United States
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Forest Service

Tongass
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June 1998

Canal Hoya Timber Sale

Final Environmental Impact Statement

United States Department of Agriculture
Forest Service
Alaska Region
Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Dear Reviewer:

Here is your copy of the Record of Decision and the Final Environmental Impact Statement for the Canal Hoya Timber Sale, Stikine Area, Tongass National Forest. The Record of Decision explains my decision to select Alternative 3, which includes the harvest of 14 million board feet of timber from 660 acres and the construction of 7.1 miles of road. The decision implements Alternative 3 as modified from the Final EIS. In response to public and agency comments, Alternative 3 was modified in the Final EIS to maintain the economic viability of potential future roads in the Canal Value Comparison Unit by replacing some units proposed in the Draft EIS: and by moving a segment of Road 6960 to address concerns about stream crossings. In the Record of Decision, a further modification was made in which a segment of Road 6960 was eliminated due to unexpected bridge and road construction costs.

The appeal period will begin the day after we publish notice in the Petersburg Pilot, the official newspaper of record for decisions made by the Stikine Area Assistant Forest Supervisor. This date is anticipated to be June 5, 1998. The appeal period will last 45 days. I expect the appeal deadline to fall on July 20, 1998. We will implement the decision no sooner than five working days after the close of the appeal period.

As the Stikine Area Assistant Forest Supervisor, I am responsible for this decision. Please direct any correspondence or requests for additional copies to Scott Posner, IDT Leader, P.O. Box 51, Wrangell, AK 99929, or call (907) 874-2323.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Record of Decision

Record of Decision

Canal Hoya Timber Sale Record of Decision

Introduction

This Record of Decision (ROD) documents my decision to select an alternative from the Canal Hoya Timber Sale Final Environmental Impact Statement (Final EIS). The selection includes the specific harvest unit locations, requirements for harvesting timber and constructing associated roads, and log transfer facilities to be used.

Background

The proposed project is a component of the overall timber sale program on the Tongass National Forest. Timber sales are allowed by the Forest Plan in order to maintain a supply of timber from National Forest lands for Southeast Alaska.

Project History

Public scoping, data collection and analysis, and documentation began with the Notice of Intent published in the Federal Register in December 1996. Following field studies of resource conditions, a second Notice of Intent reduced the estimated timber volume for the project from 20 million board feet (MMBF) to 10-17 MMBF in October 1997. The purpose and need statement for the project was also changed to reflect that volumes were a projected outcome of the purpose and need for the project. A Draft Environmental Impact Statement (Draft EIS) was distributed in January 1998 and the comment period continued into March 1998. This Record of Decision and Final EIS of the Canal Hoya Timber Sale disclose the environmental effects of the alternatives considered and document the decision for authorization of activities in the project area.

Purpose and Need

The purpose and need for the proposed timber harvest is to respond to the goals and objectives identified by the Forest Plan for the timber resource while moving the Canal Hoya Project Area towards the desired future condition for all resources. The Forest Plan identified the following goals and objectives:

1) Manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest, on an even-flow, long-term sustained yield basis and in an economically efficient manner (USDA Forest Service 1997a, page 2-4).
2) Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the demand for the planning cycle (page 2-4).
3) Maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs (page 3-135 and 3-144).
4) Produce desired resource values, products, and conditions in ways that also sustain the diversity and productivity of ecosystems (page 2-1).

The Canal Hoya Timber Sale is expected to provide between 10 to 17 million board feet to the timber industry. The range of alternatives considered in this Environmental Impact Statement was determined during our analysis and reflects issues raised during scoping.

Decision

This Record of Decision documents my decision to make timber volume available from the Canal Hoya project area on the mainland south of the Bradfield Canal to meet the Stikine Area's timber sale program goals. My decision encompasses the following

- whether or not timber volume should be made available for harvest, and if so, how much;
- the location and design of timber harvest units;
- the location and design of associated road corridors; and
- mitigation and monitoring measures associated with implementation of timber harvest.

It is my decision to choose Alternative 3, as modified in this Record of Decision, from the Final EIS as the Selected Alternative for implementation in the Canal Hoya project area. This decision is responsive to issues raised during scoping, data gathering, and utilizes public and agency responses to the Draft EIS to shape the final decision.

Changes to the Selected Alternative From the Final EIS

After we developed the Final EIS, engineering design work on road 6960 revealed that two specified bridge crossings beyond unit 19 (see Figure 2-3 on page 2-15 of the Final EIS), which would be needed in crossing Hoya Creek and West Fork Hoya Creek, would have to be longer than was previously thought. The Hoya Creek crossing would require a 104 foot bridge and crossing West Fork Hoya Creek would require a fifty foot bridge. The 104 foot bridge would cost over $180,000 and the 50 foot bridge would cost about $60,000. Construction of the 1.5 mile segment of specified road, with associated bridges and temporary roads (and a temporary crossing on West Fork Hoya Creek) would cost more than $500,000.

Although helicopter yarding is considerably more expensive than cable yarding; when the road construction costs associated with this segment of road are added into the cable yarding costs, it would be more economical to yard current and potential future volume beyond unit 19 by helicopter. This is due in part to the limited amount of cable operable ground near this segment of road. Future access to timber available for harvest is still feasible without the road. Timber on available acres north of the powerline could be helicopter yarded to the water and timber south of the power line could be flown to landings adjacent to the portion of road 6960 that will be constructed. The Suitability and Operability map on page 3-4 of the FEIS shows areas where future harvest could occur.

With these considerations in mind, I have elected to drop 1.3 miles of road construction on the proposed 6960 road beyond unit 19 in alternative 3. The units served by this road segment will be helicopter yarded to a landing in unit 19 or to a barge landing (for the volume in unit 24 north of the power line). The percentage of trees retained in units 24 and 23 will remain the same.

Helicopter yarding will allow more scattered distribution of the leave trees prescribed within the units, so partial harvest with diameter limits will be used. A buffer strip on either side of the power line in unit 24 will be retained in order to allow safe helicopter operations on either side of the power line in this area.

This change will reduce total specified road construction on the sale by 1.3 miles. It increases the distance of any road construction from the Anan observatory to about 6.5 miles and would reduce impacts on wildlife security due to the reduced presence, and associated use, of new road in the area. The change will also allow for more random distribution of leave trees in units 23 and 24, allowing for reduced visual impact from the harvest in this area.

Selected Alternative as Modified

The Selected Alternative, as modified from the Final EIS, allows harvest of 14 million board feet of timber from 660 acres in the project area. An estimated 6 miles of Specified Forest Development Road and 1.1 miles of temporary road will be constructed. Design features of the harvest units and roads are described in detail on the Unit and Road Description Cards in Appendices A and B, respectively, in the Final EIS.

The 1997 Forest Plan, through the Record of Decision, places certain requirements on timber sale projects for which environmental analysis had begun, but no NEPA decision made, at the time of the effective date of the Plan (July 31, 1997). There are two requirements:

- projects must be consistent with all applicable management direction of the proposed plan, and
- where needed, additional measures described in Appendix N of the Forest Plan ROD will be incorporated; this need will be determined through interagency review (Forest Plan ROD, p. 41).

I have determined, through review of the analysis in the Final EIS for the Canal Hoya Timber Sale, that this project incorporates all applicable management direction from the 1997 Forest Plan and is fully consistent with its goals, objectives, Forest-wide standards and guidelines, and management area prescriptions as they apply to the project area. I have also determined that the required interagency review and analysis of the need for additional measures was accomplished, and such measures have been incorporated as necessary.

Non-Significant Amendment to the Forest Plan

Based on the project level analysis as described in the Old-growth Management Prescriptions and Appendix K of the Tongass National Forest Land and Resource Management Plan (1997), the Hoya Small Old Growth Reserve will be adjusted to better meet size, location and habitat composition. Specifically, the Reserve as mapped in the Forest Plan met the productive old growth acreage requirement of small reserves, but the size of the reserve was selected before the criteria in the Forest Plan were finalized, so the current total size of the reserve is smaller than the 16% of the VCU specified in Appendix K the Forest Plan.

The Secretary of Agriculture's implementing regulation indicates the determination of significance is to be "[b]ased on an analysis of the objectives, guidelines and other contents of the

forest plan" (36 CFR 219.10(f)). The Forest Service has issued guidance for determining what constitutes a "significant amendment" under NFMA. This guidance, in Forest Service Handbook 1909.12 - Chapter 5.32, identifies four factors to be used in determining whether a proposed change to a forest plan is significant or not significant. These four factors are timing; location and size; goals, objectives, and outputs; and management prescriptions. An analysis of the factors is presented below.

Timing - The Forest Plan Revision was completed in 1997. The Old-growth Habitat Management Prescription in the Plan indicates the small mapped reserves have received differing levels of field verification and integration of site-specific information in their design. During project level environmental analysis, for project areas that include or are adjacent to mapped old growth habitat reserves, the size, spacing and habitat composition of mapped reserves may be further evaluated. Several timber sale projects are in progress forest-wide, but the Canal Hoya Timber Sale EIS is one of the first project decisions that include the decision to amend the Plan.

Location and Size - The area to the south of the Hoya reserve is isolated from timber harvest by the location of the reserve and would serve the same function as a portion of the reserve. We will increase the size of the reserve by adding the isolated area to the south, which is currently designated Timber Production management prescription, but cannot be accessed economically for timber management. This will increase the size of the Hoya Old Growth Reserve by approximately 7120 acres, of which 196 acres were classified in Forest Plan calculations as isolated, but suitable for timber production.

Goals, Objectives, and Outputs

Goals - The Forest Plan Goal for Biodiversity is to maintain healthy forest ecosystems; maintain a mix of habitats at different spatial scales (i.e. site, watershed, island, province and forest) capable of supporting the full range of naturally occurring flora, fauna, and ecological processes native to Southeast Alaska. The adjustment to the Hoya Reserve is consistent with the Goals of the Plan.

Objectives - The Forest Plan Objectives include to maintain a Forest-wide system of old growth forest habitat (includes reserves, non-development LUDs, and beach, estuary and riparian corridors) to sustain old growth associated species and resources; and, to ensure that the reserve system meets the minimum size, spacing and composition criteria described in Appendix K of the Plan. The adjustment to the Hoya Reserve was specifically designed to meet the Forest Plan Objectives.

Outputs - Adjustment of the Hoya Small Old Growth Reserve will have minimal effect on Forest Plan Outputs, primarily because the majority of the productive old growth added to the Reserve was not classified in Forest Plan calculations as suitable for timber production.

Management Prescriptions - The Hoya Small Old Growth Reserve has been adjusted as noted in the Forest Plan Record of Decision and in accordance with the Old-growth Land Use Designation Management Prescription. None of the standards and guidelines associated with the Management Prescriptions have been changed.

Conclusion - Based on a consideration of the four factors above, I conclude adoption of this amendment is not significant in a NFMA context. This amendment is fully consistent with current Forest Plan goals and objectives. The amendment provides added detail on implementation of the Old-growth Habitat Management Prescriptions of the Forest Plan.

I hereby amend the Forest Plan with this non-significant amendment by adjusting the Hoya Small Old Growth Reserve as shown on the Record of Decision Map and documented in the project record and Final EIS for the Canal Hoya Timber Sale.

Reasons for the Decision

In making my decision, I considered all issues raised during the development and scoping of this project and took into account the competing interests and values of the public. Many divergent public, personal, and professional opinions were expressed during the analysis. This decision may not completely satisfy any one particular group or individual. However, I have considered all views and feel my decision is reasonable. The Selected Alternative provides a beneficial mix of resources for the public within the framework of the existing laws, regulations, policies, public needs and desires, and capabilities of the land, while meeting the stated purpose and need for this project. I believe that Alternative 3 also best meets the goals and objectives developed for the area under the Forest Plan while balancing site specific concerns unique to the project area.

Although all action alternatives meet the purpose and need to one degree or another, the Selected Alternative embodies several characteristics that resulted in it being the alternative chosen for implementation. The Selected Alternative:

- addresses the issue of vulnerability of Anan bears by not building a road in the Canal Value Comparison Unit (VCU) for this entry. The selected alternative also harvests the smallest area (70 acres) in the Canal VCU;
- will maintain the economic viability of possible future road construction for timber harvest in the Canal VCU by deferring harvest along the potential road corridor;
- allows a high potential for adaptive management by allowing us to monitor the impacts of road construction and use in the Hoya VCU, before deciding whether to construct roads in the Canal VCU in the next entry;
- will be less noticeable from the Eastern Passage Travel Route near Blake Island than alternatives requiring road construction in the Canal VCU;
- will meet the desired condition for scenic values of Partial Retention from the Eastern Passage Travel Route in the Canal VCU; and
- balances the above issues with timber volume and associated jobs better than the other alternatives

The Canal Hoya decision is a complex one and below I explain the reasons for my decision in greater detail as related to the more frequent comments I received from the draft EIS.

Roads

Roads and their associated use were a common issue or concern in public and agency comments we received on the Draft EIS. In the Hoya VCU, Alternative 3 will construct roads to allow harvest south of the powerline, which traverses the area from east to west. A considerable portion of the timber available for harvest in the project area (as allocated under the Forest Plan) lies south of the powerline. Harvest would not be practical south of the powerline without roads using current or foreseeable technology. Due to risk to both pilots and the power supply itself, helicopter yarding over powerlines is not permitted. Alternative 3, will construct roads beneath the powerline. This makes harvest feasible in more of the area within the Hoya VCU in which timber management is one of the goals under the Forest Plan. Harvest along these roads will reduce yarding costs by making cable harvest systems possible. This will enhance the economic efficiency of this sale and possible future timber sales in the area.

Roads and Anan

Alternatives 1 and 2 make the commitment of road construction closer to Anan at this time. This approach foregoes the opportunity to monitor road use and harvest effects of the more distant road system in Hoya VCU before making any similar commitment in Canal VCU. I believe Alternative 3 is the more conservative approach. Public and agency comment on the project exhibit a high degree of concern over the proximity of harvesting to Anan. Many responses to the Draft EIS expressed concerns centered on the bears of Anan, but also reflect concern for the economic and recreational importance of the Anan bears and the Anan Wildlife Observatory. Forest Plan standards are fully implemented under each alternative and these standards were developed mindful of the importance and presence of bears throughout the Tongass. However, I concluded that some unique situations exist at Anan which require a careful look at the specific situation in the area. Among these are: the combination of high levels of bear use in Anan Creek (especially during salmon runs), the nationally known quality of the Anan Wildlife Observatory with its attendant recreational and commercial value, and the possible vulnerability of the Anan bears to hunting due to habituation of the bears by the steady exposure of bears to humans at the Anan Wildlife Observatory.

By choosing Alternative 3, no roads would be built in the Canal VCU, which is adjacent to Anan. The monitoring data on the Anan black bears indicates significantly less use of the Hoya watershed compared to the Canal watershed (FEIS, page 3-42). Creditable literature and studies cited in the EIS indicate that the average home range for Anan black bears would extend to the Canal VCU, but does not extend into the Hoya VCU (FEIS, page 3-56). I know that our bear monitoring sampled 19% of the estimated Anan black bear population, not 100%. I also acknowledge average home ranges or modeling of bear movements represent generalizations. Individual bears will, in fact, be individuals not averages or models and some do use the Hoya watershed. However, even acknowledging these limitations, I believe that the data in the EIS clearly show that it is very likely that much less Anan bear use occurs in Hoya VCU than in Canal VCU. For this reason I concluded that selection of an alternative that builds road in Hoya, but not Canal VCU

(such as Alternative 3) would provide a prudent margin for adaptive management in relation to impacts on the Anan bears.

The road closures, hunting restrictions from new roads, and the physical isolation of the site all would contribute to make mitigations of the road systems in Alternative 1 and 2 largely effective. However, the road building under these two alternatives in Canal would allow easier walking access for hunting in the Canal VCU after the sale was over, where such access had not previously existed. Under Alternative 3, however, even walk-in access remains unchanged in the Canal VCU. I believe the opportunity to observe and monitor road use effects in Hoya before considering road construction into Canal clearly provides a better chance for adaptive management than Alternatives 1 or 2 and I preferred Alternative 3 for this reason. Alternatives 1 and 2 do provide more timber than Alternative 3, but Alternative 3 allows for significant timber harvest while better providing for other important resources in the area such as Anan.

I believe Alternative 3 responds to goals and objectives identified in the Forest Plan for the timber resource in this area better than Alternative 4 or 5. Alternative 3, while harvesting more timber than either Alternative 4 or 5, also provides for a greater degree of economical harvest in the future by developing a road system that can be used for both current and future timber harvest which will allow the use of more economical cable yarding systems. Though some comments disagree with considering or accounting roads as a long term asset, such roads do facilitate timber harvest, and logging from road systems can utilize machinery which is more readily available to the timber industry and which is cheaper to use. I concluded that the environmental consequences of Alternative 3 are reasonable as described above, and that Alternative 3 better achieves the purpose and need for the proposal than do either Alternative 4 or Alternative 5.

Use of Clearcuts

Some comments suggested more use of clearcuts and many suggested less. In coming to my final decision I did not consider clearcuts on an alternative wide basis either to select or not select this prescription. The clearcuts used in Canal Hoya are used in conjunction with cable logging systems. Most of this cable yarding is downhill to the road system serving as a landing. With downhill cable yarding it is not physically feasible to individually yard the logs through groups of standing trees. For this reason, yarding corridors are cut through the stands creating openings. Trees can be left standing between yarding corridors or near the tops of the unit where fewer logs need to "pass by" as they are yarded. All of the clearcuts employed on Canal Hoya will have trees left standing in the units in this fashion. The prescriptions detailed in the EIS and on the unit cards in Appendix A call for retention of 10% to as much as 30% of the original stand to be left in each unit. Because these trees will be generally grouped or clumped with openings between and since it is the intention of the prescription to initiate new growth, we feel it is appropriate to call these prescriptions clearcuts. They will allow for more economical yarding where the prescription is used, but will likely look much different than many observers' image of a conventional clearcut.

The amount of retention that will be left in each unit will vary depending on the visual prescription, wildlife needs, or other site specific considerations of the given unit. The interdisciplinary team did not wish to change the name of this prescription so as to imply

it would leave randomly distributed trees throughout a given unit. That is not possible for the downhill cable logging systems which will be employed. However, the type of "clearcut" used on Canal Hoya leaves significant numbers of trees within each unit, with the numbers of trees left varying to fit different situations.

Range of Alternatives and Alternative formulation

Some comments suggested that I craft alternatives based on maximization of clearcutting and road development. Other comments suggested that I craft specific alternatives to avoid clearcutting or roads or use of log transfer facilities. On initially considering the range of alternatives the interdisciplinary team looked at a "cable yarding only" alternative and a "helicopter only" alternative but did not fully develop these alternatives for reasons given in the EIS and later in this record of decision. Though I could have selected an option of one of the existing alternatives which would have been all cable or all helicopter as some have suggested, I did not choose to do so because, on analysis, such alternatives were not likely to fully meet the purpose and need of the project or such an approach would not meet forest plan standards and/or the intent of the National Forest Management Act. I concluded that such alternatives did not warrant development as stand alone alternatives for these reasons.

An "all helicopter" alternative was considered early in the analysis (FEIS, page 2-6), but was not developed at that time because the purpose and need volume was not possible under an "all helicopter" approach. That purpose and need statement was revised before the Draft EIS was issued. Even after the revision of the purpose and need statement, an "all helicopter" alternative cannot access a large portion of the project area that is available for timber harvest, due to the power transmission line that cuts across the project area from east to west. Even without the powerline, long term access to the southern portions of the timber base in the project area is not economically feasible due to the long flight distances that would make helicopter use prohibitive. Though it would be possible for me to modify an alternative like Alternative 4 to select an "all helicopter" option, such an action would leave the timber base area south of the powerline unavailable. In response to some comments to the Draft EIS, we have provided a somewhat amplified analysis of the "all helicopter" alternative in the FEIS for informational purposes. Though it seems prudent to consider such an "all helicopter" option in the Canal VCU (for the reasons I discussed above), our analysis does not indicate to me that such an approach is warranted in the Hoya VCU.

An alternative that maximizes the use of roads and clearcuts would be somewhat like the "cable yarding only" alternative, which was considered but not carried forward (FEIS, page 2-6). The "cable yarding only" alternative would have required roads to each unit. Due to the nature of the access and the terrain, the roads would nearly always be at the bottom of the units. Downhill cable yarding, due to its nature, (as discussed above) would have largely resulted in clearcut prescriptions with varying retention of trees within the units for visual, wildlife or other purposes. Just as an "all helicopter" alternative has physical limitations in this area, so too does an alternative that only uses cable harvesting or clearcutting. Some areas would be very difficult, or environmentally risky to road in the Canal Hoya area, but they could be helicopter logged. Some areas would be quite adapted to use of a clearcut prescription that would be well within standards, but other areas cannot be logged with such a prescription and still meet Forest Plan standards.

Clearcutting under the National Forest Management Act is to be considered on a unit by unit basis and is not to be used as a broad brush tool. Though clearcutting can be a reasonable tool, as can road building; I did not find that I could use these tools as the sole basis to develop an alternative.

I believe the range of alternatives that was developed is adequate to display trade-offs and to explore viable options that would achieve the purpose and need. It is not possible to develop an alternative for every contingency, but those which were developed provided me with clear and reasoned trade-offs to contrast and weigh against one another and from which to interpolate or extrapolate various options.

Additional rationale for my decision can be found in the individual responses to comments, in Appendix F of the FEIS. Though my decision will not likely please all who commented, their comments have helped make this a better decision. My decision to implement the Selected Alternative, as modified in this Record of Decision, is in conformance with the Tongass Land Management Plan (1997) and sound National Forest management. In making my decision, I have balanced the need to help maintain a current timber supply in support of community stability, with the need to provide strong protection measures for soil, water, fish, wildlife, subsistence, and visual resources.

Significant Issues

In making my decision, I considered five major issues identified during the planning process. In the following summary, I disclose how the Selected Alternative addresses each of the significant issues. Table S-1 and Chapter 3 of the Final EIS supplement the following discussion and provide a comparison of the alternatives.

Issue 1: Timber Supply and Economics

The Selected Alternative converts 660 acres of old growth forest to young, even-aged or two-aged stands. Approximately 73 acres would be harvested in small 2-8 acre patches. Approximately 284 acres would be partial cut with varying densities of reserve trees. Approximately 303 acres would be clearcut with 10-30% of the units left uncut in reserves.

The Selected Alternative would provide approximately 14 MMBF of timber, which would contribute to the Forest Service's attempt to seek to meet market demand while being consistent with the Tongass Land Management Plan and the standards and guidelines for all resources. Current timber market analysis indicates that the timber demand exceeds timber supply. Timber from this sale is needed as a component of the timber sale schedule to provide timber to industry in an even flow over the ten year planning cycle. The timber volume is also necessary as a substantial component of the timber sale program to be offered in 1998 on the Stikine Area to meet annual market demand. The mid-market analysis contained in the Final EIS resulted in a stumpage value of $2/MBF (excluding specified road costs) for the Selected Alternative. For a detailed analysis of the timber resource, see pages 3-2 through 3-13 in the Final EIS.

Issue 2: Scenic and Tourism Values

Unit location and design were carefully considered in all alternatives to minimize visual impacts. The Selected Alternative meets or exceeds the required Visual Quality Objective (VQO) of Modification from all three viewpoints analyzed and will meet the desired condition for scenic values of Partial Retention from the Eastern Passage Travel Route in the Canal VCU. For a detailed analysis of the visual resource, see pages 3-14 through 3-33 of the Final EIS.

Changes to the scenery and impacts to Anan bears may have an effect on the income of guides and charter services that operate in the Bradfield Canal and at Anan. We disclosed the economic base that would be affected on pages 3-34 through 3-39 of the Final EIS, but were unable to determine an approximate value for expected gains or losses to that base as a result of the Canal Hoya Timber Sale. I do not expect, given the location and design of the sale that there will be a measurable effect in this regard.

Issue 3: Anan Bears

Mitigating effects to Anan bears was a major issue in the development of all alternatives and in my decision to select Alternative 3. The reasons for the decision given above supply my rationale for addressing this issue. The Selected Alternative addresses the issue of vulnerability of Anan bears by not building a road in the Canal VCU for this entry. The selected alternative also harvests the smallest area (70 acres) in the Canal VCU. We will also provide protection of the Anan bears by closing the roads to motorized vehicles (except for administrative use). Two gates will be installed near the beginning of the roads and an administrative closure order will be written. The gates will be designed such that ATVs cannot go under them and they will be placed in locations that will be extremely difficult to get around. The first gate will be made of iron - not the usual perforated steel, so ATVs will not have the power to pull over or destroy the barricade. During harvest, the gates will be open, but only administrative use will be allowed. Following completion of the sale, only necessary administrative use, such as road maintenance, regeneration surveys, thinning and future harvests, will be allowed. Non-motorized travel will not be restricted.

There were several comments requesting hunting restrictions to protect bears, which will become more vulnerable if roads are constructed for this timber sale. We prefer to let the State manage hunting through their regulations and process, and it is our understanding that the Wrangell Fish and Game Advisory Committee is proposing that the State should close hunting in the Canal Hoya area during the life of the sale, if roads are constructed. We support that effort. If the State does not close hunting, the Forest Service will implement a Forest closure order on hunting within 1/2 mile of any roads constructed in the Canal Hoya Sale Area during the life of the sale (36 CFR 261.58(v)). By limiting such a closure to 1/2 mile from new road, we do not believe currently existing hunting opportunities will be greatly impacted. For a detailed analysis of the Anan bear issue, see pages 3-40 through 59 of the Final EIS.

Issue 4: Wildlife Habitat and Species Conservation

The selected alternative has the least effect of any of the action alternatives on wildlife habitat and species conservation in the Canal VCU. The selected alternative has more effect on wildlife habitat in the Hoya VCU than the other action alternatives. Some impacts to wildlife habitat will

be mitigated by closing roads to motorized use, maintaining travel corridors and retaining trees in the harvest units to provide structural diversity and seed sources for forbs and shrubs. The ruggedness and remoteness of the site lead us to believe that these mitigations are likely to be highly effective. Restrictions will be placed on helicopter activities, harvest activity near bear dens and no harvest will take place within 500 feet of the identified important brown bear foraging areas. For a detailed analysis of the wildlife habitat issue, see pages 3-60 through 3-85 of the Final EIS.

Issue 5: Freshwater and Marine Resources

The selected alternative has the least effect of the action alternatives on freshwater and marine resources in and near the Canal VCU. The selected alternative, as modified in this Record of Decision, has less effect on freshwater and marine resources in the Hoya VCU than Alternatives 1 and 2, but more effects than Alternative 4, due to the number of stream crossings and miles of road. Impacts to freshwater and marine resources will be mitigated by using Best Management Practices (BMPs), storm-proofing and closing the roads to motorized use, requiring helicopter yarding to land landings or barges (no water drops), removing drainage structures and revegetating temporary roads, and other mitigation measures. For a detailed analysis of the freshwater and marine resources issue, see pages 3-86 through 3-95 of the Final EIS.

Public Involvement

Ongoing public involvement has been instrumental in the identification and clarification of issues for this project. This has been helpful in the formulation of alternatives and has assisted me in making a more informed decision for the Canal Hoya project. Public meetings, Federal Register notices, newspaper and radio releases, open houses, the Stikine Area Project Schedule, and group and individual meetings were some of the tools used to solicit input for this project.

Notice of Intent: A notice of Intent to Prepare an Environmental Impact Statement was published in the Federal Register on December 23, 1996, when it was decided that an EIS was needed for the project. Following field studies of existing resource conditions, a second Notice of Intent redefined the purpose and need for the project and reduced the estimated timber volume for the project from 20 million board feet (MMBF) to 10-17 MMBF in October 1997.

Public Comment received for the Draft EIS: Public comments to the Canal Hoya Timber Sale Draft EIS were received from January 16 to March 11, 1998. A total of 21 letters were received during the comment period and were formally responded to in the Final EIS (Appendix F).

Coordination With Other Agencies

From the time scoping was initiated, meetings and site visits with all interested State and Federal agencies have occurred. Issues were discussed and information was exchanged.

The Final EIS identifies the agencies that were informed of and/or involved in the planning process (see *List of Agencies, Organizations, and Individuals to Whom Copies of this Statement Were Sent in Chapter 4*).

Alternatives Considered in Detail

Five alternatives were considered in detail in the Final EIS. Each action alternative is consistent with the Tongass Land Management Plan (1997). The analysis of each alternative displays (1) the areas considered for harvest, (2) the location of proposed roads for access, (3) the type of logging systems to be used, and (4) site locations of log transfer facilities to be used. For a complete description of these alternatives refer to Chapter 2 of the Final EIS. The alternatives are:

Alternative 1 - The theme of this alternative is to emphasize timber volume and harvest economics in the **Hoya** VCU and balance bear habitat security, visual concerns, water quality, and timber production in the **Canal** VCU. In the Hoya VCU, an LTF and roads would be constructed to allow cable yarding in as many units as practical, while still meeting standards and guidelines and desired conditions for other resources. In the Canal VCU, resource concerns would be addressed by minimizing road construction and retaining higher percentages of trees than are retained in units in the Hoya VCU.

Alternative 2 - The theme of this alternative is to emphasize timber volume, infrastructure development and long-term harvest economics throughout the Project Area. This alternative requires the most road construction, to reach most of the areas accessible by cable yarding systems.

Alternative 3 -The theme of this alternative is to emphasize Anan bear habitat security, water quality, and visual concerns in the **Canal** VCU and to emphasize timber volume and harvest economics in the **Hoya** VCU. This alternative is similar to Alternative 2 in the Hoya VCU, since roads and most harvest units would be the same. No roads would be constructed in the Canal VCU. Helicopters would be used to yard timber north of the powerline in the Canal VCU.

Alternative 4 - The theme of this alternative is to emphasize wildlife habitat and security, visual objectives, and water quality. The theme would be met by minimizing road construction and emphasizing the use of partial harvest methods in units that are visible from the water or are in high value wildlife habitat. Due to the heavy harvest proposed in the seen area, retention within units is generally higher than that proposed in other alternatives, in order to reduce visual impacts.

Alternative 5 - This Alternative does not propose any timber harvest or road construction (no action) in the Canal Hoya area. Management of the Canal Hoya area would continue as it currently exists.

Environmentally Preferred Alternative

Based on a comparison of the alternatives and the discussion contained within Chapter 3 of the Final EIS, Alternative 5, the No Action Alternative, would cause the least environmental disturbance and is therefore the environmentally preferred alternative of all the alternatives studied in detail. Of the action alternatives, Alternative 4, implemented without road construction, is the environmentally preferred alternative. This modification of Alternative 4 would avoid environmental impacts associated with road construction and use and would minimize impacts to wildlife habitat.

Alternatives Not Considered in Detail

Lower Hoya Reserve Alternative - We considered an alternative that would move the location of the small old growth reserve in the Hoya VCU to the coastline. The theme of this alternative would be to emphasize bear habitat security in the Canal VCU and to increase the volume available for harvest in the Hoya VCU by putting the old growth reserve in a location where much of the acreage would already be retained due to beach, estuary and riparian buffers. Accessing the timber that would be available in upper Hoya drainage would require constructing a road beyond a narrow valley pinchpoint. Reasons for not considering this alternative in detail included:

- Poor economics - The narrow valley pinchpoint along Hoya Creek would make it difficult and expensive to construct a road beyond the point. Getting around the pinchpoint would require two 80 foot bridges (about $130,000 each) and several major drainage structures.
- Fish and Water Quality Risks - The double bridge site would impact the floodplain and side channels at the location of some of the highest value resident fish habitat in Hoya Creek. There is a risk of flood constriction and subsequent up and downstream channel erosion at this narrow site.
- Steep slopes - Much of the timber available above the pinchpoint is located on terrain steeper than is recommended under Forest Plan guidelines.

Upper Canal Reserve Option - We considered including an option to move the old growth reserve in the Canal VCU to a location south of the powerline, adjacent to the Anan watershed in Alternatives 1, 3, and 4. The theme of this option would be to promote long-term bear habitat security by avoiding road construction adjacent to the Anan watershed and in an area of known bear dens. Reasons for not considering this alternative in detail included:

- The original reserve location includes known bear dens and is more sensitive in regard to visual objectives. Movement of the reserve to this location could possibly result in more noise and disruption to visitors and bears at and near the Anan Wildlife Viewing Area.

Alternative with Roads Only as Far as Powerline - We considered an alternative that would have emphasized maintaining the volume of timber available for harvest, while promoting bear habitat security, soil and water quality and visual concerns over conventional logging methods. LTFs and roads would have been constructed in both VCUs, but the roads would only extend to suitable landings south of the powerline. The primary system would be helicopter yarding. Reasons for not considering this alternative in detail included:

- As we developed this alternative, it became apparent that due to the terrain in the Hoya VCU, the alternative would appear similar to components covered in Alternative 1 or 4.

Cable Yarding Only Alternative - We considered an alternative that would only harvest units accessible by roads for cable yarding. The theme of this alternative was to emphasize logging economics by designing a sale that would not require helicopter yarding, which is assumed to reduce the benefit/cost ratio for timber harvesting. Such an alternative would greatly limit our ability to meet the desired condition of leaving varying densities of trees to create multi-structured stands, as well as the desire to manage for timber production on land that is in the suitable base, but not accessible by road. Therefore, this alternative was eliminated from detailed study.

Helicopter Yarding Only Alternative - We considered an alternative that would have deferred road construction and emphasized the use of partial harvest methods in units that are visible from the water or are in high value wildlife habitat. The theme of this alternative was to emphasize wildlife habitat and security, visual objectives, and water quality, while maintaining the economic viability of future harvests. All harvest activity would be north of the powerline and yarding would be done by helicopter. There would be no roads or LTF. This strategy is consistent with the Forest Plan objective of avoiding changes to semi-primitive non-motorized settings in Modified Landscape management prescription areas, when feasible. However this alternative would not meet Forest plan objectives for timber harvest in significant areas of timber production and modified landscape land use designations south of the powerline in the project area. This is because helicopter would not be allowed to fly over the powerlines due to safety and power utility concerns, thus leaving the areas south of the powerline inaccessible for timber harvest. Some of the suitable cable ground along the potential main road corridor would be deferred from harvest this entry in order to maintain the option of a viable cable harvest alternative in future entries.

The Campbell Timber Sale is an example of a timber sale that provided timber without roads or clearcuts; however, there is not a powerline in the Campbell project area. We would have had much more flexibility in our alternatives for the Canal Hoya Timber Sale if there was not the Tyee powerline in the project area. Roads are needed because of helicopter yarding distance limits and the powerline. Economically a helicopter can only travel one mile to yard timber and may not cross the powerline while yarding timber (due to the danger to the helicopter crew of sling lines hitting the powerline and the risk of falling debris striking the powerline). Without roads the majority of the suitable timber would be isolated and very expensive to harvest. Some system would have to be devised in which timber south of the powerline was yarded to a landing adjacent to the powerline, transferred on the ground to a landing north of the powerline and then transferred by helicopter to a barge. This would be very expensive and would probably make future harvest south of the powerline uneconomical.

A helicopter only option is available to the decision maker by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). Although this option was not included as a separate alternative, I considered it when selecting an alternative to implement, but for the reasons previously stated in this document, I did not choose such an approach.

Administrative Record

The Administrative Record for this project includes the planning record, Draft EIS, Final EIS, Tongass Land Management Plan, and all material incorporated by reference.

Mitigation

Mitigation includes measures taken to avoid, reduce or minimize the adverse effects of actions. Measures were applied in the development of the project alternatives, including the Selected Alternative, and in the design of the harvest units and road corridors. The *Mitigation Measures* section of Chapter 2 of the Final EIS discusses mitigation measures common to all alternatives.

Mitigation measures applicable to the Selected Alternative include measures contained in the Tongass Land Management Plan (1997), and applicable Forest Service Manuals and Handbooks. The Final EIS includes site-specific mitigation measures described in Chapter 2, Unit Descriptions (Appendix A), Road Descriptions (Appendix B), and Log Transfer Facility Design (Appendix D). These measures are adopted as part of this decision and will be implemented. All practical means to avoid or minimize adverse environmental effects of the Selected Alternative have been adopted.

Monitoring

A monitoring program is the process by which the Forest Service can evaluate whether the resource management objectives of the final environmental documents have been implemented as specified and whether the steps identified for mitigating the environmental effects were effective. Monitoring requirements are specified in Appendix C of the Final EIS. These monitoring items are adopted as part of this decision and will be implemented.

Each monitoring item describes what will be done, what the information will tell us, how it will be done, what will be done with the information, and the approximate cost of the monitoring. Monitoring activities may reveal results that deviate from planned effects, in which case corrective actions are prescribed. The Wrangell Ranger District is responsible for ensuring that project implementation, mitigation, monitoring, and enforcement are accomplished as specified in the Final EIS.

Findings Required By Law

National Forest Management Act

The National Forest Management Act (NFMA) requires specific determinations in this Record of Decision: consistency with existing Forest Plans and Regional Guides, a determination of clearcutting as the optimal method of harvesting, and specific authorizations of clearcuts over 100 acres in size.

Tongass Land Management Plan and Alaska Regional Guide - This decision is consistent with the Alaska Regional Guide and the Tongass Land Management Plan 1997. I have reviewed the management direction, standards and guidelines, and the schedule of activities for the VCUs included in the Selected Alternative, and find the Selected Alternative to be consistent with these elements.

Clearcutting as the Optimal Method of Harvesting - Of the 23 harvest units planned in the Selected Alternative, 12 have a stand management objective of timber production accomplished by a single regeneration harvest. Those units will include green tree retention and result in conversion to a predominantly even-aged stand. In three of those units, patches within the stand will be harvested in a single regeneration harvest, but the overall stand will be a mix of ages. The stand objective of the remaining 11 units is uneven-aged management.

For the 11 harvest units with stand objectives of uneven-aged management, the silvicultural prescriptions are partial harvest with diameter limits or other measures used to retain the prescribed amount of leave trees. A more detailed discussion of each of these units can be found in Appendix A of the Final EIS.

The 12 units with even-aged management prescription (clearcuts with reserves) will either have reserve tree clumps or individual green trees remaining after harvest. The clumps or individual trees will be designated at the time of the harvest. These clumps/trees will be selected for windfirmness, the relative absence of disease and dwarf mistletoe, wildlife attributes, and noncommercial value. See Appendix A of the Final EIS for a detailed description of each unit.

I have determined that the use of clearcutting with reserves to achieve the unit objectives is the optimal silvicultural method for this project for the following reasons:

- The use of clearcutting with reserves will meet the objective of maintaining fast growing stands of mixed species.
- Logging costs are lower than with other silvicultural systems.
- Natural regeneration of spruce and hemlock is increased after cutting.
- Clearcutting with reserves should minimize the potential for logging injury to the residual stand in units that are cable yarded.

Harvest Openings Over 100 Acres in Size - There are no harvest openings over 100 acres proposed for this project.

Tongass Timber Reform Act (TTRA)

Harvest units were designed and located to maintain a minimum 100-foot buffer zone for all Class I streams and Class II streams that flow directly into Class I streams as required in Section 103 of the TTRA. As discussed in Appendix A of the Final EIS, the actual widths of these buffer strips will often be greater than the 100-foot minimum. The design and implementation direction for the Selected Alternative incorporate Best Management Practices (BMPs) for the protection of all stream classes.

Endangered Species Act

Actions authorized in the Selected Alternative are not anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in the Canal Hoya project area. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have concurred that the

actions described within the proposed project are not likely to adversely affect threatened and endangered species. A complete biological assessment is included in the planning record for this project. I have determined that this action will not have any adverse impacts on any threatened or endangered species.

Bald Eagle Protection Act

Management activities within 330 feet of an eagle nest site are restricted by a Memorandum of Understanding (MOU) between the Forest Service and the U.S. Fish and Wildlife Service to facilitate compliance with the Bald Eagle Protection Act. The Selected Alternative is not anticipated to have a significant direct, indirect, or cumulative effect on any bald eagle habitat.

Clean Water Act

The design of harvest units and roads for the Selected Alternative were guided by standards, guidelines and direction contained in the Forest Plan, Alaska Regional Guide, and applicable Forest Service manuals and handbooks. The Unit Cards (Appendix A) and Road Cards (Appendix B) contain specific details on practices prescribed to prevent or reduce non-point sediment sources. Reasonable implementation with site specific application and monitoring of approved BMPs is expected to comply with applicable State Water Quality Standards Regulations.

These regulations provide for variances from anti-degradation requirements and water quality criteria. The harvest and road building operators will be responsible for compliance, including obtaining any variance required by the State, and will be monitored for compliance by the Forest Service.

All roads, landings and rock pits for this project will be designed to a minimum standard to accommodate timber harvesting and silvicultural activities and will be constructed in accordance with Best Management Practices listed at 33 CFR 323.4(a). Therefore, no permits under Section 404 of the Clean Water Act are required.

National Historic Preservation Act

We conducted heritage resource surveys of various intensities in the Project Area. The State Historic Preservation Officer has been consulted, and the project complies with the provisions of 36 CFR part 800. I have determined that there will be no significant effects on cultural resources.

Federal Cave Resource Protection Act of 1988

The actions in the Selected Alternative will not have a direct, indirect, or cumulative effect on any significant cave in the Canal Hoya Project Area. No cave resources have been documented in the Project Area and no caves were discovered during field work done for this analysis.

ANILCA Section 810, Subsistence Evaluation and Findings

A subsistence evaluation was conducted for the five alternatives considered in detail, in accordance with ANILCA Section 810. The evaluations in the Subsistence Report on abundance, distribution, access and competition for harvested resources in the project area, Wildlife Analysis Area 1814 and the Bradfield Canal, indicate that there will not be a significant possibility of a significant restriction on subsistence uses of wildlife, fish, and shellfish, marine mammals, other foods, and timber resources as a result of this sale.

Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (CZMA), while specifically excluding Federal lands from the coastal zone, requires that a Federal agency's activities be consistent with the enforceable standards of a state's coastal management program to the maximum extent practicable when the agency's activities affect the coastal zone.

The enforceable standards for timber harvest activities are found in the State Forest Practices Act. The standards and guidelines for timber management activities in the Canal Hoya Project Area meet or exceed the standards in the State Forest Practices Act.

The Alaska Division of Governmental Coordination did a consistency review of our determination for Alternative 3 in the Draft EIS. The stipulations contained in this review have been addressed in the Final EIS. I have determined that the proposed activities are consistent with the Alaska Coastal Management Program to the maximum extent practicable.

Executive Orders

EO 11988 - Executive Order 11988 directs Federal agencies to take action to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains. The numerous streams in the Canal Hoya Project Area make it impossible to avoid all floodplains during timber harvest and road construction. The design of the proposed developments and the application of Best Management Practices combine to minimize adverse impacts on the floodplains.

EO 11990 - Executive Order 11990 requires Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the destruction or modification of wetlands. Soil moisture regimes and vegetation on some wetlands may be altered in some harvest units; however, these altered acres would still be classified as wetlands and function as wetlands in the ecosystem.

Because wetlands are so extensive in the project area, it is not feasible to avoid all wetland areas. However, there are no development activities planned on the more biologically significant wetlands. In all alternatives, roads and units were located to avoid these areas. Road construction results in the filling of wetlands creating a permanent loss of wetland habitat. Effects will be minimized by not using wetlands as sites for overburden disposal. Implementation of BMPs

such as minimizing ditching and providing adequate cross drainage, will also help minimize the affected area.

EO 12962 - Executive Order 12962 directs Federal agencies to conserve, restore and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. Section 1 of the Executive Order is most pertinent to the proposed activity. Section 1 directs Federal agencies to evaluate effects on aquatic ecosystems and recreational fisheries, develop and encourage partnerships, promote restoration, provide access, and promote awareness of opportunities for recreational fishery resources.

The effects of this project have been evaluated throughout the Final EIS, including effects to freshwater and marine resources. Partnerships are continuing to be used to leverage Federal project funds to address water quality concerns in areas of the Tongass National Forest, although none have been proposed for recreational fisheries in conjunction with this project.

Under the Selected Alternative, road closures would only provide access for recreational fishing opportunities to those willing to walk into the project area. Since most recreational fishing is expected to remain at saltwater, the impact of improved access on recreational fishing opportunities is expected to be minor.

EO 12898 - Executive Order 12898 directs Federal agencies to identify and address the issue of environmental justice, i.e. adverse human health and environmental effects of agency programs that disproportionately impact minority and low income populations. Implementation of the Selected Alternative will not cause adverse health or environmental effects that disproportionately impact minority and low income populations.

Federal and State Permits

Federal and State permits necessary to implement the authorized activities are listed in Chapter 1 of the Final EIS.

Implementation Process

Implementation of this decision may occur no sooner than 30 days after the date of publication of the Notice of Availability of the Final EIS in the Federal Register, or 52 days following publication of the legal notice of the decision in the *Petersburg Pilot*, published in Petersburg, Alaska, whichever is later. This timber sale is planned to be offered in the fall of 1998.

This project will be implemented in accordance with Forest Service Manual and Handbook direction for Timber Sale Project Implementation in FSM 2431.3 and FSH 2409.24. This direction provides a bridge between project planning and implementation and will ensure execution of the actions, environmental standards, and mitigation approved by this decision, and compliance with TTRA and other laws. All applicable Best Management Practices (BMPs) will be applied to the Selected Alternative.

Implementation of all activities authorized by this Record of Decision will be monitored to ensure that they are carried out as planned and described in the Final EIS.

Appendix A of the Final EIS contains harvest unit design cards and Appendix B contains road design cards. These cards are an integral part of this decision because they document the specific resource concerns, management objectives, and mitigation measures to govern the layout of the harvest units and construction of roads. These cards will be used during the implementation process to assure that all aspects of the project are implemented within applicable standards and guidelines and that resource impacts will not be greater than those described in the Final EIS. Similar cards will be used to document any changes to the planned layout as the actual layout and harvest of the units occurs with project implementation.

The implementation record for this project will display each harvest unit, transportation facility, and other project components as actually implemented, any proposed changes to the design, location, standards and guidelines, or other mitigation measures for the project, and the decisions on the proposed changes.

Procedure for Changes During Implementation

Proposed changes to the authorized project actions will be subject to the requirements of the National Environmental Policy Act (NEPA), the National Forest Management Act of 1976 (NFMA), Section 810 of the Alaska National Interest Lands Conservation Act, the Tongass Timber Reform Act (TTRA), the Coastal Zone Management Act (CZMA), and other laws concerning such changes.

In determining whether and what kind of NEPA action is required, the Assistant Forest Supervisor will consider the criteria for whether to supplement an existing Environmental Impact Statement (EIS) in 40 CFR 1502.9(c), and FSH 1909.15, sec. 18, and in particular, whether the proposed change is a substantial change to the Selected Alternative as planned and already approved, and whether the change is relevant to environmental concerns. Connected or interrelated proposed changes regarding particular areas of specific activities will be considered together in making this determination. The cumulative impacts of these changes will also be considered.

The intent of field verification is to confirm inventory data and to determine the feasibility and general design and location of a unit or road, not to locate final boundaries or road locations. Minor changes are expected during implementation to better meet on-site resource management and protection objectives. Minor adjustments to unit boundaries are also likely during final layout for the purpose of improving logging system efficiency. This will usually entail adjusting the boundary to coincide with logical logging setting boundaries. Many of these minor changes will not present sufficient potential impacts to require any specific documentation or other action to comply with applicable laws. Some minor changes may still require appropriate analysis and documentation to comply with FSH 1909.15, sec. 18.

Right to Appeal

This decision is subject to administrative appeal. Organizations or members of the general public may appeal this decision according to Title 36 Code of Federal Regulations (CFR) 215. The appeal must be filed within 45 days of the date that legal notification of this decision is published in the *Petersburg Pilot*, the official newspaper of record. The Notice of Appeal must be filed in duplicate with:

Regional Forester
Forest Service
U.S. Department of Agriculture
P.O. Box 21628
Juneau, AK 99802-1628

It is the responsibility of those who appeal a decision to provide the Regional Forester sufficient written evidence and rationale to show why the decision by the Forest Supervisor should be changed or reversed. This written Notice of Appeal must:

1. State that the document is a Notice of Appeal filed pursuant to 36 CFR Part 215;
2. List the name, address, and, if possible, the telephone number of the appellant;
3. Identify the decision document by title and subject, date of the decision, and name and title of the Responsible Official;
4. Identify the specific change(s) in the decision that the appellant seeks or portion of the decision to which the appellant objects;
5. State how the Responsible Official's decision fails to consider comments previously provided, either before or during the comment period specified in 36 CFR 215.6 and, if applicable, how the appellant believes the decision violates law, regulation or policy.

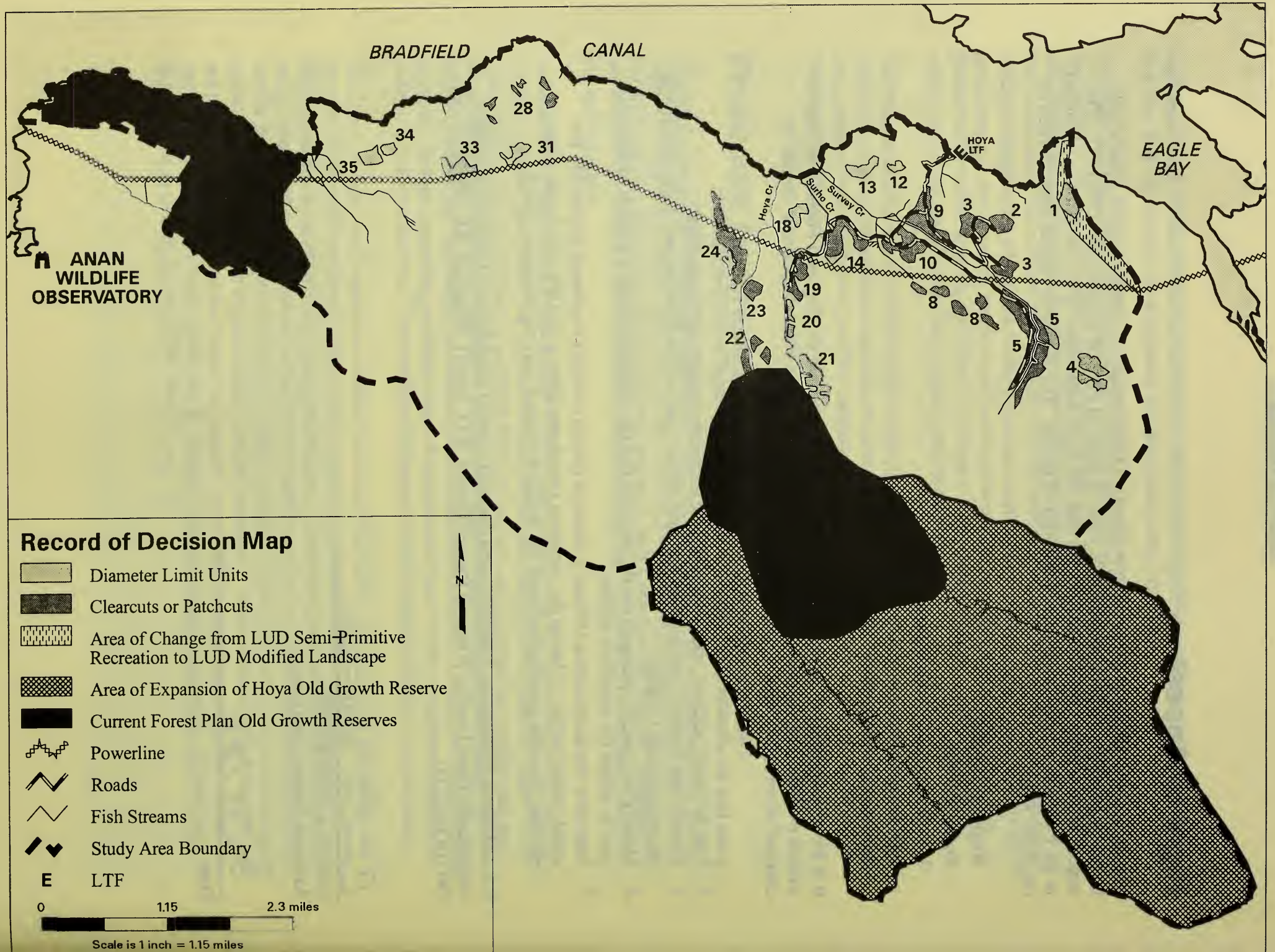
For additional information concerning this decision, contact Scott Posner, Forest Service Interdisciplinary Team Leader, Wrangell Ranger District, P.O. Box 51, Wrangell, AK 99929, or call (907) 874-2323.

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

5/15/98

Date


BRADFIELD CANAL
EAGLE BAY
HOYA LTF
ANAN WILDLIFE OBSERVATORY
Hoya Cr
Surhoo Cr
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4
Record of Decision Map
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Area of Expansion of Hoya Old Growth Reserve
Current Forest Plan Old Growth Reserves
Powerline
Roads
Fish Streams
Study Area Boundary
E LTF
N
0 1.15 2.3 miles
Scale is 1 inch = 1.15 miles

Final Environmental Impact Statement

Canal Hoya Timber Sale

United States Department of Agriculture
Forest Service – Alaska Region

Lead Agency:
USDA Forest Service
Tongass National Forest
Stikine Area

Responsible Official:
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Abstract:

This Final Environmental Impact Statement describes the effects of four "action" alternatives and one "no action" alternative for harvesting timber in the Canal Hoya Project Area.

Summary

Summary

This Environmental Impact Statement (EIS) was prepared by the Stikine Area of the Tongass National Forest to document the effects of, and alternatives to, a proposed timber sale in two Value Comparison Units (VCU). VCU 5210 (Canal Creek) and VCU 5200 (Hoya Creek) are along the south shore of the Bradfield Canal. In this document we describe the "proposed action" and three alternative strategies for harvesting timber, building roads and building log transfer facilities in the Canal Hoya Project Area. A "no action" alternative is also described.

Chapter 1 provides the purpose and need for the project we are proposing, the public issues surrounding the proposed action, and other important information. The purpose and need for the proposed action is to respond to the goals and objectives identified by the Revised Forest Plan for the timber resource while moving the Canal Hoya Project Area towards the desired future condition for all resources. The public comments we received during scoping showed that there were five main issues that people were most concerned about:

Timber Supply and Economics,
Scenic and Tourism Values,
Anan Bears,
Wildlife Habitat and Species Conservation,
Freshwater and Marine Resources.

Chapter 2 discusses the alternatives we designed, as a result of our analysis and the public comment we received.

- The Proposed Action (Alternative 1) emphasizes timber volume and harvest economics in the **Hoya VCU** and balances bear habitat security, visual concerns, soil and water quality, and timber production in the **Canal VCU**.
- Alternative 2 responds primarily to public concerns about timber harvest and economics, and proposes the highest level of harvest and road construction.
- Alternative 3 emphasizes bear habitat security, soil and water quality, and visual concerns in the **Canal VCU**, and emphasizes timber volume and harvest economics in the **Hoya VCU**. Under this alternative, there would be no roads constructed in the Canal VCU, which is nearest to the Anan Wildlife Viewing Area.
- Alternative 4 emphasizes wildlife habitat and security, visual objectives, soils and water quality throughout the Project Area. This alternative proposes the least amount of road of all the action alternatives, and partial harvest prescriptions would be emphasized.
- The No Action Alternative (Alternative 5) proposes no change to the existing environment in the Canal Hoya Project Area.

We selected Alternative 3 as our preferred alternative, because it best met the purpose and need of providing timber, while maintaining desired conditions for Anan bears and other resources. Several changes were made in the preferred alternative (Alternative 3) as a result of public and other agency comment on the Draft Environmental Impact Statement, which was published in January 1998. Briefly, the changes included:
1) Most of Unit 35 and all of Unit 36 were dropped. This will help maintain the economic viability of possible future road construction for timber harvest in the Canal VCU. Although no roads will be constructed in the Canal VCU this entry, we will monitor the effects of the roads in the Hoya VCU to determine if our mitigation measures for wildlife habitat security are adequate to allow future roads in the Canal VCU.
2) To offset some of the volume lost by deferring harvest in units 35 and 36, we added Units 18, 23 and 33.
3) A small segment of temporary road with a temporary fish stream crossing would be added in order to access unit 23 for cable yarding.
4) A segment of Road 6960 would be moved north in all alternatives, in order to avoid an unstable crossing site on West Survey Creek and four small fish stream crossings.
5) The Hoya Log Transfer Facility site was selected and the Capsize Cove LTF site was dropped in all alternatives. The Hoya LTF site poses more risk to adjacent resident fish habitat than the Capsize Cove LTF, but the risk can be mitigated through design and erosion control measures. The Hoya LTF site is preferred because it has less impact on visuals, wildlife habitat, and anchorage; and there is less road construction needed.

Chapter 3, Affected Environment and Environmental Effects, describes the Project Area and predicts changes likely to occur with implementation of the alternatives. These changes include both direct and indirect impacts of the five alternatives for each resource issue. Potential cumulative impacts of reasonably foreseeable or similar actions are also disclosed.

There are extra maps at the end of Appendix A, so you can remove them and refer to them as you review this document.

Table S-1

Alternative Comparison Table

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5 No Action
Total Acres Classified as Available for Harvest	3670	3670	3670	3670	3670
Proposed Treatment Acres	**780**	**800**	**660**	**610**	
Canal Creek VCU	230	290	70	120	0
Hoya Creek VCU	550	510	590	489	0
Harvest by Volume Strata (acres)					
Low Volume (2120 acres existing)	85	40	75	110	0
Medium Volume (5800 acres existing)	415	395	320	290	0
High Volume (4500 acres existing)	280	365	265	210	0
% of Available Treated	21%	22%	18%	17%	0
Total Volume (MMBF)	**16**	**17**	**14**	**12**	0
Cable Yarded	8.2	11.5	7.2	1.3	0
Helicopter Yarded	7.3	4.9	6.4	10.8	0
ROW Volume	.5	.7	.4	.2	0
Net Stumpage ($/MBF)					
Including Specified Road Costs	-$135	-$139	-$130	-$110	0
Excluding Specified Road Costs	$3	$23	$2	$-44	0
Number of Direct Jobs Produced During Life of Sale	60	64	52	46	0
Specified Road (miles)	8.5	11.3	7.3	2.6	0
Temporary Road	1.6	2.8	1.7	0	0
Total Road Miles	**10.1**	**14.1**	**9**	**2.6**	0
Log Transfer Sites	2	2	1	1	0
Visibility From Blake Island		most	least		
From Mouth of Canal Creek		most	least		
From Mouth of Hoya Creek	most			least	
Harvest by Visual Management Class (acres)					
Visual Management Class 2	305	350	250	190	0
Visual Management Class 3	365	300	300	345	0
Visual Management Class 4	110	150	110	75	0
Duration of Operations (years)	3-5	3-5	3-4	2-3	0
Brown Bear Denning Habitat Harvested (1985 acres existing)	73	134	89	80	0
% of Anan Bear Locations Within 1 Mile of Proposed Roads	12%	13%	6%	2%	0
% of Highly Suitable Habitat in Project Area Reduced in Quality for					
Black Bear	56	60	40	26	0
Brown Bear	4	3	3	2	0
Mountain Goat	3	55	54	3	0
Deer (Medium Suitable Habitat Reduced in Quality)	18	16	15	6	0
Marten	9	10	8	6	0
Goshawk	5	6	6	5	0
Project Area Habitat Capability as a % of Current Condition					
Black Bear	84	81	87	91	100
Brown Bear	92	90	94	96	100
Mountain Goat	91	87	89	95	100
Deer	92	92	94	95	100
Marten	95	95	95	96	100
Drainage Structures on Fish Streams	8	8	6	2	0
Harvest in Watersheds with the Most Fish Habitat (acres)					
Canal (4.1 miles of fish stream)	60	65	0	0	0
Hoya (18.9 miles of fish stream)	140	135	150	5	0
Survey (5.8 miles of fish stream)	275	305	325	385	0
% Watershed Harvest in Most Sensitive Watersheds					
Hoya	1%	1%	1%	0	0
Survey	7%	8%	8%	10%	0
Road Miles in Watersheds with the Most Fish Habitat					
Canal	0	1.0	0	0	0
Hoya	2.2	2.0	2.2	0	0
Survey	4.2	5.2	5.2	2.0	0
Volume Through LTFs (MMBF)	15	17	12	8	0
Volume to Barge (MMBF)	1	0	2	4	0

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Chapter 1

Purpose and Need

Chapter 1

Purpose and Need

Introduction: This Document and You

Thank you for your interest in the proposed Canal Hoya Timber Sale. This Environmental Impact Statement (EIS) was prepared by the Stikine Area of the Tongass National Forest to document our efforts to make decisions about a possible timber sale within the Canal Hoya Project Area based upon laws and other direction and upon public needs and concerns. The Assistant Forest Supervisor of the Stikine Area, Tongass National Forest, will make the final decision, which will be documented in a Record of Decision.

This document outlines the effects of and alternatives to a proposed timber sale in the Canal Creek and Hoya Creek watersheds, along the Bradfield Canal, known as the Canal Hoya Project Area. In this document we describe the "proposed action" and three alternative strategies for harvesting timber. These strategies also include building and maintaining roads and log transfer facilities in the Canal Hoya Project Area. A "no action" alternative is described. We have disclosed the environmental effects and resource outputs that we expect from the Proposed Action and each of the alternatives.

This Final EIS is prepared according to the format established by Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508). In general, the objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated.

The planning record is available at the Wrangell Ranger District office in Wrangell, AK. Other reference documents such as the Forest Plan (USDA Forest Service 1997a), the Tongass Timber Reform Act, the Resources Planning Act, and the Alaska Regional Guide, are available at public libraries around the region as well as at the Supervisor's Office in Petersburg.

Document Organization

Chapter 1 provides the purpose and need for the project we are proposing, the public issues surrounding the action, and other introductory information. It also discusses how the Canal Hoya Timber Sale relates to the Forest Plan and to other related NEPA actions, the key issues driving the EIS analysis, and the authorities guiding the EIS process.

Chapter 2 describes and compares the alternatives for accomplishing the proposed action and no-action alternatives. It includes summary information on their environmental impacts, implementation and mitigation.

Chapter 3 describes the environment and predicts changes likely to occur with implementation of the alternatives. These changes include both direct and indirect impacts of

the alternatives on the human and natural environment for each resource issue. Potential cumulative impacts of reasonably foreseeable or similar actions are also disclosed.

Chapter 4 contains the list of preparers, distribution list, glossary, index, and cited literature. The glossary will be especially useful to reviewers unfamiliar with technical terms or some of the more relevant laws regarding environmental analyses.

Finally, supportive information on units, roads, monitoring, log transfer facilities, and how this sale fits in with the Tongass-wide timber sale program is included in the appendices. Additional documentation may be found in the project planning record located at the Wrangell Ranger District office in Wrangell, AK.

Project Area

The Canal Hoya Timber Sale Project Area is located in Southeast Alaska on the south shore of the Bradfield Canal, 30 miles southeast of the town of Wrangell, Alaska (see Figure 1-1). The 26,000 acre Project Area includes the Canal Creek and Hoya Creek watersheds. These watersheds are designated as Value Comparison Units 5210 and 5200, respectively. There are no roads or developed facilities in the Project Area at this time; however, the Tyee powerline passes through the Project Area, parallel to the shoreline.

The project area is bordered to the west by a congressionally designated Land Use Designation II watershed (Anan) and to the east by Semi-Remote Recreation Management Prescription area (Eagle River), neither of which allow programmed timber harvest. The Anan Wildlife Viewing Area, known especially for bear viewing opportunities, is about one mile west of the Project Area boundary (Figure 1-2). North of the Project Area, across the Bradfield Canal, is the Campbell Timber Sale, where partial harvest of 476 acres was completed in 1995 (Figure 1-1) under the Cambell Timber Sale EIS and Record of Decision.

Proposed Action

At the start of the planning process we defined a "proposed action". This serves as a starting point for the planning process and lets the public and other agencies know more about the project we are considering so they can comment. We then develop other alternatives to the proposed action in response to environmental issues, public concerns and comments from other agencies. The "proposed action" could become, but does not have to be, our "preferred" or final "selected" alternative.

The proposed action for this project would harvest about 16 MMBF of sawlog and utility timber on approximately 780 acres in Value Comparison Unit (VCU) 5210 (Canal Creek) and VCU 5200 (Hoya Creek). A variety of harvest methods would be used, which would leave various densities of trees in harvested areas. Two log transfer sites would be constructed - one in the Canal VCU and another in the Hoya VCU. The log transfer sites could utilize temporary floating LTF structures, which are available on the Stikine Area. Both helicopter and cable yarding systems would be used. Approximately 10 miles of "specified" road and "temporary" roads would need to be constructed in the Canal and Hoya VCUs.

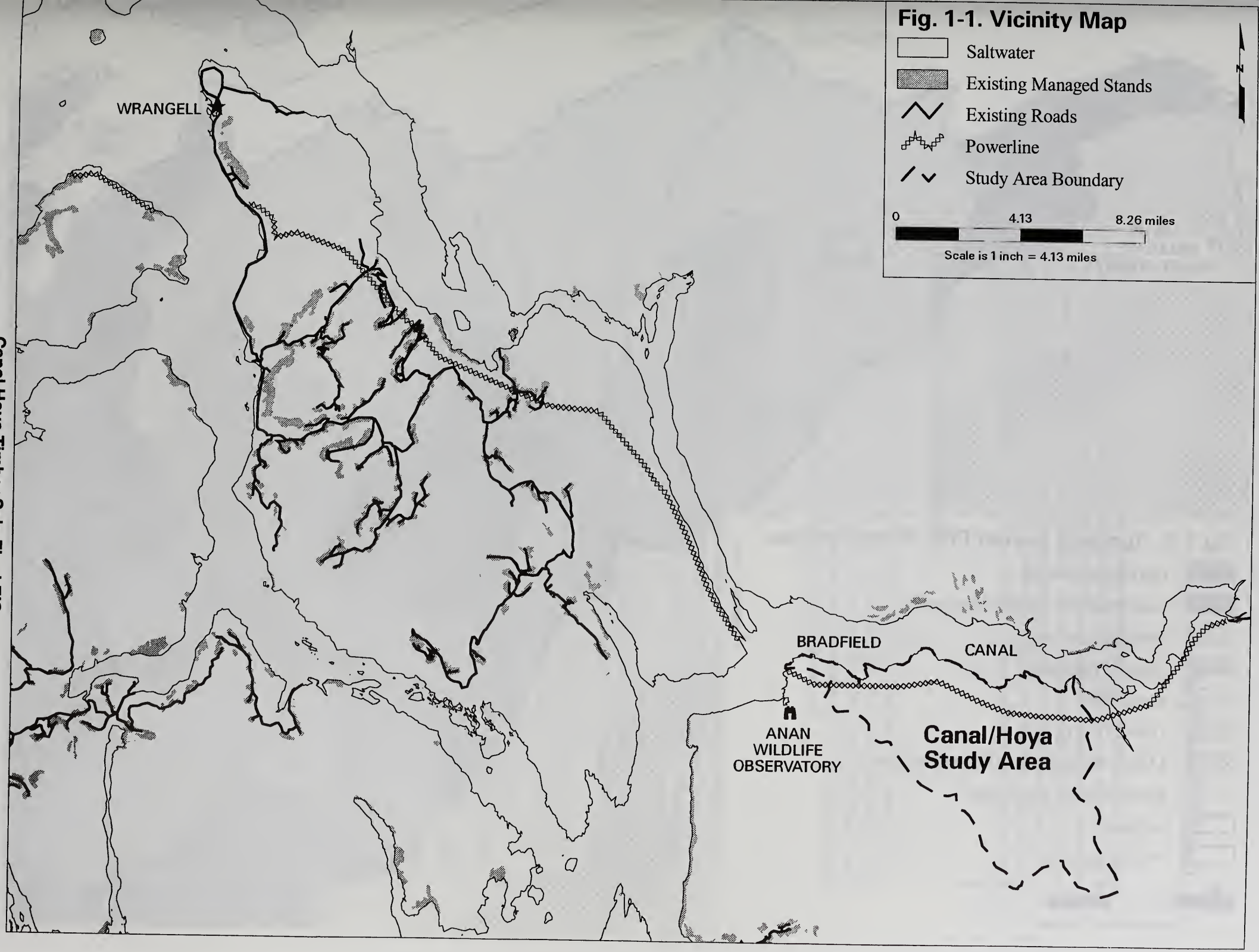
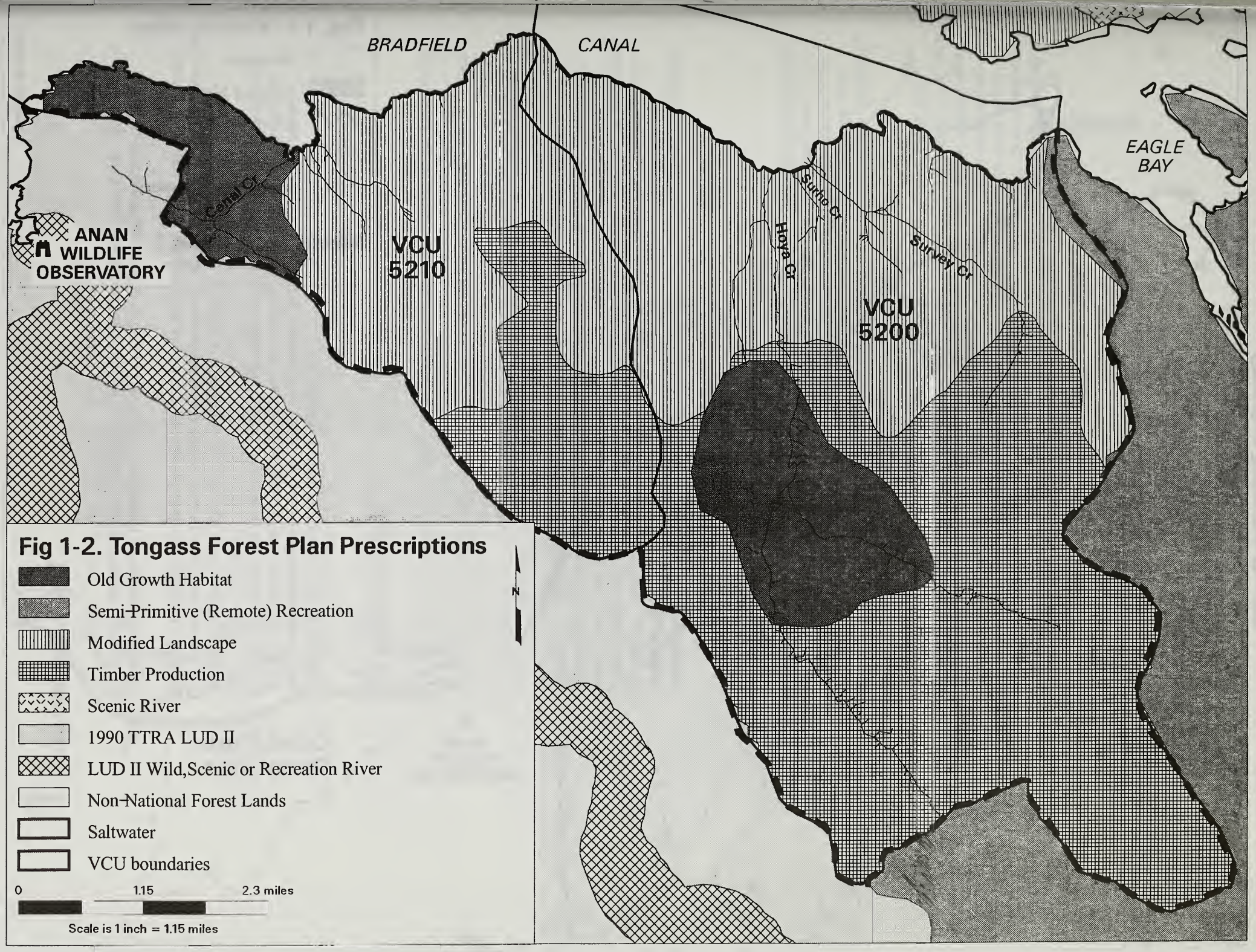


Fig. 1-1. Vicinity Map
Saltwater
Existing Managed Stands
Existing Roads
Powerline
Study Area Boundary
0
4.13
8.26 miles
Scale is 1 inch = 4.13 miles
N
WRANGELL
BRADFIELD
CANAL
ANAN
WILDLIFE
OBSERVATORY
Canal/Hoya
Study Area


BRADFIELD
CANAL
EAGLE
BAY
Canal Cr
ANAN
WILDLIFE
OBSERVATORY
VCU
5210
Hoya Cr
Sutlie Cr
Survey Cr
VCU
5200
Fig 1-2. Tongass Forest Plan Prescriptions
Old Growth Habitat
Semi-Primitive (Remote) Recreation
Modified Landscape
Timber Production
Scenic River
1990 TTRA LUD II
LUD II Wild,Scenic or Recreation River
Non-National Forest Lands
Saltwater
VCU boundaries
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

The proposed action, and all alternatives, include a non-significant amendment to the Forest Plan to increase the size of the old growth reserve in VCU 5200 (Hoya) by adding the isolated area to the south, which is currently designated Timber Production management prescription, but cannot be accessed for timber management. This will more accurately portray what will occur on the ground. The change will increase the size of the Hoya old growth reserve by approximately 7120 acres, of which 196 acres were classified in Forest Plan calculations as isolated, but suitable for timber production. See page 2-4 and 3-69 for more detail on the old growth reserves.

Decision to be Made

The Record of Decision for the Forest Plan established that timber harvest is appropriate in the Canal Hoya study area. The Stikine Area Assistant Forest Supervisor will decide: 1) if, where and how much timber harvest should occur in the Canal Hoya area at this time, and if so, 2) where road and log transfer facility development should occur to facilitate harvest and, 3) what mitigation measures and monitoring would be implemented.

Purpose and Need

The purpose and need for the proposed action is to respond to the goals and objectives identified by the Forest Plan for the timber resource while moving the Canal Hoya Project Area towards the desired future condition for all resources. The Forest Plan identified the following goals and objectives:

1) Manage the Tongass timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest, on an even-flow, long-term sustained yield basis and in an economically efficient manner (USDA Forest Service 1997a, page 2-4).

2) Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the demand for the planning cycle (USDA 1997a, page 2-4) and

3) Maintain and promote industrial wood production from suitable timber lands, providing a continuous supply of wood to meet society's needs (USDA 1997a, page 3-135 and 3-144).

4) Produce desired resource values, products, and conditions in ways that also sustain the diversity and productivity of ecosystems (USDA 1997a, page 2-1).

The Canal Hoya Timber Sale is expected to provide between 10 to 17 million board feet to the timber industry. The range of alternatives considered in this Environmental Impact Statement was determined during our analysis and reflects issues raised during scoping.

Overall Direction for the Project

Overall Management Direction for the Project Area

Areas identified as Modified Landscape and Timber Production Management Prescription lie within the Project Area. Goals in the Forest Plan for management of those lands emphasize timber production and scenic quality. Goals for timber production were described above in the Purpose and Need. Goals for scenic quality include:

> Manage these lands for sustained long-term timber yields (both Management Prescriptions) and a mix of resource activities while minimizing the visibility of developments in the foreground distance zone (Modified Landscape Management Prescription, Figure 1-2)
>
> Recognize the scenic values of suitable timber lands viewed from identified popular roads, trails, marine travel routes, recreation sites, bays and anchorages, and modify timber harvest practices accordingly (Modified Landscape).

Desired Future Condition

The Forest Plan describes the following desired condition for the **Timber Production Management Prescription** (13,700 acres of the Project Area):

"Suitable timber lands are managed for the production of sawtimber and other wood products on an even-flow, long-term sustained yield basis; the timber produced contributes to a Forest-wide sustained yield. An extensive road system provides access for timber management activities, recreation uses, hunting and fishing, and other public and administrative uses; some roads may be closed, either seasonally or year-long, to address resource concerns. Management activities will generally dominate most seen areas. Tree stands are healthy and in a balanced mix of age classes from young stands to trees of harvestable age, usually in 40 to 100 acre stands. Recreation opportunities associated with roaded settings, from Semi-primitive to Roaded Modified are available. A variety of wildlife habitats, predominantly in the early and middle successional stages are present."

The Forest Plan describes the following desired condition for the **Modified Landscape Management Prescription** (11,900 acres of the Project Area - including most of the land proposed for harvest activities, Figure 1-2):

"In areas managed under the Modified Landscape Management Prescription, forest visitors, recreationists, and others using popular travel routes and use areas will view a somewhat modified landscape. Management activities in the visual foreground will be subordinate to the characteristic landscape, but may dominate the landscape in the middle and backgrounds. Within the foreground, timber harvest units are typically small and affect only a small percentage of the seen area at any one point in time. Roads, facilities and other structures are also subordinate to the foreground landscape. Recreation opportunities associated with natural-appearing to modified settings are available. A variety of successional stages provide a range of wildlife habitat conditions. A yield of timber is produced which contributes to Forest-wide sustained yield."

Special circumstances in the Project Area guide our desired conditions.

The desired conditions described by the Forest Plan provide a basis for management of the Canal Hoya Project Area. Management activities will also be influenced by Forest Plan standards and guidelines and circumstances particular to the Project Area. Those circumstances include the adjacent LUD II (roadless) areas, the nearby Anan wildlife viewing area, and the economic needs of commercial fishermen and outfitters and guides. The following desired conditions will guide our management of the Canal Hoya Project Area in a manner consistent with the Forest Plan and the special circumstances of the area:

Soil productivity will be maintained, while using the resources it produces.

