REPORT ON THE CONSERVATION STATUS OF *Howellia aquatilis*, A CANDIDATE THREATENED SPECIES

Taxon name:	*Howellia aquatilis* A. Gray
Common name:	Water Howellia
Family:	Campanulaceae
States where taxon occurs:	U.S.A., Idaho, Montana, Washington; historical in California, Oregon
Current federal status:	USFWS Notice of Review, Category 2
Recommended federal status:	USFWS Notice of Review, Category 1
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Original date of report:	28 November 1988
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This is an abridged report

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TABLE OF CONTENTS

I. SPECIES INFORMATION

1. Classification and nomenclature.

A. Species.

1. Scientific name.

a. Binomial: Howellia aquatilis A. Gray.

b. Full bibliographic citation: Gray, A. 1879. Proc. Am. Acad. 15: 43-44.

c. Type specimen: Oregon, Multnomah County, Sauvies Island, 1879, Thomas & Joseph Howell 137, GH.

2. Pertinent synonyms: None.

3. Common name: Water Howellia.

4. Taxon codes: PDCAM0A010 (The Nature Conservancy); 4886, HOWAQU (U.S. Forest Service, Region 1); NT.L72 (Washington Natural Heritage Program; California Nongame-Heritage Program); HOAQ (Garrison et al. 1976; Soil Conservation Service 1982).

5. Size of genus: Monotypic genus.

B. Family classification.

1. Family name: Campanulaceae.

2. Pertinent family synonyms: None.

3. Common names for family: Harebell Family, Bellflower Family.

C. Major plant group: Dicotyledoneae.

D. History of knowledge of taxon: Howellia aquatilis was first collected in May, 1879, by two early Oregon botanists, Thomas and Joseph Howell. The initial discovery was made in a slough on Sauvies Island, along the Columbia River near Portland. The initially collected material included only submergent, cleistogamous flowers. They returned to a nearby area in August of that year, and collected material bearing well-developed, emergent, chasmogamous flowers. The specimens were determined to represent a new genus and species by Asa Gray, and it was described in the same year (Gray 1879).

Subsequent collections were made in Mendocino County, California in 1928 (Smith and Berg 1988); Clackamas (1892), Marion (1926, 1928), and Multnomah (1879, 1881, 1885, 1886) counties, Oregon (Oregon Natural Heritage Data Base); Clark (1980), Mason (1937),

and Spokane (1983, 1986, 1987) counties, Washington (Washington Natural Heritage Program); and Kootenai (1892) and Latah (1988) counties, Idaho. The first collection in Montana was made in 1978 by Bruce McCune (McCune 1982), when it was found in the Swan Valley in Missoula County. Further surveys (1983-1986) in the Swan Valley, primarily by John Pierce and Peter Lesica, revealed the presence of 15 additional populations, from three sites within the drainage.

In 1987, the Montana Natural Heritage Program (MTNHP) was contracted by the U.S. Fish and Wildlife Service (the Service), with funds appropriated under Section 6 of the Endangered Species Act, to conduct a status survey of Howellia aquatilis in Montana (Project Agreement SE-4-P-1). In June-July 1987, field surveys were conducted by the first author, with assistance from Lisa Campbell, Anne Morley, and Peter Lesica; further surveys were also conducted in July 1988. Surveys were completed in the Swan and Clearwater River drainages, Lake and Missoula Counties, Montana. Surveys in Idaho were conducted in 1988 by the second author, also under Section 6 sponsorship.

Of the 16 Montana populations of Howellia aquatilis which were initially recorded by the MTNHP prior to the start of the surveys, ten of these were monitored during the 1987 surveys; six others were not revisited. Thirty-six new populations were located; collections were made at 18 of these, and the remaining 18 were recorded as sight records. In 1988, three additional populations were found, and collections were made from them. In Idaho, one recently observed population was verified, but no new populations were located. All data and photos are from 1987 and 1988, except where noted.

E. Comments on current alternative taxonomic treatments: There are no known current alternative taxonomic treatments.

2. Present legal or other formal status.

A. International: None.

B. National.

1. United States.

a. Present designated or proposed legal protection or regulation: U.S. Fish and Wildlife Service: Currently, the species is included in Category 2 of the U.S. Fish and Wildlife Service Notice of Review (U.S. Department of Interior 1985), under consideration for federal listing as a threatened species. Category 2 taxa are those "...for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not

currently known or on file to support the immediate preparation of rules."

b. Other current formal status recommendations: The species is currently listed as "endangered throughout range" (global rank = G2) by The Nature Conservancy.

c. Review of past status: The species was originally placed in Category 2 in 1980 (U.S. Department of Interior 1980).

C. State.

1. California.

a. Present designated or proposed legal protection or regulation: Howellia aquatilis is included on List 1A (plants presumed extinct in California) in the California Native Plant Society inventory of rare and endangered vascular plants; all of the plants in this category are eligible for state listing (Smith and Berg 1988). However, the species currently has no state listing status (California Department of Fish and Game 1988).

b. Other current formal status recommendations: As described above.

c. Review of past status: Placed on List 1A in the California Native Plant Society inventory, as defined above (Smith and York 1984).

2. Idaho.

a. Present designated or proposed legal protection or regulation: None.

b. Other current formal status recommendations: The species is listed as "endangered" (in danger of becoming extinct or extirpated in the state within the foreseeable future, if identifiable factors contributing to its decline continue to operate) by the Idaho Natural Heritage Program.

c. Review of past status: Although the Idaho population was unknown to him at the time, Brunsfeld (1983) recommended that Howellia aquatilis be placed on the "Federal Watch List."

3. Montana.

a. Present designated or proposed legal protection or regulation: None.

b. Other current formal status recommendations: The species is currently listed as "endangered in Montana" (state rank = S2) by the MTNHP (Shelly 1988).

c. Review of past status: Previously listed as "recommended endangered" by the Montana Rare Plant Project (Lesica et al. 1984).

4. Oregon.

a. Present designated or proposed legal protection or regulation: Howellia aquatilis is a candidate for potential state listing under the 1987 Oregon Endangered Species Act (R. Meinke, Oregon Department of Agriculture, pers. comm.).

b. Other current formal status recommendations: The species is currently included on List 1 (taxa endangered throughout range), and is considered possibly extirpated from the state (Oregon Natural Heritage Data Base 1987).

c. Review of past status: Formerly listed in Group IIb (known from only a few widely disjunct populations), and considered rare and endangered in Oregon (Siddall et al. 1979).

5. Washington.

a. Present designated or proposed legal protection or regulation: None.

b. Other current formal status recommendations: The species is currently included on the list of endangered plant taxa (in danger of becoming extinct or extirpated in the state within the near future if factors contributing to its decline continue; Washington Natural Heritage Program 1987).

c. Review of past status: None known.

3. Description.

A. General nontechnical description: Howellia aquatilis is a strictly aquatic species, which grows as a mostly submerged plant rooted in the bottom sediments of the ponds and sloughs to which it is adapted. Later in the season, it can sometimes be found persisting in the muck on the edges of these areas as they dry out. It is an annual, completing its entire life cycle in one growing season, and becoming inconspicuous upon desiccation of its habitat at the end of the summer. The stems are branched several inches from the base, and each branch then extends to the surface of the water. The numerous leaves are an inch or two long and very narrow.

Howellia aquatilis produces two types of flowers. Along the stem beneath the water surface, small flowers form which do not develop a conspicuous corolla (floral tube). However, as the branches reach the surface, more conspicuous flowers develop above the water. These emergent flowers are white, have five lobes on one side of the corolla, and are about ¼ inch across. Both types of flowers give rise to thin-walled fruits which are an inch or more long, and which contain one to five or so large, shiny brown seeds which can be about ¼ inch long.

In Idaho and Washington, emergent flowers are evident in May. In Montana, the emergent flowers are in bloom from late June to August. The actual duration of the plants and flowers may be longer in certain cases, depending on the rate of drying of the habitat.

B. **Technical description:** Flaccid annual, aquatic herb, mostly submergent, often with emergent branches; plants naked below, branched above; whole plant glabrous, green, about 10-60 cm. (4-24 in.) tall, occasionally taller; leaves numerous, alternate, or some of them subopposite or whorled in threes, linear or linear-filiform, entire or nearly so, 1-5 cm. (0.4-2 in.) long, up to 1.5 mm. (0.06 in.) wide; flowers white, mostly 3-10, axillary, often scattered, pedicellate or subsessile, both petaliferous (when emergent) or much reduced and inconspicuous (when submerged), the fully-developed corollas about 2-2.7 mm (0.08-0.11 in.) long, irregular, with the tubes deeply cleft dorsally, and five-lobed; filaments and anthers connate, two of the anthers shorter than the others; calyx lobes 1.5-7 mm. (0.06-0.28 in.) long; stout pedicels 1-4 (8) mm. (0.04-0.16 (0.3) in.) long, merging gradually with the base of the capsule; ovary unilocular, with parietal placentation; stigma 2-lobed; fruit 5-13 mm. (0.2-0.5 in.) long, 1-2 mm. (0.04-0.08 in.) thick, irregularly dehiscent by the rupture of the very thin lateral walls; seeds large, 2-4 mm. (0.08-0.16 in.) long, 5 or fewer, shiny brown (adapted from Hitchcock et al. 1959; Dorn 1984).

C. **Local field characters:** Howellia aquatilis is the only member of the Campanulaceae in Montana which is strictly aquatic. Downingia laeta can occur in wet places in meadows or on the edges of ponds, but is distinguishable by its light blue or purplish flowers marked with white or yellow; it was not observed in the Swan Valley during field surveys. Heterocodon rariflorum, a species of moist areas in Lake and Ravalli counties, has regular, blue flowers. The annual habit, distinctive habitat, and irregular white flowers of H. aquatilis thus serve to distinguish it from all other members of the family in northwestern Montana.

An unrelated species which is vegetatively similar to H. aquatilis, and which is frequently found growing with it, is Callitriche heterophylla (Callitrichaceae). However, the submergent linear leaves of this species are most often opposite (only rarely whorled), and the floating leaves are broadly

obovate. In addition, the flowers of C. heterophylla are axillary, very inconspicuous, and do not have a corolla.

D. **Identifying characteristics of material which is in interstate or international commerce or trade:** No interstate or international commerce or trade known.

E. **Photographs and line drawings:** Figure 1 provides a copy of the illustration of this species, adapted from Meinke (1982). The color slides (p. 8) are duplicates of those taken at the sites indicated. Additional slides from other locations in Montana are housed at the MTNHP office in Helena.

4. Significance.

A. **Natural:** As a monotypic genus, H. aquatilis is taxonomically unique. The only genus which seems closely related to Howellia is Legenere. The latter is also monotypic, consisting only of the species L. limosa, and occurs in dried beds of vernal pools in the Central Valley of California (Munz 1959). Recent electrophoretic studies (Lesica et al. 1988) indicate that there is no genetic variation either within or among populations of H. aquatilis; this is also unique, especially considering its wide geographic distribution pattern. However, lack of genetic variation is often correlated with the narrow ecological amplitude possessed by species such as H. aquatilis (Waller et al. 1987). Howellia aquatilis has thus provided a valuable subject for conservation biology studies. Otherwise, the species is not known to have any peculiar adaptations or structures, or roles in stabilizing landforms. Obligate relationships with other species are unknown.

B. **Human:** As discussed, H. aquatilis would be of scientific significance in studies addressing its systematic relationships and isolation, and has been an important subject in conservation biology research. Otherwise, the species has no known agricultural, economic, horticultural, or other human uses or significance at this time.

5. Geographical distribution.

A. **Geographical range:** Howellia aquatilis is currently known from a total of 13 sites: one in Idaho (Latah County); three in Washington (Clark and Spokane counties; J. Gamon, pers. comm.); and nine in Montana (Lake and Missoula counties). It is historically known from one collection in California (Mendocino County; Smith and Berg 1988), four locations in northwestern Oregon (Clackamas, Marion and Multnomah counties; S. Vrilakas, pers. comm.), one location in Washington (Mason County; J. Gamon, pers. comm.), and one collection from northern Idaho (Kootenai County). The range is indicated in Figure 2, p. 9.

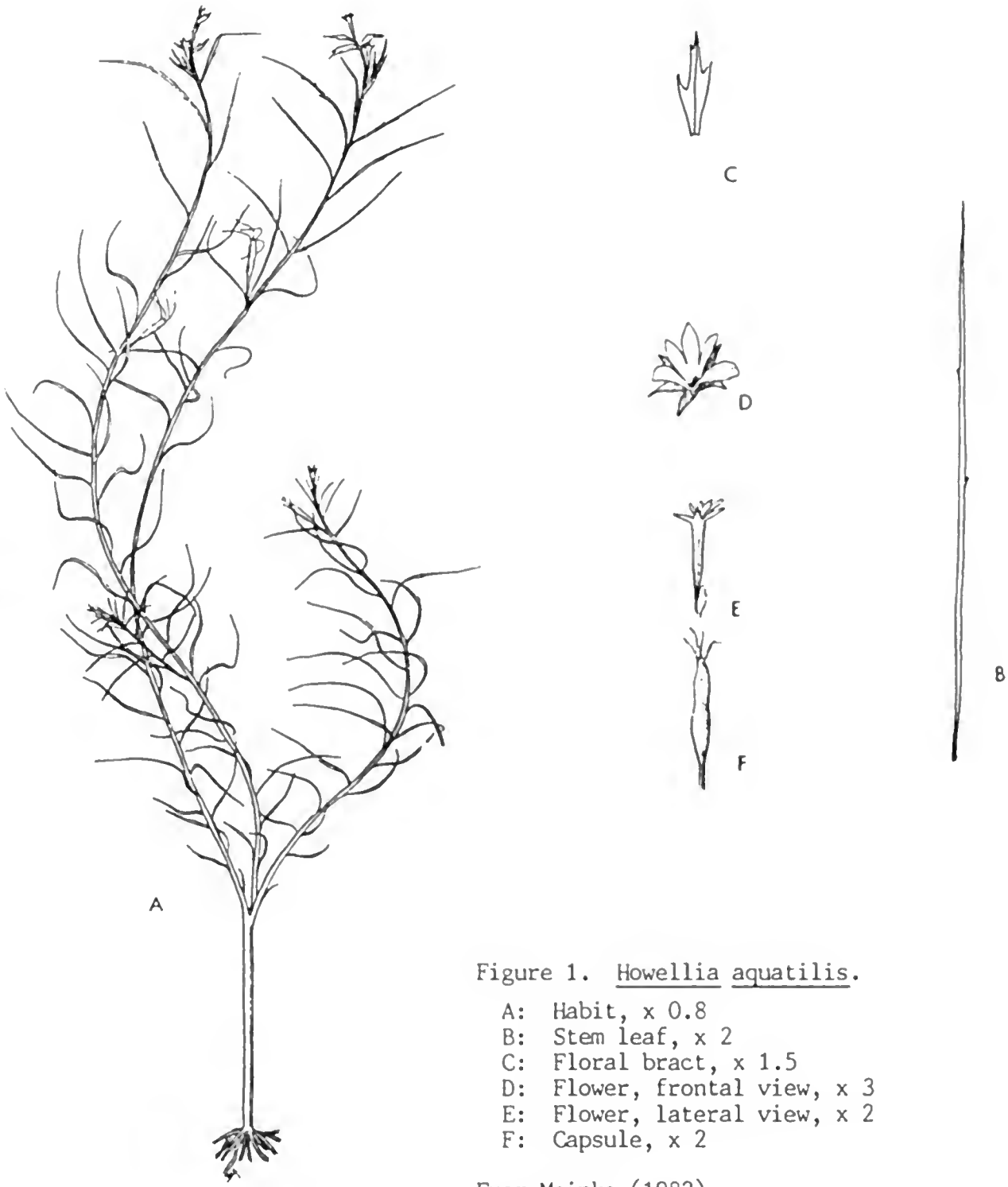

Figure 1. Howellia aquatilis.

A: Habit, x 0.8
B: Stem leaf, x 2
C: Floral bract, x 1.5
D: Flower, frontal view, x 3
E: Flower, lateral view, x 2
F: Capsule, x 2

From Meinke (1982).

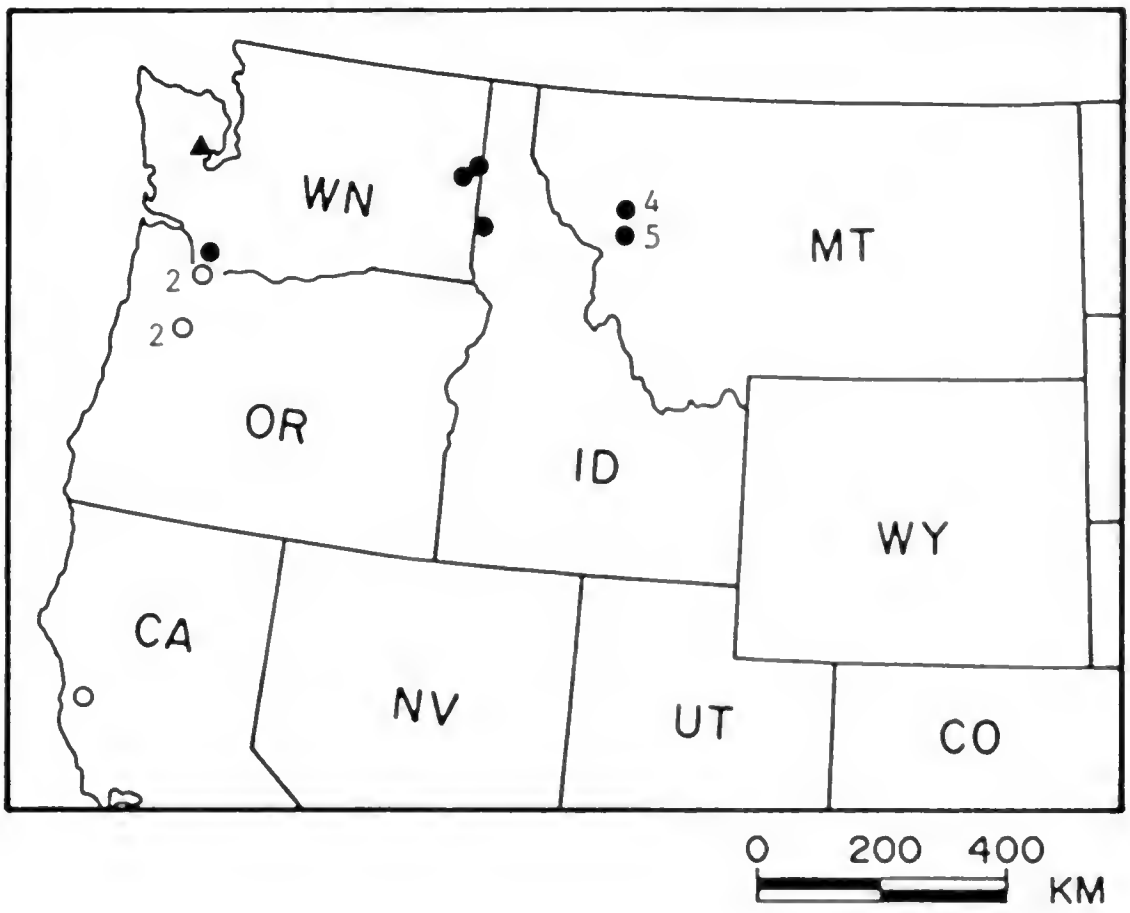

Figure 2. Distribution of Howellia aquatilis in the western Unites States (numbers indicate total sites where greater than one); adapted from Lesica et al. (1988).

● = extant sites (13)

O = extirpated sites (5)

▲ = site where current status unknown

B. Precise occurrences.

1. Populations currently or recently known extant: Table 1, pp. 11-27, lists currently known populations by state and county. Exact locations for the Montana and Idaho populations are provided in the maps on pp. 138-148.

2. Populations known or assumed extirpated:

a. Sauvie Island.

1. U.S.A., Oregon, Multnomah County.
2. Latitude, longitude, altitude: 454105N, 1224855W; 75′.
3. Legal description: T2N, R1W, Section 4.
4. USGS quad: Sauvie Island, 7.5′.
5. Year of initial discovery: 1879.
6. Year of most recent observation: 1886.
7. Location: Sauvie Island, Willamette Slough (type locality).
8. Alternative site name: Sauvies Island.

b. Lake Oswego.

1. U.S.A., Oregon, Clackamas County.
2. Latitude, longitude, altitude: 452447N, 1224130W; 125′.
3. Legal description: T2S, R1E, Section 9.
4. USGS quad: Lake Oswego, 7.5′.
5. Year of initial discovery: 1892.
6. Year of most recent observation: 1892.
7. Location: Lake Oswego, west of Portland about 4 miles (Howell s.n., WS).
8. Alternative site name: none known.

c. Painter's Woods.

1. U.S.A., Oregon, Marion County.
2. Latitude, longitude, altitude: 445647N, 1230055W; 125′.
3. Legal description: T7S, R3W, Section 23.
4. USGS quad: Salem West, 7.5′.
5. Year of initial discovery: 1926.
6. Year of most recent observation: 1935.
7. Location: Area near Painter's Woods, near Salem (Thompson (4927, 4967), ORE; J.C. Nelson (5075), GH; M.E. Peck (15935), WILLU).
8. Alternative site name: none known.

TABLE 1. Populations currently known extant, listed by state, county, and occurrence number.

IDAHO

Occurrence number: 001 Site name: HARVARD
County: LATAH
Latitude: 465503 Longitude: 1164428 Elevation: 2560
Township & Range: 041N003W Section: 08 Subsection: center of NE4
USGS Quad: DEARY
Size: 15 minute series
Year of initial discovery: ca. 1968 Date of most recent observation: 1988-06-14
Directions: NEAR JUNCTION OF ST. HWYS. 6 AND 9, 50 YDS. SOUTH OF INTERSECTION ON WEST SIDE OF HWY. 9; JUST INSIDE PROPERTY FENCELINE.

MONTANA

Occurrence number: 005 Site name: SWAN RIVER OXBOW
County: LAKE
Latitude: 475327 Longitude: 1135117 Elevation: 3100
Township & Range: 025N018W Section: 35 Subsection/additional sections: NW4;34,NE4NE4;26,SW4
USGS Quad: SWAN LAKE
Size: 7.5 minute series
Year of initial discovery: 1985 Date of most recent observation: 1987-06-25
Directions: CA. 3 MILES SOUTH OF THE VILLAGE OF SWAN LAKE ON ST. HWY. 83, 0.9 MILES WEST ON PORCUPINE CREEK ROAD; 0.2-0.7 AIR MI. N. OF PORCUPINE CREEK ROAD.

Occurrence number: 007 Site name: SWAN RIVER WEST
County: LAKE
Latitude: 474958 Longitude: 1135131 Elevation: 3190
Township & Range: 024N018W Section: 14 Subsection: SW4SE4SE4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-01
Directions: WEST SIDE OF SWAN VALLEY, 1.4 AIR MILES WEST OF ST. HWY. 83; 0.57 AIR MILE WEST OF SWAN RIVER; CA. 6.5 AIR MILES SOUTH OF SWAN LAKE (TOWN).

Occurrence number: 008 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475148 Longitude: 1134933 Elevation: 3190
Township & Range: 024N017W Section: 06 Subsection: NW4SW4SE4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1988-07-21
Directions: SWAN VALLEY, CA. 4.5 AIR MILES SSE. OF SWAN LAKE (TOWN); 0.3 AIR MILES EAST OF ST. HWY. 83; 0.68 AIR MILES SSW. OF CONFLUENCE OF NORTH AND SOUTH FORKS LOST CREEK.

TABLE 1. (cont.).

MONTANA

Occurrence number: 009 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475137 Longitude: 1134907 Elevation: 3250
Township & Range: 024N017W Section: 07 Subsection: NE4NE4NE4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1988-07-21
Directions: SWAN VALLEY, 0.6 AIR MILES EAST OF ST. HWY. 83, 0.6 AIR MILES SOUTH OF SOUTH FORK LOST CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

Occurrence number: 010 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475150 Longitude: 1134857 Elevation: 3230
Township & Range: 024N017W Section: 05 Subsection: NW4SW4SW4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-01
Directions: SWAN VALLEY, 0.75 AIR MILES EAST OF ST. HWY 83, 0.3 AIR MILES SOUTH OF SOUTH FORK LOST CREEK, CA. 4.7 AIR MILES SSE OF SWAN LAKE (TOWN).

Occurrence number: 011 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475120 Longitude: 1134826 Elevation: 3290
Township & Range: 024N017W Section: 08 Subsection: E2SE4NW4, NW4SW4NE4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-07
Directions: SWAN VALLEY, 1.05-1.2 AIR MILES EAST OF ST. HWY 83, 0.25 AIR MILES NNE OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

Occurrence number: 012 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475125 Longitude: 1134848 Elevation: 3235
Township & Range: 024N017W Section: 08 Subsection: NE4SW4NW4,SE4NW4NW4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-07
Directions: SWAN VALLEY, 0.83 AIR MILES EAST OF ST. HWY 83, 0.37 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

TABLE 1. (cont.).

MONTANA

Occurrence number: 013 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475124 Longitude: 1134852 Elevation: 3240
Township & Range: 024N017W Section: 08 Subsection: N2SW4NW4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1988-07-21
Directions: SWAN VALLEY, 0.79 AIR MILES EAST OF ST. HWY 83, 0.36 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

Occurrence number: 014 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475124 Longitude: 1134857 Elevation: 3245
Township & Range: 024N017W Section: 08 Subsection: NW4SW4NW4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-07
Directions: SWAN VALLEY, 0.72 AIR MILES EAST OF ST. HWY 83, 0.4 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

Occurrence number: 015 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475121 Longitude: 1134856 Elevation: 3245
Township & Range: 024N017W Section: 08 Subsection: NW4SW4NW4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-07
Directions: SWAN VALLEY, 0.73 AIR MILES EAST OF ST. HWY 83, 0.32 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

Occurrence number: 016 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475111 Longitude: 1134857 Elevation: 3240
Township & Range: 024N017W Section: 08 Subsection: NW4NW4SW4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-07
Directions: SWAN VALLEY, 0.71 AIR MILES EAST OF ST. HWY 83, 0.17 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

TABLE 1. (cont.).

MONTANA

Occurrence number: 017 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Latitude: 475110 Longitude: 1134845 Elevation: 3230
Township & Range: 024N017W Section: 08 Subsection: NE4NW4SW4
USGS Quad: CILLY CREEK
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-07
Directions: SWAN VALLEY, 0.85 AIR MILES EAST OF ST. HWY 83, 0.1 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).

Occurrence number: 018 Site name: DOG CREEK
County: LAKE
Latitude: 473618 Longitude: 1134412 Elevation: 3660
Township & Range: 021N017W Section: 02 Subsection: SE4NW4SE4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-14
Directions: SWAN VALLEY, EAST SIDE OF FLATHEAD N.F. RD. #899 NEAR JUNCTION WITH RD. #124, 0.35 AIR MILES NORTH OF LAKE-MISSOULA COUNTY LINE, CA. 5.5 AIR MILES NNW OF CONDON.

Occurrence number: 019 Site name: DOG CREEK
County: LAKE
Latitude: 473618 Longitude: 1134441 Elevation: 3580
Township & Range: 021N017W Section: 02 Subsection: S2NE4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-14
Directions: SWAN VALLEY, 0.33 AIR MILES WEST OF JUNCTION OF FLATHEAD NF RDS. 899 AND 124, 0.33 AIR MILES NORTH OF LAKE-MISSOULA CO. LINE, CA. 5.5 AIR MILES NNW OF CONDON.

Occurrence number: 053 Site name: SALMON PRAIRIE
County: LAKE
Latitude: 473900 Longitude: 1134822 Elevation: 3450
Township & Range: 022N017W Section: 20 Subsection: NE4SW4,NW4SE4
USGS Quad: SALMON PRAIRIE
Size: 7.5 minute series
Year of initial discovery: 1988 Date of most recent observation: 1988-07-15
Directions: SWAN VALLEY, 0.5 AIR MILES WEST OF SWAN RIVER, CA. 1.6 AIR MILES NW OF SALMON PRAIRIE (TOWN SITE).

TABLE 1. (cont.).

MONTANA

Occurrence number: 001 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472521 Longitude: 1134231 Elevation: 4230
Township & Range: 019N017W Section: 12 Subsection: NE4SE4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1984 Date of most recent observation: 1987-07-30
Directions: SWAN VALLEY, 0.68 AIR MILES NNE. FROM THE FIRST FORK ON LINDBERGH LAKE ROAD, CA. 2.5 MILES WEST FROM ST. HWY. 83.

Occurrence number: 002 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472556 Longitude: 1134232 Elevation: 4175
Township & Range: 019N017W Section: 01 Subsection: E2NE4SW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1984 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, 1.32 AIR MILES NORTH OF THE FIRST FORK ON LINDBERGH LAKE RD., CA. 2.5 MI. WEST OF ST. HWY. 83.

Occurrence number: 003 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472516 Longitude: 1134128 Elevation: 4150
Township & Range: 019N016W Section: 07 Subsection: E2SW4NW4, W2SE4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1983 Date of most recent observation: 1983-07-24
Directions: SWAN VALLEY, 0.1 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA. 1.5 MILES WEST OF ST. HWY. 83.

Occurrence number: 004 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472515 Longitude: 1134041 Elevation: 4070
Township & Range: 019N016W Section: 07 Subsection: SE4NE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1978 Date of most recent observation: 1983-07-31
Directions: SWAN VALLEY, CA. 50 FT. SOUTHWEST OF LINDBERGH LAKE RD., CA. 1 MILE WEST OF ST. HWY. 83.

TABLE 1. (cont.).

