the first transect and proceed to Step 5.

**Step 5. Identify sample plots along the transect.** Along each transect, sample plots may be established in two ways: (1) within each plant community encountered (*the plant community transect sampling approach*); or (2) at fixed intervals (*the fixed interval transect sampling approach*); these plots will be used to assess vegetation, soils, and hydrology.

When employing the *plant community transect sampling approach*, two techniques for identifying sample plots may be followed: (1) walk the entire length of the transect, taking note of the number, type, and location of plant communities present (flag the locations, if necessary) and on the way back to the baseline, record the length of the transect, identify sample plots and perform sampling; or (2) identify plant communities as the transect is walked, sample the plot at that time ("sample as you go"), and record the length of the transect.

When conducting the *fixed interval transect sampling approach*, establish sample plots along each transect using the following as a guide:

Transect Length (feet)	Number of Sample Plots	Interval Between the Center of Sample Plots (feet)
<1,000	<10	100
1,000 - <10,000	10	100 - 1,000 (based on length of transect)
≥10,000	>10	1,000

The first sample plot should be established at a distance of 50 feet from the baseline. When obvious nonwetlands occupy a long segment of the transect

from the baseline, begin the first plot in the non-wetland at approximately 300 feet from the point where the nonwetland begins to intergrade into a potential wetland community type. Keep in mind that additional plots will be required to determine the wetland-nonwetland boundary between fixed points. In large areas having a mosaic of plant communities, one transect may contain several wetland boundaries.

If obstacles such as a body of water or impenetrable thicket prevent access through the length of the transect, access from the opposite side of the project area may be necessary to complete the transect; take appropriate compass reading and location data. At each sample plot (i.e., plant community or fixed interval area), proceed to Step 6.

**Step 6. Determine whether normal environmental conditions are present.** Determine whether normal environmental conditions are present by considering the following:

1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal or long-term fluctuations in precipitation, surface water, or ground-water levels?

2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is *YES* or uncertain, proceed to the section on problem area wetland determinations (p. 55). If the answer to both questions is *NO*, normal conditions are assumed to be present. Proceed to Step 7 when following the plant community transect approach. If following the fixed interval approach, go to the appropriate fixed point along the transect and proceed to Step 8.

**Step 7. Locate a sample plot in the plant community type encountered.** Choose a representative location along the transect in this plant community. Select an area that is no closer than 50 feet from the baseline or from any perceptible change in the plant community type. Mark the center of the sample plot on the base map or photo and flag the point in the field. Additional sample plots should be established within the plant community at 300-foot intervals along the transect or sooner if a different plant community is encountered. (*Note:* In large-sized plant communities, a sampling interval

larger than 300 feet may be appropriate, but try to use 300-foot intervals first.) Proceed to Step 8.

**Step 8. Lay out the boundary of the sample plot.** A circular sample plot with a 30-foot radius should be established. (*Note* The size and shape of the plot may be changed to match local conditions.) At the flagged center of the plot, use a compass to divide the circular plot into four equal sampling units at 90°, 180°, 270°, and 360°. Mark the outer points of the plot with flagging. Proceed to Step 9.

**Step 9. Characterize the vegetation and determine dominant species within the sample plot.** Sample the vegetation in each layer or stratum (i.e., tree, sapling, shrub, herb, woody vine, and bryophyte) within the plot using the following procedures for each vegetative stratum and enter data on appropriate data sheet (see Appendix B for examples of data sheet):

1) *Herb stratum*

A) Sample this stratum using corresponding approach:

(1) Plant community transect sampling approach:

(a) Select one of the following designs:

(i) Eight (8) - 8" x 20" sample quadrats (two for each sampling unit within the circular plot); or

(ii) Four (4) - 20" x 20" sample quadrats (one for each sample unit within the plot); or

(iii) Four (4) - 40" x 40" sample quadrats (one for each sample unit).

(*Note:* Alternate shapes of sample quadrats are acceptable provided they are similar in area to those listed above.)

(b) Randomly toss the quadrat frame into the understory of the appropriate sample unit of the plot.

(c) Record percent areal cover of each plant species.

(d) Repeat (b) and (c) as required by the sampling scheme.

(e) Construct a species area curve (see example, Appendix C) for the plot to determine whether the number of quadrats sampled sufficiently represent the vegetation in the stratum; the number of samples necessary corresponds to the point at which the curve levels off horizontally; if necessary, sample additional quadrats within the plot until the curve levels off.

(f) For each plant species sampled, determine the average percent areal cover by summing the percent areal cover for all sample quadrats within the plot and dividing by the total number of quadrats (see example, Appendix C). Proceed to substep B below.

(2) *Fixed interval sampling approach:*

(a) Place one (1) - 40" x 40" sample quadrat centered on the transect point.

(b) Determine percent areal coverage for each species. Proceed to substep B below.

B) Rank plant species by their average percent areal cover, beginning with the most abundant species.

C) Sum the percent cover (fixed interval sampling approach) or average percent cover (plant community transect sampling approach).

D) Determine the dominance threshold number - the number at which 50 percent of the total dominance measure (i.e., total cover) for the stratum is represented by one or more plant species when ranked in descending order of abundance (i.e., from most to least abundant).

E) Sum the cover values for the ranked plant species beginning with the most abundant until the dominance threshold number is immediately exceeded; these species contributing to surpassing the threshold number are considered dominants, *plus* any additional species representing 20 percent or more of the total cover of the stratum; denote dominant species with an asterisk on the appropriate data form.

F) Designate the indicator status of each dominant.

2) *Bryophyte stratum* (mosses, horned liverworts, and true liverworts): Bryophytes may be sampled as a separate stratum in certain wetlands, such as shrub bogs, moss-lichen wetlands, and the wetter wooded swamps, where they are abundant and represent an important component of the plant community. If treated as a separate stratum, follow the same procedures as listed for herb stratum. In many wetlands, however, bryophytes are not abundant and should be included as part of the herb stratum.

3) *Shrub stratum* (woody plants usually between 3 and 20 feet tall, including multi-stemmed, bushy shrubs and small trees below 20 feet):

A) Determine the percent areal cover of shrub species within the entire plot by walking through the plot, listing all shrub species and estimating the percent areal cover of each species.

B) Indicate the appropriate cover class (T and 1 through 7) and its corresponding midpoints (shown in parentheses) for each species: T = <1% cover (None); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

C) Rank shrub species according to their midpoints, from highest to lowest midpoint;

D) Sum the midpoint values of all shrub species.

E) Determine the dominance threshold number - the number at which 50 percent of the total dominance measure (i.e., cover class midpoints) for the stratum is represented by one or more plant species when ranked in descending order of abundance (i.e., from most to least abundant).

F) Sum the midpoint values for the ranked shrub species, beginning with the most abundant, until the dominance threshold number is immediately exceeded; these species are considered dominants, *plus* any additional species representing 20 percent or more of the total midpoint values of the stratum; identify dominant species (e.g., with an asterisk) on the appropriate data form.

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G) Designate the indicator status of each dominant.

4) *Sapling stratum* (young or small trees greater than or equal to 20 feet tall *and* with a diameter at breast height less than 5 inches): Follow the same procedures as listed for the shrub stratum or the tree stratum (i.e., plot sampling technique), whichever is preferred.

5) *Woody vine stratum* (climbing or twining woody plants): Follow the same procedures as listed for the shrub stratum.

6) *Tree stratum* (woody plants greater than or equal to 20 feet tall *and* with a diameter at breast height equal to or greater than 5 inches). Two alternative approaches are offered for characterizing the tree stratum:

A) *Plot sampling technique*

This technique involves establishing a sample unit within the 30-foot radius sample plot and determining the basal area of the trees by individual and by species. Basal area for individual trees can be measured directly by using a basal area tape or indirectly by measuring diameter at breast height (dbh) with a diameter tape and converting diameter to basal area using the formula  $A = \pi d^2/4$  (where  $A$  = basal area,  $\pi = 3.1416$ , and  $d$  = dbh). This technique may be preferred to the plotless technique if only one person is performing a comprehensive determination.

The plot technique involves the following steps:

(1) Locate and mark, if necessary, a sample unit (plot) with a radius of 30 feet, or change the shape of the plot to match topography. (*Note:* A larger sampling unit may be required when trees are large and widely spaced.)

(2) Identify each tree, within the plot, measure its basal area (using a basal area tape) or measure its dbh (using a diameter tape) and compute its basal area, then record data on the data form.

(3) Calculate the total basal area for each tree species by summing the basal area values of all individual trees of each species.

(4) Rank species according to their total basal area, in descending order from largest basal area to lowest.

(5) Calculate the total basal area value of all trees in the plot by summing the total basal area for all species.

(6) Determine the dominant trees species; dominant species are those species (when ranked in descending order and cumulatively totaled) that immediately exceed 50 percent of the total basal area value for the plot, plus any additional species comprising 20 percent or more of the total basal area of the plot; record the dominant species on the appropriate data form.

(7) Designate the indicator status of each dominant (i.e., OBL, FACW, FAC, FACU, or UPL).

B) *Plotless Sampling Technique*

This technique involves determining basal area by using a basal area factor (BAF) prism (e.g., BAF 10 for the East) or an angle gauge to identify individual trees to measure diameter at breast height (dbh) or basal area. This approach is plotless in that trees within and beyond the 30-foot radius plot are recorded depending on their dbh and distance from the sampling point.

(1) Standing near the center of the 30-foot radius plot, hold the prism or angle gauge directly over the center of the plot at a constant distance from the eye and record all trees by species that are "sighted in," while rotating 360° in one direction. (*Note:* Trees with multiple trunks below 4.5 feet should be counted as two or more trees if all trunks are "sighted in." If trunks split above 4.5 feet, count as one tree if "sighted in." Sighting level should approximate 4.5 feet above the ground. With borderline trees, every other tree of a given species should be tallied.)

(2) Measure the dbh of all "sighted in" trees. (*Note:* This should be done as trees are sighted.)

(3) Compute basal area for each tree. (*Note:* When dbh was measured, apply the formula  $A = \pi d^2/4$ , where  $A$  = basal area,  $\pi = 3.1416$ , and  $d$  = dbh. To expedite this calculation, use a hand calculator into which the following conversion factor is

stored - 0.005454 for diameter data in inches or 0.78535 in feet. Basal area in square feet of an individual tree can be obtained by squaring the tree diameter and multiplying by the stored conversion factor.)

(4) Sum the basal areas for individual trees by species, then rank tree species by their total basal area values.

(5) Determine the dominance threshold number by summing the basal areas of all tree species (total basal area for the "plot") and multiplying by 50 percent.

(6) Sum the basal area values for the ranked tree species, beginning with the largest value, until the dominance threshold number is immediately exceeded; all species contributing to surpassing the threshold number are considered dominants, plus any species representing 20 percent or more of the total basal area for the "plot." (Note: If it is felt that a representative sample of the trees has not been obtained from one tally, additional tallies can be obtained by moving perpendicular from the center of the plot to another area.) Denote dominant species with an asterisk on the appropriate data form.

(7) Designate the indicator status of each dominant (i.e., OBL, FACW, FAC, FACU, or UPL).

After determining the dominants for each stratum, proceed to Step 10.

*Step 10. Determine whether the hydrophytic vegetation criterion is met.* When more than 50 percent of the dominant species in the sample plot have an indicator status of OBL, FACW, and/or FAC, hydrophytic vegetation is present. Complete the vegetation section of the summary data sheet. If the vegetation fails to be dominated by these types of species, the plot is usually not a wetland, however, it may constitute hydrophytic vegetation under certain circumstances (see the problem area wetland discussion, p. 55). If hydrophytic vegetation is present, proceed to Step 11.

*Step 11. Determine whether the hydric soil criterion is met.* Locate the sample plot on a county soil survey map, if possible, and determine the soil map unit delineation for the plot. Using a soil auger, probe, or spade, make a soil hole at least 18 inches deep (2-3 feet to best characterize most

soils) in the sample plot. Examine the soil characteristics and compare if possible to soil descriptions in the soil survey report. If soil colors match those described for hydric soil in the report, then record data and proceed to Step 12. If not, then check for hydric soil indicators below the A-horizon (surface layer) and within 18 inches for organic soils and poorly drained and very poorly drained mineral soils with low permeability rates (<6.0 inches/hour), within 12 inches for coarse-textured poorly drained and very poorly drained mineral soils with high permeability rates ( $\geq 6.0$  inches/hour) and within 6 inches for somewhat poorly drained soils. (Note: If the A-horizon extends below the designated depth, look immediately below the A-horizon for signs of hydric soil.) If hydric soil indicators are present (see pp. 13-15), list indicators present on data form and proceed to Step 12. If the soil has been plowed or otherwise altered, which may have eliminated these indicators, proceed to the section on disturbed areas (p. 50). If field indicators are not present, but available information verifies that the hydric soil criterion is met, then the soil is hydric.

Complete the soils section on an appropriate data sheet. (CAUTION: Become familiar with problematic hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplain soils, so that these hydric soils are not misidentified as non-hydric soils; see the section on problem area wetlands, p. 55.)

*Step 12. Determine whether the wetland hydrology criterion is met.* Examine the sample plot for indicators of wetland hydrology (see pp. 17-19) and review available recorded hydrologic information. If one or more indicators of wetland hydrology are materially present in the plot, then the wetland hydrology criterion is met. Available hydrologic data may also verify this criterion. Record observations on the appropriate data form and proceed to Step 13. If no such indicators or evidence exist, then wetland hydrology does not occur at the plot; complete the hydrology section on the data sheet.

*Step 13. Make the wetland determination for the sample plot.* Examine the data forms for the plot. When the plot meets the hydrophytic vegetation, hydric soil, and wetland hydrology criteria, it is considered wetland. Complete the summary data sheet; proceed to Step 14 when continuing to sam-



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ple transects, or to Step 15 when determining a boundary between wetland and nonwetland sample plots. (*Note:* Double check all data sheets to ensure that they are completed properly before going to another plot.)

Step 14. *Take other samples along the transect.* Repeat Steps 5 through 13, as appropriate. When sampling is completed for this transect proceed to Step 15.

Step 15. *Determine the wetland-nonwetland boundary point along the transect.* When the transect contains both wetland and nonwetland plots, then a boundary must be established. Proceed along the transect from the wetland plot toward the nonwetland plot. Look for the occurrence of upland species, the appearance of nonhydric soil types, subtle changes in hydrologic indicators, and/or slight changes in topography. When such features are noted, establish a new sample plot and repeat Steps 8 through 12. (*Note:* New data sheets must be completed for this new sample plot.) If this area is a nonwetland, move halfway back along the transect toward the last documented wetland plot and repeat Steps 8 through 12, varying plot size as appropriate. (*Note:* Soils generally are more useful than vegetation in establishing the wetland-nonwetland boundary, particularly if there is no evident vegetation break or when FAC species dominate two adjacent areas.) Continue this procedure until the wetland-nonwetland boundary point is found. It is not necessary to complete new data sheets for all intermediate points, but data sheets should be completed for each plot immediately adjacent to the wetland-nonwetland boundary point (i.e., one set for each side of the boundary). Mark the position of the wetland boundary point on the base map or photo and place a surveyor flag or stake at the boundary point in the field, as necessary. Continue along the transect until the boundary points between all wetland and nonwetland plots have been established. (*CAUTION:* In areas with a high interspersion of wetland and nonwetland plant communities, several boundary determinations will be required.) When all wetland determinations along this transect have been completed, proceed to Step 16.

Step 16. *Sample other transects and make wetland determinations along each.* Repeat Steps 5 through 15 for each remaining transect. When wetland boundary points for all transects have been established, proceed to Step 17.

Step 17. *Determine the wetland-nonwetland boundary for the entire project area.* Examine all completed copies of the data sheets and mark the location of each plot on the base map or photo. Identify each plot as either wetland (W) or nonwetland (N) on the map or photo. If all plots are wetlands, then the entire project area is wetland. If all plots are nonwetlands, then the entire project area is nonwetland. If both wetland and nonwetland plots are present, identify the boundary points on the base map or on the ground, and connect these points on the map by generally following contour lines to separate wetlands from nonwetlands. Confirm this boundary on the ground by walking the contour lines between the transects. Should anomalies be encountered, it will be necessary to establish short transects in these areas to refine the boundary, apply Step 15, and make any necessary adjustments to the boundary on the base map and/or on the ground. It may be worthwhile to place surveyor flags or stakes at these boundary points, especially when marking the boundary for subsequent surveying by engineers.

#### Point Intercept Sampling Procedure

4.19. The point intercept sampling procedure is a frequency analysis of vegetation used in areas that may meet the hydric soil and wetland hydrology criteria (see Part II, p. 5). It involves first identifying areas that may meet the hydric soil and wetland hydrology criteria within the area of concern and then refining the boundaries of areas that meet the hydric soil criterion. Transects are then established for analyzing vegetation and determining the presence of hydrophytic vegetation by calculating a prevalence index. Sample worksheets and a sample problem using this method are presented in Appendices B and D, respectively.

Step 1. *Identify the approximate limits of areas that may meet the hydric soil criterion within the area of concern and sketch limits on an aerial photograph.* To help identify these limits use sources of information such as Agricultural Stabilization and Conservation Service slides, soil surveys, NWI maps, and other maps and photographs. (*Note:* This step is more convenient to perform offsite, but may be done onsite.) Proceed to Step 2.

Step 2. *Scan the areas that may meet the hydric soil criterion and determine if disturbed conditions exist.* Are any significantly disturbed areas present? If *YES*, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas (p. 50), if necessary, to evaluate the altered characteristic(s) (vegetation, soils, or hydrology), then return to this method and continue evaluating characteristics not altered. (*Note:* Prior experience with disturbed sites may allow one to easily evaluate an altered characteristic, such as when vegetation is not present in a farmed wetland due to cultivation.) Keep in mind that if at any time during this determination one or more of these three characteristics is found to have been significantly altered, the disturbed area wetland determination procedures should be followed. If the area is not significantly disturbed, proceed to Step 3.

Step 3. *Scan the areas that may meet the hydric soil criterion and determine if obvious signs of wetland hydrology are present.* The wetland hydrology criterion is met for any area or portion thereof where, it is obvious or known that the area is frequently inundated or saturated to the surface during the growing season. If the above condition exists, the hydric soil criterion is met for the subject area and the area is considered wetland. If necessary, confirm the presence of hydric soil by examining the soil for appropriate field indicators. (*Note:* Hydrophytic vegetation is assumed to be present under these conditions, i.e., undrained hydric soil, so vegetation does not need to be examined. Moreover, hydrophytic vegetation should be obvious in these situations.) Areas lacking obvious indicators of wetland hydrology must be further examined, so proceed to Step 4.

Step 4. *Refine the boundary of areas that meet the hydric soil criterion.* Verify the presence of hydric soil within the appropriate map units by digging a number of holes at least 18 inches deep along the boundary (interface) between hydric soil units and nonhydric soil units. Compare soil samples with descriptions in the soil survey report to see if they are properly mapped, and look for hydric soil characteristics or indicators. In this way, the boundary of areas meeting the hydric soil criterion is further refined by field observations. In map units where only part of the unit is hydric (e.g., complexes, associations, and inclusions),

locate hydric soil areas on the ground by considering landscape position and evaluating soil characteristics for hydric soil properties (indicators). (*Note:* Some hydric soils, especially organic soils, have not been given a series name and are referred to by common names, such as peat, muck, swamp, marsh, wet alluvial land, tidal marsh, sulfaquents, and sulfihemists. These areas are also considered hydric soil map units. Certain hydric soils are mapped with nonhydric soils as an association or complex, while other hydric soils occur as inclusions in nonhydric soil map units. Only the hydric soil portion of these map units should be evaluated for hydrophytic vegetation.) In areas where hydric soils are not easily located by landscape position and soil characteristics (morphology), a qualified soil scientist should be consulted. (*CAUTION:* Become familiar with problematic hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplains soils, so that these hydric soils are not misidentified as nonhydric soils, see section on problem area wetlands, p. 55.) (*Note:* If the project area does not have a soil map, hydric soil areas must be determined in the field to use the point intercept sampling method. Consider landscape position, such as depressions, drainageways, floodplains and seepage slopes, and look for field indicators of hydric soil, then delineate the hydric soil areas accordingly. If the boundary of the hydric soil area cannot be readily delineated, one should use the quadrat sampling procedure on p. 40.)

After establishing the boundary of the area in question, proceed to Step 5.

Step 5. *Determine whether normal environmental conditions are present.* Determine whether normal environmental conditions are present by considering the following:

1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal, or long-term fluctuations in precipitation, surface water, or ground water levels?

2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is *YES* or uncertain, proceed to the section on problem area wetland determinations (p. 55). If the answer to

both questions is *NO*, normal conditions are assumed to be present. Proceed to Step 6.

Step 6. *Determine random starting points and random directions for three 200-foot line transects in each area that meets or may meet the hydric soil criterion.* (Note: More than three transects may be required depending on the standard error obtained for the three transects.) There are many ways to determine random starting points and random transect direction. The following procedures are suggested:

1) *Starting point* – Superimpose a grid over an aerial photo or map of the study area. Assign numbers (1, 2, 3 ...N) to each vertical and horizontal line on the grid. Starting points for a transect are selected by using a table for generating random numbers or other suitable method. The first selected digit represents a line on the horizontal axis; the second, the vertical axis. The intersection of the two lines establishes a starting point.

2) *Transect direction* – At a starting point, spin a pencil or similar pointed object in the air and let it fall to the ground. The direction that the pencil is pointing indicates the direction of the transect. Proceed to Step 7.

Step 7. *Lay out the transect in the established direction.* If the transect crosses the hydric soil boundary (into the nonhydric soil area), bend the line back into the hydric soil area by randomly selecting a new direction for the transect following the procedure suggested above. Mark the approximate location of the transect on a base map or aerial photo. Proceed to Step 8.

Step 8. *Record plant data (e.g., species name, indicator group, and number of occurrences) at interval points along the transect.* At the starting point and at each point on 2-foot intervals along the transect, record all plants that would intersect an imaginary vertical line extending through the point. If this line has no plants intersecting it (either above or below the sample point), record nothing.

Identify each plant observed to species (or other taxonomic category if species cannot be identified), enter species name on the Prevalence Index Worksheet, and record all occurrences of each species along the transect. For each species listed, identify its indicator group from the appropriate regional list of plant species that occur in wetlands (i.e., OBL,

FACW, FAC, FACU, and UPL; see p. 5). Plant species not recorded on the lists are assumed to be upland species. If no regional indicator status and only one national indicator status is assigned, apply the national indicator status to the species. If no regional indicator status is assigned and more than one national indicator status is assigned, do not use the species to calculate a prevalence index. If the plant species is on the list and no regional or national indicator status is assigned, do not use the species to calculate the prevalence index. *For a transect to be valid for a prevalence calculation, at least 80 percent of the occurrences must be plants that have been identified and placed in an indicator group.* Get help in plant identification if necessary. (Note: Unidentified plants or plants without indicator status are recorded but are not used to calculate the prevalence index.) Proceed to Step 9.

Step 9. *Calculate the total frequency of occurrences for each species (or other taxonomic category), for each indicator group of plants, and for all plant species observed, and enter on the Prevalence Index Worksheet.* The frequency of occurrences of a plant species equals the number of times it occurs at the sampling points along the transect. Proceed to Step 10.

Step 10. *Calculate the prevalence index for the transect using the following formula:*

$$PI_i = \frac{F_O + 2F_{fw} + 3F_f + 4F_{fu} + 5F_u}{F_O + F_{fw} + F_f + F_{fu} + F_u}$$

where

$PI_i$  = Prevalence Index for transect  $i$ ;

$F_O$  = Frequency of occurrence of obligate wetland species;

$F_{fw}$  = Frequency of occurrence of facultative wetland species;

$F_f$  = Frequency of occurrence of facultative species;

$F_{fu}$  = Frequency of occurrence of facultative upland species;

$F_u$  = Frequency of occurrence of upland species.

After calculating and recording the prevalence index for this transect, proceed to Step 11.

Step 11. Repeat Steps 5 through 10 for two other transects. After completing the three transects, proceed to Step 12.

Step 12. Calculate a mean prevalence index for the three transects. To be considered wetland, a hydric soil area usually must have a mean prevalence index ( $PI_M$ ) of less than 3.0. A minimum of three transects are required in each delineated area of hydric soil, but enough transects are required so that the standard error for  $PI_M$  does not exceed 0.20 percent.

Compute the mean prevalence index for the three transects by using the following formula:

$$PI_M = \frac{PI_T}{N}$$

where

$PI_M$  = mean prevalence index for transects;

$PI_T$  = sum of prevalence index values for all transects;

$N$  = total number of transects.

After computing the mean prevalence index for the three transects, proceed to Step 13.

Step 13. Calculate the standard deviation ( $s$ ) for the prevalence index using the following formula:

$$s = \sqrt{\frac{(PI_1 - PI_M)^2 + (PI_2 - PI_M)^2 + (PI_3 - PI_M)^2}{N - 1}}$$

(Note: See formulas in Steps 8 and 10 for symbol definitions.)

After performing this calculation, proceed to Step 14.

Step 14. Calculate the standard error ( $s\bar{x}$ ) of the mean prevalence index using the following formula:

$$s\bar{x} = \frac{s}{\sqrt{N}}$$

where

$s$  = standard deviation for the Prevalence Index

$N$  = total number of transects

(Note: The  $s\bar{x}$  cannot exceed 0.20. If  $s\bar{x}$  exceeds 0.20, one or more additional transects are required. Repeat Steps 6 through 14, as necessary, for each additional transect.) When  $s\bar{x}$  for all transects does not exceed 0.20, proceed to Step 15.

Step 15. Record final mean prevalence index value for each hydric soil map unit and make a wetland determination. All areas having a mean prevalence index of less than 3.0 meet the hydrophytic vegetation criterion (see p. 5). One should also look for evidence or field indicators of wetland hydrology, especially if there is some question as to whether the wetland hydrology criterion is met. If such evidence or indicators are present or the area's hydrology has not been disturbed, then the area is considered a wetland. If the area has been hydrologically disturbed, one must determine whether the area is effectively drained before making a wetland determination (see disturbed area discussion, p. 50). If the area is effectively drained, it is considered nonwetland; if it is not, the wetland hydrology criterion is met and the area is considered a wetland.

Areas where the prevalence index value is greater than or equal to 3.0 (especially greater than 3.5) are usually not wetlands, but can, on occasion, be wetlands. These exceptions are disturbed or problem area wetlands (see discussion on pp. 50-59) and further evaluation of wetland hydrology must be undertaken. When the prevalence index falls between 3.0 and 3.5 (inclusive) in the absence of significant hydrologic modification, the area is presumed to meet the wetland hydrology criterion and is, therefore, wetland; the plant community is considered hydrophytic vegetation since the plants are growing in an undrained hydric soil. If the prevalence index of the plant community is greater than 3.5, stronger evidence of wetland hydrology is required to make a wetland determination. Walk through the area of concern and look for field indicators of wetland hydrology. If field observations, aerial photographs or other reliable sources provide direct evidence of inundation or soil saturation within 6, 12, or 18 inches depending on soil permeability and drainage class for one week or more during the growing season, or if oxidized

channels (rhizospheres) are present around living roots and rhizomes of any plants, or if water-stained leaves caused by inundation are present, then these areas are considered to meet the wetland hydrology criteria and are wetlands. If direct evidence of these field indicators are not present, then one must use best professional judgement to make the wetland determination. In doing so, one should review the problem area wetland discussion (p. 55), consider other hydrologic indicators that may be present (see pp. 17-19), and perhaps even consult with a wetland expert to assist in the determination.

### Disturbed Area and Problem Area Wetland Determination Procedures

4.20. In the course of field investigations, one will undoubtedly encounter significantly disturbed or altered areas, or natural areas where making a wetland determination is not easy. Disturbed areas include situations where field indicators of one or more of the three wetland identification criteria are obliterated or not present due to recent change. In contrast, there are other wetlands that, under natural conditions, are simply difficult to identify, such as wetlands dominated by FACU species, wetlands lacking field indicators for one or more of the technical criteria for wetlands, and wetlands occurring on difficult to identify hydric soils. These wetlands are considered problem area wetlands. The following sections discuss these difficult, confounding situations and present procedures for distinguishing wetlands from nonwetlands.

### Disturbed Areas

4.21. Disturbed areas have been altered either recently or in the past in some way that makes wetland identification more difficult than it would be in the absence of such changes. Disturbed areas include both wetlands and nonwetlands that have been modified to varying degrees by human activities (e.g., filling, excavation, clearing, damming, and building construction) or by natural events (e.g., avalanches, mudslides, fire, volcanic deposition, and beaver dams). Such activities and events change the character of the area often making it difficult to identify field characteristics of one or more of the wetland identification criteria (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology). Disturbed wetlands include areas subjected to deposition of fill or dredged material,

removal or other alteration of vegetation, conversion to agricultural land and silviculture plantations, and construction of levees, channelization and drainage systems, and/or dams (e.g., reservoirs and beaver dams) that significantly modify an area's hydrology. In cases where recent human activities have caused these changes, it may be necessary to determine the date of the alteration or conversion for legal purposes. (*Note: If the activity occurred prior to the effective date of regulation or other jurisdiction, it may not be necessary to make a wetland determination for regulatory purposes.*) In considering the effects of natural events (e.g., a wetland buried by a mudslide), the relative permanence of the change and whether the area is still functioning as a wetland must be considered.

4.22. In disturbed wetlands, field indicators for one or more of the three technical criteria for wetland identification are usually absent. It may be necessary to determine whether the "missing" indicator(s) (especially wetland hydrology) existed prior to alteration. To do this requires review of aerial photographs, existing maps, and other available information about the site, and may involve evaluating a nearby reference site (similar to the original character of the one altered) for indicator(s) of the "altered" characteristic.

4.23. When a significantly disturbed condition is detected during an onsite determination, the following steps should be taken to determine if the "missing" indicator(s) was present before alteration and whether the criterion in question was originally met. Be sure to record findings on the appropriate data form. After completing the necessary steps below, return to the applicable step of the onsite determination method being used and continue evaluating the site's characteristics.

*Step 1. Determine whether vegetation, soils, and/or hydrology have been significantly altered at the site. Proceed to Step 2.*

*Step 2. Determine whether the "altered" characteristic met the wetland criterion in question prior to site alteration. Review existing information for the area (e.g., aerial photos, NWI maps, soil surveys, hydrologic data, and previous site inspection reports) contact knowledgeable persons familiar with the area, and conduct an onsite inspection to build supportive evidence. The strongest evidence involves considering all of the above *plus* evaluating a nearby reference site (an area similar to the*

one altered before modification) for field indicators of the three technical criteria for wetland. If a human activity or natural event altered the vegetation, proceed to Step 3; the soils, proceed to Step 4; the hydrology, proceed to Step 5.

*Step 3. Determine whether hydrophytic vegetation previously occurred:*

1) *Describe the type of alteration.* Examine the area and describe the type of alteration that occurred. Look for evidence of selective harvesting, clearcutting, bulldozing, recent conversion to agriculture, or other activities (e.g., burning, discing, the presence of buildings, dams, levees, roads, and parking lots).

2) *Determine the approximate date when the alteration occurred if necessary.* Check aerial photographs, examine building permits, consult with local individuals, and review other possible sources of information.

3) *Describe the effects on the vegetation.* Generally describe how the recent activities and events have affected the plant communities. Consider the following:

A) Has all or a portion of the area been cleared of vegetation?

B) Has only one layer of the plant community (e.g., trees) been removed?

C) Has selective harvesting resulted in the removal of some species?

D) Has the vegetation been burned, mowed, or heavily grazed?

E) Has the vegetation been covered by fill, dredged material, or structures?

F) Have increased water levels resulted in the death of all or some of the vegetation?

4) *Determine whether the area had hydrophytic vegetation communities.* Develop a list of species that previously occurred at the site from existing information, if possible, and determine presence of hydrophytic vegetation. If site-specific data do not exist, evaluate a neighboring undisturbed area (reference site) with characteristics (i.e., vegetation, soils, hydrology, and topogra-

phy) similar to the area in question prior to its alteration. Be sure to record the location and major characteristics (vegetation, soils, hydrology, and topography) of the reference site. Sample the vegetation in this reference area using an appropriate onsite determination method to determine whether hydrophytic vegetation is present. If hydrophytic vegetation is present at the reference site, then hydrophytic vegetation is presumed to have existed in the altered area. If no indicators of hydrophytic vegetation are found at the reference site, then the original vegetation at the project area is not considered hydrophytic vegetation. If soils and/or hydrology also have been disturbed, then continue Steps 4, 5, and 6 below, as necessary. Otherwise, return to the applicable step of the onsite determination method being used.

*Step 4. Determine whether or not hydric soils previously occurred:*

1) *Describe the type of alteration.* Examine the area and describe the type of alteration that occurred. Look for evidence of:

A) *deposition of dredged or fill material or natural sedimentation* - In many cases the presence of fill material will be obvious. If so, it will be necessary to dig a hole to reach the original soil (sometimes several feet deep). Fill material will usually be a different color or texture than the original soil (except when fill material has been obtained from similar areas onsite). Look for decomposing vegetation between soil layers and the presence of buried organic or hydric mineral soil layers. In accreting or recently formed sandbars in riverine situations, the soils may support hydrophytic vegetation but lack hydric soil indicators.

B) *presence of nonwoody debris at the surface* - This can only be applied in areas where the original soils do not contain rocks. Nonwoody debris includes items such as rocks, bricks, and concrete fragments.

C) *subsurface plowing* - Has the area recently been plowed below the A-horizon or to depths of greater than 10 inches?

D) *removal of surface layers* - Has the surface soil layer been removed by scraping or natural landslides? Look for bare soil surfaces with exposed plant roots or scrape scars on the surface.

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E) *presence of manmade structures* - Are buildings, dams, levees, roads, or parking lots present?

2) *Determine the approximate date when the alteration occurred, if necessary.* Check aerial photographs, examine building permits, consult with local individuals, and review other possible sources of information.

3) *Describe the effects on soils.* Consider the following:

A) Has the soil been buried? If so, record the depth of fill material and determine whether the original soil was left intact or disturbed. (*Note:* The presence of a typical sequence of soil horizons or layers in the buried soil is an indication that the soil is still intact; check description in the soil survey report.)

B) Has the soil been mixed at a depth below the A-horizon or greater than 10 inches? If so, it will be necessary to examine the soil at a depth immediately below the plow layer or disturbed zone.

C) Has the soil been sufficiently altered to change the soil phase? Describe these changes. If a hydric soil has been drained to some extent, refer to Step 5 below to determine whether soil is effectively drained or is still hydric.

4) *Characterize the soils that previously existed at the disturbed site.* Obtain all possible evidence that may be used to characterize soils that previously occurred on the area. Consider the following potential sources of information:

A) *soil surveys* - In many cases, recent soil surveys are available. If so, determine the soils that were mapped for the area. If all soils are hydric soils, it is presumed that the entire area had hydric soils prior to alteration.

B) *buried soils* - When fill material has been placed over the original soil without physically disturbing the soil, examine and characterize the buried soils. Dig a hole through the fill material until the original soil is encountered. Determine the point at which the original soil material begins. Remove 18 inches of the original soil from the hole and look for indicators of hydric soils immediately

below the A-horizon and within 6-18 inches (depending on soil permeability and drainage class). Be sure to record the color of the soil matrix, presence of an organic layer, presence of mottles or gleying, and/or presence of iron and manganese concretions. (*Note:* When the fill material is a thick layer, it might be necessary to use a backhoe or posthole digger to excavate the soil pit.) If USGS topographic maps indicate distinct variation in the area's topography, this procedure must be applied in each portion of the area that originally had a different surface elevation.

C) *plowed soils* - Determine the depth to which the soil has been disturbed by plowing. Look for hydric soil characteristics immediately below this depth.

D) *removed surface layers* - Dig a hole 18 inches deep and determine whether the entire surface layer (A-horizon) has been removed. If so, examine the soil immediately below the top of the subsurface layer (B-horizon) for hydric soil characteristics. As an alternative, examine an undisturbed soil of the same soil series occurring at the same topographic position in an immediately adjacent undisturbed reference area. Look for hydric soil indicators immediately below the A-horizon and within 18 inches of the surface. Record and use these data to determine the presence of hydric soils in substep 5 below.

5) *Determine whether hydric soils were present at the project area prior to alteration.* Examine the available data and determine whether indicators of hydric soils were formerly present. If no indicators and/or evidence of hydric soils are found, the original soils are considered nonhydric soils. If indicators and/or evidence of hydric soils are found the hydric soil criterion has been met. Continue to Step 5 if hydrology also was altered. Otherwise, record decision and return to the applicable step of the onsite determination method being used.

Step 5. *Determine whether wetland hydrology existed prior to alteration or whether wetland hydrology still exists (i.e., is the area effectively drained?).* To determine whether wetland hydrology still occurs, proceed to Step 6. To determine whether wetland hydrology existed prior to the alteration:

1) *Describe the type of alteration.* Examine the area and describe the type of alteration that occurred. Look for evidence of:

A) *dams* - Has recent construction of a dam or some natural event (e.g., beaver activity or landslide) caused the area to become increasingly wetter or drier? (*Note:* This activity could have occurred at a considerable distance from the site in question, so be aware of and consider the impacts of major dams in the watershed above the project area.)

B) *levees, dikes, and similar structures* - Have levees or dikes been recently constructed that prevent the area from periodic overbank flooding?

C) *ditches* - Have ditches been recently constructed causing the area to drain more rapidly?

D) *channelization* - Have feeder streams recently been channelized sufficiently to alter the frequency and/or duration of inundation?

E) *filling of channels and/or depressions (land-leveling)* - Have natural channels or depressions been recently filled?

F) *diversion of water* - Has an upstream drainage pattern been altered that results in water being diverted from the area?

G) *groundwater withdrawal* - Has prolonged and intensive pumping of groundwater for irrigation or other purposes significantly lowered the water table and/or altered drainage patterns?

2) *Determine the approximate date when the alteration occurred, if necessary.* Check aerial photographs, consult with local individuals, and review other possible sources of information.

3) *Describe the effects of the alteration on the area's hydrology.* Consider the following and generally describe how the observed alteration affected the project area:

A) Is the area more frequently or less frequently inundated than prior to alteration? To what degree and why?

B) Is the duration of inundation and soil saturation different than prior to alteration? How much different and why?

4) *Characterize the hydrology that previously existed at the area.* Obtain and record all possible evidence that may be useful for characterizing the previous hydrology. Consider the following:

A) *stream or tidal gauge data* - If a stream or tidal gauging station is located near the area, it may be possible to calculate elevations representing the upper limit of wetland hydrology based on duration of inundation. Consult SCS district offices, hydrologists from the local CE district offices or other agencies for assistance. If fill material has not been placed on the area, survey this elevation from the nearest USGS benchmark. If fill material has been placed on the area, compare the calculated elevation with elevations shown on a USGS topographic map or any other survey map that predates site alteration.

B) *field hydrologic indicators onsite or in a neighboring reference area* - Certain field indicators of wetland hydrology may still be present. Look for water marks on trees or other structures, drift lines, and debris deposits (see pp. 17-19 for additional hydrology indicators). If adjacent undisturbed areas are in the same topographic position, have the same soils (check soil survey map), and are similarly influenced by the same sources of inundation, look for wetland hydrology indicators in these areas.

C) *aerial photographs* - Examine aerial photographs and determine whether the area has been inundated or saturated during the growing season. Consider the time of the year that the aerial photographs were taken and use only photographs taken prior to site alteration.

D) *historical records* - Examine historical records for evidence that the area has been periodically inundated. Obtain copies of any such information.

E) *National Flood Insurance Agency flood maps* - Determine the previous frequency of inundation of the area from national floods maps (if available).

F) *local government officials or other knowledgeable individuals* - Contact individuals who might have knowledge that the area was periodically inundated or saturated.



If sufficient data on hydrology that existed prior to site alteration are not available to determine whether wetland hydrology was previously present, then use the other wetland identification criteria (i.e., hydrophytic vegetation and hydric soils) to make a wetland determination.

5) *Determine whether wetland hydrology previously occurred.* Examine available data. If no indicators of wetland hydrology are found, and other evidence of wetland hydrology is lacking, the original hydrology of the area is not considered wetland hydrology. If wetland hydrology indicators and other evidence of wetland hydrology are found, the area meets the wetland hydrology criterion. Record decision and return to the applicable step of the onsite determination method being used.

Step 6. *Determine whether wetland hydrology still exists.* Many wetlands have a single ditch dissecting them, while others may have an extensive network of ditches. A single ditch through a wetland may not be sufficient to effectively drain it; in other words, the wetland hydrology criterion still may be met under these circumstances. Undoubtedly, when ditches are observed, questions as to the extent of drainage arise, especially if the ditches are part of a more elaborate stream channelization or other drainage project. In these cases and other situations where the hydrology of an area has been significantly altered (e.g., dams, levees, groundwater withdrawals, and water diversions), one must determine whether wetland hydrology still exists. If it is present, the area is not effectively drained. To determine whether wetland hydrology still exists:

1) *Describe the type or nature of the alteration.* Look for evidence of:

- A) *dams;*
- B) *levees, dikes, and similar structures;*
- C) *ditches;*
- D) *channelization;*
- E) *filling of channels and/or depressions;*
- F) *diversion of water; and*
- G) *groundwater withdrawal.*

(See Step 5 above for discussion of these factors.)

2) *Determine the approximate date when the alteration occurred, if necessary.* Check aerial photographs, consult with local officials, and review other possible sources of information.

3) *Characterize the hydrology that presently exists at the area.* The following sequence of actions is recommended:

A) *Review existing information* (e.g., stream gauge data, groundwater well data, and recent observations) to learn if data provide evidence that wetland hydrology is still present.

B) *Examine early spring or wet growing season aerial photographs for several recent years and look for signs of inundation and/or soil saturation.* (Note: Large-scale aerial photographs, 1:24,000 and larger, are preferred.) These signs of wetness indicate that the area still meets the wetland hydrology criterion. If these signs are observed, return to the applicable step of the onsite determination method being used. If such signs are not present, then one should conduct an onsite inspection as follows.

C) *Inspect the site on the ground, look for field indicators of wetland hydrology, and assess changes in the plant community, if necessary.* If field indicators of wetland hydrology (excluding hydric soil morphological characteristics) are present, then wetland hydrology exists; return to the applicable step of the onsite determination method being used. If such indicators are lacking, then examine the vegetation following an appropriate onsite determination method. If OBL and FACW plant species (especially in the herb stratum) are dominant or scattered throughout the site and UPL species are absent or not dominant, the area is considered to meet the wetland hydrology criterion and remains wetland. If UPL species predominate one or more strata (i.e., they represent more than 50 percent of the dominants in a given stratum) and no OBL species are present, then the area is considered effectively drained and no longer wetland. If the vegetation differs from the above situations, then the vegetation at this site should be compared if possible with a nearby undisturbed reference area, so proceed to substep 3D; if it is not possible to evaluate a reference site and the area is ditched, channelized or tile-drained, go to substep 3E, or else go to substep 3F.

D) *Locate a nearby undisturbed reference site with vegetation, soils, hydrology, and topography similar to the subject area prior to its alteration, examine the vegetation (following an appropriate onsite delineation method), and compare it with the vegetation at the project site.* If the vegetation is

similar, (i.e., has the same dominants or the subject area has different dominants with the same indicator status as the reference site) then the area is considered to be wetland -- the wetland hydrology criterion is presumed to be satisfied. If the vegetation has changed to where FACU and UPL species or UPL species alone predominate and OBL species are absent, then the area is considered effectively drained and is nonwetland. If the vegetation is different than indicated above, additional work is required -- go to substep 3E if the area is ditched, channelized, or tile-drained, or to substep 3F if the hydrology is modified in other ways.

E) *Determine the "zone of influence" of the ditch (or drainage structure) and the effect on the water table by using existing SCS soil drainage guides.* Obtain the appropriate guide for the project area's soil(s) and collect necessary field measurements (e.g., ditch or other drainage structure dimensions) to use the guide. The zone of influence is the area affected by the ditch. The size of this zone depends on many factors including ditch dimensions, water budget, and soil type. The guide should help identify the extent of the zone as well as the water table within the zone. If the zone of influence has a water table that fails to meet the wetland hydrology criterion, then the zone is effectively drained and is nonwetland, while hydric soil areas outside of the zone remain wetland. If the wetland hydrology criterion is met within the zone, the entire area remains wetland.

F) *Conduct detailed groundwater studies.* Make direct observations of inundation and soil saturation by establishing groundwater wells throughout the site, being sure to place them in a range of elevations so that the data obtained will be representative of the site as a whole. To maximize field effort, it may be best to collect data during the wetter part of the growing season (e.g., early spring in temperate regions). These direct observations, when made during a normal rainfall year, should show whether the wetland hydrology criterion is met. It is advisable, however, to take measurements over a multi-year period. (*Note:* One must be aware of regional weather patterns. For example, observations made during a number of consecutive dry years may lead to erroneous conclusions about wetland hydrology.)

If wetland hydrology still exists, return to the applicable step in the onsite determination method being used and continue delineating the wetland.

## Problem Area Wetlands

4.24. There are certain types of wetlands and/or conditions that may make wetland identification difficult because field indicators of the three wetland identification criteria may be absent, at least at certain times of the year. These wetlands are considered problem area wetlands and not disturbed wetlands, because the difficulty in identification is generally due to normal environmental conditions and not the result of human activities or catastrophic natural events, with the exception of newly created wetlands. Artificial wetlands are also included in this section because their identification presents problems similar to some of the natural problem area wetlands.

4.25. Examples of these problem area wetlands are discussed below. Be sure to learn how to recognize these wetlands.

1) *Wetlands dominated by FACU plant species (or communities with a prevalence index greater than 3.5).* Since wetlands often exist along a natural wetness gradient between permanently flooded substrates and better drained soils, the wetland plant communities sometimes may be dominated by FACU species. Although FACU-dominated plant communities are usually uplands, they sometimes become established in wetlands. In order to determine whether a FACU-dominated plant community constitutes hydrophytic vegetation, the soil and hydrology must be examined. If the area meets the hydric soil and wetland hydrology criteria (see pp. 6-7), then the vegetation is hydrophytic.

In these plant communities, take the following steps to make a wetland determination:

Step 1. *Are 25 percent or more and 50 percent or less of the dominant plants in the plant community OBL, FACW, and/or FAC species, or does the community have a prevalence index greater than 3.5 and less than or equal to 4.0?* If the answer is YES, then proceed to Step 3. If NO, proceed to Step 2.

Step 2. *Is the community located: (1) in a depressional or flat area, (2) along a river, stream or drainageway, or (3) adjacent to a more typical wetland plant community (i.e., where greater than 50 percent of the dominants are OBL, FACW, and/or FAC, or where the prevalence index is less than or equal to 3.5)?* If YES, proceed to Step 3. If NO,

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the plant community is usually nonwetland (proceed to Step 3 if any question). Record the data and return to the applicable step of the onsite determination method being used.

Step 3. *Are hydric soils present?* If *YES*, record the data and proceed to Step 4. If *NO*, then the area is nonwetland and the plant community is not hydrophytic. Record the data and return to the applicable step of the onsite determination method being used. (*CAUTION*: Become familiar with problematic hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplain soils, so that these hydric soils are not misidentified as nonhydric soils; see pp. 58-59.)

Step 4. Answer the following questions:

1) Is there evidence of inundation or soil saturation during the growing season, as indicated by aerial photographs, recorded hydrologic data, previous site inspections, testimony of reliable persons, or direct observations?

2) Are oxidized channels (rhizospheres) present along the living roots and rhizomes of any plants growing in the area?

3) Are water-stained leaves caused by inundation present in the area?

If the answer is *YES* to one or more of these questions, then the area showing these signs is a wetland. Record the data and return to the applicable step of the onsite determination method being used. If the answer *NO* to all questions, proceed to Step 5.

Step 5. *Use one's best professional judgment in determining whether the FACU-dominated community is wetland or nonwetland. Consider the following questions in making this determination:*

1) Are other indicators of wetland hydrology present? (See pp. 17-19.)

2) Are observations being made during the dry time of the year? Would conditions be different enough during the wetter part of growing season to affect the determination?

3) Could this plant community be one of the problem area wetlands listed in the following subsection?

4) Is the dominant vegetation introduced or planted? (*Note*: If *YES*, one may choose to evaluate a nearby reference site having natural vegetation.)

5) Could the plant community reflect succession in a wetland?

6) Are OBL or UPL species present in substantial numbers?

7) If the area is forested, does a nearby reference area (where timber has not been harvested) have a plant community where more than 50 percent of the dominant species from all strata are OBL, FACW, and/or FAC species, or a plant community with a prevalence index of less than 3.0?

8) Is the region experiencing a series of dry years or long-term drought during the natural hydrologic cycle and could vegetation be reflecting this condition? If so, is hydrophytic vegetation present during the wet phase of the cycle?

9) Is the area exposed to wide annual fluctuations in vegetation, i.e., wet season vegetation is hydrophytic, while dry season vegetation is dominated by FACU and UPL species?

10) Is the area designated as wetland on National Wetlands Inventory maps, USGS topographic maps, or other maps?

In making a determination in these situations, it may be advisable to consult a wetland expert. Decide whether the area is wetland or nonwetland, record data, and return to the applicable step of the onsite determination method being used.

2) *Evergreen forested wetlands* - Wetlands dominated by evergreen trees occur in many parts of the country. In some cases, the trees are OBL, FACW, and FAC species, e.g., Atlantic white cedar (*Chamaecyparis thyoides*), black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), slash pine (*Pinus elliotii*), and loblolly pine (*P. taeda*). In other cases, however, the dominant evergreen trees are FACU species, including red spruce

(*Picea rubens*), Engelmann spruce (*P. engelmannii*), white spruce (*P. glauca*), Sitka spruce (*P. sitchensis*), eastern white pine (*Pinus strobus*), pitch pine (*P. rigida*), lodgepole pine (*P. contorta*), longleaf pine (*P. palustris*), ponderosa pine (*P. ponderosa*), red pine (*P. resinosa*), jack pine (*P. banksiana*), eastern hemlock (*Tsuga canadensis*), western hemlock (*T. heterophylla*), Pacific silver fir (*Abies amabilis*), white fir (*A. concolor*), and subalpine fir (*A. lasiocarpa*). In dense stands, these evergreen trees may preclude the establishment of understory vegetation or, in some cases, understory vegetation is also FACU species. Since these plant communities are usually found on nonwetlands, the ones established in wetland areas may be difficult to recognize at first glance. The landscape position of the evergreen forested areas such as depressions, drainageways, bottomlands, flats in sloping terrain, and seepage slopes, should be considered because it often provides good clues to the likelihood of wetland. Soils also should be examined in these situations. For identification, follow procedures for FACU-dominated wetlands described above.

3) *Wetlands on glacial till* - Sloping wetlands occur in glaciated areas where thin soils cover relatively impermeable glacial till or where layers of glacial till have different hydraulic conditions that permit groundwater seepage. Such areas are seldom, if ever, flooded, but downslope groundwater movement keeps the soils saturated for a sufficient portion of the growing season to produce anaerobic and reducing soil conditions. This promotes development of hydric soils and hydrophytic vegetation. Indicators of wetland hydrology may be lacking during the drier portion of the growing season. Hydric soil indicators also may be lacking because certain areas are so rocky that it is difficult to examine soil characteristics within 18 inches.

4) *Highly variable seasonal wetlands* - In many regions (especially in arid and semiarid regions), depressional areas occur that may have indicators of all three wetland criteria during the wetter portion of the growing season, but normally lack indicators of wetland hydrology and/or hydrophytic vegetation during the drier portion of the growing season. In addition, some of these areas lack field indicators of hydric soil. OBL and FACW plant species normally are dominant during the wetter portion of the growing season, while FACU and UPL species (usually annuals) may be dominant during the drier portion of the growing season and

during and for some time after droughts. Examples of highly variable seasonal wetlands are pothole wetlands in the upper Midwest, playa wetlands in the Southwest, and vernal pools along the coast of California. Become familiar with the ecology of these and similar types of wetlands (see Appendix A for readings). Also, be particularly aware of drought conditions that permit invasion of UPL species (even perennials).

5) *Interdunal swale wetlands* - Along the U.S. coastline, seasonally wet swales supporting hydrophytic vegetation are located within sand dune complexes on barrier islands and beaches. Some of these swales are inundated or saturated to the surface for considerable periods during the growing season, while others are wet for only the early part of the season. In some cases, swales may be flooded irregularly by the tides. These wetlands have sandy soils that generally lack field indicators of hydric soil. In addition, indicators of wetland hydrology may be absent during the drier part of the growing season. Consequently, these wetlands may be difficult to identify.

6) *Vegetated river bars and adjacent flats* - Along western streams in arid and semiarid parts of the country, some river bars and flats may be vegetated by FACU species while others may be colonized by wetter species. If these areas are frequently inundated for one or more weeks during the growing season, they are wetlands. The soils often do not reflect the characteristic field indicators of hydric soils, however, and thereby pose delineation problems.

7) *Vegetated flats* - Vegetated flats are characterized by a marked seasonal periodicity in plant growth. They are dominated by annual OBL species, such as wild rice (*Zizania aquatica*), and/or perennial OBL species, such as spatterdock (*Nuphar luteum*), that have nonpersistent vegetative parts (i.e., leaves and stems breakdown rapidly during the winter, providing no evidence of the plant on the wetland surface at the beginning of the next growing season). During winter and early spring, these areas lack vegetative cover and resemble mud flats; therefore, they do not appear to qualify as wetlands. But during the growing season the vegetation becomes increasingly evident, qualifying the area as wetland. In evaluating these areas, which occur both in coastal and interior parts of the country, one must consider the time of year of the field observation and the seasonality of the

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vegetation. Again, one must become familiar with the ecology of these wetland types (see Appendix A for readings).

8) *Caprock limestone wetlands* - These wetlands are found in the Everglades region of southern Florida. The substrate, commonly called "rockland," is composed mainly of Miami oolite or Tamiami limestone with a very thin covering of unconsolidated soil material in places. Plant communities are varied ranging from saw grass (*Cladium jamaicense*; OBL) marshes to slash pine (*Pinus elliottii*; FACW) forested wetlands. However, exotic species with drier indicator statuses are invading many areas and replacing native species. These exotics include Brazilian pepper (*Schinus terebinthifolius*; FAC), cajuput (*Melaleuca quinque-nervis*; FAC), and Australian pines (*Casuarina* spp.; FACU). These wetlands are inundated annually and the water table is at or near the land surface for prolonged periods, as long as nine months in places. Hydric soils may not be present in many places in these wetlands, since substrate (consolidated material) predominates and little or no soil (unconsolidated material) may exist. Despite the lack of hydric soils in places, these areas are wetlands because they meet the wetland hydrology criterion.

9) *Newly created wetlands* - These wetlands include manmade (artificial) wetlands, beaver-created wetlands, and other natural wetlands. Artificial wetlands may be purposely or accidentally created (e.g., road impoundments, undersized culverts, irrigation, and seepage from earth-dammed impoundments) by human activities. Many of these areas will have indicators of wetland hydrology and hydrophytic vegetation. But the area may lack typical field characteristics of hydric soils, since the soils have just recently been inundated and/or saturated. Since all of these wetlands are newly established, field indicators of one or more of the wetland identification criteria may not be present.

10) *Entisols (floodplain and sandy soils)* - Entisols are usually young or recently formed soils that have little or no evidence of pedogenically developed horizons (U.S.D.A. Soil Survey Staff 1975). These soils are typical of floodplains throughout the U.S., but are also found in glacial outwash plains, along tidal waters, and in other areas. They include sandy soils of riverine islands, bars, and banks and finer-textured soils of floodplain terraces. Wet entisols have an aquic or peraquic moisture

regime and are considered hydric soils, unless effectively drained. Some entisols are easily recognized as hydric soils such as the sulfaquents of tidal salt marshes, whereas others pose problems because they do not possess typical hydric soil field indicators. Wet sandy entisols (with loamy fine sand and coarser textures in horizons within 20 inches of the surface) may lack sufficient organic matter and clay to develop hydric soil colors. When these soils have a hue between 10YR and 10Y and distinct or prominent mottles present, a chroma of 3 or less is permitted to identify the soil as hydric (i.e., an aquic moisture regime). Also, hydrologic data showing that NTCHS criteria #3 or #4 (p. 6) are met are sufficient to verify these soils as hydric. Become familiar with wet entisols and their diagnostic field properties (see "Soil Taxonomy", U.S.D.A. Soil Survey Staff 1975 and county soil surveys).

11) *Red parent material soils* - Hydric mineral soils derived from red parent materials (e.g., weathered clays, Triassic sandstones, and Triassic shales) may lack the low chroma colors characteristic of most hydric mineral soils. In these soils, the hue is redder than 10YR because of parent materials that remain red after citrate-dithionite extraction, so the low chroma requirement for hydric soil is waived (U.S.D.A. Soil Conservation Service 1982). Red soils are most common along the Gulf-Atlantic Coastal Plain (Ultisols), but are also found in the Midwest and parts of the Southwest and West (Alfisols), in the tropics, and in glacial areas where older landscapes of red shales and sandstones have been exposed. Become familiar with these hydric soils and learn how to recognize them in the field (see "Soil Taxonomy", U.S.D.A. Soil Survey Staff 1975 and county soil surveys).

12) *Spodosols (evergreen forest soils)* - These soils, usually associated with coniferous forests, are common in northern temperate and boreal regions of the U.S. and are also prevalent along the Gulf-Atlantic Coastal Plain. Spodosols have a gray eluvial E-horizon overlying a diagnostic spodic horizon of accumulated (sometimes weakly cemented) organic matter and aluminum (U.S.D.A. Soil Survey Staff 1975). A process called podzolization is responsible for creating these two soil layers. Organic acids from the leaf litter on the soil surface are moved downward through the soil with rainfall, cleaning the sand grains in the first horizon then coating the sand grains with organic matter and iron oxides in the second layer. Certain vegeta-

tion produce organic acids that speed podzolization including eastern hemlock (*Tsuga canadensis*), spruces (*Picea* spp.), pine (*Pinus* spp.), larches (*Larix* spp.), and oaks (*Quercus* spp.) (Buol, *et al.* 1980). To the untrained observer, the gray leached layer may be mistaken as a field indicator of hydric soil, but if one looks below the spodic horizon the brighter matrix colors often distinguish nonhydric spodosols from hydric ones. The wet spodosols (formerly called "groundwater podzolic soils") usually have thick dark surface horizons, dull gray E-horizons, and low chroma subsoils. Become familiar with these soils and their diagnostic properties (see "Soil Taxonomy", U.S.D.A. Soil Survey Staff 1975 and county soil surveys).

13) *Mollisols (prairie and steppe soils)* - Mollisols are dark colored, base-rich soils. They are common in the central part of the conterminous U.S. from eastern Illinois to Montana and south to Texas. Natural vegetation is mainly tall grass prairies and short grass steppes. These soils typically have deep, dark topsoil layers (mollic epipedons) and low chroma matrix colors to considerable depths. They are rich in organic matter due largely to the vegetation (deep roots) and reworking of the soil and organic matter by earthworms, ants, moles, and rodents. The low chroma colors of mollisols are not necessarily due to prolonged saturation, so be particularly careful in making wetland determinations in these soils. Become familiar with the characteristics of mollisols with aquic moisture regimes, since they are usually hydric, unless effectively drained, and be able to recognize these from nonhydric mollisols (see "Soil Taxonomy", U.S.D.A. Soil Survey Staff 1975 and county soil surveys).

4.26. The steps for making wetland determinations in problem area wetlands, except FACU-dominated wetlands, are presented below. (*Note:* Procedures for FACU-dominated communities are on pp. 55-56.) Application of these steps is appro-

priate only when a decision has been made during an onsite determination that wetland indicators of one or more criteria were lacking. Specific procedures to be used will vary according to the nature of the area, site conditions, and affected criterion. A determination must be based on the best available evidence, including: (1) information obtained from such sources as aerial photos, wetland maps, soil survey maps, and hydrologic records; (2) field data collected during an onsite inspection; and (3) basic knowledge of the ecology of the particular wetland type and associated environmental conditions. (*Note:* The following procedures should only be applied to situations not adequately characterized by the onsite methods in Part IV. Be sure to record necessary information on appropriate data forms.)

Step 1. *Identify each criterion to be reconsidered and determine the reason for further consideration.* Consider how environmental conditions have affected the criterion in question (hydrophytic vegetation, hydric soil, and/or wetland hydrology). If hydrophytic vegetation is the criterion in question and the plant community is FACU-dominated, then follow special procedures presented earlier in this section (see pp. 55-56). Proceed to Step 2.

Step 2. *Document available information on each criterion in question.* Examine the available information and consider personal experience and knowledge of wetland ecology and the range of normal environmental conditions of the area. Contact local experts (e.g., government agency and university scientists) for additional information, if possible. Proceed to Step 3.

Step 3. *Determine whether each wetland criterion in question is met.* If no information can be found that demonstrates that the wetland criterion in question is satisfied, the area is nonwetland. (*EXCEPTION:* Caprock limestone wetlands do not meet the hydric soil criterion where limestone rock is the predominant substrate; this is an exception to the rule.)



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# Glossary



**Adaptation** - The condition of showing fitness for a particular environment, as applied to characteristics of a structure, function, or entire organism; a modification of a species that makes it more fit for reproduction and/or existence under the conditions of its environment.

**Adventitious roots** - Roots found on plant stems in positions where roots normally do not occur.

**Aerenchymous tissue (Aerenchyma)** - A type of plant tissue in which cells are unusually large, resulting in large air spaces in the plant organ; such tissues are often referred to as spongy and usually provide increased buoyancy.

**Aerobic** - A condition in which molecular oxygen is a part of the environment.

**Alfisols** - Soils having significantly more clay in the B-horizon than in the A-horizon and high base status.

**Anaerobic** - A condition in which molecular oxygen is absent (or effectively so) from the environment.

**Annual** - Occurring yearly or, as in annual plants, living for only one year.

**Aqualfs** - Soils with an aquic or peraquic moisture regime and having clay accumulating in the B-horizon; wet Alfisols.

**Aquents** - Soils with an aquic or peraquic moisture regime and lacking distinct soil horizons in the subsoil; wet Entisols.

**Aquepts** - Soils with an aquic moisture regime and showing some soil development in the B-horizon; wet Inceptisols.

**Aquic moisture regime** - A moisture condition associated with a seasonal reducing environment that is virtually free of dissolved oxygen because the soil is saturated by ground water or by water of the capillary fringe, as in soils in Aquic suborders and Aquic subgroups.

**Aquods** - Soils having an accumulation of iron, aluminum, and organic matter in the B-horizon in addition to having an aquic moisture regime; wet Spodosols.

**Areal cover** - A measure of dominance that defines the degree to which above ground portions of plants cover the ground surface; it is possible for the total areal cover for all strata combined in a community or for single stratum to exceed 100 percent because: 1) most plant communities consist of two or more vegetative strata; 2) areal cover is estimated by vegetative layer, and 3) foliage within a single layer may overlap.

**Disturbed condition** - As used herein, this term refers to areas in which indicators of one or more characteristics (vegetation, soil, and/or hydrology) have been sufficiently altered by man's activities or natural events so as to make it more difficult to recognize whether or not the wetland identification criteria are met.

**Artificial wetlands** - Wetlands created by the activities of man, either purposefully or accidentally.

**Basal area** - The cross-sectional area of a tree trunk measured in square inches, square centimeters, etc.; basal area is normally measured at 4.5 feet above ground level and is used as a measure of dominance; the most commonly used tool for measuring basal area is a diameter tape or a D-tape (then convert to basal area).

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Baseline - A line, generally a highway, unimproved road, or some other evident feature, from which sampling transects extend into a site for which a jurisdictional wetland determination is to be made.

Bench mark - A fixed, more or less permanent reference point or object of known elevation; the U.S. Geological Survey (USGS) installs brass caps in bridge abutments or otherwise permanently sets bench marks at convenient locations nationwide; the elevations on these marks are referenced to the National Geodetic Vertical Datum (NGVD), also commonly known as mean sea level (MSL); locations of these bench marks on USGS topographic maps are shown as small triangles; since the marks are sometimes destroyed by construction or vandalism, the existence of any bench mark should be field verified before planning work which relies on a particular reference point; the USGS or local state surveyors office can provide information on the existence, exact location and exact elevation of bench marks.

Biennial - An event that occurs at 2-year intervals.

Bog - A shrub peatland dominated by ericaceous shrubs (Family *Ericaceae*), sedges, and peat moss (*Sphagnum* spp.) and usually having a saturated water regime or a forested peatland dominated by evergreen trees (usually spruces and firs) and/or larch (*Larix laricina*).

Boreal region - The geographical area just below the arctic tundra and usually characterized by evergreen forests.

Bryophytes - A major taxonomic group of nonvascular plants comprised of true liverworts, horned liverworts, and mosses.

Buried soil - Soil covered by an alluvial, loessal, or other deposit (including manmade), usually to a depth greater than the thickness of the solum.

Buttressed - The swollen or enlarged bases of trees developed in response to conditions of prolonged inundation.

Capillary fringe - A zone immediately above the water table in which water is drawn upward from the water table by capillary action.

Chemical reduction - Any process by which one compound or ion acts as an electron donor; in such cases, the valence state of the electron donor is decreased.

Chroma - The relative purity or saturation of a color; intensity of distinctive hue as related to grayness; one of the three variables of color.

Comprehensive wetland determination - A type of wetland determination that is based on the strongest possible evidence, requiring the collection of quantitative data for all three wetland identification criteria.

Concretion - A localized concentration of chemical compounds (e.g., calcium carbonate and iron oxide) in the form of a grain or nodule of varying size, shape, hardness, and color; concretions of significance in hydric soils are usually iron oxides and manganese oxides occurring at or near the soil surface, which have developed under conditions of fluctuating water tables.

Contour - An imaginary line of constant elevation on the ground surface; the corresponding line on a map is called a "contour line".

Cover class - A category into which plant species would fit based upon their percent areal cover; the cover classes used (midpoints in parentheses) are T = <1% cover (0), 1 = 1-5% (3.0), 2 = 6-15% (10.5), 3 = 16-25% (20.5), 4 = 26-50% (38.0), 5 = 51-75% (63.0), 6 = 76-95% (85.5), 7 = 96-100% (98.0).

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Criteria - Technical requirements upon which a judgment or decision may be based.

Deepwater habitat - Any open water area in which the mean water depth exceeds 6.6 feet at mean low water in nontidal and freshwater tidal areas, or is below extreme low water at spring tides in salt and brackish tidal areas, or the maximum depth of emerging vegetation, whichever is greater.

Density - The number of individuals per unit area.

Detritus - Fragments of plant parts found on the soil surface or in water; when fused together by algae or soil particles, this detritus is an indicator that the soil surface was recently inundated.

Diameter at breast height (dbh) - The width of a plant stem (e.g., tree trunk) as measured at 4.5 feet above the ground surface.

Dike - An embankment (usually of earth) constructed to keep water in or out of a given area.

Disturbed area - An area where vegetation, soil, and/or hydrology have been significantly altered, thereby making a wetland determination difficult.

Dominance - As used herein, refers to the spatial extent of a species; commonly the most abundant species in each vegetation stratum that, when ranked in descending order of abundance and cumulatively totaled, immediately exceeds 50 percent of the total dominance measure (e.g., areal cover or basal area) for the stratum, plus any additional species comprising 20 percent or more of the total dominance measure for the stratum.

Dominance measure - The means or method by which dominance is established, including areal coverage and basal area; the total dominance measure is the sum total of the dominance measure values for all species comprising a given stratum.

Dominance threshold number - The number at which 50 percent of the total dominance measure for a given stratum is represented by one or more plant species when ranked in descending order of abundance (i.e., from most to least abundant); when this number is immediately exceeded, the dominant species for the stratum are realized.

Dominant species - For each stratum, dominant species are those that, when ranked in descending rank order and cumulatively totaled, immediately exceed 50 percent of the total dominance measure (i.e., the dominance threshold number), plus any additional species comprising 20 percent or more of the total dominance measure for the stratum.

Drained, effectively - A condition where ground or surface water has been removed by artificial means to the point that an area no longer meets the wetland hydrology criterion.

Drift line - An accumulation of water-carried debris along a contour or at the base of vegetation that provides direct evidence of prior inundation and often indicates the directional flow of flood waters.

Duff - The matted, partly decomposed, organic surface layer of forested soils.

Duration (of inundation or soil saturation) - The length of time that water stands above the soil surface (inundation), or that water fills most soil pores near the soil surface; as used herein, "duration" refers to a period during the growing season.

Entisols - Soils of slight or recent development; common along rivers and floodplains.

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Evergreen (plant) - Retaining its leaves at the end of the growing season and usually remaining green through the winter.

Facultative species - Species that can occur both in wetlands and uplands; there are three subcategories of facultative species: (1) *facultative wetland plants* (FACW) that usually occur in wetlands (estimated probability 67-99%), but occasionally are found in nonwetlands, (2) *facultative plants* (FAC) that are equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%), and (3) *facultative upland plants* (FACU) that usually occur in nonwetlands (estimated probability 67-99%), but occasionally are found in wetlands (estimated probability 1-33%).

Fern allies - A group of nonflowering vascular plants comprised of clubmosses (Family Lycopodiaceae), small clubmosses (Family Selaginellaceae), and quillworts (Family Isoetaceae).

Fibrists - Organic soils (peats) in which plant remains show very little decomposition and retain their original shape; more than two-thirds of the fibers remain after rubbing the materials between the fingers.

Flooded - A condition in which the soil surface is temporarily covered with flowing water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from high tides, or any combination of sources.

Flooding, frequent - Flooding is likely to occur often during usual weather conditions (i.e., more than a 50 percent chance of flooding in any year, or more than 50 times in 100 years).

Flora - A list or manual of all plant species that may occur in an area.

Fluvents - Floodplain soils, characterized by buried horizons and irregularly decreasing amounts of organic matter with depth.

Forbs - Broad-leaved herbs, in contrast to bryophytes, ferns, fern allies, and graminoids.

Frequency (of inundation or soil saturation) - The periodicity of coverage of an area by surface water or saturation of the soil; it is usually expressed as the number of years the soil is inundated or saturated during part of the growing season of the prevalent vegetation (e.g., 50 years per 100 years) or as a 1-, 2-, 5-year, etc., inundation frequency.

Frequency analysis - A method of evaluating vegetation in an area by establishing a transect and counting the occurrences of plant species at various sampling points along the transect.

Frequency of occurrence - The number of times a given plant species occurs at sample points along a transect.

Gleization - A process in saturated or nearly saturated soils which involves the reduction of iron, its segregation into mottles and concretions, or its removal by leaching from the gleyed horizon.

Gleyed - A soil condition resulting from gleization which is manifested by the presence of neutral grey, bluish or greenish colors through the soil matrix or in mottles (spots or streaks) among other colors.

Graminoids - Grasses (Family Gramineae or Poaceae) and grasslike plants such as sedges (Family Cyperaceae) and rushes (Family Juncaceae).

Ground water - That portion of the water below the surface of the ground whose pressure is greater than atmospheric pressure.

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Growing season - The portion of the year when soil temperatures are above biologic zero (41° F) as defined by "Soil Taxonomy;" the following growing season months are assumed for each of the soil temperature regimes: (1) thermic (February-October); (2) mesic (March-October); (3) frigid (May-September); (4) cryic (June-August); (5) pergelic (July-August); (6) isohyperthermic (January-December); (7) hyperthermic (February-December), (8) isothermic (January-December) and (9) isomesic (January-December).

Hardpan - A very dense soil layer caused by compaction or cementation of soil particles by organic matter, silica, sesquioxides, or calcium carbonate, for example.

Hemists - Organic soils (mucky peats and peaty mucks) in which plant remains show a fair amount of decomposition; between one-third and two-thirds of the fibers are still visible upon rubbing the material between the fingers.

Herb - Nonwoody (herbaceous) plants including graminoids (grass and grasslike plants), forbs, ferns, fern allies, and nonwoody vines; for the purposes of this manual, seedlings of woody plants that are less than three feet in height are also considered herbs.

Herb stratum - Any vegetative layer of a plant community that is composed predominantly of herbs.

Histic epipedon - A 8- to 16-inch soil layer at or near the surface that is saturated for 30 consecutive days or more during the growing season in most years and contains a minimum of 20 percent organic matter when no clay is present or a minimum of 30 percent of organic matter when 60 percent or more clay is present; generally a thin horizon of peat or muck if the soil has not been plowed.

Histosols - An order in "Soil Taxonomy" (Soil Survey Staff 1975) composed of organic soils (mucks and peats) that have organic soil materials in more than half of the upper 32 inches or that are of any thickness if overlying rock.

Horizon - A distinct layer of soil, more or less parallel with the soil surface, having similar properties such as color, texture, and permeability; the soil profile is subdivided into the following major horizons: A-horizon, characterized by an accumulation of organic material; B-horizon, characterized by relative accumulation of clay, iron, organic matter, or aluminum; and the C-horizon, the undisturbed and unaltered parent material. (*Note:* Some soils have an E-horizon, characterized by leaching of organic and other material.)

Hue - A characteristic of color related to one of the main spectral colors (red, yellow, green, blue, or purple), or various combinations of these principle colors; one of the three variables of color; each color chart in the Munsell Soil Color Charts (Kollmorgen Corporation 1975) represents a specific hue.

Hydric soil - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrology - The science dealing with the properties, distribution, and circulation of water.

Hydrophyte - Any macrophyte that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wetlands and other aquatic habitats.

Hydrophytic vegetation - Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Hypertrophied lenticels - An exaggerated (oversized) pore on the stem of woody plants through which gases are exchanged between the plant and the atmosphere; serving to increase oxygen to plant roots during periods of inundation or soil saturation.



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Indicator - An event, entity, or condition that typically characterizes a prescribed environment or situation; indicators determine or aid in determining whether or not certain stated circumstances exist or criteria are satisfied.

Inundation - A condition in which water temporarily or permanently covers a land surface.

Levee - A natural or manmade feature of the landscape that restricts movement of water into or through an area.

Litter - The undecomposed plant and animal material found above the duff layer on the forest floor.

Long duration (flooding) - A duration class in which inundation for a single event ranges from 7 days to 1 month.

Macrophyte - Any plant species that can be readily observed without the aid of optical magnification, including all vascular plant species and bryophytes (e.g., *Sphagnum* spp.), as well as large algae (e.g. *Chara* spp., and *Fucus* spp.).

Manmade wetland - Any wetland area that has been purposely or accidentally created by some activity of man; also called artificial wetlands.

Map unit - A portion of a map that depicts an area having some common characteristic.

Matrix - The natural soil material composed of both mineral and organic matter; matrix color refers to the predominant color of the soil in a particular horizon.

Microbial - Pertaining to work by microorganisms too small to be seen with the naked eye.

Mineral soil - Any soil consisting primarily of mineral (sand, silt, and clay) material, rather than organic matter.

Mollisols - Grassland soils of steppes and prairies characterized by deep topsoil (mollic epipedon); common in the Great Plains of the West.

Morphological adaptation - A structural feature that aids in fitting a species to its particular environment (e.g., buttressed bases, adventitious roots, and aerenchymous tissue).

Morphological features - Properties related to the external structure of soil (such as color and texture) or of plants.

Moss-lichen wetland - A wetland dominated by mosses (mainly peat mosses) and lichens with little taller vegetation.

Mottles - Spots or blotches of different color or shades of color interspersed within the dominant matrix color in a soil layer; distinct mottles are readily seen and easily distinguished from the color of the matrix; prominent mottles are obvious and mottling is one of the outstanding features of the horizon.

Nonhydric soil - A soil that has developed under predominantly aerobic soil conditions.

Nonpersistent vegetation - Plants that break down readily after the growing season; no evidence of previous year's growth at beginning of next growing season.

Nontidal - Not influenced by tides.

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Nonwetland - Any area that has sufficiently dry conditions that hydrophytic vegetation, hydric soils, and/or wetland hydrology are lacking; it includes upland as well as former wetlands that are effectively drained.

Normal circumstances - Refers to the soil and hydrology conditions that are normally present, without regard to whether the vegetation has been removed.

Obligate wetland species - A plant species that is nearly always found in wetlands; its frequency of occurrence in wetlands is 99% or more.

Offsite determination method - A technique for making a wetland determination in the office.

Onsite determination method - A technique for making a wetland determination in the field.

Organic soil - See Histosols.

Overbank flooding - Any situation in which inundation occurs as a result of the water level of a river or stream rising above bank level.

Oxidation-reduction process - A complex of biochemical reactions in soil that influences the valence state of elements and their ions found in the soil; long periods of soil saturation during the growing season tend to elicit anaerobic conditions that shift the overall process to a reducing condition.

Oxidized rhizospheres - Oxidized channels and soil surrounding living roots and rhizomes of hydrophytic plants.

Parent material - The unconsolidated and more or less weathered mineral or organic matter from which the soil profile is developed.

Pedogenic - Related to soil-building processes occurring within the soil.

Peraquic moisture regime - A soil condition in which reducing conditions always occur due to the presence of ground water at or near the soil surface.

Perennial (plant) - Living for many years.

Periodically - Used herein, to define detectable regular or irregular saturated soil conditions or inundation, resulting from ponding of ground water, precipitation, overland flow, stream flooding, or tidal influences that occur(s) with hours, days, weeks, months, or even years between events.

Permanently flooded - A water regime condition where standing water covers the land surface throughout the year (but may be absent during extreme droughts).

Permeability - The quality of the soil that enables water to move downward through the profile, measured as the number of inches per hour that water moves downward through the saturated soil.

Phase, soil - A subdivision of a series based on features such as slope, surface texture, stoniness, and thickness.

Physiological adaptation - A peculiarity of the basic physical and chemical activities that occur in cells and tissues of a species, which results in it being better fitted to its environment (e.g., ability to absorb nutrients under low oxygen tensions).

Plant community - The plant populations existing in a shared habitat or environment.

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Playa - Periodically flooded wetland basin common in parts of the Southwest.

Pneumatophore - Modified roots rising above ground that may function as a respiratory organ in species subjected to frequent inundation or soil saturation.

Podzolization - The process by which sesquioxides (aluminum and iron) are leached from the A-horizon and precipitated in the B-horizon, often resulting in a leached layer, the E-horizon.

Polymorphic (leaves) - Two or more different types of leaves formed on plants; in wetland plants, polymorphic leaves may develop due to extended flooding.

Ponded - A condition in which free water covers the soil surface, for example, in a closed depression; the water is removed only by percolation, evaporation, or transpiration.

Poorly drained - A condition in which water is removed from the soil so slowly that the soil is saturated periodically during the growing season or remains wet for long periods greater than 7 days.

Pothole - A depressional wetland commonly found in Upper Midwest (North and South Dakota and western Minnesota) and similar wetlands found elsewhere.

Prevalence index - A weighted average measure of the sum of the frequency of occurrences of all species along a single transect or as calculated for a plant community by averaging the prevalence index of all sample transects through the community.

Problem area wetland - A wetland that is difficult to identify because it may lack indicators of wetland hydrology and/or hydric soils, or its dominant plant species are more common in nonwetlands.

Profile - Vertical section of the soil through all its horizons and extending into the parent material.

Quadrat - Sample units or plots that vary in size, shape, number, and arrangements, depending on the nature of the vegetation, site conditions, and purpose of study.

Quantitative - A precise measurement or determination expressed numerically.

Range - The set of conditions throughout which an organism (e.g., plant species) naturally occurs.

Reduction - The process of changing an element from a higher to a lower oxidation state as in the reduction of ferric ( $\text{Fe}^{3+}$ ) iron into ferrous iron ( $\text{Fe}^{2+}$ ).

Relative basal area - An estimate of basal area for trees, such as produced by the Bitterlich sampling technique.

Relief - The change in elevation of a land surface between two points; collectively, the configuration of the earth's surface, including such features as hills and valleys.

Reproductive adaptation - A peculiarity of the reproductive mechanism of a species that results in it being better fitted to its environment (e.g., prolonged seed dormancy).

Rhizosphere - The zone of soil in which interactions between living plant roots and microorganisms occur.

Salic horizon - A layer 6 inches or more thick comprised of secondary soluble salts.

Salorthids - Soils of arid regions with a salic horizon within 30 inches of the surface and saturated within 40 inches for one month or more in most years; common in playas of the Southwest.

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Sample plot - As used herein, an observation point at which a wetland determination is made.

Sapling - Woody vegetation between 0.4 and 5.0 inches in diameter at breast height and greater than or equal to 20 feet in height, exclusive of woody vines.

Saprists - Organic soils (mucks) in which most of the plant material is decomposed and the original constituents cannot be recognized; less than one-third of the fibers remain visible upon rubbing the material between the fingers.

Saturated - A condition in which all easily drained voids (pores) between soil particles are temporarily or permanently filled with water; significant saturation during the growing season is considered to be usually one week or more.

Seedling - A young tree that is generally less than 3 feet high.

Shrub - Woody vegetation usually greater than 3 feet but less than 20 feet tall, including multi-stemmed, bushy shrubs and small trees and saplings. (*Note:* Woody seedlings less than 3 feet tall are considered part of the herbaceous layer.)

Soil - Unconsolidated material on the earth's surface that supports or is capable of supporting plants out-of-doors.

Soil horizon - A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics (e.g., color, structure, and texture).

Soil matrix - The portion of a given soil having the dominant color; in most cases, the matrix will be the portion of the soil having more than 50 percent of the same color.

Soil permeability - The ease with which gases, liquids, or plant roots penetrate or pass through a layer of soil.

Soil phase - A subdivision of a soil series having features (e.g., slope, surface texture, and stoniness) that affect the use and management of the soil, but which do not vary sufficiently to differentiate it as a separate series.

Soil pore - An area within soil occupied by either air or water, resulting from the arrangement of individual soil particles or peds.

Soil profile - A vertical section of the soil through all its horizons and extending into the parent material.

Soil series - A group of soils having horizons similar in differentiating characteristics and arrangements in the soil profile, except for texture of the surface layer.

Soil structure - The combination or arrangement of primary soil particles into secondary particles, units, or peds.

Soil surface - The upper limits of the soil profile; for mineral soils, the upper limits of the highest mineral horizon (A-horizon); for organic soils, the upper limit of undecomposed organic matter.

Soil texture - The relative proportions of the various sizes of particles (silt, sand and clay) in a soil.

Somewhat poorly drained - A condition in which water is removed slowly enough that the soil is wet for significant periods during the growing season.

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Species area curve - The curve on a graph produced when plotting the cumulative number of plant species found in a series of quadrats against the cumulative number or area of those quadrats; it is used to determine the number of quadrats sufficient to adequately survey the herb stratum.

Spodic horizon - A subsurface layer of soil characterized by the accumulation of aluminum oxides (with or without iron oxides) and organic matter; a diagnostic horizon for Spodosols.

Stratigraphy - A term referring to the origin, composition, distribution, and succession of geologic strata (layers).

Stratum - A layer of vegetation used to determine dominant species in a plant community.

Suborder (soils) - Second highest taxonomic level of the current U.S. soil classification system.

Substrate - nonsoil.

Surface water - Water present above the substrate or soil surface.

Temperate region - The geographic area having a climate that is neither very hot nor very cold.

Tidal - A situation in which the water level periodically fluctuates due to the action of lunar (moon) and solar (sun) forces upon the rotating earth.

Topography - The configuration of a surface, including its relief and the position of its natural and man-made features.

Transect - A line on the ground along which sample plots or points are established for collecting vegetation data and in many cases, soil and hydrology data as well.

Translocation - The transfer of matter from one location to another within the soil.

Transpiration - The process in plants by which water is released into the gaseous environment (atmosphere), primarily through stomata.

Tree - A woody plant 5 inches or greater in diameter at breast height and 20 feet or taller.

Typical - That which normally, usually, or commonly occurs.

Ultisols - Highly weathered soils having significantly more clay in the B-horizon than in the A-horizon and having low base status; acidic soils common in the Southeast.

Unconsolidated parent material - Material from which a soil develops.

Upland - Any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic characteristics associated with wetlands. Such areas occurring in floodplains are more appropriately termed nonwetlands.

Value (soil color) - The relative lightness or intensity of color; approximately a function of the square root of the total amount of light; one of the three variables of color.

Vascular (plant) - Possessing a well-developed system of conducting tissue to transport water, mineral salts, and foods within the plant.

Vegetation - The sum total of macrophytes that occupy a given area.

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**Vegetation unit** - A patch, grouping, or zone of plants evident in overall plant cover, which appears distinct from other such units because of the vegetation's structure and floristic composition; a given unit is typically topographically distinct and typically has a rather uniform soil, except possibly for relatively dry microsites (e.g., tree bases, old tree stumps, mosquito ditch spoil piles, and small earth hummocks) in an otherwise wet area or relatively wet microsites (e.g., small depressions) in an otherwise dry area.

**Very long duration (flooding)** - A duration class in which inundation for a single event is greater than 1 month.

**Vertisols** - Shrinking and swelling dark clay soils; most common in Texas.

**Very poorly drained** - A condition in which water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season.

**Water mark** - A line on vegetation or other upright structures that represents the maximum height reached in an inundation event.

**Water table** - The zone of saturation at the highest average depth during the wettest season; it is at least six inches thick and persists in the soil for more than a few weeks.

**Wetlands** - As used herein, areas that under normal circumstances have hydrophytic vegetation, hydric soils, and wetland hydrology.

**Wetland boundary** - The point on the ground at which a shift from wetlands to nonwetlands occurs.

**Wetland determination** - The process by which an area is identified as a wetland or nonwetland.

**Wetland hydrology** - In general terms, permanent or periodic inundation or prolonged soil saturation sufficient to create anaerobic conditions in the soil.

**Wetland indicator status** - The exclusiveness with which a plant species occurs in wetlands; the different indicator categories (i.e., facultative species, and obligate wetland species) are defined elsewhere in this glossary.

**Wooded swamp** - A wetland dominated by trees; a forested wetland.

**Zone of influence** - The area contiguous to a ditch, channel, or other drainage structure that is directly affected by it.



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# Appendix A

## Selected Wetland References



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# Appendix B

## Examples of Data Sheets



**DATA FORM  
ROUTINE ONSITE DETERMINATION METHOD<sup>1</sup>**

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_  
 Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_  
 Applicant/Owner: \_\_\_\_\_ Plant Community #/Name: \_\_\_\_\_  
 Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?  
 Yes \_\_\_\_\_ No \_\_\_\_\_ (If no, explain on back)  
 Has the vegetation, soils, and/or hydrology been significantly disturbed?  
 Yes \_\_\_\_\_ No \_\_\_\_\_ (If yes, explain on back)

**VEGETATION**

Dominant Plant Species	Indicator		Dominant Plant Species	Indicator	
	Status	Stratum		Status	Stratum
1. _____	_____	_____	11. _____	_____	_____
2. _____	_____	_____	12. _____	_____	_____
3. _____	_____	_____	13. _____	_____	_____
4. _____	_____	_____	14. _____	_____	_____
5. _____	_____	_____	15. _____	_____	_____
6. _____	_____	_____	16. _____	_____	_____
7. _____	_____	_____	17. _____	_____	_____
8. _____	_____	_____	18. _____	_____	_____
9. _____	_____	_____	19. _____	_____	_____
10. _____	_____	_____	20. _____	_____	_____

Percent of dominant species that are OBL, FACW, and/or FAC \_\_\_\_\_  
 Is the hydrophytic vegetation criterion met? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Rationale: \_\_\_\_\_

**SOILS**

Series/phase: \_\_\_\_\_ Subgroup:<sup>2</sup> \_\_\_\_\_  
 Is the soil on the hydric soils list? Yes \_\_\_\_\_ No \_\_\_\_\_ Undetermined \_\_\_\_\_  
 Is the soil a Histosol? Yes \_\_\_\_\_ No \_\_\_\_\_ Histic epipedon present? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Is the soil: Mottled? Yes \_\_\_\_\_ No \_\_\_\_\_ Gleyed? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Matrix Color: \_\_\_\_\_ Mottle Colors: \_\_\_\_\_  
 Other hydric soil indicators: \_\_\_\_\_  
 Is the hydric soil criterion met? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Rationale: \_\_\_\_\_

**HYDROLOGY**

Is the ground surface inundated? Yes \_\_\_\_\_ No \_\_\_\_\_ Surface water depth: \_\_\_\_\_  
 Is the soil saturated? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Depth to free-standing water in pit/soil probe hole: \_\_\_\_\_  
 List other field evidence of surface inundation or soil saturation.  
 \_\_\_\_\_  
 Is the wetland hydrology criterion met? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Rationale: \_\_\_\_\_

**JURISDICTIONAL DETERMINATION AND RATIONALE**

Is the plant community a wetland? Yes \_\_\_\_\_ No \_\_\_\_\_  
 Rationale for jurisdictional decision: \_\_\_\_\_

<sup>1</sup> This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.

<sup>2</sup> Classification according to "Soil Taxonomy."

**DATA FORM**  
**INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD**  
**QUADRAT TRANSECT SAMPLING PROCEDURE**  
(Vegetation Data)

Field Investigator(s): \_\_\_\_\_  
Project/Site: \_\_\_\_\_ Date: \_\_\_\_\_  
Applicant/Owner: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_  
Transect # \_\_\_\_\_ Plot # \_\_\_\_\_

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

**DOMINANT PLANT SPECIES**

Herbs (Bryophytes)	Indicator Status	Saplings	Indicator Status
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____
3. _____	_____	3. _____	_____
4. _____	_____	4. _____	_____
5. _____	_____	5. _____	_____
6. _____	_____	6. _____	_____
7. _____	_____	7. _____	_____
8. _____	_____	8. _____	_____
9. _____	_____	9. _____	_____
10. _____	_____	10. _____	_____
11. _____	_____	11. _____	_____
12. _____	_____	12. _____	_____
13. _____	_____	13. _____	_____

Shrubs	Indicator Status	Trees	Indicator Status
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____
3. _____	_____	3. _____	_____
4. _____	_____	4. _____	_____
5. _____	_____	5. _____	_____
6. _____	_____	6. _____	_____
7. _____	_____	7. _____	_____
8. _____	_____	8. _____	_____
9. _____	_____	9. _____	_____
10. _____	_____	10. _____	_____
11. _____	_____	11. _____	_____
12. _____	_____	12. _____	_____
13. _____	_____	13. _____	_____

Woody Vines

1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____
11. _____	_____
12. _____	_____
13. _____	_____

Percent of dominant species that are OBL, FACW, and/or FAC \_\_\_\_\_

**DATA FORM**  
**INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD**  
**VEGETATION UNIT SAMPLING PROCEDURE**  
**(Herbs and Bryophytes)**

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_

Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_

Applicant/Owner: \_\_\_\_\_ Vegetation Unit #/Name: \_\_\_\_\_

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Species	Indicator Status	Percent Areal Cover	Cover <sup>1</sup> Class	Midpoint <sup>1</sup> of Cover Class	Rank <sup>2</sup>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
17. _____	_____	_____	_____	_____	_____
18. _____	_____	_____	_____	_____	_____
19. _____	_____	_____	_____	_____	_____
20. _____	_____	_____	_____	_____	_____
21. _____	_____	_____	_____	_____	_____
22. _____	_____	_____	_____	_____	_____
23. _____	_____	_____	_____	_____	_____
24. _____	_____	_____	_____	_____	_____
25. _____	_____	_____	_____	_____	_____
26. _____	_____	_____	_____	_____	_____
27. _____	_____	_____	_____	_____	_____
28. _____	_____	_____	_____	_____	_____
29. _____	_____	_____	_____	_____	_____
30. _____	_____	_____	_____	_____	_____
31. _____	_____	_____	_____	_____	_____
32. _____	_____	_____	_____	_____	_____
33. _____	_____	_____	_____	_____	_____
34. _____	_____	_____	_____	_____	_____
35. _____	_____	_____	_____	_____	_____
36. _____	_____	_____	_____	_____	_____
				Sum of Midpoints	_____
				Dominance Threshold Number Equals 50% x Sum of Midpoints	_____

<sup>1</sup> Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

<sup>2</sup> To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

**DATA FORM**  
**INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD**  
**VEGETATION UNIT SAMPLING PROCEDURE**  
 (Shrubs, Woody Vines and Saplings)

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_  
 Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_  
 Applicant/Owner: \_\_\_\_\_ Vegetation Unit #/Name: \_\_\_\_\_  
 Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Shrub Species	Indicator Status	Percent Areal Cover	Cover <sup>1</sup> Class	Midpoint <sup>1</sup> of Cover Class	Rank <sup>2</sup>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
Sum of Midpoints				_____	_____
Dominance Threshold Number Equals 50% x Sum of Midpoints					

Woody Vine Species	Indicator Status	Percent Areal Cover	Cover <sup>1</sup> Class	Midpoint <sup>1</sup> of Cover Class	Rank <sup>2</sup>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
Sum of Midpoints				_____	_____
Dominance Threshold Number Equals 50% x Sum of Midpoints					

Sapling Species	Indicator Status	Percent Areal Cover	Cover <sup>1</sup> Class	Midpoint <sup>1</sup> of Cover Class	Rank <sup>2</sup>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
Sum of Midpoints				_____	_____
Dominance Threshold Number Equals 50% x Sum of Midpoints					

1 Cover classes (midpoints): T < 1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).  
 2 To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

**DATA FORM**  
**INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD**  
**VEGETATION UNIT SAMPLING PROCEDURE**  
**(Trees)**

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_

Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_

Applicant/Owner: \_\_\_\_\_ Vegetation Unit #/Name: \_\_\_\_\_

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Tree Species (Percent Cover Option)	Indicator Status	Percent Areal Cover	Cover <sup>1</sup> Class	Midpoint <sup>1</sup> of Cover Class	Rank <sup>2</sup>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
				Sum of Midpoints	_____
				Dominance Threshold Number Equals 50% x Sum of Midpoints	_____

Tree Species (Basal Area Option)	Indicator Status	Tally								Total Trees	Basal <sup>3</sup> Area	Rank <sup>2</sup>
		1	2	3	4	5	6	7	8			
1. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
											Total Basal Area of All Species Combined	_____
											Dominance Threshold Number Equals 50% of Total Basal Area	_____

<sup>1</sup> Cover classes (midpoints): T < 1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

<sup>2</sup> To determine the dominants, first rank the species by their midpoints (or basal area). Then cumulatively sum the midpoints (basal area) of the ranked species until 50% of the total for all species midpoints (or basal area) is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint, or basal area, value should be considered dominants and marked with an asterisk.

<sup>3</sup> The basal area for a species (on a per acre basis) is determined by dividing the total number of individual trees tallied for all tally areas by the number of tallies and multiplying by the basal area factor.

**DATA FORM <sup>1</sup>**  
**INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD OR**  
**COMPREHENSIVE ONSITE DETERMINATION METHOD**  
**(Soils and Hydrology)**

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_  
Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_  
Applicant/Owner: \_\_\_\_\_  
Intermediate-level Onsite Determination Method \_\_\_\_\_  
Comprehensive Onsite Determination Method \_\_\_\_\_  
Transect # \_\_\_\_\_ Plot # \_\_\_\_\_  
Vegetation Unit #/Name: \_\_\_\_\_ Sample # Within Veg. Unit: \_\_\_\_\_  
*Note:* If a more detailed site description is necessary, use the back of data form or a field notebook.

-----  
**SOILS**

Series/phase: \_\_\_\_\_ Subgroup:<sup>2</sup> \_\_\_\_\_  
Is the soil on the hydric soils list? Yes \_\_\_\_\_ No \_\_\_\_\_ Undetermined \_\_\_\_\_  
Is the soil a Histosol? Yes \_\_\_\_\_ No \_\_\_\_\_ Histic epipedon present? Yes \_\_\_\_\_ No \_\_\_\_\_  
Is the soil: Mottled? Yes \_\_\_\_\_ No \_\_\_\_\_ Gleyed? Yes \_\_\_\_\_ No \_\_\_\_\_  
Matrix Color: \_\_\_\_\_ Mottle Colors: \_\_\_\_\_  
Other hydric soil indicators: \_\_\_\_\_  
Comments: \_\_\_\_\_  
-----

**HYDROLOGY**

Is the ground surface inundated? Yes \_\_\_\_\_ No \_\_\_\_\_ Surface water depth: \_\_\_\_\_  
Is the soil saturated? Yes \_\_\_\_\_ No \_\_\_\_\_  
Depth to free-standing water in pit/soil probe hole: \_\_\_\_\_  
Mark other field indicators of surface inundation or soil saturation below:

____ Oxidized root zones	____ Water-stained leaves
____ Water marks	____ Surface scoured areas
____ Drift lines	____ Wetland drainage patterns
____ Water-borne sediment deposits	____ Morphological plant adaptations

Additional hydrologic indicators: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

<sup>1</sup> This data form can be used for both the Vegetation Unit Sampling Procedure and the Quadrat Transect Sampling Procedure of the Intermediate-Level Onsite Determination Method, or the Quadrat Sampling Procedure of the Comprehensive Onsite Determination Method. Indicate which method is used.

<sup>2</sup> Classification according to "Soil Taxonomy."

**DATA FORM <sup>1</sup>**  
**INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD OR**  
**COMPREHENSIVE ONSITE DETERMINATION METHOD**  
**(Summary Sheet)**

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_

Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_

Applicant/Owner: \_\_\_\_\_

Intermediate-level Onsite Determination Method \_\_\_\_\_

Comprehensive Onsite Determination Method \_\_\_\_\_

Transect # \_\_\_\_\_ Plot # \_\_\_\_\_ Vegetation Unit #/Name: \_\_\_\_\_

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?

Yes \_\_\_\_\_ No \_\_\_\_\_ (If no, explain on back)

Has the vegetation, soils, and/or hydrology been significantly disturbed?

Yes \_\_\_\_\_ No \_\_\_\_\_ (If yes, explain on back)

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. _____	_____	_____	14. _____	_____	_____
2. _____	_____	_____	15. _____	_____	_____
3. _____	_____	_____	16. _____	_____	_____
4. _____	_____	_____	17. _____	_____	_____
5. _____	_____	_____	18. _____	_____	_____
6. _____	_____	_____	19. _____	_____	_____
7. _____	_____	_____	20. _____	_____	_____
8. _____	_____	_____	21. _____	_____	_____
9. _____	_____	_____	22. _____	_____	_____
10. _____	_____	_____	23. _____	_____	_____
11. _____	_____	_____	24. _____	_____	_____
12. _____	_____	_____	25. _____	_____	_____
13. _____	_____	_____	26. _____	_____	_____

Percent of dominant species that are OBL, FACW and/or FAC \_\_\_\_\_

Is the hydrophytic vegetation criterion met? Yes \_\_\_\_\_ No \_\_\_\_\_

Is the hydric soil criterion met? Yes \_\_\_\_\_ No \_\_\_\_\_

Is the wetland hydrology criterion met? Yes \_\_\_\_\_ No \_\_\_\_\_

Is the vegetation unit or plot wetland? Yes \_\_\_\_\_ No \_\_\_\_\_

Rationale for jurisdictional decision: \_\_\_\_\_

\_\_\_\_\_

<sup>1</sup> This data form can be used for either the Intermediate-level Onsite Determination Method or the Comprehensive Onsite Determination Method. Indicate which method is used.

**DATA FORM**  
**COMPREHENSIVE ONSITE DETERMINATION METHOD**  
**QUADRAT SAMPLING PROCEDURE <sup>1</sup>**  
**(Herbs and Bryophytes)**

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_  
 Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_  
 Applicant/Owner: \_\_\_\_\_  
 Transect # \_\_\_\_\_ Plot # \_\_\_\_\_ Vegetation Unit #/Name: \_\_\_\_\_  
 Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Species	Indicator Status	Quadrat Percent Areal Cover								$\bar{X}$	Rank <sup>4</sup>
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8		
1. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

Total Cover \_\_\_\_\_<sup>2</sup>

Dominance Threshold Number Equals 50% x Total Cover \_\_\_\_\_<sup>2</sup>

Total of Averages ( $\bar{X}$ 's) \_\_\_\_\_<sup>3</sup>

Dominance Threshold Number Equals 50% x Total of Averages ( $\bar{X}$ 's) \_\_\_\_\_<sup>3</sup>

<sup>1</sup> This data form can be used for both the Plant Community Transect Sampling Approach and the Fixed Interval Transect Sampling Approach.

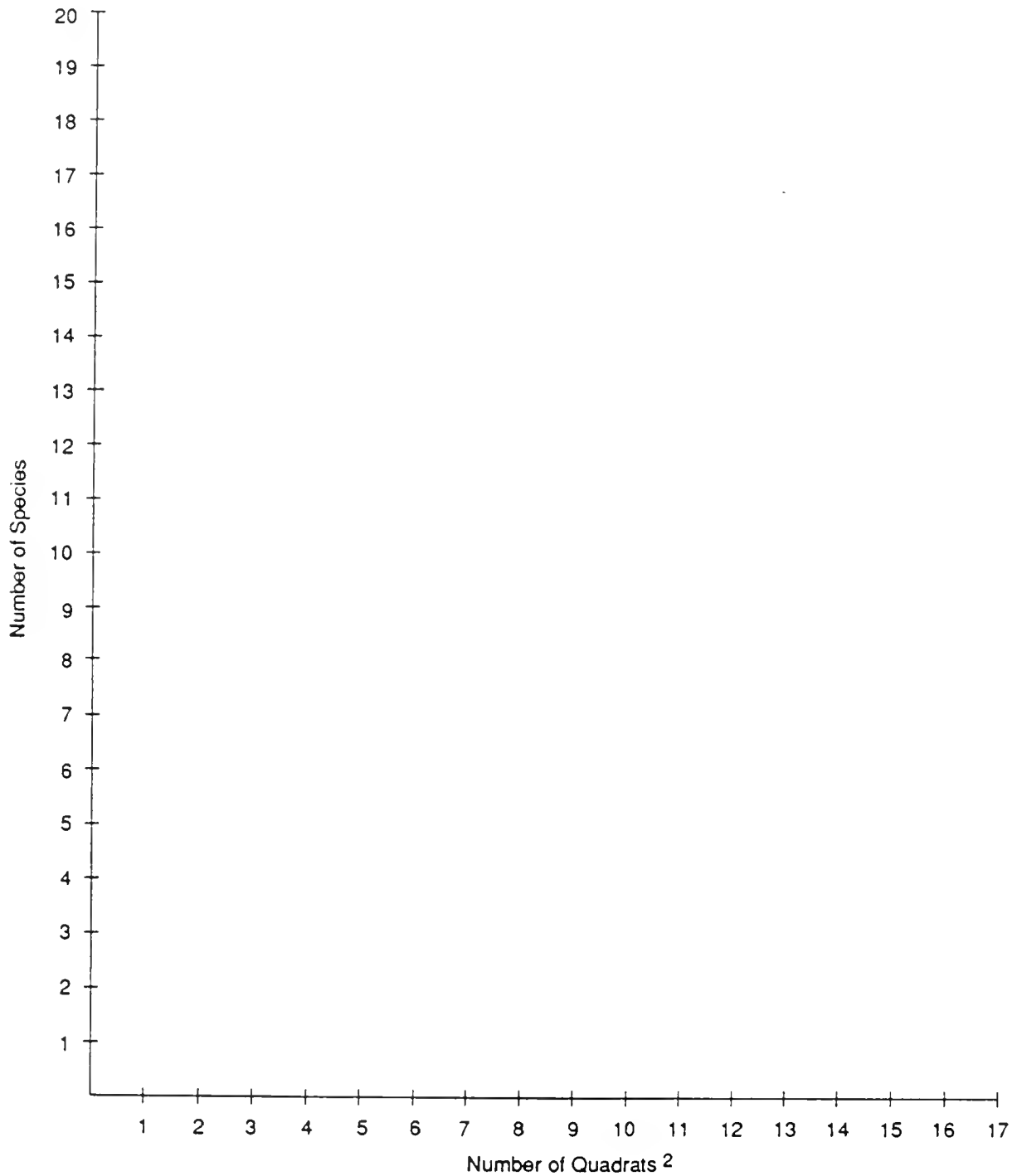
<sup>2</sup> These entries are only applicable to the Fixed Interval Transect Sampling Approach which uses only one quadrat per sampling point along a transect.

<sup>3</sup> These entries are only applicable to the Plant Community Transect Sampling Approach which uses multiple quadrats per sampling point along a transect.

<sup>4</sup> To determine the dominants, first rank the species by their cover (or mean cover). Then cumulatively sum the cover (mean cover) of the ranked species until 50% of the total for all species cover (mean cover) is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus additional species having 20% of the total cover (mean cover) value should be considered dominants and marked with an asterisk.



# SPECIES-AREA CURVE<sup>1</sup>



<sup>1</sup> Plot the cumulative number of species against the quadrats (e.g., if quadrat #1 has 3 species and quadrat #2 has any, all, or none of those species but has 2 new species, then 5 cumulative species should be plotted against quadrat #2). The number of quadrats sufficient to adequately survey the understory will correspond to the point on the curve where it first levels off and remains essentially level.

<sup>2</sup> Specify size of sample quadrat: \_\_\_\_\_

**DATA FORM  
 COMPREHENSIVE ONSITE DETERMINATION METHOD  
 QUADRAT SAMPLING PROCEDURE  
 (Shrubs and Woody Vines)**

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_  
 Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_  
 Applicant/Owner: \_\_\_\_\_  
 Transect # \_\_\_\_\_ Plot # \_\_\_\_\_ Vegetation Unit #/Name: \_\_\_\_\_

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

<u>Shrub Species</u>	<u>Indicator Status</u>	<u>Percent Areal Cover</u>	<u>Cover<sup>1</sup> Class</u>	<u>Midpoint<sup>1</sup> of Cover Class</u>	<u>Rank<sup>2</sup></u>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____

Sum of Midpoints \_\_\_\_\_  
 Dominance Threshold Number Equals 50% x Sum of Midpoints \_\_\_\_\_

<u>Woody Vine Species</u>	<u>Indicator Status</u>	<u>Percent Areal Cover</u>	<u>Cover<sup>1</sup> Class</u>	<u>Midpoint<sup>1</sup> of Cover Class</u>	<u>Rank<sup>2</sup></u>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____

Sum of Midpoints \_\_\_\_\_  
 Dominance Threshold Number Equals 50% x Sum of Midpoints \_\_\_\_\_

<sup>1</sup> Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).  
<sup>2</sup> To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

**DATA FORM**  
**COMPREHENSIVE ONSITE DETERMINATION METHOD**  
**QUADRAT SAMPLING PROCEDURE**  
(Saplings & Trees)

Field Investigator(s): \_\_\_\_\_ Date: \_\_\_\_\_

Project/Site: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_

Applicant/Owner: \_\_\_\_\_

Transect # \_\_\_\_\_ Plot # \_\_\_\_\_ Vegetation Unit #/Name: \_\_\_\_\_

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Sapling Species	Indicator Status	Percent Areal Cover	Cover <sup>1</sup> Class	Midpoint <sup>1</sup> of Cover Class	Rank <sup>2</sup>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
Sum of Midpoints				_____	_____
Dominance Threshold Number Equals 50% x Sum of Midpoints				_____	_____

Individual Tree Species	Indicator Status	DBH (inches)	Basal Area (BA) Per Tree (sq ft)	BA Per Species (sq ft)	Rank <sup>2</sup>
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
Total Basal Area of All Species Combined				_____	_____
Dominance Threshold Number Equals 50% x Total Basal Area				_____	_____

<sup>1</sup> Cover classes (midpoints): T < 1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

<sup>2</sup> To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.





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# Appendix C

## Sample Calculation for Herb Stratum Dominants

**DATA FORM  
COMPREHENSIVE ONSITE DETERMINATION METHOD  
QUADRAT SAMPLING PROCEDURE<sup>1</sup>  
(Herbs and Bryophytes)**

Field Investigator(s): Bob Barber and Bill Sipple Date: 7/29/87  
 Project/Site: Weise Slough State: Iowa County: Muscatine  
 Applicant/Owner: State of Iowa  
 Transect # 1 Plot # 2 Vegetation Unit #/Name: #1/ Marsh  
 Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

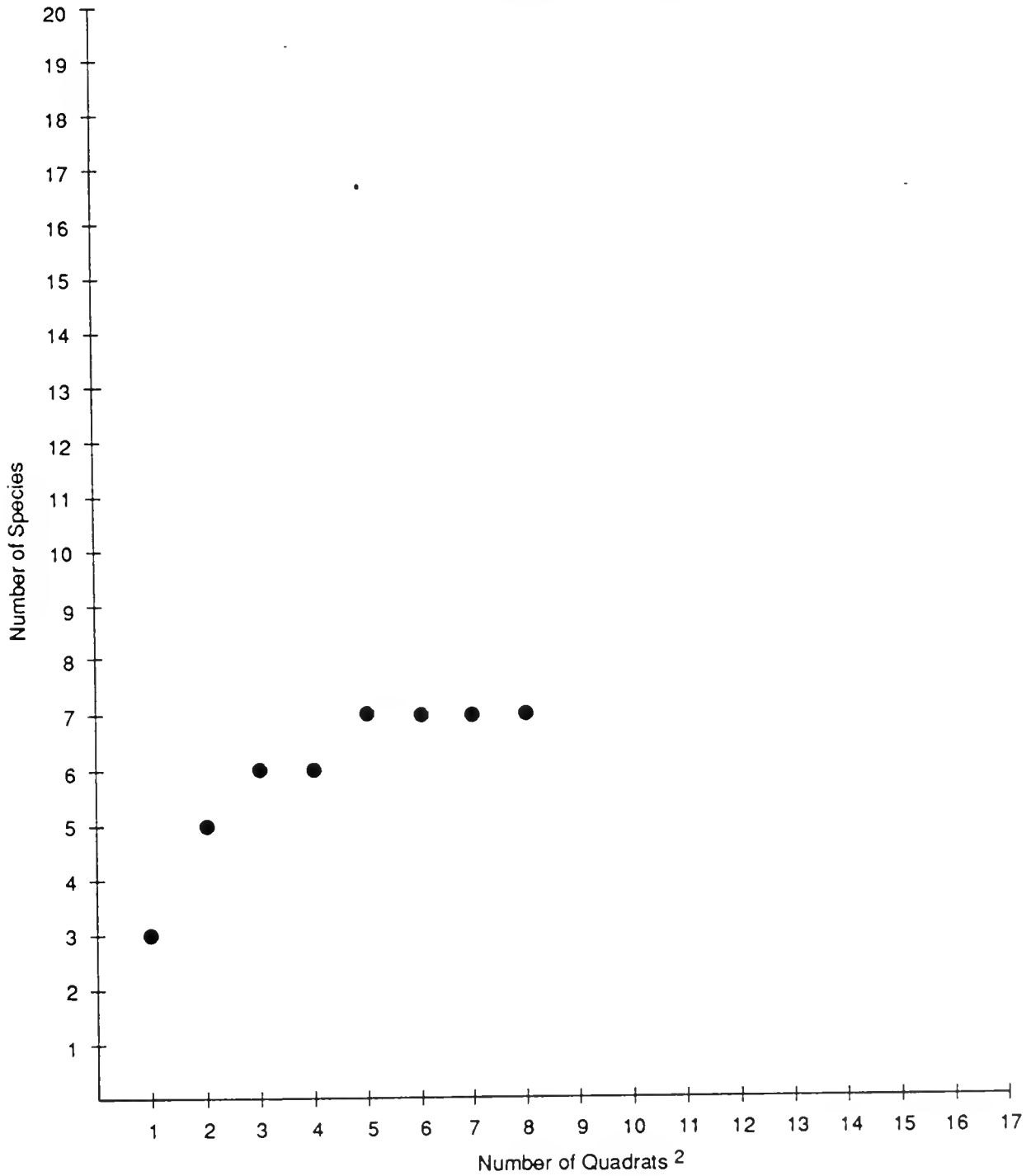
Species	Indicator Status	Quadrat Percent Areal Cover								$\bar{X}$	Rank <sup>4</sup>
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8		
* 1. <u><i>Licersia oryzoides</i></u>	<u>OBL</u>	<u>95</u>	<u>99</u>	<u>99</u>	<u>100</u>	<u>&lt;1</u>	<u>30</u>	<u>20</u>	<u>20</u>	<u>57.9</u>	<u>1</u>
2. <u><i>Echinochloa muricata</i></u>			<u>2</u>	<u>5</u>	<u>5</u>	<u>15</u>		<u>2</u>	<u>2</u>	<u>3.88</u>	<u>4</u>
3. <u><i>Lemna Sp.</i></u>		<u>70</u>	<u>20</u>		<u>5</u>					<u>11.88</u>	<u>2</u>
4. <u>VI Seedling (herb)</u>		<u>&lt;1</u>		<u>&lt;1</u>	<u>&lt;1</u>	<u>&lt;1</u>	<u>15</u>	<u>&lt;1</u>		<u>1.88</u>	<u>6</u>
5. <u><i>Bidens sp.</i></u>			<u>1</u>	<u>2</u>		<u>1</u>	<u>10</u>	<u>10</u>	<u>2</u>	<u>3.25</u>	<u>5</u>
6. <u><i>Sagittaria latifolia</i></u>			<u>&lt;1</u>	<u>&lt;1</u>						<u>-</u>	<u>7</u>
7. <u><i>Rumex verticillatus</i></u>						<u>80</u>				<u>10</u>	<u>3</u>
8. _____											
9. _____											
10. _____											
11. _____											
12. _____											
13. _____											
14. _____											
15. _____											
16. _____											

Total Cover 2  
 Dominance Threshold Number Equals 50% x Total Cover 2

Total of Averages ( $\bar{X}$ 's) 88.8<sup>3</sup>  
 Dominance Threshold Number Equals 50% x Total of Averages ( $\bar{X}$ 's) 44.4<sup>3</sup>

- <sup>1</sup> This data form can be used for both the Plant Community Transect Sampling Approach and the Fixed Interval Transect Sampling Approach.
- <sup>2</sup> These entries are only applicable to the Fixed Interval Transect Sampling Approach which uses only one quadrat per sampling point along a transect.
- <sup>3</sup> These entries are only applicable to the Plant Community Transect Sampling Approach which uses multiple quadrats per sampling point along a transect.
- <sup>4</sup> To determine the dominants, first rank the species by their cover (or mean cover). Then cumulatively sum the cover (mean cover) of the ranked species until 50% of the total for all species cover (mean cover) is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) plus additional species having 20% of the total cover (mean cover) value should be considered dominants and marked with an asterisk.

# SPECIES-AREA CURVE <sup>1</sup>



<sup>1</sup> Plot the cumulative number of species against the quadrats (e.g., if quadrat #1 has 3 species and quadrat #2 has any, all, or none of those species but has 2 new species, then 5 cumulative species should be plotted against quadrat #2). The number of quadrats sufficient to adequately survey the understory will correspond to the point on the curve where it first levels off and remains essentially level.

<sup>2</sup> Specify size of sample quadrat: 0.1 m<sup>2</sup>





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# Appendix D

## Sample Problem for Application of Point Intercept Sampling Method

Sample problem for application of point sampling method. Example follows this sample worksheet.

PREVALENCE INDEX WORKSHEET

LOCATION Montgomery Co, MD Farm 2164, Tract 742 DATE 8/4/88 EVALUATOR Anne Lynn

HYDRIC UNIT NAME Bibb TRANSECT NO. 1

Frequency of Occurrence of Identified Plants with Known Indicator Status

Plant Species	Frequency of Occurrence Total for Each Species	F <sub>0</sub> Obligate	F <sub>fw</sub> Facult. Wet.	F <sub>f</sub> Facult.	F <sub>fu</sub> Facult. Upland	F <sub>u</sub> Upland
<i>Liriodendron tulipifera</i>	13				13	
<i>Platanus occidentalis</i>	20		20			
<i>Acer rubrum</i>	8			8		
<i>Hedera helix</i>	1					
<i>Alnus serrulata</i>	2	2				
<i>Pedophyllum peltatum</i>	3					
<i>Liquidambar styraciflua</i>	2			2		
<i>Galium asperillum</i>	2	2				
<i>Lindera benzoin</i>	3		3			
<i>Lonicera japonica</i>	5			5		
<i>Toxicodendron radicans</i>	5			5		
<i>Viburnum recognitum</i>	2		2			
<i>Arisaema triphyllum</i>	4		4			
<i>Carpinus caroliniana</i>	2			2		
<i>Ilex opaca</i>	12				12	
<i>Thelypteris noveboracensis</i>	2			2		
Total occurrence for all plant species	86					
Total occurrences ID'd with known indicator status	82	4	29	24	25	
E.I. value		1	2	3	4	5

$$\frac{\text{Total occurrences identified with known indicator status}}{\text{Total occurrence for all plant species}} = \% \text{ valid occurrences} = 100 \times \frac{82}{86} = 95\%$$

$$PI_i = \frac{(1F_0) + (2F_{fw}) + (3F_f) + (4F_{fu}) + (5F_u)}{(F_0 + F_{fw} + F_f + F_{fu} + F_u)}$$

## COMPUTATIONS

1. Computation of prevalence index (PI) for transect #1:

$$PI_i = \frac{(1F_o) + (2F_{fw}) + (3F_f) + (4F_{fu}) + (5F_u)}{(F_o + F_{fw} + F_f + F_{fu} + F_u)}$$

$$PI_1 = \frac{(1 \times 4) + (2 \times 29) + (3 \times 24) + (4 \times 25)}{4 + 29 + 24 + 25} = \frac{234}{82} = 2.85$$

where:

$PI_i$  = Prevalence index for transect i

$F_o$  = Frequency of occurrence of obligate wetland species

$F_{fw}$  = Frequency of occurrence of facultative wetland species

$F_f$  = Frequency of occurrence of facultative species

$F_{fu}$  = Frequency of occurrence of facultative upland species

$F_u$  = Frequency of occurrence of upland species

2. Computation of mean prevalence index ( $PI_M$ ) for three transects:

$$PI_M = \frac{PI_T}{N}$$

where:

$PI_M$  = Mean prevalence index for transects

$PI_T$  = Sum of prevalence index values for all transects

$N$  = Total number of transects

For example: PI for Transect 1 = 2.85

PI for Transect 2 = 3.16

PI for Transect 3 = 2.93

$$PI_M = \frac{2.85 + 3.16 + 2.93}{3} = \frac{8.94}{3} = 2.98$$

3. Computation of standard deviation (s) for prevalence index (PI):

$$s = \sqrt{\frac{(PI_1 - PI_M)^2 + (PI_2 - PI_M)^2 + (PI_3 - PI_M)^2}{N - 1}}$$

For example:

Transect	$PI_j$	$PI_M$	$(PI_j - PI_M)$	$(PI_j - PI_M)^2$
1	2.85	2.98	-0.13	0.0169
2	3.16	2.98	0.18	0.0324
3	2.93	2.98	-0.05	0.0025
				0.0518

$$s = \sqrt{\frac{0.0518}{3 - 1}} = \sqrt{\frac{0.0518}{2}} = \sqrt{0.0259} = 0.161$$

4. Computation of standard error ( $s\bar{x}$ ) of the prevalence index:

$$s\bar{x} = \frac{s}{\sqrt{N}} = \frac{0.161}{\sqrt{3}} = \frac{0.161}{1.73} = 0.093$$

Since 0.093 does not exceed 0.20, no additional transects are needed.

5. Record mean prevalence index value.

$$PI_M = 2.98$$

Since 2.98 is less than 3.0, the area has hydrophytic vegetation. If the wetland hydrology criterion is met, then the area is a wetland.

ATTACHMENT C-2

Proposed Revisions to the Federal Manual for Delineating Wetlands





# **Proposed Revisions To The Federal Manual For Delineating Wetlands**

- **BACKGROUND**
- **QUESTIONS AND ANSWERS**
- **SIDE-BY-SIDE COMPARISON**
- **FEDERAL REGISTER NOTICE**







**PROPOSED REVISIONS  
TO THE  
FEDERAL MANUAL FOR DELINEATING WETLANDS**

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August 14, 1991

Proposed revisions to the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (the Federal Manual) were published in the Federal Register on August 14, 1991. The public is invited to review and provide technical comments on the proposed revisions during the 60-day review period which ends on October 15, 1991.

Implemented in March 1989, the Federal Manual is used by the Environmental Protection Agency (EPA), Army Corps of Engineers (CE), Department of Agriculture Soil Conservation Service (SCS) and Department of Interior Fish and Wildlife Service (FWS) to identify and delineate wetlands. The Federal Manual provides guidance on the technical criteria, field indicators and other sources of information necessary to make consistent wetland jurisdictional determinations.

During the 60-day review period, the four agencies will be coordinating interagency field testing of the proposed revised Federal Manual. The results of these tests will be reviewed, in conjunction with the comments received from the public, in finalizing the revised Federal Manual.

Written comments should be made to Gregory Peck, Chief, Wetlands and Aquatic Resources Regulatory Branch, Mail Code (A-104F), U.S. EPA, 401 M. Street, SW, Washington, D.C. 20460. Comments are due on or before October 15, 1991.

**FOR MORE INFORMATION CALL:  
EPA'S WETLANDS PROTECTION HOTLINE  
1-800-832-7828**



# **Backgrounder On The Proposed Revisions**

**Backgrounder**



# UNDERSTANDING THE PROPOSED REVISIONS TO THE WETLANDS DELINEATION MANUAL: A BACKGROUNDER

**INTRODUCTION** - The following discussion of the proposed revisions to the 1989 "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (1989 Federal Manual) provides a brief overview of the history and current status of the proposed revisions. The 1989 Federal Manual describes how to delineate vegetated wetlands for the purpose of determining areas regulated as "waters of the United States" under Section 404 of the Clean Water Act as well as for the purpose of implementing Swampbuster provisions under the Conservation Title of the Food Security Act of 1985, as amended. Major revisions to the 1989 Federal Manual have been proposed to address technical concerns identified in implementing the Federal Manual over the past two years, to reduce misinterpretations and the possibility of erroneous wetland determinations, and to better explain the 1989 Federal Manual's usage. Public comments on the proposed revisions will be accepted through October 15, 1991.

**WETLANDS** - *Simply put, wetlands are the areas on the landscape where land and water meet. In general, they are lands that are either inundated with surface water or saturated with groundwater long enough during the growing season to make it necessary for the vegetation to adapt to growing in saturated soil conditions. This periodic or permanent wetness is the fundamental factor that makes wetlands different from uplands. While most people picture wetlands as marshy areas with lush aquatic plants, there are actually many more kinds of wetlands. In fact, in certain seasons, many ecologically important wetlands may be dry or lack signs of plant life.*

*The term wetlands describes a broad spectrum of plant communities. Wetlands can range in size from tens of thousands of acres in extent to*

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## EXAMPLES OF WETLANDS TYPES

**BOGS** typically have a thick layer of floating root masses or peat on the surface and are highly acidic. They may have no regular inlet or outlet of water, thus they are dependent upon precipitation for water. Most floating bogs are found in the northern United States. Pocosins, also a type of bog, are described below.

**BOTTOMLAND HARDWOODS** are deciduous forested wetlands, found along rivers and streams generally in the broad floodplain of the southeast and south central United States.

**EMERGENT WETLANDS** are characterized by free-standing, nonwoody plants. They can be either freshwater or saltwater. Emergent wetlands are found throughout the United States particularly in coastal areas, adjacent to major lakes, and in the West.

**FENS** have a defined outlet and are supported by mineral rich groundwater that has seeped to the surface. Like bogs, fens have large amounts of peat. They are found in the northern United States.

**MANGROVE SWAMPS** are coastal saltwater shrub or forested wetlands that may be flooded with water all year around or only during high tide. Mangroves are found along the coast of the southern United States.

**MARSHES** are emergent wetlands typically with a regular inlet and outlet of water. They can be either salt or freshwater, inland or coastal. They are dominated primarily by nonwoody vegetation. Marshes are found throughout the United States.

**SWAMPS** are dominated primarily by trees or shrubs and are found throughout the United States.

**PRAIRIE POTHOLES** are depressional wetlands found in the Upper Midwest, especially North Dakota, South Dakota, and Minnesota. They are major waterfowl breeding and migration resting areas.

**PLAYA LAKES** are periodically flooded wetland basins that are common in parts of the Southwest and Plains States.

**POCOSINS** are broadleaved evergreen shrub bogs found in the Southeast. They may not be readily apparent because the thick underlying peaty soils dry out rapidly after the early part of the growing season.

**VERNAL POOLS** are naturally occurring depressional wetlands that are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall.

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*as small as a table top. They occur from the cold tundra of the arctic to the lush, humid tropics near the equator. They may be dark and densely wooded or sunny, open wet grasslands. Many are associated with rivers, streams, lakes, or the sea, but many others are found far from any open-water bodies. Some wetlands are uniform stands of one or a few plant species, while others may contain dozens of important plant species and represent a mixture of several discrete vegetation communities.*

**FOUR FEDERAL AGENCIES IDENTIFY AND DELINEATE WETLANDS** - There are four federal agencies that have important responsibilities with regard to identifying and delineating wetlands in the United States: the Environmental Protection Agency (EPA); the Army Corps of Engineers (Corps); the Department of Interior's Fish and Wildlife Service (FWS); and the Department of Agriculture's Soil Conservation Service (SCS). EPA and the Corps jointly administer the Section 404 program, which regulates the discharge of dredged or fill material into "waters of the United States," a term which includes rivers, streams, lakes and most of the Nation's wetlands. Among other responsibilities, EPA and the Corps are responsible for making jurisdictional determinations of wetlands regulated under Section 404 of the Clean Water Act -- that is, identifying wetlands and establishing their boundaries. The Department of Agriculture is responsible for implementing the "Swampbuster" provisions of the Food Security Act (also known as the Farm Bill). As one of its program responsibilities, the SCS identifies wetlands on agricultural land to ensure compliance with Swampbuster. FWS serves important advisory roles in the Section 404 and Swampbuster programs. FWS is also responsible for mapping the Nation's wetlands in order to assess the status and trends of their geographic distribution through the National Wetlands Inventory.

Each of the four agencies has a definition of wetlands for its wetlands programs. While the methods used for wetlands delineation have varied, the definitions of wetlands used by EPA and the Corps, which have remained unchanged since 1977, and are identical and are very similar to those used by FWS and SCS. They all include three basic elements -- hydrology (Is the area saturated or inundated with water during the growing season?), vegetation (What kinds of plants are present?), and soils (What kinds of soils are present?).