- Harvest timber on lands that are not adversely affected by the management activities. For example: harvest timber where the slopes are not overly steep unless site-specific prescriptions indicate there is not a high risk of management-induced slope failure. Manage timber yarding so the side-slopes of v-notch drainages will not be disturbed.
- Locate, construct and maintain roads in ways that minimize environmental disturbance. Avoid locating roads in areas with unstable soils to prevent an increase in the potential for mass soil movement.

Aquatic productivity will be maintained or enhanced

- Maintain fish habitat, stream bank and stream channel processes, large woody debris supply, water quality, and fish passage through crossing structures.
- Maintain balance between streamflow and sediment supplies to assure long term channel stability. Maintain streamflow regimes that support critical aquatic life stages.
- Protect State designated beneficial uses ("growth and propagation of fish, shellfish, other aquatic life and wildlife").

Biologically important habitats will continue to be represented in the Project Area, so a full spectrum of wildlife habitat needs is accounted for and landscape biodiversity is maintained.

- Follow Forest Plan direction to maintain the long-term viability of wildlife populations by managing the size and shape of forest blocks, travel corridors between forest blocks and migration pathways.
- Maintain remnant patches of "old growth" in or adjacent to harvest areas to provide a seed source to eventually recolonize areas where forbs and shrubs have been shaded out by dense second growth.
- Maintain subsistence resources by managing habitats and landscapes for game populations and by controlling access through minimizing road building and through road management.
- Maintain the population of bears that frequent Anan by managing motorized access. Maintain old growth habitat in denning site areas used by Anan bears.
- Manage timber harvest operations (including timing) to minimize impacts on the tourism business connected with Anan.

The existing condition of the Project Area is described in Chapter 3 of this EIS, in the "Affected Environment" of each resource section.

Visual quality will be maintained along the travel route from Wrangell to Anan Wildlife Observatory.

- Strive for a Visual Quality Objective (VQO) of Partial Retention in the Canal VCU.

Public Involvement

When a timber sale project begins, we designate a group of professionals with a variety of educational backgrounds to a team known as an "interdisciplinary team" or IDT. The Canal Hoya IDT listened to public comment and worked with you and the various State and Federal agencies in an effort to plan the best possible project. The team conducted the planning process and wrote this document to inform you and the Forest Supervisor of the environmental consequences of the proposed action and alternatives.

Public Scoping

"Public Scoping" is the term we use to describe the process of identifying the significant issues for a project by contacting interested individuals and agencies to determine their concerns. The following is a summary of the letters, contacts, and meetings that took place during the planning of this project:

- April 1996 - Preliminary Scoping Letter to identify issues
- December 1996 - Notice of Intent published in the Federal Register
- December 1996 - Scoping Letter sent to clarify issues and identify alternatives
- Winter/Spring 1997 - Newspaper articles and notes describing the project and opportunities for comment.
- October 1997 - Revised Notice of Intent published in the Federal Register. Field data indicates that the volume per acre in the study area is lower than the estimate used to establish the volume for the Purpose and Need for this project in the original Notice of Intent. The revised Notice of Intent incorporates the updated information to provide for a range of volumes in the Purpose and Need, which also allows us to better address the issues and desired conditions related to this project.
- January 1998 - Availability of the Draft Environmental Impact Statement (DEIS) was published in the Federal Register and copies of the DEIS were sent to interested people on the Canal Hoya mailing list. The comment period for the DEIS continued until March 2, 1998. Comments were responded to by the Forest Service and appropriate changes have been integrated into this Final EIS.

- Meetings with individuals, agencies, and organizations including: Alaska Department of Fish and Game (ADFG), Alaska Department of Environmental Conservation (ADEC), Alaska Division of Governmental Coordination (DGC), Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), Wrangell Resources Council and Stikine Jetboat Association.

Other Agency Involvement - Permits, Licenses, and Certifications

Several other agencies reviewed this project to provide their professional point of view on topics in which they have expertise. In some cases, reviews are necessary because another agency has authority to issue permits for a specific activity we propose. Below, we describe our relationship to other agencies in the planning of this project.

US Army Corps of Engineers - The Corps is responsible for approving proposals to dredge or fill materials in the coastal waters of the United States under Section 404 of the clean water act. In this project, we seek a permit from the Corps for Log Transfer Facilities. The Corps also has administrative authority over activities associated with wetlands. Any road construction in wetlands is of interest to the Corps and we must consider and reduce our effects on those areas. All roads proposed for this project are for the purpose of managing the timber resource.

Environmental Protection Agency - The EPA provides a general review in accordance with their responsibilities under the National Environmental Policy Act, Section 309 of the Clean Air Act, and Section 402 of the Clean Water Act. They also administer permits associated with the Log Transfer Facilities under the National Pollution Discharge Elimination System.

National Marine Fisheries Service - NMFS has authority for threatened or endangered marine life and we consulted with them on possible effects on those species.

US Fish and Wildlife Service - USFWS administers the Endangered Species Act. We consult with the USFWS to determine if we are affecting Threatened or Endangered species. We also discuss effects on other wildlife species with the USFWS, since they have expertise in many areas and are interested in managing for wildlife in ways that will prevent the need for listing species as Threatened or Endangered in the future. The USFWS also conducted dive surveys of potential log transfer facilities and offered recommendations on suitable sites.

State of Alaska - Five departments in the State of Alaska are asked to participate in the planning of this project. They give general comments and suggestions as well as specific reviews, such as :
1) Division of Governmental Coordination (DGC) - Provides overall coordination for the State's comments and administers Alaska Coastal Management Program (ACMP), which requires the Forest Service to design activities compatible with approved State management guidelines,
2) Department of Environmental Conservation (DEC)- Participates in cooperative water quality management through Section 319 of the Clean Water Act and a Memorandum of Agreement with the Forest Service. ADEC also issues a certificate of compliance with Alaska Water Quality Standards under Section 401 of the Clean Water Act,
3) Department of Fish and Game (ADFG) - Involved in the Coastal Zone Consistency review and are especially interested in instream activities and other fish, water, wildlife and subsistence issues,
4) Department of Natural Resources (DNR) - Tideland permit and lease or easement necessary for the log transfer site,
5) State Historic Preservation Office (SHPO) - Compliance with Section 106 if the National Historic Preservation Act, a process to determine the effects of alternatives on heritage resources.

Category 3 Timber Sale Review

The Forest Service met with representatives from the interagency implementation team on October 10, 1997 (National Marine Fisheries Service, Environmental Protection Agency, U.S. Fish and Wildlife Service, Alaska Division of Governmental Coordination, Department of Fish and Game, and Department of Environmental Conservation) to review the extent to which the new wildlife standards and guidelines added in the 1997 Forest Plan Record of Decision (USDA 1997b, page 41) should be incorporated into the Canal Hoya Timber Sale Project. The new wildlife standards and guidelines address landscape connectivity, endemic terrestrial mammals, northern goshawk, and American marten. The intent of these new standards and guidelines is to avoid some possible long-term cumulative effect. The meetings further developed the communication with the other resource management agencies regarding the timber sale planning process.

Field Studies

Field studies were conducted in 1994, 1996 and 1997 to collect specific information relative to issues and to verify resource information contained in the Tongass National Forest geographic information system (GIS). Examples of resource information in GIS include streams, important wildlife habitat, timber and soil inventories, and location of proposed harvest units. Field studies used unit and road design cards for all action alternatives to document the location of proposed harvest units and roads. Resource specialists listed specific concerns on the cards and recommended how those concerns should be addressed or mitigated (Appendix A and B).

Information from field studies and GIS was then used to address the issues and analyze the environmental effects of each alternative. The entire analysis was used by the Forest Service to select a preferred alternative for publication in both the Draft and Final EIS.

Inventories, resource specialist reports, and GIS information are part of the Canal Hoya planning record. Also included in the planning record are results of public scoping and the unit and road design cards. The planning record will be available for public inspection at the Wrangell Ranger District in Wrangell, Alaska.

Issues

Issues Associated with the Proposed Action

Although there are often many issues associated with the planning of a timber sale, the National Environmental Policy Act directs us to analyze in detail only those issues that are significant. This ensures that we focus our analysis and documentation on the issues that are most important to the specific Project Area. We reviewed planning documents for other projects in the area and listened to comments during the public participation process (see a cross section of these comments in the margin adjacent to each issue). This information was used to identify five key issues, which form the basis for the alternatives:

"...We need a timber industry; consider Helicopter and SBA sale..."

"...We hope you will consider a range of alternatives starting at .5 MMBF..."

"...Current timber sale economics make it imperative that the maximum volume be obtained from each entry into these areas. Please examine the possibility of increasing harvest to 60 or 70 MMBF at the least..."

Issue 1: Timber Supply and Economics

This project has the potential to affect employment and the economy of local communities, which was brought up as an issue during public scoping. Public comments indicated concern about current changes in the timber industry, particularly regarding the pulp products from this sale and questions about the need for the sale given the recent mill closures. The terrain and quality of timber in the Project Area may make it difficult to design a timber sale that would be advertised above base rates, so the economic viability of a sale is also an issue. The amount of wood harvested, the location of old growth reserves and any infrastructure developed with this entry may affect availability and costs associated with future entries for timber harvest. Roads and log transfer facilities constructed for timber harvest may make future sales more economical, but the access they provide between sales is a concern due to other issues, such as increased vulnerability to hunting of Anan bears.

Issue #2: Scenic and Tourism Values

"... I am concerned about the very real negative impacts on the fishery, commercial and sport ..."

"... This area, Anan in particular, has become a major tourist area. What will be the impact on tourism? No one likes to see clearcuts ..."

"... We believe that visual retention is very important in areas like the Bradfield ..."

"I have a deep concern that not enough roads will be built. Extensive roading should be pursued in order to increase the access for recreation ..."

"...Remove drainage structures ... so that vehicles will not be able to drive the roads ... Prevent hunters from hiking along the roads..."

"... We object specifically to the location of an LTF in the same site where we have established a primitive, low impact use ..."

People are concerned about how this sale would change scenic conditions, and recreation and tourism potential in the Bradfield Canal area. Although this area is used by some local people for recreation, the larger portion of recreationists affected by this sale would be tourists who are accompanied by guides, whether they are fishing, big game hunting, or sight-seeing (particularly at Anan Wildlife Viewing Area). Different people perceive impacts from a sale in different ways. It is not possible to say that any given change would have a net positive or negative effect on a recreationist in the area. It depends on whom we ask. For example, a recreationist who values the addition of roads to previously inaccessible areas would see proposed road building as a definite advantage over no harvest or helicopter yarding. Conversely, a recreationist who values the appearance of an undisturbed natural setting while boating or fishing may support helicopter yarding or no harvest, and would perceive a roaded entry with visible clearcuts as a negative impact on the recreation experience.

We can break the expected changes into three major groups:

1) Scenery - How will the area look to people who are boating past? Will the harvest units dominate the landscape, or will they blend in enough to be barely noticeable to the casual observer?

2) Post sale road management strategies and recreation potential - How would the proposed management for the road systems (if any are constructed) affect potential recreational users of the area? What type of recreational activities would be favored by the different alternatives?

3) Direct effects to recreationists, tourists, and outfitters and guides - The Bradfield Canal area is heavily traveled in the summer months by local users and outfitter/guides transporting clients to the Anan Wildlife Observatory. Additionally, the Bradfield Canal is used by guides for steelhead fishing and big game hunting. How would the actual road building, logging, and presence of logging camps, barges, and log rafts along the coastline affect these users?

Issue 3: Anan Bears

"Can they close the whole area to hunting of both brown and black bears? The construction of roads will make hunting of these animals much easier ..."

". . .I want to see a guarantee that you will not try to close bear hunting in the area because of the scarcity of viewable bears at Anan..."

"We hope you will work closely with the biologists ... to avoid all denning areas ... strict enforcement of firearm and hunting restrictions ..."

"The bears at Anan will benefit from clear cutting at Canal Hoya..."

This is a recreation issue, since people who visit or make their living guiding visitors to Anan are concerned about the effects of the Canal Hoya Timber Sale on the bears that use Anan. The Anan Wildlife Viewing Area is located 1.5 miles to the west of the Canal Hoya Project Area boundary. Some 2000 - 3000 people visit Anan each year to view wildlife, especially the 30-60 black bears and 12-20 brown bears that catch salmon in Anan Creek. Many of the bears that use Anan also den or forage in the Canal Hoya project area.

While the risk to black bear populations may be minimal, it is unclear how the timber sale would affect the behavior and distribution of individual animals now frequenting Anan and therefore, the recreational opportunities available to visitors. Timber harvest on high-value habitat and increasing access with roads has the potential to impact habituated bears at Anan, which in turn affects recreation opportunities. Habituated bears may be at greater risk if encountered by hunters along new road systems or trails.

The Anan bear issue is also a wildlife issue due to a concern for bear populations in the landscape containing a high-value fish stream (Anan creek). Timber harvest on high value habitat and increasing access with roads may impact the brown bear population in the area over time. Viability of brown bears in the Tongass National Forest has been identified as a concern.

Issue 4: Wildlife Habitat and Species Conservation

"...Leave corridors so bears are able to travel from hibernating and feeding habitats..."

"...I am concerned about the impact on the wildlife dependent on this area ; salmon, bears, eagles, etc., and the impact on their habitat..."

"...Goats can be adversely affected not only by high elevation roads, but also high elevation timber harvest..."

...It will probably reduce my fur trapping income. All of the other industrial activity in the Bradfield has..."

Many wildlife species of concern depend on large tracts of old growth with interior forest conditions. Connections between these tracts of forest are a critical component in maintaining species viability.

Old growth reserves and corridors are included in the Forest Plan as a strategy for maintaining biodiversity and viable wildlife populations. The location and habitat quality of the reserves is an important issue in the design of this timber sale.

The level of interest and concern over certain species on the Tongass leads us to conduct a species-level analysis in addition to the community-based habitat analysis mentioned above. Species to consider are generally classified as Management Indicator Species, threatened, endangered, and sensitive, special concern or harvested wildlife species. There is a concern over the acreage and location of critical beach and estuary habitats. Buffers to protect riparian corridors and beach estuary habitats are specified in the Forest Plan; however, the various alternatives discussed for this project have the potential to affect high- volume low elevation habitats in different ways. Key species considered in the design of the alternatives include: brown and black bear, wolf, deer, goat, marten, and goshawk.

The location, density, and use of roads has an effect on the quality of wildlife habitat for certain species. Roads can act as a dispersal barrier to small mammals and amphibian populations. Roads in Canal and Hoya would provide interior access to game animals that currently are only reached by shore or by accessible lakes. Road access has been identified as an issue for species with viability concerns such as the marten, wolf, and brown bear.

"... I am concerned about the streams in the area of the proposed sale with their drainages in the Bradfield ..."

"...Transfer to and the storage of logs in marine waters can result in significant impacts to marine and estuarine habitats important to many species of fish, aquatic vegetation and wildlife ..."

"... Do not log on high risk soils areas ..."

"... Undue emphasis should not be placed on alleged hazard soils, Karst and other nondescript ways for timber harvest to be limited..."

"... if it must be logged, helicopter logging using alternative cutting could avoid these hazards ..."

Issue 5: Freshwater and Marine Resources

Freshwater and marine resources that may be affected by harvest, roads, log transfer facilities, and log transport are important to the pubic and various State and Federal agencies who have responsibility for water quality, wetlands, tidelands and fish and wildlife habitat.

The Project Area contains approximately 30 miles of fish-bearing streams, including 3.5 miles accessible by anadromous fish. Salmon and steelhead access into Project Area streams is limited to the lowest reaches of most of the larger streams by steep gradients and impassable bedrock falls. The upper watersheds contain a few small lakes, but most of these are isolated from resident fish populations: only one is known to contain fish. Commercial, subsistence and recreational fishing values associated with freshwater fish habitat within the Project Area are, therefore, relatively low.

Herring spawn along much of the Project Area shoreline and the Bradfield Canal is an important crab and shrimp fishery. The confluence of several large streams into relatively sheltered bays (particularly at Canal Creek) produces high quality estuaries at the mouths of both Canal and Hoya Creeks. There is a concern that debris from logging would affect marine habitats by covering the bottom and possibly eliminating some of the ocean flora. Debris in the water could affect fishing gear, and floating camps, barges and log rafts could reduce access to fishing grounds and anchorages.

The watersheds of the Project Area are dominated by steep mountain slopes and narrow valleys. Snow and debris avalanches appear to be frequent and important disturbance processes in the upper watersheds. Much of the mainstem of Hoya Creek, for example, appears to be heavily influenced by recent deposits of sediment and debris from mass failures. There is a high proportion of steep slopes in the eastern portion of the Project Area. There is concern that management induced landslides would affect streams if roads or harvest units were not properly designed or were situated on steep "high hazard" slopes. There is also concern that stream crossings and sediment from roads would affect streams, especially in steep terrain, where larger road cuts or more extreme water flows may occur.

Other Environmental Considerations

In addition to the "key issues," there are other issues that we must disclose by law, or that were brought up by the public. Although those other issues were considered in our analysis, the effects would not be significant, so we describe them briefly in this document. Those other issues include:

Forest Soils
Subsistence
Heritage Resources
Air Quality
Effects on Consumers, Civil Rights and Women
Minerals
Karst and Caves

Legislation and Executive Orders Related to This EIS

Shown below is a brief list of laws pertaining to preparation of EISs on Federal lands. Some of these laws are specific to Alaska, while others pertain to all Federal lands.

- National Historic Preservation Act of 1966 (as amended)
- Wild and Scenic Rivers Act of 1968, amended 1986
- National Environmental Policy Act (NEPA) of 1969 (as amended)
- Clean Air Act of 1970 (as amended)
- Alaska Native Claims Settlement Act (ANCSA) of 1971
- Marine Mammal Protection Act of 1972
- Endangered Species Act (ESA) of 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)
- National Forest Management Act (NFMA) of 1976 (as amended)
- Clean Water Act of 1977 (as amended)
- American Indian Religious Freedom Act of 1978
- Alaska Native Interest Lands Conservation Act (ANILCA) of 1980
- Archeological Resource Protection Act of 1980
- Cave Resource Protection Act of 1988
- Tongass Timber Reform Act (TTRA) of 1990
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 11593 (heritage)
- Executive Order 12962 (aquatic systems and recreational fisheries)

In addition, the Coastal Zone Management Act (CZMA) of 1976, as amended, pertains to the preparation of an EIS. Federal lands are not included in the definition of the coastal zone as prescribed in the CZMA. However, the Act requires that when Federal agencies conduct activities or development that affect the Coastal Zone, that agency's activities or development be consistent to the maximum extent practicable with the approved State Coastal Management Program. This determination is made by the USDA Forest Service.

The Alaska Coastal Management Plan incorporated the Alaska Forest Resources and Practices Act of 1979 as applied standards and guidelines for timber harvesting and processing. The Forest Service Standards and Guidelines and Mitigation Measures described in Chapter Two of this document are equal to or exceed State Standards.

Public Comment on the DEIS

Several changes were made in the preferred alternative (Alternative 3) as a result of public and other agency comment on the Draft Environmental Impact Statement, which was published in January 1998. Briefly, the changes included:

1) Most of Unit 35 and all of Unit 36 were dropped. This will help maintain the economic viability of possible future road construction for timber harvest in the Canal VCU. Although no roads will be constructed in the Canal VCU this entry, we will monitor the effects of the roads in the Hoya VCU to determine if our mitigation measures for wildlife habitat security are adequate to allow future roads in the Canal VCU.

2) To offset some of the volume lost by deferring harvest in units 35 and 36, we added Units 18, 23 and 33.

3) A small segment of temporary road with a temporary fish stream crossing would be added in order to access unit 23 for cable yarding.

4) A segment of Road 6960 would be moved north in all alternatives, in order to avoid an unstable crossing site on West Survey Creek and four small fish stream crossings.

5) The Hoya Log Transfer Facility site was selected and the Capsize Cove LTF site was dropped in all alternatives. The Hoya LTF site poses more risk to adjacent resident fish habitat than the Capsize Cove LTF, but the risk can be mitigated through design and erosion control measures. The Hoya LTF site is preferred because it has less impact on visuals, wildlife habitat, and anchorage; and there is less road construction needed.

Chapter 2

Alternatives

Chapter 2

Alternatives

Introduction

In this chapter we describe the process we used to develop alternatives to the Proposed Action. We describe the alternatives we studied in detail, summarize those alternatives we dropped, identify mitigation measures, and briefly compare the alternatives. We also identify a preferred alternative, which is Alternative 3 (see page 2-14 and 2-21).

Alternative Development

The proposed action is one of many possible approaches to harvesting timber in the Canal Hoya Project Area. This chapter describes three other action alternatives being considered, plus the "no action" alternative. These other alternatives were developed to address the Purpose and Need for the project; to meet Forest Plan standards & guidelines and applicable laws; and to respond to the key issues that were identified during our public involvement process. All of the alternatives were designed to address all of the key issues and desired conditions for the Project Area to some degree; however the emphasis placed on a given key issue or desired condition will vary between alternatives.

Our greatest efforts to mitigate effects to scenery, wildlife, Anan bears and water quality are in the Canal Value Comparison Unit (VCU 5210), since it is closest to Anan and is therefore most used by Anan bears and is seen by more visitors. Harvest strategies do vary by alternative to address various issues in the Hoya area (VCU 5200); however, the most extensive harvesting is done in that area in all action alternatives.

Measures Common to All Alternatives

Forest Plan Consistency

The alternatives incorporate all applicable management direction from the 1997 Forest Plan and are fully consistent with its goals, objectives, Forestwide standards and guidelines, and management area prescriptions as they apply to the project area. Interagency review and analysis of the need for additional measures was accomplished, and such measures have been incorporated as necessary.

GIS Mapping Errors

GIS mapping data for large scale planning, such as for the Forest Plan, is often not as precise as for small scale planning for projects such as the Canal Hoya Timber Sale. This sometimes results in inconsistencies between the Forest-wide mapping of boundaries for features such as VCUs and Management Prescriptions. We noted an inconsistency in the Forest Plan mapping of the boundary for the Semi-Remote Recreation Management Prescription area to the east of the Canal Hoya Project Area. The boundary should follow the boundary of VCU 5200, but varies slightly, creating a small sliver (131 acres) of Semi-Remote Recreation Management Prescription in the Hoya VCU. We will correct the mapping error in the Forest-wide database to make the Semi-Remote Recreation Management Prescription area boundary match the boundary of VCU 5200. This will change the management prescription of the sliver to Modified Landscape. We will make this change under all of the alternatives. Unit 1, which

is proposed in Alternatives 1, 3, and 4, is in the sliver of Semi-Remote Recreation Management Prescription created by the mapping error.

Best Management Practices

Best Management Practices (BMPs) are practices and operating procedures designed to protect water quality. The BMPs are the result of extensive efforts between the Forest Service and the State of Alaska to identify practices that will ensure that timber harvest activities minimize soil erosion and protect aquatic habitat. BMPs would be applied in road location, design, and construction as well as in timber harvest units. The unit and road cards (Appendix A and B) and the log transfer facility design information (Appendix D) describe site specific application of BMPs.

Storm-proofing Roads

Specified roads will be designed with oversized culverts, outfall riprap, armored dips adjacent to culverts, substantial ditch blocks, drivable waterbars, or other protective measures to prevent culvert failure or erosion of the road surfaces and ditchlines. These measures will ensure the integrity of the specified roads in the project area during periods of inactivity.

High Hazard Soils

Slopes greater than 72 percent are generally considered to have a high risk for management induced mass wasting, and are therefore avoided in harvest units proposed in all alternatives. Some units may contain short pitches greater than 72 percent if they are minor inclusions within a unit and have been determined to be stable and suitable for harvest. To comply with Forest Plan standards, a "Slope stability assessment" is completed for all units that contain areas with slopes steeper than 72 percent.

Locations of Log Transfer Facilities (LTFs) and Roads

LTF locations, when needed, would be consistent among alternatives. Since the Draft EIS, the Capsize Cove LTF site was dropped in favor of the Hoya LTF site. At Capsize Cove, concerns were raised about the impacts of LTF activity and debris on an important anchorage for commercial fishing boats, trappers and other users. There is also a sharp-shinned hawk nest that would be affected by an LTF at Capsize Cove. The Hoya LTF, east of Capsize Cove, would not interfere with anchoring vessels or raptor nests, but there are two streams near the site that would require careful design of the LTF and road. Road locations would be consistent; however, some segments may not be constructed, depending on the alternative.

Roads in the Hoya VCU

Road construction would not continue past the "pinchpoint" in the Hoya VCU. The "pinchpoint" is a narrow valley with steep slopes along Hoya Creek, about 1.5 miles from the Hoya estuary. This pinchpoint would make road construction difficult and expensive, and mitigation of impacts to the soil and water resources would be difficult (see discussion for Lower Hoya Reserve Alternative, page 2-5).

Traffic Management

We would close the roads to motorized vehicles (except for administrative use) after the sale is completed under all action alternatives. Closing roads to motorized use allows the construction of segments of roads across wetlands under a silvicultural exemption to the Clean Water Act. Road closures also mitigate some wildlife concerns; especially regarding increased vulnerability to hunting of Anan bears and mountain goats. Two gates would be installed near the beginning of each road and an administrative closure order would be written. The gates would be designed such that ATVs cannot go under them and they would be placed in locations that will be extremely difficult to get around. The first gate would be made of iron - not the usual perforated steel, so ATVs would not have the power to pull over or destroy the barricade. During harvest, the gates would be open, but only administrative use would be allowed. Following sale completion, only necessary administrative use, such as regeneration surveys, thinning and future harvests, would be allowed. Non-motorized travel would not be restricted. This strategy is consistent with the Forest Plan objective of avoiding changes to semi-primitive non-motorized settings in Modified Landscape management prescription areas, when feasible (USDA 1997a, p. 3-135).

Instream Activities
All inwater construction activities below the ordinary high water mark on the East Fork and West Fork of Survey Creek will be restricted to the period between June 1 and August 1 to protect the habitat of spawning and rearing fish.

Temporary Roads
Temporary roads would be obliterated after use by removing all drainage structures to restore natural drainage patterns, adding waterbars as needed to control runoff, and establishing vegetative cover by seeding or other methods. Red alder (Alnus rubra), an invasive species that naturally colonizes disturbed areas, and Sitka spruce are species that would be used.

Transferring Logs to Saltwater
To address the concern of logging debris interfering with commercial fishing operations in the area, we would attempt to minimize the introduction of limbs and other debris into the ocean. Therefore, helicopters would yard logs to land or barges - no logs would be dropped directly from helicopters into saltwater. We would allow logs to be bundled and placed in saltwater to create rafts for transport.

Log Transport
Sale administrators would work with the purchaser to avoid log rafts being towed through areas with shrimp pots. This responds to a concern that log transport would disrupt commercial shrimp fishing near the Project Area after October 1, during years harvest operations are being conducted.

Logging Camp and Facilities
No land-based logging camp will be authorized for this timber sale. The purchaser would most likely use a floating camp, which would be subject to State and Federal permits. If an alternative with roads is selected, there may be some minor land-based facilities, such as a repair shop for trucks and other equipment, and storage facilities for fuel/lubricant or road building explosives. These facilities would not be used as living quarters and garbage would be removed daily to prevent bear conflicts. No garbage pits or dumps will be allowed in the project area.

Heritage Resources
Archeological surveys do not indicate that any known sites would be affected by the alternatives as currently designed. If heritage resources are found prior to or during the timber sale, appropriate mitigation and protection would be designed in consultation with the Alaska State Historic Preservation Officer.

Harvest Entries
Harvesting all of the available wood during this rotation would require multiple entries. The number and timing of entries would depend on how long it takes harvested units to regenerate consistent with visual standards. In general, a rule-of-thumb used in planning timber sales is that about 25-30% of the suitable forest land can be harvested during the first entry. In this case, standards and guidelines for the Modified Landscape management prescription; desired conditions for other resources - especially Anan bears; the marginal economic value of the timber on much of the land classified as "available;" and isolated stands of available ground that cannot be reached economically, resulted in harvest units and alternatives that would harvest from 17-22% of the total available land during the first entry.

Harvest Prescriptions
Harvest prescriptions would require retaining some trees in clumps or dispersed through all or a portion of harvest units to maintain visual quality objectives and biodiversity. This strategy is consistent with the Forest Plan objective of reducing clearcutting in Modified Landscape management prescription areas, when other methods will meet land management objectives. Reserve clumps would help meet the desire to provide seed sources to eventually recolonize areas where forbs and shrubs have been shaded out by dense second growth. Reserve clumps and dispersed trees would provide a component of large trees in regenerating stands that would provide habitat for cavity nesting birds, denning bears, marten, marbled murrelets and

other species associated with large trees. Where safety permits, reserve trees would include large standing snags, as well as green trees. The reserve trees would be retained in the units throughout the rotation. Four basic harvest prescriptions would be used and are described in more detail in Appendix A:

1. Patch Cuts: clearcuts smaller than 9 acres, yarded by helicopter
2. Clearcuts With Reserves: at least 10% of the acreage left in reserve clumps
3. Partial Harvest with Diameter Limits: one or more diameter limits
4. Partial Harvest with Diameter Limits and Reserves: similar to above, but also includes reserve clumps

Old Growth Reserves

Old growth reserves would be consistent among alternatives. Small old growth reserves were identified with the intent of selecting one for each of the two Value Comparison Units (5200 and 5210). The reserves were proposed as part of the Forest Plan revision process with input from the Canal Hoya IDT. We consulted with USFWS and ADFG on the location and adequacy of the reserves during the planning process. The location of the reserve in VCU 5210 (Canal) was based primarily on important habitat for bears that use the Anan wildlife viewing area. The reserve in VCU 5200 (Hoya) includes important mountain goat and deer winter habitat, maintains corridors to other old growth blocks, and minimizes impacts to the economically harvestable timber base by locating it beyond a narrow pinchpoint (see page 2-5). The size of the reserve was selected before the criteria in the Forest Plan were finalized, so the current total size of the reserve is smaller than the 16% of the VCU specified in the Forest Plan. The current Hoya reserve does contain the necessary amount of Productive Old Growth. The area to the south of the Hoya reserve is isolated from timber harvest by the location of the reserve and would serve the same function as a portion of the reserve. We will make a non-significant amendment to the Forest Plan to increase the size of the reserve by adding the isolated area to the south, which is currently designated Timber Production management prescription, but cannot be economically accessed for timber management. This will increase the size of the Hoya Old Growth Reserve by approximately 7120 acres, of which 196 acres were classified in Forest Plan calculations as isolated, but suitable for timber production. See page 3-69 for more detail on the old growth reserves.

Helicopter Flight Restrictions

- Helicopter yarding would not be done in the Canal VCU between May 1 - June 15, to avoid disturbance to bears with cubs upon emergence from hibernation.
- Helicopter flights associated with harvest operations would be restricted within 1.5 miles of the Anan Wildlife Viewing Area from July 1 - August 31 in an effort to reduce disturbance to bears and wildlife viewers during the peak season at Anan.
- Repeated helicopter flights within 1/4 mile of eagle nest trees would be avoided from March 1 - May 31. If nests have young, we would extend the protection to August 31.
- Helicopters would be restricted from flying near sea lion haulouts and whales.
- Helicopters would maintain at least 1,000 foot vertical and horizontal distance from visible mountain goats. There would be no sightseeing of goats.

Bear Dens

- Dens found within trees in areas to be harvested would be retained.
- No activities are proposed within 100 feet of any known bear dens in any alternative. If an active den is found after the project begins, activities within 100 feet of the den would be avoided until the bear leaves of its own volition. This is to protect nursing cubs, since black bears have been reported to abandon dens and their cubs when closely approached by humans or other predators (Davis 1996).
- In specified units (Appendix A), down logs and snags (where safety permits) would be retained to provide den sites. Logs should be at least 40" in diameter and 15 feet long.
- In specified units (Appendix A), selected large trees would be cut at least 6 feet above their base (high stumping) to allow for the formation of den sites under the stumps.

Brown Bear Foraging Areas

Hoya Creek, Survey Creek and Surho Creek were identified as important brown bear foraging areas by the Alaska Department of Fish and Game. No harvesting will be done within 500 feet of the portions of those streams where salmon spawn. Two potential units were dropped from further consideration to protect these important foraging areas.

Hunting Restrictions

There were several comments requesting hunting restrictions to protect bears, which will become more vulnerable if roads are constructed for this timber sale. We prefer to let the State manage hunting through their regulations and process, and it is our understanding that the Wrangell Fish and Game Advisory Committee is proposing that the State should close hunting in the Canal Hoya area during the life of the sale, if roads are constructed. We support that effort. If the State does not close hunting, we would implement a Forest closure order during the life of the sale on bear hunting within 1/2 mile of any roads constructed in the Canal Hoya Project Area (36 CFR 261.58 (v)).

Nests

Harvest would not take place within 600 feet of an active raptor or marbled murrelet nest. Unit 25 was modified to meet this measure. If other nests are found in or near harvest units, the boundaries would be modified.

Wetlands

Because wetlands are so extensive in the project area, it is not feasible to avoid all wetland areas. However, there are no development activities planned on the more biologically significant wetlands. There would be no direct effects to the fens, estuarine wetlands, or the lake fringe wetlands. In all alternatives , roads and units were located to avoid these areas. Roads and other facilities would be constructed at least 1000' from estuaries. Tables 3-33 and 3-34 on page 3-105 display the length of road and acres of harvest proposed by alternative on the different wetland types.

Alternatives Considered, but Eliminated From Further Review

Lower Hoya Reserve Alternative

We considered an alternative that would move the location of the small old growth reserve in the Hoya VCU to the coastline. The theme of this alternative would be to emphasize bear habitat security in the Canal VCU and to increase the volume available for harvest in the Hoya VCU by putting the old growth reserve in a location where much of the acreage would already be retained due to beach, estuary and riparian buffers. Accessing the timber that would be available in upper Hoya drainage would require constructing a road beyond a narrow valley pinchpoint.

The narrow valley pinchpoint along Hoya Creek would make it difficult and expensive to construct a road beyond the point. Getting around the pinchpoint would require two 80 foot bridges (about $130,000 each) and several major drainage structures. Although feasible from an engineering standpoint, the double bridge site would impact the floodplain and side channels at the location of some of the highest value resident fish habitat in Hoya Creek. There is a risk of flood constriction and subsequent up and downstream channel erosion at this narrow site. In addition, much of the timber available above the pinchpoint is located on terrain steeper than is recommended under Forest Plan guidelines. In response to these concerns, as well as cost effectiveness, we concluded that road construction beyond the pinchpoint was not consistent with the desired conditions for the area. Keeping the old growth reserve south of the pinchpoint would therefore only affect a few units accessible by helicopter, so the alternative with a reserve in the lower portion of Hoya watershed was eliminated from detailed study.

Upper Canal Reserve Option

We considered including an option to move the old growth reserve in the Canal VCU to a location south of the powerline, adjacent to the Anan watershed (VCU 5220) in alternatives 1, 3, and 4. The theme of this option would be to promote long-term bear habitat security by avoiding road construction adjacent to the Anan watershed and in an area our telemetry study discovered bear dens. Although this option would promote long-term bear habitat security where the reserve would be located, the original reserve location, as identified in the Forest Plan, would then be selected for harvest. The original reserve location also includes known bear dens and is more sensitive in regard to visual objectives and possibly would result in more noise and disruption to visitors and bears at and near the Anan Wildlife Viewing Area. Therefore, this option was eliminated from detailed study.

Alternative with Roads Only as Far as Powerline

We considered an alternative that would have emphasized maintaining the volume of timber available for harvest, while promoting bear habitat security, soil and water quality and visual concerns over conventional logging methods. LTFs and roads would have been constructed in both VCUs, but the roads would only extend to suitable landings south of the powerline. Cable yarding would have been used in units along the main road, but the primary system would be helicopter yarding north and south of the powerline. As we developed this alternative, it became apparent that due to the terrain in the Hoya VCU, it would be necessary to have at least two roads to the powerline to allow efficient helicopter yarding, which would make it similar to Alternative 1. If only one road was constructed, the alternative would appear similar to components covered in Alternative 4. Therefore, the additional alternative did not warrant further review.

Cable Yarding Only Alternative

We considered an alternative that would only harvest units accessible by roads for cable yarding. The theme of this alternative was to emphasize logging economics by designing a sale that would not require helicopter yarding, which is assumed to reduce the benefit/cost ratio for timber harvesting. Such an alternative would greatly limit our ability to meet the desired condition of leaving varying densities of trees to create multi-structured stands, as well as the desire to manage for timber production on land that is in the available base, but not accessible by road. Therefore, this alternative was eliminated from detailed study.

Helicopter Yarding Only Alternative

We considered an alternative that would have deferred road construction and emphasized the use of partial harvest methods in units that are visible from the water or are in high value wildlife habitat. The theme of this alternative was to emphasize wildlife habitat and security, visual objectives, and water quality, while maintaining the economic viability of future harvests. All harvest activity would be north of the powerline and yarding would be done by helicopter. There would be no roads or LTF. This strategy is consistent with the Forest Plan objective of avoiding changes to semi-primitive non-motorized settings in Modified Landscape management prescription areas, when feasible. However this alternative would not meet Forest plan objectives for timber harvest in significant areas of timber production and modified landscape land use designations south of the powerline in the project area. This is because helicopter would not be allowed to fly over the powerlines due to safety and power utility concerns, thus leaving the areas south of the powerline inaccessible for timber harvest. Some of the suitable cable ground along the potential main road corridor would be deferred from harvest this entry in order to maintain the option of a viable cable harvest alternative in future entries.

The Campbell Timber Sale is an example of a timber sale that provided timber without roads or clearcuts; however, there is not a powerline in the Campbell project area. We would have had much more flexibility in our alternatives for the Canal Hoya Timber Sale if the Tyee powerline did not pass through the project area. Roads are needed because of helicopter yarding distance limits and the power line. Economically a helicopter can only travel 1 mile to yard timber and may not cross the power line while yarding timber (due to the risk of falling debris striking the powerline). Without roads the majority of the suitable timber would be isolated and very expensive to harvest. Some system would have to be devised in which

timber south of the powerline was yarded to a landing adjacent to the powerline, transferred on the ground to a landing north of the powerline and then transferred by helicopter to a barge. This would be very expensive and would probably make future harvest south of the powerline uneconomical.

A helicopter only option is available to the decision maker by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). Although this option was not included as a separate alternative, the decision maker will consider it when selecting an alternative to implement. The following information was used as a basis for comparing the helicopter only option with the rest of the alternatives:

Eliminating the road from Alternative 4 would result in an expected timber harvest of approximately 8 MMBF from 450 acres (12% of the available acres). The harvest units would be the same as those shown for Alternative 4, except Units 4, 5 and 8 would be dropped due to the powerline and Units 9 and 10 would have partial harvest with diameter limits, rather than clearcuts with reserves. The mid-market net stumpage estimation would be a negative $109/MBF and approximately 31 direct jobs would be produced. Basically, the helicopter yarding costs were increased by 15% to account for longer yarding distances and the barge leasing costs were approximately tripled (on a per mbf basis) because of the additional volume flown to barges.

If Alternative 4 was implemented without road construction and additional units were not added to make up for lost volume, effects on Visuals would actually be reduced from the Hoya Viewpoint. Although Alternative 4 (with roads) already has the least impacts to visuals from this viewpoint, the effects would be further reduced with the elimination of roads and the LTF. The "helicopter only" option would exceed the Modification VQO, and would likely meet Partial Retention. Effects on Recreation Potential would also be reduced. Roads are the single most important factor when examining change to the recreation character of an area. With the elimination of the road in the Hoya VCU, the recreation potential of the entire study area would be largely unchanged. Effects to recreationists and outfitter/guides using the Bradfield Canal would be reduced. Helicopter yarding would remain to be a factor that may impact the visitors' perception of the setting they are visiting during the life of the sale. However, once the sale activity is finished, the setting will remain essentially the same as before the sale, with minimal visual impacts.

Species that would benefit the most from a no-road option include: brown bear, black bear, mountain goat, marten, deer and wolves. Based on the current Habitat Capability Models for brown bear, black bear and mountain goat , habitat within 1-2 miles of any road (even a closed road) will be reduced in quality from high to moderate. It is believed that animals within this road buffer are more vulnerable to human-induced mortality and/or may be actively avoiding the area due to human presence.

Under a no-road option, 6% of all high value black bear habitat within the project area would be reduced in quality to moderate versus 26% for Alternative 4. High value brown bear habitat does not fall within the road disturbance buffer for Alternative 4; however, brown bears are also expected to benefit from a no-road option (see Impacts of Roads and Disturbances on Bears, page 3-51). Three acres of potential brown bear denning habitat would be removed under the Alternative 4 - no road option as compared to 80 acres in Alternative 4. A similar pattern is seen when considering a larger study area and the impacts of past harvesting activities on bear habitat (see Cumulative Effects discussion). A no-road option would have no measurable impact on mountain goat winter range whereas Alternative 4 roads reduce goat winter range quality by providing access (see Table S-1).

Effects on freshwater and marine resources would be reduced, because there would be no roads or LTFs, and therefore no stream crossings or drainage structures. Since the total harvest would be reduced, harvest in watersheds with the most sensitive fish habitat would also be lower than the other alternatives. The volume that would be flown to barges would be higher than for any other alternative.

Alternatives Considered in Detail

Alternative 1, Proposed Action

The theme of this alternative is to emphasize timber volume and harvest economics in the **Hoya** VCU and balance bear habitat security, visual concerns, water quality, and timber production in the **Canal** VCU. In the Hoya VCU, an LTF and roads would be constructed to allow cable yarding, which is assumed to be the least costly yarding method, in as many units as practical, while still meeting standards and guidelines and desired conditions for other resources. Other units in the Hoya VCU would be harvested using helicopter yarding to provide additional volume.

In the Canal VCU, resource concerns would be addressed by minimizing road construction and retaining higher percentages of trees than are retained in units in the Hoya VCU. A road would extend from an LTF to a suitable landing about 0.25 miles south of the powerline and yarding would be done by helicopter from all units that are not accessed by the main road. Only units on ground that could not be accessed by cable yarding in future entries were selected for helicopter yarding in the Canal VCU. This would maintain the economic viability of extending the road in the future. This document does not determine future actions, but does allow for the possibility of a road if monitoring after this entry showed the effects on Anan bears was minimal.

This alternative would allow adaptive management by providing time to determine if road management ideas are effective in mitigating concerns for wildlife habitat security, before extending the road system in the Canal VCU. Monitoring described in Appendix C would also allow adaptive management of harvest prescriptions in future entries.

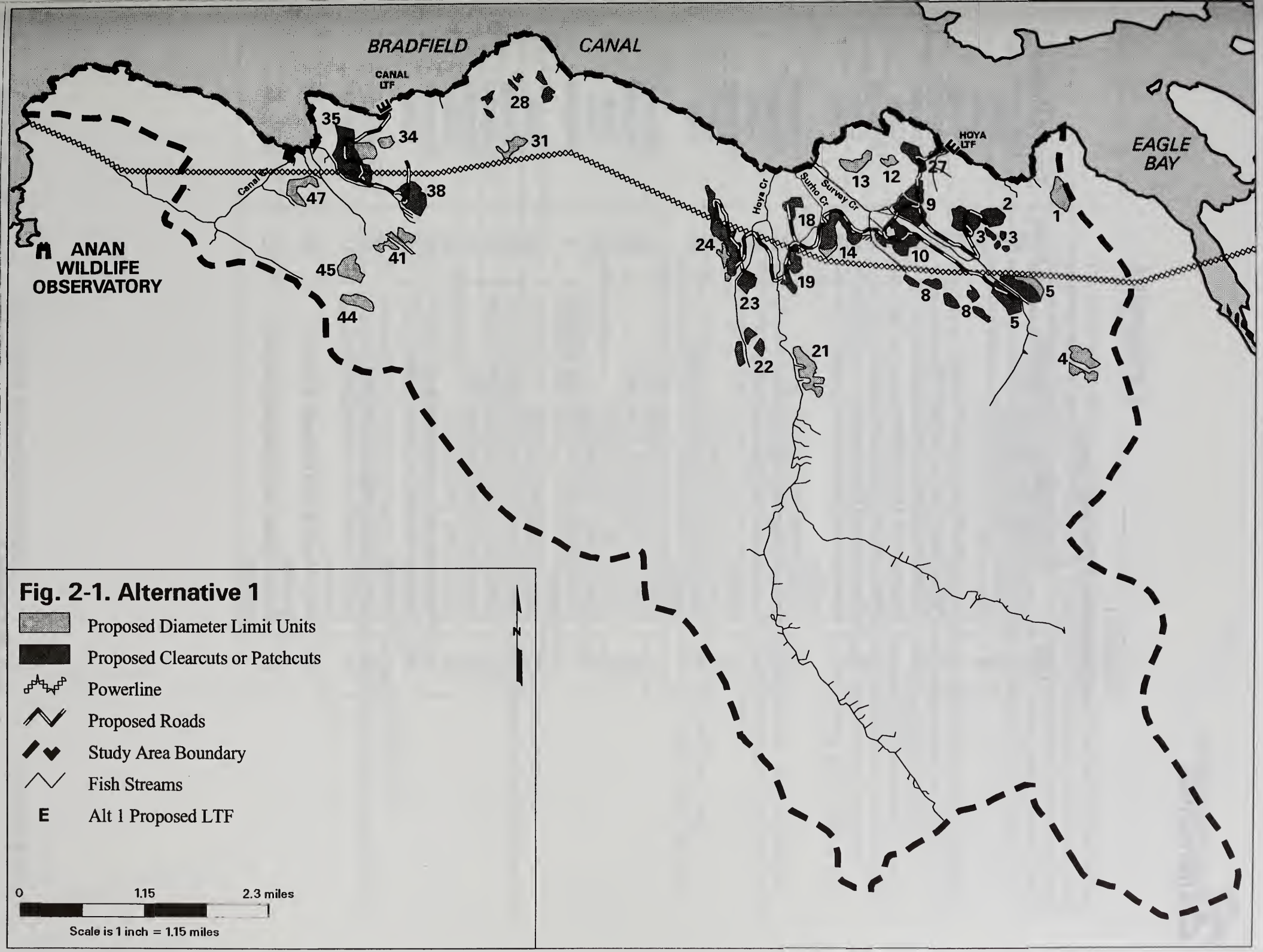
About 9 miles of specified road and 2 miles of temporary road would be needed. About 16 MMBF would be harvested on 780 acres. This would entail harvesting approximately 21% of the available forest land in the first entry. Table 2-1 and Figure 2-1 display the specific activities for this alternative.

HOYA VCU:

- Emphasis is on timber volume and harvest economics.
- Primarily cable yarding, with some helicopter yarding.
- Areas suitable for cable yarding, but not accessed by the road, would be deferred for future entries.
- A road system would be constructed from an LTF to access cable ground.
- Harvest prescriptions would be primarily clearcut-with-reserves and some diameter limit and patch cut units.

CANAL VCU:

- Emphasis is on balancing bear habitat security, visual concerns, water quality, and timber production.
- Primarily helicopter yarding, with some cable yarding.
- A road would be constructed from an LTF to a landing about 0.25 miles south of the powerline.
- A mix of harvest prescriptions would be used, with diameter limit being the primary prescription near the Anan watershed.


BRADFIELD CANAL
CANAL LTF
HOYA LTF
EAGLE BAY
ANAN WILDLIFE OBSERVATORY
Canal
Hoya Cr
Surrey Cr
Slurho Cr
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31
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Fig. 2-1. Alternative 1
Proposed Diameter Limit Units
Proposed Clearcuts or Patchcuts
Powerline
Proposed Roads
Study Area Boundary
Fish Streams
E Alt 1 Proposed LTF
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

Table 2-1
Alternative 1 Harvest Units

Unit	Silvicultural Harvest Method	Acres	Yarding Method
1	Partial harvest with diameter limit	22	Helicopter
2	Clearcut with 25% reserves	18	Cable
3	Clearcut with 10% reserves Patch cuts less than 8 acres each	30 10	Cable Helicopter
4	Partial harvest with diameter limit	32	Helicopter
5	Partial harvest with diameter limit Clearcut with 10% reserves	12 51	Helicopter Cable
8	Patch cuts less than 8 acres each	32	Helicopter
9	Clearcut with 10% reserves	41	Cable
10	Clearcut with 10% reserves, feather backline	38	Cable
12	Partial harvest with diameter limit	6	Helicopter
13	Partial harvest with diameter limit	18	Helicopter
14	Clearcut with 10% reserves, feather backline	39 5	Cable Helicopter
18	Clearcut with 10% reserves	13	Cable
19	Clearcut with 10% reserves, feather backline	25	Cable
21	Partial harvest with diameter limit	34	Helicopter
22	Patch cuts less than 8 acres each	20	Helicopter
23	Clearcut with 10% reserves	13	Cable
24	Clearcut with 10% reserves Partial harvest with diameter limit in upper portion	51 9	Cable Helicopter
27	Clearcut with 10% reserves	18	Cable
28	Patch cuts less than 8 acres each	21	Helicopter
31	Partial harvest with diameter limit	14	Helicopter
34	Partial harvest with diameter limit	8	Helicopter
35	Clearcut with 10% reserves Partial harvest with diameter limit	65 16	Cable Helicopter
38	Clearcut with 30% reserves, feather backline	33	Cable
41	Partial harvest with diameter limit	22	Helicopter
44	Partial harvest with diameter limit and reserves	17	Helicopter
45	Partial harvest with diameter limit and reserves	25	Helicopter
47	Partial harvest with diameter limit and reserves	23	Helicopter

Alternative 2

The theme of this alternative is to emphasize timber volume, infrastructure development and long-term harvest economics throughout the Project Area. This alternative requires the most road construction - about 11 miles of specified and 3 miles of temporary road - to reach most of the areas accessible by cable yarding systems. Helicopter yarding would be used to access additional timber volume where economically feasible. Helicopter yarding would also be used to feather backlines of some units.

Desired conditions for other resources would be promoted where compatible with the theme of this alternative. For instance, trees are retained in all units to maintain structural diversity in the regenerating stand, provide wildlife habitat and meet visual quality objectives. However, the amount of retention in this alternative is generally less than would be retained in the same units in other alternatives. Some unit sizes and shapes were adjusted to maintain wildlife dispersal corridors, protect important habitat and enhance visuals. Most unit boundaries are based on the suitability of the terrain for cable yarding and the quality of the timber.

This alternative would be the least conducive to adaptive management, since the complete road system would be built during the first entry. Monitoring described in Appendix C would allow adaptive management of harvest prescriptions in future entries.

About 17 MMBF would be harvested on 800 acres. This would entail harvesting approximately 22% of the available forest land in the first entry. Table 2-2 and Figure 2-2 display the specific activities for this alternative.

HOYA VCU:

- Emphasis is on timber volume and harvest economics.
- Primarily cable yarding, with some helicopter yarding.
- A road system would be constructed from an LTF to access cable ground.
- Harvest prescriptions would be primarily clearcut-with-reserves and some diameter limit and patch cuts.

CANAL VCU:

- Emphasis is on timber volume and harvest economics.
- Primarily cable yarding, with some helicopter yarding.
- A road system would be constructed from an LTF to access cable ground.
- Harvest prescriptions would be primarily clearcut-with-reserves and some diameter limit and patch cut units.

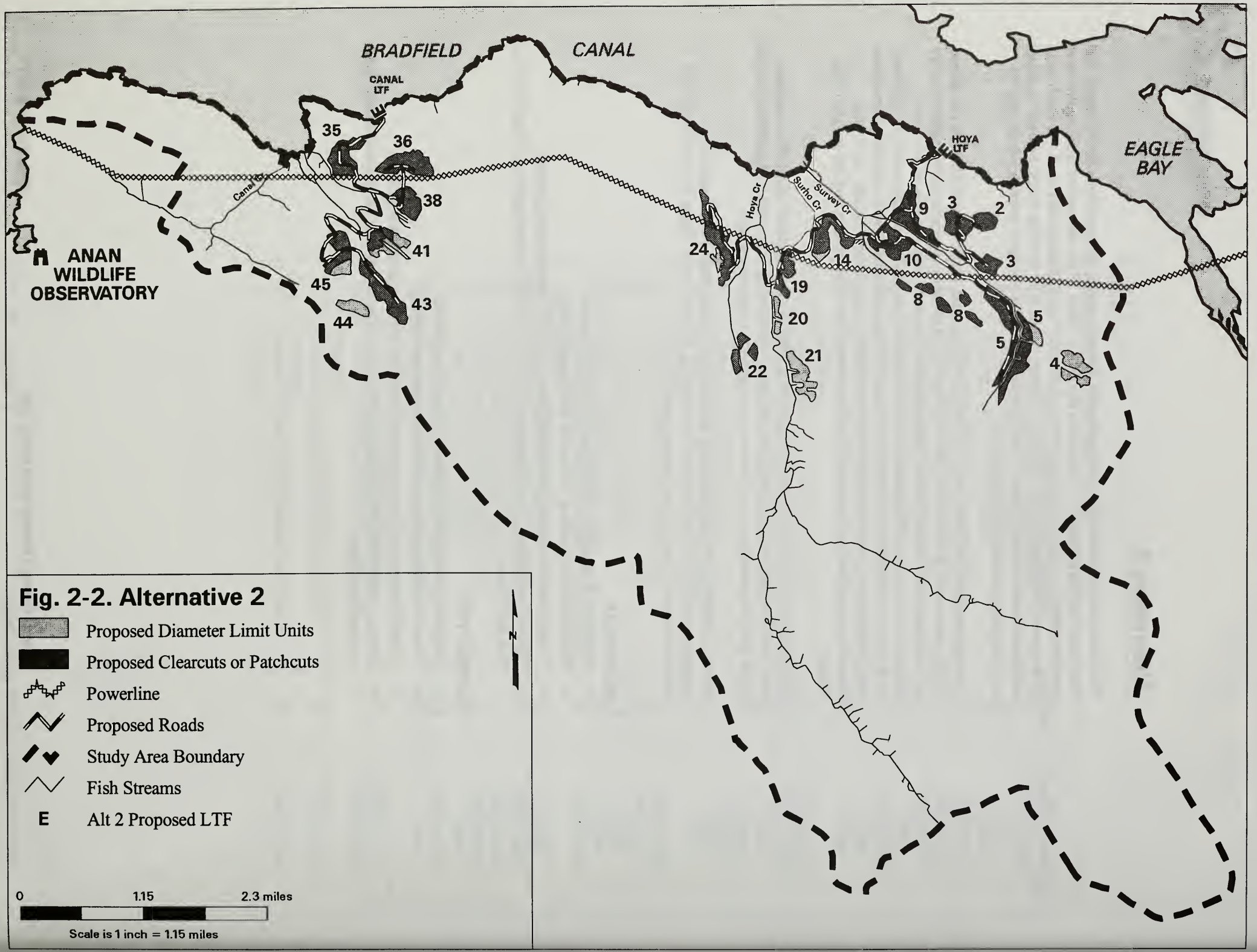
BRADFIELD CANAL
CANAL LTF
HOYA LTF
EAGLE BAY
ANAN WILDLIFE OBSERVATORY
Canal Cr
Hoya Cr
Surtho Cr
Survey Cr
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Fig. 2-2. Alternative 2
Proposed Diameter Limit Units
Proposed Clearcuts or Patchcuts
Powerline
Proposed Roads
Study Area Boundary
Fish Streams
E Alt 2 Proposed LTF
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

Table 2-2
Alternative 2 Harvest Units

Unit	Silvicultural Harvest Method	Acres	Yarding Method
2	Clearcut with 25% reserves	18	Cable
3	Clearcut with 10% reserves	48	Cable
4	Partial harvest with diameter limit	32	Helicopter
5	Clearcut with 20% reserves Partial harvest with diameter limit	86 10	Cable Helicopter
8	Patch cuts less than 8 acres each	32	Helicopter
9	Clearcut with 30% reserves	49	Cable
10	Clearcut with 10% reserves, feather backline	38	Cable
14	Clearcut with 10% reserves Partial harvest with diameter limit	39 5	Cable Helicopter
19	Clearcut with 10% reserves, feather backline	25	Cable
20	Partial harvest with diameter limit	10	Helicopter
21	Partial harvest with diameter limit	34	Helicopter
22	Patch cuts less than 8 acres each	20	Helicopter
24	Clearcut with 10% reserves Partial harvest with diameter limit	51 9	Cable Helicopter
35	Clearcut with 10% reserves	47	Cable
36	Clearcut with 10% reserves Partial harvest with diameter limit to feather backline	52	Cable
38	Clearcut with 10% reserves Partial harvest with diameter limit to feather backline	33	Cable
41	Clearcut with 10% reserves Partial harvest with diameter limit	18 22	Cable Helicopter
43	Clearcut with 20% reserves Partial harvest with diameter limit to feather backline	58	Cable Helicopter
44	Partial harvest with diameter limit and reserves	17	Helicopter
45	Clearcut with 15% reserves Partial harvest with diameter limit	33 12	Cable Helicopter

Alternative 3

The theme of this alternative is to emphasize Anan bear habitat security, water quality, and visual concerns in the **Canal** VCU and to emphasize timber volume and harvest economics in the **Hoya** VCU. This alternative is similar to Alternative 2 in the Hoya VCU, since roads and most harvest units would be the same. A few more helicopter yarding units were included in the Hoya VCU in this alternative to balance the reduction in units in the Canal VCU, compared to other alternatives. About 7 miles of specified road and 2 miles of temporary road would be needed in VCU 5200 (Hoya).

No roads would be constructed in the Canal VCU. Helicopter yarding would be used to harvest timber north of the powerline in VCU 5210 (Canal). Helicopter yarding allows more flexibility in harvest prescriptions, so diameter limit and patch cut prescriptions would be used to reduce visual impacts and to maintain a component of large trees in the future stand, which would benefit wildlife. Future harvest in the Canal VCU could use cable and/or helicopter yarding south of the powerline. Suitable cable ground along the potential main road corridor in the Canal VCU would be deferred from harvest this entry in order to maintain the option of a viable cable harvest alternative in future entries.

This alternative would allow adaptive management by providing time to determine if road management ideas are effective in mitigating concerns for wildlife habitat security in the Hoya VCU before constructing a road system in the Canal VCU. Monitoring described in Appendix C would also allow adaptive management of harvest prescriptions in future entries.

About 14 MMBF would be harvested on 660 acres. This would entail harvesting approximately 18% of the available forest land in the first entry. Table 2-3 and Figure 2-3 display the specific activities for this alternative.

HOYA DRAINAGE:

- Emphasis is on timber volume and harvest economics.
- Primarily cable yarding, with some helicopter yarding.
- Most units would be the same as in Alternative 2, with some additional helicopter units.
- A road system would be constructed from an LTF to access cable ground.
- Harvest prescriptions would be primarily clearcut-with-reserves and some diameter limit and patch cut units.

CANAL DRAINAGE:

- Emphasis is on bear habitat security, water quality, and visual concerns.
- Harvest would take place by helicopter yarding only north of the powerline.
- No roads or LTF would be constructed in this VCU.
- Harvest prescriptions would be primarily diameter limit and patch cut.

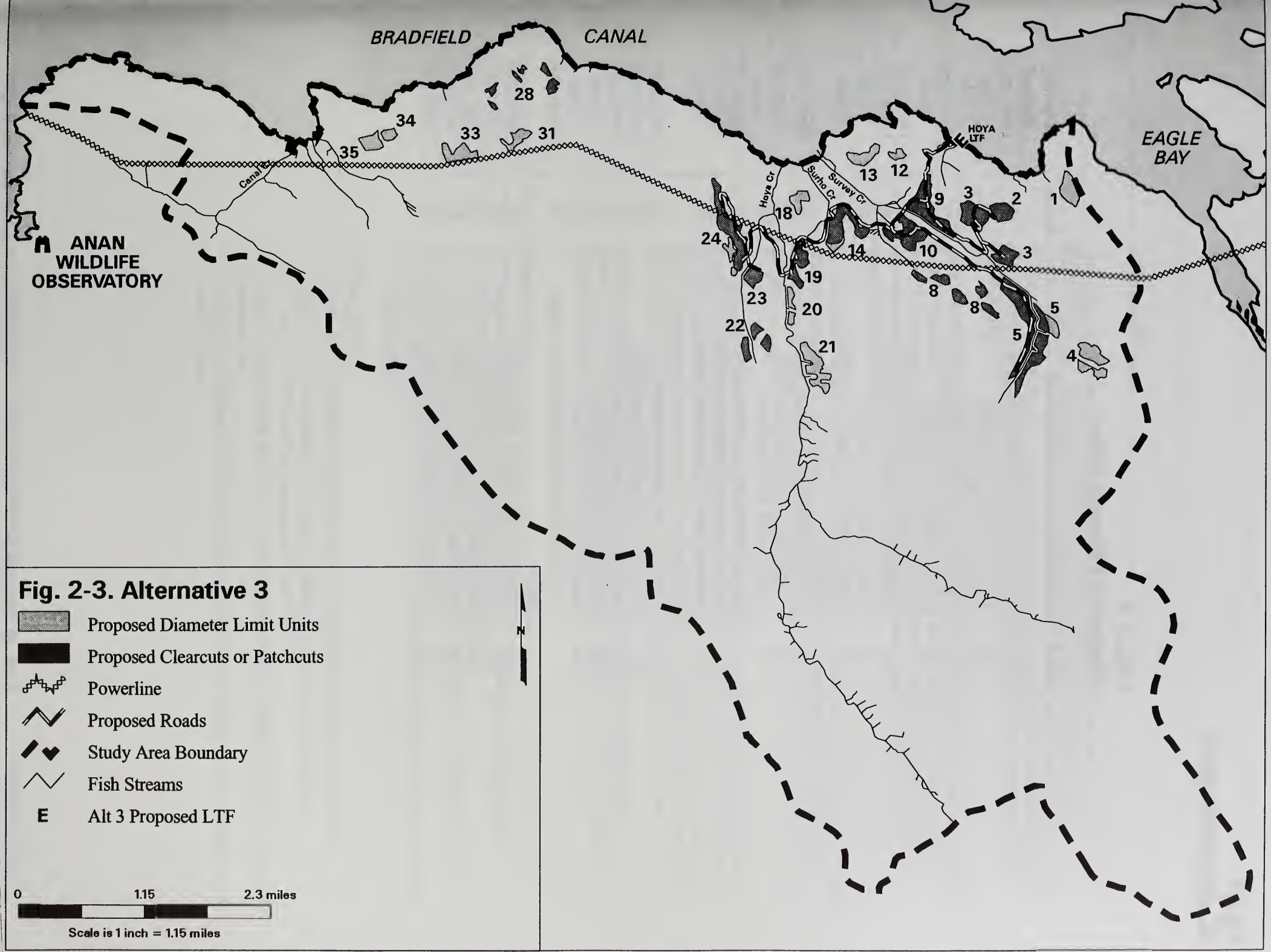


Fig. 2-3. Alternative 3

- Proposed Diameter Limit Units
- Proposed Clearcuts or Patchcuts
- Powerline
- Proposed Roads
- Study Area Boundary
- Fish Streams
- E — Alt 3 Proposed LTF

Table 2-3
Alternative 3 Harvest Units

Unit	Silvicultural Harvest Method	Acres	Yarding Method
1	Partial harvest with diameter limit	22	Helicopter
2	Clearcut with 25% reserves	18	Cable
3	Clearcut with 10% reserves	48	Cable
4	Partial harvest with diameter limit	32	Helicopter
5	Clearcut with 20% reserves Partial harvest with diameter limit	86 10	Cable Helicopter
8	Patch cuts less than 8 acres each	32	Helicopter
9	Clearcut with 30% reserves	49	Cable
10	Clearcut with 10% reserves, feather backline	38	Cable
12	Partial harvest with diameter limit	6	Helicopter
13	Partial harvest with diameter limit	18	Helicopter
14	Clearcut with 10% reserves Partial harvest with diameter limit	39 5	Cable Helicopter
18	Partial harvest with diameter limit	13	Helicopter
19	Clearcut with 10% reserves, feather backline	25	Cable
20	Partial harvest with diameter limit	10	Helicopter
21	Partial harvest with diameter limit	34	Helicopter
22	Patch cuts less than 8 acres each	20	Helicopter
23	Clearcut with 10% reserves	13	Cable
24	Clearcut with 10% reserves Partial harvest with diameter limit in upper portion	51 9	Cable Helicopter
28	Patch cuts less than 8 acres each	21	Helicopter
31	Partial harvest with diameter limit	14	Helicopter
33	Partial harvest with diameter limit	22	Helicopter
34	Partial harvest with diameter limit	8	Helicopter
35	Partial harvest with diameter limit	15	Helicopter

Alternative 4

The theme of this alternative is to emphasize wildlife habitat and security, visual objectives, and water quality. The theme would be met by minimizing road construction and emphasizing the use of partial harvest methods in units that are visible from the water or are in high value wildlife habitat. Due to the heavy harvest proposed in the seen area, retention within units is generally higher than that proposed in other alternatives, in order to reduce visual impacts.

All harvest activity in the Canal VCU would be north of the powerline and yarding would be done by helicopter. There would be no roads or LTF in the Canal VCU. Some of the suitable cable ground along the potential main road corridor in the Canal VCU would be deferred from harvest this entry in order to maintain the option of a viable cable harvest alternative in future entries.

In the Hoya drainage, a road would extend from an LTF to a suitable landing about 0.25 miles south of the powerline and yarding would be done by helicopter for all units that are not accessed by the main road. About 3 miles of specified road would be needed in VCU 5200 (Hoya).

This alternative would be the most conducive to adaptive management by providing time to determine if road management ideas are effective in mitigating concerns for wildlife habitat security, and water quality in the Hoya VCU before constructing a road system in the Canal VCU or extending the road system in the Hoya VCU. Monitoring described in Appendix C would also allow adaptive management of harvest prescriptions in future entries.

About 12 MMBF would be harvested on 610 acres. This would entail harvesting approximately 17% of the available forest land in the first entry. Table 2-4 and Figure 2-4 display the specific activities for this alternative.

HOYA VCU:

- Emphasis is on wildlife habitat and security, visual objectives, and water quality.
- Primarily helicopter yarding, with some cable yarding.
- A road would be constructed from an LTF to a sort yard about 0.25 miles south of the powerline.
- Harvest prescriptions would be primarily diameter limit to maintain visual objectives and wildlife habitat.

CANAL VCU:

- Emphasis is on wildlife habitat and security, visual objectives, and water quality.
- Harvest would take place by helicopter yarding only north of the powerline.
- No roads or LTF would be constructed in this VCU.
- Some available timber along main road corridors would be deferred this entry to maintain future options.
- Harvest prescriptions would be primarily diameter limit to maintain visual objectives and wildlife habitat.

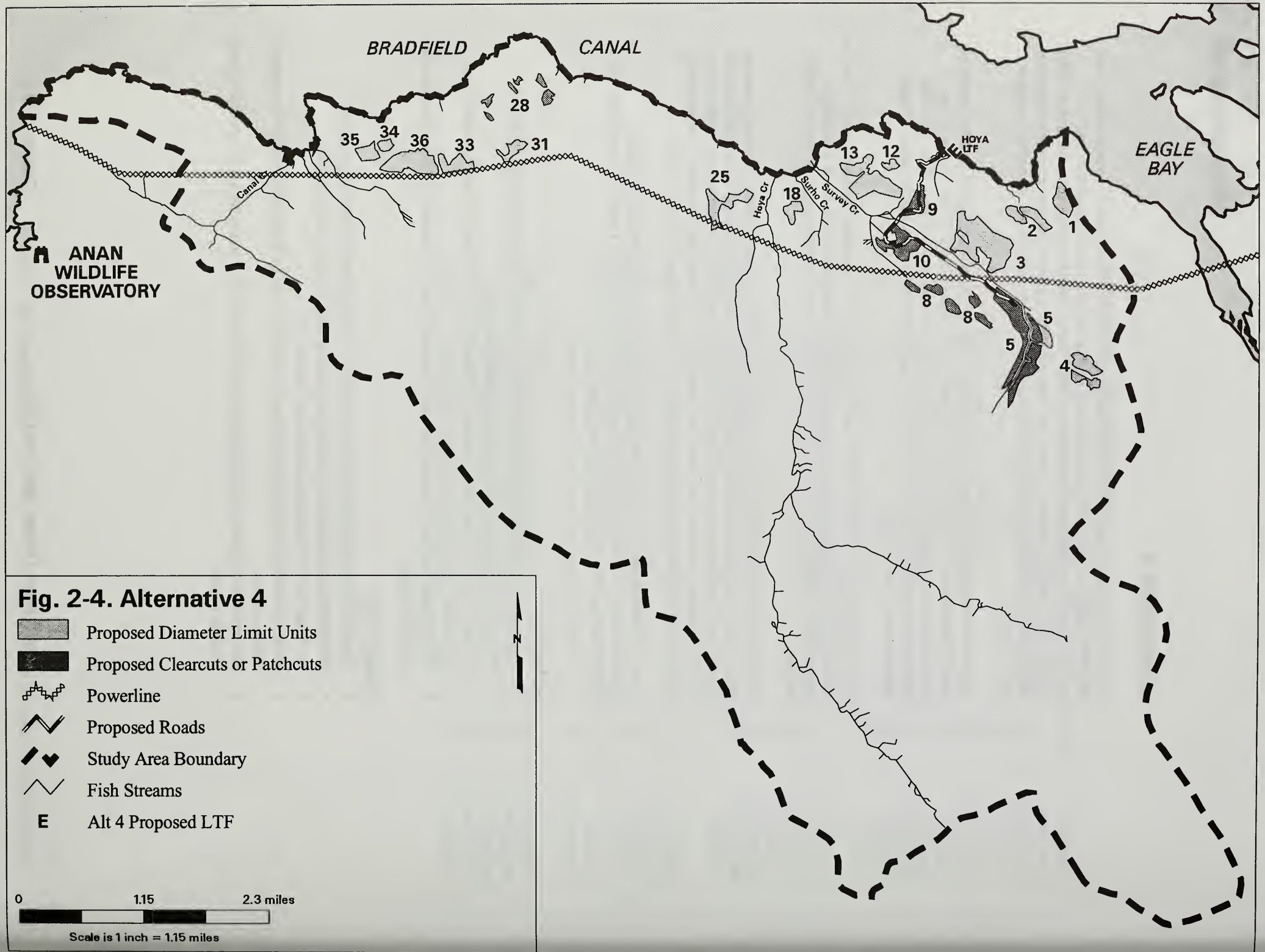


Fig. 2-4. Alternative 4

- Proposed Diameter Limit Units
- Proposed Clearcuts or Patchcuts
- Powerline
- Proposed Roads
- Study Area Boundary
- Fish Streams
- E Alt 4 Proposed LTF

Table 2-4
Alternative 4 Harvest Units

Unit	Silvicultural Harvest Method	Acres	Yarding Method
1	Partial harvest with diameter limit	22	Helicopter
2	Partial harvest with diameter limit	26	Helicopter
3	Partial harvest with diameter limit	98	Helicopter
4	Partial harvest with diameter limit	32	Helicopter
5	Clearcut with 20% reserves Partial harvest with diameter limit	95	Helicopter
8	Patch cuts less than 8 acres each	32	Helicopter
9	Clearcut with 30% reserves	20	Cable
10	Clearcut with 20% reserves	38	Cable
12	Partial harvest with diameter limit	6	Helicopter
13	Partial harvest with diameter limit	63	Helicopter
18	Partial harvest with diameter limit	13	Helicopter
25	Partial harvest with diameter limit	32	Helicopter
28	Patch cuts less than 8 acres each	21	Helicopter
31	Partial harvest with diameter limit	14	Helicopter
33	Partial harvest with diameter limit	22	Helicopter
34	Partial harvest with diameter limit	8	Helicopter
35	Partial harvest with diameter limit	15	Helicopter
36	Partial harvest with diameter limit	52	Helicopter

Alternative 5, No Action

This alternative measures the effects of having no timber sale or road construction in the Canal Hoya Project Area. This alternative is provided so you can see the changes that the other alternatives have on the social, physical and biological environment. This alternative is most responsive to scenic and tourism values, Anan bears, wildlife habitat and species conservation, freshwater and marine resources, by deferring harvest. It would not contribute to local employment or harvest economics. The existing condition would continue to be influenced by natural disturbance processes.

Alternative Comparison

Table 2-5 compares treatment acres, predicted harvest volume and environmental impacts for each of the action alternatives. It is important to note that differences in harvest prescriptions would result in different harvest volumes per acre. The environmental impacts are discussed in detail in Chapter 3.

Table 2-5

Alternative Comparison Table

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5 No Action
Total Acres Classified as Available for Harvest	3670	3670	3670	3670	3670
Proposed Treatment Acres	**780**	**800**	**660**	**610**	
Canal Creek VCU	230	290	70	120	0
Hoya Creek VCU	550	510	590	489	0
Harvest by Volume Strata (acres)					
Low Volume (2120 acres existing)	85	40	75	110	0
Medium Volume (5800 acres existing)	415	395	320	290	0
High Volume (4500 acres existing)	280	365	265	210	0
% of Available Treated	21%	22%	18%	17%	0
Total Volume (MMBF)	**16**	**17**	**14**	**12**	0
Cable Yarded	8.2	11.5	7.2	1.3	0
Helicopter Yarded	7.3	4.9	6.4	10.8	0
ROW Volume	.5	.7	.4	.2	0
Net Stumpage ($/MBF)					
Including Specified Road Costs	-$135	-$139	-$130	-$110	0
Excluding Specified Road Costs	$3	$23	$2	$-44	0
Number of Direct Jobs Produced During Life of Sale	60	64	52	46	0
Specified Road (miles)	8.5	11.3	7.3	2.6	0
Temporary Road	1.6	2.8	1.7	0	0
Total Road Miles	**10.1**	**14.1**	**9**	**2.6**	0
Log Transfer Sites	2	2	1	1	0
Visibility From Blake Island		most	least		
From Mouth of Canal Creek		most	least		
From Mouth of Hoya Creek	most			least	
Harvest by Visual Management Class (acres)					
Visual Management Class 2	305	350	250	190	0
Visual Management Class 3	365	300	300	345	0
Visual Management Class 4	110	150	110	75	0
Duration of Operations (years)	3-5	3-5	3-4	2-3	0
Brown Bear Denning Habitat Harvested (1985 acres existing)	73	134	89	80	0
% of Anan Bear Locations Within 1 Mile of Proposed Roads	12%	13%	6%	2%	0
% of Highly Suitable Habitat in Project Area Reduced in Quality for					
Black Bear	56	60	40	26	0
Brown Bear	4	3	3	2	0
Mountain Goat	3	55	54	3	0
Deer (Medium Suitable Habitat Reduced in Quality)	18	16	15	6	0
Marten	9	10	8	6	0
Goshawk	5	6	6	5	0
Project Area Habitat Capability as a % of Current Condition					
Black Bear	84	81	87	91	100
Brown Bear	92	90	94	96	100
Mountain Goat	91	87	89	95	100
Deer	92	92	94	95	100
Marten	95	95	95	96	100
Drainage Structures on Fish Streams	8	8	6	2	0
Harvest in Watersheds with the Most Fish Habitat (acres)					
Canal (4.1 miles of fish stream)	60	65	0	0	0
Hoya (18.9 miles of fish stream)	140	135	150	5	0
Survey (5.8 miles of fish stream)	275	305	325	385	0
% Watershed Harvest in Most Sensitive Watersheds					
Hoya	1%	1%	1%	0	0
Survey	7%	8%	8%	10%	0
Road Miles in Watersheds with the Most Fish Habitat					
Canal	0	1.0	0	0	0
Hoya	2.2	2.0	2.2	0	0
Survey	4.2	5.2	5.2	2.0	0
Volume Through LTFs (MMBF)	15	17	12	8	0
Volume to Barge (MMBF)	1	0	2	4	0

Preferred Alternative

The **Preferred Alternative** designated in the Draft Environmental Impact Statement is Alternative 3. Several changes were made to this alternative between the Draft and Final EIS in response to public and other agency comments:

- Most of Unit 35 and all of Unit 36 were dropped. This will help maintain the economic viability of possible future road construction for timber harvest in the Canal VCU. Although no roads will be constructed in the Canal VCU this entry, we will monitor the effects of the roads in the Hoya VCU to determine if our mitigation measures for wildlife habitat security are adequate to allow future roads in the Canal VCU.
- To offset some of the volume lost by deferring harvest in units 35 and 36, we added Units 18, 23 and 33. Units 18 and 33 will be partial harvests with helicopter yarding, with the same prescription as shown in Alternative 4. Unit 23 will be clearcut with reserves and cable yarded.
- A small segment of temporary road with a small fish stream crossing would be added in order to access unit 23 for cable yarding.
- A segment of Road 6960 would be moved north in all alternatives, in order to avoid an unstable crossing site on West Survey Creek and four small fish stream crossings.
- The Hoya Log Transfer Facility site was selected and the Capsize Cove LTF site was dropped in all alternatives. The Hoya LTF site poses more risk to adjacent resident fish habitat than the Capsize Cove LTF, but the risk can be mitigated through design and erosion control measures. The Hoya LTF site is preferred because it has less impact on visuals, wildlife habitat, and anchorage; and there is less road construction needed.