MONTANA

Occurrence number: 006 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473442 Longitude: 1134217 Elevation: 3740
Township & Range: 021N016W Section: 18 Subsection: NE4NW4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1986 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, WEST BASE OF SWAN RANGE UPLIFT, 3.5 AIR MILES NORTH OF CONDON, 2.1 AIR MILES EAST OF ST. HWY. 83, 0.1 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 020 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473433 Longitude: 1134212 Elevation: 3740
Township & Range: 021N016W Section: 18 Subsection: SW4NE4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1988-07-22
Directions: SWAN VALLEY, 3.3 AIR MILES NORTH OF CONDON, 2.13 AIR MILES EAST OF ST. HWY 83, 0.25 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 021 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473432 Longitude: 1134216 Elevation: 3740
Township & Range: 021N016W Section: 18 Subsection: SW4NE4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 3.3 AIR MILES NORTH OF CONDON, 2.08 AIR MILES EAST OF ST. HWY 83, 0.28 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 022 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473431 Longitude: 1134207 Elevation: 3750
Township & Range: 021N016W Section: 18 Subsection: SW4NE4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 3.28 AIR MILES NORTH OF CONDON, 2.18 AIR MILES EAST OF ST. HWY 83, 0.27 AIR MILES SOUTH OF CONDON CREEK.

TABLE 1. (cont.).

MONTANA

Occurrence number: 023 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473427 Longitude: 1134214 Elevation: 3740
Township & Range: 021N016W Section: 18 Subsection: NW4SE4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 3.2 AIR MILES NORTH OF CONDON, 2.10 AIR MILES
EAST OF ST. HWY 83, 0.35 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 024 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473422 Longitude: 1134212 Elevation: 3740
Township & Range: 021N016W Section: 18 Subsection: SW4SE4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 3.09 AIR MILES NORTH OF CONDON, 2.10 AIR MILES
EAST OF ST. HWY 83, 0.47 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 025 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473421 Longitude: 1134206 Elevation: 3750
Township & Range: 021N016W Section: 18 Subsection: S2SE4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 3.08 AIR MILES NORTH OF CONDON, 2.18 AIR MILES
EAST OF ST. HWY 83, 0.45 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 026 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473432 Longitude: 1134225 Elevation: 3710
Township & Range: 021N016W Section: 18 Subsection: SE4NW4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 3.29 AIR MILES NORTH OF CONDON, 1.97 AIR MILES
EAST OF ST. HWY 83, 0.28 AIR MILES SOUTH OF CONDON CREEK.

TABLE 1. (cont.).

MONTANA

Occurrence number: 027 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473426 Longitude: 1134233 Elevation: 3690
Township & Range: 021N016W Section: 18 Subsection: NW4SW4SW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1988-07-22
Directions: SWAN VALLEY, 3.18 AIR MILES NORTH OF CONDON, 1.84 AIR MILES EAST OF ST. HWY 83, 0.40 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 028 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473422 Longitude: 1134240 Elevation: 3685
Township & Range: 021N017W Section: 13 Subsection: SE4SE4SE4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 3.09 AIR MILES NORTH OF CONDON, 1.75 AIR MILES EAST OF ST. HWY 83, 0.48 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 029 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473415 Longitude: 1134228 Elevation: 3690
Township & Range: 021N016W Section: 19 Subsection: NW4NW4NW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 2.97 AIR MILES NORTH OF CONDON, 1.88 AIR MILES EAST OF ST. HWY 83, 0.59 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 030 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473416 Longitude: 1134204 Elevation: 3740
Township & Range: 021N016W Section: 19 Subsection: NE4NE4NW4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-02
Directions: SWAN VALLEY, 2.99 AIR MILES NORTH OF CONDON, 2.19 AIR MILES EAST OF ST. HWY 83, 0.55 AIR MILES SOUTH OF CONDON CREEK.

TABLE 1. (cont.).

MONTANA

Occurrence number: 031 Site name: CONDON CREEK
County: MISSOULA
Latitude: 473436 Longitude: 1134315 Elevation: 3620
Township & Range: 021N017W Section: 13 Subsection: E2NE4SW4, W2NW4SE4
USGS Quad: CONDON
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-15
Directions: SWAN VALLEY, 3.36 AIR MILES NORTH OF CONDON, 1.33 AIR MILES EAST OF ST. HWY 83, 0.32 AIR MILES SOUTH OF CONDON CREEK.

Occurrence number: 032 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472511 Longitude: 1134134 Elevation: 4165
Township & Range: 019N016W Section: 07 Subsection: SE4SW4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1983 Date of most recent observation: 1983-07-24
Directions: SWAN VALLEY, 0.16 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA. 1.75 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 033 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472520 Longitude: 1134119 Elevation: 4130
Township & Range: 019N016W Section: 07 Subsection: N2SE4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1983 Date of most recent observation: 1983-07-04
Directions: SWAN VALLEY, 0.05 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA. 1.5 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 034 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472507 Longitude: 1134116 Elevation: 4145
Township & Range: 019N016W Section: 07 Subsection: NE4NE4SW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1983 Date of most recent observation: 1983-07-24
Directions: SWAN VALLEY, 0.3 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA. 1.5 AIR MILES WEST OF ST. HWY 83.

TABLE 1. (cont.).

MONTANA

Occurrence number: 035 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472502 Longitude: 1134114 Elevation: 4150
Township & Range: 019N016W Section: 07 Subsection: E2NE4SW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1983 Date of most recent observation: 1983-07-24
Directions: SWAN VALLEY, 0.38 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA.
1.5 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 036 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472514 Longitude: 1134148 Elevation: 4190
Township & Range: 019N016W Section: 07 Subsection/additional section: SW4SW4NW4; T19NR17W, 12SE4SE4SE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-29
Directions: ALSO 12SE4SE4NE4; SWAN VALLEY, SOUTH SIDE OF LINDBERGH LAKE RD., CA. 1.87 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 037 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472551 Longitude: 1134203 Elevation: 4170
Township & Range: 019N017W Section: 01 Subsection: SW4NE4SE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, 0.93 AIR MILES NORTH OF LINDBERGH LAKE RD., CA.
1.69 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 038 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472608 Longitude: 1134215 Elevation: 4130
Township & Range: 019N017W Section: 01 Subsection: E2SW4NE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, 1.33 AIR MILES NORTH OF LINDBERGH LAKE RD., CA.
1.62 AIR MILES WEST OF ST. HWY 83.

TABLE 1. (cont.).

MONTANA

Occurrence number: 039 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472550 Longitude: 1134244 Elevation: 4190
Township & Range: 019N017W Section: 01 Subsection: SW4NE4SW4, SE4NW4SW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1984 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, 1.25 AIR MILES NORTH OF LINDBERGH LAKE RD., CA.
2.21 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 040 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472539 Longitude: 1134244 Elevation: 4225
Township & Range: 019N017W Section: 01 Subsection: SW4SE4SW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1984 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, 1.03 AIR MILES NORTH OF LINDBERGH LAKE RD., CA.
2.32 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 041 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472541 Longitude: 1134028 Elevation: 4015
Township & Range: D19N016W Section: 05 Subsection: W2SW4SW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, 0.6 AIR MILES NORTH OF LINDBERGH LAKE RD., 0.53
AIR MILES WEST OF ST. HWY 83.

Occurrence number: 042 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472544 Longitude: 1134024 Elevation: 3995
Township & Range: 019N016W Section: 05 Subsection: N2SW4SW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, 0.7 AIR MILES NORTH OF LINDBERGH LAKE RD., 0.43
AIR MILES WEST OF ST. HWY 83.

TABLE 1. (cont.).

MONTANA

Occurrence number: 043 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472526 Longitude: 1134303 Elevation: 4280
Township & Range: 019N017W Section: 12 Subsection: SW4NW4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-30
Directions: SWAN VALLEY, 0.76 AIR MILES NORTH OF LINDBERGH LAKE RD., 2.68 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 044 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472508 Longitude: 1134156 Elevation: 4215
Township & Range: 019N017W Section: 12 Subsection: S2SE4NE4, N2NE4SE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-29
Directions: SWAN VALLEY, SOUTHEAST OF LINDBERGH LAKE RD., 2.0 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 045 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472354 Longitude: 1134058 Elevation: 4250
Township & Range: 019N016W Section: 18 Subsection: SE4SW4SE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-10
Directions: SWAN VALLEY, 1.83 AIR MILES ESE OF NORTH END OF LINDBERGH LAKE, 1.08 AIR MILES SOUTH OF SWAN RIVER, CA. 2.0 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 046 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472434 Longitude: 1134141 Elevation: 4230
Township & Range: 019N016W Section: 18 Subsection: SW4NW4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-10
Directions: SWAN VALLEY, 0.58 AIR MILES SOUTH OF SWAN RIVER, 2.13 AIR MILES WEST OF ST. HWY 83.

TABLE 1. (cont.).

MONTANA

Occurrence number: 047 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472433 Longitude: 1134127 Elevation: 4215
Township & Range: 019N016W Section: 18 Subsection: SW4NE4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-10
Directions: SWAN VALLEY, 0.5 AIR MILES SOUTH OF SWAN RIVER, 1.95 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 048 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472432 Longitude: 1134122 Elevation: 4215
Township & Range: 019N016W Section: 18 Subsection: SW4NE4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-10
Directions: SWAN VALLEY, 0.5 AIR MILES SOUTH OF SWAN RIVER, 1.89 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 049 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472444 Longitude: 1134107 Elevation: 4150
Township & Range: 019N016W Section: 07 Subsection: SW4SW4SE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-10
Directions: SWAN VALLEY, 0.16 AIR MILES SOUTH OF SWAN RIVER, 1.60 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 050 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472437 Longitude: 1134232 Elevation: 4295
Township & Range: 019N017W Section: 13 Subsection: NE4NE4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-10
Directions: SWAN VALLEY, 0.25 AIR MILES ENE OF SWAN RIVER OUTLET FROM CYGNET LAKE, 0.1 AIR MILES SOUTH OF SWAN RIVER, CA. 2.8 AIR MILES WEST OF ST. HWY 83.

TABLE 1. (cont.).

MONTANA

Occurrence number: 051 Site name: LINDBERGH LAKE
County: MISSOULA
Latitude: 472335 Longitude: 1134229 Elevation: 4425
Township & Range: 019N017W Section: 24 Subsection: NE4SE4NW4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-07-16
Directions: SWAN VALLEY, 0.91 AIR MILES EAST OF EAST SHORE OF LINDBERGH LAKE, 0.8 AIR MILES SSE OF SOUTH SHORE OF CYGNET LAKE, CA. 3.3 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 052 Site name: KRAFT CREEK
County: MISSOULA
Latitude: 472829 Longitude: 1134432 Elevation: 4010
Township & Range: 020N017W Section: 22 Subsection: SE4
USGS Quad: CYGNET LAKE
Size: 7.5 minute series
Year of initial discovery: 1987 Date of most recent observation: 1987-08-21
Directions: SWAN VALLEY, CA. 0.5 AIR MILES WNW OF NORTH END OF STONER LAKE, 0.35 AIR MILES EAST OF GLACIER CREEK, 3.15 AIR MILES WEST OF ST. HWY 83.

Occurrence number: 054 Site name: ELK CREEK
County: MISSOULA
Latitude: 473048 Longitude: 1134553 Elevation: 3810
Township & Range: 020N017W Section: 04 Subsection/additional sections: SE4SE4; 9,NE4NE4
USGS Quad: PECK LAKE
Size: 7.5 minute series
Year of initial discovery: 1988 Date of most recent observation: 1988-07-26
Directions: SWAN VALLEY, 0.25 AIR MILE WEST OF ELK CREEK, CA. 2.75 AIR MILES WSW OF CONDON.

Occurrence number: 055 Site name: ELK CREEK
County: MISSOULA
Latitude: 473058 Longitude: 1134603 Elevation: 3820
Township & Range: 020N017W Section: 04 Subsection: NE4SW4SE4
USGS Quad: PECK LAKE
Size: 7.5 minute series
Year of initial discovery: 1988 Date of most recent observation: 1988-07-27
Directions: SWAN VALLEY, 0.49 AIR MILES WEST OF ELK CREEK, CA. 2.75 AIR MILES WSW OF CONDON.

TABLE 1. (cont.).

WASHINGTON

Occurrence number: 002
COUNTY: CLARK
Latitude: 455033N Longitude: 1224554W Elevation:
Township & Range: 04N 01W Section: 11 Subsection:
USGS Quad: ST HELENS, 7.5'
Year of initial discovery: 1980 Date of most recent observation: 1980-05

Occurrence number: 001
COUNTY: SPOKANE
Latitude: 473805N Longitude: 1171738W Elevation:
Township & Range: 25N 44E Section: 19 Subsection:
USGS Quad: SPOKANE NE, 7.5'
Year of initial discovery: 1983 Date of most recent observation: 1983-07

Occurrence number: 003
COUNTY: SPOKANE
Latitude: 472830N Longitude: 1173238W Elevation: 2300
Township & Range: 23N 42E Section: 19 Subsection: NE4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1986 Date of most recent observation: 1986-05-14

Occurrence number: 004
COUNTY: SPOKANE
Latitude: 472855N Longitude: 1173004W Elevation: 2320
Township & Range: 23N 42E Section: 16 Subsection: SE4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1986 Date of most recent observation: 1986-05-20

Occurrence number: 005
COUNTY: SPOKANE
Latitude: 473026N Longitude: 1173202W Elevation: 2280
Township & Range: 23N 42E Section: 08 Subsection: NW4NW4
USGS Quad: FOUR LAKES, 7.5'
Year of initial discovery: 1986 Date of most recent observation: 1986-05-20

Occurrence number: 006
COUNTY: SPOKANE
Latitude: 472755N Longitude: 1172705W Elevation:
Township & Range: 23N 42E Section: 22 Subsection: SW4SE4
USGS Quad: SPANGLE WEST, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-04

TABLE 1. (cont.).

WASHINGTON

Occurrence number: 007
COUNTY: SPOKANE
Latitude: 472606N Longitude: 1172903W Elevation: 2320
Township & Range: 23N 42E Section: 34 Subsection: SW4SE4
USGS Quad: SPANGLE WEST, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-14

Occurrence number: 008
COUNTY: SPOKANE
Latitude: 472950N Longitude: 1173237W Elevation:
Township & Range: 23N 42E Section: 07 Subsection: SE4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-04

Occurrence number: 009
COUNTY: SPOKANE
Latitude: 472944N Longitude: 1173245W Elevation:
Township & Range: 23N 42E Section: 07 Subsection: SE4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-04

Occurrence number: 010
COUNTY: SPOKANE
Latitude: 472935N Longitude: 1173233W Elevation:
Township & Range: 23N 42E Section: 07 Subsection: SE4SE4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-04

Occurrence number: 011
COUNTY: SPOKANE
Latitude: 472712N Longitude: 1173355W Elevation:
Township & Range: 23N 41E Section: 25 Subsection: SE4SE4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-13

Occurrence number: 012
COUNTY: SPOKANE
Latitude: 472644N Longitude: 1173058W Elevation: 2320
Township & Range: 23N 42E Section: 33 Subsection: SW4NW4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-14

TABLE 1. (cont.).

WASHINGTON

Occurrence number: 013
COUNTY: SPOKANE
Latitude: 472555N Longitude: 1173708W Elevation: 2320
Township & Range: 22N 41E Section: 03 Subsection: NE4NW4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-14

Occurrence number: 014
COUNTY: SPOKANE
Latitude: 472545N Longitude: 1173613W Elevation: 2290
Township & Range: 22N 41E Section: 02 Subsection: NW4
USGS Quad: CHENEY, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-18

Occurrence number: 015
COUNTY: SPOKANE
Latitude: 473018N Longitude: 1173137W Elevation: 2300
Township & Range: 23N 42E Section: 08 Subsection: NW4NE4
USGS Quad: FOUR LAKES, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-05

Occurrence number: 016
COUNTY: SPOKANE
Latitude: 473010N Longitude: 1173247W Elevation:
Township & Range: 23N 42E Section: 07 Subsection: NE4
USGS Quad: FOUR LAKES, 7.5'
Year of initial discovery: 1987 Date of most recent observation: 1987-05-05

d. Mission Bottom.

1. U.S.A., Oregon, Marion County.
2. Latitude, longitude, altitude: 450205N, 1230340W; 125'.
3. Legal description: T6S, R3W, Section 65.
4. USGS quad: Mission Bottom, 7.5'.
5. Year of initial discovery: 1977.
6. Year of most recent observation: 1977.
7. Location: Mission Bottom, near Salem (W. Bluhm, sight record).
8. Alternative site name: none known.

e. Howard Lake.

1. U.S.A., California, Mendocino County.
2. Latitude, longitude, altitude: unknown.
3. Legal description: unknown.
4. USGS quad: Buck Rock, 7.5'.
5. Year of initial discovery: 1928.
6. Year of most recent observation: 1928.
7. Location: Pond near Howard Lake, Mendocino County Forest Reserve (A. Eastwood 13267a, CAS).
8. Alternative site name: none known.

The populations in Oregon have been searched for to no avail (J. Kagan, pers. comm.); the Marion and Clackamas county sites are in areas which have largely been developed, and intensive relocation efforts at the Multnomah County site (type locality) have remained unsuccessful. Likewise, the California collection locality has not been relocated, despite searches for it in 1979 (Griggs and Dibble 1979), and again in 1980 (R. Bittman, pers. comm.).

3. **Historically known populations where current status not known:**

a. Shelton.

1. U.S.A., Washington, Mason County.
2. Latitude, longitude, altitude: unknown.
3. Legal description: unknown.
4. USGS quad: unknown.
5. Year of initial discovery: 1937.
6. Year of most recent observation: 1937.
7. Location: In a small lake about 20 mi. n. of Shelton (W.J. Eyerdam 1211, UC).
8. Alternative site name: none known.

4. **Locations not yet investigated believed likely to support additional natural populations:** In western Montana, an extensive assemblage of glacial pothole ponds and wetlands is located in the Flathead Valley in Lake County. However, this region of the state has been extensively altered by

agricultural and residential development; also, upland areas are dominated by grassland vegetation, and habitat consisting of ponds surrounded by coniferous and deciduous trees is absent. There may be some appropriate habitat on the Lolo National Forest in west-central Montana (J. Diebert, pers. comm.), especially in the Clearwater River drainage in Missoula County.

An extensive search in northern Idaho, during June 1988, was unsuccessful in locating new Howellia aquatilis populations. It is possible that other populations may exist in Idaho north of the Clearwater River drainage. As in the other states, however, past and ongoing alteration and conversion of native low elevation bottomlands makes the prospect unlikely.

In Washington, areas near the historical record north of Shelton contain numerous wetlands, so the potential exists for relocating H. aquatilis in this region. Also, the forested portions of the channeled scablands in eastern Washington (Spokane County) probably harbor additional populations. There is some potential along the forested northern periphery of the Columbia Basin, as well (J. Gamon, pers. comm.).

In Oregon, the type locality on Sauvies Island in the Columbia River has been adequately searched; however, there may still be some potential habitat in the Willamette River valley (J. Kagan, pers. comm.).

In California, there may be habitat in temporary ponds or vernal pools on the Mendocino National Forest near where the historical collection was made. These areas should be searched in May to June or July (Griggs and Dibble 1979).

5. **Reports having ambiguous or incomplete locality information:**

a. Spirit Lake.

1. U.S.A., Idaho, Kootenai County.
2. Latitude, longitude, altitude: unknown.
3. Legal description: unknown.
4. USGS quad: unknown.
5. Year of initial discovery: 1892.
6. Year of most recent observation: 1892.
7. Location: "Valley of Lake Tesemini, Kootenai Co." (J.H. Sandberg 699, US).
8. Alternative site name: Lake Tesemini.

On 22 July 1892, J.H. Sandberg collected Howellia aquatilis near Lake Tesemini (now known as Spirit Lake) in Kootenai County, Idaho. Holzinger (1895) described Sandberg's exploration of this area as follows: "Camp 10 was situated

a short distance to the north of Rathdrum, Kootenai Co. The time occupied in the vicinity of this camp was from July 20 to July 25. The plants collected were numbered 670 to 740. The region explored was the vicinity of Rathdrum, Lake Tesemini, and Mud Lake."

Habitat information on the Sandberg label states "floating in subalpine lakes." After reviewing topographic maps for the Spirit Lake area, it was determined that no subalpine lakes exist in the Spirit Lake watershed. Subalpine elevations are reached on the eastern slopes of Mt. Spokane, Washington, at the head of Brickel Creek, but no lakes occur there. Sandberg, it appears, had a bad reputation among his contemporaries and was careless in his note-taking. Leiberg reported in a letter to C.V. Piper (cited in Mack 1988) that Sandberg's report of 1892 (Holzinger 1895) erred by as much as 240 km in the location of some specimens.

A search was conducted in the vicinity of Spirit Lake during June 1988, and while suitable habitat exists in the area, no H. aquatilis populations were found (Appendix A, p. 152).

6. **Locations known or suspected to be erroneous reports:**

   a. Columbia River Gorge (two sightings, considered to be misidentifications by the Oregon Natural Heritage Data Base (S. Vrilakas, pers. comm.).

      1. U.S.A., Oregon, Wasco County.
      2. Latitude, longitude, altitude: unknown.
      3. Legal description: unknown.
      4. USGS quad: unknown.
      5. Year of observation: unknown.
      6. Location: unknown.

C. **Biogeographical and phylogenetic history:** Details unknown, and not yet investigated. It has been speculated that the widely scattered distribution of H. aquatilis may be due to the wanderings of migratory waterfowl (Meinke 1982). The distributional pattern of H. aquatilis in Montana is undoubtedly related in part to the glacial history of the Swan Valley. The valley floor was glaciated approximately 10,000 years ago, and many of the pothole ponds and wetlands were formed upon retreat of the glacier. Thus, it is possible that the present distribution pattern of the species in Montana was recently established. In Washington, all but one of the known extant sites occur in the channeled scablands, which were formed by the Bretz floods (J. Gamon, pers. comm.).

6. General environment and habitat description.

A. **Concise statement of general environment and habitat:** Howellia aquatilis is an aquatic plant occurring in small pothole ponds or the quiet water of retired river oxbows. These wetlands

usually have bottom surfaces of firm, consolidated clay and organic sediments. They are virtually always partially surrounded by broadleaf deciduous trees, such as Populus trichocarpa (Black Cottonwood) and/or P. tremuloides (Quaking Aspen) in Montana, and Fraxinus latifolia (Ash) or Quercus garryana (Garry Oak) in Washington. Characteristic associated aquatic species include Carex vesicaria (Inflated Sedge), Sium suave (Hemlock Water-parsnip), and/or Equisetum fluviatile (Water Horsetail) in Montana. In Idaho, H. aquatilis occurs in a small pond in a cutoff river channel, in a broad valley bottom surrounded by low, forested hills. Rangewide, the ponds are generally filled by spring rains or snowmelt run-off, and many are usually dry by the end of the growing season. Howellia aquatilis occurs at elevations from 3 m (10 feet) in Washington to 1350 m (4420 feet) in Montana.

B. Physical characteristics.

1. Climate.

a. Koppen climate classification (extant sites): Types Csa and Csb (warm, maritime or semimaritime types with dry summers), and Dfb (cool temperate climate, with numerous summer thunderstorms) (Visher 1954).

b. Regional macroclimate: The climates in which H. aquatilis has been found range from semi-arid Meditteranean (California; R. Bittman, pers. comm.) to moist temperate (northwestern Montana).

Near the distributional area of H. aquatilis in the Swan Valley, Montana, the closest climatological stations are located in Bigfork (3010 ft. (918 m) elevation) and Seeley Lake (4100 ft. (1250 m) elevation). Data for the period 1951-1980 are provided by the U.S. Department of Commerce (1982). At Bigfork, the mean annual precipitation was 56.08 cm (22.08 in.); the mean annual temperature was 7.5° C (45.5° F), and the mean July maximum temperature was 27.6° C (81.7° F). At Seeley Lake, the mean annual precipitation was 56.16 cm (22.11 in.); the mean annual temperature was 5.2° C (41.3° F), and the mean July maximum temperature was 27.8° C (82.0° F).

The climate of northern Idaho is influenced primarily by Pacific maritime air. However, Idaho is 500 to 650 km inland from the Pacific Ocean, and the Cascade Mountains separate Idaho from the coast. The distance and the mountain barrier result in a climate with many continental characteristics. Because prevailing westerly winds blow inland from the Pacific Ocean, winters are warmer and milder than might be expected. These mild, moist winds result in winters that are humid and cloudy. Snowfall is heavy in the mountains.

Periodically, the westerly flow of air is interrupted by outbreaks of clear, cold continental air from Canada. During the summer months, the westerly winds weaken, and continental climatic conditions prevail. Rain fall, cloud cover, and relative humidity are at their minimum in summer. The Soil Conservation Service (1981) estimates that, in Latah County, the average annual precipitation is 63.5 cm (25 in.), the average annual air temperature is about 6.7° C (44° F), and the average frost-free season is about 110 days.

The climate in western Washington is undoubtedly warmer and moister than in Idaho or Montana.

c. **Local microclimate:** No detailed quantitative information available. The aquatic habitats occupied by H. aquatilis are probably less subject to diurnal temperature fluctuations than the atmosphere. In Montana, the species often occurs along the margins of small ponds surrounded by heavy forest cover, and thus would be shaded for much of the day. In Idaho, the small pond containing Howellia aquatilis is partially shaded throughout the summer by tall shrubs that immediately border it. Cold air pooling can be intense during the fall, winter and spring, but is moderate during most of the growing season due to the relatively low elevation.

2. **Air and water quality requirements:** In Montana, water samples from nine ponds supporting H. aquatilis, and three ponds not supporting the species, were analyzed to determine pH and conductivity. In addition, five samples (three from H. aquatilis ponds, two from others) were analyzed to determine alkalinity. The results of these analyses are presented in Table 2.

None of the factors analyzed appear to distinguish among ponds containing or not containing H. aquatilis. The pH values for ponds with or without the species are all in the neutral range (6.75-7.92). It is possible that other factors which were not analyzed are more important in determining the suitability of a particular site for supporting H. aquatilis (i.e., dissolved oxygen, temperature).

Air quality requirements are unknown.

3. **Physiographic provinces:** Known from the Northern Rocky Mountain, Columbia Plateaus, and Pacific Border provinces mapped by Fenneman (1931); the Rocky Mountains, Columbia-Snake River Plateau, and Pacific Border provinces mapped by Hunt (1974); and the Columbia Basin Province mapped by Franklin and Dyrness (1973).

TABLE 2. Water chemistry analyses, Swan Valley, Lake and Missoula counties, Montana.*

A. Ponds containing Howellia aquatilis:

Sample (occurrence number)	pH	Conductivity (umho/cm @ 25°C)	Alkalinity (mg/L as CaCO3)
A-2 (007)	7.20	73	32
C-1 (020)	7.28	87	44
C-3 (027)	7.66	266	130
D-1 (008)	7.57	322	-
D-3 (014)	7.00	162	-
E-1 (049)	7.29	73	-
F-1 (018)	6.78	68	-
G-1 (031)	7.13	54	-
H-1 (051)	6.85	33	-
$\bar{x}$	7.20	126	69

B. Ponds not containing Howellia aquatilis:

B-1 (near 007)	7.61	210	103
C-2 (near 021)	6.75	30	10
D-2 (near 008)	7.92	216	-
$\bar{x}$	7.43	152	56

* - Analyses conducted by the Chemistry Laboratory Bureau, Montana Department of Health and Environmental Sciences, July 1987.

4. **Physiographic and topographic characteristics:** In the Montana portion of the range, the topography of the Swan Valley is of glacial origin. Generally, the floor of the valley is level to gently sloping, with drumlins in numerous areas. The pothole ponds in which H. aquatilis most often occurs were formed upon the retreat of a continental glacier about 10,000 years ago. These ponds could represent depressions left when masses of ice buried in outwash gravels melted; they could also be formed when areas of ice melted out between areas of outwash sediments which accumulated upon the glacier surface (Alt and Hyndman 1986).

   In Montana, the species is currently known to occur only in the Swan River drainage, within Hydrologic Unit No. 17010211 as mapped by the United States Geological Survey (1980).

   The Idaho population occurs in a mature river bottom, characterized by a wide floodplain and a meandering river. The deep, alluvial soils are derived from the erosion of loess and volcanic ash that were deposited on the surrounding mountains during the Pleistocene.

   In Washington, the ponds in the Spokane region are in an area of basalt flows, and several of them are immediately rimmed by basalt outcrops. The area is characterized by low topographic relief (J. Gamon, pers. comm.).

   The sites for H. aquatilis in Montana range from 945 m (3100 ft.) near the south end of Swan Lake, to 1348 m (4420 ft.) near the east side of Lindbergh Lake. The elevations in Washington range from 3 m (10 ft.) near the Columbia River, to 707 m (2320 ft.) in the Spokane area. The Idaho site occurs at 780 m (2560 ft.).

5. **Edaphic factors:** Howellia aquatilis is found almost exclusively in ponds with bottom surfaces which consist of firm, consolidated clay and organic sediments. Only in two cases were plants found in ponds with deeper, largely unconsolidated bottom sediments; in these situations, most H. aquatilis plants were then found in shallower areas near the shore, in more consolidated portions of the ponds. The texture and depth of these bottom sediments may be very important in relation to seed germination requirements and early growth of H. aquatilis. Loose, silty soil sediments may lead to burial of seeds too deeply to physically allow efficient germination and establishment.

   In Montana, the soil units which comprise the Swan Valley floor consist of Cryochrepts, Eutroboralfs, and Eutrochrepts. The parent materials for these soils consist of clayey alluvium and clayey colluvium; the resultant soils are deep (Montagne et al. 1982).

The Swan River Oxbow (005) site is unusual in that the H. aquatilis populations occupy areas in and near an old, retired oxbow of the previous river channel. The site is physiographically very different from the glacial pothole depressions which the species inhabits elsewhere in the Swan Valley. However, the bottom sediments of the sloughs are of a similar consolidated texture, and many of the common associated species are present, especially Carex vesicaria and Equisetum fluviatile.

Most sites in Spokane County, Washington, are mapped as Cocalalla silty clay loam, a poorly drained soil formed in volcanic ash mixed with silty alluvium, under sedges, rushes and grasses. At least one site is mapped as Semiahoo muck, a very poorly drained organic soil (Donaldson and Giese 1968).