**ONE MANUAL FOR THE FOUR AGENCIES** - Before 1989, each of these agencies had its own procedure for identifying and delineating wetlands. These procedures were developed separately from the other agencies. In 1987, the Corps published a technical manual for wetlands delineation, but its use was not required by the Corps Districts and there were variations in how it was applied in the field. EPA published a wetlands delineation manual in 1988, but it too was not required for regulatory wetlands delineations. The Soil Conservation Service developed procedures for identifying and delineating wetlands for compliance with the Swampbuster provisions of the 1985 Food Security Act. Finally, while it has no formal method for delineating wetland boundaries, in 1979 the Fish and Wildlife Service established guidelines for identifying wetlands.

These different agency manuals resulted in inconsistent determinations of wetland boundaries. This caused confusion and created the need for a single, unified Federal method for wetland delineations.

**THE 1989 FEDERAL MANUAL** - In January 1989, EPA, the Corps, FWS and SCS agreed to use one approach for delineating areas under the jurisdiction of Section 404 and Swampbuster. The four agencies adopted a single manual, referred to as the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (the 1989 Federal Manual). The 1989 Federal Manual established a national standard for

#### **DEFINITIONS OF WETLANDS**

##### **U.S. EPA and Army Corps of Engineers**

*"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

##### **Soil Conservation Service**

*"Wetlands are defined as areas that have a predominance of hydric soils and that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions..."*

##### **Fish and Wildlife Service**

*"Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: 1) at least periodically, the land supports predominantly hydrophytes, 2) the substrate is predominantly undrained hydric soil, and 3) the substrate is nonsoil and is saturated with water on covered by shallow water at some time during the growing season of each year."*

identifying and delineating vegetated wetlands. Consistent with each Agency's regulatory definition, the 1989 Federal Manual specified the three mandatory technical criteria (or parameters) needed to be met to determine whether or not an area was a wetland. These were: wetland hydrology, hydric soil characteristics, and hydrophytic vegetation. The technical criteria contained in the 1989 Federal Manual were designed to conform with the Federal definitions of wetlands used by the four agencies. The Federal Manual also provided guidance on how to collect and use field indicators (such as free water, water-stained leaves, silt marks, wetland dependent plant species and organic soils) to determine whether or not the technical criteria were met.

**REVISING THE 1989 FEDERAL MANUAL** - When the Federal Manual was adopted, it was anticipated that future revisions might be required. Revisions to the 1989 Federal Manual are based on the experience gained from its use over the past two years. Recommendations for changes were received from both inside and outside the agencies. Because of the strong degree of public interest in the Federal Manual, the four agencies provided the public with several opportunities to submit technical comments as part of the Federal Manual revision process. Four public meetings were



held in 1990 (Sacramento, California; St. Paul, Minnesota; Baltimore, Maryland; and Baton Rouge, Louisiana) to solicit comments from the public on technical revisions to the document. In addition, numerous written comments were submitted and reviewed during a public comment period which was publicized by a notice in the Federal Register. The four agencies also reviewed assessments by agency field staff using the 1989 Federal Manual.

This process resulted in the development of a substantial and useful set of concerns and recommendations that was used in developing the revisions currently being proposed. The four agencies met regularly from October 1990 through April 1991 to develop the proposed revisions to the 1989 Federal Manual. Some of the key technical issues needing re-examination were: wetland hydrology criterion, the use of hydric soil for delineating the wetland boundary, the assumption that facultative vegetation could be used to demonstrate wetland hydrology, the depth and duration of saturation, the definition of the growing season, and the nature of the determination process which provided opportunities for misuse. In addition, general misunderstandings of the 1989 Federal Manual were addressed. Perhaps the issue that engendered the most concern involved the use of hydric soils for wetland identification and delineation. This led to the misconception

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#### STATISTICS ON SECTION 404 PERMIT ACTIVITIES AND SECTION 404(c) ACTIONS

##### Permit Activities

The Clean Water Act Section 404 program regulates the discharge of dredged or fill material into waters of the United States, a term which includes most of the Nation's wetlands. In general, the Corps receives approximately 15,000 individual permit applications annually (this number includes both Section 404 and Section 10 applications). Of these 15,000 individual permit applications:

- approximately 10,000 permits (67%) are issued;
- approximately 500 permit applications (3%) are denied;
- approximately 4,500 permit applications (30%) are withdrawn by the applicant or qualify for a general permit.

In addition, approximately 75,000 minor activities are authorized each year through regional and nationwide general permits. General permits authorize activities in wetlands and other waters without the need for individual permit review as long as these activities cause only minimal adverse environmental effects. Nationwide permit #26, in particular, authorizes activities involving discharges of dredged or fill material into 10 acres or less of isolated waters or headwaters streams (non-tidal streams where the average annual flow is 5 cubic feet per second or less). For activities that affect between 1 and 10 acres of such waters, the applicant is required to notify the Corps of Engineers prior to proceeding with any discharge.

##### Permit Review Period

Approximately 92% of all permit evaluations (that is, both individual and general permits) are completed in less than 60 days after a completed permit application has been received by the Corps.

Individual permit applications that involve complex projects or sensitive environmental issues usually require more than 60 days to reach a decision. After a completed individual permit application has been received by the Corps:

- over 50% are processed in less than 60 days;
- approximately 25% percent are processed in 61 to 120 days;
- approximately 20% require 121 days to a year to process; and
- less than 5% require more than one year to process.

##### Summary of EPA Section 404(c) Actions (as of 5/91)

Section 404(c) of the Clean Water Act authorizes the Administrator of EPA to prohibit or restrict discharges of dredged or fill material into waters of the United States when such discharges would have unacceptable adverse effects on municipal water supplies, shellfish beds and fishery areas, wildlife or recreational areas. To date, EPA has completed only eleven Section 404(c) actions, out of an estimated 150,000 permit applications received since the Section 404(c) regulations went into effect in late 1979.

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that the 1989 Federal Manual was based not on three mandatory criteria, but rather solely on one criterion -- the hydric soil criterion. Some individuals believed that any area mapped as a hydric soil series was a wetland. These misunderstandings needed to be addressed. From these and other concerns raised, it was clear that a better defined set of field indicators was needed to prevent incorrect positive identification of the three technical criteria.

### **REVISIONS TO THE 1989 FEDERAL MANUAL: INCREASING THE BURDEN OF PROOF** - The goal in revising the 1989 Federal Manual is to improve the 1989 Federal Manual's accuracy for identifying and delineating wetlands. The proposed

revisions also address many of the issues raised in the public comments and public meetings. The changes incorporate technical knowledge derived from the use of the 1989 Federal Manual in the past two years and from improvements in the state of the science. It is important to note that these proposed revisions, as with the 1989 Federal Manual, are intended to be consistent with the definition of wetlands used in implementing the Section 404 program and the Swampbuster provisions of the Farm Bill.

The major changes would increase the burden of proof required to identify and delineate a wetland by clarifying and restricting the manner in which field indicators are used to indicate whether the three criteria (wetland hydrology, hydrophytic vegetation and hydric soils) are met. This approach to wetland delineation will make it easier for Federal or State agency staff to explain to landowners how wetlands are being delineated.

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#### **EXPLAINING THE THREE CRITERIA FOR**

**WETLANDS** - Under natural, undisturbed conditions, vegetated wetlands generally possess three characteristics - wetland hydrology, hydrophytic vegetation, and hydric soils. The proposed revised Federal Manual provides field indicators to verify the presence of these criteria.

**Wetland Hydrology:** The driving force creating wetlands is wetlands hydrology. The presence of water is essentially what makes a wetland a wetland. Field staff may not be able to directly observe more than two weeks of inundation and/or saturation if they are not present during the right part of the growing season or for a long enough observation period. Unless specifically addressed in the proposed revised Federal Manual as exceptions or disturbed areas, areas without any of the hydrologic indicators provided in the proposed Federal Manual are nonwetland areas.

**Hydrophytic Vegetation:** The term "hydrophytic vegetation" describes plants that live in "wet" conditions. However, not all plants that grow in wetlands grow only in wetlands. The majority of plant species growing in wetlands also grow in non-wetlands or in upland areas in varying degrees. Thus, plants alone cannot be used to identify and delineate wetlands. The determination of whether or not the vegetation in an area meets the criteria is based on estimated frequencies with which the plant species found in the area occur in wetlands.

**Hydric Soil:** The National Technical Committee for Hydric Soils has developed criteria for hydric soils and a list of the nation's hydric soils. The Federal Manual's hydric soil criterion is based on the Committee's criteria for hydric soil. Wetlands typically possess hydric soils but the presence of indicators of hydric soils does not necessarily mean that the area is a wetland.

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The proposed revised Federal Manual is being released along with a Preamble which further clarifies the major issues on which we are specifically soliciting public input. However, we wish to emphasize that we are also requesting comments on the entire proposed revised Federal Manual.

**The major revisions do the following:**

1) The Three Criteria:

- Clarify that, except in limited specified circumstances, demonstration of all three parameters (wetland hydrology, hydrophytic vegetation and hydric soils) is required for delineating vegetated wetlands.

2) Limited Specified Exceptions to the Three Criteria:

- Clarify that independent indicators of all three parameters are required **UNLESS** the area is a disturbed wetland or the area is specifically listed in the proposed Federal Manual as an exception.
- Specifically identify exceptions (i.e, playa lake, prairie pothole, vernal pool, pocosin, and other special wetlands that fail the hydrophytic vegetation criterion such as Tamarack Bogs, White Pine Bogs and Hemlock Swamps). Exceptions are widely recognized valuable wetland types that may fail to meet one or more of the 3 criteria during all or some part of the year. Request public comment on the listed exceptions as well as potential additions to the list, and on recommendations for identifying appropriate indicators for each wetland type listed as an exception.

3) Wetland Hydrology Criterion:

- Require inundation for 15 or more consecutive days, or saturation to the surface for 21 or more consecutive days during the growing season.
- Require saturation to the soil surface.
- Narrow the wetland hydrology indicators to exclude Hydric Soils and Wetland Vegetation as hydrology indicators.
- Separate the list of wetland hydrology indicators into primary and secondary indicators. Primary indicators are more reliable and can be used alone to meet hydrology criterion. Secondary indicators are weaker and can only be used with corroborative information.

- Remove water stained leaves, trunks, and stems as wetland hydrology indicators; public comments are requested in the Preamble regarding their reliability as indicators of hydrology during the growing season and whether they should be primary or secondary indicators.
- Incorporate localized differences in the growing season; the proposal solicits comments on the definition of the growing season.

#### 4) Hydric Soils Criterion:

- Specifically state that hydric soils must be field-verified; hydric soils maps alone are not sufficient evidence of hydric soils.
- Clarify that the three wetland criteria are mandatory except in specified circumstances, and therefore the presence of mapped hydric soils alone cannot be used to delineate an area as a wetland.
- Incorporate localized differences for certain hydric soil phases.

#### 5) Wetland Vegetation Criterion:

- Propose the prevalence index approach -- that is, the vegetation is considered wetlands vegetation and therefore meets this criterion if, under normal circumstances, a frequency analysis of all species within the plant community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0).

**PREAMBLE REQUESTS PUBLIC COMMENTS** - In addition, the Preamble requests comments regarding the following issues. Some of these issues have been discussed in the preceding section.

#### Issue 1: Seasonally Harder to Identify Wetland Types

- We are requesting public comment on three alternatives to identifying and delineating seasonally harder to identify wetland types that are NOT exceptions to the criteria, but may not demonstrate indicators of one or more of the 3 criteria during certain (e.g., dry) times of the year. The proposed Federal Manual explicitly requires that for an area to be delineated as a vegetated wetland it must have three components: wetlands hydrology, hydric soil, and hydrophytic vegetation. It is essential that the revised Federal Manual allow accurate wetlands determinations to be made at any time of the year (i.e., areas should not be incorrectly

identified as wetlands because the delineation was conducted during a wet time of year, nor should wetlands be identified incorrectly as upland because the delineation was conducted during normally dry times). The revised Federal Manual clearly must provide the necessary flexibility to perform wetlands determinations throughout the year regardless of normal variations in conditions such as seasonal wetness. It is also essential that the revisions to the Federal Manual not exclude obvious, long-recognized wetland types that clearly satisfy the regulatory definition.

#### Issue 2: Secondary Indicators of Wetlands Hydrology

- The proposed Federal Manual identifies several secondary indicators of wetlands hydrology. We are requesting comments on the technical validity and usefulness of these indicators.
- In addition, we request comments on whether or not water stained leaves, trunks or stems that are grayish or blackish in appearance as a result of being under water for significant periods should be included as an indicator of hydrology, their reliability as indicators of hydrology during the growing season, and whether they should be a primary or secondary indicators.

#### Issue 3: Exceptions to Requiring All Three Criteria

- We request public comment on the listed exceptions (i.e, playa lake, prairie pothole, vernal pool, pocosin, and other special wetlands that fail the hydrophytic vegetation criterion such as Tamarack Bogs, White Pine Bogs and Hemlock Swamps) as well as potential additions to the list, and on recommendations for identifying appropriate indicators for each wetland type listed as an exception.

#### Issue 4: Status of Delineations Based on the 1989 Federal Manual

- The 1989 Federal Manual will remain in effect until the revised Federal Manual becomes final. Agency staff who are making wetland delineations before the revised Federal Manual becomes final, will be advised to apply caution in making wetland delineations that could be potentially inconsistent with these proposed revisions. Any landowner whose land has been delineated a wetland after the revised Federal Manual is proposed but before the proposed revised Federal Manual becomes final may request a new delineation following publication of the final revised Federal Manual. However, final actions, such as permit issuances or completed enforcement actions, already taken on wetlands delineated

under the 1989 manual will not generally be reopened. In addition, a landowner whose property has been identified as a wetland during a seasonal dry period or drought can request a re-evaluation in the field during the wet season of the year.

- The agencies are also requesting comment on the likelihood of sites being delineated during the dry season as wetland that, if the delineation had occurred during the wet season, would not have met the hydrology criterion. Should requests for re-evaluations be limited to certain cases or should all requests be granted?

#### Issue 5: Hydrophytic Criterion

- The agencies are particularly interested in soliciting comments on including the Facultative Neutral test as part of the hydrophytic vegetation criterion in addition to the proposed prevalence index approach. Under this proposed approach the criterion would be met if after discounting all dominant facultative (FAC) plants, the number of dominant obligate wetland (OBL) and facultative wetland (FACW) species exceeds the number of dominant facultative upland (FACU) and obligate upland (UPL) species. (Note: a number of options are presented describing circumstances under which the prevalence index procedure would be used.)
- The agencies are also interested in soliciting comments on variants of the Facultative Neutral test.

#### Issue 6: Use of Hydrologic Records

- We are requesting comments on the data requirements for hydrologic records (e.g., cutoff for "normal rainfall" years) to document that the wetland hydrology criterion has been met.

#### Issue 7: Alternative Approach for Easily Recognized Wetlands

- We are requesting comments on alternative approaches that would allow identification of categories that can be identified and delineated rapidly and without the need for extensive documentation. We are soliciting comments on the basic approach taken in the Federal Manual of delineating every site individually. Is this the best approach?

#### Issue 8: Defining the Growing Season

- We are soliciting comments on the proposed definition of the growing season and whether there are other more appropriate alternatives.

**PUBLIC INPUT PLANNED ON THE PROPOSED REVISIONS** - There has been and continues to be significant public interest in the 1989 Federal Manual and potential revisions. The proposed revised Federal Manual was published on August 14, 1991, in the Federal Register for public comment. The public is invited to review and provide technical comments on the proposed revisions. Written comments must be submitted on or before October 15, 1991.

At the same time the proposed revised Federal Manual will undergo extensive field testing by the four federal agencies. Also during the public comment period an independent panel, as well as EPA and the Corps of Engineers, will review and field test the proposed revised Federal Manual. The field testing and public comments will provide important input into the final Federal Manual revisions, particularly in those areas identified above. Of particular importance to us is to maintain and improve the scientific validity of our delineation methods. Because of the importance of receiving public comment and field testing the proposed revisions, the revised Federal Manual will not be implemented until after the public review period and final revisions.

**GETTING MORE INFORMATION** - EPA has established the Wetlands Protection Hotline, a toll-free telephone service, (800) 832-7828. This service provides information and publications on wetland protection efforts involving EPA and other public and private programs. The hotline operates Monday through Friday, excluding Federal holidays, from 9:00 a.m. to 5:30 p.m., Eastern Standard Time.

For additional information regarding the Section 404 program, local EPA Regional Offices and Corps District offices may be of assistance. The Corps District office and EPA Regional offices can be found in the telephone directory or by calling the EPA Wetlands Hotline at (800) 832-7828.

For additional information on the Swampbuster program, contact your county U.S. Department of Agriculture SCS office or call the EPA Wetlands Hotline at (800) 832-7828 for the number of your State Conservationist.

**OBTAINING COPIES OF THE REVISED FEDERAL MANUAL** - Copies of the proposed revised Federal Manual can be obtained from the EPA Wetlands Hotline at (800) 832-7828. Hotline representatives can also provide referrals for answers to questions regarding the proposed revised Federal Manual.

**FURTHER CLARIFYING THE SECTION 404 PROGRAM** - Much of the public is laboring under the misunderstanding that if an area is identified as a wetland, any activity that takes place in the wetland is either regulated or prohibited. This is not true.

First, not all activities in wetlands require a Section 404 permit. Section 404 only regulates the discharge of dredged or fill material into waters of the U.S., a term which includes most of the Nation's wetlands. Not all activities in wetlands involve a discharge of dredged or fill material, and therefore do not require a Section 404 permit. There are several development activities that cause wetland conversion or damage, but do not involve discharge of dredged or fill material. Under certain circumstances, these may include: lowering of groundwater levels, flooding of wetlands, drainage of wetlands, and excavation of wetlands where the dredged material is disposed of on an upland site.

Activities which are under the scope of the Section 404 program are not necessarily prohibited. Most of the activities subject to Section 404 requirements are either exempt from the program (such as ongoing farming and silviculture activities) or are authorized by one of the Corps' general permits.

Activities which are subject to Section 404 are authorized either through a general or individual permit. Activities in wetlands that cause only minimal adverse environmental effects are authorized under general permits. General permits do not require case-specific permit review and are designed to expedite permitting process. Approximately 75,000 activities are authorized through general permits which are issued on a State, regional and nationwide basis. There are currently 26 nationwide general permits, and numerous state and regional general permits.

In addition, the Clean Water Act, under Section 404(f), generally exempts discharges associated with normal farming, ranching and forestry activities such as plowing, cultivating, minor drainage, and harvesting for the production of food, fiber and forest products or upland soil and water conservation practices. This exemption pertains to normal farming and harvesting activities that are part of an established, ongoing farming or forestry operation.

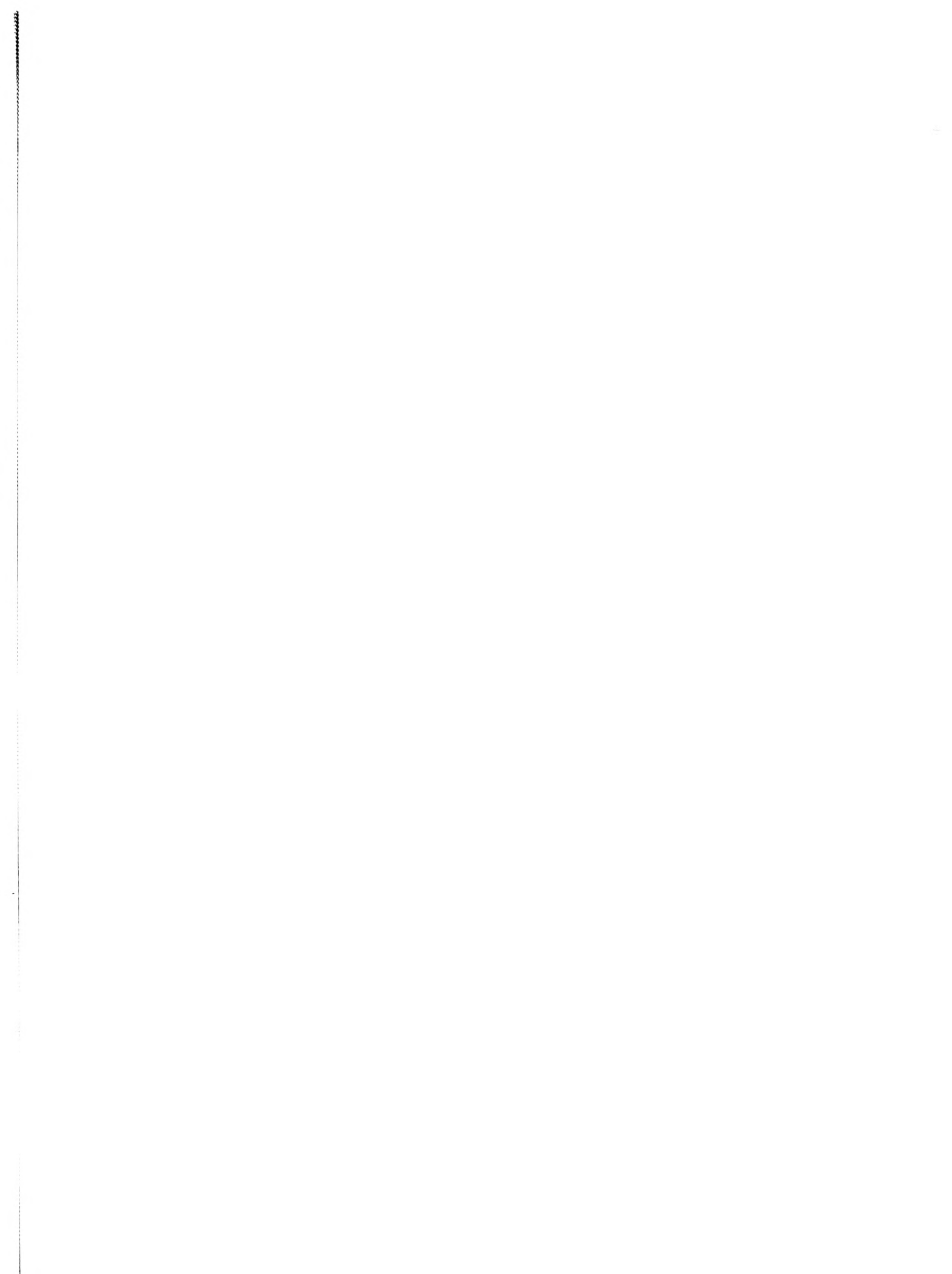
**OTHER EPA ACTIVITIES** - There are, however, a number of issues which have been raised by the public regarding the Section 404 regulatory program and other Federal wetlands protection programs that are being responded to by EPA through various administrative actions. EPA is currently working with the Corps to respond to these concerns. For additional information, contact J. Glenn Eugster, Wetlands Division, EPA at (202) 382-5043.





**Questions And  
Answers On The  
Proposed Revised  
Federal Manual**

**Questions And Answers**



# PROPOSED REVISED FEDERAL WETLANDS DELINEATION MANUAL QUESTIONS AND ANSWERS

## BACKGROUND

What is the Section 404 program?

The Section 404 permit program regulates the discharge of dredged or fill material into waters of the United States, a term which includes most of the Nation's wetlands. This program is jointly implemented by the Environment Protection Agency (EPA) and the Army Corps of Engineers (Corps), with advice from the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS). The Corps of Engineers handles the day-to-day administration of the program, including jurisdictional determinations, evaluating permit applications and deciding whether to issue or deny the permit, and enforcement. EPA has also several significant statutory responsibilities in the program including development, with the Corps, of the program's environmental standards (the Section 404(b)(1) Guidelines); restricting or prohibiting discharges that have unacceptable adverse effects (Section 404(c)); determining the scope of geographic jurisdiction; enforcement (EPA and the Corps both have enforcement authority); approval and oversight of State program assumption; and determining the applicability of permit exemptions for many agricultural and silvicultural activities under Section 404(f).

### Statistics on Section 404 permit reviews and activities

Permit Activities -- The Clean Water Act Section 404 program regulates the discharge of dredged or fill material into waters of the United States. In general, the Corps receives approximately 15,000 individual permit applications annually (this number includes both Section 404 and Section 10 applications). Of these 15,000 permit applications:

- approximately 10,000 permits (67%) are issued;
- approximately 500 permit applications (3%) are denied;
- approximately 4,500 permit applications (30%) are withdrawn by the applicant or qualify for a general permit.

In addition, approximately 75,000 minor activities are authorized each year through regional and nationwide general permits. General permits authorize activities in wetlands and other waters without the need for an individual permit review as long as these activities cause only minimal adverse environmental effects. Nationwide permit #26, in particular, authorizes activities involving discharges of dredged or fill material into 10 acres or less of isolated waters or headwaters streams (non-tidal streams where the average annual flow is 5 cubic feet per second or less). For activities that affect

between 1 and 10 acres of such waters, the applicant is required to notify the Corps of Engineers prior to proceeding with any discharge. In some States, general permits authorize activities covered by a State wetlands regulatory program.

Permit Review Period -- Approximately 92% of all permit evaluations (that is, both individual and general permits) are completed in less than 60 days after a completed permit application has been received by the Corps.

Individual permit applications that involve complex projects or sensitive environmental issues usually require more than 60 days to reach a decision. After a completed individual permit application has been received by the Corps:

- over 50% are processed in less than 60 days;
- approximately 25% percent are processed in 61 to 120 days;
- approximately 20% require 121 days to a year to process; and
- less than 5% require more than one year to process.

In addition, the Administration announced on August 9, 1991, a comprehensive plan for improving the protection of the Nation's wetlands, including a provision that permits will be deemed approved within six months unless the deadline is extended for good cause (see attached Fact Sheet on "Protecting America's Wetlands"). EPA and the Corps will provide further guidance as we move in this direction.

#### Statistics on Section 404(q) and Section 404(c) actions

Section 404(c) Actions -- Section 404(c) of the Clean Water Act authorizes the Administrator of EPA to prohibit or restrict discharges of dredged or fill material into waters of the United States when such discharges would have unacceptable adverse effects on municipal water supplies, shellfish beds and fishery areas, wildlife or recreational areas. To date, EPA has completed only eleven Section 404(c) actions, out of an estimated 150,000 permit applications received since the Section 404(c) regulations went into effect in late 1979.

Section 404(q) Actions -- Pursuant to Section 404(q), the Corps and EPA have developed a process through a Memorandum of Agreement (MOA) to resolve any differences over permit decisions within a clear timeframe to minimize delays in the permit process. Since 1980 when the Section 404(q) MOA was first agreed to, EPA has requested Headquarters level review of a permit decision only 28 times out of an estimated 150,000 permit applications received throughout this period.

Further clarifying the section 404 program: Are all uses of a wetland either regulated or prohibited?

Much of the public is laboring under the misunderstanding that if an area is identified as a wetland, any activity that takes place in the wetland is either regulated or prohibited. This is not true.

First, not all activities in wetlands require a Section 404 permit. Section 404 only regulates the discharge of dredged or fill material into waters of the U.S., a term which includes most of the Nation's wetlands. Not all activities in wetlands involve a discharge of dredged or fill material, and therefore do not require a Section 404 permit. There are several development activities that cause wetland conversion or damage, but do not involve discharge of dredged or fill material. Under certain circumstances, these may include: lowering of groundwater levels, flooding of wetlands, drainage of wetlands, and excavation of wetlands where the dredged material is disposed of on an upland site.

Activities which are under the scope of the Section 404 program are not necessarily prohibited. Most of the activities subject to Section 404 requirements are either exempt from the program (such as ongoing farming and silviculture activities) or are authorized by one of the Corps' general permits.

Activities which are subject to Section 404 are authorized either through a general or individual permit. Activities in wetlands that cause only minimal adverse environmental effects are authorized under general permits. General permits do not require case-specific permit review and are designed to expedite permitting process. Approximately 75,000 activities, out of over 85,000 authorized activities every year, are authorized through general permits which are issued on a State, regional and nationwide basis. There are currently 26 nationwide general permits, and numerous state and regional general permits.

In addition, the Clean Water Act, under Section 404(f), generally exempts discharges associated with normal farming, ranching and forestry activities such as plowing, cultivating, minor drainage, and harvesting for the production of food, fiber and forest products or upland soil and water conservation practices. This exemption pertains to normal farming and harvesting activities that are part of an established, ongoing farming or forestry operation.

## THE FEDERAL MANUAL

### **What is the 1989 Federal Manual?**

In January 1989, EPA, the Corps, FWS and Department of Agriculture Soil Conservation Service (SCS) agreed to use one approach for delineating areas under the jurisdiction of Section 404 and Swampbuster. The four agencies adopted a single manual, referred to as the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (the 1989 Federal Manual), which established a national standard for identifying and delineating vegetated wetlands. The purpose of the 1989 Federal Manual is to establish standard Federal technical criteria for identifying and delineating vegetated wetlands under Section 404 of the Clean Water Act and the "Swampbuster" provisions of the Food Security Act of 1985, as amended. The 1989 Federal Manual uses three categories of evidence (three parameters) to determine whether or not the technical criteria are met. These are: wetland hydrology, hydric soil characteristics, and hydrophytic vegetation.

The 1989 Federal Manual provides guidance on how to collect and use field indicators (such as free water, silt marks, wetland dependent plant species and organic soils) of these parameters to accurately identify and delineate wetlands.

### **Should the Federal Manual be solely relied on to identify and delineate jurisdictional wetlands?**

No. The Federal Manual provides mandatory technical criteria for the identification and delineation of wetlands, and will be used to identify wetlands that are potentially subject to the jurisdiction of Section 404 of the Clean Water Act or the "Swampbuster" provisions of the Food Security Act of 1985, as amended. However, wetland jurisdictional determinations for regulatory purposes are based on other legal and policy criteria in addition to the Federal Manual's technical criteria (e.g., regulatory guidance on normal circumstances as it pertains to prior converted croplands). Therefore, the appropriate agency policy should be consulted in conjunction with the Federal Manual when identifying and delineating jurisdictional wetlands.

## THE 1989 FEDERAL MANUAL REVISION PROCESS

### **Why is the 1989 Federal Manual being revised? What was the goal of the Federal Manual revision process?**

The goal of revising the 1989 Federal Manual is to improve the Federal Manual's ability to properly identify wetlands and to minimize the potential for erroneous wetlands determinations. When the 1989 Federal Manual was adopted, it was

anticipated by EPA, the Corps, FWS and SCS that some additional guidance or clarification may be needed. After about a year of implementation of the Federal Manual, the four agencies agreed that specific technical changes would be appropriate to make the Federal Manual more effective and understandable.

The proposed revisions tighten the evidence requirements for the three parameters -- hydrology, hydric soils, and hydrophytic vegetation -- in the definition of wetlands. This approach to wetland delineation will make it easier for Federal or State agency staff to explain to landowners how wetlands are being delineated. The proposed revisions are intended to reduce the potential for erroneous wetland determinations -- that is, identifying an upland as a wetland or conversely, identifying a wetland as upland. The proposed revisions are intended to be consistent with the definition of wetlands used by EPA and the Corps in implementing the Section 404 program or by SCS in implementing the Swampbuster program.

The proposed revisions incorporate technical knowledge derived from its use in the past two years and from improvements in the state of science. The revisions address many of the issues raised during the public meetings and public comment period (the summer of 1990).

**What was the revision process of the 1989 Federal Manual? What was the role of the public in the revision process?**

After over a year of implementation of the 1989 Federal Manual, the four agencies agreed that the Federal Manual needed additional clarification and changes. Because of the strong public interest in the Federal Manual, the four agencies provided the public several opportunities to provide technical comments as part of the revision process. Four public hearings were held in spring and summer 1990 -- in Baton Rouge, LA; Sacramento, CA; St. Paul, MN; and, Baltimore, MD. In addition, written comments on the 1989 Federal Manual were also accepted subsequent to the meetings. More than 500 letters were received and reviewed. We believe that this process has provided substantial and meaningful information. Results of formal field testing conducted by EPA to evaluate the sampling protocols of the 1989 Federal Manual and reviews by field staff of the four signatory agencies using the Federal Manual were also reviewed and considered in developing recommended revisions.

**What was the role of the technical committee?**

The Federal Interagency Committee for Wetland Delineation is a technical committee composed of technical staff from the four agencies that developed the 1989 Federal Manual: Environmental Protection Agency, Corps of Engineers, Soil Conservation



Service, and Fish and Wildlife Service. The role of the technical committee in the revision process was to recommend technical revisions to the 1989 Federal Manual based on field experience and technical comments from the public during the public meetings and public comment period scheduled in 1990. The technical committee completed their revisions in the spring of 1991.

**Have the four agencies agreed to the proposed revised Federal Manual?**

The four agencies, the Environmental Protection Agency, Department of Defense, Department of Agriculture, and Department of Interior have agreed to the Federal Register Notice of the proposed revised Federal Manual and agreed that the Federal Manual is ready for public comment.

**To what extent does policy affect the proposed revisions to the Federal Manual?**

The purpose of the Federal Manual is to establish standard Federal technical criteria for identifying and delineating vegetated wetlands. Therefore, the Federal Manual primarily deals with the technical criteria consistent with the regulatory definitions of wetlands. However, the Federal Manual is not solely a technical document. There are policy issues addressed in the proposed revised Federal Manual. A key policy consideration is, for example, the determination of "normal circumstances" under the regulatory definition of wetlands. Another is the extent of evidence necessary for each of the three criteria in order to make a positive wetland determination.

**Do the agencies plan to field test the revised Federal Manual before it is finalized and implemented ?**

Yes. The four agencies are planning to fully field test the revised Federal Manual before finalizing it. The intent of the field testing, which we expect to occur while the Federal Manual is under public review, is to verify its technical validity in delineating wetlands, assure its ease of implementation and reveal any unanticipated effects. We are also interested in evaluating the applicability of the Federal Manual to all regions of the country. The Corps will coordinate field testing among the four agencies at the field level.

An independent expert panel will also field test the revised Federal Manual. Upon completion of field testing, the expert panel as well as the regions and district offices of the four agencies will provide recommendations to the agencies to assist in developing necessary final revisions to the Federal Manual. We also encourage other interested parties to conduct field tests of the proposed revised Federal Manual and provide recommendations during the public comment period.

## PUBLIC INPUT IN THE REVISION PROCESS

**Will the public have an opportunity to comment on the proposed revised Federal Manual?**

Yes. The proposed revised Federal Manual was published on August 14, 1991, in the Federal Register for public comment. The public is invited to review and provide technical comments on the proposed revisions. Written comments must be submitted on or before October 15, 1991. Copies of the proposed revised Federal Manual are also available through the Wetlands Hotline at (800) 832-7828.

The revisions will be implemented only after the public comments have been reviewed and considered, and a final Federal Manual has been issued. We encourage interested parties to conduct field tests of the proposed revised Federal Manual and provide recommendations during the public comment period. In addition, an independent panel of experts will field test the proposed revised Federal Manual. The expert panel will provide recommendations to the agencies to assist in developing necessary revisions to the Federal Manual.

**Will there be public hearings held on the proposed revised Federal Manual?**

There are no public hearings scheduled. Specific detailed questions about the proposed revised Federal Manual can be referred to individuals identified in the Preamble of the Federal Register notice.

**Will the proposed revised Federal Manual undergo public comment in accordance with the Administrative Procedure Act (APA)?**

The position that this Federal Manual is a technical guidance document which is not required by law to go through Administrative Procedure Act (APA) legislative rulemaking procedures has been upheld in court with respect to the 1989 wetlands delineation Manual. However, the Federal Manual was published on August 14, 1991, in the Federal Register, with a 60-day period for public review and comment.

**Will the Federal Manual be issued as a regulation?**

The agencies believe that it would be appropriate and in the public interest to include parts of the final Federal Manual in the Code of Federal Regulations. When the agencies determine what portions of the Federal Manual should be issued as a regulation, they will provide notice of specific proposed regulatory language in the Federal Register at least 30 days prior to the end of the public comment period. The regulatory language will be subject to the Administrative Procedure Act rulemaking process.

## KEY CHANGES TO THE FEDERAL MANUAL

### What are the major revisions to the 1989 Federal Manual?

The major revisions and other major issues identified in the Preamble to the Manual include the following:

#### 1) The Three Criteria:

- Clarify that, except in limited specified circumstances, demonstration of all three parameters (wetland hydrology, hydrophytic vegetation and hydric soils) is required for delineating vegetated wetlands.

#### 2) Limited Specified Exceptions to the Three Criteria:

- Clarify that independent indicators of all three parameters are required UNLESS the area is a disturbed wetland or the area is specifically listed in the proposed Federal Manual as an exception.
- Specifically identify exceptions (i.e, playa lake, prairie pothole, vernal pool, pocosin, and other special wetlands that fail the hydrophytic vegetation criterion such as Tamarack Bogs, White Pine Bogs and Hemlock Swamps). Exceptions are widely recognized valuable wetland types that may fail to meet one or more of the 3 criteria during all or some part of the year.
- Request public comment on the listed exceptions as well as potential additions to the list, and on recommendations for identifying appropriate indicators for each wetland type listed as an exception.

#### 3) Wetland Hydrology Criterion:

- Require inundation for 15 or more consecutive days, or saturation to the surface for 21 or more consecutive days during the growing season.
- Require saturation at the soil surface.
- Narrow the wetland hydrology indicators to exclude Hydric Soils and Wetland Vegetation as hydrology indicators.

- Separate the list of wetland hydrology indicators into primary and secondary indicators. Primary indicators are more reliable and can be used alone to meet hydrology criterion. Secondary indicators are weaker and can only be used with corroborative information.
- Remove water stained leaves, trunks, and stems as wetland hydrology indicators; public comments are requested in the Preamble regarding their reliability as indicators of hydrology during the growing season and whether they should be primary or secondary indicators.
- Incorporate localized differences in the growing season; the Preamble solicits comments on the definition of the growing season.
- Request public comments on three alternatives to identifying and delineating seasonally harder to identify wetland types that are NOT exceptions to the criteria, but may not demonstrate indicators of one or more of the 3 criteria during certain (e.g., dry) times of the year.

#### 4) Hydric Soils Criterion:

- Specifically state that hydric soils must be field-verified; hydric soils maps alone are not sufficient evidence of hydric soils.
- Clarify that the three wetland criteria are mandatory except in specified circumstances, and therefore the presence of mapped hydric soils alone cannot be used to delineate an area as a wetland.
- Incorporate localized differences for certain hydric soil phases.

#### 5) Wetland Vegetation Criterion:

- Propose the prevalence index approach -- that is, an area meets this criterion if , under normal circumstances, a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0).
- Request public comments on including the Facultative Neutral test as part of the hydrophytic vegetation criterion in addition to the proposed prevalence index approach. Under this proposed approach the criterion would be met if after discounting all

dominant facultative (FAC) plants, the number of dominant obligate wetland (OBL) and facultative wetland (FACW) species exceeds the number of dominant facultative upland (FACU) and obligate upland (UPL) species. (Note: a number of options are presented describing circumstances under which the prevalence index procedure would be used.)

**Do the proposed revisions address concerns raised by the public?**

The 1990 public comment period and public meetings resulted in a substantial and useful record of concerns and recommendations that were considered in developing the proposed revisions to the Federal Manual. The 1990 public record focused the agencies' review on key issues, including: the wetland hydrology criterion; concern that wetlands determinations were based on less than all three of the basis parameters (hydrology, vegetation, and soils), and in some cases on only one parameter; concern that areas are dry at the surface (potentially all year round) are considered wetlands based on the presence of water as deep as 18 inches below the surface; the definition of the growing season; the assumption that facultative vegetation can indicate wetland hydrology, which provided opportunities for misuse. The proposed revisions address these and other concerns raised by the public.

**Do the proposed revisions change the definition of wetlands?**

No, the proposed revisions do NOT change the regulatory definition of wetlands used by EPA and the Corps in implementing the Section 404 program or SCS in implementing the Swampbuster program. They are intended to be consistent with the regulatory definitions of wetlands in these programs. However, the agencies are committed to including parts of the final Federal Manual in the Code of Federal Regulations to clarify the criteria by which the definition of wetlands is interpreted.

**Is the proposed revised Federal Manual a three-parameter approach?**

Yes. Independent indicators of all three parameters are required unless the area is a disturbed wetland or an area is a specifically described exception (i.e., playa lake, prairie pothole, vernal pool, pocosin, or other special wetlands that fail the hydrophytic vegetation criterion). Exceptions are widely recognized valuable wetland types that may fail to meet one or more of the three criteria during all or some part of the year. Disturbed wetland areas include situations where field indicators of one or more of the three wetland identification criteria are obliterated or not present due to recent change such as removal of vegetation.

## **How is the growing season defined in the proposed revised Federal Manual?**

The growing season in the proposed revised Federal Manual is the interval between three weeks before the average date of the last killing frost in the spring to three weeks after the average date of the first killing frost in the fall, with exceptions for wetland areas experiencing freezing temperatures throughout the year (e.g., montane, tundra and boreal areas) that nevertheless support hydrophytic vegetation. This growing season for a particular area can be determined by consulting local weather data.

## **EFFECTS OF THE REVISIONS TO THE FEDERAL MANUAL**

### **Will the revisions make it harder to get a Section 404 permit?**

No, the revisions will not affect the Section 404 permit process for those areas identified as jurisdictional wetlands. When a revised Federal Manual is implemented, it, like the 1989 Federal Manual, will only identify whether or not an area is a jurisdictional wetland. It will not change the permit evaluation process.

However, EPA and the Corps continue to respond to concerns raised over the complexity and time consumed by the permit application process by making other administrative changes. These include working on joint permitting procedures with interested states, proposing new nationwide and regional permits for activities in wetlands that have minimal environmental impacts, developing joint guidance to clarify existing policies, encouraging coordination between permit applicants and Federal agencies prior to permit application, and providing more accessible information about wetlands through the EPA Wetlands Hotline at (800) 832-7828.

In addition, the Administration announced on August 9, 1991, a comprehensive plan for improving the protection of the nation's wetlands, including measures to improve the Section 404 regulatory program (see attached Fact Sheet on "Protecting America's Wetlands"). EPA and the Corps will provide further guidance as we move in this direction.

### **What is the effect of the revisions to the scope of jurisdiction?**

The extent of potential changes in jurisdiction will be identified during the field testing. The proposed revisions are intended to reduce the potential for erroneous wetland determinations -- that is identifying an area as a wetland that is not a wetland or conversely, identifying a wetland as upland.

One of the goals of the proposed revision process is to clarify to the public what areas are wetlands. Over the past two years much of the controversy over the scope of

jurisdiction resulted from the widespread misunderstanding that the presence of a mapped hydric soil alone identified a wetland, without any supporting evidence of wetland hydrology or hydrophytic vegetation. This is not true. To reinforce this point, stronger indicators of wetland hydrology are required in the proposed revisions independent of indicators used to demonstrate the presence of hydric soils or hydrophytic plant communities.

Proposed revisions have been made to a number of different sections of the Federal Manual making it difficult to precisely predict the effect of the proposed revisions to the scope of jurisdiction without field testing by qualified personnel. We expect that the field testing of the proposed revised Federal Manual that will be conducted during the public review period will more specifically identify the effects of proposed revisions and help us to respond to any unanticipated impacts.

**Has the proposed revised Federal Manual changed the way wetlands are identified or delineated in disturbed areas such as cropland?**

The revised Federal Manual provides two important clarifications in the procedures for identifying wetlands in disturbed areas. First, the Federal Manual recognizes that there are Federal agency policies under the Clean Water Act Section 404 regulatory program and under the Swampbuster program of the Food Security Act of 1985, as amended, which should be consulted when interpreting the effect of disturbances such as cropping on the jurisdictional status of an area (e.g., regulatory guidance on normal circumstances as it pertains to prior converted croplands). Second, the disturbed areas section of the Federal Manual states clearly that the mere presence of soils meeting the hydric soil criterion is not sufficient to determine that wetlands are present. When the hydrology of an area has been significantly altered, soil characteristics resulting from wetland hydrology cannot by themselves verify wetland hydrology since they persist after wetland hydrology has been eliminated.

### **OTHER ONGOING ADMINISTRATIVE ACTIONS**

**What coordination occurs among EPA Regional staff, Corps District personnel and permit applicants to facilitate the Section 404 permit review process?**

Permit applicants are encouraged to initiate pre-application meetings with regional staff from the Corps, EPA and other commenting agencies to discuss concerns that these agencies might have with a proposed activity and to resolve differences prior to an application being submitted. In so doing, the actual permit review period may be significantly reduced. In order to facilitate these discussions, numerous Corps Districts hold regularly-scheduled (e.g., quarterly, monthly) meetings for applicants and other

agencies including EPA. This early coordination is especially important for controversial projects involving significant environmental impacts.

In addition, EPA and Corps staff are encouraged to work together to resolve differences regarding individual permit applications (e.g., project alternatives, mitigation requirements, specific permit conditions) early in the review process.

Coordination among agencies on the development of regional and general permits under the Section 404 regulatory program creates additional opportunities to expedite the permit process for projects with minor environmental impact. Guidance from EPA and Corps Headquarters (e.g., Memoranda of Agreement, Corps Regulatory Guidance Letters) reduces or eliminates confusion and controversy sometimes associated with implementation of the Section 404 regulatory program that might otherwise lead to delays during permit review.

Finally, the Administration announced on August 9, 1991, a comprehensive plan for improving the Section 404 regulatory program, including measures for effective coordination among the agencies (see attached Fact Sheet on "Protecting America's Wetlands"). EPA and the Corps will provide further guidance as we move in this direction.

**What administrative steps other than the Federal Manual are EPA and the Corps taking to respond to concerns being raised about the Section 404 program?**

The Administration announced on August 9, 1991, a comprehensive plan for improving the protection of the nation's wetlands, including measures to improve the Section 404 regulatory program (see attached Fact Sheet on "Protecting America's Wetlands"). EPA and the Corps will provide further guidance as we move in this direction.

In addition, in response to specific regional and State concerns about timeliness and complexity of the Section 404 regulatory program, EPA and the Corps have employed a variety of administrative tools to respond to specific concerns without reducing our ability to protect wetlands.

Joint Policy Guidance - EPA and Corps Headquarters have issued policy guidance (e.g., Memoranda of Agreement, Corps Regulatory Guidance Letters) intended to reduce or eliminate confusion and controversy sometimes associated with implementation of the Section 404 regulatory program. Such guidance has helped reduce delays during permit review and clarified which activities or areas are subject to the Section 404 program. For example, in response to concerns raised regarding activities in areas subject to agriculture, the Corps issued Regulatory Guidance Letter 90-7 which clarified that prior converted cropland (estimated up to 60 million acres) are NOT subject to Section 404



Section 404 jurisdiction. This made the Section 404 program more consistent with the Swampbuster provisions of the Farm Bill, thereby increasing consistency between Federal wetlands programs.

General Permits - General permits may be issued on a state, regional or nationwide basis. The general permits are designed to expedite the permitting process as long as authorized activities do not result in more than minimal environmental harm. At this time, there are 26 nationwide permits in effect, and the Corps is currently proposing additional nationwide permits. In addition, EPA and the Corps have been working with the States of Maryland, Georgia and Mississippi to develop State and regional program general permits.

Joint Federal/State Processing - EPA and the Corps have also developed Memoranda of Agreement with States to set up systems to increase consistency in joint Federal/State permit processing. For example, EPA Region 9 and Corps South Pacific Division have developed a Memorandum of Agreement with the California Department of Transportation to provide clear guidance on mitigation requirements.

Early Coordination - EPA and Corps staff work together to resolve differences regarding individual permit applications (e.g., project alternatives, mitigation requirements, specific permit conditions) early in the review process. Permit applicants are encouraged to initiate pre-application meetings with regional staff from the Corps, EPA and other commenting agencies to discuss concerns that these agencies might have with a proposed activity and to resolve differences prior to an application being submitted. In so doing, the actual permit review period may be significantly reduced. In order to facilitate these discussions, numerous Corps Districts hold regularly-scheduled (e.g., quarterly, monthly) meetings for applicants and the other agencies including EPA.

Fostering Partnerships with State and Local Programs - Over the last two years, EPA has increased its work with States on wetlands protection through the State Wetlands Protection Grants Program. Thirty-eight States are receiving EPA funding, eleven of which are developing State Wetlands Conservation Plans. These plans include developing comprehensive statewide strategies for strengthening and coordinating the many programs that affect wetlands in a State, and can lead to additional administrative reforms in certain geographic areas, more effective communication between government agencies and the regulated sector and conflict avoidance between wetlands protection and development proposals.

Additional States and Indian tribes are using grants to develop classification systems; inventory wetlands; develop restoration, creation and enhancement programs; assess the effects of site-specific mitigation requirements and design "wetland banks" to account for wetlands losses and gains.

EPA and the Corps have assisted local governments such as Eugene, OR, Bellevue, WA, Boulder, CO and Union City, CA in preparing local wetlands management plans as a portion of the city's general plan. EPA and the Corps also continue to assist in the preparation of state and local government Advance Identification (ADID) plans and special wetland area management plans.

Classification - EPA has also been investigating whether classification of wetlands into a few broad groups based on their functional value and consequently, whether developing an explicit set of corresponding regulatory responses, is an appropriate approach in the Section 404 regulatory program. In addition, as part of a comprehensive plan to improve the Section 404 program, the Administration will establish an interagency technical committee to define a limited number of wetland categories.

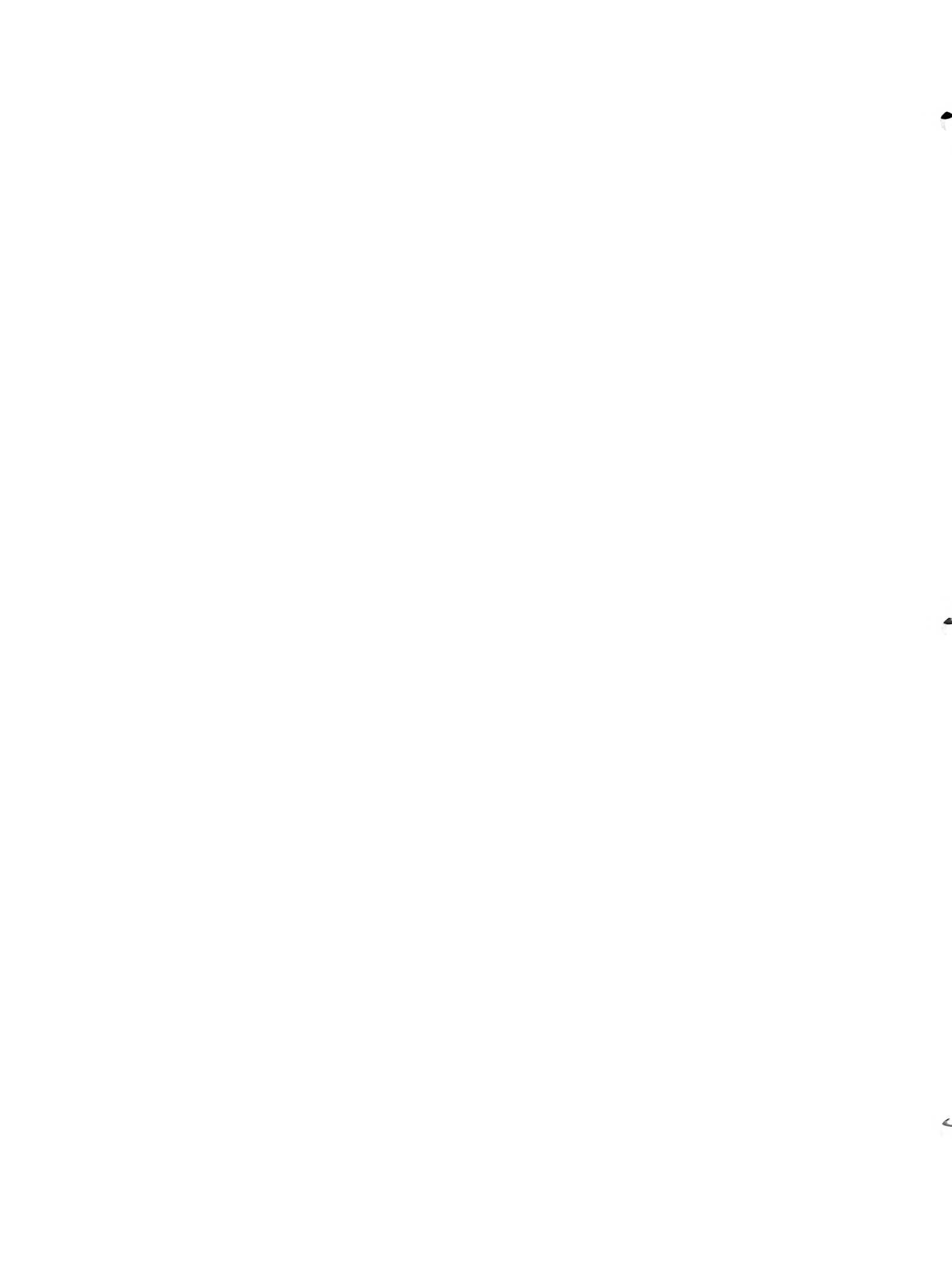
Providing Accurate Information - To increase awareness about the requirements of the Section 404 program and to provide easy, rapid access to accurate information on the Section 404 program and other federal wetland protection efforts, EPA has established a "Wetlands Hotline." This toll free service (800-832-7828) provides information on wetland protection efforts.

In addition, documents such as a brochure distributed to the farm community on "Agricultural Activities in Wetlands that are Exempt from the Section 404 Permit Process of the Clean Water Act," have been prepared to help clarify activities which are not regulated under Section 404.

For additional information regarding these ongoing administrative actions by EPA, contact J. Glenn Eugster, Wetlands Division, Washington, D.C., at (202) 382-5043.

## **OBTAINING COPIES OF THE REVISED FEDERAL MANUAL**

Copies of the proposed revised Federal Manual can be obtained from the EPA Wetlands Hotline at (800) 832-7828. Hotline representatives can also provide referrals for answers to questions regarding the revised Federal Manual.



THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release

August 9, 1991

FACT SHEET

PROTECTING AMERICA'S WETLANDS

The President announced today a comprehensive plan for improving the protection of the nation's wetlands. Wetlands serve an important role in flood control; they help filter wastes from water; they provide an important habitat and breeding ground for fish, birds and animals; and they are an important recreational resource.

Three quarters of the remaining wetlands are privately owned, and the pressure to serve other valid human needs often comes in conflict with conservation. A coordinated wetlands policy requires balancing all these interests.

The President believes we must look beyond regulation to encourage wetlands protection. We must enhance public understanding of the value of wetlands as well as support non-regulatory programs that encourage private, state and local actions to conserve wetlands.

The Administration has a three-part plan to slow and eventually stop the net loss of wetlands, taking a significant step toward the President's goal of no net loss of wetlands:

1. Strengthen wetlands acquisition programs and other efforts to protect wetlands;
2. Revise the interagency manual defining wetlands to ensure that it is workable; and
3. Improve and streamline the current regulatory system.

Wetlands Expansion Measures

Since taking office, the Bush Administration has proposed:

The purchase of approximately 450,000 acres, at a cost of over \$200 million, of critical wetlands habitat;

- A 48 percent overall funding increase for wetlands protection efforts in the FY 1992 budget to \$709 million;
- A nearly three-fold increase, from \$16 million in FY 1989 to \$45 million in FY 1992, for wetlands R&D programs;
- The establishment, under the provisions of the 1990 Farm Bill, of a 600,000 acre wetlands reserve.

To ensure further progress towards the no net loss goal, the Administration today proposed several new initiatives to enhance wetlands protection on Federal and private lands. These include:

- Fully funding the Wetlands Reserve Program in the 1990 Farm Bill. The 1990 Farm Bill authorized the purchase of up to 1 million acres of wetlands. The Administration will work for this amount in FY 1993 and future budgets.
- Initiating an Administration-wide wetlands restoration and creation program on Federal lands. Many agencies, including Interior, EPA, Defense, Commerce, and Energy, have the potential to engage in restoration and creation programs. These activities will be strengthened and coordinated through a standing interagency task force that will develop an overall policy for the most effective use of new and existing Federal resources.
- Continuing to make wetlands a priority in the allocation of Land and Water Conservation Funds (LWCF). The Administration will seek to maintain or increase funding for this program. Moreover, it will target a portion of State LWCF funds to wetlands.
- Continuing and expanding the existing satellite monitoring program to periodically assess national wetland trends. Satellite imagery provides up-to-date information on the status and trends of wetlands, and can help in conducting periodic change analysis of high-value wetland areas. The Administration is accelerating and improving our national inventory of wetlands, with more geographically targeted reporting, and monitoring of the ecological health of our wetlands.
- Expanding research on wetlands. Several agencies independently conduct research on wetlands. The Administration is establishing a process to coordinate, consolidate and establish priorities for wetlands research.

- Focusing public outreach and education programs on informing the regulated community about Federal wetlands regulations.
- Revising the existing Executive Order on wetlands to emphasize wetlands stewardship on Federal lands and the acquisition of valuable wetlands. The Administration will revise the Executive Order to include a commitment to the no net loss goal.

### Delineation Manual

On January 10, 1989, the Environmental Protection Agency, the Army Corps of Engineers, the Fish and Wildlife Service, and the Soil Conservation Service issued a joint Federal Manual for the Identification and Delineation of Wetlands to address inconsistencies in practice among the agencies. The Manual established the technical criteria and procedures used to define a wetland.

In response to public comments and field hearings, the Administration is sending to the Federal Register today a revised Manual that will incorporate changes to clarify the scope and application of the Manual. The revised Manual will be issued as a proposal and as guidance to the agencies; the public will be invited to comment on the Manual before it is made final.

### Streamlining Wetlands Regulations and Adding Flexibility

Under section 404 of the Clean Water Act a landowner must receive a permit from the Corps of Engineers before adding dredged or fill material to a wetland. The Administration will take the following actions to improve the workability of the 404 regulatory program.

#### **A. Streamline the Permitting Process**

To streamline the regulatory process, the Administration proposes a number of reforms to ensure more timely decisions and effective coordination among agencies. These include requirements to:

- Issue a regulatory guidance letter providing that meetings and other interactions between the public, applicant and Federal government will be coordinated through a single agency, the Army Corps of Engineers. The Corps would serve as the project manager, and will be responsible for all consultations with other agencies on the permit applications and for determining the final permit condition;

- Encourage attendance by all interested agencies at the pre-application meetings with the permittee and early consultation on the types and location of mitigation that will be required if wetland losses occur;
- Initiate a wetlands delineation training program for private consultants and better train agency field staff on wetlands functions, values and delineation, using cross-agency training programs to the extent appropriate;
- Deem permits approved within six months if an agency does not extend the deadline for good cause as determined by the Corps of Engineers;
- Require consulting agencies to provide site specific information when commenting on individual permits;
- Replace consulting agency appeals of individual permits with appeals based on resources or issues of national significance; and
- Expand the use of general permits.

#### B. Wetlands Categorization

The Administration will establish an interagency technical committee to define a limited number of major wetland categories based on function, value, and the relative scarcity or abundance of different wetlands. The technical committee will complete its work within 18 months and will consult with outside experts in defining the categories.

#### C. Mitigation Banking

The technical committee will also refine the details of a market-oriented mitigation banking system based on the categories it defines. The mitigation banking system will be designed to provide adequate incentives for the private restoration or creation of wetlands that can be used to mitigate the effects of developed wetlands. The mitigation banking system will:

- Allow permit applicants to satisfy compensatory mitigation requirements through the use of "mitigation credits;"
- Presume satisfaction of permit conditions if the mitigation credits are from the same or from a higher wetland category; and

Replace the preference for on-site mitigation for all wetlands except those in the highest wetland category with a preference for mitigation within States or within major hydrological units which may cross State lines.

#### D. Permit Conditions for Wetlands

The Administration proposes to maintain the process known as sequencing for the high-value wetland category. Permit applicants involving wetlands in the remaining categories will be required to offset wetland losses through compensatory mitigation. States with less than a 1 percent historic rate of wetlands development will be able to satisfy permit requirements through minimization. The Administration will also establish general permits for low-value wetlands.

#### E. Increasing State Role

To increase the role of States in the wetlands permitting process, the Administration will issue guidance to encourage greater use of Regional and State General Permit Programs. States which assume delegation of the 404 program will be given flexibility, to the extent allowed by current law, to tailor the wetland categories based on State resources. State programs would be approved as long as the program achieves on balance the same environmental benefits as the Federal program.

The Administration also supports legislation to allow permitting of wetlands near navigable waters by States that assume responsibility for the permit program.

#### F. Modifying the Coverage of the Program

The Administration supports legislation to expand the scope of the 404 program to include other activities which may destroy wetlands besides the addition of fill material. The Administration will also take steps to exempt man-made wetlands which are not used for purposes of mitigation and whose creation was not subsidized by the Federal government. The Administration will also clarify that normal farming, ranching and silvicultural activities generally are exempt from the 404 program, and that lands exempted from the Swampbuster program are similarly not covered.





**Side-by-Side  
Comparison Of The  
1989 Manual And  
Proposed Revised  
Manual**

**Side-by-Side Comparison**



## BASING WETLANDS DETERMINATIONS ON 3 PARAMETERS - HYDROLOGY, VEGETATION, AND SOILS

### 1989 MANUAL:

Evidence of all 3 parameters are required, BUT could assume hydrology from vegetation or soils IF area was disturbed.

Could assume vegetation from soils and hydrology.

Could assume soils from certain vegetation.

### PROPOSED REVISED MANUAL:

Independent indicators of all 3 parameters are required UNLESS the area is a disturbed wetland or the area is a specifically described exception (e.g., playa lake, prairie pothole, vernal pool, pocosin, and other special wetlands that fail the hydrophytic vegetation criterion). Exceptions are widely recognized valuable wetland types that may fail to meet one or more of the 3 criteria.

Requests public comment on the listed exceptions as well as potential additions to the list, and on recommendations for identifying appropriate indicators for each wetland type listed as an exception.

Requests public comment on three alternatives to identifying and delineating seasonally harder to identify wetland types that are NOT exceptions to the criteria, but may not demonstrate indicators of one or more of the 3 criteria during certain (e.g., dry) times of the year.

**DURATION OF INUNDATION AND/OR SATURATION IN THE WETLAND  
HYDROLOGY CRITERION**

**1989 MANUAL:**

Requires inundation or saturation for one week or more during the growing season.

**PROPOSED REVISED MANUAL:**

Requires inundation for 15 or more consecutive days, or saturation to the surface for 21 or more consecutive days during the growing season.

## DEPTH AT WHICH SOIL SATURATION IS REQUIRED IN THE WETLAND HYDROLOGY CRITERION

### 1989 MANUAL:

Requires saturation to the surface at some point in time during the growing season.

Saturation to the surface would normally occur when, for one week or more, the water table is within:

- 6 inches of the soil surface in somewhat poorly drained mineral soils,
- 12 inches of the soil surface in poorly drained or very poorly drained mineral soils, or
- 18 inches of the soil surface in poorly drained or very poorly drained mineral soils with low permeability (less than 6 inches per hour).

The above-listed depths to the water table were intended to correspond to saturation to the surface caused by capillary action above the water table.

### PROPOSED REVISED MANUAL:

Requires inundation and/or saturation at the surface.

1989 Manual depths to water table as indicators of surface saturation are deleted; replaced by a test for water that can be squeezed or shaken from the surface soil to ensure that capillary action is saturating the soil at the surface.

## TECHNICAL VALIDITY OF ACCEPTABLE INDICATORS OF WETLAND HYDROLOGY

### 1989 MANUAL:

The list of wetland hydrology indicators included both strong and weak indicators, each of which alone could be used to meet the wetland hydrology criterion.

Hydric soil characteristics alone also could be used to meet the hydrology criterion.

### PROPOSED REVISED MANUAL:

Eliminates hydric soil characteristics as hydrology indicators.

Separates list of hydrology indicators into primary and secondary indicators.

Primary indicators are more reliable and can be used alone to meet hydrology criterion.

Secondary indicators are weaker and can only be used with corroborative information. This corroborative information must be of sufficient quality and extent that when taken together with secondary indicators clearly supports the presence of wetland hydrology for the necessary time, duration, and frequency.

Requests public comment on the validity of secondary indicators.

Removes water-stained leaves, trunks, or stems and requests public comment on including this as indicators of hydrology, their reliability as indicators of hydrology and whether they should be primary or secondary indicators.

Solicits comments on the data requirements for hydrologic records (e.g., cutoff for "normal rainfall" years) to document that the wetland hydrology criterion has been met.

## DEFINITION OF GROWING SEASON

### 1989 MANUAL:

Used growing season zones mapped in broad bands across the country according to soil temperature regimes.

### PROPOSED REVISED MANUAL:

Growing season is based on local weather data, and will be from 3 weeks before the last killing frost in the Spring to 3 weeks after the first killing frost in the Fall, except for areas that experience freezing temperatures throughout the year, where appropriate local growing seasons will be applied. The local weather data will be available on a local level, e.g. the county level.

Solicits comment on this definition.



## PUBLIC INPUT TO THE REVISION PROCESS

### 1989 MANUAL:

As an interpretation of the existing regulatory definition of wetlands, the Manual was not required to go through notice and comment rulemaking. There was no opportunity for public input on the Manual prior to its issuance or implementation.

### PROPOSED REVISED MANUAL:

The Agencies held 4 public meetings last Summer and accepted written comments on the 1989 Manual until September 28, 1990. These comments were considered in developing the proposed revisions.

The Manual will be formally proposed in the Federal Register. The position that this Manual is a technical guidance document which is not required by law to go through Administrative Procedure Act (APA) legislative rulemaking procedures has been upheld with respect to the 1989 wetlands delineation manual in Hobbs v. United States, 32 Env't Rep. Cas. (BNA) 2091 (E.D. Va. 1990), appeal pending, No. 90-1861 (4th Cir.). Nonetheless, the agencies believe that it would be appropriate and in the public interest to include parts of the final manual in the Code of Federal Regulations. When the agencies determine what portions of the manual that may be promulgated as a legislative rule, they will provide notice of specific proposed regulatory language in the FEDERAL REGISTER at least 30 days prior to the end of the public comment period. The regulatory language will be subject to the Administrative Procedure Act rulemaking process.

## HYDROPHYTIC VEGETATION CRITERION

### 1989 MANUAL:

Requires under normal circumstances: 1) more than 50% of the composition of the dominant species from all strata are obligate wetland, facultative wetland, and/or facultative wetland species; OR 2) the prevalence index approach (that is, under normal circumstances, a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0).

### PROPOSED REVISED MANUAL:

Proposes the prevalence index approach -- that is, an area meets this criterion if, under normal circumstances, a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0).

Solicits comments on including the Facultative Neutral test as part of the hydrophytic vegetation criterion in addition to the proposed prevalence index approach. Under this approach the criterion would be met if after discounting all dominant facultative (FAC) plants, the number of dominant obligate wetland (OBL) and facultative wetland (FACW) species exceeds the number of dominant facultative upland (FACU) and obligate upland (UPL) species. (Note: a number of options are presented describing circumstances under which the prevalence index procedure would be used.)

Solicits comments on variants of the FAC neutral test.

## STATUS OF DELINEATIONS BASED ON THE 1989 FEDERAL MANUAL

### 1989 MANUAL:

Required the use of 1989 Manual for delineation and such delineations were final.

### PROPOSED REVISED MANUAL:

Any landowner whose land has been delineated a wetland after the revised Manual is proposed but before the proposed revised Manual becomes final may request a new delineation following publication of the final revised Manual. However, final actions, such as permit issuances or completed enforcement actions, already taken on wetlands delineated under the 1989 manual will not generally be reopened.

A landowner whose property has been identified as a wetland during a seasonal dry period or drought can request a re-evaluation in the field during the wet season of the year.

The agencies are soliciting comment on the likelihood of sites being delineated during the dry season as wetland that, if the delineation had occurred during the wet season, would not have met the hydrology criterion. Should requests for re-evaluations be limited to certain cases or should all requests be granted?

## DEFINITION OF A DISTURBED WETLAND AREA AND ITS DELINEATION PROCEDURES

### 1989 MANUAL:

Disturbed wetland areas include situations where field indicators of one or more of the three wetland identification criteria are obliterated or not present due to recent change.

For disturbed areas where vegetation is removed and no other alterations have been done, the presence of hydric soils and evidence of wetland hydrology will be used to identify wetlands. If such evidence is found, conditions are assumed to be sufficient to support hydrophytic vegetation.

### PROPOSED REVISED MANUAL:

Disturbed wetland areas are wetlands that met the mandatory criteria prior to disturbance and have had vegetation, soils, and/or hydrology altered such that the required evidence of the relevant indicators for the affected criteria has been removed. If a disturbed area is identified as a wetland, field personnel shall document the reasons for determining that the site would have been a wetland but for the disturbance.

For disturbed area where the vegetation is removed and no other alterations have been done, evidence of the elimination of the hydrophytic vegetation together with the presence of hydric soils and evidence of wetland hydrology must be used to identify wetlands.

## ALTERNATIVE APPROACH TO DELINEATION ON A SITE-SPECIFIC BASIS

### 1989 MANUAL:

Sites are delineated individually.

### PROPOSED REVISED MANUAL:

Sites are delineated individually.

Solicits comments on alternative approaches that would allow identification of categories that can be identified and delineated rapidly and without the need for extensive documentation.

**Federal Register  
Notice:  
Proposed Revisions  
To The Federal  
Manual For  
Identifying And  
Delineating  
Jurisdictional  
Wetlands**

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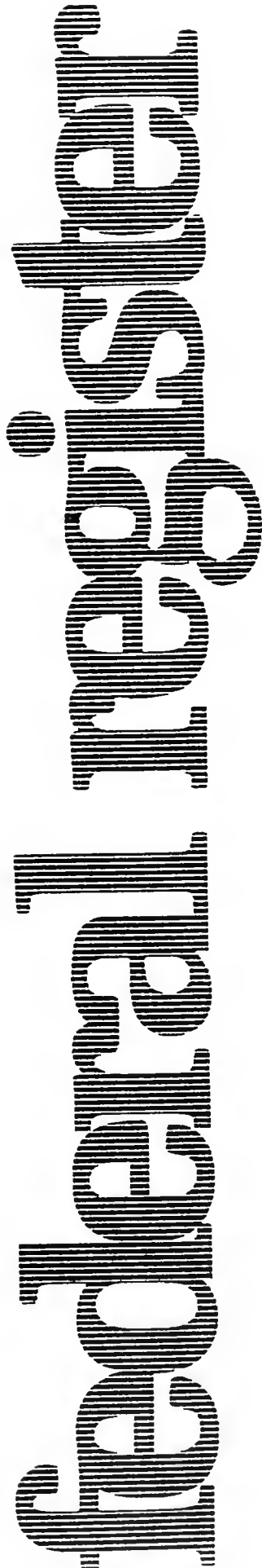




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Wednesday  
August 14, 1991

40445



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## Part VIII

### Environmental Protection Agency

40 CFR Chapter I

### Department of Defense

Corps of Engineers, Department of the Army

33 CFR Chapter II

### Department of Agriculture

Soil Conservation Service

7 CFR Chapter VI

### Department of the Interior

Fish and Wildlife Service

50 CFR Chapters I and IV

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1989 "Federal Manual for Identifying and Delineating Jurisdictional Wetlands";  
Proposed Revisions

**ENVIRONMENTAL PROTECTION  
AGENCY**

40 CFR Chapter I

**DEPARTMENT OF DEFENSE**Corps of Engineers, Department of  
the Army

33 CFR Chapter II

**DEPARTMENT OF AGRICULTURE**

Soil Conservation Service

7 CFR Chapter VI

**DEPARTMENT OF THE INTERIOR**

Fish and Wildlife Service

50 CFR Chapters I and IV

[FRL-3984-4]

**1989 "Federal Manual for Identifying  
and Delineating Jurisdictional  
Wetlands"; Proposed Revisions****AGENCIES:** Environmental Protection  
Agency; Corps of Engineers, Department  
of the Army, DOD; Soil Conservation  
Service, Agriculture; and Fish and  
Wildlife Service, Interior.**ACTION:** Proposed rule and policy  
statement; request for comments.**SUMMARY:** The Environmental Protection  
Agency (EPA); Army Corps of Engineers  
(CE); Department of Agriculture Soil  
Conservation Service (SCS); and  
Department of Interior Fish and Wildlife  
Service (FWS) request public comment  
on proposed revisions to the "Federal  
Manual for Identifying and Delineating  
Jurisdictional Wetlands" (1989 Manual),  
an interagency document adopted  
January 10, 1989. The 1989 Manual  
provides guidance for identifying and  
delineating wetlands for various  
purposes, including determining  
wetlands under the jurisdiction of the  
Clean Water Act Section 404 regulatory  
program.As a result of experience gained  
during the two years since the  
implementation of the 1989 Manual, the  
following revisions are proposed. The  
public is invited to review and provide  
technical comments on these revisions.**DATES:** Written comments must be  
submitted on or before October 15, 1991.**ADDRESSES:** Comments should be  
submitted in writing to: Mr. Gregory  
Peck, Chief, Wetlands and Aquatic  
Resources Regulatory Branch, Mail  
Code (A-104F), U.S. E.P.A., 401 M Street  
SW., Washington, DC 20460.**FOR FURTHER INFORMATION CONTACT:**  
Specific details are available from Mr.  
Michael Fritz (EPA) at (202) 245-3913;  
Ms. Karen Kochenbach (CE) at (202)  
272-0817; Mr. Billy Teels (SCS) at (202)  
447-5991; or Mr. Tom Muir (FWS) at  
(703) 358-2201.**SUPPLEMENTARY INFORMATION:****Background**The regulatory definition of wetlands  
used by the U.S. Army Corps of  
Engineers (Corps) (33 CFR 328.3(b)) and  
EPA (40 CFR 230.3(t)) are the same and  
have remained unchanged since 1977.  
The definition utilizes three  
characteristics of wetlands: Hydrology,  
vegetation, and soils. Prior to 1989, each  
agency also had its own procedures for  
identifying and delineating wetlands,  
which often differed between, as well as  
within, these agencies. Recognizing the  
need for a single, consistent approach  
for wetland determinations and  
boundary delineations, the 1989  
"Federal Manual for Identifying and  
Delineating Jurisdictional Wetlands"  
was developed. The Department of  
Interior Fish and Wildlife Service and  
the Department of Agriculture Soil  
Conservation Service also participated  
in developing the 1989 Manual.The agencies reached agreement on  
technical criteria for identifying and  
delineating wetlands and merged their  
methods into the 1989 Manual, which  
was adopted on January 10, 1989, and  
implemented on March 20, 1989. The  
1989 Manual describes the technical  
criteria, field indicators, and other  
sources of information necessary to  
make wetland jurisdictional  
determinations. This established a  
uniform national procedure for wetland  
identification and delineation, and  
terminated the use of any previous  
locally implemented approaches by the  
signatory agencies.As with the 1989 Manual, the  
proposed Manual on which we are  
soliciting public comment is a technical  
guidance document and provides  
internal procedures for agency field staff  
for identifying and delineating wetlands.  
Both versions of the document serve to  
advise the public prospectively of the  
manner in which agency personnel will  
apply the definition of wetlands to  
particular sites on a case-by-case basis.  
We are today providing an opportunity  
for public comment on the proposed  
revision prior to their implementation in  
order to foster public participation in the  
Manual revision process.**Proposed Revisions**The revision being proposed today  
will improve the 1989 Manual's accuracy  
for identifying and delineating wetlands.The position that this Manual is a  
technical guidance document which is  
not required by law to go through  
Administrative Procedure Act (APA)  
legislative rulemaking procedures has  
been upheld with respect to the 1989  
wetlands delineation manual in *Hobbs  
v. United States*, 32 Env't Rep. Cas.  
(BNA) 2091 (E.D. Va. 1990), *appeal  
pending*, No. 90-1861 (4th Cir.).  
Nonetheless, the agencies believe that it  
would be appropriate and in the public  
interest to include parts of the final  
manual in the Code of Federal  
Regulations. When the agencies  
determine what portions of the manual  
that may be promulgated as a legislative  
rule, they will provide notice of specific  
proposed regulatory language in the  
Federal Register at least 30 days prior to  
the end of the public comment period.  
The proposed revisions address many of  
the issues raised in the public comments  
and public meetings and are intended to  
minimize the potential for erroneous  
wetlands determinations. The changes  
we are developing are not intended to  
reduce jurisdiction. They are intended to  
tighten the evidence requirements for  
the three parameters in the definition of  
wetlands. In addition we expect that the  
revised Federal Manual will make it  
easier for Federal or State agency staff  
to explain to landowners how wetlands  
are being delineated and to incorporate  
technical knowledge derived from its  
use in the past two years and from  
improvements in the state of the science.  
Of paramount importance to us,  
however, is to maintain and improve the  
scientific validity of our delineation  
methods.Based on two years of experience in  
implementing the 1989 Manual and on  
comments received from the public, we  
have identified several concerns which  
the proposed revisions to the 1989  
Manual address. The revisions that are  
being proposed are intended to respond  
to each of these concerns. Comments  
that focus on these areas of major  
revision would be most useful to the  
agencies.1. Concern that wetlands  
determinations were based on less than  
all three of the basis parameters  
(hydrology, vegetation, and soils), and in  
some cases on only one parameter.2. Concern with the concept that 7  
days of wetness is not enough to create  
wetlands.3. Concern that areas are dry at the  
surface (potentially all year round) are  
considered wetlands based on the  
presence of water as deep as 18 inches  
below the surface.4. Concern that under the 1989 Manual  
wetlands hydrology could be considered

demonstrated even without strong evidence of the presence of water.

5. Concern that actual conditions in the field are not accurately reflected by the method by which the growing season is determined in the 1989 Manual.

6. Concern that the 1989 Manual was developed without meaningful public input.

In addition, we are specifically interested in input regarding the following issues:

**Issue 1:** The proposed Manual explicitly requires that for an area to be delineated as a vegetated wetland it must have three components: wetlands hydrology, hydric soil, and hydrophytic vegetation. The Manual establishes criteria for each of these three components. It is essential that the revised Manual allow accurate wetlands determinations to be made at any time of the year (i.e., areas should not be incorrectly identified as wetlands because the delineation was conducted during a wet time of year, nor should wetlands be identified incorrectly as upland because the delineation was conducted during normally dry times). The revised Manual clearly must provide the necessary flexibility to perform wetlands determinations throughout the year regardless of normal variations in conditions such as seasonal wetness. It is also essential that the revisions to the Manual not exclude obvious, long-recognized wetland types that clearly satisfy the regulatory definition.

We are soliciting comments on the following alternatives to specifying seasonally harder to identify wetlands types:

(1) Strictly require use of the three criteria, without exceptions,

(2) Specifically identify wetland types, including identification of useful wetland indicators, and

(3) Allow agency staff to use best professional judgement supported by documented field evidence to determine whether areas that fail to meet all three criteria are wetlands.

**Issue 2:** The proposed Manual identifies several secondary indicators of wetlands hydrology. We are requesting comments on the technical validity and usefulness of these indicators.

In addition, we request comments on whether or not water stained leaves, trunks or stems that are grayish or blackish in appearance as a result of being under water for significant periods should be included as an indicator of hydrology, their reliability as indicators of hydrology during the growing season,

and whether they should be a primary or secondary indicators.

**Issue 3:** The proposed Manual recognizes that there are examples of wetlands which meet the regulatory definition, but which sometimes may meet only two of the three wetland criteria. As described in the revised Manual, these wetlands include prairie potholes, vernal pools, playa lakes, pocosins, and other special wetlands that fail the hydrophytic vegetation criterion. The proposed Manual identifies these wetlands as exceptions, but includes them by specific reference as jurisdictional wetlands. We are requesting comments on the technical validity of this approach, whether additional wetland types should be included as exceptions (such as Pitch Pine Lowlands in the Northeast (New Jersey and Long Island), Jack Pine and White Spruce in Evergreen Forested Swamps of the Northern Midwest, Lodgepole Pine Bogs and Muskegs in the Northwest and Alaska Coasts, Sugar Maple and Paper Birch Swamps and Bogs in the upper Midwest, and Longleaf Pine Wet Savannahs of the Southeast) and recommendations for identifying appropriate indicators for each of the wetland types listed as exceptions.

**Issue 4:** The 1989 Manual will remain in effect until the revised Manual becomes final. Agency staff who are making wetland delineations before the revised Manual becomes final, will be advised to apply caution in making wetland delineations that could be potentially inconsistent with these proposed revisions. Any landowner whose land has been delineated a wetland after the revised Manual is proposed but before the proposed revised Manual becomes final may request a new delineation following publication of the final revised Manual. However, final actions, such as permit issuances or completed enforcement actions, already taken on wetlands delineated under the 1989 Manual will not generally be reopened. In addition, a landowner whose property has been identified as a wetland during a seasonal dry period or drought can request a re-evaluation in the field during the wet season of the year.

In addition, the agencies are soliciting comment on the likelihood of sites being delineated during the dry season as wetland that, if the delineation had occurred during the wet season, would not have met the hydrology criterion. Should requests for re-evaluations be limited to certain cases or should all requests be granted?

**Issue 5:** The agencies are particularly interested in soliciting comments on including the Facultative Neutral test as

part of the hydrophytic vegetation criterion in addition to the proposed prevalence index approach. Under this approach the criterion would be met if after discounting all dominant facultative (FAC) plants, the number of dominant obligate wetland (OBL) and facultative wetland (FACW) species exceeds the number of dominant facultative upland (FACU) and obligate upland (UPL) species.

(Note: When a tie occurs or all dominant species are FAC, the prevalence index procedure will be used.)

The agencies are also interested in soliciting comments on variants of the FAC Neutral test including one or more of the following:

(1) When there are not more than a one species difference between the number of OBL/FACW species and the number of FACU/UPL species (e.g., 6 vs 7 or 4 vs 3), the prevalence index will be used.

(2) When there are only four or less non-FAC dominant species in all strata, the prevalence index will be used.

(3) OBL and UPL species will be given twice the weight as FACU and FACW when calculating number of wetland and upland species in the FAC neutral test (e.g., 3 OBL (x2) + 2 FACW (x1) = 8 > 6 FACU (x1) + 0 UPL (x2) = 6 (FAC still neutral)).

(4) Change the lower cutoff for including a vegetational type (e.g., trees or shrubs) as a valid stratum from five percent to two percent for areal cover.

(5) When more than 50% of the dominant species are FAC, the prevalence index procedure will be used.

(6) Change the lower cutoff for including additional dominant species beyond the 50% predominance level from twenty percent to ten percent of the strata.

The FAC neutral test is less burdensome and quicker to perform than the prevalence index because it requires an evaluation of only the dominant species and not all plants. This could result in substantial resource savings and quicker permit reviews. Many believe that the FAC neutral test is reliable in most situations. The agencies are interested in any information about the reliability of the FAC neutral test to demonstrate the presence or absence of hydrophytic vegetation. To the extent commentors believe there are weaknesses to the FAC neutral test, do any of the suggested six variants (or variations to them) alone or in combination improve the tests's reliability sufficiently for use in measuring hydrophytic vegetation?

Procedures that would be used to implement the FAC neutral test are described in the Appendices to the Manual.

Issue 6: The proposed Manual provides that the wetlands hydrology criterion may be met by documenting at least three years of hydrologic records (e.g., groundwater well observations or tide or stream gauge records) collected during years of normal rainfall (amount and monthly distribution) which is correlated with long-term hydrologic records for specific geographical areas. The three annual observation periods must have at least 90 percent of average yearly precipitation and at least 90 percent of normal monthly distribution. In addition, the year prior to the water table study must have had 90 percent of the monthly and annual precipitation. We are soliciting comments on whether this 90 percent requirement is appropriate, or should other cutoff levels be used (e.g., plus or minus one or two standard deviations)?

Issue 7: In addition, we are soliciting comments on the basic approach taken in the Manual of delineating every site individually. Is this the best approach? Could the Manual be streamlined so that "obvious" identifications and delineations can occur more quickly with less unnecessary work? It is desirable to identify easily recognized wetlands (for example, *Spartina alterniflora* coastal marshes), easily recognized uplands (for example, mountainside (other than seeps) or deserts), or wetlands of overriding significance and value (for example, prairie potholes), that can be identified and delineated rapidly and without the need for extensive documentation? If this would be desirable, how should it be done? What should the categories be, what systems should be included, and how should they be described? Can the categories be described such that the wetland/upland boundary are clearly recognized, or will it be necessary to use the mandatory criteria proposed in the Manual to determine the boundary? If this were to be done, should it be on a nationwide or regional basis? What process should be followed—should technical committees be formed to develop these categories and identify communities within each category, or should the categories and communities be developed through a public notice and comment process, or should a combination of both be used?

Issue 8: The proposed Manual defines the growing season as the interval between 3 weeks before the average date of the last killing frost in the Spring to 3 weeks after the average date of the

last killing frost in the Fall, with exceptions for areas experiencing freezing temperatures throughout the year (e.g., montane, tundra and boreal areas) that nevertheless support hydrophytic vegetation. We are soliciting comments on whether this is an appropriate definition of the growing season and if not, are there other more appropriate alternatives.

It is important to emphasize that the purpose of this notice is to request comments on the proposed revisions to the 1989 Manual. The comments should not address broader policy issues regarding the implementation of the Section 404 regulatory program which this document does not address. General information and questions about wetlands protection can be directed to the EPA Wetlands Hotline at (800) 832-7828.

It is also important to note that an independent testing panel, as well as EPA and the Corps, will perform field testing of these proposed revisions during the comment period. The results of these tests will be reviewed, in conjunction with the comments received from the public, in finalizing the revised Federal Manual. The proposed revisions do not contain a glossary, references, data sheets and regional indicators of significant soil saturation which will accompany the final revised Federal Manual.

F. Henry Habicht II,  
*Deputy Administrator, U.S. Environmental Protection Agency.*

Nancy Dorn,  
*Assistant Secretary (Civil Works), Department of the Army.*

James R. Moseley,  
*Assistant Secretary for Natural Resources and Environment, Department of Agriculture.*

J. Michael Hayden,  
*Assistant Secretary for Fish and Wildlife and Parks, Department of the Interior.*

Part I Introduction  
Part II Mandatory Technical Criteria for Vegetated Wetland Identification  
Part III Methods for Identification and Delineation of Vegetated Wetlands  
Appendices

Authorities: 33 U.S.C. 1344; 16 U.S.C. 3801-3823, 3841-3844; 16 U.S.C. 3801; 16 U.S.C. 661

## Part I. Introduction

### Purpose

The purposes of this manual are: (1) To provide mandatory technical criteria for the identification and delineation of wetlands, (2) to provide recommended methods for vegetated wetlands identification and upper boundary delineation, and (3) to provide sources of information to aid in their identification. The document can be

used to identify jurisdictional wetlands subject to section 404 of the Clean Water Act and to the "Swampbuster" provision of the Food Security Act of 1985, as amended, or to identify vegetated wetlands in general for the National Wetlands Inventory and other purposes. Wetland jurisdictional determinations for regulatory purposes are based on criteria in addition to technical criteria, so consult the appropriate regulatory agency for its interpretation. The term "wetland" as used throughout this manual refers to vegetated wetlands. This includes wetlands with natural vegetation and wetlands where natural vegetation has been temporarily disturbed. This manual provides a single, consistent approach for identifying and delineating these wetlands from a multi-agency Federal perspective. This manual establishes criteria to be used by the four signatory agencies in delineating wetlands and their boundaries. The Federal government for purposes of exercising the respective agencies' statutory authorities, has the burden of proving that a particular site is a wetland. If an agency fails to meet its burden of proof then the site is not a wetland.

### Organization of the Manual

This manual is divided into three major parts: Part I—Introduction; Part II—Mandatory Technical Criteria for Vegetated Wetland Identification; and Part III—Methods for Identification and Delineation of Vegetated Wetlands.

### Use of the Manual

This manual should be used for the identification and delineation of vegetated wetlands in the United States. Emphasis for delineation is on the upper boundary of wetlands (i.e., wetland-upland boundary) and not on the lower boundary between wetlands and other aquatic habitats. The technical criteria for wetland identification presented in Part II are mandatory, while the methods presented in Part III are recommended approaches. Alternative methods are offered to provide users with a selection of methods that range from office determinations to detailed field determinations. If the user departs from these methods, the reasons for doing so should be documented. If there are any inconsistencies between Parts I, II, and III, the guidance provided in Part II has preeminence over guidance provided in the other parts.

### Background

At the Federal level, four agencies are principally involved with wetland identification and delineation: Army

Corps of Engineers (CE), Environmental Protection Agency (EPA), Fish and Wildlife (FWS), and Soil Conservation Service (SCS). The CE and EPA are responsible for making jurisdictional determinations of wetlands regulated under Section 404 of the Clean Water Act (formerly known as the Federal Water Pollution Control Act, 33 U.S.C. 1344). The CE also makes jurisdictional determinations under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Under section 404, the Secretary of the Army, acting through the Chief of Engineers, is authorized to issue permits for the discharge of dredged or fill material into the waters of the United States, including wetlands. EPA has an important role in developing the Section 404(b)(1) Guidelines and defining the geographic extent of waters of the United States, including wetlands. The CE also issues permits for filling, dredging, and other construction in certain wetlands under Section 10. Under authority of the Fish and Wildlife Coordination Act, the FWS and the National Marine Fisheries Service review applications for these Federal permits and provide comments to the CE on the environmental impacts of proposed work. In addition, the FWS is conducting an inventory of the Nation's wetlands and is producing a series of National Wetlands Inventory maps for the entire country. While the SCS has been involved in wetland identification since 1956, it has recently become more deeply involved in wetland determinations through the "Swampbuster" provision of the Food Security Act of 1985, and the 1990 amendments.

Prior to the adoption of the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" by the four agencies in 1989, each agency had its own procedures for identifying and delineating wetlands. The CE and EPA developed technical manuals for identifying and delineating wetlands subject to Section 404 (Environmental Laboratory 1987 and Sipple 1988, respectively), yet neither manual was a nationally-implemented standard even within the agencies. Consequently, wetland identification and delineation remained inconsistent. The SCS developed procedures for identifying wetlands for compliance with "Swampbuster" which were adopted by the agency for national use in 1987 (7 CFR part 12). While it has no formal method for delineating wetland boundaries, the FWS has established guidelines for identifying wetlands in the form of its official wetland classification system report (Cowardin,

et al. 1979). These varied agency approaches and lack of standardized methods resulted in inconsistent determinations of wetland boundaries for the same type of area. This created confusion and identified the need for a single, consistent approach for wetland determinations and boundary delineations.

In early 1988, the CE and EPA resumed previous discussions on the possibilities of merging their manuals into a single document and establishing it as a national standard within the agencies, since both manuals were produced in support of Section 404 of the Clean Water Act. The FWS and SCS were invited to participate, thereby creating the Federal Interagency Committee for Wetland Delineation (Committee) with each of the four agencies (CE, EPA, FWS, and SCS) represented.

The four agencies reached agreement on the technical criteria for identifying and delineating wetlands and merged their methods into a single wetland delineation manual, which was published on January 10, 1989 as the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands". This established a national standard for wetland identification and delineation, and terminated previous locally implemented approaches that were not, in some cases, scientifically based nor consistent. Further, adoption of the manual in 1989 resulted in some changes in the scope of regulatory jurisdiction in some agency field offices.

During the following two years, the 1989 manual was used by the agencies for wetland delineation, chiefly for identifying and delineating wetlands subject to federal regulations under the Clean Water Act. Unfortunately, during this time many misconceptions of the 1989 manual (e.g., classifying any area mapped as hydric soil as wetland without considering other criteria), and other factors created an obvious need to review the 1989 manual and revise it accordingly. From the outset, the four agencies recognized that additional clarification and/or changes might be required.

Accordingly, in May 1990, the agencies initiated an evaluation of the 1989 manual, which consisted of several steps:

1. Formal field testing was conducted by the Environmental Protection Agency to evaluate the sampling protocols of the 1989 manual (Sipple and DaVila 1990);

2. Reviews by agency field staff using the 1989 manual;

3. To afford the public the opportunity to comment on the technical aspects of the 1989 manual, public meetings were held in Baton Rouge, Louisiana, Sacramento, California, St. Paul, Minnesota, and Baltimore, Maryland; and

4. Written comments on the technical aspects of the 1989 manual were also accepted subsequent to the meetings to give the public ample opportunity to express any concerns. More than 500 letters were received and reviewed.

The technical comments were reviewed by the four agencies and considered for incorporation into a revised manual. The agencies concluded that while the manual represented a substantial improvement over pre-existing approaches, several key issues needed to be re-examined and clarified. Some of the key technical issues needing re-examination were: (1) The wetland hydrology criterion, (2) the use of hydric soil for delineating the wetland boundary, (3) the assumption that facultative vegetation indicated wetland hydrology, and (4) the open-ended nature of the determination process which created opportunities for misuse.

The wetland hydrology criterion in the 1989 manual included a series of requirements related to specific soil types (soil drainage classes). Looking for water tables at various depths depending on soil drainage class was confusing, especially since properties associated with soil drainage classes are not standardized across the country. The National Technical Committee for Hydric Soils (NTCHS) criteria for defining hydric soils were adopted in the 1989 manual. The hydric soil criterion included wetland hydrology requirements to identify those soils wet enough to be hydric. In adopting the NTCHS hydric soil criteria, the 1989 manual retained the hydrology requirements under its hydric soil criterion and also in effect, repeated them as the wetland hydrology criterion. This clearly gave the impression of a less than three criteria approach to wetland identification.

Perhaps the issue that engendered the most concern over potential misuse of the 1989 manual involved the use of hydric soils for wetland identification and delineation. Since the 1989 manual included wetland hydrology requirements within the hydric soil criterion, and the delineation methods relied on hydric soil properties to delineate the wetland boundary, some users got the impression that the 1989 manual was not based on three mandatory criteria, but rather based solely on one criterion—the hydric soil

criterion (since it, in fact, embodied the wetland hydrology criterion). This, by itself, was not a significant problem, since hydrology was still considered. Some users then erroneously translated this to mean that any area mapped as a hydric soil series was a wetland. However, it was the clear intent of the agencies that specific soil properties derived directly from wetland hydrology (e.g., significant soil saturation) would be used to separate those members of hydric soil series that were associated with wetlands from those that were not. Hydric soil mapping units include significant acreage of phases of these soils that were never wetland or no longer meet the wetland hydrology requirements of the hydric soil criterion (i.e., dry phases and drained phases, respectively) as well as inclusions of nonhydric soils.

By considering any mapped hydric soil area as wetland, millions of former wetlands (now effectively drained) could be misidentified as wetland. This grossly exaggerated the extent of "jurisdictional wetlands" present in the United States. While the presence of certain plants were required to separate vegetated wetlands from nonvegetated wetlands, they were not used to help identify the upper boundaries, although they can be very useful indicators in certain cases where hydrology has been altered or where soil properties themselves are difficult to interpret. Consequently, by ignoring plant composition on the upper end of the wetland/upland gradient and by erroneously using mapped boundaries of hydric soil units to delineate wetland boundaries, errors in judgment were possible.

The 1989 manual specified three mandatory criteria, but did not require the use of various indicators to verify these criteria, although the interrelationships were presented. This allowed individuals to develop their own indicators or ignore strong indicators in determining whether a particular criterion was met. Clearly, the criteria needed to be intricately linked to a limited set of field indicators to prevent their misuse.

A series of meetings of the four agencies were held during the period of October 1990 through April 1991. Major revisions to the 1989 manual were made to correct the technically-based shortcomings addressed above, reduce misinterpretations and the possibility of erroneous wetland determinations, and better explain the manual's usage.

#### *Federal Wetland Definitions*

Several definitions have been formulated at the Federal level to define

"wetland" for various laws, regulations, and programs. These definitions are cited below with reference to their guiding document along with a few comments on their key elements.

#### *Section 404 of the Clean Water Act*

The following definition of wetland is the regulatory definition used by the EPA and CE for administering the Section 404 permit program:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (EPA, 40 CFR 230.3, December 24, 1980; and CE, 33 CFR 328.3, November 13, 1986).

This definition emphasizes hydrology, vegetation, and saturated soils. The section 404 regulations also deal with other "waters of the United States" such as open water areas, mud flats, coral reefs, riffle and pool complexes, vegetated shallows, and other aquatic habitats. Both EPA and CE regulations (cited above) implementing this definition were subject to formal rulemaking public notice and comment procedures in accordance with the Administrative Procedures Act (5 U.S.C. 553).

#### *Food Security Act of 1985 (as amended)*

The following wetland definition is used by the SCS for identifying wetlands on agricultural land in assessing farmer eligibility for U.S. Department of Agriculture program benefits under the "Swampbuster" provision of this Act:

Wetlands are defined as areas that have a predominance of hydric soils and that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions, except lands in Alaska identified as having a high potential for agricultural development and a predominance of permafrost soils.\* (National Food Security Act Manual, 1988 and revised editions)

\*Special Note: The Emergency Wetlands Resources Act of 1986 also contains this definition, but without the exception for Alaska.

This definition specifies hydrology, hydrophytic vegetation, and hydric soils. Any area that meets the hydric soil criteria (defined by the national Technical Committee for Hydric Soils) is

considered to have a predominance of hydric soils. The definition also makes a geographic exclusion for Alaska, so that wetlands in Alaska with a high potential for agricultural development and a predominance of permafrost soils are exempt from the requirements of the Food Security Act.

#### *Fish and Wildlife Service's Wetland Classification System*

The FWS in cooperation with other Federal agencies, State agencies, and private organizations and individuals developed a wetland definition for conducting an inventory of the Nation's wetlands. This definition was published in the FWS's publication "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin, et al. 1979):

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) At least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

This definition includes both vegetated and nonvegetated wetlands, recognizing that some types of wetlands lack vegetation (e.g., mud flats, sand flats, rocky shores, gravel beaches, and sand bars). The classification system also defines "deepwater habitats" as "permanently flooded lands lying below the deepwater boundary of wetlands." Deepwater habitats include estuarine and marine aquatic beds (similar to "vegetated shallows" of section 404), although aquatic beds in shallow fresh water are considered wetlands. Open waters below extreme low water at spring tides in salt and brackish tidal areas and usually below 8.6 feet in inland areas and freshwater tidal areas are also included in deepwater habitats.

#### *Relationship of Wetlands Identified by This Manual to "Waters of the United States"*

This manual is used to identify and delineate vegetated wetlands. Figure 1 presents a generalized landscape continuum from upland to open water (deepwater habitat) showing the relationship of the various Federal wetland definitions. Vegetated wetlands as used herein means areas that, under normal circumstances, usually have

hydrophytic vegetation, hydric soil, and wetland hydrology. Further, this manual applies to areas that are vegetated by erect, self-supporting vegetation (e.g., vegetation extending above the water's surface in aquatic areas or free-standing on soil).

Vegetated wetlands identified by this manual are a subset of areas regulated as "Waters of the United States" under section 404 of the Clean Water Act, and one of the areas regulated as "special aquatic sites" under the section 404(b)(1) Guidelines promulgated by the Environmental Protection Agency. Other "special aquatic sites" include mudflats, vegetated shallows, coral reefs, riffle and pool complexes, and sanctuaries and refuges. Open water areas are also part of the "Waters of the United States."

Vegetated wetlands identified by this manual are also a subset of those areas designated as wetlands under the FWS's "Classification of Wetlands and Deepwater Habitats of the United States." The FWS definition of wetland is used for National Wetlands Inventory and is nonregulatory in nature. The only differences between wetlands identified by FWS and this manual are those aquatic areas 6.6 feet or less in depth that do not contain emergent vegetation, or are unvegetated. Such areas are identified as wetlands under the FWS system, but not under the manual. However, there are few if any areas covered by the FWS classification system that are not covered under section 404. For vegetated wetlands, the FWS classification system and this manual are essentially identical. Ninety-four percent of all FWS-classified wetlands in the coterminous United States are vegetated.

The emphasis of this manual is on the boundary between wetland and upland, since that is the area most often in question and where determinations and delineations become most difficult. However, wetland determinations in lower wetter areas are generally easy to make and seldom in question from a regulatory standpoint since both wetland and open water are regulated areas. Generally, as one moves from areas with standing water to dry upland areas, it is those lands at the margin that are most difficult to distinguish. This manual recognizes this fact and requires less rigorous investigation in obvious wetland situations than in areas which may be questionable. In either situation, however, documentation supporting a delineation is required.

The definitions of wetlands used for section 404 of the Clean Water Act and the Swampbuster provision of the 1985 Food Security Act, as amended, are

specific to vegetated wetlands or wetlands that are vegetated under normal circumstances. These are the wetlands to which the manual applies. This manual provides for the consistent identification and delineation of these wetlands in the field. Because this manual was developed to resolve differences in identifying wetlands under these definitions, it is limited to vegetated wetlands and does not address nonvegetated wetlands.

Wetland determinations made through the use of this manual for the purposes of determining Federal wetland jurisdiction at a site are subject to modification in accordance with legal and policy considerations of the applicable regulatory program. For example, section 404 regulatory jurisdiction in wetlands is limited to areas that are waters of the United States because they have a connection with interstate or foreign commerce. Another example is the application of Federal wetland jurisdiction on cropland which is subject to agency policy-based interpretations of such matters as the relative permanence of the cropping disturbance and its effect of hydrophytic vegetation and/or wetland hydrology. Such matters generally are not addressed in this manual; rather, the appropriate agency policy should be consulted in conjunction with the manual for wetland determinations in such areas.

Any landowner whose land has been delineated a wetland after the revised manual is proposed but before the proposed revised manual becomes final may request a new delineation following publication of the final revised manual. However, final actions, such as permit issuances or completed enforcement actions, already taken or wetlands delineated under the 1989 manual will not generally be reopened.

#### *Summary of Federal Definitions*

The CE, EPA, and SCS wetland definitions include only areas that are vegetated under normal circumstances, while the FWS definition encompasses both vegetated and nonvegetated areas. Except for the FWS inclusion of nonvegetated areas and aquatic beds in shallow water as wetlands and the exemption for Alaska in the SCS definition, all four wetland definitions are conceptually the same; they all include three basic elements—hydrology, vegetation, and soils—for identifying wetlands.

#### **Part II. Mandatory Technical Criteria for Vegetated Wetlands Identification**

Wetland hydrology is the driving force of wetlands. Vegetated wetlands occur

in shallow water, on permanently saturated soils, or in areas subject to periodic inundation or saturation where anaerobic conditions usually develop due to excess water. Certain hydrologic conditions called "wetland hydrology" therefore drive the formation of wetlands and continue to maintain them. Permanent or periodic wetness is the fundamental factor that makes wetlands different from uplands (nonwetlands). Although wetland hydrology is the dominant force creating wetlands, long-term records for hydrology typically are not available for identifying the presence of wetlands or for delineating their upper boundaries. Consequently, other indicators sometimes must be used to determine whether an area meets the wetland criteria. It has been long recognized that various plants and their adaptations, certain plant communities, specific soil properties, and particular soil types (e.g., peats, mucks, and gleyed soils) can be used to help identify wetlands. In addition, there are a number of hydrologic indicators that can be used to help identify wetlands.

Existing wetland definitions recognize that wetlands are driven by wetland hydrology (permanent or periodic inundation and/or soil saturation) and that characteristic plants (hydrophytic vegetation) and soils (hydric soils) are identifiable components of vegetated wetlands. This manual uses these three components as criteria for vegetated wetland identification. Field staff should examine sites for indicators of hydrophytic vegetation, hydric soils, and wetland hydrology and document the presence or absence of indicators to the extent practicable. At sites where wetlands are obvious due to the overwhelming evidence provided by one indicator (e.g., permanent standing water), documentation of the other indicators, while necessary, need not be as intensive as in areas where wetlands are not so obvious. There are, however, many other cases where, as one moves toward the drier portion of the moisture gradient, rigorous examination and documentation of soil, vegetation, and hydrology characteristics is necessary. The fact that such wetlands are harder to identify has no bearing on their status as wetlands.

Under natural, undisturbed conditions, vegetated wetlands generally possess three characteristics: (1) Hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. These characteristics and their technical criteria for identification purposes are described in the following sections. The three technical criteria and their



verifying characteristics are mandatory, with the following exceptions: disturbed wetlands (i.e., wetlands that met the mandatory criteria prior to disturbance and have had the vegetation, soils, and/or hydrology altered such that the required evidence of the relevant indicators for the affected criterion has been removed); and specific wetland types that may never meet all three criteria although they are widely recognized as wetlands (i.e., some prairie potholes, playa lakes, vernal pools and pocosins, and other special wetlands that fail the hydrophytic vegetation criterion such as Eastern hemlock swamps, tamarack bogs, and white pine bogs). Descriptions of these exceptions are included in this manual.

This manual also includes other circumstances which may complicate wetland delineation and which therefore require special consideration (e.g., pit and mound topography, newly formed hydric soils).

The three mandatory technical criteria are presented below. Background information for each criterion is also provided.

#### *Wetland Hydrology Criterion*

An area has wetland hydrology when it is:

1. Inundated for 15 or more consecutive days, or saturated from surface water or from ground water to the surface for 21 or more consecutive days during the growing season in most years, or

2. Periodically flooded by tidal water in most years.

Areas meeting this criterion also are usually inundated or saturated for variable periods during the non-growing season. The term "inundated and/or saturated at the surface" means the soil is inundated or wet enough at the surface to the extent that water reaches the surface in an unlined borehole or can be squeezed or shaken from the soil at the surface. The growing season is the interval between 3 weeks before the average date of the last killing frost in the Spring to 3 weeks after the average date of the first killing frost in the Fall, with exceptions for areas experiencing freezing temperatures throughout the year (e.g., montane, tundra and boreal areas) that nevertheless support hydrophytic vegetation. The term "in most years" means that the condition represents the prevailing long-term hydrologic condition and would be expected to occur in the future in more years than not over the long term (e.g., more than 5 years out of 10).

While the above criterion must be met, many times field staff will not be

present to do wetland determinations at the right time of year or for long enough to directly observe that an area is inundated for 15 or more consecutive days or saturated from surface water or from groundwater to the surface for 21 or more consecutive days during the growing season in most years.

An area meets the wetland hydrology criterion above by direct measurement of inundation and/or soil saturation of tidal flooding or as documented by one or more of the following indicators:

1. A minimum of 3 years of hydrologic records (e.g., groundwater well observations following the protocol on page 99, or tide or stream gauge records) collected during years of normal rainfall (amount and monthly distribution) and correlated with long-term hydrologic records for the specific geographical area that demonstrates the area meets the wetland hydrology criterion; or

2. Examination of aerial photography (preferably early spring or wet part of the growing season) for a minimum of 5 years reveals evidence of inundation and/or saturation in most years (e.g., 3 of 5 years or 6 of 10 years) and correlated with long-term hydrologic records for the specific geographical areas demonstrate that the area meets the wetland hydrology criterion; or

3. One or more primary hydrologic indicators below, which, when considered with evidence of frequency and duration of rainfall or other hydrologic conditions, provide evidence sufficient to establish that an area is inundated for 15 or more consecutive days or saturated from surface water or from groundwater to the surface for 21 or more consecutive days during the growing season in most years, are materially present:

a. Surface water inundation; or  
b. Observed free water at the surface in an unlined borehole; or  
c. Water can be squeezed or shaken from a soil sample taken at the soil surface; or

d. Oxidized stains along the channels of living roots (Oxidized rhizospheres); or

e. Sulfidic material (distinct hydrogen sulfide, rotten egg odor) within 12 inches of the soil surface; or

f. Specific plant morphological adaptation/responses to prolonged inundation or saturation: pneumatophores, prop roots, hypertrophied lenticels, arenchymous tissues, and floating stems and leaves of floating-leaved plants growing in the area (may be observed lying flat on the soil), and buttressed trunks or stems.

Note: Always consider the frequency and duration of these primary indicators and of

the wetness that created them, and whether significant hydrologic modification (e.g., Drainage) has effectively removed wetland hydrology from the site.

4. If none of the indicators in items 1, 2, or 3 above is present, one or more of the following secondary hydrologic indicators should be used in conjunction with corroborative information (e.g., maps) that supports a wetland hydrology determination:

a. Silt marks (waterborne silt deposits) that indicate inundation; or  
b. Drift lines; or  
c. Surface-scoured areas; or  
d. Other common plant morphological adaptations/responses to hydrology: shallow root systems and adventitious roots.

These secondary indicators may only be used in conjunction with other corroborative information that indicates wetland hydrology (e.g., regional indicators of saturation, hydrologic gauge data, county soil surveys, National Wetlands Inventory maps, aerial photographs, or reliable persons with local knowledge of inundation and/or saturated conditions). This information must be of sufficient quality and extent that when taken together with secondary indicators clearly supports the presence of wetland hydrology for the necessary time, duration, and frequency. This type of information may also be used to support determinations based on the primary indicators listed above.

Note: Unless specifically addressed in this manual as disturbed areas, areas without any of the above hydrologic indicators are nonwetland. In areas of suspected significant hydrologic modification, follow the disturbed area procedures to determine if wetland hydrology still exists.

#### *Wetland Hydrology Background*

The driving force creating wetlands is "wetland hydrology," that is, permanent or periodic inundation, or soil saturation for a significant period (inundated for 15 or more consecutive days or saturated from surface water or from groundwater to the surface for 21 or more consecutive days) during the growing season in most years. Many wetlands are found along rivers, lakes, and estuaries where flooding is likely to occur, while other wetlands form in isolated depressions surrounded by upland where surface water collects. Still others develop on slopes of varying steepness, in surface water drainageways, or where ground water discharges to the land surface in spring or seepage areas. Thus, landscape position provides much insight into whether an area is likely to be subjected to wetland hydrology.

Permanent or periodic inundation, or soil saturation at the surface, at least seasonally, are the driving forces behind wetland formation. The presence of water in the soil due to inundation for 15 or more consecutive days or saturation from surface water or from groundwater to the surface for 21 or more consecutive days during the growing season in most years typically creates anaerobic conditions, which affect the types of plants that can grow and the types of soils that develop. These conditions hold true for most wetlands, especially those at the upper end of the soil moisture gradient. Anaerobiosis does not necessarily occur in all wetlands and those where it may not occur include vegetated sand bars, seepage areas, springs, and the upper edges of salt marshes. Wetlands have at least a seasonal or periodic abundance of water. For example, this water may come from direct precipitation, overbank flooding, surface water runoff due to precipitation or snow melt, ground water discharge, tidal flooding, irrigation, or other human-induced activities. The frequency and duration of inundation and soil saturation vary widely from permanent flooding or saturation to irregular flooding or saturation. Of the three technical criteria for wetland identification, wetland hydrology is often the least exact and most difficult to establish in the field, due largely to annual, seasonal, and daily fluctuations.

Numerous factors influence the wetness of an area, including precipitation, stratigraphy, topography, soil permeability, and plant cover. The frequency and duration of inundation or soil saturation are important in separating wetlands from nonwetlands. Areas of lower elevation in a floodplain or marsh usually have longer duration of inundation and saturation and often more frequent periods of these conditions than most areas at higher levels. Floodplain configuration may significantly affect the duration of inundation by facilitating rapid runoff or by causing poor drainage.

Soil permeability related to the texture of the soil also influences the duration of inundation or soil saturation. For example, clayey soils absorb water more slowly than sandy or loamy soils, and therefore have slower permeability and remain saturated much longer.

Type and amount of plant cover affect both the degree of inundation and the duration of saturated soil conditions. Excess water drains more slowly in areas of abundant plant cover, thereby increasing duration of inundation or soil saturation. On the other hand,

transpiration rates are higher in areas of abundant plant cover, which may reduce the duration of soil saturation.

To determine whether the wetland hydrology criterion is met, one should consider recorded data, aerial photographs, and observed field conditions that provide direct or indirect evidence of inundation or soil saturation. Prolonged saturation often leaves evidence of such wetness in the soil (e.g., sulfur odor) and these properties are useful for verifying wetland hydrology provided the area's hydrology has not been significantly modified on-site or upstream in the watershed. If the hydrology has been significantly disturbed, particular care must be taken in assessing the wetland hydrology criterion; refer to disturbed area procedures to determine whether wetland hydrology still exists.

#### *Measuring Wetland Hydrology*

In certain instances, especially disturbed situations, it may be necessary to determine an area's hydrology by actively collecting on-site hydrologic data from direct measurements or observations. The duration and frequency of inundation by flooding may be established by evaluating long-term stream or tide gauge data or by examining aerial photos covering at least a 5-year period and comparing results with the wetland hydrology criterion. Saturation at the surface may be determined by making observations in an unlined borehole and establishing whether or not the soil is saturated to the surface for 21 or more consecutive days during the growing season in most years. A procedure for this is presented in the Disturbed Areas section of the manual. In general, if soil saturation is observed at the surface for 21 or more consecutive days during the growing season (or the area is inundated for 15 or more consecutive days), wetland hydrology probably exists. Interpretation of the above observations, however, must always be done with consideration of recent rainfall conditions (e.g., within the past few weeks) as well as the long-term rainfall patterns (e.g., abnormally wet or dry periods) preceding and during the time the hydrologic data were recorded.

#### *Historical Recorded Hydrologic Data*

Historical recorded hydrologic data usually provide both short- and long-term information on the frequency and duration of flooding, but little or no information on soil saturation periods. Historical recorded data include stream gauge data, lake gauge data, tide gauge data, flood predictions, and historical flood records. Use of these data is

commonly limited to areas adjacent to streams and other similar areas. Recorded data may be available from the following sources: (1) CE district offices (data for major waterbodies and for site-specific areas from planning and design documents), (2) U.S. Geological Survey (stream and tidal gauge data), (3) National Oceanic and Atmospheric Administration (tidal gauge data), (4) State, county and local agencies (flood data), (5) SCS state offices (small watershed projects and water table study data), and (6) private developers or landowners (site-specific hydrologic data, which may include water table or groundwater well data).

#### *Aerial Photographs*

Aerial photographs may provide direct evidence of inundation or soil saturation at the surface in an area. Inundation (flooding or ponding) is best observed during the early spring in temperate and boreal regions when snow and ice are gone and leaves of deciduous trees and shrubs are not yet fully developed. This allows detection of wet soil conditions that would be obscured by the tree or shrub canopy at full leaf-out. For marshes, this season of photography is also desirable, except in regions characterized by distinct dry and rainy seasons, such as southern Florida and California. Wetland hydrology would be best observed during the wet season in these latter areas.

It is most desirable to examine several consecutive years of early spring or wet season aerial photographs to document evidence of wetland inundation or soil saturation. In this way, the effects of abnormally dry or wet springs, for example, may be minimized. In interpreting aerial photographs, it is important to know the antecedent weather conditions. This will help eliminate potential misinterpretations caused by abnormally wet or dry periods. Contact the U.S. Weather Service for historical weather records or the U.S. Geological Survey for hydrologic records. Aerial photographs for agricultural regions of the country are often available at county offices of the Agricultural Stabilization and Conservation Service.

#### *Field Observations*

##### *Direct Evidence of Water*

At certain times of the year in wetlands, and in certain types of wetlands at most times, wetland hydrology is quite evident, since surface water or saturated soils (e.g., soggy or wetter underfoot) may be observed. The

most obvious and revealing hydrologic indicator may be simply observing the areal extent of inundation. However, both seasonal conditions and recent weather conditions must be considered when observing an area because they can affect the presence of surface water on wetland and nonwetland sites. In many cases, soils saturated at the surface are obvious, since the ground surface is soggy or mucky under-foot.

To observe free water at the surface it may be necessary to dig a hole and observe the level at which water stands in the hole after sufficient time has been allowed for water to drain into the hole. In some cases, the upper level at which water is flowing into the hole can be observed by examining the walls of the hole. This level may represent the depth to the water table. In some heavy clay soils, however, water may not rapidly accumulate in the hole even when the soil is saturated. When attempting to observe the level of free water in a bore hole, adequate time should be allowed for water in the hole to reach equilibrium with the water table.

Soil saturation at the surface may be detected by a "squeeze test" or "shake test" which involve taking a surface soil sample and squeezing or shaking the sample. If water can be extracted, the soil is considered saturated at the surface.

When evaluating soil saturation, both the season of the year and the preceding weather conditions must be considered, since excess water may not be present during parts of the growing season in some wetlands due to high evaporation and plant transpiration rates which effectively lower the water table. At such times, other indicators of wetland hydrology may be present.

#### *Other Signs of Wetland Hydrology*

It is not necessary to observe inundation or saturation at the time of field inspection to identify wetland hydrology so long as indicators are sufficient to demonstrate to field personnel that the wetland hydrology criterion is met. Other signs of wetland hydrology may be observed, e.g., oxidized rhizospheres (root channels).

Some plants are able to survive saturated soil conditions (i.e., a reducing environment) because they can transport oxygen to their root zone. Iron oxide concretions (orangish or reddish brown in color) may form along the channels of living roots and rhizomes creating oxidized rhizospheres that provide evidence of soil saturation (anaerobic conditions) for a significant period during the growing season. Ephemeral or temporary oxidized rhizospheres may develop after

abnormally heavy rainfall periods. Consequently, oxidized rhizospheres are most meaningful when observed with other wetland indicators especially in undrained soils displaying diagnostic hydric soil properties.

Other signs that may reflect wetland hydrology include water marks, drift lines, water-borne deposits, surface-scoured areas, wetland drainage patterns, and certain plant morphological adaptations.

(1) *Water marks* are found most commonly on woody vegetation or fixed objects (e.g., bridge pillars, buildings, and fences) but may also be observed on other vegetation. They often occur as dark stains on bark or other fixed objects.

(2) *Drift lines* are typically found adjacent to streams or other sources of water flow in wetlands and often occur in tidal marshes. Evidence consists of deposition of debris in a line on the wetland surface or debris entangled in aboveground vegetation or other fixed objects. Debris usually consists of remnants of vegetation (branches, stems, and leaves), litter, and other water-borne materials often deposited more or less parallel to the direction of water flow. Drift lines provide an indication of the minimum portion of the area inundated during a flooding event; the maximum level of inundation is generally at a higher elevation that indicated by a drift line. The drift lines in tidal wetlands are often referred to as "wrack lines."

(3) *Water-borne deposits of mineral or organic matter* may be observed on plants and other objects after inundation. This evidence may remain for a considerable period before it is removed by precipitation or subsequent inundation. Silt deposition in vegetation and other objects provides an indication of the minimum inundation level. When the deposits are primarily organic (e.g., fine organic material and algae), the detritus may become encrusted on or slightly above the soil surface after dewatering occurs. Sediment deposits (e.g., sandy material) along streams provide evidence of recent overbank flooding.

(4) *Surface scouring* occurs along floodplains where overbank flooding erodes sediments (e.g., at the bases of trees). The absence of leaf litter from the soil surface is also sometimes an indication of surface scouring. Forested wetlands that contain standing waters for relatively long duration will occasionally have areas of bare or essentially bare soil, sometimes associated with local depressions.

(5) Many plants growing in wetlands have developed *morphological features*

in response to inundation or soil saturation. Examples include pneumatophores (e.g., cypress knees), prop roots, floating stems and leaves, hypertrophied lenticels (oversized stem pore), aerenchyma (air-filled) tissue in roots and stems, buttressed tree trunks, multiple trunks, adventitious roots, shallow root systems, polymorphic leaves, inflated leaves, stems or roots. Pneumatophores, prop roots, floating stems and leaves, hypertrophied lenticels, aerenchyma tissue, and buttressed tree trunks develop virtually only in wetland or aquatic environments and therefore are listed as primary hydrologic indicators in the wetland hydrology criterion. When these features are observed in young plants, they provide good evidence that wetland hydrology exists. Multiple trunks, adventitious roots, shallow root systems, polymorphic leaves, inflated leaves, stems or roots are commonly found in many wetland plants, yet not exclusive to them, and therefore are listed as secondary hydrologic indicators in the wetland hydrology criterion and indicate wetlands only when accompanied by other collateral information that indicates wetland hydrology.

#### *Hydrophytic Vegetation Criterion*

An area meets the hydrophytic vegetation criterion if, under normal circumstances, a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, FACU = 4.0, and UPL = 5.0).

*Note:* Specific wetland types that may have vegetation that does not meet this criterion are listed as exceptions. Areas where the vegetation has been removed will generally meet the hydrophytic vegetation criteria if they are capable of supporting such vegetation. (See disturbed areas section)

#### *Hydrophytic Vegetation Background*

The term "hydrophytic vegetation" describes plants that live in conditions of excess wetness. For purposes of this manual, hydrophytes are defined as macrophytic plant life growing in water or on submerged substrates, or in soil or on a substrate that is at least periodically anaerobic (deficient in oxygen) as a result of excessive water content. All plants growing in wetlands have adapted in one way or another to life in permanently or periodically inundated or saturated soils. Some plants have developed structural or morphological adaptations to inundation or saturation, while others have broad ecological tolerances (Tiner, 1991). Some of these adaptive features are used as

indicators of wetland hydrology in this manual (see hydrology criterion), since they are a response to inundation and/or soil saturation. Probably all plants growing in wetlands possess physiological mechanisms to cope with periodic anaerobic soil conditions or life in water. Because they are not observable in the field, physiological and reproductive adaptations are not included in this manual.

Persons making wetland determinations should be able to identify at least the dominant wetland plants in each stratum (layer of vegetation) of a plant community. Plant identification requires the use of field guides or more technical taxonomic manuals. When necessary, seek help in identifying difficult species. Once a plant is identified to genus and species, consult the appropriate Federal list of plants that occur in wetlands to determine the "wetland indicator status" of the plant (see explanation below). This information will be used to help determine whether the hydrophytic vegetation criterion is met.

One should also become familiar with the technical literature on wetlands, especially for one's geographic region. Sources of available literature include: taxonomic plant manuals and field guides; scientific journals dealing with botany, ecology, and wetlands in particular; technical government reports on wetlands; proceedings of wetland workshops, conferences, and symposia; and the FWS's national wetland plant database, which contains habitat information on about 7,000 plant species. In addition, the FWS's National Wetlands Inventory (NWI) maps provide information on locations of hydrophytic plant communities that can be studied in the field to improve one's knowledge of such communities in particular regions.

If all wetland plant species grew only in wetlands, plants alone could be used to identify and delineate wetlands. However, of the nearly 7,000 vascular plant species which have been found growing in U.S. wetlands (Reed 1988), only about 27 percent are "obligate wetland" species that nearly always occur in wetlands under natural conditions. This means that the majority of plant species growing in wetlands also grow in nonwetlands to varying degrees. These plants may or may not be hydrophytes depending on where they are growing. This variability in habitat occurrence causes certain difficulties in identifying wetlands from a purely botanical standpoint in many cases. This is a major reason for

evaluating soils and hydrology when identifying wetlands.

#### *National List of Wetland Plant Species*

The FWS in cooperation with CE, EPA, and SCS has published the "National List of Plant Species That Occur in Wetlands" from a review of the scientific literature and review by selected wetland experts and botanists (Reed 1988). The list separates vascular plants into four basic groups, commonly called "wetland indicator status," based on a plant species' frequency of occurrence in wetlands: (1) Obligate wetland plants (OBL) that occur almost always (estimated probability >99%) in nonwetlands under natural conditions; (2) facultative wetland plants (FACW) that usually occur in wetlands (estimated probability 67-99%), but occasionally are found in nonwetlands; (3) facultative plants (FAC) that are nearly equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%); and (4) facultative upland plants (FACU) that usually occur in nonwetlands (estimated probability 67-99%), but occasionally are found in wetlands (estimated probability 1-33%). If a species occurs almost always (estimated probability >99%) in nonwetlands under natural conditions, it is considered an obligate upland plant (UPL). These latter plants do not usually appear on the wetland plant list; they are listed only in some regions of the country. If a species is not on the list, it is presumed to be an obligate upland plant, yet be advised that the list intentionally does not include nonvascular plant species (e.g., algae and mosses) or epiphytic plants. These omitted plants should not be considered in determining whether the hydrophytic vegetation criterion is met, unless one has particular knowledge of their frequency of occurrence in wetlands. Also be sure to check for synonyms in plant scientific names, since the nomenclature used in the list varies for some species from that used in regional taxonomic manuals or commonly used plant identification field guides.

The "National List of Plant Species That Occur in Wetlands" has been subdivided into regional and state lists. There is a formal procedure to petition the interagency plant review committee for making additions, deletions, and changes in indicator status. Since the lists are periodically updated, the U.S. Fish and Wildlife Service should be consulted to be sure that the most current version is being used for wetland determinations. The appropriate plant list for a specific geographic region should be used when making a wetland determination and

evaluating whether the hydrophytic vegetation criterion is satisfied. (*Note:* The "National List of Plant Species That Occur in Wetlands" uses a plus (+) sign or a minus (-) sign to signify a higher or lower portion of a particular wetland indicator frequency for the three facultative-type indicators; for purposes of identifying hydrophytic vegetation according to this manual, however, FACW+, FACW-, FAC+, and FAC- are included as FACW and FAC, respectively, in the hydrophytic vegetation criterion.)

Procedures to be used to determine the presence of hydrophytic vegetation under the criterion are in the Appendices identified as the Point Intercept Sampling Procedure.

#### *Hydric Soil Criterion*

An area has hydric soil when, based on field verification, it has either:

1. Soils listed by series in "Hydric Soils of the United States" (1987 and amendments), or
2. Organic soils (Histosols, except Folists), or
3. Mineral soils classifying as Sulfaquents, Hydraquents, or Histic subgroups of Aquic suborders, or
4. Other soils that meet the National Technical Committee for Hydric Soils' criteria for hydric soil.