We feel that Alternative 3 is the best possible alternative because:

- It addresses the issue of vulnerability of Anan bears by not building a road in the Canal VCU for this entry.
- Effects of this Alternative would be less noticeable from the Eastern Passage Travel Route near Blake Island than those of alternatives requiring road construction in the Canal VCU.
- The desired condition for scenic values of Partial Retention from the Eastern Passage Travel Route would be met in the Canal VCU.
- This alternative allows a high potential for adaptive management by allowing us to monitor the impacts of road construction and use in the Hoya VCU, before deciding whether to construct roads in the Canal VCU in the next entry.
- Although Alternative 4 addresses the above points to a greater extent, Alternative 3 balances those issues with timber volume and associated jobs better than Alternative 4.

This EIS is not a decision document. The primary purpose of this EIS is to inform the decision maker about our analysis and public comments about this project. The decision is made by the Assistant Forest Supervisor and documented in a Record of Decision. Specific rationale for the decision will be included in the Record of Decision and in responses to public comments.

Chapter 3

Affected Environment and Environmental Effects

Chapter 3

Affected Environment and Environmental Effects

Introduction

In this chapter, we describe the environment that would potentially be modified by this project (affected environment), and the effects of the five alternatives on the environment (environmental effects). This chapter is divided into two main sections:

Effects on the Key Issues - In this section, we will describe the effects of each alternative on the five key issues.

Other Environmental Considerations - In this section we discuss some of the other environmental considerations required by various laws.

Effects on the Key Issues

The Council on Environmental Quality (CEQ) issues guidance to Federal Agencies to determine the significant issues concerning any proposal, and to eliminate those issues that are not significant. With the help of the public and other agencies, we identified five issues that were significant enough to be examined in detail, given the nature of the proposed action. In this section, we describe the environmental effects associated with these five issues.

3 Environment and Effects

Issue One: Timber Supply and Economics

This project has the potential to affect employment and the economy of local communities, which was brought up as an issue during public scoping. Public comments indicated concern about current changes in the timber industry, particularly regarding the pulp products from this sale and questions about the need for the sale given the recent mill closures. The terrain and quality of timber in the project area may make it difficult to design a timber sale that would be advertised above base rates, so the economic viability of a sale is also an issue. The amount of wood harvested, the location of old growth reserves and any infrastructure developed with this entry may affect availability and costs associated with future entries for timber harvest.

Timber Supply

Timber Supply is Based on the Existing Project Area Land Classification

Figures 3-1 and 3-2 show the classifications of land within the project area . After various types of exclusions, there are 3,670 acres of land available for harvest. This is less than 1/3 of the total Productive Forest Land (Volume > 8,000 bf, Figure 3-3). The numbers in Figure 3-1 were derived from Geographic Information System data bases which were modified by field reconnaissance and stand exams to better reflect existing ground conditions.

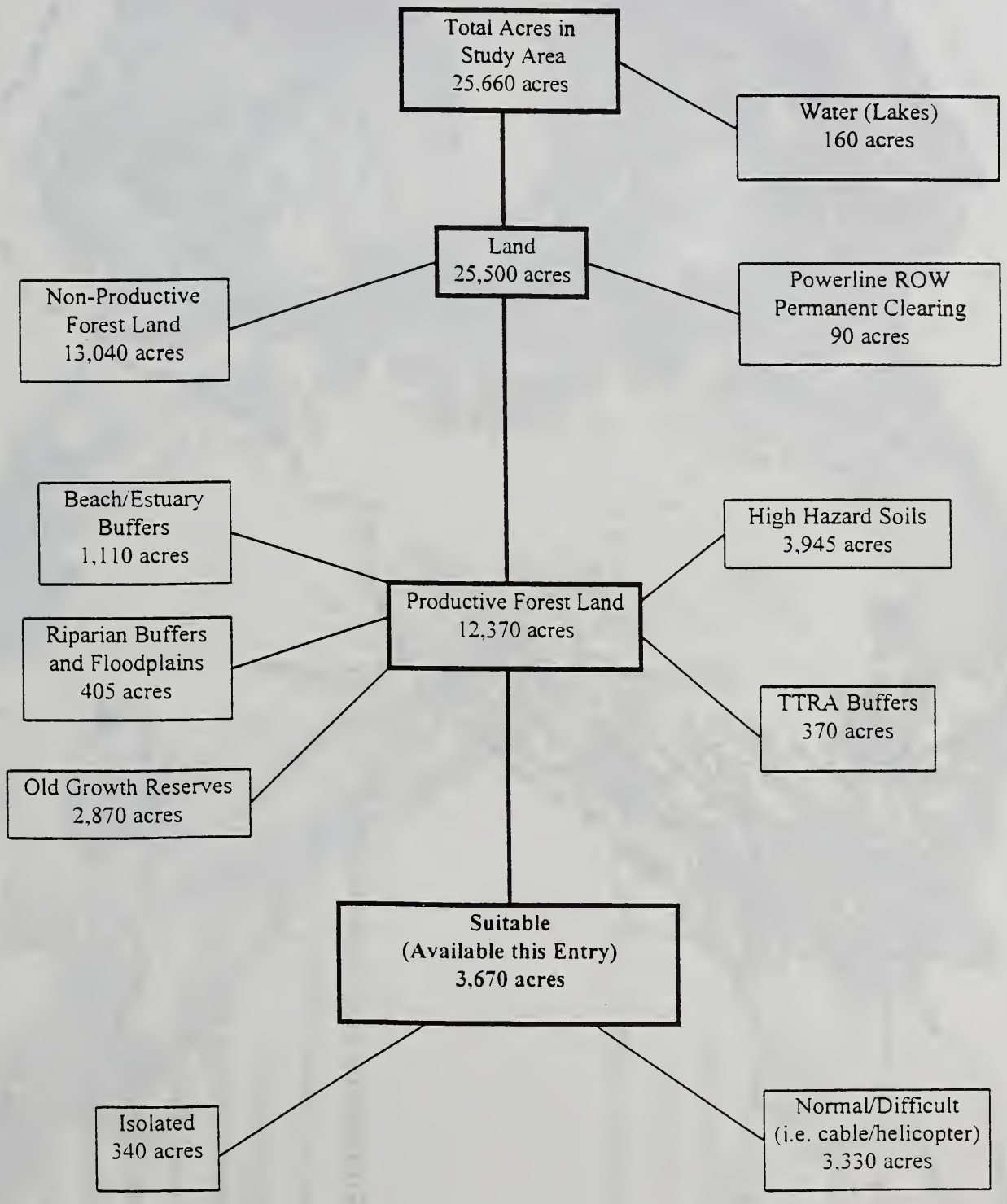
There are approximately 25,660 acres within the project area of which 160 acres are water. Most of the acreage computations are based on the remaining 25,500 acres.

- Non-productive forest land includes areas of bare rock, alpine meadows, muskeg wetlands and soils that only support scrub timber.
- High hazard soils are areas that pose a high risk of mass failure due to steep slope, soil type, drainage ability or other factors.
- Stream and riparian buffers are required on all Class I, Class II and most Class III streams.
- Forest Plan Standards require 1000 foot beach and estuary buffers.

The acres available for timber harvest include lands that can be regenerated successfully, logged without causing irreversible soil damage, and are not withdrawn from timber production by statute or administrative action. During the planning process, some of the available lands were determined to have low volume or low quality timber that would make them uneconomical to harvest at this time. Potential units on those lands were eliminated from the alternatives considered for this sale, which decreased the volume considered for harvest in this entry.

The predominate species in the stands available for harvest are western hemlock and Sitka spruce. We have not done a timber cruise in the project area, so we do not have site specific information on species composition. However, we have done stand "walk throughs" and some broad based cruising in the area as we prepared this EIS. Our current estimates of the species composition in the project area are: 70% hemlock, 15% spruce, 2% western redcedar, and 13% Alaska yellow-cedar.

Figure 3-1
Acreage Classification for the Canal Hoya Project Area



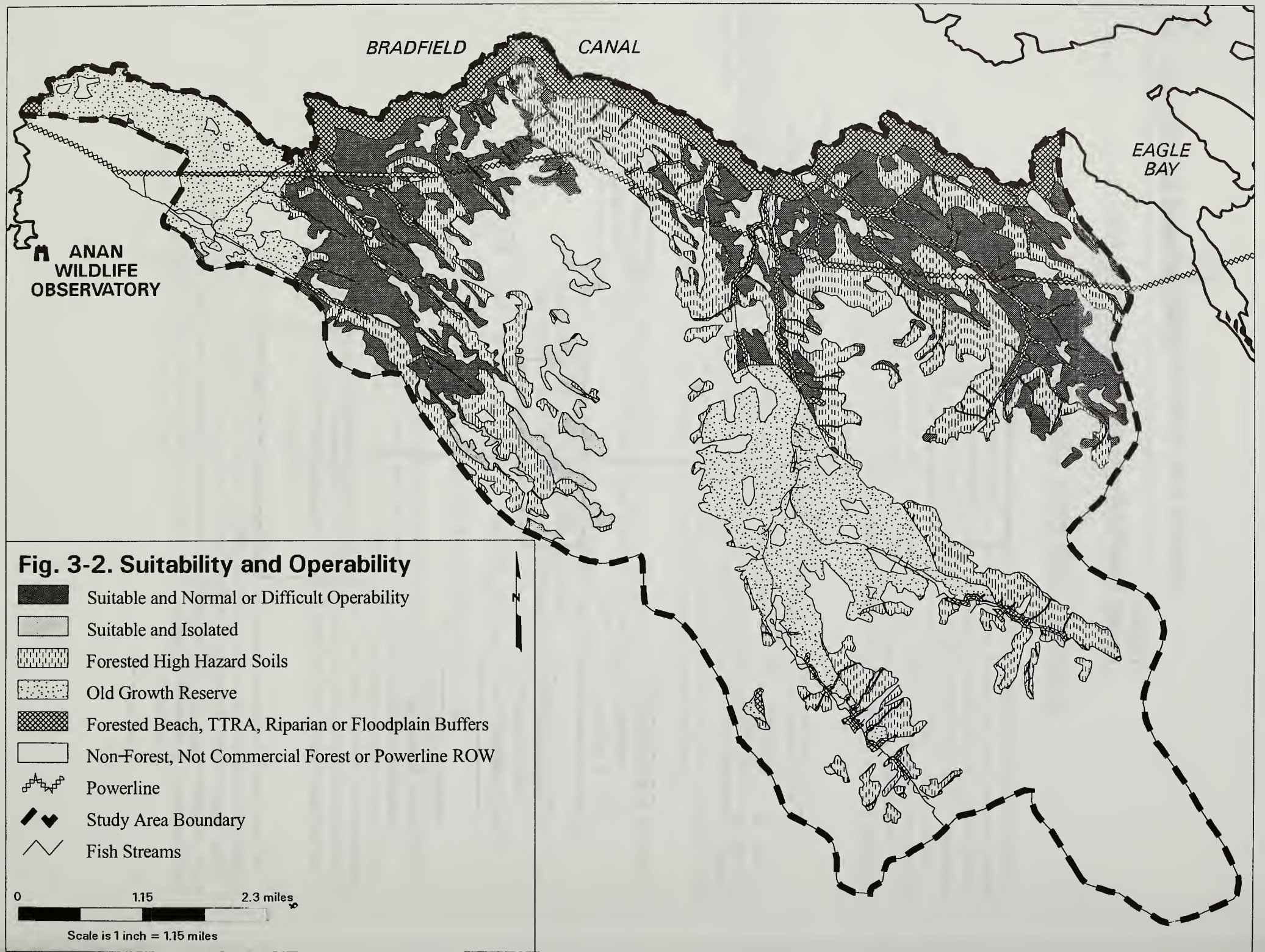
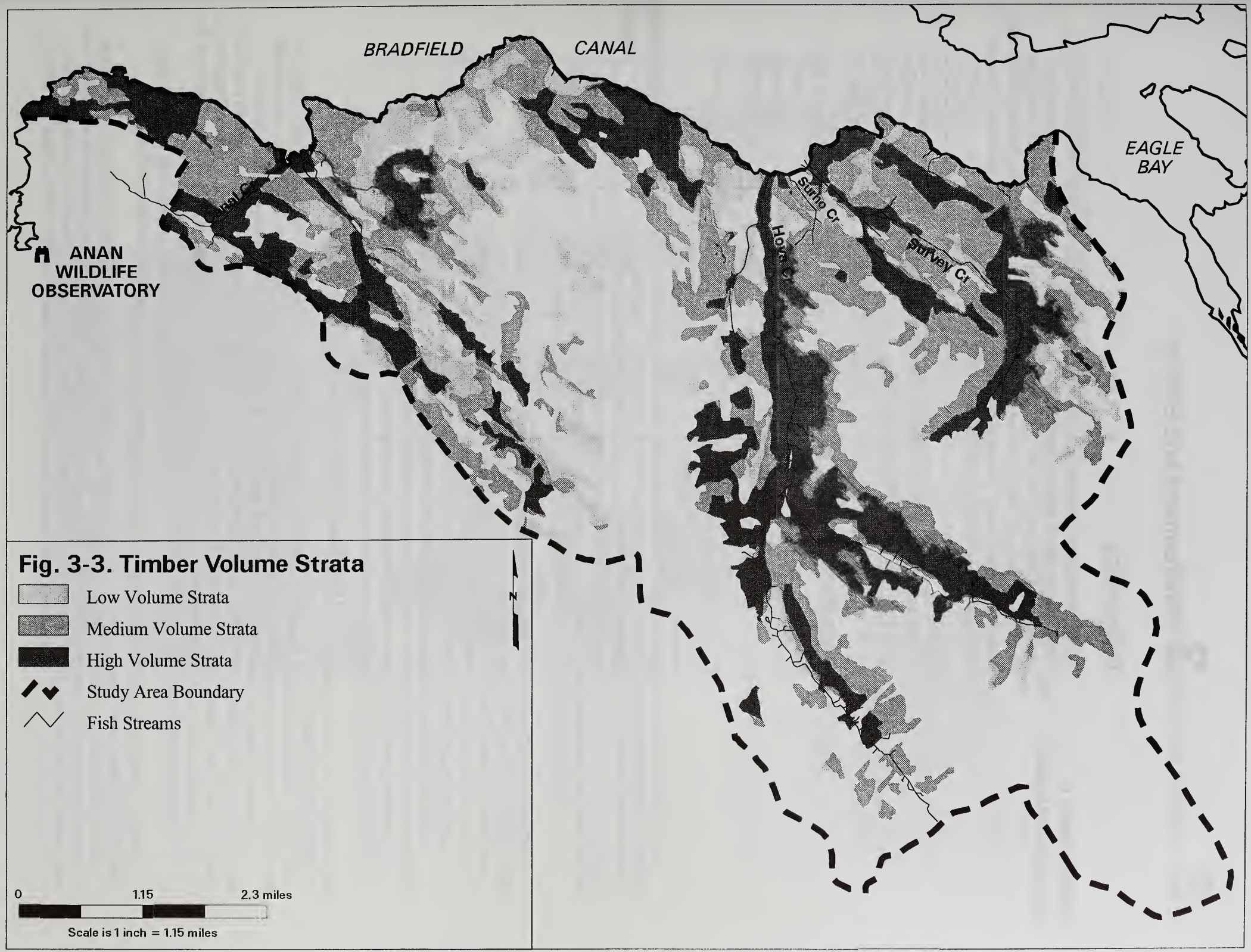


Fig. 3-2. Suitability and Operability

- Suitable and Normal or Difficult Operability
- Suitable and Isolated
- Forested High Hazard Soils
- Old Growth Reserve
- Forested Beach, TTRA, Riparian or Floodplain Buffers
- Non-Forest, Not Commercial Forest or Powerline ROW
- Powerline
- Study Area Boundary
- Fish Streams


BRADFIELD CANAL
EAGLE BAY
ANAN WILDLIFE OBSERVATORY
Hoya Cr
Surrey Cr
Surrey Cr
Fig. 3-3. Timber Volume Strata
Low Volume Strata
Medium Volume Strata
High Volume Strata
Study Area Boundary
Fish Streams
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

3 Environment and Effects

Economics

Employment in Southeast Alaska

The communities of Southeast Alaska depend on the Tongass National Forest to provide the foundation for one or more natural resource based industries including: wood products; commercial fishing and fish processing; outfitting, guiding and other tourism, mining and mineral development. Many residents also depend heavily on subsistence hunting and fishing to meet their basic needs. Government, transportation service and educational services are also significant regional income sources (Table 3-1).

Table 3-1
Southeast Alaska Annual Average Employment
1996 and 1997 Preliminary Forecast

	1996	1997	Gain/Loss
Goods Producing	5,150	4,850	-300
Mining	300	350	+50
Construction	1,750	1,700	-50
Manufacturing	3,100	2,800	-300
Durable Goods	(1,350)	(1,500)	(+150)
Lumber Products	1,200	1,350	+150
Nondurable Goods	(1,750)	(1,300)	(-450)
Seafood Process	1,000	900	-100
Pulp Mills	500	150	-350
Service Producing	29,150	29,200	+50
Transportation	2,600	2,500	-100
Trade	6,400	6,250	-150
Wholesale	(500)	(500)	(0)
Retail	(5,900)	(5,750)	(-150)
Finance, Insurance, Real Estate	1,400	1,500	+100
Services and Misc.	6,350	6,650	+300
Government	12,400	12,300	-100
Federal	(1,850)	(1,800)	(-50)
State	(5,300)	(5,200)	(-100)
Local	(5,250)	(5,300)	(+50)
TOTAL	**34,300**	**34,050**	**-250**

Source: *Alaska Economic Trends* (Alaska Department of Labor, February, 1998)

A mixture of employment growth and decline is projected for Southeast Alaska. Gains are expected in the mining industry with the reopening of the Greens Creek mine on Admiralty Island and construction employment is expected to increase in response to a number of residential and public works projects. The number of visitors to Southeast Alaska continues to increase, which increases employment in the services and retail trade sectors The gains in these industries are tempered by the effects of reduced logging activity and the closures of the APC and KPC pulpmills. Decreasing budgets are expected to lead to job cuts in the government sector. A new individual fishing quota system and recent low prices for some species are expected to reduce seasonal processing and fishing crew positions.

The wood products industry has been an integral part of the regional economy of Southeast Alaska since the 1950's. From 1987 through 1996, the industry provided direct employment to an average of 2,791 workers, and indirect jobs for an additional 2,014 people. Recent employment in the timber industry of Southeast Alaska for 1987-1996 is listed in Table 3-2.

Table 3-2.
Jobs Produced in the Timber Industry Since 1987

Type of Jobs	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Ave-Jobs/ mmbf
Logging	1,545	1,981	2,113	2,144	1,554	1,415	1,344	1,177	1,185	1,157	2.09
+Sawmill	375	468	478	500	604	538	447	515	301	230	.60
+Pulpmill	861	892	925	899	911	910	859	533	516	524	1.05
=Direct	2,790	3,341	3,516	3,543	3,069	2,863	2,650	2,225	2,002	1,911	3.74
+Indirect	1,950	2,350	2,550	2,570	2,226	2,077	1,935	1,624	1,461	1,395	2.70
=TOTAL	**4,740**	**5,691**	**6,066**	**6,113**	**5,295**	**4,940**	**4,585**	**3,849**	**3,463**	**3,306**	**6.43**
SE Alaska Total Harvest (mmbf)	**760**	**808.2**	**991**	**989.2**	**830.3**	**834.9**	**740.4**	**584.6**	**481.3**	**450.6**	

Source: Timber Supply and Demand 1996, USDAForest Service

Market Demand for Timber

As in the rest of the world, timber demand in Southeast Alaska varies dramatically on an annual basis. The level of demand is difficult for the Forest Service and the timber industries to predict with precision. Various factors influence the demand for Southeast Alaska timber, including interest rates, housing, value of the dollar with respect to changes in import tariffs, export policies locally and abroad, business cycles in the United States and overseas, installed mill capacity, regional and world timber markets, and timber availability and cost.

Wood product manufacturers in Southeast Alaska in 1994 had an installed mill capacity to process approximately 519 MMBF. Total wood consumption in 1994 was 359 MMBF which equalled 69% of the processing capability. The stated Installed Mill Capacity in the Forest Plan Appendix M (USDA 1997a, page M-2) is 322 MMBF. In the same table the percent of mill capacity utilized by Southeast Alaska Timber Processors is 52%. The Forest Plan predicts that timber demand will be lower than previous estimates primarily due to the shutdown of both the APC and KPC pulpmills. Closure of these pulpmills drastically affected the demand for utility and low grade sawlogs which have historically been processed into pulp products. Higher grade sawlog demand remains high despite the pulpmill shutdowns.

Based on the recent Brooks and Haynes 1997 update of projected demand for Tongass timber, the Forest Plan estimates the yearly demand between 1998-2002 to range from 96 MMBF to 130 MMBF depending on the scenario. The lower demand projection is based on mills that are currently operating and assumes that they maintain their current product mix. The Brooks and Haynes figures are based on demand in the global economy and minor changes in assumptions could mean large scale differences in demand for Alaskan timber products. The Brooks and Haynes' estimate in the Forest Plan was intended to predict timber harvest under a given set of assumptions and was not intended to be a predictor of market demand. Timber demand is not a single number but a set of relationships over a specific period of time.

Timber manufacturers in Southeast Alaska are in a state of transition from the Long Term Sales to a strictly independent market. Various entrepreneurs are testing markets and trying new manufacturing techniques. Under these new market conditions, it would benefit the timber industry to have an ample supply of raw material available. Several small sawmills are entering into the process of grading lumber with the help of certified lumber graders from

the Western Wood Products Association. This process may give local wood manufacturers an opportunity to compete with the contiguous 48 States that currently supply the majority of lumber sold in Alaska. Equipment has also been purchased by a Ketchikan firm to manufacture veneer to be used in plywood manufacturing. The Wrangell Sawmill and the Seley Sawmill on Gravina Island have opened creating new opportunities in the timber industry. This information is new, and was not available at the time the Brooks and Haynes study was done, nor was it available prior to the Record of Decision for the Forest Plan.

The entire timber sale process can take approximately 3 to 7 or more years to progress from project conception through field implementation. An EIS document typically takes approximately 2 years from scoping through FEIS and ROD. Another year is typically added through appeals and sometimes litigation. It then can take a year to implement the sale in the field and prepare the timber sale for advertisement and award. This includes the time necessary for field crews to "layout" the sale in the field and collect cost and value data, perform a timber appraisal, prepare the sale contract and maps, advertise the sale (30 days) and award the sale. If the sale is advertised at an opportune time, for instance late winter, the purchaser may be able to operate the sale the following year. This would most likely involve road construction and camp move-in and mobilization of equipment. It can take an additional 1-2 years for a timber purchaser to begin harvesting a sale if he/she opts to have the Forest Service contract the road construction for a small business administration act timber sale. The Forest Service then must advertise the road construction work and give the road contractor time to construct the roads. This work is completed prior to any logging taking place by the timber sale purchaser. The Forest Service also provides a range of volume sizes in timber sale offerings to meet the needs of a variety purchaser business sizes. Depending on the size of the timber sale the operation time given in the contract ranges from 1 to 3 years.

In order to maintain a stable timber sales program, the Forest Service needs to maintain a sale process to provide a continued flow of timber to the public. The Stikine Area has sold nearly all timber sales that have been advertised in the recent past which is also evidence that the supply for National Forest timber has not exceeded demand.

The Forest Service approaches annual demand with the concept of a "buffer stock" timber supply. This approach is to seek to provide an opportunity for the timber industry to acquire a supply of purchased but unharvested timber equal to about three years of timber consumption. At the close of calendar year 1997, this amount would be in the range of 600 - 700 MMBF of uncut volume under contract. This quantity considers the average rate of harvest for the past few years, and any indicators of change in the rate from planning cycle projections or other sources. The idea is that if demand for lumber or chip grade logs in any year suddenly increases, producers will have enough harvestable timber on hand to react and respond to the increase in demand for forest products without waiting for the Forest Service to take action. Normally, the Forest Service would expect the volume under contract would be drawn down during high points in the business cycle and would be built up during cycle low points. To provide this scenario, the Forest Service needs to continue the pipeline of projects in the planning process, field preparation process and harvest process. It is difficult to make a relationship from this sale to timber demand in the region since the process of providing sales to the public is a complex and involved process.

There are essentially three sources of timber for processors in Southeast Alaska: 1) the Tongass National Forest, 2) Native-owned timberlands, and 3) State timberlands.
The State's timber program in Southeast is relatively small, with an average annual harvest of 9 MMBF over the past several years, with a high of 21 MMBF in 1994. Harvest from Native timberland peaked in 1989 at 532 MMBF, declining to 215 MMBF in 1994. Timber harvest from the Tongass reached its peak in 1990 at 471 MMBF, declining to a ten year low of 120 MMBF in 1996. Harvest on all ownerships in Southeast Alaska for 1996 was 451 MMBF. (Timber Supply and Demand 1996). Currently, in-state processing restrictions only apply to timber harvested from federal lands. Because export market prices greatly exceed those paid

by local manufacturers, the majority of Private and State timber is sold overseas. Thus the bulk of the wood actually processed in Southeast Alaska comes from the Tongass National Forest.

The Canal Hoya timber sale plays an important role in the overall Tongass National Forest sale offering for fiscal year 1998 to help meet market demands for timber and retain existing employment levels, (for further information see Appendix E). The action alternatives would generate a range of 79 to 110 jobs assuming a ratio of 6.43 jobs per million board feet (3.74 direct and 2.70 indirect jobs) based on figures from Table 3-2. Because of the variability of sale life, a comparison of total jobs produced was used rather than an estimate of jobs per year. Table 3-3 displays the employment impacts for each of the action alternatives during the entire sale life.

Table 3-3
Canal Hoya Contributions to Regional Employment During Sale Life for Each Action Alternative (number of jobs)

Type of Jobs	Alt 1	Alt 2	Alt 3	Alt 4
Direct (logging & milling)	60	64	52	46
Indirect	43	46	38	33
TOTAL	**103**	**110**	**90**	**79**

Market Values and Costs of Each Alternative

An economic analysis was used to display a comparison between the four action alternatives in the Canal Hoya project area. For this analysis, the net stumpage value per MBF by alternative is calculated by subtracting all the production costs, including profit and risk allowances, from the end product selling values for lumber and pulp. The current direction in Forest Service Handbook 2409.18 recommends the use of "middle market" end product selling values in planning timber sales. By using the mid-market values instead of current values, it is easier to account for market fluctuations that can exceed $200 per MBF. The mid-market values are the weighted average values for the past ten years, adjusted for inflation and an estimate of the timber quality on the Canal Hoya project area. All other costs used in the economic analysis were current at the time of posting the Notice of Intent for this sale.

Table 3-4 displays the resulting timber values and costs for each Canal Hoya action alternative. Alternative 5, the no action alternative, is not displayed because it has no harvest associated with it. Middle market pond value is the middle market selling value of end products (lumber and pulp) minus the manufacturing costs of these products. The volumes in each alternative include sawlog, utility and an estimate of road right of way that would be cut. The difference in net stumpage values between the action alternatives can be attributed to the following factors:

- Differences in the percentage of cable or helicopter yarding
- The amount of temporary road construction
- Differences in species composition or volume per acre harvested

The values in Table 3-4 are based on the weighted average for all the sellers of products produced from Tongass National Forest timber sales. The logging and manufacturing costs are also a weighted average figure that represents the costs of an operator of average efficiency. Since both values and costs are weighted averages, they are useful for comparing the economic efficiency of the action alternatives in supplying timber to the regional economy.

Table 3-4
Canal Hoya Mid-Market Timber Values and Costs to an Operator of Average Efficiency for each Action Alternative

ECONOMIC FACTOR	Alt 1	Alt 2	Alt 3	Alt 4
Total Volume (1) (mbf)	15,936	17,120	14,005	12,256
Middle Market Pond Value ($/mbf)	364	365	365	366
COST ($/MBF)				
Stump to Truck	235	210	233	290
Transportation (2)	39	40	40	41
General Logging Overhead	26	26	26	26
Temporary Road Cost	12	19	15	0
Specified Road Cost (3)	138	162	132	66
Logging Profit and Risk (60%)	49	47	49	53
TOTAL COSTS	499	504	495	476
NET STUMPAGE ($/MBF) including Specified Road Costs	-135	-139	-130	-110
NET STUMPAGE ($/MBF) excluding Specified Road Costs (4)	3	23	2	-44

(1) includes road right-of-way volume
(2) includes log haul, road maintenance, dump, raft, tow, mobilization and barge lease
(3) includes major drainage structures and LTF costs
(4) Specified road developments are considered to be a long term economic asset

Mid-Market Conditions Indicate Alternatives 1,2 and 3 Would Produce a Net Gain From this Sale when Specified Road and LTF Costs are Excluded.

The mid-market analysis produced net stumpage values ranging from positive $23 per MBF for Alternative 2 to negative $44 per MBF for Alternative 4. A positive net stumpage value generally indicates an economically viable alternative. Alternatives with negative net stumpage values need to be sold under higher than average market conditions to produce positive advertised stumpage above base rates. The variation in net stumpage between alternatives is primarily due to differing amounts of temporary road construction and use of cable or helicopter yarding systems. Alternative 4 has the most negative mid-market net stumpage value because it relies mostly on helicopter yarding, the most expensive yarding system. Conversely, Alternative 2 utilizes a higher percentage of cable systems resulting in the lowest logging cost of the action alternatives.

Alternatives 1 and 3 fall in between the range of mid-market net stumpage values. Both of these alternatives represent a mix of temporary road construction, cable and helicopter logging systems. The comparison between net stumpage values for the action alternatives does not include specified road and LTF costs. Since the timber sale purchaser would earn purchaser credit for specified road construction it is not considered a cost but rather a long term economic asset (FSH 2409.18, chapter 10,13.05). If Specified road cost was considered a cost of the sale, all the action alternatives would have negative net stumpage values with Alternative 2 being the most deficit and Alternative 4 the least.

Although specified roads are considered an asset, there are additional costs associated with maintaining those roads that are not included in the mid-market analysis. Our estimate of road maintenance costs associated with the Canal Hoya Timber Sale, including hand road maintenance of ditches, culverts and brushing roadsides is $1,100 /mile/year. The estimated cost of road maintenance by alternative would be:

Alternative 1 = $11,110/year
Alternative 2 = $15,510/year
Alternative 3 = $9,680/year
Alternative 4 = $2,860/year

Because timber markets are cyclical, it is difficult to predict future selling values, but Forest Plan market assessments indicate sufficient mill capacity and market demand for sawlogs. Recent bidding on Stikine Area timber sales shows strong competitive demand for stumpage that far exceeds advertised rates (Table 3-5). The large spread between the advertised rate and actual bid rate on these sales indicate favorable market demand conditions and timber purchasers are willing to bid up individual sales. The final Canal Hoya timber sale appraisal will include current quarter selling values, cost information and normal profit and risk margin.

Table 3-5
Recent Stikine Area Timber Sale Bidding Results

Sale Name	Volume (MBF)	Advertised Rate ($/MBF)	Bid Rate ($/MBF)
Bohemia Mountain	35,529	$255	$315
King George	24,790	$23	$143
Saginaw	24,041	$22	$127
Shamrock	24,280	$5	$194

Over the Long Term, the Value of the Roads and Log Transfer Facilities May Outweigh the Immediate Cost of the Sale

Short-term economics of harvest are different than long-term economics of a sustained harvest level and the greatest efficiency over time. Even though this project is a short-term decision, it is the first harvest entry and should be responsive to long-term needs and issues. The economic tradeoffs between alternatives of this entry must be weighed against the cost and value of the transportation system (roads, logging system and log transfer facilities) and how they affect future economic efficiency. Alternatives 4 and 2 represent different levels of development of the transportation system. Alternative 4 builds the least amount of road infrastructure, has the lowest road maintenance cost and relies primarily on helicopter yarding this entry. Since Alternative 4 builds the least amount of road, it does not provide as much access for future harvest entries. Alternative 2 builds most of the road infrastructure on this first entry, has the highest road maintenance cost and favors cable logging systems. This alternative accesses the highest percentage of operable acres in the project area, enabling the road costs to be amortized over multiple entries. Differences in the amount of transportation infrastructure built for this entry and the harvest system used illustrates the range of alternatives and how they respond to both short-term as well as long-term harvest economics. Table 3-6 below provides a summary of the Canal Hoya project area alternatives.

Table 3-6
Alternative Summary for the Canal Hoya Project Area

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5 no action
TIMBER HARVEST					
Available Acres	3,670	3,670	3,670	3,670	3,670
Treatment Acres	780	800	660	610	0
% of Available Treated	21%	22%	18%	17%	0
HARVEST VOLUME (MBF)					
Cable Volume	8,150	11,549	7,234	1,260	0
Helicopter Volume	7,286	4,891	6,371	10,836	0
Total Volume (1)	15,436	16,440	13,605	12,096	0
ROAD MILES					
Specified Road	8.5	11.3	7.3	2.6	0
Temporary Road	1.6	2.8	1.7	0	0
Total Road Miles	10.1	14.1	9.0	2.6	0

(1) Road Right-Of-Way volume not included

Payments to the State

As part of the Twenty-Five Percent Fund Act of 1908 and subsequent amendments to the Act in 1976, 25 percent of gross National Forest receipts from net stumpage and purchaser credits are returned to the State in which the National Forest is situated for the benefit of public schools and public roads. The State of Alaska distributes the funds to organized boroughs and municipalities. Table 3-7 displays the estimated minimal payments to the State of Alaska and the proportion going to the City of Wrangell (based on average distribution from the State in past years) for each of the Action Alternatives. These figures represent the **minimum payment** and do not account for any potential competitive bid premium stumpage value above Base Rates. Any bid premium would result in increased payments to the State of Alaska and subsequently to the City of Wrangell for the benefit of public schools and public roads. Implementation of the No Action Alternative would not increase Direct and Indirect employment opportunities within the area. Under the No Action alternative local communities like Wrangell would not benefit from Twenty-Five Percent Fund Act receipts associated with the action alternatives.

Table 3-7
Estimated Minimal Payments to the State of Alaska

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Total Volume (mbf)	15,936	17,120	14,005	12,256
Minimum Base Rate Value per mbf (1)	$2.90	$2.90	$2.89	$2.93
Specified Construction Cost (per mbf) (2)	$138	$162	$132	$66
Minimum Base Rate Value + Specified Costs (per mbf)	$140.90	$164.90	$134.89	$68.93
Less $0.50/mbf to Treasury (3)	$140.40	$164.40	$134.39	$68.43
Multiplied by mbf (4)	$2,237,414	$2,814,528	$1,882,132	$838,678
25% to State	$559,354	$703,632	$470,533	$209,670
7.06% to Wrangell (5)	$42,511	$53,476	$35,761	$15,935

(1) Minimum Base Rate Value is the lowest stumpage value, CFR 223.61
(2) Includes specified roads, major drainage structure and LTF costs
(3) $0.50/mbf is the minimum payment to the U.S. Treasury
(4) 25% Fund Act payments (25% of net stumpage value plus the value of capital improvements such as purchaser credit for specified roads, LTF's, and timber stand improvements) to the State of Alaska.
(5) 7.06% is Wrangell's average portion of the 25% Fund Act payments from the Tongass National Forest to the State of Alaska for Federal fiscal years 1994-1997. Information source: Bill Rolfzen, State of Alaska Department of Community and Regional Affairs.

Public Investment Analysis

Public investment analysis of the timber harvest alternatives uses a three year average of Stikine Area Timber Sale Program Information Reporting System (TSPIRS) data from 1994 -1996. The average Region 10 Budget Allocation costs and management expenses are subtracted from net stumpage revenues to determine net value. The costs and management expenses include NEPA planning, sale preparation, harvest administration and engineering support. These costs are displayed on a per MBF basis see Table 3-8.

Table 3-8
Public Investment Summary

	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Forest Service Revenues				
Volume (mbf)	15,936	17,120	14,005	12,256
Net stumpage value per mbf (1)	$126.49	$126.49	$126.49	$126.49
Total Stumpage Value	$2,015,745	$2,165,509	$1,771,492	$1,550,261
R10 Budget Allocation Costs per mbf (2)	$96	$96	$96	$96
Total Costs	$1,529,856	$1,643,520	$1,344,480	$1,176,576
Net Value	$485,889	$521,989	$427,012	$373,685

(1) Net stumpage value/mbf based on 3 year average (1994-1996) of Stikine Area TSPIRS revenue data.
(2) Forest Service costs/mbf based on the Region 10 average budget allocation of $41/mbf for NEPA, $27/mbf Sale Prep & Administration and $28/mbf Engineering Support.

The net revenues from the action alternatives are expected to be less than the returns from future harvests. This conclusion is based on the assumption that the costs incurred on this entry will provide infrastructure improvements to support future timber harvests.

Issue Two: Scenic and Tourism Values

People are concerned about how this sale would change the scenic conditions, and recreation/tourism potential in the Bradfield Canal. The majority of use is currently by recreationists who are accompanied by guides, whether they are fishing, big game hunting, or sightseeing (particularly those users boating to Anan Wildlife Observatory with guides from Wrangell). The visual condition of the landscape is the main recreational attribute this project area provides to users. Actual recreation use of the project area is low. The majority of use consists of guided fishing and guided big game hunting.

We have split this issue into 3 major discussion areas:

- Scenery
- Post Sale Road Management Strategies and Recreation Potential
- Effects to Recreationists and Outfitter/Guides

Scenery

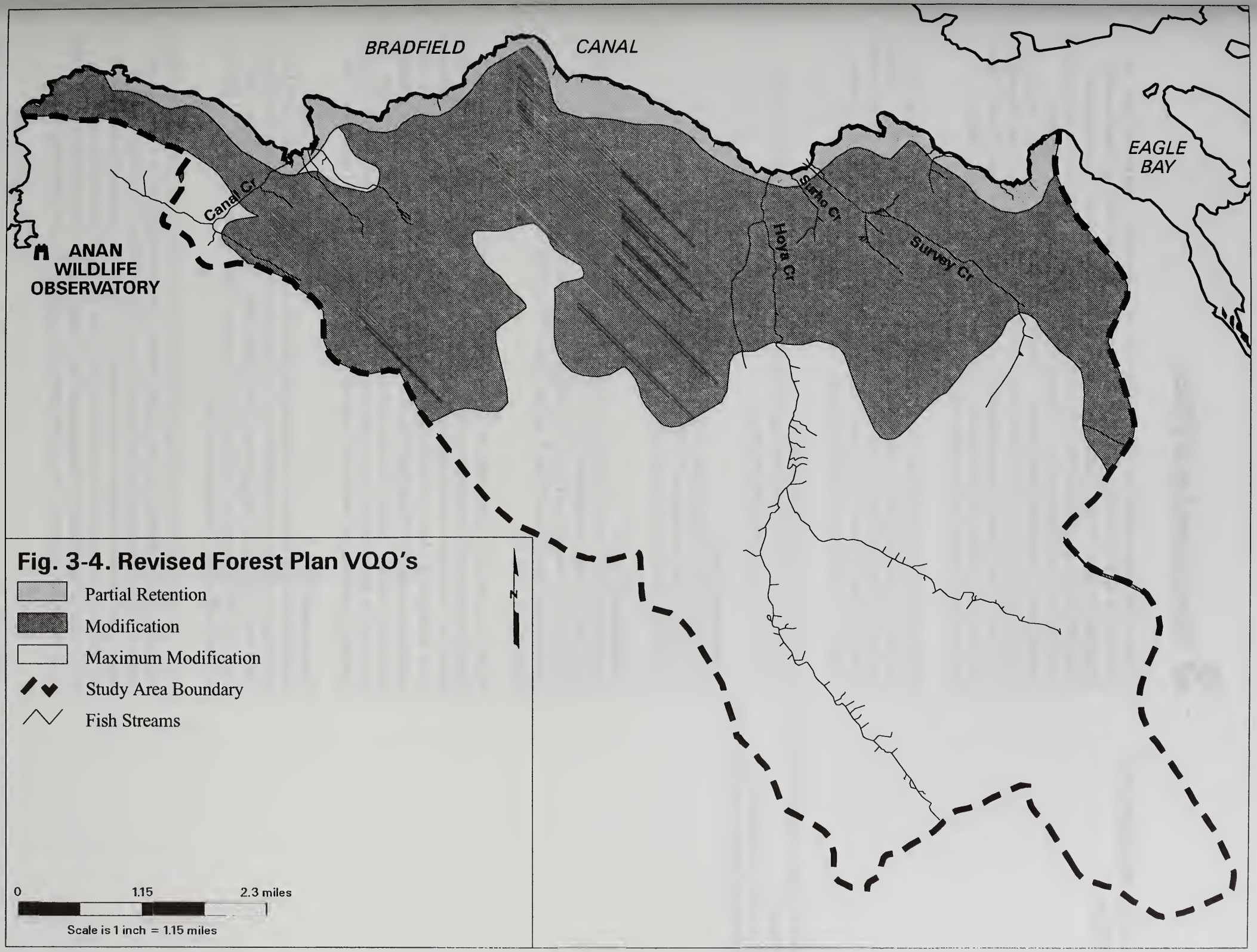
The Canal Hoya Project Area is located on the south shore of the mouth of the Bradfield Canal. Currently, the landscape seen in the project area is undeveloped, except for the powerline passing through the area. The area is viewed by boaters using the Bradfield Canal and Eastern Passage. The entire shoreline of the project area is located along the Bradfield Canal and is viewed for long periods of time by boaters travelling the Bradfield Canal and by recreationists using the area. The western shore of the project area is viewed at oblique angles for short periods of time by boaters travelling the Eastern Passage.

The Canal Hoya Project Area is in the "Modified Landscape" and "Timber Production" Management Prescriptions in the Forest Plan (Figure 1-2). Appendix F of the Forest Plan (Visual Priority Routes & Use Areas) lists the Eastern Passage under "Alaska Marine Highway & Tour Ship Routes", and the Bradfield Canal under "Other Travel Routes" in its list of Priority Routes.

For those areas designated as Timber Production, direction in the Forest Plan calls for application of the Modification Visual Quality Objective (VQO) in the foreground distance zone of Visual Priority Routes and Use Areas, and the Maximum Modification VQO in all other areas. All lands designated as Timber Production in the Canal Hoya Project Area are unseen.

For those areas designated as Modified Landscape, direction in the Forest Plan calls for application of the Partial Retention VQO in the foreground distance zone, and Modification VQO in middleground and background distance zones, as seen from Visual Priority Travel Routes and Use Areas. The Maximum Modification VQO should be applied in all other areas of this Management Prescription. All seen acres in the Canal Hoya Project Area are designated as Modified Landscape. The entire foreground distance zone, as seen from the Bradfield Canal travel route, is within the 1,000 foot beach buffer. The only proposed developments in the foreground distance zone called for in this project are the Canal and Hoya Log Transfer Facilities (LTF's).

All of the visible proposed harvest units for the Canal Hoya Timber Sale are in the Modified Landscape Management Prescription area. Therefore, all proposed harvest activities for the Canal Hoya Timber Sale should meet or exceed the Modification VQO.


BRADFIELD CANAL
EAGLE BAY
Canal Cr
Sunho Cr
Hoya Cr
Survey Cr
ANAN WILDLIFE OBSERVATORY
Fig. 3-4. Revised Forest Plan VQO's
Partial Retention
Modification
Maximum Modification
Study Area Boundary
Fish Streams
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

Visual Management Classes

In order to determine what kind of harvest activities are compatible in the project area, we have split the area into Management Classes. The Management Classes are determined by identifying an area's Visual Quality Objective (VQO) while taking into consideration the Visual Absorption Capability (VAC) of the area. VQO's are expressed in terms of describing the objective for the landscape (i.e. : "Preservation", "Retention", "Partial Retention", "Modification", "Maximum Modification", "Rehabilitation", or "Enhancement"). VQO's for particular areas on the Tongass National Forest are determined in the Forest Plan, depending on the area's Management Prescription and the presence or absence of Visual Priority Routes and Use Areas. The only VQO's present in the Canal Hoya Project Area are Partial Retention, Modification, and Maximum Modification (Figure 3-4).

An area's Visual Absorption Capability (VAC) is determined by the general complexity of the landscape, the slope, and the distance from which a person would view an area. VAC is expressed in terms of "High", "Intermediate" and "Low". All three VAC's are present in the Canal Hoya Project Area. The Region 10 Landscape Management Handbook was used to designate Visual Management Classes for the Canal Hoya Project Area (Figure 3-5).

There are five Visual Management Classes described in the Region 10 Landscape Management Handbook:

Management Class P (Preservation)
Management Class P areas are those areas with a VQO of Preservation. This VQO is not present in the Canal Hoya Project Area.

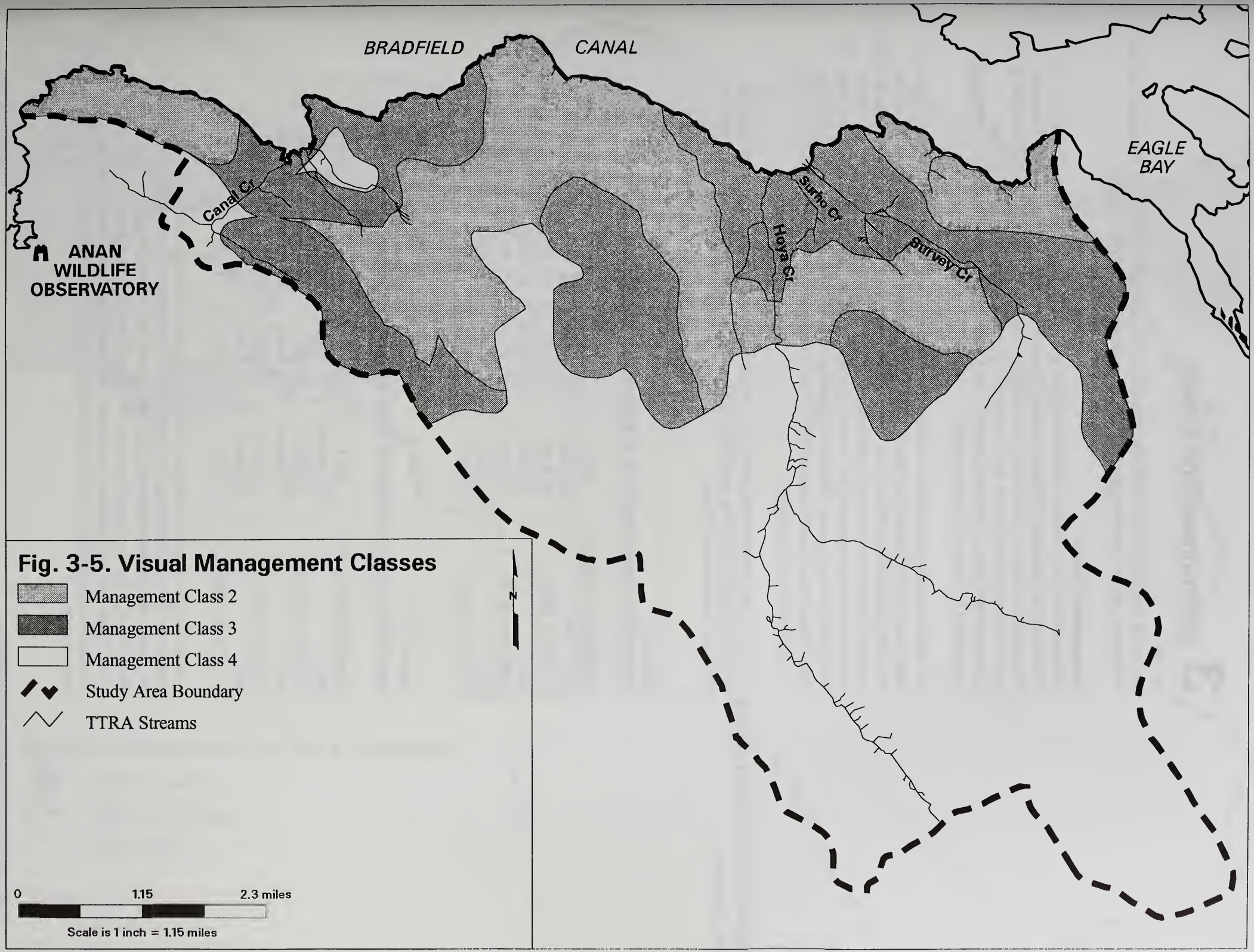
Management Class 1
Management Class 1 areas include those areas with a VQO of Retention and Low or Intermediate VAC, or areas with a VQO of Partial Retention and Low VAC. This Management Class is not present in the Canal Hoya Project Area.

Management Class 2
Management Class 2 areas include those areas with Retention VQO and High VAC, Partial Retention VQO and Intermediate VAC, or Modification VQO and Low VAC. There are 5,689 acres of Management Class 2 in the Project Area. The Canal VCU (5210) contains 2,450 acres of Management Class 2, and the Hoya VCU (5200) includes 3,239 acres of Management Class 2.

All partial cutting harvest methods are compatible in this management class. Clearcutting should remain visually subordinate to the existing landscape character. The landscape variety plays a key role in how much and what type of harvest can occur while meeting the objectives of the management class. Generally, the more complex the landscape, the more harvest that landscape can absorb. General guidelines for Management Class 2 include: clearcuts should not exceed 15 acres, "fuzzy" clearcuts with some retention can approach 40 acres in size depending on the landscape, harvest units with 20-40% retention can range from 15-55 acres depending on landscape, and overall cumulative visual disturbance should not exceed 15%.

Management Class 3
Management Class 3 areas include those areas with Partial Retention VQO and High VAC, Modification VQO and Intermediate VAC, or Maximum Modification VQO and Low VAC. There are 6,107 acres of Management Class 3 areas in the Canal Hoya Project Area. The Canal VCU (5210) contains 2,643 acres of Management Class 3, and the Hoya VCU (5200) includes 3,464 acres of Management Class 3.

All partial cutting harvest methods are compatible with this management class. Clearcutting and associated roadbuilding may be visually evident in this management class, but units and roadbeds should be designed to borrow from the existing landscape to the extent that they appear to be natural occurrences to the untrained eye. Landscape complexity will dictate how much and what type of harvest can occur and still meet the objectives of the management class. General guidelines for Management Class 3 areas include: clearcuts should not exceed 40 acres, "fuzzy' clearcuts with some retention can approach 60 acres depending on the


BRADFIELD CANAL
EAGLE BAY
Canal Cr
Sunho Cr
Hoya Cr
Burvey Cr
ANAN WILDLIFE OBSERVATORY
Fig. 3-5. Visual Management Classes
Management Class 2
Management Class 3
Management Class 4
Study Area Boundary
TTRA Streams
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

landscape, harvest units with 20-40% retention can range from 55-75 acres depending on the landscape, and the overall cumulative disturbance should not exceed 20%.

Management Class 4
Management Class 4 areas include those areas with Modification VQO and High VAC, or Maximum Modification VQO and Intermediate or High VAC. There are 13,818 acres of Management Class 4 in the Canal Hoya Project Area. The Canal VCU (5210) contains 2,541 acres of Management Class 4, and the Hoya VCU (5200) includes 11,277 acres of Management Class 4. All Management Class 4 acres in the Canal Hoya Project Area are inventoried as "unseen" from the water.

All normal timber management activities are acceptable in this management class. Harvest activities should be natural appearing when viewed in the background, and should borrow from the natural landscape as much as is practical. General guidelines for Management Class 4 areas include: clearcuts should not exceed 60 acres when visible, "fuzzy" clearcuts with some retention can approach 80-100 acres depending on the landscape, harvest units with 20-40% retention may exceed 100 acres depending on landscape, and the overall cumulative visual disturbance can not exceed 50%. Areas with Modification VQO should not exceed 25% overall visual disturbance.

Effects of the Alternatives on Scenery

All action alternatives would result in a change in the visual conditions of the landscape. Tables 3-9 and 3-10 list the number of acres each alternative proposes to harvest in the different Management Classes.

Table 3-9
Canal VCU: Acres Harvested in Each Visual Management Class

Management Class	Alt 1	Alt 2	Alt 3	Alt 4
MC 2 (2,450 ac. total)	80 Acres (3.2 %)	180 Acres (7.2 %)	30 Acres (1.2%)	50 Acres (2.0%)
MC 3 (2,643 ac. total)	90 Acres (3.5%)	80 Acres (2.9%)	40 Acres (1.5%)	70 Acres (2.6%)
MC 4 (2,541 ac. total)	60 Acres (2.3%)	35 Acres (1.4%)	0 Acres	0 Acres

Table 3-10
Hoya VCU: Acres Harvested in Each Visual Management Class

Management Class	Alt 1	Alt 2	Alt 3	Alt 4
MC 2 (3,239 ac. total)	225 Acres (6.9%)	170 Acres (5.2%)	220 Acres (6.7%)	140 Acres (4.3%)
MC 3 (3,464 ac. total)	275 Acres (7.9%)	220 Acres (6.4%)	260 Acres (7.5%)	275 Acres (7.9%)
MC 4 (11,277 ac. total)	50 Acres (<1%)	115 Acres (1.0%)	110 Acres (1.0%)	75 Acres (<1%)

Perhaps the best way to display the effects of proposed harvest on the scenic condition of the project area is to include pictures of what we expect the area would look like after harvest. We have picked three viewpoints to include in this analysis (Figure 3-6): 1) a view from Blake Island, 2) a view from the mouth of Canal Creek, and 3) a view from the mouth of Hoya Creek. We use computer generated 3-D views to help determine what the area is likely to look like after harvest. These pictures display the differences between the alternatives from each viewpoint.

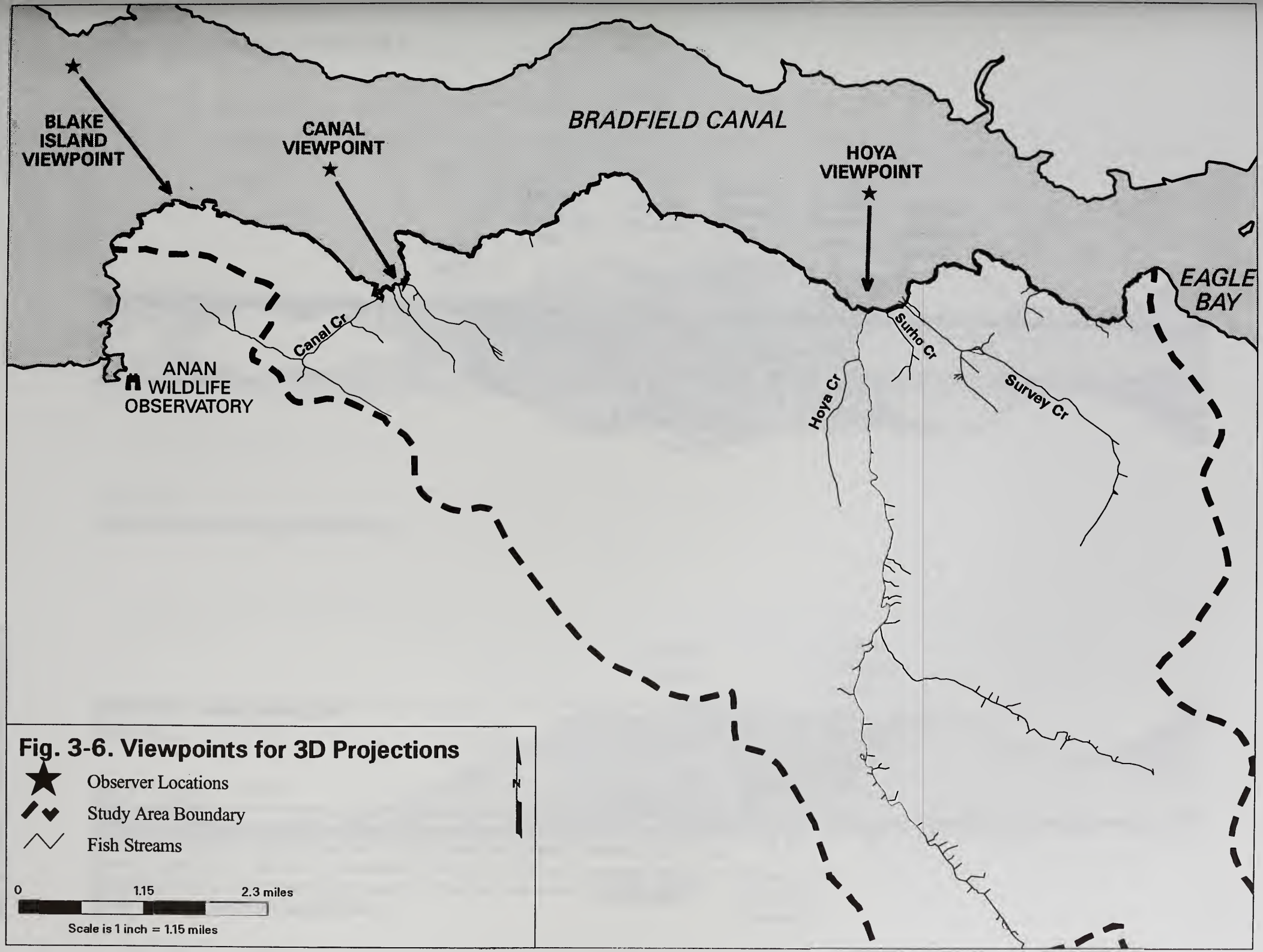


Fig. 3-6. Viewpoints for 3D Projections

Observer Locations

Study Area Boundary

Fish Streams

Blake Island Viewpoint (Viewpoint 1)

The Blake Island viewpoint is looking towards the project area as seen from the Eastern Passage (Figure 3-7). This view is important to people travelling the Eastern Passage by boat or ferry. Of particular interest is the view for the many recreationists boating to Anan from Wrangell. Although none of the proposed harvest would be visible from the Anan Wildlife Observatory, many visitors would view the effects of harvest (Figures 3-8 through 3-11) on their way to and from Anan.

Figure 3-7
Viewpoint 1, Blake Island View

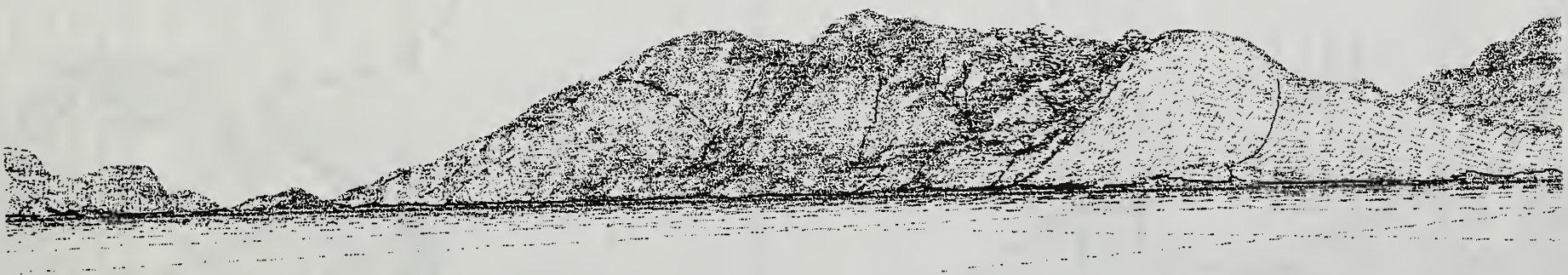


Figure 3-8
Blake Island Viewpoint, Alternative 1

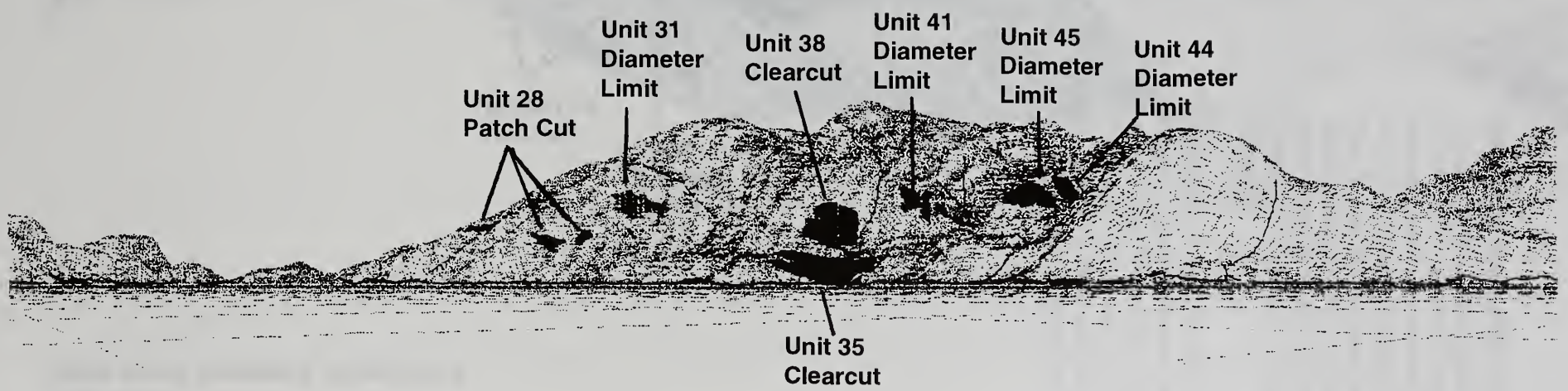


Figure 3-9
Blake Island Viewpoint, Alternative 2

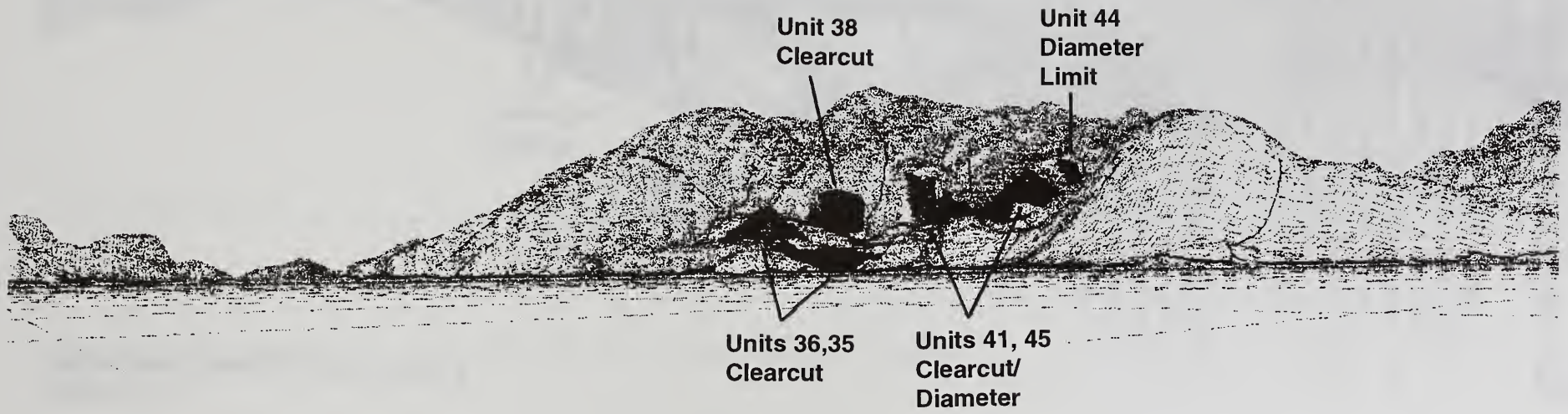


Figure 3-10
Blake Island Viewpoint, Alternative 3

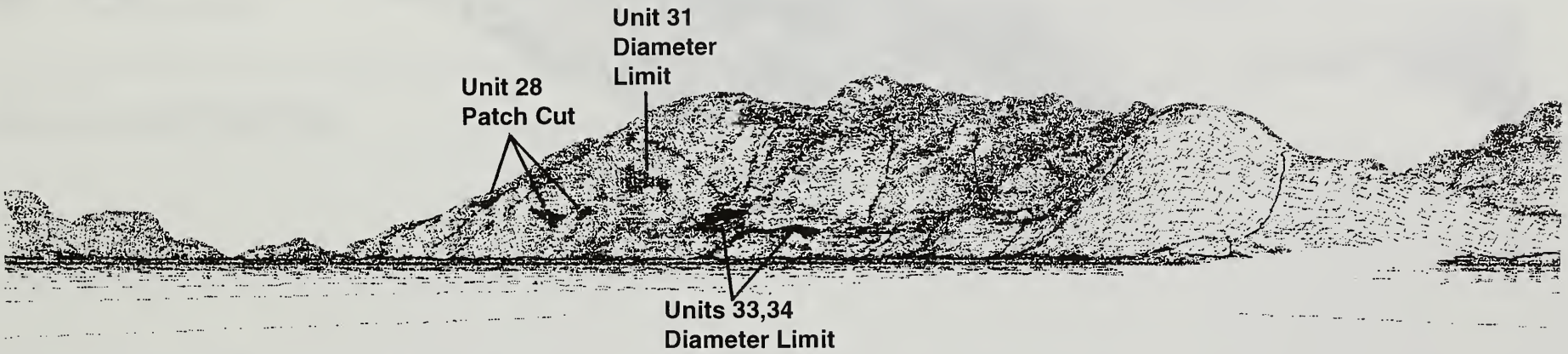
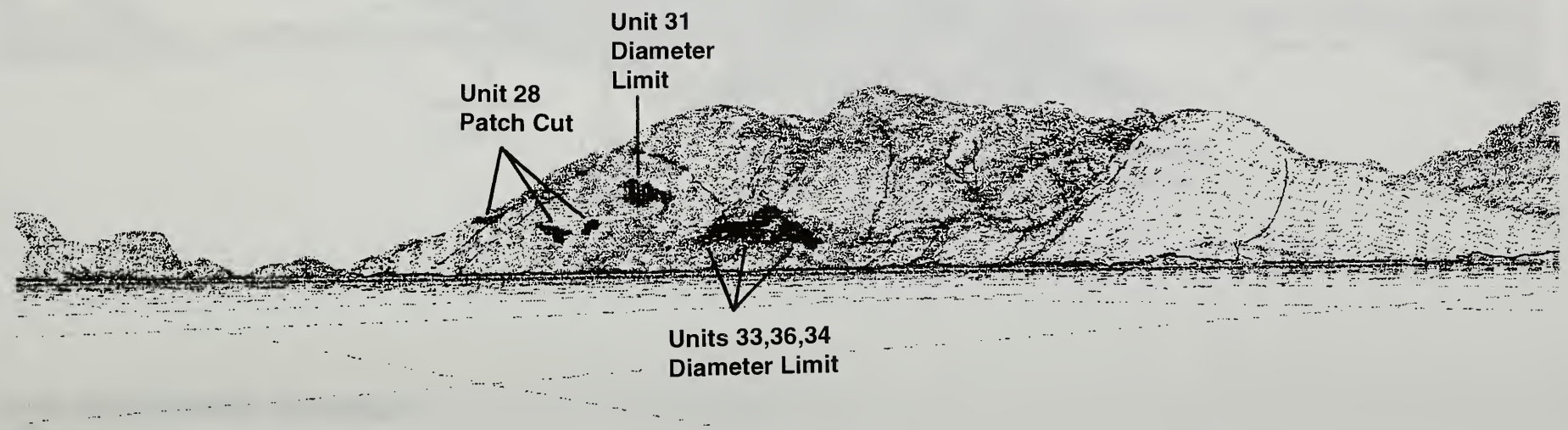


Figure 3-11
Blake Island Viewpoint, Alternative 4



Effects of Alternatives From the Blake Island Viewpoint

Any proposed harvest would be visible to some degree from the Blake Island Viewpoint. Alternative 1 (Figure 3-8) and Alternative 2 (Figure 3-9) would have similar visual effects because of the proposed road and associated cable yarding of harvest units. Alternative 1 would have more openings because of the helicopter units proposed (the patches proposed in Unit 28, and the diameter limit harvest in Unit 31), but they would blend well into the landscape and may not be noticeable to the casual observer. The cable units proposed in both alternatives would be noticeable, with Alternative 2 having the most visual impact of all the alternatives proposed. Both alternatives would meet the Modification VQO from this viewpoint.

Alternative 3 (Figure 3-10) and Alternative 4 (Figure 3-11) would have similar visual effects because they both propose helicopter logging. Both alternatives would have less visual impact than Alternatives 1 or 2. Alternative 4 would have slightly more visual impact than Alternative 3 because it proposes to harvest Unit 36. All other Canal VCU harvest units proposed in both alternatives are identical. Both alternatives would likely exceed the Modification VQO from this viewpoint, and may even meet Partial Retention.

Canal Viewpoint (Viewpoint 2)

The Canal Viewpoint (Figure 3-12) is located mid-channel in the Bradfield Canal, looking up the Canal Creek drainage.

Figure 3-12
Canal Viewpoint

Figure 3-13
Canal Viewpoint, Alternative 1

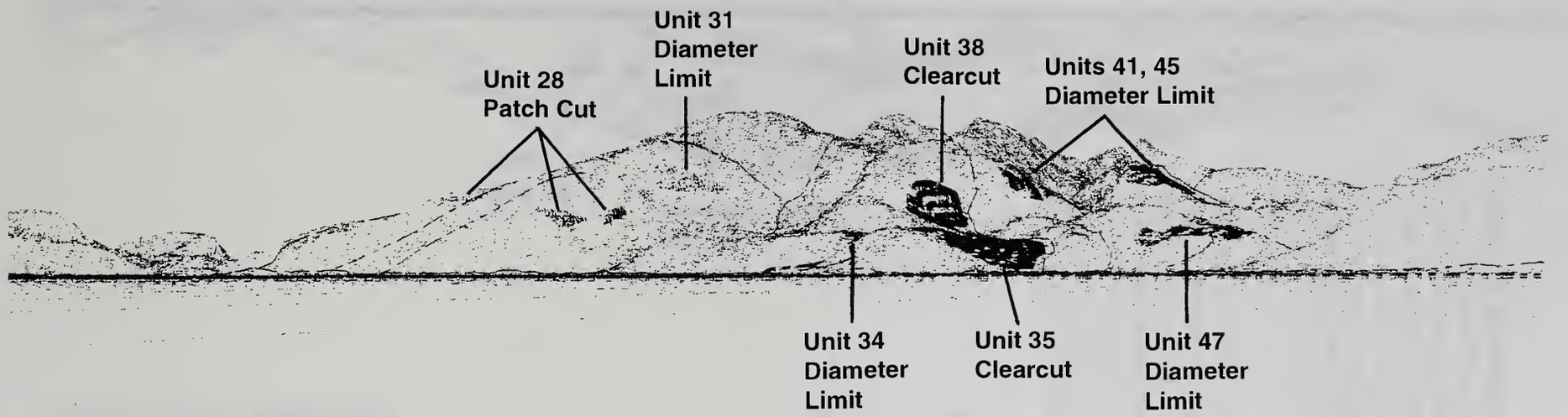


Figure 3-14
Canal Viewpoint, Alternative 2

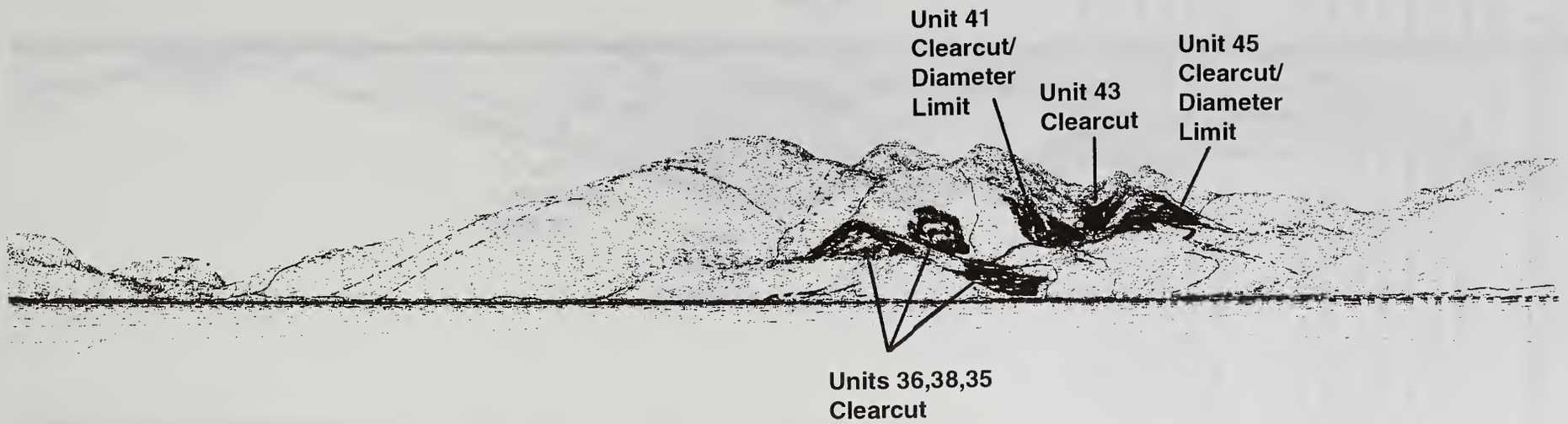


Figure 3-15
Canal Viewpoint, Alternative 3

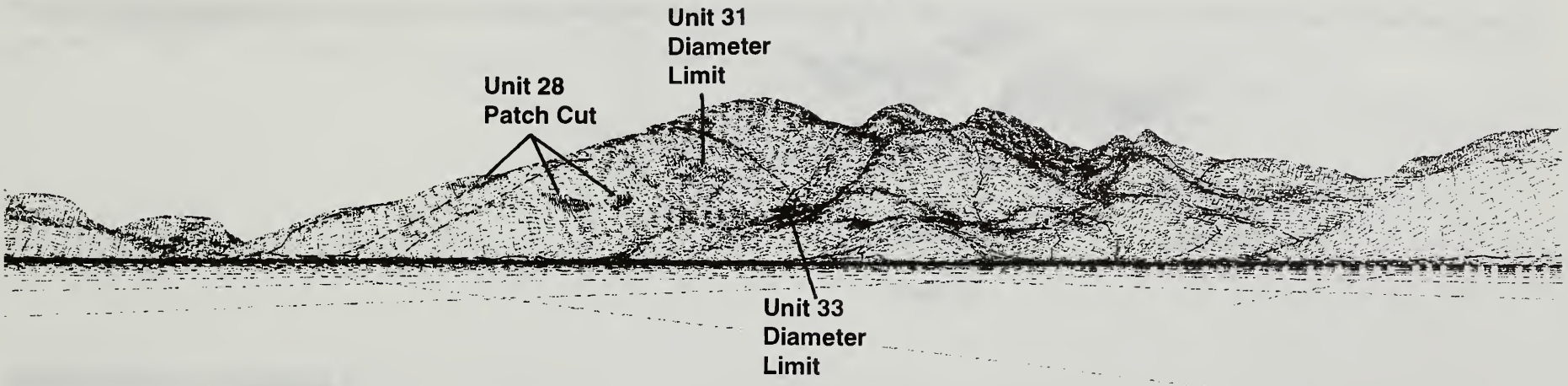
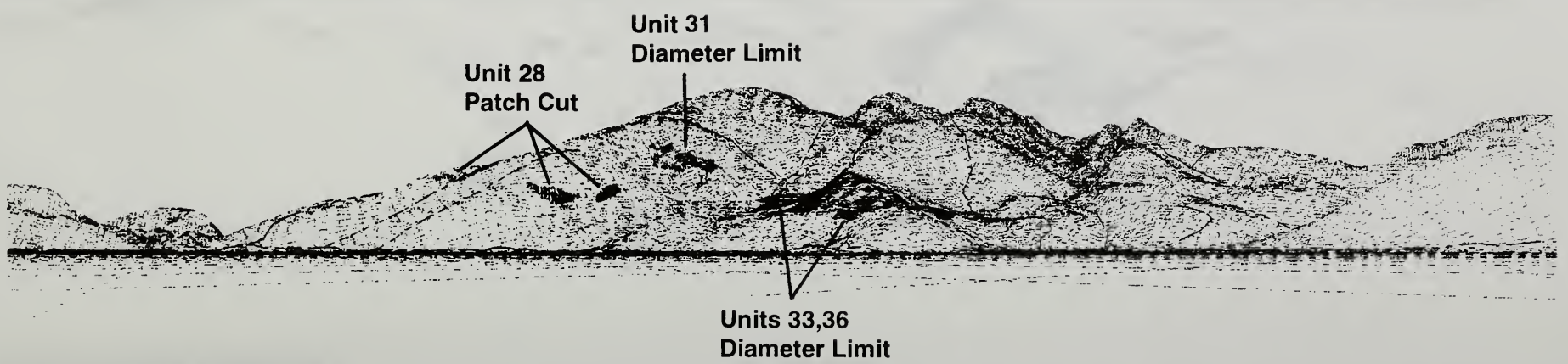


Figure 3-16
Canal Viewpoint, Alternative 4



Effects of Alternatives From the Canal Viewpoint

From the Canal Viewpoint, Alternative 1 (Figure 3-13) and Alternative 2 (Figure 3-14) would have similar visual effects because the LTF and associated road would be evident to the casual observer. Alternative 2 would have the most visual impact because most of the visible harvest would be cable logged with lower amounts of retention proposed than in Alternative 1. Alternative 1 would produce more openings than Alternative 2, but much of the proposed harvest would be helicopter yarded with higher retention left in the units, making them less evident to a casual observer. Both alternatives would meet the Modification VQO from this viewpoint.

Alternative 3 (Figure 3-15) and Alternative 4 (Figure 3-16) would have similar visual effects because both propose helicopter yarding with retention in the proposed units. Both of these alternatives may not even be evident to the casual observer. Alternative 4 would have a higher visual impact than Alternative 3 because of the proposed harvest of Unit 36. All other proposed harvest unitsin the Canal VCU are identical between the alternatives. Both alternatives would meet or exceed the Modification VQO from this viewpoint, and may even approach Partial Retention.