The Idaho population falls within a mapping unit containing soils of the Hampson series, which are coarse-silty, mixed, frigid Fluventic Haploxerolls. They are very deep, moderately well drained soils on valley floors. The soils are formed in alluvium derived from various sources. Slope is 0-3% (Soil Conservation Service 1981). These soils actually occur in adjacent bottomland meadows and are generally not submerged.

6. Dependence on natural disturbance: Howellia aquatilis is restricted to aquatic habitats which typically contain water for most of the growing season, but which dry out in many areas by late summer or early fall. The pothole ponds are stable landforms which would be influenced mainly by vegetational changes. However, in the case of the Swan River Oxbow (005) site in Montana, it occurs in a flood plain area which is completely inundated during spring run-off. Howellia aquatilis appears to be tolerant of this situation, as the populations return each season (with variation in size) from the seed bank. The extent, if any, to which the species depends on the drying of its habitat each year, i.e., to promote seed germination, is unknown. However, H. aquatilis may behave as a true "vernal pool" species. It is suspected that any disturbance which alters the local surface or subsurface hydrology around the habitats may influence the populations.

7. Other unusual physical features: None known or observed.

C. Biological characteristics.

1. Vegetation physiognomy and community structure: Howellia aquatilis occurs in wetland communities dominated by emergent vegetation. In Montana and Idaho, the ponds and wetlands are typically surrounded by temperate coniferous forests dominated by trees with more or less conical crowns. The immediate margins of these wetlands often have

a shrub zone which overhangs the shoreline. In addition, large deciduous tree species are almost always found along the margins.

2. **Regional vegetation types:** In Montana, within the Cedar-Hemlock-Douglas-fir Forest Section; in eastern Washington and Idaho, near the border between the Palouse Grassland Province and the Douglas-fir Forest Section; and in western Washington, within the Willamette-Puget Forest Province, all as mapped by Bailey (1976). In Montana, within the Subalpine Fir, Douglas-fir, and Grand Fir Climax Forest zone mapped by Ross and Hunter (1976). The Idaho population occurs in a riparian zone at the interface of two Kuchler types: Grand Fir-Douglas Fir Forests and Wheatgrass-Bluegrass (Kuchler 1964). Surrounding forest types fall into three Society of American Foresters (SAF) cover types: Interior Douglas-fir (210), Western Larch (212), Grand Fir (213), and Western White Pine (215) (Eyre 1980). Habitat types fall into the grand fir, western redcedar, and Douglas-fir series (Cooper et al. 1987).

3. **Frequently associated species:** In Montana, Howellia aquatilis is most often found in small pothole ponds of glacial origin, at lower elevations in the Swan River drainage. The zonal vegetation in these areas consists of diverse coniferous forests which contain varying amounts of the following tree species:

Abies grandis (Grand Fir)
Abies lasiocarpa (Subalpine Fir)
Larix occidentalis (Western Larch)
Picea engelmannii (Engelmann Spruce)
Pinus contorta (Lodgepole Pine)
Pinus monticola (Western White Pine)
Pinus ponderosa (Ponderosa Pine)
Pseudotsuga menziesii (Douglas Fir)

Immediately surrounding the ponds in which H. aquatilis has been found, the following deciduous broadleaf tree species are virtually always present: Populus tremuloides (Quaking Aspen) and/or Populus trichocarpa (Black Cottonwood). In the northern Swan Valley, Betula papyrifera (Paper Birch) is also associated with some sites.

Shrub species bordering H. aquatilis sites include:

Alnus incana (Thinleaf Alder)
Cornus stolonifera (Red Osier Dogwood)
Juniperus communis (Common Juniper)
Rhamnus alnifolia (Alder Buckthorn)
Salix spp. (Willows)

The following aquatic herbaceous species were found to be commonly associated with H. aquatilis; those marked with an

asterisk can be considered indicator species:

*Carex vesicaria (Inflated Sedge)
Callitriche heterophylla (Different-leaved Water-starwort)
*Equisetum fluviatile (Water Horsetail)
Potamogeton gramineus (Variable Leaf Pondweed)
Ranunculus aquatilis (Hairleaf Water Buttercup)
*Sium suave (Hemlock Water-parsnip)
Sparganium minimum (Small Bur-reed)

Other herbaceous species less frequently associated with H. aquatilis in Montana include:

Alisma plantago-aquatica (American Waterplantain)
Alopecurus aequalis (Shortawn Foxtail)
Carex atherodes (Slough Sedge)
Carex rostrata (Beaked Sedge)
Eleocharis palustris (Common Spikesedge)
Glyceria borealis (Northern Mannagrass)
Myriophyllum spicatum (Spiked Water-milfoil)
Nuphar variegatum (Yellow Water-lily)
Phalaris arundinacea (Reed Canarygrass)
Ranunculus gmelinii (Gmelin's Buttercup)
Sagittaria cuneata (Duckpotato Arrowhead)
Typha latifolia (Common Cattail)
Utricularia vulgaris (Common Bladderwort)
Veronica catenata (Chain Speedwell)

In Washington, the ponds are surrounded most often by the following tree and shrub species:

Cornus stolonifera (Red Osier Dogwood)
Fraxinus latifolia (Ash)
Pinus ponderosa (Ponderosa Pine)
Populus tremuloides (Quaking Aspen)
Populus trichocarpa (Black Cottonwood)
Symphoricarpos albus (Common Snowberry)

Associated aquatic species in Washington include:

Callitriche stagnalis (Pond Water-starwort)
Ludwigia palustris (Ludwigia) - drying areas
Nuphar polysepalum (Spatter-dock)
Polygonum coccineum (Water Smartweed)
Ranunculus flabellaris (Yellow Buttercup)
Ranunculus flammula (Creeping Buttercup) - drying areas

In Idaho, the forests bordering the broad river bottom are dominated by a mixture of coniferous species, including Pinus contorta, Larix occidentalis, Thuja plicata (Western Red-cedar), Abies grandis, Pinus ponderosa, and Abies lasiocarpa. Species immediately bordering the pond include Crataegus douglasii (Hawthorn), Cornus stolonifera, Alnus

incana, Symphoricarpos albus, Phlaris arundinacea, and Rosa sp. Associated aquatic species include Alisma plantago-aquatica, Sium suave, Carex rostrata, Lemna minor (Duckweed), Eleocharis sp., and Callitriche heterophylla.

4. **Dominance and frequency of the taxon:** Howellia aquatilis is often distributed in a patchy pattern within its habitat, and varies from scarce to relatively frequent (20-30% cover). It was generally observed to occupy less densely vegetated areas. In Montana, two situations were observed in particular: 1.) in many ponds, the greatest densities of H. aquatilis were found around the pond margins, under the cover of surrounding overhanging shrubs (Salix spp., Alnus incana, Cornus stolonifera). In this zone other emergent aquatic species do not occur in abundance, and H. aquatilis is able to spread throughout the open areas, often growing in thick mats; 2.) in ponds dominated throughout by Carex vesicaria and/or Equisetum fluviatile, H. aquatilis was frequently observed to occupy openings among such vegetation. Similarly, in the central open water of some ponds H. aquatilis becomes very dense (near 100% cover). While the species was found to occur amongst the stems of other emergent plants, it was often not as abundant in such situations. These observations suggest that H. aquatilis may prefer more open microhabitats within the ponds it occupies, and that it cannot compete vigorously with other aquatic plant species. However, at least one site in Washington is dominated by Phalaris arundinacea (Reed Canary Grass), but H. aquatilis is abundant (J. Gamon, pers. comm.). In Idaho, the 30 individuals observed in 1988 had a patchy distribution, occurring mostly in the center of the pond. No observable factors appeared responsible for this pattern.

5. **Successional phenomena:** In Montana, the pothole ponds inhabited by H. aquatilis appear to be at an early stage within the successional series for such habitats. In classifications of wetland habitat types, such ponds could generally be classified as inland shallow fresh marshes (Shaw and Fredine 1956) or seasonal ponds (Stewart and Kantrud 1971). Such wetlands are often characterized by aquatic grasses (i.e, Glyceria spp., Alopecurus aequalis) and sedges (i.e., Carex vesicaria, C. rostrata, C. atherodes), pondweeds (Potamogeton spp.), and burreeds (Sparganium spp.) (Weller 1981). With increasing sedimentation and accumulation of organic matter, and subsequent lowering of the water table, such habitats can eventually develop into sedge meadows (Reuter 1986). Numerous examples of such meadows can be found in the Swan Valley in Montana. They are dominated most often by Carex lasiocarpa, and the water table is at or below the soil surface. Such sites were never observed to contain H. aquatilis.

The characteristic which may be most important in maintaining the pothole ponds inhabited by H. aquatilis is that they generally always dry completely by the end of the growing season (late August-September in Montana). Such drying inhibits the rate of muck accumulation (Reuter 1986), and may serve to maintain these ponds in an earlier emergent successional stage.

In ponds which are more successionally advanced, and which may remain wetter for most of the growing season, Typha latifolia and Nuphar variegatum are more frequent. In Montana, Howellia aquatilis occurs in association with T. latifolia in 12 such ponds or wetlands (Condon Creek (031), Dog Creek (018), Lindbergh Lake (004, 012, 032, 033, 037, 040, 042, 046, 047, 048), and Swan River Oxbow (005)); it is associated with N. variegatum in three locations (Lost Creek-Cilly Creek Ponds (011, 012), Lindbergh Lake (047)). In many cases, these ponds support less vigorous populations of H. aquatilis, possibly owing to the advancing succession and deeper unconsolidated bottom sediments of such habitats.

Successional trends at the Idaho site could not be discerned due to the limited number of visits made to the area. Vernal ponds have been present at the site for at least 20 years (Ruth Ownbey, pers. comm.).

Despite the fact that H. aquatilis occurs over a large geographic area, it is ecologically adapted to a narrowly defined aquatic habitat. Thus, any direct impacts on its habitat may be more likely to cause extirpation. The species does not appear to be capable of colonizing disturbed habitats.

6. **Dependence on dynamic aspects of biotic associations and ecosystem features:** Howellia aquatilis occurs in shallow ponds and wetlands which generally contain water from spring to mid- or late summer, depending on climatic conditions. In the majority of cases, at least in Montana, these habitats then dry completely near the end of summer (September); in some cases in which H. aquatilis occurs near the margins of deeper ponds, these margins may dry out while the center remains filled. Thus, the species appears to be adapted to "vernal pool" conditions; substantial seed germination may require yearly drying after seed dispersal. This habitat relationship would surely be closely influenced by yearly variation in precipitation amounts, especially snow depth and resultant run-off. In Washington, some of the ponds which contain H. aquatilis were dry through all of 1987; it remains to be seen how the populations will respond once these sites have water in them again (J. Gamon, pers. comm.).

7. **Other endangered, threatened, rare, or vulnerable species occurring in habitat of this taxon:**

Idaho - Tauschia tenuissima (Leiberg's Lomatium), a Category 2 federal candidate, occurs in bottomland meadows adjacent to the pond containing H. aquatilis.

Montana - The only state sensitive aquatic species which is known to occur in the vicinity of H. aquatilis is Potamogeton obtusifolius (Blunt-leaved Pondweed, G5/S1S2). This species occurs at the Swan River Oxbow (005) site.

Washington - Cypripedium calceolus var. parviflorum (Small Yellow Lady's-slipper), which is considered endangered in the state (Washington Natural Heritage Program 1987), occurs on the periphery of some ponds which contain H. aquatilis (J. Gamon, pers. comm.).

7. Population biology of taxon.

A. **General summary:** Populations of H. aquatilis generally consist of a few to several thousand individuals. The species is an annual; population size is known to fluctuate yearly, and is probably mainly associated with variation in annual climatic patterns (precipitation and temperature fluctuations). Recent evidence indicates that the species has no intra- or inter-population genetic variation. Morphological studies and field observations indicate that H. aquatilis is an obligate self-pollinator. Seeds may be dispersed between wetland habitats by wildlife use and migration. Evidence for the existence of seed banks has been obtained from one location in Montana.

B. **Demography.**

1. **Known populations:** A total of 72 recently extant populations, from 13 sites, are known: 55 (9 sites) in Montana; 16 (3 sites) in Washington; and 1 in Idaho. A site is considered to be a cluster of adjacent populations, each of which is generally no more than 1.6 km from the next nearest population. Populations vary from only a few individuals, up to many thousands of plants. Owing to the annual life history, and the presence of seed banks, the total number of known individuals cannot be meaningfully estimated.

2. **General demographic details:** See Table 3, pp. 41-49.

C. **Phenology.**

1. **Patterns:** Recent observations in Montana revealed that H. aquatilis can germinate in the fall (P. Lesica, pers. comm.). In Idaho and Montana, the plants are then actively growing beneath the water surface by early May. The submergent, cleistogamous flowers begin to form shortly

TABLE 3. General demographic details, listed by state and occurrence number.

IDAHO

Occurrence number: 001 Site name: HARVARD
County: LATAH
Acreage: 1
Population data: 30 FLOWERING INDIVIDUALS IN THREE CLUMPS (1988), IN A POND CA. 15 x 45 FT.

MONTANA

Occurrence number: 001 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 75-100+ PLANTS (1987); NORTH END OF POND IMPACTED BY LOGGING, WITH SOME SLASH PILED INTO THE WATER.

Occurrence number: 002 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 4
Population data: EST. 2000-3000 PLANTS (1987); NORTH AND WEST MARGINS OF POND DISTURBED BY LOGGING ACTIVITY; DEEPEST POND KNOWN FOR THE SPECIES IN MONTANA (CA. EIGHT FEET); SOME INDIVIDUALS VERY LARGE.

Occurrence number: 003 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: 1000+ PLANTS (1983); POND IS A SMALL GLACIAL DEPRESSION NEXT TO A LARGER BOG, TO WHICH IT MAY HAVE BEEN CONNECTED EARLIER.

Occurrence number: 004 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 11-50 PLANTS (1983).

Occurrence number: 005 Site name: SWAN RIVER OXBOW
County: LAKE
Acreage: 30
Population data: VERY COMMON; MAY BE LARGEST OCCURRENCE KNOWN, WITH ABOUT 10000 INDIVIDUALS (1985); ELEMENT OCCURS IN 4 AREAS, IN AND ADJACENT TO THE OLD RIVER OXBOW; MANY HUNDREDS OF PLANTS OBSERVED IN 1987.

TABLE 3. (cont.).

MONTANA

Occurrence number: 006 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 1000-2000 PLANTS (1987); MANY PLANTS DISTURBED BY MOOSE AND/OR WATERFOWL ACTIVITY; AREA IS ACTIVELY THREATENED BY LOGGING ROAD CONSTRUCTION AND TIMBER HARVESTING.

Occurrence number: 007 Site name: SWAN RIVER WEST
County: LAKE
Acreage: 1
Population data: ABOUT 3000-4000 PLANTS, POSSIBLY MORE; VERY DENSE, AND FORMING MATS, IN WEST POND; THE TWO PONDS, WHICH ARE SEPARATED BY A SALIX BORDER, ARE JOINED BY HIGHER WATER IN THE SPRING.

Occurrence number: 008 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 2
Population data: EST. 2000-3000 PLANTS, IN A SINGLE POND; SURROUNDED BY A RELATIVELY UNDISTURBED FOREST, WHICH WAS REPORTEDLY LIGHTLY SELECTIVELY LOGGED IN ABOUT 1910.

Occurrence number: 009 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 3
Population data: EST. 500-600 PLANTS (1987); SPECIES DOES NOT OCCUPY ALL OF THE AVAILABLE, SUITABLE HABITAT AT THIS SITE; AREAS AROUND SOUTH AND EAST SIDES OF POND CLEARCUT CA. 15 YEARS AGO.

Occurrence number: 010 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 2
Population data: EST. 200-300 PLANTS (1987); FLOWERS AND CLEISTOGAMOUS FRUIT; SPECIES DOES NOT OCCUPY ALL OF THE AVAILABLE, SUITABLE HABITAT AT THIS SITE; AREAS AROUND SOUTH AND EAST SIDES OF POND CLEARCUT CA. 15 YEARS AGO.

Occurrence number: 011 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 5
Population data: EST. 100-200 PLANTS (1987), ON SOUTHWEST, NORTH AND EAST MARGINS; PAST LOGGING DISTURBANCE IN THE AREA.

TABLE 3. (cont.).

MONTANA

Occurrence number: 012 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 2
Population data: EST. 400-500 PLANTS (1987); MUCH OF POND HAS NO VEGETATION; LOGGING HAS OCCURRED AROUND POND.

Occurrence number: 013 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 2
Population data: EST. 1000-1500 PLANTS (1987); LOGGING HAS OCCURRED AROUND POND.

Occurrence number: 014 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 2
Population data: EST. 300-400 PLANTS (1987); LOGGING HAS OCCURRED IN ADJACENT FORESTS.

Occurrence number: 015 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 2
Population data: EST. 300+ PLANTS (1987); LOGGING HAS OCCURRED IN ADJACENT FORESTS; THIS POND WAS DRYING FASTER THAN OTHERS AT THIS SITE.

Occurrence number: 016 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 2
Population data: EST. 400+ PLANTS (1987); ADJACENT TO LOGGING ROAD.

Occurrence number: 017 Site name: LOST CREEK-CILLY CREEK PONDS
County: LAKE
Acreage: 3
Population data: EST. 10-12 PLANTS (1987); ADJACENT TO LOGGING ROAD; THIS DEPRESSION WAS MUCH DRYER THAN THE OTHERS, HOWELLIA AQUATILIS PRESENT IN A FEW PUDDLES; HABITAT MAY BE MORE ADVANCED SUCCESSIONALLY THAN NEARBY PONDS.

Occurrence number: 018 Site name: DOG CREEK
County: LAKE
Acreage: 2
Population data: EST. 200+ PLANTS (1987); SURROUNDING FOREST LOGGED.

TABLE 3. (cont.).

MONTANA

Occurrence number: 019 Site name: DOG CREEK
County: LAKE
Acreage: 2
Population data: EST. 150-200 PLANTS (1987); FOREST IMMEDIATELY SURROUNDING POND IN GOOD CONDITION, FAIRLY UNDISTURBED.

Occurrence number: 020 Site name: CONDON CREEK
County: MISSOULA
Acreage: 2
Population data: EST. 1000 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

Occurrence number: 021 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 50 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

Occurrence number: 022 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 200 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

Occurrence number: 023 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: 3 PLANTS (1987); SEVERAL HUNDRED PLANTS OBSERVED IN 1986 BY P. LESICA; NEARBY FORESTS RECENTLY LOGGED.

Occurrence number: 024 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 30 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

Occurrence number: 025 Site name: CONDON CREEK
County: MISSOULA
Acreage: 2
Population data: EST. 25 PLANTS (1987); POND MARGINS RECENTLY DISTURBED BY LOGGING.

Occurrence number: 026 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 200-300 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

TABLE 3. (cont.).

MONTANA

Occurrence number: 027 Site name: CONDON CREEK
County: MISSOULA
Acreage: 2
Population data: EST. 300 PLANTS (1987); SOUTH MARGIN OF POND RECENTLY DISTURBED BY LOGGING.

Occurrence number: 028 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 200-250 PLANTS (1987); ADJACENT USFS LAND RECENTLY LOGGED.

Occurrence number: 029 Site name: CONDON CREEK
County: MISSOULA
Acreage: 2
Population data: EST. 200-300 PLANTS (1987); POND MARGINS RECENTLY DISTURBED BY LOGGING.

Occurrence number: 030 Site name: CONDON CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 1000 PLANTS (1987); POND MARGINS RECENTLY DISTURBED BY LOGGING.

Occurrence number: 031 Site name: CONDON CREEK
County: MISSOULA
Acreage: 2
Population data: EST. 150-175 PLANTS (1987); AREA DISTURBED BY LOGGING IN THE PAST; POND ADJACENT TO A LOGGING ROAD; PLANTS FOUND IN CALM, SHALLOW AREAS UNDER SHRUBS BORDERING POND, AND ADJACENT TO LOGS.

Occurrence number: 032 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 101-1000 PLANTS (1983).

Occurrence number: 033 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 50 PLANTS (1983); THIS SLOUGH HAS A FLOATING SEDGE MAT, AND IS DOMINATED BY TYPHA, AND THUS IS APPARENTLY MORE SUCCESSIONALLY ADVANCED THAN OTHERS IN THE AREA.

TABLE 3. (cont.).

MONTANA

Occurrence number: 034 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 11-100 PLANTS (1983).

Occurrence number: 035 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 51-1000 PLANTS (1983).

Occurrence number: 036 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 100-125 PLANTS (1987); PLANTS ARE FOUND AT SOUTHEAST END OF POND, ON SECTION LINE.

Occurrence number: 037 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 10-15 PLANTS (1987); POND DISTURBED BY HEAVY LOGGING ON ALL SIDES; PLANTS FOUND IN SOUTH END OF POND.

Occurrence number: 038 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 1000-1200 PLANTS (1987); POND DISTURBED BY HEAVY LOGGING ON ALL SIDES.

Occurrence number: 039 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 1000-1500 PLANTS (1987); POND DAMAGED BY LOGGING ON NORTHEAST SIDE.

Occurrence number: 040 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 300-400 PLANTS (1987); FOREST IMMEDIATELY SURROUNDING POND CURRENTLY UNDISTURBED.

TABLE 3. (cont.).

MONTANA

Occurrence number: 041 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: FOUR PLANTS (1987); POND AND SURROUNDING FOREST UNDERSTORY HEAVILY DISTURBED BY LIVESTOCK GRAZING; PLANTS FOUND ON EAST EDGE OF POND.

Occurrence number: 042 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 3
Population data: EST. 50-60 PLANTS (1987); POND AND SURROUNDING FOREST UNDERSTORY DISTURBED BY LIVESTOCK GRAZING; PLANTS FOUND IN NORTH, NE, AND SOUTH PORTIONS OF POND; MOST PLANTS FOUND IN AN ARM ON NE SIDE OF POND.

Occurrence number: 043 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 20-25 PLANTS (1987).

Occurrence number: 044 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 275-400 PLANTS (1987); POND IS ALONGSIDE A HEAVILY USED GRAVEL ROAD, AND IS UNDER A POWER LINE.

Occurrence number: 045 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 2
Population data: EST. 300 PLANTS (1987).

Occurrence number: 046 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 50 PLANTS (1987); ADJACENT AREAS DISTURBED BY CLEARCUT LOGGING.

Occurrence number: 047 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 200 PLANTS (1987); POND LOCATED ON EDGE OF A CLEARCUT.

TABLE 3. (cont.).

MONTANA

Occurrence number: 048 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 250 PLANTS (1987); ADJACENT AREAS DISTURBED BY CLEARCUT LOGGING.

Occurrence number: 049 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 1500-2000 PLANTS (1987); POND IS ON NORTH SIDE OF A NEWLY CONSTRUCTED LOGGING ROAD, JUST NORTH OF USFS BOUNDARY.

Occurrence number: 050 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 3
Population data: EST. 500-1000 PLANTS (1987); MOSTLY ON THE POND MARGIN, IN THE MORE OPEN ZONE BETWEEN THE EMERGENT VEGETATION AND THE SHORELINE, UNDER OVERHANGING SHRUB COVER; A FEW PLANTS OUT IN DEEPER WATER.

Occurrence number: 051 Site name: LINDBERGH LAKE
County: MISSOULA
Acreage: 1
Population data: EST. 100-125 PLANTS (1987); VERY SMALL POND, MOSTLY DRY EXCEPT FOR CENTER WHERE PLANTS WERE FOUND.

Occurrence number: 052 Site name: KRAFT CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 200 PLANTS (1987); A FEW PLANTS IN MUD ON POND MARGIN STILL FLOWERING ON DATE OF SURVEY; ENTIRE POND NOT SURVEYED.

Occurrence number: 053 Site name: SALMON PRAIRIE
County: LAKE
Acreage: 2
Population data: EST. 200-300 PLANTS, ALONG MARGINS OF TWO AREAS WHICH ARE CONNECTED BY HIGHER WATER IN EARLY SUMMER; PONDS BISECTED BY FENCE, WITH MOST PLANTS ON WEST (USFS) SIDE.

Occurrence number: 054 Site name: ELK CREEK
County: MISSOULA
Acreage: 1
Population data: EST. 400-500 PLANTS, PROBABLY MORE WHEN POND IS FULL.

TABLE 3. (cont.).

MONTANA

Occurrence number: 055 Site name: ELK CREEK
County: MISSOULA
Acreage: 1
Population data: CA. 100 INDIVIDUALS (53 COUNTED); FOUND ONLY IN SOUTH END OF POND, AROUND MARGIN; DOES NOT OCCUPY ALL AVAILABLE HABITAT.

WASHINGTON (information provided for occurrences where known)

Occurrence number: 001
County: SPOKANE
Acreage: 1
Population data: 20 PLANTS (1983).

Occurrence number: 002
County: CLARK
Acreage: 1
Population data: ABUNDANT (1980).

Occurrence number: 004
County: SPOKANE
Acreage: 1
Population data: AT LEAST SEVERAL HUNDRED PLANTS (1986).

Occurrence number: 005
County: SPOKANE
Acreage: 1
Population data: PROBABLY SEVERAL HUNDRED TO >> 1000 INDIVIDUALS (1986).

Occurrence number: 010
County: SPOKANE
Acreage: 1
Population data: VERY LITTLE Howellia OBSERVED, BUT NOT MUCH WATER PRESENT (1986).

Occurrence number: 013
County: SPOKANE
Acreage: 1
Population data: VERY LITTLE Howellia WAS OBSERVED (1986).

thereafter; the first fruits from these have been found in June. The emergent, chasmogamous flowers begin to bloom when the stems reach the water surface, and are usually conspicuous from late June until August. Seed dispersal largely takes place from mid- to late summer. In Washington, the sites are lower in elevation, and emergent flowering begins during May (J. Gamon, pers. comm.). In Idaho in 1988, during which near average climatic conditions occurred during the spring, cleistogamous flowers were in bud on unbranched, submerged stems on 6 May. Plants were in flower above the water surface on 14 June, and cleistogamous fruits were near maturity.

2. **Relation to climate and microclimate:** Because H. aquatilis is an aquatic species largely restricted to vernal ponds and wetlands, its phenology is intimately tied to the climatic factors influencing these habitats. These factors would include precipitation (especially winter snowpack and subsequent run-off, and spring rains) and summer weather patterns. The current drought conditions in the Pacific Northwest have resulted in an earlier drying of some of the habitats in Montana. A subsequent reduction in the total amount of seed production would be expected, since the actual duration of the plants and flowers would be shorter. In Washington, the current drought conditions have resulted in some ponds remaining dry (or at least without ponded water) throughout the year (J. Gamon, pers. comm.). However, drought conditions experienced in northern Idaho during the winters of 1986-87 and 1987-88 did not appear to affect the water level of the pond; it was at high water mark.

D. **Reproductive biology.**

1. **Types of reproduction:** The breeding system of H. aquatilis has been studied by Lesica et al. (1988). Anatomical studies showed that in the cleistogamous flowers, the corolla develops a small closed bud and then drops off, leaving an enlarging ovary. Although the chasmogamous flowers develop fully, anther dehiscence and embryo development before the flowers had opened was repeatedly observed. In these flowers, as the corolla opens the stigma pushes up through the filament tube in close proximity to the dehiscing anthers; this sequence would almost assure self-pollination if it had not previously taken place. No evidence of agamospermy was observed; in both cleistogamous and chasmogamous flowers, embryo and/or endosperm development was observed only after penetration of the ovule by a pollen tube. Additionally, pollen stainability of samples from the Condon Creek site in Montana was 93% (s.d.=3%), indicating normal fertility. All of these observations suggest that, although not impossible, the occurrence of outcrossing in this species is probably extremely restricted, and that the breeding system

approaches obligate autogamy. Reproduction by cloning or other asexual means has not been observed.

2. **Pollination.**

   a. **Mechanisms:** As described above, H. aquatilis largely appears to be an obligate self-pollinator.

   b. **Specific pollination agents:** None known or suspected, although small insects (i.e., dipterons) have been very rarely observed on the chasmogamous flowers (J. Pierce, pers. comm.; J.S. Shelly, pers. observation).

   c. **Other suspected pollination agents:** None known, although it is possible that pollen transfer via water might occur.

   d. **Vulnerability of pollination mechanisms:** None suspected.

3. **Seed dispersal.**

   a. **General mechanisms:** The seeds of H. aquatilis are relatively large (2-4 mm. long). They do not possess any wings, appendages, or other structures which appear to provide them with any buoyancy. Though capable of floating on the surface owing to water surface tension, the seeds sink readily when pushed or released below the surface. It is likely that all of the seeds produced by the submergent cleistogamous flowers sink to the bottom upon release. Although seeds released from emergent capsules could float for a short distance from the point of dispersal, it is likely that these seeds sink fairly soon after release as well.

   The majority of the populations of H. aquatilis occur in ponds which are not connected by above-ground drainages or by spring run-off. The exception to this is the Swan River Oxbow (005) site, where the species occurs in four adjacent wetlands on the floodplain of the Swan River. During years of high spring run-off, this area is inundated, and it is likely that these wetlands are thus interconnected. Water from the Swan River was observed flowing through the surrounding forests in June, 1986. In this situation, it is possible that some dispersal of seed by water movement is occurring.

   In numerous cases broken stems, bearing fruits produced by both cleistogamous and chasmogamous flowers, were observed floating in the water. These fragments could be dispersed to other areas within the same wetland habitat, although the species is restricted to very quiet water.

b. Specific agents: Another possible means of seed dispersal for H. aquatilis is by wildlife dissemination. Waterfowl were frequently observed in the pothole ponds; it is likely that, when feeding on aquatic vegetation, these birds could ingest H. aquatilis and distribute the seeds later in other ponds.

In addition, seed movement by mammals (i.e., deer, bears, moose) also appears to be possible. Deer and moose browse in such ponds, and could thus ingest and transport seeds. In Montana, signs of bear foraging were noted at the Lost Creek-Cilly Creek site (008) late in the summer, after all water had dried from the pond; dispersal between ponds could perhaps also occur in this way.