An area meets the hydric soil criterion when, based on field verification, it has one or more of the following:

1. Where soil survey maps are available, the subject area is within:
  - a. A hydric soil map unit identified on the county list of hydric soil map units that is verified by landscape position and soil morphology against the series description of the hydric soil, or
  - b. A soil map unit with hydric soil inclusions identified on the county list of hydric soil map units, and the landscape position of the inclusion and the soil morphology for the identified soil series as a hydric soil inclusion are verified, or, if no series is designated, then either:
    - (1) The soil, classified to the series level, is on the national list of hydric soils, or
    - (2) The soil, classified according to "Soil Taxonomy", is a Histosol (except Folists), Sulfaquent, Hydraquent, or Histic Subgroup of Aquic Suborders, or
- (3) Regional indicators of significant soil saturation (as developed and approved by Soil Conservation Service soil scientists and the Federal Interagency Committee for Wetlands Delineation) are materially present; or

2. Where soil maps are not available, and the landscape position is likely to contain hydric soil (e.g., floodplain,

depression, or seepage slope), subject area has either:

- a. The soil, classified to the series level, is on the national list of hydric soils; or
- b. The soil, classified according to "Soil Taxonomy", is a Histosol (except Folists), Sulfaquent, Hydraquent, or Histic Subgroup of Aquic Suborders; or
- c. Regional indicators of significant soil saturation (as developed and approved by Soil Conservation Service soil scientists and the Federal Interagency Committee for Wetlands Delineation) are materially present.

#### *Hydric Soil Background*

Wetlands typically possess hydric soils, but not all areas mapped as hydric soil series are wetlands (e.g., dry phases that were never wetlands and drained phases that represent former wetlands). Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (U.S.D.A. Soil Conservation Service 1987). These soils usually support hydrophytic vegetation under natural (unaltered) conditions.

#### *National and State Hydric Soils Lists*

The SCS in cooperation with the National Technical Committee for Hydric Soils (NTCHS) has prepared a list of the Nation's hydric soils (U.S.D.A. Soil Conservation Service 1987). State lists have also been prepared for statewide use. The national and state lists identify those soil series that typically meet the NTCHS hydric soil criteria according to available soil interpretation records in SCS's soils database. These lists are periodically updated, so make sure the list being used is the current one. The list, while extensive, does not include all series that may have hydric members; these soils may be determined as hydric when they have evidence of wetland hydrology and hydrophytic vegetation. The lists facilitate use of SCS county soil surveys for identifying potential wetlands. One must be careful, however, in using the soil survey, because a soil map unit of a nonhydric soil may have inclusions of hydric soil that were not delineated on the map or vice versa. Also, some map units (e.g., alluvial land, swamp, tidal marsh, muck and peat) may be hydric soil areas, but are not on the hydric soils lists because they were not given a series name at the time of mapping. These soils meet the NTCHS criteria for hydric soils.

#### *County Hydric Soil Map Unit Lists*

Because of the limitations of the national and state hydric soil lists, the

SCS prepared lists of hydric soil map units for each county in the United States. These lists may be obtained from local SCS district offices and are the preferred lists to be used when using soil survey maps. The hydric soil map unit lists identify all map units that are either named by a hydric soil or that have a potential of having hydric soil inclusions. The lists provide the map unit symbol, the name of the hydric soil part or parts of the map unit, information on the hydric soil composition of the map unit, and probable landscape position of hydric soils in the map unit delineation. The county lists also include map units named by miscellaneous land types or higher levels in "Soil Taxonomy" that meet NTCHS hydric soil criteria.

#### *Soil Surveys*

The SCS publishes soil surveys for areas where soil mapping is completed. Soil surveys that meet standards of the National Cooperative Soil Survey (NCSS) are used to identify areas of hydric soils. These soil surveys may be published (completed) or unpublished (on file at local SCS field offices). Published soil surveys of an area may be obtained from the local SCS field office or the Agricultural Extension Service office. Unpublished maps may be obtained from the local SCS district office.

The NCSS maps contain four kinds of map units: (1) Consociations, (2) complexes, (3) associations, and (4) undifferentiated groups. (Note: Inclusions of unnamed soils may be contained within any map unit; the inclusions are listed in the description of the soil map unit in the soil survey report.) Consociations are soil map units named for a single kind of soil (taxon) or miscellaneous area. Seventy-five percent or more of the area is composed of the taxon for which the map unit is named (and similar taxa). When named by a hydric soil, the map unit is considered a hydric soil map unit for wetland determinations. However, small areas within these map units generally too small to be mapped separately (some areas are identified by "wet spot" symbols) may not be hydric and should be excluded in delineating wetlands.

Complexes and associations are soil map units named by two or more kinds of soils (taxa) or miscellaneous areas. If all taxa for which these map units are named are hydric, the soil map unit may be considered a hydric soil map unit for wetland determinations. If only part of the map unit is made up of hydric soils, only those portions of the map unit that are hydric are considered in wetland determinations.

Undifferentiated groups are soil map units named by two or more kinds of soils or miscellaneous areas. The soils in these map units do not always occur together in the same map unit but are included together because some common feature such as steepness or flooding determines use and management. These map units are distinguished from the others in that "and" is used as a conjunction in the name, while dashes are used for complexes and associations. If all components are hydric, the map unit may be considered a hydric soil map unit. If one or more of the soils for which the unit is named are nonhydric, each area must be examined for the presence of hydric soils.

#### *Use of County Hydric Soils Map Unit Lists and Soil Surveys*

The county hydric soils map unit list and soil surveys should be used to help determine if the hydric soil criterion is met in a given area. When making a wetland determination, one should first locate the area of concern on a soil survey map and identify the soil map units for the area. The county list of hydric soil map units should be consulted to determine whether the soil map units are hydric or potentially hydric. If hydric soil map units or map units with hydric soil inclusions are noted, then one should examine the soil in the field and compare its morphology with the corresponding hydric soil description in the soil survey report. If the soil's characteristics match those described for hydric soil, then the hydric soil criterion is met, unless the soil has been effectively drained. If soils have been significantly disturbed, either mechanically or hydrologically, refer to the disturbed areas section. In the absence of site-specific information, hydric soils also may be recognized by certain soil properties caused by wetland hydrology conditions that make soil meet the NTCHS criteria for hydric soils.

#### *General Characteristics of Hydric Soils*

Due to their wetness during the growing season, hydric soils usually develop certain morphological properties that can be readily observed in the field. Anaerobic soil conditions usually occur due to excessive wetness and they typically lower the soil redox potential causing a chemical reduction of some soil components, mainly iron oxides and manganese oxides. This reduction affects solubility, movement, and aggregation of these oxides which is reflected in the soil color and other

physical characteristics that are usually indicative of hydric soils.

Soils are separated into two major types on the basis of material composition: organic soil and mineral soil. In general, soils with at least 16 inches of organic material in the upper part of the soil profile and soils with organic material resting on bedrock are considered organic soils (Histosols). Soils largely composed of sand, silt, and/or clay are mineral soils. For technical definitions, see "Soil Taxonomy", U.S.D.A. Soil Survey Staff 1975.

#### *Organic Soils*

Accumulation of organic matter in most organic soils results from anaerobic soil conditions associated with long periods of submergence or soil saturation during the growing season. These saturated conditions impede aerobic decomposition (oxidation) of the bulk organic materials such as leaves, stems, and roots, and encourage their accumulation over time as peat or muck. Consequently, most organic soils are characterized as very poorly drained soils. Organic soils typically form in waterlogged depressions, and peat or muck deposits may range from about 1.5 feet to more than 30 feet deep. Organic soils also develop in low-lying areas along coastal waters where tidal flooding is frequent.

Hydric organic soils are subdivided into three groups based on the presence of identifiable plant material: (1) Muck (Saprists) in which two-thirds or more of the material is decomposed and less than one-third of the plant fibers are identifiable; (2) peat (Fibrists) in which less than one-third of the material is decomposed and more than two-thirds of the plant fibers are still identifiable; and (3) mucky peat or peaty muck (Hemists) in which the ratio of decomposed to identifiable plant matter is more nearly even (U.S.D.A. Soil Survey Staff 1975). A fourth group of organic soils (Folists) exists in tropical and boreal mountainous areas where precipitation exceeds the evapotranspiration rate, but these soils are never saturated for more than a few days after heavy rains and thus do not develop under hydric conditions. All organic soils, with the exception of the Folists, are hydric soils.

Hydric organic soils can be easily recognized as black-colored muck to dark brown-colored peat. Distinguishing mucks from peats based on the relative degree of decomposition is fairly simple. In mucks (Saprists), almost all of the plant remains have been decomposed beyond recognition. When rubbed, mucks feel greasy and leave hands dirty.

In contrast, the plant remains in peats (Fibrists) show little decomposition and the original constituent plants can be recognized fairly easily. When the organic matter is rubbed between the fingers, most plants fibers will remain identifiable, leaving hands relatively clean. Between the extremes of mucks and peats, organic soils with partially decomposed plant fibers (Hemists) can be recognized. In peaty mucks up to two-thirds of the plant fibers can be destroyed by rubbing the materials between the fingers, while in mucky peats up to two-thirds of the plant remains are still recognizable after rubbing.

#### *Hydric Mineral Soils*

When less organic material accumulates in soil, the soil is classified as mineral soil. Some mineral soils may have thick organic surface layers (histic epipedons) due to heavy seasonal rainfall or a high water table, yet these soils are still composed largely of mineral matter (Ponnamperuma 1972). Mineral soils that are covered with moving (flooded) or standing (ponded) water for significant periods or are saturated for extended periods during the growing season meet the NTCHS criteria for hydric soils and are classified as hydric mineral soils. Soil saturation may result from low-lying topographic position, groundwater seepage, or the presence of a slowly permeable layer (e.g., clay, confining layer, confining bedrock, or hardpan).

The duration and depth of soil saturation are essential criteria for identifying hydric soils and wetlands. Soil morphological features are commonly used to indicate long-term soil moisture regimes (Bouma 1983). A thick dark surface layer, grayish subsurface and subsoil colors, the presence of orange or reddish brown (iron) and/or dark reddish brown or black (manganese) mottles or concretions near the surface, and the wet condition of the soil may help identify the hydric character of many mineral soils. The grayish subsurface and subsoil colors and thick, dark surface layers are the best indicators of current wetness, since the yellow- or orange-colored mottles are very insoluble and once formed may remain indefinitely as relict mottles of former wetness (Diers and Anderson 1984).

A histic epipedon (organic surface layer) is evidence of a soil meeting the NTCHS criteria. It is an 8 to 18-inch organic layer at or near the surface of a hydric mineral soil that is saturated with water for 30 consecutive days or more in most years. It contains a minimum of 20 percent organic matter when no clay is

present or a minimum of 30 percent organic matter when clay content is 60 percent or greater. Soils with histic epipedons are inundated or saturated for sufficient periods to greatly retard aerobic decomposition of organic matter, and are considered hydric soils. In general, a histic epipedon is a thin surface layer of peat or muck if the soil has not been plowed (U.S.D.A. Soil Survey Staff 1975). Histic epipedons are typically designated as O-horizons (Oa, Oe, or Oi surface layers), and in some cases the terms "mucky" or "peaty" are used as modifiers to the mineral soil texture term, e.g., mucky loam.

#### *Soil-related Evidence of Significant Saturation*

Identification of some wetlands and delineation of the upper boundary in many wetlands is not readily accomplished without a detailed examination of the underlying soil. Colors in the soil are strongly influenced by the frequency and duration of soil saturation which causes reducing conditions. A gleyed layer and a low chroma matrix with high chroma mottles, near the surface are common indicators of hydric soils throughout the county. Other soil markers of significant soil saturation vary regionally. These signs include thick organic surface layers ( $\geq 8$  inches), gleying, and certain types of mottling. If significant drainage or groundwater alteration has taken place, then it is necessary to determine whether the area in question is effectively drained and is now nonwetland or is only partly drained and remains wetland despite some hydrologic modification. Guidance for determining whether an area is effectively drained is presented in the section on disturbed areas.

Soils saturated for prolonged periods during the growing season in most years are usually gleyed in the saturated zone. Gleyed layers are predominantly gray in color and occasionally greenish or bluish gray. In gleyed soils, the distinctive colors result from a process known as gleization. Prolonged saturation of mineral soil converts iron from its oxidized (ferric) form to its reduced (ferrous) state. These reduced compounds may be completely removed from the soil, resulting in gleying (Veneman, *et al.* 1970). Mineral soils that are always saturated are typically uniformly gleyed throughout the saturated area. Soils gleyed to the surface layer are evidence of wetland hydrology and anaerobic soil conditions. These soils often show evidence of oxidizing conditions only along root channels. Some nonsaturated soils have

gray layers (E-horizons) immediately below the surface layer that are gray for reasons other than saturation, such as leaching due to organic acids (see Spodosols below).

Mineral soils that are alternately saturated and oxidized (aerated) during the year are usually mottled in the part of the soil that is seasonally wet. Mottles are spots or blotches of different colors or shades of colors interspersed with the dominant (matrix) color. The abundance, size, and color of the mottles usually reflect the hydrology—the duration of the saturation period, and indicate whether or not the soil is saturated for long periods. Mineral soils that are predominantly grayish with common or many, distinct or prominent brown or yellow mottles are usually saturated for long periods during the growing season and are hydric soils. Soils that are predominantly brown or yellow with gray mottles are saturated for shorter periods and may be hydric depending on the depth to the gray mottles and the color of the overlying layer. Mineral soils that are never saturated are usually bright-colored and are not mottled; they are nonhydric soils (Tiner and Veneman 1987). Realize, however, that in some hydric soils, mottles may not be visible due to masking by organic matter (Parker, *et al.* 1984).

It is important to note that the gleization and mottle formation processes are strongly influenced by the activity of certain soil microorganisms. These microorganisms reduce iron when the soil environment is anaerobic, that is, when virtually no free oxygen is present, and when the soil contains organic matter. If the soil conditions are such that free oxygen is present, organic matter is absent, or temperatures are too low (below 41 degrees Fahrenheit) to sustain microbial activity, gleization will not proceed and mottles will not form, even though the soil may be saturated for prolonged periods of time (Diers and Anderson 1984). Soil colors as discussed above often reveal much about a soil's historical wetness over the long term. Scientists and others examining the soil can determine the approximate soil color by comparing the soil sample with a Munsell soil color chart. The standardized Munsell soil colors are identified by three components: Hue, value, and chroma. The hue is related to one of the main spectral colors: red, yellow, green, blue, or purple, or various mixtures of these principal colors. The value refers to the degree of lightness, while the chroma notation indicates the color strength or purity. In the Munsell soil color book, each individual hue has

its own page, each of which is further subdivided into units for value (on the vertical axis) and chroma (horizontal axis). Although theoretically each soil color represents a unique combination of hues, values, and chromas, the number of combinations common in the soil environment usually is limited. Because of this situation and the fact that accurate reproduction of each soil color is expensive, the Munsell soil color book contains a limited number of combinations of hues, values, and chromas. The color of the soil matrix or a mottle is determined by comparing a soil sample with the individual color chips in the soil color book. The appropriate Munsell color name can be read from the facing page in the "Munsell Soil Color Charts" (Kollmorgen Corporation 1975). Chromas of 2 or less are considered low chromas and are often diagnostic of hydric soils. Low chroma colors include black, various shades of gray, and the darker shades of brown and red.

Gleying (bluish, greenish, or grayish colors) in or immediately below the A-horizon is an indication of a markedly reduced hydric soil and an area that should meet wetland hydrology in the absence of significant hydrologic modification. Gleying can occur in both mottled and unmottled soils. Gleyed soil conditions can be determined by using the gley page of the "Munsell Soil Color Charts" (Kollmorgen Corporation 1975). Note: gleyed conditions normally extend throughout saturated soils. Beware of soils with gray subsoils due to parent materials, soils with gray e-horizons or albic horizons due to leaching and not to saturation; these latter soils can often be recognized by bright-colored layers below the e-horizon. (See "Atypical Hydric Soils" below.)

Mineral soils that are saturated for substantial periods of the growing season, but are unsaturated for some time, commonly develop mottles. Soils that have brightly colored mottles and a low chroma matrix are indicative of a fluctuating water table.

The following color features in the horizon immediately below the A-horizon (or E-horizon, albic horizon) provide evidence of soil saturation sufficient to be hydric soils and should also meet the wetland hydrology criterion:

- (1) Matrix chroma of 2 or less in mottled soils, or
- (2) Matrix chroma of 1 or less in unmottled soils.

Note: Mollisols have value requirements of 4 or more as well as chroma requirements for aquic suborders. (See "Atypical Hydric Soils" below.)

The chroma requirements above are for soils in a moistened condition. Colors noted for dry (unmoistened) soils should be clearly stated as such. The colors of the topsoil (A-horizon) are often not indicative of the hydrologic situation because cultivation and soil enrichment affect the original soil color. Hence, the soil colors below the A-horizon (and E-horizon, if present) usually must be examined.

Note: Beware of hydric soils that have colors other than those described above. (See "Atypical Hydric Soils" below.)

During the oxidation-reduction process, the iron and manganese in solution in saturated soils are sometimes precipitated as oxides into concretions or soft masses upon exposure to air as the soil dries. Concretions are local concretions of chemical compounds (e.g., iron oxide) in the form of a grain or nodule of varying size, shape, hardness, and color (Buckman and Brady 1969). Manganese concretions are also usually black or dark brown, while iron concentrations are usually yellow, orange or reddish brown. In wetlands, these concretions are also usually accompanied by soil colors as described above.

#### *Atypical Hydric Soils*

Some hydric soils are soils lacking diagnostic hydric soil properties or soils that may look like hydric soils in terms of soil color, but whose color is not the result of excess wetness.

Presumably, the area in question has been located on a soil survey map that identified it as a hydric component of a map unit on the county list of hydric soil map units or if no maps are available, soil properties (matrix colors) that appear to contradict landscape position (e.g., red-colored soils in obvious depressions or gray-colored soils in obvious uplands) have been observed. Atypical Hydric soils are discussed below.

To determine whether the area in question is wetland, emphasis will be placed on vegetation and signs of hydrology, yet always consider landscape position in assessing the likelihood of wetland in these situations.

#### *Hydric Entisols (Floodplain and Sandy Soils)*

Entisols are usually young or recently formed soils that have little or no evidence of pedogenically developed horizons (U.S.D.A. Soil Survey Staff 1975). These soils are typical of floodplains throughout the U.S., but are also found in glacial outwash plains, along tidal waters, and in other areas.

They include sandy soils of riverine islands, bars, and banks and finer-textured soils of floodplain terraces. Wet entisols have an aquic or peraquic moisture regime and are considered hydric soils, unless effectively drained. Some Entisols are easily recognized as hydric soils such as the Sulfaquents of tidal salt marshes and Hydraquents, whereas others pose problems because they do not possess typical hydric soil field indicators. Wet sandy Entisols (with loamy fine sand and coarser textures in horizons within 20 inches of the surface) may lack sufficient organic matter and clay to develop hydric soil colors. When these soils have a hue between 10YR and 10Y and distinct or prominent mottles present, a chroma of 3 or less is permitted to identify the soil as hydric (i.e., an aquic moisture regime). Also, hydrologic data showing that the soil is flooded or ponded enough to be wetland are sufficient to verify these soils as hydric. Sandy Entisols must have positive indicators of hydrology (see positive indicators for sandy soils for your region) in the upper 6 inches and have colors of the loamy fine sand or coarser Aquents. Soils that key to the aeric suborder or have colors of the aeric suborder within 12 inches are not considered hydric soils. Other Entisols are considered hydric if they classify in the aquic suborder and have the colors as listed for soils that are finer than loamy fine sand in some or all layers to a depth of 12 inches. Soils that key to the aeric subgroup or have aeric colors above 12 inches as listed for Aquent subgroups are not hydric.

#### *Hydric Mollisols (Prairie and Steppe Soils)*

Mollisols are dark colored, base-rich soils. They are common in the central part of the conterminous U.S. from eastern Illinois to Montana and south to Texas. Natural vegetation is mainly tall and mid grass prairies and short grass steppes. These soils typically have deep, dark-colored surface (mollic epipedons) and subsurface layers that have color values of less than 4 moist and commonly have chromas of 2 or less. The low chroma colors of Mollisols are not necessary due to wetness of periods of saturation. They are rich in organic matter due largely to the vegetation (deep roots) and reworking of the soil and organic matter by earthworms, ants, moles, and rodents. The low chroma colors of Mollisols are not necessarily due to prolonged saturation, so be particularly careful in making wetland determinations in these soils. Many Great Groups of aquic Mollisols do not have aeric subgroups. Therefore, if a Mollisol is classified as an Aquoll,

special care is needed to determine if it is hydric. There are two suborders of Mollisols that have aquic moisture regimes: Albolls and Aquolls. Albolls have an albic horizon that separates the surface layer from an argillic or natric horizon. The albic horizon must have chromas of 2 or less or the albic, argillic, or natric horizons must have characteristics associated with wetness such as mottles, iron-manganese concretions larger than 2 mm or both. All Albolls are considered hydric soils. Aquolls exhibiting regional hydrology characteristics for Mollisols in the upper part are considered hydric.

#### Hydric Oxisols

These soils are highly weathered, reddish, yellowish, or grayish soils of tropical and subtropical regions. They are mixtures of quartz, kaolin, free oxides, and organic matter. For the most part, they are nearly featureless soils without clearly distinguishable horizons. Oxisols normally occur on stable surfaces and weathering has proceeded to great depths. To be hydric, these normally red-colored soils are required to have chromas 2 or less immediately below the surface layer, or if there are distinct or prominent mottles, the chroma is 3 or less. They also qualify as hydric if they have continuous plinthite within 12 inches of the surface.

#### Hydric Spodosols (Evergreen Forest Soils)

These soils, usually associated with coniferous forests, are common in northern temperate and boreal regions of the U.S. and along the Gulf-Atlantic Coastal Plain. Spodosols have a gray eluvial E-horizon overlying a diagnostic spodic horizon of accumulated (sometimes weakly cemented) organic matter, aluminum, and iron (U.S.D.A. Soil Survey Staff 1975). A process called podzolization is responsible for creating these two soil layers. Organic acids from the leaf litter on the soil surface are moved downward through the soil with rainfall, cleaning the sand grains in the first horizon (the E-horizon) then coating the sand grains with organic matter and iron oxides in the second layer (the spodic horizon). Certain vegetation produce organic acids that speed podzolization including eastern hemlock (*Tsuga canadensis*), spruces (*Picea* spp.), pine (*Pinus* spp.), larches (*Larix* spp.), and oaks (*Quercus* spp.) (Buol, et al. 1980). The E-horizon or Albic horizon by definition has a chroma of 3 or less and is often mistaken for a gleyed layer by the novice. These Spodosols must have one of the positive regional hydrology indicators and meet the color requirement for Aquods listed in "Soil

Taxonomy." Hydric Spodosols that have a thick (more than 12 inches) sandy epipedon are extremely harder to identify especially in the Gulf-Atlantic Coastal Plain. These soils must also meet the color requirements for the Aquod suborder and meet one of the regional hydrology indicators for sandy soils.

#### Hydric Vertisols (Shrink and Swell Soils)

These soils are dark-colored clayey soils that are extensive in the Great Plains, in the southern U.S., and in parts of California. They develop wide, deep cracks when dry and swell shut, when wet. Many Vertisols exhibit gilgai microtopography with swells and swales or mounds and hollows. The morphology of these soils may be distinctly different on the mound and in the hollow. They commonly have thick dark-colored surface layers because of the churning action created by the shrinking and swelling clays. During wet periods, they are very slowly permeable and may pond water on the surface of the micro-hollows, but in dry periods they are rapidly permeable with water travelling along the deep cracks to lower layers. These soils must meet one of the regional hydrology indicators for Vertisols to qualify as hydric.

#### Hydric Soils Derived From Red Parent Material

Hydric mineral soils derived from red parent materials (e.g., weathered clays, Triassic sandstones, and Triassic shales) may lack the low chroma colors characteristic of most hydric mineral soils. In these soils, the hue is redder than 10YR because of parent materials that remain red after citrate-dithionite extraction, so the low chroma requirement for hydric soil is waived (U.S.D.A. Soil Conservation Service 1982). Red soils are most common along the Gulf-Atlantic Coastal Plain (Ultisols), but are also found in the Midwest and parts of the Southwest and West (Alfisols), in the tropics, and in glacial areas where older landscapes of red shales and sandstones have been exposed. In southern New England, red parent material hydric soils are derived from reddish sandstone, shale, conglomerate, or basalt. These soils include the following series: Meno (Aeric Haplaquepts), Wilbraham (Aquic Dystrochrepts), Lim (Aeric Fluvaquents), and Bash (Fluvaquentic Dystrochrepts). In the absence of diagnostic hydric soil properties, more weight must be placed on the vegetation and hydrology.



### Hydric Soils Derived From Low Chroma Parent Materials

Soils derived from slate and phyllite produce low chroma colors due to this parent material. In southern New England, nonhydric soils having predominantly low chroma colors include the following series: Newport, Nassau, Dutchess, Bernardston, Pittstown, Dummerston, Taconic, Macomber, Lakesboro, and Fullan. A few series derived from these materials are hydric, including Stissing, Brayton, and Mansfield, with the first two including nonhydric members as well. Due to the difficulty of using soil colors as indicators of wetness, more weight must be placed on vegetation and hydrology.

### *Wetlands That Are Exceptions to the Three Criteria*

There are areas that meet the definition of wetlands but are exceptions to the three mandatory wetland criteria. These exceptions include widely recognized wetlands that fail to meet the wetland hydrology criterion (i.e., playa lakes, vernal pools, prairie potholes and pocosins which are inundated and/or saturated at the surface for 7 or more consecutive days during the growing season) and the three specific wetland types that fail to meet the hydrophytic vegetation criterion (i.e., wetlands that meet the wetland hydrology and hydric soils criteria but are dominated by facultative upland plants, i.e., Eastern hemlock swamps, white pine bogs, and tamarack swamps). Such areas are wetlands only if they meet one of the descriptions of exceptions to the three criteria provided below. Additional information on some of these exceptions is provided in appendix 5. Other circumstances that warrant special consideration are addressed in this manual in the "Atypical Hydric Soils" discussion, and the "Problem Area Wetlands" section.

### *Pocosins*

The pocosin wetlands of the Southeast contain broadleaved evergreen shrub bogs. Such bogs typically occur in areas characterized by highly organic soils and long hydroperiods during which inundation may but does not always occur. The largest areas of pocosin wetlands occur in the outer Coastal Plain of North Carolina. Although early settlers used the term to depict a variety of swamp vegetation types, pocosin wetlands usually are described as marshy or boggy shrub areas or flatwoods with poor drainage where peaty soils typically support scattered pines and a

dense growth of shrubs, mostly evergreen (Sharitz and Gibbons 1982). Hydrology of pocosins may not be readily apparent due to the thick underlying peaty soils that may dry out rapidly after the early part of the growing season due to evapotranspiration. This, in addition to the strong colloidal bonding between water and organic matter in the soil may make it difficult to squeeze or shake water from the surface soil. Thus, other indicators should be used to identify wetland hydrology in pocosins. Located on the Coastal Plain, pocosins perform important aquatic functions such as storing rainwater and regulating its discharge into nearby estuaries where aquatic life is affected by fluctuations in streamflow and salinity. Pocosins also function to stabilize nutrients, reducing the potential for nutrient overloading in nearby estuaries.

### *Playas*

Playas occur in many arid and semiarid regions of the world. Although occurring throughout much of the western United States, they are concentrated in the southern Great Plains as either ephemeral or permanent lakes or wetlands. The topography of most playa regions is flat to gently rolling and generally devoid of drainage. Playa basins collect water primarily in two peak periods—May and September—as a result of regional convective storms. Wetland hydrology is best characterized by examining hydrological indicators over a multi-year period. Playa basins may have a dense cover of annual or perennial vegetation or may be barren, depending on the timing and other factors such as precipitation and irrigational runoff. As with potholes, the process of annual drying in playas enables the invasion of FAC, FACU, and UPL plants during dry periods which may persist into other seasons. Playas typically are important waterfowl habitat. Additional information to assist in playa wetland identification is in appendix 5.

### *Prairie Potholes*

Prairie potholes are glacially-formed depressional wetlands located in the north central United States and southern Canada. Many prairie potholes are seasonally dry but fill with snowmelt and rain early in the growing season. This is because average precipitation is far too sparse to meet the demands of evaporation and as a result, some potholes are dry for a significant portion of the year. The process of annual drying in potholes enables the invasion of FAC, FACU, or UPL plant species during dry periods which may persist

into wet seasons. Nevertheless, a variety of vegetation characteristic of a freshwater marsh can exist in a prairie pothole with submergent and floating plants in deeper water, bulrushes and cattails closer to shore, and sedges located toward the upland. The drastically fluctuating climate and alteration for farming have resulted in highly disturbed conditions that make wetland identification difficult. Potholes are typically known for supporting an abundance of resident and migratory waterfowl. Additional information to assist in prairie potholes wetland identification is in appendix 5.

### *Vernal Pools*

Vernal pools are natural wetlands are depressional wetlands that are covered by shallow water for variable periods from winter to spring, but may be completely dry at the surface for most of the summer and fall. They hold water long enough to allow some aquatic organisms (e.g., salamanders and frogs) to grow and reproduce (complete their life cycles), but not long enough to permit the development of a typical pond or marsh ecosystem. Since vernal pools vary considerably in depth and duration of both from year to year, within a year, or between different pools, plant composition is quite dynamic. Depending on the seasonal phase of the pool, plants can range from OBL aquatic plants to FAC and FACU species. Additional information to assist in vernal pool wetland identification is in appendix 5.

### *List of Special Wetlands That Fail the Hydrophytic Vegetation Criterion*

Some wetlands demonstrate a prevalence of wetland plant species that are more typically found in uplands. This usually occurs as a result of the adaptability of the species to saturated soil conditions. Wetland-adapted populations or ecotypes of species that more frequently occur in uplands occur in a wide variety of species (Tiner 1991).—Recognizable wetland types in which this phenomenon occurs are listed below. These areas must meet the wetland hydrology and hydric soils criteria.

White Pine Bogs of the Northeast and Northern Midwest  
Eastern Hemlock Swamps and Bogs in the Northeast  
Tamarack Bogs

### **Part III. Standard Methods for Identification and Delineation of Wetlands**

Four basic approaches for identifying and delineating wetlands have been

developed to cover situations ranging from desk-top or office determinations to highly complex field determinations for regulatory purposes. These methods are the recommended approaches that have been successfully used to delineate wetlands by the four Federal agencies. If situations require different approaches, the reasons for departing from recommended approaches should be documented. Remember, however, that any method for making a wetland determination must consider the three technical criteria (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) listed in Part II of this manual. These criteria must be met in order to identify a wetland (unless the area is addressed in this manual as an exception to the criteria). Moreover, procedures for determining the wetland boundary must be consistent with those used in this manual. In applying all methods, relevant available information on wetlands in the area of concern should be collected and reviewed. Table 1 lists primary data sources.

#### Selection of a Method

The wetland delineation methods presented in this manual can be grouped into two general types: (1) Offsite preliminary procedures and (2) onsite procedures. The offsite procedures are designed for use in the office for preliminary wetland determinations, while onsite procedures are developed for use in the field for definitive wetland determinations. When an onsite inspection is unnecessary or cannot be undertaken for various reasons, available information can be reviewed in the office to make a preliminary wetland determination. If available information is insufficient to make a preliminary wetland determination or if a definitive wetland determination or wetland boundary must be established, (e.g., for determining whether or not there is jurisdiction or the boundaries of jurisdiction under a Federal wetland regulatory program), an onsite inspection should be conducted. For determining whether or not an area is subject to Clean Water Act jurisdiction, an onsite inspection is usually necessary. Depending on the field information needed or the complexity of the area, one of three basic onsite methods may be employed: (1) Routine, (2) intermediate-level, or (3) comprehensive.

The routine method is designed for areas equal to or less than five acres in size or larger areas with homogeneous vegetation. For areas greater than five acres in size or other areas of any size that are highly diverse in vegetation, the intermediate-level method or the

comprehensive method should be applied, as necessary. The comprehensive method is applied to situations requiring detailed documentation of vegetation, soils, and hydrology. Assessments of significantly disturbed sites will often require intermediate-level or comprehensive determinations as well as some special procedures. Wetland delineators should become well acquainted with common types of wetland disturbances, and with types of wetlands that are described in this manual as exceptions to the three criteria. In making wetland determinations, one should select the appropriate method for each individual unit within the area of concern and not necessarily employ one method for the entire site. Thus, a combination of determination methods may be used for a given site.

Regardless of the method used, the desired outcome or final product is a wetland/nonwetland determination. Depending on one's expertise, available information, and individual or agency preference, there are two basic approaches to delineating wetland boundaries. The first approach involves characterizing plant communities in the area, identifying plant communities meeting the hydrophytic vegetation criterion, examining the soils in these areas to confirm that the hydric soil criterion is met, and finally looking for evidence of wetland hydrology to verify this criterion. This approach has been widely used by the CE and EPA and to a large extent by the FWS. A second approach involves first delineating the approximate boundary of potential hydric soils, and then verifying the presence of likely hydrophytic vegetation and looking for signs of wetland hydrology. This type of approach has been employed by the SCS and to a limited extent by the FWS. Since these approaches yield the same result, this manual incorporates both approaches into most of the methods presented.

TABLE 1.—PRIMARY SOURCES OF INFORMATION THAT MAY BE HELPFUL IN MAKING A WETLAND DETERMINATION

Data name	Source
Topographic Maps .....	U.S. Geological Survey (Call 1-800-USA-MAPS).
National Wetlands Inventory Maps.	U.S. Fish and Wildlife Service (Call 1-800-USA-MAPS).
County Soil Survey Reports.	U.S.D.A. Soil Conservation Service.
National Hydric Soils List..	SCS National Office.
State Hydric Soils List .....	SCS State Offices.

TABLE 1.—PRIMARY SOURCES OF INFORMATION THAT MAY BE HELPFUL IN MAKING A WETLAND DETERMINATION—Continued

Data name	Source
County Hydric Soil Map Unit List	SCS District Offices.
National Flood Insurance Maps.	Federal Emergency Management Agency.
Local Wetland Maps.....	State and local agencies.
Land Use and Land Cover Maps.	USGS (1-800-USA-MAPS).
Aerial Photographs .....	Various sources.
Agricultural Stabilization and Conservation Service Compliance Slides.	USDA/ASCS.
Satellite Imagery.....	EOSAT Corporation, SPOT Corporation, and others.
National List of Plant Species That Occur in Wetlands (Stock No. 024-010-00682-0).	Govt. Printing Office, Superintendent of Docs., Washington, DC 20402.
Regional Lists of Plants that Occur in Wetlands.	Natl. Technical Service, 5285 Port Royal Head, Springfield, VA 22181 (703) 487-4650.
National Wetland Plant Database.	FWS.
Stream Gauge Data.....	CE District Offices and USGS.
Soil Drainage Guides.....	SCS District Offices.
Environmental Impact Statements, Assessments.	Various Federal and State agencies.
Published Reports.....	Federal and State agencies, universities, and others.
Local Expertise.....	Universities, consultants, and others.
Site-specific Plans and Engineering Designs.	Private developers.

#### Description of Methods

##### Offsite Preliminary Determinations

When an onsite inspection is not necessary because information on hydrology, hydric soils, and hydrophytic vegetation is known or an inspection is not possible due to time constraints or other reasons, a preliminary wetland determination can be made in the office. This approach provides an approximation of the presence of wetland and its boundaries based on available information. The accuracy of the determination depends on the quality of the information used and on one's ability and experience in an area to interpret these data. Where reliable, site-specific data have been previously collected, the wetland determination can be reasonably accurate. Where these data do not exist, more generalized information may be used to make a preliminary wetland determination. In either case, however, if a more accurate delineation is required, then onsite procedures must be employed. For the purposes of

determining whether an area is subject to federal jurisdiction under the Clean Water Act or other Federal wetland regulatory program, onsite determinations are usually necessary. Regardless of the method used, documentation of all three criteria is mandatory.

**Onsite Determinations**

When an onsite inspection is necessary, always be sure to review pertinent background information (e.g., NWI maps, soil surveys, and site plans) before going to the subject site. This information will be helpful in determining what type of field method should be employed. Also, read the sections of this manual that discuss disturbed area, and exceptions to the three criteria before conducting field work. These situations can pose problems for the inexperienced wetland delineator, so learn the procedures for evaluating these sites. Recommended equipment and materials for conducting onsite determinations are listed in Table 2.

Step 3. Review existing background information and determine, to the extent possible, the site's geomorphological setting (e.g., floodplain, isolated depression, or ridge and swale complex), its habitat or vegetative complexity (i.e., the range or habitat or vegetation types), and its soils. (Note: Depending on available information, it may not be possible to determine the habitat complexity without going on the site; if necessary, do a field reconnaissance.) Proceed to Step 4.

Step 4. Determine whether a disturbed condition exists. Examine available information and determine whether there is evidence of sufficient natural or human-induced alteration to significantly modify all or a portion of the area's vegetation, soils, and/or hydrology. If such disturbance is noted, identify the limits of affected areas for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). The presence of disturbed areas within the subject area should be considered when selecting an onsite determination method.

(Note: It may be possible that at any time during this determination, one or more of the three characteristics may be found to be significantly altered. If this happens, follow the disturbed area wetland determination procedures, as necessary). Proceed to Step 5.

Step 5. Determine the field determination method to be used. Considering the size and complexity of the area and the need for quantification, determine whether a routine, intermediate-level, or comprehensive field determination method should be used. When the area is equal to or less than five acres in size or is larger and appears to be relatively homogeneous with respect to vegetation, soils, and/or hydrology, use the routine method (see below). When the area is greater than five acres in size, or is smaller but appears to be highly diverse with respect to vegetation, use the intermediate-level method (Appendix 3). When detailed quantification of plant communities and more extensive documentation of other factors (soils and hydrology) are required, use the comprehensive method regardless of the wetland's size (Appendix 4). Significantly disturbed sites (e.g., sites that have been filled, hydrologically modified, cleared of vegetation, or had their soils altered) will generally require intermediate-level or comprehensive methods. In these disturbed areas, it usually will be necessary to follow a set of subroutines to determine whether the altered characteristic met the applicable criterion prior to its modification; in the

case of altered wetland hydrology, it may be necessary to determine whether the area is effectively drained. Because a large area may include a diversity of smaller areas ranging from simple wetlands to vegetatively complex areas, one may use a combination of the onsite determination methods, as appropriate.

*Disturbed Area Wetland Determinations*

In the course of field investigations, one often encounters significantly disturbed or altered areas. Disturbed areas are wetlands that met the mandatory criteria prior to disturbance and have had vegetation, soils, and/or hydrology altered such that the require evidence of the relevant indicators for the affected criteria has been removed. The following sections discuss these situations and present procedures for distinguishing wetlands from nonwetlands. If a disturbed area is identified as a wetland, field personnel shall document the reasons for determining that the site would have been a wetland but for the disturbance.

Disturbed areas have been altered either recently or in the past in some way that makes wetland identification more difficult than it would be in the absence of such changes. Disturbed areas include both wetlands and nonwetlands that have been modified to varying degrees by human activities (e.g., filling, excavation, clearing, damming, and building construction) or by natural events (e.g., avalanches, mudslides, fire, volcanic deposition, and beaver dams). Disturbed wetlands include areas subjected to deposition of fill or dredged material, removal or other alteration of vegetation, conversion to agricultural land and silviculture plantations, and construction of levees, channelization and drainage systems, and/or dams (e.g., reservoirs and beaver dams) that significantly modify an area's hydrology. In considering the effects of natural events (e.g., a wetland buried by a mudslide), the relative permanence of the change and whether the area is still functioning as a wetland must be considered. If natural events have relatively permanently disturbed an area to the extent that wetland hydrology is no longer present, and therefore hydric soils and hydrophytic vegetation, even if still present, would not be expected to persist at the site, the area is no longer a wetland. Detailed investigations of the prior condition of such areas is generally inappropriate.

In cases where recent human activities have caused these changes, it may be necessary to determine the date of the alteration or conversion for legal

**TABLE 2.—RECOMMENDED EQUIPMENT AND MATERIALS FOR ONSITE DETERMINATIONS**

Equipment	Materials
Soil auger, probe, or spade.....	Data sheets and clipboard.
Sighting compass.....	Field notebook.
Pen or pencil.....	Base (topographic) map.
Penknife.....	Aerial photograph.
Hand lens.....	National Wetlands Inventory map.
Vegetation sampling frame*.....	Soil survey or other soil map.
Camera/Film.....	Appropriate Federal inter-agency.
Binoculars.....	Wetland plants list.
Tape measure.....	County hydric soil map unit list.
Prism or angle gauge.....	Munsell soil color book.
Diameter tape*.....	Plant identification field guides/manuals.
Vasculum (for plant collect.).....	National List of Scientific Plant Names.
Calculator*.....	Flagging tape/wire flags-wooden stakes.
Dissecting kit.....	Plastic bag (for collecting plants and soil samples as needed).

\*Needed for comprehensive determination.

For every upcoming field inspection, the following pre-inspection steps should be undertaken:

Step 1. Locate the project area on a map (e.g., U.S. Geological Survey topographic map or SCS soil survey map) or on an aerial photograph and determine the limits of the area of concern. Proceed to Step 2.

Step 2. Estimate the size of the subject area. Proceed to Step 3.

purposes. If an illegal disturbance is suspected, and the pre-disturbance condition must be determined for the purposes of wetland regulatory program enforcement purposes, then a detailed investigation of the prior and current conditions of the disturbed area (i.e., whether the area was and is wetland or non-wetland) is appropriate. However, if an area has been disturbed by legal human activities that have effected the relatively permanent removal of wetland hydrology, hydric soil, or hydrophytic vegetation, then the area is non-wetland, and a detailed investigation of the prior condition of such areas is generally inappropriate. In addition, determination of regulatory jurisdiction for such areas is subject to agency interpretation. For example, Federal wetland regulatory policy under the Clean Water Act, and agricultural program policy under the Food Security Act of 1985, as amended, interprets the relative permanence of disturbance to vegetation caused by agricultural cropping. Be sure to consult appropriate agency in making Federal wetland jurisdictional determinations in such areas.

In disturbed wetlands, field indicators for one or more of the three technical criteria for wetland identification are usually absent. Where it is necessary to determine whether the "missing" indicator(s) (especially wetland hydrology) existed prior to alteration, one should review aerial photographs, existing maps, and other available information about the site. This determination may involve evaluating a nearby reference site (similar to the original character of the one altered) for indicator(s) of the "altered" characteristic.

When a significantly disturbed condition is detected during an onsite determination, and the prior condition of the area must be determined or it is suspected that the area may still be a wetland, the following steps should be taken to determine if the "missing" indicator(s) was present before alteration and whether the criterion in question was originally met. Be sure to record findings on the appropriate data form. After completing the necessary steps in appendix 7, return to the applicable step of the onsite determination method being used and continue evaluating the site's characteristics.

#### Appendix 1. Offsite Preliminary Determination Method

The following steps are recommended for conducting an offsite wetland determination:

Step 1. Locate the area of interest on a U.S. Geological Survey topographic map and delineate the approximate subject area boundary on the map. Note whether marsh or swamp symbols or lakes, ponds, rivers, and other waterbodies are present within the area. If they are, then there is a good likelihood that wetland is present. Proceed to Step 2.

Step 2. Review appropriate National Wetlands Inventory (NWI) maps, State wetland maps, or local wetland maps, where available. If these maps designate wetlands in the subject area, there is a high probability that wetlands are present unless there is evidence on hand that the wetlands have been effectively drained, filled, excavated, impounded, or otherwise significantly altered since the effective date of the maps. Proceed to Step 3.

Step 3. Review SCS soil survey maps were available. In the area of interest, are there any map units listed on the county list of hydric soil map units or are there any soil map units with significant hydric soil inclusions? If YES, then at least a portion of the project area may be wetland. If this area is also shown as a wetland on NWI or other wetland maps, then there is a very high probability that the area is wetland unless it has been recently altered (check recent aerial photos, Step 4). Areas without hydric soils or hydric soil inclusions should in most cases be eliminated from further review, but aerial photos still should be examined for small wetlands to be more certain. This is especially true if wetlands have been designated on the National Wetlands Inventory or other wetland maps. Proceed to Step 4.

Step 4. Review recent aerial photos of the project area. Before reviewing aerial photos, evaluate climatological data to determine whether the photo year had normal or abnormal (high or low) precipitation two or three months, for example, prior to the date of the photo. This will help provide a useful perspective or frame-of-reference for doing photo interpretation. In some cases, aerial photos covering a multi-year period (e.g., 5-7 years) should be reviewed, especially where recent climatic conditions have been abnormal.

During photo interpretation, look for one or more signs of wetlands. For example:

- (1) Hydrophytic vegetation;
- (2) Surface water;
- (3) Saturated soils;
- (4) Flooded or drowned out crops;
- (5) Stressed crops due to wetness;
- (6) Greener crops in dry years;

(7) Differences in vegetation patterns due to different planting dates.

If signs of wetlands are observed, proceed to Step 5 when site-specific data are available; if site-specific data are not available, proceed to Step 6.

Caution: Accurate photo interpretation of certain wetland types requires considerable expertise. Evergreen forested wetlands, seasonally saturated wetlands, and temporarily flooded wetlands, in general, may present considerable difficulty. If not proficient in wetland photo interpretation, then one can rely more on the findings of other sources, such as NWI maps and soil surveys, or seek help in photo interpretation.

Step 5. Review available site-specific information. In some cases, information on vegetation, soils, and hydrology for the project area has been collected during previous visits to the area by agency personnel, environmental consultants or others. Moreover, individuals or experts having firsthand knowledge of the project site should be contacted for information whenever possible. Be sure, however, to know the reliability of these sources. After reviewing this information, proceed to Step 6.

Step 6. Determine whether wetlands exist in the subject area. Based on a review of existing information, a preliminary determination can be made that the area is likely to be a wetland if:

(1) Wetlands are shown on NWI or other wetland maps, and hydric soil map unit or a soil map unit with hydric soil inclusions is shown on the soil survey; or

(2) Hydric soil map unit or soil map unit with hydric soil inclusions is shown on the soil survey (Note: In the latter case, only the hydric inclusion is being evaluated as wetland.), and

(A) Site-specific information, if available, confirms hydrophytic vegetation, hydric soils, and wetland hydrology, or

(B) Wetlands are shown in aerial photos.

If, after examining the available reference material one is still unsure whether the area is likely to be wetland, then a field inspection should be conducted, whenever possible. Alternatively, more detailed information on the site's characteristics may be sought, to help make the preliminary determination.

The validity of offsite preliminary determinations are dependent on the availability of information for making a wetland determination, the quality of this information, and one's ability and experience to interpret these data. In most cases, therefore, the offsite procedure yields a preliminary

determination. For more accurate results, one must conduct an onsite inspection.

#### Appendix 2. Routine Onsite Determination Method

For most cases, wetland determinations can be made in the field without rigorous sampling of vegetation and soils. Two approaches for routine determinations are presented: (1) Hydric soil assessment procedure, and (2) plant community assessment procedure. In the former approach, areas that meet or may meet the hydric soil estimated to determine if hydrophytic vegetation is obvious. If so, the area is searched for indicators of wetland hydrology. If positive indicators of hydric soils, hydrophytic vegetation, and wetland hydrology are present, the area is designated as wetland. If not, then the site must undergo a more rigorous evaluation following one of the other onsite determination methods presented in the manual. The second routine approach requires initial identification of representative plant community types in the subject area and then characterization of vegetation, soils, and hydrology for each type. After identifying wetland and nonwetland communities, the wetland boundary is delineated. All pertinent observations on the three mandatory wetland criteria should be recorded on an appropriate data sheet; this should be done for all inspections to determine regulatory jurisdiction.

#### *Hydric Soil Assessment Procedure*

Step 1. Identify the approximate limits of areas that may meet the hydric soil criterion within the area of concern and sketch limits on an aerial photograph. To help identify these limits use sources of information such as Agricultural Stabilization and Conservation slides, soil surveys, NWI maps, and other maps and photographs.

(Note: This step is more convenient to perform offsite, but may be done onsite.)

Proceed to Step 2.

Step 2. Scan the areas that may meet the hydric soil criterion and determine if disturbed conditions exist. Are any significantly disturbed areas present? If yes, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas, if necessary, to evaluate the altered characteristic(s) (vegetation, soils, or hydrology). If appropriate, determine whether wetland regulatory policy exempts the area from Federal regulatory jurisdiction (e.g., regulatory

policy on wetlands converted to cropland. See Disturbed Areas discussion; then return to this method and continue evaluating characteristics not altered. (Note: Prior experience with disturbed sites may allow one to easily evaluate an altered characteristic, such as when vegetation is not present in a farmed wetland due to cultivation.) Keep in mind that if at any time during this determination, one or more of these three characteristics are found to have been significantly altered, the disturbed area determination procedures should be followed. If the area is not significantly disturbed, proceed to Step 3.

Step 3. Scan the areas that may meet the hydric soil criterion and determine if obvious signs of wetland hydrology or hydric soil are present. The wetland hydrology criterion is met for any area or portion thereof where it is obvious or known that the area is frequently inundated or saturated at the surface for a sufficient duration during the growing season in most years. Confirm the presence of hydric soil by examining the soil for appropriate properties. If the area has obvious positive indicators of wetland hydrology, the hydrology has not been significantly disturbed, the soil is organic (Histosols, except Folists) or is mineral classified as Sulfaquents, Hydraquents, or Histic subgroups of Aquic Suborders, and the area has hydrophytic vegetation, then the area is wetland. Hydrophytic vegetation should be obvious in these situations. Areas lacking obvious indicators of wetland hydrology, readily obvious hydric soils, or hydrophytic vegetation must be further examined, so proceed to Step 4.

Step 4. Refine the boundary of areas that may meet the hydric soil criterion. Verify the presence of hydric soil within the appropriate map units by digging a number of holes at least 18 inches deep along the boundary (interface) between hydric soil units and nonhydric soil units. Compare soil samples with descriptions in the soil survey report to see if they are properly mapped. In this way, the boundary of areas meeting the hydric soil criterion is further refined by field observations. In map units where only part of the unit is hydric (e.g., complexes, associations, and inclusions), locate hydric soil areas on the ground by considering landscape position and evaluating soil characteristics for hydric soil properties. (Note: Some hydric soils, especially organic soils, have not been given a series name and are referred to by common names, such as peat, muck, swamp marsh, wet alluvial land, tidal marsh, Sulfaquents, and Sulfishemists. These areas are also considered hydric

soil map units. Certain hydric soils are mapped with nonhydric soils as an association or complex, while other hydric soils occur as inclusions in nonhydric map units. Only the hydric soil portion of these map units should be evaluated for the hydrophytic vegetation criteria in Step 7.) If the area meets the hydric soil criterion, proceed to Step 5.

Step 5. Consider the following:

(1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal or long-term fluctuations in precipitation, surface water, or ground-water levels?

(2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuation in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is YES or uncertain, and the area meets the description of one of the exceptions to the three criteria, proceed to the appropriate section of this manual. If the answer to both questions is NO, normal conditions are assumed to be present, so proceed to Step 6.

Note: In some cases, normal climatic conditions, such as snow cover or frozen soils, may prevent an accurate assessment of the wetland criteria; one must use best professional judgement to determine if delaying the wetland delineation is appropriate.

Step 6. Select representative observation area(s). Identify one or more observation areas that represent the area(s) meeting the hydric soil criterion. A representative observation area is one in which the apparent characteristics (determined visually) best represent characteristics of the entire community. Mark the approximate location of the observation area(s) on the aerial photo. Proceed to Step 7.

Step 7. Characterize the plant community within the area(s) meeting the hydric soil criterion. Visually estimate the percent areal cover of dominant species for the entire plant community. If dominant species are not obvious, use one of the other onsite methods. Proceed to Step 8 or to another method, as appropriate.

Step 8. Record the indicator status of dominant species within each area meeting the hydric soil criterion. Indicator status is obtained from the interagency Federal list of plants occurring in wetlands for the appropriate geographic region. Record information on an appropriate data form. Proceed to Step 9.

Step 9. Determine whether wetland is present or additional analysis is required. If the estimated percent areal cover of OBL and FACW species

(dominants) exceeds that of FACU and UPL species (dominants), the area is considered wetland and the wetland-nonwetland boundary is the line delineated by the limits of conditions that verify the wetland hydrology criterion. If not, then the point intercept or other sampling procedures should be performed to do a more rigorous analysis of site characteristics.

#### *Plant Community Assessment Procedure*

Step 1. Scan the entire project area, if possible, or walk, if necessary, and identify plant community types present. In identifying communities, pay particular attention to changes in elevation throughout the site.

**Caution:** In highly variable sites, such as ridge and swale complexes, be sure to stratify properly, i.e., divide the site into homogeneous landforms to evaluate each landform separately.

If possible, sketch the approximate location of each plant community on a base map, an aerial photograph of the project area, or a county soil survey map and label each community with an appropriate name.

**Note:** For large homogeneous wetlands, especially marshes dominated by herbaceous plants and shrub bogs dominated by low-growing shrubs, it is usually not necessary to walk the entire project area. In these cases, one can often see for long distances and many have organic mucky soils that can be extremely difficult to walk on. Forested areas, however, will usually require a walk through the entire project area.

In examining the project area, are any significantly disturbed areas observed? If yes, identify their limits for they should be evaluated separately for wetland determination purpose (usually after evaluating undisturbed areas). Refer to the section on disturbed areas to evaluate the altered characteristic(s) (i.e., vegetation, soils, or hydrology). If appropriate, determine whether wetland regulatory policy exempts the area from Federal regulatory jurisdiction (e.g., regulatory policy on wetlands converted to cropland); then return to this method to continue evaluating characteristics not altered. Keep in mind that if at any time during this determination one or more of these three characteristics are found to have been significantly altered, the disturbed area procedures should be followed. If the area is not significantly disturbed, proceed to Step 2.

Step 2. Consider the following:

(1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal or long-term fluctuations in precipitation, surface water, or ground-water levels?

(2) Are hydrophytic vegetation indicators lacking due to seasonal

fluctuations in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is Yes or uncertain, and the area meets the description of one of the exceptions to the three criteria, proceed to the appropriate section of this manual. If the answer to both questions is No, normal conditions are assumed to be present, so proceed to Step 3.

**Note:** In some cases, normal climatic conditions, such as snow cover or frozen soils, may prevent an accurate assessment of the wetland criteria; one must use best professional judgement to determine if delaying the wetland delineation is appropriate.

Step 3. Select representative observation area(s). Select one or more representative observation areas within each community type. A representative observation area is one in which the apparent characteristics (determined visually) best represent characteristics of the entire community. Mark the approximate location of the observation areas on the base map or photo. Proceed to Step 4.

Step 4. Characterize each plant community in the project area. Within each plant community identified in Step 1, visually estimate the dominant plant species for each valid vegetative stratum in the representative observation areas and record them on an appropriate data form. Vegetative strata may include tree, sapling, shrub, herb, woody vine, and bryophyte strata (see glossary for definitions). Make sure the size of the observation area is sufficient to insure a representative assessment of the plant community. A separate form must be completed for each plant community identified for wetland determination purposes. After identifying dominants within each vegetative stratum, proceed to Step 5.

Step 5. Record the indicator status of dominant species in all strata. Indicator status is obtained from the interagency Federal list of plants occurring in wetlands for the appropriate geographic region. Record indicator status for all dominant plant species on a data form. Proceed to Step 6.

Step 6. Determine whether the hydrophytic vegetation criterion is met. Complete the vegetation section of the data form. Portions of the project area failing this test are usually not wetlands, although under certain circumstances they may have wetland hydrology and therefore be wetland (see list of exceptions). Proceed to Step 7.

Step 7. Determine whether the hydric soil criterion is met. Locate the observation area on a county soil survey map, if possible, and determine the soil map unit delineation for the area. Using

a soil auger, probe, or spade, make a hole at least 18 inches deep at the representative location in each plant community type. Examine soil characteristics and compare if possible to soil descriptions in the county soil survey report or classify to Subgroup following "Soil Taxonomy" (often requires digging a deeper hole), or look for regional indicators of significant soil saturation. If soil has been plowed or otherwise altered, which may have eliminated these indicators, proceed to the section on disturbed areas. Complete the soils section on the appropriate data sheet and proceed to Step 8 if conditions satisfy the hydric soil criterion. Areas having soils that do not meet the hydric soil criterion are nonwetlands.

**(Caution:** Become familiar with problematic hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplain soils, so that these hydric soils are not misidentified as nonhydric soils. See discussion under "Atypical Hydric Soils".)

Step 8. Determine whether the wetland hydrology criterion is met. Record observations and complete the hydrology section on the appropriate data form. If the wetland hydrology criterion is met, proceed to Step 9. If the wetland hydrology criterion is not met, the area is nonwetland.

**(Caution:** Certain exceptions to the three criteria may not meet the hydrology criterion; see discussion of these areas.)

Step 9. Make the wetland determination. Examine data forms for each plant community identified in the project area. Each community meeting the hydrophytic vegetation, hydric soil, and wetland hydrology criteria is considered wetland. If all communities meet these three criteria, then the entire project area is a wetland. If only a portion of the project area is wetland, then the wetland-nonwetland boundary must be established. Proceed to Step 10.

Step 10. Determine the wetland-nonwetland boundary. Where a base map or annotated photo was prepared, mark each plant community type on the map or photo with a "W" if wetland or an "N" if nonwetland. Combine all "W" types into a single mapping unit, if possible, and all "N" types into another mapping unit. On the map or photo, the wetland boundary will be represented by the interface of these mapping units. If flagging the boundary on the ground, the boundary is established by determining the limits of the indicators that verify all these criteria.

### Appendix 3. Intermediate-level Onsite Determination Method

On occasion, a more rigorous sampling method is required than the routine method to determine whether hydrophytic vegetation is present at a given site, especially where the boundary between wetland and nonwetland is gradual or indistinct. This circumstance requires more intensive sampling of vegetation, soils, and hydrology than presented in the routine determination method. This method also may be used for areas greater than five acres in size or other areas that are highly diverse in vegetation.

The intermediate-level onsite determination method has been developed to provide for more intensive vegetation sampling than the routine method. Two optional approaches are presented: (1) Quadrat transect sampling procedure, and (2) vegetation unit sampling procedure. The former procedure involves establishing transects within the project area and sampling plant communities along the transect within sample quadrats, with soils and hydrology also assessed in each sample plot. In contrast, the vegetation unit sampling procedure offers a different approach for analyzing the vegetation. First, vegetation units are designated in the project area and then a meander survey is conducted in each unit where visual estimates of percent areal coverage by plant species are made. Soil and hydrology observations also are made. Boundaries between wetland and nonwetland are established by examining the transitional gradient between them.

The following steps should be completed:

**Step 1.** Locate the limits of the project area in the field and conduct a general reconnaissance of the area. Previously the project boundary should have been determined on aerial photos or maps. Now appropriate ground reference points need to be located to insure that sampling will be conducted in the proper area. In examining the project area, were any significantly disturbed areas observed? If YES, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas to evaluate the altered characteristic(s) (i.e., vegetation, soils, or hydrology); then return to this method to continue evaluating the characteristics not altered. Keep in mind that if at any time during this determination, one or more of these three characteristics is found to have been significantly altered, the disturbed

areas procedures should be followed. If the area is not significantly disturbed, proceed with Step 2.

**Step 2.** Decide how to analyze plant communities within the project area: (1) By selecting representative plant communities (vegetation units), or (2) by sampling along a transect. Discrete vegetation units may be identified on aerial photographs, topographic and other maps, and/or by field inspection. These units will be evaluated for hydrophytic vegetation and also for hydric soils and wetland hydrology. If the vegetation unit approach is selected, proceed to Step 3. An alternative approach is to establish transects for identifying plant communities, sampling vegetation and evaluating other criteria, as appropriate. If the transect approach is chosen, proceed to Step 4.

**Step 3.** Identifying vegetation units for sampling. Vegetation units are identified by examining aerial photographs, topographic maps, NWI maps, or other materials or, by direct field inspection. All of the different vegetation units present in the project area should be identified. The subject area should be traversed and different vegetation units specifically located prior to conducting the sampling.

Field inspection may refine previously identified vegetation units, as appropriate. It may be advisable to divide large vegetation units into subunits for independent analysis.

(Caution: In highly variable terrain, such as ridge and swale complexes, be sure to stratify properly.) Decide which plant community to sample first and proceed to Step 7.

**Step 4.** Establish a baseline for locating sampling transects. Select as a baseline one project boundary or a conspicuous feature, such as road, in the project area. The baseline should be more or less parallel to the major watercourse through the area, if present, or perpendicular to the hydrologic gradient. Determine the approximate baseline length. Proceed to Step 5.

**Step 5.** Determine the minimum number and position of transects. Use the following to determine the minimum number and position of transects (specific site conditions may necessitate changes in intervals or additional transects). Divide the baseline length by the number of required transects to establish baseline segments for sampling. Establish one transect in each resulting baseline segment. Use the midpoint of each baseline segment as a transect starting point. For example, if the baseline is 1,200 feet in length, three transects would be established: one at 200 feet, one at 600 feet, and one at 1,000 feet from the baseline starting point.

Make sure that all plant community types are included within the transects; this may necessitate relocation of one or more transects lines or establishing more transects. Each transect should extend perpendicular to the baseline. Once positions of transect lines are established, go to the beginning of the first transect and proceed to Step 6.

**Step 6.** Locate sample plots along the transect. Along each transect, sample plots are established within each plant community encountered to assess vegetation, soils, and hydrology. When identifying these sample plots, two approaches may be followed: (1) Walk the entire length of the transect, taking note of the number, type, and location of plant communities present (flag the location, if necessary), and on the way back to the baseline, identify plots and perform sampling, or (2) identify plant communities as the transect is walked and sample the plot at that time ("sample as you go"). The sample plot should be located so it is representative of the plant community type. When the plant community type is large and covers a significant distance along the transect, select an area that is no closer than 300 feet to a perceptible change in plant community type; mark the center of this area on the base map or photo and flag the location in the field, if necessary.

(Caution: In highly variable terrain, such as ridge and swale complexes, be sure to stratify properly to ensure best results.)

At each plant community, proceed to Step 7.

**Step 7.** Consider the following:

(1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal, or long-term fluctuations in precipitation, surface water, or ground-water levels?

(2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is YES or uncertain, and the area meets the description of one of the exceptions to the three criteria, proceed to the appropriate section of this manual. If the answer to both questions is no, proceed to Step 8.

(Note: In some cases, normal climatic conditions, such as snow cover or frozen soils, may prevent an accurate assessment of the wetland criteria; one must use best professional judgment to determine if delaying the wetland delineation is appropriate.)

**Step 8.** Characterize the vegetation of the vegetation unit or the plant community along the transect.

If analyzing vegetation units, meander through the unit making visual estimates of the percent area covered for each species in the herb, shrub, sapling, woody vine, and tree strata; alternatively, for the tree stratum determine basal area using the Bitterlich method (see Dilworth and Bell 1978; Avery and Burkart 1983). Then:

(1) Within each stratum determine and record the cover class of each species and its corresponding midpoint. The cover classes (and midpoints) are T = <1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

(2) Rank the species within each stratum according to their midpoints.

(Note: If two or more species have the same midpoints and the same or essentially the same recorded percent areal cover, rank them equal; use absolute areal cover values as a tie-breaker only if they are obviously different.)

(3) Sum the midpoint values of all species within each stratum.

(4) Multiply the total midpoint values for each stratum by 50 percent.

(Note: This number represents the dominance threshold number and is used to determine dominant species.)

(5) Compile the cumulative total of the ranked species in each stratum until 50 percent of the sum of the midpoints (i.e., the dominance threshold number), for the herb, woody vine, shrub, sapling, and tree strata (or alternatively basal area for trees) is immediately exceeded. All species contributing areal cover or basal area to the 50 percent threshold are considered dominants, plus any additional species representing 20 percent or more of the total cover class midpoint values for each stratum or the basal area for tree stratum.

(Note: If the threshold is reached by two or more equally ranked species, consider them all dominants, along with any higher ranked species. If all species are equally ranked, consider them all dominants.)

(6) Record all dominant species on an appropriate data sheet and list indicator status of each. Proceed to Step 9.

If using the transect approach, sample vegetation in each stratum (e.g., tree, shrub, herb, etc.) occurring in the sample plots using the following quadrant sizes: (1) A 5-foot radius for bryophytes and herbs, and (2) a 30-foot radius for trees, saplings, shrubs, and woody vines. Plot size and shape may be changed as necessary to meet site conditions, but be sure that it is sufficient to adequately characterize the plant community.

Determine dominant species for each stratum by estimating one or more of the following as appropriate: (1) Relative

basal area (trees); (2) areal cover (trees, saplings, shrubs, herbs, woody vines, and bryophytes); or (3) stem density (shrubs, saplings, herbs, and woody vines). When estimating areal cover, use cover classes T (trace) through 7 and use the midpoints of the cover classes to determine dominants, see substeps 1 through 5 above. All plants covering the plot and representative of the plant community under evaluation should be counted in the cover estimate; plants overhanging from adjacent plant communities should not be counted. Record all dominant species on an appropriate data sheet and list the indicator status of each. Proceed to Step 9.

Step 9. Determine whether the hydrophytic vegetation criterion is met. Areas that do not meet the hydrophytic vegetation criterion, and that do not meet one of the descriptions of exceptions, usually are not wetlands. If the hydrophytic vegetation criterion is met, proceed to Step 10 after completing the vegetation section of the data sheet.

Step 10. Determine whether the hydric soil criterion is met. Locate the observation area on a county soil survey map, if possible, and determine the soil map unit delineation for the area. Using a soil auger, probe, or spade, make a hole at least 18 inches deep at the representative location in each plant community type. Examine soil characteristics and compare if possible to soil descriptions in the county soil survey report or classify to Subgroup following "Soil Taxonomy" (often requires digging a deeper hole), or look for regional indicators of significant soil saturation. If soil has been plowed or otherwise altered, which may have eliminated these indicators, proceed to the section on disturbed areas. Complete the soils section on the appropriate data sheet and proceed to Step 11 if conditions satisfy the hydric soil criterion. Areas having soils that do not meet the hydric soil criterion are nonwetlands.

(Caution: Become familiar with hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplain soils, so that these hydric soils are not misidentified as nonhydric soils; see the "Atypical Hydric Soils discussion.")

Step 11. Determine whether the wetland hydrology criterion is met. Record observations and complete the hydrology section on the appropriate data form. If the wetland hydrology criterion is met, proceed to Step 12. If the wetland hydrology criterion is not met, the area is nonwetland.

(Caution: Certain exceptions to the three criteria may not meet the hydrology criterion; see discussion of these areas.)

Step 12. Make the wetland determination for the plant community or vegetation unit. Examine the data forms for the plant community (sample plot) or vegetation unit. When the community or unit meets the hydrophytic vegetation, hydric soil, and wetland hydrology criteria, the area is considered wetland. Complete the summary data sheet; proceed to Step 13 when continuing to sample the transect or other vegetation units, or to Step 14 when determining a boundary between wetland and nonwetland plant communities or units.

(Note: Before going on, double check all data sheets to ensure that the forms are completed properly.)

Step 13. Sample other plant communities along the transect or other vegetation units. Repeat Steps 8 through 12 for all remaining plant communities along the transect if following transect approach, or repeat Steps 7 through 12 at the next vegetation unit. When sampling is completed for this transect, proceed to Step 14, or when sampling is completed for all vegetation units, proceed to Step 15.

Step 14. Determine the wetland-nonwetland boundary point along the transect. When the transect contains both wetland and nonwetland plant communities, then a boundary must be established. Proceed along the transect from the wetland plot toward the nonwetland plot. Look for the occurrence of UPL and FACU species, the appearance of nonhydric soil types, subtle changes in hydrologic indicators, and/or slight changes in topography. When such features are noted, look closely for evidence of wetland hydrology in the soil and locate the wetland boundary (i.e., the point at which the wetland hydrology criterion is no longer met). Establish sample plots on each side of the boundary (e.g., within 50 feet) and repeat Steps 8 through 12. If existing plots are within a reasonable distance, additional plots may not be necessary, but always identify the features that were used to identify the boundary. Data sheets should be completed for each new plot. Mark the position of the wetland boundary point on the base map or photo and stake or flag the boundary in the field, as necessary. Continue along the transect until the boundary points between all wetland and nonwetland plots have been established.

(Caution: In areas with a high interspersal of wetland and nonwetland plant



communities, several boundary determinations will be required.) When all wetland determinations along this transect have been completed, proceed to Step 16.

Step 15. Determine the wetland-nonwetland boundary between adjacent vegetation units. Review all completed copies of the data sheets for each vegetation unit. Identify each unit as either wetland (W) or nonwetland (N). When adjacent vegetation units contain both wetland and nonwetland communities, a boundary must be established. Walk the interface between the two units from the wetland unit toward the nonwetland unit and look for changes in vegetation, soils, hydrologic indicators, and/or elevation. As a general rule, at 100-foot intervals or whenever changes in the vegetation unit's characteristics are noted, look for evidence to locate the wetland-nonwetland boundary. At each designated boundary point, complete data sheets for new observation areas immediately upslope and downslope of the wetland-nonwetland boundary (i.e., one set for the wetland unit and one for the nonwetland unit), repeat Steps 8 through 12 for each area, and record the distance and compass directions between the boundary points. Record evidence of wetland hydrology as close to the boundary as possible, and record the features that were used to delineate the boundary. Mark the position of the wetland boundary point on the base map or photo and stake or flag the boundary in the field, as necessary. Based on observations along the interface, identify other of boundary points between each wetland unit and nonwetland unit. Repeat this step for all adjacent vegetation units of wetland and nonwetland. When wetland boundary points between all adjacent wetland and nonwetland units have been established, proceed to Step 16.

Step 16. Sample other transects and make wetland determinations along each. Repeat Steps 5 through 14 for each remaining transect. When wetland boundary points for all transects have been established, proceed to Step 17.

Step 17. Determine the wetland-nonwetland boundary for the entire project area. Examine all completed copies of the data sheets, and mark the location of each plant community type along the transect on the base map or photo, when used.

(Note: This has already been done for the vegetation unit approach.)

Identify each plant community as either wetland (W) or nonwetland (N), if it has not been done previously. If all plant communities are wetlands, then the entire project area is wetland. If all

communities are nonwetlands, then the entire project area is nonwetland. If both wetlands and nonwetlands are present, identify the boundary points on the base map and connect these points on the map by generally following contour lines to separate wetlands from nonwetlands. Confirm this boundary by walking the contour lines between the transects or vegetation units, as appropriate. Should anomalies be encountered, it will be necessary to establish short transects in these areas to refine the boundary; make any necessary adjustments to the boundary on the base map and/or on the ground. If those areas are significant in scope, be sure to record data used for the boundary determination. When marking the boundary for subsequent surveying by engineers, the boundary points should be flagged or marked otherwise to facilitate the survey.

#### Appendix 4. Comprehensive Onsite Determination Method

The comprehensive determination method is the most detailed, complex, and labor-intensive approach of the three recommended types of onsite determinations. It is usually reserved for highly complicated and/or large project areas, and/or when the determination requires rigorous documentation. Due to the latter situation, this type of onsite determination may be used for areas of any size.

In applying this method, a team of experts, including a wetland ecologist and a soil scientist, is often needed, especially when rigorous documentation of plants and soils are required. It is possible, however, for a highly trained wetland boundary specialist to singly apply this method.

Two alternative approaches of the comprehensive onsite determination method are presented: (1) Quadrat sampling procedure and (2) point intercept sampling procedure. The former approach establishes quadrats or sampling areas in the project site along transects, while the latter approach involves a frequency analysis of vegetation at sampling points along transects. The point intercept sampling procedure requires that the limits of potential hydric soils be established prior to evaluating the vegetation. In many cases, soil maps are available to meet this requirement, but in other cases a soil scientist may need to inventory the soils before applying this method. The quadrat sampling procedure, which involves identifying plant communities along transects and analyzing vegetation, soils, and hydrology within sample plots (quadrats), may be the preferred approach when soil maps are

unavailable or the individual is more familiar with plant identification.

#### Quadrat Sampling Procedures

Prior to implementing this determination procedure, read the sections of this manual that discuss disturbed areas, and exceptions to the three criteria; this information is often relevant to project areas requiring a comprehensive determination.

Step 1. Locate the limits of the project area in the field. Previously, the project boundary should have been determined on aerial photos or maps. Now appropriate ground reference points need to be located to ensure that sampling will be conducted in the proper area. Proceed to Step 2.

Step 2. Stratify the project area into different plant community types. Delineate the locations of these types on aerial photos or base maps and label each community with an appropriate name. (Caution: In highly variable terrain, such as ridge and swale complexes, be sure to stratify properly to ensure best results.) In evaluating the subject area, were any significantly disturbed areas observed? If YES, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas to evaluate the altered characteristic(s) (i.e., vegetation, soils, and/or hydrology); then return to this method to continue evaluating the characteristics not altered. Keep in mind that if at any time during this determination, it is found that one or more of these three characteristics have been significantly altered, the disturbed areas wetland determination procedures should be followed. If the area is not significantly disturbed, proceed to Step 3.

Step 3. Establish a baseline for locating sampling transects. Select as a baseline one project boundary or a conspicuous feature, such as a road, in the project area. The baseline ideally should be more or less parallel to the major watercourse through the area, if present, or perpendicular to the hydrologic gradient. Determine the approximate baseline length and record its origin, length, and compass heading in the field notebook. When a limited number of transects are planned, a baseline may not be necessary provided there are sufficient fixed points (e.g., buildings, walls, and fences) to serve as starting points for the transects. Proceed to Step 4.

Step 4. Determine the required number and position of transects. The number of transects necessary to adequately

characterize the site will vary due to the area's size and complexity of habitats. In general, it is best to divide the baseline into a number of equal segments and use the mid-point of each baseline segment as the transect starting point. For example, if the baseline is 1,600 feet in length, four transects will be established; one at 200 feet, one at 600 feet, one at 1,000 feet, and one at 1,400 feet from the baseline starting point. Each transect should extend perpendicular to the baseline.

Use the following as a guide to determine the minimum number of baseline segments:

- If the baseline exceeds five miles, baseline segments should be 0.5 mile in length.

Make sure that each plant community type is included in at least one transect; if not, modify the sampling design accordingly by relocating one or more transect lines or by establishing additional transects. When the starting points for all required transects have been established, go to the beginning of the first transect and proceed to Step 5.

Step 5. Identify sample plots along the transect. Along each transect, sample plots may be established in two ways: (1) Within each plant community encountered (the plant community transect sampling approach); or (2) at fixed intervals (the fixed interval transect sampling approach); these plots will be used to assess vegetation, soils, and hydrology.

When employing the plant community transect sampling approach, two techniques for identifying sample plots may be followed: (1) Walk the entire length of the transect, taking note of the number, type, and location of plant communities present (flag the locations, if necessary) and on the way back to the baseline, record the length of the transect, identify sample plots and perform sampling; or (2) identify plant communities as the transect is walked, sample the plot at that time ("sample as you go"), and record the length of the transect.

When conducting the fixed interval transect sampling approach, establish sample plots along each transect using the following as a guide:

The first sample plot should be established at a distance of 50 feet from the baseline. When obvious nonwetlands occupy a long segment of the transect from the baseline, begin the first plot in the nonwetland at approximately 300 feet from the point where the nonwetland begins to intergrade into a potential wetland community type. Keep in mind that additional plots will be required to determine the wetland-nonwetland

boundary between fixed points. In large areas having a mosaic of plant communities, one transect may contain several wetland boundaries.

If obstacles such as a body of water or impenetrable thicket prevent access through the length of the transect, access from the opposite side of the project area may be necessary to complete the transect; take appropriate compass reading and location data. At each sample plot (i.e., plant community or fixed interval area), proceed to Step 6.

Step 6. Consider the following:

(1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal or long-term fluctuations in precipitation, surface water, or ground-water levels?

(2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperatures (e.g., seasonality of plant growth)?

If the answer to either of these questions is Yes or uncertain, and the area meets the description of one of the exceptions in this manual, proceed to the appropriate section of this manual. If the answer to both questions is No, proceed to Step 7 when following the plant community transect approach. If following the fixed interval approach, go to the appropriate fixed point along the transect and proceed to Step 8.

(Note: In some cases, normal climatic conditions, such as snow cover or frozen soils, may prevent an accurate assessment of the wetland criteria; one must use best professional judgment to determine if delaying the wetland delineation is appropriate.)

Step 7. Locate a sample plot in the plant community type encountered. Choose a representative location along the transect in this plant community. Select an area that is no closer than 50 feet from the baseline or from any perceptible change in the plant community type. Mark the center of the sample plot on the base map or photo and flag the point in the field. Additional sample plots should be established within the plant community at 300-foot intervals along the transect or sooner if a different plant community is encountered.

(Note: In large-sized plant communities, a sampling interval larger than 300 feet may be appropriate, but try to use 300-foot intervals first.)

Proceed to Step 8.

Step 8. Lay out the boundary of the sample plot. A circular sample plot with a 30-foot radius should usually be established, however, the size and shape of the plot may be changed to match local conditions (e.g., narrow

ridges and swales) as necessary. At the flagged center of the plot, use a compass to divide the circular plot into four equal sampling units at 90°, 180°, 270°, and 360°. Mark the outer points of the plot with flagging. Proceed to Step 9.

Step 9. Characterize the vegetation and determine dominant species within the sample plot. Sample the vegetation in each layer or stratum (i.e., tree, sapling, shrub, herb, woody vine, and bryophyte) within the plot using the following procedures for each vegetative stratum and enter data on appropriate data sheet:

(1) Herb stratum

(A) Sample this stratum using corresponding approach:

(1) Plant community transect sampling approach:

(a) Select one of the following designs:

(i) Eight (8)—8" x 20" sample quadrats (two for each sampling unit within the circular plot); or

(ii) Four (4)—20" x 20" sample quadrats (one for each sample unit within the plot); or

(iii) Four (4)—40" x 40" sample quadrats (one for each sample unit).

(Note: Alternate shapes of sample quadrats are acceptable provided they are similar in area to those listed above.)

(b) Randomly toss the quadrat frame into the understory of the appropriate sample unit of the plot.

(c) Record percent areal cover of each plant species.

(d) Repeat (b) and (c) as required by the sampling scheme.

(e) Construct a species area curve for the plot to determine whether the number of quadrats sampled sufficiently represent the vegetation in the stratum; the number of samples necessary corresponds to the point at which the curve levels off horizontally; if necessary, sample additional quadrats within the plot until the curve levels off.

(f) For each plant species sampled, determine the average percent areal cover by summing the percent areal cover for all sample quadrats within the plot and dividing by the total number of quadrats. Proceed to Step B below.

(2) Fixed interval sampling approach:

(a) Place one (1)—40" x 40" sample quadrat centered on the transect point.

(b) Determine percent areal coverage for each species. Proceed to substep B below.

(B) Rank plant species by their average percent areal cover, beginning with the most abundant species.

(C) Sum the percent cover (fixed interval sampling approach) or average percent cover (plant community transect sampling approach).

(D) Determine the dominance threshold number—the number at which 50 percent of the total dominance measure (i.e., total cover) for the stratum is represented by one or more plant species when ranked in descending order of abundance (i.e., from most to least abundant).

(E) Sum the cover values for the ranked plant species beginning with the most abundant until the dominance threshold number is immediately exceeded; these species contributing to surpassing the threshold number are considered dominants, plus any additional species representing 20 percent or more of the total cover of the stratum; denote dominant species with an asterisk on the appropriate data form.

(F) Designate the indicator status of each dominant.

(2) Bryophyte stratum (mosses, horned liverworts, and true liverworts): Bryophytes may be sampled as a separate stratum in certain wetlands, such as shrub bogs, moss-lichen wetlands, and the wetter wooded swamps, where they are abundant and represent an important component of the plant community. If treated as a separate stratum, follow the same procedures as listed for herb stratum. In many wetlands, however, bryophytes are not abundant and should be included as part of the herb stratum.

(3) Shrub stratum (woody plants usually between 3 and 20 feet tall, including multi-stemmed, bushy shrubs and small trees below 20 feet):

(A) Determine the percent areal cover of shrub species within the entire plot by walking through the plot, listing all shrub species and estimating the percent areal cover of each species.

(B) Indicate the appropriate cover class (T and 1 through 7) and its corresponding midpoints (shown in parentheses) for each species: T = <1% cover (None); 1 = 1–5% (3.0); 2 = 6–15% (10.5); 3 = 16–25% (20.5); 4 = 26–50% (38.0); 5 = 51–75% (63.0); 6 = 76–95% (85.5); 7 = 96–100% (98.0).

(C) Rank shrub species according to their midpoints, from highest to lowest midpoint;

(D) Sum the midpoint values of all shrub species.

(E) Determine the dominance threshold number—the number at which 50 percent of the total dominance measure (i.e., cover class midpoints) for the stratum is represented by one or more plant species when ranked in descending order.

(F) Sum the midpoint values for the ranked shrub species, beginning with the most abundant, until the dominance threshold number is immediately

exceeded; these species are considered dominants, plus any additional species representing 20 percent or more of the total midpoint values of the stratum; identify dominant species (e.g., with an asterisk) on the appropriate data form.

(G) Designate the indicator status of each dominant.

(4) Sapling stratum (young or small trees greater than or equal to 20 feet tall and with a diameter at breast height less than 5 inches): Follow the same procedures as listed for the shrub stratum or the tree stratum (i.e., plot sampling technique), whichever is preferred.

(5) Woody vine stratum (climbing or twining woody plants): Follow the same procedures as listed for the shrub stratum.

(6) Tree stratum (woody plants greater than or equal to 20 feet tall and with a diameter at breast height equal to or greater than 5 inches): Determine the basal area of the trees by individual and by species within the 30-foot radius sample plot. Basal area for individual trees can be calculated by measuring diameter at breast height (dbh) with a diameter tape and converting diameter to basal area using the formula  $A = \pi(d)(d)/4$  (where A = basal area,  $\pi = 3.1416$ , and d = dbh).

Do the following steps:

(A) Locate and mark, if necessary, a sample unit (plot) with a radius of 30 feet, or change the shape of the plot to match topography, or increase size of plot based on species area curve assessment.

(Note: A larger sampling unit may be required when trees are large and widely spaced.)

(B) Identify each tree within the plot, measure its dbh (using a diameter tape), compute its basal area, then record data on the data form.

(Note: Compute basal area using the formula  $A = \pi(d)(d)/4$ , where A = basal area,  $\pi = 3.1416$ , and d = dbh. To expedite this calculation, use a hand calculator into which the following conversion factor is stored—0.005454 for diameter data in inches or 0.78535 in feet. Basal area in square feet of an individual tree can be obtained by squaring the tree diameter and multiplying by the stored conversion factor.)

(C) Calculate the total basal area for each tree species by summing the basal area values of all individual trees of each species.

(D) Rank species according to their total basal area, in descending order from the largest basal area to the smallest.

(E) Calculate the total basal area value of all trees in the plot by summing the total basal area for all species.

(F) Determine the dominant trees species; dominant species are those species (when ranked in descending order and cumulatively totaled) that immediately exceed 50 percent of the total basal area value for the plot, plus any additional species comprising 20 percent or more of the total basal area of the plot; record the dominant species on the appropriate data form.

(G) Designate the indicator status of each dominant (i.e., OBL, FACW, FAC, FACU, or UPL).

After determining the dominants for each stratum, proceed to Step 10.

Step 10. Determine whether the hydrophytic vegetation criterion is met. Complete the vegetation section of the summary data sheet. If the vegetation fails to be dominated by these types of species, the plot is usually not a wetland, however, it may constitute hydrophytic vegetation under certain circumstances (see list of exceptions). If hydrophytic vegetation is present, proceed to Step 11.

Step 11. Determine whether the hydric soil criterion is met. Locate the observation area on a county soil survey map, if possible, and determine the soil map unit delineation for the area. Using a soil auger, probe, or spade, make a hole at least 18 inches deep at the representative location in each plant community type. Examine soil characteristics and compare if possible to soil descriptions in the county soil survey report or classify to Subgroup following "Soil Taxonomy" (often requires digging a deeper hole), or look for regional indicators of significant soil saturation. If soil has been plowed or otherwise altered, which may have eliminated these indicators, proceed to the section on disturbed areas. Complete the soils section on the appropriate data sheet and proceed to Step 9 if conditions satisfy the hydric soil criterion. Areas having soils that do not meet the hydric soil criterion are nonwetlands. (Caution: Become familiar with hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplain soils, so that these hydric soils are not misidentified as nonhydric soils; see the "Atypical Hydric Soils" discussion.)

Step 12. Determine whether the wetland hydrology criterion is met. Record observations and complete the hydrology section on the appropriate data form. If the wetland hydrology criterion is met, proceed to Step 13. If the wetland hydrology criterion is not met, the area is nonwetland.

(Caution: Certain exceptions to the three criteria may not meet the hydrology criterion; see discussion of these areas.)

Step 13. Make the wetland determination for the sample plot. Examine the data forms for the plot. When the plot meets the hydrophytic vegetation, hydric soil, and wetland hydrology criteria, it is considered wetland. Complete the summary data sheet; proceed to Step 14 when continuing to sample transects, or to Step 15 when determining a boundary between wetland and nonwetland sample plots.

(Note: Double check all data sheets to ensure that they are completed properly before going to another plot.)

Step 14. Take other samples along the transect. Repeat Steps 5 through 13, as appropriate. When sampling is completed for this transect proceed to Step 15.

Step 15. Determine the wetland-nonwetland boundary point along the transect. When the transect contains both wetland and nonwetland plots, then a boundary must be established. Proceed along the transect from wetland plot toward the nonwetland plot. Look for the occurrence of UPL and FACU species, the appearance of nonhydric soil types, subtle changes in hydrologic indicators, and/or slight changes in topography. When such features are noted, evaluate the three criteria and locate the wetland-nonwetland boundary (i.e., the point at which one of the three wetland hydrology criterion is no longer met; make sure, however, that this area does not qualify as a problem area wetland). Establish new sample plots on each side of the boundary (e.g., within 50 feet) and repeat Steps 8 through 12. If existing plots are within a reasonable distance of the boundary, additional plots may not be necessary, but always document the features that were used to identify the boundary. Data sheets should be completed for each plot. Mark the position of the wetland boundary point on the base map or photo and place a surveyor flag or stake at the boundary point in the field, as necessary. Continue along the transect until the boundary points between all wetland and nonwetland plots have been established.

(Caution: In areas with a high interspersion of wetland and nonwetland plant communities, several boundary determinations will be required.)

When all wetland determinations along this transect have been completed, proceed to Step 16.

Step 16. Sample other transects and make wetland determinations along each. Repeat Steps 5 through 15 for each

remaining transect. When wetland boundary points for all transects have been established, proceed to Step 17.

Step 17. Determine the wetland-nonwetland boundary for the entire project area. Examine all completed copies of the data sheets and mark the location of each plot on the base map or photo. Identify each plot as either wetland (W) or nonwetland (N) on the map or photo. If all plots are wetlands, then the entire project area is wetland. If all plots are nonwetlands, then the entire project area is nonwetland. If both wetland and nonwetland plots are present, identify the boundary points on the base map or on the ground, and connect these points on the map by generally following contour lines to separate wetlands from nonwetlands. Confirm this boundary on the ground by walking the contour lines between the transects. Should anomalies be encountered, it will be necessary to establish short transects in these areas to refine the boundary, apply Step 15, and make any necessary adjustments to the boundary on the base map and/or on the ground. It may be worthwhile to place surveyor flags or stakes at the boundary points, especially when marking the boundary for subsequent surveying by engineers.

#### *Point Intercept Sampling Procedure*

The point intercept sampling procedure is a frequency analysis of vegetation used in areas that may meet the hydric soil and wetland hydrology criteria. It involves first identifying areas that may meet the hydric soil and wetland hydrology criteria within the area of concern and then refining the boundaries of areas that may meet the hydric soil criterion for further examination. Transects are then established for analyzing vegetation and determining whether hydrophytic vegetation criterion is met by calculating a prevalence index.

Step 1. Identify the approximate limits of areas that may meet the hydric soil criterion within the area of concern and sketch limits on an aerial photograph. To help identify these limits use sources of information such as Agricultural Stabilization and Conservation Service slides, soil surveys, NWI maps, and other maps and photographs.

(Note: This step is more convenient to perform offsite, but may be done onsite; some modification of study area lines may be required after seeing the site in the field.)

Areas that may meet the hydric soil criterion should be stratified into areas of similar soils and similar vegetation lifeforms (e.g., forested wetland, shrub

wetland, and emergent wetland) for further analysis. Proceed to Step 2.

Step 2. Scan the areas that may meet the hydric soil criterion and determine if disturbed conditions exist. Are any significantly disturbed areas present? If YES, identify their limits for they should be evaluated separately for wetland determination purposes (usually after evaluating undisturbed areas). Refer to the section on disturbed areas, if necessary, to evaluate the altered characteristic(s) (vegetation, soils, or hydrology), then return to this method and continue evaluating characteristics not altered.

(Note: Prior experience with disturbed sites may allow one to easily evaluate an altered characteristic, such as when vegetation is not present in a farmed wetland due to cultivation.)

Keep in mind that if at any time during this determination one or more of these three characteristics is found to have been significantly altered, the disturbed area wetland determination procedures should be followed. If the area is not significantly disturbed, proceed to Step 3.

Step 3. Scan the areas that may meet the hydric soil criterion and determine if obvious signs of wetland hydrology or hydric soil are present. The wetland hydrology criterion is met for any area or portion thereof where, it is obvious or known that the area is frequently inundated or saturated at the surface during the growing season. Confirm the presence of hydric soil by examining the soil for appropriate properties and take note of dominant plants which should easily meet the hydrophytic vegetation criterion. If the area's hydrology has not been significantly modified and the soil is organic (Histosols, except Folists) or is mineral classified as Sulfaquents, Hydraquents, or Histic Subgroups of Aquic Suborders according to "Soil Taxonomy", and the area has hydrophytic vegetation, then the area is considered wetland. Hydrophytic vegetation should be fairly obvious in these situations. Areas lacking obvious indicators of wetland hydrology, hydric soils, or hydrophytic vegetation must be further examined, so proceed to Step 4.

Step 4. Refine the boundary of areas that meet the hydric soil criterion. Verify the presence of hydric soil within the appropriate map units by digging a number of holes at least 18 inches deep along the boundary (interface) between hydric soil units and nonhydric soil units. Compare soil samples with descriptions in the soil survey report to see if they are properly mapped, and look for soil properties caused by

wetland hydrology. In this way, the boundary of areas meeting the hydric soil criterion is further refined by field observations. In map units where only part of the unit is hydric (e.g., complexes, associations, and inclusions), locate hydric soil areas on the ground by considering landscape position and evaluating soil characteristics of the hydric soil portion or for properties caused by wetland hydrology.

(Note Some hydric soils, especially organic soils, have not been given a series name and are referred to by common names, such as peat, muck, swamp, marsh, wet alluvial land, tidal marsh, Sulfaquents, and Sulphemists; these areas are also considered hydric soil map units and should appear on the county lists of hydric soil map units. Certain hydric soils are mapped with nonhydric soils as an association or complex, while other hydric soils occur as inclusions in nonhydric soil map units. Only the hydric soil portion of these map units should be evaluated for hydrophytic vegetation.)

In areas where hydric soils are not easily located by landscape position and soil characteristics (morphology), a soil scientist should be consulted.

(Caution: Become familiar with hydric soils that do not possess good hydric field indicators, such as red parent material soils, some sandy soils, and some floodplains soils, so that these hydric soils are not misidentified as nonhydric soils. See "Atypical Hydric Soils" discussion.)

(Note: If the project area does not have a soil map, hydric soil areas must be determined in the field to use the point intercept sampling method. Consider landscape position, such as depressions, drainageways, floodplains, and seepage slopes, and either classify the soil or look for field indicators of hydric soil, then delineate the hydric soil areas accordingly. If the boundary of the hydric soil areas cannot be readily delineated, one should use the quadrat sampling procedure.)

After establishing the boundary of the area in question, proceed to Step 5.

Step 5. Consider the following:

(1) Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual, seasonal, or long-term fluctuations in precipitation, surface water, or ground water levels?

(2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature (e.g., seasonality of plant growth)?

If the answer to either of these questions is Yes or uncertain, and the area meets the description of one of the exceptions in this manual, proceed to the appropriate section of this manual. If the answer to both questions is NO, proceed to Step 6.

Note: In some cases, normal climatic conditions, such as snow cover or frozen

soils, may prevent an accurate assessment of the wetland criteria; one must use best professional judgment to determine if delaying the wetland delineation is appropriate.

Step 6. Determine random starting points and random directions for three 200-foot line transects in each area that meets or may meet the hydric soil criterion.

Note: More than three transects may be required depending on the standard error obtained for the three transects.

There are many ways to determine random starting points and random transect direction. The following procedures are suggested:

(1) Starting point—Starting points for the transects are selected randomly along the perimeter of the area to be examined. Determine the approximate perimeter length and select three random numbers (from a table for generating random numbers or other suitable method); these random numbers indicate the position of the starting points for the three transects; pick a point along the perimeter to begin pacing off the distance to the starting points.

(2) Transect direction—At a starting point, spin a pencil or similar pointed object in the air and let it fall to the ground. The direction that the pencil is pointing indicates the direction of the transect. Proceed to Step 7.

Step 7. Lay out the transect in the established direction. If the transect crosses the hydric soil boundary (into the nonhydric soil area), bend the line back into the hydric soil area by randomly selecting a new direction for the transect following the procedure suggested above. Mark the approximate location of the transect on a base map or aerial photo. Proceed to Step 8.

Step 8. Record plant data (e.g., species name, indicator group, and number of occurrences) at interval points along the transect. Only individual plants with stems located in the subject area (i.e., soil type) should be recorded. At the starting point and at each point on 2-foot intervals along the transect, record all individual plants that would intersect an imaginary vertical line extending through the point. Count each individual plant only once per sample point; each individual of a single species counts as a separate plant for the tally (e.g., three individuals of red maple count as three hits for red maple at that single point). If this imaginary line has no plants intersecting it (either above or below the sample point), record nothing. Identify each plant observed to species (or other taxonomic category if species cannot be identified), enter species name on the

Prevalence Index Worksheet, and record all occurrences of each species along the transect. For each species listed, identify its indicator group from the appropriate regional list of plant species that occur in wetlands (i.e., OBL, FACW, FAC, FACU, and UPL). Plant species not recorded on the lists are assumed to be upland species. If no regional indicator status and only one national indicator status is assigned, apply the national indicator status to the species. If no regional indicator status is assigned and more than one national indicator status is assigned, do not use the species to calculate a prevalence index. If the plant species is on the list and no regional or national indicator status is assigned, do not use the species to calculate the prevalence index. For a transect to be valid for a prevalence calculation, at least 80 percent of the occurrences must be plants that have been identified and placed in an indicator group. Get help in plant identification if necessary. Unidentified plants or plants without indicator status are recorded but are not used to calculate the prevalence index. Proceed to Step 9.

Step 9. Calculate the total frequency of occurrences for each species (or other taxonomic category), for each indicator group of plants, and for all plant species observed, and enter on the Prevalence Index Worksheet. The frequency of occurrences of a plant species equals the number of times it occurs at the sampling points along the transect. Proceed to Step 10.

Step 10. Calculate the prevalence index for the transect using the following formula:

$$PII = \frac{1Fo + 2Ffw + 3Ff + 4Ffu + 5Fu}{Fo + Ffw + Ff + Ffu + Fu}$$

where

PII = Prevalence Index for transect i;

Fo = Frequency of occurrence of obligate wetland (OBL) species;

Ffw = Frequency of occurrence of facultative wetland (FACW) species;

Ff = Frequency of occurrence of facultative (FAC) species;

Ffu = Frequency of occurrence of facultative upland (FACU) species;

Fu = Frequency of occurrence of upland (UPL) species.

After calculating and recording the prevalence index for this transect, proceed to Step 11.

Step 11. Repeat Steps 5 through 10 for two other transects. After completing the three transects, proceed to Step 12.

Step 12. Calculate a mean prevalence index for the three transects. To be

considered wetland, a hydric soil area usually must have a mean prevalence index (PIM) of less than 3.0. A minimum of three transects are required in each delineated area of hydric soil, but enough transects are required so that the standard error for PIM does not exceed 0.20 percent.

Compute the mean prevalence index for the three transects by using the following formula:

$$PIM = \frac{PIT}{N}$$

where

PIM = mean prevalence index for transects;

PIT = sum of prevalence index values for transects;

all

N = total number of transects.

After computing the mean prevalence index for the three transects, proceed to Step 13.

Step 13. Calculate the standard deviation(s) for the prevalence index using the following formula:

$$s = \sqrt{\frac{(P_{I1}-PIM)^2 + (P_{I2}-PIM)^2 + (P_{I3}-PIM)^2}{N-1}}$$

(Note: See formulas in Steps 8 and 10 for symbol definitions.)

After performing this calculation, proceed to Step 14.

Step 14. Calculate the standard error ( $\bar{sx}$ ) of the mean prevalence index using the following formula:

$$\bar{sx} = \frac{s}{\sqrt{N}}$$

where

S = standard deviation for the Prevalence Index

N = total number of transects

(Note: The  $\bar{sx}$  cannot exceed 0.20. If  $\bar{sx}$  exceeds 0.20, one or more additional transects are required. Repeat Steps 6 through 14, as necessary, for each additional transect.)

When  $\bar{sx}$  for all transects does not exceed 0.20, proceed to Step 15.

Step 15. Record final mean prevalence index value for each hydric soil map unit and make a wetland determination. All areas having a mean prevalence index of less than 3.0 meet the hydrophytic vegetation criterion. If the community has a prevalence index equal to or greater than 3.0, it is usually not hydrophytic vegetation except under certain circumstances; consult the section on exceptions. Proceed to Step 16.

Step 16. Determine whether the wetland hydrology criterion is met. Record observations and complete the hydrology section on the appropriate data form. If the wetland hydrology criterion is met, then the area is considered a wetland. If the area has been hydrologically disturbed, one must determine whether the area is effectively drained before making a wetland determination; this type of area should have been identified in Step 2 (see disturbed areas discussion). If the area is effectively drained, it is considered nonwetland; if it is not, the wetland hydrology criterion is met and the area is considered a wetland.

(Caution: Seasonally saturated wetland may not appear to meet the hydrology criterion at certain times of the growing season; see discussion of exceptions.)

Step 17. Delineate the wetland boundary. After identifying the wetland, delineate the boundary by refining the limits of the area that meets all three criteria (including any problem area wetlands). Mark the boundaries with flagging tape, if necessary.

#### Appendix 5. Descriptions of wetlands that are exceptions to the three criteria

##### Prairie Potholes

Potholes are glacially-formed depressions that are capable of storing water (Eisenlohr 1972). They are generally located in the north central United States and southern Canada. Although potholes may occur in forested areas, the majority occur in the prairie region where they are subject to arid or semi-arid climatic conditions. Most potholes are small, generally less than an acre in size.

Pothole soils are generally poorly drained, slowly permeable soils capable of ponding water. Precipitation is the basic source of water in potholes. Runoff from the drainage area is highly variable, but it is the key in determining if and how long ponding will occur. Precipitation in the pothole region varies appreciably from year to year. Average precipitation is far too small to meet the demand of evaporation and as a result most potholes are dry for a significant

portion of the year, containing water for only a short period generally early in the growing season. In years of drought, potholes may not pond water at all. However in most years, seasonal replenishment can be expected (Eisenlohr 1972).

In certain areas, the vast majority of potholes are farmed, either occasionally or every year, depending upon the duration of ponding. Many potholes have been either partially or totally drained to enhance agricultural production. The drastically fluctuating climate and alteration for farming have resulted in highly disturbed conditions that make wetland identification difficult. Aerial photographs, ASCS compliance slides, and other offsite information that depict long-term conditions are often better indicators of wetland conditions than onsite indicators reflecting only a single point in time.

Plant communities in potholes are usually disturbed, either naturally or due to farming, and many do not exhibit vegetation typical of more stable wetlands. The process of annual drying (drawdown) in potholes enables the invasion of FAC, FACU, or UPL plant species during dry periods which may persist into the wet seasons. Stewart and Kantrud (1971) have recognized this condition in describing vegetation phases in their classification of wetlands for the Prairie Pothole Region. The phases are as follows:

##### For Noncropland Areas

###### Drawdown Bare Soil Phase

As surface water in the open water phase gradually recedes and disappears, expanses of bare mud flats, which often become dry, are exposed. Ordinarily, this phase is of short duration, but in intermittent-alkali zones and occasionally in the more saline deep marsh zones, it may persist for considerable periods.

###### Natural Drawdown Emergent Phase

Undisturbed areas with emergent drawdown vegetation are considered to be in this phase. This growth is composed mostly of annual plants, including many forbs, that germinate on the exposed mud or bare soil of the drawdown bare soil phase. After the drawdown emergents become established, surface water is occasionally restored by heavy summer rains. Characteristic plant species of this phase include: *Eleocharis acicularis* (terrestrial form), *Rumex maritimus*, *Kochia scoparia*, *Xanthium italicum*,

*Chenopodium rubrum*, and *Senecio congestus*.

#### For Cropland Areas

##### Cropland Drawdown Phase

Tilled pothole bottoms with drawdown vegetation characterize this phase. The plants include many coarse, introduced annual weeds and grasses that normally develop on exposed mud flats during the growing season. These species appear as overwinter emergents whenever surface water is restored by summer rains. Characteristic plant species include: *Agropyron repens*, *Echinochloa crusgalli*, *Polygonum lophatifolium*, *Veronica peregrina*, *Hordeum jubatum*, *Plagiobothrys scopulorum*, *Xanthium italicum*, *Bidens frondosa*, *Seteria glauca*, *Polygonum convolvulus*, *Agropyron smithii*, *Brassica kaber*, *Descruainia sophia*, *Androsace occidentalis*, *Ellisia nyctelea*, *Erigeron canadensis*, and *Iva xanthifolia*.

##### Cropland Tillage Phase

In this phase, tilled bottom soils are dominated by annual field weeds, characteristic of fallow or neglected low cropland. Tilled dry pothole bottoms devoid of vegetation are also considered to be in this phase. Planted small grain or row crops are often present.

#### Playas

Playas occur in many arid or semiarid regions of the world. Although occurring throughout much of the western United States, they are concentrated in the southern Great Plains as either ephemeral or permanent lakes or wetlands (Nelson et. al. 1983). The topography of most playa regions is flat to gently rolling and generally devoid of drainage. Runoff from the surrounding terrain is collected into playa basins, where water is evaporated rapidly. Playas range in size from several hundred acres to only a few acres, with the majority being less than 10 acres.

Surface soils of playas are generally clays that form a highly impermeable seal and increase their water-holding capacity. The playa soils are typically Vertisols. In the southern Great Plains, playa soils are listed as Randall, Lipan, or Ness clays, Stegall silty clay loams, Lofton clay loams, or may be uncharacterized occurring as inclusions within nonhydric soil map units. Soils of playas are generally distinguishable from surrounding upland soils because of their contrasting darker color (Reed 1930).

The hydrology of playas involves rapid accumulation of natural runoff during late spring, with a gradual loss by

evaporation and seepage through the summer except where basins have been excavated to concentrate water. The hydrology is influenced by agricultural practices, including basin modification for water collection and retention and grazing in the watershed. Water reaching the playas is derived primarily from precipitation and runoff within the basin watershed.

Playa basins are dry most of the time. The basins collect water primarily in two peak periods—May and September—as a result of regional convective storms common throughout the region. Water collection in the basins is generally representative of seasonal or long-term extremes and not average annual conditions. As a result, wetland hydrology is best characterized by examining hydrological indicators over a multi-year period rather than relying on hydrological conditions that may be present at any point in time.

The hydrology of most playa wetlands seldom allows a stable flora to develop. Playa basins may have a dense cover of annual or perennial vegetation or may be barren, depending on the timing, intensity and amount of precipitation and irrigation runoff, the extent of grazing, and the size of the playas. As with potholes, the process of annual drying (drawdown) in playas enables the invasion of FAC, FACU, and UPL plants during dry periods which may persist into other seasons. Playa basins may show vegetative zonation in concentric bands from the basin center to the perimeter in response to decreasing water depths or soil moisture levels. However, such zonation is not typical of all playa basins; small playas that collect limited runoff may support prairie vegetation (primarily FACU and UPL species) or may be cultivated. Cultivated basins often contain either the living plants or remnants of smartweeds (*Polygonum* spp.), ragweeds (*Ambrosia* spp.), or other invading annuals. Some playa basins are large enough to have an open expanse of deep water that may support aquatic plant communities.

#### Vernal Pools

Vernal pools are depression areas covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall. Small pools may drain completely several times during the rainy season and some pools may not retain any water during drought years.

An understanding of the natural history of the plants that occur in the transitional areas from pool to typically terrestrial habitat is useful in delineating these wetlands. Zedler (1987) provides

an excellent overview of vernal pools which is briefly summarized below.

Vernal pools are wide-ranging in size (from 10 feet wide to 10 acres) but are always shallow (less than 6 inches to 2 feet deep). Depth and duration of saturation and inundation are more important in defining a vernal pool than size. Soils with confining layers, either nearly impermeable clay layers or iron-silica cemented hardpans, often have a seasonally perched water table which favors the development of vernal pool. Microrelief on the soils typically is hummocky, with pits (depressions) and mounds. Individual vernal pools are often interconnected by a series of swales and tributaries. Winter rainfall perches on the confining layer, until removed by evapotranspiration in the spring. A cemented hardpan or nearly impermeable clay subsoil layer, the pit and mound microrelief, and presence of swales are strong indicators of vernal pools.

Vernal pools hold water long enough to allow some strictly aquatic organisms to grow and reproduce (complete their life cycles), but not long enough to permit the development of a typical pond or marsh ecosystem. Changes in a vernal pool during the season are so dramatic that it is in some ways more appropriate to consider it to be sequence of ecosystem (a cyclical wetland) rather than a single static type. Vernal pool development can be broken into four phases: (1) Wetting phase, (2) aquatic phase, (3) drying phase, and (4) drought phase. The first rains stimulate the germination of dormant seeds and the growth of perennial plants (wetting phase). When the cumulative rainfall is sufficient to saturate the soils, aquatic plants and animals proliferate (aquatic phase). Nonaquatic plants are subjected to stress at this time. As the pool levels begin to recede (drying phase), the high soil moisture insures that plant growth continues after standing water is gone. Eventually, the plants succumb to drought and turn brown, with drying cracks appearing in the soil (drought phase).

Plant species characteristic of vernal pools are endemic to vernal pools, or occur in vernal pools but are common in other aquatic habitats or associated with vernal pools (see Tables 6A–D in Zedler, 1987). Non-pool species can tolerate the limited periods of standing water that exist toward the pool margins.

Since vernal pools typically vary considerably in depth and duration or both from year to year, within a year, or between different pools, plant composition is quite dynamic. FAC,

FACU and UPL species often invade the pool basins in dry years, as they do in other seasonally variable wetlands. Lack of hydrophytic plant species also may be indicative of recent disturbances such as off-road vehicle activities, farming, or grazing. In delineating these wetlands, it is important to be aware not only of the "pool" but of the vernal pool complex (pool, basin, swales, tributaries), parts of which may have shorter and more variable periods of inundation.

#### Appendix 8. Problem Area Wetlands

Certain situations encountered in the field can make wetland identification and delineation problematic. These situations are discussed below.

##### *Newly Created Wetlands*

These wetlands include manmade (artificial) wetlands, beaver-created wetlands, and other wetlands that have recently formed due to natural processes. Artificial wetlands may be purposely or accidentally created (e.g., road impoundments, undersized culverts, irrigation, and seepage from earth-dammed impoundments) by human activities. Many of these areas will have evidence of wetland hydrology and hydrophytic vegetation. The area should lack typical morphological properties of hydric soils, since the soils have just recently been inundated and/or saturated. Since all of these wetlands are newly established, evidence of one or more of the wetland identification criteria may not be present. One must always consider the relative permanency of the wetter conditions. For example, if a beaver has recently blocked a road culvert that has now caused flooding of nonwetland (e.g., upland forest or field), it is quite possible that the blockage will soon be removed. In this case, the action is considered nonpermanent and the area is not considered wetland. If, however, hydrophytic vegetation has colonized the area, the hydrology is considered more or less permanently altered and the area is considered wetland. Temporary roads may impede the natural flow of water and impound water for some time. Yet, since the road is only temporary, the effect is also temporary, so the area is not considered wetland, unless, of course, it was wetland prior to the road construction.

##### *Wetlands on Glacial Till or in Rocky Areas*

Sloping wetlands occur in glaciated areas where soils cover relatively impermeable glacial till or where layers of glacial till have different hydraulic conditions that permit groundwater

seepage. Such areas are seldom, if ever, flooded, but downslope groundwater movement keeps the soils saturated for a sufficient portion of the growing season to produce anaerobic and reducing soil conditions. This promotes the development of hydric soils and hydrophytic vegetation. Evidence of wetland hydrology may be lacking during the drier portion of the growing season. Hydric soil properties also may be difficult to observe because certain areas are so rocky that it is difficult to examine soil characteristics within 18 inches.

##### *Wetland-Nonwetland Mosaics*

In numerous areas, including northern glaciated regions and the coastal plain, the local topography may be pockmarked with a complex of "pits" (depressions) and "mounds" (knolls). The pits may be wet enough to be classified as wetland, whereas the mounds are usually nonwetland. (Note: In some areas, the shallow mounds are also wetland. When this is true, the entire area is wetland.) The interspersed wet pits and dry mounds may make the delineation of the wetland boundary difficult when the pits are too small to separate from the mounds. Of course, any area should be mapped within practical limits. When it is not practicable to separate the wet pits from the dry mounds, it is recommended that the wetland-nonwetland boundary be delineated by assessing the percent of the area covered by the wetland pits in an area of similar pit-mound relief. At least two random transects should be established to determine the percent of pits vs. mounds. Based on the assessment at two-foot intervals along each transect, the percent of wetland vs. upland points can be established for the area. Consult the appropriate regulatory agency to learn what ratio they want to consider "wetland" for regulatory purposes. One should also note in his or her field report that this protocol was used and give an estimated size range for the wetland pits (e.g., 3-5' diameter) as well as a brief narrative description of the site.

##### *Cyclical wetlands*

While the hydrology of all wetlands varies annually, the hydrology of certain wetlands, may naturally fluctuate in a cyclical patterns of a series of consecutive wet years followed by a series of dry years. During the wet periods, hydrophytic vegetation and wetland hydrology are present, yet during the dry periods, the hydrology does not appear to meet the wetland hydrology criterion and FACU and UPL plant species often become established

and may predominate under these temporal drier conditions. Despite the lack of periodic flooding or saturated soils for a multi-year period, these areas should still be considered wetland, since in the long run, wetland characteristics prevail. Specific examples of cyclical wetlands include Alaska's black spruce-permafrost wetlands, groundwater wetlands of the Cimmaron Terrace of Oklahoma and Kansas, and wetlands in coastal and West Texas. Other cyclical wetlands are associated with drought-prone areas such as southern California and the arid and semi-arid regions of the country.

##### *Vegetated Flats.*

Vegetated flats typically are characterized by a marked seasonal periodicity in plant growth. They occur both in coastal and interior parts of the country (e.g., regularly flooded freshwater tidal marshes and exposed shores of lakes or reservoirs during drawdowns due to natural fluctuations or human actions). They are dominated by annual OBL species, such as wild rice (*Zizania aquatica*), and/or perennial OBL species, such as spatterdock (*Nuphar luteum*), that have nonpersistent vegetative parts (i.e., leaves and stems breakdown rapidly during the winter, providing no evidence of the plant on the wetland surface at the beginning of the next growing season). During winter and early spring, these areas lack vegetative cover and resemble mud flats; therefore, they do not appear to qualify as wetlands. But during the growing season the vegetation becomes increasingly evident, qualifying the area as vegetated wetland. In evaluating these areas, one must consider the time of year of the field observation and the seasonality of the vegetation. Again, one must become familiar with the ecology of these wetland types.

##### *Interdunal Swale Wetlands*

Along the U.S. coastline, seasonally wet swales supporting hydrophytic vegetation are located within sand dune complexes on barrier islands and beaches. Some of these swales are inundated or saturated to the surface for considerable periods during the growing season, while others are wet for only the early part of the season. In some cases, swales may be flooded irregularly by the tides. These wetlands have sandy soils that generally lack evidence of hydric soil properties. In addition, evidence of wetland hydrology may be absent during the drier part of the growing season. Consequently, these wetlands may be harder to identify.



### *Springs and Seepage Wetlands*

Wetlands occurring in flowing waters from springs and groundwater seepage areas may not exhibit typical hydric soil properties due to oxygen-enriched waters. Springs have permanently flowing waters, while seepage flows may be seasonal. Not all seepage areas, however, are considered wetlands. To qualify as wetland, the following conditions should be met: (1) Seepage flow by oxygen-enriched waters is continuous for at least a 30-day period during the growing season in most years and saturate the soil to the surface, and (2) OBL and/or FACW species predominate or have a prevalence index less than or equal to 2.5. Soils wet for this duration are typically considered to have an aquic moisture regime and are hydric. The outer boundary of these wetlands is established by the limits of predominance of OBL and/or FACW species.

### *Drought-affected Wetlands*

Droughts periodically occur in many parts of the country, especially in the semiarid and arid West. During drought, it is quite obvious that water will not be observed in many wetlands, especially those higher up on the soil moisture gradient. With the drying of these wetlands over a number of consecutive years, environmental conditions no longer favor the growth of hydrophytic vegetation, so FACU and UPL species become established and often predominate in time. Thus, the plant community composition changes to one that is no longer dominated by hydrophytes. Such communities fail to meet the hydrophytic vegetation criterion, unless treated as harder to identify wetlands. Drought-affected wetlands should be identified by the presence of hydric soils, further refined by clear signs of long-term hydrology as expressed in the soil by: Thick organic surface layers, gleyed layers, low chroma matrices with high chroma mottles, and others listed as regional wetland hydrology indicators. Additional verification of hydrology may be advisable for some sites and an examination of aerial photographs during the wet part of the growing season in years of normal precipitation (distributions and amount) should reveal signs of wetland hydrology. In addition, landscape position (e.g., depressions and sloughs) may provide additional evidence for recognizing these wetlands during droughts.

### Appendix 7. Disturbed Area Procedures

Step 1. Determine whether vegetation, soils, and/or hydrology have been

significantly altered at the site. Proceed to Step 2.

Step 2. Determine whether the "altered" characteristic met the wetland criterion in question prior to site alteration. Field personnel shall document the reasons for determining that the site would have been a wetland but for the disturbance. Review existing information for the area (e.g., aerial photos, NWI maps, soil surveys, hydrologic data, and previous site inspection reports), contact knowledgeable persons familiar with the area, and conduct an onsite inspection to build supportive evidence. The strongest evidence involves considering all of the above plus evaluating a nearby reference site (an area similar to the one altered before modification) for field indicators of the three technical criteria for wetland. If a human activity or natural event altered the vegetation, proceed to Step 3; the soils, proceed to Step 4; the hydrology, proceed to Step 5.

Step 3. Determine whether the hydrophytic vegetation criterion was met prior to disturbance:

(1) Describe the type of alteration. Examine the area and describe the type of alteration that occurred. Look for evidence of selective harvesting, clearcutting, bulldozing, recent conversion to agriculture, or other activities (e.g., burning, discing, the presence of buildings, dams, levees, roads, and parking lots).

(2) Determine the approximate date when the alteration occurred if necessary. Check aerial photographs, examine building permits, consult with local individuals, and review other possible sources of information.

(3) Describe the effects on the vegetation. Generally describe how the recent activities and events have affected the plant communities. Consider the following:

(A) Has all or a portion of the area been cleared of vegetation?

(B) Has only one layer of the plant community (e.g., trees) been removed?

(C) Has selective harvesting resulted in the removal of some species?

(D) Has the vegetation been burned, mowed, or heavily grazed?

(E) Has the vegetation been covered by fill, dredged material, or structures?

(F) Have increased water levels resulted in the death of all or some of the vegetation?

(4) Determine whether the area had plant communities that met the hydrophytic vegetation criterion. Develop a list of species that previously occurred at the site from existing information, if possible, and determine whether the hydrologic vegetation

criterion was met. If site-specific data do not exist, then do the following, as appropriate:

(A) If the vegetation is removed and supportive evidence affirmatively demonstrates that the hydrophytic vegetation criterion would have been met but for the alteration and no other alterations have been done, then evidence of the elimination of the hydrophytic vegetation together with the presence of hydric soils and evidence of wetland hydrology will be used to identify wetlands. It may be advantageous to examine a nearby reference site to collect data on the plant community to confirm this assumption. (Note: Determination of regulatory jurisdiction for such areas is subject to agency interpretation. For example, Federal wetland regulatory policy under the Clean Water Act, and agricultural program policy under the Food Security Act of 1985, as amended, interprets the relative permanence of disturbance to vegetation caused by cropping. Be sure to consult appropriate agency policy in making Federal wetland jurisdictional determinations in such areas.)

(B) If the area is filled, burying the vegetation, and no other alterations (i.e., to hydrology or soils) have taken place, then either: (1) Look below the fill layer for hydric soil and indicators of wetland hydrology, plus any signs of hydrophytic vegetation (if not decomposed), or (2) if type of fill (e.g., concrete) precludes examination of soil beneath the fill, then review existing information (e.g., soil survey, wetland maps, and aerial photos) to determine if the area was wetland. If necessary, evaluate a neighboring undisturbed area (reference site) with characteristics (i.e., vegetation, soils, hydrology, and topography) similar to the area in question prior to its alteration. Be sure to record the location and major characteristics (vegetation, soils, hydrology, and topography) of the reference site. Sample the vegetation in this reference area using an appropriate onsite determination method to determine whether hydrophytic vegetation is present. If the hydrophytic vegetation criterion is met at the reference site, then this criterion is presumed to have been met in the altered area. If no indicators of hydrophytic vegetation are found at the reference site, then the original vegetation at the project area is not considered to have met the hydrophytic vegetation criterion.

(C) If soils and/or hydrology also have been disturbed, then continue Steps 4, 5, and 6 below, as necessary.

Otherwise, return to the applicable step of the onsite determination method being used.

Step 4. Determine whether or not hydric soils previously occurred:

(1) Describe the type of alteration. Examine the area and describe the type of alteration that occurred. Look for evidence of:

(A) Deposition of dredged or fill material—In many cases the presence of fill material will be obvious. If so, it will be necessary to dig a hole to reach the original soil (sometimes several feet deep). Fill material will usually be a different color or texture than the original soil (except when fill material has been obtained from similar areas onsite). Look for decomposing vegetation between soil layers and the presence of buried organic or hydric mineral soil layers. In rare cases, excessive deposition of sediments may be due to catastrophic conditions, e.g., mud slides and volcanic eruptions. Floodplain environments are subjected to periodic sedimentation, but this is a more normal occurrence and does not constitute a significant disturbance for purposes of this manual.

(B) Presence of nonwoody debris at the surface—This can only be applied in areas where the original soils do not contain rocks. Nonwoody debris includes items such as rocks, bricks, and concrete fragments.

(C) Subsurface plowing—Has the area recently been plowed below the A-horizon or to depths of greater than 10 inches?

(D) Removal of surface layers—Has the surface soil layer been removed by scraping or natural landslides? Look for bare soil surfaces with exposed plant roots or scrape scars on the surface.

(E) Presence of manmade structures—Are buildings, dams, levees, roads, or parking lots present?

(2) Determine the approximate date when the alteration occurred, if necessary. Check aerial photographs, examine building permits, consult with local individuals, and review other possible sources of information.

(3) Describe the effects on soils. Consider the following:

(A) Has the soil been buried? If so, record the depth of fill material and determine whether the original soil was left intact or disturbed.

Note: The presence of a typical sequence of soil horizons or layers in the buried soil is an indication that the soil is still intact; check description in the soil survey report.

(B) Has the soil been mixed at a depth below the A-horizon or greater than 12 inches? If so, it will be necessary to

examine the soil at a depth immediately below the plow layer or disturbed zone.

(C) Has the soil been sufficiently altered to change the soil phase? Describe these changes. If a hydric soil has been drained to some extent, refer to Step 5 below to determine whether soil is effectively drained or is still hydric.

(4) Characterize the soils that previously existed at the disturbed site. Obtain all possible evidence that may be used to characterize soils that previously occurred on the area. Consider the following potential sources of information.

(A) Soil surveys—In many cases, recent soil surveys are available. If so, determine the soils that were mapped for the area. If all soils are hydric soils, it is presumed that the entire area had hydric soils prior to alteration. Consult aerial photos to refine hydric boundaries, especially for soil map units with hydric soil inclusions.

(B) Buried soils—When fill material has been placed over the original soil without physically disturbing the soil, examine and characterize the buried soils. Dig a hole through the fill material until the original soil is encountered. Determine the point at which the original soil material begins. Remove 18 inches of the original soil from the hole and follow standard procedures for determining whether the hydric soil criterion is met. (Note: When the fill material is a thick layer, it might be necessary to use a backhoe or posthole digger to excavate the soil pit.) If USGS topographic maps indicate distinct variation in the area's topography, this procedure must be applied in each portion of the area that originally had a different surface elevation.

(C) Deeply plowed soils or removed surface layers—If soil surface layers are removed, redistributed or deeply plowed (excluding normal plowing), vegetation will not be present, so review existing information (e.g., soil surveys, wetland maps, and aerial photos), identify a nearby reference site that is similar to disturbed area prior to its alteration, evaluate for indicators of hydrophytic vegetation, hydric soils, and wetland hydrology and make wetland or nonwetland determination, as appropriate.

(5) Determine whether hydric soils were present at the project area prior to alteration. Examine the available data and determine whether evidence of hydric soils were formerly present. If no evidence of hydric soils is found, the original soils are considered nonhydric soils. If evidence of hydric soils is found, the hydric soil criterion has been met. Continue to Step 5 if hydrology also was

altered. Otherwise, record decision and return to the applicable step of the onsite determination method being used.

Step 5. Determine whether wetland hydrology existed prior to alteration and whether wetland hydrology still exists (i.e., is the area effectively drained?). To determine whether wetland hydrology still occurs, proceed to Step 6. To determine whether wetland hydrology existed prior to the alteration:

(1) Describe the type of alteration. Examine the area and describe the type of alteration that occurred. Look for evidence of:

(A) Dams—Has recent construction of a dam or some natural event (e.g., beaver activity or landslide) caused the area to become increasingly wetter or drier?

Note: This activity could have occurred at a considerable distance from the site in question, so be aware of and consider the impacts of major dams in the watershed above the project area.

(B) Levees, dikes, and similar structures—Have levees or dikes been recently constructed that prevent the area from periodic overbank flooding?

(C) Ditches or drain tiles—Have ditches or drain tiles been recently constructed causing the area to drain more rapidly?

(D) Channelization—Have feeder streams recently been channelized sufficiently to alter the frequency and/or duration of inundation?

(E) Filling of channels and/or depressions (land-leveling)—Have natural channels or depressions been recently filled?

(F) Diversion of water—Has an upstream drainage pattern been altered that results in water being diverted from the area?

(G) Groundwater withdrawal—Has prolonged and intensive pumping of groundwater for irrigation or other purposes significantly lowered the water table and/or altered drainage patterns?

(2) Determine the approximate date when the alteration occurred, if necessary. Check aerial photographs, consult with local individuals, and review other possible sources of information.

(3) Describe the effects of the alteration on the area's hydrology. Consider the following and generally describe how the observed alteration affected the project area:

(A) Is the area more frequently or less frequently inundated than prior to alteration? To what degree and why?

(B) Is the duration of inundation and soil saturation different than prior to

alteration? How much different and why?

(4) Characterize the hydrology that previously existed at the area. Obtain and record all possible evidence that may be useful for characterizing the previous hydrology. Consider the following:

(A) Stream or tidal gauge data—If a stream or tidal gauging station is located near the area, it may be possible to calculate elevations representing the upper limit of wetland hydrology based on duration of inundation. Consult SCS district offices, hydrologists from the local CE district offices or other agencies for assistance. If fill material has not been placed on the area, survey this elevation from the nearest USGS benchmark. If fill material has been placed on the area, compare the calculated elevation with elevations shown on a USGS topographic map or any other survey map that predates site alteration.

(B) Field hydrologic indicators onsite or in a neighboring reference area—Certain field indicators of wetland hydrology may still be present. Look for water marks on trees or other structures, drift lines, and debris deposits (for additional hydrology indicators, see other signs of wetland hydrology section). If adjacent undisturbed areas are in the same topographic position, have the same soils (check soil survey map), and are similarly influenced by the same sources of inundation, look for wetland hydrology indicators in these areas.

(C) Aerial photographs—Examine aerial photographs and determine whether the area has been inundated or saturated during the growing season. Consider the time of the year that the aerial photographs were taken and use only photographs taken prior to site alteration.

(D) Historical records—Examine historical records for evidence that the area has been periodically inundated. Obtain copies of any such information.

(E) National Flood Insurance Agency flood maps—Determine the previous frequency of inundation of the area from national floods maps (if available).

(F) Local government officials or other knowledgeable individuals—Contact individuals who might have knowledge that the area was periodically inundated or saturated.

(5) Determine whether wetland hydrology previously occurred. Examine available data. If hydrology was significantly altered recently (e.g., since Clean Water Act), was wetland hydrology present prior to the alteration? If the vegetation and soils have not been disturbed, use site

characteristics—vegetation, soils, and field evidence of wetland hydrology—to identify wetland. If vegetation and soil are removed, then review existing information (e.g., soil surveys, wetland maps, and aerial photos), following procedures in Step 6, substep 3. If no evidence of wetland hydrology is found, the original hydrology of the area is not considered to meet the wetland hydrology criterion. If evidence of wetland hydrology is found, the area used to meet the wetland hydrology criterion. Record decision and return to the applicable step of the onsite determination method being used.