Hoya Viewpoint (Viewpoint 3)

The Hoya Viewpoint (Figure 3-17) is located mid-channel in the Bradfield Canal, looking up the Hoya Creek drainage

Figure 3-17
Hoya Viewpoint

Figure 3-18
Hoya Viewpoint, Alternative 1

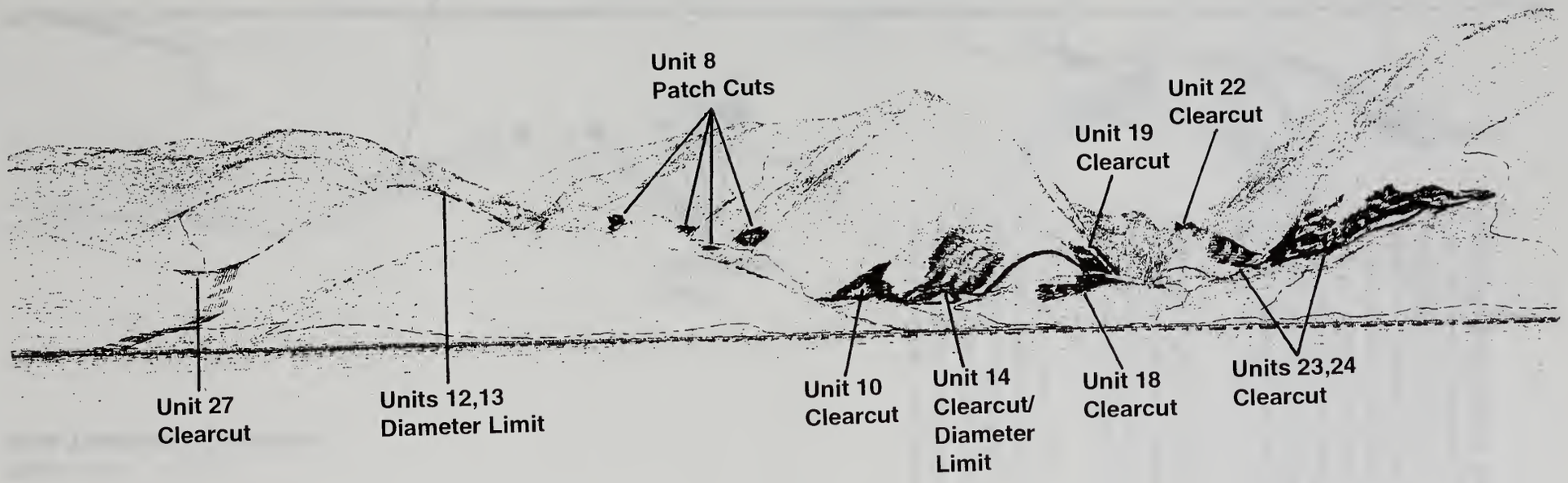


Figure 3-19
Hoya Viewpoint, Alternative 2

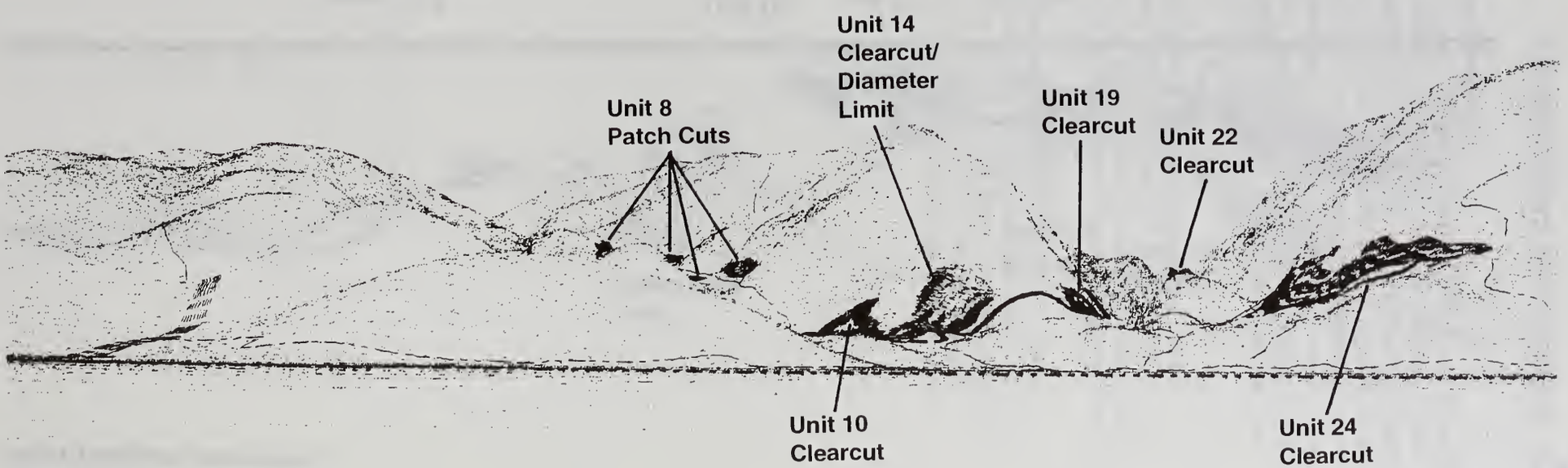


Figure 3-20
Hoya Viewpoint, Alternative 3

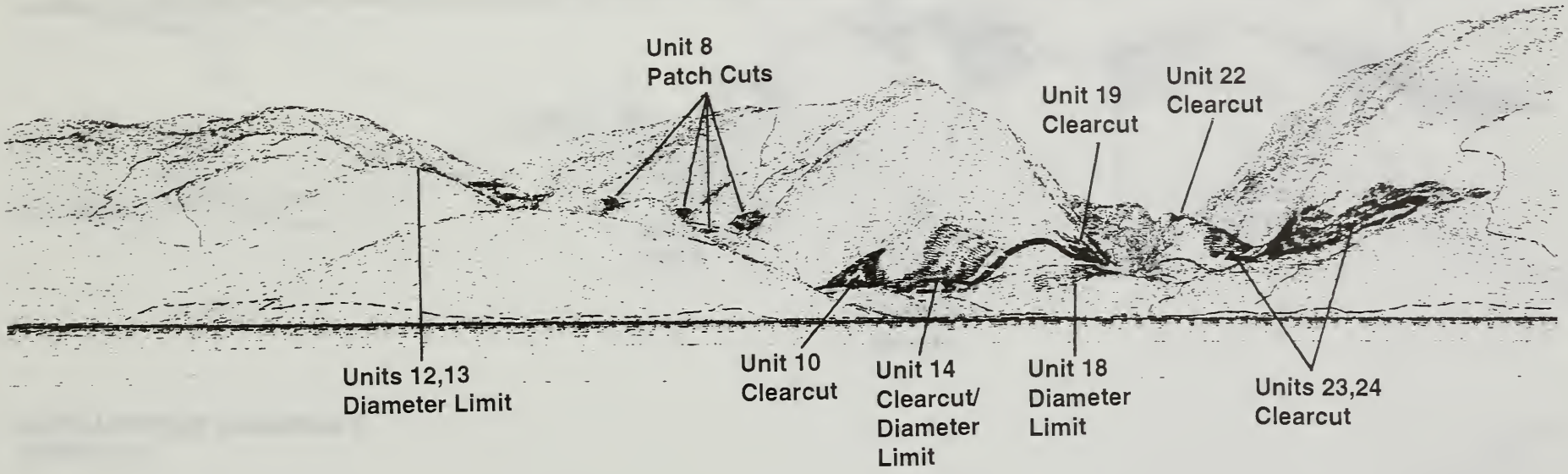
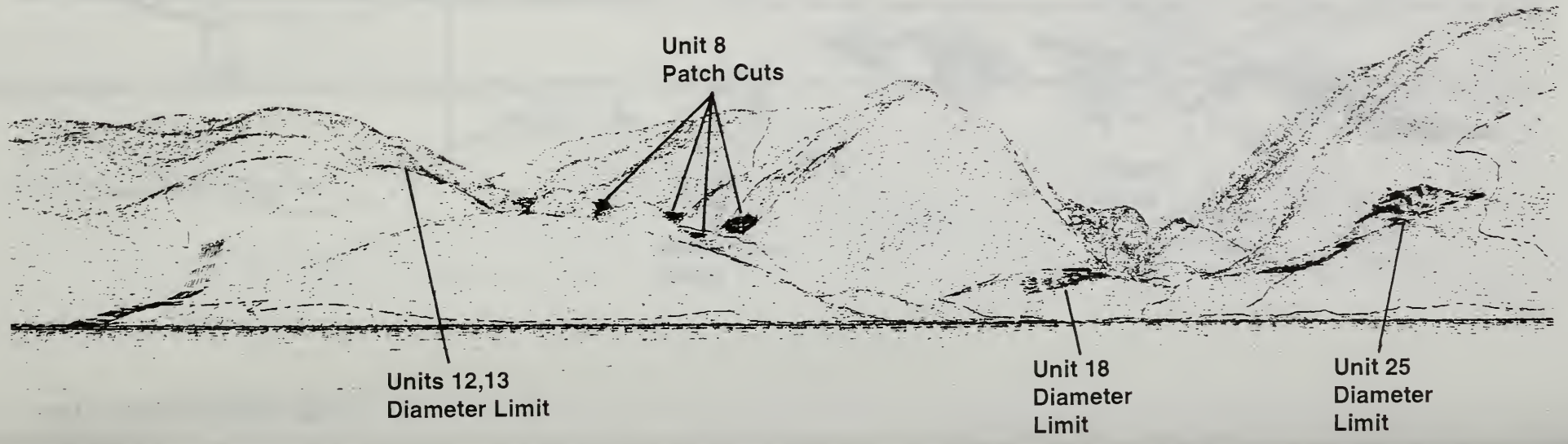


Figure 3-21
Hoya Viewpoint, Alternative 4



Effects of Alternatives From the Hoya Viewpoint

From the Hoya Viewpoint, Alternative 1 (Figure 3-18) and Alternative 3 (Figure 3-20) would have similar visual impacts. Alternative 1 would have a slightly higher visual impact than Alternative 3 because of some differences proposed in the number and prescription of visible units. Alternative 1 proposes cable harvest of Unit 18, while Alternative 3 proposes the same opening, but would harvest it by helicopter. Additionally, Alternative 1 proposes to harvest Unit 27, although it will barely be visible from this viewpoint. Alternative 3 proposes larger openings for Units 3 and 5 than Alternative 1, and includes Unit 20 (while Alternative 1 does not), but these units are not visible from this viewpoint. Both alternatives would meet the Modification VQO.

Alternative 2 (Figure 3-19) would have less visual impact than Alternatives 1 and 3. Alternative 2 proposes the same cable harvest units in the Hoya VCU as Alternative 1 (with the exception of Unit 18), but would not have any of the seen helicopter units proposed in Alternatives 1 or 3 (Units 1,12,13, and 18). Alternative 2 would meet the Modification VQO.

Alternative 4 (Figure 3-21) would have the least impact of the alternatives, because it proposes fewer road miles (2.6 miles) with less cable harvest. There are several helicopter units proposed which would be visible (Units 1, 2, 12, 13, 18, and 25) but they would be harvested with a diameter limit prescription and would blend well into the landscape . Although Alternative 4 may not meet the Partial Retention VQO from this viewpoint, it would exceed the Modification VQO.

Log Transfer Facilities

All action alternatives propose the construction of a Log Transfer Facility (LTF) accessing a road system in the Hoya VCU. Alternative 1 and Alternative 2 propose a LTF to access a road system in the Canal VCU. Both proposed LTF's would be located in the foreground distance zone as seen from the Bradfield Canal, which is listed as a Visual Priority Travel Route in Appendix F of the Forest Plan. This area is in the Modified Landscape Management Prescription, which calls for a VQO of Partial Retention in the foreground distance zone. However, the Forest Plan makes some provisions for the construction of LTF's in this Management Prescription, stating "Exceptions for small areas of non-conforming developments, such as recreation sites, transportation developments, Log Transfer Facilities, and mining development, may be considered on a case-by-case basis." Plan direction also states "To meet the VQO, give special consideration to minimizing apparent landform modification (as seen from sensitive travel routes) during road and Log Transfer Facility location, design, and construction".

Both LTF's are designed with the intent to minimize the impact to the visual resource. Working areas would be buffered by beach timber, as much as possible, and openings for rock pits would be designed to minimize visual impact. To further minimize impacts to the intertidal beach and reduce visual impacts, it is proposed to water logs by use of a 100' long inclined log slide fixed on one end at the high tide line on shore, and supported on the other end by a 30' wide, 60' long floating platform. Log bundles would slide down the inclined slide skids, and out on the floating platform until the platform submerges. The log slide would be removed from the LTF site after harvest is complete. Uplands development for the floating log slide would consist of a log crib for the shore support point of the slide, and a shot-rock fill approach access roadway from the adjacent log unloading area. Beach developments would be removed following completion of sale activities, and upland developments would be either removed or stabilized.

Alternative 3 and Alternative 4 would have the least visual impact, as they only propose LTF construction in the Hoya VCU. Alternative 1 and Alternative 2 would have the most visual impact, as they propose a second LTF in the Canal VCU. We've included conceptual sketches of the proposed LTF's to display how they would look from the water (Figures 3-22 and 3-23). Please refer to Appendix D "LTF Site Selection, Design, and Marine Effects", for a more detailed discussion of the LTF construction guidelines.

Figure 3-22
Schematic Drawing of Canal Log Transfer Facility

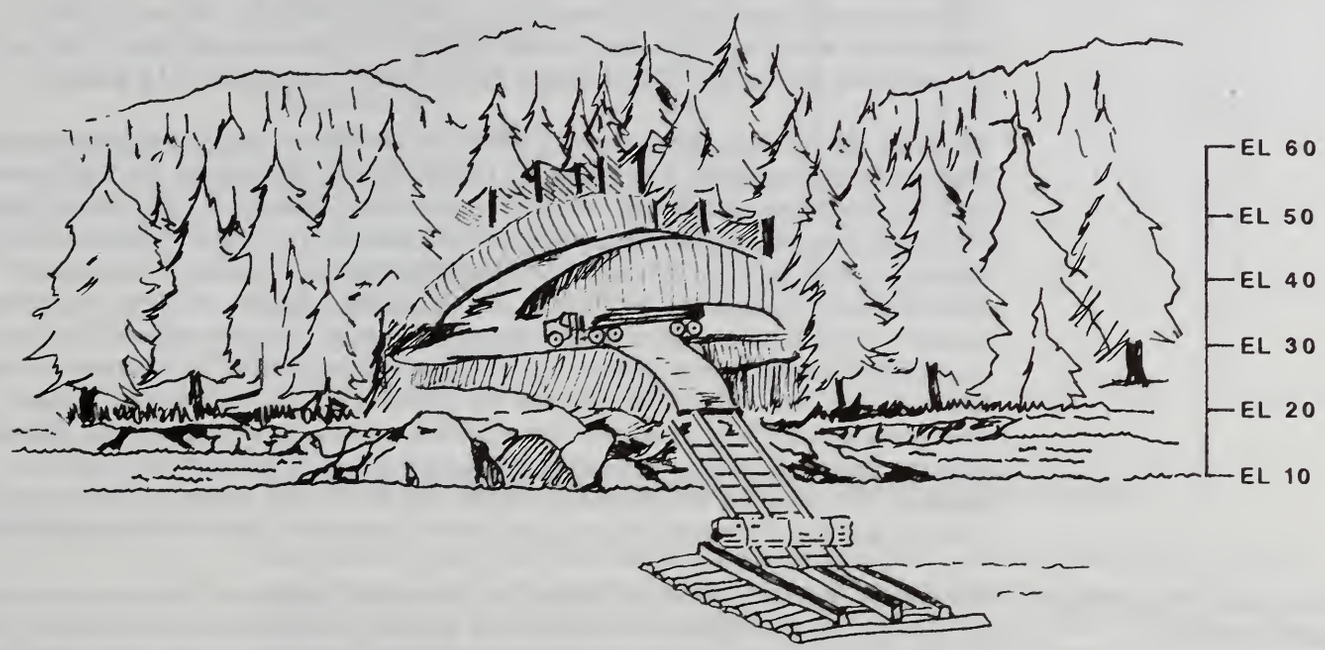
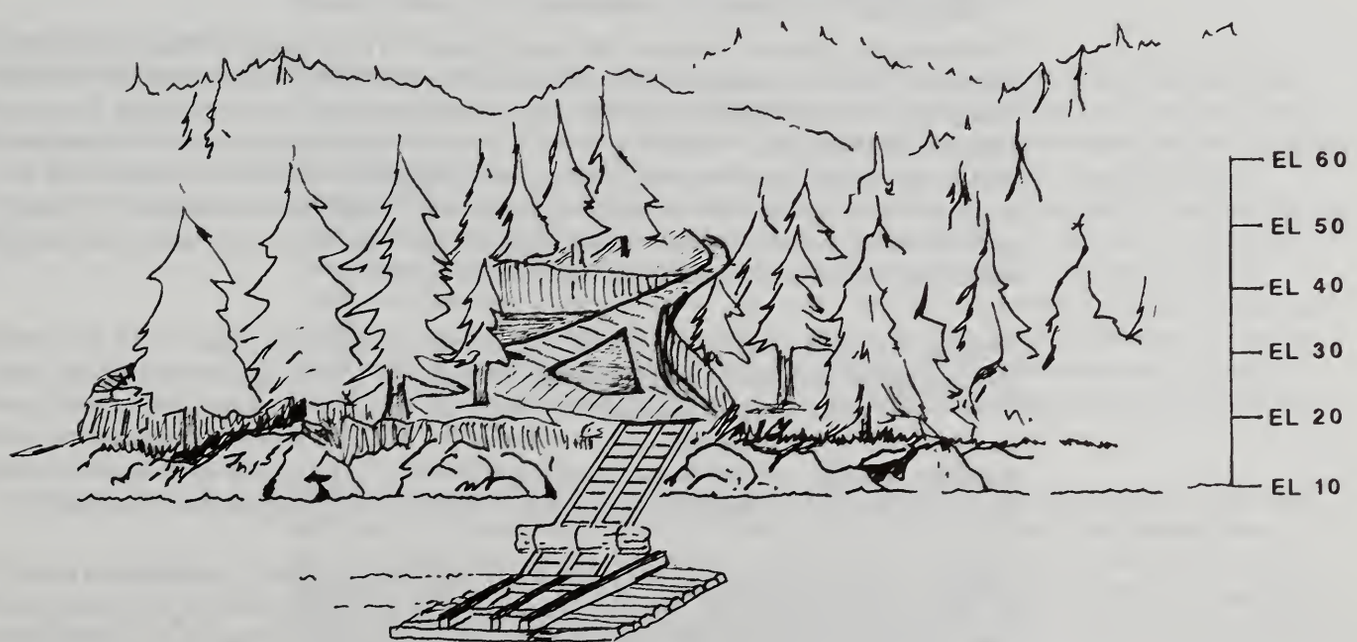


Figure 3-23
Schematic Drawing of Hoya Log Transfer Facility



Post Sale Road Management and Recreation Potential

The Canal Hoya Project Area is currently unroaded. Recreation use is generally restricted to beach use and some use of the streams for fishing and hunting. The area is fairly inaccessible, with a high potential for semi-primitive recreation experiences. The current recreation use level is very low. Many of the visitors are accompanied by guides.

The major change proposed with any of the action alternatives is the introduction of roads into a previously unroaded area (Table 3-11). In all action alternatives, the roads would be closed to motorized vehicles after the sale is completed. The area is fairly remote from any town, so it is not anticipated that the roads would result in a significantly higher amount of recreation use in the area. It is not likely that this area would become a "destination recreation area" because it is not located near a population center, and there are similar recreation opportunities located much closer to Wrangell. The most potential for use would be in those alternatives that propose a road system in the Canal VCU (Alternative 1 and Alternative 2). This may attract use from the boaters travelling the Eastern Passage. The presence of an LTF may attract recreationists visiting Anan as a camping area, especially since the area immediately surrounding the Anan Wildlife Observatory is closed to camping. The potential would exist for guides already hosting visitors at Anan to utilize this area in conjunction with trips to Anan, but it is unknown if this would actually happen.

Roads May Attract Some Users and Displace Others

The introduction of roads would change the recreation character of this area permanently. Roads would serve to attract those users who seek somewhat developed recreation. Both the road closure and the remoteness of the area will likely reduce the number of people who might be attracted to the area by the roads. Although the roads would be closed, they would provide a degree of increased access for nonmotorized recreation including; hunting, mountain biking, camping, hiking, and berry picking. Conversely, the presence of roads would serve to make the area less attractive to users seeking primitive recreation experiences. The roads may serve to displace current users of the area to areas with less development.

Obviously, the degree of change to the area is based on the amount of roads each alternative proposes. The more roads, the more opportunity to use them for nonmotorized recreation. The longer the road systems, the more access they provide for hunting, hiking, berry picking, and general exploring. Alternatives 1 and 2 propose road systems in both the Canal and Hoya VCU's and would have the most potential for changing the recreation experience of the project area. Both alternatives propose a permanent change to two drainages. Alternative 2 proposes more overall roading than Alternative 1 (14.1 miles vs. 10.1), and would have the most effect to the project area of the alternatives proposed.

Alternatives 3 and 4 do not propose an LTF or road system in the Canal VCU, and although there would be evidence of logging in that drainage, the recreation potential of the Canal VCU would remain largely unchanged. Alternative 3 would propose a longer road system in the Hoya VCU than Alternative 4 (9.0 miles vs. 2.6 miles), and would provide more access in the Hoya drainage for trail-based recreation activities. By providing more access, however, it has more potential to change the recreation character of the drainage than Alternative 4.

Table 3-11 shows the amount of specified and temporary road miles proposed in each VCU for each of the alternatives. Temporary roads would have their drainage structures removed after the sale is complete, but would still provide foot access into the VCU. The difference between temporary and specified roads, from the recreationists' perspective, is that temporary roads would eventually close in from revegetation efforts and would be less accessible than specified roads over time.

Table 3-11
Miles of Specified and Temporary Road in Each Alternative

	Canal VCU	Hoya VCU	Total Miles
Alternative 1	**1.7**	**8.4**	**10.1**
Specified Road	1.2	7.3	8.5
Temp Road	.5	1.1	1.6
Alternative 2	**5.3**	**8.8**	**14.1**
Specified Road	4.1	7.2	11.3
Temp Road	1.2	1.6	2.8
Alternative 3	**0**	**9.0**	**9.0**
Specified Road	0	7.3	7.3
Temp Road	0	1.7	1.7
Alternative 4	**0**	**2.6**	**2.6**
Specified Road	0	2.6	2.6
Temp Road	0	0	0

Effects to Recreationists and Outfitter/Guides

There are two basic ways this sale may affect recreationists and outfitter/guides. First, the actual logging activities proposed in the alternatives would impact anyone recreating or taking clients into the Bradfield Canal over the life of the sale. These activities may also affect guides and recreationists passing the mouth of the Bradfield Canal on their way to Anan or other areas. Second, response to the Draft Environmental Impact Statement suggested that we needed to examine the impacts of the proposed activities on the economic potential of this area for the tourism industry. We have included an additional section to attempt to address this concern.

Direct Effects to Recreationists and Outfitter/Guides

There was a concern from recreation users and outfitter/guides about how the activities associated with this sale would directly effect them throughout the life of the sale. People expressed concern about the presence of helicopters in the area making noise and disrupting the wildlife they had come to see (particularly the bears at Anan). Two mitigation measures are included in all action alternatives to address these concerns. First, helicopter yarding would not be allowed in the Canal VCU between May 1 and June 15, to avoid disturbance to bears with cubs upon emergence from hibernation. Second, helicopter flights associated with harvest operations would be restricted within 1.5 miles of the Anan Wildlife Viewing Area from July 1 through August 31. The second restriction would not affect yarding operations, but would direct any helicopter flights associated with the sale away from the concentration of visitors at the Anan Wildlife Observatory during the high use period.

Many people who frequent the general area of the proposed sale (particularly guides who take visitors to Anan) were concerned about what they were likely to experience when travelling near the Canal Hoya Project Area as a result of this sale. Although it is not possible to say exactly what to expect during the life of a sale in any given year, we have taken a "best guess" approach to describing what is likely to occur if a given alternative is selected. Actual activities may vary once the sale is sold.

Table 3-12 displays the type of activities that may be encountered which could affect users recreating near the Canal Hoya Project Area.

Table 3-12
Logging Activities Associated With Each Alternative

	Canal LTF Use	Hoya LTF Use	Road Construction	Cable Logging	Heli Logging	Tugs/ Rafts	Crew Traffic	Barges fo Heli Yard Water
Alt 1	Yes	Yes	2 seasons	3 seasons	3 seasons	3 seasons	3 seasons	3 season
Alt 2	Yes	Yes	2 seasons	3 seasons	3 seasons	3 seasons	3 seasons	None
Alt 3	No	Yes	2 seasons	3 seasons	3 seasons	3 seasons	3 seasons	3 season
Alt 4	No	Yes	1 season	2 seasons	2 seasons	2 seasons	2 seasons	2 season

Alternative 1 and Alternative 2 would be similar in that they would likely require a minimum of three years to complete. Both would propose LTF construction at the Hoya and Canal sites, which would likely take place the first year of the sale. Road construction would likely continue into the second season, with cable yarding and helicopter yarding expected throughout the 3 years. Both would require log storage near both LTF's, with associated tugs and other miscellaneous crew traffic. A main difference between the two alternatives is that Alternative 2 would not require any barges for helicopter yarding, as all logs removed by helicopter would be yarded to the road system and trucked to the LTF's.

Alternative 3 would likely take three years to complete, with expected activities similar to Alternative 1 (including the necessity to have barges for helicopter yarding). The main difference between Alternative 3 and the first two alternatives discussed is that Alternative 3 would not construct any roads or LTF in the Canal drainage. Alternative 4 would have the least impact to visitors using the area, as it would likely require two years for completion, and would not propose any road building or LTF construction in the Canal drainage.

Economic Value to the Tourism Industry and Potential Effects

There are several outfitters and guides who use the area immediately surrounding the proposed Canal Hoya Timber Sale. The Canal VCU is viewed by guided groups that visit the Anan Wildlife Observatory, while the entire project area is viewed by guided groups in the Bradfield Canal area that are fishing, hunting, and participating in other guided activities. It is difficult to determine exactly how "valuable" the project area is to these operators. For many guides, the area serves as only one factor that makes up tour packages for their clients.

Anan Guides
The Wrangell Ranger District has been monitoring all visitors, including guided use of the Anan Wildlife Observatory since 1991. The district began an environmental analysis to determine the carrying capacity of the site when it became apparent that the observatory was receiving heavy use by guided visitors as well as the general public. The Anan Management Standards Environmental Assessment was published in April of 1996 and set upper limits for the amount of service days the district would allocate to the guiding industry. In 1997 the Forest Service allocated 1,076 priority use service days to the guide industry.

There are three basic categories of priority use guides who rely on the Anan Wildlife Observatory for part of their overall business: 1) guides who boat clients from Wrangell, 2) guides who fly guided groups from Ketchikan, and 3) guides who integrate a stop at Anan in their multi-day Southeast Alaska excursions. Of the 1,076 priority use service days allocated in 1997, 517 were allocated to guides based in Wrangell, 371 were allocated to Ketchikan-based air charter services, and 188 were allocated to guides who integrate a stop at Anan into their Southeast Alaska excursions.

In 1997, there were an additional 50 service days available by lottery to priority use guides. It is impossible to predict which category to include them in, as that will change from year to year. Those priority service days are not included in the table below. Approximately 100 service days are allocated to temporary permitted users at Anan each year. Since temporary users change from year to year, their numbers were not included in these projections.

To determine the overall annual economic value of Anan to the guiding industry, the average price per trip from the three categories of guides above was determined using available use reports and gross income reported for trips in 1997. That number was multiplied by the number of service days allocated to each category in 1997. Although the priority use guides did not use all the service days allocated to them in 1997, we are projecting the present available value of Anan to guides on the assumption that they use each service day available to them.

Table 3-13
Present Available Value of Anan Wildlife Observatory to the Guiding Industry

Guide Category	Average Price/Trip	Service Days Available	Present Available Value
Wrangell-Based Boat Charters	$135	517	$69,795
Ketchikan-Based Air Charters	$225	371	$83,475
Multi-Day Boat Charters	$295	188	$55,460
Total Value	-	-	$208,730

The average price per trip for each category was calculated as follows:

Wrangell-Based Boat Charters - Use reports were available from seven of the eight guides in this category. The actual gross income reported for this category of guides during the priority use period in 1997 ($73,999), was divided by the number of clients taken (549). This resulted in an average of $134.78/trip, which was rounded up to $135.

Ketchikan-Based Air Charters - Use reports were available from one of the two guides in this category for 1997. The actual gross income reported during the priority use period ($24,557), was divided by the number of clients (109), which resulted in an average of $224.38/trip. That number was rounded up to $225.

Multi-Day Boat Charters - This number is more difficult to calculate, as the type of trip offered by this category of guides varies widely. Use reports were available from five of the eight guides in this category. The actual price charged to each client for the entire trip was divided by the number of days in the trip (assuming that a visit to Anan generally constituted one day's activities), resulting in a price per day. We used that number as the average price per trip, realizing that it is probably higher than the actual value of Anan to the trip because there are other amenities that constitute a full day's value. In 1997, guides in this category took 106 clients to Anan. The total gross income attributed to Anan from this category of guides was $31,224. Dividing that by the 106 clients, we arrived at $294.56/client, which was rounded up to $295.

Effects to Anan Guides

The proposed Canal Hoya Timber Sale may affect guides that take clients to the Anan Wildlife Observatory in three basic ways: 1) the view of the area from the primary boating route from Wrangell to Anan, 2) the actual logging activity during the life of the sale, and 3) the potential for the sale to impact the bears they come to view.

The result of logging the Canal VCU may be apparent to those guides that boat clients from Wrangell to Anan. Most guides take the Back Channel route and will view the area as they pass Blake Island on their way to Anan. The potential effects to scenery resulting from this proposed sale are discussed earlier in this section, starting on page 3-18. The most important viewpoint for guides who boat directly from Wrangell to Anan is the Blake Island Viewpoint (see Blake Island Viewpoint, page 3-20)

The actual logging activity may have an impact to the clients, but it's impossible to say that the impact will be positive or negative to all. For example, some clients may see the logging activity as detracting from their expectations that they are visiting a wild place with little to no development. Others, however, may find the logging activity interesting, especially if they've never seen helicopter yarding in action. In this sense, the logging activity may actually serve to enhance their overall experience. The difference between the alternatives, based on the length of the sale and the actual activity that clients may witness is discussed earlier in this section (see Direct Effects to Recreationist and Outfitter/Guides, page 3-35).

Finally, the proposed sale has the potential to effect the Anan bears. Any loss of viewable bears at Anan has the potential to seriously effect the guides opportunity to market trips to Anan for bear viewing and would lead to less customer satisfaction. The potential impact to Anan Bears is discussed in depth in its own section in this document (see Anan Bears, page 3-40).

Outfitters and Guides Using the Bradfield Canal

In addition to guides using Anan, the Forest Service also authorizes use to outfitters and guides for the Bradfield Canal, to base a portion of their guided activities. Activities provided by guides include: big game hunting, stream fishing including steelhead, waterfowl hunting, camping, hiking, wildlife viewing, sightseeing, and photography. Rates charged to clients vary widely depending on the length of the trip and the activities provided.

Attempting to estimate the value of the Bradfield Canal, or the Canal and Hoya VCU's, to these types of guides is more difficult than trying to estimate the value of Anan to guides. The economic potential for Anan is based on the carrying capacity of the site, and the reasonable assumption that all service days could be used by the guides. The carrying capacity at Anan resulted in a reduction of overall service days (from service days reported in 1995). There has not been a need to reduce the number of service days available to guides using the Bradfield Canal, because the guides are not approaching the carrying capacity of the Bradfield Canal, as identified in the 1997 Stikine Area Outfitter and Guide Environmental Assessment (EA). The EA determined the carrying capacity for guided activities at 701 Recreation Visitor Days (RVD's) for the Bradfield Study Area. In 1996, only 94 RVD's were used by guides (approximately 14% of the capacity), leaving plenty of room for growth. It is unlikely that guided activities would approach capacity in the near future.

Many of the activities provided by guides in the Bradfield Canal are not reported to the Forest Service. Any activity whereby clients do not utilize the National Forest uplands do not need to be reported. Therefore, we do not have definite numbers for saltwater based activities such as sightseeing, photography, and wildlife viewing. Of those activities that are reported to the Forest Service, the value of the trips to the guides vary widely. It would be irresponsible for us to try and determine a price per day for guided activities and project that into a potential value of the Bradfield Canal, as we have done for the Anan Guides. It is impossible to make similar assumptions based on price per day, service days available, and total potential value.

Perhaps a more useful way to examine the effects of the proposed sale on these type of guides would be to discuss the effects that would be more important to the different types of activities offered by guides.

Big Game Guides

Outfitters and guides who guide for big game hunts would be most affected by roads and harvest that effect the habitats of the species they rely on. The big game species hunted in the Bradfield Canal area include brown bear, black bear, and mountain goat. The effects to brown bear and black bear populations and habitats are examined in the Anan Bears section of this document (starting on page 3-40). The effects to wildlife in general are discussed in the Wildlife Habitat and Species Conservation section (starting on page 3-60). Mountain goats are a Management Indicator Species (MIS) for the Tongass National Forest, and these effects are discussed starting on page 3-79.

Stream Fishing Guides

Outfitters and guides who conduct trips in the Bradfield Canal for stream fishing rely on the available fish populations. They may be affected by roads providing access to the streams they visit. Effects to freshwater resources and fish habitat are discussed in a later section of this document (see Freshwater and Marine Resources, page 3-86)

Marine Sport Fishing Guides

Outfitters and guides who conduct trips in the Bradfield Canal for marine sport fishing in the waters adjacent to the project area could be affected or temporarily displaced by logging activities as described in Marine Resources, page 3-94.

Water Fowl Hunting Guides

Outfitters and guides who conduct water fowl hunting trips concentrate their activities on the flats of the Bradfield River. This area will not be affected by the proposed Canal Hoya Timber Sale.

Wildlife Viewing Guides

Effects to different wildlife species are examined later in this document (see Anan Bears, page 3-40, and Wildlife Habitat and Species Conservation, page 3-60)

All Guides

All outfitters and guides who use the Bradfield Canal in any capacity, could be affected by the visual results of the sale, the recreation potential of the area, and the logging activities proposed in each alternative. The effects to scenery are discussed earlier in this section (see Scenery, page 3-14). Effects to the recreation potential are discussed in the section titled "Post Sale Road Management and Recreation Potential" (starting on page 3-34). Direct effects that might result from logging activities are also discussed earlier in this section (see Direct Effects to Recreationists and Outfitter/Guides, page 3-35).

Issue Three: Anan Bears

"Great as always"!
--Wrangell, AK

"Fantastic! Bears galore!"
--Bristol, England

"One of the highlights of my Alaskan trip"
--Sydney, Australia

"Really great!! This is what Alaska is really all about."
--Danville, CA

"Saw bears almost all the time, great!"
--Eau Claire, WI

"Dream come true!"
--Wrangell, AK

"Nothing like it anywhere."
--Oklahoma

Many tourists visit Southeast Alaska to get a glimpse of a bear - "the symbol of the Alaskan wilderness" (Schoen et al. 1992). The Anan Wildlife Viewing Area, located 1.5 miles to the west of the Canal Hoya Project Area boundary, is the kind of place where tourists and locals can make this dream a reality. The pink salmon that return to Anan Creek in July attract numerous eagles, seals, gulls, bears and humans. More than 2,000 people visit Anan each year to view wildlife, especially the 30-60 black bears and 12-20 brown bears that frequent the area between July and September. As can be seen by the excerpts to the left from the 1997 visitor book, Anan is an internationally renowned site and a world-class bear viewing area.

This is a wildlife and a recreation issue since the people who visit or make their living guiding visitors to Anan are concerned about the effects of the Canal Hoya Timber Sale on the bears. Guides are concerned about the disturbance caused by nearby logging operations on their business. We must consider future economic benefits of tourism since popularity of this viewing area is rapidly increasing. In 1997, 2,504 visitors stopped at Anan -- an increase of 300 compared to the previous year.

We have studied the distribution of the Anan bears through a radio telemetry study in cooperation with the Alaska Department of Fish and Game. In 1993, 13 black bears and one brown bear were radio-collared at the Anan wildlife viewing area. We tracked these bears for 3 years from a fixed-wing aircraft and plotted their monthly location on aerial photos (these points are referred to as bear "relocations" throughout this document). Since then we have analyzed habitat use of these bears and their distribution throughout the project area (USDA 1997c). It is good to keep in mind that in 1993, the year the bears were trapped, berries were abundant and the pink salmon run in Anan Creek was lower than average. This resulted in fewer bears than usual using Anan; therefore our results may be conservative and not represent bears that are occasional visitors or have a broader distribution (large home range). In other words, a differing bear use pattern may emerge if the study was repeated and collaring was done during a poor berry year.

We have made wildlife resources and wildlife viewing a top priority for the Anan watershed but we know that the Anan bears do not stay within these boundaries (USDA 1996). From the results of our Anan telemetry study we discovered that the general pattern of movement for the Anan bears is east/west. The Canal and Hoya VCUs where we are planning a timber sale lie to the east of Anan (Figure 3-24).

To gain an understanding of the effects of the Canal Hoya timber sale on bears in general, the habituated Anan bear population and viewing opportunities at Anan we discuss the following concerns:

- The distribution of Anan bears in the Canal Hoya area
- The effect of habitat changes to black bears
- The effect of habitat changes to brown bears
- How roads and other human disturbances impact bears
- The local bear population and existing mortality rate
- What we expect of habituated bears (bears that tolerate people)

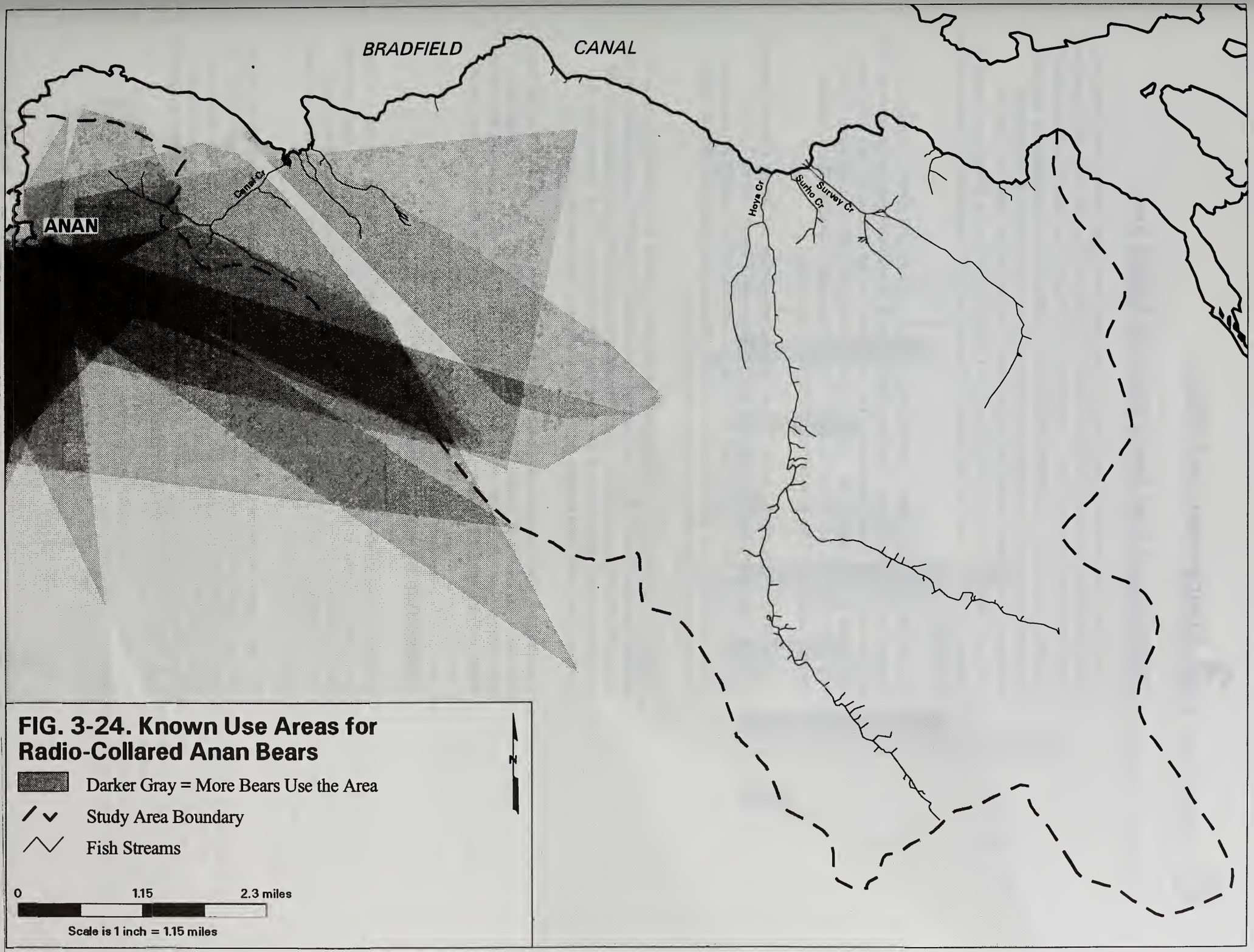


FIG. 3-24. Known Use Areas for Radio-Collared Anan Bears

Darker Gray = More Bears Use the Area

Study Area Boundary

Fish Streams

Distribution of Anan Bears Within the Project Area

Nine of the 14 radio-collared black bears at Anan denned or foraged in the Canal Hoya area. If we extrapolate this to our population estimate -- as many as 45 of the Anan black bears may spend time in the Canal Hoya area. Another way of looking at our data is to assume that the number of relocations for each bear that falls within the project area represents the amount of time that bear spends in the project area. Using this assumption, ***Anan bears spent an average of 23% of their time in the project area*** -- 15% within the Canal VCU and 7% within the Hoya VCU. The Canal Hoya project area is well within the home range averages we reported for the Anan bear population --3.5 square miles for females and 13.9 square miles for males.

We analyzed the distribution of certain groups of bears, specifically; females, regulars at the observatory and brown bears. The ***four collared female black bears spent an average of 42% of their time in the Canal Hoya area.*** The one brown bear we collared for this study spent 55% of her time in Canal Hoya. There were six collared bears that are considered regulars -- they repeatedly show up at the Lower Falls and are habituated to people. These ***regulars spent an average of 23% of their time within the project area.***

Anan bears appear to use the project area more frequently during the Spring, Fall and denning periods. ***Canal is an important denning area for Anan black bears.*** Of the 25 den relocations; 48% were within Canal, 48% within Anan, 0% in Hoya and 4% in other areas. Canal relocations were primarily picked up during denning, Spring and Fall (in that order). The majority of Hoya relocations occurred in the Spring.

Anan black bears frequent Canal Hoya during the hunting season but currently appear to be relatively inaccessible. 72% of the black bear relocations in Canal Hoya occurred during the black bear hunting season (Sept.1 - June 30) as compared to 48% of the relocations for the entire project area. Relocations of the one collared brown bear in Canal Hoya occurred outside of the brown bear hunting season (2 relocations in June and 4 in August).

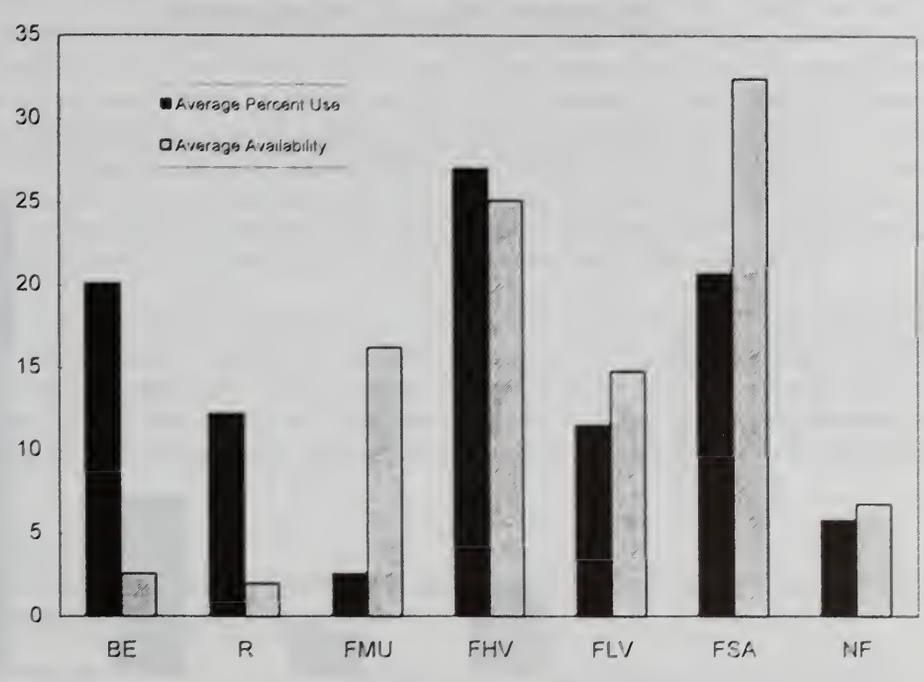
The current likely area for human-bear encounters is along the beach. The bears in our study frequented the interior of Canal Hoya more than the beach. Only 13% of the Canal Hoya relocations fell within 500 feet of the beach compared to 87% of the locations in the interior. However, beach and estuary areas were important habitat types for Anan bears (see below).

Habitat Use by Black Bears

Black bears seek out different food sources during different seasons of the year and as a result use a variety of habitat types. In the Spring, bears feed on newly emergent vegetation found along the beach or in low elevation forests. During the early summer, bears move to mid-elevation habitats to feed on salmonberries and deer cabbage. In the Fall, they return to lower elevation riparian areas to feed on spawning salmon.

The most important habitat types for black bears in general and for black bears in our project area are riparian, beach, estuary and productive old growth forested stands (Figure 3-25). The Anan bears chose beach, estuary and riparian habitats over all other habitat types based on a use/availability analysis (USDA 1997c). We did not find a significant difference in black bear use of low and high volume forest for the bears we had radio-collared; however, forested high volume was the third highest ranking cover type.

Figure 3-25
Average Percent Use and Average Availability of Habitat Types for Anan Bears



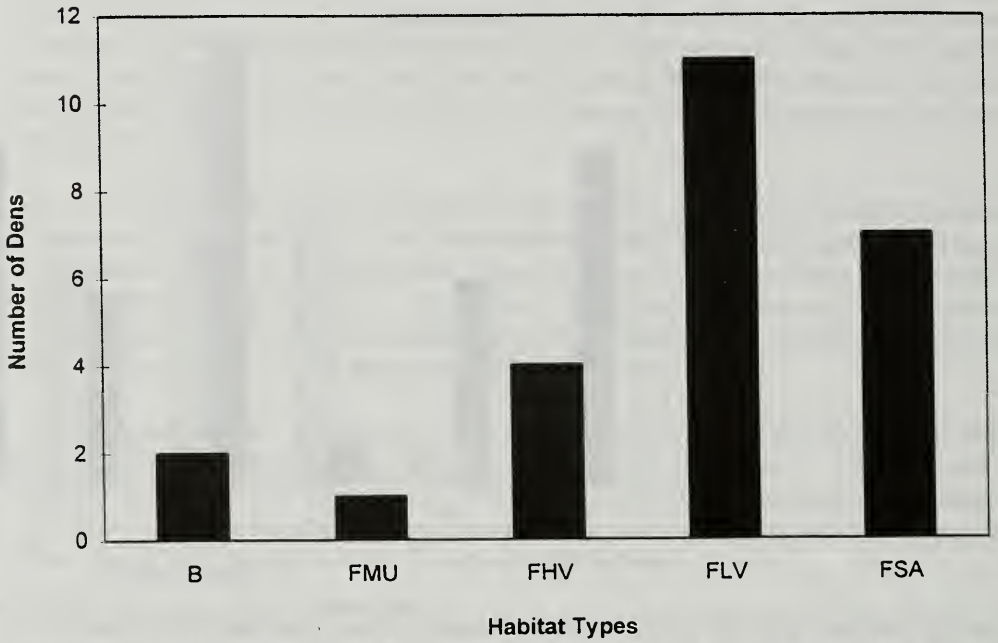
*BE = beach/estuary, *R = riparian, FMU = forested muskeg
FHV = forested high volume (>20,000 bf/acre), FLV = forested low volume (<20,000 bf/acre)
FSA = forested subalpine, NF = nonforest
* = significant use

Cover is second only to food in determining the suitability of an area for bears in the Black bear Habitat Capability Model. Bears prefer a diversity of habitat types, but they will not forage far from the cover provided by mature forest stands (Suring 1993a). Females with cubs are especially sensitive and often will not forage more than 100 meters from forested cover-- an area where they can take refuge if threatened (Herrero 1978, Rogers 1977). Forested corridors are important for migrating black bears since they seek forested cover to escape from brown bear predation and hunters (Chi 1996).

We were unable to analyze the use of clearcuts by Anan bears but research in other areas indicates that the benefits of clearcuts to bears are short-lived. Clearcuts provide forage for black bears in the form of berries and receive high habitat suitability scores. These same areas are considered completely unsuitable after 25 years when canopy closure of the stand severely reduces available food supplies (Suring 1993a). Bear population increases caused by logging may be expected to decline as second-growth stands enter the phase of least forage production (Meehan, 1974).

Large-diameter trees are a critical habitat component for denning black bears. Black bears in coastal Alaska make extensive use of tree dens due to high ground moisture, limited soil development and variable snow cover (Erickson et al. 1982; Suring 1993a). All the dens (n=67) located for a study in coastal British Columbia were in or beneath large diameter (dbh = 40") trees or wooden structures derived from trees (logs, root boles, stumps) (Davis, 1996). Most of these dens were in yellow cedar (30%) or red cedar (28%). Although the black bear habitat model stresses the importance of high volume forested stands for denning, many of the dens in our study were in low volume stands (Suring 1993a, USDA 1997c).

Figure 3-26
Number of Den Locations by Habitat Type for Eleven Anan Black Bears
(25 locations; avg. = 2.3 dens per bear)



B = beach, FMU = forested muskeg, FHV = forested high volume (>20,000bf/acre), FLV = forested low volume(<20,000bf/acre), FSA = forested subalpine

Anan bears selected den sites within at least five different habitat types: beach, forested muskeg, forested high volume, forested low volume and forest subalpine (Figure 3-26). ***The presence of a few large trees (>40" dbh) and a dry site may be the critical habitat features selected for by coastal denning black bears (Davis, pers. comm).***

The availability of secure den sites is critical to female bears. Reducing the number of den sites can lead to an increase in the number of cannibalism incidents of denned females and cubs (Davis, pers. comm). Dens need to provide thermal cover and security at this critical stage of a bear's life cycle.

Den reuse may be as high as 50% for the Anan bear population indicating low numbers of adequate den sites in our project area (USDA 1997c). Den reuse is generally low (e.g. 5 percent) throughout the range of the black bear (Suring 1993a). High rates of reuse (50%) may occur in areas where suitable dens sites are not abundant (Lindzey and Meslow, 1977). There was a 28% reuse of dens by radio-collared bears in coastal British Columbia -- another area where coastal conditions may result in a shortage of dry, secure den sites (Davis 1996).

Effects on Black Bear Habitat

The effect of each alternative on black bear habitat changes with the location and size of units and by miles of road open to foot-traffic. Gated roads are less detrimental to bears than are roads open to vehicles but still result in lower habitat values due to the potential for bear-human interactions. We ran the latest version of the interagency black bear cumulative effects model to look at changes in the suitability of habitats by alternative (Suring et al. 1993a). Table 3-14 shows the acres of suitable high value habitat by alternative for black bear. Table 3-15 shows the percent of existing habitat capability remaining by alternative. Figures 3-27 and 3-28 show where the existing high value habitat is and the conditions under Alternative 2, which would have the greatest effect on highly suitable black bear habitat.

Habitat in the Canal Hoya project area is expected to be less suitable for black bears when located within 1 mile of a road open to foot-traffic or an access point (Suring et al. 1993a). A higher impact is expected if these roads are within 1/2 mile of an anadromous fish stream. Additional disturbance factors of the habitat model do not apply in this sale since we are not planning any permanent camps, garbage dumps, cabins, or roads left open to vehicle use.

Table 3-14
Acres of Existing Highly Suitable Habitat and Percent Remaining as High by Alternative for Black Bear.

Alternatives	Acres of high remaining	Percent of high remaining
Alt1	4524	44
Alt2	4180	40
Alt3	6253	60
Alt4	7607	74
Alt5	10339	100

Table 3-15
Percent of Exisiting Overall Habitat Capability Remaining by Alternative for Black and Brown Bear.

Alternatives	Black bear * (% habitat capability)	Brown bear * (% habitat capability)
Alt1	84	92
Alt2	81	90
Alt3	87	94
Alt4	91	96
Alt5	100	100

* percent is ratio of overall area hsi index values

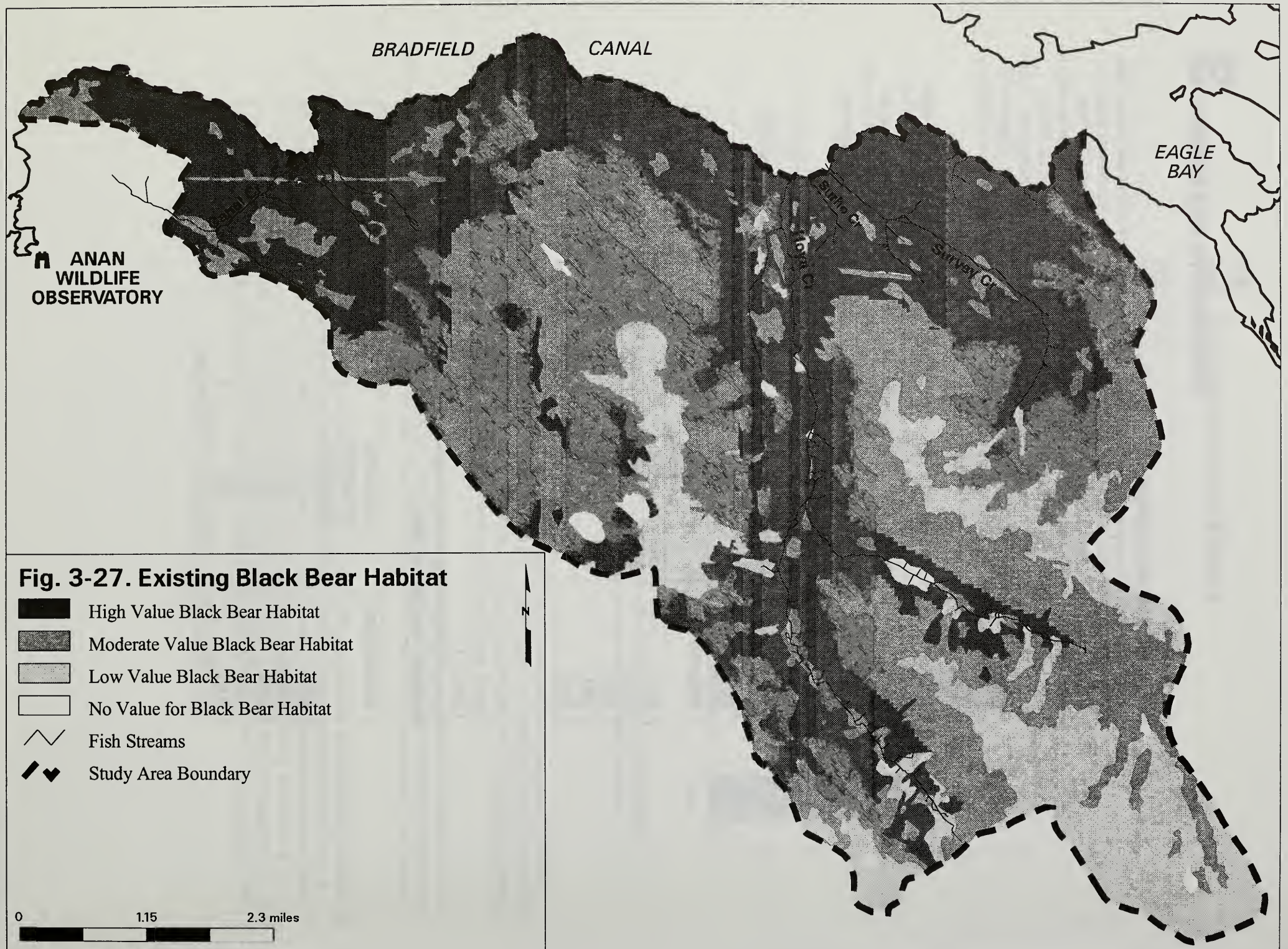


Fig. 3-27. Existing Black Bear Habitat

- High Value Black Bear Habitat
- Moderate Value Black Bear Habitat
- Low Value Black Bear Habitat
- No Value for Black Bear Habitat
- Fish Streams
- Study Area Boundary

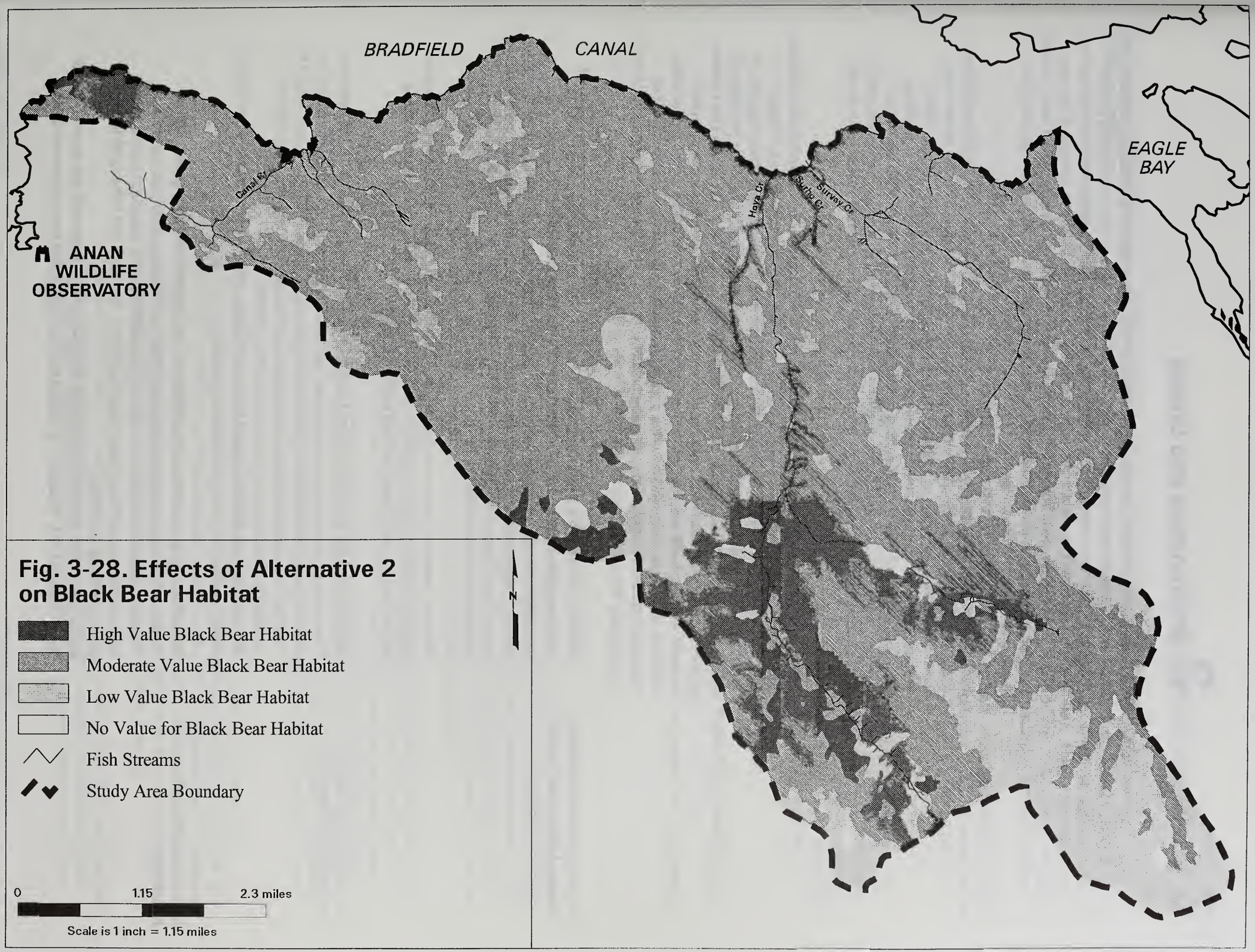


Fig. 3-28. Effects of Alternative 2 on Black Bear Habitat

The effect of road access on bears is greater than the direct effects of removing habitat (see roads and habituation discussion, page 3-51 and 3-57). 81% or more of existing habitat capability of the area is retained under any alternative. 26-60% of highly suitable habitats for black bear becomes moderately suitable under any alternative largely as a result of the road disturbance component of the model. These changes in habitat acres may reflect small overall changes in carrying capacity. Acres of habitat do not disappear with timber harvesting but move into a less suitable category.

Habitats that receive a significant amount of use by Anan black bears, the beach and estuary areas, will not be harvested. Measures to protect important foraging areas for brown bears have benefits to black bears as well (see brown bear habitat effects, page 3-50). Since salmon are a principal food source in July-September, alternatives that minimize risk to riparian habitat and fish production will benefit bears (USDA 1997a). All alternatives provide a high level of fish habitat protection (see Freshwater Resources discussion, page 3-86). In summary, Alternative 2 has the biggest impact on bear habitat values followed by Alternatives 1, 3 and 4.

Denning habitat will be maintained for black bears within riparian, beach and estuary buffers and within the old growth reserves. Davis (1996) states "the retention of stands within landscapes provides the best means for the maintenance of adequate numbers and supply of dens. Retention of patches within stands provides the next best option, and the retention of elements provides the only option better than supplying none at all." The Canal Old Growth Reserve was designed to include several known den locations (see Old Growth Reserve discussion, page 3-69) and to provide a buffer between Canal and Anan. We have included retention within our units with the objective of maintaining den trees. Below is a list of recommendations for maintaining denning habitat (Davis 1996) and a description of how we are applying these mitigation measures within all alternatives:

We have protected important denning habitat and would retain denning trees.

- **Identify areas with high densities of dens and manage for retention of adequate amounts and distribution of denning habitat.**
  Landscapes should contain areas such as old growth reserves that contain quality denning habitat. Denning habitat should be uniform across the landscape since the portion within the old growth reserve will only provide dens for a portion of the population. "The supply of dens should occur across the landscape and not be concentrated into a few patches ".
  We have protected important denning habitat within the Canal Old Growth Reserve. Denning trees would be retained across the landscape within harvest units using reserve clumps and diameter-limit prescriptions.

We would protect habitat around known den sites.

- **Retain patches of trees around dens found in trees in areas to be clearcut.**
  Trees with entrances above ground level are especially important and should always be retained in wind-firm patches. Wildlife tree patches containing den structures should be > 0.5 ha. It is important to retain more than just the standing tree since vegetational complexity around the den site is important to denning bears.
  We would protect habitat around known den sites. We would attempt to place reserve clumps around any new dens that are located.

Some large green trees would be retained

- **Retention of green trees should focus on large declining green trees.**
  Patches of leave trees should contain trees that have denning potential in the future. "Yellow cedar and western red cedar are probably the most important source of den structures because of their decay characteristics". Hemlock and Sitka spruce are also used as denning structures.
  Large green trees would be retained in reserves and for units with an upper diameter limit. Units 41, 44, 45 and 47 in Canal have an upper and lower diameter limit.

We would avoid disturbing denning black bears.

- **Timber harvesting should avoid displacing denned black bears.**
  Activities that induce den abandonment should be avoided. Female black bears with nursing cubs may remain at the den site into May. Activities should be avoided within 30 meters of the den site until the bear has left on its own volition. Harvesting during the summer when bears have left the den will mitigate these effects. Black bears have been reported to abandon dens and their cubs when closely approached by humans or other predators.
  We would avoid disturbing denning black bears by limiting activities around any active dens discovered during logging operations. A timing restriction in Canal would reduce the amount of helicopter disturbance during the Spring (before June 15th) when females and cubs may be at den sites

- **Retain large pieces of coarse woody debris (CWD) in new clearcuts.**
  Logs should be 40" in diameter and 15' long. Logs removed from fallen trees should be cut 15' from the rootwad. Stand activities such as thinning should not disturb existing pieces of CWD. Cedar logs that are beginning to show signs of decay should be retained. Salvage activities and firewood cutting should be regulated to ensure that denning capability is not compromised.
  Large logs would be retained within Units 41, 43, 44, 45 and 47.

- **Selected large trees should be cut >6' above their base (high stumping) to allow for the formation of den sites under stumps.**
  We would apply high stumping to selected trees identified as suitable den sites within Units 44, 45 and 47.

Habitat Use by Brown Bears

Alaska is one of the few remaining areas of the world with healthy brown bear populations and the future of these populations is "inextricably linked with forest management" (Schoen el al. 1992). Brown bears have been eliminated from 99% of their former range and in 1975 they were listed as threatened in the United States south of Canada (Wilcox 1996). Schoen (1992) states "Loss of habitat to human encroachment and resource development is a serious problem for bear management in the contiguous 48 states and elsewhere".

As with black bears, habitat use of brown bears varies seasonally, which is believed to be a response to seasonal difference in food quality and availability. Bears emerge from dens in April and May and seek out old growth forests, coastal sedge meadows and south-facing avalanche slopes. In early summer (mid-June through mid-July) bears move to forested slopes and meadows to seek out newly emergent vegetation. From mid-July through early September most bears move to riparian habitats, primarily spruce devil's club communities, to feed on anadromous fish. Some bears (primarily females) do not use coastal fish streams and are considered "interior bears" (Schoen et al 1994).

Brown bear population declines can be expected as a direct result of habitat loss. On northeast Chichagof, a 23% decline in brown bear populations was predicted to occur in 50 years after a 50% removal of harvestable timber (Schoen 1994). Riparian areas, floodplains and late successional forested stands are important habitat types for brown bears (Schoen et. al 1994). The Forest Plan recommends that a "minimum 500 foot no-harvest riparian buffer be maintained along streams considered important for brown bear foraging."

Clearcuts are not used extensively by brown bears. During a radio-collar study on Chichagof Island, only 2.8% of 854 relocations of radio-collared bears occurred in clearcuts (Schoen and Beier 1990). Although clearcuts occurred frequently along low elevation valleys and

adjacent to streams -- areas used extensively by bears in late summer - they were essentially avoided by brown bears (Schoen and Beier 1990). Many of the berries (devil's club, currant and salmonberry) which brown bears prefer are more abundant in riparian and avalanche slopes than in clearcuts. In the habitat model for brown bears, clearcuts receive a lower habitat suitability ranking than old growth. Unthinned second growth stands (25-150 years) have no habitat value to brown bears due to the lack of understory vegetation (Schoen 1994).

Generally forest management activities have minor effects on brown bear denning habitat (Schoen et al. 1992). Most bears move to upper elevations by mid-September before denning. Although cave denning is common, dens are also commonly observed at the base of large old growth trees and snags. Fifty-two percent of brown bear dens on Admiralty Island occurred in old growth habitat (Schoen et al. 1992). To minimize loss of denning habitat as a consequence of logging, Schoen et al (1987) recommend avoiding logging on mid-volume (20-30 mbf), hemlock-spruce stands on >20 degree slopes above 300m elevation adjacent to area of brown bear concentrations.

Effects on Brown Bear Habitat

The effect of each alternative on brown bear habitat changes with the location and size of units and by miles of road open to foot-traffic. We ran the latest version of the interagency brown bear cumulative effects model to look at changes in the suitability of habitats by alternative. Disturbance factors listed in the brown bear model that apply for this timber sale include: access points (LTF) and disturbance within 1 mile of temporary roads. Gated roads are less detrimental to bears than are roads open to vehicles, but still result in lower habitat values due to the potential for bear-human interactions (Schoen et al. 1994). All camps are floating and there would be no landfills as a result of this project. We also analyzed the impact of each alternative on brown bear denning habitat. Tables 3-19 and 3-17 show the acres of highly suitable habitat and percent of area habitat capability remaining by alternative. Figures 3-29 and 3-30 show where the high value habitat is and the locations of units in Alternative 2, which would have the greatest effect on highly suitable brown bear habitat.

The effect of roads on bears is greater than the direct effects of removing habitat (see roads and habituation discussion, page 3-51 and 3-57). 90% or more of existing habitat capability of the area is retained under any alternative (Table 3-17 under black bear habitat section). All alternatives retain more than 90% of highly suitable brown bear habitat (Table 3-19). Changes in habitat acres may reflect small overall changes in carrying capacity. Acres of highly suitable habitat do not disappear with timber harvesting but move into a less suitable category. In summary, Alternative 2 has the biggest impact on bear habitat values followed by Alternatives 1, 3 and 4. Alternative 2 also removes more acres of denning habitat than other alternatives (Table 3-20).

Important brown bear foraging streams are protected under all alternatives. Most of the Hoya creek, survey creek and a tributary between the two (Surho creek) were identified as important brown bear foraging streams. No harvesting will be done within 500 feet of the anadromous fish spawning portions of those streams. Anadromous fish streams in Canal are limited in extent and are protected by the 1000 foot beach buffer. Since salmon are a principal food source in July-September, alternatives that minimize risk to riparian habitat and fish production will benefit bears (USDA 1997a). All alternatives provide a high level of fish habitat protection (see Freshwater Resources discussion, page 3-86).

Table 3-16
Acres of Existing Highly Suitable Habitat and Percent Remaining as High by Alternative for Brown Bear

Alternatives	Acres of high remaining	Percent of high remaining
Alt1	373	96
Alt2	379	97
Alt3	379	97
Alt4	381	98

Table 3-17
Acres of Brown Bear Denning Habitat and % Remaining by Alternative

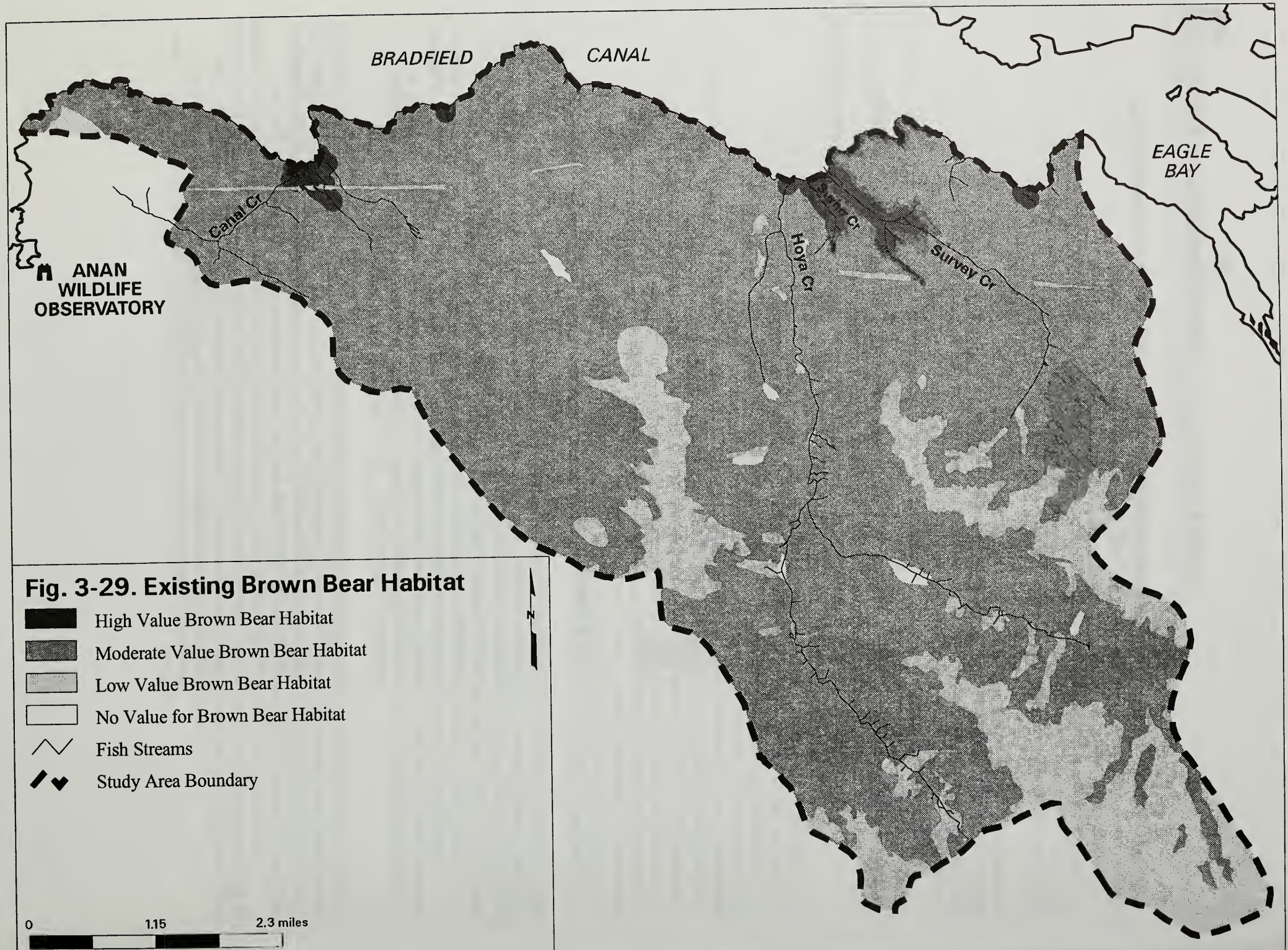
Denning habitat is defined as mid-volume stands, >20 degrees and > 300 meters in elevation (Schoen et al. 1992)

Alternatives	Acres of Denning Habitat	Acres Removed	% Remaining
Alt 1	1912	73	96
Alt 2	1851	134	93
Alt 3	1896	89	96
Alt 4	1905	80	96
Alt 5	1985	0	100

The Impact of Roads and Disturbances on Bears

Roads and other human disturbances (facilities, camps, dumps) lead to an increase in bear-human encounters which in turn may lead to bear population declines and reduced bear densities. ***Total density of black bears can be reduced by increases in human-related mortality (other than legal hunting mortality) that result from environmental disturbances*** (cited in Suring 1992). Black bear populations have been shown to decline in direct relationship to the extent of bears' interactions with people (Powell 1993). Mattson (1993) states that "direct-human caused mortality is the arguable cause of virtually all grizzly bear population declines ... and that human access is a primary mediator of this mortality "(Mattson 1993).

We know that roads and developments lead to increased bear mortality but can only estimate what that mortality rate would be. Legal hunting of bears can be managed but ***it is very difficult to control illegal kills, wounding loss and bears shot in defense of life or property***. "On the Kenai Peninsula in Alaska, where reporting is thought to be fairly complete, wounding loss of black bears was estimated to be 13-16% of reported kill based on mortalities of radio-marked bears "(cited in Sterling 1990). In 6 studies of marked grizzly bears, 26% of mortalities were caused by illegal harvests compared to 42% by legal hunting (McLellan 1990). Studies on Chichagof Island have demonstrated a direct relationship between the number of brown bear kills and cumulative kilometers of road construction (Titus and Beier 1991).