Seed movement between ponds, in sediments lodged in the feet of these bird and mammal species, may also be possible.

c. Vulnerability of dispersal agents and mechanisms: To the extent that habitat alteration might cause permanent drying of its habitat, or impacts on the putative wildife dispersers, the dispersal of H. aquatilis could be influenced by disturbance.

d. Patterns of propagule dispersal: Seed dispersal by waterfowl could partially explain the scattered distribution of H. aquatilis in the Pacific Northwest; in Montana, dispersal by waterfowl and mammals between adjacent ponds could produce the clustered arrangement of adjacent populations at the Lost Creek-Cilly Creek Ponds (008-017), Dog Creek (018, 019), Condon Creek (020-031), Elk Creek (054, 055) and Lindbergh Lake (001-004, 032-051) sites. Meinke (1982) also suggested that H. aquatilis may be "...randomly dispersed through the wanderings of migratory waterfowl," and that this could produce the wide, patchy distribution pattern. In Idaho, H. aquatilis has been present on the Ownbey property for at least 20 years, but has never occurred in more than one pond (Ruth Ownbey, pers. comm.). This suggests that dispersal mechanisms are limited at this site.

4. Seed biology.

a. Amount and variation of annual seed production: Evidence for the presence of a seed bank is reported by Lesica et al. (1987). At the Swan River Oxbow (005) site, examination of the surface 3 cm of soil from three 2.25 dm^2 quadrats in 1986 yielded an estimate of approximately 200 seeds/m^2. The presence of such a seed bank should help buffer the occurrences from

periodic environmental fluctuations which could cause varying population sizes.

b. **Seed viability and longevity:** No detailed quantitative information; because H. aquatilis is an annual species which occurs in vernal wetlands, its population sizes fluctuate from year to year depending on seasonal conditions. For example, at the Swan River Oxbow (005) site in Montana, approximately 10,000 plants were observed in 1985, but fewer than 100 plants were seen in 1986 (Lesica et al. 1987). During field surveys in 1987, the population was very large again, with many hundreds of plants observed. These observations suggest that some seeds can remain viable for at least two years.

c. **Dormancy requirements:** Unknown.

d. **Germination requirements:** For seeds to germinate, water must be present in the vernal ponds and wetlands. In addition, H. aquatilis is found almost exclusively in ponds with bottom surfaces which consist of firm, consolidated clay and organic sediments. Only in two cases in Montana were plants found in ponds with deeper, largely unconsolidated bottom sediments; in these situations, most H. aquatilis plants were then found in shallower areas near the shore, in more consolidated portions of the ponds. The texture and depth of these bottom sediments may be very important in relation to seed germination requirements and early growth of H. aquatilis. Loose, silty soil sediments may lead to burial of seeds too deeply to ensure efficient germination and establishment.

e. **Percent germination:** No quantitative information.

5. **Seedling ecology:** See germination requirements described above.

6. **Survival and nature of mortality:** No quantitative information; the plants occur predominantly in more open areas within the habitat, and some seedling mortality in densely vegetated areas would be expected.

7. **Overall assessment of taxon's reproductive success:** Reproduction appears to be vigorous in most populations in Montana, when habitat conditions are satisfactory. In some ponds the plants have been observed to produce very dense mats, and the seed output in these cases is probably high. Prevailing ecological conditions (especially climate) are probably most important in determining annual rates of seed production and germination. Observations of the Idaho population have revealed that Howellia aquatilis has been in the same pond at the site for at least 20 years.

8. Population ecology of taxon.

A. **General summary:** In general, Howellia aquatilis was observed to occupy less densely vegetated areas within the wetlands where it occurs. This suggests that it cannot compete vigorously with other aquatic plant species. In areas of more open water, the species can grow very densely, forming mats in some cases. No specific obligate relationships are known.

B. **Positive and neutral interactions:** The submersed stems and leaves of H. aquatilis were frequently observed to have egg masses attached to them, as well as caddis fly cases. None of these were observed to have a negative effect on the plants.

C. Negative interactions.

1. Herbivores, predators, pests, parasites and diseases: None directly observed; it is likely that some plants are ingested by browsing animals, and/or disturbed by movements of the latter in the associated wetlands.

2. Competition.

a. Intraspecific: In several Montana populations (i.e., Lindbergh Lake (044)), H. aquatilis was observed to grow very densely in open water. No adverse effects were observed in such sites.

b. Interspecific: Two patterns were observed in Montana: 1.) in many ponds, the greatest densities of H. aquatilis were found around the pond margins, under the cover of surrounding overhanging shrubs (Salix spp., Alnus incana, Cornus stolonifera). In this zone, other emergent aquatic species do not occur in abundance, and H. aquatilis is able to spread throughout such open areas, often growing in thick mats; 2.) in ponds dominated throughout by Carex vesicaria and/or Equisetum fluviatile, H. aquatilis was frequently observed to occupy openings among such vegetation. Similarly, in ponds with open water in the center, H. aquatilis was observed to be most dense in such areas. While the species was found to occur amongst the stems of other emergent plants, it was often not as abundant in such situations. These observations suggest that H. aquatilis may prefer more open microhabitats within the ponds it occupies, and that it cannot compete vigorously with other aquatic plant species. In Idaho, Howellia aquatilis does occur within the moderately dense matrix of associated submergent species.

3. Toxic and allelopathic interactions: None known or observed.

D. **Hybridization:** None known; the potential for hybridization, either natural or induced, is low owing to the taxonomic isolation of the genus.

E. **Other factors of population ecology:** None known or observed.

9. **Current land ownership and management responsibility.**

A. **General nature of ownership:** Idaho: private; Montana: United States Government, Burlington Northern, and private; Washington: United States Government and private.

B. Specific landowners:

1. Idaho.

a. Ruth Ownbey
NE 720 Michigan
Pullman, Washington 99163

2. Montana.

a. U.S. Forest Service
Flathead National Forest
1935 3rd Ave. East
Kalispell, MT 59901

b. Plum Creek Timber Company (Burlington Northern lands)
2050 Hwy. 2 West
P.O. Box 1957
Kalispell, MT 59901

c. The Nature Conservancy
Big Sky Field Office
P.O. Box 258
Helena, MT 59624

d. Pat Halterman
Lindbergh Lake Rd.
Seeley Lake, MT 59868

e. Horace H. Koessler
P.O. Box 3718
Missoula, MT 59806

f. Robert E. Hardy
42 Sherwood Place
Greenwich, CT 06830

g. Mrs. G.A. Martel
1533 Phillips St.
Missoula, MT 59802

3. Washington.

a. U.S. Fish and Wildlife Service
Turnbull National Wildlife Refuge
Cheney, WA 99004

b. U.S. Fish and Wildlife Service
Ridgefield National Wildlife Refuge
Ridgefield, WA 98642

c. The Nature Conservancy
Washington Field Office
1601 Second Ave., Suite 910
Seattle, WA 98101

d. Private landowners.

C. Management responsibility: As outlined under specific landowners.

D. Easements, conservation restrictions, etc.: In Montana, The Nature Conservancy has recently purchased land containing a majority of the Swan River Oxbow (005) site in Lake County, and will manage it as a preserve. Two populations on private land in the Lindbergh Lake area (041, 042) in Missoula County have been designated as registry (voluntary protection) sites in cooperation with The Nature Conservancy. In Idaho, the occurrence in Latah County is on property which has been willed to the Audubon Society for eventual designation as a wildlife sanctuary. In Washington, the occurrence on the Ridgefield National Wildlife Refuge in Clark County is proposed for inclusion in the Blackwater Islands Research Natural Area. The Dishman Hills site in Spokane County has been acquired by The Nature Conservancy, and will be transferred to the Department of Natural Resources. It will be within the Dishman Hills Conservation Area. One additional site in Washington has been proposed for inclusion within the Washington Register of Natural Areas, a voluntary landowner protection program (J. Gamon, pers. comm.).

10. Management practices and experience.

A. Habitat management.

1. Review of past management and land-use experiences: None known.

2. Performance under changed conditions: No detailed data available. Despite the fact that H. aquatilis occurs over a large geographic area, it is ecologically restricted to a narrowly defined aquatic habitat. Thus, any direct impacts on its habitat are more likely to cause the extirpation of disturbed populations. The species does not appear to be capable of colonizing disturbed habitats.

The influence of habitat alteration around the ponds could have an effect on their successional trends. In cases where logging has occurred near the habitat margins, an increase in siltation rate into the ponds would be expected. Such a change would probably influence both the nature of the bottom substrates and the vegetational composition of the sites. As discussed above, H. aquatilis occurs most frequently and most densely in ponds with firm, consolidated organic clay bottom sediments. It also is frequently found in more open areas within the ponds. Thus, increases in bottom sedimentation, and subsequent competition from other vegetation, could both have an adverse effect on the viability of H. aquatilis populations.

Impacts from grazing could also potentially influence the vegetation composition of the ponds, through increased nutrient levels and subsequent successional changes. Also, trampling of the bottom sediments may adversely affect the seed bank, and the consolidated substrate which appears to be necessary for vigorous germination. There is some indication that the historical site in California may have been negatively affected by livestock trampling (Griggs and Dibble 1979). However, in Spokane County, Washington, several of the ponds containing H. aquatilis have been significantly altered by past and current grazing. Some of these sites have possibly been grazed for 50 years or more, and the species has persisted, suggesting that in some situations it may be fairly tolerant to such land use, at least in the short term (J. Gamon, pers. comm.).

3. Current management policies and actions: In Montana, a three-year inventory and analysis program proposal has been submitted to the Flathead National Forest by the Montana Natural Heritage Program. If approved, this plan will involve additional field surveys, monitoring studies, and preparation of a management plan for populations on U.S. Forest Service lands in the state. The Nature Conservancy has established monitoring studies on the Swan River Oxbow Preserve (005) site, to assess population trends and encroachment of Phalaris arundinacea (Reed Canary Grass) into the habitat.

The habitat in Idaho is managed as a natural area by the present owner.

In Washington, the Dishman Hills site will essentially be managed as a Natural Area Preserve. The Ridgefield National Wildlife Refuge site is managed as a Research Natural Area. The sites within the Turnbull National Wildlife Refuge are managed primarily as waterfowl habitat. Grazing does occur at some of the sites, however. Grazing occurs on most, if not all, privately owned sites (J. Gamon, pers. comm.).

4. **Future land uses:** In Montana, timber harvesting in the Swan Valley is likely to continue in the future, particularly on private forest lands (especially those managed by the Plum Creek Timber Company).

   Upon execution of Ruth Ownbey's will, the National Audubon Society will become the owner of the Idaho site, and will manage the area a a natural area.

   In Washington, the habitat in Spokane County is increasingly being impacted by a rising population in the area. Impacts from resultant rural development may adversely affect habitat through pond drainage, riparian alteration, overgrazing, and pollution (J. Gamon, pers. comm.).

B. **Cultivation.**

1. **Controlled propagation techniques:** No information; owing to the habitat specificity of the species, ex situ propagation from seed may be difficult.

2. **Ease of transplanting cultivated material:** Unknown.

3. **Pertinent horticultural knowledge:** None known.

4. **Status and location of presently cultivated material:** No cultivated material known.

11. **Evidence of threats to survival.**

A. **Present or threatened destruction, modification, or curtailment of habitat or range.**

1. **Past threats:** The historical sites in Oregon and California have not been relocated, despite recent surveys. In Oregon, most of the historical locations are within urban or suburban areas which have been extensively developed in recent times, and they are thought to have been eliminated. Additionally, construction of dams along the Columbia and Willamette rivers has led to a decline of suitable pond habitats. At the type locality on Sauvies Island, carp are abundant in ponds which are connected to the Columbia River during high water periods; these fish then destroy the aquatic vegetation (J. Kagan, pers. comm.). In California, the historical collection from the vicinity of Howard Lake, in the Coast Range, was not relocated in 1979 or 1980. The status report by Griggs and Dibble (1979) suggested that cattle grazing and trampling may have eliminated the population, though they recommended further surveys earlier in the season, before cattle are allowed in the area. These past alterations have apparently extirpated H. aquatilis from approximately one-third of its known global range.

In Idaho, much of the bottomland habitat in the Palouse River drainage has been altered to some degree by roads, lumber mills (3), residential housing (3 communities), cultivation (grains), and pasture land (with seeded exotic forage). Small vernal pools are easily filled by any of these disturbances. The Ownbey property near Harvard appeared to be the only remaining parcel in a relatively undisturbed condition within the drainage. This general trend in habitat alteration of bottomlands has occurred in much of northern Idaho as well, including the Spirit Lake area.

In Washington, several ponds on the Turnbull National Wildlife Refuge have been significantly altered to improve waterfowl habitat (i.e., dredged with heavy equipment while they were dry). Although H. aquatilis was not known to be present before these manipulations, it is suspected to have been, since in some cases adjacent ponds do contain the species. It is apparently absent from the ponds which have been significantly altered (J. Gamon, pers. comm.).

2. Existing threats: MONTANA: The current threats to populations of H. aquatilis are mainly from timber harvest activities occurring adjacent to the pothole ponds which the species occupies. Additionally, some populations are adjacent to gravel logging and public access roads, and are thus susceptible to any road improvement activities which may take place. Lastly, in the vicinity of Lindbergh Lake, some ponds are currently disturbed or potentially threatened by domestic livestock grazing. The sites threatened by these activities are reviewed below:

   a. TIMBER HARVEST ACTIVITIES: Of the 55 populations of H. aquatilis found in the Swan Valley, 22 occur in ponds around which logging has occurred historically or in the very recent past. In many cases, all coniferous trees were removed down to the pond margins, and the trees left standing were broadleaf deciduous species (i.e., Populus tremuloides, P. trichocarpa). In a few instances, no trees were left bordering some sides of the ponds, and in one case (Lindbergh Lake (001)) logging slash had been placed in the water.

      Listed below, by site name and occurrence number, are the 22 pond habitats whose margins or immediate surroundings have been physically impacted by timber harvesting. Those which have been very recently impacted (i.e., in 1986-87) are indicated by an asterisk (*).

      Condon Creek: *025, *027, *029, *030, 031

      Dog Creek: 018

Elk Creek: 054

Lindbergh Lake: *001, 002, *037, *038, *039, 046, 047, 048

Lost Creek-Cilly Creek Ponds: 009-015 (seven ponds)

The following populations are located in areas where nearby forests have been logged. Though the habitat immediately surrounding these ponds may still be intact, they are considered vulnerable to further future logging activity.

Condon Creek: 006, 020, 021, 022, 023, 024, 026, 028

Lindbergh Lake: 045

Swan River West: 007

One population occurs in an area which has not yet been logged, but in which new logging roads have recently been constructed:

Lindbergh Lake: 051

b. ROAD CONSTRUCTION AND MAINTENANCE: The following ponds supporting H. aquatilis occur alongside gravel logging and public access roads:

Kraft Creek: 052

Lindbergh Lake: 004, 033, 036, 044, 049

Lost Creek-Cilly Creek Ponds: 016, 017

c. GRAZING: Two ponds (Lindbergh Lake (041, 042)), located on private land, were found to be heavily impacted by grazing of domestic livestock (esp. horses). Grazing and traversing of these sites has physically disturbed the associated shorelines and vegetation; these sites could also be influenced by changes in nutrient status from livestock bodily wastes. Both of these populations were small in 1987: four plants (041), and 50-60 plants (042).

Much of the area near Lindbergh Lake is used for open cattle range, especially south of the Swan River. Three populations in this vicinity, on Flathead National Forest land, are in areas currently being used for open range cattle grazing (Lindbergh Lake (046, 047, 048)). Impacts near these ponds were noted, and it is probable that they are used for watering by the livestock.

IDAHO: Land clearing activities are continuing in the Palouse River drainage, and throughout the lower elevations of northern

Idaho. The Harvard population currently appears secure, although it is very small.

WASHINGTON: Timber harvest activities are not expected to have any direct impacts on the known sites. Associated activities, such as road construction, yarding, decking, etc., could have localized impacts.

Grazing does occur at a majority of the sites in Washington. In general, it does not appear to pose an immediate threat, although it may eventually, through changes in nutrient levels and successional alteration towards more weedy species (J. Gamon, pers. comm.).

3. **Potential threats:** As discussed, timber harvesting in the Swan Valley in Montana is likely to continue in the foreseeable future. Further impacts to areas containing ponds inhabited by H. aquatilis may occur as a result. In Idaho, the single known population is located on private land; although the site is willed to the National Audubon Society, the habitat is adjacent to a paved highway, and may be subject to impacts from road maintenance. Other potential threats to this population are not foreseen. However, disturbances in bottomland habitats are expected to continue throughout northern Idaho, reducing the likelihood that additional populations of Howellia aquatilis will be found.

   A potential ecological threat observed in Montana involves the encroachment of Phalaris arundinacea (Reed Canary Grass) into wetlands inhabited by H. aquatilis. Because of the tenacity and rapid growth of the former, it poses a major threat to many wetland ecosystems; it is capable of forming dense monocultures which result in declines in other wetland species (Apfelbaum and Sams 1987). Several stands have become established at the recently preserved Swan River Oxbow (005) site in Montana, and impacts on H. aquatilis are being monitored closely. Phalaris arundinacea also appears to increase in wetland areas in Oregon, especially where some siltation has occurred (J. Kagan, pers. comm.). In Washington, however, H. aquatilis is persisting in some ponds where P. arundinacea has apparently been dominant for many years (J. Gamon, pers. comm.).

B. **Overutilization for commercial, sporting, scientific, or educational purposes:** No significant existing or potential threats known.

C. **Disease or predation:** Howellia aquatilis may be susceptible to some impacts from grazing by native animals which use the pothole pond habitats. Also, as discussed above, two ponds in Montana have been impacted in the past by livestock grazing, and the historical California population may have been extirpated by livestock use. In Idaho, although livestock do not feed

directly on Howellia aquatilis, habitat alteration by clearing, draining, filling, and seeding exotics for livestock forage have altered much of the bottomland habitat in the Palouse River drainage, and in northern Idaho in general. Adjacent property is heavily grazed year-round and the vernal pools have little remaining native vegetation associated with them. No threats from grazing to this site are foreseen, although grazing at high stocking levels would be detrimental. Otherwise, no additional significant threats are known.

D. Inadequacy of existing regulatory mechanisms: Currently, there are no statutes in Montana, Idaho, or Washington which provide state legal protection for H. aquatilis.

E. Other natural or manmade factors: The narrow ecological amplitude and the apparent lack of genetic variation may predispose H. aquatilis to decline or extinction if major environmental perturbations occur (esp. drought and habitat alteration). Also, as successional changes occur in the wetland habitats, it is likely that populations disappear with declines in the associated water tables.

II. ASSESSMENT AND RECOMMENDATIONS

12. General assessment of vigor, trends, and status: Howellia aquatilis is an annual aquatic species with narrowly defined habitat requirements, and as a result it would be intolerant of major environmental alterations. It is known from 13 sites in the Pacific Northwest (nine in Montana, three in Washington, and one in Idaho). Population sizes range from a few to many thousands of individuals, but large yearly fluctuations in population size have been observed. These fluctuations are most likely due to annual differences in climatic factors, and to variation in seed germination percentage. Some populations in Montana are large, and currently appear to be stable. However, long-term successional trends in the associated habitats probably result in the occasional disappearance of established populations. Additionally, habitat alteration is continuing in all extant portions of the range, primarily from timber harvesting, development, and alteration of bottomland habitats. Evidence from recent field surveys in Oregon and California indicates that H. aquatilis has been extirpated from these states. Owing to this curtailment of range, and the ecological and genetic factors summarized above, the species should continue to be closely monitored.

13. Recommendations for listing or status change.

A. Recommendation to U.S. Fish and Wildlife Service: On the basis of information obtained during recent field surveys and biological studies, it is recommended that Howellia aquatilis be placed in Category 1, as a candidate for listing as a threatened species. The species has been extirpated from a large portion of its previously known global range, and several factors make it susceptible to further serious declines in distribution and abundance. These factors include a narrow ecological amplitude,

lack of inter- and intrapopulation genetic variation, and continuing habitat alteration in major portions of its extant range.

B. Recommendations to other U.S. federal agencies.

1. U.S. Forest Service: Howellia aquatilis is currently included on the sensitive (Montana) and watch (Idaho) plant lists in Region 1, and the sensitive list in Region 5. Agency objectives and policy provide for the management and protection of such species. It is recommended that H. aquatilis be retained on all of these lists.

C. Other status recommendations.

1. Counties and local areas: No need for regulation at county or other local levels of government is apparent at this time.

2. States: The species should be retained on the respective lists of each state in which it is historically or currently known to occur.

3. Other nations: Not currently pertinent.

4. International Trade Convention, etc.: None at this time.

14. Recommended critical habitat: Genetic studies indicate that H. aquatilis consists of one uniform genotype throughout its range (Lesica et al. 1988). This lack of genetic variation, coupled with the narrow ecological adaptation of the species, suggests that H. aquatilis is vulnerable to natural and/or artificial environmental changes. Thus, it will be important to protect populations throughout as much of the range as possible. Should the species be listed, critical habitat should be designated in all three states where it is currently extant; if it is rediscovered in Oregon or California, these areas should also be included as critical habitat.

A. Concise statement: Glacial pothole and riverine pond complexes in the Swan Valley, Lake and Missoula counties, Montana; bottomland habitat in the vicinity of the population along the Palouse River in Latah County, Idaho; pond complexes in Spokane County, Washington; and habitat containing the population on the Ridgefield National Wildlife Refuge in Clark County, Washington.

B. Legal description: The following occurrences comprise the minimum recommended critical habitat:

Idaho: Harvard (001)

Montana: Condon Creek (006, 020-031)
Lindbergh Lake (001-004, 032-051)
Lost Creek-Cilly Creek Ponds (008-017)
Swan River Oxbow (005)

Washington: Spokane area (001, 003-016)
Ridgefield (002)

Exact legal descriptions are provided in Table 1, pp. 11-27.

C. **Latitude and longitude:** Provided in Table 1, pp. 11-27.

D. **Publicity sensitivity of critical habitat areas:** Low to moderate at this time.

15. Conservation/recovery recommendations.

A. General conservation recommendations.

1. **Recommendations regarding present or anticipated activities:** Recommendations for long-term maintenance of viable populations on U.S. Forest Service lands in Montana are as follows:

a. Protection of habitats which currently support populations. Thirty-two populations of H. aquatilis have been found on U.S. Forest Service lands. Of these, timber harvesting has occurred around 15 of them:

Condon Creek (025, 027)

Dog Creek (018)

Elk Creek (054)

Lindbergh Lake (001, 046, 047, 048)

Lost Creek-Cilly Creek Ponds (009-015)

The remaining 17 populations occur in relatively intact forest communities:

Condon Creek (006, 020-024, 026)

Dog Creek (019)

Lindbergh Lake (043-045)

Lost Creek-Cilly Creek Ponds (008, 016, 017)

Swan River West (007)

All of these populations should be considered in future land use management plans, i.e., road construction, future timber harvesting, grazing allotments, etc. In addition, since the long-term influences of disturbance adjacent to the ponds are unknown, it is especially important that the undisturbed populations be

maintained in their current condition.

b. Notification of U.S. Forest Service personnel of locations of populations on U.S.F.S. lands. To prevent inadvertent impacts to known populations, all appropriate Flathead National Forest personnel should be provided with detailed location information. It is especially important that Ranger District timber sale managers, engineers, and other planners know the precise locations, so that disturbance may be prevented.

c. Evaluation of projects which may affect the hydrology of habitats supporting populations. Because the ponds supporting H. aquatilis populations depend largely on run-off for water supply, impacts which may influence this source should be carefully studied. Also, projects which could result in permanent inundation or drying of the ponds should be mitigated. The hydrology of the Swan Valley is highly complex, and H. aquatilis is dependent upon intact drainage patterns.

In Washington, the Natural Heritage Program should notify all landowners of the presence of the species on their land. It is also recommended that the Turnbull National Wildlife Refuge develop a species management plan.

The population in Idaho is currently being protected by the landowner.

2. Areas recommended for protection: In Montana, areas with populations in numerous adjacent ponds in varying stages of succession would be best suited for protection or special management. Because H. aquatilis is found in aquatic habitats which appear to be in an earlier successional stage, an assemblage of such ponds would possibly allow for longer-term persistence of the species; as the habitats change, the species could be established (naturally or artificially) in nearby sites which are still ecologically suitable (Lesica et al. 1988). Such habitat clusters are found in the Condon Creek, Lindbergh Lake, Lost Creek-Cilly Creek, and Swan River Oxbow areas in the Swan Valley (see maps, pp. 138-147). The first three areas have been impacted by timber harvesting, and future management plans and recommendations should take these impacts into account.

In Washington, the Natural Heritage Program should identify and recommend areas for protection. In Idaho, the National Audubon Society should be notified of the occurrence on the Ownbey property so that management strategies can be developed accordingly.

3. Management and recovery recommendations: Owing to the narrow ecological restriction of H. aquatilis, the most

effective method of management will be to avoid impacts to habitats which are as yet undisturbed. Additionally, transplant experiments in suitable unoccupied habitat would provide information regarding the suitability of this potential recovery technique.

4. **Publicity sensitivity:** Low to moderate.

5. **Other recommendations:** None.

B. **Monitoring activities and research needs:** In Montana, a multi-year proposal to continue inventory and analysis of H. aquatilis on the Flathead National Forest has been submitted to the U.S. Forest Service. This proposal includes the following research suggestions:

1. Complete field surveys of potential habitat for H. aquatilis on Flathead National Forest lands, and evaluate the possible presence of potential habitat in other areas in northwestern Montana. Resurvey suitable habitats previously identified, but where the species was not found, to verify the reported absence of H. aquatilis from such sites.

2. Evaluate known suitable habitats identified on U.S. Forest Service lands, for inclusion in a transplant experiment to establish new populations. Conduct transplants of soil plugs from known, large populations to identified potential habitats, and monitor establishment success.

3. Continue quantitative monitoring studies established at five locations in Montana in 1988, to assess adequacy/suitability of the methodology used (line-intercept transects). Resurvey all other known populations, to obtain ongoing estimates of population size, condition, persistence, and response to management practices.

4. Evaluate the effects of wetland successional trends on the presence and quantity of suitable habitats. Investigate possible methods of maintaining such habitat, possibly through artificial methods.

In Washington, inventory efforts should continue, particularly in the forested portions of the channeled scablands in the eastern part of the state. Known sites should be periodically monitored for trends in population size. Trend information should be correlated with other site parameters, such as grazing levels and changes in vegetation composition (J. Gamon, pers. comm.).

Phalaris arundinacea has aggressively invaded many bottomland habitats in northern Idaho, and is present at the Harvard (001) site. While it does not presently appear to be encroaching on the pond containing Howellia aquatilis, it should be monitored.

16. Interested parties:

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U.S. Forest Service, Region 1
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III. INFORMATION SOURCES

17. Sources of information.

A. Publications.

1. References cited in report: List appended (p. 72).

2. Other pertinent publications.

a. Technical: None known.

b. Popular:

Shelly, S. 1987. Rare and endangered plant profile - Howellia aquatilis. Montana Native Plant Society Newsletter 1: 2.

B. Museum collections: Specimens from Montana were examined at the University of Montana Herbarium (MONTU), and the Rocky Mountain Herbarium (RM) at the University of Wyoming. For Idaho, data from J.H. Sandberg's 1892 specimens were obtained from the U.S. National Herbarium (US) and the University of Washington Herbarium (WTU). The University of Idaho (UI) and Washington State University (WS) herbaria were also searched, but contained no Idaho collections of H. aquatilis.

Voucher specimens collected in Montana during field work for this status report are cited in the COMMENTS field of the computer printouts (Appendix A, pp. 76-130), and are deposited at MONTU. Previously collected specimens from Montana are cited in the COMMENTS or BESTSOURCE fields of these printouts. A specimen from the Idaho population is deposited at UI.

C. Fieldwork.

1. Surveys by the authors:

MONTANA:

J.S. Shelly: 23-26 & 30 June, 1-17 & 28-30 July 1987; 14-15, 21-22, & 26-29 July 1988. Surveys in Lake and Missoula counties; field notes, population surveys, photographs, and herbarium specimens.

IDAHO:

After consultation with Ruth Ownbey, the authors searched the area near Harvard and located one pond with H. aquatilis on 6 May 1988. The pond was revisited on 14 June 1988 by R. Moseley and A. Cholewa, University of Minnesota. Population and community data were collected on this date. From 24-28 June 1988, R. Moseley searched suitable habitat in northern Idaho, from the Palouse River drainage north to the Pend

Oreille River. Sandberg's 1892 collection site could not be relocated, nor were any new populations found.

Maps indicating areas which were unsuccessfully searched in Idaho and Montana are included in Appendix A (pp. 149-166).

2. Surveys by contractor:

MONTANA:

L. Campbell: 2 & 9-10 July 1987. Surveys in Lake and Missoula counties; field notes, population surveys, and herbarium specimens.

D. Knowledgeable individuals.

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John Pierce
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Addresses listed under Interested Parties above:

John Gamon
Peter Lesica
Robert Moseley
J. Stephen Shelly

E. Other information sources: Color slides of additional populations in Montana are on file at the Montana Natural Heritage Program (first author's address).

18. Summary of materials on file: All detailed field survey forms and field maps are on file at the respective NHP offices. The references cited in this report are on file at the Idaho and/or Montana Natural Heritage Programs.

IV. AUTHORSHIP

19. **Initial authorship:**

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20. **Maintenance of status report:** The respective Natural Heritage Programs will maintain current information, and update the status report as needed. Should the species be listed by the U.S. Fish and Wildlife Service, the respective USFWS offices should maintain the primary information files, encourage others to provide new information, and distribute new findings to the interested parties.

V. NEW INFORMATION

21. **Record of revisions:** Not currently applicable.

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APPENDIX A: Computer printouts and maps

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.001
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 1 TENTEN: 3,6 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; NORTH MARGIN OF POND IMPACTED BY LOGGING.
SURVEYDATE: 1984-07-15 LASTOBS: 1987-07-30 FIRSTOBS: 1984 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472521 LONG: 1134231 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 12 MERIDIAN: PR
TRSCOMM: NE4SE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.68 AIR MILES NNE. FROM THE FIRST FORK ON LINDBERGH LAKE ROAD, CA. 2.5 MILES WEST FROM ST. HWY. 83.