Step 6. Determine whether wetland hydrology still exists. Many wetlands have a single ditch running through them, while others may have an extensive network of ditches. A single ditch through a wetland may not be sufficient to effectively drain it; in other words, the wetland hydrology criterion still may be met under these circumstances. Undoubtedly, when ditches or drain tiles are observed, questions as to the extent of drainage arise, especially if the ditches or drain tiles are part of a more elaborate stream channelization or other drainage project. In these cases and other situations where the hydrology of an area has been significantly altered (e.g., dams, levees, groundwater withdrawals, and water diversions), one must determine whether wetland hydrology still exists. If it is present, the area is not effectively drained. If wetland hydrology is not present, the area is still a wetland. To determine whether wetland hydrology still exists:

(1) Describe the type or nature of the alteration. Look for evidence of:

- (A) Dams;
- (B) Levees, dikes, and similar structures;
- (C) Ditches;
- (D) Channelization;
- (E) Filling of channels and/or depressions;
- (F) Diversion of water; and
- (G) Groundwater withdrawal.

(See Step 5 above for discussion of these factors.)

(2) Determine the approximate date when the alteration occurred, if necessary. Check aerial photographs, consult with local officials, and review other possible sources of information.

(3) Characterize the hydrology that presently exists at the area. When evaluating agricultural land to determine the presence or absence of wetland, it is recognized that such lands are generally disturbed and must be viewed in that context. Wetland hydrology is often altered on agricultural lands, so the mere presence of soils meeting the

hydric soil criterion is not sufficient to determine that wetlands are present. Due to the common hydrologic and vegetative modifications on agricultural lands, indicators of wetland hydrology, together with soil-related properties, are the most reliable means of wetland identification. The following procedures is designed to provide technical guidance for determining whether an area subject to some degree of hydrologic modification still meets the wetland hydrology criterion. In general, the hydrology of most such areas can be evaluated by reviewing existing site-specific information, examining aerial photographs, or conducting onsite inspections to look for evidence of wetland hydrology (substeps A–F). More rigorous assessment (substep G) may be done less commonly where despite the lack of wetland hydrology evidence one has a strong suspicion that wetland hydrology still exists. The reason for doing this more detailed assessment should be documented. Caution: when the hydrology of an area has been significantly altered, soil characteristics resulting from wetland hydrology cannot be used to verify wetland hydrology since they persist after wetland hydrology has been eliminated.)

(A) Review existing site-specific hydrologic information to see if data support the wetland hydrology criterion. If such data are unavailable or inconclusive, proceed to Step 2.

(B) Examine aerial photographs (preferably early spring or wet growing season) for several recent years (e.g., a minimum of 5 years is recommended), look for signs of inundation or prolonged soil saturation, and consider these observations in the context of long-term hydrology. (Note: Large-scale aerial photographs, 1:24,000 and larger, are preferred.) Be sure to know the prevailing environmental conditions for all dates of photography. Try to avoid abnormally wet or dry dates for they may lead to erroneous conclusions about wetland hydrology. You are attempting to assess conditions during normal rainfall years. If the area is wet more years than not during normal rainfall years (e.g., 3 of 5 years or 6 of 10 years), then the wetland hydrology criterion is presumed to be met. If the area shows no indication of wetness during normal rainfall years or shows such signs in only a few years (e.g., 1 of 5 years or 3 of 10 years), then the wetland hydrology criterion is presumed not to be met. If conditions are between the two mentioned above (e.g., 2 of 5 years or 4–5 of 10 years), proceed to substep C.

Note: Only those areas showing signs of wetness should be considered to meet the wetland hydrology criterion.

(C) Examine additional aerial photos, National Wetland Inventory maps, or other information for indication of wetland or signs of wetland hydrology. If other information, coupled with the previous information is substep B, indicates that the area is wet more often than not (e.g., 3 of 5 years or 6 of 10 years), or indicates that the area is wet half of the time (e.g., 3 of 6 years or 5 of 10 years), then the wetland hydrology criterion is presumed to be met. If other information, coupled with the previous information in substep 2, provides indication that the area is wet less often than not (e.g., 2 of 5 years or 4 of 10 years), then the wetland hydrology criterion is presumed not to be met. If it is perceived after reviewing additional information that wetland hydrology is still inconclusive, proceed to substep D.

(D) Inspect the site for direct evidence of inundation or prolonged soil saturation or other field evidence of wetland hydrology (excluding soil properties resulting from long-term hydrology) to determine whether the wetland hydrology criterion is met. Ideally, such inspection should be done during the early or wet part of the growing season during a normal rainfall year. Avoid periods after heavy rainfall or immediately after more normal rainfalls. After conducting the onsite inspection, if necessary, proceed to substep E in areas where vegetation has not been removed or cultivated or to substep G in cultivated areas to perform a more rigorous assessment of vegetation and/or hydrology and document your reason for doing so.

(E) Inspect the site on the ground to assess changes in the plant community. If OBL or OBL and FACW plant species (especially in the herb stratum) are dominant or scattered throughout the site and UPL species are absent or not dominant, the area is considered to meet the wetland hydrology criterion and remains wetland. If UPL species predominate one or more strata (i.e., they represent more than 50 percent of the dominants in a given stratum) and no OBL species are present, then the area is considered effectively drained and is no longer wetland.

Note: Make sure that the UPL species are materially present and dominate a valid stratum.

If the vegetation differs from the above situations, then the vegetation at this site should be compared if possible with a nearby undisturbed reference area, so proceed to substep F; if it is not possible to evaluate a reference site and

the area is ditched, channelized or tile-drained, go to substep G.

(F) Locate a nearby undisturbed reference site with vegetation, soils, hydrology, and topography similar to the subject area prior to its alteration, examine the vegetation (following an appropriate onsite delineation method), and compare it with the vegetation at the project site. If the vegetation is similar (i.e., has the same dominants or the subject area has different dominants with the same indicator status or wetter as the reference site), then the area is considered to be wetland—the wetland hydrology criterion is presumed to be satisfied. If the vegetation has changed to where FACU and UPL species or UPL species alone predominate and OBL species are absent, then the area is considered effectively drained and is nonwetland. If the vegetation is different than indicated above, additional work is required—go to substep G.

(G) Select one of the following approaches to further assess the area's hydrology:

(1) Determine the "zone of influence" of the drainage structure and its effect on the water table using existing SCS soil drainage guides, the ellipse equation, or similar drainage model (SCS soil drainage guides and the ellipse equation relate only to water table and do not address surface water), and determine the effect of the drainage structure on surface water (ponding and flooding). Factors to consider when analyzing the effect of the drainage structure on surface water are: (a) The type of drainage system (e.g., size, spacing, depth, grade, and outlet conditions); (b) surface inlets; (c) condition of the drainage system; (d) how surface water is removed; and (e) soil type as it related to runoff.

(2) Conduct detailed ground water studies, making direct observations of inundation and soils saturation throughout the area in question. Data should be collected in the following manner:

(a) *Depth of Wells.* Well should be placed within 24 inches of the soil surface or to the top of the restrictive horizon, if shallower.

(b) *Annual Observation Period.* Observations should be made during the expected high water table period including both the nongrowing and growing seasons; the recommended period of observation will vary regionally. At a minimum the period should encompass a three month period during the wettest part of the growing season and include the month before the start of the growing season if the wettest part is in the Spring.

(c) *Frequency of Observation.* During the observation periods, the wells should be observed a minimum of two times per week at a regular interval not to exceed four days between observations; for soils with anticipated rapid fluctuations of the water table (e.g., sandy soils), a one or two day observation interval is recommended.

(d) *Length of Study.* A minimum of three annual observation periods, each having at least 90% of average yearly precipitation and at least 90% of normal monthly distribution. Also, the year prior to the water table study must have had 90% of the monthly and annual precipitation. The observation study may cease after the minimum consecutive time period required for meeting the wetland hydrology criterion.

Note: Data from any year that does not have 90% of average precipitation cannot be counted toward the three-year study duration unless it can be adequately justified in a specific case.

Precipitation information should be locally derived (not necessarily site-specific) from the nearest NOAA-approved weather station or other available sources of technically valid information (e.g., university branch stations or research sites, media weather stations, USGS stations, state agency stations, etc.). These precipitation stations must be located within 25 miles of the monitored water table study. If this is not possible, consult appropriate regulatory agency for alternatives.

If the wetland hydrology criterion is met, return to the applicable step in the onsite determination method being used and continue delineating the wetland.

#### Appendix 8. Procedures for Exceptions to the Three Criteria

Wetlands that are exceptions to the three criteria are to be identified using the procedures below.

1. What is the reason for the exception? (Identify vegetation or hydrology as the reason for the exception.)

If vegetation is the reason for the exception, go to 2a. If hydrology, go to 2b.

2a. Is the plant community growing on a soil that meets the hydric soil criterion?

If no, the area is non-wetland.

If yes, document the reasons for this conclusion and go to 3a.

3a. Are one or more of the following conditions satisfied?

- Hydrologic records or aerial photography combined with hydrologic records (items 1 and 2 of wetlands

hydrology criterion) document wetland hydrology; or

- One or more primary hydrologic indicators (item 3 of wetlands hydrology criterion) is documented to have been found at the site; or

- One or more secondary hydrologic indicators are materially present and supported by corroborative information as described in item 4 of wetlands hydrology criterion (e.g., regional indicators of saturation, hydrologic gauge data, NWI maps).

If no, the area is non-wetland.

If yes, the area is a wetland; document the reasons for this conclusion. The upper boundary of these wetlands is established by the limits of the

combination of the wetland hydrology indicators present and hydric soil.

2b. Is the plant community growing on a soil that meets the hydric soil criterion?

If no, the area is non-wetland.

If yes, document the reasons for this conclusion and go to 3b.

3b. Does the area demonstrate a regional indicator of saturation?

If no, go to 5b.

If yes, go to 4b.

4b. Does the area support a plant community that meets the hydrophytic vegetation criterion?

If no, the area is non-wetland.

If yes, the area is a wetland.

Document the reasons for this

conclusion. The upper boundary of this wetland is established by the limits of the combination of hydrophytic vegetation, hydric soils, and the regional indicators of saturation present.

5b. Does the plant community have a mean prevalence index of less than 3.0?

If no, the area is non-wetland.

If yes, the area is wetland; document the reasons for this conclusion. The upper boundary of this wetland is established by the limits of the combination of the wetland vegetation as described in this step and hydric soils.

[FR Doc. 91-19418 Filed 8-13-91; 8:45 am]

BILLING CODE 6560-50-M

ATTACHMENT C-3

CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL





US Army Corps  
of Engineers

# WETLANDS RESEARCH PROGRAM

TECHNICAL REPORT Y-87-1

## CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL

by

Environmental Laboratory

DEPARTMENT OF THE ARMY  
Waterways Experiment Station, Corps of Engineers  
PO Box 631, Vicksburg, Mississippi 39180-0631



January 1987

Final Report

Approved For Public Release. Distribution Unlimited



Prepared for DEPARTMENT OF THE ARMY  
US Army Corps of Engineers  
Washington, DC 20314-1000



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**REPORT DOCUMENTATION PAGE**

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS			
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.			
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE						
4. PERFORMING ORGANIZATION REPORT NUMBER(S) Technical Report Y-87-1			5. MONITORING ORGANIZATION REPORT NUMBER(S)			
6a. NAME OF PERFORMING ORGANIZATION USAEWES Environmental Laboratory		6b. OFFICE SYMBOL (If applicable)		7a. NAME OF MONITORING ORGANIZATION		
6c. ADDRESS (City, State, and ZIP Code) PO Box 631 Vicksburg, MS 39180-0631			7b. ADDRESS (City, State, and ZIP Code)			
8a. NAME OF FUNDING / SPONSORING ORGANIZATION US Army Corps of Engineers		8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c. ADDRESS (City, State, and ZIP Code)  Washington, DC 20314-1000			10. SOURCE OF FUNDING NUMBERS			
			PROGRAM ELEMENT NO	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO
11. TITLE (Include Security Classification) Corps of Engineers Wetlands Delineation Manual						
12. PERSONAL AUTHOR(S)						
13a. TYPE OF REPORT Final report		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) January 1987		15. PAGE COUNT 169
16. SUPPLEMENTARY NOTATION Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.						
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)			
FIELD	GROUP	SUB-GROUP				
			Delineation Manual Plant communities Vegetation Hydrology Methods Soil Wetlands			
19. ABSTRACT (Continue on reverse if necessary and identify by block number)						
<p>This document presents approaches and methods for identifying and delineating wetlands for purposes of Section 404 of the Clean Water Act. It is designed to assist users in making wetland determinations using a multiparameter approach. Except where noted in the manual, this approach requires positive evidence of hydrophytic vegetation, hydric soils, and wetland hydrology for a determination that an area is a wetland. The multiparameter approach provides a logical, easily defensible, and technical basis for wetland determinations. Technical guidelines are presented for wetlands, deepwater aquatic habitats, and nonwetlands (uplands).</p> <p>Hydrophytic vegetation, hydric soils, and wetland hydrology are also characterized, and wetland indicators of each parameter are listed.</p>						
(Continued)						
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS				21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL			22b. TELEPHONE (Include Area Code)		22c. OFFICE SYMBOL	

19. ABSTRACT (Continued).

Methods for applying the multiparameter approach are described. Separate sections are devoted to preliminary data gathering and analysis, method selection, routine determinations, comprehensive determinations, atypical situations, and problem areas. Three levels of routine determinations are described, thereby affording significant flexibility in method selection.

Four appendices provide supporting information. Appendix A is a glossary of technical terms used in the manual. Appendix B contains data forms for use with the various methods. Appendix C, developed by a Federal interagency panel, contains a list of all plant species known to occur in wetlands of the region. Each species has been assigned an indicator status that describes its estimated probability of occurring in wetlands. A second list contains plant species that commonly occur in wetlands of the region. Morphological, physiological, and reproductive adaptations that enable a plant species to occur in wetlands are also described, along with a listing of some species having such adaptations. Appendix D describes the procedure for examining the soil for indicators of hydric soil conditions, and includes a national list of hydric soils developed by the National Technical Committee for Hydric Soils.

## PREFACE

This manual is a product of the Wetlands Research Program (WRP) of the US Army Engineer Waterways Experiment Station (WES), Vicksburg, Miss. The work was sponsored by the Office, Chief of Engineers (OCE), US Army. OCE Technical Monitors for the WRP were Drs. John R. Hall and Robert J. Pierce, and Mr. Phillip C. Pierce.

The manual has been reviewed and concurred in by the Office of the Chief of Engineers and the Office of the Assistant Secretary of the Army (Civil Works) as a method approved for voluntary use in the field for a trial period of 1 year.

This manual is not intended to change appreciably the jurisdiction of the Clean Water Act (CWA) as it is currently implemented. Should any District find that use of this method appreciably contracts or expands jurisdiction in their District as the District currently interprets CWA authority, the District should immediately discontinue use of this method and furnish a full report of the circumstances to the Office of the Chief of Engineers.

This manual describes technical guidelines and methods using a multi-parameter approach to identify and delineate wetlands for purposes of Section 404 of the Clean Water Act. Appendices of supporting technical information are also provided.

The manual is presented in four parts. Part II was prepared by Dr. Robert T. Huffman, formerly of the Environmental Laboratory (EL), WES, and Dr. Dana R. Sanders, Sr., of the Wetland and Terrestrial Habitat Group (WTHG), Environmental Resources Division (ERD), EL. Dr. Huffman prepared the original version of Part II in 1980, entitled "Multiple Parameter Approach to the Field Identification and Delineation of Wetlands." The original version was distributed to all Corps field elements, as well as other Federal resource and environmental regulatory agencies, for review and comments. Dr. Sanders revised the original version in 1982, incorporating review comments. Parts I, III, and IV were prepared by Dr. Sanders, Mr. William B. Parker (formerly detailed to WES by the US Department of Agriculture (USDA), Soil Conservation Service (SCS)) and Mr. Stephen W. Forsythe (formerly detailed to WES by the US Department of the Interior, Fish and Wildlife Service (FWS)). Dr. Sanders also served as overall technical editor of the manual. The manual was edited by Ms. Jamie W. Leach of the WES Information Products Division.

The authors acknowledge technical assistance provided by: Mr. Russell F. Theriot, Mr. Ellis J. Clairain, Jr., and Mr. Charles J. Newling, all of WTHG, ERD; Mr. Phillip Jones, former SCS detail to WES; Mr. Porter B. Reed, FWS, National Wetland Inventory, St. Petersburg, Fla.; Dr. Dan K. Evans, Marshall University, Huntington, W. Va.; and the USDA-SCS. The authors also express gratitude to Corps personnel who assisted in developing the regional lists of species that commonly occur in wetlands, including Mr. Richard Macomber, Bureau of Rivers and Harbors; Ms. Kathy Mulder, Kansas City District; Mr. Michael Gilbert, Omaha District; Ms. Vicki Goodnight, Southwestern Division; Dr. Fred Weinmann, Seattle District; and Mr. Michael Lee, Pacific Ocean Division. Special thanks are offered to the CE personnel who reviewed and commented on the draft manual, and to those who participated in a workshop that consolidated the field comments.

The work was monitored at WES under the direct supervision of Dr. Hanley K. Smith, Chief, WTHG, and under the general supervision of Dr. Conrad J. Kirby, Jr., Chief, ERD. Dr. Smith, Dr. Sanders, and Mr. Theriot were Managers of the WRP. Dr. John Harrison was Chief, EL.

Director of WES during the preparation of this report was COL Allen F. Grum, USA. During publication, COL Dwayne G. Lee, CE, was Commander and Director. Technical Director was Dr. Robert W. Whalin.

This report should be cited as follows:

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

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CONVERSION FACTORS, NON-SI TO SI (METRIC)  
UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI  
(metric) units as follows:

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
acres	0.4047	hectares
Fahrenheit degrees	5/9	Celsius degrees*
feet	0.3048	metres
inches	2.54	centimetres
miles (US statute)	1.6093	kilometres
square inches	6.4516	square centimetres

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\* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings,  
use the following formula:  $C = (5/9) (F - 32)$ .

# CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL

## PART I: INTRODUCTION

### Background

1. Recognizing the potential for continued or accelerated degradation of the Nation's waters, the US Congress enacted the Clean Water Act (hereafter referred to as the Act), formerly known as the Federal Water Pollution Control Act (33 U.S.C. 1344). The objective of the Act is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States. Section 404 of the Act authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into the waters of the United States, including wetlands.

### Purpose and Objectives

#### Purpose

2. The purpose of this manual is to provide users with guidelines and methods to determine whether an area is a wetland for purposes of Section 404 of the Act.

#### Objectives

3. Specific objectives of the manual are to:
- a. Present technical guidelines for identifying wetlands and distinguishing them from aquatic habitats and other nonwetlands.\*
  - b. Provide methods for applying the technical guidelines.
  - c. Provide supporting information useful in applying the technical guidelines.

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\* Definitions of terms used in this manual are presented in the Glossary, Appendix A.



## Scope

4. This manual is limited in scope to wetlands that are a subset of "waters of the United States" and thus subject to Section 404. The term "waters of the United States" has broad meaning and incorporates both deep-water aquatic habitats and special aquatic sites, including wetlands (Federal Register 1982), as follows:

- a. The territorial seas with respect to the discharge of fill material.
- b. Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including their adjacent wetlands.
- c. Tributaries to navigable waters of the United States, including adjacent wetlands.
- d. Interstate waters and their tributaries, including adjacent wetlands.
- e. All others waters of the United States not identified above, such as isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.

Determination that a water body or wetland is subject to interstate commerce and therefore is a "water of the United States" shall be made independently of procedures described in this manual.

### Special aquatic sites

5. The Environmental Protection Agency (EPA) identifies six categories of special aquatic sites in their Section 404 b.(1) guidelines (Federal Register 1980), including:

- a. Sanctuaries and refuges.
- b. Wetlands.
- c. Mudflats.
- d. Vegetated shallows.
- e. Coral reefs.
- f. Riffle and pool complexes.

Although all of these special aquatic sites are subject to provisions of the Clean Water Act, this manual considers only wetlands. By definition (see paragraph 26a), wetlands are vegetated. Thus, unvegetated special aquatic

sites (e.g. mudflats lacking macrophytic vegetation) are not covered in this manual.

#### Relationship to wetland classification systems

6. The technical guideline for wetlands does not constitute a classification system. It only provides a basis for determining whether a given area is a wetland for purposes of Section 404, without attempting to classify it by wetland type.

7. Consideration should be given to the relationship between the technical guideline for wetlands and the classification system developed for the Fish and Wildlife Service (FWS), US Department of the Interior, by Cowardin et al. (1979). The FWS classification system was developed as a basis for identifying, classifying, and mapping wetlands, other special aquatic sites, and deepwater aquatic habitats. Using this classification system, the National Wetland Inventory (NWI) is mapping the wetlands, other special aquatic sites, and deepwater aquatic habitats of the United States, and is also developing both a list of plant species that occur in wetlands and an associated plant database. These products should contribute significantly to application of the technical guideline for wetlands. The technical guideline for wetlands as presented in the manual includes most, but not all, wetlands identified in the FWS system. The difference is due to two principal factors:

- a. The FWS system includes all categories of special aquatic sites identified in the EPA Section 404 b.(1) guidelines. All other special aquatic sites are clearly within the purview of Section 404; thus, special methods for their delineation are unnecessary.
- b. The FWS system requires that a positive indicator of wetlands be present for any one of the three parameters, while the technical guideline for wetlands requires that a positive wetland indicator be present for each parameter (vegetation, soils, and hydrology), except in limited instances identified in the manual.

#### Organization

8. This manual consists of four parts and four appendices. PART I presents the background, purpose and objectives, scope, organization, and use of the manual.

9. PART II focuses on the technical guideline for wetlands, and stresses the need for considering all three parameters (vegetation, soils, and hydrology) when making wetland determinations. Since wetlands occur in an intermediate position along the hydrologic gradient, comparative technical guidelines are also presented for deepwater aquatic sites and nonwetlands.

10. PART III contains general information on hydrophytic vegetation, hydric soils, and wetland hydrology. Positive wetland indicators of each parameter are included.

11. PART IV, which presents methods for applying the technical guideline for wetlands, is arranged in a format that leads to a logical determination of whether a given area is a wetland. Section A contains general information related to application of methods. Section B outlines preliminary data-gathering efforts. Section C discusses two approaches (routine and comprehensive) for making wetland determinations and presents criteria for deciding the correct approach to use. Sections D and E describe detailed procedures for making routine and comprehensive determinations, respectively. The basic procedures are described in a series of steps that lead to a wetland determination.

12. The manual also describes (PART IV, Section F) methods for delineating wetlands in which the vegetation, soils, and/or hydrology have been altered by recent human activities or natural events, as discussed below:

- a. The definition of wetlands (paragraph 26a) contains the phrase "under normal circumstances," which was included because there are instances in which the vegetation in a wetland has been inadvertently or purposely removed or altered as a result of recent natural events or human activities. Other examples of human alterations that may affect wetlands are draining, ditching, levees, deposition of fill, irrigation, and impoundments. When such activities occur, an area may fail to meet the diagnostic criteria for a wetland. Likewise, positive hydric soil indicators may be absent in some recently created wetlands. In such cases, an alternative method must be employed in making wetland determinations.
- b. Natural events may also result in sufficient modification of an area that indicators of one or more wetland parameters are absent. For example, changes in river course may significantly alter hydrology, or beaver dams may create new wetland areas that lack hydric soil conditions. Catastrophic events (e.g. fires, avalanches, mudslides, and volcanic activities) may also alter or destroy wetland indicators on a site.

Such atypical situations occur throughout the United States, and all of these cannot be identified in this manual.

13. Certain wetland types, under the extremes of normal circumstances, may not always meet all the wetland criteria defined in the manual. Examples include prairie potholes during drought years and seasonal wetlands that may lack hydrophytic vegetation during the dry season. Such areas are discussed in PART IV, Section G, and guidance is provided for making wetland determinations in these areas. However, such wetland areas may warrant additional research to refine methods for their delineation.

14. Appendix A is a glossary of technical terms used in the manual. Definitions of some terms were taken from other technical sources, but most terms are defined according to the manner in which they are used in the manual.

15. Data forms for methods presented in PART IV are included in Appendix B. Examples of completed data forms are also provided.

16. Supporting information is presented in Appendices C and D. Appendix C contains lists of plant species that occur in wetlands. Section 1 consists of regional lists developed by a Federal interagency panel. Section 2 consists of shorter lists of plant species that commonly occur in wetlands of each region. Section 3 describes morphological, physiological, and reproductive adaptations associated with hydrophytic species, as well as a list of some species exhibiting such adaptations. Appendix D discusses procedures for examining soils for hydric soil indicators, and also contains a list of hydric soils of the United States.

#### Use

17. Although this manual was prepared primarily for use by Corps of Engineers (CE) field inspectors, it should be useful to anyone who makes wetland determinations for purposes of Section 404 of the Clean Water Act. The user is directed through a series of steps that involve gathering of information and decisionmaking, ultimately leading to a wetland determination. A general flow diagram of activities leading to a determination is presented in Figure 1. However, not all activities identified in Figure 1 will be required for each wetland determination. For example, if a decision is made to use a

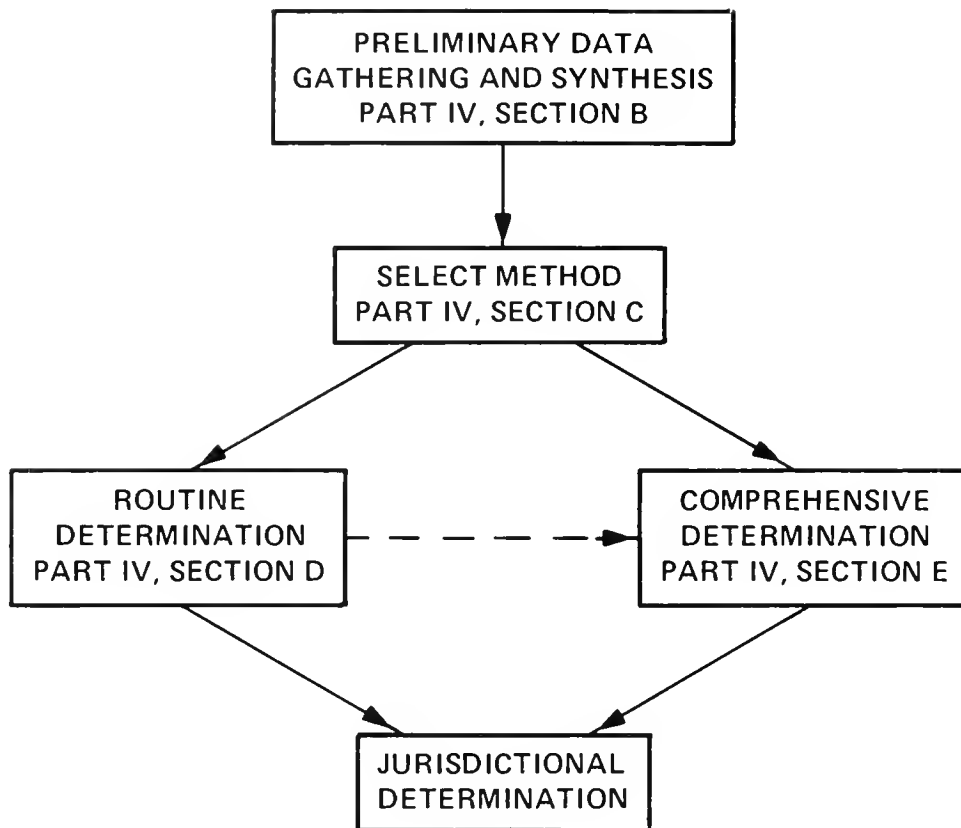


Figure 1. General schematic diagram of activities leading to a wetland/nonwetland determination

routine determination procedure, comprehensive determination procedures will not be employed.

Premise for use of the manual

18. Three key provisions of the CE/EPA definition of wetlands (see paragraph 26a) include:

- a. Inundated or saturated soil conditions resulting from permanent or periodic inundation by ground water or surface water.
- b. A prevalence of vegetation typically adapted for life in saturated soil conditions (hydrophytic vegetation).
- c. The presence of "normal circumstances."

19. Explicit in the definition is the consideration of three environmental parameters: hydrology, soil, and vegetation. Positive wetland indicators of all three parameters are normally present in wetlands. Although vegetation is often the most readily observed parameter, sole reliance on vegetation or either of the other parameters as the determinant of wetlands can sometimes be misleading. Many plant species can grow successfully in both

wetlands and nonwetlands, and hydrophytic vegetation and hydric soils may persist for decades following alteration of hydrology that will render an area a nonwetland. The presence of hydric soils and wetland hydrology indicators in addition to vegetation indicators will provide a logical, easily defensible, and technical basis for the presence of wetlands. The combined use of indicators for all three parameters will enhance the technical accuracy, consistency, and credibility of wetland determinations. Therefore, all three parameters were used in developing the technical guideline for wetlands and all approaches for applying the technical guideline embody the multiparameter concept.

#### Approaches

20. The approach used for wetland delineations will vary, based primarily on the complexity of the area in question. Two basic approaches described in the manual are (a) routine and (b) comprehensive.

21. Routine approach. The routine approach normally will be used in the vast majority of determinations. The routine approach requires minimal level of effort, using primarily qualitative procedures. This approach can be further subdivided into three levels of required effort, depending on the complexity of the area and the amount and quality of preliminary data available. The following levels of effort may be used for routine determinations:

- a. Level 1 - Onsite inspection unnecessary. (PART IV, Section D, Subsection 1).
- b. Level 2 - Onsite inspection necessary. (PART IV, Section D, Subsection 2).
- c. Level 3 - Combination of Levels 1 and 2. (PART IV, Section D, Subsection 3).

22. Comprehensive approach. The comprehensive approach requires application of quantitative procedures for making wetland determinations. It should seldom be necessary, and its use should be restricted to situations in which the wetland is very complex and/or is the subject of likely or pending litigation. Application of the comprehensive approach (PART IV, Section E) requires a greater level of expertise than application of the routine approach, and only experienced field personnel with sufficient training should use this approach.

#### Flexibility

23. Procedures described for both routine and comprehensive wetland determinations have been tested and found to be reliable. However,

site-specific conditions may require modification of field procedures. For example, slope configuration in a complex area may necessitate modification of the baseline and transect positions. Since specific characteristics (e.g. plant density) of a given plant community may necessitate the use of alternate methods for determining the dominant species, the user has the flexibility to employ sampling procedures other than those described. However, the basic approach for making wetland determinations should not be altered (i.e. the determination should be based on the dominant plant species, soil characteristics, and hydrologic characteristics of the area in question). The user should document reasons for using a different characterization procedure than described in the manual. *CAUTION: Application of methods described in the manual or the modified sampling procedures requires that the user be familiar with wetlands of the area and use his training, experience, and good judgment in making wetland determinations.*

## PART II: TECHNICAL GUIDELINES

24. The interaction of hydrology, vegetation, and soil results in the development of characteristics unique to wetlands. Therefore, the following technical guideline for wetlands is based on these three parameters, and diagnostic environmental characteristics used in applying the technical guideline are represented by various indicators of these parameters.

25. Because wetlands may be bordered by both wetter areas (aquatic habitats) and by drier areas (nonwetlands), guidelines are presented for wetlands, deepwater aquatic habitats, and nonwetlands. However, procedures for applying the technical guidelines for deepwater aquatic habitats and nonwetlands are not included in the manual.

### Wetlands

26. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for the identification and delineation of wetlands:

- a. Definition. The CE (Federal Register 1982) and the EPA (Federal Register 1980) jointly define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
- b. Diagnostic environmental characteristics. Wetlands have the following general diagnostic environmental characteristics:
  - (1) Vegetation. The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described in a above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions.\* Indicators of vegetation associated with wetlands are listed in paragraph 35.

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\* Species (e.g. *Acer rubrum*) having broad ecological tolerances occur in both wetlands and nonwetlands.



- (2) Soil. Soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions. Indicators of soils developed under reducing conditions are listed in paragraphs 44 and 45.
  - (3) Hydrology. The area is inundated either permanently or periodically at mean water depths  $\leq 6.6$  ft, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation.\* Indicators of hydrologic conditions that occur in wetlands are listed in paragraph 49.
- c. Technical approach for the identification and delineation of wetlands. Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination.

### Deepwater Aquatic Habitats

27. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for deepwater aquatic habitats:

- a. Definition. Deepwater aquatic habitats are areas that are permanently inundated at mean annual water depths  $> 6.6$  ft or permanently inundated areas  $\leq 6.6$  ft in depth that do not support rooted-emergent or woody plant species.\*\*
- b. Diagnostic environmental characteristics. Deepwater aquatic habitats have the following diagnostic environmental characteristics:
  - (1) Vegetation. No rooted-emergent or woody plant species are present in these permanently inundated areas.
  - (2) Soil. The substrate technically is not defined as a soil if the mean water depth is  $> 6.6$  ft or if it will not support rooted emergent or woody plants.
  - (3) Hydrology. The area is permanently inundated at mean water depths  $> 6.6$  ft.
- c. Technical approach for the identification and delineation of deepwater aquatic habitats. When any one of the diagnostic characteristics identified in b above is present, the area is a deepwater aquatic habitat.

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\* The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and nontidal situations.

\*\* Areas  $\leq 6.6$  ft mean annual depth that support only submergent aquatic plants are vegetated shallows, not wetlands.

## Nonwetlands

28. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for the identification and delineation of nonwetlands:

- a. Definition. Nonwetlands include uplands and lowland areas that are neither deepwater aquatic habitats, wetlands, nor other special aquatic sites. They are seldom or never inundated, or if frequently inundated, they have saturated soils for only brief periods during the growing season, and, if vegetated, they normally support a prevalence of vegetation typically adapted for life only in aerobic soil conditions.
- b. Diagnostic environmental characteristics. Nonwetlands have the following general diagnostic environmental characteristics:
  - (1) Vegetation. The prevalent vegetation consists of plant species that are typically adapted for life only in aerobic soils. These mesophytic and/or xerophytic macrophytes cannot persist in predominantly anaerobic soil conditions.\*
  - (2) Soil. Soils, when present, are not classified as hydric, and possess characteristics associated with aerobic conditions.
  - (3) Hydrology. Although the soil may be inundated or saturated by surface water or ground water periodically during the growing season of the prevalent vegetation, the average annual duration of inundation or soil saturation does not preclude the occurrence of plant species typically adapted for life in aerobic soil conditions.
- c. Technical approach for the identification and delineation of nonwetlands. When any one of the diagnostic characteristics identified in b above is present, the area is a nonwetland.

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\* Some species, due to their broad ecological tolerances, occur in both wetlands and nonwetlands (e.g. *Acer rubrum*).

PART III: CHARACTERISTICS AND INDICATORS OF HYDROPHYTIC  
VEGETATION, HYDRIC SOILS, AND WETLAND HYDROLOGY

Hydrophytic Vegetation

Definition

29. Hydrophytic vegetation. Hydrophytic vegetation is defined herein as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. The vegetation occurring in a wetland may consist of more than one plant community (species association). The plant community concept is followed throughout the manual. Emphasis is placed on the assemblage of plant species that exert a controlling influence on the character of the plant community, rather than on indicator species. Thus, the presence of scattered individuals of an upland plant species in a community dominated by hydrophytic species is not a sufficient basis for concluding that the area is an upland community. Likewise, the presence of a few individuals of a hydrophytic species in a community dominated by upland species is not a sufficient basis for concluding that the area has hydrophytic vegetation.

*CAUTION: In determining whether an area is "vegetated" for the purpose of Section 404 jurisdiction, users must consider the density of vegetation at the site being evaluated. While it is not possible to develop a numerical method to determine how many plants or how much biomass is needed to establish an area as being vegetated or unvegetated, it is intended that the predominant condition of the site be used to make that characterization. This concept applies to areas grading from wetland to upland, and from wetland to other waters. This limitation would not necessarily apply to areas which have been disturbed by man or recent natural events.*

30. Prevalence of vegetation. The definition of wetlands (paragraph 26a) includes the phrase "prevalence of vegetation." Prevalence, as applied to vegetation, is an imprecise, seldom-used ecological term. As used in the wetlands definition, prevalence refers to the plant community or communities that occur in an area at some point in time. Prevalent vegetation is characterized by the dominant species comprising the plant community or communities. Dominant plant species are those that contribute more to the character of a plant community than other species present, as estimated or

measured in terms of some ecological parameter or parameters. The two most commonly used estimates of dominance are basal area (trees) and percent areal cover (herbs). Hydrophytic vegetation is prevalent in an area when the dominant species comprising the plant community or communities are typically adapted for life in saturated soil conditions.

31. Typically adapted. The term "typically adapted" refers to a species being normally or commonly suited to a given set of environmental conditions, due to some morphological, physiological, or reproductive adaptation (Appendix C, Section 3). As used in the CE wetlands definition, the governing environmental conditions for hydrophytic vegetation are saturated soils resulting from periodic inundation or saturation by surface or ground water. These periodic events must occur for sufficient duration to result in anaerobic soil conditions. When the dominant species in a plant community are typically adapted for life in anaerobic soil conditions, hydrophytic vegetation is present. Species listed in Appendix C, Section 1 or 2, that have an indicator status of OBL, FACW, or FAC\* (Table 1) are considered to be typically adapted for life in anaerobic soil conditions (see paragraph 35a).

#### Influencing factors

32. Many factors (e.g. light, temperature, soil texture and permeability, man-induced disturbance, etc.) influence the character of hydrophytic vegetation. However, hydrologic factors exert an overriding influence on species that can occur in wetlands. Plants lacking morphological, physiological, and/or reproductive adaptations cannot grow, effectively compete, reproduce, and/or persist in areas that are subject to prolonged inundation or saturated soil conditions.

#### Geographic diversity

33. Many hydrophytic vegetation types occur in the United States due to the diversity of interactions among various factors that influence the distribution of hydrophytic species. General climate and flora contribute greatly to regional variations in hydrophytic vegetation. Consequently, the same associations of hydrophytic species occurring in the southeastern United States are not found in the Pacific Northwest. In addition, local environmental conditions (e.g. local climate, hydrologic regimes, soil series, salinity, etc.)

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\* Species having a FAC- indicator status are not considered to be typically adapted for life in anaerobic soil conditions.

Table 1  
Plant Indicator Status Categories\*

<u>Indicator Category</u>	<u>Indicator Symbol</u>	<u>Definition</u>
OBLIGATE WETLAND PLANTS	OBL	Plants that occur almost always (estimated probability >99%) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1%) in nonwetlands. Examples: <i>Spartina alterniflora</i> , <i>Taxodium distichum</i> .
FACULTATIVE WETLAND PLANTS	FACW	Plants that occur usually (estimated probability >67% to 99%) in wetlands, but also occur (estimated probability 1% to 33% in nonwetlands). Examples: <i>Fraxinus pennsylvanica</i> , <i>Cornus stolonifera</i> .
FACULTATIVE PLANTS	FAC	Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and nonwetlands. Examples: <i>Gleditsia triacanthos</i> , <i>Smilax rotundifolia</i> .
FACULTATIVE UPLAND PLANTS	FACU	Plants that occur sometimes (estimated probability 1% to <33%) in wetlands, but occur more often (estimated probability >67% to 99%) in nonwetlands. Examples: <i>Quercus rubra</i> , <i>Potentilla arguta</i> .
OBLIGATE UPLAND PLANTS	UPL	Plants that occur rarely (estimated probability <1%) in wetlands, but occur almost always (estimated probability >99%) in nonwetlands under natural conditions. Examples: <i>Pinus echinata</i> , <i>Bromus mollis</i> .

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\* Categories were originally developed and defined by the USFWS National Wetlands Inventory and subsequently modified by the National Plant List Panel. The three facultative categories are subdivided by (+) and (-) modifiers (see Appendix C, Section 1).

may result in broad variations in hydrophytic associations within a given region. For example, a coastal saltwater marsh will consist of different species than an inland freshwater marsh in the same region. An overview of hydrophytic vegetation occurring in each region of the Nation has been published by the CE in a series of eight preliminary wetland guides (Table 2), and a group of wetland and estuarine ecological profiles (Table 3) has been published by FWS.

#### Classification

34. Numerous efforts have been made to classify hydrophytic vegetation. Most systems are based on general characteristics of the dominant species occurring in each vegetation type. These range from the use of general physiognomic categories (e.g. overstory, subcanopy, ground cover, vines) to specific vegetation types (e.g. forest type numbers as developed by the Society of American Foresters). In other cases, vegetational characteristics are combined with hydrologic features to produce more elaborate systems. The most recent example of such a system was developed for the FWS by Cowardin et al. (1979).

#### Indicators of hydrophytic vegetation

35. Several indicators may be used to determine whether hydrophytic vegetation is present on a site. However, the presence of a single individual of a hydrophytic species does not mean that hydrophytic vegetation is present. The strongest case for the presence of hydrophytic vegetation can be made when several indicators, such as those in the following list, are present. However, any one of the following is indicative that hydrophytic vegetation is present:\*

- a. More than 50 percent of the dominant species are OBL, FACW, or FAC\*\* (Table 1) on lists of plant species that occur in wetlands. A national interagency panel has prepared a National List of Plant Species that occur in wetlands. This list categorizes species according to their affinity for occurrence in wetlands. Regional subset lists of the national list, including only species having an indicator status of OBL, FACW, or FAC, are presented in Appendix C, Section 1. The CE has also developed regional lists of plant species that commonly occur

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\* Indicators are listed in order of decreasing reliability. Although all are valid indicators, some are stronger than others. When a decision is based on an indicator appearing in the lower portion of the list, re-evaluate the parameter to ensure that the proper decision was reached.

\*\* FAC+ species are considered to be wetter (i.e., have a greater estimated probability of occurring in wetlands) than FAC species, while FAC- species are considered to be drier (i.e., have a lesser estimated probability of occurring in wetlands) than FAC species.

Table 2  
List of CE Preliminary Wetland Guides

<u>Region</u>	<u>Publication Date</u>	<u>WES Report No.</u>
Peninsular Florida	February 1978	TR Y-78-2
Puerto Rico	April 1978	TR Y-78-3
West Coast States	April 1978	TR-Y-78-4
Gulf Coastal Plain	May 1978	TR Y-78-5
Interior	May 1982	TR Y-78-6
South Atlantic States	May 1982	TR Y-78-7
North Atlantic States	May 1982	TR Y-78-8
Alaska	February 1984	TR Y-78-9

Table 3  
List of Ecological Profiles Produced by the FWS Biological  
 Services Program

Title	Publication Date	FWS Publication No.
"The Ecology of Intertidal Flats of North Carolina"	1979	79/39
"The Ecology of New England Tidal Flats"	1982	81/01
"The Ecology of the Mangroves of South Florida"	1982	81/24
"The Ecology of Bottomland Hardwood Swamps of the Southeast"	1982	81/37
"The Ecology of Southern California Coastal Salt Marshes"	1982	81/54
"The Ecology of New England High Salt Marshes"	1982	81/55
"The Ecology of Southeastern Shrub Bogs (Pocosins) and Carolina Bays"	1982	82/04
"The Ecology of the Apalachicola Bay System"	1984	82/05
"The Ecology of the Pamlico River, North Carolina"	1984	82/06
"The Ecology of the South Florida Coral Reefs"	1984	82/08
"The Ecology of the Sea Grasses of South Florida"	1982	82/25
"The Ecology of Tidal Marshes of the Pacific Northwest Coast"	1983	82/32
"The Ecology of Tidal Freshwater Marshes of the U.S. East Coast"	1984	83/17
"The Ecology of San Francisco Bay Tidal Marshes"	1983	83/23
"The Ecology of Tundra Ponds of the Arctic Coastal Plain"	1984	83/25
"The Ecology of Eelgrass Meadows of the Atlantic Coast"	1984	84/02
"The Ecology of Delta Marshes of Louisiana"	1984	84/09

(Continued)



Table 3 (Concluded)

Title	Publication Date	FWS Publication No.
"The Ecology of Eelgrass Meadows in the Pacific Northwest"	1984	84/24
"The Ecology of Irregularly Flooded Marshes of Northeastern Gulf of Mexico"	(In press)	85(7.1)
"The Ecology of Giant Kelp Forests in California"	1985	85(7.2)

in wetlands (Appendix C, Section 2). Either list may be used. Note: A District that, on a subregional basis, questions the indicator status of FAC species may use the following option: When FAC species occur as dominants along with other dominants that are not FAC (either wetter or drier than FAC), the FAC species can be considered as neutral, and the vegetation decision can be based on the number of dominant species wetter than FAC as compared to the number of dominant species drier than FAC. When a tie occurs or all dominant species are FAC, the nondominant species must be considered. The area has hydrophytic vegetation when more than 50 percent of all considered species are wetter than FAC. When either all considered species are FAC or the number of species wetter than FAC equals the number of species drier than FAC, the wetland determination will be based on the soil and hydrology parameters. Districts adopting this option should provide documented support to the Corps representative on the regional plant list panel, so that a change in indicator status of FAC species of concern can be pursued. Corps representatives on the regional and national plant list panels will continually strive to ensure that plant species are properly designated on both a regional and subregional basis.

b. Other indicators. Although there are several other indicators of hydrophytic vegetation, it will seldom be necessary to use them. However, they may provide additional useful information to strengthen a case for the presence of hydrophytic vegetation. Additional training and/or experience may be required to employ these indicators.

(1) Visual observation of plant species growing in areas of prolonged inundation and/or soil saturation. This indicator can only be applied by experienced personnel who have accumulated information through several years of field experience and written documentation (field notes) that certain species commonly occur in areas of prolonged (>10 percent) inundation and/or soil saturation during the growing season. Species such as *Taxodium distichum*, *Typha latifolia*, and *Spartina alterniflora* normally occur in such areas. Thus, occurrence of species commonly observed in other wetland areas provides a strong indication that hydrophytic vegetation is present. *CAUTION: The presence of standing water or saturated soil on a site is insufficient evidence that the species present are able to tolerate long periods of inundation. The user must relate the observed species to other similar situations and determine whether they are normally found in wet areas, taking into consideration the season and immediately preceding weather conditions.*

(2) Morphological adaptations. Some hydrophytic species have easily recognized physical characteristics that indicate their ability to occur in wetlands. A given species may exhibit several of these characteristics, but not all hydrophytic species have evident morphological

adaptations. A list of such morphological adaptations and a partial list of plant species with known morphological adaptations for occurrence in wetlands are provided in Appendix C, Section 3.

- (3) Technical literature. The technical literature may provide a strong indication that plant species comprising the prevalent vegetation are commonly found in areas where soils are periodically saturated for long periods. Sources of available literature include:
- (a) Taxonomic references. Such references usually contain at least a general description of the habitat in which a species occurs. A habitat description such as, "Occurs in water of streams and lakes and in alluvial floodplains subject to periodic flooding," supports a conclusion that the species typically occurs in wetlands. Examples of some useful taxonomic references are provided in Table 4.
  - (b) Botanical journals. Some botanical journals contain studies that define species occurrence in various hydrologic regimes. Examples of such journals include: Ecology, Ecological Monographs, American Journal of Botany, Journal of American Forestry, and Wetlands: The Journal of the Society of Wetland Scientists.
  - (c) Technical reports. Governmental agencies periodically publish reports (e.g. literature reviews) that contain information on plant species occurrence in relation to hydrologic regimes. Examples of such publications include the CE preliminary regional wetland guides (Table 2) published by the US Army Engineer Waterways Experiment Station (WES) and the wetland community and estuarine profiles of various habitat types (Table 3) published by the FWS.
  - (d) Technical workshops, conferences, and symposia. Publications resulting from periodic scientific meetings contain valuable information that can be used to support a decision regarding the presence of hydrophytic vegetation. These usually address specific regions or wetland types. For example, distribution of bottomland hardwood forest species in relation to hydrologic regimes was examined at a workshop on bottomland hardwood forest wetlands of the Southeastern United States (Clark and Benforado 1981).
  - (e) Wetland plant database. The NWI is producing a Plant Database that contains habitat information on approximately 5,200 plant species that occur at some estimated probability in wetlands, as compiled from the technical literature. When completed, this computerized database will be available to all governmental agencies.

Table 4

List of Some Useful Taxonomic References

<u>Title</u>	<u>Author(s)</u>
<u>Manual of Vascular Plants of Northeastern United States and Adjacent Canada</u>	Gleason and Cronquist (1963)
<u>Gray's Manual of Botany, 8th edition</u>	Fernald (1950)
<u>Manual of the Southeastern Flora</u>	Small (1933)
<u>Manual of the Vascular Flora of the Carolinas</u>	Radford, Ahles, and Bell (1968)
<u>A Flora of Tropical Florida</u>	Long and Lakela (1976)
<u>Aquatic and Wetland Plants of the Southwestern United States</u>	Correll and Correll (1972)
<u>Arizona Flora</u>	Kearney and Peebles (1960)
<u>Flora of the Pacific Northwest</u>	Hitchcock and Cronquist (1973)
<u>A California Flora</u>	Munz and Keck (1959)
<u>Flora of Missouri</u>	Steyermark (1963)
<u>Manual of the Plants of Colorado</u>	Harrington (1979)
<u>Intermountain Flora - Vascular Plants of the Intermountain West, USA - Vols I and II</u>	Cronquist et al. (1972)
<u>Flora of Idaho</u>	Davis (1952)
<u>Aquatic and Wetland Plants of the Southeastern United States - Vols I and II</u>	Godfrey and Wooten (1979)
<u>Manual of Grasses of the United States</u>	Hitchcock (1950)

- (4) Physiological adaptations. Physiological adaptations include any features of the metabolic processes of plants that make them particularly fitted for life in saturated soil conditions. *NOTE: It is impossible to detect the presence of physiological adaptations in plant species during onsite visits.* Physiological adaptations known for hydrophytic species and species known to exhibit these adaptations are listed and discussed in Appendix C, Section 3.
- (5) Reproductive adaptations. Some plant species have reproductive features that enable them to become established and grow in saturated soil conditions. Reproductive adaptations known for hydrophytic species are presented in Appendix C, Section 3.

### Hydric Soils

#### Definition

36. A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (US Department of Agriculture (USDA) Soil Conservation Service (SCS) 1985, as amended by the National Technical Committee for Hydric Soils (NTCHS) in December 1986).

#### Criteria for hydric soils

37. Based on the above definition, the NTCHS developed the following criteria for hydric soils:

- a. "All Histosols\* except Folists;
- b. Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:
  - (1) Somewhat poorly drained and have a water table less than 0.5 ft\*\* from the surface for a significant period (usually a week or more) during the growing season, or
  - (2) Poorly drained or very poorly drained and have either:
    - (a) A water table at less than 1.0 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within 20 inches; or

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\* Soil nomenclature follows USDA-SCS (1975).

\*\* A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 4.

- (b) A water table at less than 1.5 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 in/hr in any layer within 20 inches; or
- c. Soils that are ponded for long or very long duration during the growing season; or
- d. Soils that are frequently flooded for long duration or very long duration during the growing season."

A hydric soil may be either drained or undrained, and a drained hydric soil may not continue to support hydrophytic vegetation. Therefore, not all areas having hydric soils will qualify as wetlands. Only when a hydric soil supports hydrophytic vegetation and the area has indicators of wetland hydrology may the soil be referred to as a "wetland" soil.

38. A drained hydric soil is one in which sufficient ground or surface water has been removed by artificial means such that the area will no longer support hydrophyte vegetation. Onsite evidence of drained soils includes:

- a. Presence of ditches or canals of sufficient depth to lower the water table below the major portion of the root zone of the prevalent vegetation.
- b. Presence of dikes, levees, or similar structures that obstruct normal inundation of an area.
- c. Presence of a tile system to promote subsurface drainage.
- d. Diversion of upland surface runoff from an area.

Although it is important to record such evidence of drainage of an area, a hydric soil that has been drained or partially drained still allows the soil parameter to be met. However, the area will not qualify as a wetland if the degree of drainage has been sufficient to preclude the presence of either hydrophytic vegetation or a hydrologic regime that occurs in wetlands. *NOTE: the mere presence of drainage structures in an area is not sufficient basis for concluding that a hydric soil has been drained; such areas may continue to have wetland hydrology.*

#### General information

39. Soils consist of unconsolidated, natural material that supports, or is capable of supporting, plant life. The upper limit is air and the lower limit is either bedrock or the limit of biological activity. Some soils have very little organic matter (mineral soils), while others are composed primarily of organic matter (Histosols). The relative proportions of particles (sand, silt, clay, and organic matter) in a soil are influenced by many

interacting environmental factors. As normally defined, a soil must support plant life. The concept is expanded to include substrates that could support plant life. For various reasons, plants may be absent from areas that have well-defined soils.

40. A soil profile (Figure 2) consists of various soil layers described from the surface downward. Most soils have two or more identifiable horizons. A soil horizon is a layer oriented approximately parallel to the soil surface, and usually is differentiated from contiguous horizons by characteristics that can be seen or measured in the field (e.g., color, structure, texture, etc.). Most mineral soils have A-, B-, and C-horizons, and many have surficial organic layers (O-horizon). The A-horizon, the surface soil or topsoil, is a

		<u>DESCRIPTION</u>
ORGANIC HORIZONS	O1	ORGANIC MATTER CONSISTING OF VISIBLE VEGETATIVE MATTER.
	O2	ORGANIC MATTER IN A FORM WHERE INDIVIDUAL COMPONENTS ARE UNRECOGNIZABLE TO THE NAKED EYE.
MINERAL HORIZONS	A1	DECOMPOSED ORGANIC MATTER MIXED WITH MINERAL MATTER AND COATING MINERAL PARTICLES, RESULTING IN DARKER COLOR OF THE SOIL MASS. USUALLY THIN IN FOREST SOILS AND THICK IN GRASSLAND SOILS.
	A2	ZONE WHERE CLAY, IRON, OR ALUMINUM IS LOST. GENERALLY LIGHTER IN COLOR AND LOWER IN ORGANIC MATTER CONTENT THAN THE A1 HORIZON.
	A3	THESE HORIZONS ARE TRANSITIONAL BETWEEN THE A AND B HORIZONS. THE A3 HORIZON HAS PROPERTIES MORE LIKE A THAN B. THE B1 HORIZON HAS PROPERTIES MORE LIKE B THAN A.
	B1	
	B2	ZONE WHERE THE SOIL LACKS PROPERTIES OF THE OVERLYING A AND UNDERLYING C HORIZONS. GENERALLY THE ZONE OF MAXIMUM CLAY CONTENT AND SOIL STRUCTURE DEVELOPMENT.
	B3	ZONE OF TRANSITION BETWEEN THE B AND C OR R HORIZONS, BUT WITH PREDOMINANT CHARACTERISTICS OF THE B HORIZON.
	C	A MINERAL LAYER, EXCLUSIVE OF BEDROCK, THAT HAS BEEN RELATIVELY LITTLE AFFECTED BY SOIL-FORMING PROCESSES AND LACKS PROPERTIES OF EITHER THE A OR B HORIZONS, BUT WHICH CONSISTS OF MATERIALS WEATHERED BELOW THE ZONE OF BIOLOGICAL ACTIVITY.
R	CONSOLIDATED BEDROCK, WHICH IS NOT NECESSARILY THE SOURCE OF MINERAL MATTER FROM WHICH THE SOIL FORMED.	

Figure 2. Generalized soil profile

zone in which organic matter is usually being added to the mineral soil. It is also the zone from which both mineral and organic matter are being moved slowly downward. The next major horizon is the B-horizon, often referred to as the subsoil. The B-horizon is the zone of maximum accumulation of materials. It is usually characterized by higher clay content and/or more pronounced soil structure development and lower organic matter than the A-horizon. The next major horizon is usually the C-horizon, which consists of unconsolidated parent material that has not been sufficiently weathered to exhibit characteristics of the B-horizon. Clay content and degree of soil structure development in the C-horizon are usually less than in the B-horizon. The lowest major horizon, the R-horizon, consists of consolidated bedrock. In many situations, this horizon occurs at such depths that it has no significant influence on soil characteristics.

#### Influencing factors

41. Although all soil-forming factors (climate, parent material, relief, organisms, and time) affect the characteristics of a hydric soil, the overriding influence is the hydrologic regime. The unique characteristics of hydric soils result from the influence of periodic or permanent inundation or soil saturation for sufficient duration to effect anaerobic conditions. Prolonged anaerobic soil conditions lead to a reducing environment, thereby lowering the soil redox potential. This results in chemical reduction of some soil components (e.g. iron and manganese oxides), which leads to development of soil colors and other physical characteristics that usually are indicative of hydric soils.

#### Classification

42. Hydric soils occur in several categories of the current soil classification system, which is published in Soil Taxonomy (USDA-SCS 1975). This classification system is based on physical and chemical properties of soils that can be seen, felt, or measured. Lower taxonomic categories of the system (e.g. soil series and soil phases) remain relatively unchanged from earlier classification systems.

43. Hydric soils may be classified into two broad categories: organic and mineral. Organic soils (Histosols) develop under conditions of nearly continuous saturation and/or inundation. All organic soils are hydric soils except Folists, which are freely drained soils occurring on dry slopes where excess litter accumulates over bedrock. Organic hydric soils are commonly



known as peats and mucks. All other hydric soils are mineral soils. Mineral soils have a wide range of textures (sandy to clayey) and colors (red to gray). Mineral hydric soils are those periodically saturated for sufficient duration to produce chemical and physical soil properties associated with a reducing environment. They are usually gray and/or mottled immediately below the surface horizon (see paragraph 44d), or they have thick, dark-colored surface layers overlying gray or mottled subsurface horizons.

Wetland indicators (nonsandy soils)

44. Several indicators are available for determining whether a given soil meets the definition and criteria for hydric soils. Any one of the following indicates that hydric soils are present:\*

- a. Organic soils (Histosols). A soil is an organic soil when: (1) more than 50 percent (by volume) of the upper 32 inches of soil is composed of organic soil material;\*\* or (2) organic soil material of any thickness rests on bedrock. Organic soils (Figure 3) are saturated for long periods and are commonly called peats or mucks.
- b. Histic epipedons. A histic epipedon is an 8- to 16-inch layer at or near the surface of a mineral hydric soil that is saturated with water for 30 consecutive days or more in most years and contains a minimum of 20 percent organic matter when no clay is present or a minimum of 30 percent organic matter when clay content is 60 percent or greater. Soils with histic epipedons are inundated or saturated for sufficient periods to greatly retard aerobic decomposition of the organic surface, and are considered to be hydric soils.
- c. Sulfidic material. When mineral soils emit an odor of rotten eggs, hydrogen sulfide is present. Such odors are only detected in waterlogged soils that are permanently saturated and have sulfidic material within a few centimetres of the soil surface. Sulfides are produced only in a reducing environment.
- d. Aquic or peraquic moisture regime. An aquic moisture regime is a reducing one; i.e., it is virtually free of dissolved oxygen because the soil is saturated by ground water or by water of the capillary fringe (USDA-SCS 1975). Because dissolved oxygen is removed from ground water by respiration of microorganisms, roots, and soil fauna, it is also implicit that the soil temperature is above biologic zero (5° C) at some time while the

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\* Indicators are listed in order of decreasing reliability. Although all are valid indicators, some are stronger indicators than others. When a decision is based on an indicator appearing in the lower portion of the list, re-evaluate the parameter to ensure that the proper decision was reached.

\*\* A detailed definition of organic soil material is available in USDA-SCS (1975).

soil is saturated. Soils with peraquic moisture regimes are characterized by the presence of ground water always at or near the soil surface. Examples include soils of tidal marshes and soils of closed, landlocked depressions that are fed by permanent streams.

- e. Reducing soil conditions. Soils saturated for long or very long duration will usually exhibit reducing conditions. Under such conditions, ions of iron are transformed from a ferric valence state to a ferrous valence state. This condition can often be detected in the field by a ferrous iron test. A simple colorimetric field test kit has been developed for this purpose. When a soil extract changes to a pink color upon addition of  $\alpha$ - $\alpha$ -dipyridil, ferrous iron is present, which indicates a reducing soil environment. *NOTE: This test cannot be used in mineral hydric soils having low iron content, organic soils, and soils that have been desaturated for significant periods of the growing season.*
- f. Soil colors. The colors of various soil components are often the most diagnostic indicator of hydric soils. Colors of these components are strongly influenced by the frequency and duration of soil saturation, which leads to reducing soil conditions. Mineral hydric soils will be either gleyed or will have bright mottles and/or low matrix chroma. These are discussed below:

(1) Gleyed soils (gray colors). Gleyed soils develop when anaerobic soil conditions result in pronounced chemical reduction of iron, manganese, and other elements, thereby producing gray soil colors. Anaerobic conditions that occur in waterlogged soils result in the predominance of reduction processes, and such soils are greatly reduced. Iron is one of the most abundant elements in soils. Under anaerobic conditions, iron is converted from the oxidized (ferric) state to the reduced (ferrous) state, which results in the bluish, greenish, or grayish colors associated with the gleying effect (Figure 4). Gleying immediately below the A-horizon or 10 inches (whichever is shallower) is an indication of a markedly reduced soil, and gleyed soils are hydric soils. Gleyed soil conditions can be determined by using the gley page of the Munsell Color Book (Munsell Color 1975).

(2) Soils with bright mottles and/or low matrix chroma. Mineral hydric soils that are saturated for substantial periods of the growing season (but not long enough to produce gleyed soils) will either have bright mottles and a low matrix chroma or will lack mottles but have a low matrix chroma (see Appendix D, Section 1, for a definition and discussion of "chroma" and other components of soil color). Mottled means "marked with spots of contrasting color." Soils that have brightly colored mottles and a low matrix chroma are indicative of a fluctuating water table. The soil matrix is the portion (usually more than 50 percent) of a given soil layer that has the predominant

color (Figure 5). Mineral hydric soils usually have one of the following color features in the horizon immediately below the A-horizon or 10 inches (whichever is shallower):

- (a) Matrix chroma of 2 or less\* in mottled soils.
- (b) Matrix chroma of 1 or less\* in unmottled soils.

*NOTE: The matrix chroma of some dark (black) mineral hydric soils will not conform to the criteria described in (a) and (b) above; in such soils, gray mottles occurring at 10 inches or less are indicative of hydric conditions.*

*CAUTION: Soils with significant coloration due to the nature of the parent material (e.g. red soils of the Red River Valley) may not exhibit the above characteristics. In such cases, this indicator cannot be used.*

- g. Soil appearing on hydric soils list. Using the criteria for hydric soils (paragraph 37), the NTCHS has developed a list of hydric soils. Listed soils have reducing conditions for a significant portion of the growing season in a major portion of the root zone and are frequently saturated within 12 inches of the soil surface. The NTCHS list of hydric soils is presented in Appendix D, Section 2. *CAUTION: Be sure that the profile description of the mapping unit conforms to that of the sampled soil.*
- h. Iron and manganese concretions. During the oxidation-reduction process, iron and manganese in suspension are sometimes segregated as oxides into concretions or soft masses (Figure 6). These accumulations are usually black or dark brown. Concretions >2 mm in diameter occurring within 7.5 cm of the surface are evidence that the soil is saturated for long periods near the surface.

#### Wetland indicators (sandy soils)

45. Not all indicators listed in paragraph 44 can be applied to sandy soils. In particular, soil color should not be used as an indicator in most sandy soils. However, three additional soil features may be used as indicators of sandy hydric soils, including:

- a. High organic matter content in the surface horizon. Organic matter tends to accumulate above or in the surface horizon of sandy soils that are inundated or saturated to the surface for a significant portion of the growing season. Prolonged inundation or saturation creates anaerobic conditions that greatly reduce oxidation of organic matter.
- b. Streaking of subsurface horizons by organic matter. Organic matter is moved downward through sand as the water table

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\* Colors should be determined in soils that have been moistened; otherwise, state that colors are for dry soils.



Figure 3. Organic soil



Figure 4. Gleyed soil



Figure 5. Soil showing matrix (brown) and mottles (reddish-brown)



Figure 6. Iron and manganese concretions

fluctuates. This often occurs more rapidly and to a greater degree in some vertical sections of a sandy soil containing high content of organic matter than in others. Thus, the sandy soil appears vertically streaked with darker areas. When soil from a darker area is rubbed between the fingers, the organic matter stains the fingers.

- c. Organic pans. As organic matter is moved downward through sandy soils, it tends to accumulate at the point representing the most commonly occurring depth to the water table. This organic matter tends to become slightly cemented with aluminum, forming a thin layer of hardened soil (spodic horizon). These horizons often occur at depths of 12 to 30 inches below the mineral surface. Wet spodic soils usually have thick dark surface horizons that are high in organic matter with dull, gray horizons above the spodic horizon.

*CAUTION: In recently deposited sandy material (e.g. accreting sandbars), it may be impossible to find any of these indicators. In such cases, consider this as a natural atypical situation.*

### Wetland Hydrology

#### Definition

46. The term "wetland hydrology" encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively. Such characteristics are usually present in areas that are inundated or have soils that are saturated to the surface for sufficient duration to develop hydric soils and support vegetation typically adapted for life in periodically anaerobic soil conditions. Hydrology is often the least exact of the parameters, and indicators of wetland hydrology are sometimes difficult to find in the field. However, it is essential to establish that a wetland area is periodically inundated or has saturated soils during the growing season.

#### Influencing factors

47. Numerous factors (e.g., precipitation, stratigraphy, topography, soil permeability, and plant cover) influence the wetness of an area. Regardless, the characteristic common to all wetlands is the presence of an abundant supply of water. The water source may be runoff from direct precipitation,

headwater or backwater flooding, tidal influence, ground water, or some combination of these sources. The frequency and duration of inundation or soil saturation varies from nearly permanently inundated or saturated to irregularly inundated or saturated. Topographic position, stratigraphy, and soil permeability influence both the frequency and duration of inundation and soil saturation. Areas of lower elevation in a floodplain or marsh have more frequent periods of inundation and/or greater duration than most areas at higher elevations. Floodplain configuration may significantly affect duration of inundation. When the floodplain configuration is conducive to rapid runoff, the influence of frequent periods of inundation on vegetation and soils may be reduced. Soil permeability also influences duration of inundation and soil saturation. For example, clayey soils absorb water more slowly than sandy or loamy soils, and therefore have slower permeability and remain saturated much longer. Type and amount of plant cover affect both degree of inundation and duration of saturated soil conditions. Excess water drains more slowly in areas of abundant plant cover, thereby increasing frequency and duration of inundation and/or soil saturation. On the other hand, transpiration rates are higher in areas of abundant plant cover, which may reduce the duration of soil saturation.

#### Classification

48. Although the interactive effects of all hydrologic factors produce a continuum of wetland hydrologic regimes, efforts have been made to classify wetland hydrologic regimes into functional categories. These efforts have focused on the use of frequency, timing, and duration of inundation or soil saturation as a basis for classification. A classification system developed for nontidal areas is presented in Table 5. This classification system was slightly modified from the system developed by the Workshop on Bottomland Hardwood Forest Wetlands of the Southeastern United States (Clark and Benforado 1981). Recent research indicates that duration of inundation and/or soil saturation during the growing season is more influential on the plant community than frequency of inundation/saturation during the growing season (Theriot, in press). Thus, frequency of inundation and soil saturation are not included in Table 5. The WES has developed a computer program that can be used to transform stream gage data to mean sea level elevations representing

Table 5  
Hydrologic Zones\* - Nontidal Areas

Zone	Name	Duration**	Comments
I†	Permanently inundated	100%	Inundation >6.6 ft mean water depth
II	Semipermanently to nearly permanently inundated or saturated	>75% - <100%	Inundation defined as ≤6.6 ft mean water depth
III	Regularly inundated or saturated	>25% - 75%	
IV	Seasonally inundated or saturated	>12.5% - 25%	
V	Irregularly inundated or saturated	≥5% - 12.5%	Many areas having these hydrologic characteristics are not wetlands
VI	Intermittently or never inundated or saturated	<5%	Areas with these hydrologic characteristics are not wetlands

\* Zones adapted from Clark and Benforado (1981).

\*\* Refers to duration of inundation and/or soil saturation during the growing season.

† This defines an aquatic habitat zone.

the upper limit of each hydrologic zone shown in Table 5. This program is available upon request.\*

#### Wetland indicators

49. Indicators of wetland hydrology may include, but are not necessarily limited to: drainage patterns, drift lines, sediment deposition, watermarks, stream gage data and flood predictions, historic records, visual observation of saturated soils, and visual observation of inundation. Any of these indicators may be evidence of wetland hydrologic characteristics. Methods for determining hydrologic indicators can be categorized according to the type of indicator. Recorded data include stream gage data, lake gage data, tidal gage data, flood predictions, and historical records. Use of these data is commonly limited to areas adjacent to streams or other similar

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\* R. F. Theriot, Environmental Laboratory, US Army Engineer Waterways Experiment Station, P.O. Box 631, Vicksburg, Miss. 39180.

areas. Recorded data usually provide both short- and long-term information about frequency and duration of inundation, but contain little or no information about soil saturation, which must be gained from soil surveys or other similar sources. The remaining indicators require field observations. Field indicators are evidence of present or past hydrologic events (e.g. location and height of flooding). Indicators for recorded data and field observations include:\*

- a. Recorded data. Stream gage data, lake gage data, tidal gage data, flood predictions, and historical data may be available from the following sources:
  - (1) CE District Offices. Most CE Districts maintain stream, lake, and tidal gage records for major water bodies in their area. In addition, CE planning and design documents often contain valuable hydrologic information. For example, a General Design Memorandum (GDM) usually describes flooding frequencies and durations for a project area. Furthermore, the extent of flooding within a project area is sometimes indicated in the GDM according to elevation (height) of certain flood frequencies (1-, 2-, 5-, 10-year, etc.).
  - (2) US Geological Survey (USGS). Stream and tidal gage data are available from the USGS offices throughout the Nation, and the latter are also available from the National Oceanic and Atmospheric Administration. CE Districts often have such records.
  - (3) State, county, and local agencies. These agencies often have responsibility for flood control/relief and flood insurance.
  - (4) Soil Conservation Service Small Watershed Projects. Planning documents from this agency are often helpful, and can be obtained from the SCS district office in the county.
  - (5) Planning documents of developers.
- b. Field data. The following field hydrologic indicators can be assessed quickly, and although some of them are not necessarily indicative of hydrologic events that occur only during the growing season, they do provide evidence that inundation and/or soil saturation has occurred:
  - (1) Visual observation of inundation. The most obvious and revealing hydrologic indicator may be simply observing the areal extent of inundation. However, because seasonal

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\* Indicators are listed in order of decreasing reliability. Although all are valid indicators, some are stronger indicators than others. When a decision is based on an indicator appearing in the lower portion of the list, re-evaluate the parameter to ensure that the proper decision was reached.



conditions and recent weather conditions can contribute to surface water being present on a nonwetland site, both should be considered when applying this indicator.

- (2) Visual observation of soil saturation. Examination of this indicator requires digging a soil pit (Appendix D, Section 1) to a depth of 16 inches and observing the level at which water stands in the hole after sufficient time has been allowed for water to drain into the hole. The required time will vary depending on soil texture. In some cases, the upper level at which water is flowing into the pit can be observed by examining the wall of the hole. This level represents the depth to the water table. The depth to saturated soils will always be nearer the surface due to the capillary fringe. For soil saturation to impact vegetation, it must occur within a major portion of the root zone (usually within 12 inches of the surface) of the prevalent vegetation. The major portion of the root zone is that portion of the soil profile in which more than one half of the plant roots occur. *CAUTION: In some heavy clay soils, water may not rapidly accumulate in the hole even when the soil is saturated. If water is observed at the bottom of the hole but has not filled to the 12-inch depth, examine the sides of the hole and determine the shallowest depth at which water is entering the hole. When applying this indicator, both the season of the year and preceding weather conditions must be considered.*
- (3) Watermarks. Watermarks are most common on woody vegetation. They occur as stains on bark (Figure 7) or other fixed objects (e.g. bridge pillars, buildings, fences, etc.). When several watermarks are present, the highest reflects the maximum extent of recent inundation.
- (4) Drift lines. This indicator is most likely to be found adjacent to streams or other sources of water flow in wetlands, but also often occurs in tidal marshes. Evidence consists of deposition of debris in a line on the surface (Figure 8) or debris entangled in aboveground vegetation or other fixed objects. Debris usually consists of remnants of vegetation (branches, stems, and leaves), sediment, litter, and other waterborne materials deposited parallel to the direction of water flow. Drift lines provide an indication of the minimum portion of the area inundated during a flooding event; the maximum level of inundation is generally at a higher elevation than that indicated by a drift line.
- (5) Sediment deposits. Plants and other vertical objects often have thin layers, coatings, or depositions of mineral or organic matter on them after inundation (Figure 9). This evidence may remain for a considerable period before it is removed by precipitation or subsequent inundation. Sediment deposition on vegetation and other



Figure 7. Watermark on trees



Figure 8. Absence of leaf litter and drift line (extreme left)



Figure 9. Sediment deposit on plants



Figure 10. Encrusted detritus



Figure 11. Drainage pattern



Figure 12. Debris deposited  
in stream channel

objects provides an indication of the minimum inundation level. When sediments are primarily organic (e.g. fine organic material, algae), the detritus may become encrusted on or slightly above the soil surface after dewatering occurs (Figure 10).

- (6) Drainage patterns within wetlands. This indicator, which occurs primarily in wetlands adjacent to streams, consists of surface evidence of drainage flow into or through an area (Figure 11). In some wetlands, this evidence may exist as a drainage pattern eroded into the soil, vegetative matter (debris) piled against thick vegetation or woody stems oriented perpendicular to the direction of water flow, or the absence of leaf litter (Figure 8). Scouring is often evident around roots of persistent vegetation. Debris may be deposited in or along the drainage pattern (Figure 12). *CAUTION: Drainage patterns also occur in upland areas after periods of considerable precipitation; therefore, topographic position must also be considered when applying this indicator.*

## PART IV: METHODS

### Section A. Introduction

50. PART IV contains sections on preliminary data gathering, method selection, routine determination procedures, comprehensive determination procedures, methods for determinations in atypical situations, and guidance for wetland determinations in natural situations where the three-parameter approach may not always apply.

51. Significant flexibility has been incorporated into PART IV. The user is presented in Section B with various potential sources of information that may be helpful in making a determination, but not all identified sources of information may be applicable to a given situation. *Note: The user is not required to obtain information from all identified sources.* Flexibility is also provided in method selection (Section C). Three levels of routine determinations are available, depending on the complexity of the required determination and the quantity and quality of existing information. Application of methods presented in both Section D (routine determinations) and Section E (comprehensive determinations) may be tailored to meet site-specific requirements, especially with respect to sampling design.

52. Methods presented in Sections D and E vary with respect to the required level of technical knowledge and experience of the user. Application of the qualitative methods presented in Section D (routine determinations) requires considerably less technical knowledge and experience than does application of the quantitative methods presented in Section E (comprehensive determinations). The user must at least be able to identify the dominant plant species in the project area when making a routine determination (Section D), and should have some basic knowledge of hydric soils when employing routine methods that require soils examination. Comprehensive determinations require a basic understanding of sampling principles and the ability to identify all commonly occurring plant species in a project area, as well as a good understanding of indicators of hydric soils and wetland hydrology. The comprehensive method should only be employed by experienced field inspectors.

## Section B. Preliminary Data Gathering and Synthesis

53. This section discusses potential sources of information that may be helpful in making a wetland determination. When the routine approach is used, it may often be possible to make a wetland determination based on available vegetation, soils, and hydrology data for the area. However, this section deals only with identifying potential information sources, extracting pertinent data, and synthesizing the data for use in making a determination. Based on the quantity and quality of available information and the approach selected for use (Section C), the user is referred to either Section D or Section E for the actual determination. Completion of Section B is not required, but is recommended because the available information may reduce or eliminate the need for field effort and decrease the time and cost of making a determination. However, there are instances in small project areas in which the time required to obtain the information may be prohibitive. In such cases PROCEED to paragraph 55, complete STEPS 1 through 3, and PROCEED to Section D or E.

### Data sources

54. Obtain the following information, when available and applicable:

- a. USGS quadrangle maps. USGS quadrangle maps are available at different scales. When possible, obtain maps at a scale of 1:24,000; otherwise, use maps at a scale of 1:62,500. Such maps are available from USGS in Reston, Va., and Menlo Park, Calif., but they may already be available in the CE District Office. These maps provide several types of information:
  - (1) Assistance in locating field sites. Towns, minor roads, bridges, streams, and other landmark features (e.g. buildings, cemeteries, water bodies, etc.) not commonly found on road maps are shown on these maps.
  - (2) Topographic details, including contour lines (usually at 5- or 10-ft contour intervals).
  - (3) General delineation of wet areas (swamps and marshes).  
*Note: The actual wet area may be greater than that shown on the map because USGS generally maps these areas based on the driest season of the year.*
  - (4) Latitude, longitude, townships, ranges, and sections. These provide legal descriptions of the area.
  - (5) Directions, including both true and magnetic north.
  - (6) Drainage patterns.

- (7) General land uses, such as cleared (agriculture or pasture), forested, or urban.

*CAUTION: Obtain the most recent USGS maps. Older maps may show features that no longer exist and will not show new features that have developed since the map was constructed. Also, USGS is currently changing the mapping scale from 1:24,000 to 1:25,000.*

b. National Wetlands Inventory products.

- (1) Wetland maps. The standard NWI maps are at a scale of 1:24,000 or, where USGS base maps at this scale are not available, they are at 1:62,500 (1:63,350 in Alaska). Smaller scale maps ranging from 1:100,000 to 1:500,000 are also available for certain areas. Wetlands on NWI maps are classified in accordance with Cowardin et al. (1979). *CAUTION: Since not all delineated areas on NWI maps are wetlands under Department of Army jurisdiction, NWI maps should not be used as the sole basis for determining whether wetland vegetation is present.* NWI "User Notes" are available that correlate the classification system with local wetland community types. An important feature of this classification system is the water regime modifier, which describes the flooding or soil saturation characteristics. Wetlands classified as having a temporarily flooded or intermittently flooded water regime should be viewed with particular caution since this designation is indicative of plant communities that are transitional between wetland and nonwetland. These are among the most difficult plant communities to map accurately from aerial photography. For wetlands "wetter" than temporarily flooded and intermittently flooded, the probability of a designated map unit on recent NWI maps being a wetland (according to Cowardin et al. 1979) at the time of the photography is in excess of 90 percent. *CAUTION: Due to the scale of aerial photography used and other factors, all NWI map boundaries are approximate.* The optimum use of NWI maps is to plan field review (i.e. how wet, big, or diverse is the area?) and to assist during field review, particularly by showing the approximate areal extent of the wetland and its association with other communities. NWI maps are available either as a composite with, or an overlay for, USGS base maps and may be obtained from the NWI Central Office in St. Petersburg, Fla., the Wetland Coordinator at each FWS regional office, or the USGS.
- (2) Plant database. This database of approximately 5,200 plant species that occur in wetlands provides information (e.g., ranges, habitat, etc.) about each plant species from the technical literature. The database served as a focal point for development of a national list of plants that occur in wetlands (Appendix C, Section 1).

- c. Soil surveys. Soil surveys are prepared by the SCS for political units (county, parish, etc.) in a state. Soil surveys contain several types of information:
- (1) General information (e.g. climate, settlement, natural resources, farming, geology, general vegetation types).
  - (2) Soil maps for general and detailed planning purposes. These maps are usually generated from fairly recent aerial photography. *CAUTION: The smallest mapping unit is 3 acres, and a given soil series as mapped may contain small inclusions of other series.*
  - (3) Uses and management of soils. Any wetness characteristics of soils will be mentioned here.
  - (4) Soil properties. Soil and water features are provided that may be very helpful for wetland investigations. Frequency, duration, and timing of inundation (when present) are described for each soil type. Water table characteristics that provide valuable information about soil saturation are also described. Soil permeability coefficients may also be available.
  - (5) Soil classification. Soil series and phases are usually provided. Published soil surveys will not always be available for the area. If not, contact the county SCS office and determine whether the soils have been mapped.
- d. Stream and tidal gage data. These documents provide records of tidal and stream flow events. They are available from either the USGS or CE District office.
- e. Environmental impact assessments (EIAs), environmental impact statements (EISs), general design memoranda (GDM), and other similar publications. These documents may be available from Federal agencies for an area that includes the project area. They may contain some indication of the location and characteristics of wetlands consistent with the required criteria (vegetation, soils, and hydrology), and often contain flood frequency and duration data.
- f. Documents and maps from State, county, or local governments. Regional maps that characterize certain areas (e.g., potholes, coastal areas, or basins) may be helpful because they indicate the type and character of wetlands.
- g. Remote sensing. Remote sensing is one of the most useful information sources available for wetland identification and delineation. Recent aerial photography, particularly color infrared, provides a detailed view of an area; thus, recent land use and other features (e.g. general type and areal extent of plant communities and degree of inundation of the area when the photography was taken) can be determined. The multiagency cooperative National High Altitude Aerial Photography Program (HAP) has 1:59,000-scale color infrared photography for approximately 85 percent (December 1985) of the coterminous United States from 1980 to 1985. This photography has excellent



resolution and can be ordered enlarged to 1:24,000 scale from USGS. Satellite images provide similar information as aerial photography, although the much smaller scale makes observation of detail more difficult without sophisticated equipment and extensive training. Satellite images provide more recent coverage than aerial photography (usually at 18-day intervals). Individual satellite images are more expensive than aerial photography, but are not as expensive as having an area flown and photographed at low altitudes. However, better resolution imagery is now available with remote sensing equipment mounted on fixed-wing aircraft.

- h. Local individuals and experts. Individuals having personal knowledge of an area may sometimes provide a reliable and readily available source of information about the area, particularly information on the wetness of the area.
- i. USGS land use and land cover maps. Maps created by USGS using remotely sensed data and a geographical information system provide a systematic and comprehensive collection and analysis of land use and land cover on a national basis. Maps at a scale of 1:250,000 are available as overlays that show land use and land cover according to nine basic levels. One level is wetlands (as determined by the FWS), which is further subdivided into forested and nonforested areas. Five other sets of maps show political units, hydrologic units, census subdivisions of counties, Federal land ownership, and State land ownership. These maps can be obtained from any USGS mapping center.
- j. Applicant's survey plans and engineering designs. In many cases, the permit applicant will already have had the area surveyed (often at 1-ft contours or less) and will also have engineering designs for the proposed activity.

#### Data synthesis

55. When employing Section B procedures, use the above sources of information to complete the following steps:

- STEP 1 - Identify the Project Area on a Map. Obtain a USGS quadrangle map (1:24,000) or other appropriate map, and locate the area identified in the permit application. PROCEED TO STEP 2.
- STEP 2 - Prepare a Base Map. Mark the project area boundaries on the map. Either use the selected map as the base map or trace the area on a mylar overlay, including prominent landscape features (e.g., roads, buildings, drainage patterns, etc.). If possible, obtain diazo copies of the resulting base map. PROCEED TO STEP 3.
- STEP 3 - Determine Size of the Project Area. Measure the area boundaries and calculate the size of the area. PROCEED TO STEP 4 OR TO SECTION D OR E IF SECTION B IS NOT USED.

● STEP 4 - Summarize Available Information on Vegetation. Examine available sources that contain information about the area vegetation. Consider the following:

- a. USGS quadrangle maps. Is the area shown as a marsh or swamp? *CAUTION: Do not use this as the sole basis for determining that hydrophytic vegetation is present.*
- b. NWI overlays or maps. Do the overlays or maps indicate that hydrophytic vegetation occurs in the area? If so, identify the vegetation type(s).
- c. EIAs, EISs, or GDMs that include the project area. Extract any vegetation data that pertain to the area.
- d. Federal, State, or local government documents that contain information about the area vegetation. Extract appropriate data.
- e. Recent (within last 5 years) aerial photography of the area. Can the area plant community type(s) be determined from the photography? Extract appropriate data.
- f. Individuals or experts having knowledge of the area vegetation. Contact them and obtain any appropriate information. *CAUTION: Ensure that the individual providing the information has firsthand knowledge of the area.*
- g. Any published scientific studies of the area plant communities. Extract any appropriate data.
- h. Previous wetland determinations made for the area. Extract any pertinent vegetation data.

When the above have been considered, PROCEED TO STEP 5.

● STEP 5 - Determine Whether the Vegetation in the Project Area Is Adequately Characterized. Examine the summarized data (STEP 4) and determine whether the area plant communities are adequately characterized. For routine determinations, the plant community type(s) and the dominant species in each vegetation layer of each community type must be known. Dominant species are those that have the largest relative basal area (overstory),\* height (woody understory), number of stems (woody vines), or greatest areal cover (herbaceous understory). For comprehensive determinations, each plant community type present in the

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\* This term is used because species having the largest individuals may not be dominant when only a few are present. To use relative basal area, consider both the size and number of individuals of a species and subjectively compare with other species present.

project area area must have been quantitatively described within the past 5 years using accepted sampling and analytical procedures, and boundaries between community types must be known. Record information on DATA FORM 1.\* In either case, PROCEED TO Section F if there is evidence of recent significant vegetation alteration due to human activities or natural events. Otherwise, PROCEED TO STEP 6.

● STEP 6 - Summarize Available Information on Area Soils. Examine available information and describe the area soils. Consider the following:

- a. County soil surveys. Determine the soil series present and extract characteristics for each. *CAUTION: Soil mapping units sometimes include more than one soil series.*
- b. Unpublished county soil maps. Contact the local SCS office and determine whether soil maps are available for the area. Determine the soil series of the area, and obtain any available information about possible hydric soil indicators (paragraph 44 or 45) for each soil series.
- c. Published EIAs, EISs, or GDMs that include soils information. Extract any pertinent information.
- d. Federal, State, and/or local government documents that contain descriptions of the area soils. Summarize these data.
- e. Published scientific studies that include area soils data. Summarize these data.
- f. Previous wetland determinations for the area. Extract any pertinent soils data.

When the above have been considered, PROCEED TO STEP 7.

● STEP 7 - Determine Whether Soils of the Project Area Have Been Adequately Characterized. Examine the summarized soils data and determine whether the soils have been adequately characterized. For routine determinations, the soil series must be known. For comprehensive determinations, both the soil series and the boundary of each soil series must be known. Record information on DATA FORM 1. In either case, if there is evidence of recent significant soils alteration due to human activities or natural events, PROCEED TO Section F. Otherwise, PROCEED TO STEP 8.

● STEP 8 - Summarize Available Hydrology Data. Examine available information and describe the area hydrology. Consider the following:

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\* A separate DATA FORM 1 must be used for each plant community type.

- a. USGS quadrangle maps. Is there a significant, well-defined drainage through the area? Is the area within a major floodplain or tidal area? What range of elevations occur in the area, especially in relation to the elevation of the nearest perennial watercourse?
- b. NWI overlays or maps. Is the area shown as a wetland or deepwater aquatic habitat? What is the water regime modifier?
- c. EIAs, EISs, or GDMs that describe the project area. Extract any pertinent hydrologic data.
- d. Floodplain management maps. These maps may be used to extrapolate elevations that can be expected to be inundated on a 1-, 2-, 3-year, etc., basis. Compare the elevations of these features with the elevation range of the project area to determine the frequency of inundation.
- e. Federal, State, and local government documents (e.g. CE floodplain management maps and profiles) that contain hydrologic data. Summarize these data.
- f. Recent (within past 5 years) aerial photography that shows the area to be inundated. Record the date of the photographic mission.
- g. Newspaper accounts of flooding events that indicate periodic inundation of the area.
- h. SCS County Soil Surveys that indicate the frequency and duration of inundation and soil saturation for area soils. *CAUTION: Data provided only represent average conditions for a particular soil series in its natural undrained state, and cannot be used as a positive hydrologic indicator in areas that have significantly altered hydrology.*
- i. Tidal or stream gage data for a nearby water body that apparently influences the area. Obtain the gage data and complete (1) below if the routine approach is used, or (2) below if the comprehensive approach is used (OMIT IF GAGING STATION DATA ARE UNAVAILABLE):
  - (1) Routine approach. Determine the highest water level elevation reached during the growing season for each of the most recent 10 years of gage data. Rank these elevations in descending order and select the fifth highest elevation. Combine this elevation with the mean sea level elevation of the gaging station to produce a mean sea level elevation for the highest water level reached every other year. *NOTE: Stream gage data are often presented as flow rates in cubic feet per second. In these cases, ask the CE District's Hydrology Branch to convert flow rates to corresponding mean sea level elevations and adjust gage data to the site.* Compare the resulting elevations reached biennially with the project area elevations. If the water level elevation exceeds the area

elevation, the area is inundated during the growing season on average at least biennially.

(2) Comprehensive approach. Complete the following:

(a) Decide whether hydrologic data reflect the apparent hydrology. Data available from the gaging station may or may not accurately reflect the area hydrology. Answer the following questions:

- Does the water level of the area appear to fluctuate in a manner that differs from that of the water body on which the gaging station is located? (In ponded situations, the water level of the area is usually higher than the water level at the gaging station.)
- Are less than 10 years of daily readings available for the gaging station?
- Do other water sources that would not be reflected by readings at the gaging station appear to significantly affect the area? For example, do major tributaries enter the stream or tidal area between the area and gaging station?

If the answer to any of the above questions is YES, the area hydrology cannot be determined from the gaging station data. If the answer to all of the above questions is NO, PROCEED TO (b).

(b) Analyze hydrologic data. Subject the hydrologic data to appropriate analytical procedures. Either use duration curves or a computer program developed by WES (available from the Environmental Laboratory upon request) for determining the mean sea level elevation representing the upper limits of wetland hydrology. In the latter case, when the site elevation is lower than the mean sea level elevation representing a 5-percent duration of inundation and saturation during the growing season, the area has a hydrologic regime that may occur in wetlands. *NOTE: Duration curves do not reflect the period of soil saturation following dewatering.*

When all of the above have been considered, PROCEED TO STEP 9.

● STEP 9 - Determine Whether Hydrology Is Adequately Characterized.

Examine the summarized data and determine whether the hydrology of the project area is adequately characterized. For routine determinations, there must be documented evidence of frequent inundation or soil saturation during the growing season. For comprehensive determinations, there must be documented quantitative evidence of frequent inundation or soil saturation during the growing season, based on at least

10 years of stream or tidal gage data. Record information on DATA FORM 1. In either case, if there is evidence of recent significant hydrologic alteration due to human activities or natural events, PROCEED TO Section F. Otherwise, PROCEED TO Section C.

### Section C. Selection of Method

56. All wetland delineation methods described in this manual can be grouped into two general types: routine and comprehensive. Routine determinations (Section D) involve simple, rapidly applied methods that result in sufficient qualitative data for making a determination. Comprehensive methods (Section E) usually require significant time and effort to obtain the needed quantitative data. The primary factor influencing method selection will usually be the complexity of the required determination. However, comprehensive methods may sometimes be selected for use in relatively simple determinations when rigorous documentation is required.

57. Three levels of routine wetland determinations are described below. Complexity of the project area and the quality and quantity of available information will influence the level selected for use.

- a. Level 1 - Onsite Inspection Unnecessary. This level may be employed when the information already obtained (Section B) is sufficient for making a determination for the entire project area (see Section D, Subsection 1).
- b. Level 2 - Onsite Inspection Necessary. This level must be employed when there is insufficient information already available to characterize the vegetation, soils, and hydrology of the entire project area (see Section D, Subsection 2).
- c. Level 3 - Combination of Levels 1 and 2. This level should be used when there is sufficient information already available to characterize the vegetation, soils, and hydrology of a portion, but not all, of the project area. Methods described for Level 1 may be applied to portions of the area for which adequate information already exists, and onsite methods (Level 2) must be applied to the remainder of the area (see Section D, Subsection 3).

58. After considering all available information, select a tentative method (see above) for use, and PROCEED TO EITHER Section D or E, as appropriate. *NOTE: Sometimes it may be necessary to change to another method described in the manual, depending on the quality of available information and/or recent changes in the project area.*

## Section D. Routine Determinations

59. This section describes general procedures for making routine wetland determinations. It is assumed that the user has already completed all applicable steps in Section B,\* and a routine method has been tentatively selected for use (Section C). Subsections 1-3 describe steps to be followed when making a routine determination using one of the three levels described in Section C. Each subsection contains a flowchart that defines the relationship of steps to be used for that level of routine determinations. *NOTE: The selected method must be considered tentative because the user may be required to change methods during the determination.*

### Subsection 1 - Onsite Inspection Unnecessary

60. This subsection describes procedures for making wetland determinations when sufficient information is already available (Section B) on which to base the determination. A flowchart of required steps to be completed is presented in Figure 13, and each step is described below.

#### Equipment and materials

61. No special equipment is needed for applying this method. The following materials will be needed:

- a. Map of project area (Section B, STEP 2).
- b. Copies of DATA FORM 1 (Appendix B).
- c. Appendices C and D to this manual.

#### Procedure

62. Complete the following steps, as necessary:

- STEP 1 - Determine Whether Available Data Are Sufficient for Entire Project Area. Examine the summarized data (Section B, STEPS 5, 7, and 9) and determine whether the vegetation, soils, and hydrology of the entire project area are adequately characterized. If so, PROCEED TO STEP 2. If all three parameters are adequately characterized for a portion, but not all, of the project area, PROCEED TO Subsection 3. If

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\* If it has been determined that it is more expedient to conduct an onsite inspection than to search for available information, complete STEPS 1 through 3 of Section B, and PROCEED TO Subsection 2.



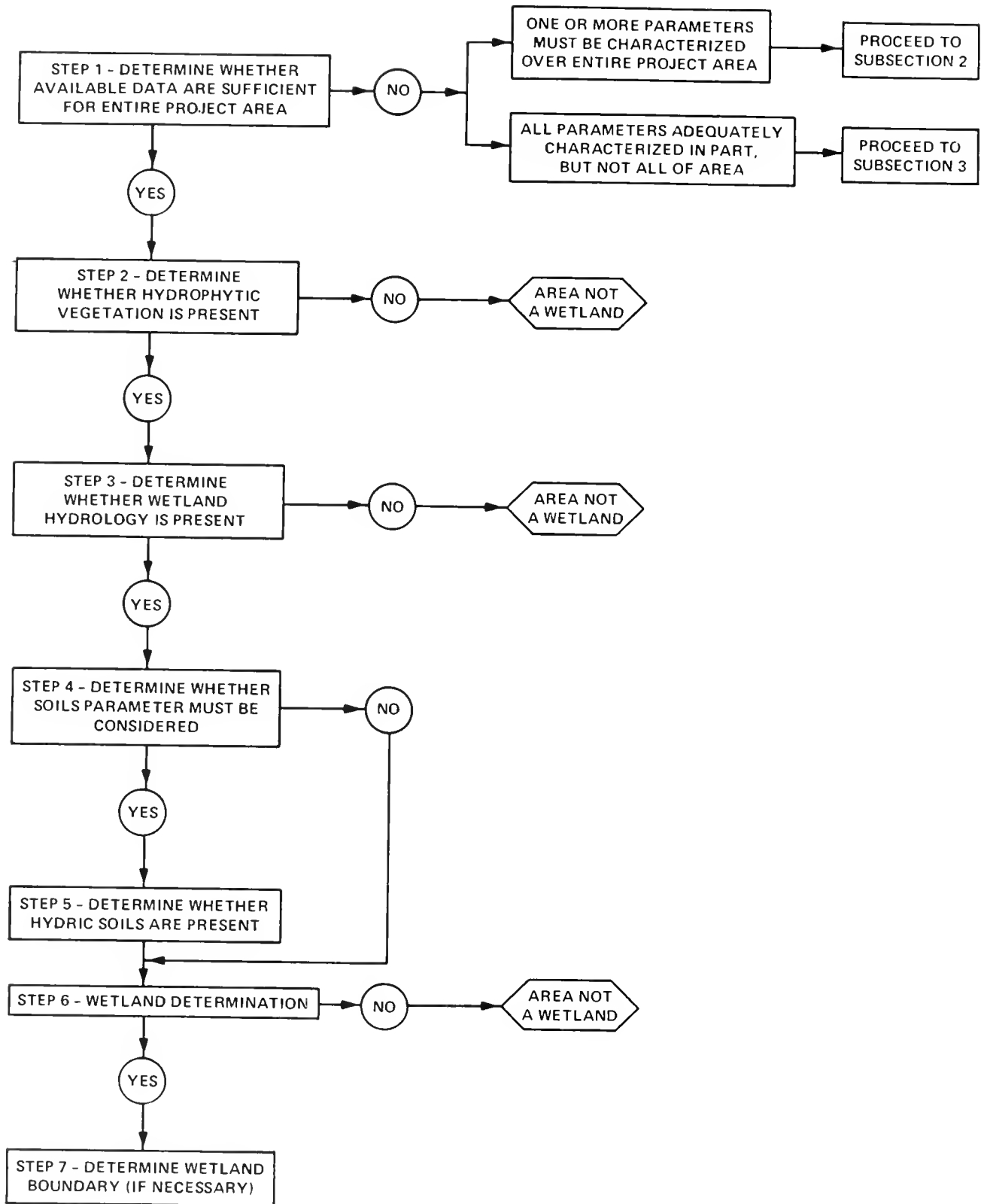


Figure 13. Flowchart of steps involved in making a wetland determination when an onsite inspection is unnecessary

the vegetation, soils, and hydrology are not adequately characterized for any portion of the area, PROCEED TO Subsection 2.

● STEP 2 - Determine Whether Hydrophytic Vegetation Is Present.

Examine the vegetation data and list on DATA FORM 1 the dominant plant species found in each vegetation layer of each community type. *NOTE:*

*A separate DATA FORM 1 will be required for each community type.*

Record the indicator status for each dominant species (Appendix C, Section 1 or 2). When more than 50 percent of the dominant species in a plant community have an indicator status of OBL, FACW, and/or FAC,\* hydrophytic vegetation is present. If one or more plant communities comprise of hydrophytic vegetation, PROCEED TO STEP 3. If none of the plant communities comprise hydrophytic vegetation, none of the area is a wetland. Complete the vegetation section for each DATA FORM 1.

● STEP 3 - Determine Whether Wetland Hydrology Is Present. When one of the following conditions applies (STEP 2), it is only necessary to confirm that there has been no recent hydrologic alteration of the area:

- a. The entire project area is occupied by a plant community or communities in which all dominant species are OBL (Appendix C, Section 1 or 2).
- b. The project area contains two or more plant communities, all of which are dominated by OBL and/or FACW species, and the wetland-nonwetland boundary is abrupt\*\* (e.g. a *Spartina alterniflora* marsh bordered by a road embankment).

If either a or b applies, look for recorded evidence of recently constructed dikes, levees, impoundments, and drainage systems, or recent avalanches, mudslides, beaver dams, etc., that have significantly altered the area hydrology. If any significant hydrologic alteration is found, determine whether the area is still periodically inundated or

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\* For the FAC-neutral option, see paragraph 35a.

\*\* There must be documented evidence of periodic inundation or saturated soils when the project area:

- a. Has plant communities dominated by one or more FAC species;
- b. Has vegetation dominated by FACW species but no adjacent community dominated by OBL species;
- c. Has a gradual, nondistinct boundary between wetlands and nonwetlands; and/or
- d. Is known to have or is suspected of having significantly altered hydrology.

has saturated soils for sufficient duration to support the documented vegetation (a or b above). When a or b applies and there is no evidence of recent hydrologic alteration, or when a or b do not apply and there is documented evidence that the area is periodically inundated or has saturated soils, wetland hydrology is present. Otherwise, wetland hydrology does not occur on the area. Complete the hydrology section of DATA FORM 1 and PROCEED TO STEP 4.

● STEP 4 - Determine Whether the Soils Parameter Must Be Considered.

When either a or b of STEP 3 applies and there is either no evidence of recent hydrologic alteration of the project area or if wetland hydrology presently occurs on the area, hydric soils can be assumed to be present. If so, PROCEED TO STEP 6. Otherwise PROCEED TO STEP 5.

● STEP 5 - Determine Whether Hydric Soils Are Present. Examine the

soils data (Section B, STEP 7) and record the soil series or soil phase on DATA FORM 1 for each community type. Determine whether the soil is listed as a hydric soil (Appendix D, Section 2). If all community types have hydric soils, the entire project area has hydric soils.

*(CAUTION: If the soil series description makes reference to inclusions of other soil types, data must be field verified).* Any portion of the area that lacks hydric soils is a nonwetland. Complete the soils section of each DATA FORM 1 and PROCEED TO STEP 6.

● STEP 6 - Wetland Determination. Examine the DATA FORM 1 for each community type. Any portion of the project area is a wetland that has:

- a. Hydrophytic vegetation that conforms to one of the conditions identified in STEP 3a or 3b and has either no evidence of altered hydrology or confirmed wetland hydrology.
- b. Hydrophytic vegetation that does not conform to STEP 3a or 3b, has hydric soils, and has confirmed wetland hydrology.

If STEP 6a or 6b applies to the entire project area, the entire area is a wetland. Complete a DATA FORM 1 for all plant community types. Portions of the area not qualifying as a wetland based on an office determination might or might not be wetlands. If the data used for the determination are considered to be highly reliable, portions of the area not qualifying as wetlands may properly be considered nonwetlands. PROCEED TO STEP 7. If the available data are incomplete or questionable, an onsite inspection (Subsection 2) will be required.

- STEP 7 - Determine Wetland Boundary. Mark on the base map all community types determined to be wetlands with a W and those determined to be nonwetlands with an N. Combine all wetland community types into a single mapping unit. The boundary of these community types is the interface between wetlands and nonwetlands.

#### Subsection 2 - Onsite Inspection Necessary

63. This subsection describes procedures for routine determinations in which the available information (Section B) is insufficient for one or more parameters. If only one or two parameters must be characterized, apply the appropriate steps and return to Subsection 1 and complete the determination. A flowchart of steps required for using this method is presented in Figure 14, and each step is described below.

#### Equipment and materials

64. The following equipment and materials will be needed:
- a. Base map (Section B, STEP 2).
  - b. Copies of DATA FORM 1 (one for each community type and additional copies for boundary determinations).
  - c. Appendices C and D.
  - d. Compass.
  - e. Soil auger or spade (soils only).
  - f. Tape (300 ft).
  - g. Munsell Color Charts (Munsell Color 1975) (soils only).

#### Procedure

65. Complete the following steps, as necessary:
- STEP 1 - Locate the Project Area. Determine the spatial boundaries of the project area using information from a USGS quadrangle map or other appropriate map, aerial photography, and/or the project survey plan (when available). PROCEED TO STEP 2.
  - STEP 2 - Determine Whether an Atypical Situation Exists. Examine the area and determine whether there is evidence of sufficient natural or human-induced alteration to significantly alter the area vegetation, soils, and/or hydrology. *NOTE: Include possible offsite modifications that may affect the area hydrology.* If not, PROCEED TO STEP 3.

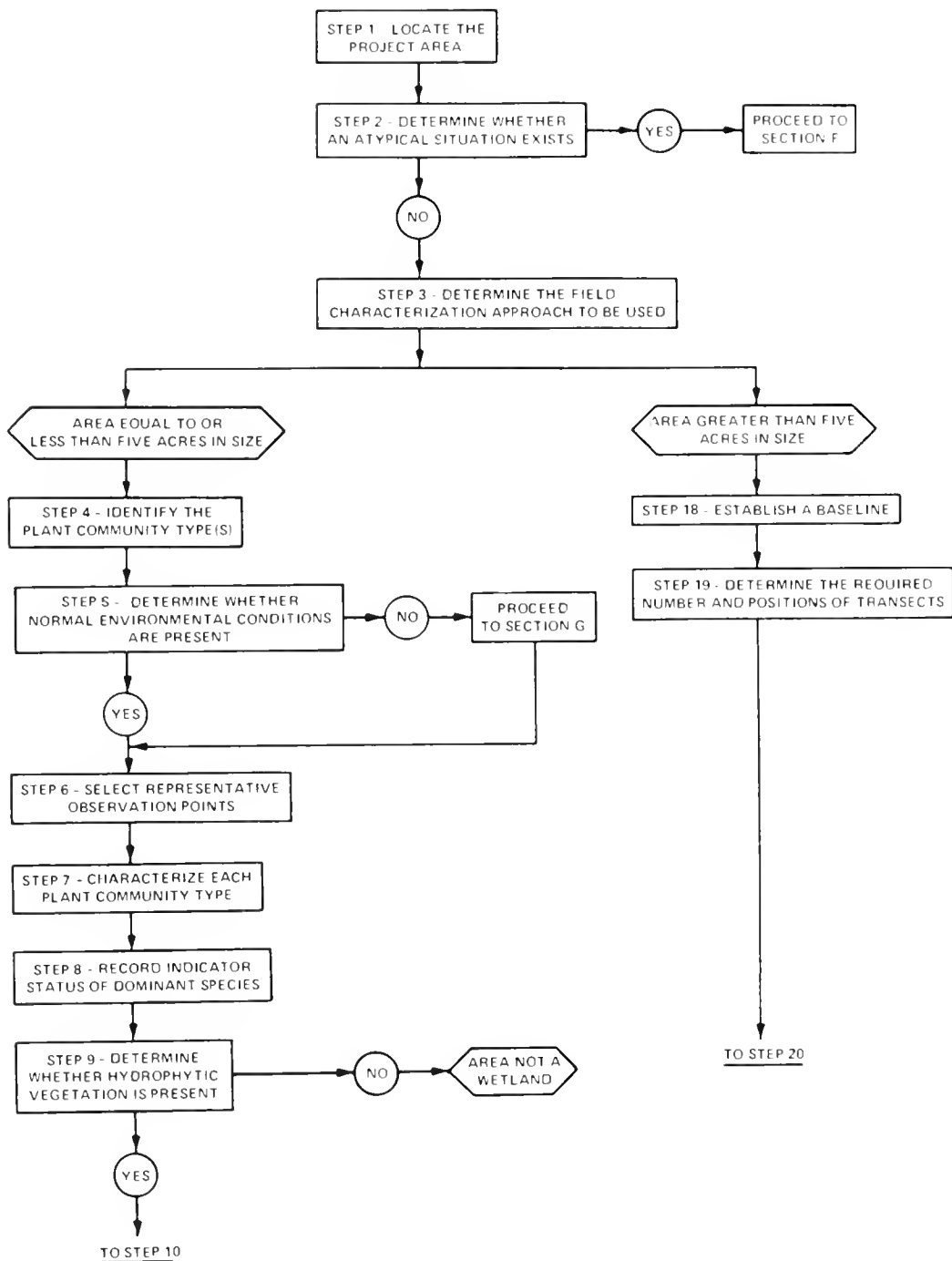


Figure 14. Flowchart of steps involved in making a routine wetland determination when an onsite visit is necessary (Continued)

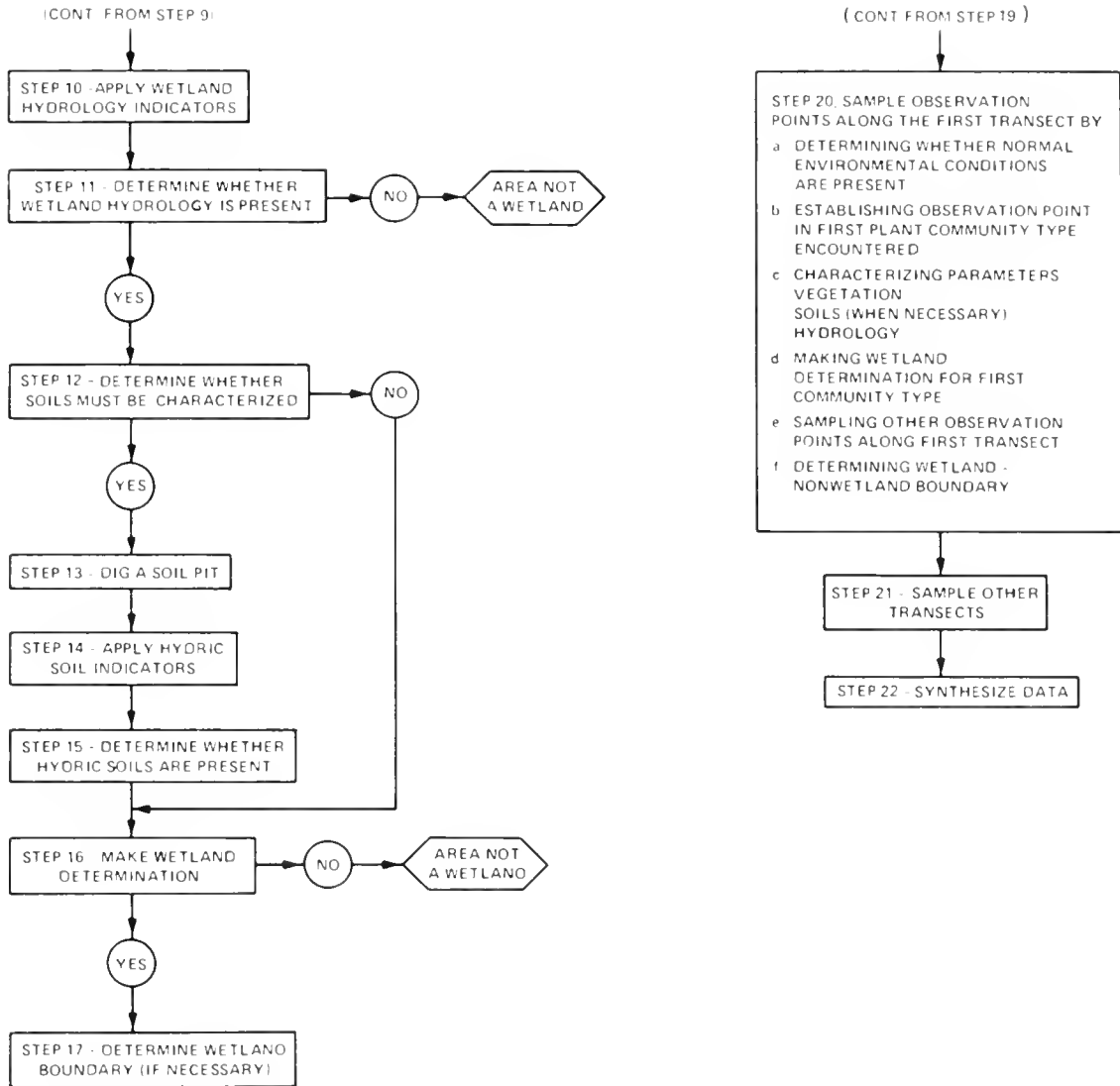


Figure 14. (Concluded)

If one or more parameters have been significantly altered by an activity that would normally require a permit, PROCEED TO Section F and determine whether there is sufficient evidence that hydrophytic vegetation, hydric soils, and/or wetland hydrology were present prior to this alteration. Then, return to this subsection and characterize parameters not significantly influenced by human activities. PROCEED TO STEP 3.

● STEP 3 - Determine the Field Characterization Approach to be Used.

Considering the size and complexity of the area, determine the field characterization approach to be used. When the area is equal to or less than 5 acres in size (Section B, STEP 3) and the area is thought to be relatively homogeneous with respect to vegetation, soils, and/or hydrologic regime, PROCEED TO STEP 4. When the area is greater than 5 acres in size (Section B, STEP 3) or appears to be highly diverse with respect to vegetation, PROCEED TO STEP 18.

Areas Equal to or Less Than 5 Acres in Size

● STEP 4 - Identify the Plant Community Type(s). Traverse the area and determine the number and locations of plant community types. Sketch the location of each on the base map (Section B, STEP 2), and give each community type a name. PROCEED TO STEP 5.

● STEP 5 - Determine Whether Normal Environmental Conditions Are Present. Determine whether normal environmental conditions are present by considering the following:

- a. Is the area presently lacking hydrophytic vegetation or hydrologic indicators due to annual or seasonal fluctuations in precipitation or ground-water levels?
- b. Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature?

If the answer to either of these questions is thought to be YES, PROCEED TO Section G. If the answer to both questions is NO, PROCEED TO STEP 6.

● STEP 6 - Select Representative Observation Points. Select a representative observation point in each community type. A representative observation point is one in which the apparent characteristics (determine visually) best represent characteristics of the entire community.

Mark on the base map the approximate location of the observation point.  
PROCEED TO STEP 7.

- STEP 7 - Characterize Each Plant Community Type. Visually determine the dominant plant species in each vegetation layer of each community type and record them on DATA FORM 1 (use a separate DATA FORM 1 for each community type). Dominant species are those having the greatest relative basal area (woody overstory),\* greatest height (woody under-story), greatest percentage of areal cover (herbaceous understory), and/or greatest number of stems (woody vines). PROCEED TO STEP 8.
- STEP 8 - Record Indicator Status of Dominant Species. Record on DATA FORM 1 the indicator status (Appendix C, Section 1 or 2) of each dominant species in each community type. PROCEED TO STEP 9.
- STEP 9 - Determine Whether Hydrophytic Vegetation Is Present. Examine each DATA FORM 1. When more than 50 percent of the dominant species in a community type have an indicator status (STEP 8) of OBL, FACW, and/or FAC,\*\* hydrophytic vegetation is present. Complete the vegetation section of each DATA FORM 1. Portions of the area failing this test are not wetlands. PROCEED TO STEP 10.
- STEP 10 - Apply Wetland Hydrologic Indicators. Examine the portion of the area occupied by each plant community type for positive indicators of wetland hydrology (PART III, paragraph 49). Record findings on the appropriate DATA FORM 1. PROCEED TO STEP 11.
- STEP 11 - Determine Whether Wetland Hydrology Is Present. Examine the hydrologic information on DATA FORM 1 for each plant community type. Any portion of the area having a positive wetland hydrology indicator has wetland hydrology. If positive wetland hydrology indicators are present in all community types, the entire area has wetland hydrology. If no plant community type has a wetland hydrology indicator, none of the area has wetland hydrology. Complete the hydrology portion of each DATA FORM 1. PROCEED TO STEP 12.

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\* This term is used because species having the largest individuals may not be dominant when only a few are present. To determine relative basal area, consider both the size and number of individuals of a species and subjectively compare with other species present.

\*\* For the FAC-neutral option, see paragraph 35a.



● STEP 12 - Determine Whether Soils Must Be Characterized. Examine the vegetation section of each DATA FORM 1. Hydric soils are assumed to be present in any plant community type in which:

- a. All dominant species have an indicator status of OBL.
- b. All dominant species have an indicator status of OBL or FACW, and the wetland boundary (when present) is abrupt.\*

When either a or b occurs and wetland hydrology is present, check the hydric soils blank as positive on DATA FORM 1 and PROCEED TO STEP 16. If neither a nor b applies, PROCEED TO STEP 13.

● STEP 13 - Dig a Soil Pit. Using a soil auger or spade, dig a soil pit at the representative location in each community type. The procedure for digging a soil pit is described in Appendix D, Section 1. When completed, approximately 16 inches of the soil profile will be available for examination. PROCEED TO STEP 14.

● STEP 14 - Apply Hydric Soil Indicators. Examine the soil at each location and compare its characteristics immediately below the A-horizon or 10 inches (whichever is shallower) with the hydric soil indicators described in PART III, paragraphs 44 and/or 45. Record findings on the appropriate DATA FORM 1's. PROCEED TO STEP 15.

● STEP 15 - Determine Whether Hydric Soils Are Present. Examine each DATA FORM 1 and determine whether a positive hydric soil indicator was found. If so, the area at that location has hydric soil. If soils at all sampling locations have positive hydric soil indicators, the entire area has hydric soils. If soils at all sampling locations lack positive hydric soil indicators, none of the area is a wetland. Complete the soil section of each DATA FORM 1. PROCEED TO STEP 16.

● STEP 16 - Make Wetland Determination. Examine DATA FORM 1. If the entire area presently or normally has wetland indicators of all three parameters (STEPS 9, 11, and 15), the entire area is a wetland. If the entire area presently or normally lacks wetland indicators of one or

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\* The soils parameter must be considered in any plant community in which:

- a. The community is dominated by one or more FAC species.
- b. No community type dominated by OBL species is present.
- c. The boundary between wetlands and nonwetlands is gradual or nondistinct.
- d. The area is known to or is suspected of having significantly altered hydrology.

more parameters, the entire area is a nonwetland. If only a portion of the area presently or normally has wetland indicators for all three parameters, PROCEED TO STEP 17.

- STEP 17 - Determine Wetland-Nonwetland Boundary. Mark each plant community type on the base map with a W if wetland or an N if nonwetland. Combine all wetland plant communities into one mapping unit and all nonwetland plant communities into another mapping unit. The wetland-nonwetland boundary will be represented by the interface of these two mapping units.

Areas Greater Than 5 Acres in Size

- STEP 18 - Establish a Baseline. Select one project boundary as a baseline. The baseline should parallel the major watercourse through the area or should be perpendicular to the hydrologic gradient (Figure 15). Determine the approximate baseline length. PROCEED TO STEP 19.

- STEP 19 - Determine the Required Number and Position of Transects. Use the following to determine the required number and position of transects (specific site conditions may necessitate changes in intervals):

<u>Baseline length, miles</u>	<u>Number of Required Transects</u>
≤0.25	3
>0.25-0.50	3
>0.50-0.75	3
>0.75-1.00	3
>1.00-2.00	3-5
>2.00-4.00	5-8
>4.00	8 or more*

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\* Transect intervals should not exceed 0.5 mile.

Divide the baseline length by the number of required transects. Establish one transect in each resulting baseline increment. Use the

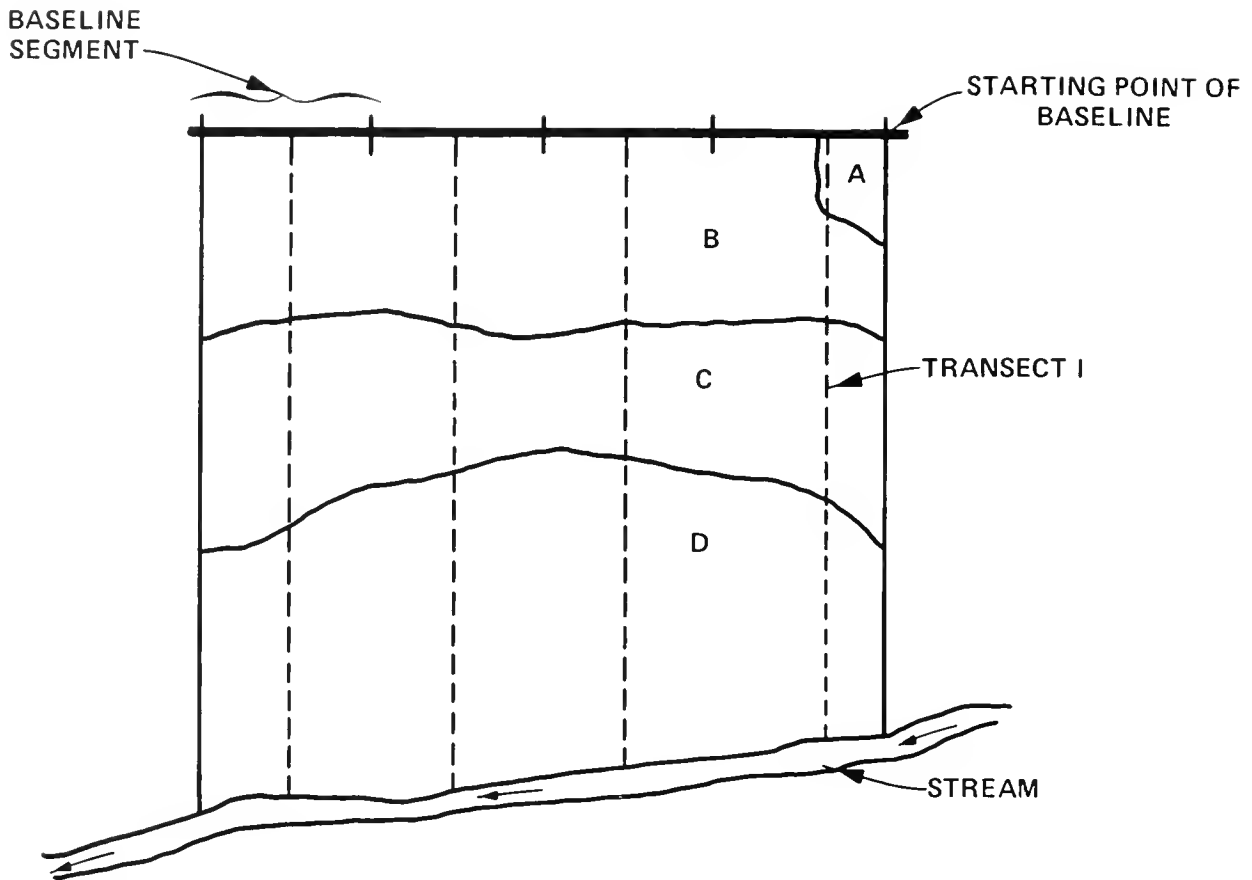


Figure 15. General orientation of baseline and transects (dotted lines) in a hypothetical project area. Alpha characters represent different plant communities. All transects start at the midpoint of a baseline segment except the first, which was repositioned to include community type A

midpoint of each baseline increment as a transect starting point. For example, if the baseline is 1,200 ft in length, three transects would be established--one at 200 ft, one at 600 ft, and one at 1,000 ft from the baseline starting point. *CAUTION: All plant community types must be included. This may necessitate relocation of one or more transect lines.* PROCEED TO STEP 20.

● STEP 20 - Sample Observation Points Along the First Transect. Beginning at the starting point of the first transect, extend the transect at a 90-deg angle to the baseline. Use the following procedure as appropriate to simultaneously characterize the parameters at each observation point. Combine field-collected data with information already available and make a wetland determination at each observation point. A DATA FORM 1 must be completed for each observation point.

a. Determine whether normal environmental conditions are present. Determine whether normal environmental conditions are present by considering the following:

- (1) Is the area presently lacking hydrophytic vegetation and/or hydrologic indicators due to annual or seasonal fluctuations in precipitation or ground-water levels?
- (2) Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature?

If the answer to either of these questions is thought to be YES, PROCEED TO Section G. If the answer to both questions is NO, PROCEED TO STEP 20b.

b. Establish an observation point in the first plant community type encountered. Select a representative location along the transect in the first plant community type encountered. When the first plant community type is large and covers a significant distance along the transect, select an area that is no closer than 300 ft to a perceptible change in plant community type. PROCEED TO STEP 20c.

c. Characterize parameters. Characterize the parameters at the observation point by completing (1), (2), and (3) below:

- (1) Vegetation. Record on DATA FORM 1 the dominant plant species in each vegetation layer occurring in the immediate vicinity of the observation point. Use a 5-ft radius for herbs and saplings/shrubs, and a 30-ft radius for trees and woody vines (when present). Subjectively determine the dominant species by estimating those having the largest relative basal area\* (woody overstory), greatest height (woody understory), greatest percentage of areal cover (herbaceous understory), and/or greatest number of stems (woody vines). *NOTE: Plot size may be estimated, and plot size may also be varied when site conditions warrant.* Record on DATA FORM 1 any dominant species observed to have morphological adaptations (Appendix C, Section 3) for occurrence in wetlands, and determine and record dominant species that have known physiological adaptations for occurrence in wetlands (Appendix C, Section 3). Record on DATA FORM 1 the indicator status (Appendix C, Section 1 or 2) of each dominant species. Hydrophytic vegetation is present at the observation point when more than 50 percent of the dominant species have an indicator status of OBL, FACW, and/or FAC\*\*; when two or more dominant species have observed morphological or known physiological adaptations for occurrence in wetlands; or when other indicators of hydrophytic vegetation (PART III, paragraph 35) are

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\* This term is used because species having the largest individuals may not be dominant when only a few are present. To use relative basal area, consider both the size and number of individuals of a species and subjectively compare with other species present.

\*\* For the FAC-neutral option, see paragraph 35a.

present. Complete the vegetation section of DATA FORM 1. PROCEED TO (2).

- (2) Soils. In some cases, it is not necessary to characterize the soils. Examine the vegetation of DATA FORM 1. Hydric soils can be assumed to be present when:

(a) All dominant plant species have an indicator status of OBL.

(b) All dominant plant species have an indicator status of OBL and/or FACW (at least one dominant species must be OBL).\*

When either (a) or (b) applies, check the hydric soils blank as positive and PROCEED TO (3). If neither (a) nor (b) applies but the vegetation qualifies as hydrophytic, dig a soil pit at the observation point using the procedure described in Appendix D, Section 1. Examine the soil immediately below the A-horizon or 10-inches (whichever is shallower) and compare its characteristics (Appendix D, Section 1) with the hydric soil indicators described in PART III, paragraphs 44 and/or 45. Record findings on DATA FORM 1. If a positive hydric soil indicator is present, the soil at the observation point is a hydric soil. If no positive hydric soil indicator is found, the area at the observation point does not have hydric soils and the area at the observation point is not a wetland. Complete the soils section of DATA FORM 1 for the observation point. PROCEED TO (3) if hydrophytic vegetation (1) and hydric soils (2) are present. Otherwise, PROCEED TO STEP 20d.

- (3) Hydrology. Examine the observation point for indicators of wetland hydrology (PART III, paragraph 49), and record observations on DATA FORM 1. Consider the indicators in the same sequence as presented in PART III, paragraph 49. If a positive wetland hydrology indicator is present, the area at the observation point has wetland hydrology. If no positive wetland hydrologic indicator is present, the area at the observation point is not a wetland. Complete the hydrology section of DATA FORM 1 for the observation point. PROCEED TO STEP 20d.

- d. Wetland determination. Examine DATA FORM 1 for the observation point. Determine whether wetland indicators of all three parameters are or would normally be present during a significant portion of the growing season. If so, the area at the observation point is a wetland. If no evidence can be found that the area at the observation point normally has wetland indicators for all three parameters, the area is a nonwetland. PROCEED TO STEP 20e.

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\* Soils must be characterized when any dominant species has an indicator status of FAC.