BRADFIELD CANAL
EAGLE BAY
Canal Cr
Hoya Cr
Survey Cr
ANAN WILDLIFE OBSERVATORY
Fig. 3-29. Existing Brown Bear Habitat
High Value Brown Bear Habitat
Moderate Value Brown Bear Habitat
Low Value Brown Bear Habitat
No Value for Brown Bear Habitat
Fish Streams
Study Area Boundary
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

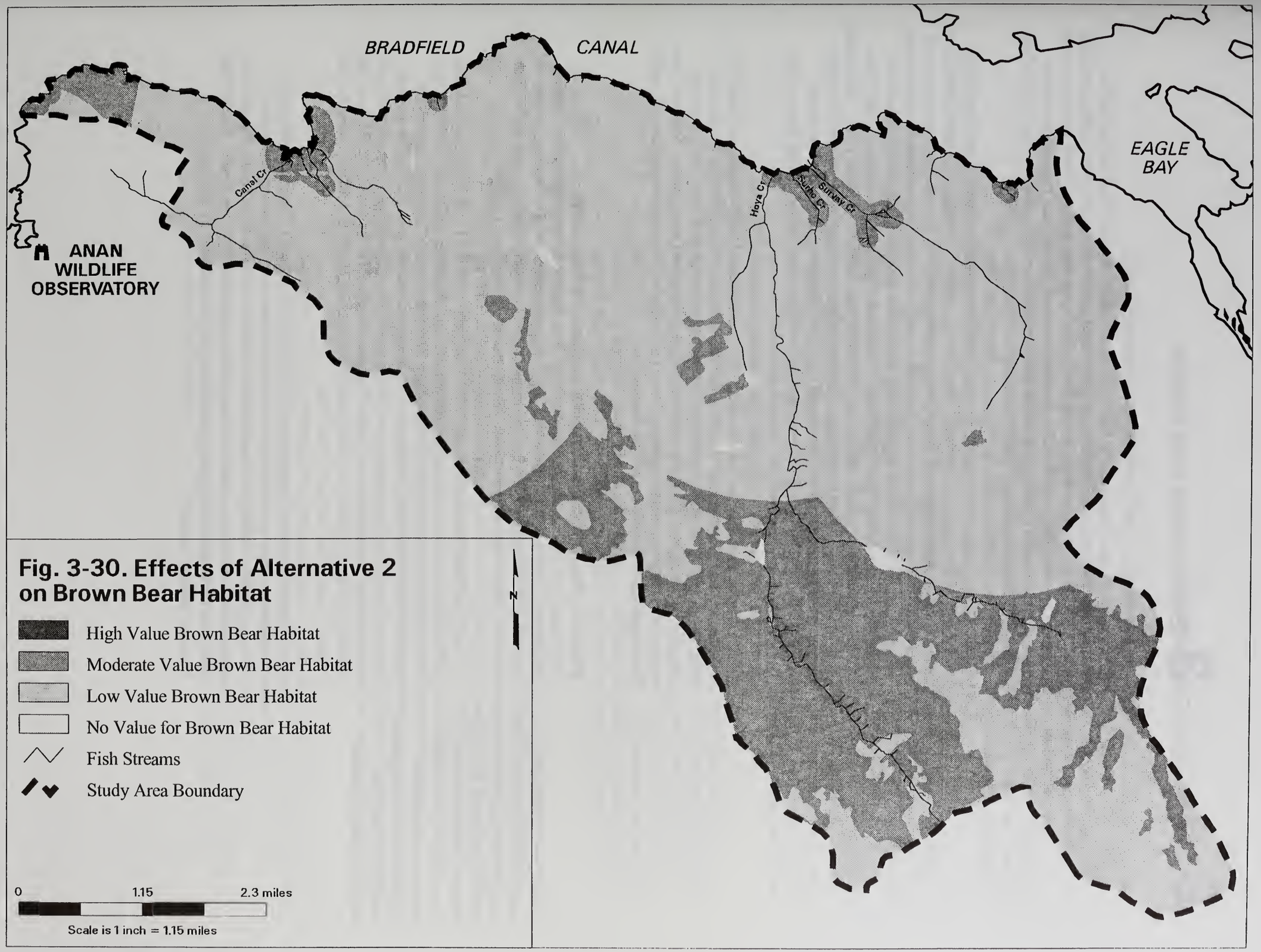


Fig. 3-30. Effects of Alternative 2 on Brown Bear Habitat

Human activity along roads and at facilities can also displace bears from critical habitat. Radio-collared brown bears on Chichagof remained much farther away from salmon streams in highly roaded and clearcut watershed due to a lack of cover, however their tendency to use roads and forest patches resulted in more human-bear encounters and increased mortality (Titus and Beier 1991). Black bears have been known to abandon dens and even cubs when disturbed at their denning location (cited in Davis 1996).

Human disturbances are an important component of the habitat model for both brown and black bear. Primary disturbance factors identified in the recent Habitat Capability model for brown bears include: permanent camps, communities, landfills, and vehicle-accessible roads (Schoen 1994). Open-pit dumps and permanent camps have the biggest impact on black bear habitat quality (Suring 1993a). Roads open to vehicles have the greatest impact on bears. Roads closed temporarily (gates) are more detrimental than those closed permanently since they will generally still have some level of off-road vehicle traffic (Schoen 1994) ***"All roads, regardless of closure, still have the potential for supporting additional human foot traffic which also influences bear populations."*** (Schoen 1994). Brown bears do not avoid secondary and blocked roads, thus they are likely to encounter humans along these systems (Titus and Beier 1991).

Disturbance as a result of timber harvesting may have a bigger impact on brown bears in the late summer (mid-July through mid-September). This period is believed to be the most critical time period for brown bears because they are concentrated along coastal salmon streams - areas where the most abundant and high quality food is available. Schoen (1994) states "we believe that brown bears are most vulnerable to human-induced mortality (aside from legal hunting) at this time and place".

Effects of Roads and Disturbances on Bears by Alternative

"Manage road use where concentrations of brown bear occur to minimize human/bear interactions and to help ensure the long-term productivity of brown bears. To meet this direction, develop and implement road management objectives through an interdisciplinary process"

The impact of roads and disturbances on bears is an important component of the habitat models and is reflected in these results (see habitat discussions). For bears in general we can compare this impact by evaluating the miles of road by alternative. Alternative 2 has more road miles than other alternatives followed by Alternatives 1, 3 and 4.

To further evaluate this impact on the Anan bears we applied a 1 mile buffer around roads and access points and calculated the average percent time spent within this buffer by the radio-collared Anan bears. We are assuming that "percent time" is represented by the percent of relocations that fall within this disturbance zone for each bear. The average percent time that Anan bears spent within the disturbance zone for any alternatives (other than no action) ranged between 2 and 13%. Alternatives 2 (13%) and 1 (12%) have the greatest disturbance impact on Anan bears. Alternatives 3 (6%) and 4 (2%) have the least impact because there are no roads in Canal.

Road impacts are partially mitigated by installing gates at both LTF sites to eliminate recreational vehicle use on the roads. The Forest Plan states the following standard: ***"Manage road use where concentrations of brown bear occur to minimize human/bear interactions and to help ensure the long-term productivity of brown bears. To meet this direction, develop and implement road management objectives through an interdisciplinary process"***

Bear Populations Within the Project Area

Baseline data on bear population density and composition is very important for bear management purposes but difficult to obtain (Miller 1990). In addition, there can be a significant lag effect time between when habitat degradation occurs and when habitat degradation effects show up in terms of a bear population decline (Doak 1995). "The costs associated with unintended population declines and the difficulties of detecting such declines until they are far advanced mandate a conservative approach to bear population management (Miller 1990)."

We have used habitat capability models in the past to estimate carrying capacity but these numbers have a high degree of error associated with them (see MIS discussion, page 3-78). Our models predict that habitat within this Wildlife Analysis Area (WAA -- Canal, Hoya and Eagle rivers but not Anan) will support 97 black bears (USDA 1991 - TLMP SDEIS). ADFG (1993) states that current black bear populations in GMU 1 remain stable and high. The carrying capacity of brown bears for this WAA was estimated to be 24 animals (USDA 1991 - TLMP SDEIS). ADFG (1994) reports the brown bear population in this area as stable but "bear-human interactions and conflicts from increased access and development remain a concern." ***Most of the long term concern for brown bear populations is related to the low density mainland bear populations*** (USDA 1997a).

Current legal harvest of black bears in our project area is low. Four black bears were harvested between 1980 and 1995 (USDA 1991 - TLMP SDEIS, ADFG harvest report 1997). Sustainable harvest rates for black bear range between 7-14% (Miller 1990, USDA 1991 - TLMP SDEIS). In the last ten years, one bear was taken in the Canal drainage and one in the Eagle river drainage, east of Hoya (ADFG harvest report 1997). The age/sex composition of black bears at Anan was stable during the course of a three year study. The relatively large proportion of large adult males suggests that this population is not heavily exploited. (Chi 1996).

Current legal harvest of brown bears may be at the upper limit of what this population can support. Eleven brown bear were harvested in this WAA between 1987 and 1995 which equates to an annual harvest rate of 5% if the population is at carrying capacity. Sustainable harvest rates for brown bears range from 4-5.7% (USDA 1991 - TLMP SDEIS, Miller 1990). Five of the eleven brown bears harvested were females which exceeds state management objectives for proportion of females harvested (ADFG 1995). ***One of three marked Anan brown bears, a 4 1/2 year old female, was harvested in the Eagle river drainage -- demonstrating the movement and susceptibility of this population across our project area.*** Eight of the eleven bears were harvested by nonresidents. ADFG reports that the percentage of successful brown bear hunters in GMU 1 that were non-residents increased between 1985 and 1990 from 13% to 30%.

It is very difficult to estimate how many Anan bears will be illegally harvested in the future or killed in defense of life and property (see road discussion, page 3-51). Chi (1996) states "with the increasing popularity of bear viewing and continued habituation of the bears to people throughout their lifetime these bears will be especially vulnerable to illegal hunting throughout the Cleveland Peninsula ...an increasing rate of commercial sales of bears parts makes this issue ("illegal hunting") even more critical for bears and the integrity of the ecosystem." (Chi 1996).

Effects on Bear Populations

--"No net loss of habituated/visible bears at the falls for more than two consecutive years. Cubs continue to use Anan as they become adults and are recruited into the population."

--"Maintain a well distributed bear age and sex ratio indicated by the continued use of the area by family groups, cubs that return as adults, and use by dominant males."

We know that the Anan bears do not stay within the Anan watershed and we know that they frequent the project area (see distribution discussion, page 3-42). The Anan Environmental Analysis (USDA 1996) lists the following objectives that relate to the local bear population:

-"No net loss of habituated/visible bears at the falls for more than two consecutive years. Cubs continue to use Anan as they become adults and are recruited into the population."

-"Maintain a well distributed bear age and sex ratio indicated by the continued use of the area by family groups, cubs that return as adults, and use by dominant males."

Given the size of the local black bear population and the current low level of hunting, we do not expect large changes in overall black bear density as a result of this timber sale (see habitat discussion). However, we do expect to lose individual bears -- especially those animals that are highly habituated. We cannot guarantee that objective one (above) would be met with any alternative, including no action. We may meet objective two if hunting pressure does not increase and/or if other mortality factors are controlled (illegal harvest, harvest in defense of life and property). Alternative 2 would have the biggest impact on black bear populations followed by Alternative 1, 3 and 4. Alternatives 3 and 4 have much less of an impact than 1 and 2 because they do not include a road in Canal. The average home range of Anan black bears falls within the Canal area and does not extend into Hoya.

All alternatives (other than no action) pose risk to brown bear populations by increasing access for the following reasons:

- There is a greater concern over the viability of mainland brown bear populations than for other subpopulations in Southeast (USDA 1997a). Risk to this population remaining viable is exacerbated by roading and human access.
- Current hunting pressure in the project area on brown bear takes 45-50% females, is increasing and may be at the upper limit of what this population can withstand.
- Loss of brown bears as a result of illegal take or bears shot in defense would add to this mortality
- Loss of habituated females (see discussion below) may have population impacts due to relatively low reproductive rates.

"Manage human/bear interactions to limit brown bear mortality from both illegal kills and defense of life and property. Work with the Alaska Department of Fish and Game to develop and implement a brown bear management program which considers both access management and season and bag limits to manage brown bear mortality rates within sustainable levels. "

As with black bears, roads pose the biggest problem and the ranking of alternatives matches that of black bears. Alternatives 3 and 4 create more risks for brown bears than for black bears since Hoya roads falls within their average home range.

We would mitigate effects on bear populations through road closures and the development of a bear mortality monitoring plan. Through an administrative order we would close roads to vehicle use during nonworking hours which would reduce the amount of hunting that occurs during the sale. The Forest Plan directs the Forest Service to develop management programs in cooperation with ADFG to address brown bear mortality with the following guideline: ***Manage human/bear interactions to limit brown bear mortality from both illegal kills and defense of life and property. Work with the Alaska Department of Fish and Game to develop and implement a brown bear management program which considers both access management and season and bag limits to manage brown bear mortality rates within sustainable levels. "***

Behavior We Can Expect from Habituated Bears

A goal for the Anan wildlife viewing area is to make people predictable to bears and to encourage habituation of bears (i.e. make bears tolerant of people). Making people predictable reduces the chance of 'surprises' to bears and negative encounters, as well as increasing the chances that bears will be seen. "Predictable and consistent interactions are instrumental in providing for safe visitor experiences by encouraging habituation of bears to the schedules and places of people (Aumiller 1994, Herrero, 1994)." .

We need to consider how habituated bears from Anan would react to "unpredictable" people encountered at Canal Hoya . Harvest units in the project area are as close as 1 1/2 miles from Anan - a distance that may be perceived as "far" to a human being and "not so far" to a bear. The behavioral study at Anan focused on the bears at that particular site and did not assess the behavioral response of bears to people on other drainages some distance away However, Chi (1996) reports that habituated bears did not act differently at the upper falls - an area where they did not necessarily "expect" to run into people (Chi, pers. comm). Other researchers have found that bears may be tolerant of people's activities in areas where interactions are expected and innocuous, but avoid or show aggression towards people when encounters occur in novel locations (Mclellan and Shackleton 1989). Brown bears that have been wounded by firearms may act aggressively toward people or abandon an area altogether (Gilbert 1993)

Habituated bears are more likely to come into contact with human food and are more likely to be killed than non-habituated bears. Mattson (1992) found that ***"human-habituated and food-conditioned bears were 2.9 times as likely to range within 4 km of developments and 3.1 times as often killed by humans compared with non-habituated bears.*** Bears that become food conditioned can become aggressive when seeking food from people (Olson 1993). Human garbage is a major contributors to bear attacks on humans (Herrero 1985). Habituated bears at the Mcneil River State Game Sanctuary were found to be safer in the absence of a food reward than wary non-habituated bears (Aumiller 1994)."

Females bears are more likely to become habituated to humans and may be more likely to frequent the project area. Females bears at Anan distribute their use evenly between the upper and lower falls indicating a higher level of habituation to people (Chi 1996). Subadults and females are more likely to be displaced by other bears from feeding areas (such as Anan). ***"High mortality of adult females and subadult males during small seed crop years was a consequence of their tendency to range closest to human facilities. They also had a higher frequency of human habituation compared with adult males."*** (Mattson 1992)

Effect on Habituated Bears and Anan Viewing Opportunities

Harvesting high-value habitat and increasing access with roads has the potential to impact habituated bears at Anan and affect recreational viewing opportunities . Habituated bears (bears that tolerate people) are ones observed on a regular basis and provide a viewing experience at times when other bears are not present. For example, in 1996 one subadult brown bear and one female with three cubs were present nearly every day and were "the brown bears" seen by visitors. In 1997, many visitors saw brown bears as a result of a return of these three cubs from 1996. One objective for the Anan observatory is: ***"No net loss of habituated/visible bears at the falls for more than two consecutive years. Cubs continue to use Anan as they become adults and are recruited into the population."*** We know that habituated Anan bears and female Anan bears spend a large percentage of their time in the project area (23% and 42%. See distribution discussion, page 3-42).

The biggest effect of the Canal Hoya timber sale on Anan bears would be the loss of habituated female bears as they encounter people along new road systems. ***Female bears***

with cubs and brown bear females that frequent the Anan lagoon provide optimal viewing opportunities for people visiting Anan. Female bears are more likely to become habituated than males and experience higher mortality as a result (Mattson 1992, Chi 1996). ***Habituated female bears from Anan are the group most at risk as a result of hunting, illegal kill and kill in defense of life and property.*** This has implications for Anan viewing and for the brown bear population (see population discussion, page 3-55). The impact of removing a habituated female from the Anan bear population includes the loss of future offspring that learn habituation from their mother.

Increased access (roads and LTFs) would increase the likelihood of Anan bears coming into contact with human food. Extreme efforts are being taken at the Anan observatory to prevent food-conditioning since this leads to dangerous bear-human encounters. Conflicts between campers and bears have occurred at Anan in the past which is why camping is not allowed at Anan. The Anan EA states: ***"reduce, eliminate, or modify human behaviors that pose a high risk of temporarily or permanently displacing bears. Eliminate human behaviors that have a high to moderate risk of causing bears to become food-conditioned."*** We have mitigated some of these effects by choosing a floating logging camp where human garbage would be inaccessible to bears. We do not know how many people would choose to camp or hike along new road systems in the project area. Existing camping along the beach occurs infrequently. Gating roads at both access points would also mitigate these effects.

The potential for any of these alternatives to impact viewing opportunities is best represented by a measure of miles of road since this is where we expect human-bear encounters and loss of habituated bears and food-conditioning to occur. Alternative 2 has the greatest impact on habituated bears and viewing opportunities followed by Alternatives 1, 3 and 4.

Cumulative Effects Analysis

The Effects of Past Timber Harvesting and this Project on High Value Bear Habitat
The study area for the bear cumulative effects analysis included a large landscape and encompassed the areas we believed would be routinely traversed by Anan bears based on radiotelemetry locations and home range estimates. This landscape includes the Frosty Bay, Anan and Eagle River VCUs in addition to the Canal Hoya project area.

There would be no additional removal or reduction in quality of existing high value brown bear habitat with this timber sale . High value brown bear habitat is narrowly defined as riparian forest which is protected by current stream/beach/estuary buffers. Within this larger landscape there has been a 17% reduction in high value brown bear habitat due to past management activities.

High value black bear habitat is more broadly defined than high value brown bear habitat and encompasses most medium-volume forested stands. There has been a 24% reduction in high value black bear habitat as a result of past management activities across this landscape (Table 2, column 4). There would be a 2-22% reduction in existing high value black bear habitat as a result of the Canal Hoya timber sale (Table 3-18, column 3. Results for just the Canal and Hoya VCU are shown in Table 3-16). *As stated earlier, most high value habitat does not disappear but moves into a moderate value category as a result of the road disturbance buffer.*

Table 3-18
Percentage of highly suitable black bear habitat (>0.67) reduced in quality by alternative across the Canal, Hoya, Anan, Eagle, and Frosty VCUs

Landscape Scenario	Acres of high value habitat	% of existing high value habitat reduced in quality	% of original high value habitat reduced in quality
Original condition	37119	--	0
Existing condition	28242	0	24
Alt1	22711	20	39
Alt 2	21979	22	41
Alt 3	25056	11	32
Alt 4	25631	9	31
Alt 4 - no roads	27694	2	25

Future Projects and the Anan Bear Population

We looked at the expected impact on high value bear habitat as a result of timber harvesting and road-building over the next 100 years. Over the next 100 years future sales and road building could take place at Frosty Bay (5 possible miles of road), Point Warde (no road), Canal (2 possible miles of road) and Hoya (1 mile of possible road). Point Warde/Frosty (10 MMBF) is on the 10 year action plan. Sunny Bay - located over 15 miles south of Anan --is also on the 10 year action plan (10 MMBF, 7 possible road miles). Future road building in the Canal drainage (> 10 years from now) would have the biggest impact on Anan bears.

Roads are believed to be more of a concern for bears than direct habitat removal but we do not know how many miles of road will be built with future sales (above numbers represent the high value estimates based on current management strategies). In addition, a certain percentage of the roads that are built will revegetate within 30 years. We are mitigating road development at Canal Hoya with the addition of gates. Current use of the Frosty Bay road system which is now open to access is believed to be low.

In order to precisely predict population change for the Anan bears we would need to know more about population parameters such as survival. Even with this information, our population modeling would be based on many assumptions that are more linked to human social behavior than to habitat changes. In all likelihood, the Anan bear population is and will continue to be highly influenced by hunting regulations, public attitudes and human use of roads. The difficulty in accurately predicting the human factors creates a low degree of precision for projections of future bear populations.

Issue Four: Wildlife Habitat and Species Conservation

Biodiversity and Viability

The National Forest Management Act (NFMA) requires that the Forest Service provide for the diversity of plants and animals, based upon the suitability and capability of each National Forest, as a part of meeting overall multiple-use objectives (16 USC 1604(g)(3)(B). ''Biodiversity may be defined as the distribution and abundance of all of the plant and animal communities and species within an area, or as the variety of life and associated ecological processes (USDA 1996). As an example of one scale of diversity: the Tongass provides habitat for 54 species of mammals, 231 birds and 5 amphibians.

Maintaining biodiversity over time requires a close look at species viability. The Forest Ecosystem Management Assessment Team defined viability as ''the likelihood of a species persisting well distributed throughout its range for a century or longer'' (FEMAT 1993). The Forest Plan considers two wildlife groups in its viability assessment: the widely-distributed group and the endemic group . Species from the widely-distributed group that may be present in the Canal Hoya project area include: black bear, Canada lynx, wolverine, fisher, northern flying squirrel, river otter, mountain goat, silver-haired bat, California Myotis, Keen's Myotis, little brown Myotis and long-legged Myotis. Species in the endemic group that may be present include red-backed vole subspecies (Clethrionomys gapperi) and ermine subspecies (Mustela erminea).

29% of the world's remaining unlogged temperate rainforest is within the Tongass

Biodiversity and viability need to be assessed on a number of scales (global, regional, local). On a global scale, 56% of the worlds temperate rain forests remain undeveloped and 29% of the remaining unlogged acreage is within the Tongass. These numbers may explain why there is a high level of outside interest in the management of the Tongass. To gain a more regional perspective an ecosystem approach was applied to subdivide the Tongass National Forest into 21 unique ecological provinces. The area that includes the timber sale we are proposing has been classified as a part of the North Misty Fiords Province. This province is characterized by ''considerable topographic relief, as compared to South Misty Fiords with a colder, mainland-type climate with many glaciers. Vegetation occurs in long, narrow strips along the valleys and lower slopes of fiords. Much of the vegetation is muskeg, with cottonwoods in some of the river bottoms and subalpine fir along the Canadian border'' (USDA 1996).

Effects on Biodiversity and Viability

Based on the most recent regional analysis, this province is not one of the ten ''high risk'' areas for loss of biodiversity (USDA 1996). A committee report indicated a medium to high probability of maintaining species viability within this province over time (Suring et al. 1993b). However, Revilla Island and the Cleveland Peninsula to the south are considered ''high risk'' areas for species viability. The old growth reserves within the project area and the forested connections between these reserves are designed to maintain biodiversity and wildlife viability (see Old Growth Reserve and corridor discussions, page 3-69 and 3-67). Additional old growth habitat will remain within beach, estuary and stream buffers and on lands unsuitable for timber harvest.

Wildlife Habitat

Fragmentation

Loss of forested habitat, increased access and forest fragmentation are all impacts that occur with harvesting and ones we consider important in our wildlife analysis. Loss of forested habitat, at least temporarily, is the most obvious and unavoidable impact of logging. The development of roads and facilities associated with logging practices may increase access to game species and create dispersal barriers. "Forest Fragmentation" is the term we use to describe a process in which a forest block becomes subdivided into smaller more isolated units. When fragmentation occurs in a forested environment we see an increase in the amount of "edge" habitat and a decrease in ''interior" forested habitat. Fragmentation, which isolates small populations, contributes to decreased population distribution and increased likelihood of local extirpation.

The Tongass forest is characterized by fragmentation at many scales and is fragmented by different disturbance processes. On a small scale, single tree gaps within a 400 year old Sitka Spruce stand provide habitat for forest interior birds such as the Hairy Woodpecker. On a broader scale, large patches of wind disturbance of 10 acres or more create nesting habitat for songbirds such as the Orange-crowned warbler. From a regional perspective, the Tongass National Forest is highly fragmented due to numerous islands and dramatic topographic relief. Our wildlife analysis for this report covers disturbance and fragmentation at the landscape-level (the Canal and Hoya VCUs).

Timber harvesting is a relatively new disturbance within the Tongass forest ecosystem with many unknown impacts to wildlife species. In addition, timber harvesting adds to the level of fragmentation or edge that is occurring naturally. The effect of harvest-level fragmentation would vary with the dispersal of units and their proximity to large existing forest blocks. Simulation studies have indicated that when 50% of a watershed is harvested with a staggered setting design, little if any forest interior remains. Whether a particular patch pattern and degree of fragmentation is beneficial or deleterious largely depends on the characteristics of the species using the landscape (Morrison, Marcot & Mannan 1992).

Traditional wildlife and forest management techniques focused on maximizing edge habitat to benefit wildlife species such as the ruffed grouse. Today, a broader perspective of wildlife ecology recognizes that certain groups of wildlife prefer forest interior habitats not affected by openings or abrupt edges created by timber harvesting. Research indicates that many predators hunt along edge habitats thus decreasing the habitat suitability of these types for birds and small mammals. Species such as the goshawk, may hunt along edge types but prefer old growth forest conditions for nesting.

Effects on Fragmentation

We can compare the present level of fragmentation in Canal Hoya to each alternative by comparing the acres of edge and interior forest. Definitions of edge can be confusing because they vary for the species being considered and by habitat types. For example, studies indicate that the edge that is created between harvest units and forested habitat is biologically different from "natural" edge types. Research has shown that edge effects may extend up to two to three tree heights into the forest stand (Harris, 1984). Edge in our analysis is defined as the forested habitat within 300 feet of a nonforested opening of 5 acres or more. Figure 3-31 shows large forest blocks across the landscape (note that there are many natural breaks within these blocks if we look at it on a finer-scale). Table 3-19 displays the existing acreages of forested interior and edge habitat in the Canal Hoya project area. Alternative 1 would lead to the highest degree of fragmentation followed by alternatives 2, 3 and 4.

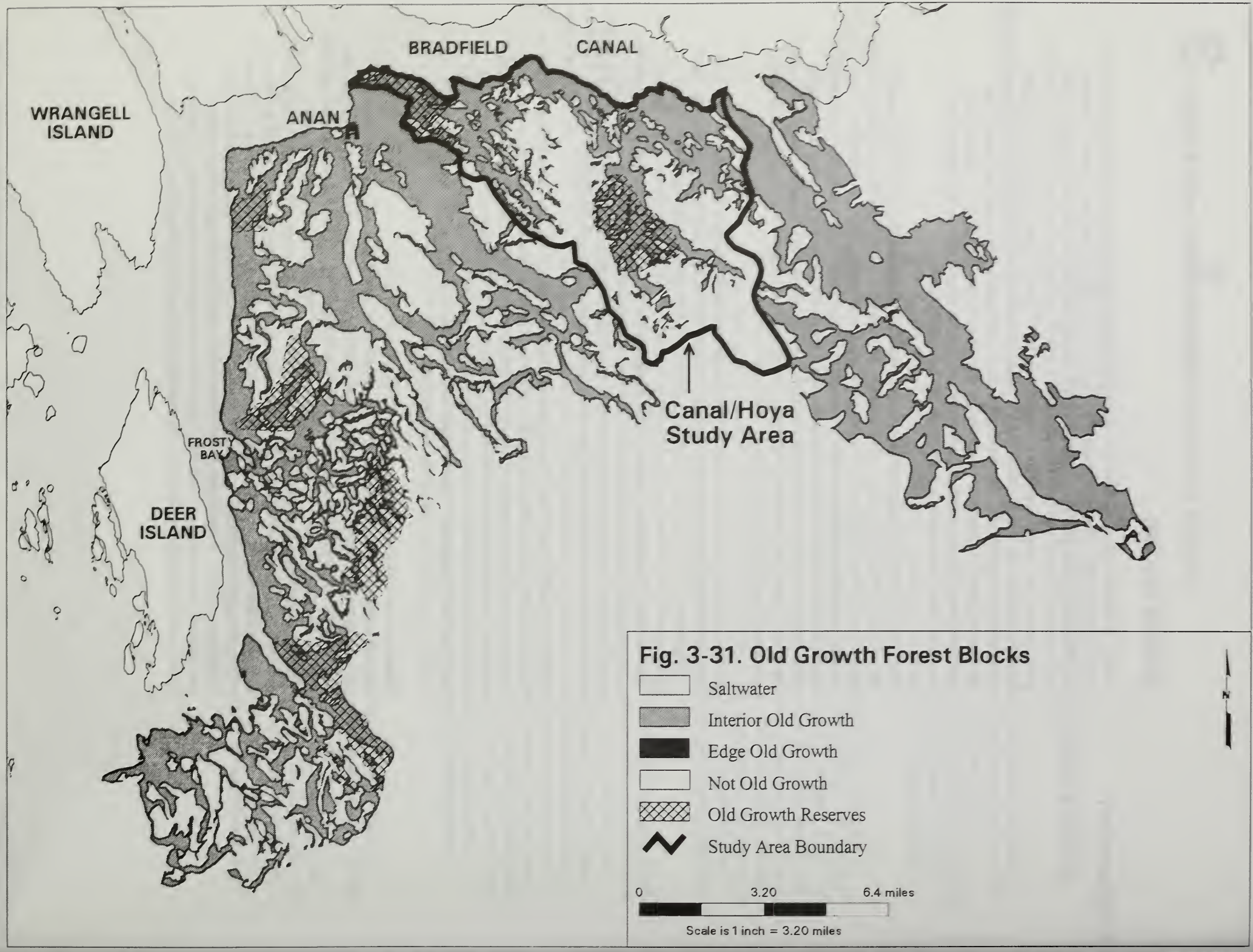

BRADFIELD CANAL
WRANGELL ISLAND
ANAN
FROSTY BAY
DEER ISLAND
Canal/Hoya Study Area
Fig. 3-31. Old Growth Forest Blocks
Saltwater
Interior Old Growth
Edge Old Growth
Not Old Growth
Old Growth Reserves
Study Area Boundary
0
3.20
6.4 miles
Scale is 1 inch = 3.20 miles

Table 3-19
Measures of Fragmentation Effect by Alternative

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Edge (acres)	6410	6320	6355	6156	6722
Interior (acres)	5223	5295	5354	5643	5690
Edge/interior	1.23	1.19	1.18	1.09	0.84

Distribution of Forested Acres and Important Habitats

Part of the concern over wildlife viability on the Tongass stems from the fact there is a disproportionate amount of harvesting planned within high-volume low-elevation stands - areas that also provide critical wildlife habitat and are the most valuable to several species of concern (Suring et.al. 1993b). Logging in the past has targeted these same high volume stands (Iverson et al. 1996). All forested acres are not created equal when taking wildlife into consideration, therefore we felt that it was important in our analysis to look at the effect of each alternative on low-elevation, high-volume stands.

Effects on Important Habitats

On the Tongass National Forest there is approximately 2.2 million acres of high volume, 2.2 million acres of mid volume and .6 million acres of low volume (USDA 1996). In the Canal Hoya project area there is approximately 676 acres of high volume, 4,496 acres of mid volume and 7,251 acres of low volume. High volume stands make up a small proportion of the project area landscape. Most of the high volume acres occur within the Hoya drainage along Hoya creek. High volume units include 9 (small section) 21 and 33. Alternatives 1, 2 and 3 harvest the highest number of high volume acres (Table 3-20). Alternative 4 harvests substantially fewer high volume acres.

Table 3-20
Acres of High Volume Removed by Alternative

Alternative	Acres removed	Units with High Volume
Alt 1	34	9, 21
Alt 2	34	9, 21
Alt 3	34	9, 21
Alt 4	22	9, 33

Existing acres of high volume = 676

Landscape position is another important component of a wildlife habitat analysis. Important landscape positions for wildlife include the beach/estuary fringe, riparian areas and forested habitats below 800 feet in elevation (USDA 1997a). 1,395 acres of med-high volume (>20,000 bf/acre), low elevation (<800'), low slope (<30%) old growth habitat exists in our project area (Table 3-24 under goshawk section). Many low-elevation areas with large-diameter trees in Hoya are protected within floodplain buffers. There is little change (3-8 acres) between alternatives in the loss of these habitats (Table 3-24: goshawk section). Figure 3-32 displays the location of these stands and other unique habitats in the area.

Two beaver ponds have been identified - one in Canal and one in Hoya (Figure 3-32). A beaver was observed near the Hoya pond and beaver activity enhances the floodplain qualities of the area. Old beaver sign was also observed in upper Hoya and in Canal. Bird surveys in these areas indicate high use by old growth dependent species such as the Brown Creeper and

Hairy Woodpecker. We reported several rarer bird species within the project area at the Canal beaver pond including: the Lincoln Sparrow and Western Wood Pewee (Incidental bird observations field report 1997). Timber would not be harvested adjacent to the beaver ponds in any alternative.

We have observed a high level of wildlife activity and a high amount of diversity within the Canal and Hoya estuaries. Trails in both estuaries indicate high wildlife use by foraging bears, river otters and mink. Waterfowl, shorebirds, gulls and eagles frequented both areas throughout the summer (see waterfowl discussion, page 3-76). On April 8, 1997 we noted as many as 50 harbor seals in the Hoya estuary presumably feeding on herring.

A few south-facing slopes exist in the project area but many of these slopes occur a great distance from saltwater and may have reduced winter range value for wildlife due to cold interior conditions. Important south-facing slopes for goats exist in upper Hoya and for deer in the southwest corner of the Canal area. We combined habitat capability models with field information to identify habitats believed to be critical to game species (see MIS discussion, page 3-78).

Vertical Diversity and Retention

High vertical diversity within a stand generally leads to high animal diversity due to an increase in niche space. Vertical diversity increases as a stand goes through the various stages of forest succession. Stands with trees all of the same age have only one canopy layer and low vertical diversity. Stands with multiple layers (i.e. overstory, midstory, understory, snags, etc.) have high vertical diversity.

Oliver (1990) describes forest succession as follows:

There are four general stages of forest succession

- "Stand initiation stage: After a disturbance, new individuals and species continue to appear for several years. Stands developing after major disturbances have been described as 'even-aged' stands, since all component trees have been assumed to regenerate shortly after the disturbance. In fact, trees may continue to regenerate for several decades where growth is slow before the available growing space becomes reoccupied.

- Stem exclusion stage. After several years, new individuals do not appear and some of the existing ones die. The surviving ones grow larger and express differences in height and diameter; first one species and then another may appear to dominate the stand.

- Understory reinitiation stage. Later, forest floor herbs and shrubs and advance regeneration again appear and survive in the understory, although they grow very little.

- Old growth stage. Much later, overstory trees die in an irregular fashion, and some of the understory trees begin growing to the overstory.

These stages will be used to describe the changes occurring within stands as a result of natural and man-made disturbances throughout this report. The majority of the forested landscape in Canal Hoya exists in an old growth stage with a high amount of vertical diversity.

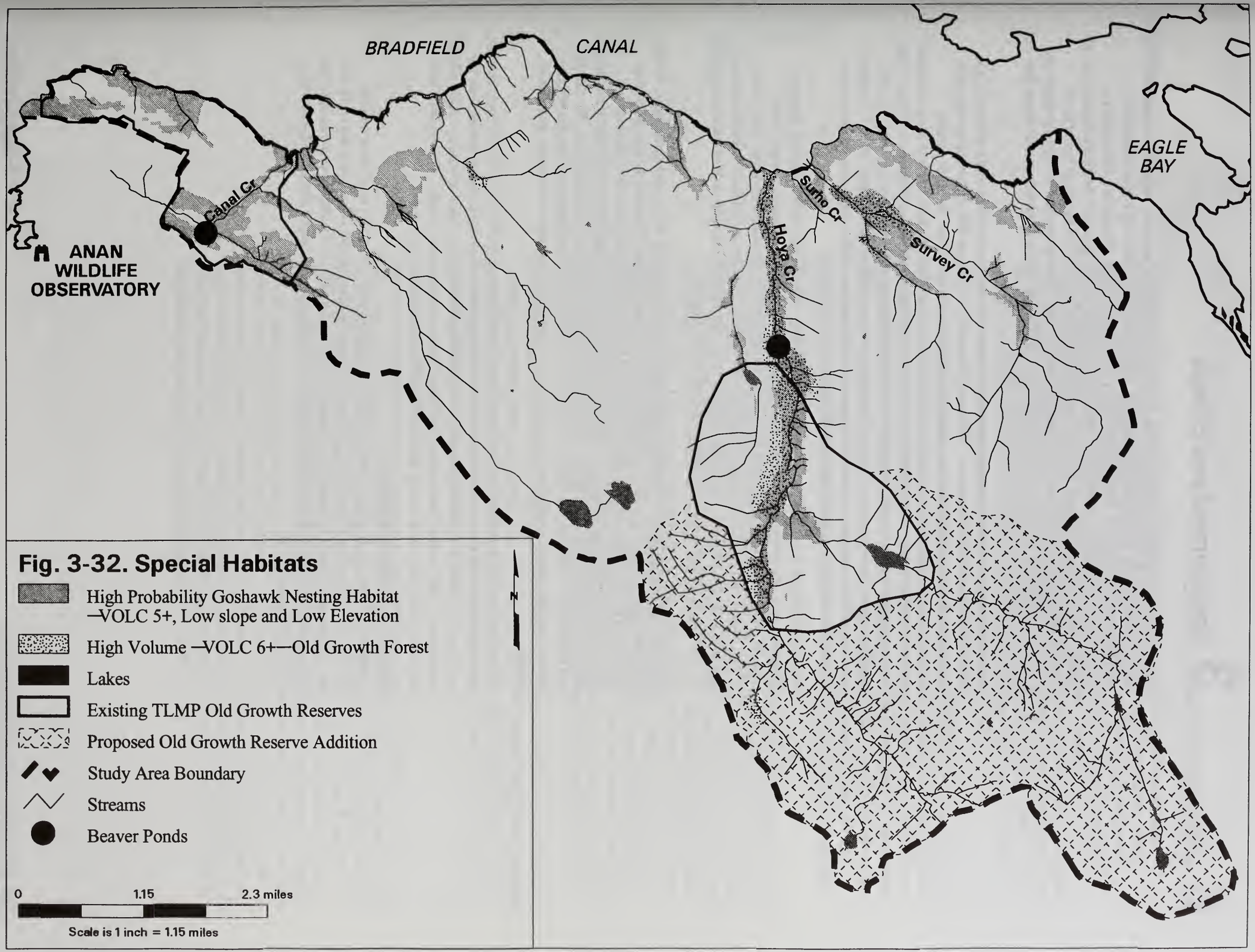


Fig. 3-32. Special Habitats

- High Probability Goshawk Nesting Habitat —VOLC 5+, Low slope and Low Elevation
- High Volume —VOLC 6+—Old Growth Forest
- Lakes
- Existing TLMP Old Growth Reserves
- Proposed Old Growth Reserve Addition
- Study Area Boundary
- Streams
- Beaver Ponds

The positive and negative aspects of each of the successional stage for wildlife depends on the species considered. Following clearcutting, a forested stand will offer some benefits to wildlife while in the stem initiation phase by providing forage. However, the quality of forage within clearcuts is lower than that which occurs within smaller openings (Hanley et. al. 1989). When a stand reaches the stem exclusion phase in 15 to 25 years its benefits to wildlife drop dramatically and may remain poor for 140 years or more. Wildlife population increases caused by logging may be expected to decline as second-growth stands enter the phase of least forage production (Meehan, 1974).

Most wildlife species will respond positively to retention of trees within units although it is difficult to measure this response. We know deer utilize habitats where forage production remains even if portions of the overstory have been removed, either through natural occurrences (i.e. windthrow) or harvest activities. On the Thomas Bay project area, deer and moose use have increased in partially cut units. "Both deer and moose showed similar trends in spring pellet-group counts with the lowest densities occurring in the old growth controls and the highest densities occurring in the 40 percent partial harvest" (Doerr, 1995). Marten, however, will reduce use in areas with more than 70 percent of the overstory removed and will not cross clear areas greater than 100 feet (Ruggiero 1994).

Desirable wildlife trees can be retained by feathering a forest edge with selective harvests along the unit boundary Feathering will channel wind above the forest canopy, thus lessening the chance of substantial losses due to windthrow. In addition, Ratti and Reese (1988) found that feathered edges result in lower predation rates on interior wildlife species than areas of abrupt edge. Desirable wildlife trees can also be retained within unit boundaries by creating reserves or through diameter-limit prescriptions.

Snags are another important habitat component for cavity nesting birds and mammals. Snags are dead trees at least 15 inches in diameter at breast height and 10 feet in height or higher (Reserve Tree Selection Guidelines R10-MB-215, 1993). Snags, especially broken-top spruce, are extremely important to wintering resident birds. Snags provide important marten den sites (Spencer, 1987). Marten use the tops of broken snags as resting sites in the summer and cavities in winter and summer. Large down logs are another important habitat feature. Marten use the spaces under the snow below the edges of large logs for hunting and travel routes.

The greatest concern relating to snag use in the Canal Hoya project area is for denning bears. (See Anan issue) Black bears in Southeast Alaska appear to show an unusual preference for tree dens. 25 dens were aerially located in Canal Hoya through a radio-telemetry study of the Anan bears. We located the majority of these dens in low volume forest . Seven dens were located during the course of our field work- all of these were tree dens.

Effects on Vertical Diversity

Alternative 4 has the highest level of retention within units. All units in all alternatives provide alternatives to clearcutting. Clearcut prescriptions for this sale would leave 10% of the acreage of the unit as reserves. Diameter-limit prescriptions would leave a younger age component within the stand. In a few units we would apply an upper diameter-limit which would retain large trees.

Corridors

Low elevation passes, beach fringe and stream corridors provide natural connections between forested blocks and are important areas for migratory wildlife species. These areas can become "pinch-points" to wildlife species if they provide the only migratory route between two blocks of forest. Corridors can be protected by not harvesting within them or by managing the matrix of habitat between the reserves (Suring et. al. 1993b). Under the Forest Plan, maintaining forested corridors between old growth reserves is a key component to maintaining viable wildlife populations on the Tongass since the majority of the habitat matrix between the reserves is scheduled to be harvested (USDA 1997a). We also looked closely at forested corridors below the powerline since these could also be pinchpoints and important to small mammal dispersal. (Figure 3-33)

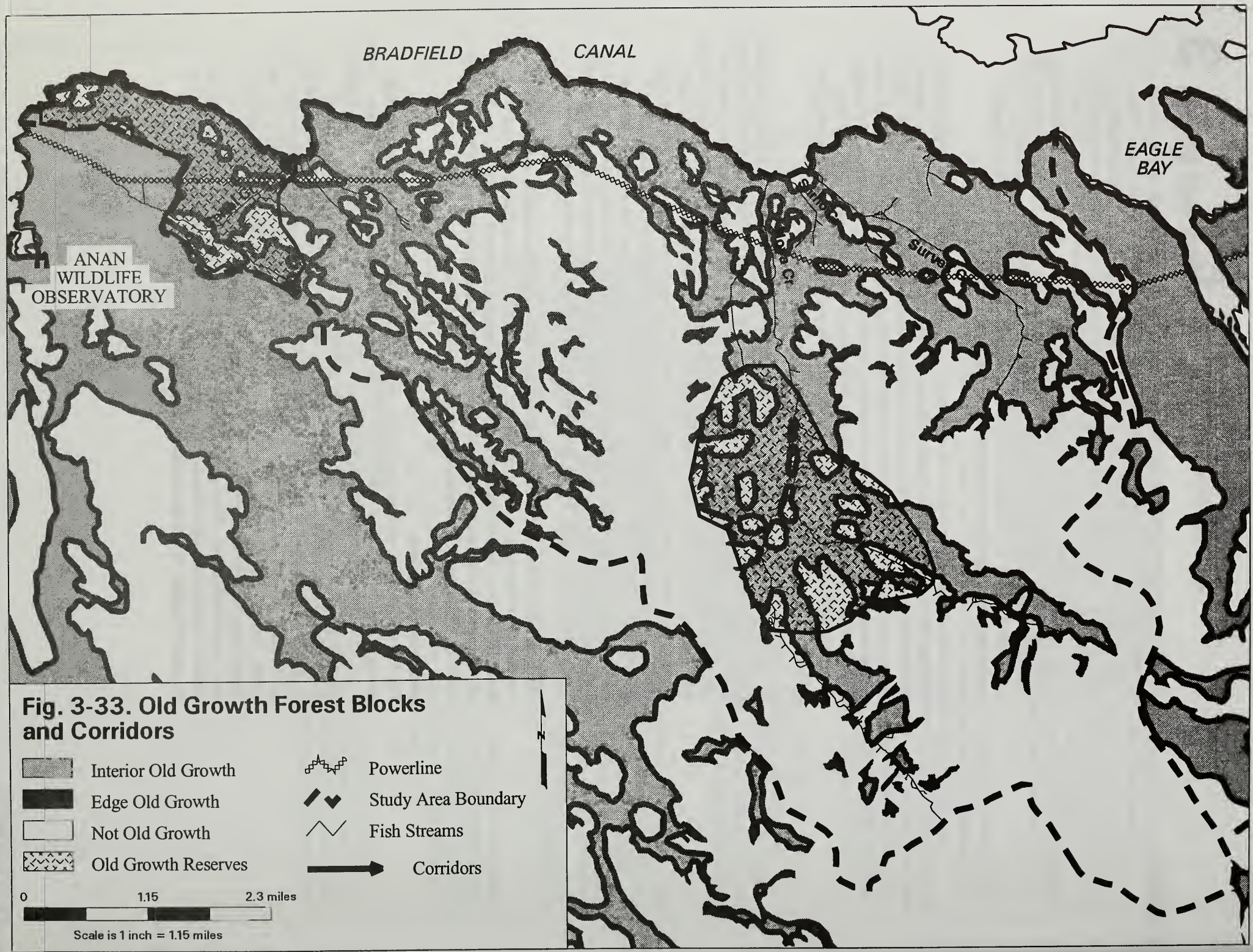
The beach fringe is believed to be important as a wildlife travel corridor, as a transition zone between interior forest and salt water influences, and as a unique habitat (or micro-climate). The beach fringe provides important low-elevation connectivity between watersheds that are separated by very steep sides and non-forested ridgetops. In conjunction with riparian areas, which provide connectivity within watersheds, the beach fringe is a component of the major travel corridor system used by many resident wildlife species. The beach fringe is also thought to provide important avian migratory habitat, particularly for neotropical migrants. (USDA 1997a).

Extensive north/south ridge systems limit the number of east/west corridors available in Canal Hoya. The beach fringe may be the most important and well used east/west travel corridor for this area and is marked by extensive game trails. Well used bear trails occur throughout the project area but are note-worthy along Hoya Creek, the creeks going into Hoya estuary and in the southern portion of the Canal Old Growth Reserve. A low elevation, partially forested pass extends from Upper Hoya, through the Canal VCU and to the upper East Fork of Anan Creek. The easiest route for animals to move to and from Eagle River is along the beach (Figure 3-33). The only travel corridor that provides a connection between large forested blocks occurs along the beach between Hoya and Eagle River. The only corridor between the Canal and Hoya Old Growth Reserves is along the beach and Hoya Creek. Many of the other connections between blocks have been broken with the placement of the power line.

Corridors along slopes allow for the seasonal movement of certain wildlife species between summer and winter range. Although a great many of these exist, several trails were recorded in the proximity of the lake located west of Hoya Creek and in upper Survey Creek. The habitat capability models for the mountain goat and deer were utilized to identify other areas believed to be important in seasonal migrations.

Effects on Corridors

The following harvest units are adjacent to forested powerline crossings and are potential barriers to wildlife dispersal: the portion of Unit 5 east of Survey Creek in Alternative 1, Unit 33 in Alternative 4 and Unit 3 in Alternatives 2 and 3. Mitigation for these impacts includes retention within the units and stream buffers. Reserves for the portion of Unit 5 east of Survey Creek would be placed to enhance corridor values. Unit 35 in Alternative 1, 2 and 3 does not block a corridor but funnels wildlife travel into the adjacent beach buffer. Units 1,2 in Alternatives 1 and 3 restrict the corridor between Eagle River and Hoya Creek to the beach buffer. Units 19, 20 and 21 in Alternatives 1,2 and 3 parallel Hoya Creek and the corridor between the old growth reserves. Again, these units may reduce the size of the corridor but they do not eliminate it. Alternative 2 has the greatest impact on wildlife dispersal due to the length of road and the size of units in Canal Creek drainage. In summary, Alternative 2 has the greatest impact on travel corridors followed by 1, 3 and 4.


BRADFIELD
CANAL
EAGLE
BAY
ANAN
WILDLIFE
OBSERVATORY
Survey
Cr
Survey
Fig. 3-33. Old Growth Forest Blocks and Corridors
Interior Old Growth
Edge Old Growth
Not Old Growth
Old Growth Reserves
Powerline
Study Area Boundary
Fish Streams
Corridors
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

Old Growth Reserves

Old growth reserves are part of a forest-wide strategy to maintain viable wildlife populations and diversity on the Tongass. A system of large (40,000 acres), medium (10,000 acres) and small (1600 acres per 10,000 acre watershed) old growth reserves have been mapped across the Tongass.

Forest Standards and Guidelines direct us to maintain 600 foot wide corridors between large and medium old growth reserves and natural setting LUD's (Land Use Designations), since interactions between wildlife populations is an important component of viability. Panelists reviewing the Forest Plan concluded that reserves by themselves were not enough to maintain viability (USDA 1997a). Other critical factors for retaining wildlife populations include: alternative harvesting, longer rotations and residual trees left in clearcuts to maintain lichens, mosses, fungi and other species (USDA 1997a).

Small old growth reserves are required to be a certain size and contain a certain amount of productive old growth (POG, volume > 8000 bf per acre). The Forest Plan specifies that the size of each reserve must be 16% of the VCU size (average reserve size is 1600 acres). Within each small reserve, half of the acres (8% of the VCU) must exist as Productive Old Growth. Based on these criteria, small reserves were mapped in the Canal and Hoya VCUs at the regional planning level.

Aside from these general criteria, the design of each reserve should be based on the wildlife concerns specific to the area (Iverson, pers. comm). Criteria that are commonly used in designing small reserves include: important deer winter range, probable goshawk nesting habitat, probable murrelet nesting habitat, large forest blocks, rare plant associations and landscape linkages (Iverson, 1996). The northern flying squirrel and the marten were species of concern that were considered in developing standards for the small old growth reserves (Suring et al. 1993b).

This report will analyze two old growth reserve options for the Canal Hoya area -- one small reserve for each VCU (Figure 3-33). A reserve option, located south of the powerline in the Canal VCU, was dropped from further analysis. We felt that the existing Canal Old Growth Reserve contained the best wildlife habitat within the area and provided greater security for Anan bears. Table 3-21 lists the acres required and the acres that exist within the reserve as mapped. Since the current size of the Hoya Old Growth Reserve is less than specified by Forest Plan guidelines, and the timber to the south is isolated by the reserve, we propose to expand the Hoya Old Growth Reserve to the south in all alternatives, as discussed in Chapter 2 (page 2-4).

Table 3-21
Size, and Acres of Productive Old Growth (volume > 8,000 bf) for each Old Growth Reserve

	Acres of Low Volume Strata	Acres of Medium Volume Strata	Acres of High Volume Strata	Total Productive Old Growth	Total Size
*Canal Old Growth Reserve	10	500	540	1050	1260
**Current Hoya Old Growth Reserve	70	480	1080	1630	2090
Proposed Hoya Old Growth Reserve Adjustment	140	1180	1420	2740	9210

* Size requirements for Canal = 1223. POG requirements for Canal = 611
** Size requirements for Hoya = 2901. POG requirements for Hoya = 1450

Canal Old Growth Reserve

Bears were a key component in designing the Canal Old Growth Reserve due to the proximity of the Anan wildlife observatory (see Anan issue, page 3-40). Several radio-collared Anan bears were relocated within this reserve as well as a number of den sites. During the course of our field work we documented numerous well-used bear trails, lots of scat, beds, dens and scratching posts within this reserve -- indicating that this is an area well-used by the local bear population. Corridors between the Canal area and Anan exist along the southern boundary of the reserve and in the beach buffer. The location of this reserve provides a buffer between the Anan bears and the impacts of timber harvest. Human-bear encounters often lead to increased bear mortality which in turn can reduce the overall density of bears (see Anan issue).

Other considerations in the design of this reserve included: deer winter range, large medium volume forested stands, a resident fish stream and unique habitats (beaver pond/wetland). This reserve contains much of the important deer winter range within the Canal area. Most of the deer sign we observed in 1994-1996 was along Canal Creek and in nearby stands. Two large medium volume forested blocks exist within the reserve which provide optimal habitat for nesting goshawks and murrelets (Figure 3-33). The forested stands adjacent to Canal Creek, which follows the east boundary of the reserve, contain important habitat values for furbearers such as mink and marten. The beaver pond area (discussed under special habitats) is a unique habitat type for the project area and its inclusion within the reserve gives added benefit to songbirds and waterfowl as well as other species.

Hoya Old Growth Reserve

The mountain goat was an important species in the design of the Hoya reserve. We received several questions from the public concerning how improved hunting access would impact the local goat population. The Hoya reserve includes all acres of important high value goat winter range within the project area. The location of this reserve also eliminates the need for the construction of a road (and increased) access along Hoya Creek. The Hoya reserve prevents the disturbance of seasonal travel corridors between goat summering and wintering areas and between the east and west side of Hoya Creek. Nearly all of our goat observations in the past have been within this reserve.

Bears, wolves, waterfowl and furbearers will benefit from the placement of the Hoya reserve. We reported bear sign throughout the reserve and a well-used corridor along Hoya Creek. On one Fall flight we observed three black bears in these alpine habitats indicating that denning habitat may be close by. Wolf sign has been observed on several occasions especially in the area of the southwest landscape corridor. The east branch of Hoya Creek contains a wetland complex with unique habitat values and is frequented by geese. The riparian zone of upper Hoya appears to be an area used by nesting geese based on the amount of sign recorded. This same zone provides important habitat for furbearers. There is a forested corridor connecting the Hoya and Canal reserves that extends along Hoya Creek and includes the beach buffer.

Cumulative Effects on Old Growth and Fragmentation

Three percent of the productive old growth within this ecological province was harvested between 1954 and 1995 (USDA 1996). Approximately 94% of the Productive old growth in this province and 90% of the highly productive old growth will remain in 2095 (USDA 1996). For the Cleveland peninsula to the west, 80% of the productive old growth and 82% of the highly productive old growth will remain in 2095. There will be no timber harvesting in the Anan VCU which borders the west or the Eagle River VCU to the east.

Fragmentation within the Canal Hoya project area occurred with the placement of the powerline which parallels the beach. Much of the powerline was cleared and remains extremely difficult to cross. Forested crossings occur along v-notches (see Figure 3-33: corridor section). Timber harvesting would add to these fragmentation effects (Table 3-19).

Species Conservation

Threatened and Endangered Species

Biological Assessments were written to evaluate the effects of the proposed action on federally-listed threatened or endangered species. The Biological Assessments were submitted to the Fish and Wildlife Service for the American peregrine falcon and to the National Marine Fisheries Service for the humpback whale and Steller's sea lion. Both agencies concurred with the findings of no significant adverse effects to these listed species. Consultation with the Fish and Wildlife Service and National Marine Fisheries Service during preparation of this document identified no inventoried resident threatened or endangered species in the project area. The American peregrine falcon passes through the Stikine Area during spring and fall migration flights but is not known to occur in the project area.

Biological Evaluations (B.E.) are completed for any project that has the potential to affect a regionally listed sensitive plant or animal species. Biologists provide written documentation in Biological Evaluations of their judgments about whether or not a proposed management action will increase the likelihood of sensitive species becoming threatened or endangered. Peale's peregrine falcon, osprey, Queen Charlotte goshawk, and trumpeter swan have been classified as sensitive species on the Tongass National Forest and may occur in the study area. Only the goshawk is expected to occur in the project area for extended periods of time. The Biological Evaluation for sensitive plants concluded that none of the alternatives would have an impact on sensitive plant species.

Species of Concern

Northern Goshawk

The northern goshawk (Accipiter gentilis atricapillus and A.g. laingi) is an old growth associated raptor of special concern on the Tongass National Forest and a key species for the viability assessment of the new Forest Plan (Iverson et al. 1996, USDA 1997a). In 1994 the USFWS received a petition to list the Queen Charlotte Goshawk pursuant to the Endangered Species Act (ESA). The USFWS made a second decision to not list the goshawk in 1997 based on protection measures outlined in the Forest Plan.

The Queen Charlotte Goshawk (A.g. laingi) is a subspecies of the goshawk with a northern range extending to the Taku River in southeast Alaska. Eighty-one percent of the confirmed and probable nest sites of this subspecies in southeast Alaska are south of Frederick Sound (Queen Charlotte Goshawk Statue Report for R10 Sensitive Species Consideration, USDA, 1991). A portion if not all of the goshawks in Southeast Alaska are believed to belong to the Queen Charlotte subspecies (Iverson et al. 1996).

Concern for the goshawk stems from the reductions in preferred habitat. "The amount of habitats used and selected by goshawks for nesting and foraging, and most likely important habitats for principal prey species, have declined in the past and continue to decline under current management" (Iverson et al. 1996). Goshawk densities are low in Southeast Alaska with less than 40 nest sites identified after five years of inventory across the Forest (USDA 1997a). Large home ranges, nonbreeding and differential winter and breeding areas may be indicators of ecological stress in Southeast Alaskan goshawks .

Goshawks make extensive use of productive old growth forests for foraging and nesting. Based on radio-telemetry studies of goshawks on the Tongass, 70.5 percent of goshawk habitat use occurred in mature sawtimber or productive old growth forest (Iverson et al. 1996). Titus et al (1994) reported 92% of radio-collared goshawk relocations in productive old growth (volume > 8,000 bf/acre) and only 1% of the relocations in young, second growth forests. Productive old growth forests support a wider range of important prey than do other habitat cover types (Iverson et al. 1996). At least 600 acres of nesting habitat (Productive Old Growth) is desirable within each 10,000- 30,000 acre watershed (USDA 1997a).

Landscape factors such as slope and elevation along with beaches, riparian and estuaries are important to goshawk habitat suitability. Goshawks appear to prefer low elevations (less than 800') and gentle slopes (less than 35%, Iverson et al. 1996). We used this information to determine acres of suitable nesting habitat within the project area (Table 3-22). Riparian zones ranked as the most important landscape component by radio-marked goshawks (Iverson et al. 1996). Telemetry results also indicate extensive goshawk use within the 1000 feet of beaches and estuaries (Titus, ADFG, unpubl. data). Beach, estuary and riparian habitats generally support greater prey diversity and net prey productivity, features important to goshawk habitat quality (USDA 1997a).

There is a great deal of variation in goshawk home range estimates and seasonal movements. Crocker-Bedford (1990) estimates home range acres to vary between 6000 and 8000 acres. Iverson et al (1996) reports female and male use areas to range from 9,469 to 11,425 acres. Current standards direct the Forest Service to "maintain an area of not less than 100 acres of Productive Old Growth generally centered around the nest tree" (USDA 1997a).

Due to the extreme difficulty in finding nests, management for goshawks must take a dynamic landscape approach. Recommendations for maintaining goshawk viability include maintaining 1/3 of the landscape in 0-100 year old stands, 1/3 in 100-200 year old stands, and 1/3 in 200-300 or older stands (high value). This is based on a 300 year rotation disturbance regime which mimics the natural condition of the landscape by providing foraging and nesting areas (Iverson et al. 1996).

Alternative harvesting methods may also offer options for goshawk protection. Management of the landscape matrix was viewed as more important than habitat reserves by the scientific panel reviewing the Forest Plan and roads may not decrease habitat suitability. Group selection harvests of 1-2 acres (3.3% of a stand in any decade) are believed to maintain medium to high habitat values for nesting and foraging goshawks (Iverson et al 1996).

Broadcast surveys were completed on 121 points in portions of the Canal Hoya project area in 1994 and 1996, following the Regional protocols for the northern goshawk. Surveys in 1994 were conducted before harvest units had been designed and focused on high probability stands. 90% of the high probability units in Canal Hoya were surveyed in 1996. Courtship surveys were completed during April of 1996 and 1997. One individual was observed flying over the Bradfield Canal during these surveys but was not engaged in courtship behavior.

Effects on Northern Goshawks

We do not expect a significant impact on goshawk populations as a result of this sale due to the amount of habitat that would remain after the sale. At the biogeographic scale, the North Misty Fiords province is not an area of high risk for the persistence of goshawk populations before the year 2055 (Iverson et al). On a finer-scale, this Stikine Management Area does not exceed the 33% landscape timber harvest level by 2055, which can result in goshawk population impacts (Iverson et al.) The steep rugged terrain with the Canal Hoya project area may be less suitable for nesting goshawks than the habitat found on nearby islands (Cole Crocker Bedford, pers. comm). There is an insignificant difference in the acres of suitable goshawk habitat removed by each alternative (Table 3-22). If we expand our habitat definition to include low volume forest, Alternative 1 removes 33-55 more acres of low-elevation, low-slope habitats than the other alternatives. This is largely due to the size of unit 35 in Canal and unit 47. Alternative 1 also results in the greatest amount of fragmentation.

Table 3-22
Acres of Medium - High Volume (>20,000 bf/acre), Low Elevation (<800'), Low Slope (<30%) forested habitat and % Remaining after implementation, by Alternative

Important Goshawk Habitat	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Acres remaining *	1325	1308	1308	1323	1,395
Percent remaining	95	94	94	95	100

Marbled Murrelet

The marbled murrelet is a small seabird with black and white winter plumage that is found throughout the North Pacific. Murrelets feed on small fish and invertebrates in near-shore ocean areas, inland saltwater and occasionally on inland freshwater lakes. Birds are most easily observed during the nonbreeding season when they form small flocks. During the breeding season birds are more dispersed but will still concentrate in feeding areas during the day. Murrelets are highly mobile in their search for foraging areas suggesting a high level of population interaction.

Marbled murrelets are listed as a threatened species in Washington, Oregon and California and attention to this special emphasis species is increasing in Alaska. The Forest Plan states ''The listing of this species in WA, OR and CA and the reductions in habitat from timber harvesting, have raised concerns for the viability of this species in southeast Alaska (USDA 1997a). Global population trends are considered to be downward for all populations that rely on large, commercially valuable conifers for nesting . Estimates of murrelet numbers in southeast Alaska range from 45,000 to 250,000 (DeGange 1996) .

Marbled murrelets generally select old growth stands and large diameter trees as nest sites (Ralph et al. 1995, DeGange 1996). A small percentage (less than 10%) of birds may nest on the ground (DeGange 1996). Large limbs of old growth trees are the preferred area for nest placement. The importance of canopy cover is unclear. High canopy cover within the stand may limit ease of access to the nest. However, high canopy cover at the nest site is believed to contribute to nest success by concealing nests from predators. Therefore, mid-volume stands with large trees may receive a high amount of use. Due to the difficulty in finding nests, marbled murrelet nesting requirements are not well established in southeast Alaska. Tree diameters for two nests discovered on Prince of Wales ranged between 31"dbh to 80" dbh (DeGange 1996). In general, the "best or most important habitat is found within large contiguous blocks of high-volume, low-elevation old growth forest" (USDA 1997a).

The importance of beach and riparian areas is largely unknown. Some researchers have found a preference for riparian corridors indicating that birds may be following stream (openings) to the nest. Three nests discovered on Prince of Wales varied in their distance from saltwater (.3 miles, 3.9 miles, 8.1 miles). One study in southeast Alaska reported the greatest amount of murrelet activity occurring between 1 and 7 km from the coast (DeGange 1996). Riparian and beach fringe buffers, due to their linear nature and high amount of edge, may be less suitable for nesting (USDA 1997a).

There are no nest records of marbled murrelets in the Canal Hoya area. During the 1994 and 1996 field seasons, boat surveys were conducted in high probability areas using a standard protocol for surveying marbled murrelets in forested sites (Field report on murrelets 1997). Field surveys of probable nesting stands did not locate any eggshell fragments. Inland dawn counts were not conducted due to the inability to pinpoint likely nest areas and for safety reasons. Due to the fact that murrelets are often completely quiet near the nest; boat surveys may provide as much information as land-based surveys (Marks et. al. 1995).

The Forest Service is directed to protect nesting habitat around identified murrelet nests. This is believed to be a relatively ineffective management strategy given the difficulty in finding nests (DeGange 1996). If a nest site is found, a 600 foot buffer would be maintained around the nest (USDA 1997a). Roads can enter this buffer if unavoidable, but every effort should be made to protect the nest site. Road building and fragmentation of forested areas is believed to increase predation as a result of increased access to marbled murrelet nesting stands by avian predators, especially jays, crows, and ravens (cited in DeGange 1996).

Results of our project surveys did not show a difference in murrelet activity between the two VCUs but most of our initial detections were of birds located north of the project area. An area *north* of the Canal VCU was also identified as a "presumed nesting area" in the Conservation Assessment for marbled murrelets that was completed for the Revised Plan (DeGange 1996). Small boat surveys conducted in 1994 as part of this assessment estimated 0.1-10.0 murrelets per sq. km in the section of the Bradfield adjacent to Hoya Creek and 10-25 murrelets per sq. km. in the area adjacent to Canal (DeGange 1996). Based on this Assessment and our project surveys, we believe that much of the murrelet activity on the Bradfield Canal occurs north of the Canal and Hoya VCUs (Murrelet field report 1997).

Effects on Marbled Murrelets

The impact of these alternatives on murrelets varies with the location of units, the amount of suitable habitat lost and the level of fragmentation. The Tongass conservation assessment for murrelets recommends developing reserves in low elevation areas that include streams and rivers. In addition, the Forest Plan recommends protection of old growth habitat near the heads of bays especially in aquatic or terrestrial concentration areas. Many of these habitats are protected within the old growth reserves and in beach, estuary and stream buffers. As with goshawks, there is little difference between the acres of suitable habitat removed by alternative (Table 3-26).

It is known that marbled murrelets prefer late-successional forested stands or old growth, with large diameter limbs covered with moss and lichen for nesting areas. With the silvicultural prescriptions used in this Environmental Impact Statement, such trees would be retained to varying degrees in most treatment areas, possibly mitigating many of the effects on murrelet habitat. Murrelets may remain nesting in stands with two-age management systems (10-20% of stand left) and reserves (DeGange 1996).

Wolf

Wolves in southeast Alaska prey on Sitka black-tailed deer, moose, mountain goat, beaver, black bear, spawning salmon and geese. The total population is estimated at fewer than one thousand individuals in all of southeast Alaska with approximately 200 being harvested annually (Kirchhoff 1991). Although wolves are listed as threatened in the contiguous 48 states, they are not listed in Alaska. The commitment of the Forest Service to revise its Tongass Land Management Plan to adequately protect habitat for the Queen Charlotte goshawk and other species associated with old growth forest was an important element in the USFWS decision not to list the wolf in Alaska at this time. Kirchhoff (1991) identified four factors that could place this subspecies at risk:

- Liberal trapping and hunting regulations
- High road densities
- Reduced prey populations in areas subject to intensive logging
- Inbreeding depression within insular populations

Two viability concerns exist for the wolf: 1) the short-term concern involves increased harvest (especially in GMU2 on Prince of Wales Island) and 2) the long-term concern involves large reductions in deer habitat capability (USDA 1997a). The greatest concern over wolf harvesting is in GMU2, north Prince of Wales, where wolf harvests have exceeded 50% of the population in some locales. Wolf harvests have been relatively stable in the last 15 years in GMU 1B however the level of harvesting is high (27% of the population) (Kirchoff 1991). Exceeding this level of harvest may result in a population decline (Kirchoff 1991).

Roads increase the risk to wolf viability due to the high level of hunting, trapping and poaching that occurs along roads. Of the wolves killed in GMU 2 since 1985, 46% were either shot or trapped along the road system (cited in Kirchoff 1993). Kirchoff (1993) and Pletscher (1994) recommend a road density threshold of no more than 1 mile of open road/square mile. Education and management of roads is an important component of a wolf conservation strategy. Current hunting and trapping of wolves in this area is low with only one animal harvested in the last 9 years (ADFG harvest report 1997).

Deer habitat capability is believed to be the most significant factor effecting the viability of wolves. Deer capability of WAAs should be greater than 4.0 deer per km2 (10 deer/mi2) (Kirchoff 1991). The Forest Plan predicts a reduction in deer density for this WAA in the year 2095 from 15 deer/sq mile to 14 deer/square mile as a result of timber harvesting. However, ADFG reports that deer populations in this area are probably below habitat capability and that "habitat capability is so low... that viability of the deer population could be in question if any habitat were to be lost" (ADFG 1991).

The Canal Hoya timber sale area covers approximately 60 square miles. This size area is probably frequented by 1-2 packs. Sign was observed throughout the project area. Sign was noted for a high proportion of the stand surveys that occurred along the beach fringe which indicates that this is a well used corridor. Animals were observed on a few occasions along the beach. We also noted use within the upper Hoya corridor area (see Figure 3-33, corridor map). Scat in the project area appeared to contain a mixture of deer and goat hair. (Field report on wolves 1997).

Effects on Wolves

The effect of this timber sale to the wolf population is displayed by analyzing the impact to the deer population and the level of roading by alternative. Predicted increases in wolf harvest would vary according to the number of road miles and post-harvest management planned for the roads in the various alternatives. The alternatives with the most miles of road would have the greatest potential to increase wolf harvest since hunting access at this time is restricted to the shoreline. Road closures would reduce the potential wolf harvest; however, we anticipate that most of the potential harvest would be incidental take by people hunting other game species, and even closed roads provide walking corridors that would be used by

increasing numbers of hunters. Alternative 2 has from four to eleven more miles of road than the other alternatives. Alternatives 1, 2 and 3 retain 92-94% of existing deer winter range habitat capability (Table 3-24, MIS section). Alternative 4 has fewer roads and retains more of the existing deer winter range than Alternatives 1, 2 and 3. Alternative 2 would have the greatest impact on wolves followed by Alternatives 1, 3, 4 and 5.

Waterfowl and Shorebirds

Important areas for waterfowl in Canal Hoya include estuaries, streams, lakes and beaver ponds (see special habitats discussion, page 3-63). We recorded eight waterfowl species in the project area during the course of our field work (Field report on waterbirds 1997). No important molting or waterfowl concentration areas were found in muskeg or beaver pond habitats. We observed small flocks of birds, Barrow's goldeneye and Canada geese in both estuaries during migration.

Vancouver Canada Geese are distributed throughout SE Alaska with an estimated population of 10,000 in northern SE. The Vancouver Canada Goose is a Management Indicator Species that uses forested and nonforested wetlands in the estuary, riparian and upland areas of the forest (USDA 1997a). Geese were observed displaying territorial behavior at two lakes within the Hoya VCU. Harlequin ducks nest along streams and were formerly a candidate species for listing under the Endangered Species Act. Harlequin ducks have been observed near the Hoya estuary but always in small flocks (8-20 birds). We saw no evidence of nesting activity, i.e. young birds or pairs, by Harlequin ducks.

Shorebirds were observed along the beach and estuaries and in muskegs. Greater yellowlegs and Spotted sandpipers are the only species that appear to breed in the project area. We have seen no evidence of use by large flocks of migrating shorebirds.

Effects on Waterfowl and Shorebirds

The riparian, beach and estuary buffers protect habitat for waterfowl such as harlequin ducks and Vancouver Canada Geese. The estuary buffer zones and placement of LTFs away from the estuaries should minimize most of the effects of timber harvest on waterfowl. The wetlands that would be affected by roads do not appear to be of significant importance to large numbers of waterfowl.

Amphibians

We spent seven days conducting intensive amphibian surveys within the project area. The spotted frog has been identified as a species of concern by the USFWS and was formerly a candidate species for listing under the Endangered Species Act. During field evaluations, no spotted frogs were found. There are no historical records of spotted frogs in this area (Hodge 1976). Rough-skinned newts and Boreal toads were observed in a few of the muskeg wetlands. One of these wetlands is close to the LTF and sortyard in Hoya. If spotted frogs are found, their locations will be documented and a management decision will be made for the correct course of action. The processes outlined by the Endangered Species Act of 1973 will be followed if the spotted frog, a special concern species, is listed by the Fish and Wildlife Service for protection. Amphibian populations may be low in this area as a result of extreme weather conditions and lack of dispersal corridors. Beach, estuary and stream buffers as well as wetlands habitat protection would reduce the impacts of this sale on amphibians.

Songbirds

We recorded 54 bird species during incidental wildlife observations and songbird censuses (Field Report on incidental bird observations 1997). Sixteen species and 144 individuals were detected during songbird point counts in the project area in 1996 (Field report on NTMB 1996). Twenty of the species we detected are classified as neotropical migrants - birds that winter in the southern U.S., Central and South America. We frequently observed Chestnut-backed chickadees and Pacific-slope flycatchers -- two species of high priority in Alaska (Brad Andres, pers. comm.). The Red Crossbill also ranked as one of the most commonly observed species. Crossbill numbers were high throughout the region in 1996 (Armstrong, pers. comm.). We reported five other high priority species in relatively low numbers: Red-breasted sapsucker, Rufous hummingird, Golden-crowned kinglet, Townsend's warbler and Ruby-crowned kinglet.

All three of the songbird Management Indicator Species were reported as incidental observations during non-census hours: Hairy Woodpecker, Brown Creeper and Red-breasted Sapsucker. Brown creepers depend on old growth forest conditions for nesting. On several occasions we noted Brown creepers as well as the other two MIS utilizing beach/estuary and stream buffered habitats. Brown creepers appear to be breeding in Hoya units 27, 19, 23 and 5. A Red-breasted Sapsucker nest with young was located and marked along a proposed road location in Canal.

Effects on Songbirds

Maintaining old growth habitat for songbirds varies by each alternative based on the level of harvest and the degree of fragmentation. Beach, estuary and riparian habitats -- important areas for songbirds -- would be retained under all alternatives. Alternatives 1 and 2 would have the greatest impact on songbirds as a result of forested acres harvested and fragmentation. More forested acres remain with Alternative 4 as well as vegetative structure within the harvest units. Alternative 4 results in the least amount of fragmentation.

Eagles and Other Raptors

In 1989, nine eagle nests were mapped within the project area by the USFWS. Several of these nests were inactive in 1997 or had blown down. Five of the nine nests occur within the beach buffer in the Canal Old Growth Reserve. The USFWS and the Forest Service maintain an interagency agreement for bald eagle habitat management in the Alaska Region. All identified nests are surrounded by a 330 foot radius protective management zone. Helicopter activities for this sale would be restricted within 1/4 mile of active eagle nests.

The Forest Plan calls for a 600-foot windfirm buffer around active raptor nests. The only raptor nest that has been located in the project area is near Unit 25 in Hoya which has been redesigned to meet this standard. We have noted merlins, sharp-shinned hawks and pygmy owls in the area west of the Hoya LTF and within the beach buffer but no nest has been located. Owls (Pygmy or Saw-whet) were heard calling within the Hoya Old Growth Reserve in 1994. We completed 121 goshawk survey points within the project area but did not discover any breeding birds (Field report on incidental bird observations 1997).

Effects on Eagles and Other Raptors

The mitigation measures discussed and the habitat protected within beach, estuary and stream buffers would reduce the impact of all alternatives on raptors.

Management Indicator Species

Management Indicator Species Analysis

Management Indicator Species (MIS) are vertebrate or invertebrate species whose response to land management activities is used to predict the likely response of other species with similar habitat requirements. These species are termed indicator species due to their importance to the ecosystem and humans, and as an indicator of habitat quality. A species selected as an indicator may be threatened or endangered; commonly hunted, fished or trapped; or a non-game species of special interest. Taking a look at the MIS in an area is consistent with the National Forest Management Act that requires that management indicator species be identified for each national forest and be used for environmental analysis.

Habitat needs of many of the MIS are accounted for with the beach/estuary and stream buffers. The highest habitat suitability values for bald eagles, marten and river otter were assigned to the beach fringe (Suring 1993b). The beach fringe ranked second only to the 1000' estuary fringe for brown and black bears in overall habitat quality, and higher deer habitat values generally occur in high-volume old growth below 800' elevation. (USDA 1997a).

Habitat Capability Models are used for Management Indicator Species

Analyzing the effects of an action on MIS has traditionally involved using habitat capability models. The Forest Plan points out the problems with the MIS approach and points to the importance of "coarse-filter approach" or look at overall impacts to the old growth ecosystem (such as is being done in this analysis with goshawk habitat and road density). The use of MIS to represent the needs of other species is highly questioned since "there is no assurance that all or even most other old growth associated species have similar needs" (USDA 1997a). Productive old growth stands older than 200 years with a volume of 8,000 board feet per acre provide essentially all of the highly-important habitats for MIS (USDA 1997a). As a result, the Forest Plan limits the use of habitat capability models to deer.

Even given the problems with the MIS approach, we believed that a close look at the habitat capability models for a few species in Canal Hoya would provide another useful measure of effects. The results of our habitat capability models are presented for the mountain goat, deer and marten. Bald eagle and otter were not chosen as MIS because management activities would have little effect on their habitat given the estuary, beach and riparian buffers. The results of habitat capability modeling for brown and black bear are discussed under the Anan bear section.

The ability of the project area to support the selected indicator species was analyzed using a Geographic Information System (GIS) and computer habitat capability models developed for the Tongass Forest Plan revision effort. Habitat suitability analyses were performed on TIMTYP modified with field information on volume. Due to model limitations, and to allow for the possibility of natural events such as blowdown in partial cut units, we modeled all harvest activity as a clearcut. Thus, the reductions listed here are used as a "worst case scenario". We predict that there would be greater use of partial cuts by Management Indicator Species than of clearcuts, so we expect less impact under the unevenaged prescriptions than have been modeled here.

Habitat ''scores'' produced by habitat capability models are often linked to the carrying capacity of a species for purposes such as a subsistence analysis. However, the ability of Habitat Capability models to predict animal populations has been highly criticized. To understand the effect of habitat changes on populations, Habitat Capability scores need to be linked to mortality, natality, habitat patch size, emigration and immigration estimates. Furthermore, to predict a future population, information on the population's current density and age and sex composition is also required. In short, we are unable to predict wildlife populations into the future, except in the most general of terms.

Wildlife habitat capability models, are best suited for comparison of habitat availability between alternative land management proposals. Habitat Capability models assign values to habitats and should be viewed as an index of risk used to rank planning alternatives. In other words, the statement "of the five alternatives, Alternative 1 has the highest habitat capability score" is believed to be more accurate than the statement "the model predicts a habitat capable of supporting 324 animals in Alternative 1". The first statement implies that habitat features associated with animal use would be more abundant in Alternative 1.

Models used as a tool for management decisions are important. They should be recognized as only one of several sources in the analysis process to identify specific project effects. Knowledge concerning each species and their various habitat needs improves with field validation over time and adds to the reliability of model predictions.