GENDESC: GLACIAL POTHOLE; WITH CAREX VESICARIA, SIUM SUAVE, RANUNCULUS GMELINII; POPULUS TRICHOCARPA, PINUS CONTORTA, LARIX OCCIDENTALIS, SALIX SP. AROUND POND.
ELEV: 4230 SIZE: 2
EODATA: EST. 75-100+ PLANTS (1987); NORTH END OF POND IMPACTED BY LOGGING, WITH SOME SLASH PILED INTO THE WATER.

MMENTS:

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM: -
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDPIE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 85-11-26 JSS CDREV: Y MAPPER: 85-12-04 JSS OC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.002
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 2 TENTEN: 3,5 IDENT: Y EORANK: C
EORANKCOMM: LARGE POPULATION; NORTH & WEST MARGINS DISTURBED BY LOGGING.
SURVEYDATE: 1984-07-15 LASTOBS: 1987-07-29 FIRSTOBS: 1984 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472556 LONG: 1134232 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 01 MERIDIAN: PR
TRSCOMM: E2NE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 1.32 AIR MILES NORTH OF THE FIRST FORK ON LINDBERGH LAKE RD., CA. 2.5 MI. WEST OF ST. HWY. 83.

GENDESC: GLACIAL POTHOLE POND; WITH CAREX VESICARIA, SIUM SUAVE; POPULUS TRICHOCARPA, PINUS CONTORTA, AND LARIX OCCIDENTALIS AROUND POND.
ELEV: 4175 SIZE: 4
EODATA: EST. 2000-3000 PLANTS (1987); NORTH AND WEST MARGINS OF POND DISTURBED BY LOGGING ACTIVITY; DEEPEST POND KNOWN FOR THE SPECIES IN MONTANA (CA. EIGHT FEET); SOME INDIVIDUALS VERY LARGE.
COMMENTS: VOUCHERS-PIERCE, J. (1199), 1984, SPECIMEN #353428 RM, #095217 UM; (1200), 1984, SPECIMEN #095256 UM.
MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM: -
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDPIE01MTUS S84PIERMMTUS S84 PIEUMMTUS
DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 85-11-26 JSS CDREV: Y MAPPER: 85-12-15 JSS QC: Y
UPDATE: 87-11-11 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.003
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 3 TENTEN: 4,6 IDENT: Y EORANK: B
EORANKCOMM: LARGE POPULATION; HABITAT RELATIVELY UNDISTURBED.
SURVEYDATE: 1983-07-24 LASTOBS: 1983-07-24 FIRSTOBS: 1983 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472516 LONG: 1134128 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: E2SW4NW4,W2SE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.1 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA.
1.5 MILES WEST OF ST. HWY. 83.

GENDESC: GLACIAL POTHOLE WITH 1 TO 2.5 FT. OF WATER OVER A FIRM BOTTOM; WITH EQUISETUM FLUVIATILE, SIUM SUAVE, CAREX VESICARIA; POPULUS TREMULOIDES, P. TRICHOCARPA AROUND POND.
ELEV: 4150 SIZE: 2
EODATA: 1000+ PLANTS (1983); POND IS A SMALL GLACIAL DEPRESSION NEXT TO A LARGER BOG, TO WHICH IT MAY HAVE BEEN CONNECTED EARLIER.

COMMENTS:

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM: -
BESTSOURCE: PIERCE, J. 737 LOCUST ST., MISSOULA, MT 59802.

SOURCECODE: PNDPIE01MTUS U85LES02MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 85-11-26 JSS CDREV: Y MAPPER: 85-12-15 JSS QC: Y
UPDATE: 87-11-11 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.004
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 4 TENTEN: 6,6 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; ADJACENT TO GRAVEL ROAD.
SURVEYDATE: 1983-07-31 LASTOBS: 1983-07-31 FIRSTOBS: 1978 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472515 LONG: 1134041 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: SE4NE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, CA. 50 FT. SOUTHWEST OF LINDBERGH LAKE RD., CA. 1 MILE WEST OF ST. HWY. 83.

GENDESC: GLACIAL SLOUGH, IN ONE TO TWO FEET OF WATER; WITH SIUM SUAVE, EQUISETUM FLUVIATILE, TYPHA LATIFOLIA; POPULUS, PICEA, PINUS CONTORTA IN SURROUNDING FOREST.
ELEV: 4070 SIZE: 1
EODATA: EST. 11-50 PLANTS (1983).

MMENTS: VOUCHERS-McCUNE, B. (s.n.), 1978, SPECIMEN #80889 UM; SCHUYLER, A.E. (5871), 1982, SPECIMEN #091279 UM.
MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM: -
BESTSOURCE: PIERCE, J. 737 LOCUST ST., MISSOULA, MT 59802.

SOURCECODE: PNDPIE01MTUS S78MCCUMMTUS S82SCHUMMTUS A82MCC03MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-11 JSS CDREV: Y MAPPER: 87-11-11 JSS QC: Y
UPDATE: 87-11-11 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.005
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 2 TENTEN: 2,9 IDENT: Y EORANK: A
EORANKCOMM: MAY BE LARGEST OCCURRENCE KNOWN; EXCELLENT CONDITION SITE.
SURVEYDATE: 1985-07-15 LASTOBS: 1987-06-25 FIRSTOBS: 1985 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711387
QUADNAME: SWAN LAKE PRECISION: SC
LAT: 475327 LONG: 1135117 S: 475316 N: 475343 E: 1135052 W: 1135125
TOWNRANGE: 025N018W SECTION: 35 MERIDIAN: PR
TRSCOMM: NW4;34,NE4NE4;26,SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: CA. 3 MILES SOUTH OF THE VILLAGE OF SWAN LAKE ON ST. HWY. 83, 0.9 MILES WEST ON PORCUPINE CREEK ROAD; 0.2-0.7 AIR MI. N. OF PORCUPINE CREEK ROAD.
GENDESC: MARGINS OF OLD, RETIRED OXBOW OF THE SWAN RIVER, AND IN 3 ADJACENT WETLAND AREAS; WITH CAREX VESICARIA, SIUM SUAVE, TYPHA LATIFOLIA; SHALLOW WATER, SOILS OF MUCKY PEAT-CLAY.
ELEV: 3100 SIZE: 30
EODATA: VERY COMMON; MAY BE LARGEST OCCURRENCE KNOWN, WITH ABOUT 10000 INDIVIDUALS (1985); ELEMENT OCCURS IN 4 AREAS, IN AND ADJACENT TO THE OLD RIVER OXBOW; MANY HUNDREDS OF PLANTS OBSERVED IN 1987.
MMENTS: VOUCHERS-LESICA, P. (3537) & A. SCHUYLER, 1985, UM (102131); SHELLY, J.S. (1348), UM; SCHUYLER, A.E. (6349), UM (103547).
MACODE1: PNCPRSWAN1MTUS CONTAINED1: N MACODE2: FFSNFFLAT1MTUS CONTAINED2: N
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: SWAN RIVER OXBOW
OWNER: THE NATURE CONSERVANCY
OWNERCOMM: BIG SKY FIELD OFFICE, P.O. BOX 258, HELENA, MT 59624
PROTCOMM: SITE PARTIALLY OCCURS ON FLATHEAD NATIONAL FOREST LAND.
MGMTCOMM:
MONITOR: MONITORNUM: -
BESTSOURCE: LESICA, P. DEPT. OF BOTANY, UNIVERSITY OF MONTANA, MISSOULA, MT 59812.
SOURCECODE: PNDLES01MTUS PNDKIE01MTUS S85LESUMMTUS U85LES02MTUS S87 SHEUMMTUS F87SHE03MTUS PNDSHE01MTUS S85SCHUM
DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 86-01-08 JSS CDREV: Y MAPPER: 86-01-08 JSS QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.006
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 2 TENTEN: 4,4 IDENT: Y EORANK: C
EORANKCOMM: LARGE POPULATION; AREA THREATENED BY LOGGING.
SURVEYDATE: 1986-07-14 LASTOBS: 1987-07-02 FIRSTOBS: 1986 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473442 LONG: 1134217 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: NE4NW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, WEST BASE OF SWAN RANGE UPLIFT, 3.5 AIR MILES NORTH OF CONDON, 2.1 AIR MILES EAST OF ST. HWY. 83, 0.1 AIR MILES SOUTH OF CONDON CREEK.
GENDESC: VERNAL POND, IN PINUS PONDEROSA/LARIX OCCIDENTALIS FOREST; WITH SIUM SUAVE, CAREX VESICARIA, RANUNCULUS AQUATILIS, VERONICA CATENATA, CALLITRICHE HETEROPHYLLA.
ELEV: 3740 SIZE: 1
EODATA: EST. 1000-2000 PLANTS (1987); MANY PLANTS DISTURBED BY MOOSE AND/OR WATERFOWL ACTIVITY; AREA IS ACTIVELY THREATENED BY LOGGING ROAD CONSTRUCTION AND TIMBER HARVESTING.

COMMENTS: VOUCHER-LESICA, P. (3965), 1986, SPECIMEN #104450 UM.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: LESICA, PETER. DEPT. OF BOTANY, UNIVERSITY OF MONTANA, MISSOULA, MT 59812.
SOURCECODE: PNDLES01MTUS S86LESUMMTUS PNDSHE01MTUS PNDCAM01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 86-12-09 JSS CDREV: Y MAPPER: 86-12-09 JSS OC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.007
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 4 TENTEN: 2,4 IDENT: Y EORANK: AB
EORANKCOMM: VERY LARGE POPULATION; NEARBY STATE LAND IS LOGGED.
SURVEYDATE: 1987-07-01 LASTOBS: 1987-07-01 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 474958 LONG: 1135131 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N018W SECTION: 14 MERIDIAN: PR
TRSCOMM: SW4SE4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: WEST SIDE OF SWAN VALLEY, 1.4 AIR MILES WEST OF ST. HWY. 83; 0.57 AIR MILE WEST OF SWAN RIVER; CA. 6.5 AIR MILES SOUTH OF SWAN LAKE (TOWN).
GENDESC: IN TWO SMALL, ADJACENT GLACIAL POTHOLES, IN 1-2 FEET OF WATER; WITH CAREX VESICARIA, EQUISETUM FLUVIATILE, SIUM SUAVE; POPULUS TRICHOCARPA, BETULA PAPYRIFERA AROUND PONDS.
ELEV: 3190 SIZE: 1
EODATA: ABOUT 3000-4000 PLANTS, POSSIBLY MORE; VERY DENSE, AND FORMING MATS, IN WEST POND; THE TWO PONDS, WHICH ARE SEPARATED BY A SALIX BORDER, ARE JOINED BY HIGHER WATER IN THE SPRING.
MMENTS: VOUCHER-SHELLY, J.S. (1356), 1987, MONTU.
pH = 7.20 IN WEST POND.
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: SWAN RIVER WEST
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-08-20 JSS CDREV: Y MAPPER: 87-08-21 JEG QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.008
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 5 TENTEN: 4,1 IDENT: Y EORANK: B
SURVEYSITE: LOST CREEK-CILLY CREEK PONDS
EORANKCOMM: LARGE, VIGOROUS POPULATION; IN GOOD CONDITION HABITAT.
SURVEYDATE: 1987-07-07 LASTOBS: 1988-07-21 FIRSTOBS: 1987 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475148 LONG: 1134933 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 06 MERIDIAN: PR TRSCOMM: NW4SW4SE4

PHYSPROV: NR WATERSHED: 17010211 RIVERREACH:
DIRECTIONS: SWAN VALLEY, CA. 4.5 AIR MILES SSE. OF SWAN LAKE (TOWN); 0.3 AIR MILES EAST OF ST. HWY. 83; 0.68 AIR MILES SSW. OF CONFLUENCE OF NORTH AND SOUTH FORKS LOST CREEK.
GENDESC: THROUGHOUT A GLACIAL POTHOLE POND, BOTTOM SOIL OF CONSOL-IDATED CLAY MUCK; WITH SIUM SUAVE, RANUNCULUS AQUATILIS, GLYCERIA BOREALIS, CAREX VESICARIA, POTAMOGETON, ELEOCHARIS.
ELEV: 3190 SIZE: 2
DATA: EST. 2000-3000 PLANTS, IN A SINGLE POND; SURROUNDED BY A RELATIVELY UNDISTURBED FOREST, WHICH WAS REPORTEDLY LIGHTLY SELECTIVELY LOGGED IN ABOUT 1910.

COMMENTS: VOUCHER-SHELLY, J.S. (1358) AND ANNE MORLEY, 1987, MONTU. pH=7.57.
MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-08-31 JSS CDREV: Y MAPPER: 87-09-04 JSS OC: Y
UPDATE: 88-11-04 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.009
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 6 TENTEN: 5,2 IDENT: Y EORANK: C
SURVEYSITE: LOST CREEK-CILLY CREEK PONDS
EORANKCOMM: MEDIUM-SIZED POPULATION, ADJACENT FOREST PREVIOUSLY LOGGED.
SURVEYDATE: 1987-07-01 LASTOBS: 1988-07-21 FIRSTOBS: 1987 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475137 LONG: 1134907 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 07 MERIDIAN: PR TRSCOMM: NE4NE4NE4

PHYSPROV: NR WATERSHED: 17010211 RIVERREACH:
DIRECTIONS: SWAN VALLEY, 0.6 AIR MILES EAST OF ST. HWY. 83, 0.6 AIR MILES SOUTH OF SOUTH FORK LOST CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN SHALLOW WATER OF A GLACIAL POND, ORGANIC CLAY BOTTOM; WITH EQUISETUM FLUVIATILE, CAREX VESICARIA, SIUM SUAVE; POPULUS TRICHOCARPA BORDERING POND.
ELEV: 3250 SIZE: 3
QUALDATA: EST. 500-600 PLANTS (1987); SPECIES DOES NOT OCCUPY ALL OF THE AVAILABLE, SUITABLE HABITAT AT THIS SITE; AREAS AROUND SOUTH AND EAST SIDES OF POND CLEARCUT CA. 15 YEARS AGO.

COMMENTS: VOUCHER-SHELLY, J.S. (1357) AND ANNE MORLEY, 1987, UM.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-09 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 88-11-04 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.010
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 7 TENTEN: 5,1 IDENT: Y EORANK: C
EORANKCOMM: MODERATE-SIZED POPULATION. NEARBY FOREST PREVIOUSLY LOGGED.
SURVEYDATE: 1987-07-01 LASTOBS: 1987-07-01 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475150 LONG: 1134857 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 05 MERIDIAN: PR
TRSCOMM: NW4SW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.75 AIR MILES EAST OF ST. HWY 83, 0.3 AIR MILES SOUTH OF SOUTH FORK LOST CREEK, CA. 4.7 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN 0.5-2 FT. OF WATER; IN NW ARM OF A GLACIAL POND; ORGANIC CLAY BOTTOM; WITH EQUISETUM FLUVIATILE, CAREX VESICARIA, SIUM SUAVE; POPULUS TRICHOCARPA BORDERING POND.
ELEV: 3230 SIZE: 2
EODATA: EST. 200-300 PLANTS (1987); FLOWERS AND CLEISTOGAMOUS FRUIT; SPECIES DOES NOT OCCUPY ALL OF THE AVAILABLE, SUITABLE HABITAT AT THIS SITE; AREAS AROUND SOUTH AND EAST SIDES OF POND CLEARCUT CA. 15 YEARS AGO.
MMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT).
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LOST CREEK-CILLY CREEK PONDS
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-08-25 JSS CDREV: Y MAPPER: 87-11-11 CDJ OC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.011
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 8 TENTEN: 6,2 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION, AREA DISTURBED BY LOGGING.
SURVEYDATE: 1987-07-07 LASTOBS: 1987-07-07 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475120 LONG: 1134826 S: 475119 N: 475122 E: 1134819 W: 1134831
TOWNRANGE: 024N017W SECTION: 08 MERIDIAN: PR
TRSCOMM: E2SE4NW4, NW4SW4NE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 1.05-1.2 AIR MILES EAST OF ST. HWY 83, 0.25 AIR MILES NNE OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: SINGLE, LARGE POND; SOIL FIRM CLAY TO UNCONSOLIDATED MUCK; WITH SPARGANIUM MINIMUM, SIUM SUAVE, POTAMOGETON GRAMINEUS, NUPHAR VARIEGATUM.
ELEV: 3290 SIZE: 5
EODATA: EST. 100-200 PLANTS (1987), ON SOUTHWEST, NORTH AND EAST MARGINS; PAST LOGGING DISTURBANCE IN THE AREA.

MMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT).
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LOST CREEK-CILLY CREEK PONDS
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-09-02 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.012
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 9 TENTEN: 6,2 IDENT: Y EORANK: C
EORANKCOMM: MODERATE-SIZED POPULATION; SURROUNDING FOREST LOGGED.
SURVEYDATE: 1987-07-07 LASTOBS: 1987-07-07 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475125 LONG: 1134848 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 08 MERIDIAN: PR
TRSCOMM: NE4SW4NW4,SE4NW4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.83 AIR MILES EAST OF ST. HWY 83, 0.37 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION, SOILS FAIRLY UNCONSOLIDATED; WITH NUPHAR VARIEGATUM, SIUM SUAVE, POTAMOGETON SP., POPULUS TRICHOCARPA, BETULA PAPYRIFERA AROUND POND.
ELEV: 3235 SIZE: 2
EODATA: EST. 400-500 PLANTS (1987); MUCH OF POND HAS NO VEGETATION; LOGGING HAS OCCURRED AROUND POND.

MMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT).
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LOST CREEK-CILLY CREEK PONDS
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.013
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 10 TENTEN: 5,2 IDENT: Y EORANK: C
SURVEYSITE: LOST CREEK-CILLY CREEK PONDS
EORANKCOMM: LARGE POPULATION; SURROUNDING FOREST LOGGED.
SURVEYDATE: 1987-07-07 LASTOBS: 1988-07-21 FIRSTOBS: 1987 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475124 LONG: 1134852 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 08 MERIDIAN: PR TRSCOMM: N2SW4NW4

PHYSPROV: NR WATERSHED: 17010211 RIVERREACH:
DIRECTIONS: SWAN VALLEY, 0.79 AIR MILES EAST OF ST. HWY 83, 0.36 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; OPENINGS AMONG CAREX VESICARIA, WITH SIUM SUAVE, ELEOCHARIS PALUSTRIS, CAREX ROSTRATA; POPULUS TRICHOCARPA, BETULA PAPYRIFERA AROUND POND
ELEV: 3240 SIZE: 2
DATA: EST. 1000-1500 PLANTS (1987); LOGGING HAS OCCURRED AROUND POND.

COMMENTS: VOUCHER - SHELLY, J.S. (1359) AND ANNE MORLEY, 1987, MONTU.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 88-11-04 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.014
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 11 TENTEN: 5,2 IDENT: Y EORANK: C
EORANKCOMM: MODERATE-SIZED POPULATION; SURROUNDING FOREST LOGGED.
SURVEYDATE: 1987-07-07 LASTOBS: 1987-07-07 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475124 LONG: 1134857 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 08 MERIDIAN: PR
TRSCOMM: NW4SW4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.72 AIR MILES EAST OF ST. HWY 83, 0.4 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; AROUND LOGS & IN OPENINGS AMONG CAREX VESICARIA, WITH SIUM SUAVE, POTAMOGETON SPP; POPULUS TRICHOCARPA, P. TREMULOIDES, BETULA PAPYRIFERA.
ELEV: 3245 SIZE: 2
EODATA: EST. 300-400 PLANTS (1987); LOGGING HAS OCCURRED IN ADJACENT FORESTS.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT); pH = 7.00.
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LOST CREEK-CILLY CREEK PONDS
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.015
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 12 TENTEN: 5,2 IDENT: Y EORANK: C
EORANKCOMM: MODERATE-SIZED POPULATION; SURROUNDING FOREST LOGGED.
SURVEYDATE: 1987-07-07 LASTOBS: 1987-07-07 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475121 LONG: 1134856 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 08 MERIDIAN: PR
TRSCOMM: NW4SW4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.73 AIR MILES EAST OF ST. HWY 83, 0.32 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH CAREX VESICARIA, SIUM SUAVE, VERONICA CATENATA, SALIX SPP.; POPULUS TRICHOCARPA, P. TREMULOIDES BORDERING POND.
ELEV: 3245 SIZE: 2
EODATA: EST. 300+ PLANTS (1987); LOGGING HAS OCCURRED IN ADJACENT FORESTS; THIS POND WAS DRYING FASTER THAN OTHERS AT THIS SITE.

MMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT).
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LOST CREEK-CILLY CREEK PONDS
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.016
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 13 TENTEN: 5,2 IDENT: Y EORANK: C
EORANKCOMM: MODERATE-SIZED POPULATION; ADJACENT TO LOGGING ROAD.
SURVEYDATE: 1987-07-07 LASTOBS: 1987-07-07 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475111 LONG: 1134857 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 08 MERIDIAN: PR
TRSCOMM: NW4NW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.71 AIR MILES EAST OF ST. HWY 83, 0.17 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH CAREX VESICARIA, SIUM SUAVE; POPULUS TRICHOCARPA BORDERING POND.

ELEV: 3240 SIZE: 2
EODATA: EST. 400+ PLANTS (1987); ADJACENT TO LOGGING ROAD.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT).
MACODE1: FFSNFFLATIMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LOST CREEK-CILLY CREEK PONDS
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.017
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 14 TENTEN: 6,2 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; ADJACENT TO LOGGING ROAD.
SURVEYDATE: 1987-07-07 LASTOBS: 1987-07-07 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711377
QUADNAME: CILLY CREEK PRECISION: SC
LAT: 475110 LONG: 1134845 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 024N017W SECTION: 08 MERIDIAN: PR
TRSCOMM: NE4NW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.85 AIR MILES EAST OF ST. HWY 83, 0.1 AIR MILES NORTH OF CILLY CREEK, CA. 5.0 AIR MILES SSE OF SWAN LAKE (TOWN).
GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH CAREX VESICARIA, SIUM SUAVE, POTAMOGETON, CAREX ROSTRATA, POTENTILLA PALUSTRIS; POPULUS TREMULOIDES AROUND POND.
ELEV: 3230 SIZE: 3
EODATA: EST. 10-12 PLANTS (1987); ADJACENT TO LOGGING ROAD; THIS DEPRESSION WAS MUCH DRYER THAN THE OTHERS, HOWELLIA AQUATILIS PRESENT IN A FEW PUDDLES; HABITAT MAY BE MORE ADVANCED SUCCESSIONALLY THAN NEARBY PONDS.
MMENTS: SIGHT RECORD; NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT).
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LOST CREEK-CILLY CREEK PONDS
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-11 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.018
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 4 TENTEN: 2,2 IDENT: Y EORANK: D
EORANKCOMM: MODERATE-SIZED POPULATION; SURROUNDING FOREST LOGGED.
SURVEYDATE: 1987-07-14 LASTOBS: 1987-07-14 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473618 LONG: 1134412 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N017W SECTION: 02 MERIDIAN: PR
TRSCOMM: SE4NW4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, EAST SIDE OF FLATHEAD N.F. RD. #899 NEAR JUNCTION WITH RD. #124, 0.35 AIR MILES NORTH OF LAKE-MISSOULA COUNTY LINE, CA. 5.5 AIR MILES NNW OF CONDON.
GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH EQUISETUM FLUVIATILE, SIUM SUAVE, CAREX VESICARIA, TYPHA LATIFOLIA; POPULUS TRICHOCARPA, P. TREMULOIDES, SALIX SP. AROUND POND.
ELEV: 3660 SIZE: 2
EODATA: EST. 200+ PLANTS (1987); SURROUNDING FOREST LOGGED.

MMENTS: VOUCHER - SHELLY, J.S. (1370) AND ANNE MORLEY, 1987, MONTU. pH=6.78.
MACODE1: FFSNFFLATIMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: DOG CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.019
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 5 TENTEN: 1,2 IDENT: Y EORANK: C
EORANKCOMM: MODERATE-SIZED POPULATION; ADJACENT FOREST IN GOOD CONDITION
SURVEYDATE: 1987-07-14 LASTOBS: 1987-07-14 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473618 LONG: 1134441 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N017W SECTION: 02 MERIDIAN: PR
TRSCOMM: S2NE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.33 AIR MILES WEST OF JUNCTION OF FLATHEAD NF RDS. 899 AND 124, 0.33 AIR MILES NORTH OF LAKE-MISSOULA CO. LINE, CA. 5.5 AIR MILES NNW OF CONDON.
GENDESC: IN SHALLOW WATER OF GLACIAL DEPRESSION; WITH EQUISETUM FLUVIATILE, SIUM SUAVE, CAREX VESICARIA, ALISMA TRIVIALE; POPULUS TRICHOCARPA, P. TREMULOIDES, PINPON, LAROCC AROUND POND.
ELEV: 3580 SIZE: 2
EODATA: EST. 150-200 PLANTS (1987); FOREST IMMEDIATELY SURROUNDING POND IN GOOD CONDITION, FAIRLY UNDISTURBED.

MMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED; SITE SURVEYED WITH ANNE MORLEY (SWAN LAKE, MT).
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: DOG CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDMOR01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.020
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 6 TENTEN: 4,4 IDENT: Y EORANK: C
SURVEYSITE: CONDON CREEK
EORANKCOMM: LARGE POPULATION; AREA BEING LOGGED.
SURVEYDATE: 1987-07-02 LASTOBS: 1988-07-22 FIRSTOBS: 1987 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473433 LONG: 1134212 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR TRSCOMM: SW4NE4SW4

PHYSPROV: NR WATERSHED: 17010211 RIVERREACH:
DIRECTIONS: SWAN VALLEY, 3.3 AIR MILES NORTH OF CONDON, 2.13 AIR MILES EAST OF ST. HWY 83, 0.25 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3740 SIZE: 2
DATA: EST. 1000 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED. pH=7.28.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDLES01MTUS PNDCAM01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-11-04 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.021
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 7 TENTEN: 4,4 IDENT: Y EORANK: C
EORANKCOMM: SMALL POPULATION; AREA BEING LOGGED
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473432 LONG: 1134216 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SW4NE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.3 AIR MILES NORTH OF CONDON, 2.08 AIR MILES EAST OF ST. HWY 83, 0.28 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3740 SIZE: 1
EODATA: EST. 50 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDLES01MTUS PNDCAM01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.022
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 8 TENTEN: 4,4 IDENT: Y EORANK: C
EORANKCOMM: MEDIUM-SIZED POPULATION; AREA BEING LOGGED.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473431 LONG: 1134207 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SW4NE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.28 AIR MILES NORTH OF CONDON, 2.18 AIR MILES EAST OF ST. HWY 83, 0.27 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3750 SIZE: 1
EODATA: EST. 200 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDLES01MTUS PNDCAM01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ OC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.023
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 9 TENTEN: 4,4 IDENT: Y EORANK: C
EORANKCOMM: MEDIUM-SIZED POPULATION; AREA BEING LOGGED.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473427 LONG: 1134214 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: NW4SE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.2 AIR MILES NORTH OF CONDON, 2.10 AIR MILES EAST OF ST. HWY 83, 0.35 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3740 SIZE: 1
EODATA: 3 PLANTS (1987); SEVERAL HUNDRED PLANTS OBSERVED IN 1986 BY P. LESICA; NEARBY FORESTS RECENTLY LOGGED.

MMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDLES01MTUS PNDCAM01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.024
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 10 TENTEN: 4,4 IDENT: Y EORANK: C
EORANKCOMM: SMALL POPULATION; AREA BEING LOGGED.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473422 LONG: 1134212 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SW4SE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.09 AIR MILES NORTH OF CONDON, 2.10 AIR MILES EAST OF ST. HWY 83, 0.47 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3740 SIZE: 1
EODATA: EST. 30 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

MMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: CAMPBELL, L. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 2 JULY AND 9-10 JULY.
SOURCECODE: F87CAM01MTUS PNDCAM01MTUS PNDLES01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.025
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 11 TENTEN: 4,4 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; POND MARGIN IMPACTED BY LOGGING.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473421 LONG: 1134206 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: S2SE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.08 AIR MILES NORTH OF CONDON, 2.18 AIR MILES EAST OF ST. HWY 83, 0.45 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3750 SIZE: 2
EODATA: EST. 25 PLANTS (1987); POND MARGINS RECENTLY DISTURBED BY LOGGING.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: CAMPBELL, L. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 2 JULY AND 9-10 JULY.
SOURCECODE: F87CAM01MTUS PNDCAM01MTUS PNDLES01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.026
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 12 TENTEN: 4,4 IDENT: Y EORANK: C
EORANKCOMM: MEDIUM-SIZED POPULATION; AREA BEING LOGGED.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473432 LONG: 1134225 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SE4NW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.29 AIR MILES NORTH OF CONDON, 1.97 AIR MILES EAST OF ST. HWY 83, 0.28 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3710 SIZE: 1
EODATA: EST. 200-300 PLANTS (1987); NEARBY FORESTS RECENTLY LOGGED.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-23 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.027
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 13 TENTEN: 4,4 IDENT: Y EORANK: D
SURVEYSITE: CONDON CREEK
EORANKCOMM: MEDIUM-SIZED POPULATION; POND MARGIN IMPACTED BY LOGGING.
SURVEYDATE: 1987-07-02 LASTOBS: 1988-07-22 FIRSTOBS: 1987 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473426 LONG: 1134233 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 18 MERIDIAN: PR TRSCOMM: NW4SW4SW4

PHYSPROV: NR WATERSHED: 17010211 RIVERREACH:
DIRECTIONS: SWAN VALLEY, 3.18 AIR MILES NORTH OF CONDON, 1.84 AIR MILES EAST OF ST. HWY 83, 0.40 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3690 SIZE: 2
EDATA: EST. 300 PLANTS (1987); SOUTH MARGIN OF POND RECENTLY DISTURBED BY LOGGING.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED. pH=7.66.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2:

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-11-04 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.028
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 14 TENTEN: 3,4 IDENT: Y EORANK: C
EORANKCOMM: MEDIUM-SIZED POPULATION; ADJACENT USFS LAND RECENTLY LOGGED.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473422 LONG: 1134240 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N017W SECTION: 13 MERIDIAN: PR
TRSCOMM: SE4SE4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.09 AIR MILES NORTH OF CONDON, 1.75 AIR MILES EAST OF ST. HWY 83, 0.48 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3685 SIZE: 1
EODATA: EST. 200-250 PLANTS (1987); ADJACENT USFS LAND RECENTLY LOGGED.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MOREFLAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ OC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.029
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 15 TENTEN: 4,5 IDENT: Y EORANK: D
EORANKCOMM: MEDIUM-SIZED POPULATION; POND MARGINS IMPACTED BY LOGGING.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473415 LONG: 1134228 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 19 MERIDIAN: PR
TRSCOMM: NW4NW4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 2.97 AIR MILES NORTH OF CONDON, 1.88 AIR MILES EAST OF ST. HWY 83, 0.59 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3690 SIZE: 2
EODATA: EST. 200-300 PLANTS (1987); POND MARGINS RECENTLY DISTURBED BY LOGGING.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.030
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 16 TENTEN: 4,5 IDENT: Y EORANK: D
EORANKCOMM: LARGE POPULATION; POND MARGINS IMPACTED BY LOGGING.
SURVEYDATE: 1987-07-02 LASTOBS: 1987-07-02 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473416 LONG: 1134204 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N016W SECTION: 19 MERIDIAN: PR
TRSCOMM: NE4NE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 2.99 AIR MILES NORTH OF CONDON, 2.19 AIR MILES EAST OF ST. HWY 83, 0.55 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, PINUS PONDEROSA, LARIX OCCIDENTALIS IN SURROUNDING FOREST.
ELEV: 3740 SIZE: 1
EODATA: EST. 1000 PLANTS (1987); POND MARGINS RECENTLY DISTURBED BY LOGGING.