- e. Sample other observation points along the first transect. Continue along the first transect until a different community type is encountered. Establish a representative observation point within this community type and repeat STEP 20c - 20d. If the areas at both observation points are either wetlands or nonwetlands, continue along the transect and repeat STEP 20c - 20d for the next community type encountered. Repeat for all other community types along the first transect. If the area at one observation point is wetlands and the next observation point is nonwetlands (or vice versa), PROCEED TO STEP 20f.
- f. Determine wetland-nonwetland boundary. Proceed along the transect from the wetland observation point toward the nonwetland observation point. Look for subtle changes in the plant community (e.g. the first appearance of upland species, disappearance of apparent hydrology indicators, or slight changes in topography). When such features are noted, establish an observation point and repeat the procedures described in STEP 20c - 20d. *NOTE: A new DATA FORM 1 must be completed for this observation point, and all three parameters must be characterized by field observation.* If the area at this observation point is a wetland, proceed along the transect toward the nonwetland observation point until upland indicators are more apparent. Repeat the procedures described in STEP 20c - 20d. If the area at this observation point is a nonwetland, move half-way back along the transect toward the last documented wetland observation point and repeat the procedure described in STEP 20c - 20d. Continue this procedure until the wetland-nonwetland boundary is found. It is not necessary to complete a DATA FORM 1 for all intermediate points, but a DATA FORM 1 should be completed for the wetland-nonwetland boundary. Mark the position of the wetland boundary on the base map, and continue along the first transect until all community types have been sampled and all wetland boundaries located. *CAUTION: In areas where wetlands are interspersed among nonwetlands (or vice versa), several boundary determinations will be required.* When all necessary wetland determinations have been completed for the first transect, PROCEED TO STEP 21.

● STEP 21 - Sample Other Transects. Repeat procedures described in STEP 21 for all other transects. When completed, a wetland determination will have been made for one observation point in each community type along each transect, and all wetland-nonwetland boundaries along each transect will have been determined. PROCEED TO STEP 22.

● STEP 22 - Synthesize Data. Examine all completed copies of DATA FORM 1, and mark each plant community type on the base map. Identify each plant community type as either a wetland (W) or nonwetland (N). If all plant community types are identified as wetlands, the entire area is wetlands. If all plant community types are identified as

nonwetlands, the entire area is nonwetlands. If both wetlands and nonwetlands are present, identify observation points that represent wetland boundaries on the base map. Connect these points on the map by generally following contour lines to separate wetlands from nonwetlands. Walk the contour line between transects to confirm the wetland boundary. Should anomalies be encountered, it will be necessary to establish short transects in these areas, apply the procedures described in STEP 20f, and make any necessary adjustments on the base map.

### Subsection 3 - Combination of Levels 1 and 2

66. In some cases, especially for large projects, adequate information may already be available (Section B) to enable a wetland determination for a portion of the project area, while an onsite visit will be required for the remainder of the area. Since procedures for each situation have already been described in Subsections 1 and 2, they will not be repeated. Apply the following steps:

- STEP 1 - Make Wetland Determination for Portions of the Project Area That Are Already Adequately Characterized. Apply procedures described in Subsection 1. When completed, a DATA FORM 1 will have been completed for each community type, and a map will have been prepared identifying each community type as wetland or nonwetland and showing any wetland boundary occurring in this portion of the project area. PROCEED TO STEP 2.
- STEP 2 - Make Wetland Determination for Portions of the Project Area That Require an Onsite Visit. Apply procedures described in Subsection 2. When completed, a DATA FORM 1 will have been completed for each plant community type or for a number of observation points (including wetland boundary determinations). A map of the wetland (if present) will also be available. PROCEED TO STEP 3.
- STEP 3 - Synthesize Data. Using the maps resulting from STEPS 1 and 2, prepare a summary map that shows the wetlands of the entire project area. *CAUTION: Wetland boundaries for the two maps will not always match exactly. When this occurs, an additional site visit will be required to refine the wetland boundaries. Since the degree of*

resolution of wetland boundaries will be greater when determined on-site, it may be necessary to employ procedures described in Subsection 2 in the vicinity of the boundaries determined from Subsection 1 to refine these boundaries.



## Section E. Comprehensive Determinations

67. This section describes procedures for making comprehensive wetland determinations. Unlike procedures for making routine determinations (Section D), application of procedures described in this section will result in maximum information for use in making determinations, and the information usually will be quantitatively expressed. Comprehensive determinations should only be used when the project area is very complex and/or when the determination requires rigorous documentation. This type of determination may be required in areas of any size, but will be especially useful in large areas. There may be instances in which only one parameter (vegetation, soil, or hydrology) is disputed. In such cases, only procedures described in this section that pertain to the disputed parameter need be completed. It is assumed that the user has already completed all applicable steps in Section B. *NOTE: Depending on site characteristics, it may be necessary to alter the sampling design and/or data collection procedures.*

68. This section is divided into five basic types of activities. The first consists of preliminary field activities that must be completed prior to making a determination (STEPS 1-5). The second outlines procedures for determining the number and locations of required determinations (STEPS 6-8). The third describes the basic procedure for making a comprehensive wetland determination at any given point (STEPS 9-17). The fourth describes a procedure for determining wetland boundaries (STEP 18). The fifth describes a procedure for synthesizing the collected data to determine the extent of wetlands in the area (STEPS 20-21). A flowchart showing the relationship of various steps required for making a comprehensive determination is presented in Figure 16.

### Equipment and material

69. Equipment and materials needed for making a comprehensive determination include:

- a. Base map (Section B, STEP 2).
- b. Copies of DATA FORMS 1 and 2.
- c. Appendices C and D.
- d. Compass.
- e. Tape (300 ft).
- f. Soil auger or spade.
- g. Munsell Color Charts (Munsell Color 1975).

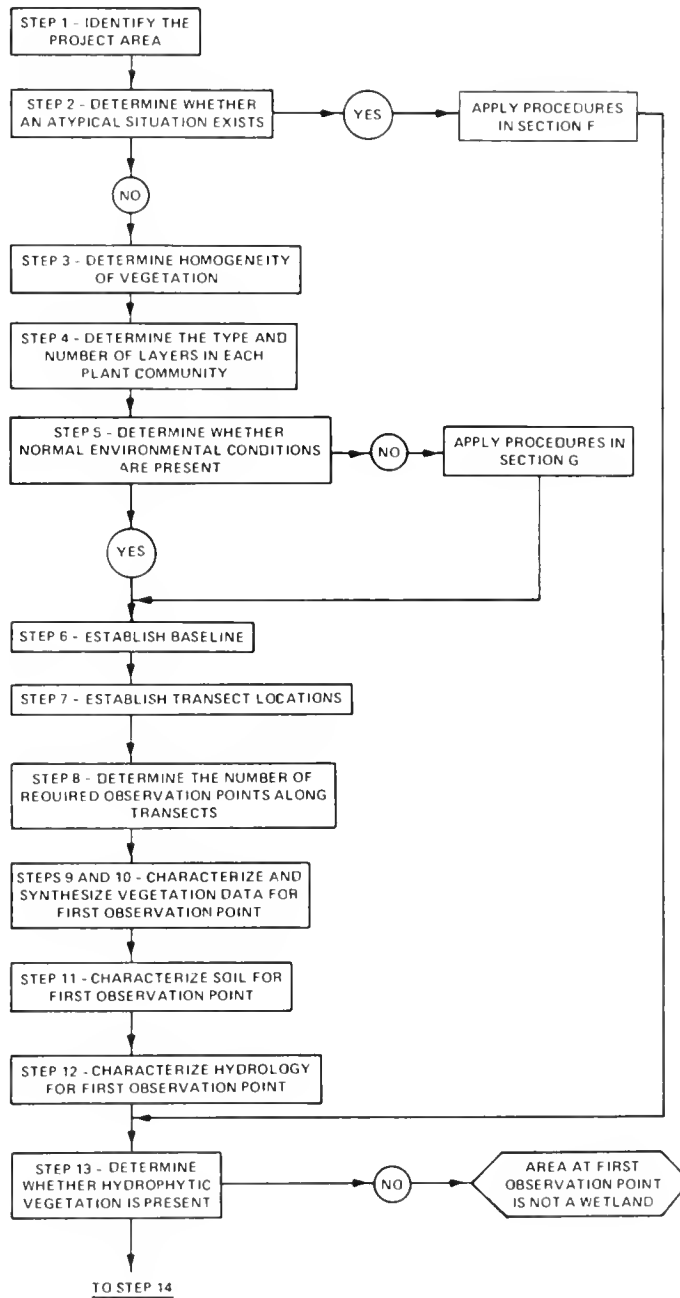


Figure 16. Flowchart of steps involved in making a comprehensive wetland determination (Section E) (Continued)

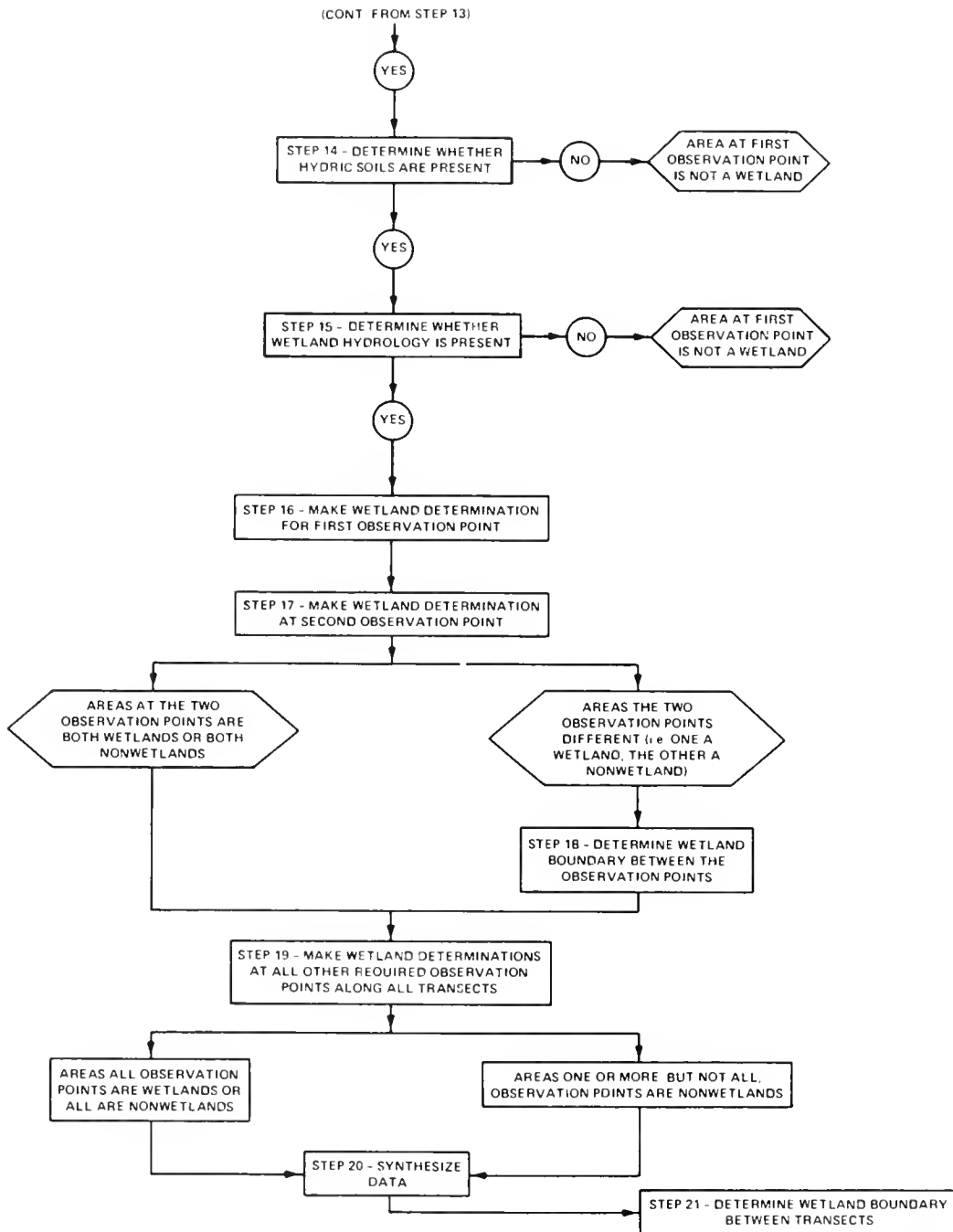


Figure 16. (Concluded)

h. Quadrat (3.28 ft by 3.28 ft).

i. Diameter or basal area tape (for woody overstory).

#### Field procedures

70. Complete the following steps:

- STEP 1 - Identify the Project Area. Using information from the USGS quadrangle or other appropriate map (Section B), locate and measure the spatial boundaries of the project area. Determine the compass heading of each boundary and record on the base map (Section B, STEP 2). The applicant's survey plan may be helpful in locating the project boundaries. PROCEED TO STEP 2.
- STEP 2 - Determine Whether an Atypical Situation Exists. Examine the area and determine whether there is sufficient natural or human-induced alteration to significantly change the area vegetation, soils, and/or hydrology. If not, PROCEED TO STEP 3. If one or more parameters have been recently altered significantly, PROCEED TO Section F and determine whether there is sufficient evidence that hydrophytic vegetation, hydric soils, and/or wetland hydrology were present on the area prior to alteration. Then return to this section and characterize parameters not significantly influenced by human activities. PROCEED TO STEP 3.
- STEP 3 - Determine Homogeneity of Vegetation. While completing STEP 2, determine the number of plant community types present. Mark the approximate location of each community type on the base map. The number and locations of required wetland determinations will be strongly influenced by both the size of the area and the number and distribution of plant community types; the larger the area and greater the number of plant community types, the greater the number of required wetland determinations. It is imperative that all plant community types occurring in all portions of the area be included in the investigation. PROCEED TO STEP 4.
- STEP 4 - Determine the Type and Number of Layers in Each Plant Community. Examine each identified plant community type and determine the type(s) and number of layers in each community. Potential layers include trees (woody overstory), saplings/shrubs (woody understory), herbs (herbaceous understory), and/or woody vines. PROCEED TO STEP 5.
- STEP 5 - Determine Whether Normal Environmental Conditions Are Present. Determine whether normal environmental conditions are present

at the observation point by considering the following:

- a. Is the area at the observation point presently lacking hydrophytic vegetation and/or hydrologic indicators due to annual or seasonal fluctuations in precipitation or ground-water levels?
- b. Are hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature?

If the answer to either of these questions is thought to be YES, PROCEED TO Section G. If the answer to both questions is NO, PROCEED TO STEP 6.

● STEP 6 - Establish a Baseline. Select one project boundary area as a baseline. The baseline should extend parallel to any major watercourse and/or perpendicular to a topographic gradient (see Figure 17). Determine the baseline length and record on the base map both the baseline length and its compass heading. PROCEED TO STEP 7.

● STEP 7. Establish Transect Locations. Divide the baseline into a number of equal segments (Figure 17). Use the following as a guide to determine the appropriate number of baseline segments:

<u>Baseline Length, ft</u>	<u>Number of Segments</u>	<u>Length of Baseline Segment, ft</u>
>50 - 500	3	18 - 167
>500 - 1,000	3	167 - 333
>1,000 - 5,000	5	200 - 1,000
>5,000 - 10,000	7	700 - 1,400
>10,000*	variable	2,000

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\* If the baseline exceeds 5 miles, baseline segments should be 0.5 mile in length.

Use a random numbers table or a calculator with a random numbers generation feature to determine the position of a transect starting point within each baseline segment. For example, when the baseline is 4,000 ft, the number of baseline segments will be five, and the baseline segment length will be  $4,000/5 = 800$  ft. Locate the first transect within the first 800 ft of the baseline. If the random numbers table yields 264 as the distance from the baseline starting point, measure 264 ft from the baseline starting point and establish the starting point of the first transect. If the second random number selected is

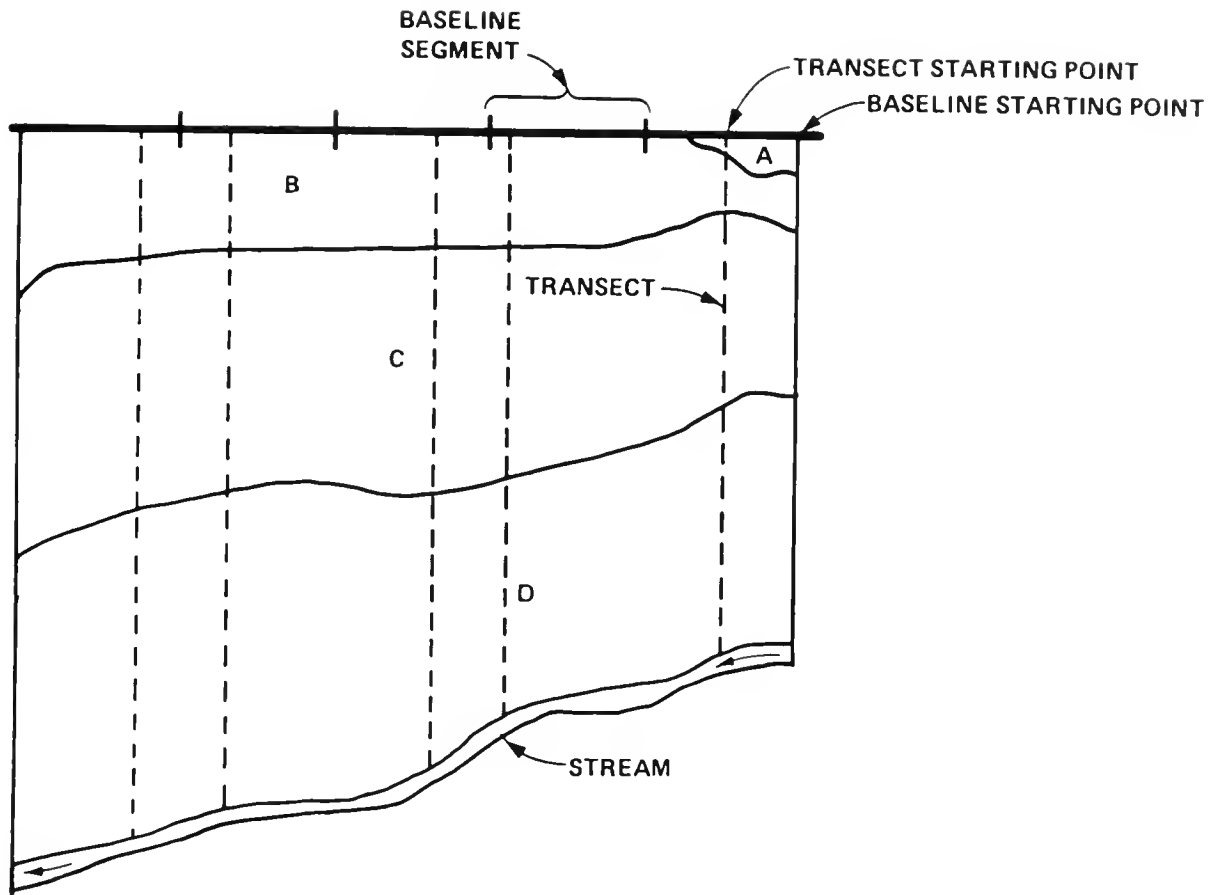


Figure 17. General orientation of baseline and transects in a hypothetical project area. Alpha characters represent different plant communities. Transect positions were determined using a random numbers table

530, the starting point of the second transect will be located at a distance of 1,330 ft (800 + 530 ft) from the baseline starting point.

*CAUTION: Make sure that each plant community type is included in at least one transect. If not, modify the sampling design accordingly.*

When the starting point locations for all required transects have been determined, PROCEED TO STEP 8.

- STEP 8 - Determine the Number of Required Observation Points Along Transects. The number of required observation points along each transect will be largely dependent on transect length. Establish observation points along each transect using the following as a guide:

<u>Transect Length, ft</u>	<u>Number of Observation Points</u>	<u>Interval Between Observation Points, ft</u>
<1,000	2-10	100
1,000 - <5,000	10	100 - 500
5,000 - <10,000	10	500 - 1,000
≥10,000	>10	1,000

Establish the first observation point at a distance of 50 ft from the baseline (Figure 17). When obvious nonwetlands occupy a long portion of the transect from the baseline starting point, establish the first observation point in the obvious nonwetland at a distance of approximately 300 ft from the point that the obvious nonwetland begins to intergrade into a potential wetland community type. Additional observation points must also be established to determine the wetland boundary between successive regular observation points when one of the points is a wetland and the other is a nonwetland. *CAUTION: In large areas having a mosaic of plant community types, several wetland boundaries may occur along the same transect.* PROCEED TO STEP 9 and apply the comprehensive wetland determination procedure at each required observation point. Use the described procedure to simultaneously characterize the vegetation, soil, and hydrology at each required observation point along each transect, and use the resulting characterization to make a wetland determination at each point. *NOTE: All required wetland boundary determinations should be made while proceeding along a transect.*

● STEP 9 - Characterize the Vegetation at the First Observation Point Along the First Transect.\* Record on DATA FORM 2 the vegetation

occurring at the first observation point along the first transect by completing the following (as appropriate):

- a. Trees. Identify each tree occurring within a 30-ft radius\*\* of the observation point, measure its basal area (square inches) or diameter at breast height (DBH) using a basal area tape or

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\* There is no single best procedure for characterizing vegetation. Methods described in STEP 9 afford standardization of the procedure. However, plot size and descriptors for determining dominance may vary.

\*\* A larger sampling plot may be necessary when trees are large and widely spaced.

diameter tape, respectively, and record. *NOTE: If DBH is measured, convert values to basal area by applying the formula  $A = \pi r^2$ . This must be done on an individual basis. A tree is any nonclimbing, woody plant that has a DBH of  $\geq 3.0$  in., regardless of height.*

- b. Saplings/shrubs. Identify each sapling/shrub occurring within a 10-ft radius of the observation point, estimate its height, and record the midpoint of its class range using the following height classes (height is used as an indication of dominance; taller individuals exert a greater influence on the plant community):

<u>Height Class</u>	<u>Height Class Range, ft</u>	<u>Midpoint of Range, ft</u>
1	1 - 3	2
2	3 - 5	4
3	5 - 7	6
4	7 - 9	8
5	9 - 11	10
6	>11	12

A sapling/shrub is any woody plant having a height  $>3.2$  ft but a stem diameter of  $<3.0$  in., exclusive of woody vines.

- c. Herbs. Place a 3.28- by 3.28-ft quadrat with one corner touching the observation point and one edge adjacent to the transect line. As an alternative, a 1.64-ft-radius plot with the center of the plot representing the observation point position may be used. Identify each plant species with foliage extending into the quadrat and estimate its percent cover by applying the following cover classes:

<u>Cover Class</u>	<u>Class Range, %</u>	<u>Midpoint of Class Range, %</u>
1	0 - 5	2.5
2	>5 - 25	15.0
3	>25 - 50	37.5
4	>50 - 75	62.5
5	>75 - 95	85.0
6	>95 - 100	97.5

Include all nonwoody plants and woody plants  $<3.2$  ft in height. *NOTE: Total percent cover for all species will often exceed 100 percent.*



d. Woody vines (lianas). Identify species of woody vines climbing each tree and sapling/shrub sampled in STEPS 9a and 9b above, and record the number of stems of each. Since many woody vines branch profusely, count or estimate the number of stems at the ground surface. Include only individuals rooted in the 10-ft radius plot. Do not include individuals <3.2 ft in height. PROCEED TO STEP 10.

● STEP 10 - Analyze Field Vegetation Data. Examine the vegetation data (STEP 9) and determine the dominant species in each vegetation layer\* by completing the following:

a. Trees. Obtain the total basal area (square inches) for each tree species identified in STEP 9a by summing the basal area of all individuals of a species found in the sample plot. Rank the species in descending order of dominance based on total basal area. Complete DATA FORM 2 for the tree layer.

b. Saplings/shrubs. Obtain the total height for each sapling/shrub species identified in STEP 9b. Total height, which is an estimate of dominance, is obtained by summing the midpoints of height classes for all individuals of a species found in the sample plot. Rank the species in descending order of dominance based on sums of midpoints of height class ranges. Complete DATA FORM 2 for the sapling/shrub layer.

c. Herbs. Obtain the total cover for each herbaceous and woody seedling species identified in STEP 9c. Total cover is obtained by using the midpoints of the cover class range assigned to each species (only one estimate of cover is made for a species in a given plot). Rank herbs and woody seedlings in descending order of dominance based on percent cover. Complete DATA FORM 2 for the herbaceous layer.

d. Woody vines (lianas). Obtain the total number of individuals of each species of woody vine identified in STEP 9d. Rank the species in descending order of dominance based on number of stems. Complete DATA FORM 2 for the woody vine layer. PROCEED TO STEP 11.

● STEP 11 - Characterize Soil. If a soil survey is available (Section B), the soil type may already be known. Have a soil scientist confirm that the soil type is correct, and determine whether the soil series is a hydric soil (Appendix D, Section 2). *CAUTION: Mapping units on soil surveys sometimes have inclusions of soil series or phases not shown on the soil survey map.* If a hydric soil type is confirmed, record on DATA FORM 1 and PROCEED TO STEP 12. If not, dig a soil pit using a soil auger or spade (See Appendix D, Section 1) and

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\* The same species may occur as a dominant in more than one vegetation layer.

look for indicators of hydric soils immediately below the A-horizon or 10 inches (whichever is shallower) (PART III, paragraphs 44 and/or 45). Record findings on DATA FORM 1. PROCEED TO STEP 12.

● STEP 12 - Characterize Hydrology. Examine the observation point for indicators of wetland hydrology (PART III, paragraph 49), and record observations on DATA FORM 1. Consider indicators in the same sequence as listed in paragraph 49. PROCEED TO STEP 13.

● STEP 13 - Determine Whether Hydrophytic Vegetation Is Present. Record the three dominant species from each vegetation layer (five species if only one or two layers are present) on DATA FORM 1.\* Determine whether these species occur in wetlands by considering the following:

- a. More than 50 percent of the dominant plant species are OBL, FACW, and/or FAC\*\* on lists of plant species that occur in wetlands. Record the indicator status of all dominant species (Appendix C, Section 1 or 2) on DATA FORM 1. Hydrophytic vegetation is present when the majority of the dominant species have an indicator status of OBL, FACW, or FAC. *CAUTION: Not necessarily all plant communities composed of only FAC species are hydrophytic communities. They are hydrophytic communities only when positive indicators of hydric soils and wetland hydrology are also found.* If this indicator is satisfied, complete the vegetation portion of DATA FORM 1 and PROCEED TO STEP 14. If not, consider other indicators of hydrophytic vegetation.
- b. Presence of adaptations for occurrence in wetlands. Do any of the species listed on DATA FORM 1 have observed morphological or known physiological adaptations (Appendix C, Section 3) for occurrence in wetlands? If so, record species having such adaptations on DATA FORM 1. When two or more dominant species have observed morphological adaptations or known physiological adaptations for occurrence in wetlands, hydrophytic vegetation is present. If so, complete the vegetation portion of DATA FORM 1 and PROCEED TO STEP 14. If not, consider other indicators of hydrophytic vegetation.
- c. Other indicators of hydrophytic vegetation. Consider other indicators (see PART III, paragraph 35) that the species listed on DATA FORM 1 are commonly found in wetlands. If so, complete the vegetation portion of DATA FORM 1 by recording sources of supporting information, and PROCEED TO STEP 14. If no indicator of hydrophytic vegetation is present, the area at the observation point is not a wetland. In such cases, it is

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\* Record all dominant species when less than three are present in a vegetation layer.

\*\* For the FAC-neutral option, see paragraph 35a.

unnecessary to consider soil and hydrology at that observation point. PROCEED TO STEP 17.

- STEP 14 - Determine Whether Hydric Soils Are Present. Examine DATA FORM 1 and determine whether any indicator of hydric soils is present. If so, complete the soils portion of DATA FORM 1 and PROCEED TO STEP 15. If not, the area at the observation point is not a wetland. PROCEED TO STEP 17.
- STEP 15 - Determine Whether Wetland Hydrology Is Present. Examine DATA FORM 1 and determine whether any indicator of wetland hydrology is present. Complete the hydrology portion of DATA FORM 1 and PROCEED TO STEP 16.
- STEP 16 - Make Wetland Determination. When the area at the observation point presently or normally has wetland indicators of all three parameters, it is a wetland. When the area at the observation point presently or normally lacks wetland indicators of one or more parameters, it is a nonwetland. PROCEED TO STEP 17.
- STEP 17 - Make Wetland Determination at Second Observation Point. Locate the second observation point along the first transect and make a wetland determination by repeating procedures described in STEPS 9-16. When the area at the second observation point is the same as the area at the first observation point (i.e. both wetlands or both nonwetlands), PROCEED TO STEP 19. When the areas at the two observation points are different (i.e. one wetlands, the other nonwetlands), PROCEED TO STEP 18.
- STEP 18 - Determine the Wetland Boundary Between Observation Points. Determine the position of the wetland boundary by applying the following procedure:
  - a. Look for a change in vegetation or topography. *NOTE: The changes may sometimes be very subtle.* If a change is noted, establish an observation point and repeat STEPS 9-16. Complete a DATA FORM 1. If the area at this point is a wetland, proceed toward the nonwetland observation point until a more obvious change in vegetation or topography is noted and repeat the procedure. If there is no obvious change, establish the next observation point approximately halfway between the last observation point and the nonwetland observation point and repeat STEPS 9-16.
  - b. Make as many additional wetland determinations as necessary to find the wetland boundary. *NOTE: The completed DATA FORM 1's*

for the original two observation points often will provide a clue as to the parameter(s) that change between the two points.

- c. When the wetland boundary is found, mark the boundary location on the base map and indicate on the DATA FORM 1 that this represents a wetland boundary. Record the distance of the boundary from one of the two regular observation points. Since the regular observation points represent known distances from the baseline, it will be possible to accurately pinpoint the boundary location on the base map. PROCEED TO STEP 19.
- STEP 19 - Make Wetland Determinations at All Other Required Observation Points Along All Transects. Continue to locate and sample all required observation points along all transects. *NOTE: The procedure described in STEP 18 must be applied at every position where a wetland boundary occurs between successive observation points.* Complete a DATA FORM 1 for each observation point and PROCEED TO STEP 20.
- STEP 20 - Synthesize Data to Determine the Portion of the Area Containing Wetlands. Examine all completed copies of DATA FORM 1 (STEP 19), and mark on a copy of the base map the locations of all observation points that are wetlands with a W and all observation points that are nonwetlands with an N. Also, mark all wetland boundaries occurring along transects with an X. If all the observation points are wetlands, the entire area is wetlands. If all observation points are nonwetlands, none of the area is wetlands. If some wetlands and some nonwetlands are present, connect the wetland boundaries (X) by following contour lines between transects. *CAUTION: If the determination is considered to be highly controversial, it may be necessary to be more precise in determining the wetland boundary between transects. This is also true for very large areas where the distance between transects is greater. If this is necessary, PROCEED TO STEP 21.*
- STEP 21 - Determine Wetland Boundary Between Transects. Two procedures may be used to determine the wetland boundary between transects, both of which involve surveying:
  - a. Survey contour from wetland boundary along transects. The first method involves surveying the elevation of the wetland boundaries along transects and then extending the survey to determine the same contour between transects. This procedure will be adequate in areas where there is no significant elevational change between transects. However, if a significant elevational change occurs between transects, either the surveyor must adjust elevational readings to accommodate such changes or the second method must be used. *NOTE: The surveyed*

wetland boundary must be examined to ensure that no anomalies exist. If these occur, additional wetland determinations will be required in the portion of the area where the anomalies occur, and the wetland boundary must be adjusted accordingly.

- b. Additional wetland determinations between transects. This procedure consists of traversing the area between transects and making additional wetland determinations to locate the wetland boundary at sufficiently close intervals (not necessarily standard intervals) so that the area can be surveyed. Place surveyor flags at each wetland boundary location. Enlist a surveyor to survey the points between transects. From the resulting survey data, produce a map that separates wetlands from nonwetlands.

## Section F. Atypical Situations

71. Methods described in this section should be used only when a determination has already been made in Section D or E that positive indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology could not be found due to effects of recent human activities or natural events. This section is applicable to delineations made in the following types of situations:

- a. Unauthorized activities. Unauthorized discharges requiring enforcement actions may result in removal or covering of indicators of one or more wetland parameters. Examples include, but are not limited to: (1) alteration or removal of vegetation; (2) placement of dredged or fill material over hydric soils; and/or (3) construction of levees, drainage systems, or dams that significantly alter the area hydrology. *NOTE: This section should not be used for activities that have been previously authorized or those that are exempted from CE regulation. For example, this section is not applicable to areas that have been drained under CE authorization or that did not require CE authorization. Some of these areas may still be wetlands, but procedures described in Section D or E must be used in these cases.*
- b. Natural events. Naturally occurring events may result in either creation or alteration of wetlands. For example, recent beaver dams may impound water, thereby resulting in a shift of hydrology and vegetation to wetlands. However, hydric soil indicators may not have developed due to insufficient time having passed to allow their development. Fire, avalanches, volcanic activity, and changing river courses are other examples. *NOTE: It is necessary to determine whether alterations to an area have resulted in changes that are now the "normal circumstances."* The relative permanence of the change and whether the area is now functioning as a wetland must be considered.
- c. Man-induced wetlands. Procedures described in Subsection 4 are for use in delineating wetlands that have been purposely or incidentally created by human activities, but in which wetland indicators of one or more parameters are absent. For example, road construction may have resulted in impoundment of water in an area that previously was nonwetland, thereby effecting hydrophytic vegetation and wetland hydrology in the area. However, the area may lack hydric soil indicators. *NOTE: Subsection D is not intended to bring into CE jurisdiction those man-made wetlands that are exempted under CE regulations or policy.* It is also important to consider whether the man-induced changes are now the "normal circumstances" for the area. Both the relative permanence of the change and the functioning of the area as a wetland are implied.

72. When any of the three types of situations described in paragraph 71 occurs, application of methods described in Sections D and/or E will lead to the conclusion that the area is not a wetland because positive wetland indicators for at least one of the three parameters will be absent. Therefore, apply procedures described in one of the following subsections (as appropriate) to determine whether positive indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology existed prior to alteration of the area. Once these procedures have been employed, RETURN TO Section D or E to make a wetland determination. PROCEED TO the appropriate subsection.

#### Subsection 1 - Vegetation

73. Employ the following steps to determine whether hydrophytic vegetation previously occurred:

- STEP 1 - Describe the Type of Alteration. Examine the area and describe the type of alteration that occurred. Look for evidence of selective harvesting, clear cutting, bulldozing, recent conversion to agriculture, or other activities (e.g., burning, discing, or presence of buildings, dams, levees, roads, parking lots, etc.). Determine the approximate date\* when the alteration occurred. Record observations on DATA FORM 3, and PROCEED TO STEP 2.
- STEP 2 - Describe Effects on Vegetation. Record on DATA FORM 3 a general description of how the activities (STEP 1) have affected the plant communities. Consider the following:
  - a. Has all or a portion of the area been cleared of vegetation?
  - b. Has only one layer of the plant community (e.g. trees) been removed?
  - c. Has selective harvesting resulted in removal of some species?
  - d. Has all vegetation been covered by fill, dredged material, or structures?
  - e. Have increased water levels resulted in the death of some individuals?

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\* It is especially important to determine whether the alteration occurred prior to implementation of Section 404.

PROCEED TO STEP 3.

● STEP 3 - Determine the Type of Vegetation That Previously Occurred.

Obtain all possible evidence of the type of plant communities that occurred in the area prior to alteration. Potential sources of such evidence include:

- a. Aerial photography. Recent (within 5 years) aerial photography can often be used to document the type of previous vegetation. The general type of plant communities formerly present can usually be determined, and species identification is sometimes possible.
- b. Onsite inspection. Many types of activities result in only partial removal of the previous plant communities, and remaining species may be indicative of hydrophytic vegetation. In other cases, plant fragments (e.g. stumps, roots) may be used to reconstruct the plant community types that occurred prior to site alteration. Sometimes, this can be determined by examining piles of debris resulting from land-clearing operations or excavation to uncover identifiable remains of the previous plant community.
- c. Previous site inspections. Documented evidence from previous inspections of the area may describe the previous plant communities, particularly in cases where the area was altered after a permit application was denied.
- d. Adjacent vegetation. Circumstantial evidence of the type of plant communities that previously occurred may sometimes be obtained by examining the vegetation in adjacent areas. If adjacent areas have the same topographic position, soils, and hydrology as the altered area, the plant community types on the altered area were probably similar to those of the adjacent areas.
- e. SCS records. Most SCS soil surveys include a description of the plant community types associated with each soil type. If the soil type on the altered area can be determined, it may be possible to generally determine the type of plant communities that previously occurred.
- f. Permit applicant. In some cases, the permit applicant may provide important information about the type of plant communities that occurred prior to alteration.
- g. Public. Individuals familiar with the area may provide a good general description of the previously occurring plant communities.
- h. NWI wetland maps. The NWI has developed wetland type maps for many areas. These may be useful in determining the type of plant communities that occurred prior to alteration.

To develop the strongest possible record, all of the above sources should be considered. If the plant community types that occurred prior



to alteration can be determined, record them on DATA FORM 3 and also record the basis used for the determination. PROCEED TO STEP 4. If it is impossible to determine the plant community types that occurred on the area prior to alteration, a determination cannot be made using all three parameters. In such cases, the determination must be based on the other two parameters. PROCEED TO Subsection 2 or 3 if one of the other parameters has been altered, or return to the appropriate Subsection of Section D or to Section E, as appropriate.

● STEP 4 - Determine Whether Plant Community Types Constitute Hydrophytic Vegetation. Develop a list of species that previously occurred on the site (DATA FORM 3). Subject the species list to applicable indicators of hydrophytic vegetation (PART III, paragraph 35). If none of the indicators are met, the plant communities that previously occurred did not constitute hydrophytic vegetation. If hydrophytic vegetation was present and no other parameter was in question, record appropriate data on the vegetation portion of DATA FORM 3, and return to either the appropriate subsection of Section D or to Section E. If either of the other parameters was also in question, PROCEED TO Subsection 2 or 3.

#### Subsection 2 - Soils

74. Employ the following steps to determine whether hydric soils previously occurred:

- STEP 1 - Describe the Type of Alteration. Examine the area and describe the type of alteration that occurred. Look for evidence of:
  - a. Deposition of dredged or fill material or natural sedimentation. In many cases the presence of fill material will be obvious. If so, it will be necessary to dig a hole to reach the original soil (sometimes several feet deep). Fill material will usually be a different color or texture than the original soil (except when fill material has been obtained from like areas onsite). Look for decomposing vegetation between soil layers and the presence of buried organic or hydric soil layers. In accreting or recently formed sandbars in riverine situations, the soils may support hydrophytic vegetation but lack hydric soil characteristics.
  - b. Presence of nonwoody debris at the surface. This can only be applied in areas where the original soils do not contain rocks.

Nonwoody debris includes items such as rocks, bricks, and concrete fragments.

- c. Subsurface plowing. Has the area recently been plowed below the A-horizon or to depths of greater than 10 in.?
- d. Removal of surface layers. Has the surface soil layer been removed by scraping or natural landslides? Look for bare soil surfaces with exposed plant roots or scrape scars on the surface.
- e. Presence of man-made structures. Are buildings, dams, levees, roads, or parking lots present?

Determine the approximate date\* when the alteration occurred. This may require checking aerial photography, examining building permits, etc.

Record on DATA FORM 3, and PROCEED TO STEP 2.

● Step 2 - Describe Effects on Soils. Record on DATA FORM 3 a general description of how identified activities in STEP 1 have affected the soils. Consider the following:

- a. Has the soil been buried? If so, record the depth of fill material and determine whether the original soil is intact.
- b. Has the soil been mixed at a depth below the A-horizon or greater than 10 inches? If so, it will be necessary to examine the original soil at a depth immediately below the plowed zone. Record supporting evidence.
- c. Has the soil been sufficiently altered to change the soil phase? Describe these changes.

PROCEED TO STEP 3.

● STEP 3 - Characterize Soils That Previously Occurred. Obtain all possible evidence that may be used to characterize soils that previously occurred on the area. Consider the following potential sources of information:

- a. Soil surveys. In many cases, recent soil surveys will be available. If so, determine the soil series that were mapped for the area, and compare these soil series with the list of hydric soils (Appendix D, Section 2). If all soil series are listed as hydric soils, the entire area had hydric soils prior to alteration.
- b. Characterization of buried soils. When fill material has been placed over the original soil without physically disturbing the soil, examine and characterize the buried soils. To accomplish this, dig a hole through the fill material until the original soil is encountered. Determine the point at which the original

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\* It is especially important to determine whether the alteration occurred prior to implementation of Section 404.

soil material begins. Remove 12 inches of the original soil from the hole and look for indicators of hydric soils (PART III, paragraphs 44 and/or 45) immediately below the A-horizon or 10 inches (whichever is shallower). Record on DATA FORM 3 the color of the soil matrix, presence of an organic layer, presence of mottles or gleying, and/or presence of iron and manganese concretions. If the original soil is mottled and the chroma of the soil matrix is 2 or less,\* a hydric soil was formerly present on the site. If any of these indicators are found, the original soil was a hydric soil. (NOTE: When the fill material is a thick layer, it might be necessary to use a backhoe or posthole digger to excavate the soil pit.) If USGS quadrangle maps indicate distinct variation in area topography, this procedure must be applied in each portion of the area that originally had a different surface elevation. Record findings on DATA FORM 3.

- c. Characterization of plowed soils. Determine the depth to which the soil has been disturbed by plowing. Look for hydric soil characteristics (PART III, paragraphs 44 and/or 45) immediately below this depth. Record findings on DATA FORM 3.
- d. Removal of surface layers. Dig a hole (Appendix D, Section 1) and determine whether the entire surface layer (A-horizon) has been removed. If so, examine the soil immediately below the top of the subsurface layer (B-horizon) for hydric soil characteristics. As an alternative, examine an undisturbed soil of the same soil series occurring in the same topographic position in an immediately adjacent area that has not been altered. Look for hydric soil indicators immediately below the A-horizon or 10 inches (whichever is shallower), and record findings on DATA FORM 3.

If sufficient data on soils that existed prior to alteration can be obtained to determine whether a hydric soil was present, PROCEED TO STEP 4. If not, a determination cannot be made using soils. Use the other parameters (Subsections 1 and 3) for the determination.

● STEP 4 - Determine Whether Hydric Soils Were Formerly Present.

Examine the available data and determine whether indicators of hydric soils (PART III, paragraphs 44 and/or 45) were formerly present. If no indicators of hydric soils were found, the original soils were not hydric soils. If indicators of hydric soils were found, record the appropriate indicators on DATA FORM 3 and PROCEED TO Subsection 3 if the hydrology of the area has been significantly altered or return either to the appropriate subsection of Section D or to Section E and characterize the area hydrology.

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\* The matrix chroma must be 1 or less if no mottles are present (see paragraph 44). The soil must be moist when colors are determined.

### Subsection 3 - Hydrology

75. Apply the following steps to determine whether wetland hydrology previously occurred:

- STEP 1 - Describe the Type of Alteration. Examine the area and describe the type of alteration that occurred. Look for evidence of:
  - a. Dams. Has recent construction of a dam or some natural event (e.g. beaver activity or landslide) caused the area to become increasingly wetter or drier? *NOTE: This activity could have occurred a considerable distance away from the site in question.*
  - b. Levees, dikes, and similar structures. Have levees or dikes recently been constructed that prevent the area from becoming periodically inundated by overbank flooding?
  - c. Ditching. Have ditches been constructed recently that cause the area to drain more rapidly following inundation?
  - d. Filling of channels or depressions (land-leveling). Have natural channels or depressions been recently filled?
  - e. Diversion of water. Has an upstream drainage pattern been altered that results in water being diverted from the area?
  - f. Ground-water extraction. Has prolonged and intensive pumping of ground water for irrigation or other purposes significantly lowered the water table and/or altered drainage patterns?
  - g. Channelization. Have feeder streams recently been channelized sufficiently to alter the frequency and/or duration of inundation?

Determine the approximate date\* when the alteration occurred. Record observations on DATA FORM 3 and PROCEED TO STEP 2.

- STEP 2 - Describe Effects of Alteration on Area Hydrology. Record on DATA FORM 3 a general description of how the observed alteration (STEP 1) has affected the area. Consider the following:
  - a. Is the area more frequently or less frequently inundated than prior to alteration? To what degree and why?
  - b. Is the duration of inundation and soil saturation different than prior to alteration? How much different and why?

PROCEED TO STEP 3.

- STEP 3 - Characterize the Hydrology That Previously Existed in the Area. Obtain all possible evidence that may be used to characterize

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\* It is especially important to determine whether the alteration occurred prior to implementation of Section 404.

the hydrology that previously occurred. Potential sources of information include:

- a. Stream or tidal gage data. If a stream or tidal gaging station is located near the area, it may be possible to calculate elevations representing the upper limit of wetlands hydrology based on duration of inundation. Consult hydrologists from the local CE District Office for assistance. The resulting mean sea level elevation will represent the upper limit of inundation for the area in the absence of any alteration. If fill material has not been placed on the area, survey this elevation from the nearest USGS benchmark. Record elevations representing zone boundaries on DATA FORM 3. If fill material has been placed on the area, compare the calculated elevation with elevations shown on a USGS quadrangle or any other survey map that predated site alteration.
- b. Field hydrologic indicators. Certain field indicators of wetland hydrology (PART III, paragraph 49) may still be present. Look for watermarks on trees or other structures, drift lines, and debris deposits. Record these on DATA FORM 3. If adjacent undisturbed areas are in the same topographic position and are similarly influenced by the same sources of inundation, look for wetland indicators in these areas.
- c. Aerial photography. Examine any available aerial photography and determine whether the area was inundated at the time of the photographic mission. Consider the time of the year that the aerial photography was taken and use only photography taken during the growing season and prior to site alteration.
- d. Historical records. Examine any available historical records for evidence that the area has been periodically inundated. Obtain copies of any such information and record findings on DATA FORM 3.
- e. Floodplain Management Maps. Determine the previous frequency of inundation of the area from Floodplain Management Maps (if available). Record flood frequency on DATA FORM 3.
- f. Public or local government officials. Contact individuals who might have knowledge that the area was periodically inundated.

If sufficient data on hydrology that existed prior to site alteration can be obtained to determine whether wetland hydrology was previously present, PROCEED TO STEP 4. If not, a determination involving hydrology cannot be made. Use other parameters (Subsections 1 and 2) for the wetland determination. Return to either the appropriate subsection of Section D or to Section E and complete the necessary data forms.

PROCEED TO STEP 4 if the previous hydrology can be characterized.

● STEP 4 - Determine Whether Wetland Hydrology Previously Occurred.

Examine the available data and determine whether indicators of wetland

hydrology (PART III, paragraph 49) were present prior to site alteration. If no indicators of wetland hydrology were found, the original hydrology of the area was not wetland hydrology. If indicators of wetland hydrology were found, record the appropriate indicators on DATA FORM 3 and return either to the appropriate subsection of Section D or to Section E and complete the wetland determination.

#### Subsection 4 - Man-Induced Wetlands

76. A man-induced wetland is an area that has developed at least some characteristics of naturally occurring wetlands due to either intentional or incidental human activities. Examples of man-induced wetlands include irrigated wetlands, wetlands resulting from impoundment (e.g. reservoir shorelines), wetlands resulting from filling of formerly deepwater habitats, dredged material disposal areas, and wetlands resulting from stream channel realignment. Some man-induced wetlands may be subject to Section 404. In virtually all cases, man-induced wetlands involve a significant change in the hydrologic regime, which may either increase or decrease the wetness of the area. Although wetland indicators of all three parameters (i.e. vegetation, soils, and hydrology) may be found in some man-induced wetlands, indicators of hydric soils are usually absent. Hydric soils require long periods (hundreds of years) for development of wetness characteristics, and most man-induced wetlands have not been in existence for a sufficient period to allow development of hydric soil characteristics. Therefore, application of the multi-parameter approach in making wetland determinations in man-induced wetlands must be based on the presence of hydrophytic vegetation and wetland hydrology.\* There must also be documented evidence that the wetland resulted from human activities. Employ the following steps to determine whether an area consists of wetlands resulting from human activities:

● STEP 1 - Determine Whether the Area Represents a Potential Man-Induced Wetland. Consider the following questions:

- a. Has a recent man-induced change in hydrology occurred that caused the area to become significantly wetter?

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\* Uplands that support hydrophytic vegetation due to agricultural irrigation and that have an obvious hydrologic connection to other "waters of the United States" should not be delineated as wetlands under this subsection.

- b. Has a major man-induced change in hydrology that occurred in the past caused a former deepwater aquatic habitat to become significantly drier?
- c. Has man-induced stream channel realignment significantly altered the area hydrology?
- d. Has the area been subjected to long-term irrigation practices?

If the answer to any of the above questions is YES, document the approximate time during which the change in hydrology occurred, and PROCEED TO STEP 2. If the answer to all of the questions is NO, procedures described in Section D or E must be used.

● STEP 2 - Determine Whether a Permit Will be Needed if the Area is Found to be a Wetland. Consider the current CE regulations and policy regarding man-induced wetlands. If the type of activity resulting in the area being a potential man-induced wetland is exempted by regulation or policy, no further action is needed. If not exempt, PROCEED TO STEP 3.

● STEP 3 - Characterize the Area Vegetation, Soils, and Hydrology. Apply procedures described in Section D (routine determinations) or Section E (comprehensive determinations) to the area. Complete the appropriate data forms and PROCEED TO STEP 4.

● STEP 4 - Wetland Determination. Based on information resulting from STEP 3, determine whether the area is a wetland. When wetland indicators of all three parameters are found, the area is a wetland. When indicators of hydrophytic vegetation and wetland hydrology are found and there is documented evidence that the change in hydrology occurred so recently that soils could not have developed hydric characteristics, the area is a wetland. In such cases, it is assumed that the soils are functioning as hydric soils. *CAUTION: If hydrophytic vegetation is being maintained only because of man-induced wetland hydrology that would no longer exist if the activity (e.g. irrigation) were to be terminated, the area should not be considered a wetland.*

## Section G - Problem Areas

77. There are certain wetland types and/or conditions that may make application of indicators of one or more parameters difficult, at least at certain times of the year. These are not considered to be atypical situations. Instead, they are wetland types in which wetland indicators of one or more parameters may be periodically lacking due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events.

### Types of problem areas

78. Representative examples of potential problem areas, types of variations that occur, and their effects on wetland indicators are presented in the following subparagraphs. Similar situations may sometimes occur in other wetland types. *Note: This section is not intended to bring nonwetland areas having wetland indicators of two, but not all three, parameters into Section 404 jurisdiction.*

- a. Wetlands on drumlins. Slope wetlands occur in glaciated areas in which thin soils cover relatively impermeable glacial till or in which layers of glacial till have different hydraulic conditions that produce a broad zone of ground-water seepage. Such areas are seldom, if ever, flooded, but downslope ground-water movement keeps the soils saturated for a sufficient portion of the growing season to produce anaerobic and reducing soil conditions. This fosters development of hydric soil characteristics and selects for hydrophytic vegetation. Indicators of wetland hydrology may be lacking during the drier portion of the growing season.
- b. Seasonal wetlands. In many regions (especially in western states), depression areas occur that have wetland indicators of all three parameters during the wetter portion of the growing season, but normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetland plant species (Appendix C, Section 1 or 2) normally are dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. These areas may be inundated during the wetter portion of the growing season, but wetland hydrology indicators may be totally lacking during the drier portion of the growing season. It is important to establish that an area truly is a water body. Water in a depression normally must be sufficiently persistent to exhibit an ordinary high-water mark or the presence of wetland characteristics before it can be considered as a water body potentially subject to Clean Water Act jurisdiction. The determination that an area exhibits wetland



characteristics for a sufficient portion of the growing season to qualify as a wetland under the Clean Water Act must be made on a case-by-case basis. Such determinations should consider the respective length of time that the area exhibits upland and wetland characteristics, and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soil, drainage characteristics, uses to which it has been subjected, and weather or hydrologic records.

- c. Prairie potholes. Prairie potholes normally occur as shallow depressions in glaciated portions of the north-central United States. Many are landlocked, while others have a drainage outlet to streams or other potholes. Most have standing water for much of the growing season in years of normal or above normal precipitation, but are neither inundated nor have saturated soils during most of the growing season in years of below normal precipitation. During dry years, potholes often become incorporated into farming plans, and are either planted to row crops (e.g. soybeans) or are mowed as part of a haying operation. When this occurs, wetland indicators of one or more parameters may be lacking. For example, tillage would eliminate any onsite hydrologic indicator, and would make detection of soil and vegetation indicators much more difficult.
- d. Vegetated flats. In both coastal and interior areas throughout the Nation, vegetated flats are often dominated by annual species that are categorized as OBL. Application of procedures described in Sections D and E during the growing season will clearly result in a positive wetland determination. However, these areas will appear to be unvegetated mudflats when examined during the nongrowing season, and the area would not qualify at that time as a wetland due to an apparent lack of vegetation.

#### Wetland determinations in problem areas

79. Procedures for making wetland determinations in problem areas are presented below. Application of these procedures is appropriate only when a decision has been made in Section D or E that wetland indicators of one or more parameters were lacking, probably due to normal seasonal or annual variations in environmental conditions. Specific procedures to be used will vary according to the nature of the area, site conditions, and parameter(s) affected by the variations in environmental conditions. A determination must be based on the best evidence available to the field inspector, including:

- a. Available information (Section B).
- b. Field data resulting from an onsite inspection.

- c. Basic knowledge of the ecology of the particular community type(s) and environmental conditions associated with the community type.

*NOTE: The procedures described below should only be applied to parameters not adequately characterized in Section D or E. Complete the following steps:*

- STEP 1 - Identify the Parameter(s) to be Considered. Examine the DATA FORM 1 (Section D or E) and identify the parameter(s) that must be given additional consideration. PROCEED TO STEP 2.
- STEP 2 - Determine the Reason for Further Consideration. Determine the reason why the parameter(s) identified in STEP 1 should be given further consideration. This will require a consideration and documentation of:
  - a. Environmental condition(s) that have impacted the parameter(s).
  - b. Impacts of the identified environmental condition(s) on the parameter(s) in question.

Record findings in the comments section of DATA FORM 1. PROCEED TO STEP 3.

- STEP 3 - Document Available Information for Parameter(s) in Question. Examine the available information and consider personal ecological knowledge of the range of normal environmental conditions of the area. Local experts (e.g. university personnel) may provide additional information. Record information on DATA FORM 1. PROCEED TO STEP 4.
- STEP 4 - Determine Whether Wetland Indicators are Normally Present During a Portion of the Growing Season. Examine the information resulting from STEP 3 and determine whether wetland indicators are normally present during part of the growing season. If so, record on DATA FORM 1 the indicators normally present and return to Section D or Section E and make a wetland determination. If no information can be found that wetland indicators of all three parameters are normally present during part of the growing season, the determination must be made using procedures described in Section D or Section E.

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APPENDIX A: GLOSSARY



Active water table - A condition in which the zone of soil saturation fluctuates, resulting in periodic anaerobic soil conditions. Soils with an active water table often contain bright mottles and matrix chromas of 2 or less.

Adaptation - A modification of a species that makes it more fit for existence under the conditions of its environment. These modifications are the result of genetic selection processes.

Adventitious roots - Roots found on plant stems in positions where they normally do not occur.

Aerenchymous tissue - A type of plant tissue in which cells are unusually large and arranged in a manner that results in air spaces in the plant organ. Such tissues are often referred to as spongy and usually provide increased buoyancy.

Aerobic - A situation in which molecular oxygen is a part of the environment.

Anaerobic - A situation in which molecular oxygen is absent (or effectively so) from the environment.

Aquatic roots - Roots that develop on stems above the normal position occupied by roots in response to prolonged inundation.

Aquic moisture regime - A mostly reducing soil moisture regime nearly free of dissolved oxygen due to saturation by ground water or its capillary fringe and occurring at periods when the soil temperature at 19.7 in. is greater than 5° C.

Arched roots - Roots produced on plant stems in a position above the normal position of roots, which serve to brace the plant during and following periods of prolonged inundation.

Areal cover - A measure of dominance that defines the degree to which above-ground portions of plants (not limited to those rooted in a sample plot) cover the ground surface. It is possible for the total areal cover in a community to exceed 100 percent because (a) most plant communities consist of two or more vegetative strata; (b) areal cover is estimated by vegetative layer; and (c) foliage within a single layer may overlap.

Atypical situation - As used herein, this term refers to areas in which one or more parameters (vegetation, soil, and/or hydrology) have been sufficiently altered by recent human activities or natural events to preclude the presence of wetland indicators of the parameter.

Backwater flooding - Situations in which the source of inundation is overbank flooding from a nearby stream.

Basal area - The cross-sectional area of a tree trunk measured in square inches, square centimetres, etc. Basal area is normally measured at 4.5 ft above the ground level and is used as a measure of dominance. The most easily used tool for measuring basal area is a tape marked in square inches. When plotless methods are used, an angle gauge or prism will provide a means for rapidly determining basal area. This term is also applicable to the cross-sectional area of a clumped herbaceous plant, measured at 1.0 in. above the soil surface.

Bench mark - A fixed, more or less permanent reference point or object, the elevation of which is known. The US Geological Survey (USGS) installs brass caps in bridge abutments or otherwise permanently sets bench marks at convenient locations nationwide. The elevations on these marks are referenced to the National Geodetic Vertical Datum (NGVD), also commonly known as mean sea level (MSL). Locations of these bench marks on USGS quadrangle maps are shown as small triangles. However, the marks are sometimes destroyed by construction or vandalism. The existence of any bench mark should be field verified before planning work that relies on a particular reference point. The USGS and/or local state surveyor's office can provide information on the existence, exact location, and exact elevation of bench marks.

Biennial - An event that occurs at 2-year intervals.

Buried soil - A once-exposed soil now covered by an alluvial, loessal, or other deposit (including man-made).

Canopy layer - The uppermost layer of vegetation in a plant community. In forested areas, mature trees comprise the canopy layer, while the tallest herbaceous species constitute the canopy layer in a marsh.

Capillary fringe - A zone immediately above the water table (zero gauge pressure) in which water is drawn upward from the water table by capillary action.

Chemical reduction - Any process by which one compound or ion acts as an electron donor. In such cases, the valence state of the electron donor is decreased.

Chroma - The relative purity or saturation of a color; intensity of distinctive hue as related to grayness; one of the three variables of color.

Comprehensive wetland determination - A type of wetland determination that is based on the strongest possible evidence, requiring the collection of quantitative data.

Concretion - A local concentration of chemical compounds (e.g. calcium carbonate, iron oxide) in the form of a grain or nodule of varying size, shape, hardness, and color. Concretions of significance in hydric soils are usually iron and/or manganese oxides occurring at or near the soil surface, which develop under conditions of prolonged soil saturation.

Contour - An imaginary line of constant elevation on the ground surface. The corresponding line on a map is called a "contour line."

Criteria - Standards, rules, or tests on which a judgment or decision may be based.

Deepwater aquatic habitat - Any open water area that has a mean annual water depth >6.6 ft, lacks soil, and/or is either unvegetated or supports only floating or submersed macrophytes.

Density - The number of individuals of a species per unit area.

Detritus - Minute fragments of plant parts found on the soil surface. When fused together by algae or soil particles, this is an indicator that surface water was recently present.

Diameter at breast height (DBH) - The width of a plant stem as measured at 4.5 ft above the ground surface.

Dike - A bank (usually earthen) constructed to control or confine water.

Dominance - As used herein, a descriptor of vegetation that is related to the standing crop of a species in an area, usually measured by height, areal cover, or basal area (for trees).

Dominant species - As used herein, a plant species that exerts a controlling influence on or defines the character of a community.

Drained - A condition in which ground or surface water has been reduced or eliminated from an area by artificial means.

Drift line - An accumulation of debris along a contour (parallel to the water flow) that represents the height of an inundation event.

Duration (inundation/soil saturation) - The length of time during which water stands at or above the soil surface (inundation), or during which the soil is saturated. As used herein, duration refers to a period during the growing season.

Ecological tolerance - The range of environmental conditions in which a plant species can grow.

Emergent plant - A rooted herbaceous plant species that has parts extending above a water surface.

Field capacity - The percentage of water remaining in a soil after it has been saturated and after free drainage is negligible.

Fill material - Any material placed in an area to increase surface elevation.

Flooded - A condition in which the soil surface is temporarily covered with flowing water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from high tides, or any combination of sources.

Flora - A list of all plant species that occur in an area.

Frequency (inundation or soil saturation) - The periodicity of coverage of an area by surface water or soil saturation. It is usually expressed as the number of years (e.g. 50 years) the soil is inundated or saturated at least once each year during part of the growing season per 100 years or as a 1-, 2-, 5-year, etc., inundation frequency.

Frequency (vegetation) - The distribution of individuals of a species in an area. It is quantitatively expressed as

$$\frac{\text{Number of samples containing species A}}{\text{Total number of samples}} \times 100$$

More than one species may have a frequency of 100 percent within the same area.

Frequently flooded - A flooding class in which flooding is likely to occur often under normal weather conditions (more than 50-percent chance of flooding in any year or more than 50 times in 100 years).

Gleyed - A soil condition resulting from prolonged soil saturation, which is manifested by the presence of bluish or greenish colors through the soil mass or in mottles (spots or streaks) among other colors. Gleying occurs under reducing soil conditions resulting from soil saturation, by which iron is reduced predominantly to the ferrous state.

Ground water - That portion of the water below the ground surface that is under greater pressure than atmospheric pressure.

Growing season - The portion of the year when soil temperatures at 19.7 inches below the soil surface are higher than biologic zero (5° C) (US Department of Agriculture - Soil Conservation Service 1985).<sup>\*</sup> For ease of determination this period can be approximated by the number of frost-free days (US Department of the Interior 1970).

Habitat - The environment occupied by individuals of a particular species, population, or community.

Headwater flooding - A situation in which an area becomes inundated directly by surface runoff from upland areas.

Herb - A nonwoody individual of a macrophytic species. In this manual, seedlings of woody plants (including vines) that are less than 3.2 ft in height are considered to be herbs.

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\* See references at the end of the main text.

Herbaceous layer - Any vegetative stratum of a plant community that is composed predominantly of herbs.

Histic epipedon - An 8- to 16-in. soil layer at or near the surface that is saturated for 30 consecutive days or more during the growing season in most years and contains a minimum of 20 percent organic matter when no clay is present or a minimum of 30 percent organic matter when 60 percent or greater clay is present.

Histosols - An order in soil taxonomy composed of organic soils that have organic soil materials in more than half of the upper 80 cm or that are of any thickness if directly overlying bedrock.

Homogeneous vegetation - A situation in which the same plant species association occurs throughout an area.

Hue - A characteristic of color that denotes a color in relation to red, yellow, blue, etc; one of the three variables of color. Each color chart in the Munsell Color Book (Munsell Color 1975) consists of a specific hue.

Hydric soil - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation (US Department of Agriculture-Soil Conservation Service 1985). Hydric soils that occur in areas having positive indicators of hydrophytic vegetation and wetland hydrology are wetland soils.

Hydric soil condition - A situation in which characteristics exist that are associated with soil development under reducing conditions.

Hydrologic regime - The sum total of water that occurs in an area on average during a given period.

Hydrologic zone - An area that is inundated or has saturated soils within a specified range of frequency and duration of inundation and soil saturation.

Hydrology - The science dealing with the properties, distribution, and circulation of water.

Hydrophyte - Any macrophyte that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wet habitats.

Hydrophytic vegetation - The sum total of macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. When hydrophytic vegetation comprises a community where indicators of hydric soils and wetland hydrology also occur, the area has wetland vegetation.

Hypertrophied lenticels - An exaggerated (oversized) pore on the surface of stems of woody plants through which gases are exchanged between the plant and the atmosphere. The enlarged lenticels serve as a mechanism for increasing oxygen to plant roots during periods of inundation and/or saturated soils.

Importance value - A quantitative term describing the relative influence of a plant species in a plant community, obtained by summing any combination of relative frequency, relative density, and relative dominance.

Indicator - As used in this manual, an event, entity, or condition that typically characterizes a prescribed environment or situation; indicators determine or aid in determining whether or not certain stated circumstances exist.

Indicator status - One of the categories (e.g. OBL) that describes the estimated probability of a plant species occurring in wetlands.

Intercellular air space - A cavity between cells in plant tissues, resulting from variations in cell shape and configuration. Aerenchymous tissue (a morphological adaptation found in many hydrophytes) often has large intercellular air spaces.

Inundation - A condition in which water from any source temporarily or permanently covers a land surface.

Levee - A natural or man-made feature of the landscape that restricts movement of water into or through an area.

Liana - As used in this manual, a layer of vegetation in forested plant communities that consists of woody vines. The term may also be applied to a given species.

Limit of biological activity - With reference to soils, the zone below which conditions preclude normal growth of soil organisms. This term often is used to refer to the temperature (5° C) in a soil below which metabolic processes of soil microorganisms, plant roots, and animals are negligible.

Long duration (flooding) - A flooding class in which the period of inundation for a single event ranges from 7 days to 1 month.

Macrophyte - Any plant species that can be readily observed without the aid of optical magnification. This includes all vascular plant species and mosses (e.g., *Sphagnum* spp.), as well as large algae (e.g. *Chara* spp., kelp).

Macrophytic - A term referring to a plant species that is a macrophyte.

Major portion of the root zone. The portion of the soil profile in which more than 50 percent of plant roots occur. In wetlands, this usually constitutes the upper 12 in. of the profile.

Man-induced wetland - Any area that develops wetland characteristics due to some activity (e.g., irrigation) of man.

Mapping unit - As used in this manual, some common characteristic of soil, vegetation, and/or hydrology that can be shown at the scale of mapping for the defined purpose and objectives of a survey.

Mean sea level - A datum, or "plane of zero elevation," established by averaging all stages of oceanic tides over a 19-year tidal cycle or "epoch." This plane is corrected for curvature of the earth and is the standard reference for elevations on the earth's surface. The correct term for mean sea level is the National Geodetic Vertical Datum (NGVD).

Mesophytic - Any plant species growing where soil moisture and aeration conditions lie between extremes. These species are typically found in habitats with average moisture conditions, neither very dry nor very wet.

Metabolic processes - The complex of internal chemical reactions associated with life-sustaining functions of an organism.

Method - A particular procedure or set of procedures to be followed.

Mineral soil - A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter usually containing less than 20-percent organic matter.

Morphological adaptation - A feature of structure and form that aids in fitting a species to its particular environment (e.g. buttressed base, adventitious roots, aerenchymous tissue).

Mottles - Spots or blotches of different color or shades of color interspersed within the dominant color in a soil layer, usually resulting from the presence of periodic reducing soil conditions.

Muck - Highly decomposed organic material in which the original plant parts are not recognizable.

Multitrunk - A situation in which a single individual of a woody plant species has several stems.

Nonhydric soil - A soil that has developed under predominantly aerobic soil conditions. These soils normally support mesophytic or xerophytic species.

Nonwetland - Any area that has sufficiently dry conditions that indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology are lacking. As used in this manual, any area that is neither a wetland, a deepwater aquatic habitat, nor other special aquatic site.

Organic pan - A layer usually occurring at 12 to 30 inches below the soil surface in coarse-textured soils, in which organic matter and aluminum (with or without iron) accumulate at the point where the top of the water table most often occurs. Cementing of the organic matter slightly reduces permeability of this layer.

Organic soil - A soil is classified as an organic soil when it is: (1) saturated for prolonged periods (unless artificially drained) and has more than 30-percent organic matter if the mineral fraction is more than 50-percent clay, or more than 20-percent organic matter if the mineral fraction has no clay; or (2) never saturated with water for more than a few days and having more than 34-percent organic matter.

Overbank flooding - Any situation in which inundation occurs as a result of the water level of a stream rising above bank level.

Oxidation-reduction process - A complex of biochemical reactions in soil that influences the valence state of component elements and their ions. Prolonged soil saturation during the growing season elicits anaerobic conditions that shift the overall process to a reducing condition.

Oxygen pathway - The sequence of cells, intercellular spaces, tissues, and organs, through which molecular oxygen is transported in plants. Plant species having pathways for oxygen transport to the root system are often adapted for life in saturated soils.

Parameter - A characteristic component of a unit that can be defined. Vegetation, soil, and hydrology are three parameters that may be used to define wetlands.

Parent material - The unconsolidated and more or less weathered mineral or organic matter from which a soil profile develops.

Ped - A unit of soil structure (e.g. aggregate, crumb, prism, block, or granule) formed by natural processes.

Peraquic moisture regime - A soil condition in which a reducing environment always occurs due to the presence of ground water at or near the soil surface.

Periodically - Used herein to define detectable regular or irregular saturated soil conditions or inundation, resulting from ponding of ground water, precipitation, overland flow, stream flooding, or tidal influences that occur(s) with hours, days, weeks, months, or even years between events.

Permeability - A soil characteristic that enables water or air to move through the profile, measured as the number of inches per hour that water moves downward through the saturated soil. The rate at which water moves through the least permeable layer governs soil permeability.

Physiognomy - A term used to describe a plant community based on the growth habit (e.g., trees, herbs, lianas) of the dominant species.

Physiological adaptation - A feature of the basic physical and chemical activities that occurs in cells and tissues of a species, which results in it being better fitted to its environment (e.g. ability to absorb nutrients under low oxygen tensions).

Plant community - All of the plant populations occurring in a shared habitat or environment.

Plant cover - See areal cover.

Pneumatophore - Modified roots that may function as a respiratory organ in species subjected to frequent inundation or soil saturation (e.g., cypress knees).



Ponded - A condition in which water stands in a closed depression. Water may be removed only by percolation, evaporation, and/or transpiration.

Poorly drained - Soils that commonly are wet at or near the surface during a sufficient part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these conditions.

Population - A group of individuals of the same species that occurs in a given area.

Positive wetland indicator - Any evidence of the presence of hydrophytic vegetation, hydric soil, and/or wetland hydrology in an area.

Prevalent vegetation - The plant community or communities that occur in an area during a given period. The prevalent vegetation is characterized by the dominant macrophytic species that comprise the plant community.

Quantitative - A precise measurement or determination expressed numerically.

Range - As used herein, the geographical area in which a plant species is known to occur.

Redox potential - A measure of the tendency of a system to donate or accept electrons, which is governed by the nature and proportions of the oxidizing and reducing substances contained in the system.

Reducing environment - An environment conducive to the removal of oxygen and chemical reduction of ions in the soils.

Relative density - A quantitative descriptor, expressed as a percent, of the relative number of individuals of a species in an area; it is calculated by

$$\frac{\text{Number of individuals of species A}}{\text{Total number of individuals of all species}} \times 100$$

Relative dominance - A quantitative descriptor, expressed as a percent, of the relative size or cover of individuals of a species in an area; it is calculated by

$$\frac{\text{Amount* of species A}}{\text{Total amount of all species}} \times 100$$

Relative frequency - A quantitative descriptor, expressed as a percent, of the relative distribution of individuals of a species in an area; it is calculated by

$$\frac{\text{Frequency of species A}}{\text{Total frequency of all species}} \times 100$$

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\* The "amount" of a species may be based on percent areal cover, basal area, or height.

Relief - The change in elevation of a land surface between two points; collectively, the configuration of the earth's surface, including such features as hills and valleys.

Reproductive adaptation - A feature of the reproductive mechanism of a species that results in it being better fitted to its environment (e.g. ability for seed germination under water).

Respiration - The sum total of metabolic processes associated with conversion of stored (chemical) energy into kinetic (physical) energy for use by an organism.

Rhizosphere - The zone of soil in which interactions between living plant roots and microorganisms occur.

Root zone - The portion of a soil profile in which plant roots occur.

Routine wetland determination - A type of wetland determination in which office data and/or relatively simple, rapidly applied onsite methods are employed to determine whether or not an area is a wetland. Most wetland determinations are of this type, which usually does not require collection of quantitative data.

Sample plot - An area of land used for measuring or observing existing conditions.

Sapling/shrub - A layer of vegetation composed of woody plants <3.0 in. in diameter at breast height but greater than 3.2 ft in height, exclusive of woody vines.

Saturated soil conditions - A condition in which all easily drained voids (pores) between soil particles in the root zone are temporarily or permanently filled with water to the soil surface at pressures greater than atmospheric.

Soil - Unconsolidated mineral and organic material that supports, or is capable of supporting, plants, and which has recognizable properties due to the integrated effect of climate and living matter acting upon parent material, as conditioned by relief over time.

Soil horizon - A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics (e.g. color, structure, texture, etc.).

Soil matrix - The portion of a given soil having the dominant color. In most cases, the matrix will be the portion of the soil having more than 50 percent of the same color.

Soil permeability - The ease with which gases, liquids, or plant roots penetrate or pass through a layer of soil.

Soil phase - A subdivision of a soil series having features (e.g. slope, surface texture, and stoniness) that affect the use and management of the soil, but which do not vary sufficiently to differentiate it as a separate series. These are usually the basic mapping units on detailed soil maps produced by the Soil Conservation Service.

Soil pore - An area within soil occupied by either air or water, resulting from the arrangement of individual soil particles or peds.

Soil profile - A vertical section of a soil through all its horizons and extending into the parent material.

Soil series - A group of soils having horizons similar in differentiating characteristics and arrangement in the soil profile, except for texture of the surface horizon.

Soil structure - The combination or arrangement of primary soil particles into secondary particles, units, or peds.

Soil surface - The upper limits of the soil profile. For mineral soils, this is the upper limit of the highest (A1) mineral horizon. For organic soils, it is the upper limit of undecomposed, dead organic matter.

Soil texture - The relative proportions of the various sizes of particles in a soil.

Somewhat poorly drained - Soils that are wet near enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, wet conditions high in the profile, additions of water through seepage, or a combination of these conditions.

Stilted roots - Aerial roots arising from stems (e.g., trunk and branches), presumably providing plant support (e.g., *Rhizophora mangle*).

Stooling - A form of asexual reproduction in which new shoots are produced at the base of senescing stems, often resulting in a multitrunk growth habit.

Stratigraphy - Features of geology dealing with the origin, composition, distribution, and succession of geologic strata (layers).

Substrate - The base or substance on which an attached species is growing.

Surface water - Water present above the substrate or soil surface.

Tidal - A situation in which the water level periodically fluctuates due to the action of lunar and solar forces upon the rotating earth.

Topography - The configuration of a surface, including its relief and the position of its natural and man-made features.

Transect - As used herein, a line on the ground along which observations are made at some interval.

Transition zone - The area in which a change from wetlands to nonwetlands occurs. The transition zone may be narrow or broad.

Transpiration - The process in plants by which water vapor is released into the gaseous environment, primarily through stomata.

Tree - A woody plant >3.0 in. in diameter at breast height, regardless of height (exclusive of woody vines).

Typical - That which normally, usually, or commonly occurs.

Typically adapted - A term that refers to a species being normally or commonly suited to a given set of environmental conditions, due to some feature of its morphology, physiology, or reproduction.

Unconsolidated parent material - Material from which a soil develops, usually formed by weathering of rock or placement in an area by natural forces (e.g. water, wind, or gravity).

Under normal circumstances - As used in the definition of wetlands, this term refers to situations in which the vegetation has not been substantially altered by man's activities.

Uniform vegetation - As used herein, a situation in which the same group of dominant species generally occurs throughout a given area.

Upland - As used herein, any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic characteristics associated with wetlands. Such areas occurring within floodplains are more appropriately termed nonwetlands.

Value (soil color) - The relative lightness or intensity of color, approximately a function of the square root of the total amount of light reflected from a surface; one of the three variables of color.

Vegetation - The sum total of macrophytes that occupy a given area.

Vegetation layer - A subunit of a plant community in which all component species exhibit the same growth form (e.g., trees, saplings/shrubs, herbs).

Very long duration (flooding) - A duration class in which the length of a single inundation event is greater than 1 month.

Very poorly drained - Soils that are wet to the surface most of the time. These soils are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

Watermark - A line on a tree or other upright structure that represents the maximum static water level reached during an inundation event.

Water table - The upper surface of ground water or that level below which the soil is saturated with water. It is at least 6 in. thick and persists in the soil for more than a few weeks.

Wetlands - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetland boundary - The point on the ground at which a shift from wetlands to nonwetlands or aquatic habitats occurs. These boundaries usually follow contours.

Wetland determination - The process or procedure by which an area is adjudged a wetland or nonwetland.

Wetland hydrology - The sum total of wetness characteristics in areas that are inundated or have saturated soils for a sufficient duration to support hydrophytic vegetation.

Wetland plant association - Any grouping of plant species that recurs wherever certain wetland conditions occur.

Wetland soil - A soil that has characteristics developed in a reducing atmosphere, which exists when periods of prolonged soil saturation result in anaerobic conditions. Hydric soils that are sufficiently wet to support hydrophytic vegetation are wetland soils.

Wetland vegetation - The sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. As used herein, hydrophytic vegetation occurring in areas that also have hydric soils and wetland hydrology may be properly referred to as wetland vegetation.

Woody vine - See liana.

Xerophytic - A plant species that is typically adapted for life in conditions where a lack of water is a limiting factor for growth and/or reproduction. These species are capable of growth in extremely dry conditions as a result of morphological, physiological, and/or reproductive adaptations.

APPENDIX B: BLANK AND EXAMPLE DATA FORMS

DATA FORM 1  
WETLAND DETERMINATION

Applicant Name: \_\_\_\_\_ Application Number: \_\_\_\_\_ Project Name: \_\_\_\_\_  
 State: \_\_\_\_\_ County: \_\_\_\_\_ Legal Description: \_\_\_\_\_ Township: \_\_\_\_\_ Range: \_\_\_\_\_  
 Date: \_\_\_\_\_ Plot No.: \_\_\_\_\_ Section: \_\_\_\_\_

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

	<u>Indicator Status</u>		<u>Indicator Status</u>
<u>Species</u>		<u>Species</u>	
<u>Trees</u>		<u>Herbs</u>	
1.		7.	
2.		8.	
3.		9.	
<u>Saplings/shrubs</u>		<u>Woody vines</u>	
4.		10.	
5.		11.	
6.		12.	

% of species that are OBL, FACW, and/or FAC: \_\_\_\_ . Other indicators: \_\_\_\_ .  
 Hydrophytic vegetation: Yes \_\_\_\_ No \_\_\_\_ . Basis: \_\_\_\_\_ .

Soil

Series and phase: \_\_\_\_\_ On hydric soils list? Yes \_\_\_\_ ; No \_\_\_\_ .  
 Mottled: Yes \_\_\_\_ ; No \_\_\_\_ . Mottle color: \_\_\_\_\_ ; Matrix color: \_\_\_\_\_ .  
 Gleyed: Yes \_\_\_\_ No \_\_\_\_ Other indicators: \_\_\_\_\_ .  
 Hydric soils: Yes \_\_\_\_ No \_\_\_\_ ; Basis: \_\_\_\_\_ .

Hydrology

Inundated: Yes \_\_\_\_ ; No \_\_\_\_ . Depth of standing water: \_\_\_\_\_ .  
 Saturated soils: Yes \_\_\_\_ ; No \_\_\_\_ . Depth to saturated soil: \_\_\_\_\_ .  
 Other indicators: \_\_\_\_\_ .  
 Wetland hydrology: Yes \_\_\_\_ ; No \_\_\_\_ . Basis: \_\_\_\_\_ .  
 Atypical situation: Yes \_\_\_\_ ; No \_\_\_\_ .  
Normal Circumstances? Yes \_\_\_\_ No \_\_\_\_ .  
Wetland Determination: Wetland \_\_\_\_\_ ; Nonwetland \_\_\_\_\_ .

Comments:

Determined by: \_\_\_\_\_

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: \_\_\_\_\_ Application No.: \_\_\_\_\_ Project Name: \_\_\_\_\_  
 Location: \_\_\_\_\_ Plot #: \_\_\_\_\_ Date: \_\_\_\_\_ Determined By: \_\_\_\_\_

VEGETATION LAYER

<u>TREES</u>	<u>BASAL AREA</u>	<u>TOTAL BASAL AREA</u>	<u>RANK</u>	<u>HERBS</u>	<u>MIDPOINT OF % COVER CLASS</u>	<u>RANK</u>
1				1		
2				2		
3				3		
4				4		
5				5		
6				6		
7				7		
8				8		
9				9		
10				10		

<u>SAPLINGS/SHRUBS</u>	<u>MIDPOINT OF HEIGHT CLASS</u>	<u>TOTAL HEIGHT CLASS</u>	<u>RANK</u>	<u>WOODY VINES</u>	<u>NUMBER OF STEMS</u>	<u>RANK</u>
1				1		
2				2		
3				3		
4				4		
5				5		
6				6		
7				7		
8				8		
9				9		
10				10		



DATA FORM 3  
ATYPICAL SITUATIONS

Applicant Name: \_\_\_\_\_ Application Number: \_\_\_\_\_ Project Name: \_\_\_\_\_  
Location: \_\_\_\_\_ Plot Number: \_\_\_\_\_ Date: \_\_\_\_\_

A. VEGETATION:

1. Type of Alteration: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
2. Effect on Vegetation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
3. Previous Vegetation: \_\_\_\_\_  
(Attach documentation) \_\_\_\_\_  
\_\_\_\_\_.
4. Hydrophytic Vegetation? Yes \_\_\_\_\_ No \_\_\_\_\_.

B. SOILS:

1. Type of Alteration: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
2. Effect on Soils: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
3. Previous Soils: \_\_\_\_\_  
(Attach documentation) \_\_\_\_\_  
\_\_\_\_\_.
4. Hydric Soils? Yes \_\_\_\_\_ No \_\_\_\_\_.

C. HYDROLOGY:

1. Type of Alteration: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
2. Effect on Hydrology: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
3. Previous Hydrology: \_\_\_\_\_  
(Attach documentation) \_\_\_\_\_  
\_\_\_\_\_.
4. Wetland Hydrology? Yes \_\_\_\_\_ No \_\_\_\_\_.

Characterized By: \_\_\_\_\_

DATA FORM 1  
WETLAND DETERMINATION

Applicant Name: John Doe Application Number: R-85-1421 Project Name: Zena Agricultural Land  
 State: LA County: Choctaw Legal Description: \_\_\_\_\_ Township: 7N Range: 2E  
 Date: 10/08/85 Plot No.: 1-1 Section: 32

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

<u>Species</u>	<u>Indicator Status</u>	<u>Species</u>	<u>Indicator Status</u>
<u>Trees</u>		<u>Herbs</u>	
1. <i>Quercus lyrata</i>	OBL	7. <i>Polygonum hydropiperoides</i>	OBL
2. <i>Carya aquatica</i>	OBL	8. <i>Boehmeria cylindrica</i>	FACW+
3. <i>Gleditsia aquatica</i>	OBL	9. <i>Brunnichia cirrhosa</i>	--
<u>Saplings/shurbs</u>		<u>Woody vines</u>	
4. <i>Forestiera acuminata</i>	OBL	10. <i>Toxicodendron radicans</i>	FAC
5. <i>Planera aquatica</i>	OBL	11. --	--
6. --	--	12. --	--

% of species that are OBL, FACW, and/or FAC: 100%. Other indicators: --.  
 Hydrophytic vegetation: Yes X No \_\_\_. Basis: 50% of dominants are OBL, FACW, and/or FAC on plant list.

Soil

Series and phase: Sharkey, frequently flooded On hydric soils list? Yes X; No \_\_\_.  
 Mottled: Yes X; No \_\_\_. Mottle color: 5YR4/6; Matrix color: 10YR4/1.  
 Gleyed: Yes \_\_\_ No X. Other indicators: \_\_\_\_\_.  
 Hydric soils: Yes X No \_\_\_; Basis: On hydric soil list and matrix color.

Hydrology

Inundated: Yes \_\_\_; No X. Depth of standing water: \_\_\_.  
 Saturated soils: Yes X; No \_\_\_. Depth to saturated soil: 6".  
 Other indicators: Drift lines and sediment deposits present on trees.  
 Wetland hydrology: Yes X; No \_\_\_. Basis: Saturated soils.  
 Atypical situation: Yes \_\_\_; No X.

Normal Circumstances?: Yes X No \_\_\_.

Wetland Determination: Wetland X; Nonwetland \_\_\_.

Comments: No rain reported from area in previous two weeks.

Determined by: Zelda Schmill (Signed)

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: John Doe Application No.: R-85-1421 Project Name: Zena Agricultural Land  
 Location: LA (Choctaw Parish) Plot #: 1-1 Date: 10/08/85 Determined By: Zelda Schmell  
VEGETATION LAYER

TREES	BASAL AREA (in <sup>2</sup> )	TOTAL BASAL AREA	RANK	HERBS	MIDPOINT OF % COVER CLASS	RANK
1 <i>Quercus lyrata</i>	465	1,145	1	1 <i>Boehmeria cylindrica</i>	37.5	2
2 <i>Quercus lyrata</i>	680			2 <i>Polygonum hydropiperoides</i>	62.5	1
3 <i>Carya aquatica</i>	85	243	3	3 <i>Brunnichia ovata</i>	37.5	3
4 <i>Carya aquatica</i>	120			4 <i>Gleditsia aquatica</i> (seedling)	2.5	
5 <i>Carya aquatica</i>	38			5 <i>Eclipta alba</i>	2.5	
6 <i>Gleditsia aquatica</i>	235	253	2	6		
7 <i>Gleditsia aquatica</i>	18			7		
8 <i>Diospyros virginiana</i>	46	46	8	8		
9			9	9		
10			10	10		

SAPLINGS/SHRUBS	MIDPOINT OF HEIGHT CLASS	TOTAL HEIGHT CLASS	RANK	WOODY VINES	NUMBER OF STEMS	RANK
1 <i>Forestiera acuminata</i>	4.5	13.0	1	1 <i>Toxicodendron radicans</i>	35	1
2 <i>Forestiera acuminata</i>	4.5			2 (only woody vine present)		
3 <i>Forestiera acuminata</i>	1.5			3		
4 <i>Forestiera acuminata</i>	2.5			4		
5 <i>Planera aquatica</i>	4.5	8.0	2	5		
6 <i>Planera aquatica</i>	3.5			6		
7 <i>Carya aquatica</i>	1.5	1.5	7	7		
8			8	8		
9			9	9		
10			10	10		

DATA FORM 3  
ATYPICAL SITUATIONS

Applicant Name: Wetland Developers, Inc. Application Number: R-85-12 Project Name: Big Canal  
Location: Joshua Co., MT Plot Number: 2 Date: 10/08/85

A. VEGETATION:

1. Type of Alteration: Vegetation totally removed or covered by placement of fill from canal (1984)
2. Effect on Vegetation: None remaining
3. Previous Vegetation: Carex nebrascensis - Juncus effusus freshwater (Attach documentation) marsh (based on contiguous plant communities and aerial photography predating fill)
4. Hydrophytic Vegetation? Yes  No

B. SOILS:

1. Type of Alteration: Original soil covered by 4 feet of fill material excavated from canal
2. Effect on Soils: Original soil buried in 1984
3. Previous Soils: Original soil examined at 10 inches below (Attach documentation) original soil surface. Soil gleyed (color notation 5Y2/0)
4. Hydric Soils? Yes  No

C. HYDROLOGY:

1. Type of Alteration: 4 feet of fill material placed on original surface
2. Effect on Hydrology: Area no longer is inundated
3. Previous Hydrology: Examination of color IR photography taken on 6/5/84 (Attach documentation) showed the area to be inundated. Gaging station data from gage 2 miles upstream indicated the area has been inundated for as much as 3 months of the growing season during 8 of the past 12 years
4. Wetland Hydrology? Yes  No

Characterized By: Joe Zook



APPENDIX C: VEGETATION

1. This appendix contains three sections. Section 1 is a subset of the regional list of plants that occur in wetlands, but includes only those species having an indicator status of OBL, FACW, or FAC. Section 2 is a list of plants that commonly occur in wetlands of a given region. Since many geographic areas of Section 404 responsibility include portions of two or more plant list regions, users will often need more than one regional list; thus, Sections 1 and 2 will be published separately from the remainder of the manual. Users will be furnished all appropriate regional lists.

2. Section 3, which is presented herein, describes morphological, physiological, and reproductive adaptations that can be observed or are known to occur in plant species that are typically adapted for life in anaerobic soil conditions.

Section 3 - Morphological, Physiological, and Reproductive  
Adaptations of Plant Species for Occurrence in Areas  
Having Anaerobic Soil Conditions

Morphological adaptations

3. Many plant species have morphological adaptations for occurrence in wetlands. These structural modifications most often provide the plant with increased buoyancy or support. In some cases (e.g. adventitious roots), the adaptation may facilitate the uptake of nutrients and/or gases (particularly oxygen). However, not all species occurring in areas having anaerobic soil conditions exhibit morphological adaptations for such conditions. The following is a list of morphological adaptations that a species occurring in areas having anaerobic soil conditions may possess (a partial list of species with such adaptations is presented in Table C1):

- a. Buttressed tree trunks. Tree species (e.g. *Taxodium distichum*) may develop enlarged trunks (Figure C1) in response to frequent inundation. This adaptation is a strong indicator of hydrophytic vegetation in nontropical forested areas.
- b. Pneumatophores. These modified roots may serve as respiratory organs in species subjected to frequent inundation or soil saturation. Cypress knees (Figure C2) are a classic example, but other species (e.g., *Nyssa aquatica*, *Rhizophora mangle*) may also develop pneumatophores.
- c. Adventitious roots. Sometimes referred to as "water roots," adventitious roots occur on plant stems in positions where roots normally are not found. Small fibrous roots protruding from the base of trees (e.g. *Salix nigra*) or roots on stems of herbaceous

plants and tree seedlings in positions immediately above the soil surface (e.g. *Ludwigia* spp.) occur in response to inundation or soil saturation (Figure C3). These usually develop during periods of sufficiently prolonged soil saturation to destroy most of the root system. *CAUTION: Not all adventitious roots develop as a result of inundation or soil saturation. For example, aerial roots on woody vines are not normally produced as a response to inundation or soil saturation.*

- d. Shallow root systems. When soils are inundated or saturated for long periods during the growing season, anaerobic conditions develop in the zone of root growth. Most species with deep root systems cannot survive in such conditions. Most species capable of growth during periods when soils are oxygenated only near the surface have shallow root systems. In forested wetlands, wind-thrown trees (Figure C4) are often indicative of shallow root systems.
- e. Inflated leaves, stems, or roots. Many hydrophytic species, particularly herbs (e.g. *Limnobiium spongia*, *Ludwigia* spp.), have or develop spongy (aerenchymous) tissues in leaves, stems, and/or roots that provide buoyancy or support and serve as a reservoir or passageway for oxygen needed for metabolic processes. An example of inflated leaves is shown in Figure C5.
- f. Polymorphic leaves. Some herbaceous species produce different types of leaves, depending on the water level at the time of leaf formation. For example, *Alisma* spp. produce strap-shaped leaves when totally submerged, but produce broader, floating leaves when plants are emergent. *CAUTION: Many upland species also produce polymorphic leaves.*
- g. Floating leaves. Some species (e.g. *Nymphaea* spp.) produce leaves that are uniquely adapted for floating on a water surface (Figure C6). These leaves have stomata primarily on the upper surface and a thick waxy cuticle that restricts water penetration. The presence of species with floating leaves is strongly indicative of hydrophytic vegetation.
- h. Floating stems. A number of species (e.g., *Alternanthera philoxeroides*) produce matted stems that have large internal air spaces when occurring in inundated areas. Such species root in shallow water and grow across the water surface into deeper areas. Species with floating stems often produce adventitious roots at leaf nodes.
- i. Hypertrophied lenticels. Some plant species (e.g. *Gleditsia aquatica*) produce enlarged lenticels on the stem in response to prolonged inundation or soil saturation. These are thought to increase oxygen uptake through the stem during such periods.
- j. Multitrunks or stooling. Some woody hydrophytes characteristically produce several trunks of different ages (Figure C7) or produce new stems arising from the base of a senescing individual (e.g. *Forestiera acuminata*, *Nyssa ogechee*) in response to inundation.





Figure C1. Buttressed tree trunk (bald cypress)



Figure C2. Pneumatophores (bald cypress)



Figure C3. Adventitious roots



Figure C4. Wind-thrown tree with shallow root system



Figure C5. Inflated leaves



Figure C6. Floating leaves



Figure C7. Multitrunk plant

- k. Oxygen pathway to roots. Some species (e.g. *Spartina alterniflora*) have a specialized cellular arrangement that facilitates diffusion of gaseous oxygen from leaves and stems to the root system.

#### Physiological adaptations

4. Most, if not all, hydrophytic species are thought to possess physiological adaptations for occurrence in areas that have prolonged periods of anaerobic soil conditions. However, relatively few species have actually been proven to possess such adaptations, primarily due to the limited research that has been conducted. Nevertheless, several types of physiological adaptations known to occur in hydrophytic species are discussed below, and a list of species having one or more of these adaptations is presented in Table C2. *NOTE: Since it is impossible to detect these adaptations in the field, use of this indicator will be limited to observing the species in the field and checking the list in Table C2 to determine whether the species is known to have a physiological adaptation for occurrence in areas having anaerobic soil conditions):*

- a. Accumulation of malate. Malate, a nontoxic metabolite, accumulates in roots of many hydrophytic species (e.g. *Glyceria maxima*, *Nyssa sylvatica* var. *biflora*). Nonwetland species concentrate ethanol, a toxic by-product of anaerobic respiration, when growing in anaerobic soil conditions. Under such conditions, many hydrophytic species produce high concentrations of malate and unchanged concentrations of ethanol, thereby avoiding accumulation of toxic materials. Thus, species having the ability to concentrate malate instead of ethanol in the root system under anaerobic soil conditions are adapted for life in such conditions, while species that concentrate ethanol are poorly adapted for life in anaerobic soil conditions.
- b. Increased levels of nitrate reductase. Nitrate reductase is an enzyme involved in conversion of nitrate nitrogen to nitrite nitrogen, an intermediate step in ammonium production. Ammonium ions can accept electrons as a replacement for gaseous oxygen in some species, thereby allowing continued functioning of metabolic processes under low soil oxygen conditions. Species that produce high levels of nitrate reductase (e.g. *Larix laricina*) are adapted for life in anaerobic soil conditions.
- c. Slight increases in metabolic rates. Anaerobic soil conditions effect short-term increases in metabolic rates in most species. However, the rate of metabolism often increases only slightly in wetland species, while metabolic rates increase significantly in nonwetland species. Species exhibiting only slight increases in metabolic rates (e.g. *Larix laricina*, *Senecio vulgaris*) are adapted for life in anaerobic soil conditions.

- d. Rhizosphere oxidation. Some hydrophytic species (e.g. *Nyssa aquatica*, *Myrica gale*) are capable of transferring gaseous oxygen from the root system into soil pores immediately surrounding the roots. This adaptation prevents root deterioration and maintains the rates of water and nutrient absorption under anaerobic soil conditions.
- e. Ability for root growth in low oxygen tensions. Some species (e.g. *Typha angustifolia*, *Juncus effusus*) have the ability to maintain root growth under soil oxygen concentrations as low as 0.5 percent. Although prolonged (>1 year) exposure to soil oxygen concentrations lower than 0.5 percent generally results in the death of most individuals, this adaptation enables some species to survive extended periods of anaerobic soil conditions.
- f. Absence of alcohol dehydrogenase (ADH) activity. ADH is an enzyme associated with increased ethanol production. When the enzyme is not functioning, ethanol production does not increase significantly. Some hydrophytic species (e.g. *Potentilla anserina*, *Polygonum amphibium*) show only slight increases in ADH activity under anaerobic soil conditions. Therefore, ethanol production occurs at a slower rate in species that have low concentrations of ADH.

#### Reproductive adaptations

5. Some plant species have reproductive features that enable them to become established and grow in saturated soil conditions. The following have been identified in the technical literature as reproductive adaptations that occur in hydrophytic species:

- a. Prolonged seed viability. Some plant species produce seeds that may remain viable for 20 years or more. Exposure of these seeds to atmospheric oxygen usually triggers germination. Thus, species (e.g., *Taxodium distichum*) that grow in very wet areas may produce seeds that germinate only during infrequent periods when the soil is dewatered. NOTE: Many upland species also have prolonged seed viability, but the trigger mechanism for germination is not exposure to atmospheric oxygen.
- b. Seed germination under low oxygen concentrations. Seeds of some hydrophytic species germinate when submerged. This enables germination during periods of early-spring inundation, which may provide resulting seedlings a competitive advantage over species whose seeds germinate only when exposed to atmospheric oxygen.
- c. Flood-tolerant seedlings. Seedlings of some hydrophytic species (e.g. *Fraxinus pennsylvanica*) can survive moderate periods of total or partial inundation. Seedlings of these species have a competitive advantage over seedlings of flood-intolerant species.

Table C1  
Partial List of Species With Known Morphological Adaptations for  
 Occurrence in Wetlands\*

Species	Common Name	Adaptation
<i>Acer negundo</i>	Box elder	Adventitious roots
<i>Acer rubrum</i>	Red maple	Hypertrophied lenticels
<i>Acer saccharinum</i>	Silver maple	Hypertrophied lenticels; adventitious roots (juvenile plants)
<i>Alisma</i> spp.	Water plantain	Polymorphic leaves
<i>Alternanthera philoxeroides</i>	Alligatorweed	Adventitious roots; inflated, floating stems
<i>Avicennia nitida</i>	Black mangrove	Pneumatophores; hypertrophied lenticels
<i>Brasenia schreberi</i>	Watershield	Inflated, floating leaves
<i>Cladium mariscoides</i>	Twig rush	Inflated stems
<i>Cyperus</i> spp. (most species)	Flat sedge	Inflated stems and leaves
<i>Eleocharis</i> spp. (most species)	Spikerush	Inflated stems and leaves
<i>Forestiera acuminata</i>	Swamp privet	Multi-trunk, stooling
<i>Fraxinus pennsylvanica</i>	Green ash	Buttressed trunks; adventi- tious roots
<i>Gleditsia aquatica</i>	Water locust	Hypertrophied lenticels
<i>Juncus</i> spp.	Rush	Inflated stems and leaves
<i>Limnium spongia</i>	Frogbit	Inflated, floating leaves
<i>Ludwigia</i> spp.	Waterprimrose	Adventitious roots; inflated floating stems
<i>Menyanthes trifoliata</i>	Buckbean	Inflated stems (rhizome)
<i>Myrica gale</i>	Sweetgale	Hypertrophied lenticels
<i>Nelumbo</i> spp.	Lotus	Floating leaves
<i>Nuphar</i> spp.	Cowlily	Floating leaves

(Continued)

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\* Many other species exhibit one or more morphological adaptations for occurrence in wetlands. However, not all individuals of a species will exhibit these adaptations under field conditions, and individuals occurring in uplands characteristically may not exhibit them.

Table C1 (Concluded)

Species	Common Name	Adaptation
<i>Nymphaea</i> spp.	Waterlily	Floating leaves
<i>Nyssa aquatica</i>	Water tupelo	Buttressed trunks; pneumatophores; adventitious roots
<i>Nyssa ogechee</i>	Ogechee tupelo	Buttressed trunks; multi-trunk; stooling
<i>Nyssa sylvatica</i> var. <i>biflora</i>	Swamp blackgum	Buttressed trunks
<i>Platanus occidentalis</i>	Sycamore	Adventitious roots
<i>Populus deltoides</i>	Cottonwood	Adventitious roots
<i>Quercus laurifolia</i>	Laurel oak	Shallow root system
<i>Quercus palustris</i>	Pin oak	Adventitious roots
<i>Rhizophora mangle</i>	Red mangrove	Pneumatophores
<i>Sagittaria</i> spp.	Arrowhead	Polymorphic leaves
<i>Salix</i> spp.	Willow	Hypertrophied lenticels; adventitious roots; oxygen pathway to roots
<i>Scirpus</i> spp.	Bulrush	Inflated stems and leaves
<i>Spartina alterniflora</i>	Smooth cordgrass	Oxygen pathway to roots
<i>Taxodium distichum</i>	Bald cypress	Buttressed trunks; pneumatophores

Table C2  
Species Exhibiting Physiological Adaptations for  
Occurrence in Wetlands

Species	Physiological Adaptation
<i>Alnus incana</i>	Increased levels of nitrate reductase; malate accumulation
<i>Alnus rubra</i>	Increased levels of nitrate reductase
<i>Baccharis virinea</i>	Ability for root growth in low oxygen tensions
<i>Betula pubescens</i>	Oxidizes the rhizosphere; malate accumulation
<i>Carex arenaria</i>	Malate accumulation
<i>Carex flacca</i>	Absence of ADH activity
<i>Carex lasiocarpa</i>	Malate accumulation
<i>Deschampsia cespitosa</i>	Absence of ADH activity
<i>Filipendula ulmaria</i>	Absence of ADH activity
<i>Fraxinus pennsylvanica</i>	Oxidizes the rhizosphere
<i>Glyceria maxima</i>	Malate accumulation; absence of ADH activity
<i>Juncus effusus</i>	Ability for root growth in low oxygen tensions; absence of ADH activity
<i>Larix laricina</i>	Slight increases in metabolic rates; increased levels of nitrate reductase
<i>Lobelia dortmanna</i>	Oxidizes the rhizosphere
<i>Lythrum salicaria</i>	Absence of ADH activity
<i>Molinia caerulea</i>	Oxidizes the rhizosphere
<i>Myrica gale</i>	Oxidizes the rhizosphere
<i>Nuphar lutea</i>	Organic acid production
<i>Nyssa aquatica</i>	Oxidizes the rhizosphere
<i>Nyssa sylvatica</i> var. <i>biflora</i>	Oxidizes the rhizosphere; malate accumulation
<i>Phalaris arundinacea</i>	Absence of ADH activity; ability for root growth in low oxygen tensions
<i>Phragmites australis</i>	Malate accumulation
<i>Pinus contorta</i>	Slight increases in metabolic rates; increased levels of nitrate reductase
<i>Polygonum amphibium</i>	Absence of ADH activity
<i>Potentilla anserina</i>	Absence of ADH activity; ability for root growth in low oxygen tensions

(Continued)

Table C2 (Concluded)

Species	Physiological Adaptation
<i>Ranunculus flammula</i>	Malate accumulation; absence of ADH activity
<i>Salix cinerea</i>	Malate accumulation
<i>Salix fragilis</i>	Oxidizes the rhizosphere
<i>Salix lasiolepis</i>	Ability for root growth in low oxygen tensions
<i>Scirpus maritimus</i>	Ability for root growth in low oxygen tensions
<i>Senecio vulgaris</i>	Slight increases in metabolic rates
<i>Spartina alterniflora</i>	Oxidizes the rhizosphere
<i>Trifolium subterraneum</i>	Low ADH activity
<i>Typha angustifolia</i>	Ability for root growth in low oxygen tensions





APPENDIX D: HYDRIC SOILS

1. This appendix consists of two sections. Section 1 describes the basic procedure for digging a soil pit and examining for hydric soil indicators. Section 2 is a list of hydric soils of the United States.

Section 1 - Procedures for Digging a Soil Pit and Examining  
for Hydric Soil Indicators

Digging a soil pit

2. Apply the following procedure: Circumscribe a 1-ft-diam area, preferably with a tile spade (sharpshooter). Extend the blade vertically downward, cut all roots to the depth of the blade, and lift the soil from the hole. This should provide approximately 16 inches of the soil profile for examination. *Note: Observations are usually made immediately below the A-horizon or 10 inches (whichever is shallower).* In many cases, a soil auger or probe can be used instead of a spade. If so, remove successive cores until 16 inches of the soil profile have been removed. Place successive cores in the same sequence as removed from the hole. *Note: An auger or probe cannot be effectively used when the soil profile is loose, rocky, or contains a large volume of water (e.g. peraquic moisture regime).*

Examining the soil

3. Examine the soil for hydric soils indicators (paragraphs 44 and/or 45 of main text (for sandy soils)). *Note: It may not be necessary to conduct a classical characterization (e.g. texture, structure, etc.) of the soil. Consider the hydric soil indicators in the following sequence (Note: THE SOIL EXAMINATION CAN BE TERMINATED WHEN A POSITIVE HYDRIC SOIL INDICATOR IS FOUND):*

Nonsandy soils.

- a. Determine whether an organic soil is present (see paragraph 44 of the main text). If so, the soil is hydric.
- b. Determine whether the soil has a histic epipedon (see paragraph 44 of the main text). Record the thickness of the histic epipedon on DATA FORM 1.
- c. Determine whether sulfidic materials are present by smelling the soil. The presence of a "rotten egg" odor is indicative of hydrogen sulfide, which forms only under extreme reducing conditions associated with prolonged inundation/soil saturation.
- d. Determine whether the soil has an aquic or peraquic moisture regime (see paragraph 44 of the main text). If so, the soil is hydric.

- e. Conduct a ferrous iron test. A colorimetric field test kit has been developed for this purpose. A reducing soil environment is present when the soil extract turns pink upon addition of  $\alpha$ - $\alpha$ -dipyridil.
- f. Determine the color(s) of the matrix and any mottles that may be present. Soil color is characterized by three features: hue, value, and chroma. Hue refers to the soil color in relation to red, yellow, blue, etc. Value refers to the lightness of the hue. Chroma refers to the strength of the color (or departure from a neutral of the same lightness). Soil colors are determined by use of a Munsell Color Book (Munsell Color 1975).<sup>\*</sup> Each Munsell Color Book has color charts of different hues, ranging from 10R to 5Y. Each page of hue has color chips that show values and chromas. Values are shown in columns down the page from as low as 0 to as much as 8, and chromas are shown in rows across the page from as low as 0 to as much as 8. In writing Munsell color notations, the sequence is always hue, value, and chroma (e.g. 10YR5/2). To determine soil color, place a small portion of soil\*\* in the openings behind the color page and match the soil color to the appropriate color chip. *Note: Match the soil to the nearest color chip. Record on DATA FORM 1 the hue, value, and chroma of the best matching color chip. CAUTION: Never place soil on the face or front of the color page because this might smear the color chips. Mineral hydric soils usually have one of the following color features immediately below the A-horizon or 10 inches (whichever is shallower):*

(1) Gleyed soil.

Determine whether the soil is gleyed. If the matrix color best fits a color chip found on the gley page of the Munsell soil color charts, the soil is gleyed. This indicates prolonged soil saturation, and the soil is highly reduced.

(2) Nongleyed soil.

- (a) Matrix chroma of 2 or less in mottled soils.\*\*
- (b) Matrix chroma of 1 or less in unmottled soils.\*\*
- (c) Gray mottles within 10 inches of the soil surface in dark (black) mineral soils (e.g., Mollisols) that do not have characteristics of (a) or (b) above.

Soils having the above color characteristics are normally saturated for significant duration during the growing season. However, hydric soils with significant coloration due to the nature of the parent material (e.g. red soils of the Red River Valley) may not exhibit chromas within the range indicated above. In such cases, this indicator cannot be used.

---

\* See references at the end of the main text.

\*\* The soil must be moistened if dry at the time of examination.

- g. Determine whether the mapped soil series or phase is on the national list of hydric soils (Section 2). *CAUTION: It will often be necessary to compare the profile description of the soil with that of the soil series or phase indicated on the soil map to verify that the soil was correctly mapped. This is especially true when the soil survey indicates the presence of inclusions or when the soil is mapped as an association of two or more soil series.*
- h. Look for iron and manganese concretions. Look for small (>0.08-inch) aggregates within 3 inches of the soil surface. These are usually black or dark brown and reflect prolonged saturation near the soil surface.

Sandy soils.

Look for one of the following indicators in sandy soils:

- a. A layer of organic material above the mineral surface or high organic matter content in the surface horizon (see paragraph 45a of the main text). This is evidenced by a darker color of the surface layer due to organic matter interspersed among or adhering to the sand particles. This is not observed in upland soils due to associated aerobic conditions.
- b. Streaking of subsurface horizons (see paragraph 45c of the main text). Look for dark vertical streaks in subsurface horizons. These streaks represent organic matter being moved downward in the profile. When soil is rubbed between the fingers, the organic matter will leave a dark stain on the fingers.
- c. Organic pans (see paragraph 45b of the main text). This is evidenced by a thin layer of hardened soil at a depth of 12 to 30 inches below the mineral surface.

## Section 2 - Hydric Soils of the United States

4. The list of hydric soils of the United States (Table D1) was developed by the National Technical Committee for Hydric Soils (NTCHS), a panel consisting of representatives of the Soil Conservation Service (SCS), Fish and Wildlife Service, Environmental Protection Agency, Corps of Engineers, Auburn University, University of Maryland, and Louisiana State University. Keith Young of SCS was committee chairman.

5. The NTCHS developed the following definition of hydric soils:

A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation" (US Department of Agriculture (USDA) Soil Conservation Service 1985, as amended by the NTCHS in December 1986).

### Criteria for hydric soils

6. Based on the above definition, the NTCHS developed the following criteria for hydric soils, and all soils appearing on the list will meet at least one criterion:

- a. "All Histosols\* except Folists;
- b. Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:
  - (1) Somewhat poorly drained and have water table less than 0.5 ft from the surface for a significant period (usually a week or more) during the growing season, or
  - (2) Poorly drained or very poorly drained and have either:
    - (a) A water table at less than 1.0 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within 20 inches; or
    - (b) A water table at less than 1.5 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 in/hr in any layer within 20 inches; or
- c. Soils that are ponded for long duration or very long duration during part of the growing season; or
- d. Soils that are frequently flooded for long duration or very long duration during the growing season.

---

\* Soil taxa conform to USDA-SCS (1975).

7. The hydric soils list was formulated by applying the above criteria to soil properties documented in USDA-SCS (1975) and the SCS Soil Interpretation Records (SOI-5).

#### Use of the list

8. The list of hydric soils of the United States (Table D1) is arranged alphabetically by soil series. Unless otherwise specified, all phases of a listed soil series are hydric. In some cases, only those phases of a soil series that are ponded, frequently flooded, or otherwise designated as wet are hydric. Such phases are denoted in Table D1 by the following symbols in parentheses after the series name:

F - flooded

FF - frequently flooded

P - ponded

W - wet

D - depressional

9. Drained phases of some soil series retain their hydric properties even after drainage. Such phases are identified in Table D1 by the symbol "DR" in parentheses following the soil series name. In such cases, both the drained and undrained phases of the soil series are hydric.

*CAUTION: Be sure that the profile description of the mapping unit conforms to that of the sampled soil. Also, designation of a soil series or phase as hydric does not necessarily mean that the area is a wetland. An area having a hydric soil is a wetland only if positive indicators of hydrophytic vegetation and wetland hydrology are also present.*

**\*\* NOTE** - Table D1, List of Hydric Soils has been changed and is now contained in the third edition Hydric Soils of the United States (June 1991). Copies of this publication can be obtained by contacting Maurice J. Mausbach, NTCHS, SCS, Room 152, Federal Building, 100 Centennial Mall North, Lincoln, NE 68508-3866 (Telephone 402-437-5423).





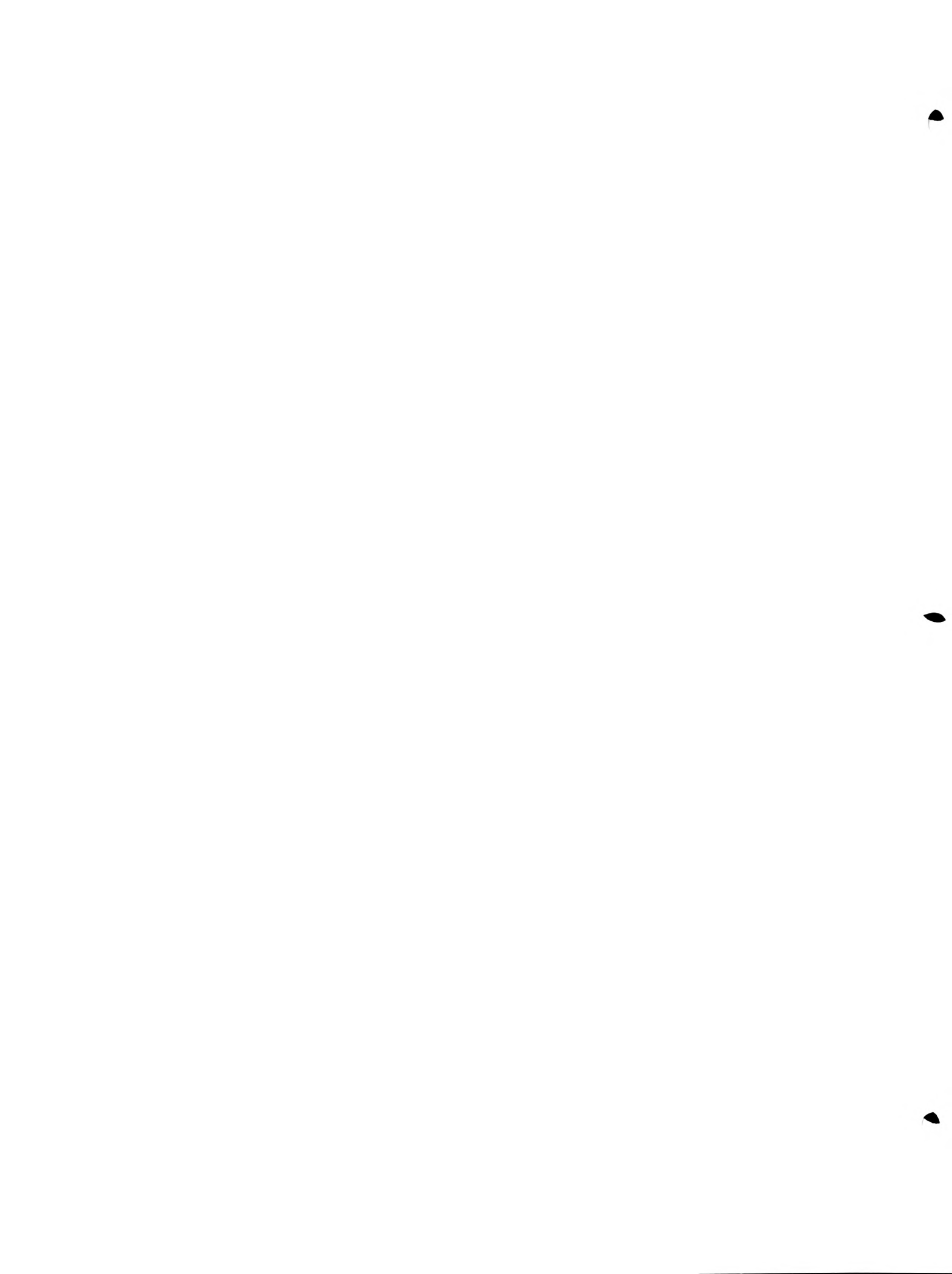
7. The hydric soils listed in the Soil Survey of the United States to soil properties documentation Records (SOI-5).

Use of the list

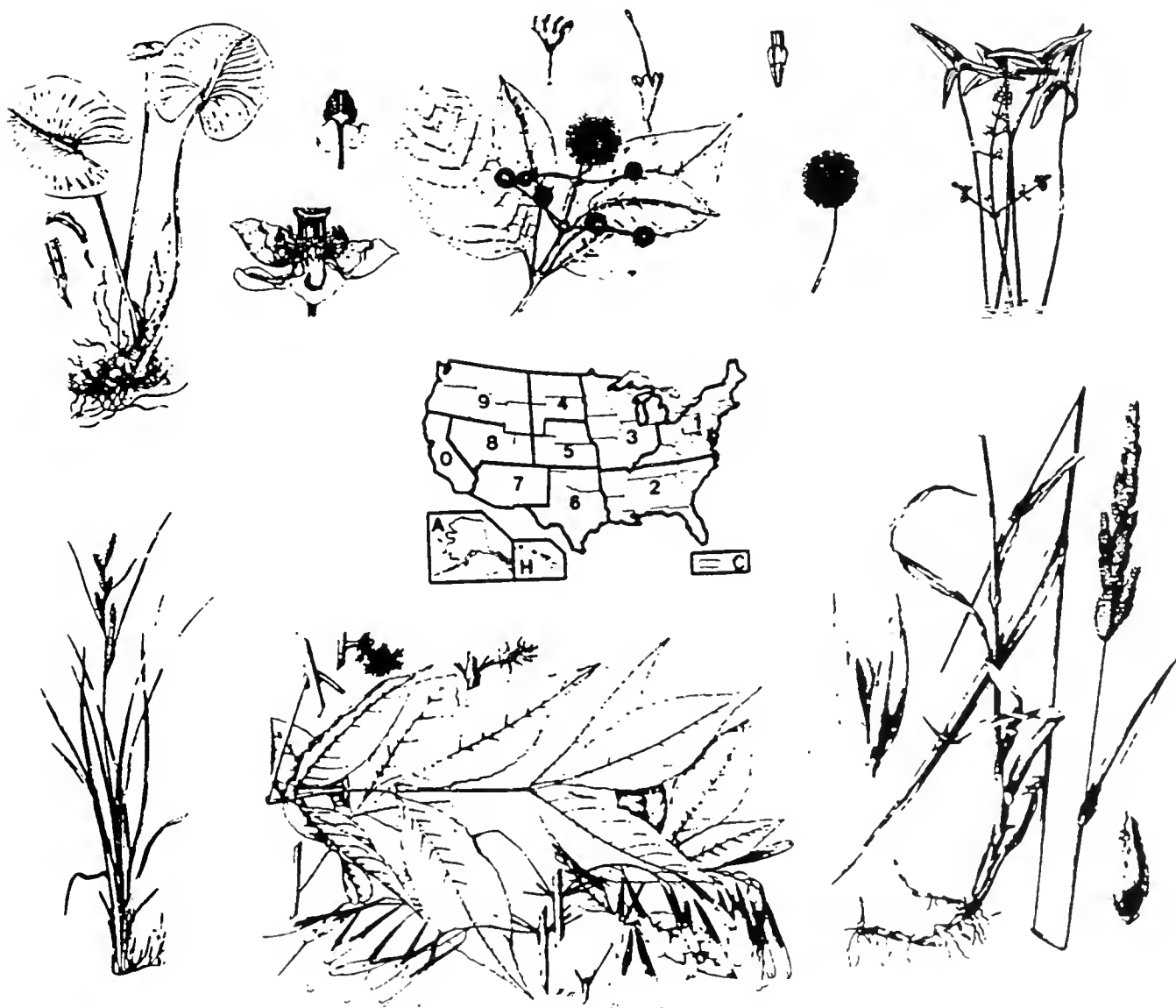
8. The list of soil series is arranged alphabetically by the first letter of the listed soil series that are hydric. Soil series names are enclosed in parentheses.

**ATTACHMENT D**

**NATIONAL LIST OF PLANT SPECIES  
THAT OCCUR IN WETLANDS  
(Overview)**



# NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS: 1988 NATIONAL SUMMARY



Fish and Wildlife Service

In Cooperation with the National and  
Regional Interagency Review Panels

U.S. Department of the Interior

92001749

Biological Report 88(24)  
September 1988  
Supersedes WELUT-86/W17.01

NATIONAL LIST OF PLANT SPECIES  
THAT OCCUR IN WETLANDS:  
NATIONAL SUMMARY

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National Wetlands Inventory  
U.S. Fish and Wildlife Service

In cooperation with the National and Regional  
Interagency Review Panels:

U.S. Fish and Wildlife Service  
U.S. Army Corps of Engineers  
U.S. Environmental Protection Agency  
U.S. Soil Conservation Service

U.S. Department of the Interior  
Fish and Wildlife Service  
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## DEDICATION

The National List of Plant Species That Occur in Wetlands is respectfully dedicated to Neil Hotchkiss and Francis M. Uhler, who made this work possible by their contributions to wetland botany and ecology. These two scientists focused their long and productive careers on the study of wetlands long before our current emphasis on wetland systems began. They aided in producing the Fish and Wildlife Service's first wetland classification system, developed initial lists and guidebooks to the wetland plants of the United States, and produced many studies on the ecology and management of wetlands and their value to wildlife. It is my sincere pleasure and humble gratitude to acknowledge the dependence of this current work on their long and untiring efforts.

Suggested citation:

Reed, P.B., Jr. 1988. National list of plant species that occur in wetlands: national summary. -U.S. Fish Wildl. Serv. Biol. Rep. 88(24). 244 pp.

## ACKNOWLEDGMENTS

The National List of Plant Species That Occur in Wetlands (hereafter referred to as the National List) is the result of the collective efforts of a large number of dedicated biologists. Special recognition and thanks are extended to the many people who contributed to the successful completion of this project. The National Wetlands Inventory, especially John Montanari and William Wilen, provided the funding and administrative support necessary for the development of the National List and coordination of the review effort.

The other Federal agencies, especially William Sipple, John Meagher, and Dave Davis of the Environmental Protection Agency, Robert Pierce, Richard Macomber, and Dana Sanders of the Corps of Engineers, and Billy Teels and Carl Thomas of the Soil Conservation Service, provided much needed funding to aid development of the Annotated National Wetland Plant Species Data Base and technical support through their agency biologists' participation in the review effort.

Special recognition and appreciation is extended to Lewis Cowardin who conceived the need for the National List, supervised the compilation of the initial draft list, and provided invaluable advice and direction during the initial phase of the project.

The contribution of the authors of the almost 300 regional and State floras and regional wetland manuals used in compiling the Annotated National Wetland Plant Species Data Base is gratefully acknowledged.

The development of the National List was greatly facilitated by the dedicated staff who contributed over 50 person years to compile the Annotated National Wetland Plant Species Data Base. This data base provided a solid information base from which the National List was derived. This staff included Karen E. Amidei, James G. Armstrong, Sheryl A. Brenner, Steven I. Candileri, Mark A. Charneski, Diana Fry, Thomas B. Gunter, Lillian A. Gustafson, Iris A. Kendall, Mary E. Klee, Annie L. Kosvanec, David R. Lindsey, Stephen Mortellaro, Kent A. Moyer, Laura E. Pittman, Donald R. Richardson, Richard N. Rowse, Angela F. Salem, Deana Ulmer, Sheri A. Ulrich, Sandra M. Upchurch, Diane Wallace, Debora L. Wegner, August M. Wooten and Kevin R. Youngberg. This landmark effort to collect much of the taxonomic and ecological information about wetland plants into a textual computer data base was a protracted and extremely tedious task. It was truly a pleasure to work with such a productive and conscientious group.

A special debt is owed to the regional ecologists who so generously gave of their time and experience in reviewing the lists. Their review helped to refine the information presented in the botanical manuals and in many cases provided the only and often best description of the ecology of many plant species. The



National List would not be as accurate and complete if it were not for the enormous amount of review so generously provided by the regional reviewers. State distributions and common names provided by John Kartesz from unpublished data bases allowed the production of accurate State lists and common name assignments for almost all species. The high quality and completeness of the National List is in large part due to the data provided by John Kartesz from the Biota of North America Program.

The composition and pleasing format of the lists is largely due to the computer skills of Jill Muhlenbruck and Gregor Auble of the National Ecology Research Center.

The contributions of the many National and regional review panel members is gratefully acknowledged. These biologists represented their agencies in a technically competent and thoroughly professional manner. The strength of the Regional lists and Indicator assignments is largely due to the diverse background of the review panel members and a firm desire by all to make the process work. The unswerving resolve and determination displayed by all the review panels to complete each phase of the task during the marathon regional review panel meetings was truly inspiring. Well over 200 weeks of staff time was contributed by the review panel members.

It has been a pleasure to coordinate this effort and to work so closely with so many dedicated and professional biologists. The credit and recognition for the completion of this task applies equally to all who contributed so much. As compiler, I must necessarily take the responsibility for any transcription errors which may have occurred during the production of this report. The extensive use of the National List has made the entire effort professionally satisfying for all who have contributed.

## INTRODUCTION

The National List of Plant Species That Occur in Wetlands (hereafter referred to as the National List) represents the combined efforts of many biologists over the last decade to define the wetland flora of the United States. The National List has undergone a number of revisions based on intensive review by regional ecologists. National, regional, and State lists are being distributed to provide users with the most current information. We welcome and encourage modification and improvement of the National List. Refinement of the National List will occur continually, reflecting increased knowledge in Indicator assignments, taxonomy, and geographic distribution. We anticipate that further refinement of the National List will lead to additional infra-specific and subregional Indicator assignments. Review documents and procedures are included with the National List to aid and encourage additional review (Appendix A). The U.S. Fish and Wildlife Service initially developed the National List in order to provide an appendix to the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979) to assist in the field identification of wetlands. Plant species that occur in wetlands as used in the National List are defined as species that have demonstrated an ability (presumably because of morphological and/or physiological adaptations and/or reproductive strategies) to achieve maturity and reproduce in an environment where all or portions of the soil within the root zone become, periodically or continuously, saturated or inundated during the growing season (adapted from Huffman 1981). The development of the National List changed significantly when a cooperative review effort was established by the major Federal agencies involved in wetland identification and management. The utility of the National List goes far beyond a simple catalog of wetland plants. The Fish and Wildlife Service, in cooperation with North Carolina State University, has produced a weighted average procedure for using the wetland Indicator assignments of individual species to assist in determining the probability that a community is a wetland (Wentworth and Johnson 1986). This procedure is used by the Soil Conservation Service to aid in the determination of wetlands included under the conservation provisions of the Food Security Act of 1985. The Fish and Wildlife Service, Army Corps of Engineers, Environmental Protection Agency, and Soil Conservation Service use the National List to aid in identifying wetlands falling under their various wetland program responsibilities. Wetland identification manuals which incorporate the National List have recently been produced by the Corps of Engineers (Environmental Laboratory 1987) and the U.S. Environmental Protection Agency (Sipple 1988).

## DEVELOPMENT OF CURRENT LIST

The Fish and Wildlife Service recognized that accessory lists of hydrophytes (plant species that occur in wetlands) and hydric soils would need to be developed to apply the wetland classification system accurately and consistently in the field. The scientific names of the plant species included in the major wetland plant lists and manuals were collected and merged into a single computerized list with those species on the National List of Scientific Plant Names (U.S. Department of Agriculture 1971) that had emergent, floating, or submergent life forms. This initial list of 1,626 species, completed in March 1976, was obviously incomplete, and was especially deficient in plant species from the western United States and the Alaska, Caribbean, and Hawaii regions. Dr. Donovan Correll, Fairchild Tropical Garden, Miami, Florida, reviewed this initial list in 1977 and suggested many additional species for inclusion. Dr. Correll's additions were combined with the initial list, and a draft list of 4,235 species was developed in 1977. This draft list, although plagued by problems of plant nomenclature and synonymy, was remarkably complete, considering the small amount of time which had been spent on its development.