Mountain Goat

The mountain goat is considered an old growth associate that is generally associated with steep slopes and cliff habitat, areas generally inoperable for timber. The quantity and quality of winter habitat is the most limiting factor for mountain goats in SE Alaska. Old growth trees with large dense crowns intercept the most snow thus providing understory forage during hard winters. The most recent version of the goat habitat capability model shows important habitat to generally be productive old growth forest within 1,300 feet of escape terrain (>50% slope or cliff). Travel corridors between seasonal sites are important and should be maintained (USDA 1997a).

Goats are sensitive to disturbance that results from human developments and activities. The Forest Plan requires the Forest Service to locate camps, LTFs, facilities and other developments 1 mile or more from important wintering and kidding areas. Goats can be disturbed by low-level aircraft flights over alpine habitats (USDA 1997a). ''Forest Service permitted or approved aircraft flights, including helicopter yarding of timber, should maintain a 1,500 foot vertical or horizontal clearance from traditional summer and kidding habitat and animals whenever feasible. Where feasible, flight paths should avoid known mountain goat kidding areas from May 15 through June 15. Pilots will not compromise safety. ''

Field surveys in 1996 and in previous years provided us with the information we needed to address goat habitat security (Field Report on Mountain goats 1997). Important areas occur throughout the upper Hoya drainage. The Hoya Old Growth Reserve contains or isolates all of the high value habitat we identified using the goat Habitat Capability model (Figure 3-34). Most of our visual reports of goats have been in this same area. Goats appear to occasionally use the cliffs west of Hoya Creek and parallel to the beach. We have also seen sign and animals in the area of Upper Survey Creek. No important habitat areas have been identified in the Canal VCU due to lack of escape cover.

Harvest data is collected by the ADFG using a geographic division called the Wildlife Analysis Area (WAA). On average, one goat is harvested per year within this WAA which covers the Canal, Hoya and Eagle River drainages (ADFG harvest report 1997). ADFG (1992) suggests that mountain goat populations are stable to slightly increasing for all of GMU 1B.

Effects on Goats

The loss of high value habitats for MIS varies by alternative and by the species considered. Alternatives 2 and 3 have the biggest indirect effect on goat habitat due to the segment of road in upper Survey Creek (Figure 3-34, Tables 3-23 and 3-24). However, most winter hunting of goat populations occurs along the beach and it is highly unlikely that hunters would travel 4-5 miles to access the patch of interior habitat that the model predicts would be impacted. Hunters would have easier access to the alpine area above this patch of high value wintering habitat in Alternatives 2 and 3. Alternatives 1, 2 and 3 all construct a segment of road west of Hoya Creek which would provide much easier access to goat populations than is afforded by

no action. Mitigation to reduce this impact would require removing the Hoya Creek bridge. Many hunters prefer to access hunting areas by vehicle. We would mitigate the effect of improved access by gating the road. Harvest units that are in close proximity to goat wintering and summering areas include units 4 and 5 in Upper Survey Creek and Units 19, 22, 23 and 24. The percent of overall habitat capability remaining under any alternative is greater than 87% (Table 3-24). Alternatives 2 and 3 would have the greatest impact on local goat populations followed by Alternatives 1 and 4.

Deer

Under intermediate and deep snow conditions, deer will select those habitats that provide for snow interception and food availability. The combination of a dense canopy with scattered openings in old growth forest types allows forage growth under openings while the canopy modifies snowfall sufficiently to promote forage availability and movement of deer. The nutritional value of plants grown in partial shade is also higher than that of plants grown in full sunlight (Hanley et. al. 1989). Timber harvesting of old growth can lead to reductions in deer wintering habitat. Fragmentation of these habitats may also lead to changes in population distribution. Predator search time is reduced when deer are forced to concentrate into smaller, predictable blocks of cover (Suring et. al. 1992).

The revised deer habitat model assigns optimal values to higher volume old growth stands on south-facing slopes at lower elevations in watersheds with low propensity for deep snow (Figure 3-35). Clearcuts receive low scores in high snow areas such as the mainland but group selection units (10% of a 100 acre stand) provide moderate habitat conditions for deer. Variables important in the deer model include: volume (high, medium, low, other), post-harvest types, snow accumulation, elevation and aspect. Wolves also have an effect on deer populations. There are no group selection prescriptions for our project area and there are no "low snow" zones which contain suitable wintering habitats for deer.

In general, we examine changes in habitat capability and not actual on the ground numbers, which for any given time period are likely to be below, or occasionally above the population estimates of the habitat capability model. However, for certain species such as deer, we stretch the limits of our models by estimating population numbers in order to answer questions concerning subsistence. The number of deer for this WAA is estimated at 687 in 1995 based on the habitat model.

"Sitka black-tailed deer is by far the most important, and most ''harvested" terrestrial wildlife species for subsistence purposes, and for sport hunting (USDA 1997a). Biologists estimate that 10% of the population can be harvested at carrying capacity with the population remaining stable and hunter satisfaction remaining high (Suring et al. 1992). Harvest data is collected by the ADFG using a geographic division called the Wildlife Analysis Area (WAA). The average 8 year harvest for WAA 1814 (Canal, Hoya and Eagle drainage) is 0 (USDA 1997a, ADFG harvest report).

Standards and guidelines in the Forest Plan protect deer winter habitat in the following ways:

- Important deer winter range needs to be identified as a part of project analysis
- We must assure consideration of deer winter range in the environmental analysis process.
- Beach/estuary and riparian buffers are designed to protect important deer winter habitat
- We are directed to maintain sufficient deer habitat to maintain sustainable wolf populations (generally 13 deer/sq mile)

Based on the low level of browse and general lack of sign in the project area we feel that the deer population is relatively low and has been for some time. Wildlife surveys in 1984 reported that deer sign was limited to three areas of Canal. This may be a result of two factors -- high predator density (wolves and bears) and severe winter conditions. Two general areas identified as high value habitat by the model and where we noted sign were the high

volume stands within the Canal Old Growth Reserve, and the floodplain habitat east of Hoya Creek (Survey Creek).

Effects On Deer

The Forest Plan predicts a reduction in deer density for this WAA by the year 2095 of 1 deer/sq mile as a result of timber harvesting. Although deer winter habitat loss would occur with this timber sale, many important areas are protected under the Forest Plan. The 1000 foot beach and estuary buffer were established to protect critical deer winter range habitat. Forested stands that appeared to be well used by deer were included within the two old growth reserves. In addition, >80% percent of moderate value deer habitat would remain under any alternative (Table 3-23, no high value habitat exists).

At least 92% of overall habitat capability would be retained with any alternative (Table 3-24). Timber harvest and the closing in of second-growth stands would likely alter deer habitat use patterns. Roads would improve hunting access which could depress this low density population. Harvest units within the Canal area that contain important deer winter range include Units: 35 (close to LTF) and 38. Similar units in Hoya include: 9-10 (Survey Creek floodplain), 22 (west of Hoya Creek), 12, 13 , and 5 (upper Survey Creek). Alternatives 1, 2 and 3 have the biggest impact on moderate value habitats (Table 3-23). Alternative 4 harvests the least amount of deer winter range (other than no action) and provides greater habitat security.

Marten

Marten are a viability concern species on the Tongass because they are ''clearly associated with late seral and old growth forests and ... function ecologically at broad landscape scales '' (USDA 1997a). Beach fringe and riparian habitats are believed to be highly important to this species (Figure 3-36). The marten is a broadly ranging species and conifer corridors facilitate movement and dispersal between patches of habitat (USDA 1997a). Optimum forest patch size is 180 acres or more.

Marten are trapped for their fur and populations in southeast Alaska are susceptible to overharvest. ADFG (1991b) reports moderate to high marten populations with numbers decreasing in heavily trapped areas. Studies on Chichagof Island using radio-collared marten demonstrated that marten have a 100% probability of being trapped when their home range intersects road or shoreline (Tom Paul, pers. comm).

As many as 50 marten have been trapped in one season from WAA 1814. Ninety-two marten were trapped in the WAA between 1984 - 1987 (USDA 1991 - TLMP SDEIS, ADFG harvest report 1997). Results of our habitat capability models indicate that this area could support 62 marten in 1990 (USDA 1991 - TLMP SDEIS). Forest management activities resulting in increased roading access may increase the potential for overtrapping

Mitigation measures for marten include extended rotation, retention within units and road closures. Rotations of greater than 100 years were considered important in maintaining viable marten populations. A two-aged management scheme can enhance structural diversity in managed stands, particularly later in the stand development. This improves both marten prey species habitat as well as provide more complex and beneficial structure for marten cover and denning. (USDA 1997a).

Effects On Marten

The change in existing high value marten habitat for any alternative is less than 10% (Table 3-23). Change in overall habitat capability is less than 6% (Table 3-24). We expect roads to have the biggest impact on martens since current trapping access is restricted to the shoreline. Trapping may have removed 80% or more of the population of this WAA in previous years. Roads constructed with this sale would further increase the trapping pressure on this population. Large tracts of undisturbed old growth would remain after the timber sale within old growth reserves and riparian buffers. These areas would serve as a "source", i.e. martens

would disperse and repopulate areas where they would continue to be trapped (beach and road system). Many hunters prefer to access hunting areas by vehicle. We would mitigate the effect of improved access by gating the road. Alternative 2 would have the greatest impact on marten by constructing more miles of road than other alternatives followed by Alternatives 1 and 3. Alternative 4 would have the least impact on marten (other than no action) due to fewer miles of constructed road and remaining habitat.

Table 3-23
Acres of Highly Suitable Habitat for Management Indicator Species and Percent Remaining by Alternative

Species	Existing acres	% remaining Alt 1	% remaining Alt 2	% remaining Alt 3	% remaining Alt 4
*Goat	436	97	45	46	97
**Deer	813	82	84	85	94
Marten	7814	91	90	92	94

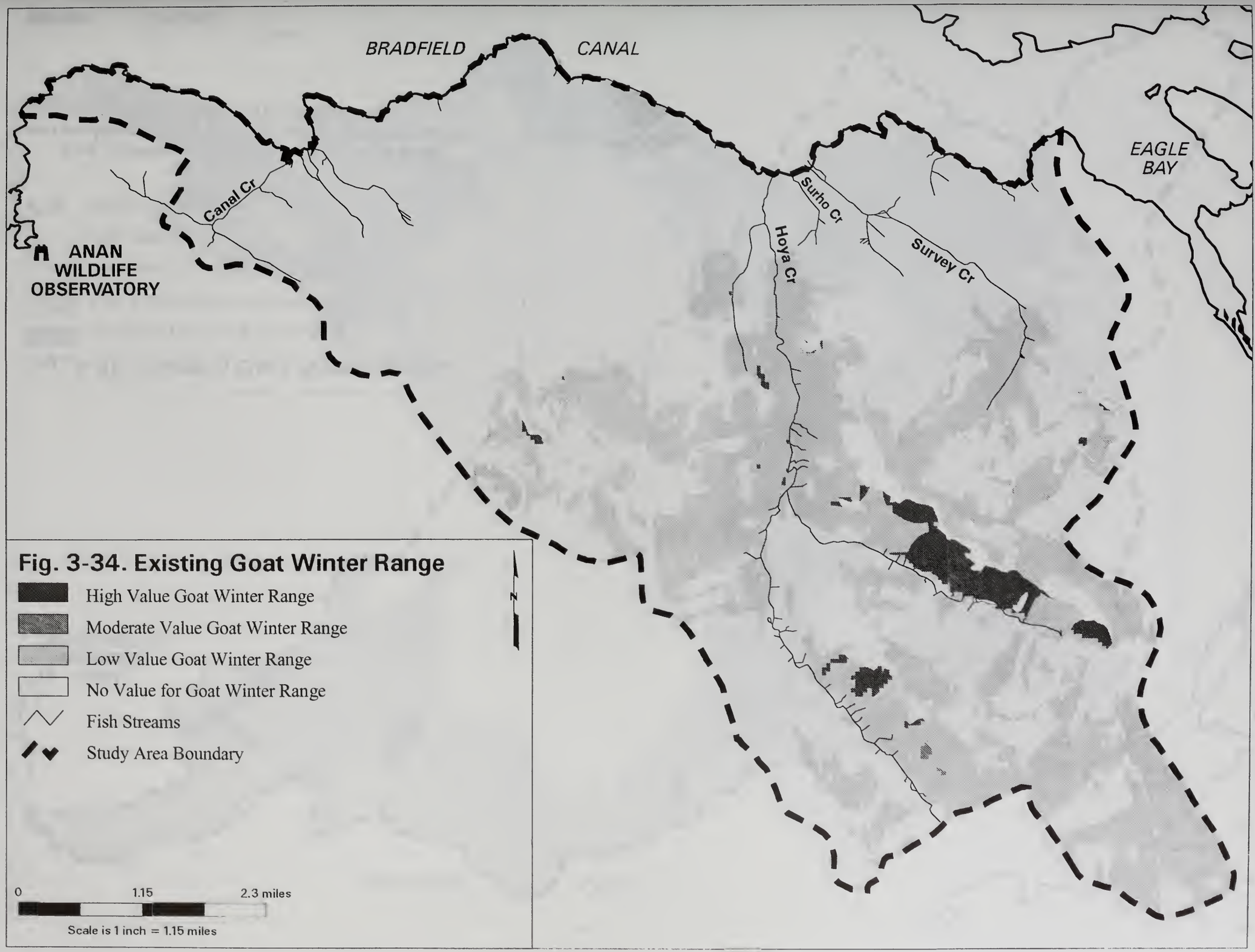
* Numbers for goat habitat reflect indirect loss as a result of road disturbance, i.e. not a direct loss of habitat.

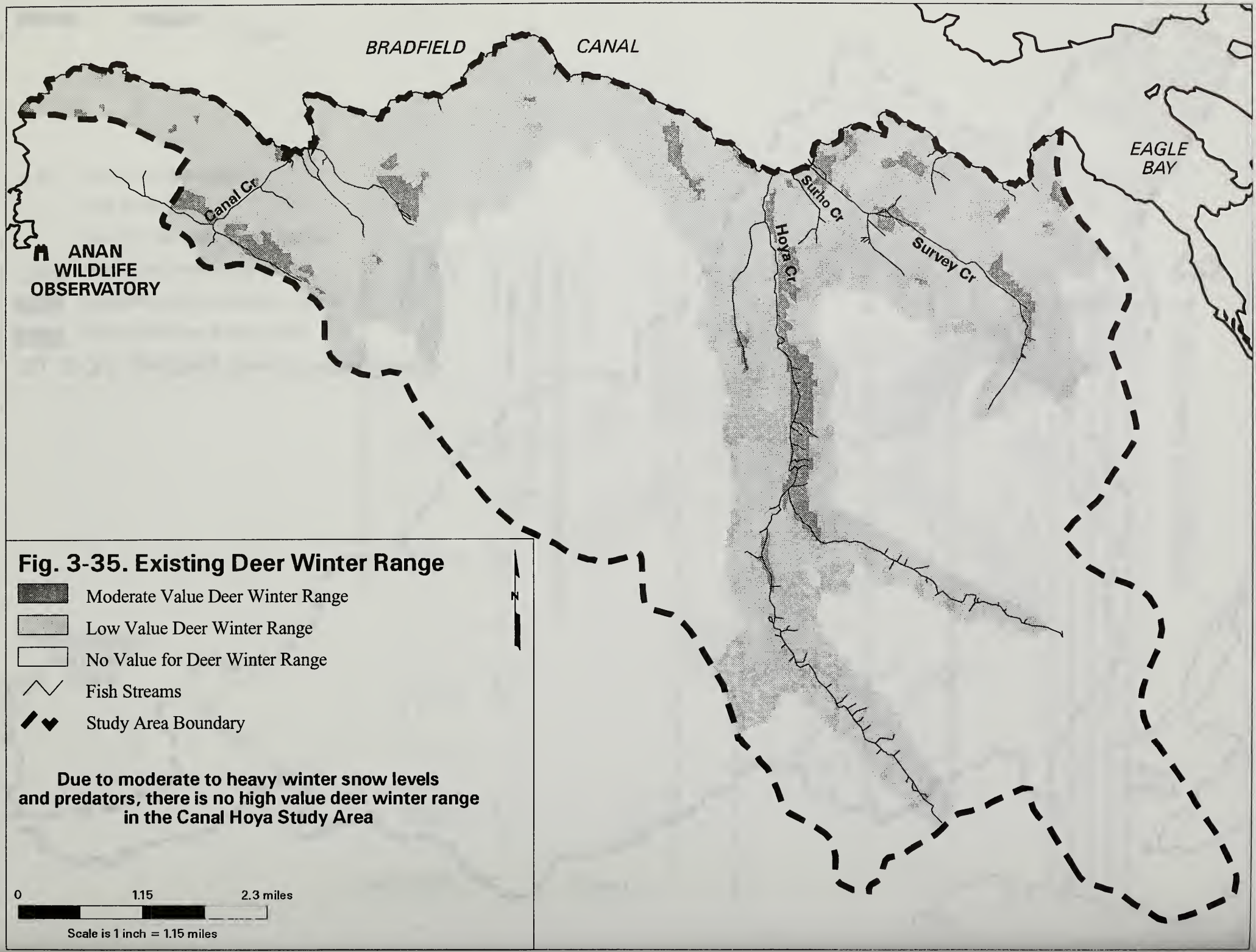
** Numbers reflect acres of moderately suitable habitat. No high value habitat (hsi score > .67) exists for deer in the project area .

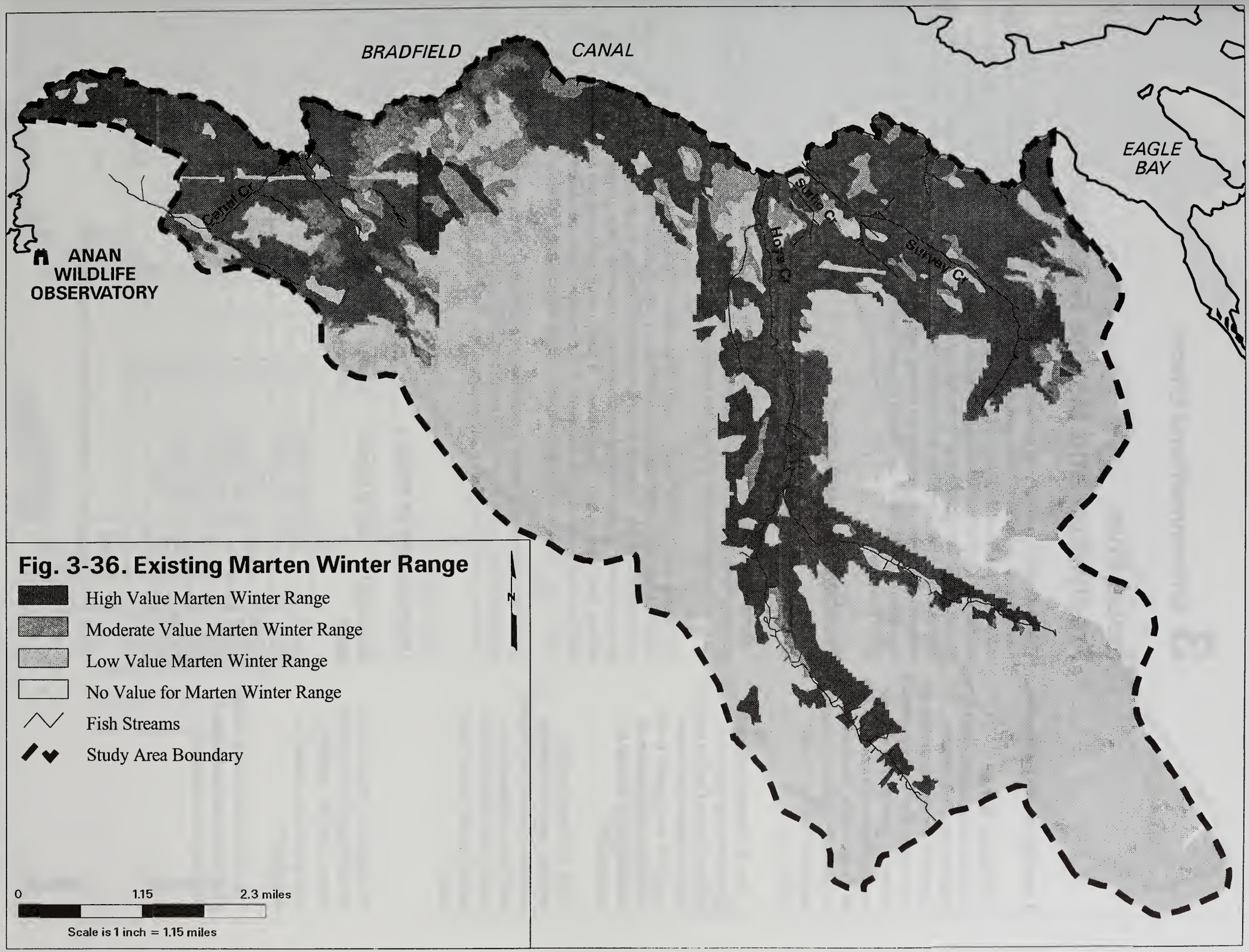
Table 3-24
Percent of Existing Overall Habitat Capability Remaining by Alternative

Species	Alt 1	Alt 2	Alt 3	Alt 4
Goat	91	87	89	95
Deer	92	92	94	95
Marten	95	95	95	96

* Percent is ratio of overall area hsi index values


BRADFIELD CANAL
EAGLE BAY
Canal Cr
Surho Cr
Hoya Cr
Survey Cr
ANAN WILDLIFE OBSERVATORY
Fig. 3-34. Existing Goat Winter Range
High Value Goat Winter Range
Moderate Value Goat Winter Range
Low Value Goat Winter Range
No Value for Goat Winter Range
Fish Streams
Study Area Boundary
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles


BRADFIELD CANAL
EAGLE BAY
Canal Cr
Surho Cr
Hoya Cr
Survey Cr
ANAN WILDLIFE OBSERVATORY
Fig. 3-35. Existing Deer Winter Range
Moderate Value Deer Winter Range
Low Value Deer Winter Range
No Value for Deer Winter Range
Fish Streams
Study Area Boundary
N
Due to moderate to heavy winter snow levels and predators, there is no high value deer winter range in the Canal Hoya Study Area
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles


BRADFIELD CANAL
EAGLE BAY
ANAN WILDLIFE OBSERVATORY
Canal Cr.
Hoya Cr.
Survey Cr.
Fig. 3-36. Existing Marten Winter Range
High Value Marten Winter Range
Moderate Value Marten Winter Range
Low Value Marten Winter Range
No Value for Marten Winter Range
Fish Streams
Study Area Boundary
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

3 Environment and Effects

Issue Five: Freshwater and Marine Resources

A sampling of public comments:

" We believe that the recommendations presented in the Anadromous Fish Habitat Assessment report, including the use of watershed analysis, should be used to develop appropriate protections for all streams within the Project Area. (including those not presently afforded protection under the Tongass Timber Reform Act)."

"...The EIS should include an evavaluation of impacts to resident fish and reflect project-design elements that ensure beneficial uses related to the growth and propagation of resident species awould be maintained".

"How will water quality, turbidity, sediment-loading, macroinvertebrate populations, and flow be affected in the Canal, Hoya and other fish-bearing creeks in the Project Area?"

"Bridges rater than culverts should be used on larger fish streams, and the number of stream crossings should be minimized".

"The EIS should clearly identify road closure and maintenance practices to be employed ..."

This issue reflects concern for the effects of timber harvest, road construction and road management on freshwater and marine fish habitats in and adjacent to the project area. There is also concern about the effects of LTFs and marine water-based log processing activities on charter and commercial fishing operations in the Bradfield Canal. The State of Alaska has designated the beneficial use of fresh and marine waters in the project area for the growth and propagation of fish, shellfish, other aquatic life, and wildlife (18 AAC 70). By law, we must maintain these uses, protect riparian habitat, and prevent detrimental changes in water temperature, water chemistry, stream channel stability, and sediment loads that adversely affect these uses.

Freshwater Resources

Affected Environment

Fisheries crews surveyed much of the project area by electroshocker in 1994. Follow up electroshocking in 1996 and 1997 focused on determining upstream limits of fish populations, particularly in the vicinity of proposed roads and units.

The project area contains approximately thirty miles of fish-bearing streams (Figure 3-37). Cutthroat trout and Dolly Varden char are widely distributed throughout both VCUs. Salmon and steelhead access is limited to the lowest stream reaches by impassable bedrock falls or steep gradients. Anadromous species commonly observed in the project area include coho salmon, pink salmon, and chum salmon. A few juvenile steelhead and one Chinook salmon smolt were also reported, but the presence of these species is considered incidental in the project area. No fish habitat enhancement opportunities appear feasible.

Table 3-25 displays fish stream lengths in each major project area watershed. All watershed or stream names in this project area are local unofficial names except for Hoya Creek. Class I streams contain anadromous fish species. Class II streams contain only resident fish species.

Table 3-25
Distribution of Fish Streams

Watershed Name	ADFG Number	Class I (miles)	Class II (miles)	Total Fish Stream (miles)
Canal	107-40-10650	0.2	3.9	4.1
Bear	107-40-10640	0.8	0.6	1.4
Cowboy	none	0.1	1.6	1.7
Flying V	107-40-10630	0.1	0.1	0.2
Hoya	107-40-10590	0.1	18.8	18.9
Surho	none	0.5	0.6	1.1
Survey	107-40-10570	1.8	4.0	5.8
All Others	n/a	0.1	1.3	1.4
TOTAL		**3.6**	**28.9**	**32.5**

Figure 3-37 displays these watersheds and their stream networks.

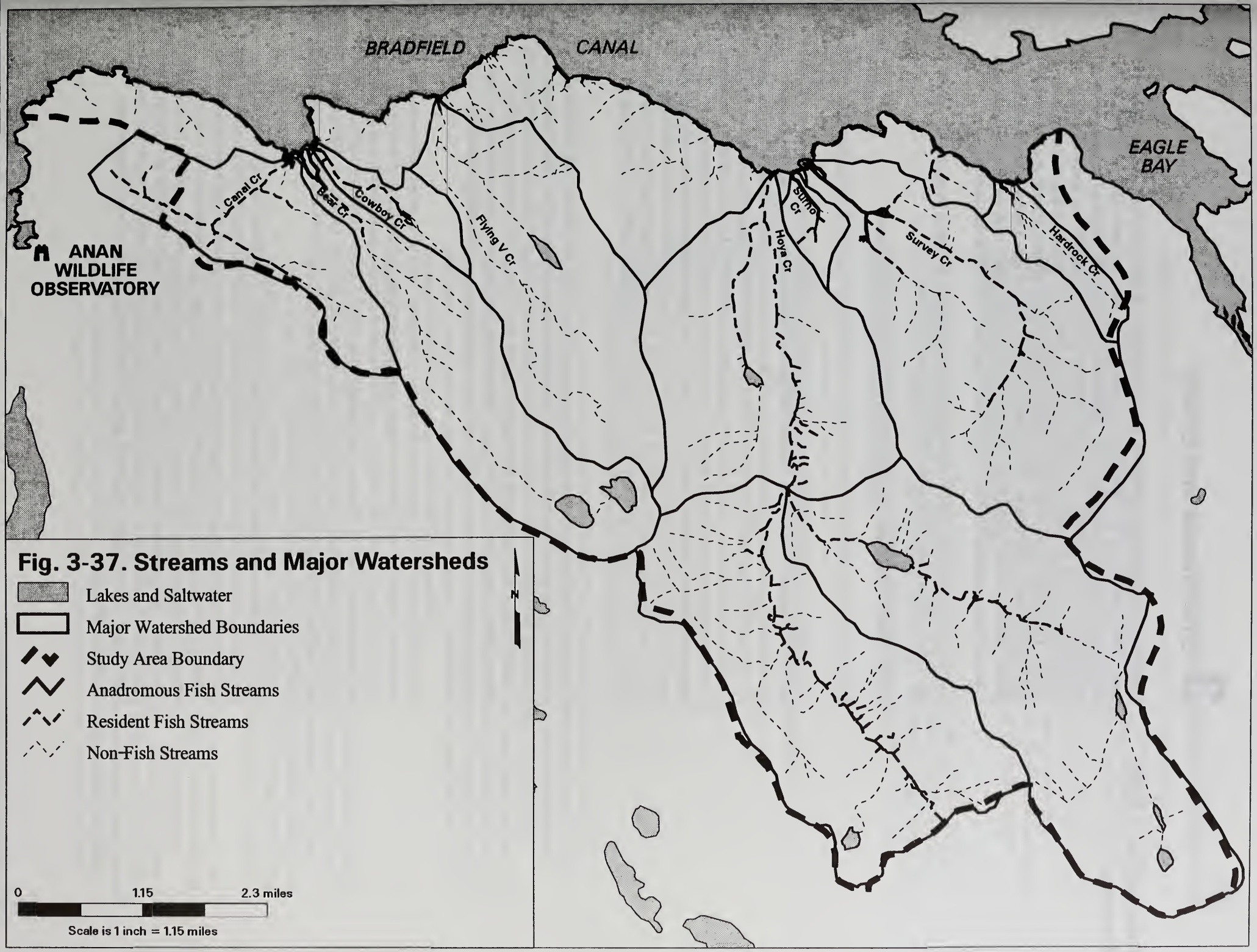


Fig. 3-37. Streams and Major Watersheds

- Lakes and Saltwater
- Major Watershed Boundaries
- Study Area Boundary
- Anadromous Fish Streams
- Resident Fish Streams
- Non-Fish Streams

Distribution of Fish Streams

The extent of anadromous fish habitat in the project area is quite low when compared to nearby watersheds such as Eagle River or Anan Creek. Survey Creek (Hoya VCU) contains the most anadromous fish habitat. The fisheries crew conducted a detailed habitat survey of lower Survey Creek in 1996. The highest quality habitat is found in low gradient stream reaches below the road crossings of Survey Creek, and at the mouth of Bear Creek (Canal VCU). These large alluvial streams, along with their sidechannels, provide good spawning and rearing habitat for salmon. Both Canal and Hoya Creeks have barrier falls near salt water. There is a large quantity of low gradient stream in Canal Creek and Hoya Creek; it is inaccessible to anadromous fish, but provides high quality resident fish habitat.

Fish (cutthroat trout) have been observed in only one project area lake located in the upper east fork of Hoya Creek within the Hoya old growth reserve.

Environmental Consequences and Alternative Comparisons

Road construction, more than timber harvest, may effect fish habitat in the project area.

Each alternative provides a high level of fish habitat protection through both mandatory mitigation measures and project-specific design considerations. Estuary and riparian no-harvest buffers provide direct protection to the highest quality fish habitat in the project area. No alternative proposes harvest adjacent to fish streams. The Tongass Timber Reform Act (TTRA) prohibits harvest within 100 feet horizontal distance of all Class I streams and Class II streams that flow into Class I streams. All alternatives incorporate the riparian management areas described in the Forest Plan; providing additional protection beyond the mandatory TTRA buffers. Furthermore, a 500-foot no harvest buffer has been delineated below road crossings on both sides of Survey Creek and Surho Creek (the Class I stream west of Survey Creek) to protect brown bears foraging on fish in these streams. Both Canal and Hoya old growth reserves protect high quality resident fish habitat.

A review of the alternative maps provides a comparison of the alternatives with respect to the amount of harvest in close proximity to fish streams throughout the project area. Alternative 1 harvests the most acres in close proximity to fish streams in both VCUs. Alternatives 2 and 3 treat the Hoya VCU similarly, but harvest slightly less Canal VCU acres close to fish streams than Alternative 1. Alternative 4 harvests the least acres in close proximity to fish streams across the project area, although it harvests the most acres in Survey Creek's watershed.

The rugged terrain in the project area presented a challenge to road locators. However, the road system proposed in all alternatives incorporates location and design considerations to reduce direct impacts on fish habitat by minimizing fish stream crossings and road alignments in close proximity to fish streams. For example, the Canal VCU road system considered early in this project would have crossed lower Canal, Bear, and Cowboy Creeks. It was dropped in favor of the currently proposed road, thereby eliminating the need for Class I and some high maintenance Class II stream crossings in this VCU.

Upon completion of the sale, public motorized access will be restricted through the use of physical barriers such as gates. Periodic administrative motorized access will be allowed for silvicultural purposes and road maintenance. Due to the remoteness of the road system, some "storm-proofing" measures will be used during sale closure to decrease the risk of minor drainage structure failure during storm events. Driveable dips will be installed to safeguard cross drains and particular attention will be given to ensuring that ditchlines are open and functional. A maintenance crew will inspect the road system annually to ensure that the road is not causing resource damage and to perform hand work such as culvert cleaning and seeding as necessary.

Table 3-26 shows confirmed fish stream crossings by watershed in each alternative. In addition to these crossings, there are three very small stream crossings on Road 6960 (see road card, Appendix B) located at the upper limit of habitat in resident fish streams. The final surveyed road location may or may not cross these streams where resident fish have been confirmed. The fisheries crew electroshocked all streams crossed by the proposed road system and the project hydrologist reviewed fish stream crossing sites in the field to ensure that crossing locations are compatible with fish habitat and water quality protection objectives. These three possible fish streams will receive extra field verification during the final road survey to determine if fish are present. If fish are present we would design drainage structures to provide fish passage.

The crossing on the east fork of Survey Creek is the only site where anadromous fish have been verified at or upstream of a proposed road. This is the only Class I stream crossing proposed in any alternative; a bridge is proposed at this site. The largest stream crossings are at Bear Creek, Hoya Creek, and the two forks of Survey Creek. Appendix B provides additional detail about each crossing.

Table 3-26
Comparison of Alternatives - Confirmed Fish Stream Crossings

Watershed Name	Alt 1	Alt 2	Alt 3	Alt 4
Bear	0	1	0	0
Cowboy	2	2	0	0
Hoya	3	2	3	0
Survey	3	3	3	2
TOTAL	**8**	**8**	**6**	**2**

In summary, direct impacts associated with harvest adjacent to fish streams have been avoided. Indirect impacts associated with watershed harvest are addressed below. Road construction (especially drainage structure installation), road use, and road maintenance would inevitable introduce sediment to fish streams in any alternative. Alternatives constructing more road and more fish stream crossings would have more direct impacts. The use of standard and site-specific Best Management Practices (BMPs) would ensure that this impact is short term and minimized to the extent feasible. BMPs are described on road cards, included in design drawings, and enforced through road construction specifications. BMP implementation monitoring is described in Appendix C.

Affected Environment

Floodplains and Riparian Areas

Floodplains moderate floodflow, recharge stream low flow, and provide deposition areas for sediment. The decay of salmon carcasses deposited on floodplains during fall peak flows is an important part of the nutrient cycling process. Riparian areas, including floodplains, contain vegetation that provides shade, large wood for fish habitat and channel stability, and litter fall as a nutrient and food source for fish. Intact riparian areas also intercept sediment and provide critical habitat for wildlife species feeding on fish and other aquatic organisms.

Table 3-27 shows the distribution of stream process groups in each major watershed. The values shown are Class I, II, and III stream miles. Tongass National Forest streams have been classified and mapped according to these process groups, which serve as the basis for delineating riparian management areas or no-harvest buffers (USDA 1997a). The process groups reflect physical differences in stream channels and stream processes (USDA, 1992). Floodplain (FP), estuarine (ES) and palustrine (PA) streams represent the most important and sensitive riparian areas in the project area. These low gradient streams contain the highest quality fish habitat and are the most sensitive to sediment deposition. Alluvial fan (AF),

moderate gradient mixed control (MM), and moderate gradient contained (MC) streams are slightly steeper and alternately receive and transport sediment. They usually contain fish habitat. High gradient contained (HC) streams are headwater streams, have limited fish habitat (usually Class II, if any) and function as conduits of sediment and debris to downstream reaches. Class IV streams are not shown in Table 3-27.

Table 3-27
Distribution of Stream Process Groups (Stream Miles by Watershed)

Process Group	Canal	Bear	Cowboy	Flying V	Hoya	Surho	Survey
ES	0.1	0	0.1	0	0	0.2	0
FP	0	0	0.3	0	3.4	0	1.3
PA	1.3	0	0	0	0.8	0.3	0
AF	0	0.8	0.3	0	1.7	0	0.3
MM	1.7	0	0.9	0.5	2.4	0.1	0.7
MC	0	1.3	0	0.9	4.4	0	2.0
HC	3.0	5.9	0.7	7.2	20.1	0.7	13.4
TOTAL	6.1	8.0	2.3	8.6	32.8	1.3	17.7

The most important riparian habitats in the project area are associated with the high quality fish habitat described above.

Environmental Consequences and Alternative Comparisons

Direct impacts to floodplains and riparian areas may result from vegetation and ground disturbance in these areas. Each alternative provides a high level of riparian and floodplain protection through both mandatory mitigation measures and project-specific design considerations. Most of these are described in the fish habitat discussion above. Riparian management areas associated with Class I, II, and III streams in the vicinity of proposed roads and units were verified by field crews and in many cases, unit boundaries and road locations were changed to protect riparian resources. For example, a road system accessing upper Hoya Creek was considered early in the project but dropped because the only feasible approach to this area was through a canyon pinch-point in the vicinity of Unit 21. This road would have encroached on Hoya Creek and its floodplain. Even as a temporary road with all drainage structures removed, we were concerned that mitigation measures to maintain floodplain function, channel stability, and fish habitat would have a high risk of failure, resulting in chronic long-term impacts to these resources. Therefore, the upper Hoya road system was dropped.

None of the alternatives propose modifications to the riparian standards and guides described in the Forest Plan. The widths of the riparian management areas (no-harvest buffers) vary by process group. Units proposed in Hoya and Survey Creek floodplains were entirely dropped to provide complete floodplain (FP stream) protection. Some buffers are 120 (MM streams) or 140 (AF streams) feet wide. Large V-notches (Class III HC streams) have complete sideslope protection: unit boundaries were flagged at the edge of the notch or beyond. Buffers on small Class III streams within units are generally individual leave trees or narrow buffers that completely protect the stream sideslope. The unit cards and maps in Appendix A display these details.

Windthrow is not of great concern in the project area due to the north-south orientation of most drainages, topographical protection of high ridges. Field crews did not observe much windthrow in the project area.

Watersheds

Affected Environment

The watersheds of the project area are dominated by steep mountain slopes and narrow valleys. Snow and debris avalanches appear to be relatively frequent and important disturbance processes in the upper watersheds. Much of the mainstem of Hoya Creek, for example, appears to be heavily influenced by recent deposits of sediment and debris from mass failures.

A simple watershed sensitivity analysis based on GIS soils, streams, and slope data shows that Hoya Creek is the most geomorphically sensitive watershed in the project area. Table 3-24 displays a summary of the sensitivity analysis. The analysis did not consider watersheds less than 500 acres in size. (Small watersheds tend to appear more sensitive than large watersheds in this type of analysis). A digital elevation model was used to calculate slope classes. Steep slopes represent sediment sources: they may not accurately portray landslide hazard, but steep slopes rapidly transport sediment should mass wasting occur. Stream density, as miles of stream per square mile of watershed, reflects a watershed's ability to transport sediment through the stream network: high stream densities provide efficient transport. Only Class I, II, and III streams are included in this value. Depositional stream length is an index of the risk of sediment deposition. Floodplain, palustrine, and estuarine process groups are considered depositional streams.

Table 3-28
Watershed Sensitivity

Watershed	Area (acres)	Percent Acres > 55% Slope	Percent Acres > 75% Slope	Stream Density (mi/sq mi)	High Transport Stream (miles)	Depositional Stream (miles)
Canal	1550	0	0	2.5	2.9	1.4
Bear	2120	12	1	2.4	4.6	0
Flying V	2570	10	1	2.1	5.8	0
Hoya	11230	41	13	1.9	4.9	4.2
Survey	3920	29	6	2.9	3.8	1.3

Hoya Creek's watershed has a relatively high proportion of steep slopes. Although its stream network is not the most dense, it has a high proportion of HC3 and HC6 streams which reflect high sediment transport rates. This watershed has significant natural sediment source areas in combination with a relatively high proportion of low gradient streams that are sensitive to sediment deposition. Survey Creek's watershed is also considered sensitive and contains the most anadromous fish habitat in the project area.

Class III and IV streams were mapped by field crews in 1996 and 1997. Many previously unmapped streams were discovered in the vicinity of proposed units and roads.

Environmental Consequences and Alternative Comparisons

The sensitivity of Hoya and Survey Creek watersheds became an important consideration in designing a timber sale in the Hoya VCU. The Hoya old growth reserve provides a long term benefit by protecting some of the most sensitive watershed acres in the project area. Providing complete protection to large portions of both watersheds was not compatible with the objectives of the Management Prescription for the Hoya VCU, and would not have met the purpose and need for this project. The higher overall quality of both fish and wildlife habitat in Hoya Creek's watershed, as well as the difficulties in accessing timber in upper Hoya Creek, led to the conclusion that Hoya Creek was more suited to old growth reserve designation. All alternatives provide a high level of fish habitat and riparian protection to Survey Creek's watershed as described previously. Table 3-29 shows the acres and proportion harvested by major project area watersheds.

Table 3-29
Alternative Comparison
Watershed Acres and Percent Harvested

	Alt 1	Alt 2	Alt 3	Al 4
Canal Acres	60	65	0	0
Canal Percent	4	4	0	0
Bear Acres	25	95	0	0
Bear Percent	1	4	0	0
Cowboy Acres	70	50	0	0
Cowboy Percent	18	13	0	0
Flying V Acres	15	20	35	55
Flying V Percent	1	1	1	2
Hoya Acres	140	135	150	5
Hoya Percent	1	1	1	0
Survey Acres	275	305	325	385
Survey Percent	7	8	8	10
All Other Acres	197	130	150	165
TOTAL Acres	780	800	660	610

Alternative 4 proposes the most harvest in a sensitive watershed (Survey Creek). However, the proportion harvested is not considered excessive for a first entry, particularly since this alternative proposes less disturbance overall in the watershed by constructing less road and by not constructing a crossing on the west fork of Survey Creek, which has a high risk of failure.

Table 3-30 displays amount of total road (temporary and specified) proposed by watershed in each alternative.

Table 3-30
Alternative Comparison
Watershed Road Miles Constructed

Watershed	Alt 1	Alt 2	Alt 3	Alt 4
Canal	0	1.0	0	0
Bear	0	1.6	0	0
Cowboy	0.9	1.5	0	0
Flying V	0	0.1	0	0
Hoya	2.2	2.0	2.2	0
Surho	1.1	0.8	0.8	0
Survey	4.2	5.2	5.2	2.0
All Other Miles	1.7	1.9	0.8	0.6
TOTAL Miles	**10.1**	**14.1**	**9.0**	**2.6**

Class III and IV stream mapping focused on determining the influence of these headwater streams on unit boundaries and logging systems. All Class III streams are buffered according to riparian standards and guides in the Forest Plan. Class IV streams are protected through specific BMPs controlling logging operations. Unit cards in Appendix A describe both kinds of protection.

Cumulative Effects on Freshwater Resources

Future programmed timber harvest entries are likely in both Hoya and Canal VCUs in the next 100 years, but not within the next ten years. Programmed or salvage sales could construct a road system in the Canal VCU similar to what is shown in the FEIS under Alternative 2, but there are limited options (and little rationale from a timber standpoint) for road construction beyond what is shown under this alternative in the Canal VCU. There are similar limits to additional road construction in the Hoya VCU for future entries; most of the suitable timber is accessed by the road system shown in Alternative 3. Alternative 3 constructs most of the road ever likely to be constructed in the Hoya VCU. Therefore, the cumulative effects of future road construction are displayed in the FEIS under Alternative 2 for Canal VCU and under Alternative 3 for Hoya VCU.

Future entries in either VCU would evaluate the cumulative percent harvest in each watershed. We are directed to conduct a more intensive watershed analysis if more than 20% of the watershed acres are in a second growth condition younger than 30 years (Forest Plan Appendix J-2). It is a fairly safe assumption that we would schedule future entries in a manner that would avoid reaching this threshold in any Canal Hoya watersheds. In the case of unprogrammed salvage timber sales that might exceed the threshold, a detailed watershed analysis should be incorporated into the decision to exceed the threshold.

A Sampling of public comments:

"I strongly encourage you to look somewhere else for the volume and give the 12 or so fishermen who fish the (the Bradfield Canal) at least 5 years between sales in the immediate area. The increase in boat and log traffic in the area... results not only in lost gear but in substantial areas that we cannot physically use".

"No LTF in bay where Canal Creek enters....Capsize Cove is the only anchorage between Anan and the Eagle and is the best anchorage for N and SE winds in the Bradfield. Provision must be made to assure that the fishing fleet has continued and uninterrupted use of this area."

"The Campbell logging operation dumped a lot of limbs onto the crab and shrimp grounds and tops and limbs drifted down to Blake Island where several boats were charter fishing."

"I am concerned about the very real negative impacts on the fishery--commercial and sport--as the streams in this area would be affected by logging."

Marine Resources

Affected Environment

The project area drains into the Bradfield Canal, an important commercial crab and shrimp fishery for Wrangell and a fairly popular (though somewhat remote) sport fishing destination for guides and charter boats from Wrangell and other communities. The Bradfield Canal is a fjord, extending about sixteen miles inland (east) from the northern end of Ernest Sound to the Bradfield River mouth. The canal ranges from one to two miles wide and is charted to about 150 fathoms deep. The convoluted project area shoreline is approximately fourteen miles long and is characterized by estuarine, intertidal, and deepwater marine (permanently flooded) habitats.

Estuaries are areas where fresh water mixes with salt water; unique brackish environments supporting complex and productive ecosystems. The confluence of several large streams into relatively sheltered bays produces high quality estuaries at the mouths of both Canal and Hoya Creeks. Both of these estuaries are smaller and less sheltered than the Anan Creek and Eagle River estuaries located on either side of the project area. Canal and Hoya estuaries, which together represent about two miles of shoreline, are considered sensitive habitats, supporting shellfish and intertidal salmon spawning and nursery habitat. A SCUBA survey of Canal Bay (an LTF site dropped from further consideration) near the east edge of the Canal estuary noted many Dungeness crab. The intertidal flats associated with these estuaries store fine sediment supporting sedges and grasses which bears and ungulates feed on in the spring. Adult fish use estuaries as staging areas for migrating up streams. Shorebirds, waterfowl, eagles, ospreys, bears, wolves, mink, land otters and other wildlife are drawn to these attractions.

Apart from the estuaries, most of the project area shoreline is composed of steeply plunging bedrock walls and shelves. SCUBA surveys of the three (DEIS) proposed LTF sites noted a rapid transition from intertidal to deepwater habitat. Barnacles and mussels are abundant and attract birds and mink. Herring spawn has been observed along much of the rocky shoreline.

The deepwater habitat comprising most of the Bradfield Canal supports a wide array of marine species. Target species for commercial and marine sport fishing include Dungeness and tanner crab; pink, spot, sidestripe and coonstripe shrimp; halibut; and Chinook, coho, and sockeye salmon. Red king crab are not known to be present in the Bradfield Canal. The current commercial fisheries within the canal include pot and beam trawl shrimping, pot and ring crabbing, long-line halibut, and winter salmon trolling. There is a eulochon seine fishery in the Bradfield River. Seals, orcas, humpback whales and Pacific white-sided dolphins have also been observed in the canal. Commercial fishing, charter, and recreational boats are known to use the sheltered estuaries and coves adjacent to the project area for anchorages and staging areas for land-based activities such as hunting.

Environmental Consequences and Alternative Comparisons

The potential effects on marine resources, as well as fishing and boating activities in the Bradfield Canal were important considerations in selecting and designing LTF sites and planning water-based activities associated with proposed timber harvest. Marine resources are potentially affected in the following ways: 1) ground disturbance in the immediate vicinity of estuaries and intertidal areas could result in sediment increases; 2) vegetation changes in and around estuaries may reduce habitat quality for marine species as well as terrestrial species dependent on marine species; 3) LTF construction may temporarily or permanently displace marine species; 4) log processing activities in and adjacent to marine areas could introduce pollutants and debris to marine waters; 5) helicopter log drops, barges, and log rafts could displace or interfere with commercial fishing operations and charter or recreational boating (see Figure D-1, Appendix D).

The first two potential impacts are minimized through avoiding ground disturbance and harvest within 1000 feet of estuaries and beaches (intertidal areas). The only disturbance proposed within this zone is LTF and access road development. Two early LTF sites (Canal Bay and Hoya Bay) were dropped from further consideration due to their proximity to estuaries. The sites considered in this FEIS (Canal and Hoya) are both located over a mile from the nearest estuary. Roads connecting LTFs to harvest units head abruptly away from the shoreline. Sort yards are located in uplands 1000 feet or more from salt water and well away from estuaries. Harvest units are located 1000 feet or more from estuaries.

Other potential marine impacts are minimized through the location and design of the LTF, and by establishing operating guidelines to control pollution and debris and avoiding the likelihood of conflicts with other Bradfield Canal users. Appendix D contains a summary of the LTF siting guidelines for the proposed LTF sites and a summary of mitigation measures incorporated into the LTF designs and operating guidelines.

Eventually, the Canal Hoya timber sale may develop small upland facilities as approved for equipment and fuel storage, maintenance, etc. usually in conjunction with sort yards. Initially, however, barges would be used for these purposes and for transporting materials to and from the area. At least one barge would also be stationed in the waters nearby to facilitate helicopter yarding. No land-based logging camp will be authorized in the project area. Crews would most likely use a floating camp which would be subject to state and federal permits. The map in Appendix D displays possible sites for these facilities and log raft storage. However, the sites actually chosen will largely be at the discretion of the purchaser. The Forest Service will work with the purchaser to make them aware of the other uses in the area and to negotiate placements that cause the least disruption.

Floating log rafts of about 35,000 square feet surface area would be assembled nearby in designated dumping and rafting areas of 4-5 acres in size. A "pathway" of indirect marine impacts (primarily bark deposits) associated with log transport after leaving the project area can be estimated by describing what happened to logs leaving the nearby Campbell Timber Sale in 1995. Some Campbell Timber Sale log rafts were temporarily stored in Frosty Bay, then towed to Thorne Bay where logs were transferred to land for sorting, scaling, and manufacturing. Cedar rafts were assembled at Thorne Bay and towed to Tolstoi for export by ship. Small saw logs were towed to the Ketchikan Pulp Mill for processing. Large saw logs bypassed Thorne Bay and were towed directly to Metlakatla for milling into cants. These same facilities may or may not be used for Canal Hoya Timber Sale logs: the actual pathway is primarily at the discretion of the purchaser. It is unlikely that any new processing facilities will be developed to transport logs in or out of marine waters in Southeast Alaska in the near future. The centralized facilities described above have been in place for years and may be already affected by bark deposits.

The alternative with the highest volume is likely to have the highest potential for conflicts with other Bradfield users. Table 3-31 displays volumes produced by each alternative. Alternative 2 (the highest volume) would involve the most log rafting and have the most potential for operations and debris interfering with other marine users. Alternatives 3 and 4 are likely to have the least impacts, since only one LTF is proposed.

Table 3-31
Comparison of Alternatives
Marine Impacts

	Alt 1	Alt 2	Alt 3	Alt 4
Volume MMBF thru LTF	14.9	17.1	12.2	8.2
Volume MMBF to Barge	1.1	0	1.8	4.1
Number of LTFs	2	2	1	1

Other Environmental Considerations

Cumulative Effects

We considered cumulative effects of past and present projects in the area, but such activities are not likely to lead to significant cumulative effects beyond those disclosed in this EIS. Under Forest Plan goals and objectives, more harvest would likely take place in the area, but is not likely to occur for many years and is not scheduled at this time. Our best estimate is that additional timber harvest in the project area is not likely to take place for 20 to 30 years. We do not believe the effects of such possible harvests are reasonably foreseeable; nor are environmental and regulatory conditions that would exist in 20 to 30 years well enough known to forecast effects of such a possible entry. Any activities nearby known to us or which we can foresee are either largely well removed and/or unconnected to the project area, or are far enough in the future as to be highly speculative in terms of possible effects.

Past projects near Canal Hoya which can be considered in a cumulative effects analysis include Frosty Bay Timber Sale (1992-1993), Campbell Timber Sale (1995), and the Tyee Powerline (cleared and constructed through the project area in the early 1980s). Reasonably foreseeable future activities in the short-term (within 10 years) include the Swan Lake-Lake Tyee Intertie (powerline clearing and construction in the Eagle River drainage beginning in 1998), ongoing upgrade and maintenance of the existing Tyee Powerline, and timber harvest on Deer Island (1999) and south of Point Warde (primarily helicopter harvest in 2005).

Reasonably foreseeable future activities in the long-term (within 100 years) include timber sales within Frosty Bay, Canal, Hoya, and Campbell VCUs. Some possible effects of these future entries are discussed in the EIS. However, the details of these projects are for the most part unknown at this time. Cumulative effects of each of these projects will be considered as part of the analysis and decision for each project.

At a broad landscape level, we evaluated cumulative effects (except Campbell Timber Sale, which is physically--and from a terrestrial standpoint, biologically--disconnected from Canal Hoya) on changes in brown and black bear habitat (see page 3-58). We have also considered potential cumulative effects of all but Frosty Bay and Point Warde Timber Sales (which are physically--and from an aquatic standpoint, biologically--disconnected from Canal Hoya) on freshwater and marine resources. Existing impacts to freshwater fisheries in the project area from powerline right of way clearing are negligible. Potential future impacts to freshwater fisheries in the project area are discussed on page 3-93. Campbell Timber Sale operations introduced logging debris to marine waters that interfered with fishing gear in the Bradfield Canal. It appears that this debris is rapidly decomposing (USFS memo, October 3 1997), but we have addressed this concern for future projects through mitigation and monitoring.

The two LTF sites (Canal and Hoya) shown in Alternative 2 are the only LTFs that are likely to ever be constructed in these two VCUs. It is possible that a future entry in the Campbell Timber Sale on the north side of the Bradfield Canal would construct an LTF there (north of the Canal LTF site) as shown in the Campbell Timber Sale FEIS (R10-MB-240, Sept. 1993). It is unlikely that all three of these LTFs would be in use simultaneously even if all three were eventually constructed. The cumulative bark deposition at LTF sites is monitored as a permit requirement and mitigated as discussed in Appendix C.

It is likely that conflicts between users in the Bradfield Canal will increase within the next five to ten years. Cumulative effects of the Canal Hoya timber sale in combination with construction and logging activities associated with the Swan Lake-Lake Tyee Intertie (the north end of which will be based from the Bradfield Canal) and continuing maintenance of

the existing Tyee Powerline could result in displacement of or interference with commercial and charter fishing activities.

In summary, potential cumulative effects associated with past and near-future projects in and around Canal Hoya have been considered and addressed as part of the decision on this project. At this time, cumulative effects are not an environmental concern in the project area. Mitigation measures and monitoring will play an important role in ensuring that cumulative effects do not become a concern in the near future.

Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources concerns resources that we would affect that would not be returned or could return, but only over long periods of time. For this analysis, the irreversible disturbance of some types of heritage resources could occur on unknown sites, subsurface sites, or even known sites when unplanned events occur.

Use of petroleum fuels and rock sources for road and sort yard construction commits non-renewable resources. Alternative 5, the no action alternative, has no effect on mineral resource use at this time.

Constructing roads in the project area would irreversibly reduce the amount of roadless area and opportunities related to the roadless character. Alternative 5 would not have these consequences.

Under all action alternatives, there would be an irretrievable loss of old growth forest unless rehabilitation occurs over a period of 250-300 years. Due to increased fragmentation, other old growth areas adjacent to units would have their habitat values reduced.

Unavoidable Environmental Effects

Although we designed mitigation measures, units and roads to avoid adverse consequences, some environmental impacts cannot be completely mitigated and would be expected to occur:

Air quality would diminish on a recurring, temporary basis due to the construction of roads, timber harvest, and hauling. Limbs and logging slash would be burned at sort yards intermittently throughout the logging periods which, would deposit minor amounts of particulate matter and smoke into the air.

Although Best Management Practices are designed to protect soil and water, some potential for surface erosion, sediment production, channel erosion, and mass movement does exist. Road development poses a risk of sediment production, while helicopter yarding reduces this risk considerably. Sediment production could displace fish or result in a loss of habitat near stream crossings and temporarily affect the function of the freshwater system.

Increased human activity both during and after logging, and loss of habitat, would result in impacts to fish and wildlife species, particularly those populations that have low numbers or are more sensitive to the presence of people. The habitat for old growth associated species would be reduced. Travel corridors between old growth blocks in adjacent watersheds would also be reduced in size and fragmented, which may affect the ability for individuals to disperse and genetic material to exchange among local populations of species.

Although the degree of impact varies with the alternative selected, logging operations would temporarily affect the use of the area by guides, commercial fishermen, tourists, and local

recreationists. There would also be some loss of primitive and semi-primitive recreation opportunities in the project area. The natural landscape, as viewed from the Bradfield Canal, would appear visually altered and may be noticeable to viewers.

Alaska Coastal Management Program

We have determined the alternatives are consistent with the Alaska Coastal Management Plan.

We have determined that the proposed alternatives, including the preferred alternative, are consistent with the Alaska Coastal Management Program to the maximum extent practicable. We have based this determination on the analysis and mitigation measures outlined in this document. In particular, we direct your attention to our methods of addressing Issue 5 (Freshwater and Marine Resources), and the specific measures outlined and summarized in the Unit, Road and Log Transfer Facility cards (Appendix A, B, and D). The Division of Governmental Coordination reviewed our finding of consistency on the preferred alternative and concurred with our determination, with two stipulations (see letter in Appendix F), which have been addressed by relocating the stream crossing on Survey Creek and adding storm-proofing to our road mitigation (page B-7 and 2-2).

ANILCA Section 810 Subsistence Evaluation Process

Section 810 of the Alaska Native Interest Lands Conservation Act (ANILCA) requires a Federal agency, having jurisdiction over public lands in Alaska, to analyze the potential effects of proposed land-use activities on subsistence uses and needs. An ANILCA 810 analysis should include:

- An evaluation of the possibility of affects on subsistence uses;
- A distinct finding on whether the proposed action may significantly restrict subsistence uses;
- Notices and hearings if the evaluation results in a finding that the proposed action may significantly restrict subsistence uses; and
- Determinations if, following a public hearing a finding of a significant restriction remains, the responsible official decides to proceed with the proposed project.

Evaluation criteria used to assess the effects of the proposed alternatives are: (1) changes in abundance or distribution of subsistence resources, (2) supply and demand, (3) changes in access to subsistence resources, and (4) changes in competition from non-subsistence users for those resources. The evaluation determines whether subsistence uses within the project area or portions of the area may be significantly restricted by any of the proposed action alternatives. Wrangell is the only community that meets the criteria in this area for inclusion in the subsistence 810 analysis (Kruse 1993). Wildlife, fish, shellfish, marine mammals, other foods, and timber are the resources used for subsistence that are evaluated in this document. The evaluation relies heavily upon wildlife habitat capability models developed in support of the Forest Plan Revision and displayed in Appendices K and L of the 1991 Supplement to the Draft EIS for the Tongass Land Management Plan Revision. A complete Subsistence Report is in the planning file.

Canal Hoya Subsistence/ANILCA 810 Findings

The Findings are based on the evaluations in the Subsistence Report on abundance, distribution, supply and demand, access and competition for harvested resources in the project area, WAA 1814 and the Bradfield Canal. There would be some decreases in habitat capability for wildlife under the action alternatives.

Habitat capability can support populations greater than projected harvest demand for deer, black bear, mountain goat and furbearers under all alternatives through the rotation (USDA 1991). The area is not extensively used for subsistence harvesting. The 1987-1993 harvest rate for deer was 0 which also equals the estimated future hunter demand (ADFG 1991, USDA 1997a). Harvest of marten has been highly variable, ranging from zero to 50 in any given year. The effects on finfish and shellfish populations are expected to be minimal and should not affect the supply available for subsistence harvest.

Although brown bear numbers remain relatively stable (according to our models), demand will surpass what the population can support (USDA 1991). Table 3-32 shows the past harvest levels, predicted brown bear populations needed to meet future demand and estimated habitat capability (supply). Roads developed in conjunction with this sale would increase hunter access to brown bear populations which is being mitigated by closing roads to motorized use. This impact will be further mitigated by hunting closures adjacent to new roads, where such hunting currently does not occur, and by the intrinsic remoteness of the area. We do not anticipate that the restriction on hunting adjacent to new roads during the sale will significantly affect subsistence users. Monitoring brown bear mortality after the life of the sale would assist in detecting downward population trends. From a subsistence standpoint, brown bear are generally not considered a food source but rather a very limited use is made of parts of the bear for cultural purposes. Harvest by nonresidents is high (73%) and nonresident harvest increases yearly within this Game Management Unit. Demand (hunter harvest) is currently regulated by the Alaska Department of Fish and Game. If the brown bear population in this area declines, a subsistence priority would go into effect and hunting may be limited to rural residents. Projected demand surpasses the carrying capacity of the habitat even under existing conditions.

Although there may be some long term changes in access, we do not expect that the increased access would reduce subsistence harvests below historic levels. Alternative 2 would result in construction of the most roads, followed by Alternatives 1, 3 and 4. Closure of roads to motorized access would further mitigate these effects. A substantial increase in competition for subsistence wildlife resources from non-rural community residents is not projected to result from the alternatives proposed.

There will not be a significant restriction on subsistence uses as a result of this sale

A finding that there will not be a significant restriction on subsistence uses as a result of this sale is in order for wildlife, fish, and shellfish, marine mammals, other foods, and timber resources.

Table 3-32
Harvest demand and estimated habitat capability for WAA 1901 (USDA 1991 - TLMP SDEIS, USDA 1997a)

Species	Annual Harvest (from TLMP SDEIS)	Population Needed*				Estimated Habitat Capability (from TLMP SDEIS preferred alt)			
		1990	2000	2010	2040	1990	2000	2010	2040
Deer	0	0	0	0	0	687	687	687	641
Black Bear	0.3	4	4	5	8	97	97	95	93
Brown Bear	0.9	23	27	31	48	24	24	24	23
Goat	0.9	13	15	18	27	28	28	28	28
Marten	7.6	19	22	26	30	62	59	59	56
River Otter	1.3	3	4	5	7	25	25	25	25

* Assume harvest rate of 7% for black bear, 4% for brown bear, 7% for goats, 10% for deer, 40% for marten and 40% for river otter. Demand for all species increases by 18% per decade through 2010 and 15% per decade through 2040.

3 Environment and Effects

Heritage Resources

Heritage resources represent past human activities that span the last several thousand years. While present, heritage resources in the project area are limited in size, complexity and age. This suggests the project area has not witnessed concentrated human activity such as that represented by ancient village sites, camps and other settlements. Stikine Area archaeologists have recorded six heritage resource sites in the project area, including one historic cabin (Site XBC-028), an intertidal rock alignment (Site XBC-039), one historic mine adit (Site XBC-040), an ancient fish trap (Site XBC-041), one historic log crib structure (Site XBC-042), and an alpine rock cairn site (Site XBC-043) After applying the eligibility criteria for the National Register of Historic Places we have determined that the two sites, XBC-041 and XBC -043, are eligible. Site XBC-041, an intertidal fish trap, would not be affected by any of the proposed alternatives. Site XBC-043 is located in the Alpine zone, outside the area of potential effect. We have determined that no sites eligible to the National Register of Historic Places would be affected under any of the alternatives.

We conducted an extensive archival and literature search to references to heritage resources in the project area. We also consulted the Alaska Heritage Resource Survey, a statewide listing of heritage resources. The search reveals very little specific information about the project area. The project area is within the former territory of the Stikine Tlingit and various documents attribute ownership of Bradfield Canal to the Nanyaayih, Kiks'adi and Katch'adi clans. Ethnographic records suggest the Stikine Tlingit preferred other areas of the Bradfield Canal compared to the project area. Historic records document limited logging, mining and trapping activities in the project area.

Previous heritage resource investigations in the project area have been limited in scope. In 1980 Elizabeth Andrews (1980) conducted a survey of portions of the Tyee Lake Hydroelectric Project powerline that traverse the project area, but she found no sites. In 1984 Forest Service archaeologist Larry Roberts (1984a) conducted a survey of several log transfer facilities along the southern Bradfield Canal coastline. He only found evidence of modern logging activities. Also in 1984, Roberts (1984b) surveyed about 18 acres for a timber sale proposed in the project area. Roberts recorded one historic cabin (Site XBC-028).

Between May 1993 and September 1994, Stikine Area archaeologists surveyed about 600 acres within the project area. The Area archaeologist designed a model to predict the probability of heritage resources for any portion of the project area. The model divides the study area into high and low probability zones. We defined the high probability zone as all areas between mean and high tide and 100 feet elevation. We included areas along anadromous fish streams and, because of the potential for culturally modified trees, we included concentrations of cedar. Ethnographic records refer to Tlingit goat hunting in Bradfield Canal so we also targeted some alpine areas for field survey. The low probability zone incudes all lands not in the high probability zone. We focused most of our survey in the high probability zone, but we did allocate some survey effort in the low probability zone.

Stikine Area archaeologists recorded five new sites, bringing to six the total number of sites for the project area. Due to lack of integrity and absence of associated artifacts we have determined that four of the sites (SitesXBC-028, XBC-039, XBC -040, XBC-042) are not eligible to the National Register of Historic Places. There are two sites in the project area (Sites XBC-041, XBC-043) that do meet the National Register eligibility criteria. Site XBC-041 is an intertidal fish trap site that is protected by a beach fringe buffer. Site XBC-043 is an alpine site, well away from planned timber harvest or road construction. Therefore we have determined that no sites eligible to the National Register of Historic Places would be affected by any of the considered alternatives.

Federal laws and regulations require processes for considering the impacts of Federal projects on significant heritage resources, i.e. sites eligible to the National Register of Historic Places. Major legislation related to these processes includes the National Historic Preservation Act. as amended; the Archaeological Resources Protection Act, as amended; the American Indian Religious Freedom Act and the Native American Graves Protection and Repatriation Act. Section 106 of the National Historic Preservation Act (and the regulations in 36 CFR 800) outlines a process for evaluating the effects Federal projects may have on heritage resources. It involves inventorying heritage resources within a project area, determining which are significant or eligible to the National Register of Historic Places, evaluating project effects and designing and implementing measures to negate any adverse effect that projects may have upon significant heritage resources. This process is undertaken in consultation with the Alaska State Historic Preservation Officer and sometimes with the Advisory Council on Historic Preservation, an independent Federal agency.

We have completed the inventory, made determinations of eligibility and submitted a report outlining our work to the Alaska State Historic Preservation Officer. The Alaska State Historic Preservation Officer, in a letter dated April 24, 1998, concurred with our determination that no sites eligible to the National Register of Historic Places will be affected by the proposed timber sale. This completes our requirements under Section 106 of the National Historic Preservation Act.

Soil Resources

Soil development in Southeast Alaska is influenced by high levels of rainfall, cool maritime temperatures, and moderately low yearly soil temperatures. Under these conditions, organic material decomposes slowly, resulting in an accumulation of a organic material. Mineral soils in stable landscapes are typically Spodisol, having a thin albic horizon (leached) with an underlying spodic horizon (iron and aluminum accumulation). A thick organic surface horizon composed of forest litter is common on mineral soils.

Deep organic soils develop where the movement of water is impeded by bedrock, or other restrictive soil horizons. All areas with organic soils are considered wetlands (COE, 1987).

Soil Productivity and Erosion

Ecological functions dictate a relationship between soil forming factors and plant community development. Soils with particular physical, chemical, and biological characteristics generally support a certain plant community type or association. Deep well drained mineral soils are the most productive sites for tree growth even though tree rooting is generally shallow. Site productivity usually decreases with increasing soil wetness. Timber site productivity on poorly to very poorly drained organic soils is generally much lower than the productivity of mineral soils. Very little quantitative information on soil nutrient status and timber productivity exists for certain organic wetland soil types (Kaikli, Karheen, Kitkun, and Maybeso soils series). Until further information is available, we will avoid timber harvest on these soils. Because soils are heterogeneous, inclusion of up to 2 acres of organic soils may be included in harvest units (USDA 1997b).

Erosion

Surface erosion is virtually nonexistent in a natural condition under the forest canopy, except in areas of mass wasting, because the forest floor is protected by living vegetation or by a thick organic surface layer.

Mass Wasting

Mass failures, debris torrents, debris avalanches, etc. are all active, natural erosion processes occurring in the project area. They occur in undisturbed areas and will continue to do so in the future. Many landslides occur during or immediately after a heavy rainfall event, when

soils are saturated. The failures usually originate in the mid- to upper-slope positions, at the upper end of small drainages. Failure occurs when the downward force is greater than resisting forces.

Tree roots contribute to the stability of hillslopes in several ways. Roots add strength to the soil by vertically anchoring through the soil mantle into fractured bedrock or other stable substrate. Small roots at the soil surface reinforce the upper soil layer so that it acts as a membrane to provide lateral strength and increased slope stability. After harvesting timber, tree roots deteriorate reducing soil strength and the stability of steep slopes with shallow soils. Large downed wood can also act as a slope buttress. Research in Southeast Alaska (Swanston, 1989) has suggested that although less than 10 percent of all landslides in the past 20 years were related to logging or roads, logging and roads increase the potential for landslides in a given area.

Harvest on Oversteepened Slopes

A high percentage of the forested area in the project area is on very steep slopes (>72%). These lands are not considered suitable for timber management until a site-specific risk assessment has been completed. Cliffs, bedrock exposures, landslides and avalanche tracts are common land type features in these areas. In general, we avoid harvest on oversteepened slopes; however, some short steep pitches do occur in larger areas of lesser slopes. Helicopter yarding and silvicultural prescriptions that leave a substantial amount of trees undisturbed are planned for harvest units with oversteepened slopes. The risk of initiating slope failure and degrading site productivity is a concern when harvesting on oversteepened slopes. Harvest on short pitches of oversteepened slopes poses less risk than harvest on long smooth oversteepened slopes. Slope steepness and soil material were the primary factors used to evaluate slope stability and likelihood of management induced slope failures. Harvest on small inclusions of slopes >72% is proposed in two units. The risk of impacting soil productivity or inducing a mass wasting event as a result of harvest is low.

Effects to Soil Resources

Soil disturbance would result from road building and harvest activities. Road construction takes lands out of productivity, replacing them with a road surface. This is considered a soil/site impact on temporary roads and a permanent change on specified roads. Road and infrastructure construction are expected to cause the most significant impact to soils.

Soil erosion associated with construction of the specified road is primarily along cut slopes. Implementation of BMPs, especially prompt revegetation of cut slopes would reduce the amount of soil erosion.

Miles of temporary road construction are used to compare impacts of the alternatives. Alternative 2 has the most temporary road construction, 2.8 miles, thus, the greatest impact. Alternative 4 has no temporary road construction, and Alternative 1 and 3 are intermediate with 1.6 miles of temporary road construction. Long term impacts associated with temporary road construction would be mitigated by revegetating roads when they are obliterated.

Harvest units would be designed to minimize impacts to soil. No harvest units are located in areas where harvest might increase the risk of mass failure or cause loss of site productivity due to soil erosion. Some mineral soil material may be exposed by yarding operations. Helicopter yarding is expected to cause much less disturbance than cable yarding. Potential for impacts can be assessed by comparing the acres harvested and harvest method for each Alternative. Alternative 2 is the most likely to cause impacts, Alternative 4 the least and Alternatives 1 and 3 are similar and between 2 and 4.

Wetlands

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater with a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (40CFR 230.41 (a) (1)).

Executive Order 11990, as amended, requires Federal agencies exercising statutory authority and leadership over Federal lands to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands. Federal agencies are required to preserve and enhance the natural and beneficial values of wetlands in carrying out their responsibilities for : 1) acquiring, managing and disposing of lands and facilities; 2) providing federally undertaken, financed, or assisted construction and improvements; and 3) conducting Federal activities and programs affecting land use.

Wetlands were identified using the Corps of Engineers three-parameter system described in U.S. Army Corps Engineers Wetlands Delineation Manual (COE 1987). Wetlands are areas with hydric soils, hydrophytic vegetation, and wetland hydrology. Soil resource inventory maps, including correlations between soil series and plant communities were used to determine the extent of wetlands in the project area. Following field verification, the GIS database was revised in order to generate wetland maps. These maps were used to quantify the acreage of wetlands in harvest units and along the road corridor.

Wetlands in the Project Area

Extensive areas of wetlands are located in the project area. For purposes of description, the wetlands are classified and mapped based on vegetative cover type. The geomorphic categories as described by Brinson (1993): depressional, riverine, fringe, and peatlands, are useful in interpreting wetland function. Riverine wetlands are associated with streams and are represented by floodplains which support Sitka spruce/devils club forest community types and emergent sedge/tall shrub community types. Fringe wetlands are those that border a water body, such as along the lakes and salt water. Peatlands are the most extensive, occurring at all elevations across the project area. Sphagnum bogs and emergent sedge wetland types are associated with peatlands.

The biological significance of a wetland is related to the value of its functions, and at least in part to the relative scarcity of the wetland type in the landscape. This is especially true in terms of biological diversity on the landscape scale. The relatively scarce fens, estuarine salt marshes and lakes are assumed to have a greater biological significance than the more common bogs and forested wetlands which are widespread throughout the landscape.

In the project area, wetlands adjacent to water bodies were recognized as "important", primarily for the wildlife habitat they provide. Another area recognized as an important wetland is along a tributary to Canal Creek. Tall sedge meadows along the creek (a PA5 stream channel type) and muskeg uplands are heavily used by bear and beaver.

Wetlands cover approximately 12,200 acres of the project area. Wetland types present include coniferous forested wetlands (palustrine forested), mixed forest/muskeg wetlands (palustrine forested/palustrine emergent), sphagnum bogs or muskegs (palustrine emergent and palustrine scrub-shrub), estuarine wetlands (estuarine intertidal unconsolidated shore and estuarine intertidal emergent), alpine/subalpine wetlands.

Forested Wetlands

Forested wetlands consist primarily of slope bogs supporting coniferous forests, some of which occur in a mosaic pattern with small open bogs. Tree cover ranges from a minimum of 10 percent to about 60 percent canopy cover. Tree height is at least 25 feet. Plant communities (Pawuk and Kissinger, 1989) consist primarily of Mixed Conifer/Blueberry/Skunk Cabbage, Mixed Conifer/Blueberry/Deer Cabbage, Western Hemlock/Blueberry/Skunk Cabbage, Shorepine/Blueberry, and some Mountain Hemlock/Blueberry/Skunk Cabbage. Soils are typically very poorly drained organic soils or poorly and very poorly drained mineral soils. There are 960 acres of this wetland type in the project area.

Forested Wetland/Forest Non-Wetland Complex

Consists of a mixture of forest wetlands as described above and non-wetlands in a complex mosaic of microtopography that controls drainage and water regime. Approximately 500 acres of this wetland type are mapped in the project area. These areas make up the majority of wetland acres planned for timber harvest.

Forested Wetland/Sphagnum Peat Bog Complex

These wetlands are a complex of forested wetlands as described above, and sphagnum bogs as described below. Approximately 1400 acres of this wetland type occurs in the project area.

Sphagnum Peat Bogs

Sphagnum bogs, locally called muskegs, have deep peat soils. The high amount of free water reduces aeration necessary for organic matter decomposition resulting in the accumulation of peat deposits overtime. Soils are very poorly drained, moderately deep to deep, extremely acid peat soils. Tree cover is less than 10 percent, consisting mainly of stunted shore pine with lesser amounts of western hemlock, mountain hemlock, yellow cedar and Sitka spruce. Common shrubs include Labrador tea, crowberry, mountain cranberry, dwarf blueberry, bog laurel, and bog cranberry. These wetlands function as areas for recharge of groundwater and streams, and for deposition and storage of sediment and nutrients. There are approximately 1,600 acres of this wetland habitat in the project area.

Emergent Sedge Wetlands

Emergent sedge wetlands are open (non-forest) fens. Unlike bogs, shore pine are usually not present in fens. Oregon crab apple and highbush cranberry are common on the margins of fens. Soils are poorly and very poorly drained, and moderately deep to deep organic soils. Soil and water in fens typically are less acidic and have a higher nutrient content than sphagnum bogs. These organic soils typically contain some mineral soil material as thin strata of alluvium. These wetlands are more common in the Canal VCU than the Hoya VCU. They usually occur along streams or on the fringe of muskegs. Two-hundred acres of this wetland type are in the project area.

Alpine and Subalpine

Subalpine wetlands as used here, are primarily high elevation (1800 to 2300 feet) bogs that occupy the sloping to steep summit of mountains. They are typically dominated by dwarf shrubs, low sedges and various forbs, especially deer cabbage. Trees include widely scattered stunted mountain hemlock, yellow cedar and less frequently shore pine. Shrubs include some alpine species typically yellow mountain heather, Merten's cassiope, luetkea and copperbush. Soils are typically poorly and very poorly drained shallow organic soils over bedrock. There are 7770 acres of alpine and subalpine habitat mapped in the project area, not all of which is wetland.

Salt or Marine Estuary

Fourteen acres of salt marsh wetlands occupy the estuary area at the mouth of Hoya and Canal Creek. These intertidal areas contain a variety of salt tolerant sedge communities

arranged according to subtle differences in elevation and corresponding frequency of salt water inundation. The higher, less frequently inundated areas typically contain highly diverse grass/sedge/forb communities. Oregon crab apple and alder are found along the forest fringe. Salt marshes have poorly drained mineral soils that have appreciably higher pH values and nutrient contents than other wetland types.