COMMENTS: SIGHT RECORD, NO VOUCHER SPECIMEN COLLECTED.

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: CAMPBELL, L. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 2 JULY AND 9-10 JULY.
SOURCECODE: F87CAM01MTUS PNDCAM01MTUS PNDLES01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAMOA010.031
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 17 TENTEN: 3,4 IDENT: Y EORANK: D
EORANKCOMM: MEDIUM-SIZED POPULATION; AREA DISTURBED BY LOGGING.
SURVEYDATE: 1987-07-15 LASTOBS: 1987-07-15 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711356
QUADNAME: CONDON PRECISION: SC
LAT: 473436 LONG: 1134315 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 021N017W SECTION: 13 MERIDIAN: PR
TRSCOMM: E2NE4SW4,W2NW4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 3.36 AIR MILES NORTH OF CONDON, 1.33 AIR MILES EAST OF ST. HWY 83, 0.32 AIR MILES SOUTH OF CONDON CREEK.

GENDESC: IN SHALLOW WATER OF A GLACIAL DEPRESSION; WITH SIUM SUAVE, TYPHA LATIFOLIA, GLYCERIA BOREALIS; POPULUS TREMULOIDES, LARIX OCCIDENTALIS, SALIX SP. AROUND POND.
ELEV: 3620 SIZE: 2
EODATA: EST. 150-175 PLANTS (1987); AREA DISTURBED BY LOGGING IN THE PAST; POND ADJACENT TO A LOGGING ROAD; PLANTS FOUND IN CALM, SHALLOW AREAS UNDER SHRUBS BORDERING POND, AND ADJACENT TO LOGS.
COMMENTS: VOUCHER - SHELLY, J.S. (1373), 1987, MONTU. pH=7.13.

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: CONDON CREEK
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-10 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.032
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 8 TENTEN: 5,6 IDENT: Y EORANK: B
EORANKCOMM: MEDIUM-SIZED POPULATION; HABITAT RELATIVELY UNDISTURBED.
SURVEYDATE: 1983-07-24 LASTOBS: 1983-07-24 FIRSTOBS: 1983 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472511 LONG: 1134134 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: SE4SW4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.16 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA. 1.75 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE, IN ONE TO TWO FEET OF WATER; WITH EQUISETUM FLUVIATILE, SIUM SUAVE, TYPHA, CAREX ROSTRATA; POPULUS TRICHOCARPA, P. TREMULOIDES AROUND POND.
ELEV: 4165 SIZE: 2
EODATA: EST. 101-1000 PLANTS (1983).

COMMENTS:

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM: -
BESTSOURCE: PIERCE, J. 737 LOCUST ST., MISSOULA, MT 59802

SOURCECODE: PNDPIE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-12 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.033
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 9 TENTEN: 5,6 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; ADJACENT TO GRAVEL ROAD.
SURVEYDATE: 1983-07-04 LASTOBS: 1983-07-04 FIRSTOBS: 1983 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472520 LONG: 1134119 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: N2SE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.05 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA.
1.5 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL DEPRESSION, IN WATER ON EAST EDGE OF BOG; WITH UTRICULARIA, SPARGANIUM, RANUNCULUS; UNDER OVERHANGING POPULUS TREMULOIDES, POPTRI, SALIX AND CORNUS.
ELEV: 4130 SIZE: 1
EODATA: EST. 50 PLANTS (1983); THIS SLOUGH HAS A FLOATING SEDGE MAT, AND IS DOMINATED BY TYPHA, AND THUS IS APPARENTLY MORE SUCCESSIONALLY ADVANCED THAN OTHERS IN THE AREA.

COMMENTS: VOUCHER - PIERCE, J. (1166), 1983, SPECIMEN #092257 UM.

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: PIERCE, J. 737 LOCUST ST., MISSOULA, MT 59802

SOURCECODE: PNDPIE01MTUS S83PIEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-12 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.034
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 10 TENTEN: 5,6 IDENT: Y EORANK: B
EORANKCOMM: MEDIUM-SIZED POPULATION; HABITAT RELATIVELY UNDISTURBED.
SURVEYDATE: 1983-07-24 LASTOBS: 1983-07-24 FIRSTOBS: 1983 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472507 LONG: 1134116 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: NE4NE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.3 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA.
1.5 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE, WITH FIRM BOTTOM; WITH SIUM SUAVE, CAREX
ROSTRATA, EQUISETUM FLUVIATILE.

ELEV: 4145 SIZE: 2
EODATA: EST. 11-100 PLANTS (1983).

COMMENTS:

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: PIERCE, J. 737 LOCUST ST., MISSOULA, MT 59802

SOURCECODE: PNDPIE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-12 CDJ OC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.035
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 11 TENTEN: 5,6 IDENT: Y EORANK: B
EORANKCOMM: MEDIUM-SIZED POPULATION; HABITAT RELATIVELY UNDISTURBED.
SURVEYDATE: 1983-07-24 LASTOBS: 1983-07-24 FIRSTOBS: 1983 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472502 LONG: 1134114 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: E2NE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.38 AIR MILES SOUTH OF LINDBERGH LAKE RD., CA.
1.5 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE, IN 0.5-1.5 FEET OF WATER; WITH SIUM SUAVE,
CAREX ROSTRATA.

ELEV: 4150 SIZE: 2
EODATA: EST. 51-1000 PLANTS (1983).

COMMENTS:

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: PIERCE, J. 737 LOCUST ST., MISSOULA, MT 59802

SOURCECODE: PNDPIE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-12 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.036
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 12 TENTEN: 5,6 IDENT: Y EORANK: C
EORANKCOMM: MEDIUM-SIZED POPULATION; ADJACENT TO GRAVEL ROAD.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472514 LONG: 1134148 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: SW4SW4NW4;T19NR17W:+ PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: ALSO 12SE4SE4NE4; SWAN VALLEY, SOUTH SIDE OF LINDBERGH LAKE RD., CA. 1.87 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH CAREX VESICARIA, SIUM SUAVE, EQUISETUM FLUVIATILE, SALIX SPP.; POPULUS TREMULOIDES, P. TRICHOCARPA, LAROCC, PICENG AROUND EDGE.
ELEV: 4190 SIZE: 1
EODATA: EST. 100-125 PLANTS (1987); PLANTS ARE FOUND AT SOUTHEAST END OF POND, ON SECTION LINE.

COMMENTS: VOUCHER - SHELLY, J.S. (1394), 1987, UM.

MACODE1: PRIVATEOWNMTUS CONTAINED1: N MACODE2: FFSNFFLAT1MTUS CONTAINED2: N
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.037
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 13 TENTEN: 4,6 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; POND DISTURBED BY LOGGING ACTIVITY.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472551 LONG: 1134203 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 01 MERIDIAN: PR
TRSCOMM: SW4NE4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.93 AIR MILES NORTH OF LINDBERGH LAKE RD., CA. 1.69 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH TYPHA LATIFOLIA, ALISMA TRIVIALE, SIUM SUAVE, CAREX VESICARIA, UTRICULARIA VULGARIS; POPULUS TRICHOCARPA, P. TREMULOIDES, LARIX OCCIDENTALIS AROUND POND.
ELEV: 4170 SIZE: 1
EODATA: EST. 10-15 PLANTS (1987); POND DISTURBED BY HEAVY LOGGING ON ALL SIDES; PLANTS FOUND IN SOUTH END OF POND.

COMMENTS:

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.038
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 14 TENTEN: 4,6 IDENT: Y EORANK: C
EORANKCOMM: LARGE POPULATION; POND DISTURBED BY LOGGING ACTIVITY.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472608 LONG: 1134215 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 01 MERIDIAN: PR
TRSCOMM: E2SW4NE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 1.33 AIR MILES NORTH OF LINDBERGH LAKE RD., CA.
1.62 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH SIUM SUAVE, CAREX VESICARIA,
EQUISETUM FLUVIATILE, GLYCERIA BOREALIS, SPARGANIUM MINIMUM;
POPULUS TRICHOCARPA, LAROCC, PINCON AROUND POND.
ELEV: 4130 SIZE: 2
EODATA: EST. 1000-1200 PLANTS (1987); POND DISTURBED BY HEAVY
LOGGING ON ALL SIDES.

COMMENTS: VOUCHER - SHELLY, J.S. (1395), 1987, UM.

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS.
OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.039
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 15 TENTEN: 3,6 IDENT: Y EORANK: C
EORANKCOMM: LARGE POPULATION; LOGGING DAMAGE ON NORTHEAST SIDE.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1984 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472550 LONG: 1134244 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 01 MERIDIAN: PR
TRSCOMM: SW4NE4SW4,SE4NW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 1.25 AIR MILES NORTH OF LINDBERGH LAKE RD., CA. 2.21 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL DEPRESSION; WITH GLYCERIA BOREALIS, SIUM SUAVE, CAREX VESICARIA; POPULUS TRICHOCARPA, P. TREMULOIDES, PINUS CONTORTA, LARIX OCCIDENTALIS, SALIX SPP. AROUND EDGE.
ELEV: 4190 SIZE: 2
EODATA: EST. 1000-1500 PLANTS (1987); POND DAMAGED BY LOGGING ON NORTHEAST SIDE.

COMMENTS:

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDPIE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.040
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 16 TENTEN: 3,6 IDENT: Y EORANK: B
EORANKCOMM: FAIRLY LARGE POPULATION; SURROUNDING FOREST UNDISTURBED.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1984 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472539 LONG: 1134244 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 01 MERIDIAN: PR
TRSCOMM: SW4SE4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 1.03 AIR MILES NORTH OF LINDBERGH LAKE RD., CA.
2.32 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH SIUM SUAVE, CAREX VESICARIA, TY-
PHA LATIFOLIA, RANUNCULUS AQUATILIS, GLYCERIA BOREALIS; POP-
ULUS TRICHOCARPA, P. TREMULOIDES, PINUS CONTORTA AROUND EDGE
ELEV: 4225 SIZE: 2
EODATA: EST. 300-400 PLANTS (1987); FOREST IMMEDIATELY SURROUNDING
POND CURRENTLY UNDISTURBED.

COMMENTS:

MACODE1: PBURLNORTHMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS.
OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDPIE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-13 CDJ OC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.041
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 17 TENTEN: 6,6 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; POND HEAVILY DISTURBED BY GRAZING.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472541 LONG: 1134028 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 05 MERIDIAN: PR
TRSCOMM: W2SW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.6 AIR MILES NORTH OF LINDBERGH LAKE RD., 0.53 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH SIUM SUAVE, EQUISETUM FLUVIATILE, CAREX VESICARIA, C. ROSTRATA, ALISMA TRIVIALE, POTAMOGETON GRAMINEUS; POPULUS TRICHOCARPA, P. TREMULOIDES AROUND EDGE.
ELEV: 4015 SIZE: 1
EODATA: FOUR PLANTS (1987); POND AND SURROUNDING FOREST UNDERSTORY HEAVILY DISTURBED BY LIVESTOCK GRAZING; PLANTS FOUND ON EAST EDGE OF POND.

COMMENTS:

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: HORACE H. KOESSLER
OWNERCOMM: P.O. BOX 3718, MISSOULA, MT 59806
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.042
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 18 TENTEN: 6,6 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; POND DISTURBED BY LIVESTOCK GRAZING.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472544 LONG: 1134024 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 05 MERIDIAN: PR
TRSCOMM: N2SW4SW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.7 AIR MILES NORTH OF LINDBERGH LAKE RD., 0.43 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH SIUM SUAVE, EQUISETUM FLUVIATILE, CAREX VESICARIA, C. ROSTRATA, ALISMA TRIVIALE; POPULUS TRICHOCARPA, P. TREMULOIDES, RHAMNUS ALNIFOLIA AROUND EDGE.
ELEV: 3995 SIZE: 3
EODATA: EST. 50-60 PLANTS (1987); POND AND SURROUNDING FOREST UNDERSTORY DISTURBED BY LIVESTOCK GRAZING; PLANTS FOUND IN NORTH, NE, AND SOUTH PORTIONS OF POND; MOST PLANTS FOUND IN AN ARM ON NE SIDE OF POND.
COMMENTS: VOUCHER - SHELLY, J.S. (1393), 1987, UM.

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: HORACE H. KOESSLER
OWNERCOMM: P.O. BOX 3718, MISSOULA, MT 59806
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-12 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.043
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 19 TENTEN: 3,6 IDENT: Y EORANK: C
EORANKCOMM: SMALL POPULATION; HABITAT CURRENTLY UNDISTURBED.
SURVEYDATE: 1987-07-30 LASTOBS: 1987-07-30 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472526 LONG: 1134303 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 12 MERIDIAN: PR
TRSCOMM: SW4NW4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.76 AIR MILES NORTH OF LINDBERGH LAKE RD., 2.68 AIR MILES WEST OF ST. HWY 83.

GENDESC: SMALL GLACIAL POTHOLE POND; WITH CAREX VESICARIA, ALOPECURUS AEQUALIS, SIUM SUAVE; POPULUS TRICHOCARPA, P. TREMULOIDES, PINUS CONTORTA, LARIX OCCIDENTALIS AROUND POND.
ELEV: 4280 SIZE: I
EODATA: EST. 20-25 PLANTS (1987).

COMMENTS:

MACODE1: FFSNFFLATIMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-13 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.044
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 20 TENTEN: 4,6 IDENT: Y EORANK: C
EORANKCOMM: LARGE POPULATION; ADJACENT TO A GRAVEL ROAD.
SURVEYDATE: 1987-07-29 LASTOBS: 1987-07-29 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472508 LONG: 1134156 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 12 MERIDIAN: PR
TRSCOMM: S2SE4NE4, N2NE4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, SOUTHEAST OF LINDBERGH LAKE RD., 2.0 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE DEPRESSION; WITH CAREX VESICARIA, SIUM SUAVE, RANUNCULUS AQUATILIS; POPULUS TRICHOCARPA, P. TREMULOIDES, PINUS CONTORTA, LARIX OCCIDENTALIS AROUND POND.
ELEV: 4215 SIZE: 1
EODATA: EST. 275-400 PLANTS (1987); POND IS ALONGSIDE A HEAVILY USED GRAVEL ROAD, AND IS UNDER A POWER LINE.

COMMENTS:

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDPIE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-13 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.045
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 21 TENTEN: 6,8 IDENT: Y EORANK: C
EORANKCOMM: FAIRLY SMALL POPULATION, NEARBY AREAS LOGGED.
SURVEYDATE: 1987-07-10 LASTOBS: 1987-07-10 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472354 LONG: 1134058 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SE4SW4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 1.83 AIR MILES ESE OF NORTH END OF LINDBERGH LAKE, 1.08 AIR MILES SOUTH OF SWAN RIVER, CA. 2.0 AIR MILES WEST OF ST. HWY 83.
GENDESC: GLACIAL POTHOLE POND, SURROUNDED BY PINUS CONTORTA FOREST, POPULUS TREMULOIDES NEAR MARGIN; WITH CAREX VESICARIA, EQUISETUM FLUVIATILE, POTAMOGETON GRAMINEUS, SIUM SUAVE.
ELEV: 4250 SIZE: 2
EODATA: EST. 300 PLANTS (1987).

COMMENTS: VOUCHER - SHELLY, J.S. (1364) AND L. CAMPBELL, 1987, UM.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: CAMPBELL, L. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 2 JULY AND 9-10 JULY.
SOURCECODE: F87CAM01MTUS PNDCAM01MTUS S87SHEUMMTUS PNDSHE01MTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-09-01 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.046
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 22 TENTEN: 5,7 IDENT: Y EORANK: D
EORANKCOMM: SMALL POPULATION; SURROUNDING HABITAT DISTURBED BY LOGGING.
SURVEYDATE: 1987-07-10 LASTOBS: 1987-07-10 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472434 LONG: 1134141 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SW4NW4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.58 AIR MILES SOUTH OF SWAN RIVER, 2.13 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH SIUM SUAVE, CAREX VESICARIA, TYPHA, RANUNCULUS GMELINII, POTAMOGETON GRAMINEUS.

ELEV: 4230 SIZE: 1
EODATA: EST. 50 PLANTS (1987); ADJACENT AREAS DISTURBED BY CLEARCUT LOGGING.

COMMENTS: VOUCHER - SHELLY, J.S. (1368) AND L. CAMPBELL, 1987, UM.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: CAMPBELL, L. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 2 JULY AND 9-10 JULY.
SOURCECODE: F87CAM01MTUS PNDCAM01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-13 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.047
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 23 TENTEN: 5,7 IDENT: Y EORANK: C
EORANKCOMM: MED.-SIZED POPULATION; SURROUNDING AREA DISTURBED BY LOGGING
SURVEYDATE: 1987-07-10 LASTOBS: 1987-07-10 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472433 LONG: 1134127 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SW4NE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.5 AIR MILES SOUTH OF SWAN RIVER, 1.95 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL DEPRESSION; WITH SIUM SUAVE, CAREX VESICARIA, TYPHA LATIFOLIA, NUPHAR VARIEGATUM, ELEOCHARIS PALUSTRIS, SPARGANIUM MINIMUM; ALNUS ON EDGES, NO POPULUS.
ELEV: 4215 SIZE: 1
EODATA: EST. 200 PLANTS (1987); POND LOCATED ON EDGE OF A CLEARCUT.

COMMENTS: VOUCHER - SHELLY, J.S. (1365) AND L. CAMPBELL, 1987, UM.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: CAMPBELL, L. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 2 JULY AND 9-10 JULY.
SOURCECODE: F87CAM01MTUS PNDCAM01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-13 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.048
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 24 TENTEN: 5,7 IDENT: Y EORANK: C
EORANKCOMM: MED.-SIZED POPULATION; SURROUNDING AREA DISTURBED BY LOGGING
SURVEYDATE: 1987-07-10 LASTOBS: 1987-07-10 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472432 LONG: 1134122 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 18 MERIDIAN: PR
TRSCOMM: SW4NE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.5 AIR MILES SOUTH OF SWAN RIVER, 1.89 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH CAREX VESICARIA, SIUM SUAVE, EQUISETUM FLUVIATILE, TYPHA LATIFOLIA.

ELEV: 4215 SIZE: 1
EODATA: EST. 250 PLANTS (1987); ADJACENT AREAS DISTURBED BY CLEARCUT LOGGING.

COMMENTS: VOUCHER - SHELLY, J.S. (1366) AND L. CAMPBELL, 1987, UM.

MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: CAMPBELL, L. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 2 JULY AND 9-10 JULY.
SOURCECODE: F87CAM01MTUS PNDCAM01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-11-13 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.049
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 25 TENTEN: 6,7 IDENT: Y EORANK: C
EORANKCOMM: LARGE POPULATION; ADJACENT TO NEW LOGGING ROAD.
SURVEYDATE: 1987-07-10 LASTOBS: 1987-07-10 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472444 LONG: 1134107 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N016W SECTION: 07 MERIDIAN: PR
TRSCOMM: SW4SW4SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.16 AIR MILES SOUTH OF SWAN RIVER, 1.60 AIR MILES WEST OF ST. HWY 83.

GENDESC: GLACIAL POTHOLE POND; WITH CAREX ROSTRATA, C. VESICARIA, RANUNCULUS GMELINII, R. AQUATILIS, ALOPECURUS AEQUALIS; POPULUS SPP., ALNUS INCANA, SALIX SPP. AROUND EDGE.
ELEV: 4150 SIZE: 1
EODATA: EST. 1500-2000 PLANTS (1987); POND IS ON NORTH SIDE OF A NEWLY CONSTRUCTED LOGGING ROAD, JUST NORTH OF USFS BOUNDARY.

COMMENTS: VOUCHER - SHELLY, J.S. (1369) AND L. CAMPBELL, 1987, UM. pH=7.29.
MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: PAT HALTERMAN
OWNERCOMM: LINDBERGH LAKE RD., SEELEY LAKE, MT 59868.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS PNDCAM01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-11-13 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 CDJ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.050
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 26 TENTEN: 4,7 IDENT: Y EORANK: B
EORANKCOMM: FAIRLY LARGE POPULATION; POND IN UNDISTURBED SETTING.
SURVEYDATE: 1987-07-10 LASTOBS: 1987-07-10 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472437 LONG: 1134232 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 13 MERIDIAN: PR
TRSCOMM: NE4NE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.25 AIR MILES ENE OF SWAN RIVER OUTLET FROM CYGNET LAKE, 0.1 AIR MILES SOUTH OF SWAN RIVER, CA. 2.8 AIR MILES WEST OF ST. HWY 83.
GENDESC: GLACIAL POTHOLE POND, BOTTOM OF CONSOLIDATED CLAY MUCK;EDGE-CORNUS STOLONIFERA, RHAMNUS ALNIFOLIA, SALIX SPP.; WATER-GLYCERIA BOREALIS, SIUM SUAVE, CAREX ATHERODES,C. VESICARIA.
ELEV: 4295 SIZE: 3
EODATA: EST. 500-1000 PLANTS (1987); MOSTLY ON THE POND MARGIN, IN THE MORE OPEN ZONE BETWEEN THE EMERGENT VEGETATION AND THE SHORELINE, UNDER OVERHANGING SHRUB COVER; A FEW PLANTS OUT IN DEEPER WATER.
COMMENTS: VOUCHER - SHELLY, J.S. (1367), 1987, UM.

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: ROBERT E. HARDY
OWNERCOMM: 42 SHERWOOD PLACE, GREENWICH, CT 06830
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-09-01 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-08 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAMOA010.051
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 27 TENTEN: 4,8 IDENT: Y EORANK: C
EORANKCOMM: SMALL POPULATION; NEWLY CONSTRUCTED LOGGING ROADS IN AREA.
SURVEYDATE: 1987-07-16 LASTOBS: 1987-07-16 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472335 LONG: 1134229 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 019N017W SECTION: 24 MERIDIAN: PR
TRSCOMM: NE4SE4NW4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, 0.91 AIR MILES EAST OF EAST SHORE OF LINDBERGH LAKE, 0.8 AIR MILES SSE OF SOUTH SHORE OF CYGNET LAKE, CA. 3.3 AIR MILES WEST OF ST. HWY 83.
GENDESC: SMALL POND, SURROUNDED BY FOREST OF POPULUS TRICHOCARPA, P. TREMULOIDES, PINUS CONTORTA, LARIX OCCIDENTALIS; WITH CAREX VESICARIA AND SIUM SUAVE; BOTTOM OF FIRM CLAY.
ELEV: 4425 SIZE: 1
EODATA: EST. 100-125 PLANTS (1987); VERY SMALL POND, MOSTLY DRY EXCEPT FOR CENTER WHERE PLANTS WERE FOUND.

COMMENTS: VOUCHER - SHELLY, J.S. (1375), 1987, UM. pH=6.85.
MACODE1: FFSNFFLAT1MTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: LINDBERGH LAKE
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1987. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 23-26 & 30 JUNE, 1-17 & 28-30 JULY.
SOURCECODE: F87SHE03MTUS PNDSHE01MTUS S87SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 87-09-02 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 88-01-12 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.052
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 28 TENTEN: 1,3 IDENT: Y EORANK: C
EORANKCOMM: MODERATE-SIZED POPULATION; ADJACENT TO ROAD.
SURVEYDATE: 1987-08-21 LASTOBS: 1987-08-21 FIRSTOBS: 1987 GRANK: G2
SRANK: S1 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711346
QUADNAME: CYGNET LAKE PRECISION: SC
LAT: 472829 LONG: 1134432 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 020N017W SECTION: 22 MERIDIAN: PR
TRSCOMM: SE4 PHYSPROV: NR WATERSHED: 17010211
DIRECTIONS: SWAN VALLEY, CA. 0.5 AIR MILES WNW OF NORTH END OF STONER LAKE, 0.35 AIR MILES EAST OF GLACIER CREEK, 3.15 AIR MILES WEST OF ST. HWY 83.
GENDESC: MARSHY AREA ON EDGE OF A GLACIAL POTHOLE POND; WITH CAREX VESICARIA, SIUM SUAVE, EQUISETUM FLUVIATILE, RANUNCULUS AQUATILIS.
ELEV: 4010 SIZE: 1
EODATA: EST. 200 PLANTS (1987); A FEW PLANTS IN MUD ON POND MARGIN STILL FLOWERING ON DATE OF SURVEY; ENTIRE POND NOT SURVEYED.

COMMENTS: VOUCHER - LESICA, P. (4502), 1987, UM.

MACODE1: PRIVATEOWNMTUS CONTAINED1: Y MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:

MOREMGMT: SITECODE:
SITENAME: KRAFT CREEK
OWNER: MRS. G.A. MARTEL
OWNERCOMM: 1533 PHILLIPS ST. MISSOULA, MT 59802.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: LESICA, P. DEPARTMENT OF BOTANY, UNIVERSITY OF MONTANA, MISSOULA, MT 59812.
SOURCECODE: PNDLES01MTUS S87LESUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 87-08-25 JSS CDREV: Y MAPPER: 87-11-13 CDJ QC: Y
UPDATE: 87-11-17 LWS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.053
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 2 TENTEN: 6,8 IDENT: Y EORANK: BC
SURVEYSITE: SALMON PRAIRIE
EORANKCOMM: MODERATE POPULATION, LITTLE-DISTURBED AREA.
SURVEYDATE: 1988-07-15 LASTOBS: 1988-07-15 FIRSTOBS: 1988 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTLAKE
QUADCODE: 4711367
QUADNAME: SALMON PRAIRIE PRECISION: SC
LAT: 473900 LONG: 1134822 S: 473854 N: 473902 E: 1134820 W: 1134825
TOWNRANGE: 022N017W SECTION: 20 MERIDIAN: PR TRSCOMM: NE4SW4,NW4
4
PHYSPROV: NR WATERSHED: 17010211 RIVERREACH: 17010211012000.00
DIRECTIONS: SWAN VALLEY, 0.5 AIR MILES WEST OF SWAN RIVER, CA. 1.6 AIR MILES NW OF SALMON PRAIRIE (TOWN SITE).

GENDESC: GLACIAL POTHOLE POND, IN SHALLOW WATER; WITH CAREX VESICARIA, EQUISETUM FLUVIATILE, SIUM SUAVE, TYPHA LATIFOLIA, POTAMOGETON GRAMINEUS.
ELEV: 3450 SIZE: 2
DATA: EST. 200-300 PLANTS, ALONG MARGINS OF TWO AREAS WHICH ARE CONNECTED BY HIGHER WATER IN EARLY SUMMER; PONDS BISECTED BY FENCE, WITH MOST PLANTS ON WEST (USFS) SIDE.

COMMENTS: VOUCHER - SHELLY, J.S. (1489), 1988, MONTU.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: N MACODE2: PRIVATEOWNMTUS CONTAINED2: N
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: FLATHEAD N.F.; PHILLIPS, L.
OWNERCOMM: LOUIS AND CAROL PHILLIPS, 672 TWO MILE DRIVE, KALISPELL, MT.
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 14-15 JULY, 21-22 JULY AND 26-29 JULY.
SOURCECODE: F88SHE06MTUS PNDSHE01MTUS S88SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 88-08-02 JSS CDREV: Y MAPPER: 88-08-02 JSS OC: Y
UPDATE: 88-08-30 JSS

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAM0A010.054
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 4 TENTEN: 9,9 IDENT: Y EORANK: BC
SURVEYSITE: ELK CREEK
EORANKCOMM: LARGE POPULATION, ROAD AND LOGGING NEARBY.
SURVEYDATE: 1988-07-26 LASTOBS: 1988-07-26 FIRSTOBS: 1988 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711357
QUADNAME: PECK LAKE PRECISION: SC
LAT: 473048 LONG: 1134553 S: 0 N: 0 E: 0 W: 0
TOWNRANGE: 020N017W SECTION: 04 MERIDIAN: PR IRSCOMM: SE4SE4;9,NE
NE4
PHYSPROV: NR WATERSHED: 17010211 RIVERREACH: 17010211102100.00
DIRECTIONS: SWAN VALLEY, 0.25 AIR MILE WEST OF ELK CREEK, CA. 2.75 AIR MILES WSW OF CONDON.

GENDESC: GLACIAL POTHOLE POND, IN SHALLOW WATER; WITH CAREX VESICARIA, SIUM SUAVE, POTAMOGETON GRAMINEUS, SAGITTARIA CUNEATA, UTRICULARIA VULGARIS, CAREX ATHERODES.
ELEV: 3810 SIZE: 1
QDATA: EST. 400-500 PLANTS, PROBABLY MORE WHEN POND IS FULL.