Review and refinement of this draft list has continued since 1977. Initial tasks were to maintain and improve computer storage and retrieval of the draft list information, align the listed species with a national taxonomic treatment, and subdivide the species according to their fidelity to wetlands. The importance of the development of an accurate National List of Plant Species That Occur in Wetlands to the Federal community and the need to substantiate the occurrence of these plant species in wetlands from the botanical literature led the Fish and Wildlife Service to begin development of the Annotated National Wetland Plant Species Data Base. This textual data base documents the taxonomy, distribution, and ecology of each species based on a synthesis of almost 300 National and regional wetland plant and botanical manuals representing the major State and regional floras. Computer storage of the Annotated National Wetland Plant Species Data Base allowed for the efficient maintenance of the initial National List and creation of early draft regional subdivisions of the National List. Data collection for the Annotated National Wetland Plant Species Data Base for all plant species was completed in 1987, but incorporation of this information into a single data base on the National Wetlands Inventory minicomputer remains to be accomplished. The species data base is presently stored on a microcomputer. Information on the data base and preliminary species listings or data reports from the Annotated National Wetland Plant Species Data Base can be obtained from the National Wetlands Inventory, St. Petersburg, Florida.

The Soil Conservation Service, through a contract to the Smithsonian Institution, produced a revised National List of Scientific Plant Names in 1982 (U.S. Department of Agriculture 1982.) This national treatment provided a standard nomenclature for the National List of Plant Species That Occur in Wetlands,

supplied a listing of synonyms linked to the accepted names, and updated the regional distribution of each species. The Soil Conservation Service list was selected as the taxonomic standard in order to facilitate the eventual correlation of the National List of Plant Species That Occur in Wetlands with the Hydric Soils of the United States (U.S. Department of Agriculture 1987). Copies of the National List of Scientific Plant Names (1982) are available from the State offices of the Soil Conservation Service.

A wetland fidelity rating system was created during the initial development of the Annotated National Wetland Plant Species Data Base. Early coding of verbatim habitat from the botanical manuals for a wide variety of plant species indicated that an obvious separation of obligate (restricted to wetlands) and facultative (not restricted to wetlands) species could be made. Further refinement led to subdivision of the facultative category into three subcategories, with a range of percent occurrences in wetland versus nonwetland applied to each subcategory to enhance user understanding and consistent application.

The ecological information obtained from the botanical manuals during data collection for the development of the Annotated National Wetland Plant Species Data Base led to the identification and addition to the National List of many additional species for which at least one manual reported the species occurring in an obvious wetland site. The National List had increased as a result of this process to 5,244 species in 1982, 6,042 species in 1986, and presently is composed of 6,728 plant species.

## REVIEW PANELS AND REVIEW PROCESS

The desire of the Federal agencies involved in wetland identification and delineation for a Federal list of plant species that Occur in Wetlands led to the suggestion by the Fish and Wildlife Service that a review process be established similar to that developed to review the Hydric Soils of the United States (U.S. Department of Agriculture 1987). In early 1983, the Fish and Wildlife Service formally requested that the Army Corps of Engineers, Environmental Protection Agency, and Soil Conservation Service participate cooperatively in an interagency review and development of a National List of Plant Species that Occur in Wetlands. Each agency nominated staff wetland ecologists with a strong background in wetland botany to a National Interagency Review Panel. Two organizational meetings were held in the summer of 1983 to determine the responsibilities and goals of the National and Regional Interagency Review Panels and the structure of the review process. The four Federal agencies also nominated staff wetland ecologists to represent them on each of the Regional Review Panels. Selection and appointment of the Regional Interagency Review Panel representatives was completed by each agency by the spring of 1984. All four agencies have been represented on most Review Panels, with some change in agency representatives occurring through the years.

Initial organizational meetings for all the conterminous United States Regional Interagency Review Panels were held in 1984. The regional review process was discussed, and review materials were developed. Potential reviewers, principally field botanists and ecologists associated with State and Federal agencies and universities, were identified for each region, and the responsibility for contacting the potential regional reviewers was partitioned among the Review Panel members. Regional reviewers were contacted during the summer and fall of 1984 to determine if they could review the list and return their review comments by the winter of 1984-85. Regional reviewers were sent the most current copy of the regional list (dated September 1982) during the summer and fall of 1984. The Regional review lists contained, for many species, a tentative Indicator assignment developed from the data collected for the Annotated National Wetland Plant Species Data Base. All the Regional Review Panels met during the spring of 1985 to consider the review provided by the regional ecologists. A total of 142 ecologists and botanists from across the country initially reviewed the 1982 lists. The number of reviewers varied from 10 to 30 per region. Regional reviewers assigned a wetland Indicator to as many species as possible, based upon their field experience, using Cowardin et al. (1979) for the definition of a wetland.

The Regional Interagency Review Panels examined the Indicator assignments suggested by each reviewer and any additional supporting documentation which reviewers provided. Each of the Regional Review Panel members independently synthesized the review received and developed a regional Indicator assignment

for each species based upon all the regional review and information gathered about the species. The tentative Indicator assignment developed from the Annotated National Wetland Plant Species Data Base often was regarded as the equivalent of a regional reviewer's assignment and was given the same status or weight in Review Panel deliberations. The Regional Review Panel collectively considered Indicator assignments for each species made by each agency panel member and, with each agency having one vote, attempted to achieve unanimous agreement on a Regional Indicator assignment. The plus (+) and minus (-) designations, specifying respectively the higher or lower part of the frequency range for a particular Indicator, were used by some Review Panels as a means of achieving interagency agreement. The number of reviewers for each species varied considerably, and each reviewer was generally given the same weight by a Review Panel. The number of reviewers commenting on individual species varied, depending on the distribution of the species across the region. Particular species ranged from 20 review comments to only a single review, and in some cases received no review. Review reflecting a wide range of suggested Indicators was received for some species. This broad range of suggested Indicators for these species was difficult to synthesize and blend into a single Indicator status. These species were given an NA (no agreement) assignment if the Review Panel could not reach a unanimous decision. Unreviewed species were assigned an NI (no indicator) assignment if the Review Panel had little or no information on which to base an Indicator status.

The National Review Panel met in July 1985 to review progress, to examine the Indicator assignments for consistency across regions, and to develop a procedure for the assignment of an Indicator to as many unassigned species as possible. National, regional, and State lists of plant species that Occur in Wetlands were produced in the spring of 1986, and were distributed widely.

The Regional Review Panels met during the summer and fall of 1986 to apply an Indicator assignment to as many remaining unassigned species as possible. The Review Panels principally relied on additional review received from former and new reviewers, the habitat information recorded in the Annotated National Wetland Plant Species Data Base, or examination of the habitat given in selected regional manuals if the Species Data Base information was not available, to assign a regional Indicator status. An asterisk (\*) was assigned by the Regional Review Panels to Indicators derived from limited ecological information. The asterisk reflected a tentative assignment made with less confidence and data than the other Indicator assignments. Usually no review was received from regional ecologists for these asterisked species. A question mark (?) following a National Indicator denoted a tentative Indicator assignment assigned by the compiler and not confirmed by Regional Interagency Review Panel concurrence. The 1986 National Wetland Plant List - Regional Indicator Compilation (Reed 1986) reported the status of the review process.

The National Review Panel reexamined the review process and current list in 1986 and directed the Regional Panels to complete the review of the regional lists. The Regional Review Panels met during the spring and summer of 1987 to complete the initial assignment of as many unassigned species remaining on the regional lists as possible. The Review Panels also considered species suggested for addition by reviewers. Additional Regional Indicator assignments and changes to previous assignments were made based on new review received from reviewers,

ecological information from the Annotated National Wetland Plant Species Data Base, or information from botanical manuals.

The task of the Regional Interagency Review Panels was to interpret and synthesize reviewers' comments and the range of habitat descriptions given for each species by the various authors of the botanical manuals into a single wetland Indicator category for their regions. There was an overwhelming similarity of independent Indicator assignments made by both the reviewers, based on their field experience, and the Regional Review Panel members, based on the habitat expressed in the botanical literature. This repeatability of Indicator assignments derived in a variety of ways by ecologists with a wide variety of backgrounds confirmed that the Indicators were both reproducible and defensible. The Regional Review Panels were able to assign, with the highest degree of confidence, Indicators to those species which had been reviewed by a number of regional reviewers and also had a large literature base. The comparability of the Indicator designations is also demonstrated by the large number of species (6,114 species, 91% of the species assigned an Indicator) that were assigned only a single Indicator or a narrow range of Indicators by the independently functioning Regional Review Panels. An analysis of the National Indicator range shows that 483 species (7%) were assigned an NI (no indicator), and 675 species (10%) have a question mark following the Indicator. The question mark signifies a tentative assignment. An analysis of the Regional Indicators for all regions shows that an \* was added to 729 Regional Indicators and an NA was assigned to 28 species. The National List of Plant Species that Occur in Wetlands represents our progress to date and is provided both for current use and as a base for future revisions.

## COMPOSITION OF THE LISTS

The National, regional, and State lists are reported in a variety of formats. All of the lists are initially arranged alphabetically by scientific name followed by a second list, also alphabetical by scientific name, of those species with infra-specific (subspecies, variety, or form) Indicator assignments. A third list, alphabetic by scientific name, provides a list of synonyms related to the equivalent accepted name shown in the alphabetical scientific name list. The State lists also contain a fourth compilation, following the synonymy report, of the species found in each State, alphabetized by common name and subdivided into eight separate lists by life form (trees, shrubs, vines, forbs, grasses, grasslikes [sedges and rushes], ferns and allies, and aquatics).

Nomenclature and distribution follow the National List of Scientific Plant Names (1982) except as modified by State distribution data from an unpublished plant species geographic data base (Kartesz).

Epiphytic (e.g., mistletoes and some orchids) and nonrooted species (e.g., dodder) were excluded from the National List because their roots were respectively either never exposed to ground-level soil conditions or were not in existence during all or part of the plant's life span. The current National List contains only vascular plants, but a companion list of Bryophytes (mosses and liverworts) that occur in wetlands is being developed to further define the wetland flora of the United States. The Algae have also been excluded from the current list.

Listings of the members of the National and appropriate Regional Interagency Review Panels and the regional reviewers are included at the end of each list (Appendix D). Not all categories listed below are displayed in each National, regional, or State report. The National alphabetical scientific name list is reported by SCI-NAME, NAT-IND, R1IND, R2IND, R3IND, R4IND, R5IND, R6IND, R7IND, R8IND, R9IND, ROIND, RAIND, RCIND, RHIND, and REGION. The National trinomial list is reported by SCI-NAME, TRINOM, R1IND, R2IND, R3IND, R4IND, R5IND, R6IND, R7IND, R8IND, R9IND, ROIND, RAIND, RCIND, RHIND, and REGION. The National, regional, and State synonym lists are reported by SYNONYMY, SCI-NAME, AUTHOR, and REGION. The regional and State alphabetical scientific name lists are reported by SCI-NAME, AUTHOR, COMMON-NAME, R\_IND, NAT-IND, and HABIT. The regional and State trinomial lists are reported by SCI-NAME, AUTHOR, TRINOM, R\_IND, NAT-IND, and HABIT. The State alphabetical common-name lists are reported within life forms (HABIT) by COMMON-NAME, R\_IND, NAT-IND, SYMBOL, SCI-NAME, and HABIT.

The information in these lists is presented in the following categories. A brief definition of the categories reported in the various lists is given below:



#### SCI-NAME (Scientific Name)

The genus and species applied to the taxon by the National List of Scientific Plant Names (1982).

#### SYMBOL

Symbol assigned in the National List of Scientific Plant Names (1982), consisting of the first two letters of the genus name and the first two letters of the specific epithet, with additional numbers added in numeric sequence to the four-letter symbol to break ties. Tentative plant symbols for species not in the National List of Scientific Plant Names (1982) have been created by taking the first two letters of the genus and specific epithet, adding a numeric tie breaker, if necessary, and ending with a question mark. All species have a unique symbol.

#### AUTHOR

The author of the scientific name as cited by the National List of Scientific Plant Names (1982).

#### SYNONYMY

Alternate scientific names applied to the species by major regional or State floras.

#### TRINOM (Trinomial)

Varieties, subspecies, or forms which differ in Indicator assignment from the species.

#### NAT-IND (National Range Of Indicators)

The National Indicators reflect the range of estimated probabilities (expressed as a frequency of occurrence) of a species occurring in wetland versus nonwetland across the entire distribution of the species. A frequency, for example, of 67%-99% (Facultative Wetland) means that 67%-99% of sample plots containing the species randomly selected across the range of the species would be wetland. A question mark (?) following an Indicator denotes a tentative assignment based on the botanical literature and not confirmed by regional review. When two indicators are given, they reflect the range from the lowest to the highest frequency of occurrence in wetlands across the regions in which the species is found. A positive (+) or negative (-) sign was used with the Facultative Indicator categories to more specifically define the regional frequency of occurrence in wetlands. The positive sign indicates a frequency toward the higher end of the category (more frequently found in wetlands), and a negative sign

indicates a frequency toward the lower end of the category (less frequently found in wetlands).

#### Indicator Categories

Obligate Wetland (OBL). Occur almost always (estimated probability >99%) under natural conditions in wetlands.

Facultative Wetland (FACW). Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in nonwetlands.

Facultative (FAC). Equally likely to occur in wetlands or nonwetlands (estimated probability 34%-66%).

Facultative Upland (FACU). Usually occur in nonwetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).

Obligate Upland (UPL). Occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in nonwetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the National List.

The wetland Indicator categories should not be equated to degrees of wetness. Many obligate wetland species occur in permanently or semipermanently flooded wetlands, but a number of obligates also occur and some are restricted to wetlands which are only temporarily or seasonally flooded. The facultative upland species include a diverse collection of plants which range from weedy species adapted to exist in a number of environmentally stressful or disturbed sites (including wetlands) to species in which a portion of the gene pool (an ecotype) always occurs in wetlands. Both the weedy and ecotype representatives of the facultative upland category occur in seasonally and semipermanently flooded wetlands.

#### R\_IND (Regional Indicator)

The estimated probability (likelihood) of a species occurring in wetlands versus nonwetlands in the region. Regional Indicators reflect the unanimous agreement of the Regional Interagency Review Panel. If a regional panel was not able to reach a unanimous decision on a species, NA (no agreement) was recorded in the regional indicator (R\_IND) field. An NI (no indicator) was recorded for those species for which insufficient information was available to determine an indicator status. A nonoccurrence (NO) designation indicates that the species does not occur in that region. An asterisk (\*) following a regional Indicator identifies tentative assignments based on limited information from which to determine the indicator status. In the listings for the States divided into two regions (Montana, Wyoming, and Colorado), both regional Indicators are reported.

## REGION

The distribution of the species expressed by the regional codes used in the National List of Scientific Plant Names (1982). These code numbers and regions are displayed in Figure 1.

<u>REGION CODE</u>	<u>REGION</u>	<u>STATE(S) IN REGION</u>
1	Northeast	ME,NH,VT,MA,CT,RI,WV,KY,NY,PA, NJ,MD,DE,VA,OH
2	Southeast	NC,SC,GA,FL,TN,AL,MS,LA,AR
3	North Central	MO,IA,MN,MI,WI,IL,IN
4	North Plains	ND,SD,MT(Eastern),WY(Eastern)
5	Central Plains	NE,KS,CO(Eastern)
6	South Plains	TX,OK
7	Southwest	AZ,NM
8	Intermountain	NV,UT,CO(Western)
9	Northwest	WA,OR,ID,MT(Western),WY(Western)
0	California	CA
A	Alaska	AK
C	Caribbean	PR(Puerto Rico), VI(U.S. Virgin Islands.), CZ(Canal Zone), SQ (Swan Islands.)
H	Hawaii	HI(Hawaiian Islands.), AQ(American Samoa), GU(Guam), IQ(U.S. Misc. Pacific Islands.), MQ(Midway Islands.), TQ(Trust territories of the Pacific Islands.), WQ(Wake Isl.), YQ(Ryukyu Islands. Southern)

## COMMON-NAME

A popular name applied to the species. Common name selection generally follows Common Names for North American Plants (Kartesz and Thieret, in press), but some common names follow the current common name list maintained by the Soil Conservation Service.

## HABIT

The plant characteristics and life forms assigned to each species in the National List of Scientific Plant Names (1982) and by the Soil Conservation Service. Family names are listed alphabetically under specific life forms restricted to these families.

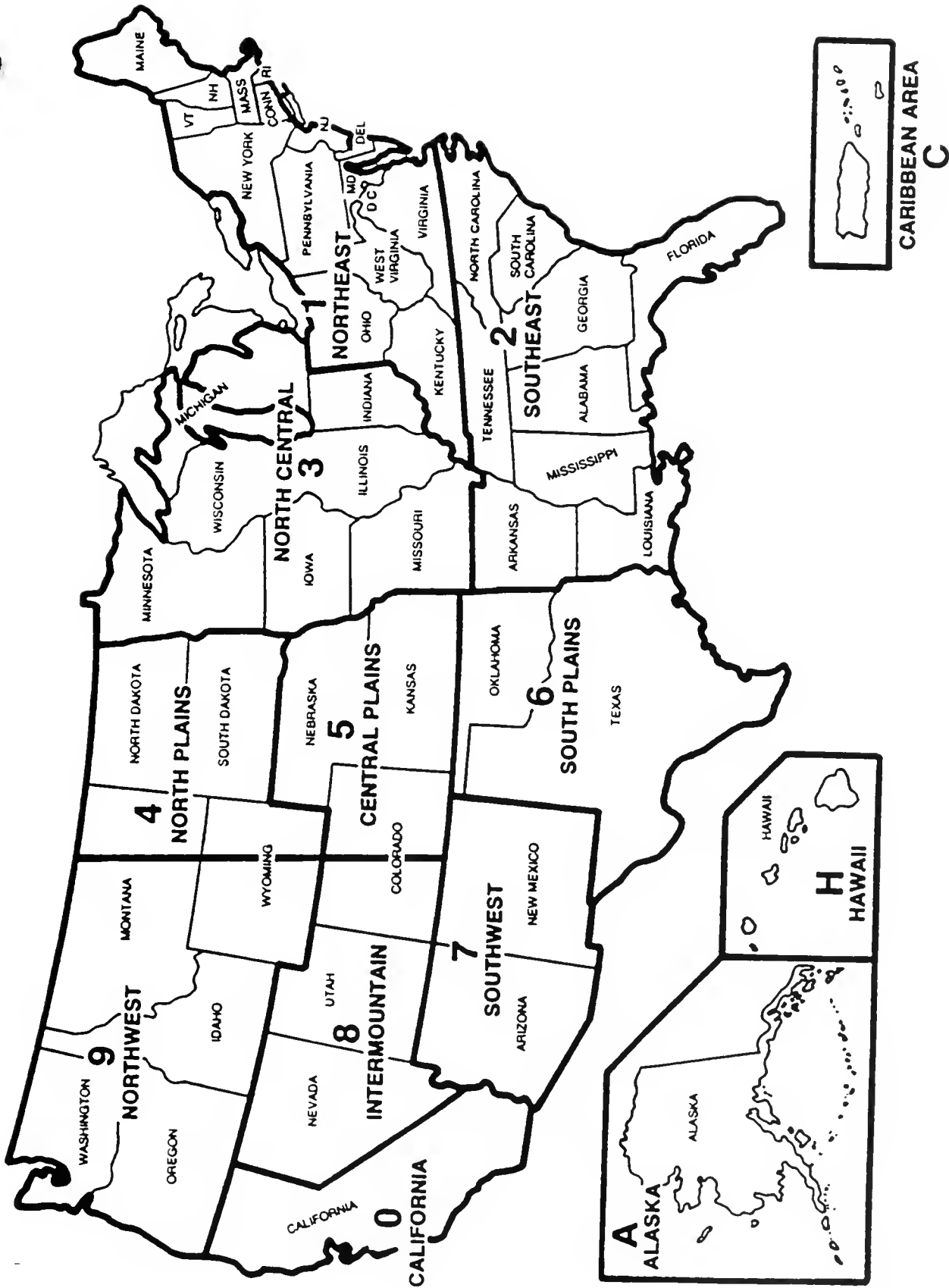


Figure 1. Regions of distribution for the National List of Scientific Plant Names (1982).

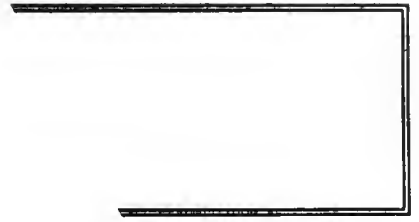
<u>SYMBOL</u>	<u>CHARACTERISTIC OR LIFE FORM</u>	<u>SYMBOL</u>	<u>CHARACTERISTIC OR LIFE FORM</u>
A =	Annual	G =	Grass
B =	Biennial	POACEAE	
C =	Clubmoss	GL =	Grasslike
	LYCOPODIACEAE		CYPERACEAE
	SELAGINELLACEAE		JUNCACEAE
E =	Emergent	H =	Partly woody
@ =	Epiphytic	HS =	Half shrub
F =	Forb	H2 =	Horsetail
/ =	Floating	EQUISETACEAE	
F3 =	Fern	I =	Introduced
	ADIANTACEAE	N =	Native
	ASPLENIACEAE	P =	Perennial
	BLECHNACEAE	+ =	Parasitic
	CYATHEACEAE	P3 =	Pepperwort
	DAVALLIACEAE	MARSILEACEAE	
	DENNSTAEDTIACEAE	Q =	Quillwort
	DRYOPTERIDACEAE		ISOETACEAE
	GLEICHENIACEAE	S =	Shrub
	GRAMMITIDACEAE	- =	Saprophytic
	HYMENOPHYLLACEAE	Z =	Submerged
	LOMARIOPSIDACEAE	\$ =	Succulent
	MARATTIACEAE	T =	Tree
	OPHIOGLOSSACEAE	V =	Herbaceous Vine
	OSMUNDACEAE	W =	Waterfern
	PARKERIACEAE	AZOLLACEAE	
	POLYPODIACEAE	SALVINIACEAE	
	PSILOACEAE	WV =	Woody vine
	PTERIDACEAE		
	SCHIZAEACEAE		

The HABIT symbols are combined to describe the life form of the species (e.g., ANG means annual native grass, IT means introduced tree).

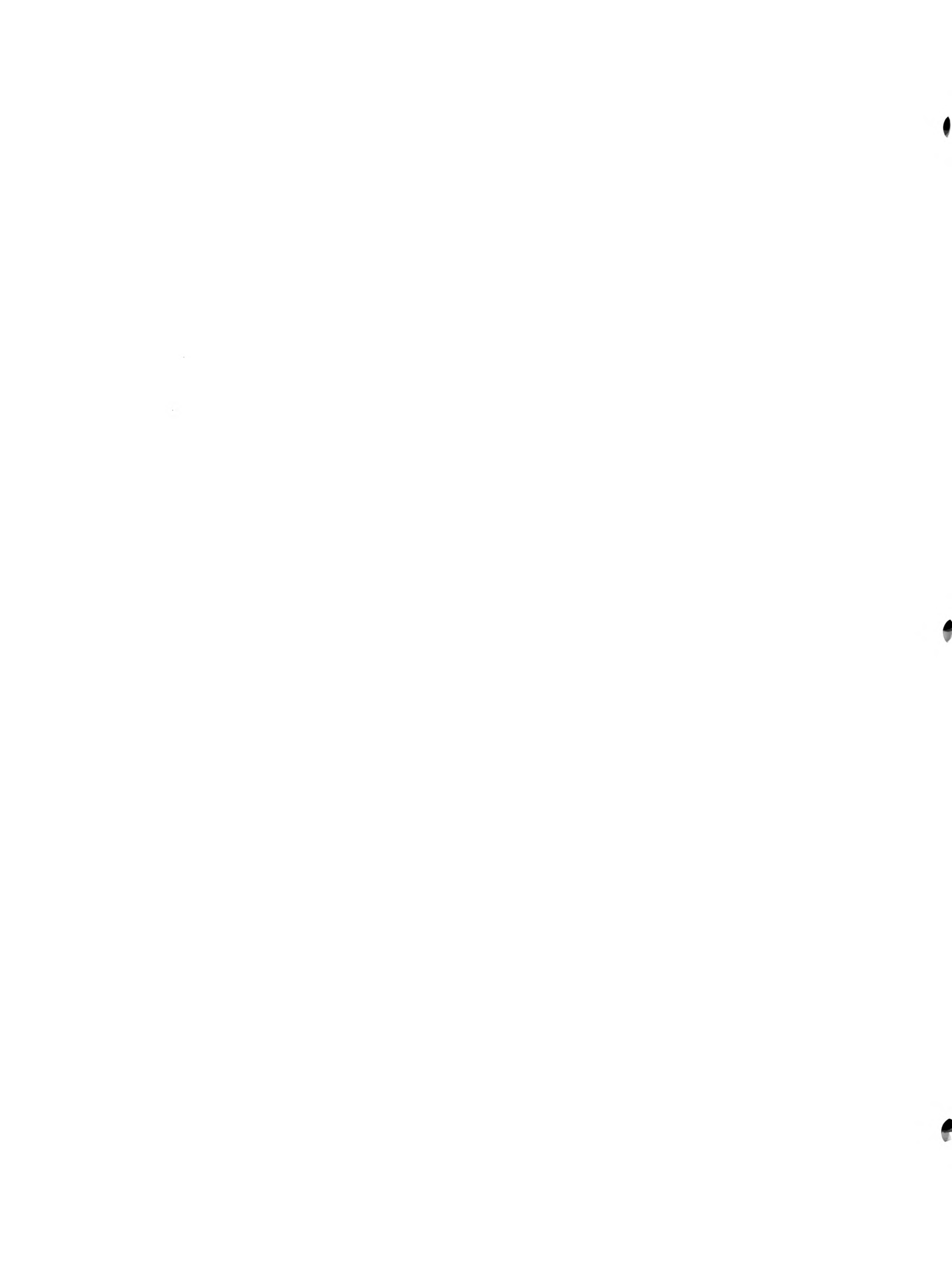
## DIGITAL DATA BASE AVAILABILITY

The National List of Plant Species that Occur in Wetlands is maintained in a microcomputer data base. This data base was created to track and document the decisions made by the Regional Interagency Review Panels and to facilitate generation of National, regional and State reports. The data base is organized into 26 fixed-length and 3 variable-length fields and contains information on plant taxonomy, geography, and wetland Indicator status. We expect to make regional subdivisions of the data base and a user's manual available on selected magnetic media. An announcement of the format and ordering procedures will be distributed widely when the data base is available in digital form.









**ATTACHMENT E**

**NATIONAL WETLANDS PRIORITY  
CONSERVATION PLAN**





# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
WASHINGTON, D.C. 20240



ADDRESS ONLY THE DIRECTOR,  
FISH AND WILDLIFE SERVICE

## Note to the Reader:

Enclosed is the National Wetlands Priority Conservation Plan (Plan), which is mandated by P.L. 99-645, the Emergency Wetlands Resources Act of 1986. The Plan was developed by the Department of the Interior after consultation with the Environmental Protection Agency, the Secretary of Commerce, the Secretary of Agriculture, the executive officer of each State, and environmental groups.

The Plan provides the framework, criteria, and guidance for identifying wetlands warranting priority attention for Federal and State acquisition using Land and Water Conservation Fund appropriations. Its primary purpose is to help decision-makers focus their acquisition efforts on the more important, scarce, and vulnerable wetlands in the Nation. However, it can also be used by the private sector and local, State, and Federal agencies to identify wetlands warranting protection through measures that do not require land acquisition. The Plan will also help the States meet the Emergency Wetland Resources Act's requirement to address wetlands as an important outdoor recreation resource.



# NATIONAL WETLANDS PRIORITY CONSERVATION PLAN



U.S. Department of the Interior  
Fish and Wildlife Service  
April 1989

U.S. Fish and Wildlife Service photographs on the cover are by:

Black-necked stilt (*Ruth Nissen*); Water lily and cypress (*Dan O'Neil*); Mangrove Swamp, Florida (*Bill Wilen*); Canoeist in Okefenokee NWR (*Joe Doherty*); Wetland (*Jerry Langcore*); and Wetland, Modac NWR (*Steve Lewis*)

RAINES

**UNITED STATES DEPARTMENT OF THE INTERIOR**

**NATIONAL WETLANDS PRIORITY  
CONSERVATION PLAN**

**PREPARED BY  
U.S. FISH AND WILDLIFE SERVICE  
APRIL 1989**



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## PREFACE

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We now know things about wetlands that we should have known decades ago. Of course, we knew that they provide important habitat for waterfowl and other wildlife resources. However, we are only now coming to realize the importance of wetlands for enhancing water quality, providing water supply, and serving as natural means of flood and erosion control. They also contribute significant recreational and commercial benefits that enhance the Nation's economy.

Historically, wetlands have had very negative connotations in our thinking and in our vocabulary. Swamps, for example, have conjured up images of impenetrable wastelands, places where people get "bogged down." We have also associated wetlands with mosquitos, malaria, alligators and snakes.

These negative perceptions have found their way into our national public policies as well. As one consequence of the perception of wetlands as wastelands, the Federal Government has promoted the loss or alteration of wetlands. The Swamp Land Acts of 1849, 1850 and 1866 provide an early example. These Acts gave away Federal lands in certain States on the condition that they be drained.

Of the estimated 215 million acres of wetlands existing in the conterminous United States at the time of European settlement, only 94 million acres (44 percent) are estimated to remain. Wetlands losses still continue at a level estimated at several hundred thousand acres each year.

Most wetlands in the United States (74 per cent) occur on private property. The protection and creative management of wetlands, however, requires concerted, cooperative efforts on the part of:

- o the Federal government,
- o State and local governments,
- o private organizations, and
- o individuals.

Working together, State and local governments, organizations and individuals can reinforce and supplement the legal and administrative framework now established at the Federal level for wetlands protection. This framework includes provisions of the River and Harbor Act of 1899, Fish and Wildlife Coordination Act of 1958, as amended, Clean Water Act

of 1977, as amended, Coastal Zone Management Act of 1972, Watershed Protection and Flood Prevention Act of 1954, as amended, Coastal Barrier Resources Act of 1982, Federal Power Act, as amended, Food Security Act of 1985, Emergency Wetlands Resources Act of 1986, and Executive Orders 11990 and 11988 on Protection of Wetlands and Floodplain Management, respectively.

State and local governments are encouraged to educate the public about wetland values and services and establish a policy designed to encourage conservation and enhancement of wetlands. A wetland policy would promote sound thinking and planning on the part of private entities and those charged with protecting public resources.

In recognition of the important values associated with wetlands, including significant economic benefits, State and local governments also may offer tax incentives, such as preferential property tax assessments or special tax deductions, to landowners who protect their wetlands through deed restrictions or conservation easements. Donation of wetlands to conservation organizations or governmental entities also may qualify landowners for substantial tax benefits. Or, individuals could contribute dollars to non-profit organizations so that their resources could be pooled for wetland protection or purchase.

State and local entities may want to evaluate existing programs to ensure that they are not promoting wetland losses, through such programs as tax deductions for wetland drainage or funding for economic development projects located in wetlands.

The full spectrum of wetland protection options not requiring acquisition of lands should be cooperatively evaluated by the private sector and local, State and Federal governments before considering land acquisition as the ultimate solution to wetland protection. Acquisition of an interest in wetlands is an important, but costly, option for protecting wetlands. And, even with full public control over the land, it may not guarantee absolute protection to the wetland. The present Administration's policy focuses on protecting our Nation's wetlands through measures that do not require use of appropriated funds for fee title acquisition of lands.

Technical assistance and educational materials are available from Federal and State agencies and national conservation groups to assist in this effort.

In 1986, the Emergency Wetlands Resources Act was enacted to promote the conservation of our Nation's wetlands by intensifying cooperative efforts among private interests and local, State and Federal governments for the conservation, management and/or acquisition of wetlands. Among a number of provisions in this Act designed to protect wetlands of the United States, section 301 requires the Secretary of the Interior to establish a National Wetlands Priority Conservation Plan to assist decisionmakers in identifying the types and locations of wetlands, and

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interests in wetlands (e.g., fee acquisition, deed restrictions) warranting consideration for Federal and State acquisition.

The National Wetlands Priority Conservation Plan provides general direction and guidance from the national level and allows the States and appropriate Federal agencies flexibility, within the limits of the generic criteria specified in the Emergency Wetlands Resources Act, to develop step down plans that reflect information or data specific to less than national level planning areas. State level acquisition planning refinements are appropriate to focus attention on documentable issues of wetland loss, scarcity, threat and values that are not necessarily discernible at the national level.

This National Wetlands Priority Conservation Plan has been developed to comply with the specific requirements of section 301 of the Emergency Wetlands Resources Act and only applies to wetlands that would be acquired by Federal agencies and States using Land and Water Conservation Fund appropriations. The Department of the Interior, however, is highly supportive of cooperative efforts among private interests and local, State and Federal governments to implement options other than acquisition of lands to conserve and protect wetlands.

The Department encourages the private sector and all local, State and Federal agencies, to use this National Wetlands Priority Conservation Plan as a decisionmaking tool to assist in identifying wetlands warranting priority consideration for protection, using whatever measures may be available in addition to acquisition of a fee title interest in wetlands.

Implementation of the National Wetlands Priority Conservation Plan will result in development of lists of wetland sites warranting priority consideration for acquisition. When a wetland site appears on a list, it does not mean that the wetland necessarily will be acquired; rather, that the site qualifies for acquisition consideration. Any subsequent decision to purchase property must rely on additional data, policies and conditions that are not a part of the National Wetlands Priority Conservation Plan.

Any listing of wetlands for acquisition consideration has no direct bearing on Federal regulatory programs or the evaluation of wetlands for regulatory purposes. Moreover, only through the cooperative efforts of all governmental agencies, private organizations and individuals can public wetland resources be adequately protected. In this regard, lists of wetlands for acquisition consideration may be useful to assist any entity in identifying wetlands warranting priority attention for protection, management, restoration and/or enhancement using non-acquisition measures.

## **EXECUTIVE SUMMARY**

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As a means to further promote the conservation of our Nation's wetlands, Congress enacted the Emergency Wetlands Resources Act (Act) of 1986 (Public Law 99-645). Under the provisions of the Act, Congress found that wetlands are nationally significant resources that contribute to our economy, food supply, water supply and quality, flood control, and fish, wildlife and plant resources. However, these resources have been significantly affected by human land and water use activities, and recognition of the value of wetlands has developed slowly. FWS estimates that less than 45 percent of the original wetlands in the conterminous United States remain. Wetlands losses are still continuing, perhaps at a level as high as 450,000 acres annually.

Under the Act the Department of the Interior is directed by Congress to develop a National Wetlands Priority Conservation Plan that identifies the locations and types of wetlands, and interests in wetlands, that should receive priority attention for wetland acquisition projects by Federal and State agencies using Land and Water Conservation Fund appropriations. The Department of the Interior has been given authority to acquire wetlands based on broad consideration of their value. The primary purpose of the National Wetlands Priority Conservation Plan is to assist decisionmakers in focusing their acquisition efforts on the more important, scarce and vulnerable wetlands in the Nation; however, it also can be used by the private sector and local, State and Federal agencies to identify priority wetlands warranting protection through measures not requiring land acquisition.

The Fish and Wildlife Service has prepared this National Wetlands Priority Conservation Plan for the Department of the Interior. The National Wetlands Priority Conservation Plan provides a planning framework, criteria and guidance intended to meet the requirements of section 301 of the Emergency Wetlands Resources Act. Criteria to be considered in determining acquisition priorities include functions and values of wetlands, historic wetland losses and threat of future wetland losses. In general, wetlands given priority consideration for acquisition will be those that provide a high degree of public benefits, that are representative of rare or declining wetland types within an ecoregion, and that are subject to identifiable threat of loss or degradation. Implementation of the National Wetlands Priority Conservation Plan will result in development of plans that list wetland sites warranting priority consideration for Federal and State acquisition. Wetlands assessment threshold criteria have been developed to assist users of the National Wetlands Priority Conservation Plan in identifying wetland sites that qualify for such priority.

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The Emergency Wetlands Resources Act also requires consistency between the Statewide Comprehensive Outdoor Recreation Plan process and the National Wetlands Priority Conservation Plan. The National Wetlands Priority Conservation Plan will assist the States in meeting the requirement under the Emergency Wetlands Resources Act that wetlands are addressed as an important outdoor recreation resource. States are encouraged to develop State wetlands priority plans as implementing documents that address specific wetland acquisition priorities within the State.

The National Wetlands Priority Conservation Plan represents only one tool to be used for the protection of valuable wetland ecosystems. Only through the continued and coordinated efforts of all interests, public and private, can wetland resources be adequately protected for future generations.



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# NATIONAL WETLANDS PRIORITY CONSERVATION PLAN

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## ABBREVIATIONS

Act	<i>Emergency Wetlands Resources Act of 1986</i>
BLM	<i>Bureau of Land Management</i>
Concept Plan	<i>Fish and Wildlife Service Regional Wetlands Concept Plan</i>
Convention	<i>Convention on Wetlands of International Importance Especially as Waterfowl Habitat</i>
Corps	<i>U.S. Army Corps of Engineers</i>
Department	<i>Department of the Interior</i>
EPA	<i>U.S. Environmental Protection Agency</i>
ESIS	<i>Endangered Species Information System</i>
Farm Bill	<i>Food Security Act of 1985</i>
FmHA	<i>Farmers Home Administration</i>
HEP	<i>Habitat Evaluation Procedures</i>
International List	<i>List of Wetlands of International Importance According to Convention Criteria</i>
LAPS	<i>Land Acquisition Priority System</i>
MB	<i>Migratory Bird Target</i>
NSW	<i>Nationally Significant Wetlands Target</i>
NSWH	<i>Nationally Significant Wildlife Habitat Target</i>
SE	<i>Endangered Species Target</i>
LWCF	<i>Land and Water Conservation Fund</i>
NEPA	<i>National Environmental Policy Act</i>
NPS	<i>National Park Service</i>
Waterfowl Plan	<i>North American Waterfowl Management Plan</i>
NMFS	<i>National Marine Fisheries Service</i>
NWI	<i>National Wetlands Inventory</i>
NWPCP	<i>National Wetlands Priority Conservation Plan</i>
NWR	<i>National Wildlife Refuge</i>
SCORP	<i>Statewide Comprehensive Outdoor Recreation Plan</i>
Secretary	<i>Secretary of the Interior</i>
Service	<i>U.S. Fish and Wildlife Service</i>
Threshold Criteria	<i>Wetlands Assessment Threshold Criteria</i>
USDA	<i>U.S. Department of Agriculture</i>
USGS	<i>U.S. Geological Survey</i>

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## A. INTRODUCTION

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This National Wetlands Priority Conservation Plan (NWPCP) has been prepared by the United States (U.S.) Fish and Wildlife Service (Service) on behalf of the Department of the Interior (Department) in response to section 301 of the Emergency Wetlands Resources Act of 1986 (Act).

The NWPCP provides a process that identifies wetlands that should receive priority attention for Federal and State acquisition. The new authority significantly broadens the Department's wetlands acquisition mandate to include consideration of all values of wetlands in making acquisition decisions.

The NWPCP is intended to assist Federal, State and local agencies in making wetland acquisition decisions when Land and Water Conservation Fund appropriations are used. The NWPCP can also assist other users, including governmental agencies, conservation groups or private individuals, in acquisition planning that complements Federal and State efforts to set priorities for wetlands protection through acquisition.

The document discusses wetland values and losses and provides evaluation criteria to be used in making wetland acquisition determinations. Guidance is also provided on the use of the NWPCP and its relationship with other legislation, plans, policies and programs.

Wetland protection and use are controlled or managed by regulation, policy guidance or acquisition of interests in wetlands. No single legislative authority addresses all the facets of wetland protection or use. Ways and means of wetland protection that do not require acquisition include Federal, State and local laws, tax code provisions and regulatory programs. The primary regulatory mechanism for Federal involvement in the use of wetlands is section 404 of the Clean Water Act. However, wetland protection afforded by this program is not comprehensive and additional losses of the Nation's wetlands continue.

Wetland acquisition, therefore, often may be a desired option to best serve the public interest when other means for wetland protection or use have been less effective. Acquisition of an interest in a wetland (e.g., obtaining public access) also may be desirable to protect the wetland. Additionally, acquisition of restorable wetlands can serve to replace or improve some of the functional values of wetlands which have been lost to society.

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## **B. PURPOSE AND SCOPE**

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The NWPCP provides a planning framework, criteria and guidance to determine the locations and types of wetlands, and interests in wetlands, that should receive priority consideration for Federal and State acquisition. The purpose of the NWPCP is to assist decisionmakers in focusing their acquisition efforts on the more important, scarce and vulnerable wetlands in the Nation. The NWPCP was not intended to be a comprehensive wetland conservation plan. The authorized name for the NWPCP does not include "acquisition" in the title, but the Act specifies that the purpose of the NWPCP is priority planning for wetland acquisition.

Implementation of the NWPCP will result in development of plans or modifications to existing plans that list wetland sites warranting priority consideration for Federal and State acquisition. The NWPCP will also assist the States in complying with section 303 of the Act, which requires that each Statewide Comprehensive Outdoor Recreation Plan (SCORP) address wetlands within that State as an important outdoor recreation resource.

As a planning document, this NWPCP:

- 1) establishes assessment criteria concerning wetland functions and values, historic wetland losses, and threat of future wetland losses;
- 2) addresses other important wetland acquisition considerations;
- 3) assists States in complying with section 303 of the Act;
- 4) assists in identifying (listing) wetland sites warranting consideration for Federal and State acquisition; and
- 5) does not reduce or replace the implementation of other wetland protection or regulatory programs as established by Federal, State or local laws.

## **C. AUTHORITY**

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The Emergency Wetlands Resources Act of 1986 (Public Law 99-645) was enacted to promote the conservation of our Nation's wetlands in order to maintain the public benefits they provide and to help fulfill migratory bird treaties and conventions by: (1) intensifying cooperative efforts among private interests and local, State and Federal governments for the

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management and conservation of wetlands; and (2) intensifying wetland protection efforts through acquisition in fee, easements or other interests and methods by local, State and Federal governments and the private sector. The Act also addresses the importance that wetlands have for fish and wildlife resources, water supply and quality, flood damage reduction and outdoor recreation. Major provisions of the Act are summarized as follows:

- o Authorizes admission permits (entrance fees) at designated refuges to provide revenue for refuge operations and the Migratory Bird Conservation Fund.
- o Raises the price of the Migratory Bird Hunting and Conservation Stamp.
- o Requires the Department to establish a NWPCP which specifies the types and locations of, and interests in, wetlands that should be given priority for Federal and State acquisition.
- o Amends the Land and Water Conservation Fund (LWCF) Act to require that for Fiscal Year 1988 and thereafter, each SCORP specifically addresses wetlands.
- o Authorizes the Secretary of the Interior (Secretary) to purchase wetlands or interests in wetlands consistent with the NWPCP.
- o Directs the Department/Service to continue the National Wetlands Inventory Project (NWI) and update the wetlands status and trends report.
- o Requires the Department to report to Congress on the status, condition and trends of wetlands and effect of Federal programs on wetlands in selected regions of the United States.
- o Authorizes the acquisition and management of the Bayou Sauvage Urban National Wildlife Refuge in Louisiana.

Section 301 of the Act directs the Secretary to establish and periodically review and revise a NWPCP. Section 301 is reproduced from the Act below:

**"SEC. 301. NATIONAL WETLANDS PRIORITY CONSERVATION PLAN.**

- (a) *IN GENERAL - The Secretary shall establish and periodically review and revise, a national wetlands priority conservation plan which shall specify, on a region-by-region basis or other basis considered appropriate by the Secretary, the types of wetlands and interests in wetlands which should be given priority with respect to Federal and State acquisition.*

(b) *CONSULTATION* - The Secretary shall establish the plan required by subsection (a) after consultation with-

- (1) the Administrator of the Environmental Protection Agency;
- (2) the Secretary of Commerce;
- (3) the Secretary of Agriculture; and
- (4) (the chief executive officer of ) each State.

(c) *FACTORS TO BE CONSIDERED* - The Secretary, in establishing the plan required by subsection (a), shall consider :

- (1) the estimated proportion remaining of the respective types of wetlands which existed at the time of European settlement;
- (2) the estimated current rate of loss and threat of future losses of the respective types of wetlands; and
- (3) the contributions of the respective types of wetlands to-
  - (A) wildlife, including endangered and threatened species, migratory birds, and resident species;
  - (B) commercial and sport fisheries;
  - (C) surface and groundwater quality and quantity, and flood control;
  - (D) outdoor recreation; and
  - (E) other areas or concerns the Secretary considers appropriate."

For the purpose of this NWPCP, types of wetlands will be based on the wetlands classification system and terminology developed by the Service (Cowardin *et al.*, 1979). The 1986 Report of the U.S. Senate Committee on Environment and Public Works (Senate Committee Report) on the Act indicates that "region-by-region" refers to natural provinces rather than political jurisdictions; therefore, the ecoregion classification by Bailey (1978) is adopted for use in the NWPCP. (The Bailey classification system was used because it is comparable to Hammond's (1970) physical subdivisions of the U.S., the system used to establish boundaries for data collection in the Service's 1954-74 wetlands trends study.) "Interests in wetlands" refers to the financial interest, e.g., fee title acquisition or less than fee interests, such as conservation easements. Refer to section J for complete definitions of terms.

Section 303 of the Act states that for Fiscal Year 1988 and thereafter each SCORP shall be revised to specifically address wetlands within that State as an important outdoor recreation resource as a prerequisite to approval for LWCF Act funding of recreational projects by the Secretary. Alternatively, a State may submit a State wetlands priority plan, developed in consultation with the State fish and wildlife agency and consistent with the NWPCP, as an addendum to the existing SCORP.

Section 303 of the Act also amends the LWCF Act to authorize wetlands specifically as suitable replacement for LWCF lands slated for conversion to other uses. Thus, wetlands are considered to be of reason-

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ably equivalent usefulness with the property proposed for conversion regardless of the nature of that property. For example, a city may wish to use a portion of a park acquired and/or developed with LWCF monies for a non-outdoor recreation use such as city offices. Section 303 permits the acquisition of wetlands of at least equal fair market value and of reasonably equivalent location to be used as replacement lands.

#### **D. CONSULTATION**

As specified in section 301 of the Act, the NWPCP is being developed in consultation with the Administrator of the Environmental Protection Agency (EPA), the Secretary of Commerce, the Secretary of Agriculture and the chief executive officer of each State. The NWPCP also is being coordinated with the U.S. Army Corps of Engineers (Corps) and environmental groups.

#### **E. WETLANDS ASSESSMENT CRITERIA**

The following discusses the minimal wetlands assessment criteria that must be considered in evaluating wetlands for acquisition potential and background information supporting the selection of these criteria.

Section 301(c) of the Act directs the Department in establishing the NWPCP to consider specific factors. These factors may be summarized as: (1) historic wetland losses, (2) threat of future wetland losses, and (3) wetland functions and values. Wetlands assessment criteria have been established for each of these major categories to assist Federal and State decisionmakers in determining which types and locations of wetlands warrant priority attention for acquisition. In summary, priority consideration for acquisition will be given to:

- 1) wetland types that are rare or have declined within an ecoregion (one half or more of the wetland site consists of rare or declining wetland types);
- 2) wetland sites subject to identifiable threat of loss or degradation; and
- 3) wetland sites with diverse and important functions and values and/or especially high or special value for specific wetland functions.



At a minimum, proposed wetland acquisition projects should have been selected based on evaluation according to all three of these generic criteria. Minimum standards for these criteria are indicated in the Wetlands Assessment Threshold Criteria (Threshold Criteria) located in Appendix 1. The Threshold Criteria are used in determining which wetland sites (see definitions) qualify for Federal and State consideration for acquisition. Those wetlands meeting the Threshold Criteria warrant priority consideration for Federal and State acquisition. This systematic evaluation of wetland sites will help achieve national consistency and comparability between wetlands identified for acquisition consideration.

States developing wetlands components to SCORPs, including State Wetlands Priority Plans and their own or modified wetlands assessment threshold criteria or methodologies, should ensure that all three of the criteria mentioned above are addressed in their acquisition planning process and documents. States also should ensure that sufficient information will be available to allow a Federal or State decisionmaker to determine that proposed wetland acquisitions meet each criterion mentioned above.

The NWPCP contains only the threshold standards for each criterion. Users who need to rank various wetlands should develop a weighted scoring system taking into account the priorities and needs of the agency considering acquisition. The NWPCP has intentionally avoided development of a weighted scoring system for all criteria. This is because a single system will not serve all the differing applications of the NWPCP by various users. For example, the Service uses a Land Acquisition Priority System (LAPS) to rank and compare various properties proposed for acquisition, including wetlands. Thus, the NWPCP does not stand alone as an acquisition justification document.

The Threshold Criteria address wetland losses, wetland threats and wetland functions and values, which are fully discussed subsequently.

## **1. WETLAND LOSSES**

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### **Criterion**

- o Wetland types to be given priority consideration for acquisition are those that are rare or have declined within an ecoregion.

### **Discussion**

The following guidance will assist in applying this criterion:

- o In general, palustrine emergent, forested and scrub-shrub wetland types and coastal vegetated wetlands (estuarine intertidal, emer-
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gent, forested and scrub-shrub and marine intertidal) will usually warrant priority consideration for Federal and State acquisition. Documentable information (see definitions section) may be used to support giving priority to other wetland types.

- o All wetland types that are rare or have declined within an ecoregion may be considered.
- o An ecoregion sustaining a high or moderate Index of Loss (see definitions) could warrant priority consideration over an ecoregion having a low Index of Loss of wetlands present in 1954 at the start of the wetlands trends study.
- o Statistically valid data or documentable information may be used to support priority for a specified wetland type(s) within an ecoregion, a State or portion of a State due to rarity or wetland losses prior to, during or after the wetlands trend study, if NWI trends study data do not accurately portray the wetlands trends or Index of Loss within a State, portion of an ecoregion or other priority planning area.

Wetland losses are continuing throughout the U.S. in spite of increased Federal, State and local efforts to protect these areas. Of the estimated original (i.e., at the time of European settlement) 215 million acres of wetlands that existed in the conterminous U.S. (Roe and Ayres, 1954), less than 95 million acres (44 percent) probably remain. For example, between 1954 and 1974, about 9 million acres of wetlands were lost (Frayer *et al.*, 1983). Net annual wetland losses during this period averaged 458,000 acres (440,000 acres inland and 18,000 acres coastal). About 396,000 acres/year (87 percent) of this estimated annual wetland loss has been attributed to agricultural conversion. Wetland losses were also due to residential and commercial developments, ports and harbors, roads, water development projects, erosion and inundation, mining for mineral resources, livestock grazing and other land and water use activities.

Destruction or degradation of wetlands eliminates or reduces some of their values. Drainage of wetlands, for example, eliminates or reduces many of the beneficial effects of the wetlands on water quality and may directly contribute to flooding problems. When wetlands are converted to another use, the general public loses benefits from the wetlands associated with incremental flood, erosion and storm damage control, water quality maintenance, outdoor recreation and fish and wildlife resources; the public also inherits economic liability for correcting problems associated with lost wetland functions. The broad public interest is served when these wetland values are protected.

Diking and draining wetlands for agricultural uses, such as pasture or crop production, may significantly alter wetland functions and values but not convert the wetlands to uplands or non-wetlands. For example, significant wetland uses include muckland farming, row crops, hay, summer vegetables, and blueberry and cranberry cultivation. Drainage and pumping permits crop production during drier summer months but the wetlands are maintained by saturation, inundation and/or flooding

during the wetter winter and spring months. Farmed wetlands may quickly recover functional values without continued use of pumping and dike maintenance. As such, many wetlands in agricultural land uses have high potential for being restored or having their functional values increased.

The Service, under the NWI, studied trends in wetland habitats in the conterminous United States (Alaska, Hawaii, Puerto Rico and U.S. Trust Territories were not included in the study) during the 20-year period between 1954 and 1974 (trends study) to develop information on losses and gains of wetland types (Frayer *et al.*, 1983). The NWI trends study was designed to obtain a high degree of accuracy and precision at the national level. During this study, less emphasis was placed on sub-national levels (e.g., States); thus, information on the location of wetland losses (or gains) is statistically less meaningful at State levels and for certain regions. The NWI trends study did not address the significant reduction in quality of many wetlands.

The trends study did not address all types of wetlands. Marine subtidal and riverine wetlands were not evaluated because of the relatively small expected change in these types. Also, submerged vegetated or aquatic bed wetlands, an essential habitat for commercial and recreational fisheries, were not studied as they could not be reliably mapped. The trends study, however, looked at estuarine subtidal and intertidal non-vegetated wetlands, lacustrine wetlands, and palustrine open water and non-vegetated wetlands, all of which may include aquatic bed wetlands.

Aquatic bed wetlands may be under State ownership and/or State and Federal regulatory jurisdiction in many States, thereby being afforded some level of protection. However, in some States such wetlands may be under private ownership and vulnerable to loss or degradation from dredge or fill projects associated with navigation, marine, gas or oil, or similar projects or activities. Aquatic bed wetlands have diminished substantially in several regions in the U.S. The significant value of this wetland type can not be over-emphasized and priority consideration for acquisition may be warranted based on documentable wetland loss studies.

The riverine system includes wetlands and deepwater habitats contained within a channel except for wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens or; habitats with water containing ocean-derived salts in excess of 5 parts per thousand. However, upland islands or palustrine wetlands may occur within the channel. This system has been modified by man's activities through channelization, dredging, encroaching fills and conversion from natural substrate to concrete. Because of such activities, adjacent or intermixed palustrine wetlands have been lost or degraded.

Riverine wetlands usually are bordered by or intermixed with palustrine wetlands. In many cases, only a narrow band of palustrine wetlands or

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riparian vegetation (includes wetland and upland vegetation) may persist along the channel. These remnant wetlands and riparian lands may strongly influence the functional values and integrity of riverine wetlands, particularly the quality of fish and wildlife habitat in the riverine system. Palustrine wetlands and buffering riparian lands adjacent to riverine wetlands, therefore, may warrant special consideration for acquisition, especially in the arid regions of the western U.S. If so, this priority should be substantiated with documentable information.

The trends study showed that during the 1954-1974 period, certain wetland types had high rates of conversion to other land uses in specific regions of the U.S. For example, palustrine forested wetlands in the Lower Mississippi Alluvial Plain (commonly called bottomland hardwoods), palustrine emergent wetlands in the Prairie Pothole Region in the Dakotas and Minnesota, palustrine scrub-shrub wetlands in North Carolina, and estuarine intertidal wetlands in the south and southeast sustained extensive losses during this period. Nineteen States had significant decreases in wetlands over the 20-year period: Alabama, Arkansas, California, Delaware, Florida, Georgia, Illinois, Louisiana, Maryland, Minnesota, Mississippi, Nebraska, New Jersey, North Carolina, North Dakota, South Carolina, South Dakota, Texas and Wisconsin (Frayer *et al.*, 1983).

The national decline of wetlands was dramatic in many States or particular regions since the time of European settlement of the U.S. and prior to the trends study. Significant wetland losses during the late 1800's and early 1900's in 15 States (Alabama, Arkansas, California, Florida, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Ohio, Oregon and Wisconsin) were due to passage of the Swamp Land Acts of 1849, 1850 and 1860 (Shaw and Fredine, 1956). Wetlands in these States were drained for agriculture by constructing levees and drainage ditches. Tiner (1984), citing a number of sources, listed 10 States that probably had lost 50 percent or more of their wetlands or certain types of wetlands prior to 1955: California, Connecticut, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, North Dakota and Ohio.

#### (a) Losses by Wetland Type

An analysis of trends study data for the 48 states indicates that some wetland types, as described by Cowardin *et al.* (1979), declined significantly, others remained relatively stable and some increased since 1954. Using this information, the wetland types, as shown in Table 1, have been grouped in three categories that correspond with declining, stable and increasing wetland trends.

These data form the basis for establishing the wetland loss threshold in Appendix 1. An upland (non-wetland) cover type category is also included under the wetland loss criterion in Appendix 1 to address all other cover types at a wetland site that are not described under Wetlands

Groups 1-3. To protect the integrity of the wetland system, it is often essential to acquire adjacent or intermixed upland areas.

The Senate Committee Report on the Act provided guidance indicating that acquisition of an interest in wetlands includes adjacent and associated uplands essential to maintaining the values of the wetlands. However, the Act refers specifically to the acquisition of wetlands and it was not intended that former wetlands converted to non-wetlands were to be targeted for acquisition purposes. These areas may have been diked or drained by man for conversion to other uses, such as agriculture. As such, there may be several factors making these sites less viable for acquisition, including landowner opposition to selling the land, high cost per acre for "highly productive" land, and high cost for wetland restoration.

Although the trends study provides the only data useful for a statistical comparison of ecoregions in the U.S. during the 1954-74 period, it is recognized that the data may not accurately portray wetland trends for certain local, State or regional areas. Other historical, recent or detailed information may demonstrate a different trend of wetland loss, stability or increase for a local, State or regional area. When information is available to substantiate trends for various wetland types other than that shown by the NWI trends study, it may be used to support departures from the trends groupings presented in Table 1. For example, the trends data showed that palustrine open water wetlands increased between 1954 and 1974. However, a State may have documentable information showing that generally unmappable wetland types, such as aquatic bed, rock bottom or reef, found within the open water type, decreased significantly and warrant priority consideration for acquisition. Also, wetland types may have been historically rare, such as in the arid regions of the western U.S., so would warrant priority consideration.

### **(b) Losses by Region**

The NWI trends study generated national estimates of wetlands and deepwater habitat acreage for the lower 48 States during the 1950's, the 1970's, and the change for this period. The study also generated State estimates. The study samples were selected within boundaries formed by 35 physical subdivisions described by Hammond (1970), States, and a special coastal strata (see Cowardin *et al.*, 1979, pg. 27) including the marine intertidal category and the estuarine system. The study results are valid at the national level, but the data are not reliable enough to provide statistical significance at the State level.

The national data show that certain ecoregions of the U.S. have lost more of their wetland base acreage (i.e., between 1954 and 1974) than other areas. In this NWPCP, ecoregions are used for an objective comparison of wetland losses among various locations.

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**Wetlands Group 1 - Declining**

The following wetland types experienced a net decline between 1954 and 1974.

Wetland Type	1954-1974	% Change (SE*)
1. Palustrine Emergent	-14.1	(5.2%)
2. Palustrine Forested	-10.8	(3.7%)
3. Estuarine Intertidal Emergent	- 8.3	(8.3%)
4. Marine Intertidal	- 4.9	(57.5%)
5. Palustrine Scrub-Shrub	- 3.5	(56.7%)
6. Estuarine Intertidal Forested & Scrub-Shrub	- 3.2	(93.2%)

**Wetlands Group 2 - Stable**

The following wetland types were relatively stable between 1954 and 1974.

Wetland Type	1954-1974	% Change (SE*)
7. Estuarine Intertidal Non-Vegetated		+ 0.7 **
8. Estuarine Subtidal	+ 1.4	(14.9%)
9. Lacustrine	+ 2.4	(34.1%)

**Wetlands Group 3 - Increasing**

The following wetland types increased significantly between 1954 and 1974.

Wetland Type	1954-1974	% Change (SE*)
10. Palustrine - Other Non-vegetated		+45.0 (39.9%)
11. Palustrine Unconsolidated Shore		+51.8 ( 5.5%)
12. Palustrine Open Water	+89.4	( 2.5%)

\* The standard error (SE) of each entry expressed as a percentage of the entry.

\*\* Standard error of estimate is equal to or larger than the estimate.

**Table 1. Wetland losses or gains by type.**

Ecoregions (Bailey, 1978) are a hierarchical classification of areas characterized by distinctive flora, fauna, land forms, climate, vegetation and ecological climax. Ecoregion classification includes biotic and abiotic factors. For the purpose of this NWPCP, ecoregions will be determined from Figure 1, taken from Cowardin *et al.* (1979), page 27. Use of ecoregions allows compilation, comparison and interpretation of data based on biogeographical units rather than on political units (e.g., States).

The EPA's Corvallis Laboratory has modified the Bailey ecoregion classification system for their use in priority planning regarding regulatory protection of aquatic and wetland resources (Omernik, 1987). This new system factors in land use in addition to climate, soils, geology, vegetation and physiography for identifying distinctive ecosystems. Although this system may have advantages for wetland trends studies, it was not available when the trends study was conducted.

An Index of Loss formula was developed by Frayer for use in comparing the magnitude of loss for a wetland type during the 1954-74 study period between ecoregion divisions or other units of interest (e.g., States). The Index of Loss is expressed by the following equation:

$$\frac{(Y - X \times 100)}{N} \times \frac{(Y - X \times 100)}{Y}; \text{ or } \frac{(\text{Unit Loss} \times 100)}{\text{Net National Loss}} \times \frac{(\text{Unit Loss} \times 100)}{1954 \text{ Unit Base}}$$

Where, Y = 1954 Unit Base acreage per wetland type and unit area;  
 X = 1974 Remaining acreage per wetland type and unit area;  
 Y-X = Unit Loss (e.g., 1954-74 State loss per wetland type); and  
 N = 1954-74 Net National Loss per wetland type.  
 Unit = Area of comparison (e.g., ecoregion, State)  
 Base = Acres of wetlands in 1954 for the unit.

*Example:* The subtropical ecoregion had 1,000,000 acres of palustrine forested wetlands in 1954 and only 500,000 acres in 1974. The 1954-74 net national loss of this wetland type was 6,000,000.

$$\begin{aligned} Y &= 1,000,000 \\ X &= 500,000 && \text{Index of Loss} = 417 \text{ (high)} \\ Y - X &= 500,000 \\ N &= 6,000,000 \end{aligned}$$

An Index of Loss number (as translated to a high, moderate or low value) was developed by the Service for each non-coastal wetland type experiencing a loss during the 1954-1974 study period: palustrine

emergent, palustrine forested and palustrine scrub-shrub. The coastal vegetated wetland types experiencing losses during the 1954-1974 period (i.e., estuarine intertidal emergent, marine intertidal and estuarine intertidal forested and scrub-shrub wetlands) were not compared with palustrine wetlands. This is because these wetlands only represent about 5 percent of total U.S. estuarine and palustrine wetlands. The Index of Loss numbers generated were not meaningful when compared with palustrine wetlands having a significantly higher base acreage.

The coastal region, or that area along or near the coastline having marine intertidal and estuarine system wetland types, has experienced a significant loss of vegetated wetlands and associated values in the lower 48 States. During the NWI trends study, estuarine wetlands losses were greatest in California, Florida, Louisiana, New Jersey and Texas. Louisiana's coastal marsh losses were mostly due to submergence of coastal wetlands. Dredge and fill development was a significant cause of coastal wetlands losses in California, Florida, New Jersey and Texas. In other coastal areas, urban development was the major cause of wetland loss. In general, declining wetland types in the coastal region warrant priority consideration for protection and Federal and State acquisition.

The Index of Loss results for palustrine emergent, palustrine forested and palustrine scrub-shrub wetland types are listed in Table 2, ranked from highest to lowest losses per ecoregion division. A high Index of Loss indicates a large magnitude of loss, a large percent of wetland base loss or both (as well as their functions and values) during the 1954-74 study period.

The Index of Loss data show that certain ecoregions of the U.S. had substantially higher losses of palustrine wetlands than other ecoregions. These data can be used, if desired, to set national acquisition priorities among various ecoregions. However, it should be recognized that the trends study period data do not reflect wetland trends prior to 1954 or after 1974. Also, the trends study data are not refined enough to show sub-regional differences within the ecoregion (e.g., high wetland losses occurred within an ecoregion section, although losses were low within the same ecoregion division). For these reasons, decisionmakers should be cautious with their use of the Index of Loss information. States having specific information or data for these periods, or more specific information or data during the trends study period, may use such documentable information to support statements made in a wetland acquisition document indicating estimated levels (e.g., high, moderate, low) of wetland loss by a State or subregion. Such estimates or indices of wetland loss, however, are not directly comparable with the Index of Loss estimates based on trends study data (refer to Table 2).



## **2. THREAT OF FUTURE WETLAND LOSS**

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### **Criterion**

- o Wetlands to be given priority consideration for acquisition should be subject to identifiable threat of loss or degradation.

### **Discussion**

Wetlands continue to be threatened with loss or degradation due to such factors as agricultural, commercial and residential development; drainage and filling; road building; water development projects; groundwater withdrawal; loss of instream flows; water pollution; and vegetation removal. During the NWI trends study, agriculture was responsible for 87 percent of the man-induced wetland losses. Residential and commercial development accounted for most of the remaining losses. While some land use activities in wetlands may require a Federal permit in accordance with section 404(a) of the Clean Water Act, the regulatory program has not halted all wetland losses or degradation.

A number of factors influence the type, degree and imminence of threat. Degree of threat addresses the percentage of the wetland's functions and values likely to be lost or degraded by all types of wetland threats. Imminence of threat measures the time period within which the wetlands are likely to be destroyed or altered. These factors include changes in population growth and movements; food and energy policies and supplies; local, State and Federal laws and ordinances; and land or resource use controls. For example, the movement of people from the Northeastern U.S. to "sun belt" States such as California, Florida, Hawaii and Texas may fuel a demand for conversion of wetlands to urban lands. The National Planning Association, an economic research organization in Washington, D.C., has estimated that 80 percent of the Nation's population growth for the period 1980-2000 will occur in the south and west. The top 10 States for population growth were projected to be: California, Florida, Texas, Arizona, North Carolina, Georgia, Washington, Colorado, Virginia and Tennessee. The threat to wetlands could be high in these States due to developmental pressures associated with rapid population growth. A depressed agricultural economy due to crop surplus, low prices and weak export demand could result in a reduced rate of wetland conversion to agricultural lands. Conversely, increased demand for U.S. agricultural products could promote conversion of wetlands to agricultural lands.

Coastal wetlands have experienced significant historic losses and continue to be threatened. For example, the U.S. Census Bureau has estimated that 75 percent of the population is expected to live within 50 miles of the U.S. coast (including the Great Lakes coastlines) by the year 1990 (President's Council on Environmental Quality, 1984). This

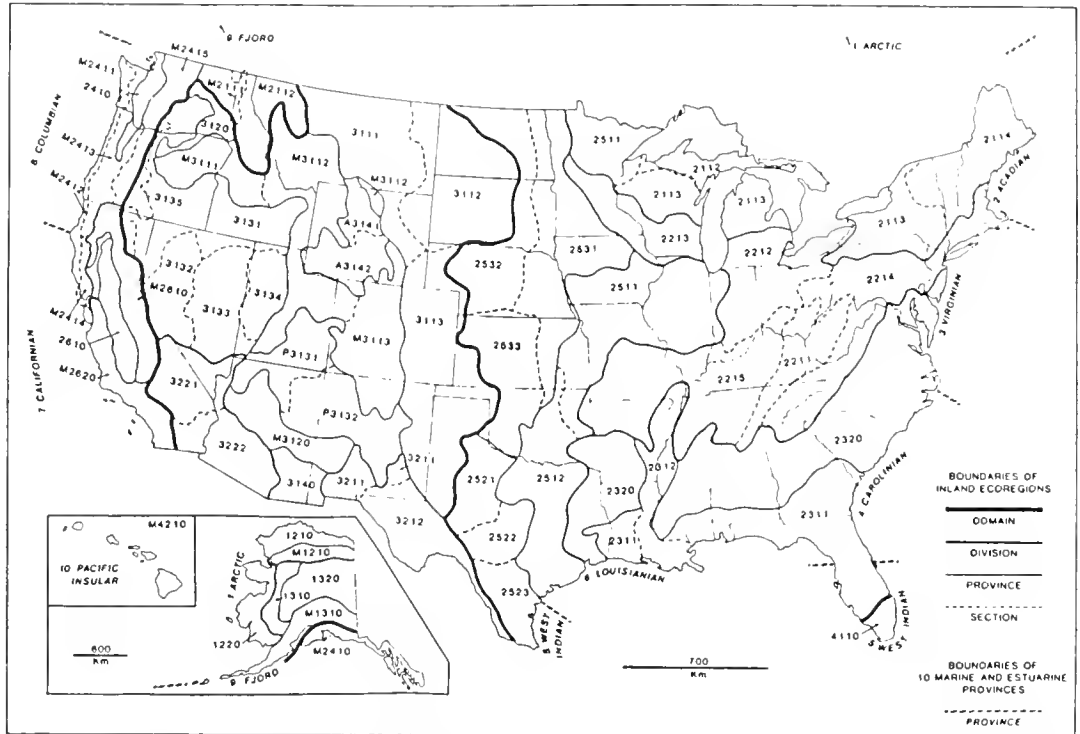
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Wetland Type	Ecoregion No.*	Index of Loss Division
Palustrine Emergent	2300 Subtropical	High
	2100 Warm Continental	
	2500 Prairie	Moderate
	2600 Mediterranean	
	2200 Hot Continental	
	3200 Steppe	Low
	2312 Southern Floodplain Forest	
	2400 Marine	
	2312 Southern Floodplain Forest	
Palustrine Forested	2300 Subtropical	High
	2600 Mediterranean	Moderate
	2500 Prairie	Low
	2400 Marine	
	2100 Warm Continental	
	2200 Hot Continental	
	3100 Steppe	
Palustrine Scrub-Shrub	2300 Subtropical	High
	2600 Mediterranean	
	2400 Marine	Moderate
	2312 Southern Floodplain Forest	
	2500 Prairie	
	2100 Warm Continental	
	3100 Steppe	Low
	2200 Hot Continental	

\* See Figure 1.

*Special Note: Trends study data were unreliable for the Desert ecoregion. However, based on the inherent rarity of palustrine emergent, forested and scrub-shrub wetlands in the Desert ecoregion and recognized historical and recent losses of these types, they should be accorded high priority consideration for acquisition.*

**Table 2.** Index of Loss by Ecoregion for Selected Palustrine Wetland Types.



\*Domains, Divisions, Provinces and Sections used on Bailey's (1976) map and described in detail in Bailey (1978). Highland ecoregions are designated, M mountain, P plateau, and A altiplano.

<p>1000 Polar</p> <p>1200 Tundra</p> <p>1210 Arctic Tundra</p> <p>1220 Bering Tundra</p> <p>M1210 Brooks Range</p> <p>1300 Subarctic</p> <p>1320 Yukon Forest</p> <p>M1310 Alaska Range</p> <p>2000 Humid Temperate</p> <p>2100 Warm Continental</p> <p>2110 Laurentian Mixed Forest</p> <p>2111 Spruce-Fir Forest</p> <p>2112 Northern Hardwoods-Fir Forest</p> <p>2113 Northern Hardwoods Forest</p> <p>2114 Northern Hardwoods-Spruce Forest</p> <p>M2110 Columbia Forest</p> <p>M2111 Douglas fir Forest</p> <p>M2112 Cedar-Hemlock Douglas fir Forest</p> <p>2200 Hot Continental</p> <p>2210 Eastern Deciduous Forest</p> <p>2211 Mixed Mesophytic Forest</p> <p>2212 Beech-Maple Forest</p> <p>2213 Maple-Basswood Forest + Oak Savanna</p> <p>2214 Appalachian Oak Forest</p> <p>2215 Oak-Hickory Forest</p> <p>2300 Subtropical</p> <p>2310 Outer Coastal Plain Forest</p> <p>2311 Beech-Sweetgum-Magnolia Pine-Oak</p> <p>2312 Southern Floodplain Forest</p> <p>2320 Southeastern Mixed Forest</p>	<p>2000 Humid Temperate</p> <p>2400 Marine</p> <p>2410 Willamette-Puget Forest</p> <p>M2410 Pacific Forest (in conterminous U.S.)</p> <p>M2411 Sitka Spruce-Cedar-Hemlock Forest</p> <p>M2412 Redwood Forest</p> <p>M2413 Cedar-Hemlock Douglas fir Forest</p> <p>M2414 California Mixed Evergreen Forest</p> <p>M2415 Silver fir Douglas fir Forest</p> <p>M2410 Pacific Forest (in Alaska)</p> <p>2500 Prairie</p> <p>2510 Prairie Parkland</p> <p>2511 Oak-Hickory-Bluestem Parkland</p> <p>2512 Oak + Bluestem Parkland</p> <p>2520 Prairie Brushland</p> <p>2521 Mesquite-Buffalo Grass</p> <p>2522 Juniper-Oak-Mesquite</p> <p>2523 Mesquite-Acacia</p> <p>2530 Tall-Grass Prairie</p> <p>2531 Bluestem Prairie</p> <p>2532 Wheatgrass-Bluestem-Needlegrass</p> <p>2533 Bluestem-Grass Prairie</p> <p>2600 Mediterranean (Dry summer Subtropical)</p> <p>2610 California Grassland</p> <p>M2610 Sierran Forest</p> <p>M2620 California Chaparral</p> <p>3000 Dry</p> <p>3100 Steppe</p> <p>3110 Great Plains Shortgrass Prairie</p> <p>3111 Grass-Needlegrass-Wheatgrass</p> <p>3112 Wheatgrass-Needlegrass</p> <p>3113 Grass-Buffalo Grass</p>	<p>3000 Dry</p> <p>3100 Steppe</p> <p>M3110 Rocky Mountain Forest</p> <p>M3111 Grand fir Douglas-fir Forest</p> <p>M3112 Douglas fir Forest</p> <p>M3113 Ponderosa Pine-Douglas fir Forest</p> <p>3120 Palouse Grassland</p> <p>M3120 Upper Gila Mountains Forest</p> <p>3130 Intermountain Sagebrush</p> <p>3131 Sagebrush-Wheatgrass</p> <p>3132 Lahontan Saltbush-Grasswood</p> <p>3133 Great Basin Sagebrush</p> <p>3134 Bonneville Saltbush-Grasswood</p> <p>3135 Ponderosa Shrub Forest</p> <p>P3130 Colorado Plateau</p> <p>P3131 Juniper-Pinyon Woodland + Sagebrush-Saltbush Mosaic</p> <p>P3132 Greta Galleta Steppe + Juniper Pinyon Woodland Mosaic</p> <p>3140 Mexican Highland Shrub-Steppe</p> <p>A3140 Wyoming Basin</p> <p>A3141 Wheatgrass-Needlegrass-Sagebrush</p> <p>A3142 Sagebrush-Wheatgrass</p> <p>3200 Desert</p> <p>3210 Chihuahuan Desert</p> <p>3211 Greta Tobacco</p> <p>3212 Tarbush-Creosote Bush</p> <p>3220 American Desert</p> <p>3221 Creosote Bush</p> <p>3222 Creosote Bush-Blar Sage</p> <p>4000 Humid Tropical</p> <p>4100 Savanna</p> <p>4110 Everglades</p> <p>4200 Rainforest</p> <p>M4210 Hawaiian Islands</p>
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**Figure 1:** Ecoregions of the United States after Bailey (1976) with the addition of 10 marine and estuarine provinces (Taken from Cowardin *et al.* 1979, page 27).

concentration of humans and their land use activities places a high level of threat on coastal area wetlands. However, in the past decade a strong emphasis by Federal and State regulatory programs in the coastal zone has reduced estuarine wetland losses compared to the period before the mid-1970's.

Various land use controls achieved through local zoning, Federal regulatory programs for activities in wetlands, and coastal zone laws influence human activities that cause wetland losses or alterations. For example, coastal wetland losses have been drastically reduced in Delaware, New Jersey and Maryland through State coastal and/or inland wetland protection laws. The Food Security Act of 1985 contains several wetland protection features that could significantly reduce the threat of wetland losses due to agricultural conversion. Nonetheless, even in the most conservation conscious States, with the strongest management, regulatory and acquisition mechanisms, wetlands continue to decline.

Because of the aforementioned variables, degree and imminence of threat are often difficult to determine. However, it is important to establish that wetlands are threatened by loss or degradation. Types of threat and laws, ordinances or land use controls fostering protection of wetlands should be considered in Appendix 1 in making a threshold decision that the wetland site is threatened. Quantifying threat type, degree and imminence is encouraged in developing ranking systems to measure threat.

### **3. WETLAND FUNCTIONS AND VALUES**

#### **Criteria**

- o Wetlands to be given priority consideration for acquisition are those with important and diverse functions and values and/or especially high or special value for specific wetland functions.
- o All wetland functions and the broadest range of wetland values should be considered in establishing priorities without greater priority consideration given to one public value over another.

#### **Discussion**

Wetlands provide important public values including fish and wildlife habitat (e.g., support endangered and threatened species, migratory birds and resident species); surface and groundwater supply; water quality improvement; flood, erosion and storm damage reduction; outdoor recreation; and research and education. Wetland functions and values vary according to wetland type, location and human modification.

Wetlands do not necessarily perform all functions with associated public service values and/or perform them equally well.

Congress directed the Department to consider contributions wetlands make to wildlife, fisheries, water quantity and quality, flood control, outdoor recreation and other areas or concerns of the Secretary. As indicated by the Report of the Senate Committee on Environment and Public Works (U.S. Senate, September 16, 1986):

*"No one of these services or products provided by the respective wetlands types should be given greater priority than any other. Instead, the Secretary should consider the broadest range of wetlands values in establishing priorities and not limit his consideration to any one service or product contributed by a wetlands type."*

A summary discussion of the functions and values of wetlands is provided to assist in understanding the importance of wetlands from the standpoint of public values that should be protected. "An Overview of Major Wetland Functions and Values" (Sather and Smith, 1984) and "A Method for Wetland Functional Assessment, Vol. 1" (Adamus and Stockwell, March 1983) were the sources for much of this information. These reports are example sources that may be consulted for detailed information on wetland functions, assessment methodologies and literature sources.

### **a. and b. Wildlife and Fisheries**

Wetlands are among the world's most biologically productive ecosystems and are crucial as habitats for fish and wildlife. Roughly two-thirds of the commercially important fish and shellfish species harvested along the Atlantic and Gulf coasts and half of the Pacific coast are dependent upon estuarine wetlands for food, spawning and/or nursery areas. A commercial marine fisheries harvest valued at over \$10 billion annually provides one economic measure of the significance of coastal wetland resources. Coastal recreational fishing may contribute an equivalent economic value annually (U.S. Department of Commerce, 1987).

Wetlands provide essential breeding, spawning, nursery, nesting, migratory and/or wintering habitat for a major portion of the Nation's migratory and resident fish and wildlife. Approximately one-third of the Nation's threatened and endangered plant and animal species depend heavily on wetlands. Millions of water-associated birds including waterfowl, shorebirds, wading birds, gulls and terns, rails and other groups depend on marshes, potholes, sloughs, swamps, mudflats and other wetland types.

Fish and wildlife habitat is one of the more studied functional values of wetlands (Lonard *et al.*, 1981). The state-of-the-art for fish and wildlife

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resource evaluations is well-developed, although many habitat evaluation methodologies are based on various assumptions due to current gaps in knowledge on wildlife habitat requirements. The Service's Habitat Evaluation Procedure (HEP), which is based on a numerical rating of habitat quality, is the most comprehensive methodology for quantifying fish and wildlife resource values (U.S. Fish and Wildlife Service, 1980).

High fish and wildlife resource values (biological or socioeconomic) for wetlands are often associated with such factors as diverse species composition; abundant wildlife numbers or populations; presence of species, populations or habitats of special importance or concern; and/or satisfaction of habitat requirements for those species with specialized habitat or occupying outer extensions of their range. Large, diverse wetlands, hydrologically connected to other wetlands, are likely to have high wildlife resource values since they meet the living requirements of more species. Wetlands with an irregular wetlands-open water edge and intermixture of open water and wetland vegetation are more likely to provide diverse food and cover conditions supporting more wildlife.

### **c. Hydrologic**

Hydrologic functions of wetlands include surface and groundwater recharge and discharge, water quality, flood water conveyance and storage, and shoreline and erosion protection. Most wetland functions are related to the presence, quantity, quality and movement of water in wetlands (Carter *et al.*, 1979). In general, the hydrologic functional values of wetlands are not well understood and the state-of-the-art is poorly developed (Lonard *et al.*, 1981); this is because wetlands are among the most difficult hydrologic environments to assess (Sather and Smith, 1984). Additional research and field testing are needed to correct this deficiency. Wetlands assessment techniques for hydrological functions are limited or poorly developed.

#### **(i) Surface and Groundwater Supply**

The groundwater discharge function of wetlands (i.e., movement of groundwater into surface water, e.g., springs) is recognized as being more important than the groundwater recharge function (i.e., movement of surface water into groundwater aquifers). Most wetlands are areas of groundwater discharge with some providing water for public uses. Many researchers believe that most wetlands do not function as groundwater recharge sites (Carter *et al.*, 1979). Some exceptions include depressional wetlands like cypress domes in Florida and prairie potholes in the Dakotas (Lissey, 1971). In urban areas, the pumping of municipal wells may draw water from streams and adjacent wetlands and induce groundwater recharge in wetlands (Tiner, 1985). Seasonal wetlands are more likely to perform a recharge function than are permanent or semi-permanent wetlands (Reppert *et al.*, 1979). Recharge is important for

replenishing aquifers used for water supply. Wetlands demonstrated to be groundwater discharge sites are good indicators of potential water supplies for towns. More work is needed to adequately understand this function in specific wetlands (Sather and Smith, 1984).

The effectiveness of the groundwater supply function of wetlands is higher when the surface and groundwater aquifers are connected. The socio-economic value is higher when the public derives its water supply from the wetlands or related groundwater aquifer. The public benefits of this wetland function include water supply for public use, irrigation, livestock watering and wildlife uses.

### (ii) Water Quality

Wetlands can help maintain water quality or improve degraded water by removing, transforming and retaining nutrients; processing chemical and organic wastes and pollutants (including heavy metals); and reducing sediment loads. Wetlands intercept runoff from uplands before it reaches the water and help filter sediments, nutrients and wastes from flood water. It is important, however, to recognize that wetlands have a finite capacity to perform this function.

Important water quality functions of wetlands include uptake, transformation and addition of materials as water flows through the wetlands. Wetlands act as sediment, toxic substance and nutrient traps and perform functions similar to a waste treatment plant. The waste treatment or water quality improvement process occurring in wetlands still needs additional study to understand retention mechanisms and capacities. Wetlands also have an important water quality role as sedimentation basins. Wetland vegetation filters (e.g., lowers turbidity of floodwater) and holds sediments which otherwise enter lakes, streams, reservoirs or harbors, often necessitating costly maintenance dredging activities. However, excessive sedimentation may raise the elevation of wetlands and accelerate their conversion to uplands, thereby eliminating values for trapping sediments. Wetlands also assimilate toxic substances, such as heavy metals and pesticides. The pollutant trapping function can result in serious problems for fish and wildlife, e.g., Kesterson National Wildlife Refuge and other refuges in the West collect irrigation return flow water containing leached salts and other minerals in toxic concentrations.

The water quality value of wetlands is highest when there is a net removal or detoxification of materials that would lower water quality further downstream. As would be expected, wetlands in urbanized and agricultural environments have more eutrophic water (i.e., excessive amounts of dissolved nutrients that may stimulate biological growth and reduce oxygen levels in water) than ones in forested and/or naturally vegetated areas.

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### (iii) Flood, Erosion and Shoreline Damage Reduction

Flood Reduction--Wetlands temporarily store flood water, slow water velocities, reduce bank and shoreline erosion, and slowly release stored water downstream, thereby saving lives and property. This function is especially important in areas with developed floodplains, where the potential for flood damage is high. Inland wetlands located along major streams and around lakes stabilize shorelines and channel banks and buffer developed uplands from storm, wave or erosion damage. Coastal wetlands serve these functions as well as providing a buffer to reduce potentially devastating effects of storm surges.

Flood conveyance and reduction functions of wetlands relate to their capacity to store and slow flood water, thereby increasing the duration of the flow and reducing downstream flood peaks (Sather and Smith, 1984). Many authors cite the Corps of Engineers' 1972 study of the Charles and Neponset River watersheds in Massachusetts as a prime example of the socioeconomic values associated with protecting wetlands to maximize flood control benefits. In this study, the Corps estimated that loss of the 8,423 acres of wetlands within the basin would result in annual flood damages of over \$17,000,000 (Sather and Smith, 1984).

Important factors influencing the flood reduction role of wetlands include: size (larger wetlands provide more flood storage and flow reduction); location within the basin (wetlands in the upper watershed often are more effective for flood retention); texture of substrate; structure of the vegetation; and connection with other wetlands (isolated wetlands are generally less effective for flood control).

The data base continues to improve regarding capability to identify wetlands having high potential for flood reduction. For example, Ogawa and Male (1986) have developed a methodology for assessing the flood control role of individual wetlands for certain kinds of streams.

The flood control functional value of a wetland site could be measured by its potential to store floodwater and prevent future flood damage that could result in substantial public costs each year. Among different wetland types, riverine wetlands with adjacent open or relatively open (non-developed) flood plains often have relatively high flood storage and conveyance values.

Erosion and Shoreline Damage Reduction--Wetland vegetation plays an important role in reducing damages from shoreline erosion by binding (i.e., plant roots hold soil) and stabilizing substrate, trapping sediments and reducing wave or current energy (Reppert *et al.*, 1979). The effectiveness of shoreline vegetation in reducing erosion depends on particular species, width of shoreline vegetation (e.g., the wider the wetland area, the higher the value), substrate (e.g., sandy substrate is less



stable than clay soils) and height and slope of the bank (Clark and Clark, 1979).

The direct economic significance of the shoreline erosion control function of wetlands was summarized by Adamus and Stockwell (1983) as follows: "Millions of dollars are spent annually for construction of jetties, bulkheads, and other structures intended to inhibit shoreline erosion by waves and currents. Such erosion may destroy inhabited structures, eliminate harvestable timber and peat, remove fertile soil and alter local land uses. Eroded sediments may be redeposited in navigable channels, aggravating the need for costly dredging."

Wide, densely vegetated wetlands with a long linear extent, especially along coastal areas, and those inland wetlands adjoining larger lakes or rivers are generally more effective at performing this wetland function. Coastal emergent and forested (e.g., cypress or mangrove) fringe wetlands and inland forested and scrub-shrub wetlands are often effective for protecting against erosion caused by storm tides or waves or high velocity water during flooding or heavy runoff. The value of riparian vegetation for streambank stabilization has been extensively documented throughout the U.S. The public value of this function usually is higher when developments or high value lands are located near wetland areas.

#### **d. Outdoor Recreation**

Wetlands support boating, swimming, sport fishing, hunting, birdwatching, nature observation and study and other wetland-related recreational activities that generate billions of dollars of expenditures annually. For example, 17.4 million hunters spent about \$5.6 billion on supplies, lodging, transportation and other related expenses in 1980 (U.S. Department of the Interior and U.S. Department of Commerce, 1982). Of these totals, 5.3 million hunted waterfowl, spending about \$640 million. In total, fish and wildlife-related recreation in 1980 was a \$41 billion industry, largely based on wetland resources.

Participation in water- and wetland-related outdoor recreation by Americans twelve years and older was estimated in 1982-83 at 53 million for boating, 64 million for fishing and 22 million for birdwatching (U.S. Department of the Interior, 1986). Recreation in wetlands, such as hiking, nature observation and photography, swimming, boating, and ice-skating, is generally not evaluated in economic terms. Many people simply enjoy the beauty and sounds of nature and spend their leisure time walking or boating in or near wetlands observing plant and animal life. The aesthetic value of wetlands is extremely difficult to evaluate or quantify monetarily. Nonetheless, it is very important, because in 1980 alone, 28.8 million people (17 percent of the U.S. population) took special trips simply to observe or photograph wildlife (U.S. Department of the Interior and U.S. Department of Commerce, 1982).

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Easily accessible wetlands that are close to major population centers often have higher direct outdoor recreation value than non-accessible wetlands located some distance from any population centers.

#### **e. Other Areas or Concerns**

Other important wetland values that were not specifically mentioned in section 301(c) of the Act, include natural areas, education, research, scenic, archaeological, historical and open space. Also, with proper management, consumptive uses of wetlands, such as agriculture, commercial fishing and timber harvest, may be compatible with wetland protection.

Wetlands are important as natural areas containing diverse plant and animal life. Since wetlands constitute only an estimated 5 percent of the Nation's lands in the contiguous U.S. (Kusler, 1983), these communities are, in general, rare. Their special importance resulting from their rarity and plant diversity is shown, for example, by the high percentage of wildlife species using these areas (e.g., an estimated 80 percent or more of the wildlife species in the dry southwestern U.S. utilize wetlands). Undisturbed natural wetland communities have high value as prime examples of their community type, as areas of study and comparison, and for protection of the unique resource. Most States recognize the value of wetland natural areas through special designation under The Nature Conservancy's Natural Heritage Program.

Society often more easily identifies with consumptive wetland values (e.g., outdoor recreation or commercial fishing) than nonconsumptive values (e.g., wildlife habitat, natural areas, research or water quality) because the consumptive values are more easily measured in monetary terms. Although consumptive values of wetlands (e.g., timber, peat, commercial fishery) are monetarily quantifiable, there is no clear agreement on an assessment methodology for defining such functional values of wetlands. Limited work has been conducted to define or quantify the nonconsumptive or less quantifiable values of wetlands.

The nonconsumptive values of wetlands usually are highest when wetland quality (i.e., undisturbed natural communities, unpolluted water) and fish and wildlife resource diversity are high and there is good accessibility for outdoor recreation uses. Certain uses of wetlands (e.g., timber harvest, recreational, contaminant removal, livestock watering and grazing, crop production, energy and mineral extraction), if not carefully managed, may cause degradation and reduction of fish and wildlife, recreational or scenic values. Such uses of wetlands to achieve a direct economic return may also lower other functional wetland values such as habitat and water quality. It is important to manage consumptive uses of wetlands so the integrity of the ecosystem is protected. This requires a good understanding of wetland functions and values.

The wetland functions and values part of the Threshold Criteria in Appendix 1 contains statements that were selected in part based on analysis of information and techniques evaluated in the literature on wetlands and assessment methodologies. One important source of information was the Operational Draft Wetland Evaluation Technique (WET), Volume II (Adamus *et al.*, 1987). Questions in the Threshold Criteria emphasize biological and socioeconomic components of wetland functional values that assist in identifying important or outstanding features of wetlands.

## **F. OTHER WETLAND ACQUISITION CONSIDERATIONS**

It is necessary in the acquisition planning process to determine the appropriate acquisition interest in the wetland site under consideration in order to achieve the acquisition objectives. Factors that are often considered in making this acquisition decision include the degree of financial interest in the wetlands required; cost to restore, enhance, operate and/or maintain the acquired wetlands; and the willingness of the current owner(s) to grant the desired interest in the wetlands. These factors are discussed in the NWPCP in the context of directing attention and/or priority in the acquisition planning process; however, these factors should not be ranked or weighed during the early planning stage when a threshold determination is to be made concerning qualification for acquisition consideration. Rather, they should be considered later in the acquisition process when more detailed information is available to determine when and under what conditions a wetland site should be acquired. This planning occurs only after the initial decision has been made that the wetland site meets the threshold criteria for acquisition. A complementary evaluation or ranking system may be used for this purpose. The Service, for example, addresses these factors in the Land Acquisition Priority System.

### **Factors to be Considered**

- o Priority consideration will be given to wetlands whose public values and benefits cannot be maintained or realized, except through acquisition.
  - o Priority consideration will be given to interests in wetlands (acquisition methods) that are the most cost-effective available while fully and permanently allowing for protection and/or improvement of the public values provided by the wetlands. Fee title, perpetual easements, leases, deed restrictions, land donations and exchanges or other methods may be employed.
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- o Upland areas and/or aquatic areas that contribute appreciably to the long-term preservation of adjacent wetlands may be given priority consideration for acquisition.
- o Priority consideration will normally be given to wetlands which can be acquired from willing sellers.
- o Priority may be assigned regardless of size (large or small) or the physical or biological condition of the wetland site (degraded or undisturbed). Restorable or pristine wetland sites may warrant priority depending on various interrelated acquisition considerations.
- o Wetland sites having minimal operation and maintenance requirements warrant priority consideration for acquisition.

## **1. Financial Interests In Wetlands**

Section 304 of the Act authorizes the Secretary to purchase wetlands or "interests in wetlands" consistent with the NWPCP. Guidance on Federal acquisitions given in the Report of the U.S. Senate Committee on Environment and Public Works on the Act (U.S. Senate, September 16, 1986) indicated:

*"Acquisition should be limited to those purchases of fee title or easements of wetlands and associated upland areas that contribute appreciably to the long-term preservation of such wetlands and associated populations of fish, wildlife, and plants. Acquisition of upland areas adjacent to wetlands is often essential to maintaining the values of those wetlands. Acquisition of less than fee interests, such as acquiring the surface estate but not the mineral interests, or acquiring an easement, is often appropriate. Long-term preservation of wetlands and associated uplands may often best be achieved through obtaining easement in perpetuity."*

As emphasized by the Senate Committee Report, uplands adjacent to wetlands may be considered for acquisition when it is established that their acquisition is essential to maintaining the functional integrity and quality of the wetland ecosystem. Based on the NWPCP Threshold Criteria, as long as at least one half or greater of the wetland acquisition site consists of rare or declining wetland types, the remainder of the site could be essential adjacent uplands and/or non-declining wetland types and still qualify for acquisition consideration.

Section 305 of the Act directs that the powers of condemnation or eminent domain shall not be used to acquire wetlands which either have been constructed for the purpose of farming or ranching (e.g., ponds) or have resulted from conservation activities associated with farming or

ranching (e.g., wetlands incidental to irrigation practices). In general, wetlands that can be acquired from willing sellers should be given priority in the acquisition planning process.

Fee title acquisition of wetlands generally offers the greatest opportunity for land use management and control. Acquisition of a lesser interest, such as an easement or deed restriction, may be less effective (although not necessarily less desirable) to protect a wetland site unless sufficient restrictions are included to secure the desired public interest values. In general, the following factors must be considered in establishing the effectiveness for wetland protection of a purchase that is less than fee title:

- 1) Time Period - In perpetuity easements are preferred over short-term (e.g., 10- or 20-year) easements.
- 2) Protection of Wetland Resource Values - Restrictions on wetland uses by the landowner must be specified in the easement to protect the fish and wildlife habitat, water sources/supply, public access and/or other appropriate functions or values of the site.
- 3) Cost Effectiveness - The cost for securing the easement (or other interest in the wetland) with the appropriate land use restrictions should be less than the cost of fee title purchase.

Fee title or easement acquisition need not only involve cash purchases; land donations or exchanges are also acceptable. As appropriate, local interests or groups other than Federal or State agencies, such as The Nature Conservancy or the Audubon Society or similar non-profit groups, may be involved in the wetland acquisition planning process and management.

LWCF appropriations provide a major source of money for land acquisition (non-wetland and wetland) by the Bureau of Land Management (BLM), Fish and Wildlife Service, U.S. Forest Service and National Park Service (NPS). Additionally, funding for acquisition of Fish and Wildlife Service refuge lands (including waterfowl production areas) is authorized by the Migratory Bird Hunting and Conservation Stamp Act and Wetlands Loan Act. LWCF monies are also provided to the States for land acquisition and facilities. States received almost \$370 million in LWCF monies in Fiscal Year 1979 and \$16.5 million in Fiscal Year 1988. Many States also have their own programs for funding wetland acquisitions. Among private organizations, The Nature Conservancy operates a successful land acquisition program designed to protect outstanding examples of natural communities and demonstrates that private citizens and organizations can cooperatively purchase land which they believe has a higher and better use for which they are willing to pay.

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## **2. Wetlands Restoration**

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A wetland site may have been significantly altered or degraded through human activities yet still have important functions and values or have potential for having functions and values improved significantly. Such sites may warrant the same priority consideration for acquisition that might be given a pristine or less disturbed wetland site because of the potential for recovering wetland functions and values at a relatively low restoration cost. For example, some diked wetlands could have an opening put in the dike to restore freshwater or tidal water flow. This action could significantly increase fish and wildlife resource and outdoor recreational values, as well as increase flood storage area and reduce problems associated with saltwater intrusion.

## **3. Management**

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Federal and State fish and wildlife and State parks and recreation agencies frequently will be responsible for managing wetlands acquired under the authority of the Emergency Wetlands Resources Act. However, as appropriate, other Federal, State or local agencies (e.g., NPS, BLM, U.S. Forest Service, County parks and recreation departments) and private conservation organizations (e.g., The Nature Conservancy, Ducks Unlimited) may be responsible, or share responsibility with other agencies, for managing acquired wetlands.

Management needs and costs are important considerations for Federal or State wetland acquisition planning. In order to minimize operation and maintenance costs and manpower, it may be appropriate to give priority consideration to wetland sites requiring very limited long-term physical maintenance and management to protect and enhance wetland functions and values. Use of personnel from a non-profit or volunteer group for management purposes may be a feasible option in appropriate circumstances. In any case, consideration should be given to identifying any necessary funding and manpower sources for managing wetlands to be acquired.

Characteristics of the site that could generate management constraints (i.e., biological or political problems) should be carefully evaluated in the acquisition planning process, e.g., lack of water rights, environmental contaminants, ability to protect the wetland site and resources, or extraction of energy or mineral resources. Likewise, off-site biological or political problems (e.g., soil erosion, pesticides, contaminated irrigation

water) should be assessed to determine if they may adversely affect a potential wetland site.

Land use activities proposed on a potential acquisition site should be compatible with protection of the wetland functions and values. Hunting, fishing, trapping, boating and birdwatching are examples of recreational activities in wetlands that through proper management could be compatible with maintaining the integrity of the wetland site.

The relative size of a wetland site, particularly small wetlands, should not in itself disqualify it from priority consideration for acquisition or management. Certain acquisition processes are better suited to smaller units while some realize increased efficiency in larger units. The diversity of interests among entities considering wetland acquisitions (e.g., Federal, State and local governmental agencies, private organizations) that may refer to the NWPCP for guidance, necessitates an open-minded approach.

## **G. IMPLEMENTATION GUIDANCE**

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The following guidance is provided to assist in implementing this NWPCP and fulfilling its purpose.

The Act directs the establishment of a NWPCP for setting acquisition priority by specifically considering wetland losses, vulnerability and functions and values. The goal of priority setting is to establish a system that leads to selecting the rare or declining wetland types within the more important and vulnerable wetland sites in the U.S. The NWPCP Threshold Criteria establish minimal standards for projects to be considered for possible funding under the LWCF authority. Section 304 of the Act only authorizes the Secretary to acquire wetlands with LWCF appropriations; therefore, Federal agencies must use other authorities and funding sources to restore, enhance and/or manage wetlands acquired under the LWCF authority. However, the LWCF Act authorizes the Secretary to provide financial assistance to the States for planning, acquisition and development of land and waters. In keeping with the fragile nature of wetlands, any development should not degrade the wetland.

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## 1. ROLE OF THE STATES

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Section 303 of the Act (discussed in section C, Authority) requires that SCORPs include wetlands components. The National Park Service administers the Federal portion of the SCORP program and is managing the required program changes through revision of Federal regulations, technical assistance and training. The Fish and Wildlife Service and the National Park Service have cooperated closely during development of the NWPCP, especially regarding section 303 requirements and State implementation guidance, in order to facilitate these changes.

In order to meet the requirements of the Act and maintain eligibility to participate in the LWCF Program, each State must revise its SCORP to include a wetlands component, or develop a State Wetlands Priority Plan that is consistent with the NWPCP as an addendum to the SCORP. The Act also requires that the State agency responsible for fish and wildlife resources be specifically consulted as part of this process. The National Park Service can provide recreational grants to States for work on SCORPs, including development of wetlands components.

The National Park Service has indicated that they are requiring States to develop SCORP wetlands components that are consistent with the NWPCP. They have requested that a State Assessment and Policy Plan should include consideration of wetlands as an important outdoor recreation resource, as well as address wetland protection strategies, including acquisition. At a minimum, the wetlands component of the Assessment and Policy Plan should provide wetland acquisition goals, objectives and/or strategies. Also, the State Action Program should consider specific actions that will be taken to protect wetlands. The relationship between SCORP wetlands components and the NWPCP is shown in Figure 2.

Since the SCORP wetlands component is an implementation tool for wetland protection, it should identify wetland sites (refer to definitions section) warranting priority consideration for acquisition. If the information is available, specific wetland parcels or tracts may be listed. If the planning information is general in the Assessment and Policy Plan (e.g., freshwater emergent wetlands in the southern part of the State), then the National Park Service is requiring States to list in their Action Program specific wetland sites intended to be acquired consistent with NWPCP criteria. States are encouraged, but not required, to use the Threshold Criteria (Appendix 1) and follow the outline for the Service Regional Wetlands Concept Plan (Concept Plan) contained in the NWPCP to comply with the Act, while making modifications and increasing the level of detail and accuracy as necessary to meet State needs.



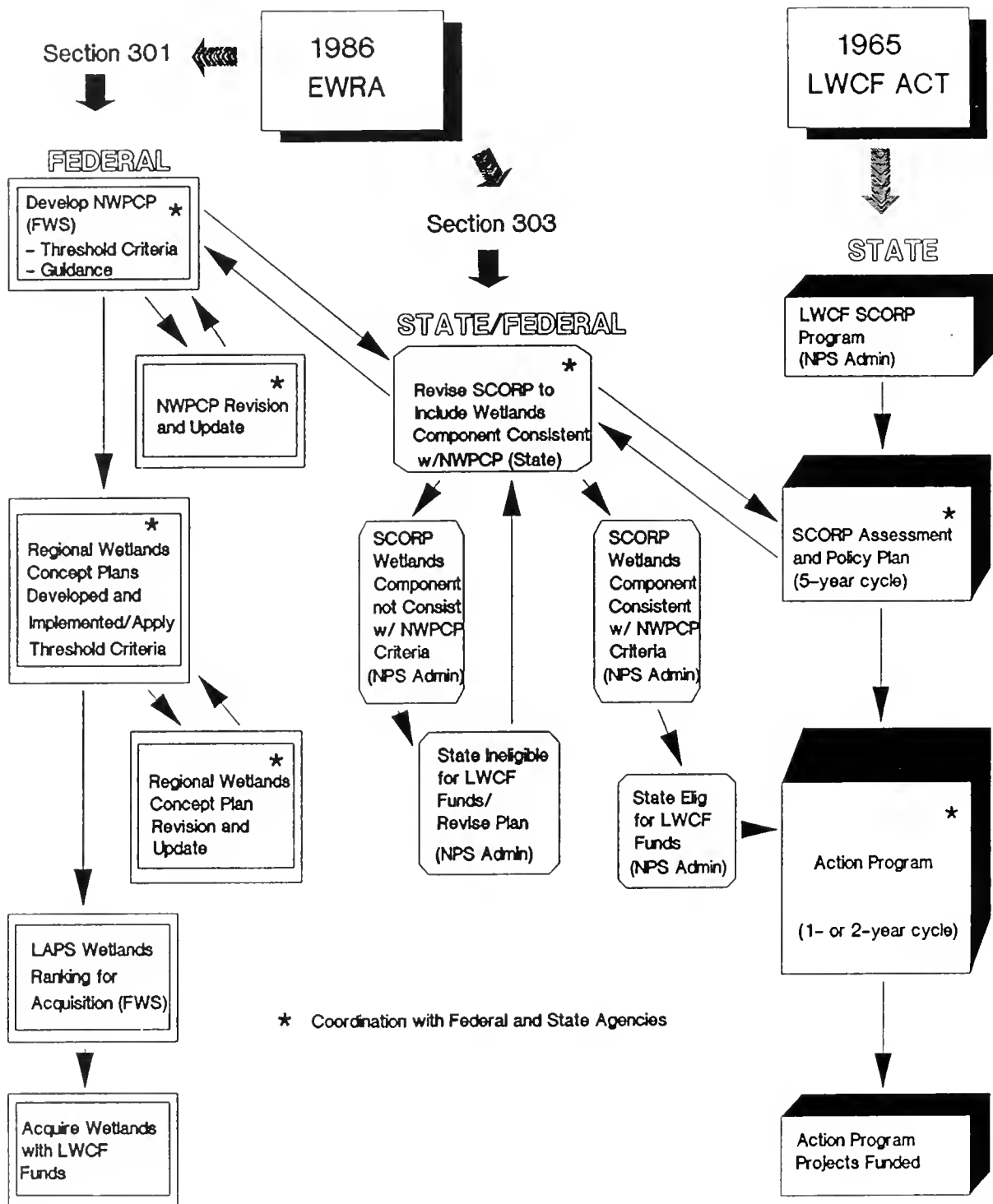


Figure 2: Flowchart Showing the Relationship Between SCORP Wetlands Components and the NWPCP

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While the National Park Service is requiring that SCORP wetlands components will be consistent with the NWPCP, it is recognized that they need not and will not be identical. However, they must be consistent with the NWPCP regarding the generic wetland loss, threat, and functions and values criteria specified in the Act. To the extent possible, the Service will use State Wetlands Priority Plans in formulating Service Regional Wetlands Concept Plans.

The NWPCP allows States flexibility to conduct wetland acquisition priority planning and to develop their own wetlands assessment criteria as long as they are compatible with the framework established by the three generic criteria in the Act on wetland scarcity, vulnerability and function and values. The NWPCP is intended to effect priority planning efforts for protecting wetland resources at the State level based on evaluating all important wetland values, without greater priority consideration given to any one value over another. However, the Senate Committee Report (1986) indicated that wetlands acquired under the LWCF State grant program will be subject to direct recreation use, or if not subject to direct public access, will produce valuable recreation opportunities elsewhere (e.g., migratory bird sanctuary).

A State may develop its own evaluation criteria or modify the NWPCP Threshold Criteria to meet State needs (i.e., refine the threshold criteria to be more specific and geared to the State level rather than the national level). For example, State Wetlands Priority Plans can give resolution not possible in the NWPCP, such as identifying specific areas (e.g., Rainwater Basin) within a State or portion of an ecoregion warranting top priority consideration for acquisition. However, the process should still result in collection or generation of sufficient information that can be used by Federal or State decisionmakers to determine if the wetland site is eligible for acquisition consideration based on the Threshold Criteria in the NWPCP.

The qualifying thresholds determined by an individual State should not be lower than those established by the NWPCP Threshold Criteria. In other words, a State should have gathered and substantiated sufficient background information on a proposed wetland acquisition project to allow a Federal or State decisionmaker to determine that the wetland site: 1) includes predominantly (greater than 50 percent) rare or declining wetland types (or substantiated exceptions); 2) is threatened with loss or degradation; and 3) has had all the functional values considered with equal priority and is recognized, identified or listed as important for at least two functional values. If a State finds that these threshold criteria would exclude wetland types and sites that warrant priority in the State, then documentable information should be provided to substantiate the departure from the minimal standards set by the NWPCP Threshold Criteria.

The NWPCP provides States with latitude to use other classification criteria and systems, such as a Natural Areas Inventory. For example,

the inventory system used in Florida is based on organizing land acquisition objectives according to resource categories, such as natural communities, forest resources, coastal resources and fish and wildlife. Wetlands are one of the land types found within most of these resource categories. The Cowardin et al. wetlands classification system used in the NWPCP can easily be applied to address wetland types found within such systems.

States using their own resource classification system, however, should be or become knowledgeable about the Cowardin et al. classification system in order to ensure that priority acquisition proposals considered for LWCF appropriations are definable wetland types established to be rare or declining in the ecoregion. The Service continues to recommend that States use the Cowardin et al. wetlands classification system because it leads to standardized terminology and is useful for objectively comparing States based on compatible data.

It is recognized that States have experienced some problems in modifying their SCORPs to address wetlands since the schedule for developing SCORP wetlands components preceded completion of the final NWPCP. Consequently, some States were uncertain about the level of specificity required in their wetlands components to be consistent with the NWPCP and the Act. In recognition of this scheduling problem, the National Park Service provided the States with a draft version of the NWPCP in July 1987 for guidance. The final NWPCP is very similar based on framework and generic criteria.

The National Park Service is allowing States flexibility in their Policy and Assessment Plans to develop more generalized wetlands components (e.g., priority given to declining and vulnerable wetland types along a major river in the southwestern portion of a State) if detailed information is not available to identify specific wetland tracts for acquisition. However, if wetlands acquisition is a SCORP priority, the National Park Service is requiring States to submit more specific information regarding wetland sites in the wetlands components to the Action Programs.

The available LWCF moneys for each State is very limited and also wetland projects have to compete with non-wetland outdoor recreation projects. Therefore, a State many want to develop a wetland acquisition ranking system that would permit numerical ranking of candidate projects. A weighted scoring system could assist decisionmakers in determining which project(s) should be submitted first for possible use of LWCF moneys. The Service can provide information on its Land Acquisition Priority System to those States desiring an example of a numerical ranking system for wetland acquisition planning purposes. The National Park Service, however, is not requiring States to develop a numerical ranking system for use in the Recreation Plan Standard Open Project Selection Process.

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It is not intended by the Act or as part of the NWPCP that States would have to inventory all wetlands as part of systematic acquisition planning. Most States probably are aware of a number of wetland sites, meeting NWPCP criteria for wetland scarcity, vulnerability, and function and values, that could be identified as warranting consideration for acquisition. This information plus State goals, objectives and/or strategies for wetland protection/acquisition are the basic ingredients needed to develop a SCORP wetlands component that demonstrates State level wetland acquisition planning and consistency with the NWPCP.

## **2. ROLE OF THE U.S. FISH AND WILDLIFE SERVICE**

The Service will assist in fulfilling the purposes of this NWPCP by preparing Regional Wetlands Concept Plans that address the States within each of the seven Service Regions (refer to outline shown in Table 3). This outline also could be used by a State for preparing a State Wetlands Priority Plan. A Concept Plan will be prepared in coordination with a State fish and wildlife agency, as well as other State and Federal agencies (e.g., State Water Quality Board, State Parks and Recreation Department, Corps of Engineers, Environmental Protection Agency, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, National Park Service) having expertise regarding wetland functions and values (including water resources, flood control, and outdoor recreation), and will complement a State Wetlands Priority Plan or other SCORP wetlands component prepared under section 303 of the Act. In many situations, the two documents may be very similar depending on the degree of coordination and overlapping interests of Federal and State agencies.

The Concept Plans will assure that national priorities for wetlands acquisition are addressed within each State in compliance with the Act. The Concept Plans will discuss and list the Nation's wetland resources (specific sites and/or regions or systems) within each Service Region that should be given priority consideration for acquisition as directed in section 301 of the Act.

To accomplish this task, the Regional Offices of the Service will coordinate with the States at their request during their preparation of SCORP wetlands components to assist in achieving consistency with the NWPCP. Regions also will review the wetland resources in the States within their Regions and following the outline in Table 3 will prepare Concept Plans that address the criteria specified in the NWPCP and list wetland sites that should be given priority consideration for Federal and State acquisition. The Service will maintain close coordination with appropriate State and Federal agencies, including the agency responsible for fish and wildlife resources, to assist in identifying wetland issues and

potential acquisition sites which result from the SCORP revision process pursuant to section 303 of the Act.

During the acquisition planning process, the Service must also involve other Federal, State and local agencies and private conservation organizations having land and water use planning responsibilities, to identify their concerns and objectives. As appropriate, the Service should coordinate with the following agencies during development of the Concept Plans: Bureau of Land Management, Bureau of Reclamation, National Park Service, U.S. Forest Service, Corps of Engineers, Environmental Protection Agency, National Marine Fisheries Service, State fish and wildlife, State parks and recreation, water quality board, county flood control and The Nature Conservancy. The input of other agencies and conservation organizations involved in land and water use planning and protection is essential for a coordinated effort to protect priority wetlands.

To provide for national consistency, prospective wetlands should be systematically evaluated by Regions using the Threshold Criteria contained in Appendix 1. These criteria address: 1) the broad spectrum of public benefits (functions and values) provided by wetlands; 2) historic wetland losses; and 3) threat of wetland losses. A brief documentation has been requested at the end of most statements or questions to support the response. The use of supporting references as documentation is encouraged. The professional expertise and judgment of Service Field and Regional Office personnel will be relied upon to determine which wetland sites qualify for acquisition consideration, based on the criteria specified in the Act and the guidance provided in the NWPCP. The criteria in the NWPCP may be refined in the Concept Plans to address Regional needs provided that the generic threshold criteria are satisfied.

Wetland lists generated based on application of the Threshold Criteria will not be ranked because this would require extensive data, either non-existent or not readily available, to prepare a defensible ranked list. The lists should seek to identify wetland sites that meet the criteria specified in the Act and the guidance in the NWPCP.

The Service will continue to assist the National Park Service and States in formulating and revising the SCORP wetlands components required in section 303 of the Act. Full participation by the Service in the SCORP revision will facilitate comparability of State and national wetlands planning and reduce duplication of effort.

The Fish and Wildlife Service will fully comply with the National Environmental Policy Act (NEPA); and procedures set forth for implementing NEPA by the Council on Environmental Quality (40 CFR 1500-1508), Department of the Interior, and the Service in the development of Regional Wetlands Concept Plans and any subsequent acquisition and operation and management of wetlands listed in the Concept Plans.

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**OUTLINE**

**SERVICE REGIONAL WETLANDS CONCEPT PLAN**

(May also be used for State Wetlands Priority Plans)

- A. Introduction
- B. Purpose and Authority
- C. Consultation
- D. Wetlands Assessment Criteria
  - 1. Wetland Loss
  - 2. Wetland Threat
  - 3. Wetland Functions and Values
    - a. Wildlife (including endangered and threatened species, migratory birds and resident species)
    - b. Commercial and Sport Fisheries
    - c. Surface and Groundwater Quality and Quantity and Flood Control
    - d. Outdoor Recreation
    - e. Other Areas or Concerns
- E. Wetland Acquisition Issues, Conflicts and Priorities
- F. Implementation Guidance
- G. Review and Revision
- H. References
- I. Definitions
- J. Appendices
  - Appendix 1 Lists of Wetland Sites for Acquisition Consideration (Including tables and maps, as appropriate)

**Table 3.** Outline for a Service Regional Wetlands Concept Plan.

### **3. ROLE OF OTHER FEDERAL AGENCIES**

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Federal agencies having specific wetlands, water resources or NWPCP-related responsibilities and/or expertise include:

Bureau of Land Management	<i>multiple use, outdoor recreation, wetlands</i>
Bureau of Reclamation	<i>water resources, flood control</i>
National Park Service	<i>outdoor recreation, SCORP</i>
Environmental Protection Agency	<i>water quality, wetlands</i>
National Marine Fisheries Service	<i>sport and commercial fisheries, marine and estuarine wetlands</i>
Corps of Engineers	<i>flood control, shoreline protection, wetlands</i>
Soil Conservation Service	<i>water resources, wetlands</i>

The preceding Federal agencies may be consulted for input to documents addressing wetland sites warranting priority for acquisition. An effort should be made to ensure consistency among the various Federal agencies making wetland acquisition decisions. Periodic informal interagency coordination is also recommended to discuss wetland acquisition and interrelated regulatory program activities and problems.

Federal agencies, including the BLM, NPS and U.S. Forest Service, that acquire lands under the LWCF authority should ensure that any existing land use or fish and wildlife management plans identifying proposed wetland acquisitions are consistent with the NWPCP. This may require modification of existing documents or development of agency wetland acquisition planning documents to ensure consistency with the NWPCP. All Federal agencies using LWCF monies for wetland acquisition should apply the NWPCP Threshold Criteria or Threshold Criteria modified to meet specific agency needs to identify wetlands qualifying to be considered for acquisition.

Although not required by the Act, all Federal agencies using a funding source for wetland acquisitions other than the LWCF authority, are encouraged to consult the Service, Service Wetlands Concept Plans, State Wetlands Priority Plans or follow NWPCP Threshold Criteria in making decisions regarding acquisition of priority wetlands. Alternatively, Federal agency wetland acquisition needs can be incorporated into Service Concept Plans during the coordination and updating of these documents.

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#### **4. FEDERAL WETLAND ACQUISITIONS**

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All agencies within the Department will ensure that wetlands acquired under the authority of the Emergency Wetlands Resources Act using LWCF moneys, in full or in part, are either: 1) listed in the Concept Plans; or 2) subjected to evaluation under the NWPCP Threshold Criteria or Threshold Criteria modified to meet agency needs and found to warrant priority consideration for acquisition. The Emergency Wetlands Resources Act, however, exempts wetland acquisitions using Migratory Bird Conservation Funds from being consistent with the NWPCP. The Service acquisition process is described in section G (5)(c).

Section 502 of the Act authorized the establishment of the Bayou Sauvage Urban National Wildlife Refuge. Significantly, this provision demonstrates Congressional intent that a broad variety of public values are considered in the decision to acquire a wetland site. The Bayou Sauvage Urban National Wildlife Refuge will provide public benefits associated with fish and wildlife resources (including endangered and threatened species), outdoor recreation opportunities, scientific research and environmental education, archaeological resources and location within an urban setting.

#### **5. OTHER LEGISLATION, PLANS, PROCEDURES, PROGRAMS AND POLICIES**

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##### **a. Food Security Act of 1985**

The Food Security Act of 1985 (Farm Bill) encourages removal of marginal agricultural lands from production and provides various opportunities for wetland habitat protection and restoration while reducing Federal subsidy costs. Sections 1314 (Disposition and Leasing of Farmland) and 1318 (Farm Debt Restructure and Conservation Set-Aside) of the Farm Bill offer opportunities through acquisitions (e.g., fee title, conservation easement, deed restrictions, leases) to protect fish and wildlife resources.

Under section 1314, local or State governments or private non-profit organizations may obtain easements, deed restrictions or the equivalent for conservation purposes on Farmers Home Administration (FmHA) inventory lands prior to resale. FmHA has acquired over 1.7 million acres of inventory lands through voluntary conveyance and non-FmHA initiated foreclosure proceedings. Once acquired, FmHA seeks to resell



these lands to eligible farmers or other entities. These inventory lands include existing and restorable wetland habitats of local, regional, State, national and international importance.

Under a Memorandum of Understanding between the FmHA and Service, the Service has an opportunity to screen all inventory lands, identify important wetland protection opportunities and formulate and implement, or sponsor third party implementation of, mutually acceptable plans for wetland preservation and enhancement. The Service estimates that more than 200,000 acres of wetlands may be preserved and enhanced through cooperative Federal, State and private group efforts under this provision.

Once the Farm Debt Restructure and Conservation Set-Aside provision (loan servicing) becomes operational, wetlands on private lands may be set aside in conservation easements, in exchange for debt relief to the landowners.

The driving wetland protection tool for FmHA inventory land and loan servicing is the Executive Order on Protection of Wetlands (11990) which establishes Federal policy to conserve wetlands regardless of any priority system. Therefore, virtually all wetlands are eligible for protection and possible enhancement on inventory lands and through loan servicing and the process of prioritization need not be pursued in most cases. However, the NWPCP criteria could be applied to wetlands in the FmHA inventory to identify those warranting priority consideration (including restorable wetlands) for acquisition by local conservation entities, State fish and wildlife agencies and private conservation organizations.

Section 616 of the Agricultural Credit Act of 1987 authorizes the Secretary of the Department of Agriculture to transfer lands, or interest therein, to Federal or State agencies for conservation purposes. The NWPCP would be useful for identifying wetlands that warrant protection and/or management through this land transfer process.

#### **b. Section 906(e) of the Water Resources Development Act of 1986**

Section 906(e) of the Water Resources Development Act of 1986 provides that, in those cases when activities to enhance fish and wildlife resources are recommended as part of any report to Congress, the first cost shall be Federal when:

- o the enhancement provides benefits that are determined to be national, including benefits to species identified by the National Marine Fisheries Service as of national economic importance, species subject to treaties or international conventions involving the U.S., and anadromous fish;
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- o it is designed to benefit threatened or endangered species under the Endangered Species Act; and
- o activities are located on lands managed as a National Wildlife Refuge.

Section 906(e) deals with activities that are taken to benefit certain categories of species. Thus, such actions could be those taken to restore, improve and conserve habitats that support species that meet the criteria of section 906(e). Many wetlands fall under this category and should be included because actions taken to enhance wetlands would provide benefits that are national.

The Act indicates Congressional intent that wetlands are a significant resource of national importance that deserve protection. Most of the criteria contained in section 906(e) are also contained in the Act. Thus, the Act contains statements relating to wetlands that complement the provisions of section 906(e). Wetlands represent a habitat type that could fulfill the requirements of section 906(e). Hence, wetlands appearing on a list in a Concept Plan should meet the requirements for first costs of enhancement actions (including acquisitions) being Federal.

### **c. The Service's Land Acquisition Program and Land Acquisition Priority System**

The Service has an on-going land acquisition program that is authorized by the Migratory Bird Conservation Act, Endangered Species Act, Fish and Wildlife Act of 1956 and Fish and Wildlife Coordination Act. Funding for acquisition of lands is authorized by the Migratory Bird Hunting and Conservation Stamp (Duck Stamp) Act, Wetlands Loan Act and LWCF Act. Section 302 of the Emergency Wetlands Resources Act allows appropriation under the LWCF Act for purchase of wetlands and also removes the restriction on the use of LWCF appropriations for Service acquisition of migratory waterfowl areas.

The Service has a migratory bird land acquisition program that is funded through the Duck Stamp Act and Wetlands Loan Act. Priority has been given to acquisition of wetlands and adjacent uplands of breeding and/or wintering importance to migratory waterfowl (i.e., ducks, geese and swans). The Service and Canadian Wildlife Service also cooperated to prepare the North American Waterfowl Management Plan (Waterfowl Plan) which serves as a guide for participation by various private organizations and the public in the conservation and management of waterfowl, especially through the protection and wise use of wetlands. The Emergency Wetlands Resources Act exempts wetland acquisitions using Migratory Bird Conservation Fund appropriations from being consistent with the NWPCP.

In response to budgetary questions raised by the Department, Office of Management and Budget, and Congress concerning the manner in which

the Service determined acquisition priorities, the Service developed the Land Acquisition Priority System to provide an objective and uniform approach for establishing Service land acquisition priorities. LAPS is designed to result in a prioritized ranking of projects to assist decisionmakers in acquisition planning and developing budget proposals.

LAPS addresses land acquisition projects falling within four Service target (i.e., resource planning) areas: endangered species (SE); migratory birds (MB); nationally significant wildlife habitats (NSWH); and nationally significant wetlands (NSW). LAPS provides numerical project and budget scores that can be compared for ranking purposes. For the species-related targets (SE and MB), criteria under habitat and species categories are applied to species or populations known to use a proposed acquisition site. For habitat-related targets (NSWH and NSW), criteria are applied to a proposed project area under diversity of species or Service objectives and habitat trends categories.

The NSW target was developed to be consistent with the Act and has been modified to be consistent with the final NWPCP. The NSW target addresses acquisition of wetlands for all the services and products they provide without greater priority consideration given to one functional value over another.

Service Regional Wetlands Concept Plans will provide lists of wetland sites in each State warranting consideration for acquisition. The NSW target of LAPS will be used to rank wetlands appearing on lists in the Concept Plans for acquisition planning and budgeting purposes.

#### **d. Fish and Wildlife Service Mitigation Policy**

The Service Mitigation Policy (*Federal Register* 46(15), January 23, 1981), provides a systematic method to determine appropriate mitigation for fish and wildlife impacts resulting from development projects. Mitigation elements include avoiding the impact, minimizing the impact by selecting least damaging alternatives, rectifying the impact by repairing or restoring the environment, and replacing unavoidable habitat losses based on the relative value of the affected habitat.

In those cases where application of the Service Mitigation Policy indicates that acquisition with restoration or enhancement as compensatory mitigation is acceptable, wetlands meeting NWPCP Threshold Criteria or appearing on State or Federal lists developed in consistency with the NWPCP should be evaluated and recommended by the Service.

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### **e. EPA Regional Priority Wetland Lists**

Each of the EPA's 10 Regional Offices has prepared or is currently developing a list of priority wetlands within its Region. These lists seek to identify the most valuable and vulnerable wetlands based on input from the Department of the Interior and other agencies and organizations.

The purpose of the lists is to assist EPA in focusing wetland protection efforts under the section 404 regulatory program. These authorities include section 230.80 of the Guidelines, section 404(c) actions (both in response to and in advance of permit applications), section 404(q) elevations and actions under the National Environmental Policy Act, and section 309 of the Clean Air Act.

The EPA has determined that there will be no ranking among wetlands and that the Regional Priority Wetland Lists will be periodically updated. These lists will provide an important source of information concerning wetlands that may warrant consideration for acquisition under the NWPCP. However, the EPA Regional Priority Wetland Lists will differ from the lists generated through the Service Regional Wetlands Concept Plans. The lists will be similar in that they are fundamentally based on identifying wetlands that are both valuable and threatened. They will be vastly different in their management orientation to these wetlands. The EPA lists emphasize regulatory efficiency, and Service lists will be based on eventual acquisition as the best alternative for long-term protection or realization of public values. Particular wetland sites may be added to or removed from either or both the Service or EPA lists depending on factors such as changing threats or effectiveness of regulatory efforts.

Environmental Protection Agency and Service Regional Office staff should meet informally several times each year to discuss the Concept Plans and EPA Regional Priority Wetland lists. The focus should be on the interrelationships between these priority listing efforts and how regulatory or acquisition activities of the respective agencies can complement each other for more effective wetland protection.

### **f. List of Wetlands of International Importance**

The NWPCP can also help in the early identification of wetlands of international importance. The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Convention) is an international treaty which provides the framework for international cooperation to conserve wetland habitats. The Convention places obligations on contracting parties (nations) relating to wetland conservation and specifies that each party shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance (International List). Placing a wetland site on the International List, however, affects neither the management regime for the area nor resource

use within it. The U.S. sees the Convention as another important public awareness tool to highlight various wetland values.

The Convention came into force in 1975. The United States signed the Convention in 1985. By December 1986, 44 nations had joined and designated 358 wetlands on the International List. The U.S. Senate ratified the Convention in October 1986 and four U.S. wetland sites (Ash Meadows National Wildlife Refuge (NWR), Nevada; Edwin B. Forsythe NWR, New Jersey; Izembek NWR, Alaska; and Okefenokee NWR, Georgia and Florida) were added to the International List in December 1986. The U.S. became a full member to the Convention on April 8, 1987. The U.S. nominated two additional sites, State- and Federally-owned wetlands within the Chesapeake Bay ecosystem and the Everglades National Park, for addition to the International List, at the Convention meeting held in Regina, Canada from May 27 to June 5, 1987.