Effects on Wetlands

Because wetlands are so extensive in the project area, it is not feasible to avoid all wetland areas. However, there are no development activities planned on the more biologically significant wetlands. There would be no direct effects to the fens, estuarine wetlands, or the lake fringe wetlands. In all alternatives, roads and units were located to avoid these areas. Roads and other facilities would be constructed at least 1000' from estuaries. Effects to wetlands in the project area can be divide into two categories: permanent loss, a long-term effect; and disturbance, a temporary or short term effect. Road construction results in the filling of wetlands creating a permanent loss of wetland habitat. Effects will be minimized by not using wetlands as sites for overburden disposal. Implementation of BMPs such as minimizing ditching and providing adequate cross drainage, can minimize the affected area. Table 3-33 displays the length of road that would be constructed across the different wetland types.

Table 3-33
Roads in Wetlands

Wetland Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Forested Wetland	.98	.93	.93	.58	0
Forested Wetland/Forest Non-Wetland Complex	.47	.98	0	0	0
Sphagnum Peat Bog	.54	.41	.41	.1	0
Sphagnum Bog/ Forested Wetland Complex	1.65	2.8	1.17	.37	0
Emergent Sedge Wetlands	.06	.06	0	0	0

Table 3-34 displays the acres of harvest that is planned on the different wetland types.

Table 3-34
Acres of Harvest on Wetlands

Wetland Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Forested Wetland	77.6	66	83	106	0
Forested Wetland/Forest Non-Wetland Complex	66	7	15	11	0
Sphagnum Peat Bog	1	1	1	.9	0
Sphagnum Bog/ Forested Wetland Complex	35	19	18	30	0
Emergent Sedge Wetlands	2.3	2.3	.7	0	0

The harvest of trees in wetlands converts needle-leaved, evergreen, forested wetlands to deciduous shrub wetland types. The conversion from forested to shrub wetland is not expected to result in long-term loss of any wetland values, only a conversion from one set of wetland functions to another. Silviculturists on the Tongass National Forest have concluded that all wetlands which have been harvested over the past 20 years are adequately restocked

(USDA Forest Service, 1995). Because there is a lack of response information on regrowth rates, wetlands with organic soils will not be harvested. The wetlands considered for harvest are primarily low volume forests with low site indexes. Regeneration of the second growth stand on these sites is expected to be slower growing then stands on sites with well drained mineral soils. Shovel logging in wetlands can cause detrimental soil disturbance, all wetlands considered for shovel harvest will be inspected by Soil Scientists prior to logging.

Karst and Caves

Karst Features

During field surveys for this project, an effort was made to examine rock types for karst features wherever possible. In most forest and muskeg areas, the soil layer is too thick to allow easy observation of the underlying rocks. Exposed rock at high elevation, along stream channels, on steep slopes, and along the shoreline, as well as past geologic inventory, was the basis for determining the extent of the karst resources.

Karst features were located in the Canal VCU. The best expressed karst landscape features are located in the 2500-3400 foot elevation zone. Numerous collapsed sink holes were located in this area. Limestone bedrock exposures were also located in Canal Creek about 1/2 mile from salt water, and on the peninsula extending to the west. It appears that a thin belt of crystalline limestone, as described by Buddington (1921), extends south from Blake Island across the Bradfield Canal and up into the subalpine zone of the Canal VCU. Surveys for caves were conducted in areas with carbonate bedrock, but none were located.

Effects on Karst

All of the forested area known to have limestone bedrock is included in the Canal Old Growth Reserve, and will not be harvested. Unit 44 lies in the path of the limestone belt; however, no limestone bedrock has been located in this unit. No caves are known to occur in the project area, and consequently, no impacts are expected to occur to cave resources.

Sensitive Plants

Surveys for sensitive plants were conducted through out the project area. No sensitive plants were located. The biological evaluation concluded that none of the action alternatives would have an impact on any sensitive plant species.

Other Findings

The effects of the alternatives on consumers is reflected in the discussion of the various goods and services supplied as a result of the proposed alternatives (see Issue 1, Timber Economics and Supply, page 3-2). We have determined that the actions proposed in the alternatives would not adversely affect prime farm land, range land, rivers eligible for Wild and Scenic River designation, Class II Airshed standards associated with the Clean Air Act, or Wilderness, nor would it adversely impact civil rights, women or minorities.

Chapter 4

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Glossary

Access
The opportunity to approach, enter, and make use of public lands.

Access Management
Acquiring rights and developing and maintaining facilities needed by people to get to and move through public lands (physical attributes).

Adaptive Management
A continuous process of action-based planning, monitoring, research, evaluation, and adjustment with the objective of improving implementation and achieving desired management goals and objectives.

Alaska National Interest Lands Conservation Act (ANILCA)
Passed by Congress in 1980, this legislation designated 14 National Forest wilderness areas in Southeast Alaska. The Alaska National Interest Lands Conservation Act of December 2, 1980. Public Law 96-487, 96th Congress, 94 Stat. 2371-2551. In Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

Alaska Native Claims Settlement Act (ANCSA)
Public Law 92-203, 92nd Congress, 85 Stat. 2371-2551. Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Alaska natives and for other purposes.

Allowable Sale Quantity (ASQ)
ASQ refers to the maximum quantity of timber that may be sold each decade from the Tongass National Forest. This quantity, expressed as a board foot measure, is calculated per timber utilization standards specified in the Alaska Regional Guide, the number and type of acres available for timber management, and the intensity of timber management. The ASQ was calculated at 4.5 billion board feet per decade for the Tongass National Forest.

Alluvial Fan
A cone-shaped deposit of organic and mineral material made by a stream where it runs out onto a level plain or meets a slower stream.

Alluvium
Material deposited by rivers or streams, including the sediment laid down in river beds, floodplains and at the foot of mountain slopes and estuaries.

Alpine
Parts of mountains above tree growth and/or the organisms living there.

Alternative
One of several policies, plans, or projects proposed for decision making.

Anadromous Fish
Anadromous fish (such as salmon, steelhead, and sea run cutthroat trout) spend part of their lives in freshwater and part of their lives in saltwater.

Background
The distant part of a landscape. The seen or viewed area located from three or five miles to infinity from the viewer. (See "Foreground" and "Middleground".)

Beach Fringe
The area inland from salt water shorelines, which is typically forested.

Bedload
Sand, silt, and gravel, or soil and rock debris rolled along the bottom of a stream by the moving water.

Best Management Practice (BMP)
Land management methods, measures, or practices intended to minimize or reduce water pollution. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility,

Biological Diversity (Biodiversity)
The variety of life in all its processes.

Blowdown
See windthrow.

Board Foot (BF)
A unit of wood 12" X 12" X 1". One acre of commercial timber in Southeast Alaska on the average yields 28,000-34,000 board feet per acre (ranging from 8,000-90,000 board feet per acre). One million board feet (MMBF) would be the volume of wood covering one acre two feet thick. One million board feet yields approximately enough timber to build 120 houses or 75,555 pounds of dissolving pulp.

Bole
Trunk of the tree.

Braided Streams or Channels
A stream flowing in several dividing and reuniting channels resembling the strands of a braid, the cause of division being the obstruction by sediment deposited by the stream.

Brush Disposal
Cleanup and disposal of slash and other hazardous fuels within the forest or project areas.

Buffer
Tongass Timber Reform Act (TTRA) requires that timber harvest be prohibited in an area no less than 100 feet on each side of all Class I streams and Class II streams which flow directly into Class I streams. This 100-foot area is known as a buffer.

Capability
An evaluation of a resource's inherent potential for use.

Clearcut
The harvesting in one cut of all trees on an area. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield. Clearcut size on the Tongass National Forest is limited to 100 acres, except for specific conditions noted in the Alaska Regional Guide.

Coarse Woody Debris
Any large piece of relatively stable woody material having a diameter of at least four inches and a length greater than three feet that intrudes into the stream channel. Also called Large Organic Debris (LOD).

Code of Federal Regulations (CFR)
A codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

Commercial Fishery
Fish, shellfish, or other fishery resources taken or processed within a designated area for commercial purposes

Commercial Forest Land (CFL)
Productive Forest land that is producing or capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

Normal CFL: Timber that can be economically harvested with locally available logging systems. Composed of two categories:

Standard: Timber that can be economically harvested with locally available logging systems, such as highlead or short-span skyline.

Special: Timber that is in areas where special consideration is needed to protect other resources but can be harvested with locally available logging systems.

Non-standard CFL: Timber that cannot be harvested with locally available logging systems and would require the use of other logging systems such as helicopter or long-span skyline.

Confluence
The point where two streams meet.

Connectivity
A measure of the extent that forest areas between or outside reserves provide habitat for breeding, feeding, dispersal, and movement.

Corridor
Connective links of certain types of vegetation between patches of suitable habitat which are necessary for certain species to facilitate movement of individuals between patches of suitable habitat. Also refers to transportation or utility rights-of-way.

Cover
Refers to trees, shrubs, or other landscape features that allow an animal to partly or fully conceal itself.

Critical Habitat
Specific terrain within the geographical area occupied by threatened or endangered species. Physical and biological features that are essential to conservation of the species and which may require special management considerations or protection are found in these areas.

Crown
The tree canopy. The upper part of a tree or woody plant that carries the main branch system and foliage.

Cruise
Refers to the general activity of determining timber volumes and quality as opposed to a specific method.

Cultural Resources
See Heritage Resources.

Cumulative Effects
The impacts on the environment resulting from additional incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions occurring over time.

Diameter Breast Height (DBH)
The diameter of a tree measured 4 feet 6 inches from the ground.

Debris Avalanche
The sudden movement downslope of the soil mantle; it occurs on steep slopes and is caused by the complete saturation of the soil from prolonged heavy rains. Also known as a debris slide.

Debris Flow
A general term for all types of rapid movement of debris downslope.

Debris Torrents
Landslides that occur as a result of debris; avalanche materials which either dam a channel temporarily or accumulate behind temporary obstructions such as logs and forest debris.

Deer Winter Range
A combination of environmental elements that support Sitka black-tailed deer under moderately severe or severe winter conditions. Usually associated with high volume old-growth stands at low elevations and south aspects.

Developed Recreation
Recreation that requires facilities that, in turn, result in concentrated use of an area. Facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, and buildings.

Direct Employment
Jobs that are immediately associated with a timber sale, including, for example, logging, sawmills, and pulpmills.

Dispersal
The movement, usually one way, of plants and animals from their point of origin to another location where they subsequently produce offspring.

Distance Zone
Areas of landscapes denoted by specified distances from the observer (foreground, middleground, or background). Used as a frame of reference in which to discuss landscape characteristics of management activities.

Diversity
The distribution and abundance of different plant and animal communities and species within an area.

Draft Environmental Impact Statement (DEIS)
A statement of environmental effects for a major Federal action which is released to the public and other agencies for comment and review prior to a final management decision. Required by Section 102 of the National Environmental Policy Act (NEPA).

Eagle Nest Tree Buffer Zone
A 330-foot radius around eagle nest trees established in an Agreement between the U.S. Fish and Wildlife Service and the Forest Service.

Ecological Province
Twenty-one ecological subdivisions of Southeast Alaska that are identified by generally distinct ecological, physiographic, and biogeographic features. Plant and animal species composition, climate, and geology within each province are generally more similar within than among adjacent provinces. Historical events (such as glaciers and uplifting) are important to the nature of the province and to the barriers that distinguish each province.

Ecosystem
A community of organisms and its physical setting. An ecosystem, whether a fallen log or an entire watershed, includes resident organisms, non-living components such as soil nutrients, inputs such as rainfall, and outputs such as organisms that disperse to other ecosystems.

Effects
Effects, impacts, and consequences as used in this environmental impact statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historical, cultural, economic, or social, and may be direct, indirect, or cumulative.

Direct Effects: Results of an action occurring when and where the action takes place.
Indirect Effects: Results of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future.
Cumulative Effects: See Cumulative Effects.

Endangered Species
Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act. See also, threatened species, sensitive species.

Endemic
Restricted to a particular locality. For example, a particular species or subspecies may occur on only one or a very few islands.

Erosion
The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

Estuary
For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are unforested except for scattered spruce or cottonwood.

Even-Aged Stand Management
The application of a combination of actions that result in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees in forming the main canopy level of a stand usually does not exceed 20 percent of that age of the stand at harvest rotation age. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

Executive Order
An order or regulation issued by the President or some administrative authority under his or her direction.

Fen
A tract of low, wet ground containing sedge peat, relatively rich in mineral salts, alkaline in reaction, and characterized by slowly flowing water. Unlike peatlands (commonly referred to as bogs or muskegs), fens contribute to stable stream flows, provide nutrient input to streams and often contribute to fish rearing habitat.

Final Environmental Impact Statement (FEIS)
The final version of the statement of environmental effects required for major federal actions under Section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement (DEIS) to include public and agency responses to the draft. The decision maker chooses which alternative to select from the Final EIS, and subsequently issues a Record of Decision (ROD).

Fiscal Year (FY)
October 1 through September 30, e.g. October 1, 1992 - September 30, 1993 = FY93.

Floodplain
That portion of a river valley, adjacent to the river channel, which is covered with water when the river overflows its banks at flood stages.

Forbs
Herbaceous plants; generally smaller flowering plants. Not included in the grass, shrub or tree categories.

Foreground
The stand of trees immediately adjacent to a scenic area, recreation facility, or forest highway; area located less than 1/4 mile from the viewer. See also, Background and Middleground.

Forest and Rangeland Renewable Resources Planning Act of 1976 (RPA)
Amended in 1976 by the National Forest Management Act. See RPA Assessment and Program.

Forest or Forest Land
National Forest lands currently supporting or capable of supporting forests at a density of 10 percent crown closure or better. Includes all areas with forest cover, including old growth and second growth, and both commercial and non-commercial forest land.

Forested Habitat
All areas with forest cover. Used in this EIS to represent a general habitat zone.

Forested Wetland
A wetland whose vegetation is characterized by an overstory of trees that are 20 feet or taller.

Forest Plan
The Tongass Land Management Revision, signed in 1997. This is the 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the forest.

Fragmentation
An element of biological diversity that describes the natural condition of habitats in terms of the size of discrete habitat blocks or patches, their distribution, the extent to which they are interconnected, and the effects of management on these natural conditions. Also the process of reducing the size and connectivity of stands within a forest.

FSH
Forest Service Handbook.

FSM
Forest Service Manual.

Geographic Information System (GIS)
An information processing technology to input, store, manipulate, analyze, and display spatial and attribute data to support the decision-making process. It is a system of computer maps with corresponding site specific information that can be electronically combined to provide reports and maps.

Group Selection
Small groups of trees up to 2 acres in size are harvested.

Guideline
A preferred or advisable course of action or level of attainment designed to promote achievement of goals and objectives.

Habitat
The sum total of environmental conditions of a specific place occupied by an organism, population, or community of plants and animals.

Habitat Capability
The estimated number of healthy animals that a habitat can sustain. Often shown as a relative percentage of optimum habitat conditions.

Habitat Suitability Index
A value assigned to a unit of land using a computerized model that relates vegetative and geographic characteristics (e.g. stand volume, proximity to a stream or cliff, slope, aspect, etc.) to the land unit's value for a particular wildlife species. Values range from 0 to 1, with 1 being the best. Habitat Capability Models used to generate HSIs were developed by interagency teams of biologists using the best available information including research results and best professional judgement.

Habituation
A reduction in the frequency or strength of response following repeated exposure to inconsequential stimulus. In the case of bears at Anan, if people are repeatedly encountered in non-threatening situations, the bears become used to the people and react less over time.

Haul out
An area of large, smooth rocks used by seals and sea lions for resting and pupping.

Heritage Resources
Also known as Cultural Resources. Historic or prehistoric objects, sites, buildings, structures, and their remains, resulting from past human activities.

Humus
Substance of organic origin that is fairly but not entirely resistant to further bacterial decay.

Hydrophyte
Plants typically found in wet habitats.

Important Subsistence Use Area
Important Subsistence Use Areas include the "most -reliable" and "most often hunted" categories from the TRUCS survey and from subsistence survey data from ADFG, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Indirect Employment
The jobs in service industries that are associated with a timber sale including, for example, suppliers of logging and milling equipment.

Infrastructure
The facilities, utilities, and transportation systems needed to meet public and administrative needs.

Inoperable Timber
Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

Interception
The process by which precipitation is caught and held by foliage, twigs, and branches of trees, shrubs, and other vegetation, and lost by evaporation, never reaching the surface of the ground.

Interdisciplinary Team (IDT)
Two or more natural resource planners who use relevant information to develop alternative design and comparison for a proposed project. The team insures that integrated use of environmental, social, and economic information is clearly presented so the best decision can be made.

Intermediate Stand Treatments
A stand management treatment which manipulates stand growth, composition, structure, or tree quality. Intermediate treatments include thinning, pruning, clearing, weeding, liberation, release, improvement, salvage, and sanitation cutting to achieve different management objectives. These stand treatments do not attempt to obtain new tree regeneration, and they occur before the final regeneration harvest. Some treatments such as salvage cutting or commercial thinning result in the harvest of forest products.

Invertebrates
Animals without a backbone.

Irretrievable Commitments
Losses of production or use of renewable natural resources for a period of time. For example, timber production from an area is irretrievably lost during the time an area is allocated to a no-harvest prescription; if the allocation is changed to allow timber harvest, timber production can be resumed. The production lost is irretrievable, but is not irreversible.

Irreversible Commitments
Decisions causing changes which cannot be reversed. For example, if a roadless area is allocated to allow timber harvest and timber is actually harvested, that area cannot, at a later date, be allocated to wilderness. Once harvested, the ability of that area to meet wilderness criteria has been irreversibly lost. Often applies to nonrenewable resources such as minerals and cultural resources.

Issue
A point, matter, or section of public discussion or interest to be addressed or decided.

Karst
A type of topography that develops in areas underlain by soluble rocks, primarily limestone. Dissolution of the subsurface strata results in areas of well-developed surface drainage that are sinkholes, collapsed channels, or caves.

Knutsen-Vandenburg Fund (KV)
The portion of timber sale receipts collected and used for reforestation and other renewable resource projects on the sale area.

Landslides
The moderately rapid to rapid down slope movement of soil and rock materials that may or may not be water-saturated.

Land Use Designation (LUD)
A defined area of land specific to which management is applied. Referred to more commonly as Management Prescriptions in the Forest Plan.

Log Transfer Facility (LTF)
A facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and location and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed "terminal transfer facility" or "log dump".

Logging Systems
Cable: Ground based yarding of logs using a steel cable to pull logs to a landing.
Helicopter: Flight path cannot exceed 40 percent downhill or 30 percent uphill; landings must be selected so there is adequate room for the operation and so that the helicopter can make an upwind approach to the drop zone.

Logging Camp
A temporary facility established to house industry and Forest Service personnel while timber harvest occurs in the area.

MBF
A thousand board feet net sawlog and utility volume.

MMBF
A million board feet net sawlog and utility volume.

Maintenance Level 1
This level is assigned to intermittent service roads during the time management direction requires that the road be closed or otherwise blocked to traffic. Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level. Drainage facilities and runoff patterns are maintained.

Maintenance Level 3
Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material.

Management Indicator Species (MIS)
Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.

Management Prescriptions
Method of classifying land uses presented in the Forest Plan. Replaces the Land Use Designations (LUDs) originally presented in TLMP.

Market Pond Value
Also known as pond log value. Selling value minus manufacturing costs. Pond log values are the price a timber buyer would pay for a log at the mill site.

Mass Failure
The downslope movement of a block or mass of soil. This usually occurs under conditions of high-soil moisture and does not include individual soil particles displaced as surface erosion.

Maritime Climate
Weather conditions controlled by an oceanic environment characterized by small annual temperature ranges and high precipitation.

Memorandum of Understanding (MOU)
A legal agreement between the Forest Service and others agencies resulting from consultation between agencies that states specific measures the agencies will follow to accomplish a large or complex project. A memorandum of understanding is not a fund obligating document.

Middleground
The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly for the landscape; area located from 1/4 to 5 miles from the viewer. See also, Foreground and Background.

Mineral Soils
Soils consisting predominately of, and having its properties determined by, mineral material.

Minimum Viable Population
A population with the estimated numbers and distribution of reproductive individuals to maintain the population over time.

Mitigation
Measures designed to counteract environmental impacts or to make impacts less severe. These may include: avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources.

Mixed Conifer
In Southeast Alaska, mixed conifer stands usually consist of western hemlock, mountain hemlock, Alaska yellowcedar, Western redcedar, and Sitka spruce species. Shorepine may occasionally be present.

Model
A representation of reality used to describe, analyze, or understand a particular concept. A model may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations. A model has limits to its effectiveness, and is used as one of several tools to analyze a problem.

Monitoring
A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring can occur at different levels: to confirm whether mitigation measures were carried out in the manner called for, to determine whether the mitigation measures were effective, or to validate whether overall goals and objectives were appropriate. Different levels call for different methods of monitoring.

Multiple-aged Stands
An intermediate form of stand structure between even and uneven-aged stands. These stands generally have two or three distinct tree canopy levels occurring within a single stand.

Multiple Entry
More than one stand or land treatment activity during a rotation of a stand or area.

Multiple Use
The management of all the various renewable resources of the National Forest System to be used in the combination that will best met the needs of the American people.

Muskeg
In Southeast Alaska a type of bog that has developed over thousands of years in depressions or flat areas on gentle to steep slopes. Also called peatlands.

National Environmental Policy Act (NEPA) of 1969
An Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, agric. Handb. 453. USDA Forest Service, 359 p.).

National Forest Management Act (NFMA)
A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Wild and Scenic River System
Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act of 1968 and amended in 1986, for preservation of their free-flowing condition. May be classified and administered under one or more of the following categories: Wild, Scenic, and/or Recreational.

Net Sawlog Volume
Tree or log volume suitable in size and quality to be processed into lumber. In Southeast Alaska, depending on the market, the volume may be processed as pulp or lumber.

No-action Alternative
The most likely condition expected to exist in the future if current management direction were to continue unchanged.

Non-commercial Forest Land
Land with more than 10 percent cover of commercial tree species but not qualifying as Commercial Forest land.

Non-Forest Land
Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc.

Non-interchangeable Components (NIC's)
Increments of the suitable land base and their contribution to the allowable sale quantity (ASQ) that are established to meet Forest Plan objectives. NIC's are identified as parcels of land and the type of timber thereon which are differentiated for the purpose of Forest Plan implementation. The total ASQ is derived from the sum of the timber volumes from all NIC's. The NIC's cannot be substituted for each other in the timber sale program.

NIC I. Normal Operability: This is volume scheduled from suitable lands using existing logging systems. Most of these lands are expected to be economic under projected market conditions. On average, sales from these lands have the highest probability of offering a reasonable opportunity for a purchaser to gain a profit from his/her investment and labor. This is the best operable ground.

NIC II. Difficult and Isolated Operability: This is volume scheduled from suitable lands that are available for harvest using logging systems not in common use in Southeast Alaska. Most of these lands are presently considered economically and technologically marginal. Difficult operability in the Canal Hoya Project Area would include helicopter yarding distances greater than three-quarters of a mile. Isolated operability stands are extremely difficult and costly to harvest, due to terrain or helicopter yarding distances greater than one mile.

Notice of Intent (NOI)
A notice printed in the Federal Register announcing that an Environmental Impact Statement will be prepared. The NOI must describe the proposed action and possible alternatives, describe the agency's proposed scoping process, and provide a contact person for further information.

Objectives
The precise steps to be taken and the resources to be used in achieving goals.

Offering
A Forest Service specification of timber harvest units, subdivisions, roads, and other facilities and operations to meet the requirements of a contract.

Old Growth
Ecosystems distinguished by old trees and related structural attributes. Old-growth forests are characterized by larger tree size, higher accumulations of large dead woody material, multiple canopy layers, different species composition, and different ecosystem function. The structure and function of an old-growth ecosystem will be influenced by its stand size and landscape position and context. For the displays in this project, it is those areas typed as Volume Class 4, 5, 6, and 7.

Old-Growth Habitat
Wildlife habitat managed to maintain old-growth forest characteristics through the planning period.

Organic Soils
Soils that contain a high percentage (generally greater than 20 to 30 percent) of organic matter throughout the soil depth.

Partial Cut
Method of harvesting trees where any number of live stems are left standing in any of various spatial patterns. Not clearcutting. Can include seed tree, shelterwood, or other methods.

Patch
A non-linear surface area differing in appearance from its surroundings.

Peak flow
The highest discharge of water recorded over a specified period of time at a given stream location. Often thought of in terms of spring snowmelt, summer, fall, or winter rainy season flows. Also called maximum flow.

pH
The degree of soil acidity or alkalinity.

Planning Record
A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment.

Plant Association
Climax plant community type.

Plant Communities
Aggregations of living plants having mutual relationships among themselves and to their environment. More than one individual plant community.

Population Viability
Ability of a population to sustain itself.

Precommercial Thinning
An intermediate stand treatment in even-aged stands which removes immature or undesirable trees to reduce competition so remaining trees can more fully utilize site potential and remain in a healthy condition.

Process Group
A combination of similar channel types based on major differences in landform, gradient, and channel shapes.

Productive Old Growth
Old-growth forest capable of producing at least 20 cubic feet of wood fiber per acre per year, or having greater than 8,000 board feet per acre.

Public Participation
Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service activities.

Record of Decision
A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not.

Reforestation
The natural or artificial restocking of an area with trees.

Regeneration
The process of establishing a new crop of trees on previously harvested land.

Regional Guide
The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended. It guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands within a given region.

Rehabilitation
Actions taken to protect or enhance site productivity, water quality, or other values for a short period of time.

Resident Fish
Fish that are not anadromous and that reside in freshwater on a permanent basis. Resident fish include non-anadromous Dolly Varden char and cutthroat trout.

Reserve Trees
Live or dead trees that are retained for various resource objectives such as wildlife, structural diversity, etc.

Resident Fish
Fish that are not migratory and complete their entire life cycle in fresh water.

Resource values
The tangible and intangible worth of forest resources.

Responsible Official
The Forest Service employee who has the delegated authority to make a specific decision.

Revegetation
The re-establishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseeding.

Revised Forest Plan
The Tongass Land Management Revision, signed in 1997. This is the 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the forest.

Riparian Area
Geographically definable area with distinctive resource values and characteristics that contain elements of aquatic and riparian ecosystems.

Riparian Ecosystem
Land next to water where plants that are dependent on a perpetual source of water occur.

Roads
Specified: Roads usually developed and operated for long-term land and resource management purposes to constant service.
Temporary: For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging roads are not considered part of the permanent Forest transportation network and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.

Roadless Area
An area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

Rotation
The planned number of years (approximately 100 years in Alaska) between the time that a Forest stand is regenerated and its next cutting at a specified stage of maturity.

Salvage Cutting

Cutting primarily to utilize dead/down material resulting from windthrow and scattered poor risk trees that will not be marketable if left in the stand until the next scheduled harvest. Salvage sales must contain more than 50 percent by volume of dead, insect infested, or windthrown timber

Sawlog
The portion of a tree suitable in size and quality for the production of dimension lumber collectively known as sawtimber.

Scoping Process
Early and open activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate. Scoping focuses on the issues surrounding the proposed action, and the range of actions, alternatives, and impacts to considered in an EA or an EIS.

Scrub-Shrub Wetland
Wetlands dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. In Southeast Alaska this includes forested lands where trees are stunted because of poor soil drainage.

Second Growth
Forest growth that has become established following some disturbance such as cutting, serious fire, or insect attack; even-aged stands that will grow back on a site after removal of the previous timber stand.

Sediment
Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface.

Sensitive Species
Plant and animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on a non-official State list, or that are recognized by the regional forester as needing special management to prevent placement on Federal or state lists.

Seral
Early stage of succession.

Silviculture
The branch of forestry involving the theory and practice of manipulating the establishment, composition, structure, and growth of forest vegetation. Silviculture involves the appropriate application of ecological, social, and economic principles of vegetative management to achieve resource management objectives and desired future forest conditions.

Silvicultural Prescription
A written technical document which provides detailed implementation direction about methods, techniques, timing, and monitoring or vegetative treatments. A prescription is prepared after a preferred treatment alternative has been selected, but before the project is implemented. A prescription is prepared by a silviculturist who uses interdisciplinary input to best achieve established objectives, direction, and requirements for land managed by the USDA Forest Service.

Site Preparation
Manipulation of the vegetation or soil of an area prior to planting or seeding. The manipulation follows harvest, wildfire, or construction in order to encourage the growth of favored species. Site preparation may include the application of herbicides, burning, or cutting of living vegetation that competes with the favored species; tilling the soil; or burning of organic debris (usually logging slash) that makes planting or seeding difficult.

Site Productivity
Production capability of specific areas of land.

Slash
Debris left over after a logging operation; i.e. limbs, bark, broken pieces of logs.

Smolt
Young silvery-colored salmon or trout which move from freshwater streams to saltwater.

Snag
A standing dead tree, usually greater than 5 feet tall and 6 inches in diameter at breast height.

Soil Productivity
The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

Soil Resource Inventory (SRI)
An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials.

Spawning Area
The available area in a stream course which is suitable for the deposition and incubation of salmon or trout eggs.

Special Habitats
Structural elements of ecosystems. These may include, but are not limited to: snags, spawning gravels, fallen trees, aquatic reefs, caves, seeps, and springs.

Species Diversity
The number of different species occurring in a location or under a similar environmental condition.

Split Yarding
The process of separating the direction of timber harvest yarding into opposite directions.

Stand (Tree Stand)
An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

Standard
A course of action or level of attainment required by the forest plan to promote achievement of goals and objectives.

State Historic Preservation Officer (SHPO)
State appointed official who administers Federal and State programs for cultural resources.

Stocking
The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

Structural Diversity
The diversity of forest structure, both vertically and horizontally, which provides for a variety of forest habitats such as logs and multi-layered forest canopy for plants and animals.

Stumpage
The value of timber as it stands uncut in terms of dollar value per thousand board feet.

Study Area
The area of the National Forest System controlled by a decision document.

Subsistence
The term "subsistence uses" means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing , tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; and for customary trade.

Subsistence Use Area
Important Subsistence Use Areas include the "most reliable" and "most often hunted" categories from the Tongass Resource Use Cooperative Survey (TRUCS) and from subsistence survey data from ADFG, the University of Alaska, and the Forest

Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Substantive Comment
A comment that provides factual information, professional opinion, or informed judgement germane to the action being proposed.

Substrate
The type of material in the bed (bottom) of rivers and streams.

Succession
The ecological progression of community change over time, characterized by displacements of species leading towards a stable climax community.

Suitable Forest Land
Commercial Forest land identified as having both the biological capability and availability to produce industrial wood products.

Suitability
An evaluation based upon a resource's potential use within proposed management activities.

Suitable Forest land
Forest land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions, and for which there is reasonable assurance that such lands can be adequately restocked, and for which there is management direction indicating that timber production is an appropriate use of that area.

Sustained Yield
The amount of renewable resources that can be produced continuously at a given intensity of management.

Swale
A slight, marshy depression in generally level land. A depression in glacial ground moraine.

Thinning
The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may also be done to change the characteristics of a stand or wildlife or other purposes. Thinning may be done at two different stages.

Threatened Species
Plant or animal species which is likely to become endangered throughout all or a significant portion of its range within the foreseeable future, as defined in the Endangered Species Act of 1973, and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species. (See also, endangered species, sensitive species.)

Threshold
The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

Timber Classification
Forested land is classified under each of the land management alternatives according to how it relates to be management of the timber resource. The following are definitions of timber classifications used for this purpose.

Nonforest: Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

Forest: Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

Suitable or suitable available: Land to be managed for timber production on a regulated basis.

Unsuitable: Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as inappropriate for timber production in the Forest planning process.

Commercial forest: Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

Timber Harvest Unit
A "Timber Harvest Unit" is an area within which Forest Service specifies for harvest all or part of the timber.

Timber Stand Improvement (TSI)
All noncommercial intermediate cutting and other treatments to improve composition, condition, and volume growth of a timber stand.

Tongass Land Management Plan (TLMP)
See Forest Plan

Turbidity
An indicator of the amount of sediment suspended in water.

Understory
The trees and shrubs in a forest growing under the canopy or overstory.

Unsuitable
Forest land withdrawn from timber utilization by statute or administrative regulation; for example, wilderness, or identified as not appropriate for timber production in the forest planning process.

Utility Logs
Those logs that do not meet sawlog grade but are suitable for production of firm useable pulp chips.

VAC
See Visual Absorption Capability.

Value Comparison Unit (VCU)
Areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. Established to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

Viable Population
The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

Viewshed
An expansive landscape or panoramic vista seen from a road, marine water way, or specific viewpoint.

Visual Quality Objectives (VQO)
A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.

Preservation: Permits ecological changes only. Applies to wilderness areas and other special classified areas. Management activities are generally not allowed in this setting.
Retention: Provides for management activities that are not visually evident to the casual Forest visitor.
Partial Retention: Management activities remain visually subordinate to the natural landscape.
Modification: Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally established form-line color and texture so that the visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.
Maximum Modification: Management activities may dominate the landscape but should appear as a natural occurrence when viewed as background.

V-Notches
A deeply incised valley along some waterways that would look like a "V" from a cross-section. These abrupt changes in terrain features are often used as harvest unit or yarding boundaries.

Volume
Stand volume based on standing net board feet per acre by Scribner Rule.

Volume Strata
Divisions of old-growth timber volume derived from the interpreted timber type data layer (TIMTYP) and the common land unit data layer (CLU). Three volume strata (low, medium, and high) are recognized in the Forest Plan.

Watershed
The area that contributes water to a drainage or stream. Portion of the forest in which all surface water drains to a common point. Watersheds can range from a few tens of acres that drain a single small intermittent stream to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams.

Wetland
Areas that are inundated by surface or groundwater frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include: swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Wilderness
Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or humans habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation; areas of at least 5,000 acres are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest. In Alaska, Wilderness has been designated by ANILCA and TTRA.

Wildlife Analysis Area (WAA)
A division of land used by the Alaska Department of Fish and Game for wildlife analysis.

Wildlife Habitat
The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

Windfirm
Trees that have been exposed to the wind throughout their life and have developed a strong root system or trees that are protected from the wind by terrain features.

Windthrow
The act of trees being uprooted by the wind. In Southeast Alaska, Sitka spruce and hemlock trees are shallow rooted and susceptible to windthrow. There generally are three types of windthrow:

Endemic: where individual trees are blown over;
Catastrophic: where a major windstorm can destroy hundreds of acres; and
Management Related: where the clearing of trees in an area make the adjacent standing trees vulnerable to windthrow.

Winter Range
An area, usually at lower elevation, used by big game during the winter months; usually smaller and better-defined than summer ranges.

Yarding
Hauling timber from the stump to a collection point.

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Appendix A

Unit Cards and Extra Alternative Maps

Appendix A

Null Cards and Extra Alternatives Mode

Appendix A

Unit Cards and Extra Alternative Maps

Harvest Prescriptions

The prescriptions provided on the unit cards are intended to meet the objectives listed on the cards. For instance, the visual quality objective as listed in the Forest Plan for the units is modification. We have tried to exceed this objective (units less apparent) by unit shape and the amount of structure left standing in the units. Leaving trees standing in the units, especially low value (grade 3, 7 and 8) trees will help both the wildlife and visual resource.

Once the units are laid out and cruised, the way individual trees are left in a unit may be changed to better meet the objectives listed for the unit. For example, a unit with visual concerns and a diameter limit prescription that does not meet the objective because the majority of the trees are within the same diameter class could be changed to individual tree marking or to leaving clumps of reserve trees. In another unit with a prescription of reserves we may discover that our objectives may be better met by switching to diameter limits, depending upon the objectives and stand structure.

The following descriptions describe what a unit will look like after harvest using the various prescriptions and yarding methods. Standard contract specifications require that trees larger than 9 inches in diameter at 4.5 feet above ground (dbh) be cut and removed. Trees smaller than contract specifications may be cut. Once a tree is cut the logs must be removed if they are larger than or equal to the minimum piece size. Current minimum piece size is 12 feet long and 6 inches small end diameter. Some standing trees smaller than contract specifications are damaged during falling and yarding. More damage occurs with cable yarding than with helicopter yarding. The amount of damage and number of trees destroyed is determined by many factors, including, but not limited to, slope, size of trees removed, fallers skill, yarding corridors, and location of trees relative to other trees. If cable yarding is used the trees smaller than 9 inches dbh and over 4-5 feet tall have a high probably of being knocked over as the cable yarding rows are changed. Most trees under 4 feet tall are not destroyed when the cables are moved. If helicopter yarding is used, most of the tress smaller than the contract specifications are left standing. We learned from the Campbell Sale that the amount of falling and yarding damage to the trees left with helicopter yarding can be kept at acceptable levels by using diameter limits. In this sale the objectives for the various resources objectives will be met by using one of the following silvicultural systems:

Patch Cut

A patch cut is an opening approximately 2 to 8 acres in size. All trees meeting the contract specifications will be cut and removed. Some of the remaining trees will be destroyed or damaged.

Clearcut with reserves

A clearcut is a larger opening greater than 8 acres. A clearcut removes all merchantable trees meeting the contract specifications. Trees smaller than contract specifications are usually left standing by the fallers. If yarding is done by cable, most of the trees left by the fallers smaller than 9 inches at dbh and over 4-5 feet tall are usually knocked over as cable rows are changed. Some trees under 4 feet tall are not destroyed by the cable row changes. If helicopter yarding is used most trees smaller than the contract specifications are left standing. More trees are left standing in the unit by leaving reserves. Reserves leave patches or groups of trees within the unit boundary and can be accomplished with cable or helicopter yarding. Reserves can either leave all trees in the area standing or a range of sizes can be harvested. Buffers left along streams or on oversteepened slopes are examples of reserves in a unit.

Partial Harvest

Units are larger than 8 acres and only a portion of the trees are harvested. The number of trees left standing is determined by the diameter limit and size of the trees in the unit. Diameter limits can vary between units and species of tree within in a unit and are selected to meet the management objectives. Diameter limits enable the harvest of trees larger than a certain size and can also leave trees smaller than a certain size. This method is usually only effective with helicopter yarding. Units harvested with diameter limits usually have trees distributed throughout the unit, but may look like patches or groups have been left. We chose not to list specific diameter limits until the units are laid out and cruised. This will enable us to choose a size that best accomplishes the objectives.

CANAL HOYA Timber Sale Unit Number 1 In Alternatives 1, 3, & 4

Harvest method Helicopter
Total Acres 22 Volume per Acre 22.4 MBF Total Unit Volume 493 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality object of partial retention. Boundary stays off of steep cliffs to southeast side of the unit. Northwest boundary skirts the edge of some old blowdown.

Stand Management Objectives:	Future stand to have several canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation.
Silvicultural Prescription:	Harvest unit while leaving a mix of species, about 10% of the total trees per acre will be left in Alternatives 1 & 4. About 20% of the total trees per acre will be left in Alternative 3. Diameter limit will meet stand management objectives.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
- Concern: Class IV stream in unit and along southwestern boundary.
- Mitigation: Streamcourse protection accomplished by helicopter yarding.

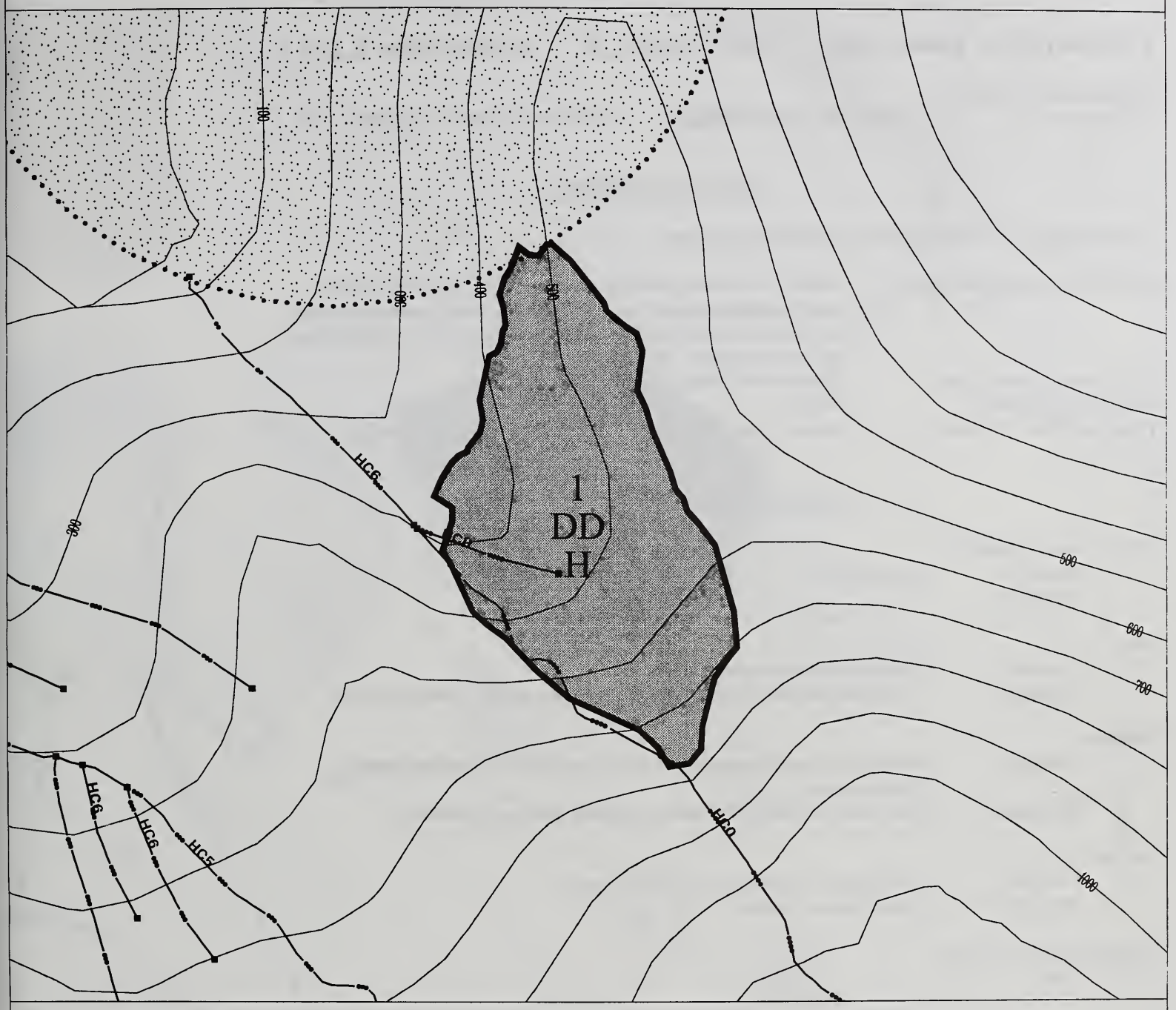
Soils
- Concern: Oversteepened slopes adjacent to unit.
- Mitigation: Avoid harvest on steep slopes on northwest and southeast side of unit. Soil disturbance minimized by helicopter yarding.

Wildlife
- Concern: Connection between large forested blocks.
- Mitigation: Leave trees in the unit and the presence of the beach buffer.

Visuals
- Concern: Appearance of unit from Bradfield Canal.
- Mitigation: Leave trees in unit.

Special Contract Concerns
None

UNIT 1 ALTERNATIVE 1, 3 & 4 22 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 2 In Alternatives 1, 2, & 3

Harvest method Cable
Total Acres 18 Volume per Acre 19.8 MBF Total Unit Volume 356 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with cable yarding system.

Stand Management Objectives:	Future stand to have several canopy layers. Stand will have at least two different age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. About 25% will be left.
Silvicultural Prescription:	Clearcut with clumps of trees left in the unit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
- Concern: No concerns.
- Mitigation:

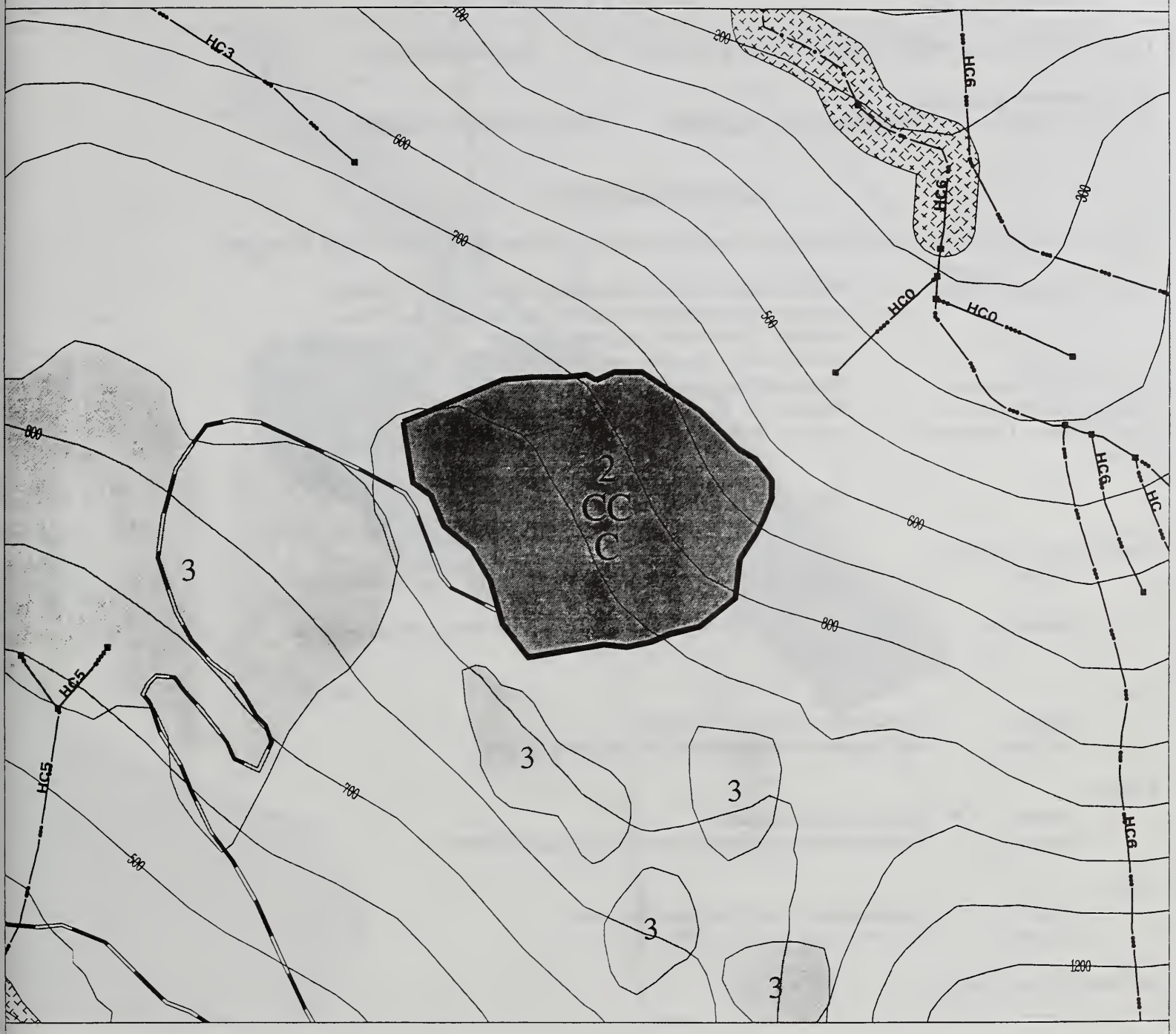
Soils
- Concern: Harvest on oversteepened slopes.
- Mitigation: Adjust boundaries to avoid harvest on slopes steeper than 72% slope.

Wildlife
- Concern: Dispersal of small mammals. Loss of large trees for nesting/denning. Fragmentation.
- Mitigation: Place reserves within the unit to maintain structural diversity.

Visuals
- Concern: Appearance of unit from Bradfield Canal.
- Mitigation: Leave trees in clumps.

Special Contract Concerns:
None

UNIT 2 ALTERNATIVE 1, 2 & 3 18 ACRES



- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 2 In Alternative 4

Harvest method Helicopter
Total Acres 26 Volume per Acre 18.3 MBF Total Unit Volume 477 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality object of partial retention. Unit modified to buffer Class III streams.

Stand Management Objectives:	Future stand to have several canopy layers. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. Harvest unit while leaving a mix of species, retaining about 25%.
Silvicultural Prescription:	Diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Class III streams (HC6) tributary to Hardrock Creek. Class IV streams in Unit.
Mitigation:	No harvest within notch of Class III streams. Helicopter yarding protects Class IV streams.

Soils

Concern:	Avoid steep slopes and V-notches.
Mitigation:	Full suspension accomplished by helicopter yarding.

Wildlife

Concern:	Travel corridor to beach.
Mitigation:	Structure maintained with leave trees and stream buffers.

Visuals

Concern:	Appearance of Unit from Bradfield Canal.
Mitigation:	Diameter limit will leave trees in unit.

Special Contract Concerns:

UNIT 2 ALTERNATIVE 4 26 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 3 In Alternative 1

Harvest method Cable and Helicopter
Total Acres 40 Volume per acre 16 MBF Total Unit Volume 651 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with cable for larger block and helicopter yarding of patches. Unit stays off oversteepened soils . Unit has stream along west edge. Backline is feathered into remaining timber. Patchs may not be shaped or located exactly as shown .Much of the unit is not visible from Bradfield Canal.

Stand Management Objectives:	Unit with 10% retention in cable portion and 5% retention in the helicopter portion. Unit will be predominately even aged with two canopy levels.
Silvicultural Prescription	Clearcut with retention. Patch cuts will leave trees smaller than 9 inches.
Regeneration Method	Natural
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
Concern; Stream along west side of unit.
Mitigation Provide protection for stream.

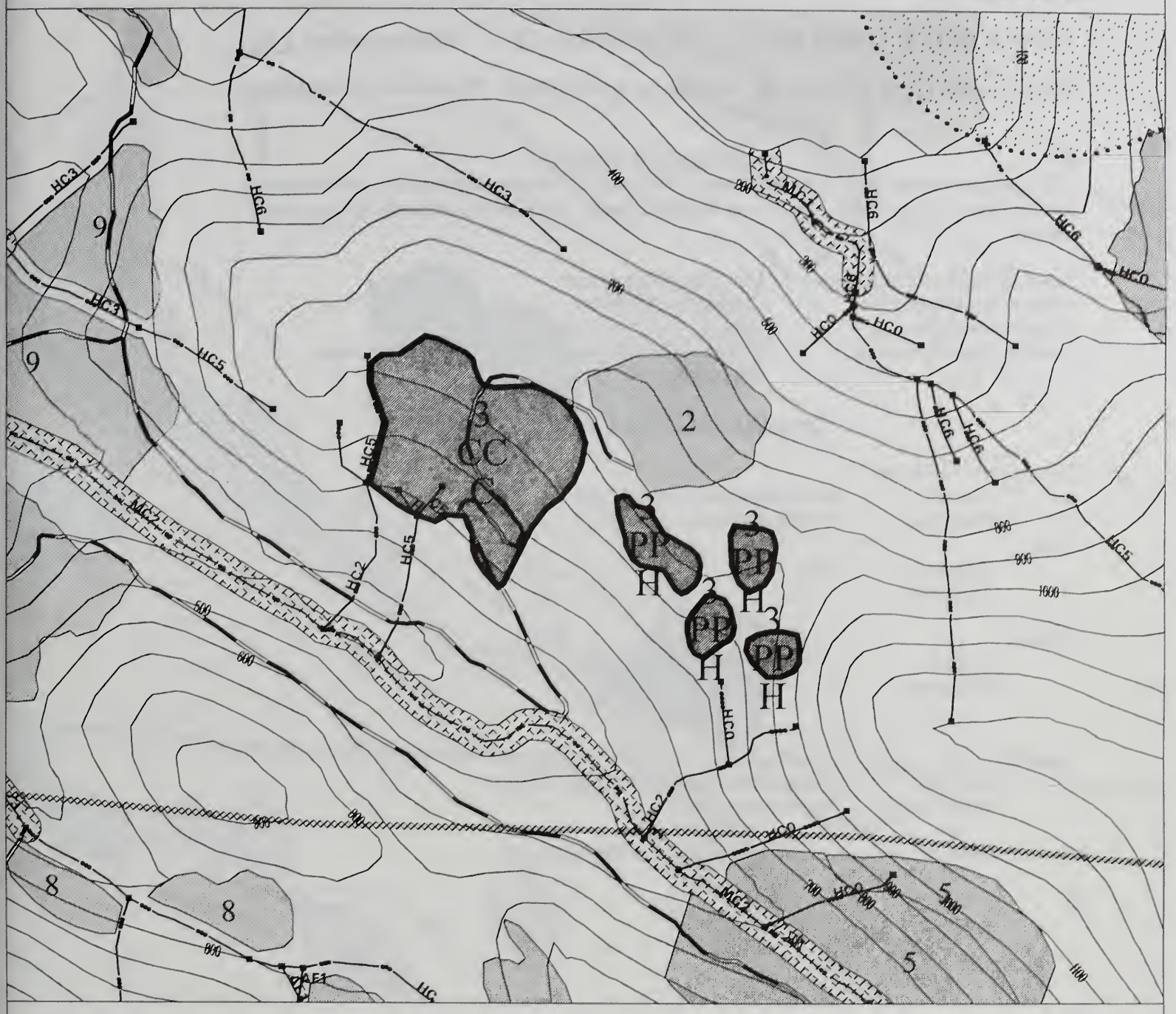
Soils
Concern:
Mitigation:

Wildlife
Concern
Mitigation

Visuals
Concern Appearance of unit from Bradfield Canal.
Mitigation Retention in unit and djameter limit on upper portion of unit should accomplish the visual objective.

Special Contract Concerns
Ensure protection of stream.

UNIT 3 ALTERNATIVE 1 40 ACRES



- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

Last Updated: April 10, 1998

CANAL HOYA Timber Sale Unit Number 3 In Alternatives 2 & 3

Harvest method Cable Tot Acs 48 Volume per acre18.0 MBF Total Unit Volume 863MBF

UNIT DEVELOPMENT

Unit designed to yard most trees with cable;. Unit stays off oversteepened soils . Unit is split by stream. Much of unit is not visible from Bradfield Canal. Backline is feathered into remaining timber.

Stand Management Objectives:	Unit with 10% retention
Silvicultural Prescription	Clearcut with retention.
Regeneration Method	Natural
Possible future treatments:	Release, possible planting, pre-commercial thinning and pruning.

Resource CONCERNS & MITIGATION

Water Quality Fisheries

Concern	Stream along west side of unit.
Mitigation	Provide protection for buffer.

Soils

Concern:	none.
Mitigation	

Wildlife

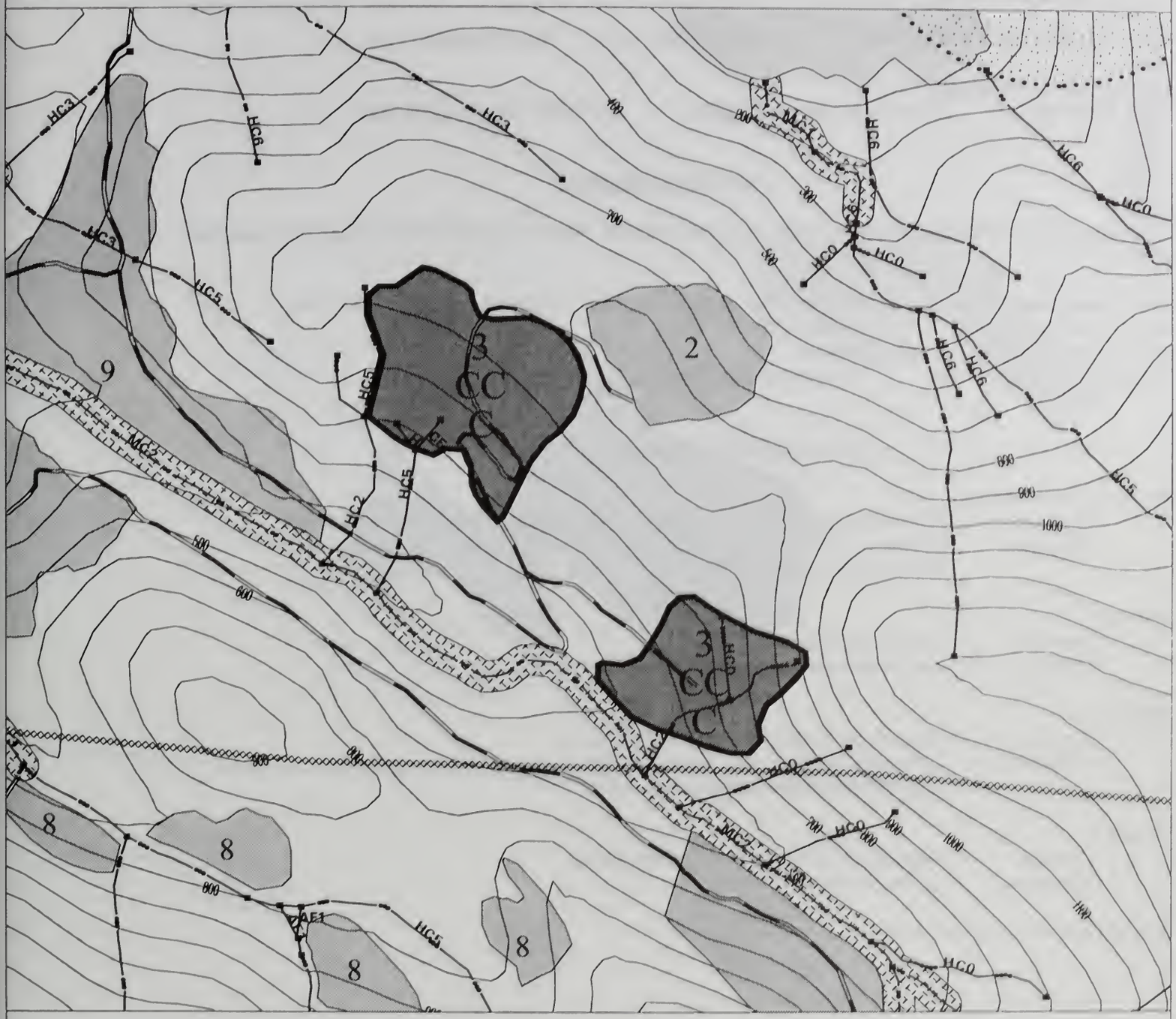
Concern	
Mitigation	

Visuals

Concern	Appearance of unit from Bradfield Canal.
Mitigation	Retention in unit.

Special Contract Concerns: Ensure protection of stream buffers

UNIT 3 ALTERNATIVE 2 & 3 48 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

Last Updated: April 10, 1998

CANAL HOYA Timber Sale Unit Number 3 In Alternative 4

Harvest method Helicopter
Total Acres 98 Volume per Acre 16.7 MBF Total Unit Volume 1,635 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality object of partial retention. Much of the unit is not visible from Bradfield Canal.

Stand Management Objectives:	Harvest Unit while leaving a mix of species, retaining about 25%.
Silvicultural Prescription:	Diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Class III streams (HC5) tributary to Survey Creek. Class IV streams in unit.
Mitigation:	No harvest within notch of Class III streams. Helicopter yarding provides streamcourse protection.

Soils

Concern:	Avoid steep slopes and V-notches.
Mitigation:	Full suspension accomplished by helicopter yarding.

Wildlife

Concern:	Size of unit could create dispersal problems.
Mitigation:	25% retention of existing forest structure. Scatter reserves to maintain structure throughout and allow dispersal.

Visuals

Concern:	Appearance of Unit from Bradfield Canal.
Mitigation:	Leave reserve trees in unit.

Special Contract Concerns: None

UNIT 3 ALTERNATIVE 4 98 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

Last Updated: April 10, 1998

CANAL HOYA Timber Sale Unit Number 4 In Alternatives 1, 2, 3, 4

Harvest method Helicopter
Total Acres 32 Volume per Acre 23.7 MBF Total Unit Volume 757 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with a helicopter. Unit modified to buffer Class III stream. Unit meets the visual quality objective of partial retention. East side of unit dropped for forested wetlands. A portion of the unit was expanded to the south to avoid isolating timber. Unit avoids hazardous soils in the east portion of northern half of unit.

Stand Management Objectives:	Future stand to have several canopy layers. Trees are being retained to meet the visual quality objective and to provide structure.
Silvicultural Prescription:	Retain a mix of about 10% of the trees until next rotation. Diameter Limit. Harvest trees larger than 14-16 inches. Trees left shall be retained until the next rotation.
Regeneration Method:	Natural.
Possible future treatments:	Release, possible planting and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
- Concern: Class III stream is HC6 tributary to Survey Creek.
- Mitigation: No harvest within notch.

Soils
- Concern: Avoid steep slopes.
- Mitigation: Locate unit to avoid harvest on slopes greater than 72%.

Wildlife
- Concern: Mountain goat winter range.
- Mitigation: Reserve trees provide some snow interception. Avoidance of high hazard areas protects existing habitat.

Visuals
- Concern: Unit can be seen from North side of the Bradfield Canal near Miners Creek.
- Mitigation: Reserve trees help unit to appear more natural and breakup straight boundaries.

Special Contract Concerns: None

UNIT 4 ALTERNATIVE 1, 2, 3 & 4 32 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut units
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 14, 1998

CANAL HOYA Timber Sale Unit Number 5 In Alternative 1

Harvest method Helicopter & Cable
Total Acres 63 Volume per Acre 24.5 MBF Total Unit Volume 1541 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with cable yarding system on the lower portions of the unit and the upper portion with a helicopter. The unit was shortened on the south side to a leave a logical future setting, while maintaining wildlife habitat during this entry. Unit modified to buffer Survey Creek and Class II and III tributaries. Skyline yarding from west side of creek eliminates the need for road construction up east side of creek.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to provide structure. Retain trees until next rotation.
Silvicultural Prescription:	Clearcut with retention. Helicopter yarding and diameter limit will be used in this unit because of terrain. Retain 10% in Alternative 1.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Survey Creek (Class II HC and MC process groups) flows through unit. Class IV streams in eastern half of unit.
Mitigation:	No timber harvest within notch of Class II streams. This includes no harvest within 100 feet horizontal distance of Class II streams. No harvest within notch of Class III streams. Unit design will provide Class III stream buffers and Class IV stream protection. Yarding corridors across Survey Creek will be designated by fisheries and logging systems specialist. Logs shall be suspended over riparian buffer where feasible. Trees felled for yarding corridors within TTRA buffer will be felled away from stream and left in place. Logs shall be fully suspended over stream. A streamcourseprotection plan will be developed by the timber sale administrator to enforce mitigation during felling and yarding operations.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Easier access for goat hunters may increase harvest and affect population. Goat, deer, forest birds, and marten habitat value.
Mitigation:	Retain structure in reserves, buffers, and leave trees.

Visuals

Concern:	none
Mitigation:	

Special Contract Concerns

Full suspension over Survey Creek

UNIT 5 ALTERNATIVE 1 63 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 5 In Alternatives 2 & 3

Harvest method Helicopter & Cable
Total Acres 96 Volume per Acre 24.5 MBF Total Unit Volume 2349 MBF

UNIT DEVELOPMENT

In Alternatives 2 & 3 unit designed to harvest trees with cable yarding system on the lower portions of the unit and the upper portion with a helicopter. Yarding corridors will provide cable access to the unit on the east side of Survey Creek. No stable site for either temporary or permanent road could be found to access east side of upper Survey Creek. Terrain is suitable for skyline yarding and eliminates the need for road construction.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to provide structure. Retain trees until next rotation.
Silvicultural Prescription:	Clearcut with retention. Helicopter yarding and diameter limit will be Used in this unit because of terrain. Retain 20%
Regeneration Method:	Natural.
Possible future treatments:	Release, possible planting, pre-commercial thinning and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern: Survey Creek (Class II HC and MC process group) flows through the unit. Class II tributaries (HC and AF) flow through the east units. Class III and IV streams also flow through unit.

Mitigation: No timber harvest within notch of Class II streams. This includes no harvest within 100 feet horizontal distance of Class II streams. No harvest within 140 feet of outermost AF channel. This includes no harvest within 100 feet horizontal distance of Class II streams. No harvest within notch of Class III streams. Unit design will provide Class III stream buffers and Class IV stream protection. Yarding corridors across Survey Creek will be designated by fisheries and logging systems specialist. Logs shall be suspended over riparian buffer where feasible. Trees felled for yarding corridors within TTRA buffer will be felled away from stream and left in place. Logs shall be fully suspended over stream. A streamcourse protection plan will be developed by the timber sale administrator to enforce mitigation during felling and yarding operations.

Soils

Concern: none
Mitigation:

Wildlife

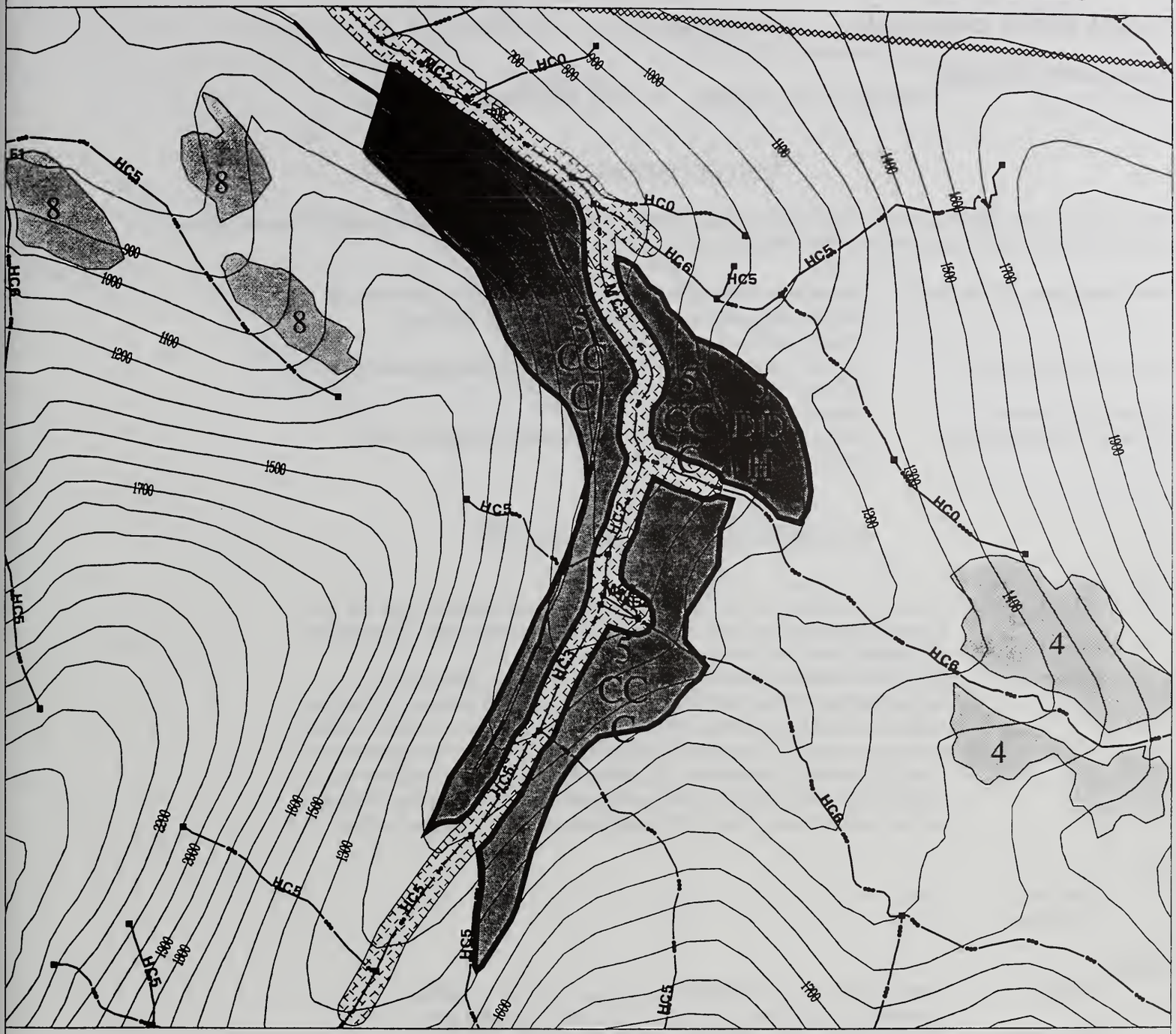
Concern: Easier access for goat hunters may increase harvest and affect population. Goat, deer, forest birds, and marten habitat value.
Mitigation: Retain structure in reserves, buffers, and leave trees.

Visuals

Concern: none
Mitigation:

Special Contract Concerns: Suspension over stream during yarding.

UNIT 5 ALTERNATIVE 2 & 3 96 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 5 In Alternative 4

Harvest method Helicopter
Total Acres 96 Volume per Acre 24.5 MBF Total Unit Volume 2349 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with a helicopter yarding system. Unit designed to provide buffers for Survey Creek and its Class II and Class III tributaries flowing through unit.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to provide structure. Retain trees until next rotation.
Silvicultural Prescription:	Clearcut with retention. Helicopter yarding and diameter limit will be used. Retain 20%.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Survey Creek (Class II HC and MC process group) flows through the unit. Class II tributaries (HC and AF) flow through the east units. Class III and IV streams also flow through unit.
Mitigation:	No timber harvest within notch of Class II streams. This includes no harvest within 100 feet horizontal distance of Class II streams. No harvest within 140 feet of outermost AF channel. This includes no harvest within 100 feet horizontal distance of Class II streams. No harvest within notch of Class III streams. Unit design will provide Class III stream buffers and Class IV stream protection. Helicopter yarding will not require corridors across Survey Creek. Logs will be suspended over all riparian buffers.

Soils

Concern:	none
Mitigation:	

Wildlife

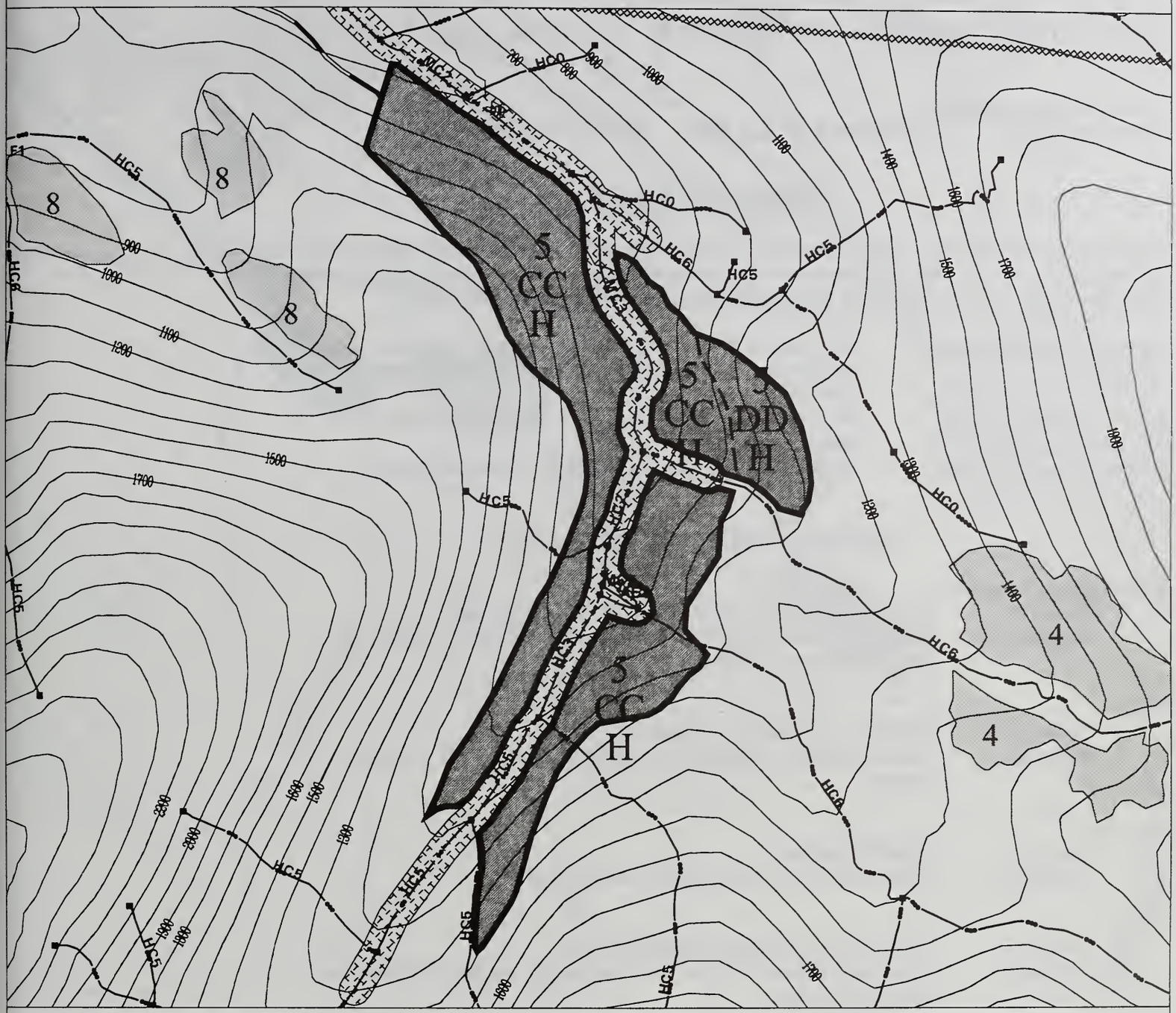
Concern:	Easier access for goat hunters may increase harvest and affect population. Goat, deer, forest birds, and marten habitat value.
Mitigation:	Retain structure in reserves, buffers,and leave trees.

Visuals

Concern:	none
Mitigation:	

Special Contract Concerns
Suspension over stream during yarding.

UNIT 5 ALTERNATIVE 4 96 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 8 Alternative 1, 2, 3, 4

Harvest method Helicopter
Total Acres 32 Volume per Acre 22.5 MBF Total Unit Volume 719 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with a helicopter. This unit is made up of several small patches ranging in size from 2-7 acres. All units avoid harvest on over steepened slopes and have been designed to buffer Class III streams. Unit 8.1 not visible from saltwater. These units are located on a bench.

Stand Management Objectives:	Only several small patches will be harvested. Portions of area not harvested will provide stand structure and travel corridors for wildlife.
Silvicultural Prescription:	Patch cut harvest all trees larger than 9 inches at d.b.h.
Regeneration Method:	Natural
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Class III streams (HC and AF) tributary to Survey Creek.
Mitigation:	No harvest within notch of Class III streams. No harvest within 140 feet of outermost AF channel.

Soils

Concern:	Harvest on oversteepened slopes.
Mitigation:	Units located to avoid steep slopes. Full suspension with helicopter yarding.

Wildlife

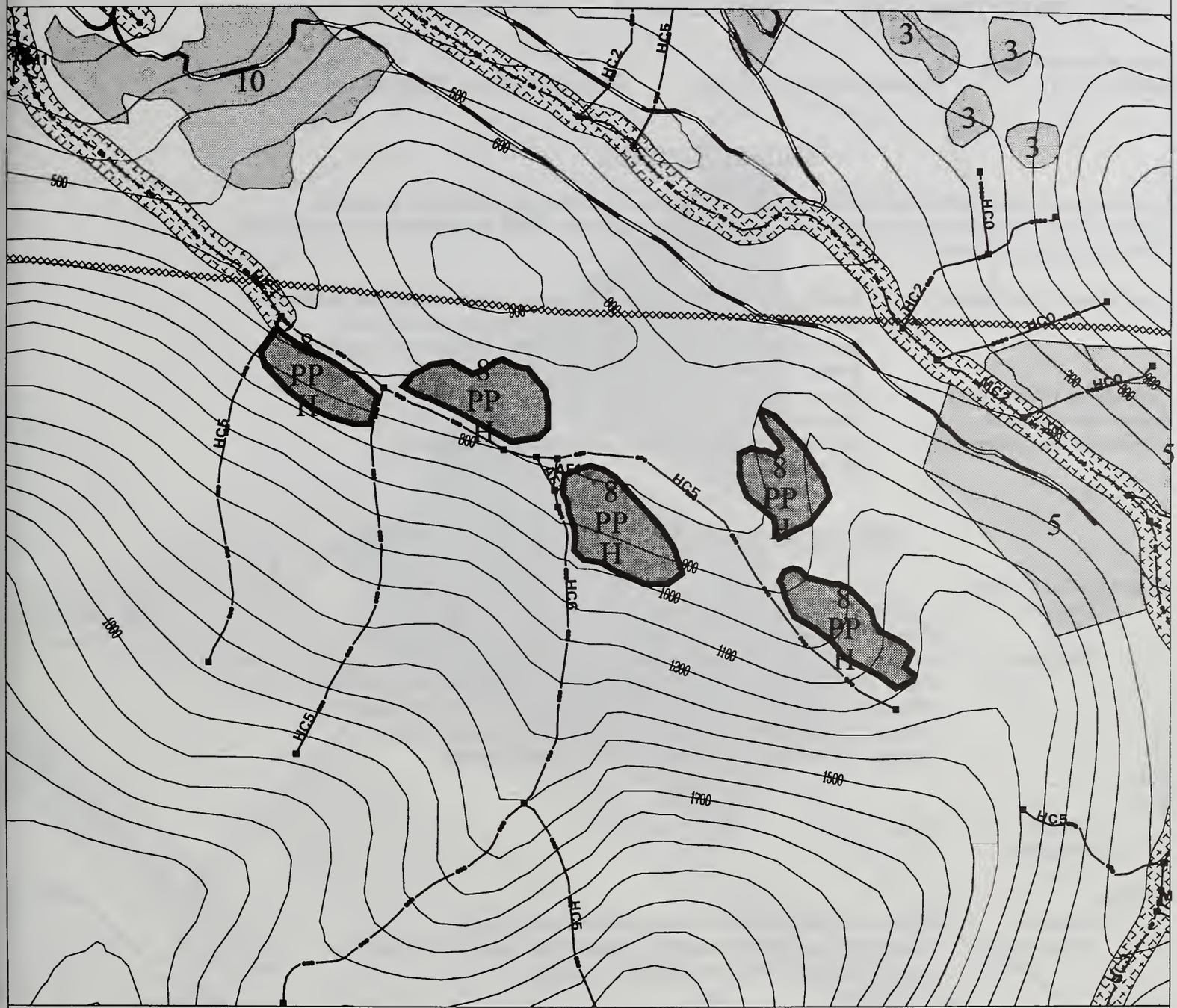
Concern:	Wildlife dispersal.
Mitigation:	Patches provide for travel through uncut timber.