COMMENTS: VOUCHER - SHELLY, J.S. (1499), 1988, MONTU.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: N MACODE2: PBURLNORTHMTUS CONTAINED2: N
MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: BURLINGTON NORTHERN, INC.
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 14-15 JULY, 21-22 JULY, AND 26-29 JULY.
SOURCECODE: F88SHE06MTUS PNDSHE01MTUS S88SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: Y OWNERINFO:
TRANSCRIBR: 88-08-02 JSS CDREV: Y MAPPER: 88-08-02 JSS OC: Y
UPDATE: 88-08-15 MEZ

ELEMENT OCCURRENCE RECORD

EOCODE: PDCAMØAØ10.Ø55
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 5 TENTEN: 9,9 IDENT: Y EORANK: C
SURVEYSITE: ELK CREEK
EORANKCOMM: SMALL POPULATION; HABITAT STILL INTACT, BUT THREATENED.
SURVEYDATE: 1988-Ø7-27 LASTOBS: 1988-Ø7-27 FIRSTOBS: 1988 GRANK: G2
SRANK: S2 STATE: MT COUNTYNAME: MTMISS
QUADCODE: 4711357
QUADNAME: PECK LAKE PRECISION: SC
LAT: 473Ø58 LONG: 1134ØØ3 S: Ø N: Ø E: Ø W: Ø
TOWNRANGE: Ø2ØNØ17W SECTION: Ø4 MERIDIAN: PR TRSCOMM: NE4SW4SE4

PHYSPROV: NR WATERSHED: 17Ø1Ø211 RIVERREACH: 17Ø1Ø211Ø2100.ØØ
DIRECTIONS: SWAN VALLEY, Ø.49 AIR MILES WEST OF ELK CREEK, CA. 2.75 AIR MILES WSW OF CONDON.

GENDESC: GLACIAL POTHOLE POND, IN SHALLOW WATER; WITH EQUISETUM FLUVIATILE, SIUM SUAVA, UTRICULARIA VULGARIS, LEMNA; POPULUS TRICHOCARPA AROUND POND.
ELEV: 3820 SIZE: 1
EDATA: CA. 100 INDIVIDUALS (53 COUNTED); FOUND ONLY IN SOUTH END OF POND, AROUND MARGIN; DOES NOT OCCUPY ALL AVAILABLE HABITAT.

COMMENTS: VOUCHER - SHELLY, J.S. (15ØØ), 1988, MONTU.

MACODE1: FFSNFFLAT9MTUS CONTAINED1: Y MACODE2: CONTAINED2

MACODE3: CONTAINED3: ADLMAS: MORELAN: MOREPROT:
MOREMGMT: B SITECODE:
SITENAME:
OWNER: FLATHEAD NATIONAL FOREST
OWNERCOMM:
PROTCOMM:
MGMTCOMM:
MONITOR: MONITORNUM:
BESTSOURCE: SHELLY, J.S. 1988. FIELD SURVEYS IN LAKE AND MISSOULA COS. OF 14-15 JULY, 21-22 JULY, AND 26-29 JULY.
SOURCECODE: F88SHEØ6MTUS PNDSHEØ1MTUS S88SHEUMMTUS

DATASENS: Y BOUNDARIES: Y PHOTOS: N OWNERINFO:
TRANSCRIBR: 88-Ø8-Ø2 JSS CDREV: Y MAPPER: 88-Ø8-Ø2 JSS OC: Y
UPDATE: 88-Ø8-15 MEZ

WASHINGTON NATURAL HERITAGE D[illegible] SYSTEM
HOWELLIA AQUATILIS RECORDS
DATA CURRENT AS OF AUGUST 1988

NAME: HOWELLIA AQUATILIS 001
INDEX CODE: NT.L72
OWNERSHIP CODE: PVTUUU
NUMBER OF OWNERS: .
NAME OF OWNER:
FEDERAL STATUS: C2
STATE STATUS: SPE
STATE RANK: S1
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: SCHULLER R 1983 (1929) (1 PREV COLL 1978)
GENERAL DESCRIPTION: JUL 14, SHALLOW "PERMANENT" POND, 2200 FT EL, 20 PLS, MOSTLY FRUITING, EASTERN MARGIN OF POND W/N 2X15M AREA, OPEN WATER & W CAREX VESICARIA, ALISMA PLANTAGO-AQUATICA V AMERICANUM, ELEOCHARIS, POLYGONUM COCCINEUM, NO HERBIVORY OR DISEASE
BIOTIC COMMUNITIES:
DATA POINT: 6
DATE OF ENTRY: 8346
ELEVATION:
ASPECT:
DATE: 198307
SITE REVISITATION:
PRECISION: C
THREAT:
SIZE: .
EO RANK: B
NDG REGION: 1
DNR REGION:
DIRECTIONS:
BOUNDARIES:
TRS: T25N R44E S19
QUADCODE: 4711763
QUADNAME: SPOKANE NE 7.5
LATLONG: 473805N1171738W
COUNTY: SPOKANE
PROVINCE: CB
SPECIAL STATUS:
PROTECTION STATUS: .
PHOTOS: P
SURVEY: B
VERIFICATION: V
REFERENCES: A

NAME: HOWELLIA AQUATILIS 002
INDEX CODE: NT.L72
OWNERSHIP CODE: USAFWS
NUMBER OF OWNERS: 1
NAME OF OWNER:
FEDERAL STATUS: C2
STATE STATUS: SPE
STATE RANK: S1
NAME OF AREA: BLACKWATER ISLANDS RNA-RIDGEFIELD NWR
AGENCY SUBSECTION:
SOURCE OF LEAD: KEMP, LM 1980 MUSK017, 001
GENERAL DESCRIPTION: RIDGEFIELD NAT.WILDLIFE REFUGE. NEAR NW SIDE FOWLER LAKE,VERNAL POOL CA 30X30 FT EL10.ABUNDANT:GRASS SPP:FRAXINUS LATIFOLIA,SALIX SP,RANUNCULUS AQUATILIS,CALLITRICH STAGNALIS,C.HETEROPHYLLA.POND DRY:R.FLAMMULA,LUDWIGIA PALUSTRIS,ELEOCHARIS,MAYIS
BIOTIC COMMUNITIES:
DATA POINT: 12
DATE OF ENTRY: 8051
ELEVATION:
ASPECT:
DATE: 198005
SITE REVISITATION:
PRECISION: C
THREAT:
SIZE: .
EO RANK: B
NDG REGION: 5
DNR REGION:
DIRECTIONS:
BOUNDARIES:
TRS: T04N R01W S11
QUADCODE: 4512277
QUADNAME: ST HELENS 7.5
LATLONG: 455033N1224554W
COUNTY: CLARK
PROVINCE: PT
SPECIAL STATUS: ENANGERPRS
PROTECTION STATUS: 2
PHOTOS:
SURVEY:
VERIFICATION: V
REFERENCES:

NAME: HOWELLIA AQUATILIS 003
INDEX CODE: NT.L72
OWNERSHIP CODE: PVTUUU
NUMBER OF OWNERS: .
NAME OF OWNER:
FEDERAL STATUS: C2
STATE STATUS: SPE
STATE RANK: S1
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON JG 1986
GENERAL DESCRIPTION: GROWING IN SMALL POND (CA 100M X 40M) SURROUNDED BY PIPO/SYAL. A FEW POPULUS TREMULOIDES OCCUR AROUND EDGE OF POND. SPP IN POND INCLUDE RANUNCULUS FLABELLARIS, SIUM SUAVE(?), TYPHA LATIFOLIA, PHALARIS ARUNDINACEA,
BIOTIC COMMUNITIES:
DATA POINT: 14
DATE OF ENTRY: 8630
ELEVATION: 2300FT
ASPECT:
DATE: 19860514
SITE REVISITATION:
PRECISION: C
THREAT:
SIZE: .
EO RANK: BC
NDG REGION: 1
DNR REGION:
DIRECTIONS: D
BOUNDARIES:
TRS: T23N R42E S19 NE
QUADCODE: 4711745
QUADNAME: CHENEY 7.5
LATLONG: 472830N1173238W
COUNTY: SPOKANE
PROVINCE: CB
SPECIAL STATUS:
PROTECTION STATUS: .
PHOTOS:
SURVEY:
VERIFICATION: V
REFERENCES: A

WASHINGTON NATURAL HERITAGE DATA SYSTEM
HOWELLIA AQUATILIS RECORDS
DATA CURRENT AS OF AUGUST 1988

NAME: HOWELLIA AQUATILIS 004 — TRS: T23N R42E S16 SE
INDEX CODE: NT.L72 — QUADCODE: 4711745
OWNERSHIP CODE: PVTUUU — DATE: 19860520 — QUADNAME: CHENEY 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 472855N1173004W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS:
STATE RANK: S1 — EO RANK: BC — PROTECTION STATUS: .
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON JG 1986
GENERAL DESCRIPTION: IN VERNAL POND SURROUNDED BY PIPO WITH A FEW SCATTERED ASPEN. SYAL & PHILADELPHU S LEWISII OCCUR ON UPLANDS. PHALARIS ARUNDINACEA ALONG ENTIRE POND MARGIN. ELEOC HARIS SP & RANUNCULUS AQUATILIS IN WATER. AT LEAST SEVERAL HUNDRED HOAQ PLANTS.
BIOTIC COMMUNITIES:
DATA POINT: 15 — ELEVATION: 2320FT — HDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8630 — ASPECT: — DNR REGION: — BOUNDARIES: — SURVEY: — REFERENCES: A

NAME: HOWELLIA AQUATILIS 005 — TRS: T23N R42E S08 NWOFNW
INDEX CODE: NT.L72 — QUADCODE: 4711755
OWNERSHIP CODE: PVTUUU — DATE: 19860520 — QUADNAME: FOUR LAKES 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 473026N1173202W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS: PRS
STATE RANK: S1 — EO RANK: B — PROTECTION STATUS: .
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON JG 1986
GENERAL DESCRIPTION: IN SMALL POND SURROUNDED BY PIPO & ASPEN. OTHERS IN POND: TYPHA LATIFOLIA, CAREX VESICARIA, PHALARIS ARUNDINACEA, RANUNCULUS AQUATILIS, SIUM SUAVE & POLYGONUM SP PROBABLY SEVERAL HUNDRED TO >>1000 INDIVIDUALS. POND IN BETTER SHAPE THAN MOST.
BIOTIC COMMUNITIES:
DATA POINT: 3 — ELEVATION: 2280FT — HDG REGION: 1 — DIRECTIONS: D — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8630 — ASPECT: — DNR REGION: — BOUNDARIES: — SURVEY: — REFERENCES: A

NAME: HOWELLIA AQUATILIS 006 — TRS: T23N R42E S22 SWOFSE
INDEX CODE: NT.L72 — QUADCODE: 4711744
OWNERSHIP CODE: PVTUUU — DATE: 19870504 — QUADNAME: SPANGLE WEST 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 472755N1172705W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: 1 — SPECIAL STATUS:
STATE RANK: S1 — EO RANK: C — PROTECTION STATUS: .
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: IN POND DISSECTED BY CAMERON RD. RINGED BY ASPEN & PIPO. PHALARIS DOMINATES THE POND, WHICH IS CA 1 ACRE. SALIX, SYAL, ROSA & CORNUS STOLONIFERA OCCUR AROUND THE POND EDGE. SOME SCIRPUS IN POND.
BIOTIC COMMUNITIES:
DATA POINT: 11 — ELEVATION: — HDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8743 — ASPECT: — DNR REGION: NE — BOUNDARIES: — SURVEY: — REFERENCES: A

WASHINGTON NATURAL HERITAGE DATA SYSTEM
HOWELLIA AQUATILIS RECORDS
DATA CURRENT AS OF AUGUST 1988

NAME: HOWELLIA AQUATILIS 007
INDEX CODE: NT.L72
OWNERSHIP CODE: PVTUUU
NUMBER OF OWNERS: .
NAME OF OWNER:
FEDERAL STATUS: C2
STATE STATUS: SPE
STATE RANK: S1
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: IN SHALLOW POND CA 2 ACRES IN SIZE, LINED BY PIPO & ASPEN(NOT MUCH ASPEN LEFT). SITE IS GRAZED, ALTHOUGH NOT CURRENTLY. VEG DOMINATED BY SCIRPUS & PHALARIS ARUN DINACEA. OTHERS INCLUDE ELEOCHARIS, R.AQUATILIS, R.FLABELLARIS & ALOPECURUS.
BIOTIC COMMUNITIES:
DATA POINT: 12
DATE OF ENTRY: 8743
DATE: 19870514
SITE REVISITATION:
PRECISION: C
THREAT:
SIZE: 2
EO RANK: C
ELEVATION: 2320FT
ASPECT:
HDG REGION: 1
DIR REGION: NE
DIRECTIONS:
BOUNDARIES:
TRS: T23N R42E S34 SWOFSE
QUADCODE: 4711744
QUADNAME: SPANGLE WEST 7.5
LATLONG: 472606N1172903W
COUNTY: SPOKANE
PROVINCE: CB
SPECIAL STATUS:
PROTECTION STATUS: .
PHOTOS:
SURVEY:
VERIFICATION: V
REFERENCES: A

NAME: HOWELLIA AQUATILIS 008
INDEX CODE: NT.L72
OWNERSHIP CODE: PVTUUU
NUMBER OF OWNERS: .
NAME OF OWNER:
FEDERAL STATUS: C2
STATE STATUS: SPE
STATE RANK: S1
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: IN SMALL POND (20M X 30M) SURROUNDED BY PIPO & ASPEN; RIMMED BY BASALT. CA 2-3FT DEEP IN CENTER. SOME PIPO HAS BEEN CUT & UPLAND VEG DEGRADED BY GRAZING. OTHERS PRESENT: TYPHA LATIFOLIA, SIUM SUAVE, RANUNCULUS AQUATILIS, PHALARIS, SCIRPUS
BIOTIC COMMUNITIES:
DATA POINT: 22
DATE OF ENTRY: 8743
DATE: 19870504
SITE REVISITATION:
PRECISION: C
THREAT:
SIZE: .
EO RANK: C
ELEVATION:
ASPECT:
HDG REGION: 1
DIR REGION: NE
DIRECTIONS: D
BOUNDARIES:
TRS: T23N R42E S07 SE
QUADCODE: 4711745
QUADNAME: CHENEY 7.5
LATLONG: 472950N1173237W
COUNTY: SPOKANE
PROVINCE: CB
SPECIAL STATUS:
PROTECTION STATUS: .
PHOTOS:
SURVEY:
VERIFICATION: V
REFERENCES: A

NAME: HOWELLIA AQUATILIS 009
INDEX CODE: NT.L72
OWNERSHIP CODE: PVTUUU
NUMBER OF OWNERS: .
NAME OF OWNER:
FEDERAL STATUS: C2
STATE STATUS: SPE
STATE RANK: S1
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: HOURGLASS-SHAPED POND SURROUNDED BY POPULUS TRICHOCARPA, P.TREMULOIDES, PINUS PONDEROSA, CORNUS STOLONIFERA. OTHERS PRESENT: PHALARIS, ELEOCHARIS, RANUNCULUS AQUATILIS, R.FLABELLARIS, SIUM SUAVE, CALLITRICHE, CAREX SP., ALISMA.
BIOTIC COMMUNITIES:
DATA POINT: 23
DATE OF ENTRY: 8743
DATE: 19870504
SITE REVISITATION:
PRECISION: C
THREAT:
SIZE: .
EO RANK: C
ELEVATION:
ASPECT:
HDG REGION: 1
DIR REGION: NE
DIRECTIONS:
BOUNDARIES:
TRS: T23N R42E S07 SE
QUADCODE: 4711745
QUADNAME: CHENEY 7.5
LATLONG: 472944N1173245W
COUNTY: SPOKANE
PROVINCE: CB
SPECIAL STATUS:
PROTECTION STATUS: .
PHOTOS:
SURVEY:
VERIFICATION: V
REFERENCES: A

WASHINGTON NATURAL HERITAGE DATA SYSTEM
HOWELLIA AQUATILIS RECORDS
DATA CURRENT AS OF AUGUST 1988

NAME: HOWELLIA AQUATILIS 010 — TRS: T23N R42E S07 SEOFSE
INDEX CODE: NT.L72 — QUADCODE: 4711745
OWNERSHIP CODE: PVTUUU — DATE: 19870504 — QUADNAME: CHENEY 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 472935N1173233W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS:
STATE RANK: S1 — EO RANK: C — PROTECTION STATUS: .
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: IN RELATIVELY LARGE POND SYSTEM IN OPENING IN MIDDLE AMONG THE SCIRPUS AND PHALARIS. MICROSITE IS DOMINATED BY PHALARIS. VERY LITTLE HOWELLIA WAS OBSERVED, BUT THERE ISN'T MUCH WATER THIS YEAR
BIOTIC COMMUNITIES:
DATA POINT: 24 — ELEVATION: — WDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8743 — ASPECT: — DNR REGION: NE — BOUNDARIES: — SURVEY: — REFERENCES: A

NAME: HOWELLIA AQUATILIS 011 — TRS: T23N R41E S25 SEOFSE
INDEX CODE: NT.L72 — QUADCODE: 4711745
OWNERSHIP CODE: USAFWS — DATE: 19870513 — QUADNAME: CHENEY 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 472712N1173355W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS: NAR
STATE RANK: S1 — EO RANK: B — PROTECTION STATUS: 2
NAME OF AREA: TURNBULL NAR
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: POND LINED BY BASALT & PIPO & ASPEN. POND DOMINATED BY PHALARIS ARUNDINACEA. OTHERS PRESENT INCLUDE SIUM SUAVE, POTAMOGETON SP, TYPHA LATIFOLIA, RANUNCULUS AQUATILIS, NUPHAR POLYSEPALUM, ELEOCHARIS, LEMNA SP, & ALISMA SP.
BIOTIC COMMUNITIES:
DATA POINT: 25 — ELEVATION: — WDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8743 — ASPECT: — DNR REGION: NE — BOUNDARIES: — SURVEY: — REFERENCES: A

NAME: HOWELLIA AQUATILIS 012 — TRS: T23N R42E S33 SWOFNW
INDEX CODE: NT.L72 — QUADCODE: 4711745
OWNERSHIP CODE: PVTUUU — DATE: 19870514 — QUADNAME: CHENEY 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 472644N1173058W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS:
STATE RANK: S1 — EO RANK: CB — PROTECTION STATUS: .
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: POND VEG DOMINATED BY SCIRPUS SP & PHALARIS ARUNDINACEA. OTHERS INCLUDE ALOPECURUS CF AEQUALIS, RANUNCULUS AQUATILIS, R. FLABELLARIS, SIUM SUAVE. AREA SEEMS TO RECEIVE FAIR GRAZING PRESSURE. SOME TREES AROUND POND EDGE HAVE BEEN CUT DOWN.
BIOTIC COMMUNITIES:
DATA POINT: 26 — ELEVATION: 2320FT — WDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8743 — ASPECT: — DNR REGION: NE — BOUNDARIES: — SURVEY: — REFERENCES: A

WASHINGTON NATURAL HERITAGE DATA SYSTEM
HOWELLIA AQUATILIS RECORDS
DATA CURRENT AS OF AUGUST 1988

NAME: HOWELLIA AQUATILIS 013 — TRS: T22N R41E S03 NEOFNW
INDEX CODE: NT.L72 — QUADCODE: 4711745
OWNERSHIP CODE: USAFWS — DATE: 19870514 — QUADNAME: CHENEY 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 472555N1173708W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS: NSR
STATE RANK: S1 — EO RANK: CB — PROTECTION STATUS: 2
NAME OF AREA: TURNBULL NWR
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: IN POND RIMMED BY BASALT AND PIPO & ASPEN. POND HAS TYPHA LATIFOLIA, NUPHAR POLY SEPALUM, SCIRPUS SP, RANUNCULUS AQUATILIS, R. FLABELLARIS, ALOPECURUS CF AEQUALI S, SIUM SUAVE & VERONICA SP. VERY LITTLE HOWELLIA WAS OBSERVED.
BIOTIC COMMUNITIES:
DATA POINT: 27 — ELEVATION: 2320FT — MDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8743 — ASPECT: — DNR REGION: NE — BOUNDARIES: — SURVEY: — REFERENCES: A

NAME: HOWELLIA AQUATILIS 014 — TRS: T22N R41E S02 NW
INDEX CODE: NT.L72 — QUADCODE: 4711745
OWNERSHIP CODE: USAFWS — DATE: 19870518 — QUADNAME: CHENEY 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 472545N1173613W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS: NSR
STATE RANK: S1 — EO RANK: C — PROTECTION STATUS: 2
NAME OF AREA: TURNBULL NWR
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: IN SHALLOW POND DOMINATED BY PHALARIS ARUNDINACEA & ELEOCHARIS SP. SOME SCIRPUS, SIUM SUAVE & RANUNCULUS AQUATILIS ALSO PRESENT. POND MOSTLY BORDERED BY ASPEN & PIPO. SITE IS IN GRAZING ALLOTMENT AFTER JULY 15.
BIOTIC COMMUNITIES:
DATA POINT: 28 — ELEVATION: 2290FT — MDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8743 — ASPECT: — DNR REGION: NE — BOUNDARIES: — SURVEY: — REFERENCES: A

NAME: HOWELLIA AQUATILIS 015 — TRS: T23N R42E S08 NWOFNE
INDEX CODE: NT.L72 — QUADCODE: 4711755
OWNERSHIP CODE: PVTUUU — DATE: 19870505 — QUADNAME: FOUR LAKES 7.5
NUMBER OF OWNERS: . — SITE REVISITATION: — LATLONG: 473018N1173137W
NAME OF OWNER: — PRECISION: C — COUNTY: SPOKANE
FEDERAL STATUS: C2 — THREAT: — PROVINCE: CB
STATE STATUS: SPE — SIZE: . — SPECIAL STATUS:
STATE RANK: S1 — EO RANK: C — PROTECTION STATUS: .
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: WALDRON L & GAMON J 1987
GENERAL DESCRIPTION: IN BASALT RIMMED POND, CA .25 ACRE IN SIZE. SOME PIPO & ASPEN AROUND POND, BUT MORE OPEN THAN MOST. NUPHAR POLYSEPALUM, RANUNCULUS AQUATILIS, SIUM SUAVE, TYPHA PHALARIS(NOT MUCH), ELEOCHARIS, LEMNA. UPLANDS ARE DEGRADED.
BIOTIC COMMUNITIES:
DATA POINT: 4 — ELEVATION: 2300FT — MDG REGION: 1 — DIRECTIONS: — PHOTOS: — VERIFICATION: V
DATE OF ENTRY: 8743 — ASPECT: — DNR REGION: NE — BOUNDARIES: — SURVEY: — REFERENCES: A

WASHINGTON NATURAL HERITAGE DATA SYSTEM
HOWELLIA AQUATILIS RECORDS
DATA CURRENT AS OF AUGUST 1988

NAME: HOWELLIA AQUATILIS 016
INDEX CODE: NT.L72
OWNERSHIP CODE: PVTUUU
NUMBER OF OWNERS: .
NAME OF OWNER:
FEDERAL STATUS: C2
STATE STATUS: SPE
STATE RANK: S1
NAME OF AREA:
AGENCY SUBSECTION:
SOURCE OF LEAD: GAMON J 1987
GENERAL DESCRIPTION: IN NE PART OF POND BORDERED BY ASPEN & PIPO (SOME OF BOTH HAVE BEEN CUT). TYPHA, SCIRPUS & PHALARIS DOMINATE THE AQUATIC VEG. CAREX SP & ELEOCHARIS ALSO PRESENT. UPLANDS DEGRADED! SALIX, ROSA, SYAL, PRVI, CORNUS & AMAL PRESENT.
BIOTIC COMMUNITIES:

DATE: 19870505
SITE REVISITATION:
PRECISION: C
THREAT:
SIZE: .
EO RANK: CB

TRS: T23N R42E S07 NE
QUADCODE: 4711755
QUADNAME: FOUR LAKES 7.5
LATLONG: 473010N1173247W
COUNTY: SPOKANE
PROVINCE: CB
SPECIAL STATUS:
PROTECTION STATUS: .

DATA POINT: 5 ELEVATION: NDG REGION: 1 DIRECTIONS: PHOTOS: VERIFICATION: V
DATE OF ENTRY: 8743 ASPECT: DNR REGION: NE BOUNDARIES: SURVEY: REFERENCES: A

ELEMENT OCCURRENCE CODE: PDCAM0A010.001
NAME: HOWELLIA AQUATILIS
COMNAME: WATER HOWELLIA
MARGNUM: 1 TENTEN: 01,03 IDENT: Y EORANK: A
EORANKCOMM: ONLY KNOWN POPULATION IN IDAHO
SURVEYDATE: 1988-06-14 LASTOBS: 1988-06-14 FIRSTOBS: GRANK: G2
SURVEYSITE: HARVARD
SRANK: S1 STATE: ID COUNTYNAME: IDLATA
QUADCODE: 4611675
QUADNAME: DEARY (15') PRECISION: SC
LAT: 465503 LONG: 1164428 S: 465230 N: 465530 E: 1164400 W: 1164600
TOWNRANGE: 041N003W SECTION: 08 MERIDIAN: BO
TRSCOMM: CENTER OF NE4 WATERSHED: 17060108
DIRECTIONS: NEAR JUNCTION OF ST HWYS 6 AND 9, 50 YDS S OF INTERSECTION
ON W SIDE OF HWY 9; JUST INSIDE PROPERTY FENCELINE

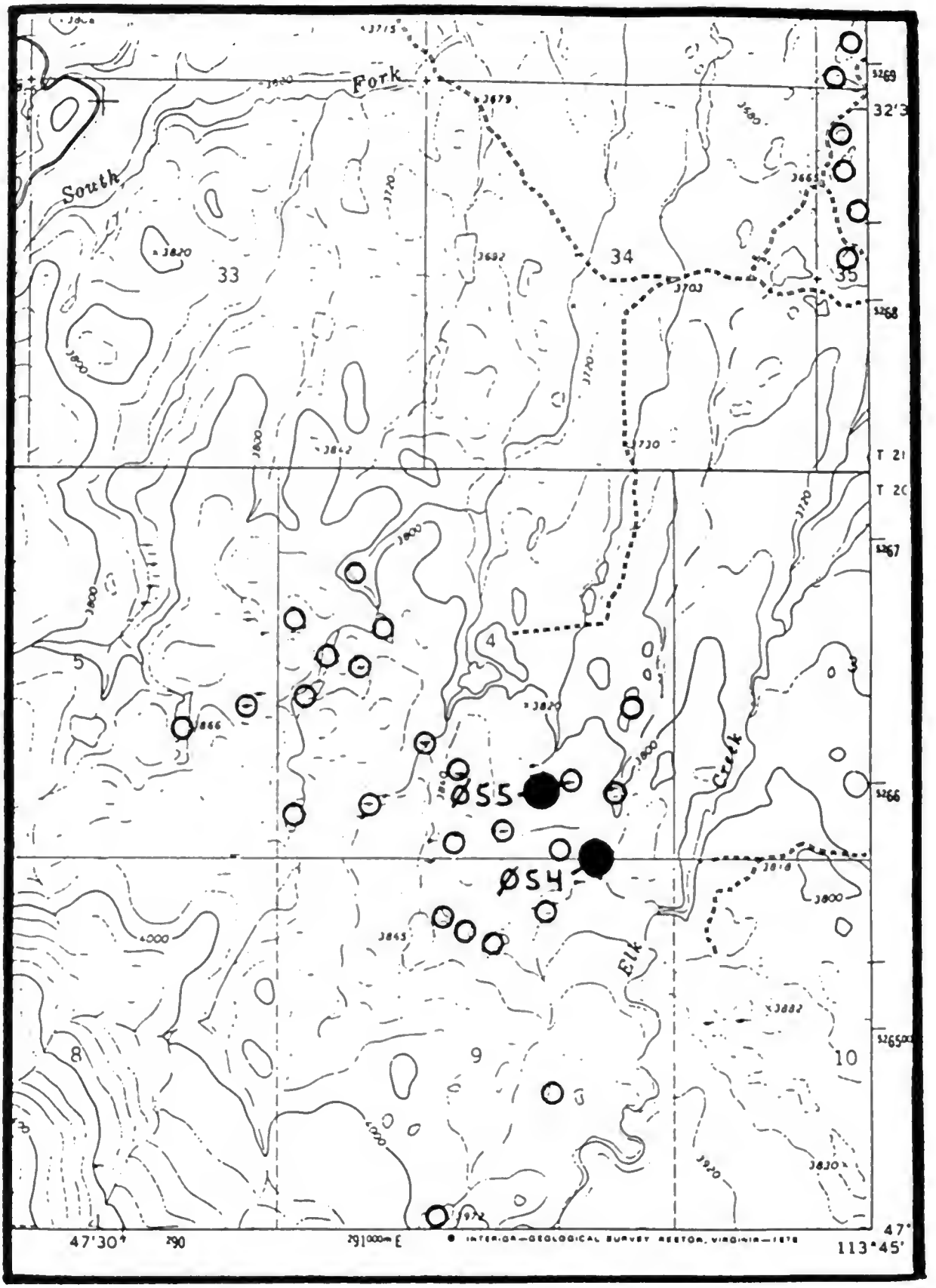
GENDESC: VERNAL POOL, OLD RIVER MEANDER OF PALOUSE RIVER; SURROUNDED
BY CORNUS STOLONIFERA, ALNUS INCANA, CRATAEGUS DOUGLASIA