Wetlands of International Importance are identified by using the 1987 Regina criteria (Appendix 2) which superseded the 1980 Cagliari criteria. A wetland site must meet any one (or any subpart of a criterion) of the three criteria to qualify for nomination as a wetlands of international importance. Members to the convention nominate wetlands that meet the criteria but the wetland site is not actually designated as a wetlands of international importance until it is approved by member parties to the Convention. At the May-June 1987 Regina meeting, a definition for wise use of wetlands and guidelines for the application of criterion 1 were adopted. A meeting was held in Costa Rica in January 1988 to review the Regina criteria and prepare further recommendations, and develop guidelines regarding the wise use of wetlands.

Wetlands meeting criteria for inclusion on a list appearing in a Concept Plan may also satisfy criteria that would qualifying them to be considered for inclusion on the International List. However, a wetland site should be secure from threat of loss or major external impact (e.g., in public or private ownership and managed for conservation purposes) prior to eventual nomination to the International List. The Service, after coordination with appropriate State and Federal agencies and private organizations, will identify wetlands under the NSW Target in LAPS that meet the criteria for consideration to be nominated to the International List.

### **g. National Natural Landmark Program**

The National Park Service administers the National Natural Landmark Program which strives to identify the best examples of natural systems. Natural Landmarks are nominated, studied and designated by the National Park Service according to a classification system which includes natural regions (e.g., Appalachian Ranges, Mohave-Sonoran Desert, Virgin Islands) and resource types (e.g., aquatic community, estuary, cave, river). Some sites are already in public ownership, others

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are privately owned, some are threatened and some are relatively secure. Wetland sites identified by the National Park Service in the list of National Natural Landmarks that are threatened are likely candidates for acquisition consideration.

## **h. Natural Heritage Program**

The Nature Conservancy coordinates the efforts of 47 State Natural Heritage Programs which identify ecologically significant natural areas in their respective States. In most States, the Natural Heritage Program is a statewide inventory of rare plants and animals and the best examples of ecological communities. Data include computerized records of these resources, maps, biological survey and descriptive information, identification of threats, management needs and local land use and planning activities. Many identified natural areas are superior examples of all communities, including rare types. Those areas containing threatened wetland sites are likely candidates for acquisition consideration.

## **i. North American Waterfowl Management Plan**

The North American Waterfowl Management Plan (Waterfowl Plan), released in May 1986, was developed to address the need for protecting, restoring and managing wetlands of importance to waterfowl and other wildlife species in light of significant losses and degradation of wetlands across the continent. The Waterfowl Plan provides a broad policy framework with general guidelines for waterfowl habitat protection and management actions. Thirty-four waterfowl habitat areas of major concern are identified in the U.S. and Canada. Among these areas, special priority was directed in the U.S. to the Prairie Pothole Region, the Lower Mississippi River Delta and Gulf Coast Region, Central Valley of California, the Atlantic Coast, and Great Lakes-St. Lawrence lowlands.

The Waterfowl Plan addresses the need to influence land use practices throughout the continent and recognizes that fee acquisition is not the sole solution to the wetland loss problem. Other resource protection and management options are emphasized. It is also recognized in the Waterfowl Plan that a long-term solution to the problem of declining waterfowl populations must involve the coordinated action of Federal, State and local agencies, private organizations, landowners and the general public.

The NWPCP and Waterfowl Plan were developed independently, having two different specific identified purposes. The NWPCP addresses setting priorities for wetland acquisition based on considering equally all functions and values. The Waterfowl Plan addresses public and private efforts to conserve and manage waterfowl; wetland acquisition in specifically identified habitat areas of concern is one recommended option to accomplish the Waterfowl Plan goals. Although these plans have

some overlapping objectives and can be used to complement each other during wetland protection efforts, there will be differences in acquisition priorities. For example, NWPCP priority wetlands can not be restricted solely to Waterfowl Plan habitat areas of concern because the Act requires that no one function or value be given greater priority consideration than another. The NWPCP may be used, however, to assist the Service in meeting Waterfowl Plan objectives. Also, as a planning tool, this NWPCP could broaden public support for Service waterfowl protection efforts by showing accountability for all wetland functions and values during the acquisition planning process.

## **6. Information Sources**

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Users of the NWPCP may want to consult appropriate agencies having professional expertise to address or answer some of the Threshold Criteria questions or statements. For example, it may be desirable to consult the Corps of Engineers regarding a flood control question, or the EPA or a State Water Quality Control Board regarding a water quality question.

Potential sources of wetland information or expertise that could be helpful in identifying the types and locations of wetlands warranting acquisition consideration include (this list was modified from a list compiled by the U.S. Environmental Protection Agency, 1987):

- o U.S. Fish and Wildlife Service NWI maps may be available for a wetland assessment site or area. Information on how to order maps may be obtained by calling 1-800-USA-MAPS. Alternatively, assistance concerning NWI maps or the Service's wetlands classification system may be obtained by writing or calling an NWI Regional Coordinator located within each Service Regional Office. (The addresses and telephone numbers for Regional Offices are given at the end of this section).
  - o The U.S. Fish and Wildlife Service's Wetland Values Bibliographic Data Base provides references to articles on wetlands organized into 13 information fields, including location. Nearly 5000 articles are included. (For information on use of the data base, contact the Service at (813) 893-3624 or FTS 826-3867).
  - o Special aquatic sites over EPA's designated Sole Source Aquifers. (For further information, call EPA at (202) 382-5530).
  - o State Water Quality Management Plans required in accordance with section 303(3) of the Clean Water Act and Federal Regulation 40 CFR 130.6. These plans have information on ground and surface water quality, wildlife resources, including endangered species, and commercial and sport fisheries.
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- o Wetlands included in the approximately 40 State Natural Heritage or Heritage Trust Program inventories or priority lists.
- o Wetlands listed by The Nature Conservancy and its State chapters.
- o Wetlands identified as important by State fish and wildlife agencies.
- o Wetlands identified in Bureau of Land Management planning documents as Areas of Critical Environmental Concern.
- o Wetlands identified by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service. (Refer to Alexander et al., 1986 and Lindall and Thayer, 1982 in the References section.)
- o Wetlands identified in U.S. Forest Service Forest Plans.
- o Wetland areas identified in federally approved State Coastal Zone Management Plans.
- o Important wetland areas situated downstream from, and vulnerable to, hazardous waste sites on EPA's National Priority List.
- o Wetlands of special significance listed under State wetlands protection programs, (e.g., New York State's Freshwater Wetlands Classification System).
- o Wetlands identified in U.S. Fish and Wildlife Service "Concept Plans for Waterfowl Habitat Preservation."
- o Wetland areas identified in the North American Waterfowl Management Plan.
- o Wetlands identified as being important to a federally listed threatened or endangered species in the Endangered Species Information System (ESIS) maintained by the U.S. Fish and Wildlife Service. (For further information, contact the appropriate Service Regional Office - see list at end of this section).
- o Wetlands listed under State Critical Area Programs, e.g., Massachusetts' Areas of Critical Environmental Concern, Maryland's Chesapeake Bay Critical Areas Program, Maine's Critical Area Program.
- o Wetlands included in the Department of the Interior's 1979 National Wild and Scenic Rivers Inventory. (For further information, contact the NPS at (202) 343-3761).
- o Wetlands included as scenic rivers within approximately 30 State Wild and Scenic Rivers Programs. (For further information, contact the Association of State River Planners, Department of Environmental Conservation, N.Y. State at (518) 457-7433).
- o Wetlands identified as important by State Reclamation Commission Water Resource Divisions.
- o Wetlands identified as important by U.S. Fishery or River Basin Commissions, (e.g., the Atlantic States Marine Fisheries



Commission, the Great Lakes Commission, Great Lakes Fishery Commission, Gulf States Marine Fisheries Commission).

- o Wetlands identified as important by the Extension Service in each State land grant university. (For further information, contact the USDA, Extension Service at (202) 447-5468).

## **U.S. Fish and Wildlife Service Regional Offices**

### **REGION 1**

Regional Director  
U.S. Fish and Wildlife Service  
1002 Northeast Holladay Street  
Portland, OR. 97232-4181

Telephone: 503-231-6158  
8-429-6119

#### **Jurisdiction**

*Wash., Oregon, Calif., Idaho,  
Nevada, Hawaii,  
Pacific Trust Territories*

### **REGION 3**

Regional Director  
U.S. Fish and Wildlife Service  
Federal Building, Fort Snelling  
Twin Cities, MN. 55111

Telephone: 612-725-3510  
8-725-3510

#### **Jurisdiction**

*Iowa, Illinois, Indiana, Michigan,  
Minnesota, Missouri, Ohio, Wisconsin*

### **REGION 2**

Regional Director  
U.S. Fish and Wildlife Service  
P.O. Box 1306  
Albuquerque, N.M. 87103

Telephone: 505-766-2932  
8-474-2321

#### **Jurisdiction**

*Arizona, N. Mexico, Oklahoma,  
Texas*

### **REGION 4**

Regional Director  
U.S. Fish and Wildlife Service  
Richard B. Russell Building  
75 Spring Street, S.W., Suite 1726  
Atlanta, GA. 30303

Telephone: 404-221-6343  
8-242-3588

#### **Jurisdiction**

*Alabama, Arkansas, Florida,  
Kentucky, Louisiana, Mississippi  
North Carolina, Puerto Rico, South  
Carolina, Tennessee, Virgin Islands*

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**REGION 5**

Regional Director  
U.S. Fish and Wildlife Service  
One Gateway Center, Suite 700  
Newton Corner, MA. 02158  
Telephone: 617-965-5100  
8-829-9200

**Jurisdiction**

*Connecticut, Delaware, Maine,  
Maryland, Massachusetts, New  
Hampshire, New Jersey, New York,  
Pennsylvania, Rhode Island, Virginia,  
Vermont, West Virginia.*

**REGION 6**

Regional Director  
U.S. Fish and Wildlife Service  
P.O. Box 25486  
Denver, CO. 80225  
Telephone: 303-324-4169  
8-776-7920

**Jurisdiction**

*Colorado, Kansas, Montana,  
North Dakota, Nebraska, South  
Dakota, Utah, Wyoming*

**REGION 7**

Regional Director  
U.S. Fish and Wildlife Service  
1011 East Tudor Road  
Anchorage, AK. 99503  
Telephone: 907-768-3537

**Jurisdiction**

*Alaska*

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## H. REVIEW AND REVISION

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A draft NWPCP, dated September 1, 1987, was circulated to appropriate Federal agencies, all States and territories and several environmental groups for formal review on October 7, 1987. Comments on the NWPCP were received from 33 States, 2 territories, 10 Federal agencies and 3 environmental groups. In general, many of those commenting indicated that the draft NWPCP was well-organized, thorough, flexible, workable and in compliance with the Act. Many substantive comments were received that reflected Federal and State agency and environmental group concerns about specific wording within, components of, or recommended additions or changes to the NWPCP. The NWPCP has been revised to reflect various review comments.

The general implementation time frame for the NWPCP and SCORP wetlands components is indicated in Figure 3. The temporal relationship of the National Park Service, State SCORP programs and Fish and Wildlife Service actions under sections 301 and 303 of the Act are illustrated there.

The NWPCP will be reviewed and revised in Fiscal Year 1991 to reflect new or updated scientific, administrative and user information, especially concerning wetland resource functions and values, wetland scarcity and changing vulnerability of wetlands to losses. Service Regional Wetlands Concept Plans will be updated, as appropriate, to reflect changes in listed wetland sites and/or revisions to the NWPCP. As a minimum, revisions to the NWPCP and Concept Plans will involve consultation, as appropriate, with the Bureau of Land Management, Corps of Engineers, Environmental Protection Agency, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, National Park Service, U.S. Forest Service and State clearing houses.

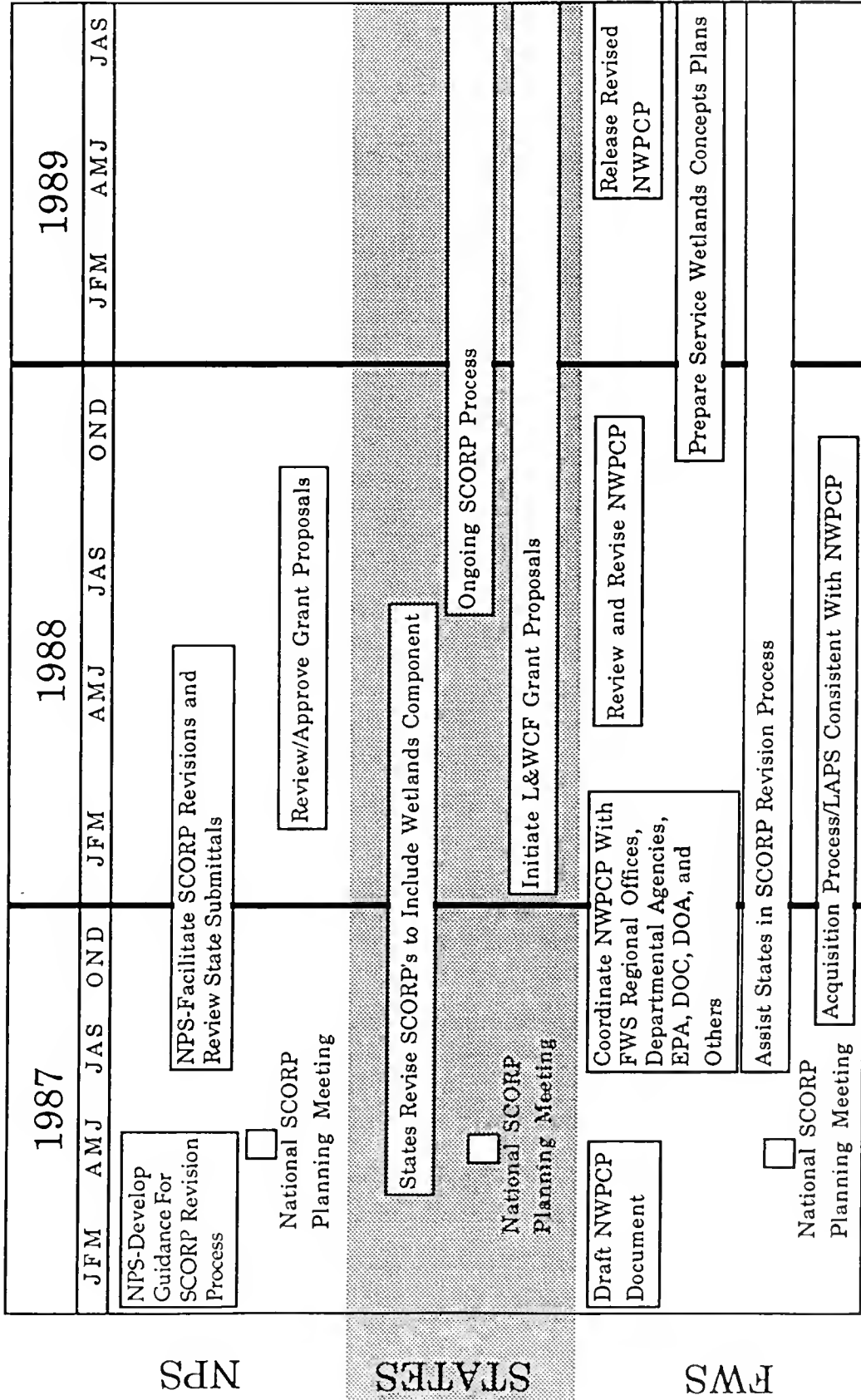


Figure 3: Time Frame for Implementation of the National Wetlands Priority Conservation Plan



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## J. DEFINITIONS

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The National Wetlands Priority Conservation Plan uses wetlands terminology from the Service's wetlands classification system developed by Cowardin *et al.* (1979), except for the following definitions specified in section 301 of the Act:

**WETLAND** - Land that has a predominance of hydric soils that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

**HYDRIC SOIL** - Soil that, in its undrained condition, is saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation.

**HYDROPHYTIC VEGETATION** - A plant growing in:

- a. water or
- b. a substrate that is at least periodically deficient in oxygen during a growing season as a result of excessive water content.

**ACQUISITION** - As used in the National Wetlands Priority Conservation Plan, any purchase of complete or partial interest in a wetland site obtained with total or partial Federal funding.

**DOCUMENTABLE INFORMATION** - Information or data collected and/or published by an individual, group, organization, institution or agency and used as an objective basis for establishing wetland functions and values, threats and losses.

**ECOREGION** - Continuous geographical areas characterized by distinctive flora, fauna, land forms, climate, vegetation and ecological climax. Refer to Bailey (1978) for additional definition.

**EMERGENCY WETLANDS RESOURCES ACT (Act)** - The Public Law (99-645) enacted in 1986 authorizing a variety of measures, including establishing the National Wetlands Priority Conservation Plan, to promote the conservation of wetlands in the United States.

**HISTORIC WETLAND LOSSES** - The losses of wetlands from a particular site or loss of a specific type of wetlands within a region from the time of European settlement through the present.

**INDEX OF LOSS** - Measure of loss of a wetland type within an ecoregion expressed by the equation:

$$\frac{(Y-X)[100]}{N} \times \frac{(Y-X)[100]}{Y}; \text{ or } \frac{(\text{Unit Loss} \times 100)}{\text{Net National Loss}} \times \frac{(\text{Unit Loss} \times 100)}{\text{1954 Unit Base}}$$

Where, Y = 1954 Unit Base acreage per wetland type and unit area  
X = 1974 Remaining acreage per wetland type and unit area  
Y-X = Unit Loss (e.g., 1954-74 State loss per wetland type)  
N = 1954-74 Net National Loss per wetland type  
Unit = Area of comparison (e.g., ecoregion, State)  
Base = Acres of wetlands in 1954 for the unit

**INTERESTS IN WETLANDS** - The financial interest in wetland acquisition including, but not limited to, fee title acquisition, perpetual conservation easements, deed restrictions or other methods. Adjacent associated uplands essential to protecting wetland values are also included.

**NATIONAL WETLANDS INVENTORY PROJECT (NWI)** - A long term inventory and mapping effort of the Nation's wetlands being conducted by the Fish and Wildlife Service. As of 1988, approximately 55 percent of the wetlands in the conterminous United States had been mapped. Mapping in the conterminous United States is projected to be completed by 1998.

**NATIONAL WETLANDS PRIORITY CONSERVATION PLAN (NWPCP)** - The plan referenced in section 301 of the Act, established and periodically updated by the Secretary of the Interior, which specifies the locations and types of wetlands and interests in wetlands that should be given priority consideration with respect to Federal and State acquisition.

**RARE** - Wetland types that are uncommon or seldom occur in the ecoregion.

**RESTORABLE WETLANDS** - Wetlands having functions and values diminished by human impacts that can be restored through various management techniques.

**SECRETARY** - The Secretary of the Department of the Interior.

**SERVICE REGIONAL WETLANDS CONCEPT PLANS (Concept Plans)** - Wetlands Concept Plans developed by the Regional Offices of the Fish and Wildlife Service to implement the NWPCP for that agency. They will be prepared to address wetlands within each Service Region on a state-by-state basis and will include an unranked listing of wetland sites which meet the Wetlands Assessment Threshold Criteria established by the NWPCP. These Concept Plans: will be prepared in cooperation with various Federal and State agencies, including fish and wildlife

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departments; will complement the State SCORP wetlands planning documentation; and will constitute the feeder list of wetland sites proposed for acquisition by the Fish and Wildlife Service.

**STATE WETLANDS PRIORITY PLAN** - The planning document which is required by section 303 of the Act as an addendum to a Statewide Comprehensive Outdoor Recreation Plan in lieu of revising the Statewide Comprehensive Outdoor Recreation Plan to include a wetlands component.

**STATEWIDE COMPREHENSIVE OUTDOOR RECREATION PLAN (SCORP)** - The State planning process required by the Land and Water Conservation Fund Act for State participation in the grant program administered by the National Park Service.

**THREAT** - The likelihood that a wetland site, or portion thereof, will be destroyed or degraded, directly or indirectly, through human actions. In establishing the threat threshold for the NWPCP in Appendix 1, a wetland site is considered to be threatened if an estimated > 10 percent of the site's functions and values are likely to be destroyed or adversely affected through direct, indirect, or cumulative impacts over the next ten years considering:

1. the array of potential wetland threats; and
2. the probable degree of protection provided by the various relevant laws, ordinances and regulations.

**TYPES OF WETLANDS** - Those classifications of wetlands based on physical, botanical and hydrological characteristics. The classification system described by Cowardin *et al.* (1979) will serve as the basis for determining types of wetlands within any given region.

**WETLANDS ASSESSMENT THRESHOLD CRITERIA (Threshold Criteria)** - A series of questions or statements provided to help NWPCP users determine if a wetland site qualifies for acquisition consideration based on wetland loss trends by type, threat of loss or degradation of the wetland site and the importance or significance of the wetland's functions and values.

**WETLAND FUNCTIONS AND VALUES** - The various products, services, functions and values which wetlands provide to society, including fish and wildlife habitat, water supply, improvement of water quality, flood control, erosion and shoreline protection, outdoor recreation opportunities and education and research.

**WETLAND LISTS** - As used in the NWPCP, lists of wetlands will be included, as appropriate, in both State SCORP documents and Service Regional Wetlands Concept Plans. These lists will indicate wetlands which meet the Threshold Criteria set forth in the NWPCP. They are not

necessarily lists of wetlands for purchase, but lists of wetlands qualifying for purchase.

**WETLAND SITE** - An identifiable property, tract, area, or region containing wetlands or a complex (aggregation) of physically- or functionally-related wetlands. A wetland site may contain a variety of wetland types, interspersed habitat of other types and associated upland buffer areas. The boundary of the site should be specific and as geographically restricted as practical, determined by application of sound acquisition principles. In other words, regardless of size, a wetland site should be treated in terms of a unit which would generally fit the acquisition goals, process and needs of the user.

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## K. APPENDICES

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**Appendix 1** — *Wetlands Assessment Threshold Criteria*

**Appendix 2** — *Criteria for Identifying Wetlands of  
International Importance*

**Appendix 3** — *Emergency Wetlands Resources Act of 1986*



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**APPENDIX 1**

**NATIONAL WETLANDS PRIORITY CONSERVATION  
PLAN**

**WETLANDS ASSESSMENT THRESHOLD CRITERIA**





**NATIONAL WETLANDS PRIORITY CONSERVATION PLAN  
WETLANDS ASSESSMENT THRESHOLD CRITERIA**

**INSTRUCTIONS:** Complete this page to determine whether a wetland site (refer to Wetlands Profile guidance) qualifies for acquisition consideration under the National Wetlands Priority Conservation Plan.

Use the attached guidance for estimating wetland losses, threats and functions and values thresholds. The guidance is organized in the same sequence as the threshold criteria and will direct the user to an appropriate conclusion. Complete all questions and statements.

**1. WETLANDS PROFILE:**

- a. Wetland Site Name: \_\_\_\_\_ File No: \_\_\_\_\_
- b. USGS 1:24,000 Map Quadrangle Name: \_\_\_\_\_
- c. Township: \_\_\_\_\_; Section: \_\_\_\_\_
- d. Longitude: \_\_\_\_\_; Latitude: \_\_\_\_\_
- e. City: \_\_\_\_\_; County: \_\_\_\_\_; State: \_\_\_\_\_
- f. Ecoregion: \_\_\_\_\_ (refer to Cowardin *et al.*, 1979, p.27).
- g. Size: \_\_\_\_\_ (acres). Date of wetlands assessment: \_\_\_\_\_

**2. WETLAND LOSS PRIORITY:** (circle one) 1 2 3 4 5

Must be priority level 1, 2 or 3 to meet threshold.

**3. IS THE WETLAND SITE THREATENED?** (refer to the attached guidance under Wetland Threats) Must be circled "yes" to meet threshold.

YES NO

**4. WETLAND FUNCTIONS AND VALUES**

Check all that apply. Must check at least two to meet threshold.

- a. Wildlife
- b. Fisheries
- c. Water Supply/Quality, Flood and Erosion Protection
- d. Outdoor Recreation
- e. Other Areas or Concerns \_\_\_\_\_

**5. CONCLUSION**

----- Yes, wetland site meets all threshold criteria and qualifies for acquisition consideration under provisions of the National Wetlands Priority Conservation Plan.

----- No, wetland site does not meet all threshold criteria and therefore does not qualify for acquisition consideration under provisions of the National Wetlands Priority Conservation Plan.



## GUIDANCE FOR ESTIMATING WETLAND LOSSES, THREATS AND VALUES THRESHOLDS

### 1. WETLANDS PROFILE

Complete items (a) through (g) to give a name and address to each wetland site.

For the purpose of the National Wetlands Priority Conservation Plan, a wetland site is an identifiable property, tract, area, or region containing wetlands or a complex (aggregation) of physically- or functionally-related wetlands. A wetland site may contain a variety of wetland types, interspersed habitat of other types and associated upland buffer areas. The boundary of the site should be specific and as geographically restricted as practical, determined by application of sound acquisition principles. In other words, regardless of size, a wetland site should be treated in terms of a unit which would generally fit the acquisition goals, process and needs of the user.

### 2. WETLAND LOSSES

Wetlands will be classified as follows: System, subsystem, class and water regime according to Cowardin *et al.*, 1979 (refer to key on next page). Estimate percent of site for each type.

TYPE	PERCENT OF SITE
<i>system</i>	
<i>subsystem</i>	
<i>class</i>	
<i>water regime</i>	
a. ___ : ___ : ___ : ___	___ %
b. ___ : ___ : ___ : ___	___ %
c. ___ : ___ : ___ : ___	___ %
d. ___ : ___ : ___ : ___	___ %
e. ___ : ___ : ___ : ___	___ %
f. ___ : ___ : ___ : ___	___ %
g. ___ : ___ : ___ : ___	___ %
h. ___ : ___ : ___ : ___	___ %
i. ___ : ___ : ___ : ___	___ %
j. ___ : ___ : ___ : ___	___ %
k. Upland	Total 100 % ___ %

Example:

**E:2:E M:N**      *System:* Estuarine  
                  *Subsystem:* Intertidal  
                  *Class:* Emergent  
                  *Water Regime:* Regularly Flooded

Letter and number key for classification of wetlands to the level of water regime:

#### SYSTEMS AND SUBSYSTEMS

<b>M</b> Marine	<b>R</b> Riverine
1 Subtidal	1 Tidal
2 Intertidal	2 Lower Perennial
	3 Upper Perennial
	4 Intermittent
	5 Unknown Perennial
<b>E</b> Estuarine	<b>L</b> Lacustrine
1 Subtidal	1 Limnetic
2 Intertidal	2 Littoral
<b>P</b> Palustrine	
No Subsystem	Upland

#### CLASSES

<b>AB</b> Aquatic Bed	<b>RS</b> Rocky Shore
<b>EM</b> Emergent	<b>SB</b> Streambed
<b>FO</b> Forested	<b>SS</b> Scrub-Shrub
<b>ML</b> Moss/Lichen	<b>UB</b> Unconsolidated Bottom
<b>RB</b> Rocky Bottom	<b>US</b> Unconsolidated Shore
<b>RF</b> Reef	

#### WATER REGIME MODIFIERS

<b>A</b> Temporary	<b>J</b> Intermittently Flooded
<b>B</b> Saturated	<b>L</b> Subtidal
<b>C</b> Seasonal	<b>M</b> Irregularly Exposed
<b>F</b> Semipermanent	<b>N</b> Regularly Flooded
<b>G</b> Intermittently Exposed	<b>P</b> Irregularly Flooded
<b>H</b> Permanent	

Wetland losses by type. Determine whether the wetland types identified above are decreasing, stable or increasing. Apply to the formula and priority table on the next page.

If supportable information is available to substantiate trends for various wetland types other than that shown by the NWI trends study, this

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information may be used to support departures from the trends groupings presented above.

Explain: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

In the absence of more reliable data, the following conclusions based on Frayer et al. (1983) may be used:

*Decreasing:* Palustrine emergent  
 Palustrine forested  
 Palustrine scrub-shrub  
 Estuarine intertidal emergent  
 Estuarine intertidal forested  
 Estuarine intertidal scrub-shrub  
 Marine intertidal

*Stable:* Estuarine intertidal non-vegetated  
 Estuarine subtidal  
 Lacustrine

*Increasing:* Palustrine open water  
 Palustrine unconsolidated shore  
 Palustrine non-vegetated

Decreasing wetland types	_____ % OF SITE X 1 = _____
Stable wetland types	_____ % OF SITE X 2 = _____
Increasing wetland types	_____ % OF SITE X 3 = _____
Uplands	_____ % OF SITE X 3 = _____
	TOTAL _____

a.	Priority 1 (0-139)	
b.	Priority 2 (140-179)	
c.	Priority 3 (180-219)	<b>WETLAND LOSS PRIORITY =</b>
-----		
d.	Priority 4 (220-259)	
e.	Priority 5 (260-300)	

### 3. WETLANDS THREATS

For the purpose of the National Wetlands Priority Conservation Plan, threat is defined as the likelihood that a wetland site, or portion thereof, will be destroyed or degraded, directly or indirectly, through human actions.

In establishing the threat threshold, a wetland site is considered to be threatened if an estimated > 10 percent of the site's wetland functions and values are likely to be destroyed or adversely affected through direct, indirect, or cumulative impacts over the next ten years considering:

1. the array of potential wetland threats; and
2. the probable degree of protection provided by the various relevant laws, ordinances and regulations.

At a minimum, the following items should be considered when evaluating wetland threat (indicate activities that either destroy or degrade wetlands at the site):

- a. \_\_\_\_\_ Drainage or filling
  - b. \_\_\_\_\_ Agricultural conversion or use
  - c. \_\_\_\_\_ Livestock grazing
  - d. \_\_\_\_\_ Groundwater withdrawal/depletion
  - e. \_\_\_\_\_ Loss of instream flows
  - f. \_\_\_\_\_ Residential or commercial development
  - g. \_\_\_\_\_ Oil, gas, mineral development
  - h. \_\_\_\_\_ Power plants
  - i. \_\_\_\_\_ Transportation (roads and bridges)
  - j. \_\_\_\_\_ Navigation project, port, marina or pier
  - k. \_\_\_\_\_ Water development project(s)
  - l. \_\_\_\_\_ Water pollution
  - m. \_\_\_\_\_ Other, (e.g., timber or vegetation removal, mosquito control practices, diverse ownership with no individual commitment to protection):\_\_\_\_\_
- 

Indicate all laws, ordinances or programs that have some degree of wetland protection potential for this site:

- a. \_\_\_\_\_ Clean Water Act (Corps section 404 regulatory program)
  - b. \_\_\_\_\_ River and Harbor Act (Corps section 10 regulatory program)
  - c. \_\_\_\_\_ Endangered Species Act
  - d. \_\_\_\_\_ Water Resources Development Act of 1986
  - e. \_\_\_\_\_ Food Security Act of 1985
  - f. \_\_\_\_\_ Local zoning or ordinances (e.g., local wetland or floodplain zoning)
-

- g. ----- State ordinances or authorities (e.g., State wetland protection laws, State permit program for activities in wetlands)
- h. ----- Coastal Wetlands Protection Law
- i. ----- Inland Wetlands Protection Law
- j. ----- Owner(s) favors protection
- k. ----- Other: -----

Considering the relative effectiveness of the combination of the above factors to protect the public values and services of the wetlands, is the wetland site threatened using the definition of threat?

YES NO

If yes, explain type, degree and imminence of threat: -----

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#### 4. WETLAND FUNCTIONS AND VALUES

It is assumed that virtually all wetlands provide important public benefits in several functions and values categories. Many wetlands, however, have been recognized, identified and/or listed as having certain of these functions and values. In order to lead to greater objectivity and provide a technique for use by persons of many disciplines, this wetlands assessment method relies on documented data or information rather than allowing for interpretation by users across many disciplines.

Indicate all functions and values which can be attributed to the wetland site. If any of the statements within a category (wildlife, fisheries, water supply/quality, flood and erosion protection, outdoor recreation and other areas or concerns) is affirmative, check that category on the cover sheet, under item 4.

##### A. Wildlife (endangered and threatened species, migratory birds and resident species)

1.Y N Are Federal or State threatened or endangered plants or animals known to use the wetland site on a regular basis? If yes, list species names: -----

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2. **Y N** Have any wildlife resources of the wetland site been recognized, identified, or listed by a Federal or State agency, conservation organization, institution (educational or research) or private group due to specific legislation, designations or management or planning documents (e.g., high wildlife value, declining populations/numbers, edge of range, Audubon Blue List, list(s) or species of special concern or emphasis)? If yes, list recognition: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. **Y N** Has the wetland site been specially designated, or is it part of a region specially designated, by a Federal or State agency or private group as important for migratory birds or resident wildlife (e.g., referenced in the North American Waterfowl Management Plan or a State Waterfowl Concept Plan or on a list maintained by The Nature Conservancy? If yes, list designation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**B. Commercial and Sport Fisheries**

1. **Y N** Does commercial fishing occur on the site? If so, name the fishery: \_\_\_\_\_  
\_\_\_\_\_

2. **Y N** Does sport fishing occur on the site? If so, name the fishery: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. **Y N** Does the wetland site have fishery resource value(s) (e.g. anadromous fishery, spawning, nursery, juvenile or foraging habitat) that is recognized, identified or listed by a Federal or State agency, conservation organization, institution or private group due to specific legislation, designations, or management or planning documents? If so, name recognition: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**C. Surface and Ground Water Quality and Quantity and Flood Control**

1. **Y N** Are the groundwater recharge and/or discharge (water supply) functions of the wetland site recognized, identified or listed by a

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Federal, State, or local agency, conservation organization, institution or private group due to specific legislation, designations, or management or planning documents (e.g., sole source aquifer, municipal water supply)? If so, name recognition: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Y N Are the water quality functions (e.g., nutrient assimilation, sediment trapping, toxic substance uptake and transformation) of the wetland site recognized, identified or listed by a Federal, State, or local agency, conservation organization, institution or private group due to specific legislation, designations, or management or planning documents (e.g., presence of a downstream dredged channel or reservoir which requires periodic dredging, eutrophic waterbodies downstream, low dissolved oxygen problems, fish kills)? If so, name recognition: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Y N Are the flood control, erosion and/or shoreline damage reduction functions of the wetland site recognized, identified or listed by a Federal, State, or local agency, conservation organization, institution or private group due to specific legislation, designations, or management or planning documents (e.g., flood control project, wetland site within the 100-year floodplain, identified by a city as important for coastal shoreline protection)? If so, name recognition: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**D. Outdoor Recreation**

1. Y N Is there a recognized or documented demand for the recreational opportunities available in the wetland site? If yes, explain: \_\_\_\_\_  
\_\_\_\_\_

2. Y N Is the wetland site within 50 miles of a Metropolitan Statistical Area or within 50 miles of a tourist area receiving more than 100,000 visitors per year? If yes, name location: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**E. Other Areas or Concerns**

1. Y N Does the wetland site have ecological or geological features consistently considered by regional scientists to be rare for wetlands in the region (e.g., fens in the midwest, cypress swamps in northern States, spring communities in various regions)? If yes, name the feature: \_\_\_\_\_  
-----  
-----

2. Y N Is the wetland site included in a national or statewide listing of historical or archaeological sites? If yes, name list: \_\_\_\_\_  
-----  
-----

3. Y N Is the wetland site being used, or could it be used, for educational or research purposes (e.g., used by a nature center, school, camp, or college, essential to an on-going environmental research or monitoring program)? If yes, name use: \_\_\_\_\_  
-----  
-----

4. Y N Does the wetland site have other public values of concern to the Secretary of the Interior? If yes, name and document: \_\_\_\_\_  
-----  
-----

**5. Conclusion**

To qualify for acquisition consideration under the provisions of the National Wetlands Priority Conservation Plan, a wetland site must: 1) include predominantly (50 percent or greater) wetland types which are rare or declining in the ecoregion; 2) be threatened with loss and/or degradation; and 3) offer important values to society in two identifiable functional categories. References, literature citations, agency contacts and personal communications must be provided to support the assessment and conclusions made in this checklist.

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## **6. Map of Wetland Site**

Reproduce and submit a USGS quadrangle map, National Wetlands Inventory Map or other appropriate map delineating the wetland site, its principal features where appropriate (e.g., bald eagle nest sites) and other relevant features of the assessment area where appropriate (e.g., downstream municipal water supply or public access point).



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**APPENDIX 2**  
**CRITERIA FOR IDENTIFYING WETLANDS OF**  
**INTERNATIONAL IMPORTANCE**

**Regina, Canada 1987**  
**REGINA CRITERIA**



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**CRITERIA FOR IDENTIFYING WETLANDS OF  
INTERNATIONAL IMPORTANCE AND GUIDELINES ON  
THEIR USE**

*As Revised at the Third Meeting of the Conference of the Contracting  
Parties*

*27 May to 5 June 1987*

*Regina, Saskatchewan, Canada*

A wetland is suitable for inclusion in the List if it meets any one of the criteria set out below:

1. Criteria for assessing the value of representative or unique wetlands.

A wetland should be considered internationally important if it is a particularly good example of a specific type of wetland characteristic of its region.

2. General criteria for using plants or animals to identify wetlands of importance.

A wetland should be considered internationally important if:

(a) it supports an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant or animal, or an appreciable number of individuals of any one or more of these species;

or (b) it is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna;

or (c) it is of special value as the habitat of plants or animals at a critical stage of their biological cycles;

or (d) it is of special value for its endemic plant or animal species or communities.

3. Specific criteria for using waterfowl to identify wetlands of importance.

A wetland should be considered internationally important if:

(a) it regularly supports 20,000 waterfowl;

or (b) it regularly supports substantial numbers of individuals from particular groups of waterfowl, indicative of wetland values, productivity or diversity;

or (c) where data on populations are available, it regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl.



## Guidelines

A wetland could be considered for selection under Criterion 1 if:

- (a) It is an example of a type rare or unusual in the appropriate biogeographical region;
- or (b) it is a particularly good representative example of a wetland characteristic of the appropriate region;
- or (c) it is a particularly good representative of a common type where the site also qualifies for consideration under criteria 2a, 2b, or 2c;
- or (d) it is representative of a type by virtue of being part of a complex of high quality wetland habitats. A wetland of national value could be considered of international importance if it has a substantial hydrological, biological or ecological role in the functioning of an international river basin or coastal system;
- or (e) in developing countries, it is a wetland which, because of its outstanding hydrological, biological or ecological role, is of substantial socioeconomic and cultural value within the framework of sustainable use and habitat conservation.

## INFORMATION ON WISE USE OF WETLANDS SPECIFIED UNDER ARTICLE 3 OF THE RAMSAR CONVENTION

Definition of wise use:

*"The wise use of wetlands is their sustainable utilization for benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem."*

Sustainable utilization is defined as "human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations."

Natural properties of the ecosystem are defined as "those physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them."

## Guidelines

Wise use involves the promotion of wetland policies containing the following elements:

- (a) a national inventory of wetlands;
  - (b) identification of the benefits and values of these wetlands;
-

- (c) definition of the priorities for each site in accordance with the needs of, and socioeconomic conditions in, each country;
- (d) proper assessment of environmental impact before development projects are approved, continuing evaluation during the execution of projects, and full account of the recommendations of this process of environmental assessment and evaluation.
- (e) use of development funds for projects which permit conservation and sustainable utilization of wetland resources;
- (f) regulated utilization of wild fauna and flora, such that these components of the wetland systems are not over-exploited.

When detailed policies are being established, action should be taken on:

- (a) interchange of experience and information between countries seeking to elaborate national wetland policies;
- (b) training of appropriate staff in the disciplines which will assist in elaboration of such policies;
- (c) pursuit of legislation and policies which will stimulate wetland conservation action, including the amendment as appropriate of existing legislation;
- (d) review of traditional techniques of sustainable wetland use, and elaboration of pilot projects which demonstrate wise use of representative national and regional wetland types.



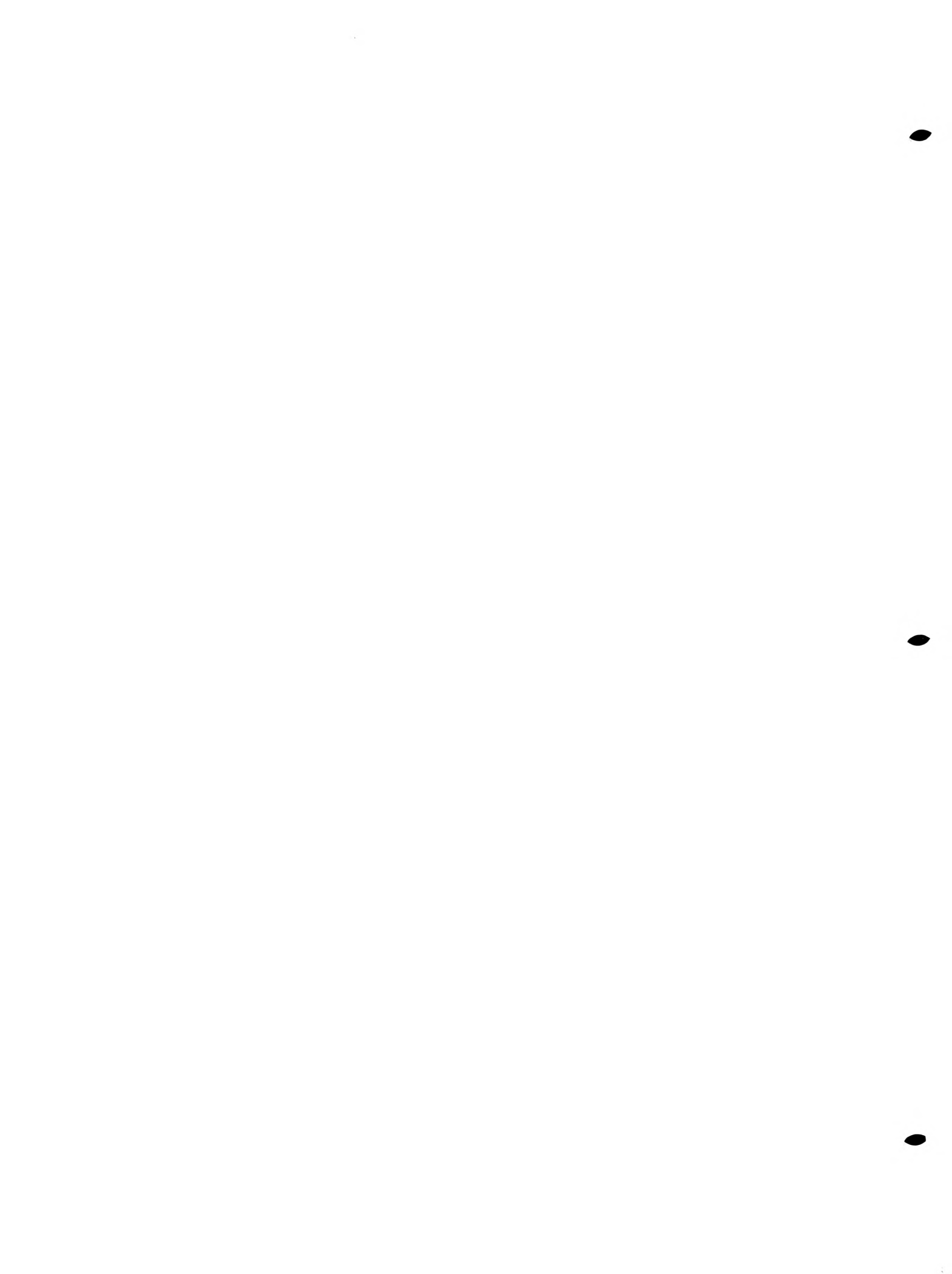
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**APPENDIX 3**

**EMERGENCY WETLANDS RESOURCES ACT OF  
1986**

**P.L. 99-645**

**Signed November 11, 1986**



Public Law 99-645  
99th Congress

An Act

To promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

SECTION 1. SHORT TITLE.

This Act may be cited as the "Emergency Wetlands Resources Act of 1986".

SEC. 2. FINDINGS AND STATEMENT OF PURPOSE.

(a) FINDINGS.—The Congress finds that—

(1) wetlands play an integral role in maintaining the quality of life through material contributions to our national economy, food supply, water supply and quality, flood control, and fish, wildlife, and plant resources, and thus to the health, safety, recreation, and economic well-being of all our citizens of the Nation;

(2) wetlands provide habitat essential for the breeding, spawning, nesting, migration, wintering and ultimate survival of a major portion of the migratory and resident fish and wildlife of the Nation; including migratory birds, endangered species, commercially and recreationally important finfish, shellfish and other aquatic organisms, and contain many unique species and communities of wild plants;

(3) the migratory bird treaty obligations of the Nation with Canada, Mexico, Japan, the Union of Soviet Socialist Republics, and with various countries in the Western Hemisphere require Federal protection of wetlands that are used by migratory birds for breeding, wintering or migration and needed to achieve and to maintain optimum population levels, distributions, and patterns of migration;

(4) wetlands, and the fish, wildlife, and plants dependent on wetlands, provide significant recreational and commercial benefits, including—

- (A) contributions to a commercial marine harvest valued at over \$10,000,000,000 annually;
  - (B) support for a major portion of the Nation's multi-million dollar annual fur and hide harvest; and
  - (C) fishing, hunting, birdwatching, nature observation and other wetland-related recreational activities that generate billions of dollars annually;
- (5) wetlands enhance the water quality and water supply of the Nation by serving as groundwater recharge areas, nutrient traps, and chemical sinks;
- (6) wetlands provide a natural means of flood and erosion control by retaining water during periods of high runoff, thereby protecting against loss of life and property;

(7) wetlands constitute only a small percentage of the land area of the United States, are estimated to have been reduced by half in the contiguous States since the founding of our Nation, and continue to disappear by hundreds of thousands of acres each year;

(8) certain activities of the Federal Government have inappropriately altered or assisted in the alteration of wetlands, thereby unnecessarily stimulating and accelerating the loss of these valuable resources and the environmental and economic benefits that they provide; and

(9) the existing Federal, State, and private cooperation in wetlands conservation should be strengthened in order to minimize further losses of these valuable areas and to assure their management in the public interest for this and future generations.

(b) PURPOSE.—It is the purpose of this Act to promote, in concert with other Federal and State statutes and programs, the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions with Canada, Mexico, Japan, the Union of Soviet Socialist Republics, and with various countries in the Western Hemisphere by—

- (1) intensifying cooperative efforts among private interests and local, State, and Federal governments for the management and conservation of wetlands; and
- (2) intensifying efforts to protect the wetlands of the Nation through acquisition in fee, easements or other interests and methods by local, State, and Federal governments and the private sector.

SEC. 3. DEFINITIONS.

For the purpose of this Act:

(1) The term "Committees" means the Committee on Merchant Marine and Fisheries and the Committee on Interior and Insular Affairs of the House of Representatives and the Committee on Environment and Public Works and the Committee on Energy and Natural Resources of the Senate.

(2) The term "designated unit" means a unit of the National Wildlife Refuge System designated by the Secretary under section 201(a)(2).

(3) The term "hydric soil" means soil that, in its undrained condition, is saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation.

(4) The term "hydrophytic vegetation" means a plant growing in—

- (A) water; or
  - (B) a substrate that is at least periodically deficient in oxygen during a growing season as a result of excessive water content.
- (5) The term "wetland" means land that has a predominance of hydric soils and that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

Nov. 10, 1986  
[S. 740]

Emergency Wetlands Resources Act of 1986.  
16 USC 3901 note.

16 USC 3901

International agreements, Canada, Mexico, Japan, Union of Soviet Socialist Republics

16 USC 3902

TITLE I—EXTENSION OF WETLANDS LOAN ACT

SEC. 101. EXTENSION OF WETLANDS LOAN ACT.

(a) AVAILABILITY OF APPROPRIATIONS.—The first section of the Act entitled "An Act to promote the conservation of migratory waterfowl by the acquisition of wetlands, and for other essential waterfowl habitat, and for other purposes", approved October 4, 1961 (16 U.S.C. 715k-3), is amended by striking out "September 30, 1986" and inserting in lieu thereof "September 30, 1988".

(b) REPAYMENT PROVISIONS.—Section 3 of such Act (16 U.S.C. 715k-5) is amended by striking out the first three sentences.

TITLE II—REVENUES FOR REFUGE OPERATIONS AND THE MIGRATORY BIRD CONSERVATION FUND

SEC. 201. SALE OF ADMISSION PERMIT AT CERTAIN REFUGE UNITS.

(a) SALE OF ADMISSION PERMITS.—(1) Notwithstanding the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-4 et seq.) in order to provide additional revenues for the conservation of wetland resources of the Nation and for the operation and maintenance of refuges—

(A) the Secretary of the Interior may, at units of the National Wildlife Refuge System designated by the Secretary under paragraph (2)—

- (i) charge fees for admission permits;
(ii) sell Golden Eagle passports and Golden Age passports;
(iii) issue at no charge lifetime admission permits as authorized in section 4(a)(5) of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-4-4601-11);
(B) the amounts collected by the Secretary as a result of the activities described in subparagraph (A) shall be distributed as provided in subsection (c).

(2) The Secretary shall designate a unit of the National Wildlife Refuge System for purposes of this Act if the Secretary determines, with respect to such unit, that—

- (A) The level of visitation for recreational purposes is high enough to justify the collection of fees for admission permits for economic reasons.
(B) There is a practical mechanism in existence for implementing and operating a system of collecting fees for admission permits.
(C) Imposition of a fee for admission permits is not likely to result in undue economic hardship for a significant number of visitors to the unit.

(b) EXCEPTIONS.—(1) The Secretary may not require an admission permit under subsection (a)(1) for entry by a person into a designated unit if such person is the holder of—

- (A) a valid migratory bird hunting and conservation stamp issued under section 2 of the Act of March 16, 1934 (16 U.S.C. 7178b) (commonly known as the Duck Stamp Act);
(B) a valid Golden Eagle Passport issued under section 4(a)(1) of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-6a)(A)(1);
(C) a valid Golden Age Passport issued under section 4(a)(4) of such Act; or

(D) a valid lifetime admission permit as authorized in section 4(a)(5) of such Act.

(2) Permits for a single visit to any designated unit shall be made available by the Secretary of the Interior for a reasonable fee, but not to exceed \$3 for individuals or \$7.50 per vehicle. For purposes of this subsection, the term "single visit" means a more or less continuous stay within a designated unit by a person or group described in subsection (d). Payment of a single visit fee and issuance of a single visit permit shall authorize exits from and re-entries to a single designated unit for a period of from one to fifteen days. Such period shall be defined for each designated unit by the Secretary based upon a determination of the period of time reasonably and ordinarily necessary for such a single visit.

(3) Special admission permits for uses such as group activities may be issued in accordance with procedures and at fees established by the Secretary.

(4) A person may not be required to purchase an admission permit under subsection (a)(1) in order to travel by private noncommercial vehicle over any road or highway—

- (A)(i) established as part of the National Federal Aid System (as defined in section 101 of title 23, United States Code); and
(ii) commonly used by the public as a means of travel between two places which are outside the designated unit; or
(B) to any land in which such person has a property interest if such land is within any designated unit.

(5) A person may not be required to purchase an admission permit under subsection (a)(1) for entrance or admission to a unit of the National Wildlife Refuge System created, expanded, or modified by Public Law 96-487.

(c) DISTRIBUTION OF AMOUNTS COLLECTED.—Amounts collected from the sale of admission permits under this section and from fees collected at any unit of the National Wildlife Refuge System under subsections (b) and (c) of section 4 of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-6a (b), (c)) shall be distributed as follows:

(A) Thirty per centum shall be available to the Secretary of the Interior until expended. The Secretary shall use such amount—

- (i) first, to defray the cost of collection;
(ii) next, for operation and maintenance of the collecting unit; and
(iii) next, for operation and maintenance of all units within the National Wildlife Refuge System, except those units created, expanded, or modified by Public Law 96-487.
(B) Seventy per cent shall be deposited into the migratory bird conservation fund established under section 4 of the Act of March 16, 1934 (16 U.S.C. 718d).

(d) PERSONS ACCOMPANYING PERMITEES.—A person who holds a stamp, passport, or permit described in subsection (b) shall be entitled to general entrance into any designated unit, along with—

- (1) any persons accompanying such person in a single, private, noncommercial vehicle; or
(2) where entry to the area is by any means other than single, private, noncommercial vehicle, the person and any accompanying spouse, children, or parents.
(e) RESTRICTIONS.—A permit issued under this section is nontransferable. Such a permit may not authorize any uses for

which fees are charged under the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-4 et seq.).

(f) **ESTABLISHMENT OF FEES; POSTING OF NOTICES.**—(1) All fees established pursuant to this section shall be fair and equitable. In establishing such fees, the Secretary shall consider the following:

- (A) The direct and indirect cost to the Government.
- (B) The benefits to the permit holder.
- (C) The public policy or interest served.
- (D) The comparable fees charged by non-Federal public agencies.

(E) The economic and administrative feasibility of fee collection and other pertinent factors.

(2) The Secretary shall require that notice that a fee has been established under this section—

- (A) be prominently posted at each designated unit and at appropriate locations in each such unit; and
- (B) to the extent practicable, be included in publications distributed at such units.

(g) **VOLUNTEERS.**—The Director of the United States Fish and Wildlife Service may accept services of volunteers to sell admission permits under this section or to sell Golden Eagle and Golden Age Passports or Migratory Bird Hunting and Conservation Stamps. The Director may use funds appropriated or otherwise made available to the Service to cover the cost of any surety bond that may be required of a volunteer performing the services authorized under this subsection.

**SEC. 202. PRICE OF MIGRATORY BIRD HUNTING AND CONSERVATION STAMP.**

Section 2(b) of the Act of March 16, 1934 (16 U.S.C. 718(b)), is amended in the first sentence—

(1) by striking out "\$7.50" and inserting in lieu thereof "\$10.00";

(2) by striking out "any hunting year" and inserting in lieu thereof "hunting years 1987 and 1988, \$12.50 for hunting years 1989 and 1990, and \$15.00 for each hunting year thereafter,"; and

(3) by inserting "available for obligation and" before "attributable".

**SEC. 203. TRANSFERS TO MIGRATORY BIRD CONSERVATION FUND.**

Notwithstanding any other provision of law, an amount equal to the amount of all import duties collected on arms and ammunition, as specified in subpart A of part 5 of schedule 7 of the Tariff Schedules of the United States, shall, beginning with the next fiscal year quarter after the date of enactment of this Act, be paid quarterly into the migratory bird conservation fund established under section 4 of the Act of March 16, 1934 (16 U.S.C. 718d).

**TITLE III—STATE AND FEDERAL WETLAND ACQUISITION**

**SEC. 301. NATIONAL WETLANDS PRIORITY CONSERVATION PLAN.**

(a) **IN GENERAL.**—The Secretary shall establish, and periodically review and revise, a national wetlands priority conservation plan which shall specify, on a region-by-region basis or other basis considered appropriate by the Secretary, the types of wetlands and in-

terests in wetlands which should be given priority with respect to Federal and State acquisition.

(b) **CONSULTATION.**—The Secretary shall establish the plan required by subsection (a) after consultation with—

- (1) the Administrator of the Environmental Protection Agency;

(2) the Secretary of Commerce;

(3) the Secretary of Agriculture; and

(4) (the chief executive officer of) each State.

(c) **FACTORS TO BE CONSIDERED.**—The Secretary, in establishing the plan required by subsection (a), shall consider—

(1) the estimated proportion remaining of the respective types of wetlands which existed at the time of European settlement;

(2) the estimated current rate of loss and the threat of future losses of the respective types of wetlands; and

(3) the contributions of the respective types of wetlands to—

- (A) wildlife, including endangered and threatened species, migratory birds, and resident species;

(B) commercial and sport fisheries;

(C) surface and ground water quality and quantity, and flood control;

(D) outdoor recreation; and

(E) other areas or concerns the Secretary considers appropriate.

**SEC. 302. REMOVAL OF RESTRICTION ON ACQUISITION.**

Section 7(a)(1) of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-9(a)(1)) is amended by striking out "national wildlife refuge areas under section 7(a)(5) of the Fish and Wildlife Act of 1956 (16 U.S.C. 742f(5)) except migratory waterfowl areas which are authorized to be acquired by the Migratory Bird Conservation Act of 1929, as amended (16 U.S.C. 715-715s)" and inserting in lieu thereof "national wildlife refuge areas under section 7(a)(4) of the Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4)) and wetlands acquired under section 304 of the Emergency Wetlands Resources Act of 1986".

**SEC. 303. INCLUSION OF WETLANDS IN COMPREHENSIVE STATEWIDE OUTDOOR RECREATION PLANS.**

Section 6 of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-8) is amended—

- (1) in subsection (d), by adding at the end thereof the following new paragraph:

"For fiscal year 1988 and thereafter each comprehensive statewide outdoor recreation plan shall specifically address wetlands within that State as an important outdoor recreation resource as a prerequisite to approval, except that a revised comprehensive statewide outdoor recreation plan shall not be required by the Secretary, if a State submits, and the Secretary, acting through the Director of the National Park Service, approves, as a part of and as an addendum to the existing comprehensive statewide outdoor recreation plan, a wetlands priority plan developed in consultation with the State agency with responsibility for fish and wildlife resources and consistent with the national wetlands priority conservation plan developed under section 301 of the Emergency Wetlands Resources Act or, if such national plan has not been completed, consistent with the provisions of that section";



(2) in subsection (e)(1), by inserting, in the first sentence thereof, after "For the acquisition of land, waters, or interests in land or waters" the following: ", or wetland areas and interests therein as identified in the wetlands provisions of the comprehensive plan"; and

(3) in subsection (f)(3), by adding at the end thereof the following: ". *Provided*, That wetland areas and interests therein as identified in the wetlands provisions of the comprehensive plan and proposed to be acquired as suitable replacement property within that same State that is otherwise acceptable to the Secretary, acting through the Director of the National Park Service, shall be considered to be of reasonably equivalent usefulness with the property proposed for conversion."

#### SEC. 304. FEDERAL ACQUISITION.

The Secretary is authorized to purchase wetlands or interests in wetlands, which are not acquired under the authority of the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715s), consistent with the wetlands priority conservation plan established under section 301.

#### SEC. 305. RESTRICTION ON USE OF EMINENT DOMAIN IN ACQUISITIONS.

The powers of condemnation or eminent domain shall not be used in the acquisition of wetlands under any provision of this Act where such wetlands have been constructed for the purpose of farming or ranching, or result from conservation activities associated with farming or ranching.

### TITLE IV—WETLANDS INVENTORY AND TREND ANALYSIS

#### SEC. 401. NATIONAL WETLANDS INVENTORY PROJECT.

(a) **IN GENERAL.**—The Secretary, acting through the Director of the United States Fish and Wildlife Service, shall continue the National Wetlands Inventory Project and shall—

(1) produce, by September 30, 1988, National Wetlands Inventory maps for the areas that have been identified by the Service as top priorities for mapping, including—

(A) the entire coastal zone of the United States;

(B) floodplains of major rivers; and

(C) the Prairie Pothole region;

(2) produce, by September 30, 1998, National Wetlands Inventory maps for those portions of the contiguous United States for which final maps have not been produced earlier;

(3) produce, as soon as practicable, National Wetlands Inventory maps for Alaska and other noncontiguous portions of the United States; and

(4) produce, by September 30, 1990, and at ten-year intervals thereafter, reports to update and improve the information contained in the report dated September 1982 and entitled "Status and Trends of Wetlands and Deepwater Habitat in the Conterminous United States, 1950's to 1970's".

(b) **NOTICE.**—The Secretary shall notify the appropriate State and local units of government at such time as he proposes to begin map preparation under subsection (a) in an area. Such notice shall include, but is not limited to, the identification of the area to be mapped, the proposed schedule for completion, and the identification of a source for further information.

#### SEC. 402. REPORTS TO CONGRESS.

(a) **IN GENERAL.**—The Secretary, in consultation and cooperation with the Secretary of Agriculture, shall prepare and submit to the committees—

(1) by March 30, 1987, a report regarding the status, condition, and trends of wetlands in the lower Mississippi alluvial plain and the prairie pothole regions of the United States; and

(2) by September 30, 1987, a report regarding trends of wetlands in all other areas of the United States.

(b) **CONTENTS OF REPORTS.**—The reports required under subsection (a) shall contain—

(1) an analysis of the factors responsible for wetlands destruction, degradation, protection and enhancement;

(2) a compilation and analysis of Federal statutory and regulatory mechanisms, including expenditures, financial assistance, and tax provisions which—

(A) induce wetlands destruction or degradation; or

(B) protect or enhance wetlands;

(3) a compilation and analysis of Federal expenditures resulting from wetlands destruction, degradation, protection or enhancement;

(4) an analysis of public and private patterns of ownership of wetlands;

(5) an analysis of the environmental and economic impact of eliminating or restricting future Federal expenditures and financial assistance, whether direct or indirect, which have the effect of encouraging the destruction, degradation, protection or enhancement of wetlands, including—

(A) public works expenditures;

(B) assistance programs such as price support programs, commodity loans and purchase programs and disaster assistance programs;

(C) soil conservation programs; and

(D) certain income tax provisions;

(6) an analysis of the environmental and economic impact of failure to restrict future Federal expenditures, financial assistance, and tax provisions which have the effect of encouraging the destruction, degradation, protection or enhancement of wetlands, including—

(A) assistance for normal silviculture activity (such as plowing, seeding, planting, cultivating, minor drainage, or harvesting for the production of fiber or forest products);

(B) Federal expenditures required incident to studies, evaluations, design, construction, operation, maintenance, or rehabilitation of Federal water resource development activities, including channel improvements;

(C) the commodity loans and purchases program and cotton, feed grain, wheat, and rice production stabilization programs administered by the Department of Agriculture; and

(D) Federal expenditures for the construction of publicly owned or publicly operated highways, roads, structures, or facilities that are essential links in a larger network or system; and

(7) recommendations for the conservation of wetlands resources based on an evaluation and comparison of all manage-

16 USC 3932

Taxes

Loans

Taxes  
TaxesAgriculture and  
agricultural  
commodities  
Forests and  
forest productsLoans.  
Agriculture and  
agricultural  
commodities

Highways

State and local  
governments

16 USC 3922

16 USC 3923  
Farms and  
farming

16 USC 3931

Alaska

Reports

State and local  
governments.

ment alternatives, and combinations of management alternatives, such as State and local actions, Federal actions, and initiatives by private organizations and individuals.

**TITLE V—MISCELLANEOUS PROVISIONS**

**SEC. 501. MIGRATORY BIRD TREATY ACT.**

Section 6(b) of the Act of July 3, 1918 (16 U.S.C. 707(b)) is amended by deleting "shall" the first place it appears therein and by inserting in lieu thereof "shall knowingly".

**SEC. 502. BAYOU SAUVAGE URBAN NATIONAL WILDLIFE REFUGE.**

(a) **PURPOSES OF REFUGE.**—The purposes of the Bayou Sauvage Urban National Wildlife Refuge are—

- (1) to enhance the populations of migratory, shore, and wading birds within the refuge;
- (2) to encourage natural diversity of fish and wildlife species within the refuge;
- (3) to protect the endangered and threatened species and otherwise to provide for the conservation and management of fish and wildlife within the refuge;
- (4) to fulfill the international treaty obligations of the United States respecting fish and wildlife;
- (5) to protect the archeological resources of the refuge;
- (6) to provide opportunities for scientific research and environmental education, with emphasis being given to the ecological and other values of wetlands; and
- (7) to provide opportunities for fish and wildlife oriented public uses and recreation in an urban setting.

(b) **ACQUISITION AND ESTABLISHMENT OF REFUGE.**—

(1) **ACQUISITION.**—Within four years after the effective date of this section the Secretary of the Interior (hereinafter in this Act referred to as the "Secretary") shall acquire the approximately nineteen thousand acres of lands and waters, and interests therein, located in Orleans Parish, Louisiana, that are depicted on the map entitled "Bayou Sauvage Urban National Wildlife Refuge", dated September 15, 1986, and on file at the United States Fish and Wildlife Service, Department of the Interior. The lands and waters, and interests therein, acquired under this paragraph comprise the Bayou Sauvage Urban National Wildlife Refuge. The acquisition shall be made through donation, purchase with donated or appropriated funds, or exchange, or through any combination of the foregoing.

(2) **ESTABLISHMENT.**—At such time as sufficient lands and waters, and interests therein, have been acquired under paragraph (1) to constitute an initial area that can be administered to carry out the purposes set forth in subsection (a), the Secretary shall establish the Bayou Sauvage Urban National Wildlife Refuge by publication of notice to that effect in the Federal Register.

(3) **BOUNDARY ADJUSTMENTS.**—The Secretary may make such adjustments with respect to the boundary of the Bayou Sauvage Urban National Wildlife Refuge as may be necessary to facilitate the acquisition of lands and waters, and interests therein, for the refuge and to facilitate the administration of the refuge.

(c) **ADMINISTRATION OF REFUGE.**—The Secretary shall administer all lands and waters, and interests therein, acquired under subsec-

tion (b) in accordance with the provisions of the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) to carry out the purposes set forth in subsection (a). The Secretary may utilize such additional statutory authority as may be available to him for the conservation and development of wildlife and natural resources, the development of outdoor recreation opportunities, and interpretive environmental education as he considers appropriate to carry out such purposes. Within two years after the effective date of this section, the Secretary shall complete a master plan for the development of the Bayou Sauvage Urban National Wildlife Refuge.

(d) **AUTHORIZATION OF APPROPRIATIONS.**—There are authorized to be appropriated to the Department of the Interior—

- (1) from funds not otherwise appropriated from the Land and Water Conservation Fund, such sums as may be necessary for the acquisition of lands and waters, and interests therein, for the Bayou Sauvage Urban National Wildlife Refuge; and
- (2) \$5,000,000 for the development of the refuge.

The moneys appropriated under subparagraphs (1) and (2) shall remain available until expended.

(e) **EFFECTIVE DATE.**—This section takes effect on the later of the date of enactment of this Act or October 1, 1986.

Approved November 10, 1986.

Federal Register, publication.

Louisiana

LEGISLATIVE HISTORY—S. 740 (H.R. 1203):

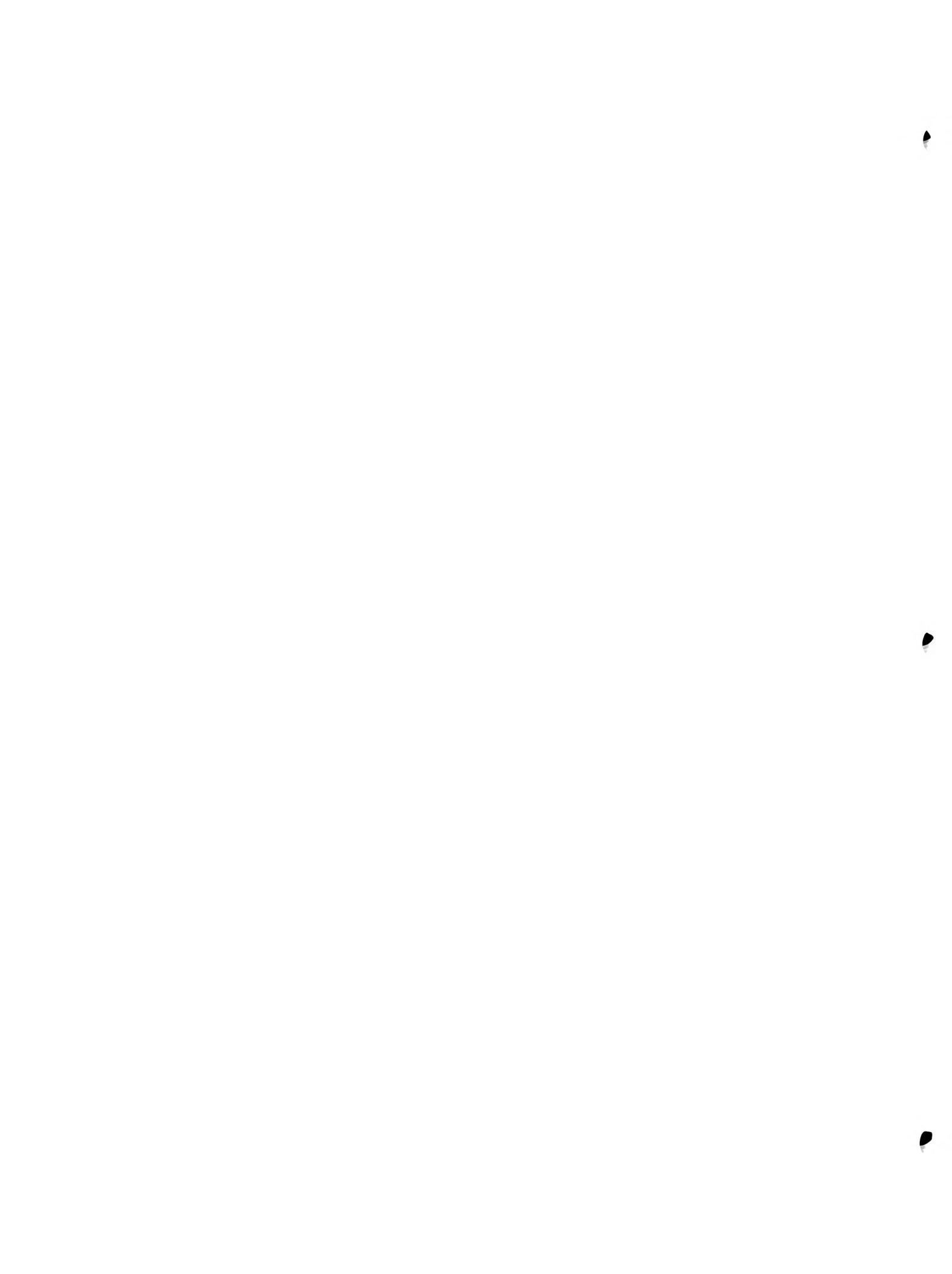
HOUSE REPORTS: No. 99-86, Pt. 1 accompanying H.R. 1203 (Comm. on Merchant Marine and Fisheries).

SENATE REPORTS: No. 99-445 (Comm. on Environment and Public Works); CONGRESSIONAL RECORD, Vol. 132 (1986):

Oct. 3, considered and passed Senate.  
Oct. 14, considered and passed House.







**ATTACHMENT F**

**MONTANA WETLANDS CONSERVATION PRIORITY PLAN**



# MONTANA WETLANDS PRIORITY CONSERVATION PLAN

(Reproduced from Montana SCORP 1988)

On November 10, 1986, President Reagon signed the Emergency Wetlands resources Act of 1986 ( Public Law 99-645). The purpose of the Act is to promote, in concert with other Federal and State statutes and programs, the conservation of the wetlands of the Nation in order to maintain the public benefits they provide. The act provides for Federal wetlands acquisition and gives equal consideration (along with other lands) to acquisition involving the purchase of wetlands with LWCF monies. While acquisition of wetlands for public outdoor recreation has always been eligible for LWCF assistance, they are now specifically highlighted under the new act. In addition, SCORP's must now contain a Department of the Interior approved wetlands component starting in fiscal year 1988.

In order to comply with the recent legislation, the National Park Service has requested that states modify their existing SCORP document to specifically address the wetlands issue within each state. The objectives of this plan must be consistent with the draft version of the National Wetlands Priority Conservation Plan (NWPCP) developed by the U.S. Fish and Wildlife Service (USFWS). Factors to be considered include the estimated proportion of remaining wetlands that currently exist, the estimated current rate of loss and threat of future losses of the various wetland types and consideration of the functional values of these wetlands to wildlife, fisheries, water quality and outdoor recreation.

In response to this mandate, the Montana Department of Fish, Wildlife and Parks has included these needs in the development of an ongoing wetlands consultation process that began over two years ago. Through both meetings and correspondence, all wetland related activities in Montana have so far included coordination and consultation with the following agencies and groups: Federal - Bureau of Land Management, Corps of Engineers, Environmental Protection Agency, Fish and Wildlife Service, Highway Administration; State - Department of Highways, Water Quality Bureau; Group - Ducks Unlimited, The Nature Conservancy.

## Resource Assessment

**Inventory** - To date, the Department of Fish, Wildlife and Parks has not been actively involved with a wetland inventory program nor a statewide prioritization of wetlands acquisitions and easements. However, the USFWS has been involved with these types of programs in Montana. This represents the best available information to date.

The objective of the program (consistent with LWCF guidelines) is to prioritize wetlands, as defined by Public Law 99-645, within the state for protection; specifically, to provide for land acquisition for outdoor recreation, and to insure continued productivity of the



waterfowl resource and wetland functional values. At the present time, the program does not include a discussion of riparian lands or river beds.

An inventory of existing wetlands is necessary in order to respond to the question of wetland status and trends. The USFWS is currently involved with the National Wetland Inventory project that has targeted the glaciated pothole regions within the U.S., including Montana. The sequence of these photo-mapping efforts in Montana are as follows:

<u>Completed</u>	<u>Drafted</u>	<u>1988 Proposed</u>	<u>1989 Proposed</u>
Hardin SE Ekalaka	Havre NE Glasgow NW,SW	Wolf Point Intermountain West Zone (Flathead) Rocky Mtn. Front Zone	Great Plains Zone

When this project is completed, it will provide the Department of Fish, Wildlife, and Parks with a detailed inventory of wetlands by type (based on the Cowardin classification system) within the state.

In addition to this ongoing inventory work, completed inventories available as SCORP references include Harvey Wittmier's Land Acquisition and Development Plan, Flathead and Lake Counties (1986), and Rodney King's Wetland Delineation of Montana, (1974 - 1975); compiled for the USFWS. The latter effort was directed towards the identification of natural wetlands throughout Montana with significant waterfowl production capabilities. This information was assembled on a county basis and prioritized for the USFWS wetland acquisition and easement program. This was again directed at natural wetlands and did not address the waterfowl production capabilities of the artificially created stock dam complexes of eastern Montana.

### Threat Analysis

Review of the draft National Wetlands Priority Conservation Plan indicates that, on a regional basis, wetland losses within Montana have occurred at a much lower rate in comparison to other regions of the United States. Drainage and irrigation drawdowns can be a problem, but not to the magnitude of that experienced in the Dakotas and Minnesota. However, intensified land use practices on upland habitat adjacent to wetlands has definitely impacted the waterfowl production potential of many of these complexes. Residential development, especially in the Flathead Valley, is reducing the overall values of the wetland/upland complex for waterfowl.

The wetland losses that have occurred have not been quantified with any accuracy. Estimates are included as part of the inventories above. Impacts to the adjacent upland habitat types in some areas have been extensive and have reduced both the wetland functions and the waterfowl production potential of the wetland complexes.

Both King's Wetland Delineation of Montana (Tables 2 and 5), and Wittmier's Land

Acquisition and Development Plan (Table 1 and Appendix 1), lay out potential acquisition priorities and targets. Both of these references are reproduced in full in the SCORP Appendix. In terms of dealing with natural wetland complexes, this is the best information currently available. The one drawback to this information is the lack of recognition given to the livestock reservoir complexes scattered throughout eastern Montana.

Significant numbers of stock reservoirs were constructed during the last 30 years by both the private sector and public agencies. A total estimate is not yet available. However, many of these units have washed out or are in need of maintenance work. The construction of these reservoirs did not offset the loss of natural wetlands in the glaciated pothole area of Montana. However these reservoir complexes when constructed in areas of suitable soils and upland vegetation types have been productive for the waterfowl resource. Many of these reservoirs provide an important contribution to waterfowl production and associated recreational opportunities. A statewide program requires an inventory of this portion of the wetland base and, hopefully, the National Wetland Inventory project will provide this data.

### Protection Strategies

State legislation in 1987 (Sec. 87-1-241, 242 MCA) created an earmarked source of revenue that will go towards a wildlife habitat acquisition program. Guidelines for the program are currently being assembled and will apply to wetlands. This is in addition to a State Waterfowl Stamp program initiated in 1985 (Sec. 87-2-411, 412 MCA). Efforts under this latter law are being directed towards enhancement and development of wetland-upland complexes for waterfowl production.

The intent of the State Waterfowl Stamp program is to protect, develop and enhance wetlands and associated upland areas to increase waterfowl production capabilities. Specific work activities will take place on both state and privately owned lands and will include incentives for such things as island construction, diking, installation of water control structures, erection of artificial nest structures, seeding of dense nesting cover, and fencing to control livestock grazing. Easements and/or acquisitions will be used to provide public access and to protect existing wetlands.

This program is reviewed by an advisory council composed of representatives from the agricultural industry, sportsmen and non-consumptive groups. Activities are also overseen by the Montana Fish and Game Commission. Dollars from the Waterfowl Stamp Program will be used to match funds from the Ducks Unlimited Matching Aid to Restore States Habitat (MARSH) program and to assist with development of Ducks Unlimited U.S. habitat projects.

Under a new U.S. Prairie Pothole Joint Venture Program that is part of the North American Waterfowl Management Plan, several projects are scheduled for possible implementation. The two projects that have been accepted for Montana include the

Beaver Creek Project in south Phillips County and the Comentown Project in northeast Sheridan County. The objective of both projects is to increase the waterfowl production capabilities of existing wetlands and various management strategies will be employed to meet that goal. A detailed prospectus is being developed on each project.

A highway mitigation project is also being designed to evaluate and document unavoidable impacts to wetland habitats as a result of highway reconstruction activities. Mitigation strategies will include both on-site and off-site activities that replace wetland habitat. A method to identify wetland types and to provide an assessment of their functional values is currently being developed by an interagency wetland committee. The intent is to develop a consistent approach to dealing with impacts and provide mitigation strategies. This information will be available for review when completed.

In addition, guidelines are currently being developed for the Department's wildlife habitat acquisition program with implementation targeted for March 1988. This will be an acquisition-easement program with the objective being to protect wildlife habitat including wetlands. Priorities will be established on a statewide basis.

Public involvement was extensive in the development of the above strategies. Both were established through the legislative process where numerous public hearings were held, and both have been featured in the Department's Montana Outdoors magazine (March/April 1986-1988; May/June 1987; July/August 1988). The waterfowl stamp includes a publicly advertised annual contest to choose a painting for the stamp with proceeds from the sale of art prints to be used for waterfowl habitat.

The wildlife habitat acquisition program grew out of wildlife habitat concerns mentioned by the public at both the 1986 Governor's Forum and the SCORP Issue Development Workshop (Issue 10). Also, public review and hearings were held regarding proposed policy and priorities for the habitat acquisition program in major communities throughout the state during January and February, 1988.

### State Priorities

Guidelines being developed for both of the above programs will be instrumental in the prioritization of potential acquisition activities under the LWCF program. However, the inventory of Montana wetlands is still underway and will not be completed for at least another 2 to 3 years. The Department of Fish, Wildlife and Parks has not yet developed a separate prioritized ranking of wetlands for acquisition. The efforts of the USFWS, however, have laid out some guidelines for wetland protection within the state.

Certain areas of the state obviously have much greater potential for wetland protection, development and enhancement based on habitat and breeding densities. Acquisition priorities and targets are listed in King's Wetland Delineation of Montana (Tables 2 and 5), and Wittmier's Land Acquisition and Development Plan (Table 1 and Appendix 1) references which are reproduced in full in the SCORP Appendix. However, artificial

stock dam complexes of eastern Montana are omitted. When the National Wetlands Inventory is finished we may have the opportunity to develop a more complete list of acquisition priorities.

Thanks to state and federal programs other than the LWCF, over \$1 million annually is available for carrying out wetlands protection strategies in Montana. Therefore, the protection of wetlands will remain for the foreseeable future one of the lowest priorities for the expenditure of LWCF funds. To prioritize wetlands high enough to become dependant upon LWCF funds would seriously jeopardize an already healthy program.

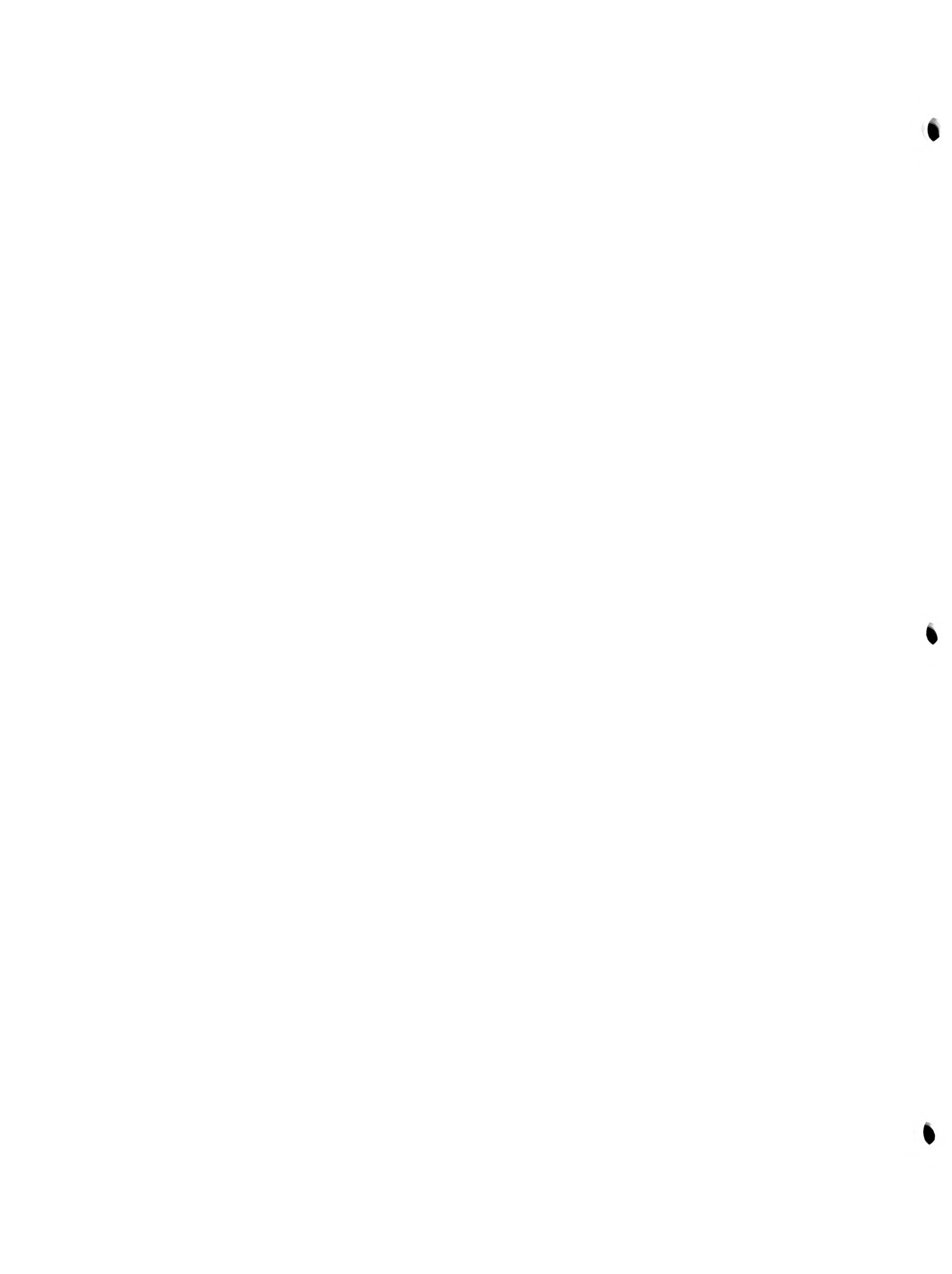
The Department is however considering funding strategies which could allow the use of wetland funds to share in the acquisition or development of portions of parklands for waterfowl production. Therefore no change in the LWCF priority rating system is necessary for these purposes at this time.

### National Issues

First of all, Montana has complied with a National Park Service request to amend our SCORP document to satisfy new wetland criteria. Yet at this point in time, LWCF funding levels are no where sufficient for use in wetland acquisition purposes. Other state and federal programs channel millions of dollars for wetland protection and enhancement activities instead.

Secondly, Montana wetlands have not been impacted to the degree of the prairie pothole regions of the Dakotas and Minnesota. However, impacts such as drainage, intensified agricultural activities and subdivision development continue to reduce the productivity of wetlands within the state. From a waterfowl production standpoint, it is imperative to recognize the importance of the quality of the upland areas adjacent to these wetlands. This point should be emphasized in the National Priority Conservation Plan.

Finally, the thrust of the NWPP is protection of natural wetland basins, especially those in the high loss category. Obviously these are very important components on a national level. Within the State of Montana, particularly in eastern Montana, the importance of artificially created livestock reservoirs to the wetland base and waterfowl production cannot be overstated. Under the proposed evaluation criteria, these wetlands would assume a low priority for protection. From a state standpoint this could create a problem in using LWCF or possibly other federal funds for wetland protection.



ATTACHMENT F-1

WETLANDS DELINEATION OF MONTANA  
Rodney J. King



WETLANDS DELINEATION  
OF MONTANA

1974 - 1975

Rodney J. King  
U.S. Fish and Wildlife Service  
Billings, Montana





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of the large reservoirs (see page 4 of Wetland Inventory - Montana, 1954).

2. The second attempt at analyzing the wetlands in the state was made by a Delineation Biologist assigned to the area in 1966. Approximately three years were spent locating wetlands for delineation in various counties across the Hi-line. A 100% sample was conducted in Blaine, Hill, Phillips, Sheridan and Toole Counties.<sup>3</sup> This sample was conducted from aerial photos and the number and acres of Type 3, 4 and 5 wetlands were tabulated (see Table 1). From this information certain areas were checked on the ground for delineation. Much of Sheridan County was completed for delineations. Other delineations were made in Toole, Roosevelt, Glacier, Daniels and Phillips Counties. The problem with the 1966-68 survey was that many good areas were not delineated because only the best areas were included in the survey. A study of precipitation records indicate a series of very dry years previous to 1966, and this may have been why many areas were overlooked. Other areas checked in that study included parts of Flathead County.
3. Other studies have included "hot spots" where land with duck use becomes available for purchase or someone had an idea about a certain area making a good "refuge". Most of this work was done by state biologists and was generally with the idea of development of marshes for other game animals as well as waterfowl.

## II. Wetland Surveys - 1974-75

As indicated under the purpose of this study, we need a method to rank wetlands for their value to waterfowl. We want wetlands ranked so that, to the extent possible, we can concentrate on acquiring the most valuable wetlands, particularly during times when acquisition funds limit our ability to buy lands. Also, new information has been developed concerning the production of waterfowl and classification of wetlands by research personnel at the Northern Prairie Wildlife Research Center, Jamestown, North Dakota. This information has added a new dimension to our understanding of wetlands and their value to wildlife.

### A. Criteria for Wetland Value Ratings

When determining the value of anything as changing as prairie wetlands and as mobile as migrating waterfowl one is faced with serious complications. About the only factor not changing is the land-soil capabilities, and with the incomplete expertise soil



TABLE 1  
WETLANDS OF MONTANA  
CLASS (1)

County	III		IV		V		TOTALS	
	Wetlands Acres	No.	Wetlands Acres	No.	Wetlands Acres	No.	Wetlands (2) Acres	No.
Beaverhead	1003	232	839	143	10	5	1,852*	380
Blaine (3)	7174	2161	3071	157	1107	26	11,352*!	2344
Broadwater	63	6	50	4			113	10
Carbon	130	9	40	7	60	7	230	23
Cascade	400	55	339	15	47	3	786*	73
Chouteau	2203	248	693	20	4075	9	6,791*!	277
Daniels	175	123	130	9			305*!	132
Deer Lodge	23	5	165	59			188	64
Fergus	647	46	609	32			1,256*	78
Flathead	538	37	2691	190	4874	179	8,103*	406
Glacier	5504	2595	7389	834	2185	10	15,078*!	3439*
Golden Valley	840	54	800	17			1,640*	71
Granite	18	11	64	21			82	32
Hill (3)	4316	987	4802	114	1200	18	10,318*!	1119
Jefferson	50	9	269	25	136	9	455	43
Judith Basin	668	62	567	18			1,235*	80
Lake	2190	5	1053	391	2190	5	3,668*!	401
Lewis & Clark	857	341	1018	110	168	3	2,043*!	454
Liberty	1509	399	600	66			2,109*!	465
Lincoln	128	22	282	24	1106	18	1,516	64
Madison	327	25	224	29	480	3	1,031	57
Meagher	46	5	490	13			536	18
Mineral	37	6	21	2			58	8
Missoula	240	75	288	94	204	16	832	185
Musselshell	50	10	150	4			200	14
Park	633	78	133	31	567	7	1,333*	116
Petroleum	146	34	43	5	1030	2	1,219	41
Phillips (3)	11652	4570	9733	633	1362	48	22,747*!	5251
Pondera	1825	265	943	184	105	8	2,873*!	457
Powell	1176	9902	1147	231	1419	23	3,742*!	1156
Roosevelt	1250	270	3044	106	183	6	4,477*!	382
Sanders	72	68	408	43	88	8	568	119
Sheridan (3)	4665	2507	6422	373	4575	58	15,662*!	2938
Stillwater	5430	27	780	44			6,210*	71
Sweet Grass	590	88	608	68	975	8	2,173*	164
Teton	5578	155	1978	159	262	5	7,818*!	319
Toole (3)	2851	724	5029	168	1925	13	9,805*!	905
Valley	742	234	534	38	190	2	1,466*	274
Wheatland	153	21	240	20	45	2	438	43
Yellowstone	6180	91	940	11			7,120*	103
TOTAL (4)							159,608	22,575

Footnotes from Table 1

1. According to Stewart and Kantrud, Classification of Prairie Potholes . . . , 1971. All wetlands not classified by Plenert (1967) are the author's figures by the above classification.
  2. Acres and wetland basin types (classes) determined from aerial photos and average precipitation records.
  3. Plenert's 1967 figures.
  4. Totals do not include reservoirs, only natural wetlands.
- \* Fee program suggested or in operation.  
! Easement program suggested or in operation.

Counties not listed in the table have been checked for wetlands by visiting ASCS offices or from aerial photo indexes.

scientists possess even land capabilities are not precise. However, the best available knowledge on the following factors were used in developing criteria: (a) ecology of the wetlands, (b) relationship of wetlands to the surrounding uplands, (c) wetland threat from destruction, (d) the species of waterfowl using the area, (e) the capability of a unit (delineated area) to produce waterfowl and (f) the cost of the area per acre. All of these were considered in delineation and in assigning the relative value of the delineated area. Following is an analysis of how the rating system was derived:

Since the first printing of Circular 39, Wetlands of the United States, in 1953, biologists working in wetland ecology have used the handbook in various ways. There have been others who have tried to improve upon our understanding of wetlands and waterfowl. The publication, "Classification of Natural Ponds and Lakes in the Glaciated Prairie Region" by Stewart and Kantrud (1971)<sup>4</sup> put new light on understanding wetland ecology. The old type classification which incorporated water depth and vegetative species to determine a wetland type was modified by Stewart and Kantrud. Martin, et al. (1953) seemed to place too much emphasis on water depths and cover interspersions to give the real picture of prairie wetlands.<sup>4</sup> It was during a seven year study of wetlands in North Dakota that Stewart and Kantrud made their adaptation to classifying wetlands. We decided that ecological similarities of the habitat of North Dakota and Montana made their data and classification applicable in most parts of Montana. Stewart and Kantrud incorporated a "class" of wetlands which was determined by the plant species most dominant in the wetland and also a "cover type" which was the percent of the wetland basin covered by emergent vegetation. A detailed explanation of the classes and cover types is found on pp. 5-13 of this publication and a comparison of the two wetland classification studies on pp. 13-14.

In personal correspondence with personnel of the Northern Prairie Wildlife Research Center, I obtained information from the work of several people on waterfowl production and land requirements. Director Harvey Nelson compiled the data in a letter to the Assistant Director, Operations, U.S. Fish and Wildlife Service, Washington, D.C., dated July 10, 1973. It was from this memo and others from Northern Prairie that the production criteria of the rating system were developed. Following is an excerpt from that memo: "For example, in semi-permanent ponds and lakes (Class IV) we recommend that acquisition priority be given to

subclasses A-0 and that decreasing priority be given to cover types 2, 3, 1, and 4 in that order. . . . In line with broadened Service responsibilities, we believe the wetland program should be directed not just to the production of waterfowl, but also to other migratory birds, as well as rare and endangered species. In addition, it should consider the wetland needs of migratory birds that breed in the north but require prairie wetlands as important migration habitat. Value to resident species should also be given greater recognition. . . . As far as waterfowl are concerned, an increasing effort should be made to preserve important diving duck habitat because of the decreasing populations of canvasbacks, reheads and other species, and the threats to their remaining habitat. . . . Also, the program in the past specifically excluded alkaline areas for the most part. While not of high value to most species of waterfowl for breeding purposes, these areas are very important to cranes and many species of shorebirds. . . . We believe that the program in the future should be directed toward the acquisition of key blocks of high value habitat wherever it occurs rather than to just one ownership in any 9-square-mile block as recommended in the original criteria. . . . We believe further that, as a general rule, purchased areas should contain a minimum of 20 percent and a maximum of about 80 percent wetland acreage."

Exhibit 1 is the wetlands delineation rating system used in Montana. Following is a discussion of the criteria developed and used in that system:

1. Vulnerability

Wetlands in Montana are suffering from various forms of human intrusion, depending on which part of the state the wetlands are located. In Northeast and Northcentral Montana drainage is a major threat. With the increase in the price of wheat many acres of native prairie have "gone to the plow" and if wetlands are drainable, they are eliminated. In some areas along the Hi-line cattle ranchers have drained small potholes into larger basins and placed dikes across the ends for more permanent watering areas.

Irrigation by gravity and pumps has been the destruction of wetlands along both sides of the Rocky Mountains. In the Flathead Valley sub-division for housing is severely curtailing waterfowl from using wetlands. In some of the larger wetland basins siltation is occurring and pollution from heavy use of fertilizer in uplands is destroying the waterfowl value of these significant migratory use areas. Destruction of



wetlands occurs from filling basins with rocks, car bodies, manure and other debris.

Many sub-dividers are finding greater value if they have a "own your own pothole" section in their advertisement. This usually prevents the wetland from being drained, but eliminates much chance for nesting success by waterfowl. Nests are either abandoned because of human disturbance, destroyed by pets, or are never initiated because nesting habitat becomes a back yard lawn.

All contribute to the continued destruction of wetlands as measured by the Vulnerability Section of the rating system. This criterion is considered to be the most important consideration in wetlands delineation and has, accordingly, been given the highest rating score.

2. Species Composition

The value of the duck species produced was derived from the rating used in the Flyway Habitat Management Unit Project, RBU's (Refuge Benefit Units) in the National Wildlife Refuge Management System, and from recent emphasis given to canvasback and redheads. Each species is placed in one of three groups -- high, medium or low.

3. Production Capability

This criterion of the rating system estimates the ability of the total delineated area to produce ducks (wetlands plus associated uplands) if managed for that purpose. It incorporates considerations of wetland types, juxtaposition of wetlands with uplands, edge effect, "complex concept", known production history, soil productivity, etc. This criterion is judged slightly more important than Species Composition.

4. Acquisition Cost

The dollar breakdown of the cost criterion was determined from talking with FWS Realty Specialists in Montana. The most expensive land costs approximately eight times more than the least expensive. A value of \$1000 per acre and

\$50 per acre was established for high and low land values, respectively.

5. Value to Other Wildlife

It is becoming evident as wetland ecosystems are better understood that many species of wildlife benefit from protection of "waterfowl habitat." Studies are now being conducted on the use of wetlands by many species of migrating birds -- shorebirds, passerines, predatory, as well as colonial nesters -- and the importance that the role of natural wetlands plays in their life cycles. Other wildlife in various parts of Montana have been found associated with wetlands. Whitetail deer have been known to spend their entire lives in DNC plantings associated with waterfowl production areas. Antelope are found in the native prairie where wetlands are interspersed throughout the uplands. Upland gamebirds, such as sharp-tail and sage grouse, as well as the Hungarian partridge, are found using potholes for watering as well as the uplands for nesting. Also important is the use by many species of wildlife, such as pheasants, of dense emergents for critical winter cover.

B. Methods Used to Determine Delineation

Several methods were used to decide whether a wetland should qualify for delineation. The more closely one could become acquainted with a wetland or complex of wetlands, the better the ability to judge that wetland's capabilities to produce waterfowl.

Réservoirs, although important to waterfowl in some sections of the state, were not included in the survey unless significant emergents were noted and appeared significant enough to merit delineation.

It was decided in October, 1974 that the wetlands inventory should be completed by July, 1975. Aircraft would be used to complete the 100% survey of the state. Previous to this, one year had been spent on ground surveys of wetlands in Sheridan, Roosevelt and Toole Counties. At this rate it would have taken approximately three years to complete all delineations.

1. Aerial Photographs

To save time in surveying the state, aerial photo indexes with a scale of 1 inch to 1 mile were ordered for all counties north and west of the Missouri River on the east

Exhibit 1

MONTANA WETLANDS DELINEATION RATING CRITERIA \*

<u>1. Vulnerability</u>	<u>Rating</u>
High - Probable loss within 10 years	20
Med. - Possible loss in foreseeable future	10
Low - Unlikely loss in foreseeable future	1
<u>2. Species Composition</u>	
High - Canvasback, redhead, ringneck, mallard, wood duck	14
Med. - Widgeon, gadwall, green-winged teal	7
Low - Shoveler, pintail, blue-winged teal, scaup, ruddy, etc.	3
<u>3. Production Capability</u>	
High - At least 6 ducks produced per acre	15
Med. - 3 to 5 ducks produced per acre	8
Low - Less than 3 ducks produced per acre	4
<u>4. Acquisition Cost</u>	
High - \$801 - \$1,000 per acre	16
Med. - \$201 - \$800 per acre	8
Low - \$50 - \$200 per acre	2
<u>5. Value to Other Wildlife</u>	(non-add)

\* Footnotes for rating criteria are found on next two pages.

1/ Vulnerability

Vulnerability of wetlands in a delineation would not only include present and potential threat to wetlands in future but also ease of drainage, loss due to recreational development, housing subdivision, severe siltation, extensive over-use from grazing and haying, pumping for irrigation, etc., all of which threaten the ability of wetlands to produce waterfowl.

2/ Species Composition

High

- a. 30% breeding population composed of high category species or known significant breeding use by species in this category.
- b. At least one marsh of Class IV or exceptional Class III with cover type 2 or 3 (Stewart & Kantrud-1971). Marsh(es) must be of significant size within delineation to have substantial effect on waterfowl production, i.e. during drought years.

Med.

- a. 50% breeding population composed of medium category species (would include high category species when their total is less than 30%) or known significant breeding use by above species.
- b. Priority should be given to a delineation with a variety of potholes with all classes represented.

Low

- a. Does not meet species criteria established for high or medium rating.
- b. Same as Med. b. above.

3/ Production Capability

Assumption is made that delineated area is optimal for area under consideration and if acquired in fee would be managed to maximize waterfowl production.

High - 6+ ducks produced/delineated acre, or at least 1.6 nests/acre with 70% nest success, or 30+ wetlands/square mile in wet years.

- a. Divers: At least 20-80% of the delineated area are wetlands and criteria of 2b apply.

Exhibit 1 (Continued)

b. Dabblers: At least 50% of delineated area is upland, a balance of all wetland classes and at least one Class IV, V or exceptional III large enough to have a significant effect on production necessities in the delineated area during years of low water and at least 50% of uplands with soil capabilities to produce vigorous, tall dense nesting cover in blocks of at least 80 acres.

Med. - 3 to 5 ducks produced per delineated acre, or 0.5 to 1.4 nests/acre with 50-70% nest success or 15 to 29 wetlands/square mile in wet years, and meeting criteria of high a and b above except for production capabilities and less than 50% of uplands capable of producing DNC in 80-acre blocks.

Low - Less than 3 ducks produced per delineated acre or less than 0.5 nest/acre with less than 50% nest success or less than 15 wetlands/square mile in wet years.

4/ Acquisition Cost

Cost of land may need future adjustment to reach a mean land value for all areas. This rating should be divided into total value of other three criteria.

5/ Value to Other Wildlife

Additional benefits to wildlife from wetlands delineated have priorities as indicated in decreasing value ranked in order below:

- (1) Rare and endangered wildlife.
- (2) Uncommon waterfowl use or limited production habitat for specific waterfowl.
- (3) Migratory waterfowl use.
- (4) Other migratory bird use.
- (5) Resident wildlife use.

Although these factors are not given a point value they are taken into consideration at the time of the delineation and noted on the delineation sheet.

side of the Continental Divide, south and east of the Missouri River on a north-south line with Carbon, Yellowstone, Golden Valley and Petroleum Counties, and six counties west of the Continental Divide. These indexes were used to find areas with wetlands which appeared good for waterfowl production. The indexes were supplemented with 12" x 12" photographs of 4 inches to 1 mile scale of areas with potential delineations. These photos were used in totalling delineated wetland acres by county and will later be used by Realty Specialists in acquisition.

## 2. Aerial Reconnaissance

The information gathered from aerial flights was minimal and was gained in a few seconds and passes over a particular wetland. To minimize the cost and time spent in the aircraft many hours were spent with aerial photo indexes on the ground mapping flight routes and specific wetlands to check.

During June and July 1975, 76 hours flight time was logged surveying wetlands. Information recorded during the flight over a wetland was legal description, class and cover type, dominant vegetation by species (emergent and submergent), upland conditions, waterfowl present (use and broods). All information was recorded on a tape recorder and transcribed on the ground.

Problems associated with the aerial survey were: (1) early in the season it was difficult to judge what cover type was typical for a particular wetland, (2) the late chronological season during 1975 associated with high precipitation in many parts of the state made it difficult to accurately determine wetland classification, average water levels and breeding pair information. These problems were overcome somewhat by noting last year's growth of vegetation, conditions during previous aerial photo coverages, and precipitation records. This supplemental information helped in establishing "average water conditions."

Aerial surveys saved many hours over ground delineation. Aerial coverage was not as intensive or complete as ground surveys, but were judged accurate enough, when correlated with other sources of information, to reach decisions as to wetland values.

## 3. Ground Checks

Where possible, certain areas were spot-checked for accuracy in estimating water depth, emergent and submergent vegeta-

tion, or just to confirm waterfowl use of an area. Key wetland areas in each geographically different area were checked. Approximately 20% of all wetlands delineated from the air were rechecked on the ground.

#### 4. Personal Contacts

During 1974 many personal contacts and letter communications were used to determine areas for wetland studies. By contacting the right people a better picture can be obtained of a wetland and its uses and can be of great help in making a delineation. Some of those who assisted in initiating "recommended search areas" for wetland reconnaissance were Montana Fish and Game Regional Biologists, Soil Conservation Service personnel, local Agricultural Stabilization and Conservation Service personnel at each county seat, and land owners.

### III. Wetland - Physiographic Relationships

In the report "Wetlands Inventory - Montana, 1954" page 10, is a good description of the physiographic regions of Montana:

"The major physiographic provinces represented in Montana are the Great Plains, Northern Rocky Mountains, and Middle Rocky Mountains. The glaciated and unglaciated portions of the Missouri Plateau, which comprise the section of the Great Plains province in Montana, are roughly divided by the Missouri River. The inventoried area in Lake County is located in the Northern Rocky Mountain province and it includes a broad glaciated valley surrounded by mountain ranges."

To draw all factors of waterfowl use, physiography and climate together one must certainly consider weather or precipitation records. From a publication of the Department of Commerce entitled "Climate of Montana," 1960, a chart indicating precipitation isolines shows much of the Hi-line of Montana to receive approximately twelve inches of precipitation annually. A closer evaluation of individual stations shows some areas to receive ten inches while others might receive as high as fourteen inches.

Generally speaking, areas in the higher precipitation zones receive higher waterfowl use where good habitat is available. In final analysis of the data in the delineations, the best waterfowl areas are generally found in the higher precipitation zones.

In Section IV the counties are listed in order of rank with respect to importance of waterfowl habitat. Six of the top ten counties are those found in the Hi-line portion of the state. Of this list the top four counties are found in a precipitation zone of approximately thirteen inches. Again, the first seven of the top ten

counties are found in the Glaciated Prairie region and contain significant waterfowl habitat.

Of the 26 counties which have acres delineated for purchase of waterfowl habitat, 16 counties are found to have all or portions of the county affected by glaciation. Generally speaking, the higher percent of land that had been glaciated in a county, the higher the acreage of delineation in that county.



#### IV. Summary of Wetland Survey - 1974-1975

##### A. Fee Delineations

To say that the values and ratings of the wetlands delineated from this study are "etched in rock" would not be realistic. Establishing the value of a particular area relied heavily on what was seen from low level flights over wetlands. What was observed was what that particular wetland or complex had on it at that time and on that day. As mentioned earlier in this report, other aids such as old aerial photos and precipitation records were correlated to give a better picture of what the wetland would really look like seven years out of ten. This was what the rating was based on. No matter how many records or notes are made about a particular area, however, what one sees at any one time has a great impression on the final decision. Therefore, there may be a bias.

It was difficult, for example, to overlook the fact that many wetlands I observed in the Great Falls area in August, 1975, had many duck broods on them, but checking additional aids and physical features of the marshes convinced me that three to four years of average precipitation would find the areas dry farmed or at best foxtail meadows. On the other hand, a series of wet years could change the whole class of temporaries to permanent marshes for upwards of five to ten years. I have tried to look at the delineations objectively for a best estimate of what they can produce most years.

As close to 100% of all marshes with what I consider to have waterfowl production potential were checked as was physically possible at this time. I am sure that in years to come biologists will say "Here is a good area," or "Why was this one left out?" It is my hope that as new areas are located or as these current delineations are studied and better "judgments" of wetland values are made, they will be changed.

From these guidelines each county's delineations are found in the appropriate county folder filed in the Area Office, Billings, Montana. All delineations for each county are ranked in order of highest total rating of all four criteria and merely need to be referred to in order to find out which delineation ranked highest in that county. Many delineations were ranked with the same number of total points in the same county, but all one has to do is look at the various rating criteria to determine where that particular wetland would "fit."

A total of 252 delineations were selected for Montana (Table 2). Each delineation consists of a wetland or complex of wetlands with enough associated upland so that it can be managed for optimum production of waterfowl. The average size delineation is 538 acres with a

TABLE 2

DELINEATED WETLANDS IN MONTANA

<u>County*</u>	<u>Number of Areas Delineated</u>	<u>Acres Delineated</u>	<u>Acres of Wetlands in Delineation</u>	<u>Fee Acres in Cost Suggested For Approval by State</u>
Beaverhead	4	2,286	387	2,500
Blaine	10	10,010	2,085	10,000**
Cascade	2	720	200	1,500
Chouteau	10	6,270	1,220	7,000**
Daniels	4	1,015	162	1,500**
Fergus	3	960	182	1,500
Flathead	17	5,427	1,387	6,000
Glacier	11	9,825	2,438	10,000 (4,000)
Golden Valley	1	1,280	500	1,500
Hill	2	5,019	959	6,000**
Jefferson	1	1,690	190	2,000
Judith Basin	1	600	100	1,000
Lake	43	4,820	990	5,000 (A11)
Lewis & Clark	5	1,487	301	2,000
Liberty	5	3,270	550	4,500
Park	1	380	40	500
Phillips	17	11,980	2,860	12,000**
Pondera	6	4,820	1,050	5,000 (1,500)
Powell	11	5,350	846	6,000
Roosevelt	8	8,310	2,120	9,000 (4,500)
Sheridan	72	34,670	8,652	35,000**
Stillwater	1	120	30	500
Sweet Grass	1	200	22	500
Teton	3	4,980	1,300	5,000
Toole	12	9,380	1,620	10,000
Valley	1	800	172	1,000**
Totals	252	135,669	30,363	146,500

* <u>County</u>	<u>Refuge Acres Delineated for Purchase</u>
Madison	15,000
Beaverhead	8,000
Gallatin	3,000
Total	26,000

\*\*Counties which contain Indian reservation lands where no delineations were made.

( ) Acres of delineated areas found within the boundaries of the respective Indian reservation of appropriate county.

total of 135,669 acres delineated. Of this total, 30,363 acres or 22% are wetlands. Twenty-six counties in the state have delineations for waterfowl production areas. Madison County has 15,000 acres delineated for refuge development and Beaverhead County has 8,000 acres delineated for refuge development. One area northeast of Three Forks in Gallatin County has approximately 3,000 acres previously delineated for refuge development.

Delineated area ratings ranged from a high of 2100 to a low of 7. From these 252 delineation ratings I have ranked the 26 counties according to various factors of the rating criteria. Exhibit 2 is a sample delineation sheet demonstrating how delineation values are derived.

#### 1. Final Rank of All Counties (Table 3)

##### Column A

This column determines rank by multiplying the final value of the four rating criteria for each delineation by the number of acres in that delineation. This value was summed for all delineations in the respective county. The rank of counties in Column A is believed to give the best estimate of a county's rank in its importance to the wetlands program in Montana in that it takes into account the quantity of delineated wetlands as well as their quality.

The total points for each county give an idea of the magnitude counties could be separated by. In referring back to Exhibit 2 (Delineation Sample) it is easy to see that one delineation (when not divided by cost) could account for 1,000,000+ points. Therefore, point spreads of approximately 500,000 could represent the difference of one medium value delineation of 1,000 acres or a highly vulnerable complex of wetlands of medium value 500 acres in size.

##### Column B

This column is the final ranking of counties throughout the state. Column A determined the county ranking from the criteria used in the rating formula; however, the formula did not include all of the information that must be considered in ranking counties for their value in the wetlands program. These externalities are discussed below with the effect they had on the outcome of the final county ranking, as shown in Column B.

WETLANDS DELINEATION

Rank No. State \_\_\_\_\_

State Montana County Liberty T. 36N R. 3E Area \_\_\_\_\_  
 Sec. \_\_\_\_\_

Aerial Photo No. \_\_\_\_\_ Date of Photo \_\_\_\_\_

Criteria Rating	Vulnerability ( )	Sps. Comp. ( )	Waterfowl Prod. ( )	Sub-total	Cost ( )	Total Value
High	x					
Med.		x	x		x	
Low						
<b>Total</b>	20	7	8	1120	8	140

Additional Criteria:

Value to other wildlife (1 to 5) 4

Miscellaneous Information:

Emergent sps.: Scirpus acutus, Typha latifolia

Sub. species: Potamogeton sps.

Soil: Dark

Other: Good grasslands in area.

Wetland Classification in Delineation:	Class	III	IV	IV	
Cover Type		2	3	2	
No.		6	3	2	
Acres wet		40	30	25	95
<b>Total upland acres in delineation:</b>					<b>305</b>

Other Comments: Good complex of wetlands with 21 broods of ducks - mainly Gadwall, Pintail and a few Redhead and Mallard.

Scale: 4 inches = 1 mile

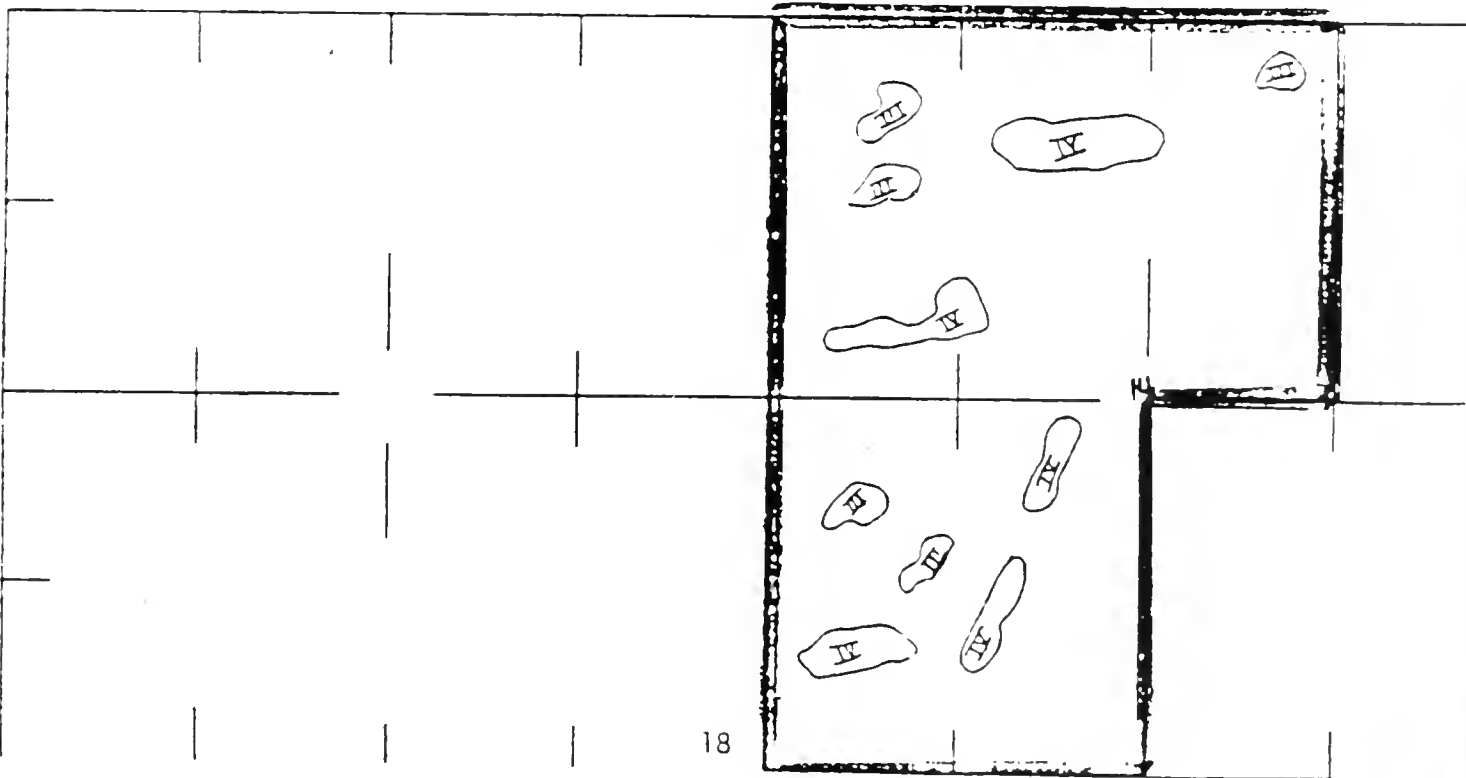


TABLE 3: FINAL COUNTY DELINEATION RANKING

A County Ranking According to Rating Formula		B Final Adjusted Rank by County
<u>County</u>	<u>Value*</u>	
Sheridan	10,533,212	Sheridan
Roosevelt	4,627,840	Glacier
Glacier	3,317,941	Toole
Phillips	2,845,088	Liberty
Toole	2,381,952	Phillips
Teton	2,184,000	Blaine
Lake	1,544,023	Teton
Blaine	1,272,320	Roosevelt
Liberty	724,760	Powell
Chouteau	560,264	Chouteau
Powell	458,205	Pondera
Pondera	386,316	Lake
Beaverhead	367,808	Flathead
Flathead	340,561	Lewis & Clark
Jefferson	196,500	Hill
Cascade	179,760	Cascade
Lewis & Clark	173,540	Daniels
Hill	135,732	Beaverhead
Daniels	128,325	Jefferson
Judith Basin	78,600	Judith Basin
Fergus	55,600	Fergus
Valley	44,800	Valley
Golden Valley	35,840	Golden Valley
Sweet Grass	7,000	Sweet Grass
Stillwater	6,360	Stillwater
Park	5,320	Park

$$*County Value = \sum_{i=1}^n \left( \frac{A_i \times B_i \times C_i}{D_i} \right) \times E_i$$

Where:

- n = Number of delineations in county
- i = First in the series
- A = Vulnerability rating
- B = Species composition rating
- C = Production capability rating
- D = Cost rating
- E = Acres in delineation

Sheridan County is noted as having the most acres of the best waterfowl habitat and remains as first priority.

Glacier and Roosevelt counties have delineations found on the Blackfeet and Fort Peck Indian Reservations, respectively. Roosevelt County contained the Manning Lake area which was large in size with very good waterfowl habitat. Manning Lake, however, is on reservation land and is very probably inaccessible for acquisition. The remaining wetlands delineated in Roosevelt County were scattered and of less importance. Therefore, Roosevelt was moved downward. Glacier County has good wetlands on and off the Blackfeet Reservation. Those located on the reservation are virtually inaccessible for acquisition because of land ownership. Those delineations located off the reservation (approximately two-thirds of the total points) are very good areas and, therefore, Glacier County was moved to second position.

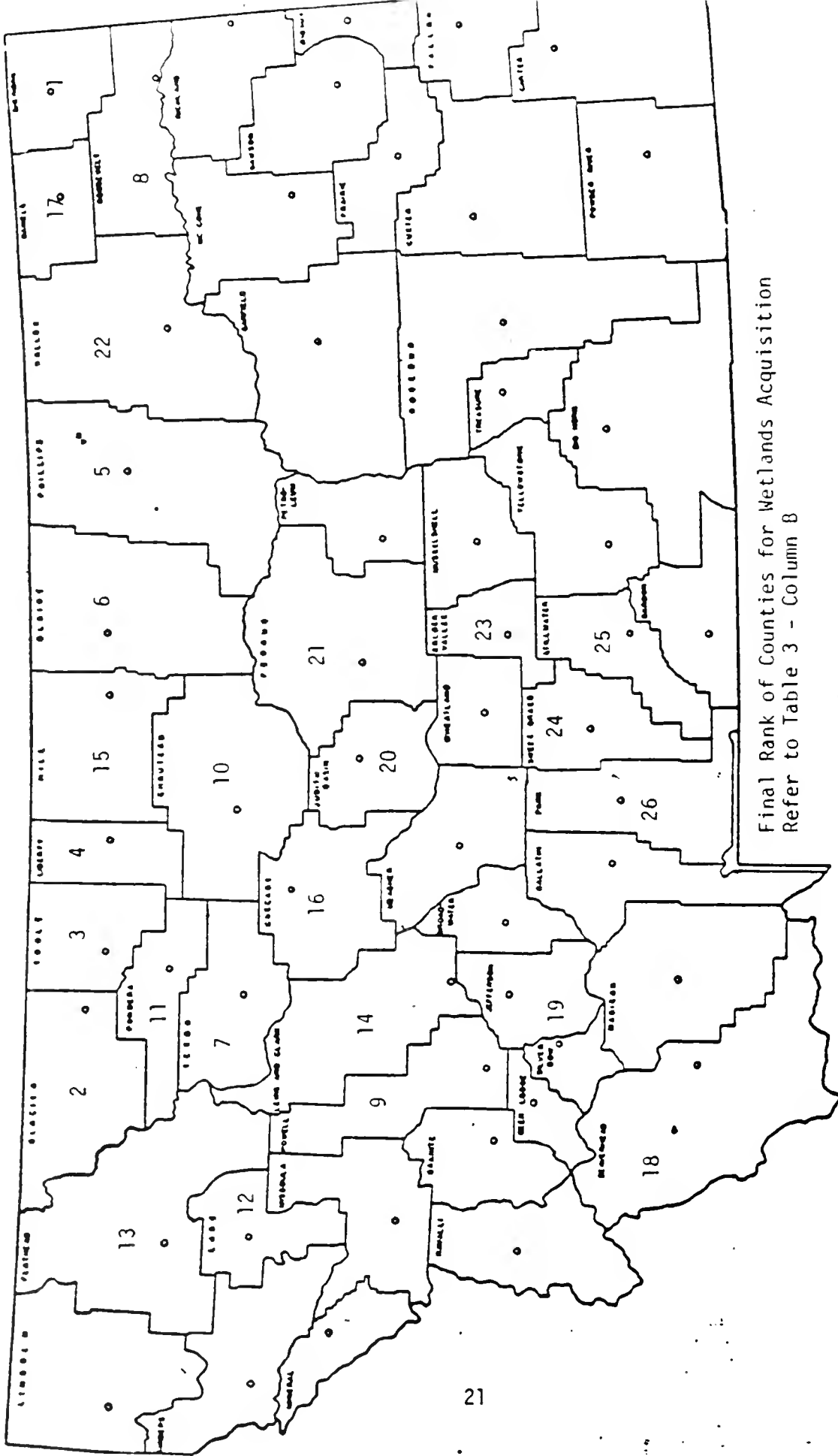
Liberty County was moved to fourth position because the size and quality of wetlands there seemed more important than those ranked below it. In other words, it was felt that the formula did not take into consideration the overall value of wetlands in Liberty County. In the author's opinion, Liberty County should be higher than where value places it in Column A.

Phillips County has a number of good areas; however, Service acquisition for at least half of the delineation is not critical because they are found on Bureau of Land Management lands and that agency is expected to consider the waterfowl resource in their planning. BLM will be notified by the Service of our view on many wetlands which they administer.

Powell County is as important as Roosevelt and Teton counties because of the blocks of private land.

Lake County was moved downward because even though no delineations were made on tribal lands, they are all within the exterior boundaries of the Flathead Indian Reservation where acquisition authority is in doubt.

Pondera County has two delineations on the Blackfeet Reservation, but still ranks at this approximate position pointwise as well as in the author's opinion.



Final Rank of Counties for Wetlands Acquisition  
 Refer to Table 3 - Column B





Lewis and Clark County was moved upward because of the large blocks of areas located on private land.

Beaverhead and Jefferson counties were moved downward because the areas delineated were either widely scattered (Beaverhead) or contained one unit (Jefferson) making acquisition priority less important.

All other counties remained at the same rank or were moved only one or two positions. When a county remained at or near its rank in the two columns the criteria established its rank regardless of unaccounted constraints related to acquisition.

On the basis of the final ranking found above the following recommendations are made in relation to acquisition and wetland importance (Refer to Exhibits 3 and 4): The number 1 area (geographically) for waterfowl production habitat is the northeast part of the state; i.e., Sheridan and Roosevelt counties. Next in importance of production is the northcentral area consisting of Glacier, Liberty, Toole, Teton and Pondera counties. Then would be the central part of the Hilline with Phillips and Blaine counties followed by Hill and Chouteau counties for that portion of the state. Areas west of the mountains with high potential for waterfowl production are the counties of Powell, Lake and Flathead, respectively. Next in order of delineation acquisition importance would be the west central part of the state consisting of Cascade and Lewis and Clark counties. All other areas have scattered important delineated wetlands but do not contain extensive areas significant to production of waterfowl in the two flyways.

## 2. Additional Views of Criteria

Table 4 represents the county rank by points received in relation to various methods of analysis of the criteria. When studying the columns in Table 4 the following information should be used for interpretation:

### Column 1

This ranking was made by summing the total rating of the four criteria of each delineation. A total was derived for all delineations in the county and was then divided by the number of delineations in that county. This ranked the counties by the average value of the delineations

TABLE 4: COUNTY RANK IN RELATION TO VARIOUS  
VIEWS OF WETLAND IMPORTANCE

Column 1 Average Delineation Value		Column 2 Effects of Cost		Column 3 Effects of Vulnerability and Waterfowl Capabilities	
County	Points	County	Points	County	Points
Roosevelt	325	Sheridan	29,736,798	Sheridan	3,710,651
Teton	322	Lake	10,138,800	Lake	2,191,970
Sheridan	321	Roosevelt	9,432,080	Glacier	1,095,937
Phillips	269	Toole	8,927,310	Phillips	1,087,275
Glacier	242	Phillips	7,260,750	Roosevelt	1,063,720
Toole	185	Glacier	6,633,637	Toole	913,710
Liberty	177	Liberty	5,746,720	Powell	798,560
Blaine	157	Teton	5,465,600	Hill	650,664
Cascade	143	Flathead	5,445,860	Flathead	605,752
Jefferson	131	Powell	3,651,200	Liberty	595,592
Judith Basin	131	Chouteau	2,641,800	Blaine	565,600
Chouteau	127	Blaine	2,544,640	Teton	519,680
Daniels	127	Pondera	2,411,360	Chouteau	509,880
Beaverhead	121	Jefferson	1,575,000	Pondera	336,560
Pondera	110	Beaverhead	735,616	Jefferson	157,500
Lewis & Clark	106	Daniels	678,230	Beaverhead	141,904
Flathead	83	Hill	650,664	Daniels	92,015
Lake	73	Judith Basin	630,000	Valley	89,600
Fergus	71	Cascade	362,880	Lewis & Clark	88,5
Powell	65	Lewis & Clark	347,088	Fergus	73,360
Valley	56	Fergus	300,160	Golden Valley	71,680
Stillwater	53	Valley	89,600	Judith Basin	63,000
Sweet Grass	35	Golden Valley	71,680	Cascade	40,320
Golden Valley	28	Sweet Grass	56,000	Stillwater	12,600
Hill	27	Stillwater	12,600	Park	10,640
Park	14	Park	10,640	Sweet Grass	5,600

Table 4 Column Explanation

Column 1 =  $\frac{\text{Vulnerability} \times \text{Sps. Composition} \times \text{Production Capability} \times \text{Acres}}{\text{Estimated Cost per Acre}}$

= Value for each delineation summed for county

= Above total divided by number of delineations in county

Column 2 =  $\text{Vulnerability} \times \text{Sps. Composition} \times \text{Production Capability} \times \text{Acres}$

= Value for each delineation summed for county

Column 3 =  $\text{Species Produced} \times \text{Production Capability} \times \text{Acres}$

= Value for each delineation summed for county

in the county. It gives no consideration to the total acreage of delineations in the county. In viewing the ranking of each county in all three columns of Table 4, one must remember that the constraints used in arriving at the Final Rank of Counties (Table 3, Column B) would also apply when viewing these areas for acquisition. Thus, on the average the "best" delineations are in Roosevelt, Teton, and Sheridan counties. However, this does not take into consideration the number or size of delineations.

#### Column 2

This column is concerned with the ranking of counties when cost is not a consideration. This was obtained by multiplying the value ratings for vulnerability, species composition and production capability for each delineation in the county and then summing their values. Thus, counties with good wetland values but high land costs, such as Lake County, moved up in the ranking. This column will be useful if acquisition funds become abundant and the objective is to acquire the best habitat regardless of cost.