ELEV: 2560 SIZE: 1
EODATA: 30 PLANTS ESTIMATED; GOOD EO QUALITY

COMMENTS: CONFIRMATION OF OWNBEYS' OBSERVATION OF SEVERAL YEARS AGO;
MOSELEY #1264 UI
MACODE1: CONTAINED1: MACODE2: CONTAINED2:
MACODE3: CONTAINED3: ADDLMAS:
MORELAND: MOREPROT: MOREMGMT: SITECODE:
SITENAME: HARVARD
OWNER: RUTH OWNBEY
OWNERCOMM: OWNER LIVES IN PULLMAN, WASHINGTON; CONTACTED, AWARE OF EO
PROTCOMM: PROPERTY BEING WILLED TO NATIONAL AUDUBON SOCIETY
MGMTCOMM:
MONITOR: MONITORNUM: -
BESTSOURCE: MOSELEY, BOB

SOURCECODE: PNDMOS01IDUS F88MOS04IDUS

DATASENS: N BOUNDARIES: Y PHOTOS: Y OWNERINFO: N
TRANSCRIBR: 88-07-22 RKM CDREV: Y MAPPER: 88-07-22 RKM QC: Y
UPDATE: 88-11-06 RKM



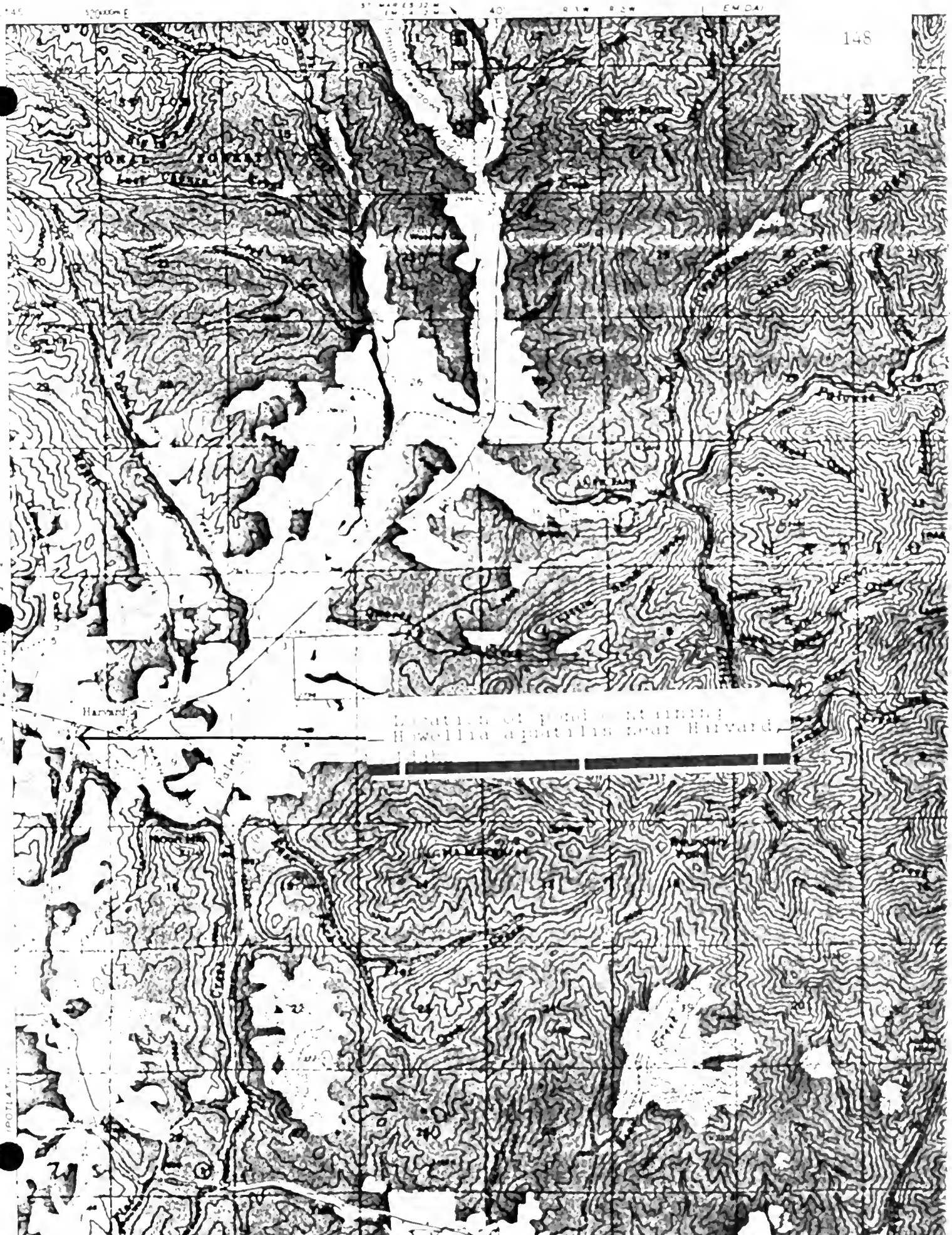
USGS Peck Lake Quadrangle (7.5')

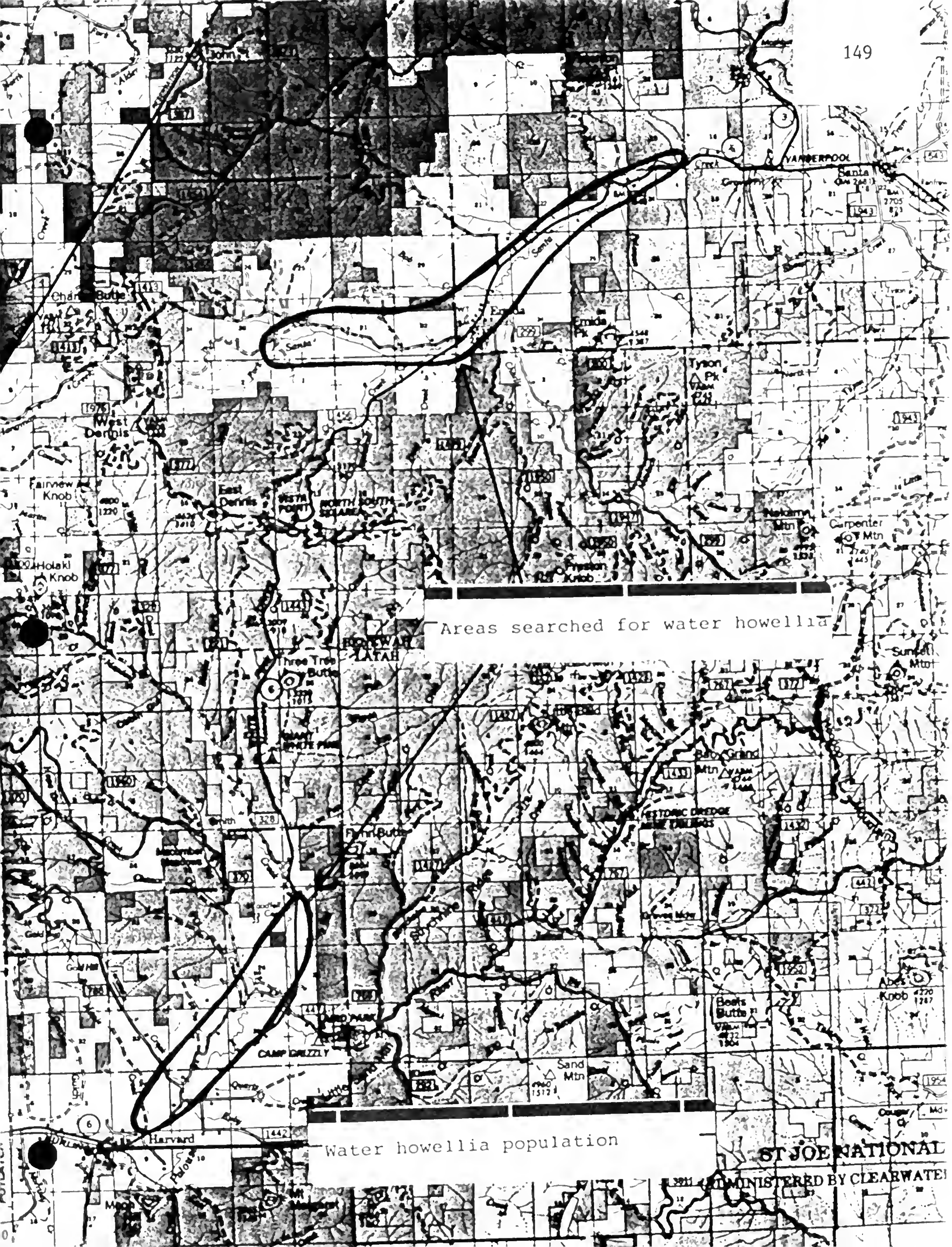
Howellia aquatilis

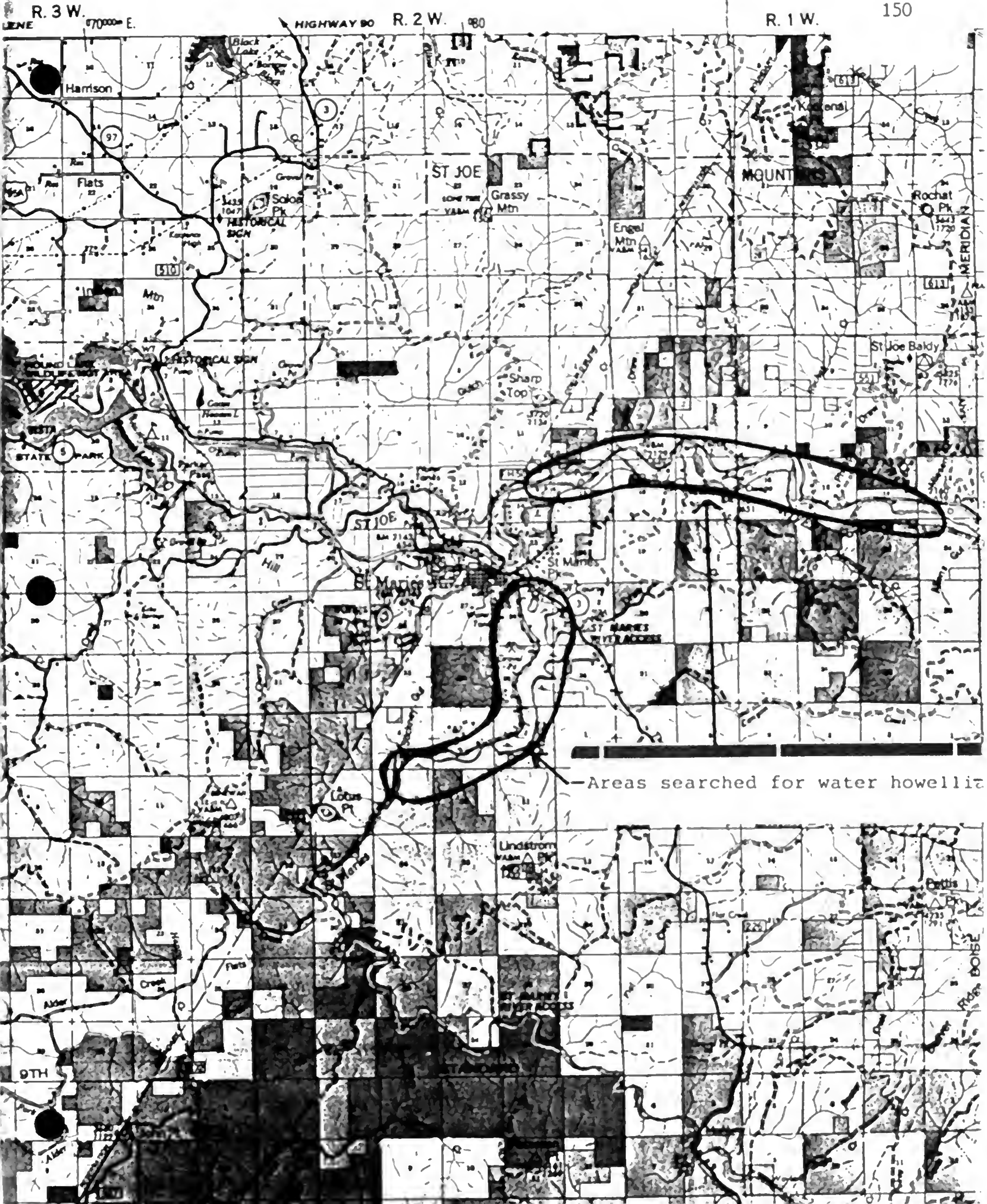
○ = areas unsuccessfully searched

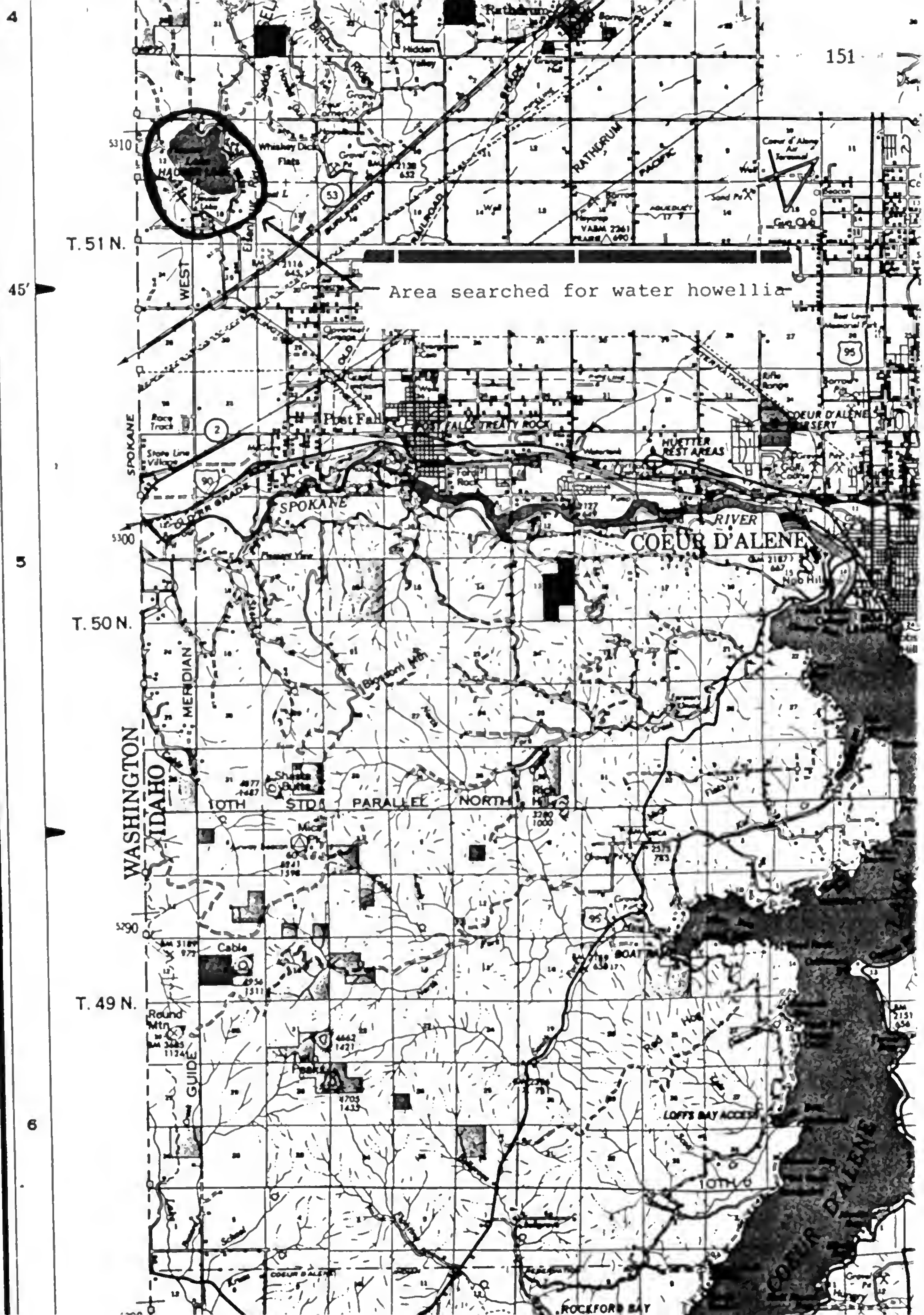
● = element occurrences

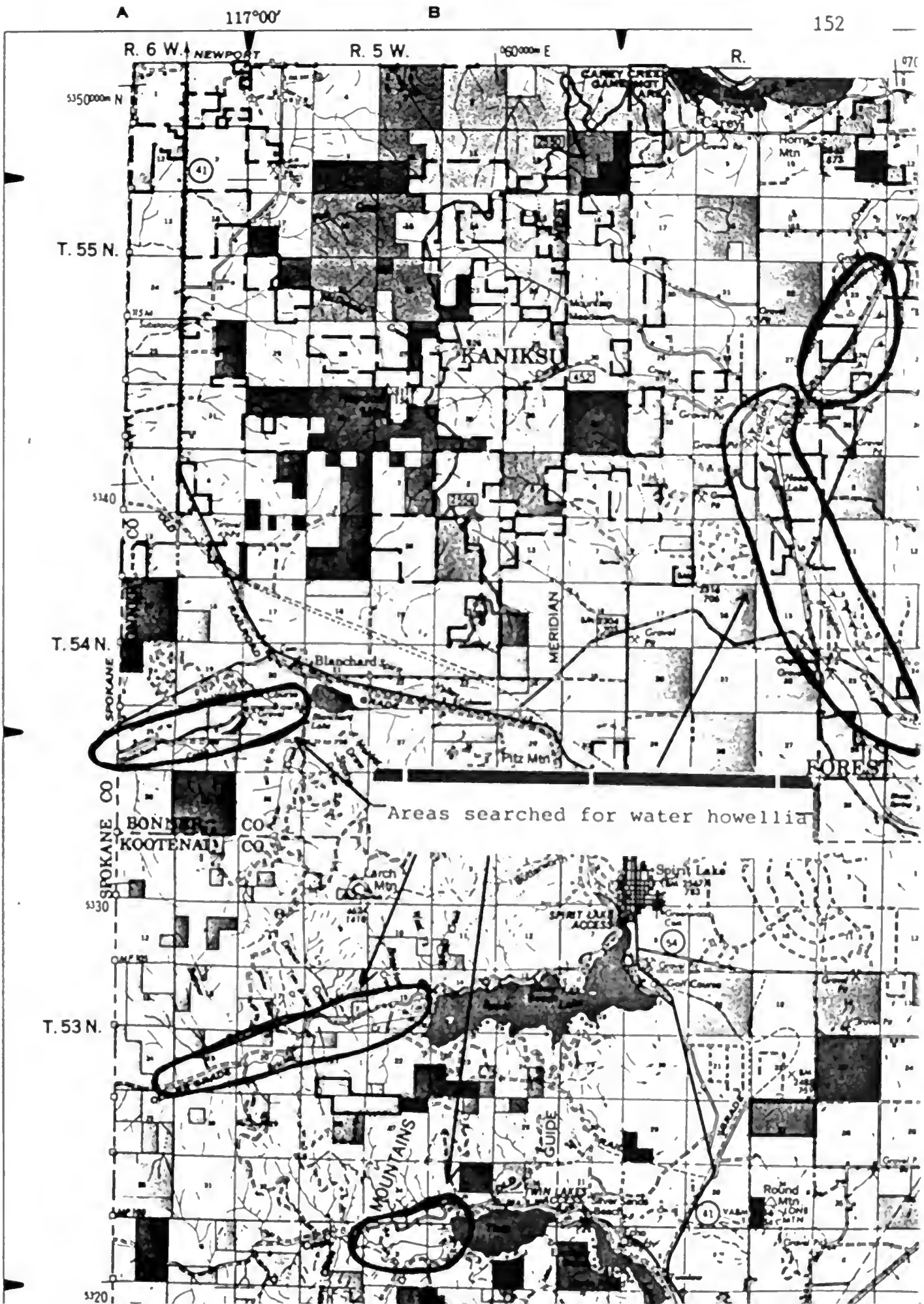
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

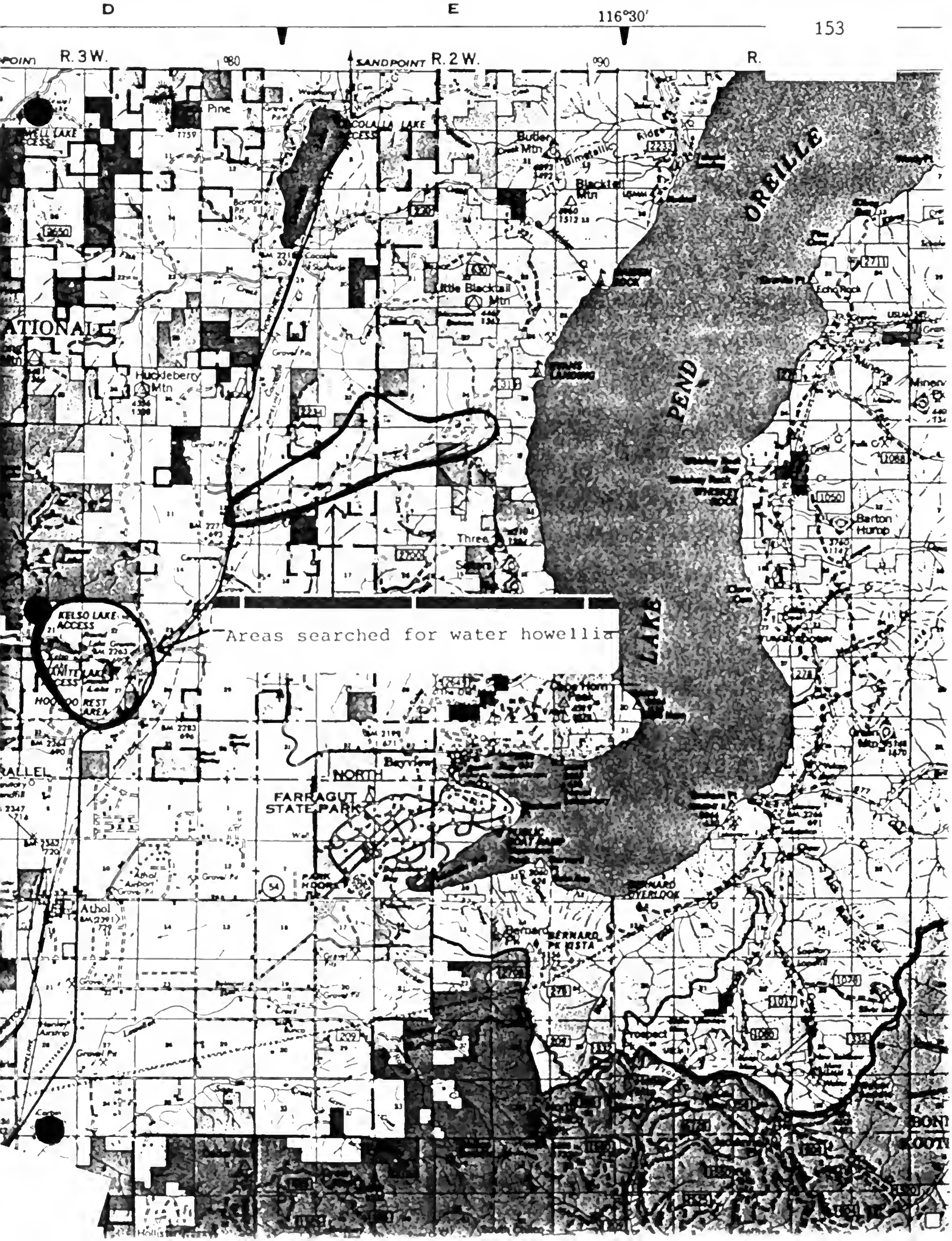



Areas searched for water howellia
Water howellia population
ST JOE NATIONAL
Vanderpool
Santa
Emida
Tyson Pk
West Dennis
Fairview Knob
East Dennis
Holaki Knob
Three Tree Butte
Carpenter Mtn
Grand Mtn
Sand Mtn
Harvard
Beals Butte
Abes Knob

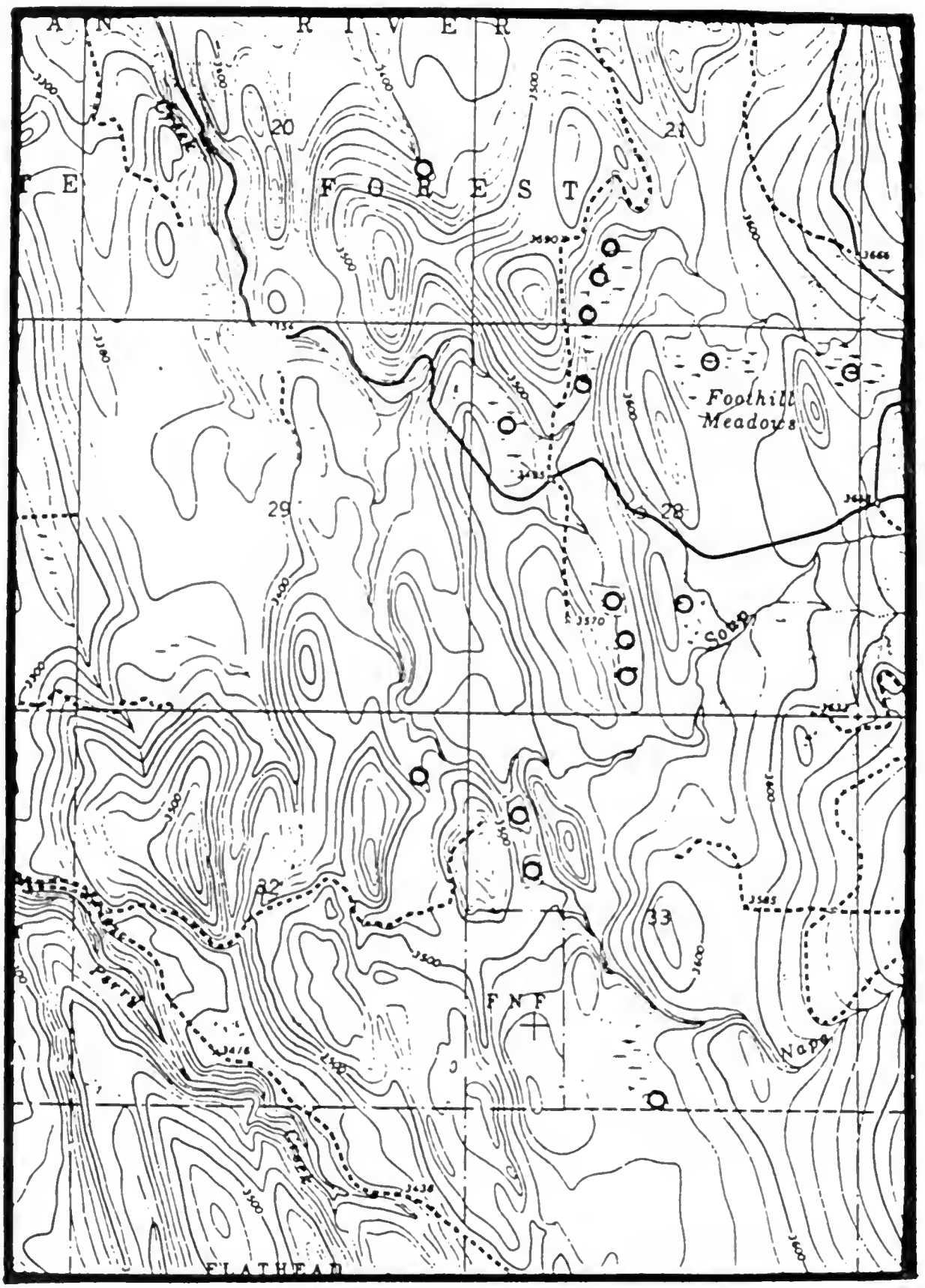

R. 3 W.
R. 2 W.
R. 1 W.
HIGHWAY 90
Harrison
Flats
ST JOE
Grassy Mtn
HISTORICAL SIGN
Engel Mtn
Rochat Pk
MERIDIAN
St Joe Baldy
Sharp Top
STATE PARK
ST JOE
St Maries
Lotus Pt
Lindstrom Pk
Pettis Pk
Alder
Creek
BOISE
Areas searched for water howelliz


Area searched for water howellia
T. 51 N.
45'
T. 50 N.
T. 49 N.
4
5
6
WASHINGTON
IDAHO
WEST
MERIDIAN
GUIDE
SPOKANE
Post Falls
SPOKANE
RIVER
COEUR D'ALENE
10TH STD PARALLEL NORTH
Rathdrum
RATHDRUM
PACIFIC
RAILROAD
Whiskey Dick Flats
Hidden Valley
Cable
Round Mtn
LOFFS BAY ACCESS
ROCKFORD BAY
COEUR D'ALENE
COEUR D'ALENE NURSERY
HUETTER REST AREAS
Blossom Mtn


A
117°00'
B
R. 6 W.
NEWPORT
R. 5 W.
R.
5350000m N
960000m E
1
T. 55 N.
KANIKSU
2
5340
T. 54 N.
SPOKANE CO.
BONNER CO.
KOOTENAI CO.
Blanchard
Fitz Mtn
MERIDIAN
48° 00'
FOREST
Areas searched for water howellia
SPOKANE CO.
5330
Spirit Lake
Larch Mtn
SPIRIT LAKE ACCESS
3
T. 53 N.
GUIDE
MOUNTAINS
TWIN LAKES
Round Mtn
5320


D
E
116°30′
R. 3 W.
SANDPOINT
R. 2 W.
R.
Pine
Butler Mtn
Blacktail Mtn
Little Blacktail Mtn
Huckleberry Mtn
Echo Rock
Barton Hump
PEND
OREILLE
LAKE
KELSO LAKE ACCESS
HOODOO REST AREA
Areas searched for water howellia
Bayview
NORTH
FARRAGUT STATE PARK
Athol


GAME UNIT 2
Prater Mtn
Johnny Long Mtn
PINE STREET SKI AREA
Lindsey Mtn
Grouse Mtn
MORTON SLOUGH GAME MGT AREA
FISH HATCHERY
Gold Cup Mtn
Hornby Mtn
COCOLALLA
Butler Mtn
Huckleberry Mtn
Little Butler Mtn



USGS Cilly Creek Quadrangle (7.5')

O = areas unsuccessfully searched

Howellia aquatilis