#### Column 3

This column is presented so that we can look at counties from the standpoint of their present value to the waterfowl resource, irrespective of cost and future vulnerability. Here the species composition, production capabilities, and size of the area were multiplied together and values summed for each delineation in the county. By using this rating we are able to view at the top of the ranking those counties which are high producers of the right kinds of waterfowl and, also, generally have the most acres of delineated wetlands.

### 3. Areas Not Recommended for Fee or Easement

Many wetland areas throughout the state were checked for their ability to produce waterfowl-- some were recommended and many were not. There were various reasons for not recommending some areas. There were too many areas not measuring up to discuss individually here, but each area checked is legally described in my aerial survey notes with information why the area was not recommended (These notes on file in Area Office).

Most areas were not recommended because habitat did not seem to be present for the production of waterfowl. Some areas were found to appear as good habitat (potholes and emergents) but lacked any noticeable use by waterfowl. Those which "appeared good," for example, were usually found as "slumps" of hillsides which seemed to settle unevenly creating small kettles where water was caught. These areas were generally along open mountain fronts and it was suspected that the wetlands may be too high and ice-free too late in spring for good breeding pair use, sterile, or too isolated from the general waterfowl migration patterns.

Portions of Hill and Valley counties contained numerous shallow wetland basins. It was felt that in very heavy precipitation years some of these areas may hold water long enough for duck production, but generally lacked permanency. Some counties had a few good areas for delineation, but lacked complexes of wetlands for an extensive wetlands program. Counties where large rivers, such as the Yellowstone, Gallatin, and Beaverhead had oxbows with marsh vegetation but are not amenable to management and do not have heavy use by waterfowl.

Moreover, Missoula County, as an example, had many mountain lakes which appeared to have marsh areas, but again had very little use by waterfowl. Also, these areas were found on Forest Service lands where vulnerability is low and acquisition is not realistic.

#### B. Easement Recommendations

Most areas with significant numbers of wetlands were found to contain complexes which merited at least one delineation. Some counties have one or two good delineations but no easement program is recommended because there are essentially no wetland complexes associated with the marshes delineated. Previous memos to the Area Office gave descriptions of areas recommended for an easement program. To date, the counties which have been recommended and approved by the Governor for easements are: Blaine, Chouteau, Daniels, Glacier, Hill, Lewis and Clark, Liberty, Phillips, Pondera, Roosevelt, Sheridan, Teton and Toole (Refer to Table 1). As noted in Table 1, Lake County is recommended for easements, but is not yet approved by the State.

Previously, individual townships were recommended for taking easements. It was then found that getting approval for individual townships prevented Realty specialists from completing easements for individual ownerships which may be spread throughout the county. The policy of individual township approval by the State was changed so that any county with wetlands thought to be important to the easement program, and complemented fee areas, was given complete county-wide approval by the State. It is still recommended that the U.S. Fish and Wildlife Service not approve easements on wetlands that are of marginal quality to waterfowl and isolated, or for the mere appeasement of individual land-owners to accept the program. It is recommended that the Service stand behind the policy that good wetland complexes are beneficial and critical to waterfowl use and are, therefore, worth the taxpayers' money to protect.

Table 5 recommends the minimum acreage which should be acquired under the easement program. In referring to Table 5 it will be noted that in some counties more wetlands acres exist than is recommended for easement. The reason for this is that it is suggested that easements be taken on wetlands that are near and will complement areas under proposed fee acquisition. Also, the wetlands total for each county in Tables 1 and 5 refer only to Class III, IV, and V wetlands. Some counties have as much as 20%-40% more wetlands in the Class I and II categories.

TABLE 5: EASEMENT ACREAGE RECOMMENDATIONS

<u>County</u>	<u>Total III, IV &amp; V Wetlands Acres in County</u>	<u>Wetland Acres Delineated for Fee</u>	<u>Minimum Wetland Acres Recommended for Easement *</u>
Blaine	11,352	2,085	7,000 (±1,000)
Chouteau	6,791	1,220	2,500
Daniels	305	162	300
Glacier	15,078	2,438	8,000** (5,000)
Hill	10,318	959	6,000
Lake	3,668	990	1,000*** (All)
Lewis & Clark	2,043	301	1,000
Liberty	2,109	550	1,500
Phillips	22,747	2,860	10,000****
Pondera	2,873	1,050	1,500 (None)
Powell	3,742	846	1,500*
Roosevelt	4,477	2,120	2,500 (±500)
Sheridan	15,662	8,652	6,000
Teton	7,818	1,300	2,000
Toole	9,805	1,620	4,000
TOTALS	118,788	27,153	54,800

\* Totals here refer to acres of wetlands in addition to those already recommended for fee. For maximum acres available for easement, see Table 1.

\*\* Approximately 5,000 acres of wetlands recommended for easement in Glacier County are found on the Blackfeet Indian Reservation and would be under the same constraints as fee areas in Glacier County.

\*\*\* State approval for easements in Lake County will be requested, but the same constraints that apply to Glacier County also are in effect in Lake County. However, all wetlands recommended are found on the Flathead Indian Reservation.

\*\*\*\* The easement acreages recommended in Phillips County would be much higher except that many thousands of acres of wetlands are found on Bureau of Land Management lands. These wetlands are of low vulnerability, but it is recommended that the Bureau of Land Management be notified of the Service's assumption that the integrity of wetlands found on Public Land will be protected.

( ) Acres of wetlands found on Indian reservations in respective county that are delineated for easement.

Literature Cited

1. Wetlands Inventory - Montana, U.S. Fish and Wildlife Service, 1954, p. 2.
2. Ibid. . . . p. 4.
3. Wetlands Inventory Progress Report, Marvin Plenert, U.S. Fish and Wildlife Service, January 1967.
4. Classification of Natural Ponds and Lakes In the Glaciated Prairie Region, Resource Publication 92, U.S. Fish and Wildlife Service, Stewart and Kantrud, 1971, p. 1.
5. Classification of Wetlands of the United States, Martin, A.C., et al, Fish and Wildlife Service, Special Scientific Report - Wildlife No. 20.

ATTACHMENT F-2

LAND ACQUISITION AND DEVELOPMENT PLAN  
Flathead and Lake Counties, Montana  
Harvey Wittmier





LAND ACQUISITION AND  
DEVELOPMENT PLAN

Flathead and Lake Counties  
Montana

October 1986

U.S. Fish and Wildlife Service  
134 Union Boulevard  
Lakewood, Colorado 80228

Prepared by:  
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Refuges and Wildlife  
Denver, CO



LAND ACQUISITION AND  
DEVELOPMENT PLAN  
Flathead and Lake Counties  
Montana

Approved:

Date:

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10-7-86

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Acting Regional Director, Fish and Wildlife Service

8 October 1986

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SUMMARY RECOMMENDATIONS

Following is a list of acquisition and habitat improvement actions that the Service should pursue in Lake and Flathead Counties of Montana (see Figures C-6). These recommendations assume: (1) very limited Service funding for such actions, (2) more willing sellers will be available than money, and (3) Bonneville Power Administration (BPA) will implement a mitigation plan for Hungry Horse Dam and other BPA projects.

"A" Priority

<u>Tract Description</u>	<u>Acres</u>	<u>Funding</u>
#1 WPA - Kicking Horse	240	MBCA/BPA
#2 WPA - Blasdel/Ficken	560	"
#3 WPA	480	"
#4 WPA - Fairview Marsh	360	"

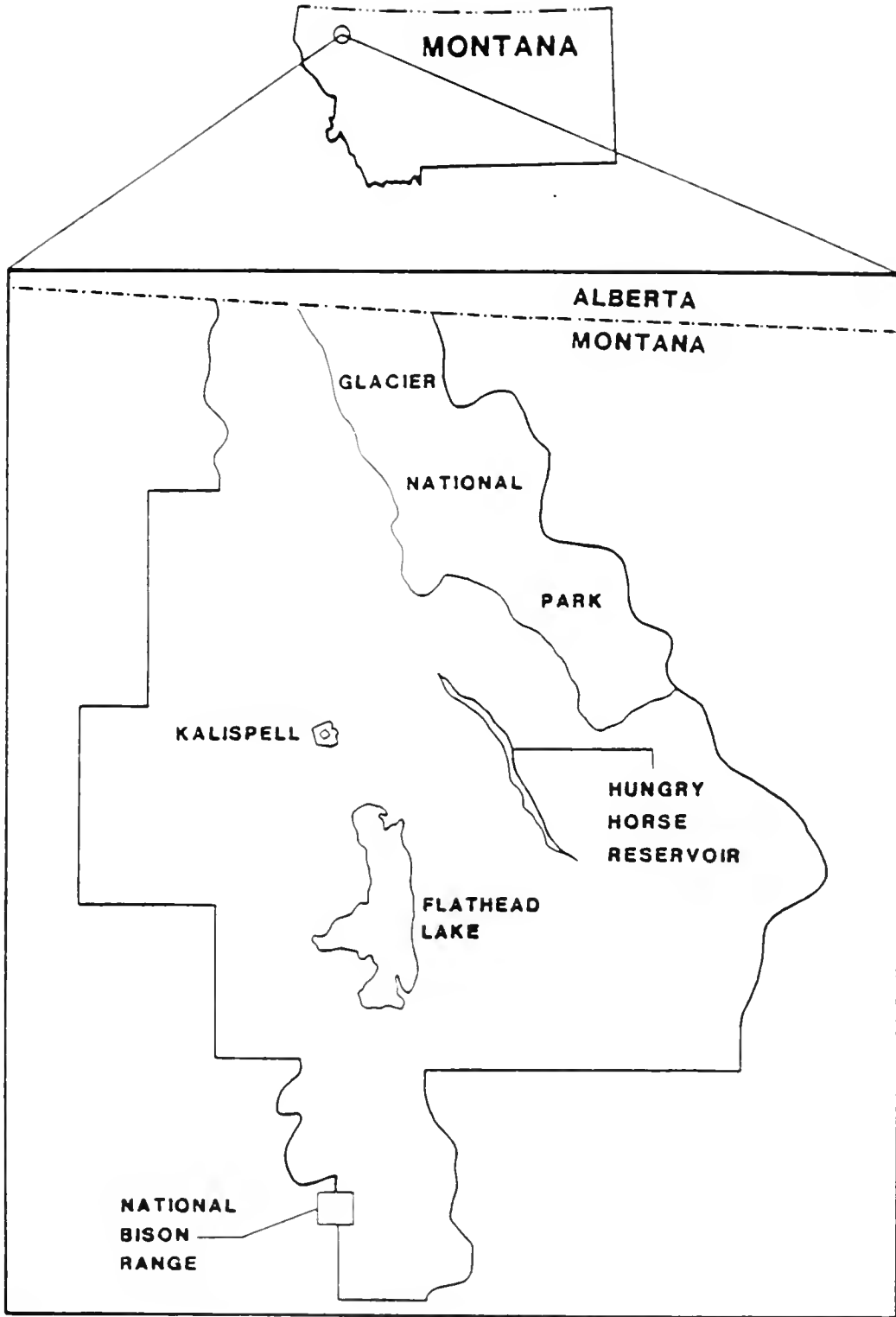
"B" Priority

#5 WPA	160	"
#6 WPA	140	"
#7 WPA	330	"
#8 WPA	195	"
#9 WPA	54	"
Smith Lake WPA Roundout (South side)	1,000	BPA

"C" Priority

#10 WPA	97 (easement only)	MBCA/BPA
#11 WPA - Morning Slough	150	"
#12 WPA	180	"
#13 WPA - Sansmark Roundout	80	"
#14 WPA	452	"
#15 WPA	300	"
Smith Lake Diking		BPA
Swan River roundouts (wetland tract)	71	LWCF/BPA
Swan River roundouts (forested tracts)	534	LWCF/BPA
Flathead WPA Habitat Improvement		BPA
Smith Lake WPA roundout (North side)	590	"
	<u>5,973</u>	

Each tract should be purchased in fee title except for #10. Tract #10 has several houses very close to the shoreline and an easement would better serve Service objectives and avoid management conflicts.



**FIGURE 1.**  
**FLATHEAD AND LAKE COUNTIES, MONTANA**



## INTRODUCTION

In 1995, the Fish and Wildlife Service (FWS) recognized the need to evaluate the future of land acquisition in Flathead and Lake Counties, Montana (figure 1). The need resulted from two issues: (1) the BPA was nearing approval and implementation of a wildlife mitigation/enhancement plan for construction of Hungry Horse Dam, and (2) limited funding for FWS wetland acquisition necessitated a decision to evaluate and prioritize tracts for acquisition.

This report provides background on FWS land acquisition in northwest Montana. It presents a list of tracts for acquisition by the FWS or other entities to maintain waterfowl production in the area. The report also recommends two structural developments as BPA mitigation projects.

## SUMMARY OF ACQUISITION TO DATE

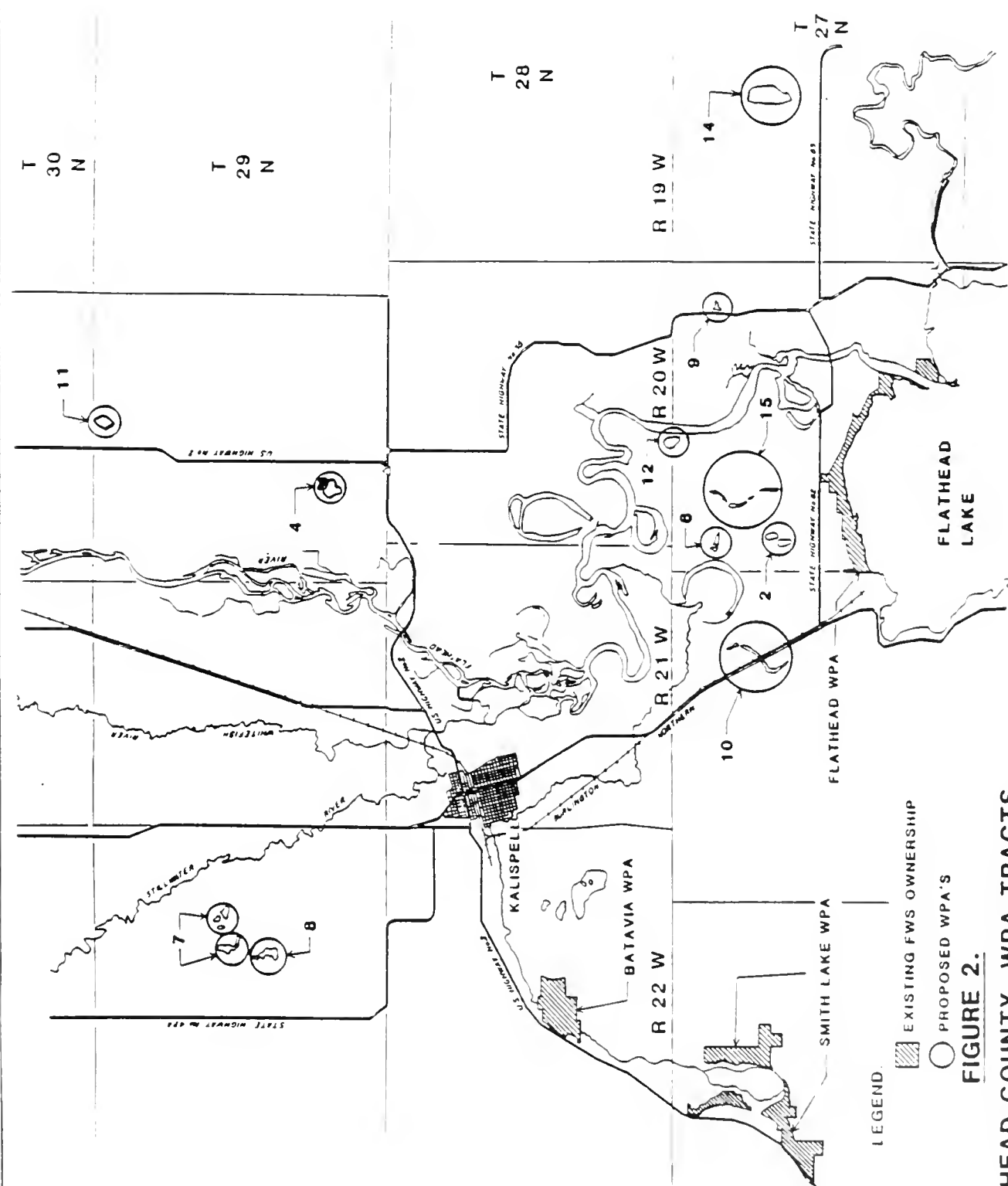
### Fish and Wildlife Service

Presently the Service owns the following lands in Flathead and Lake Counties (see maps, Figures 2 and 3).

	<u>Acres</u>
National Bison Range	22,824*
Swan River NWR	1,569
Smith Lake WPA	1,040 (+1,400 ac. meandered)
Batavia WPA	510
Flathead WPA	2,370
Sansmark WPA	400
Montgomery WPA	80
Herak WPA	80
Creston NFH	74
TOTAL	<u>28,947</u>

\* The National Bison Range manager also has management jurisdiction on Pablo NWR (2,542 acres) and Ninepipe NWR (2,022 acres) under agreement with Bureau of Indian Affairs.

Delineation of wetlands for acquisition in the Small Wetland Acquisition Program began in 1966. The FWS met with Montana personnel to discuss a 16 county acquisition program. In 1968, the FWS identified acreage goals for nine counties including Lake (1,000 acres in fee) and Flathead (1,000 acres in fee). At that time the State had approved a program in only two counties; Sheridan and Roosevelt. By 1969, about 40,000 acres had been delineated for acquisition in Montana including 4,800 acres in Flathead County and 1,500 acres in Lake County.

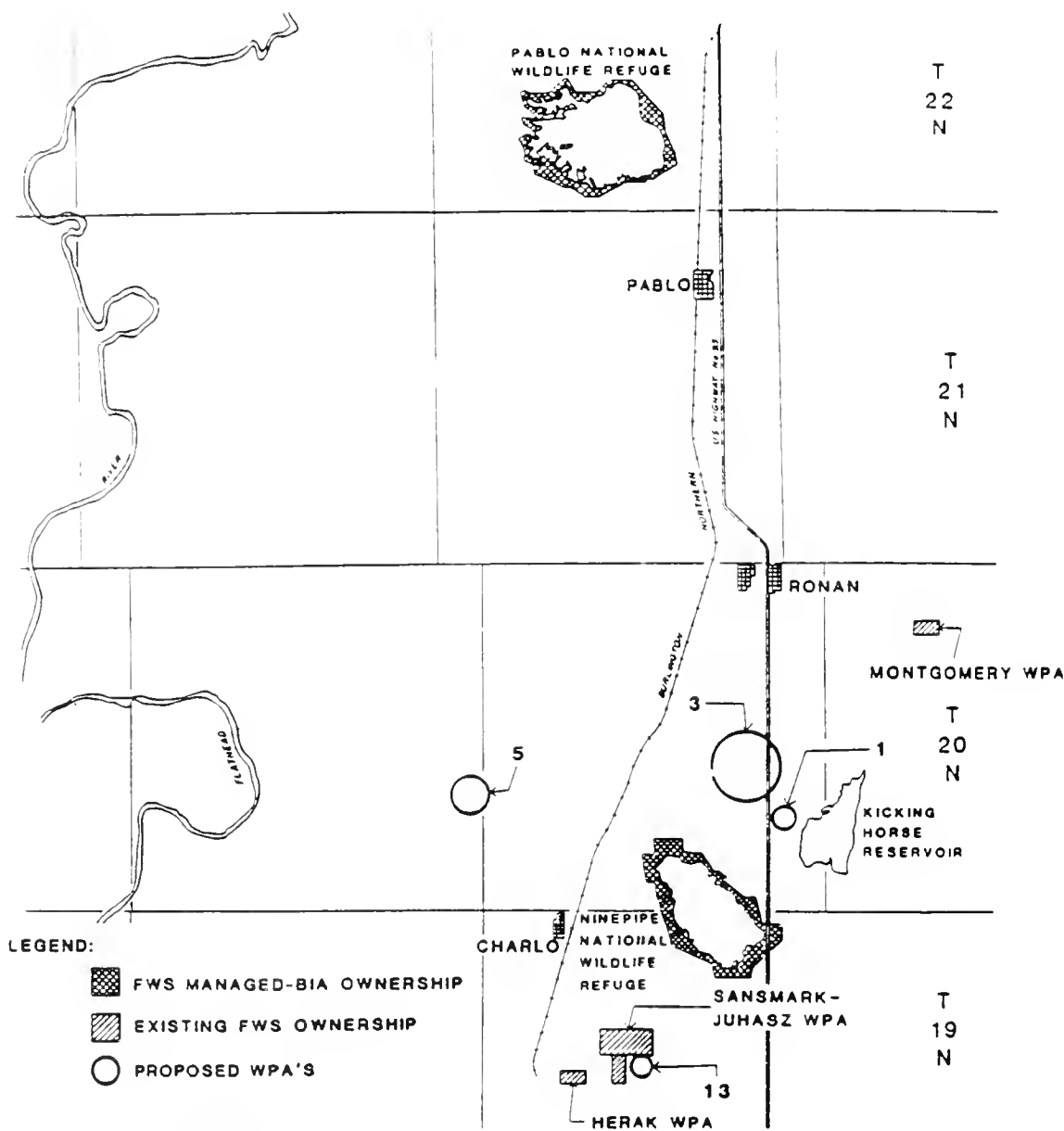


LEGEND.




- ▨ EXISTING FWS OWNERSHIP
- PROPOSED WPA'S

**FIGURE 2.**

**FLATHEAD COUNTY, WPA TRACTS**



**LEGEND:**

-  FWS MANAGED-BIA OWNERSHIP
-  EXISTING FWS OWNERSHIP
-  PROPOSED WPA'S

**FIGURE 3**  
**LAKE COUNTY, WPA TRACTS**

The FWS established a statewide goal of 40,000 acres in fee and 6,000 acres in easement to be acquired by 1976. In the early 1970's, the FWS reestablished fee goals of 5,000 acres for Flathead County, 10,000 acres for Lake County, and 47,070 acres for the State.

In 1970, Governor Anderson approved a limit of 5,000 acres to be purchased in fee in Flathead County with each tract to be reviewed by the Director of Montana Department of Fish, Wildlife and Parks (MDFWP). In 1976, Governor Judge approved an unlimited easement program for Flathead and Lake Counties, and a 2,000 acre fee program in Lake County. Governor Judge also approved a larger fee program in Flathead County not to exceed 7,500 acres. In 1980, Governor Judge increased Lake County fee acres to 3,000. Appendix 1 lists present goals and approvals for Montana.

### Bonneville Power Administration

In 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act which accomplished two important actions:

1. It placed fish and wildlife resources on a more equal footing with hydroelectric development, and
2. It called for protection, mitigation, and enhancement of fish and wildlife resources in the Columbia River drainage.

The act created the Northwest Power Planning Council (NPPC). The council's first task was to develop a fish and wildlife program for mitigation, protection, and enhancement. In August 1985, the MDFWP completed a revised plan entitled Wildlife and Wildlife Habitat Mitigation Plan for Hungry Horse Hydroelectric Project. The plan was submitted to NPPC for approval and identified acquisition or habitat improvement on 12,260 acres.

The original mitigation goal for waterfowl was 1,508 acres which has been reduced to 1,146 acres. An additional 4,326 acres of waterfowl mitigation could be required for Libby Dam mitigation. There also may be up to 5,000 acres for waterfowl required by the Federal Energy Regulatory Commission as mitigation for Kerr Dam. In total, up to 10,472 acres could be required for waterfowl and wetland mitigation, primarily in Flathead and Lake Counties.

To date, BPA has not acquired any land but expects to have funding in 1987.

## IMPORTANCE OF HABITAT AND WATERFOWL USE

Habitat loss in the Flathead Valley is difficult to document. No agency monitors changes in wetland habitat. During the field review of delineation completed in 1986, biologists noted one delineated wetland that had been drained. Another wetland was crisscrossed with dikes, apparently to conserve surface water for irrigation pumping. Several delineated wetlands have irrigation pumps stationed on the shoreline. The impact of those pumping activities is unknown since there is no monitoring by the FWS.

Another threat is residential development in upland nesting habitat. Subdivision of land is slowly occurring in the Flathead Valley. Most of that activity is in wooded areas where houses have been built close to wetlands. The most important impact of that is not on the wetland, but the loss of uplands for nesting. In agricultural areas near Kalispell residential developments also result in more disturbance by humans and pets.

Waterfowl use in the area is high with good productivity. A study by John Lokemoen (1966) found the highest published density of redheads in North America. Lokemoen's study documented 25 redhead pairs per square mile on 686 potholes near Ninepipe NWR. Bellrose (1976) made specific mention of western Montana as an important breeding area for redheads. FWS breeding pair counts verify high duck use in Lake County where a 4-year average on three Waterfowl Production Areas (WPA) was 1.8 pairs/wet acre.

Breeding pair counts in both counties point to good waterfowl use of small wetlands and relatively low use on large wetlands. Smith Lake, which totals about 2,340 acres of which over 1,400 are wetland, had only 154 breeding pairs in 1986. The estimated breeding pair density was .1 pairs per acre of wetland.

The FWS identified Lake and Flathead County wetlands as the top two acquisition priorities for redhead habitat in western Montana. An estimated 6,000 redheads breed in western Montana. The FWS now includes the Flathead Valley in Category 7 for waterfowl habitat acquisition (Appendix 2). Category 7 is the number seven priority on a national list of eleven categories.

## METHOD OF EVALUATING SMALL TRACTS

Biologists evaluated each potential WPA for purchase by scoring according to the four following factors:

<u>Factor</u>	<u>Score</u>
1. Value of tract to duck breeding pairs - interspersion of emergent vegetation - shallow shoreline or other feeding sites - presence of seasonal water regime - quality and quantity of adjacent wetlands	0-4
2. Value of tract to duck broods - ratio of open water to vegetation - presence of semipermanent water regime - escape cover available on wetland	0-4
3. Improvement/development potential - potential to restore or create wetlands - potential for island/brood ponds - assume upland nesting cover for all tracts	0-2
4. Access - easy management access to tract - easy public access to tract	0-2
	<u>0-12</u>

The score for each factor was a subjective judgment by the observers. Biologists made on-site inspections of each tract in Flathead County and aerial inspections in Lake County. They classified wetlands according to Cowardin, et.al. (1979). The aerial flight over Lake County tracts was adequate to identify the existence of wetland complexes and brood water.

## RECOMMENDED ACQUISITION PLAN

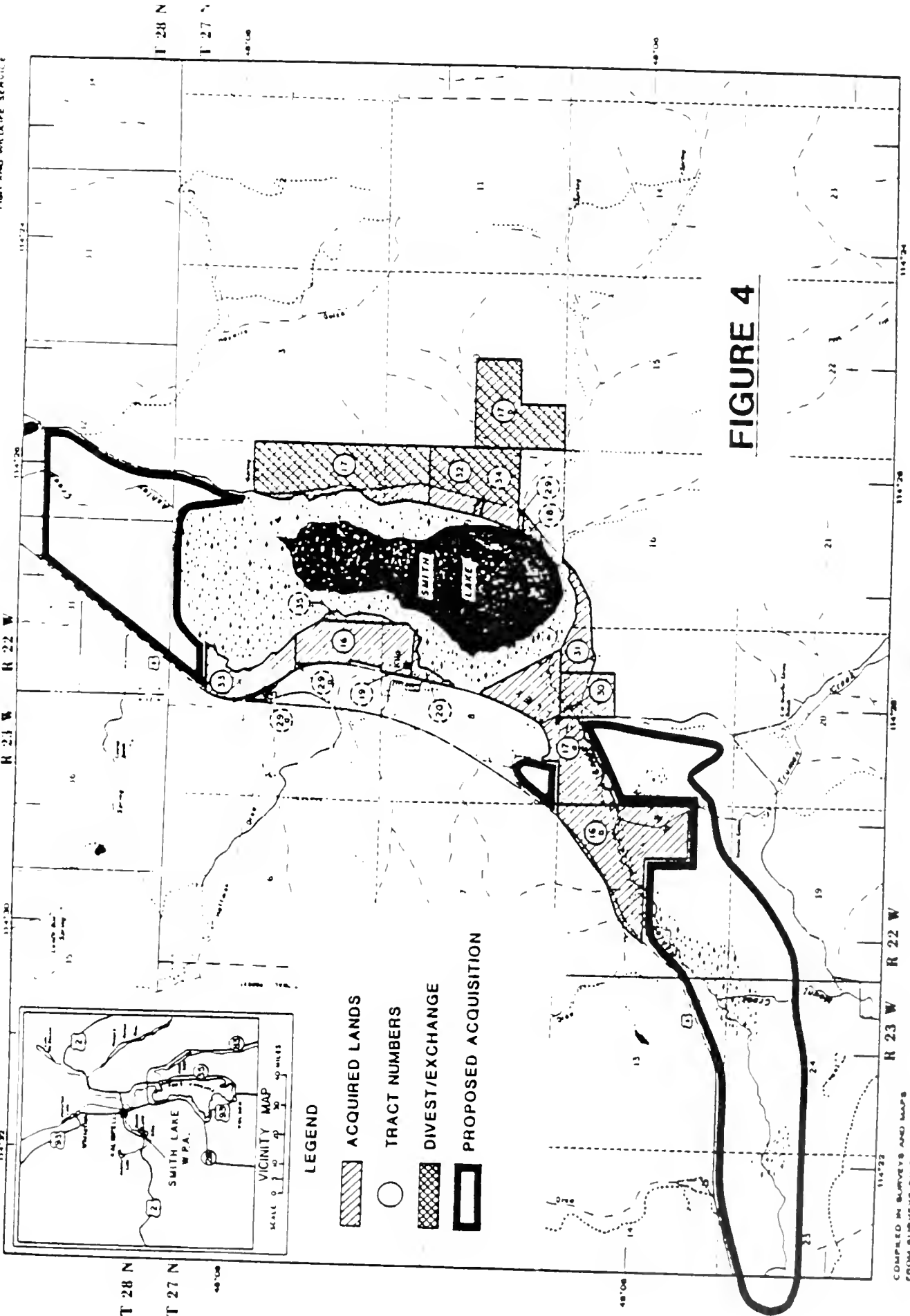
### Small WPA tracts

Table 1 presents a list of small tracts suitable for purchase as Waterfowl Production Areas. The tracts are listed in priority order according to the evaluation score and locations are shown in Figures 2 and 3. Where scores were the same, biologists made a judgment on which tract was a higher priority.

Table 1. Prioritized WPA tracts, Flathead and Lake Counties, Montana  
(Delineation sheets and photos in Appendix 3)

<u>No.</u>	<u>General Area Description</u>	<u>County</u>	<u>Legal Description</u>	<u>Acres</u>	<u>Percent Wetland</u>	<u>Score</u>
#1	WPA Kicking Horse	Lake	T.20N., R.20W. Sec. 25	240	23	11.0
#2	WPA Blasdel/Ficken	Flathead	T.27N., R.20/21W. Sec. 13/18	560	17	11.0
#3	WPA	Lake	T.20N., R.20W. Sec. 23	480	15	10.5
#4	WPA Fairview Marsh	Flathead	T.29N., R.20W. Sec. 27,28,32,33	360	31	10.0
#5	WPA	Lake	T.20N., R.20W. Sec. 24/25	160	22	8.0
#6	WPA	Flathead	T.27N., R.20/21W. Sec. 6/1	140	26	8.0
#7	WPA	Flathead	T.29N., R.22W. Sec. 14/15	330	27	8.0
#8	WPA Northwest Potholes	Flathead	T.29N., R.22W. Sec. 22	195	18	8.0
#9	WPA	Flathead	T.27N., R.19W. Sec. 1	54	39	8.0
#10	WPA*	Flathead	T.27N., R.21W. Sec. 10/15	97	Easement	7.5
#11	WPA Morning Slough	Flathead	T.29N., R.20W. Sec. 3	150	29	7.0
#12	WPA Hodgeson Pond	Flathead	T.28W., R.20W. Sec. 33	180	35	7.0
#13	WPA Sansmark Roundout	Lake	T.19N., R.20W. Sec. 16	80	9	6.0
#14	WPA	Flathead	T.27N., R.19W. Sec. 10/15	452	34	6.0
#15	WPA	Flathead	T.27N., R.20W. Sec. 5	300	22	6.0
Total WPA's				3,778	25	

\* This wetland has houses and other buildings right on the shore and has a series of dikes on north end. Easement is only realistic option.



**FIGURE 4**

COMPILED IN SURVEYS AND MAPS  
FROM SURVEYS BY THE B.L.M. AND  
GEOLOGICAL SURVEY

DENVER, COLORADO  
REVISED FEBRUARY 1983

PRINCIPAL MERIDIAN



MEAN  
DECLINATION  
1978



### Smith Lake WPA

The first objective for Smith Lake WPA should be the exchange of tracts 17, 17a, and 22 (about 350 acres) for lands immediately north or south of the existing WPA (Figure 4). Additional land could be purchased near Smith Lake, but acquisition is a low priority for the following reasons.

1. Impoundment of water to create a 3-foot deep wetland upstream would require the purchase of about 1,000 acres of land 3-4 miles upstream from 17 landowners.
2. Ashley Creek is presently over-appropriated and water rights would have to be purchased to allow development.
3. The waterfowl production potential on Smith Lake is only fair - FWS recorded 57 duck pairs in 1985 and 154 in 1986. For 1986, this represents .1 pairs per acre of wetland.

Acquisition of 590 acres on the north end and 1,000 acres on the south end would round out the Smith Lake WPA. Acquisition of land to the south would allow construction of a low dike and impoundment of about 800 acres of water up to 3 feet deep. Water rights would have to be acquired from existing users or the MDFWP. A letter from the Director, MDFWP, to the FWS Regional Director indicates that up to 11,448 acre-feet of water from Ashley Reservoir may be available. MDFWP is evaluating their storage rights and fishery values for Ashley Reservoir. Preliminary information suggests MDFWP may relinquish their rights because of high maintenance costs and low fishery value. If some of that water can be acquired by BPA, an impoundment should be built on the south end of the Lake.

Because of the reasons mentioned above, acquisition and development at Smith Lake should be accomplished only by BPA or entities other than the FWS.

### Swan River NWR

Tract 12a (71 acres) on the attached map should be acquired first to round out the best habitat remaining within the authorized boundary (Figure 5). The remaining 10 tracts are primarily forested and a lower priority for the refuge. Tracts 1, 1a and the northern portion of 1b are under Forest Service jurisdiction, but managed by the FWS under provisions of a Memorandum of Understanding. The rest of Tract 1b and 1c are managed by The Forest Service. Six tracts (534 acres) are privately owned and should be purchased to round out the refuge. Because of Swan River's unique habitat and pristine setting, the FWS should use Land and Water Conservation Fund monies for acquisition. The area is also a good candidate for BPA funding for waterfowl and grizzly bear mitigation.

# SWAN RIVER NATIONAL WILDLIFE REFUGE

LAKE COUNTY, MONTANA

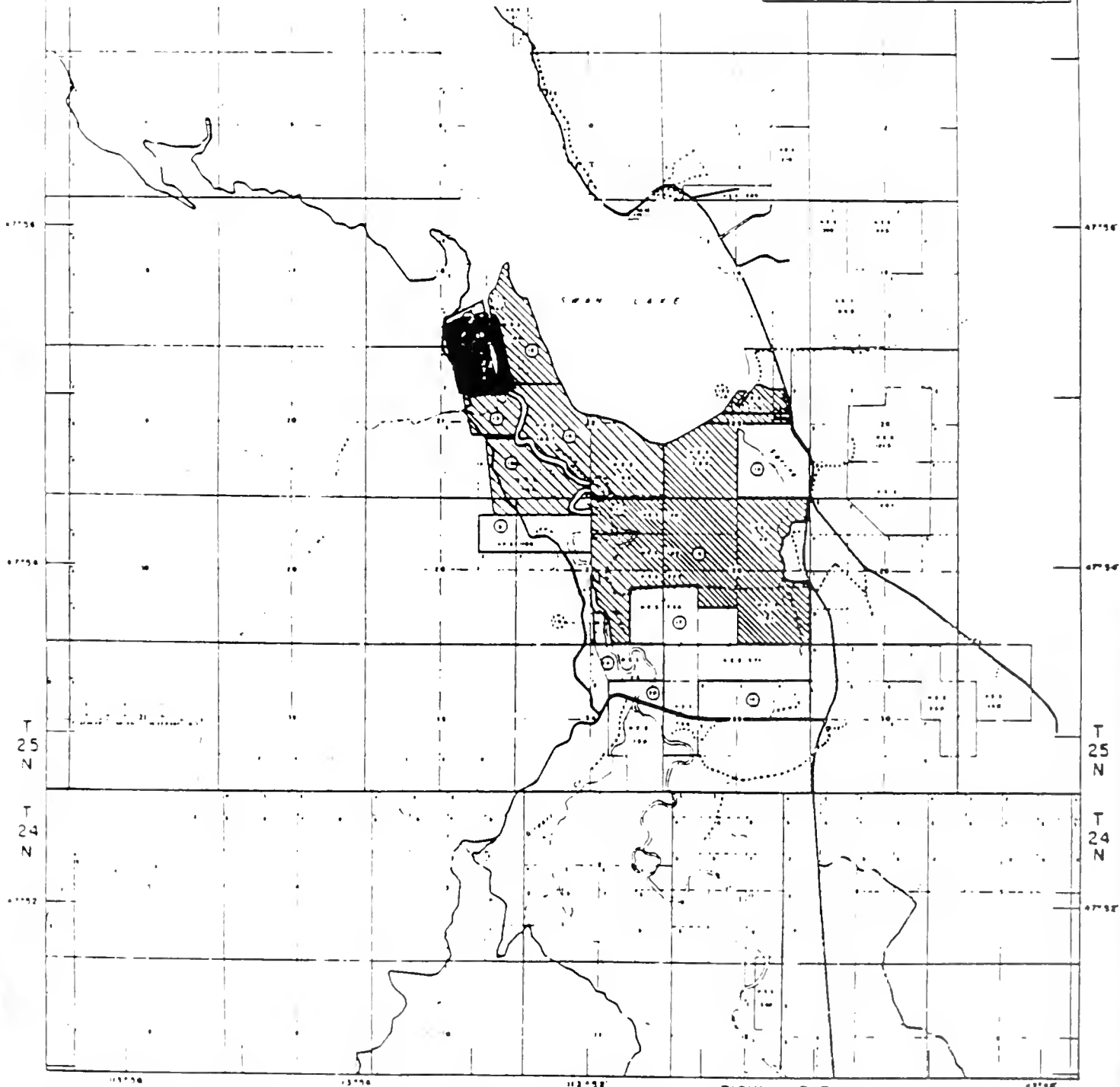
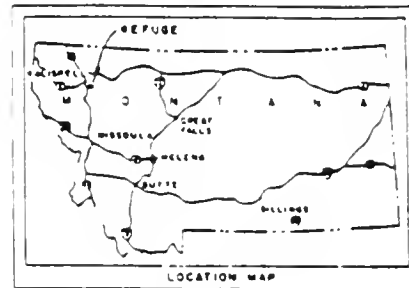
NEED STAFFS  
DEPARTMENT OF THE INTERIOR  
1936

FISH AND WILDLIFE SERVICE  
R18W R17W

LEGEND

- TRACT NUMBER
- ▭ TRACT BOUNDARY
- ▨ ACQUIRED AREA

## FIGURE 5



COMPILED IN SURVEYS AND MAPS FROM SURVEYS BY THE BLM AND USGS

PRINCIPAL MERIDIAN MONTANA

## Flathead WPA

No additional land should be purchased at Flathead WPA (Figure 6); however, the area should be improved for goose production and brood survival. Presently, goose broods have limited ability to move because of driftwood accumulation and heavy cattail growth. Channels should be constructed from open beach areas to an old dike that borders the uplands. Channels should be 150 to 300 feet long and up to 100 feet wide. Pilings should be driven near the entrance of the channels to minimize driftwood movement into the brood areas.

There is also a need for nesting structures but because of their low cost and the willingness of local conservation groups to install them, they do not need special attention in this report.

### ESTIMATED COST FOR ACQUISITION

Cost for land acquisition of WPA's Smith Lake and Swan River lands (5973 acres) would be \$8 million based upon recent land sales in the area. Cost for enhancement-type projects are unknown since engineering designs and estimates were not done.

### SOURCES OF FUNDING

Funding for acquisition or improvement can come from three major sources; Migratory Bird Conservation Fund (MBCF), Land and Water Conservation Fund (LWCF), and Bonneville Power Administration (BPA) mitigation funds.

WPA tracts, except for Smith Lake, should be purchased with MBCF or BPA monies. Acquisition and development at Smith Lake should be funded by BPA or private organizations.

Swan River NWR was authorized as a migratory bird refuge and therefore qualifies for MBCF money. Because of its primitive characteristics and limited waterfowl productivity, the FWS should seek LWCF and BPA funding to acquire additional land there.

Habitat improvement projects on Flathead WPA should be funded by BPA or private organizations. Limited money for such projects in the FWS makes them low priority in Region 6 because many other refuges have greater waterfowl use and productivity.



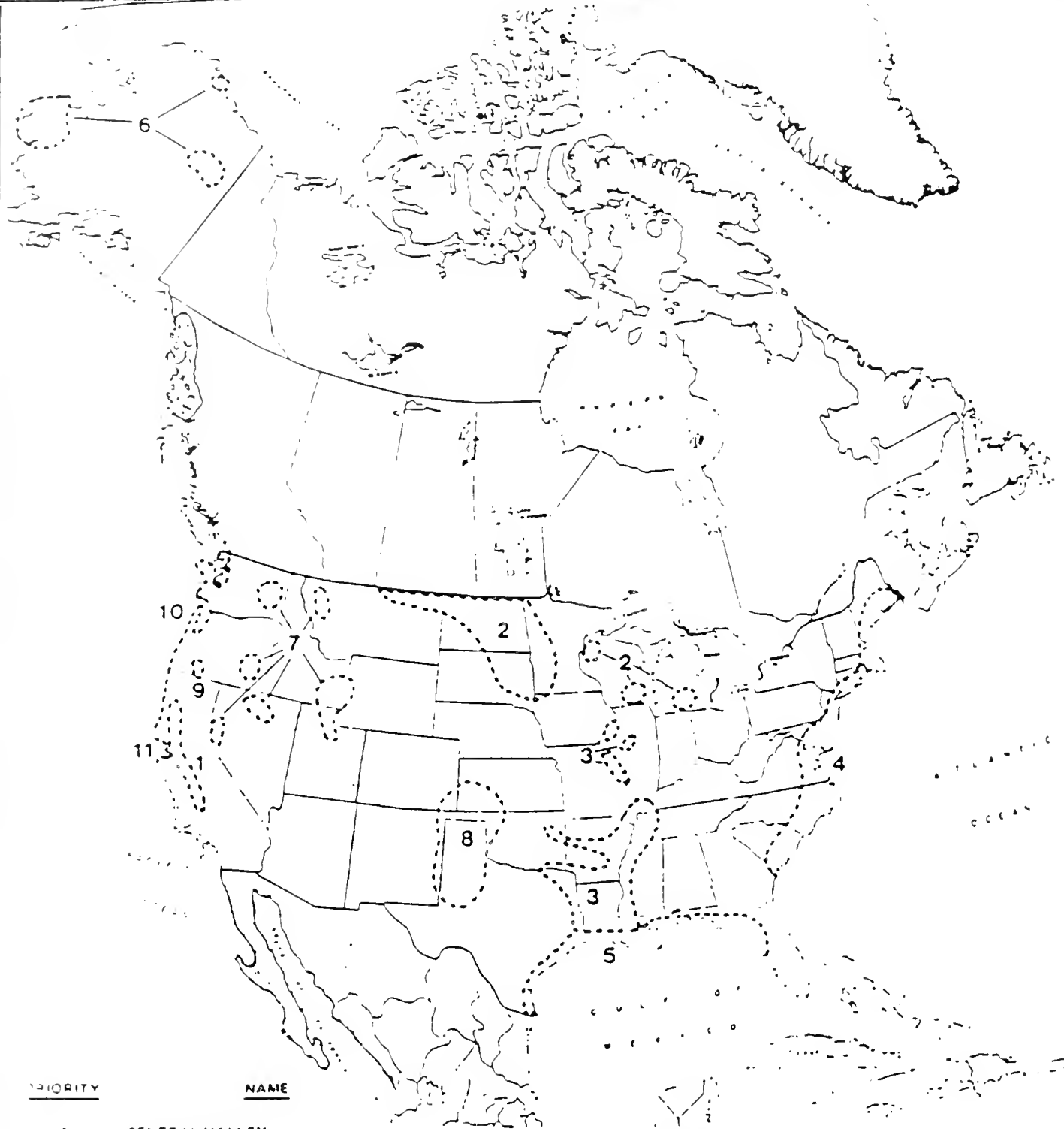
#### REFERENCES CITED

- Belrose, Frank C. 1976. Ducks, Geese and Swans of North America. Stackpole Books, Harrisburg, Pennsylvania. 543 p.
- Cowardin, Lewis M.; Carter, Virginia; Golet, Francis; and LaRoe, Edward. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Washington, D.C., FWS/OBS-79/31, 103 p.
- Lokemoen, J. T. 1966. Breeding Ecology of the Redhead Duck in Western Montana. J. Wildlife Management 30 p. 668-681.

Appendix 1

MOHAWA WETLAND ACQUISITION SUMMARY

County	FWS GOAL ACRES		GOVERNOR'S APPROVED ACRES		
	Fee	Easement	Approval Date	Easement	Approval Date
Blaine	3,000	4,000	06/05/80	Blanket	04/18/75
Cascade	2,000	2,000	06/05/80	---	---
Chouteau	2,500	2,000	06/05/80	"	04/18/75
Daniels	1,646	2,000	06/25/68	"	10/21/80
Flathead	6,236	1,000	06/05/80	"	08/11/76
Glacier	2,096	4,234	11/17/69	"	10/21/80
Golden Valley	2,000	500	08/20/79	"	08/20/79
Hill	1,000	1,000	06/05/80	"	04/18/75
Lake	2,560	2,000	06/05/80	"	08/11/76
Lewis and Clark	500	1,000	04/28/76	"	10/21/80
Liberty	2,000	4,428	04/28/76	"	10/21/80
Musselshell	2,000	500	04/28/76	"	08/20/79
Petroleum	1,000	---	06/05/80	---	---
Phillips	4,000	5,000	08/11/76	"	08/11/76
Pondera	2,000	3,601	08/11/76	"	04/18/75
Powell	1,300	1,000	06/05/80	"	10/21/80
Roosevelt	2,180	2,000	06/25/68	"	10/21/80
Sheridan	11,370	11,198	06/25/68	"	10/21/80
Stillwater	2,000	500	08/20/79	"	08/20/79
Teton	2,251	2,050	06/05/80	"	04/18/75
Toole	4,675	7,013	06/05/80	"	04/18/75
Valley	1,000	500	04/28/76	"	04/18/75
Wibaux	1,000	---	08/11/76	"	11/16/79
Yellowstone	3,000	500	08/20/79	---	---
TOTAL	63,314	58,024			08/20/79



PRIORITY

NAME

- 1 CENTRAL VALLEY
- 2 PRAIRIE POTHoles AND PARKLANDS
- 3 BOTTOMLAND HARDWOODS
- 4 ATLANTIC COASTAL PLAIN
- 5 GULF COAST
- 6 ALASKA AREAS
- 7 INTERMOUNTAIN WEST
- 8 PLAYA LAKES
- 9 KLAMATH BASIN
- 10 UPPER PACIFIC COAST
- 11 SAN FRANCISCO BAY

**APPENDIX 2**

**RECOMMENDED WATERFOWL HABITAT  
ACQUISITION AREAS\*  
January 1985**

\* Area delineations are general.

Appendix 3

Delineations of Small WPA Tracts



WETLANDS ACQUISITION PROPOSAL

State Montana County: Flathead T. 27 N. R. 21 W Sec. 1  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shore		X	
Adj Wetland Complex		X	
Interspersion Emgt. Veg.		X	
Dabbler Potential		X	
Oliver Potential		X	
Emergent Vegetation (Species)	<u>Typha sp. Scirpus acutus</u>		
Sub. Veg (Species)	<u>unk.</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>local - maybe groundwater</u>		
Ease of Drainage	<u>Moderate - pumping</u>		
Adjacent Land Use	<u>cropland</u>		
Susc. to Erosion	<u>moderate to low</u>		
Soils			

Development Possibilities

Wetlands in Proposal	(Type (No. (Acres	PSMF	TOTAL
		1 36	

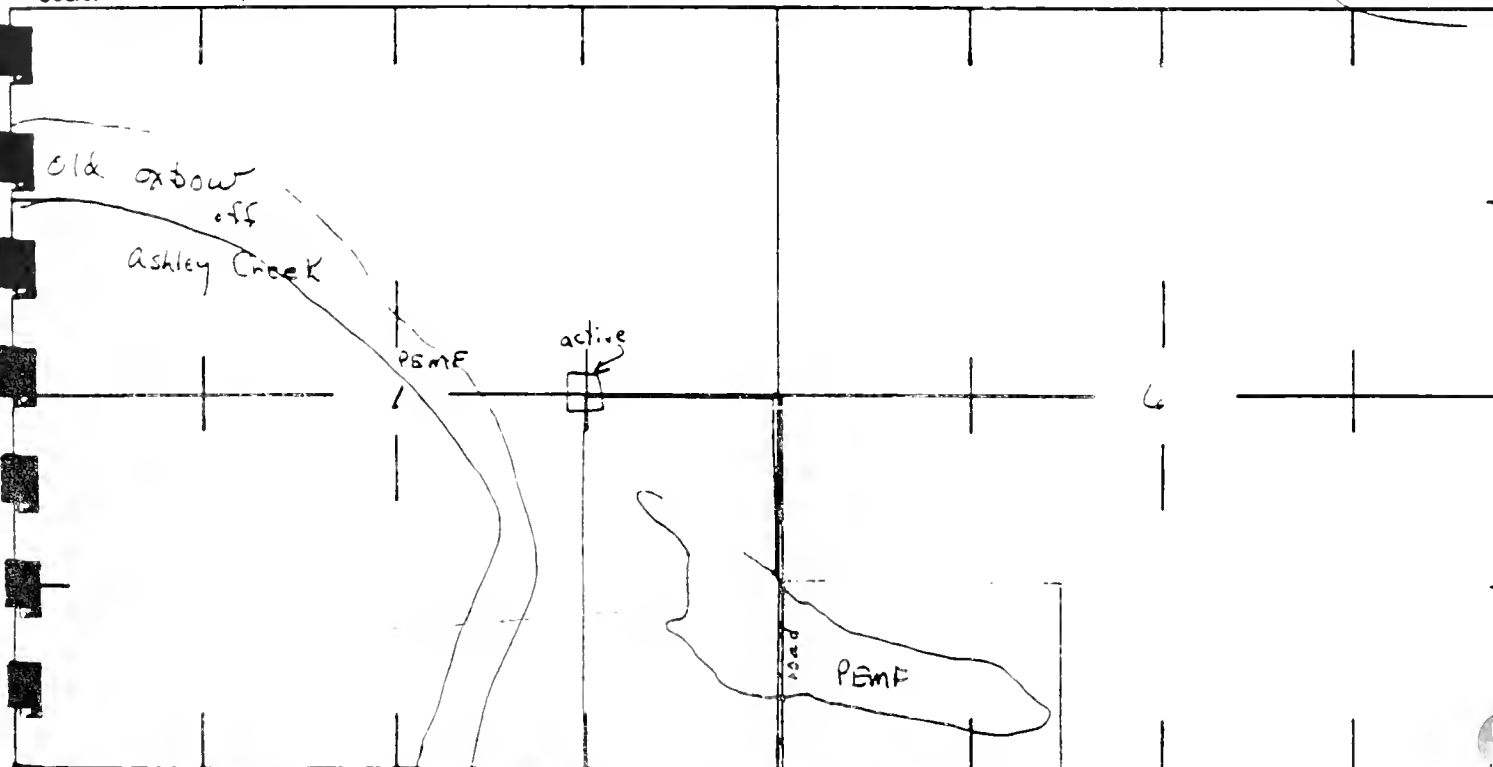
Comments:

- Typical semipermanent brood marsh
- Good wetland to west
- too small for much hunting potential

Score = 8  
 Scale: 4 inches equal 1 mile

170 acres

(26 2/3)



Date Examined 4-2-86 By William Washak Realty Check Date \_\_\_\_\_ By \_\_\_\_\_



WETLANDS ACQUISITION PROPOSAL

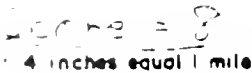
State Minnesota County Ft. Snodgrass T. 29 N. R. 22 W. Sec. 14, 15  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Twp \_\_\_\_\_

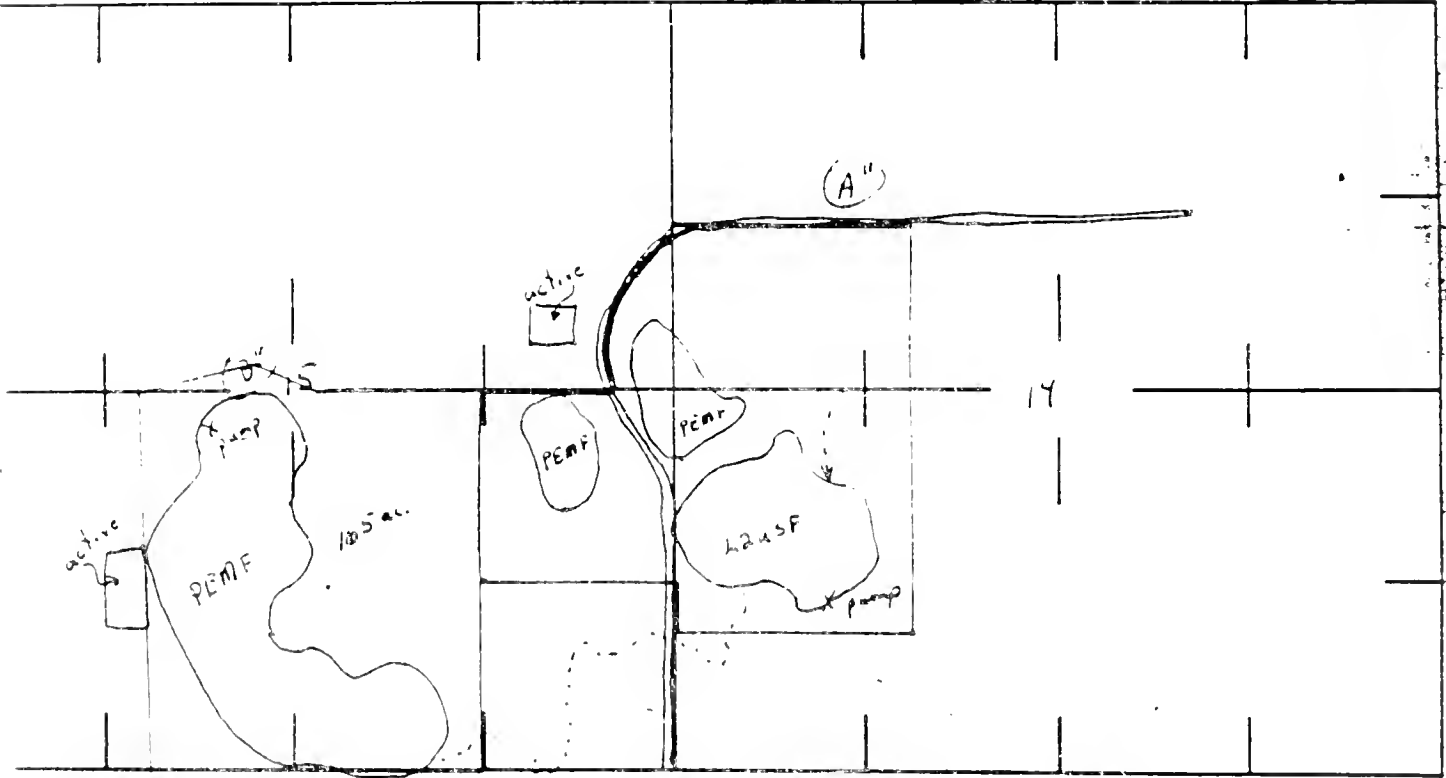
DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shags		X	
Adj. Wetland Complex		X	
Interspersion Emgt. Veg.			X
Dabbler Potential		X	
Diver Potential		X	
Emergent Vegetation (Species)	<u>Typha sp ; Scirpus acutus</u>		
Sub Veg (Species)	<u>Grass</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>Local Runoff</u>		
Ease of Drainage	<u>Pumping only</u>		
Adjacent Land Use	<u>Cropland</u>		
Susc. to Erosion	<u>Uplands - Moderate</u>		
Soils			

Development Possibilities "B" could support an island

	(Type)	LAUSF	PEMF	TOTAL
Wetlands in Proposal	(No.)	1	3	
	(Acres)	21	68	

- Comments:
- Good interspersion of emergents on "B"
  - Pumps for irrigation present
  - "B" could be acquired separately or as one unit
  - Boundary Flexible

Scale =  330 acres (27% wet)



Examined 4-5-86 By Wittmick Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State MONTANA County FLATHEAD T. 27N R. 19W Sec 1

Aerial Photo No. \_\_\_\_\_ Date of Photo. \_\_\_\_\_ Two

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape	X		
Adj. Wetland Complex	X		
Interspersed Emgl Veg		X	
Dabbler Potential		X	
Diver Potential			X
Emergent Vegetation (Species)	<u>TYPHA (SPP.) SCIRPUS (SPP.) POTAMOGETON (SPP.); PHALARIS (SPP.)</u>		
Sub Veg (Species)			
Water Qualities	<u>FRESH</u>		
watershed	<u>MIX. RAINF</u>		
Flow of Drainage	<u>2.5 mi. moderate channel - could be changed for minor irrigation purposes</u>		
Adjacent Land Use	<u>TIMBER LAND &amp; FARMING</u>		
Suscept to Erosion	<u>MIDSEVERE</u>		
Soils			

Development Possibilities

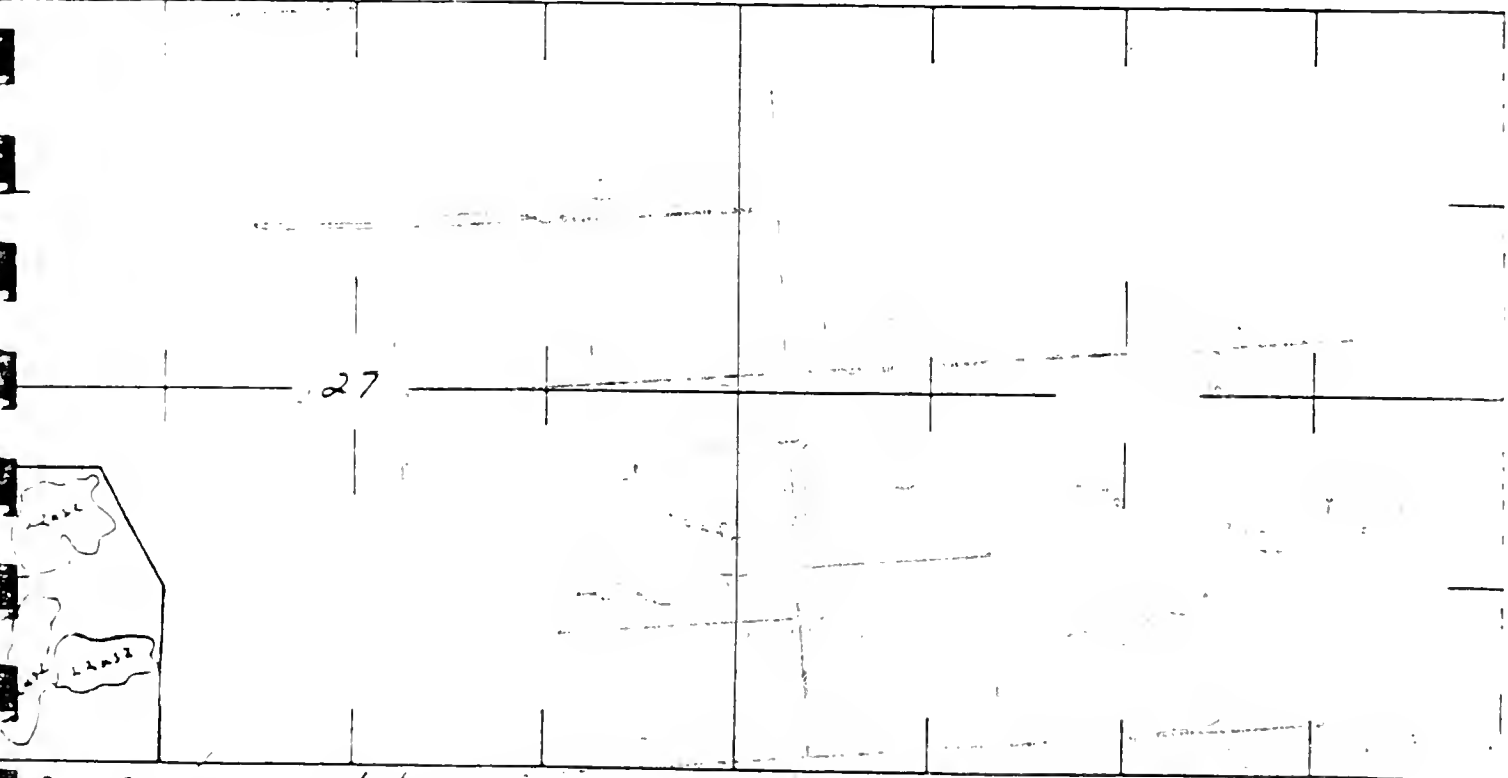
(Type 22432 + AGF + PLC + D + \_\_\_\_\_ TOTAL  
 Wetlands in Proposal (No. \_\_\_\_\_ (Acres 21.2)

Comments

TOTAL ACRES - 54  
 NET ACRES - 21.2  
 39% NET  
SCORE - 8

VERY GOOD WETLAND complex - additional wetlands within 1 mi radius - area has received various use in 1985 & 1986 - with production of teal & various other birds & mammals - that 35 lies adjacent to the wetland side - the area does have houses in it

Scale: 4 inches equal 1 mile



Date Examined 6/3/76 By R. Washburn Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State: Montana County: Flathead T. 29 N. R. 22 W. Sec. 22  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Twp \_\_\_\_\_

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shore		X	
Adj. Wetland Complex		X	
Interspersion Emgt. Veg.		X	
Debtler Potential		X	
Diver Potential		X	
Emergent Vegetation (Species)	<u>Typha sp. ; Scirpus sp.</u>		
Sub. Veg. (Species)	<u>unk.</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>Local</u>		
Ease of Drainage	<u>By Pumping</u>		
Adjacent Land Use	<u>Cropland / Pasture</u>		
Susc. to Erosion	<u>Moderate on uplands</u>		
Soils			

Development Possibilities

Wetlands in Proposal	(Type No. Acres)	PEN F	TOTAL
		2	
		36	

Comments:

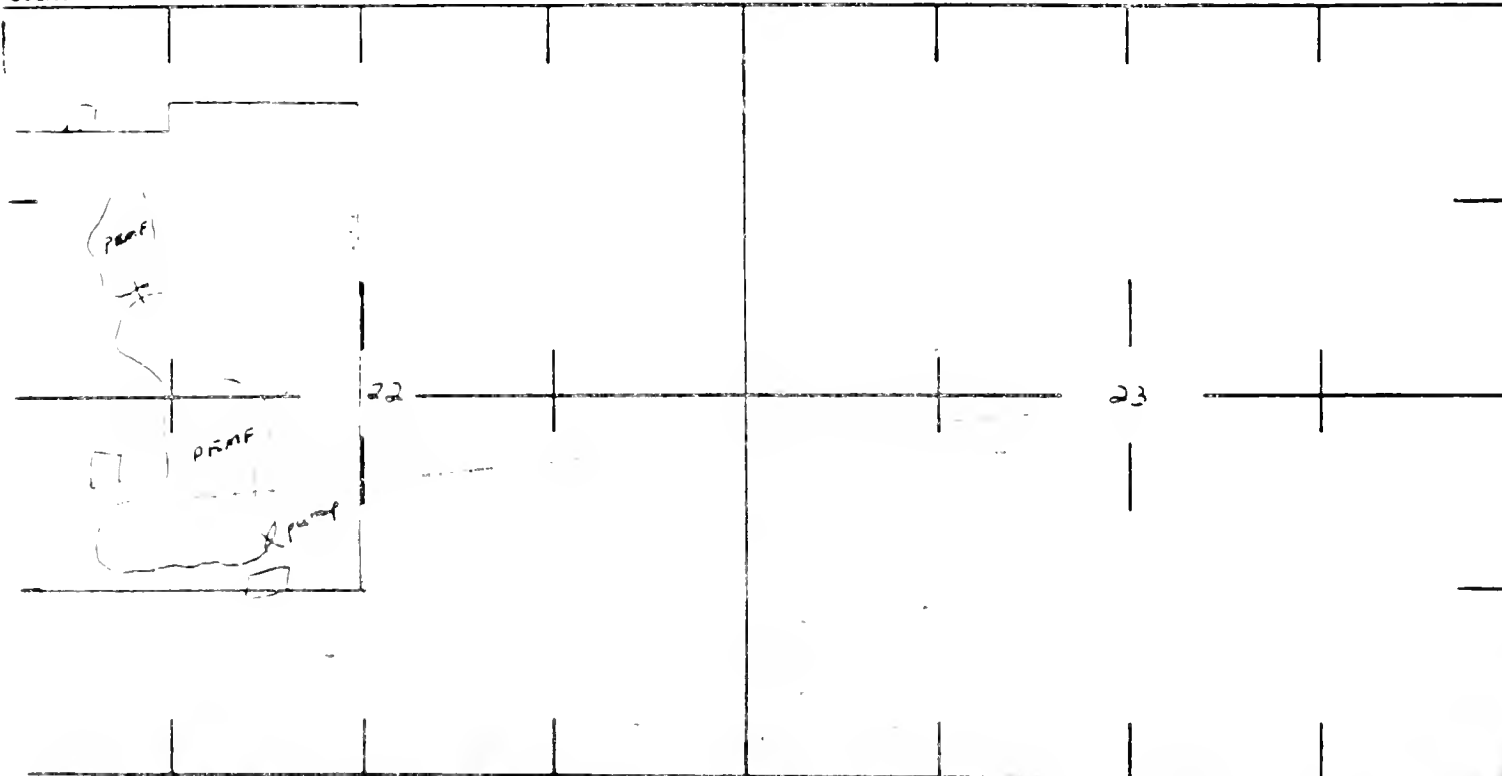
- Pump may be active
- Boundary flexible around home sites

→ COKE = S

195 acres

18% wet

Scale: 4 inches equal 1 mile



Date Examined 7-3-86 By Wittmer Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State: Montana County: LAKE T. 20 N R. 20 W Sec. 23  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Twp \_\_\_\_\_

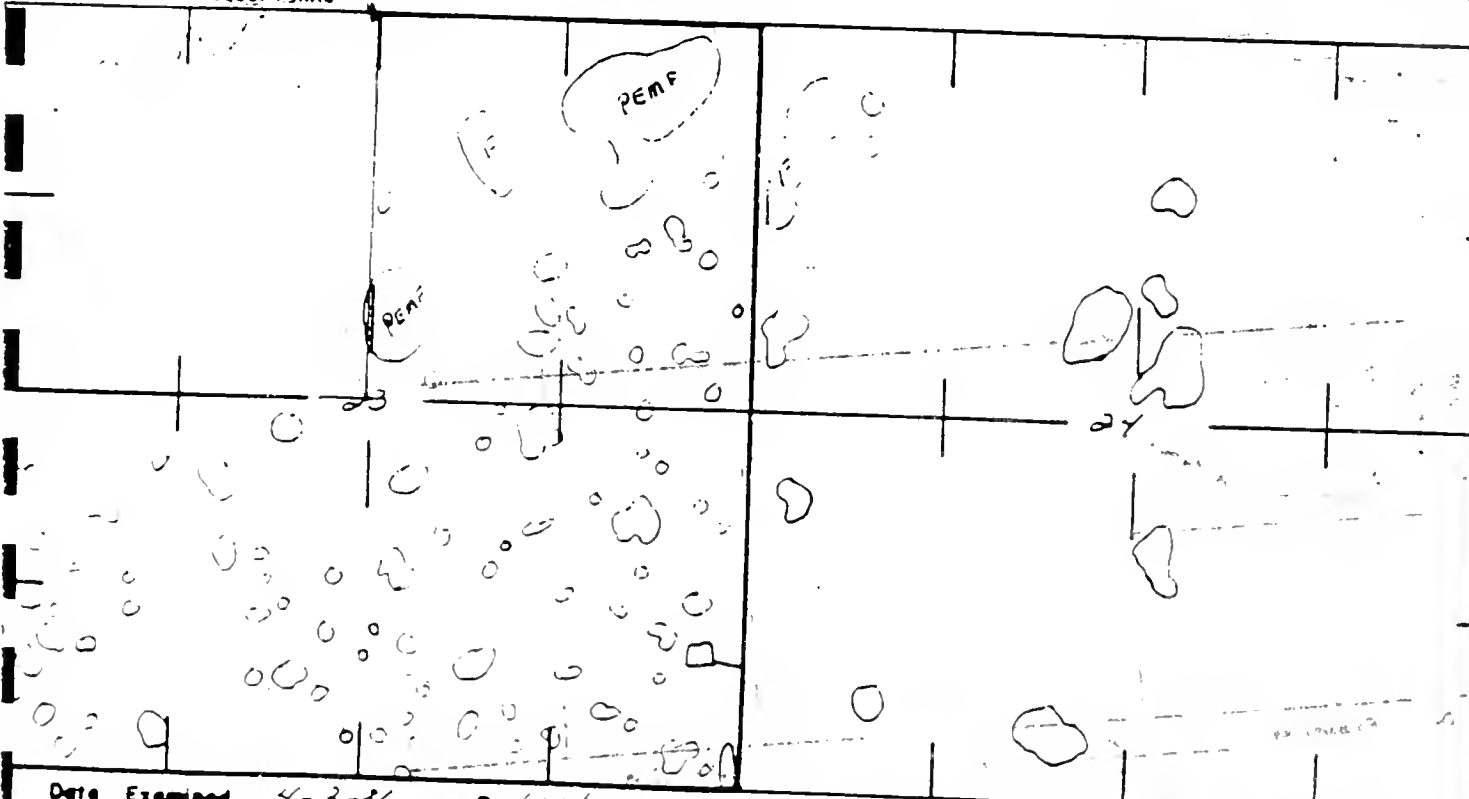
DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shrub	X		
Adj. Wetland Complex	X		
Interspersion Emgt. Veg.	X		
Dabbler Potential	X		
Diver Potential		X	
Emergent Vegetation (Species)	<u>Typha sp.; Scirpus sp.</u>		
Sub. Veg. (Species)	<u>UNK</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>Local</u>		
Ease of Drainage	<u>Moderate</u>		
Adjacent Land Use	<u>Pasture / Cropland</u>		
Susc. to Erosion	<u>Moderate</u>		
Soils			
Development Possibilities			

Wetlands in Proposal	(Type No. Acres)	All Types approx. 90	TOTAL
		approx. 70	

Comments:  
 - Excellent complex  
 - High density of basins to east and south  
 - Good brood water

Scale = 10.5  
 Scale: 4 inches equal 1 mile

480 acres 15% we



Date Examined 4-3-86 By W. Smith Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State Montana County Flathead T. 29 N. R. 20 W Sec. 27, 28  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Twp \_\_\_\_\_

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape	X		
Adj. Wetland Complex		X	
Interspersion Emgt. Veg.	X		
Sabotier Potential	X		
Oliver Potential	X		
Emergent Vegetation (Species)	<u>Sagurus Ac, Typha</u>		
Sub Veg (Species)	<u>uak.</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>local w/ good supply</u>		
Case of Drainage	<u>by pumping, moderate</u>		
Adjacent Land Use	<u>pasture / crop</u>		
Risk to Erosion	<u>low</u>		
Soils			
Development Possibilities	<u>Islands possible</u>		

Wetlands in Proposal	(Type V)	PEMF III	I	TOTAL
(No.)				
(Acres)		<u>114</u>		

Comments

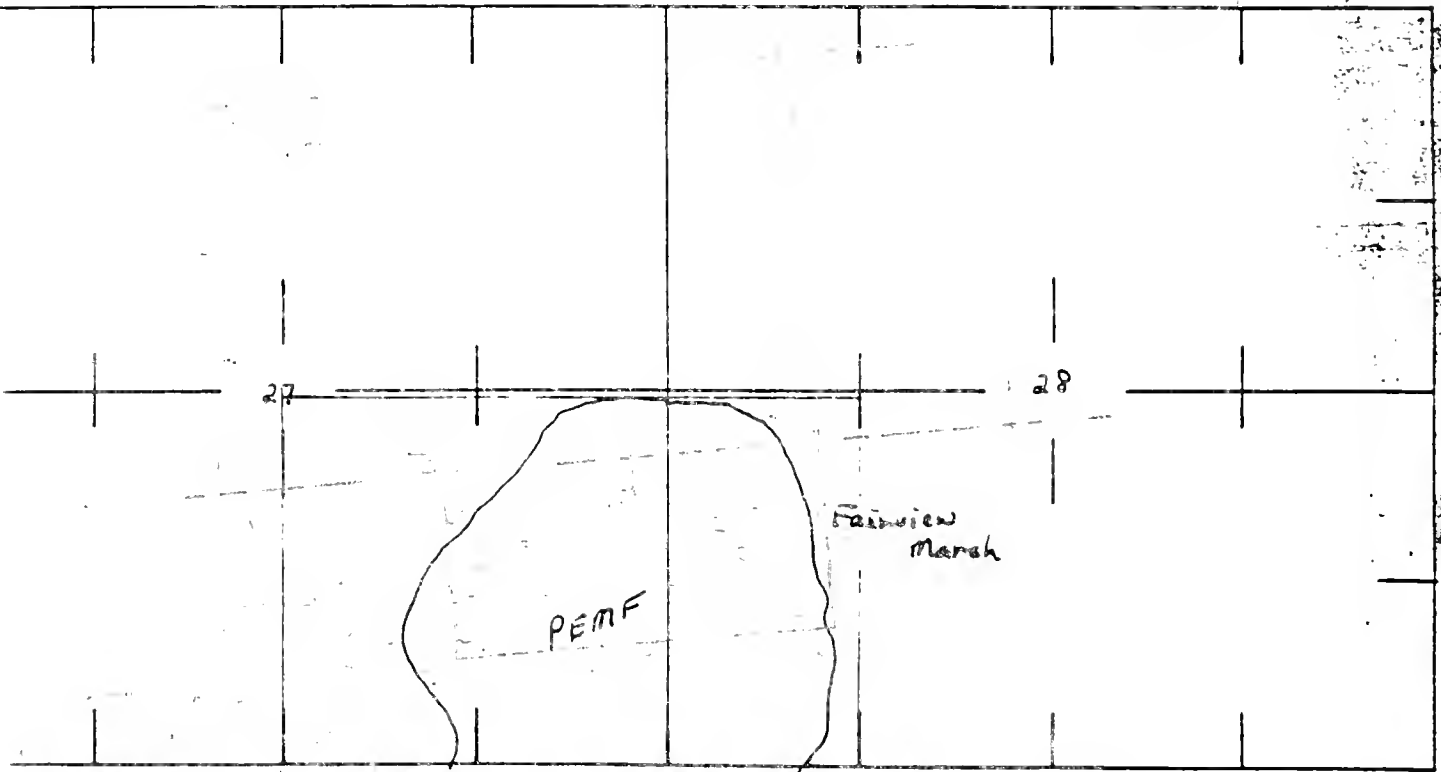
Excellent wetland  
 many hunting blinds present

Score = 10

4 inches equal 1 mile

360 acres

31% wet



Examined By: \_\_\_\_\_ Realty Check Date: \_\_\_\_\_ By: \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State Montana County: LAKE T. 20N R. 20W Sec. 25  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Top \_\_\_\_\_

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape	X		
Adj. Wetland Complex	X		
Interspersion Emgt. Veg.	X		
Deleter Potential	X		
Diver Potential		X	
Emergent Vegetation (Species)	<u>Typha sp. ; Scirpus sp.</u>		
Sub. Veg. (Species)	<u>unk</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>Local</u>		
Ease of Drainage	<u>Moderate</u>		
Adjacent Land Use	<u>Pasture / Cropland</u>		
Susc. to Erosion	<u>Moderate</u>		
Soils			

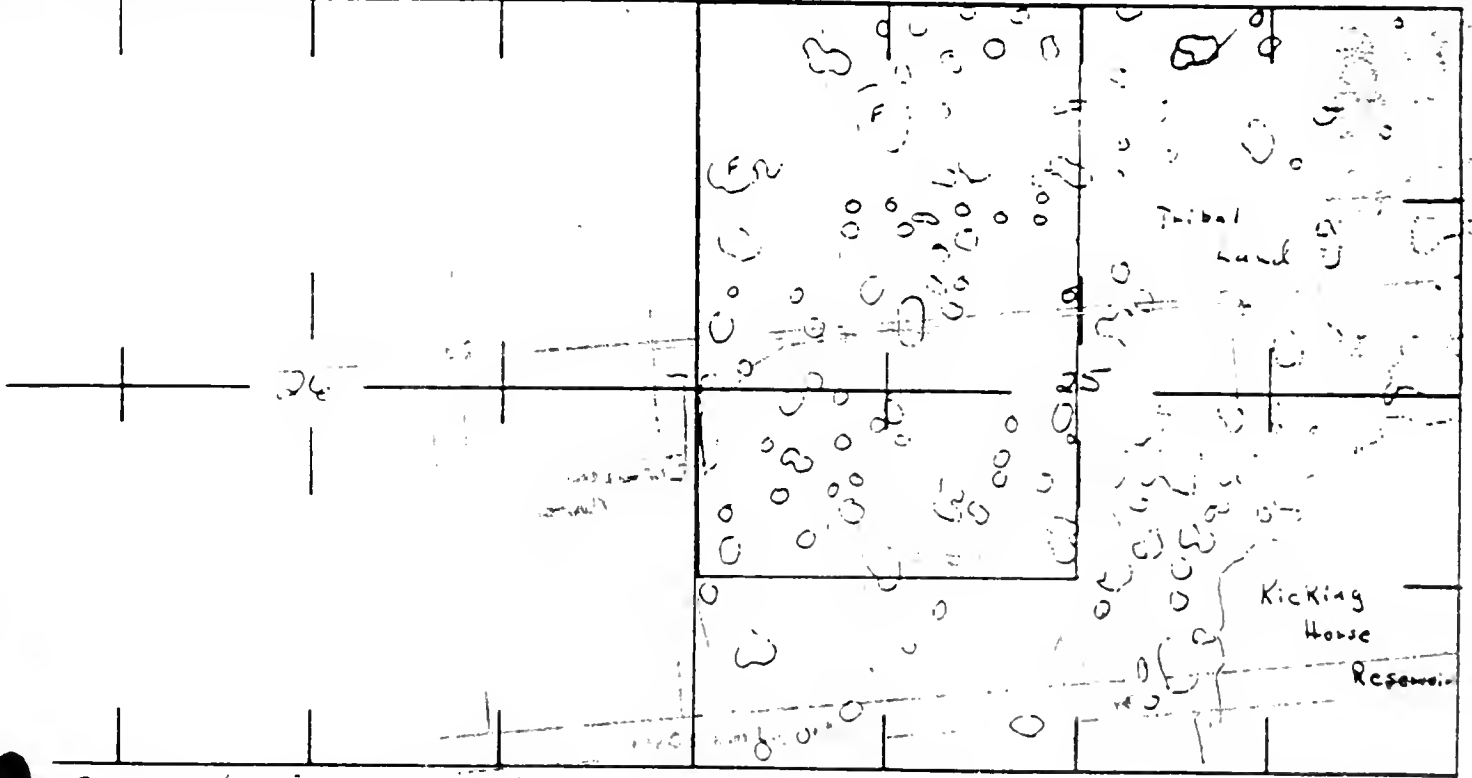
Development Possibilities

	Type	all	Types	TOTAL
Wetlands in Proposal	(No. Acres)	approx.	60	
Comments:		approx.	56	

- Trivial land on east side
- outstanding wetland complex
- Exact # bays/lacnes of wetlands uncertain w/o detailed field work
- Good Brood water

Scale = 11" = 246 acres  
 1" = 4 inches equal 1 mile

23 2/3 wet



Examined 4-3-86 By W. Smith Realty Check Date \_\_\_\_\_ By \_\_\_\_\_



WETLANDS ACQUISITION PROPOSAL

State Montana County Flathead T. 37 N R. 2 E Sec. 5  
 Aerial Photo No. \_\_\_\_\_ Date of Photo. \_\_\_\_\_

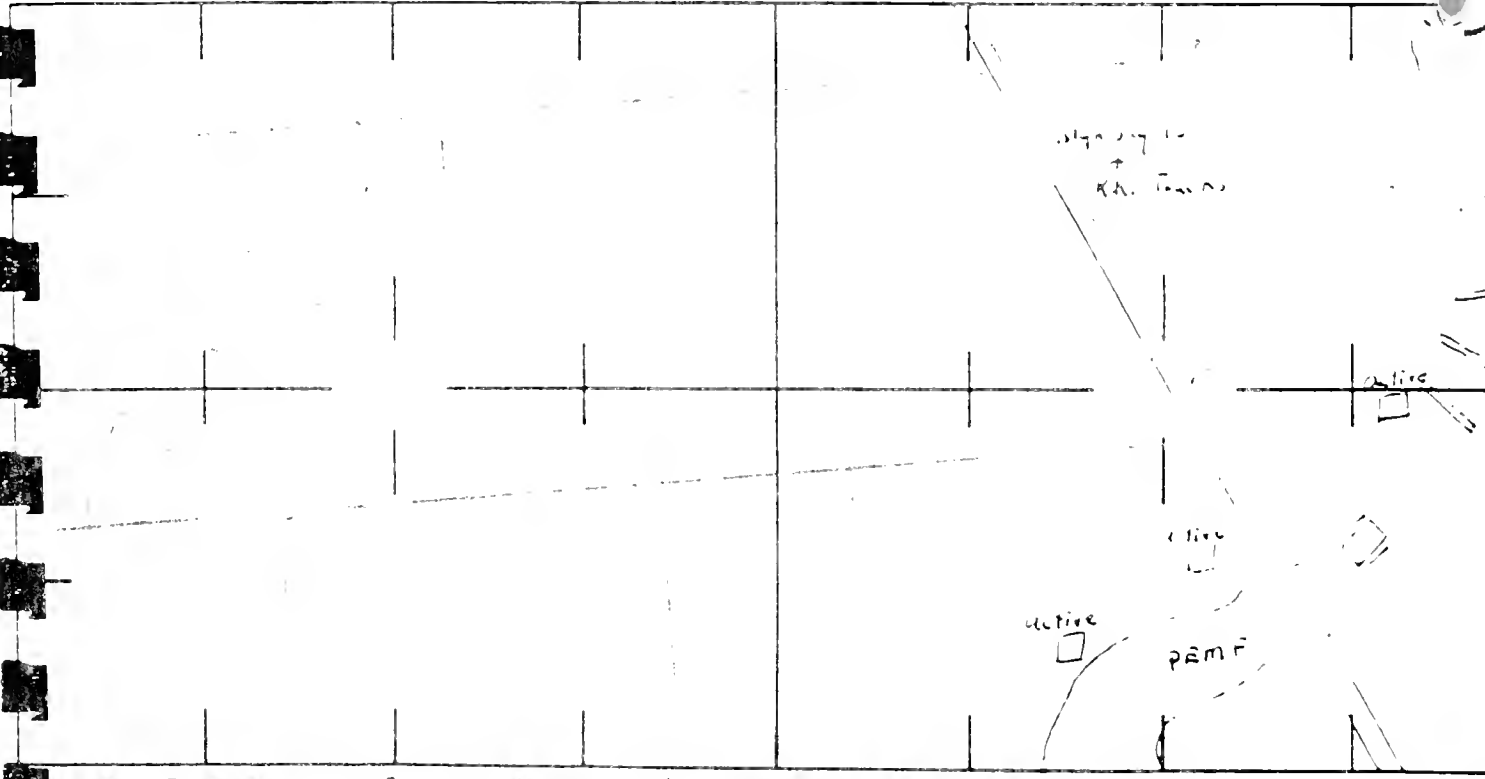
DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape			X
Adj. Wetland Complex		X	
Interspersion Emgt. Veg.		X	
Dabbler Potential		X	
Diver Potential		X	
Emergent Vegetation (Species)	<u>Polygonum Scirpus</u>		
Sub. Veg (Species)	<u>add</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>road exsett, may be ground water</u>		
Ease of Drainage	<u>Pumping only</u>		
Adjacent Land Use	<u>cropland</u>		
Susc. to Erosion	<u>low</u>		
Soils			

Development Possibilities

Wetlands in Proposal	(Type)	(No.)	(Acres)	TOTAL
	P&MF	1	117	

Comments  
No title - Easement best means of protection  
active residence

Scale: 4 inches equal 1 mile



Date Examined 4-2-80 By William J. ... Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

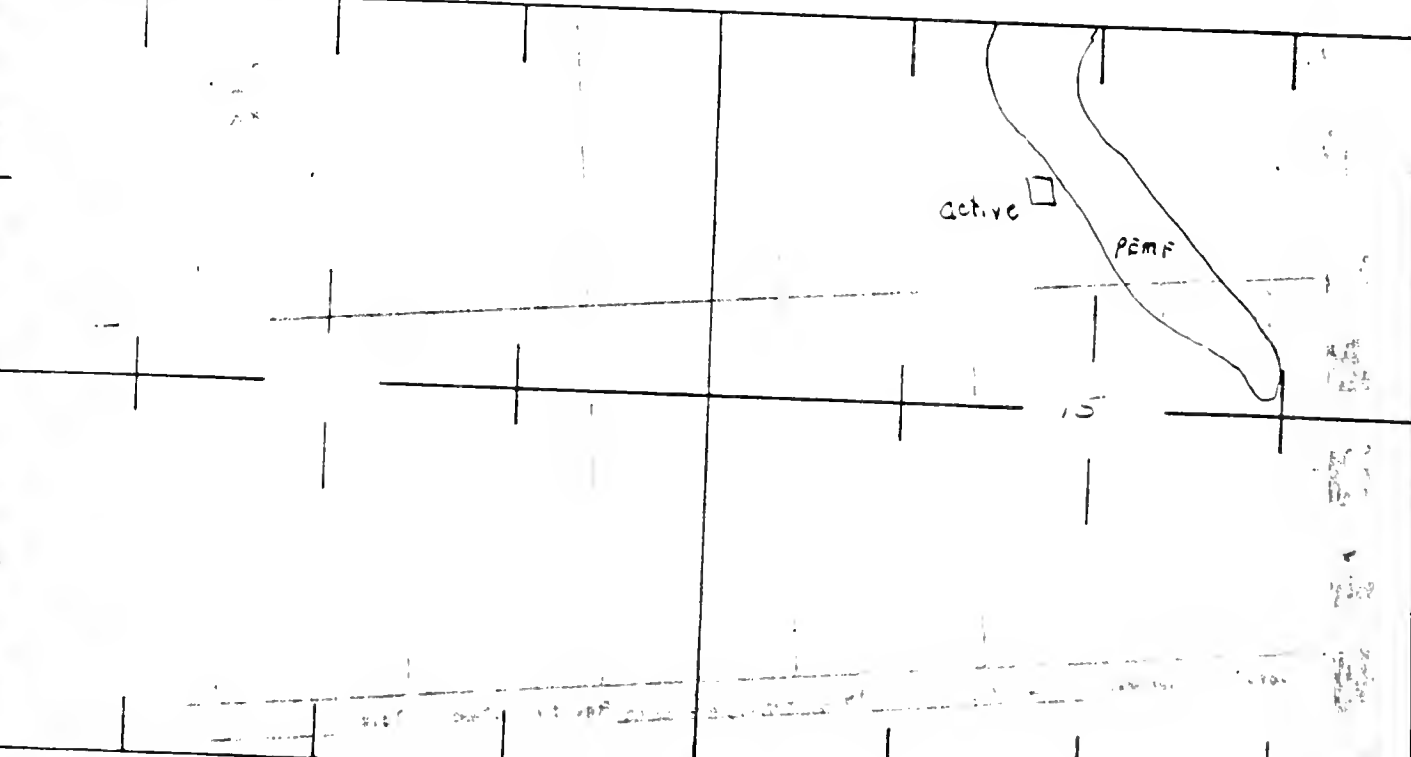
State Montana County: Flathead T. 27 N R. 21 W Sec. 15

Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape			
Adj. Wetland Complex			
Interspersion Emgt. Veg.			
Dabster Potential			
Oliver Potential			
Emergent Vegetation (Species)	<u>E. P. I</u>		
Sub. Veg (Species)			
Water Qualities			
Watershed			
Ease of Drainage			
Adjacent Land Use			
Susc. to Erosion			
Soils			
Development Possibilities			

Wetlands in Proposal	(Type No. Acres)	V	IV	III	I	TOTAL
<u>Comments</u>						

Scale: 4 inches equal 1 mile



Date Examined 4-2-86 By William J. Smith for Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State Illinois County Madison T. 7 N R. 21 W Sec 3  
 Aerial Photo No. \_\_\_\_\_ Date of Photo. \_\_\_\_\_ Twp \_\_\_\_\_

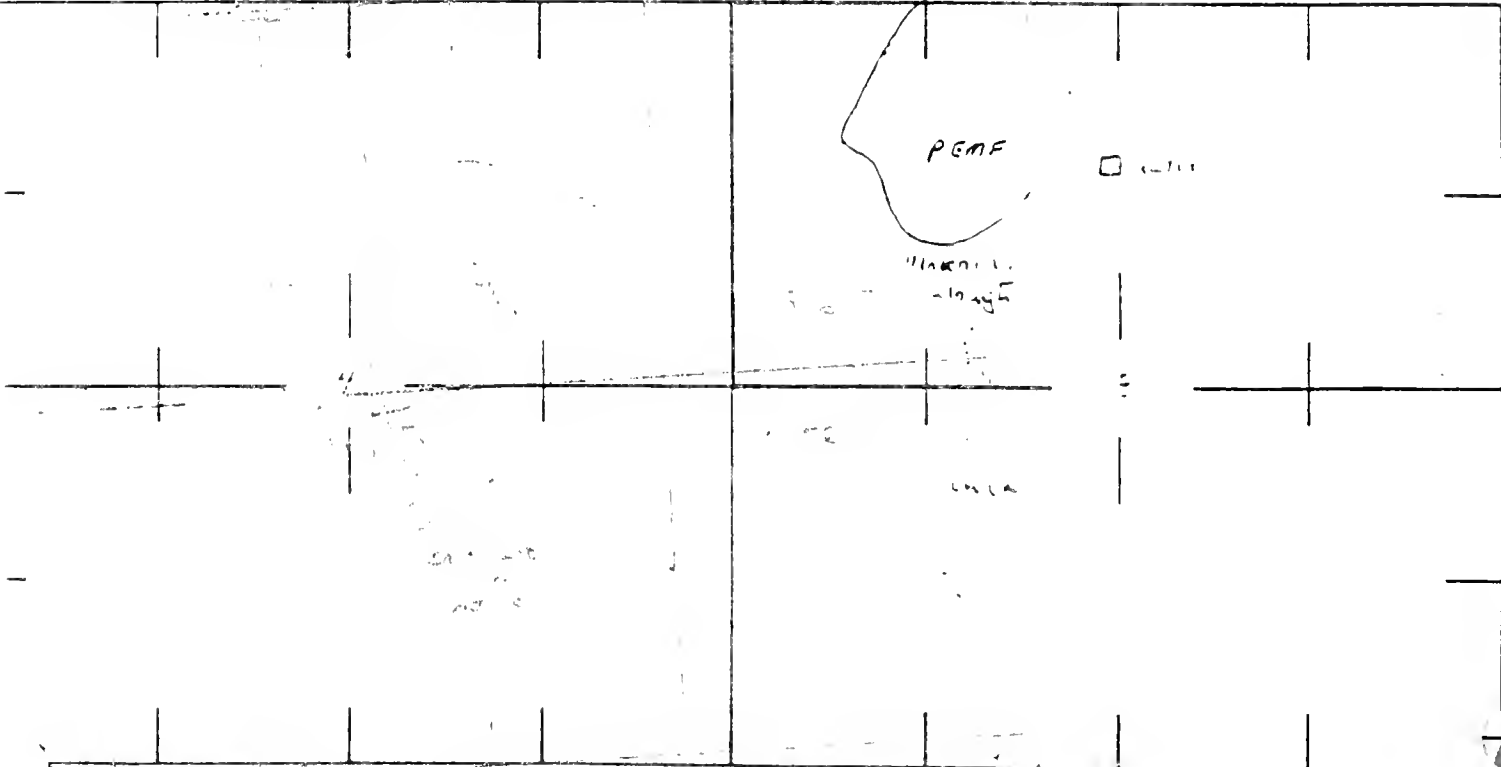
DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape	X		
Adj. Wetland Complex			X
Interspersion Emgt Veg.		X	
Dabbler Potential		X	
Diver Potential		X	
Emergent Vegetation (Species)	mostly <u>Scirpus americanus</u> sp.		
Sub. Veg. (Species)	<u>None</u>		
Water Qualities	<u>Good</u>		
Watershed	<u>Local, may have ground water</u>		
Ease of Drainage	<u>only by pumping</u>		
Adjacent Land Use	<u>timber, timber</u>		
Susc. to Erosion	<u>Low</u>		
Soils			

Development Possibilities stand possible but dam may be too small

Wetlands in Proposal	(Type)	(No.)	(Acres)	TOTAL
	PEMF	1	44	

Comments: adjacent wetland complex  
possible use of water treatment and active residences

Score = 7 150 acres max. 29% wet  
 Scale: 4 inches equal 1 mile



Date Examined 7-1-86 By Stratton/Johnson Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

27-20 Sect 7

State Illinois County Franklin T. 27 N R. 20 W Sec. 33

Aerial Photo No. \_\_\_\_\_ Date of Photo. \_\_\_\_\_

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape		X	
Adj. Wetland Complex		X	
Interspersion Emgt. Veg.		X	
Dabbler Potential		X	
Diver Potential		X	
Emergent Vegetation (Species)	<u>Typha sp., Scirpus sp.</u>		
Sub Veg (Species)	<u>...</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>...</u>		
Ease of Drainage	<u>...</u>		
Adjacent Land Use	<u>Cropland</u>		
Susc. to Erosion	<u>Low</u>		
Soils			
Development Possibilities			

Wetlands in Proposal	(Type)	(No.)	(Acres)	TOTAL
	PERM	1	64	64

Comments

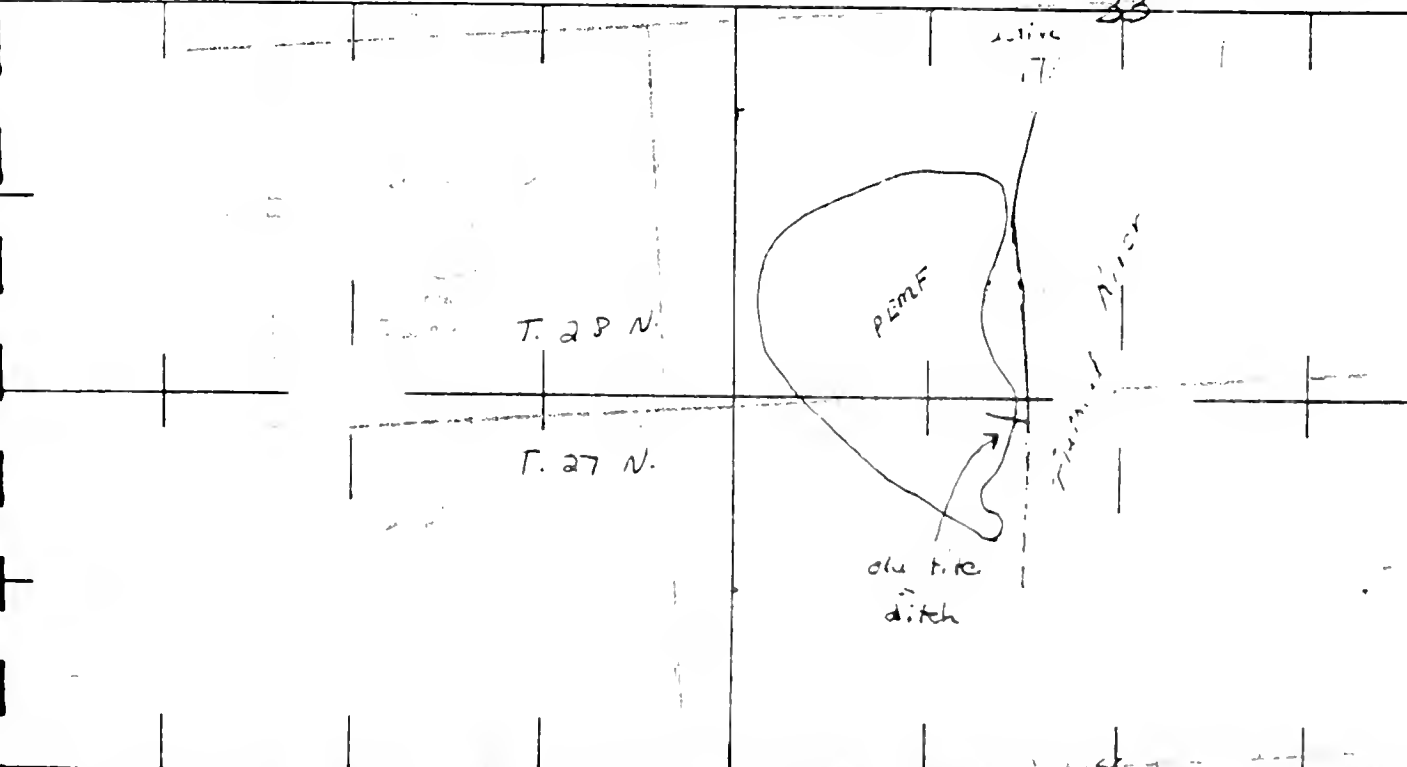
- The area is a former wetland and is not effective now  
 - some of the area is now

Scale = 7

Scale: 4 inches equal 1 mile

180 acres

35%



Date Examined 4-2-80 By ... Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State Montana County: Flathead T. 29 N R. 20 W Sec. 32, 33

Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Twp \_\_\_\_\_

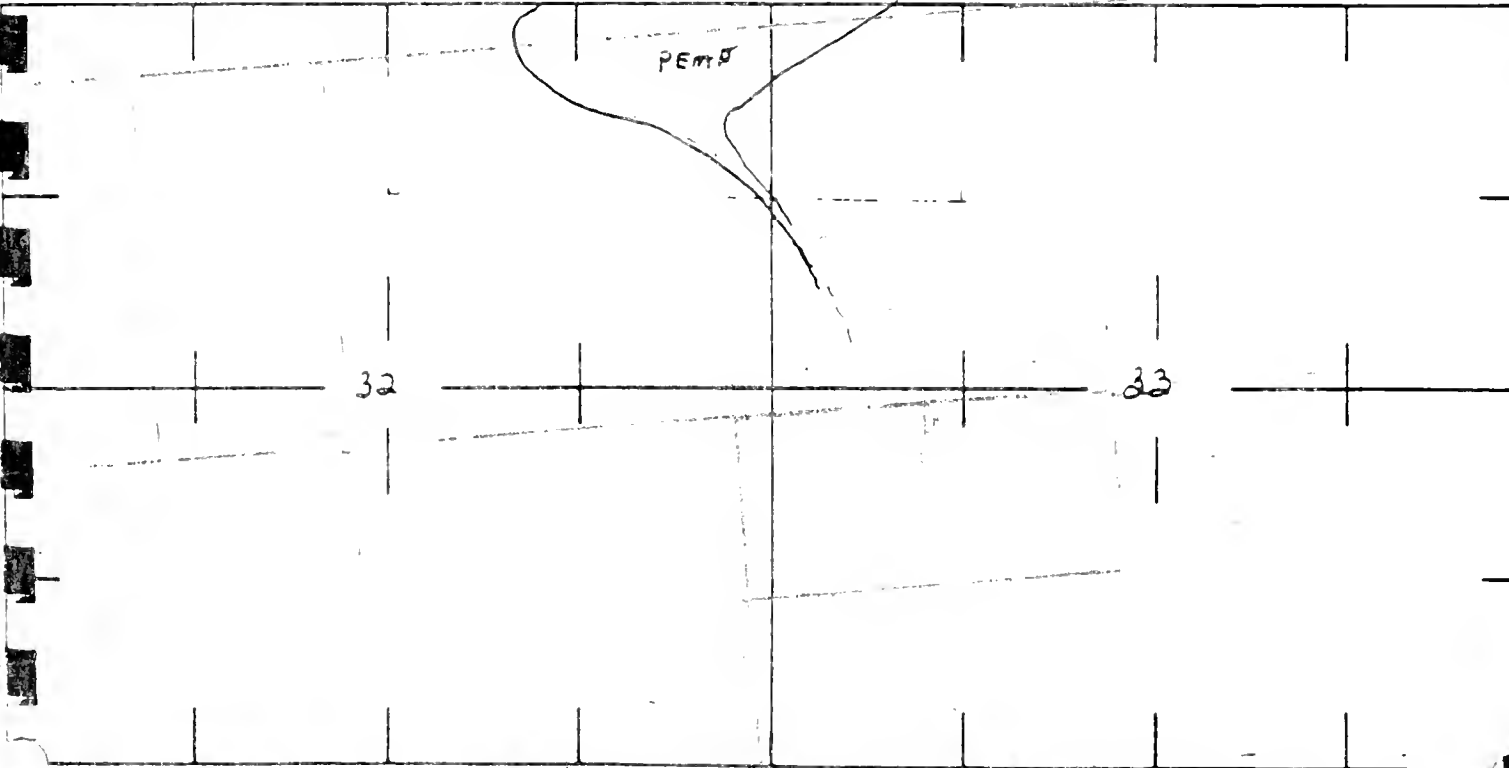
DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape			
Adj. Wetland Complex			
Interspersion Emgt. Veg.			
Dobbler Potential			
Diver Potential			
Emergent Vegetation (Species)			
Sub. Veg. (Species)			
Water Qualities			
Watershed			
Ease of Drainage			
Adjacent Land Use			
Susc. to Erosion			
Soils			

Development Possibilities \_\_\_\_\_

	(Type I)	(Type II)	(Type III)	(Type IV)	TOTAL
Wetlands in Proposal					

Comments \_\_\_\_\_

Scale: 4 inches equal 1 mile



Date Examined \_\_\_\_\_ By \_\_\_\_\_ Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State: Montana County: LEWIS T. 19 N. R. 20 W. Sec. 16  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shades		X	
Adk Wetland Complex		X	
Interspersion Emgt. Veg.		X	
Debris Potential		X	
Diver Potential			X
Emergent Vegetation (Species)	<u>Typha sp.</u>		
Sub. Veg. (Species)	<u>TNR</u>		
Water Qualities	<u>Fresh</u>		
Watershed	<u>Local</u>		
Ease of Drainage	<u>Moderate</u>		
Adjacent Land Use	<u>Cropland</u>		
Susc. to Erosion	<u>Moderate</u>		
Soils			

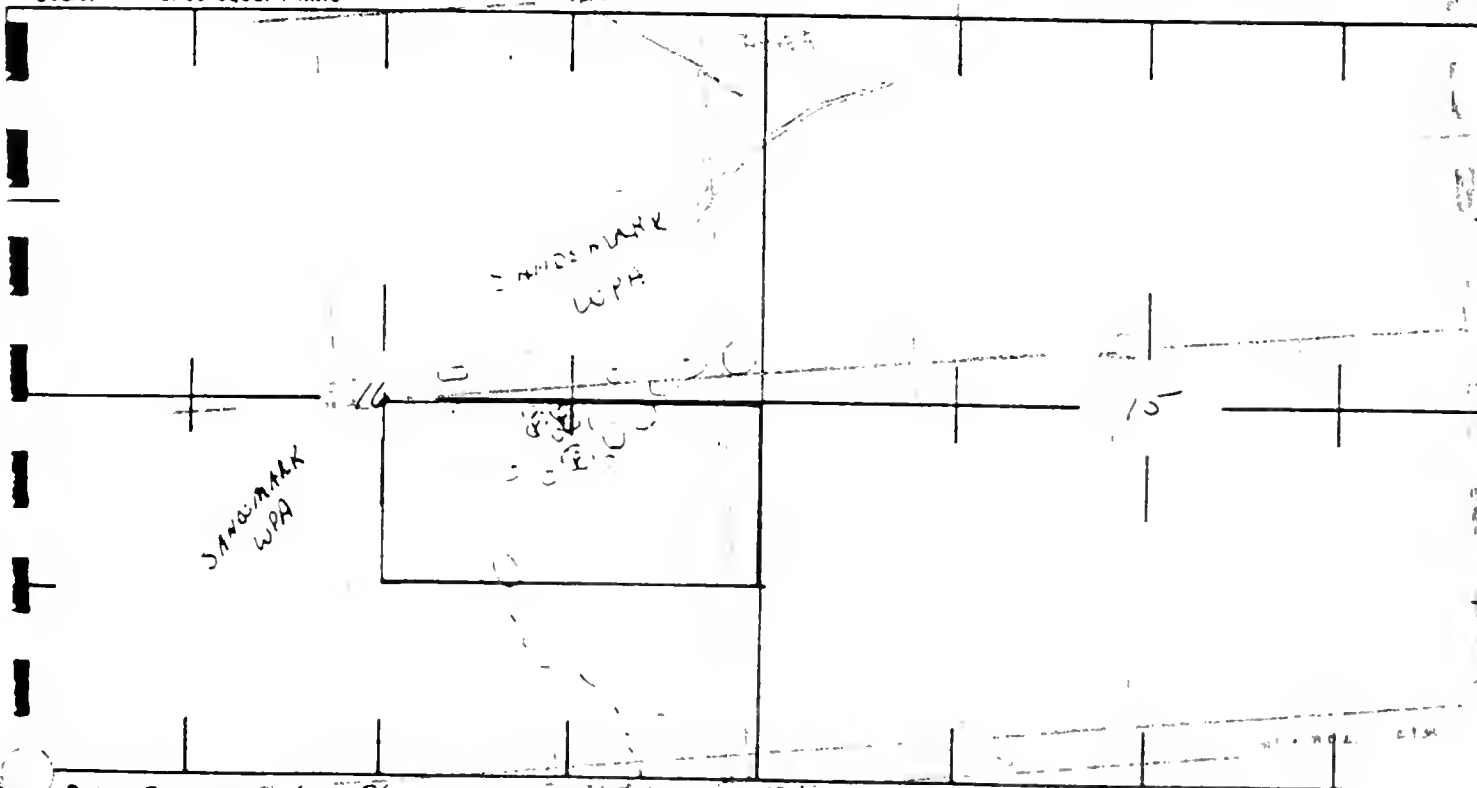
Development Possibilities Create wetlands

Wetlands in Proposal	(Type)	(No.)	(Acres)	Types	TOTAL
		10	7		

Comments:

- 10 acres water charge per year = negative aspect of this tract
- OK add-on to Sandmark WPA
- Not necessary to management of Sandmark WPA
- Potential wetland creation
- Adequate flood water available

Score = 6  
 Scale: 4 inches equal 1 mile  
80 acres



Date Examined 4-3-86 By [Signature] Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State: Michigan County: Flathead T. 27 N R. 14 W Sec. 16 15  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Twp \_\_\_\_\_

DESCRIPTIVE INFORMATION:	EXCELLENT	GOOD	FAIR
Shrub		X	
Aquatic Wetland Complex		X	
Interseasonal Emerg. Veg.		X	
Double Potential		X	
Diver Potential		X	
Emergent Vegetation (Species)	<u>Typha spp.</u>		
Sub. Veg. (Species)			
Water Quality	<u>Fresh</u>		
Watershed	<u>Consistent water table; local runoff</u>		
Ease of Drainage	<u>Moderate - could be pumped outlet on south end</u>		
Adjacent Land Use	<u>Cropland / Timber</u>		
Soils	<u>Peat</u>		
Development Possibilities	<u>Water level regulation possible with structure in outlet</u>		

Wetlands in Proposal	(Type)	(No.)	(Acres)	TOTAL
	<u>L2USZ</u>	<u>1</u>	<u>155.6</u>	

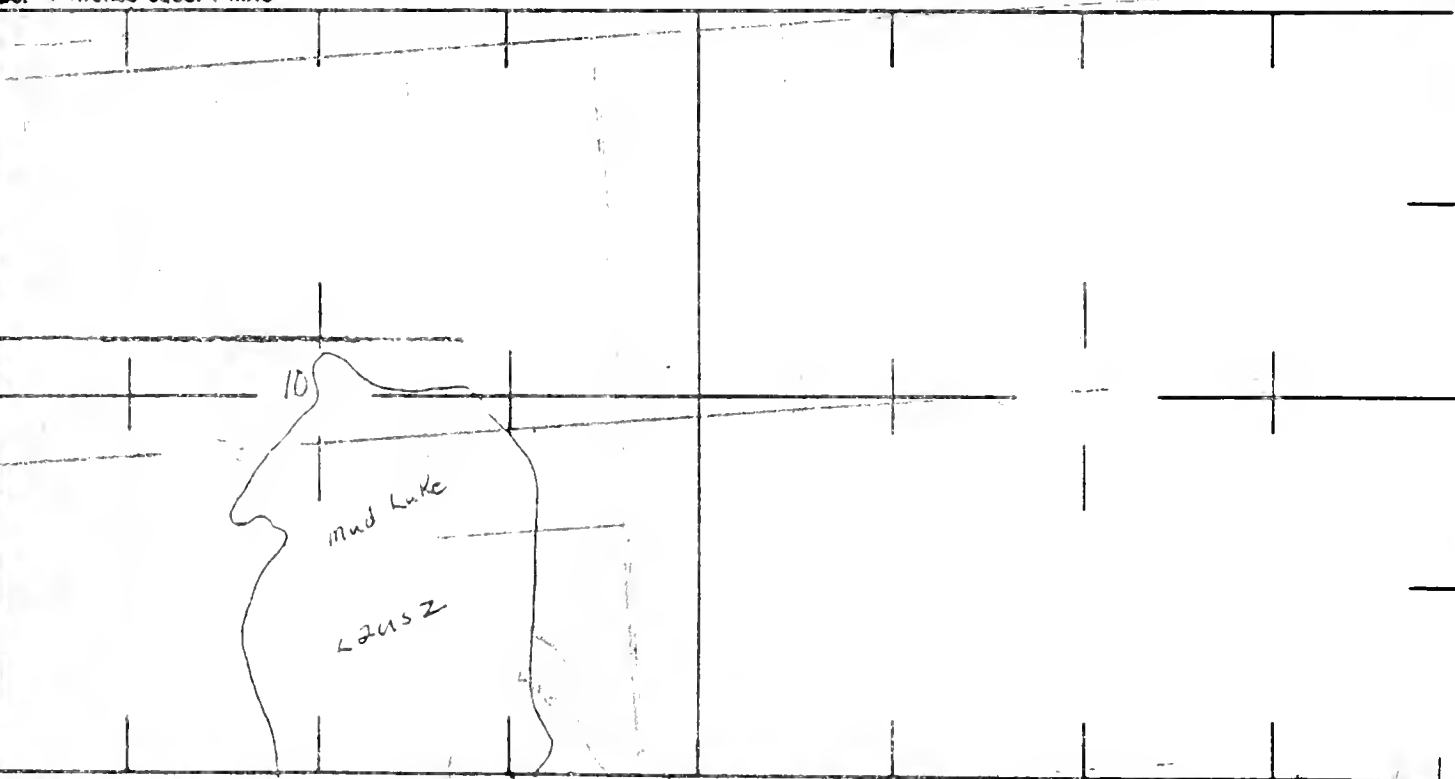
Comments:  
 - Brush and pine habitat fair to good; 84 Canada geese produced in this area since 1986; - area is prime recreational development land

Score - 6

452 acres

34 2 wet

Scale: 4 inches equal 1 mile



Date Examined 12/3/86 By R. Washburn Realty Check Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

PK 3

State Montana County Flathead T. 27 N R. 50 W Sec. 5  
 Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Top

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shrub			X
All Wetland Complex		X	
Interspersion Emgt. Veg.		X	
Deleter Potential		X	
Diver Potential		X	
Emergent Vegetation (Species)	<u>Typha sp ; Scirpus acutus</u>		
Sub-Veg. (Species)			
Water Qualities	<u>Fresh</u>		
Watershed	<u>High water Table; local runoff</u>		
Ease of Drainage	<u>Difficult; pumping possible</u>		
Adjacent Land Use	<u>Mostly Cropland</u>		
Rusc-to Erosion	<u>low</u>		
Sells			

Development Possibilities None obvious

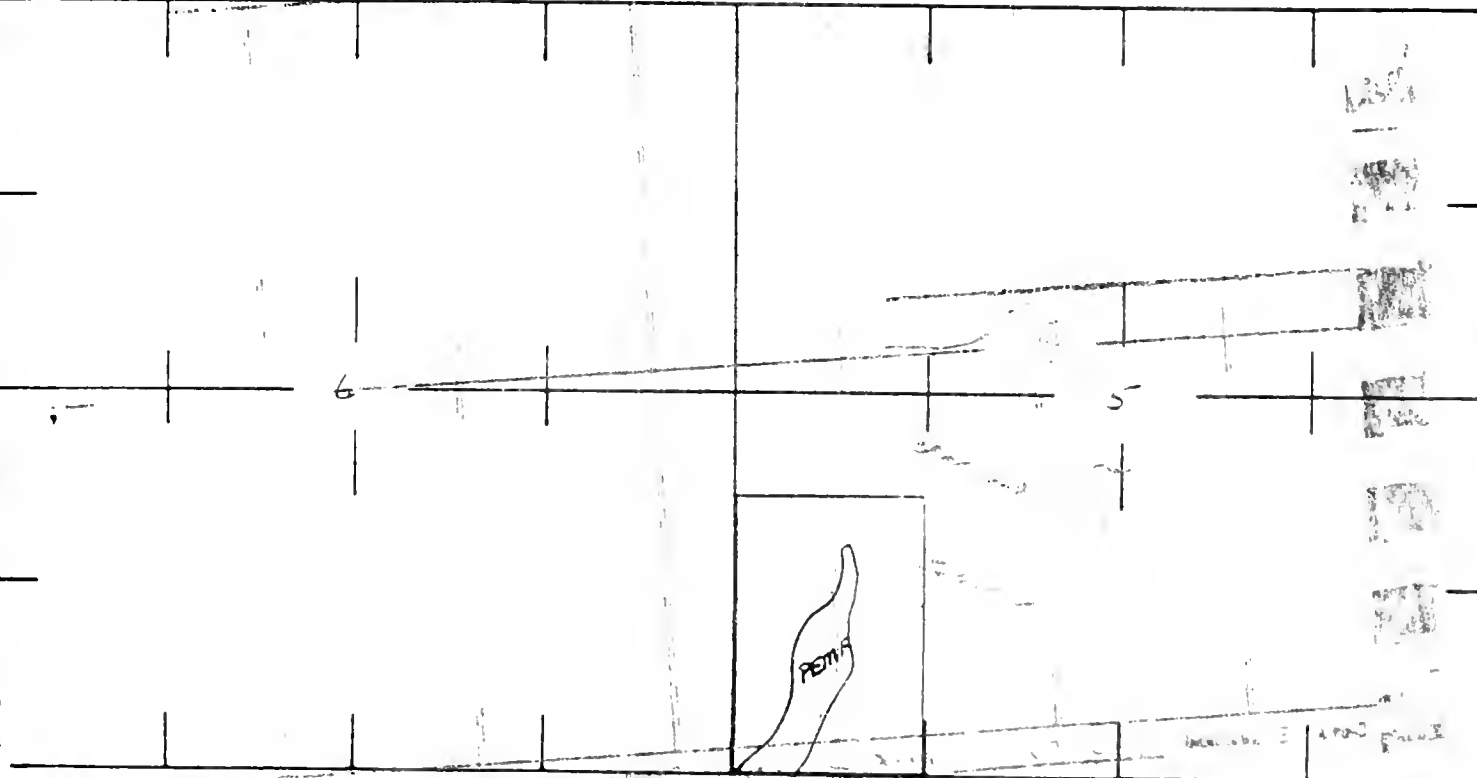
	(Type)	PEMF	TOTAL
Wetlands in Proposal	(No.)	1	
	(Acres)	9.2	

Comments

- long narrow channel, average pair and brood habitat
- Good interspersion of emergents in Sect 5; poor in other parts of basin
- Good Road access
- 66 acres

Acres = 6 - 300 acres - 66.8 wet acres = 233.2 wet

Scale: 4 inches equal 1 mile



Date Examined 4-2-86 By William Kohler Realty Check Date \_\_\_\_\_ By \_\_\_\_\_



WETLANDS ACQUISITION PROPOSAL

p 2 of 3

State Alabama County: Flathead T. 27 N R. 20 W Sec. 7 + 8

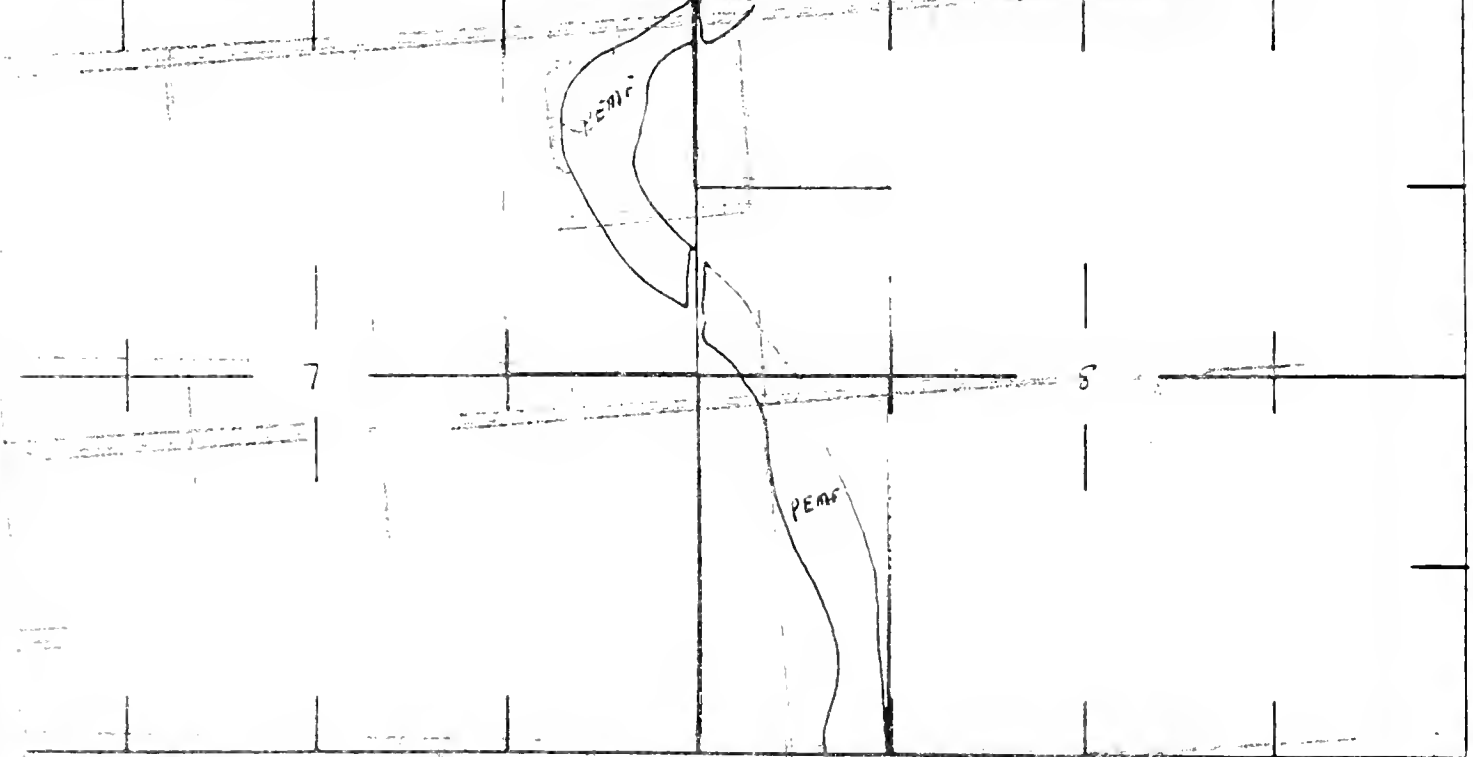
Aerial Photo No. \_\_\_\_\_ Date of Photo: \_\_\_\_\_ Top

DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shore			
Adj. Wetland Complex			
Inundation Emgt. Veg.			
Dabler Potential			
Diver Potential			
Emergent Vegetation (Species)			
Sub Veg (Species)	See Page 1		
Water Qualities			
Watershed			
Ease of Drainage			
Adjacent Land Use			
Susc. to Erosion			
Soils			
Development Possibilities			

	(Type)	PERM	TOTAL
Wetlands in Proposal	(No.)		
	(Acres)	50.4	

Comments  
 - 50 acres

1" = 4 inches equal 1 mile



Site Examined 2-86 By William - Wash to K Realty Check - Date \_\_\_\_\_ By \_\_\_\_\_

WETLANDS ACQUISITION PROPOSAL

State: Montana County: Flathead T. 27 N R. 20 W Sec. 17

P 38

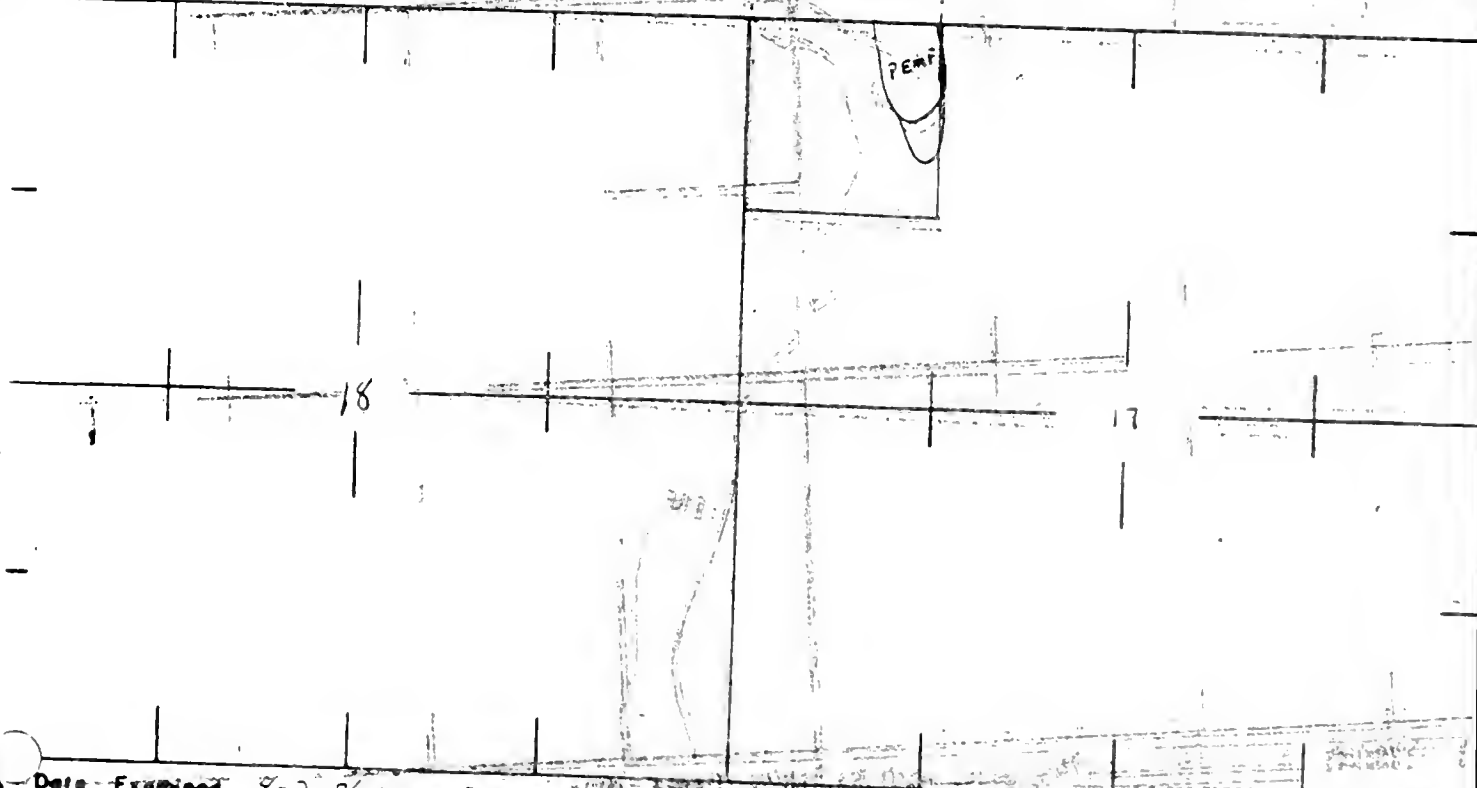
DESCRIPTIVE INFORMATION	EXCELLENT	GOOD	FAIR
Shape			
Adj. Wetland Complex			
Interspersion Emgt. Veg.			
Dabbling Potential			
Diver Potential			
Emergent Vegetation (Species)			
Sub. Veg. (Species)			
Water Qualities			
Watershed			
Ease of Drainage			
Adjacent Land Use			
Suscept. to Erosion			
Soils			
Development Possibilities			

See Page 1

Wetlands in Proposal	(Type)	(No.)	(Acres)	TOTAL
	PEMF	1	7.2	

Comments:  
- 40 acres

Scale: 4 inches equal 1 mile



Date Examined 9-2-86 By Wm. J. [unclear] Realty Check Date \_\_\_\_\_