Visuals

Concern:	Appearance of Unit from Bradfield Canal
Mitigation:	Small size, scattered location, and topographic screening of patches will help screen theunit

Special Contract Concerns
Ensure protection of needed buffers.

UNIT 8 ALTERNATIVE 1, 2, 3 & 4 32 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 9 In Alternative 1

Harvest method Cable
Total Acres 41 Volume per Acre 22.1 MBF Total Unit Volume 907 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with cable yarding. Unit stays off oversteepened soils and is split by buffered stream. Northwest and southwest unit boundary along Survey Creek and tributaries. At least 10% of the trees will be reserved.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. At least 10% retention.
Silvicultural Prescription:	Clearcut with reserves
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Unit borders Survey Creek (Class II FP and MC) and tributary (Class II HC). Class III stream in unit.
Mitigation:	No timber harvest in Survey Creek floodplain. No timber harvest within 130 feet of Survey Creek FP channel (includes no harvest within 100 horizontal feet of stream). No harvest within notch of MC and HC streams. Includes no harvest within 100 horizontal feet of Class II streams. Fisheries specialist will assist with buffer layout.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Riparian habitat values for marten and bear along creeks.
Mitigation:	Locate reserves adjacent to creeks. Avoid removing possible denning trees and include in reserves whenever possible.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in harvested area and avoid straight backline and sideline.

Special Contract Concerns
Ensure stream buffer protection.

UNIT 9 ALTERNATIVE 1 41 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number 9 In Alternatives 2 & 3

Harvest method Cable
Total Acres 49 Volume per Acre 20.0 MBF Total Unit Volume 981 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with cable yarding. Unit stays off oversteepened soils and is split by buffered stream. Southwest unit boundary along stream buffer. Road through unit provides access to other units.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 30% retention.
Silvicultural Prescription:	Clearcut with reserves
Regeneration Method:	Natural
Possible Future Treatments:	Possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Unit borders Survey Creek (Class II FP and MC) and tributary (Class II HC). Class III stream in unit.
Mitigation:	No timber harvest in Survey Creek floodplain. No timber harvest within 130 feet of Survey Creek FP channel (includes no harvest within 100 horizontal feet of stream). No harvest within notch of MC and HC streams. Includes no harvest within 100 horizontal feet of Class II streams. Fisheries specialist will assist with buffer layout.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Riparian habitat values for marten and bear along creeks.Maintain uncut area between the unit and stream to the northwest.
Mitigation:	Locate reserves adjacent to creeks. Avoid removing possible denning trees and include in reserves whenever possible. Wildlife and timber to locate reserves.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in harvested area and avoid straight back and side line.

Special Contract Concerns
Ensure stream buffer protection.

UNIT 9 ALTERNATIVE 2 & 3 49 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number 9 In Alternative 4

Harvest method Cable
Total Acres 20 Volume per Acre 17.5 MBF Total Unit Volume 349 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with cable yarding. Unit stays off oversteepened soils and is split by buffered stream. Portion of northwest corner of unit adjacent to buffered stream. Road through unit provides access to other units.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 30% retention.
Silvicultural Prescription:	Clearcut with reserves. Reserve trees will be retained until next rotation.
Regeneration Method:	Natural
Possible Future Treatments:	Possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Unit borders Survey Creek (Class II FP and MC) and tributary (Class II HC). Class III stream in unit.
Mitigation:	No timber harvest in Survey Creek floodplain. No timber harvest within 130 feet of Survey Creek FP channel (includes no harvest within 100 horizontal feet of stream). No harvest within notch of MC and HC streams. Includes no harvest within 100 horizontal feet of Class II streams. Fisheries specialist will assist with buffer layout.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Locate reserves adjacent to creeks. Avoid removing possible denning trees and include in reserves whenever possible.
Mitigation:	Unit is smaller and was designed to be further away from creeks than in the other alternatives. Maintain uncut area between the unit and stream to the northwest. Wildlife and timber to locate reserves.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in harvested area and avoid straight back and side line.

Special Contract Concerns

Ensure stream buffer protection.

UNIT 9 ALTERNATIVE 4 20 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number **10** In Alternatives 1, 2, 3 & 4

Harvest method Cable
Total Acres 38 Volume per Acre 24.0 MBF Total Unit Volume 911 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with cable yarding. Unit stays off oversteepened soils and avoids stream buffers.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention in Alternatives 1-3 and 20% retention in Alternative 4.
Silvicultural Prescription:	Clearcut with reserves. Reserve trees will be retained until the next rotation.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	East and West Forks of Survey Creek (Class II MC and HC) flow some distance on either side of unit.
Mitigation:	No harvest within notch of Class II streams. Fisheries specialist will assist with layout.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Bear denning and foraging habitat.
Mitigation:	Avoid harvest of large low value grdes 3, 7 & 8 trees with cavities; retain snags and downed logs; and retain 15' of low value butt logs of attached to rootwads. Leave 3-4 reserves to met the above objectives.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in harvested area and avoid straight backline.

Special Contract Concerns
None

UNIT 10 ALTERNATIVE 1, 2, 3 & 4 38 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number **12** In Alternatives 1, 3 & 4

Harvest method Helicopter
Total Acres 6 Volume per Acre 29.0 MBF Total Unit Volume 174 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with helicopter yarding. Unit stays off oversteepened soils. There are a few small rock outcrops within the unit. Unit is on the top of a knob. Evidence of past windthrow. Portions of the unit will be seen.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention in Alternatives 1 & 3. 30% retention in Alternative 4.
Silvicultural Prescription:	Diameter Limit. Reserve trees will be retained until the next rotation.
Regeneration Method:	Natural.
Possible Future Treatments:	Possible planting and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries
Concern: none
Mitigation:

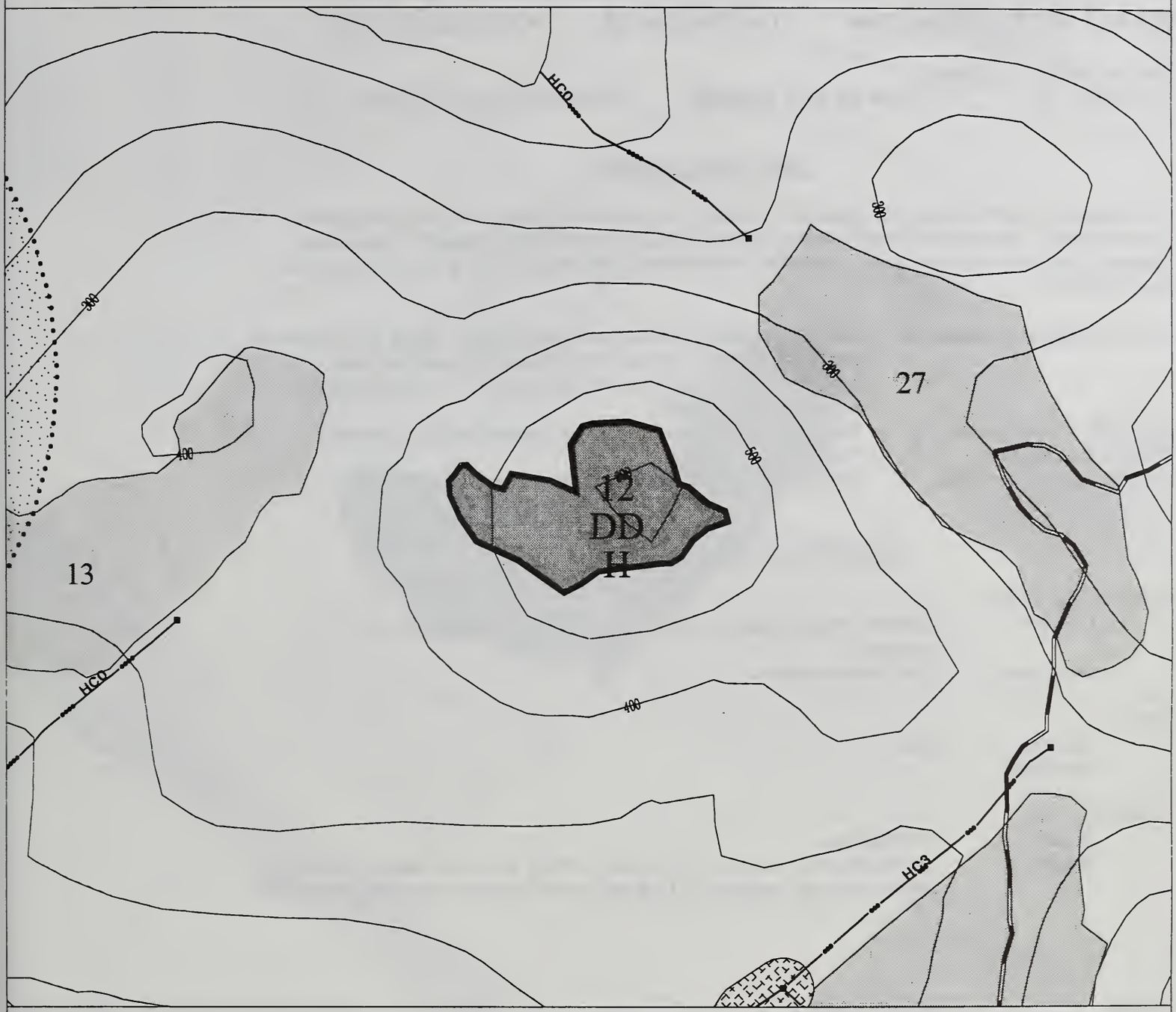
Soils Concern none
Mitigation:

Wildlife
Concern: Bear denning.
Mitigation Avoid harvest of large low value grdes 3, 7 & 8 trees with cavities; retain snags and downed logs; and retain 15' of low value butt logs of attached to rootwads.

Visuals
Concern: Appearance of unit from Bradfield Canal.
Mitigation: Leave trees in harvested area and avoid straight back and side lines.

Special Contract Concerns
None.

UNIT 12 ALTERNATIVE 1, 3 & 4 6 ACRES



- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number **13** In Alternatives 1 & 3

Harvest method Helicopter
Total Acres 18 Volume per Acre 17.9 MBF Total Unit Volume 323 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with helicopter yarding. Unit stays off oversteepened soils and avoids stream buffers. There are small rock outcrops within the unit with small trees. Ninety to ninety-five percent of the unit is not seen. Unit screened by beach buffers, but higher knobs in west portion of unit may be seen.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Diameter Limit. Retention will be retained until next rotation.
Regeneration Method:	Natural
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Southern boundary runs along a Class IV stream that originates in a muskeg.
Mitigation:	Unit excludes stream.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Bear denning.
Mitigation:	Avoid harvest of large low value grdes 3, 7 & 8 trees with cavities; retain snags and downed logs; and retain 15' of low value butt logs of attached to rootwads.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in harvested area and avoid straight backline.

Special Contract Concerns

UNIT 13 ALTERNATIVE 1 & 3 18 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **13** In Alternative 4

Harvest method Helicopter
Total Acres 63 Volume per Acre 18.0 MBF Total Unit Volume 1,132 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. Unit stays out of beach buffer.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. Leave a mix of species, retaining about 30%.
Silvicultural Prescription:	Diameter limit. Retention will be retained until next rotation.
Regeneration Method:	Natural
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
- Concern: Class IV stream tributary to Survey Creek west of unit.
- Mitigation: Unit excludes stream.

Soils
- Concern: Avoid steep slopes > 72% and V-notches. Forested wetlands in central southern part of the unit .
- Mitigation: Minimize ground disturbance

Wildlife
- Concern: Deer winter range value.
- Mitigation: Retention of trees within unit will enhance snow interception in the future stand.

Visuals
- Concern: Appearance of Unit from Bradfield Canal.
- Mitigation: Leave trees in the unit to reduce visual impacts.

Special Contract Concerns
None

UNIT 13 ALTERNATIVE 4 63 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **14** In Alternatives 1, 2, & 3

Harvest method Cable
Cable Acres 39 Volume per Acre 10.7 MBF Cable Volume 417 MBF

Harvest method Helicopter
Helicopter Acres 5 Volume per Acre 11.8 MBF Helicopter Volume 59 MBF

UNIT DEVELOPMENT

Unit designed to harvest trees with both cable and helicopter yarding. Road through unit provides access to other cable and helicopter units. Unit stays off oversteepened soils and has been modified to buffer Class II streams.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Cable clearcut with 10% retention,helicopterwith diameter limits and feather backline.
Regeneration Method:	Natural
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Small Class II streams (HC and MM) tributary to Survey Creek and Surho Creek. Class IV stream in unit.
Mitigation:	No timber harvest within notch on HC stream or within 120 feet of MM stream. This includes no harvest within 100 feet horizontal distance of Class II streams. Partial suspension allowed on Class IV stream.

Soils

Concern:	Harvest on oversteepened slopes.
Mitigation:	Locate units to avoid harvest on slopes > 72%.

Wildlife

Concern:	Small mammal dispersal. Loss of large trees for nesting and denning. Fragmentation.
Mitigation:	Place reserves within the unit to maintain structural diversity. Place at least one reserve to provide corridor through unit.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in harvested area and avoid straight backline.

Special Contract Concerns
Ensure stream buffer protection.

UNIT 14 ALTERNATIVE 1, 2 & 3 44 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **18** In Alternative **1**

Harvest method Cable
Total Acres 13 Volume per Acre 16.1 MBF Total Unit Volume 209 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. Unit north boundary adjacent to high hazard soils. Forested wetland adjacent to the west side of the unit. Unit was reduced from original size due to low volume in surrounding area. Unit will be helicopter yarded with partial harvest with retention.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Cable portion will have reserves. Retention will be retained until next rotation.
Regeneration Method:	Natural
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries
Concern: none
Mitigation:

Soils
Concern: none.
Mitigation:

Wildlife
Concern: Proximity to estuary and streams important for bear foraging. Road intercepts travel corridor for bears
Mitigation: Small unit, leave 1-2 reserves.

Visuals
Concern: none
Mitigation:

UNIT 18 ALTERNATIVE 1 13 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **18** In Alternative 3 & 4

Harvest method Helicopter
Total Acres 13 Volume per Acre 16.1 MBF Total Unit Volume 209 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. Unit north boundary adjacent to high hazard soils. Forested wetland adjacent to the west side of the unit. Unit was reduced from original size due to low volume in surrounding area.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 20% retention. Diameter limits.
Silvicultural Prescription:	Retention will be retained until next rotation.
Regeneration Method:	Natural
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries
Concern: none
Mitigation:

Soils
Concern: none.
Mitigation:

Wildlife
Concern: Proximity to estuary and streams important for bear foraging.
Mitigation: Small unit, leave reserve trees.

Visuals
Concern: none
Mitigation:

UNIT 18 ALTERNATIVE 3 & 4 13 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **19** In Alternatives 1, 2 & 3

Harvest method Cable
Total Acres 25 Volume per Acre 20.0 MBF Total Unit Volume 500 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. East boundary is not straight. Unit goes under the Tyee power line. Spur road is located just above small muskeg included in the unit.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Cable portion will have reserves. Feather backlines. Retention will be left until next rotation.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Hoya Creek (Class II MC) flows west of unit. Class IV stream in unit.
Mitigation	No harvest within notch of Hoya Creek. Includes no harvest within 100 feet horizontal distance of Hoya Creek. Partial suspension allowed across Class IV stream.

Soils

Concern:	Steep slopes to east and south of unit.
Mitigation:	Unit shaped to avoid the steep slopes.

Wildlife

Concern:	Improved access for goat hunters may increase harvest and impact population. Loss of structural diversity.
Mitigation:	Place 1-2 reserves within the unit.

Visuals

Concern:	Appearance of Unit from Bradfield Canal.
Mitigation:	Leaving trees in unit with 10% retention will help meet the visual quality objective. Irregular boundary along east side.

UNIT 19 ALTERNATIVE 1, 2 & 3 25 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 20 In Alternatives 2 & 3

Harvest method Helicopter
Total Acres 10 Volume per Acre 28.8 MBF Total Unit Volume 288 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. Unit modified to provide Class II and Class III stream buffers. Unit is located at the toe of a very steep mountain slope.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Helicopter yarding diameter limits.
Regeneration Method:	Natural.
Possible Future Treatments:	Release and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Hoya Creek (Class II) flows west of unit. Channel Type is MC2. A short Class II tributary divides unit. Class III and IV streams flow through unit.
Mitigation:	No harvest within 100 horizontal feet of Hoya Creek or its Class II tributary (includes no harvest within notch). No harvest within notch of Class III stream. Helicopter yarding provides Class IV stream protection.

Soils

Concern:	Oversteepened slopes east of unit.
Mitigation:	Locate unit to avoid the slopes > 72%.

Wildlife

Concern:	Travel corridor and high habitat values for deer, marten, bear, forest birds.
Mitigation:	Structural diversity remains within stream buffers and within the unit.

Visuals

Concern:	Appearance of Unit from Bradfield Canal.
Mitigation:	Leave trees in unit to help meet the visual quality objective.

UNIT 20 ALTERNATIVE 2 & 3 10 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 21 In Alternatives 1, 2 & 3

Harvest method Helicopter
Total Acres 34 Volume per Acre 36.7 MBF Total Unit Volume 1,249 MBF

UNIT DEVELOPMENT

Unit modified to provide Class II and Class III stream buffers. Southern most portion of unit dropped. East portion of unit adjacent to high hazard soils. Possible diameter limit of 18-20'' for spruce and 14'' for hemlock. Unit has a few short pitches over 72% slope but these are stable.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Helicopter yarding with diameter limits.
Regeneration Method:	Natural.
Possible future treatments:	Release and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Hoya Creek (Class II FP4) and short Class II (MM1) tributaries west of unit. Class IV streams within unit.
Mitigation:	No harvest within floodplain or 130 feet of Hoya Creek (includes no harvest within 100 horizontal feet of stream). No harvest within 120 feet of Class II tributaries (includes no harvest within 100 horizontal feet of streams). Helicopter yarding provides Class IV stream protection.

Soils

Concern:	Short steep pitches in unit.
Mitigation:	Helicopter yarding and resulting full suspension.

Wildlife

Concern:	Noise from helicopter yarding may disturb goat populations. Travel corridor and riparian habitat values. Deer winter range
Mitigation:	Avoid flying over goats with kids. Retain structural diversity within stream buffer and within the unit.

Visuals

Concern:	Appearance of Unit from Bradfield Canal.
Mitigation:	Leaving trees in unit with diameter limit retention will help meet the visual quality objective.

Special Contract Concerns
Ensure buffers protected.

UNIT 21 ALTERNATIVE 1, 2 & 3 34 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 22 In Alternatives 1, 2 & 3

Harvest method Helicopter
Total Acres 20 Volume per Acre 22.1 MBF Total Unit Volume 441 MBF

UNIT DEVELOPMENT

Unit not visible from saltwater. Unit is three small patches with a Class II stream requiring a buffer. Unit contains Class III streams.

Stand Management Objectives:	Stand will be predominately even aged. Future stand will have two age classes, one from the small uncut trees, the other as a result of the regeneration after the harvest. Small even age patches.
Silvicultural Prescription:	Patch cut.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Class II stream is HC3 tributary to West Fork of Hoya Creek. Class III streams are small HC5s.
Mitigation:	No timber harvest within 100 feet horizontal distance from Class II stream. No timber harvest within notch of Class II or Class III streams.

Soils

Concern:	none
Mitigation:	

Wildlife

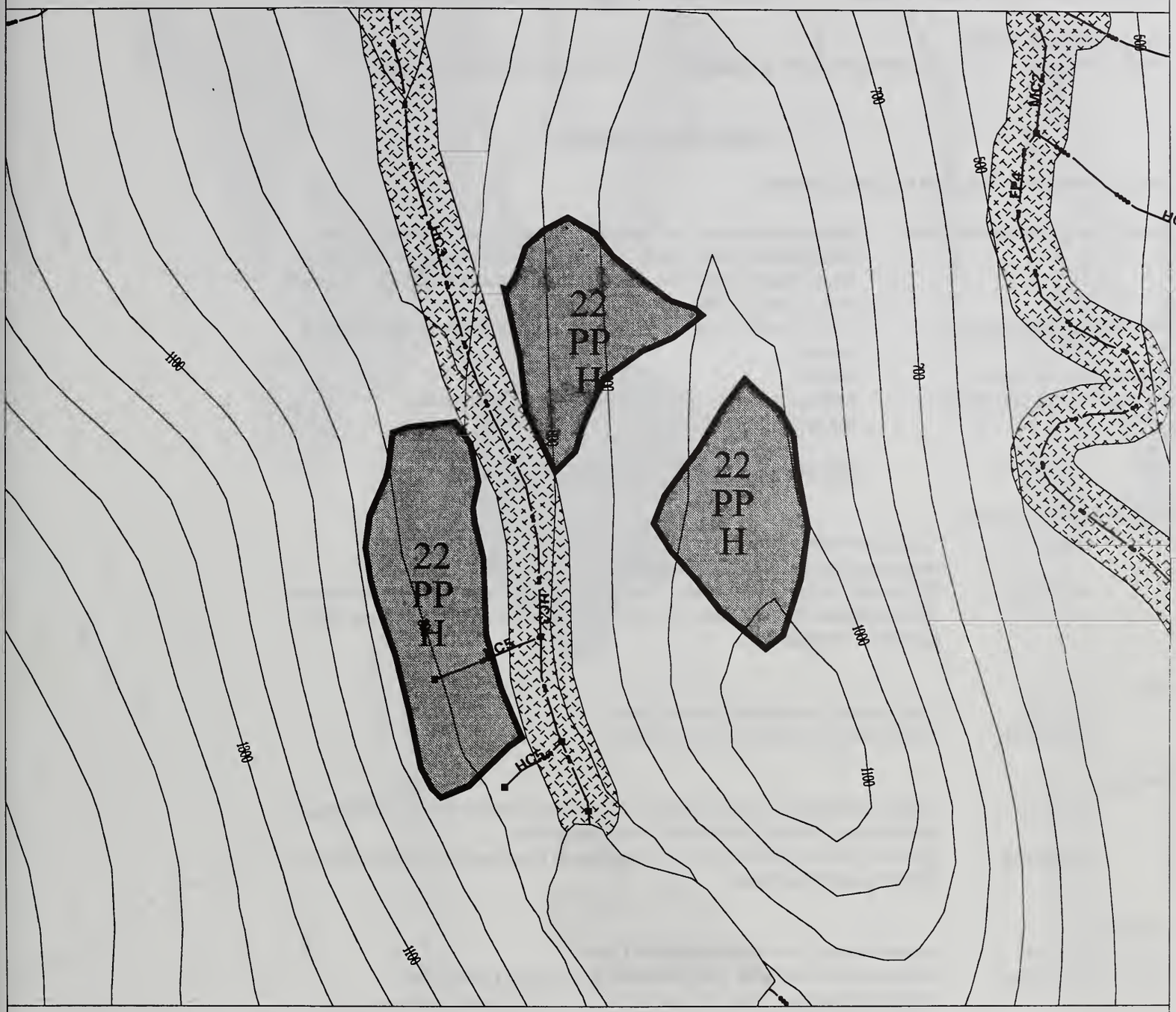
Concern:	West portion of unit is adjacent to Old Growth Reserve. Noise from helicopter yarding may disturb goat populations. Goat and deer winter range.
Mitigation:	Avoid flying over goats with kids. Winter range retained in uncut portion.

Visuals

Concern:	none
Mitigation:	

Special Contract Concerns
Ensure stream buffers protected.

UNIT 22 ALTERNATIVE 1, 2 & 3 20 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number 23 In Alternative 1&3

Harvest method Cable
Total Acres 13 Volume per Acre 16.9 MBF Total Unit Volume 220 MBF

UNIT DEVELOPMENT

West side boundary adjacent to Class II stream.

Stand Management Objectives: Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.

Silvicultural Prescription: Clearcut with reserves. Retention will be retained until the next rotation.

Regeneration Method: Natural.

Possible Future Treatments: Release, possible planting, pre-commercial thinning and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern: Class II stream is MM1 (West Fork of Hoya Creek). Unit requires temporary road across Class II stream.

Mitigation: No harvest within 120 feet of Class II stream (including no harvest within 100 horizontal feet of stream). Log stringer bridge will be removed after harvest is complete.

Soils

Concern: Steep slopes to southeast side of unit.

Mitigation: Unit located to avoid the steep slopes.

Wildlife

Concern: Improved walking access for goat hunters may increase harvest and impact populations. Nesting habitat for forest songbirds.

Mitigation: Retain a reserve within the unit connected to backline and include cliffs to allow for goat dispersal.

Visuals

Concern: Appearance of Unit from Bradfield Canal.

Mitigation: Leave trees in unit with 10% retention to help meet the visual quality objective.

Special Contract Concerns

Ensure stream buffers protected.

UNIT 23 ALTERNATIVE 1 & 3 13 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **24** In Alternatives 1, 2 & 3

Harvest method Cable
Cable Acres 51 Volume per Acre 17.0 MBF Total Cable Volume 869 MBF

Harvest method Helicopter
Helicopter Acres 9 Volume per Acre 17.0 MBF Total Helicopter Volume 153 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. Upper, south portion of unit will be yarded with helicopter and is adjacent to high hazard soils. Unit north boundary is irregular shaped. Unit goes under the Tyee power line. West edge of unit borders on high hazard soils. For the diameter limit consider 16 inches. Unit excludes cliffs between cable and helicopter settings. Unit includes a short steep pitch (75-88%) with shallow well drained soils. Bedrock controls slope angle. Risk of management induced mass wasting or soil erosion is thought to be low. Class II stream south of unit. Class III or IV streams within unit.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Cable portion will have reserves. Helicopter with diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Class II stream is MM1 (West Fork of Hoya Creek). Small Class III or Class IV streams within unit shall be verified during unit layout.
Mitigation:	No harvest within 120 feet of Class II stream (includes no harvest within 100 horizontal feet). No harvest within notch of Class III streams. Split yard Class IV streams. Road location (or helicopter yarding) will provide both Class III and Class IV protection.

Soils

Concern:	Soil disturbance and erosion.
Mitigation:	Unit located to avoid the steep unstable slopes and cliffs and full suspension on steep slopes.

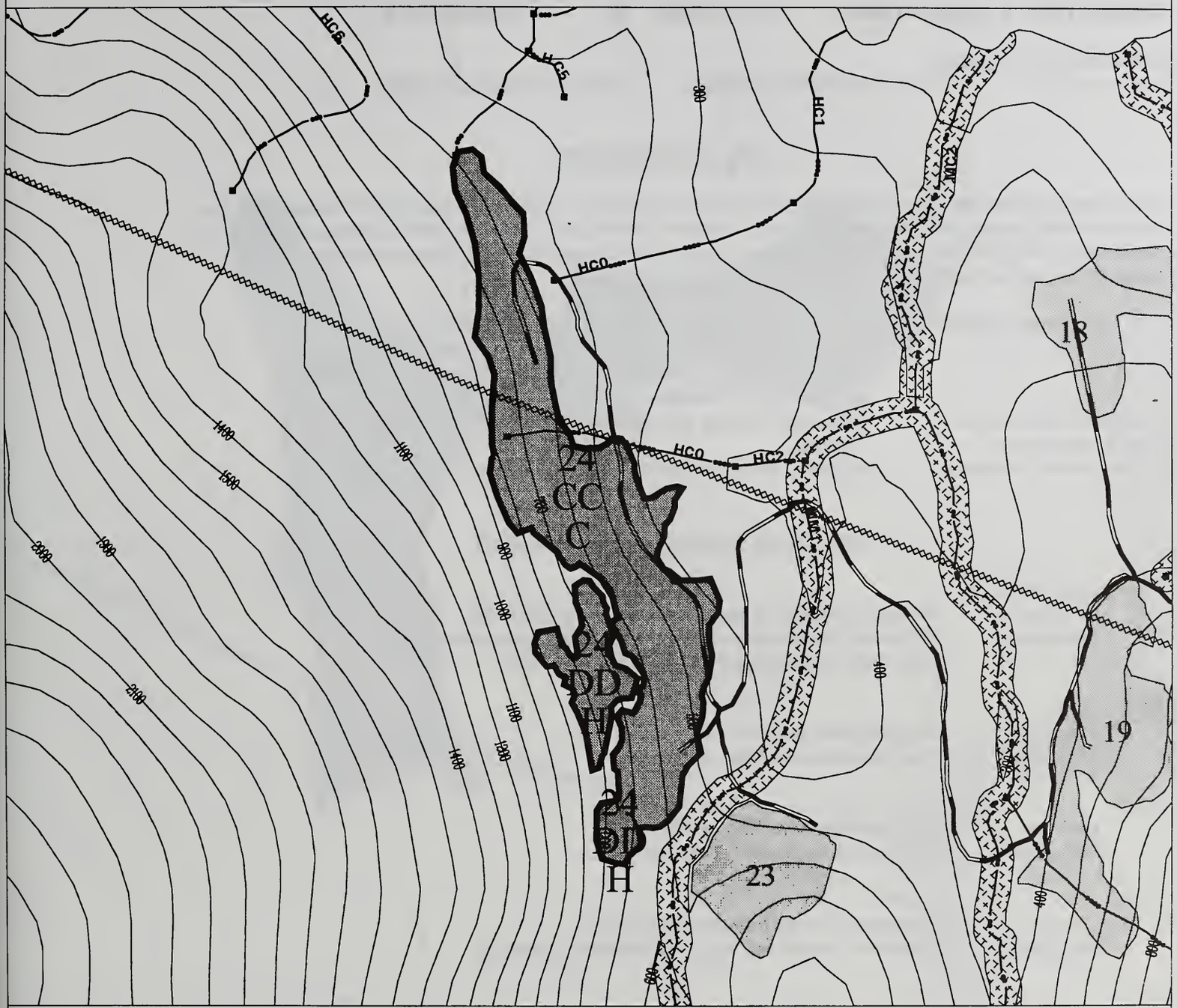
Wildlife

Concern:	Improved access for goat hunters may increase harvest and impact populations.
Mitigation:	Retain 4-5 reserves connected to backline and include cliffs to allow for goatdispersal.

Visuals

Concern:	Appearance of Unit from Bradfield Canal.
Mitigation:	Leave trees in unit with a diameter limit and the 10% retention to meet the visual quality objective.

UNIT 24 ALTERNATIVE 1, 2 & 3 60 ACRES



- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 25 In Alternative 4

Harvest method Helicopter
Total Acres 32 Volume per Acre 17.0 MBF Total Unit Volume 544 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. Unit will be yarded with helicopter and is adjacent to high hazard soils along the west edge. A sharp shinned hawk nest buffer and a muskeg resulted in this unit being dropped from the other alternatives and expanded to the west and south in this alternative. A large portion of the east and north portions of unit dropped because of nest.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 20% retention.
Silvicultural Prescription:	Helicopter yarding with diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Northeast boundary approaches Hoya Creek (Class II).
Mitigation:	No harvest within notch of Hoya Creek. This includes no harvest within 100 feet horizontal distance of Hoya Creek.

Soils

Concern:	Steep slopes to west and south of unit.
Mitigation:	Unit located to avoid the steep slopes.

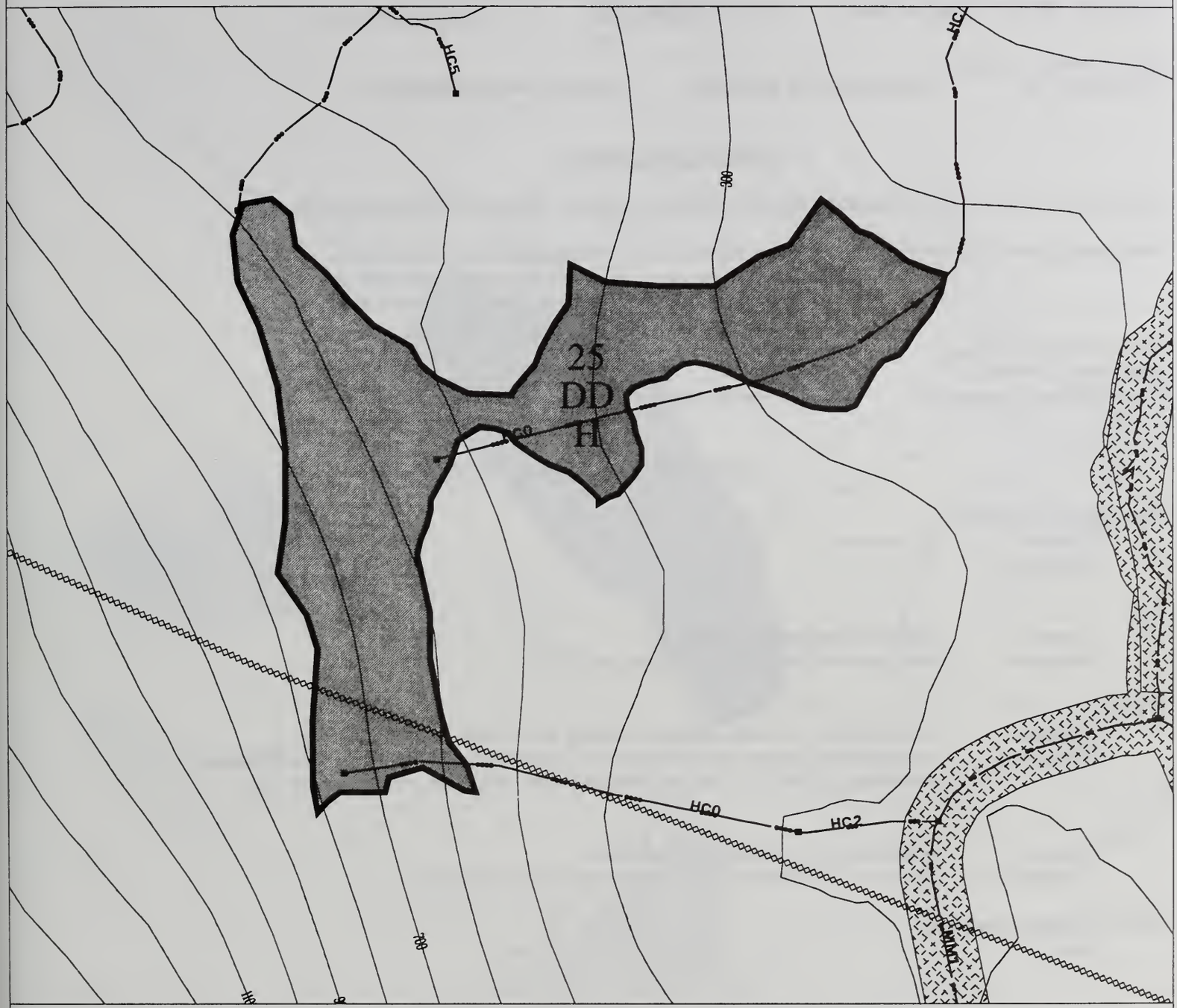
Wildlife

Concern:	Sharp-shinned hawk nest in unit.
Mitigation:	Nest buffered with 600 foot radius buffer.

Visuals

Concern:	Appearance of unit from Bradfield Canal
Mitigation:	Leave trees in unit and design an irregular shaped unit.

UNIT 25 ALTERNATIVE 4 32 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 27 In Alternative 1

Harvest method Cable
Total Acres 18 Volume per Acre 22.7 MBF Total Unit Volume 409 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objective of partial retention. No harvest in the beach buffer.

Stand Management Objectives: Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription: Clearcut with reserves.
Regeneration Method: Natural.
Possible Future Treatments: Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries
Concern: No concerns.
Mitigation:

Soils
Concern: Harvest on oversteepened slopes.
Mitigation: Unit layout will avoid harvest on slopes > 72%.

Wildlife
Concern: Travel corridor for bears; denning potential; forest birds.
Mitigation: Avoid harvest of large low value grade 3,7 and 8 trees with cavities, retain snags and downed logs. Place 2-4 reserves within the unit. Avoid removing treeswith nests.

Visuals
Concern: Appearance of unit from Bradfield Canal
Mitigation: Leave trees in clumps to help meet the visual quality objective.

Special Contract Concerns:
None

UNIT 27 ALTERNATIVE 1 18 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 28 In Alternatives 1, 3 & 4

Harvest method Helicopter
Total Acres 21 Volume per Acre 17.1 MBF Total Unit Volume 359 MBF

UNIT DEVELOPMENT

Southeast patch is a 7 acre patch cut with a Class III stream along the west side, requiring a buffer. Units are located in areas surrounded by steep areas. The other 6 units are small patch cuts. Unit will be yarded to a barge using a helicopter.

Stand Management Objectives:	Stand will be predominately even aged. Future stand will have two age classes, one from the small uncut trees, the other as a result of the regeneration after the harvest. Small even age patches.
Silvicultural Prescription:	Clearcut in small patches.
Regeneration Method:	Natural.
Possible Future Treatments:	Release and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Class III streams adjacent to several patches. None are tributary to freshwater fish habitat. Class IV streams in one patch.
Mitigation:	No timber harvest within notch of Class III streams. Helicopter yarding provide Class IV stream protection.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Travel corridor between Canal and Hoya Creeks. Ensure protection of eagle nest north of units. Portions of two patches are within 1/4 mile of an eagle tree.
Mitigation:	Small unit size allows for wildlife dispersal.

Anan Bears

Concern:	Noise of helicopter yarding during denning and during tourist season.
Mitigation:	Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

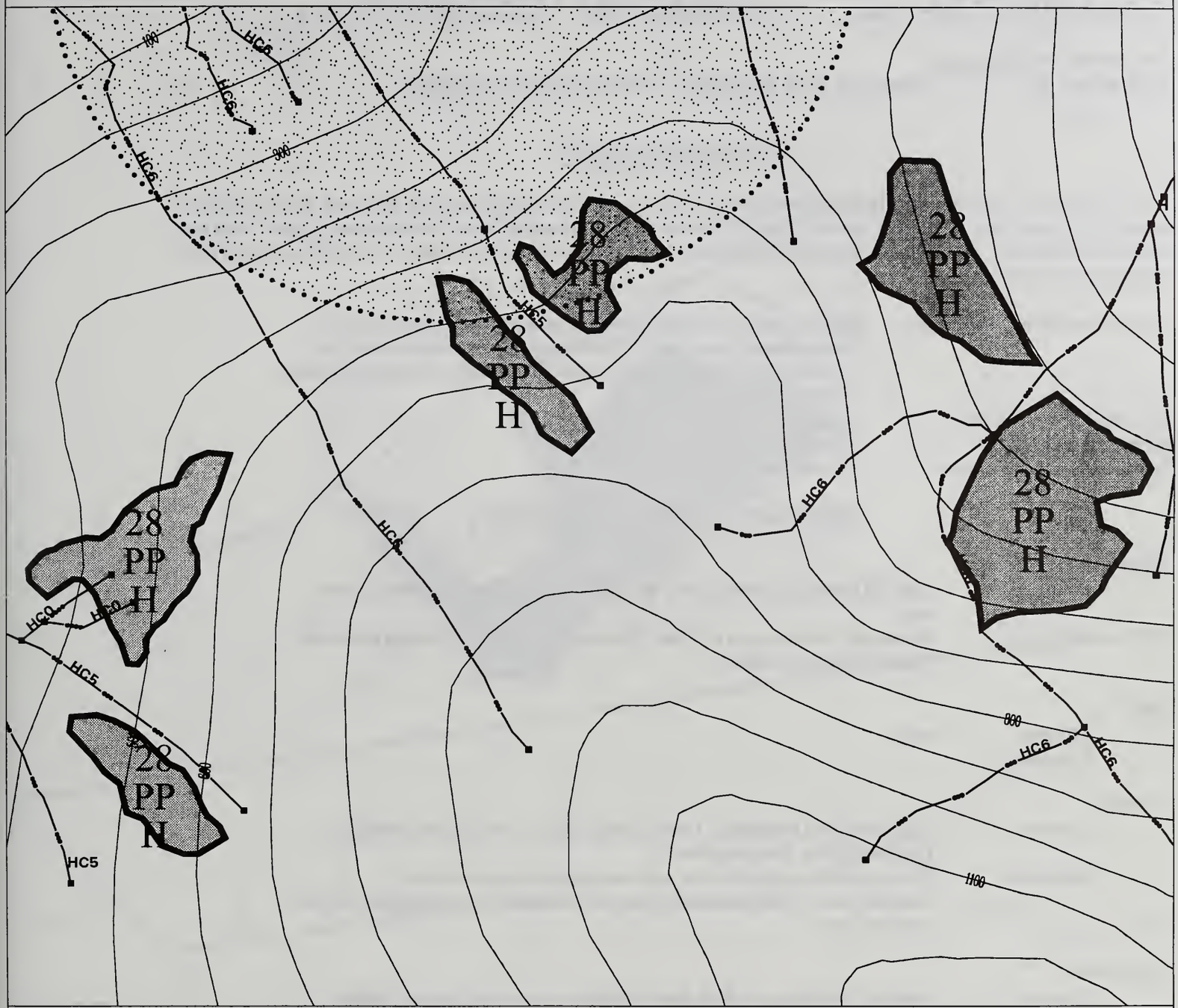
Visuals

Concern:	Appearance from Bradfield Canal.
Mitigation:	Harvest helicopter will leave the small sub-merchantable trees standing.

Special Contract Concerns

Ensure stream buffers protected.

UNIT 28 ALTERNATIVE 1, 3 & 4 21 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 31 In Alternatives 1, 3 & 4

Harvest method Helicopter
Total Acres 14 Volume per Acre 14.6 MBF Total Unit Volume 205 MBF

UNIT DEVELOPMENT

Parts of unit are visible from the Blake Island area. Unit is an irregular shaped area with the south portion adjacent to the Tyee power line. There are several Class IV streams in the unit and a Class III stream runs parallel with the north side boundary. The diameter limit prescription will minimize the impact to visuals. Western portion of unit dropped because of very low volume.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Helicopter with diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Pre-commercial thinning

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Class III stream is tributary to Flying V Creek. Class IV streams within unit.
Mitigation:	No harvest within notch of Class III stream. Helicopter yarding achieves Class IV stream protection.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Small mammal dispersal. Loss of large trees for nesting and denning. Travel corridor. Fragmentation.
Mitigation:	Reserves trees within the unit will maintain structural diversity. Younger stand component and leave trees retained. Unit designed to leave corridor intact.

Anan Bears

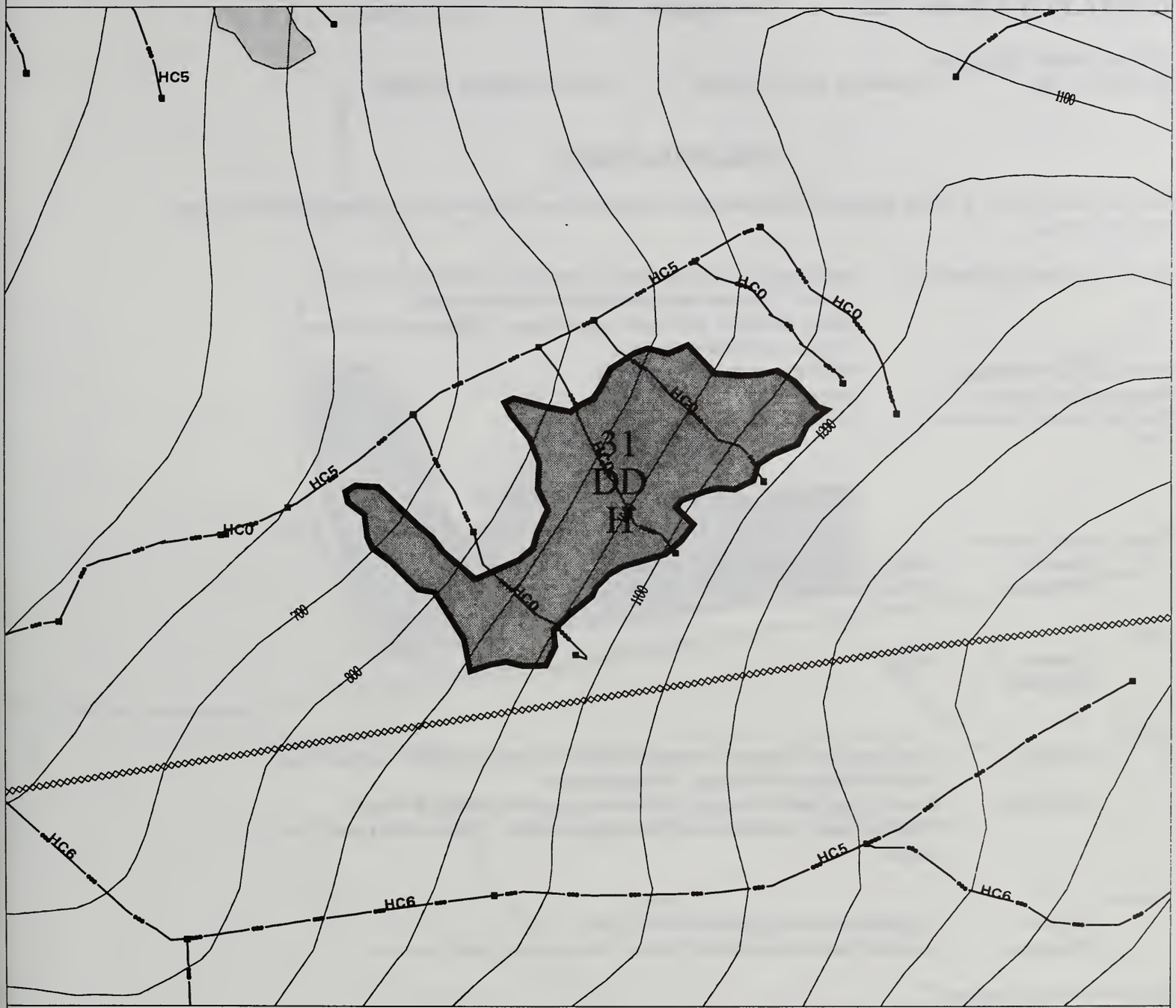
Concern:	Noise of helicopter yarding during denning and during tourist season.
Mitigation:	Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Diameter limits will retain trees in unit, North boundary is irregular.

Special Contract Concerns
Ensure stream buffers protected.

UNIT 31 ALTERNATIVE 1, 3 & 4 14 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 33 In Alternative 3 & 4

Harvest method Helicopter
Total Acres 22 Volume per Acre 17.7 MBF Total Unit Volume 389 MBF

UNIT DEVELOPMENT

Unit is split by Flying V Creek tributaries which require V-notch buffers. South boundary of unit is adjacent to the Tyee power line.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 25% retention.
Silvicultural Prescription:	Helicopter with diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/Fisheries

Concern:	Flying V Creek tributaries (Class III, HC6) flow through unit.
Mitigation:	No harvest within notch of Class III streams.

Soils

Concern:	none.
Mitigation:	

Wildlife

Concern:	Small mammal dispersal. Forested corridor beneath powerline. Loss of large trees for nesting and denning. Fragmentation.
Mitigation:	Reserve trees within the unit will maintain some structural diversity. Younger stand component and leave trees retained. Stream buffer provides habitat.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Diameter limit reduces the effects of harvest on the visual resource.

Special Contract Concerns

Ensure stream buffers protected.

UNIT 33 ALTERNATIVE 3 & 4 22 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 34 In Alternatives 1

Harvest method Helicopter
Total Acres 8 Volume per Acre 13.0 MBF Total Unit Volume 104 MBF

UNIT DEVELOPMENT

Unit was reduced in size due to low timber volume. Unit is mapped as forested wetlands.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 30%retention as unit is close to largest version of Unit 35.
Silvicultural Prescription:	Helicopter with diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Verify possible Class III or Class IV stream east of unit.
Mitigation:	No harvest within notch of Class III stream. Helicopter yarding provides Class IV stream protection.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Small mammal dispersal. Loss of large trees for nesting and denning. Fragmentation.
Mitigation:	Reserve trees within the unit will maintain structural diversity. Younger stand component and leave trees retained.

Anan Bears

Concern:	Noise of helicopter yarding during denning and during tourist season.
Mitigation:	Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

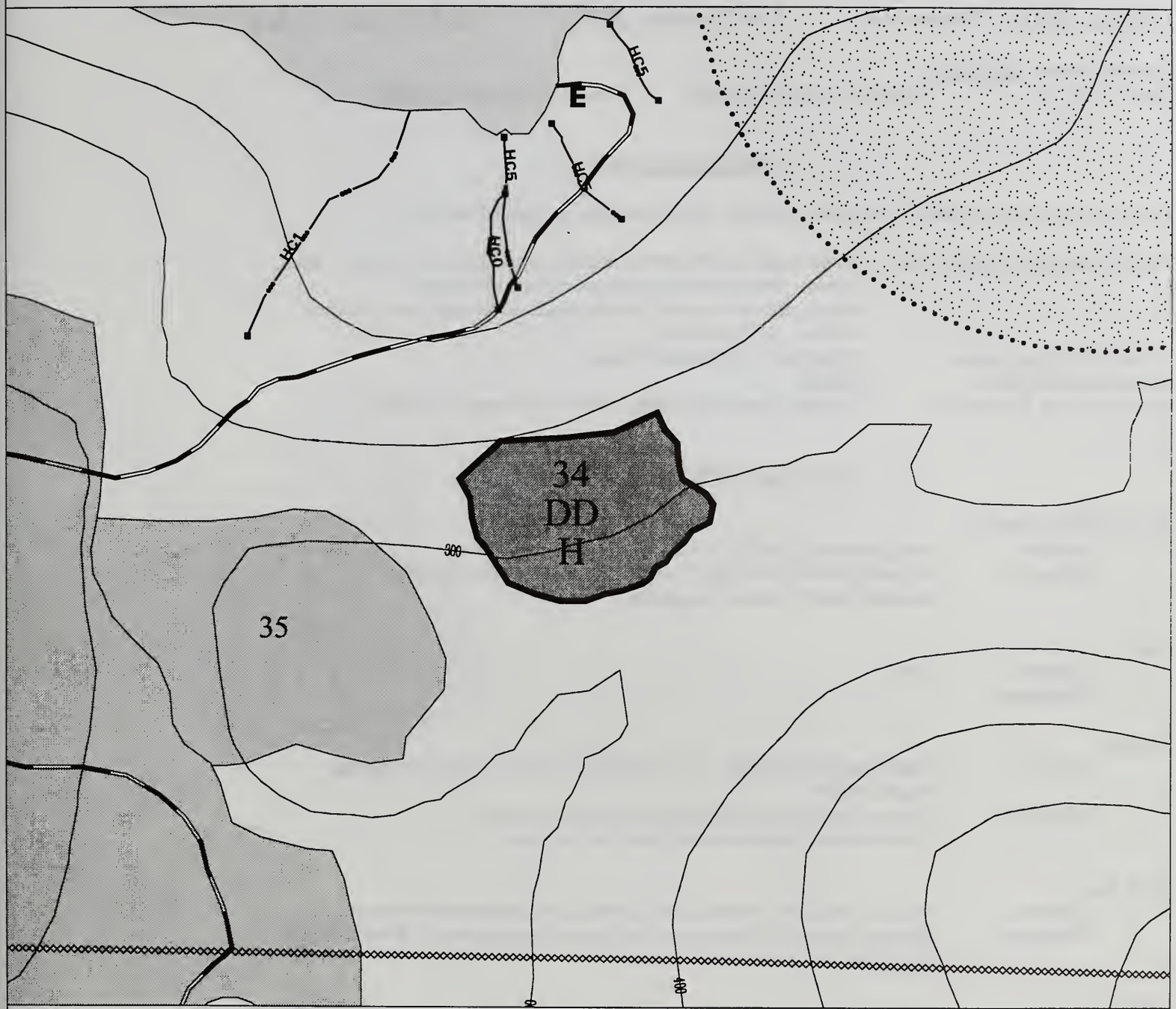
Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Diameter limit reduces the effects of harvest on the visual resource.

Special Contract Concerns

Ensure stream buffer protected.

UNIT 34 ALTERNATIVE 1 8 ACRES



- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 14, 1998

CANAL HOYA Timber Sale Unit Number **34** In Alternative 3 & 4

Harvest method Helicopter
Total Acres 8 Volume per Acre 13.0 MBF Total Unit Volume 104 MBF

UNIT DEVELOPMENT

Unit was reduced in size due to low timber volume. Unit is mapped as forested wetlands.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 20% retention.
Silvicultural Prescription:	Helicopter with diameter limits.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Verify possible Class III or Class IV stream east of unit.
Mitigation:	No harvest within notch of Class III stream. Helicopter yarding provides Class IV stream protection.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Small mammal dispersal. Loss of large trees for nesting and denning. Fragmentation.
Mitigation:	Trees within the unit will maintain structural diversity. Younger stand component and leave trees retained.

Anan Bears

Concern:	Noise of helicopter yarding during denning and during tourist season.
Mitigation:	Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Diameter limit reduces the effects of harvest on the visual resource.

Special Contract Concerns
Ensure stream buffer protected.

UNIT 34 ALTERNATIVE 3 & 4 8 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 14, 1998

CANAL HOYA Timber Sale Unit Number 35 In Alternative 1

Harvest method Helicopter
Helicopter Acres 16 Volume per Acre 14.8 MBF Total Helicopter Volume 237 MBF

Harvest method Cable
Cable Acres 65 Volume per Acre 15.0 MBF Total Cable Volume 972 MBF

UNIT DEVELOPMENT

Unit is adjacent to Cowboy Creek (Class II stream) on west side. Northern and parts of west boundary are adjacent to beach buffer. Southern boundary of unit adjacent to the Tyee power line. Unit includes 23 acres of forested wetlands and a small sedge muskeg.

Stand Management Objectives: Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.

Silvicultural Prescription: Helicopter with diameter limit in unit and clearcut with reserves in unit.

Regeneration Method: Natural.

Possible Future Treatments: Release and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
- Concern: Class II stream is MM1 and FP3. Verify buffer width during layout.
- Mitigation: No timber harvest within floodplain. Includes no timber harvest within 100 horizontal feet of stream. No harvest within 130 feet of FP3 stream or within 120 feet of MM1 stream. Fisheries specialist will assist with buffer layout.

Soils
- Concern: none
- Mitigation:

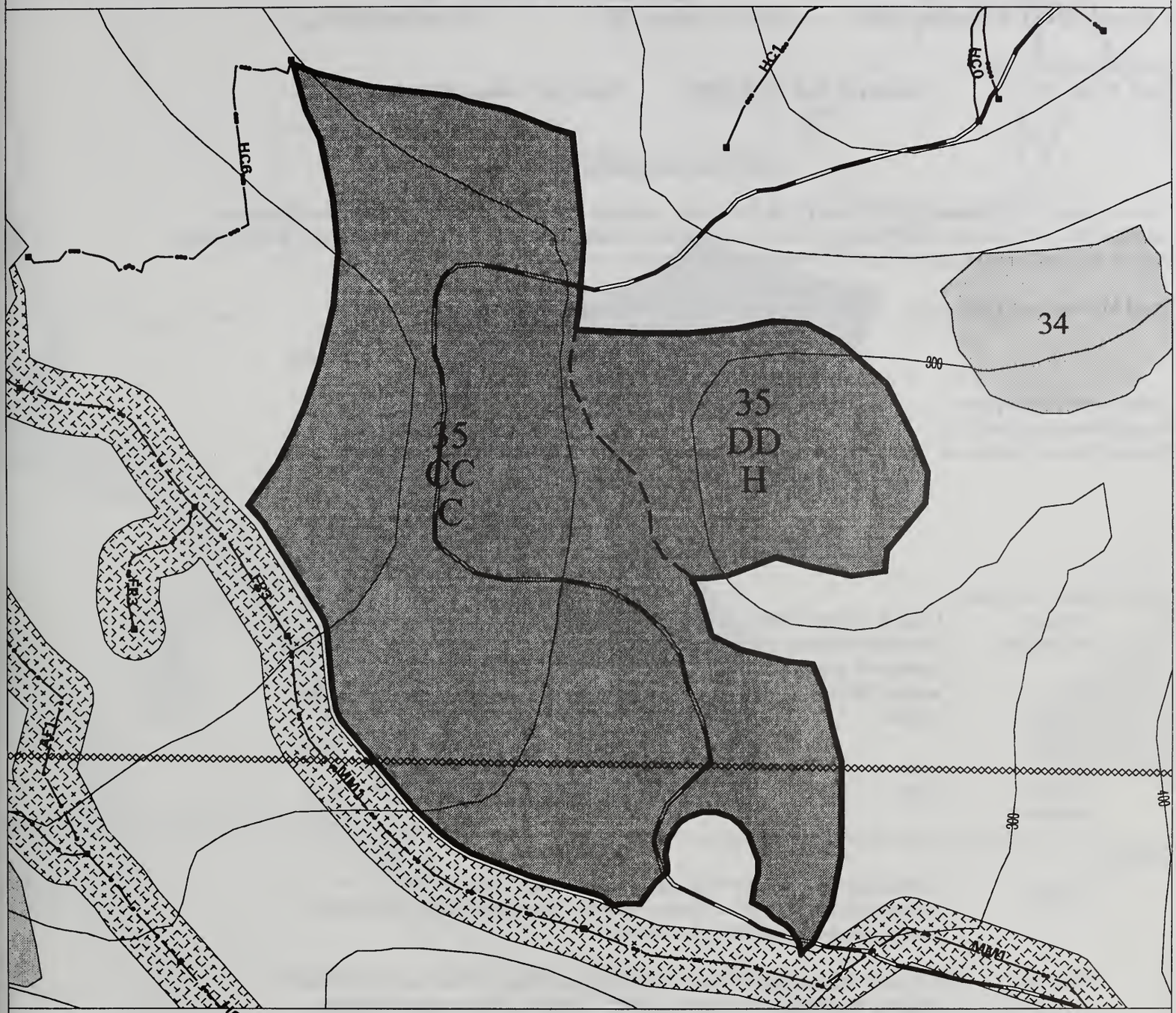
Wildlife
- Concern: Improved access: impact to bear population and habituated bears. Unit adjacent to beach buffer. Deer marten and forest songbird habitat values.
- Mitigation: Locate unit boundary at least 1000 feet from beach. Reserve trees within the unit will maintain structural diversity and are placed west of the road. Highest habitat values within the beach buffer.

Anan Bears
- Concern: Noise of helicopter yarding during denning and during tourist season.
- Mitigation: Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals
- Concern: Appearance from Bradfield Canal.
- Mitigation: Reserve trees will reduce visual impacts.

Special Contract Concerns
Ensure stream buffers protected.

UNIT 35 ALTERNATIVE 1 81 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 14, 1998

CANAL HOYA Timber Sale Unit Number **35** In Alternative 2

Harvest method Cable
Total Acres 47 Volume per Acre 14.8 MBF Total Unit Volume 695 MBF

UNIT DEVELOPMENT

Unit is adjacent to Cowboy Creek (Class II) on west side. Northern and parts of west boundary are adjacent to beach buffer. Unit will be cable yarded. Southern boundary of unit adjacent to the Tyee power line. Unit includes about 9 acres of forested and nonforested wetland complex and a small sedge muskeg exclusion.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predomiately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Clearcut with reserves.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Class II stream is MM1 and FP3. Verify buffer width during layout.
Mitigation:	No timber harvest within floodplain. Includes no timber harvest within 100 horizontal feet of stream. No harvest within 130 feet of FP3 stream or within 120 feet of MM1 stream. Fisheries specialist will assist with buffer layout.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Unit adjacent to beach buffer and beach corridor. Deer, marten and forest songbird habitat values. Improved access may impact bear populations and habituated bears.
Mitigation:	Locate unit boundary at least 1000 feet from beach. Reserves trees within the unit will maintain structural diversity. Highest habitat values within the beach buffer. Place 2-4 reserves west of the road and adjacent to estuary.

Visuals

Concern:	none
Mitigation:	

Special Contract Concerns
Ensure the beach buffers are protected.

UNIT 35 ALTERNATIVE 2 47 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 35 In Alternative 3 & 4

Harvest method Helicopter
Total Acres 15 Volume per Acre 15.0 MBF Total Unit Volume 225 MBF

UNIT DEVELOPMENT

Unit is located west of unit 34 and south of beach buffer.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation.
Silvicultural Prescription:	Helicopter with diameter limit.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
Concern: None.
Mitigation:

Soils
Concern: none
Mitigation:

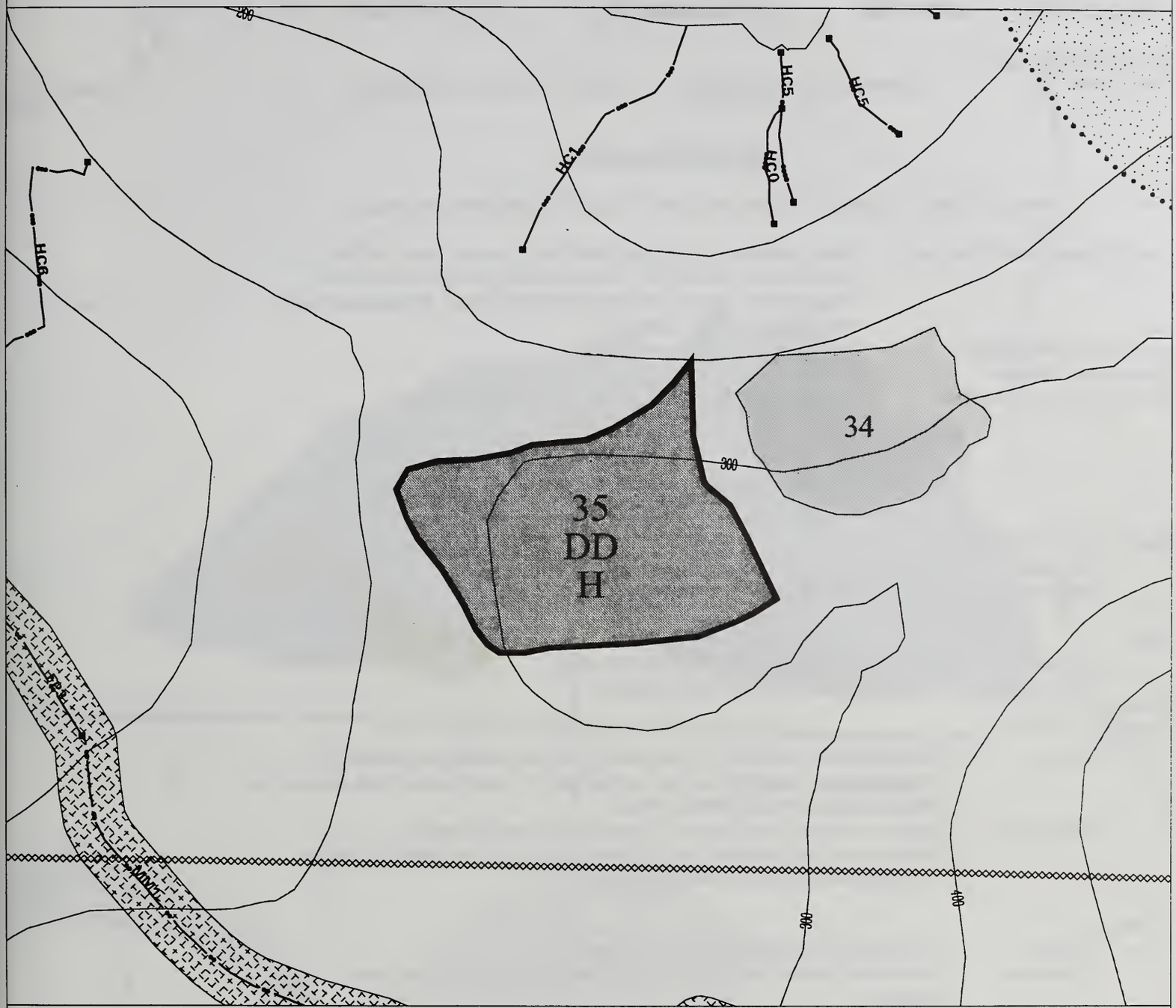
Wildlife
Concern: Deer, marten, and forest songbird habitat values.
Mitigation: Ensure unit boundary at least 1000' from the beach. Highest habitat value is within the beach buffer.

Anan Bears
Concern: Noise of helicopter yarding during denning and during tourist season.
Mitigation: Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals
Concern: Appearance of unit from Bradfield Canal.
Mitigation: Leave trees in unit to help meet the visual the visual resource.

Special Contract Concerns
Ensure beach buffers protected.

UNIT 35 ALTERNATIVE 3 & 4 15 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 36 In Alternative 2

Harvest method Cable
Total Acres 52 Volume per Acre 20.6 MBF Total Unit Volume 1,072 MBF

UNIT DEVELOPMENT

Portion of southern boundary is adjacent to Tyee power line. Flying V Creek flows east of unit.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Cable with reserves.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Flying V Creek east of unit (Class III HC6).
Mitigation:	No harvest within notch of stream.

Soils

Concern:	Inclusion of oversteepened slopes in the unit.
Mitigation:	Field verify site stability prior to layout.

Wildlife

Concern:	Small mammal dispersal. Loss of large trees for nesting and denning. Fragmentation. Improved access in Alternative 2 may increase bear harvest and impact population and habituate bears.
Mitigation:	Reserve trees within the unit will maintain structural diversity. Reserve trees will maintain some structural diversity and promote a large tree component in the regenerating stand.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in the unit will reduce the effects of harvest on the visual resource.

Special Contract Concerns
Ensure stream buffers protected.

UNIT 36 ALTERNATIVE 2 52 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number 36 In Alternatives 4

Harvest method Helicopter
Total Acres 52 Volume per Acre 20.2 MBF Total Unit Volume 1,072 MBF

UNIT DEVELOPMENT

Portion of southern boundary is adjacent to Tyee power line. Flying V Creek flows east of unit.

Stand Management Objectives:	Future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Silvicultural Prescription:	Helicopter with diameter limits.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
- Concern: Flying V Creek east of unit (Class III HC6).
- Mitigation: No harvest within notch of stream.

Soils
- Concern: Inclusion of oversteepened slopes in the unit.
- Mitigation: Field verify site stability prior to layout.

Wildlife
- Concern: Small mammal dispersal. Loss of large trees for nesting and denning. Fragmentation.
- Mitigation: Reserve trees within the unit will maintain structural diversity. Reserve trees will maintain some structural diversity and promote a large tree component in the regenerating stand.

Anan Bears
- Concern: Noise of helicopter yarding during denning tourist season.
- Mitigation: Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals
- Concern: Appearance of unit from Bradfield Canal.
- Mitigation: Leave trees in the unit will reduce the effects of harvest on the visual resource.

Special Contract Concerns
Ensure stream buffers protected.

UNIT 36 ALTERNATIVE 4 52 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 500 1000 feet

Scale is 1 inch = 0.09 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 03, 1998

CANAL HOYA Timber Sale Unit Number **38** In Alternatives 1 & 2

Harvest method Cable
Total Acres 33 Volume per Acre 19.7 MBF Total Unit Volume 649 MBF

UNIT DEVELOPMENT

Unit designed to meet the visual quality objectives of partial retention. Road goes through unit and provides access to additional units in Alternative 2. Unit size and shape were designed to avoid low volume, poor quality timber.

Stand Management Objectives: Alternative 2 future stand to have at least two canopy layers. Stand will be predominately even aged. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10% retention.
Alternative 1 future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 10 to 15% retention.

Silvicultural Prescription: Clearcut with reserves.

Possible Future Treatments: Release, possible planting, pre-commercial thinning, and pruning.

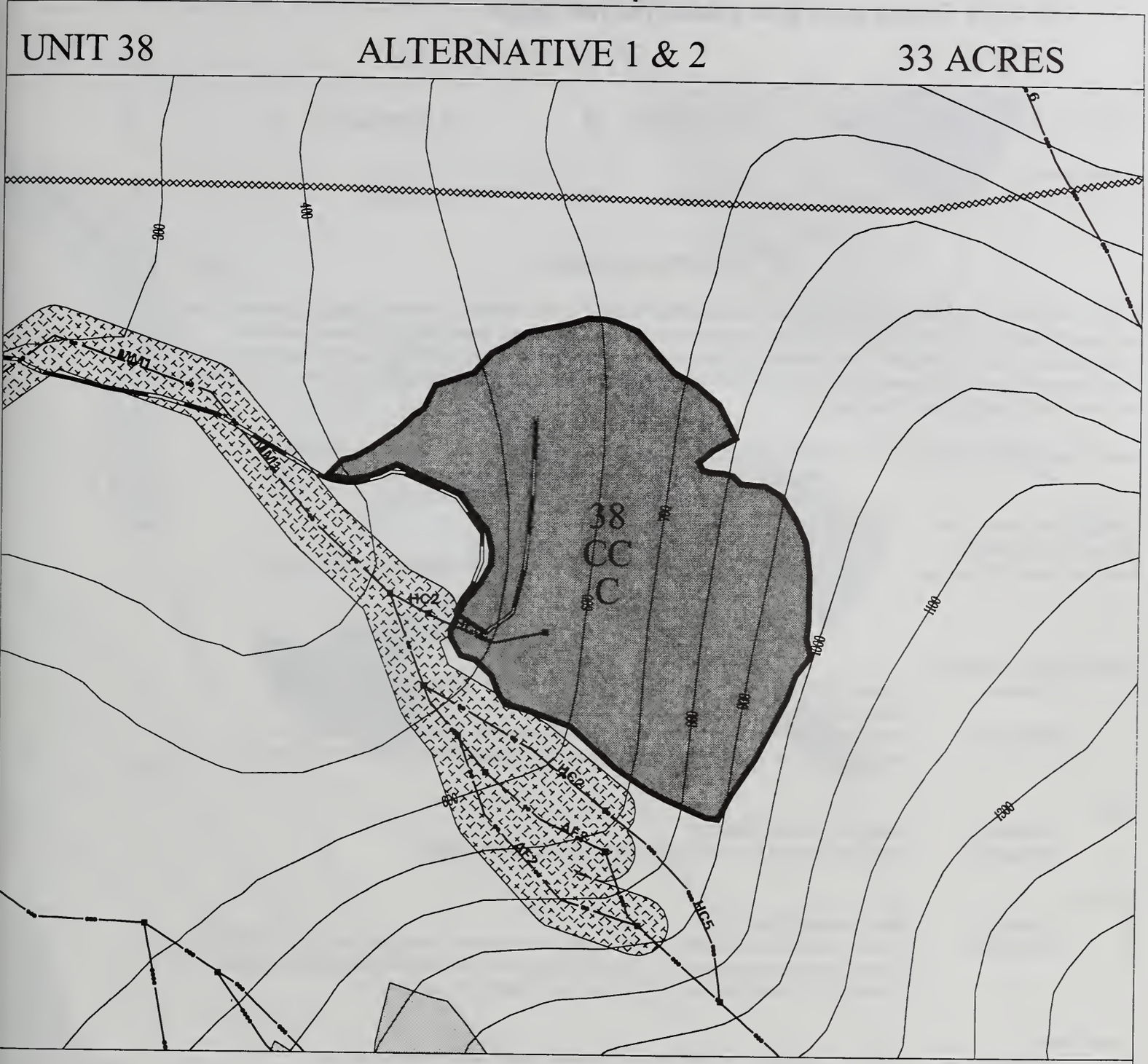
RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
Concern: none
Mitigation:

Soils
Concern: Steep slopes on southeast side of unit.
Mitigation: Unit located to avoid slopes > 72%.

Wildlife
Concern: Improved access may impact bear populations and habituated bears. Forest songbirds, corridor and deer winter range habitat values.
Mitigation: Place reserves within unit. Maintain canopy cover in backline. Higher retention will help maintain winter range values.

Visuals
Concern: none
Mitigation:


UNIT 38
ALTERNATIVE 1 & 2
33 ACRES
38
CC
C
MM1
MM3
HC2
HC1
HC2
AF2
AF2
HC5
Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline
Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers
E Proposed LTF Sites
HC1,MM3,... Channel Types
0
500
1000 feet
Scale is 1 inch = 0.09 miles
PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut
HARVEST SYSTEMS
C = Cable
H = Helicopter
Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **41** In Alternatives 1

Harvest method Helicopter
Total Acres 22 Volume per Acre 16.4 MBF Total Unit Volume 360 MBF

UNIT DEVELOPMENT

Unit is visible from the Marten Creek area of the Bradfield Canal. Unit designed to buffer Class III streams. Unit designed to meet the visual quality objective of partial retention. There are about 5 acres of forest wetlands included in this unit. This unit is helicopter yarded with a diameter limit. Logs will be flown to landing in unit 38. The irregular shape and diameter limit harvest will help the unit to meet the visual quality objective. Retention will help maintain bear habitat effectiveness.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation.
Silvicultural Prescription:	Diameter limits in helicopter portion.
Regeneration Method:	Natural
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern:	Stream west of unit is Class III, HC6 (Bear Creek). Streams within unit are small Class III (HC5) and Class IV streams.
Mitigation:	No timber harvest within notch of Class III streams. Unit design, temporary road location (or helicopter yarding) provides Class IV stream protection.

Soils

Concern:	Steep slopes and muskegs.
Mitigation:	Unit was shaped to avoid steep slopes and muskeg stringer.

Wildlife

Concern:	Bear denning potential.
Mitigation:	Create 2-3 reserves within the unit that contain suitable denning trees (>40" DBH). Leave large low value grade 3, 7, and 8 trees with cavities, downed logs or snags. On downed trees retain at least 15' of butt log attached to the rootwad.

Anan Bears

Concern:	Noise of helicopter yarding during denning and during tourist season.
Mitigation:	Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals

Concern:	Appearance of Unit from Bradfield Canal
Mitigation:	Leaving trees in the unit using a diameter limit and 40% retention will help meet the visual quality objective.

Special Contract Concerns
Ensure stream buffers protected.

UNIT 41 ALTERNATIVE 1 22 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **41** In Alternative 2

Harvest method Cable
Cable Acres 18 Volume per Acre 15.8 MBF Cable Unit Volume 284 MBF

Harvest method Helicopter
Helicopter Acres 22 Volume per Acre 16.4 MBF Helicopter Unit Volume 360 MBF

UNIT DEVELOPMENT

Unit is visible from the Marten Creek area of the Bradfield Canal. Unit designed to buffer Class III streams. Unit designed to meet the visual quality objective of partial retention. There are about 5 acres of forest wetlands included in this unit. The upper portion of this unit is helicopter yarded with a diameter limit. The low portions of the unit are cable yarded with 10% retention. The irregular shape and diameter limit harvest will help the unit to meet the visual quality objective. Retention will help maintain bear habitat effectiveness.

Stand Management Objectives: Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation.

Silvicultural Prescription: Cable Portion will have reserves. Upper and lower diameter limits in helicopter portion.

Regeneration Method: Natural

Possible Future Treatments: Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries

Concern: Stream west of unit is Class III, HC6 (Bear Creek). Streams within unit are small Class III (HC5) and Class IV streams.

Mitigation: No timber harvest within notch of Class III streams. Unit design, temporary road location (or helicopter yarding) provides Class IV stream protection.

Soils

Concern: Steep slopes and muskegs.

Mitigation: Unit was shaped to avoid steep slopes and muskeg stringer.

Wildlife

Concern: Improved walk in access. Bear denning potential.

Mitigation: Create 2-3 reserves within the unit that contain suitable denning trees (>40" DBH). Leave large low value grade 3, 7 & 8 trees with cavities, downed logs or snags. On downed trees retain at least 15' of butt log attached to the rootwad.

Anan Bears

Concern: Noise of helicopter yarding during denning and during tourist season.

Mitigation: Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals

Concern: Appearance of Unit from Bradfield Canal

Mitigation: Leaving trees in the unit using a diameter limit and 40% retention will help meet the visual quality objective.

Special Contract Concerns: Ensure stream buffers are protected.

UNIT 41 ALTERNATIVE 2 40 ACRES

Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

★ Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 43 In Alternative 2

Harvest method Cable
Total Acres 58 Volume per Acre 22.5 MBF Total Unit Volume 1,303 MBF

UNIT DEVELOPMENT

Unit has portions of east boundary adjacent to Bear Creek tributary. The reserves in this alternative will help meet the visual objectives.

Stand Management Objectives:	Future stand to have several canopy layers and at least two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation.
Silvicultural Prescription:	Clearcut with 20% retention. Stagger and feather backline.
Regeneration Method:	Natural.
Possible Future Treatments:	Release and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Bear Creek (Class III HC6) east of unit.
Mitigation:	No harvest within notch of Bear Creek.

Soils

Concern:	
Mitigation:	

Wildlife

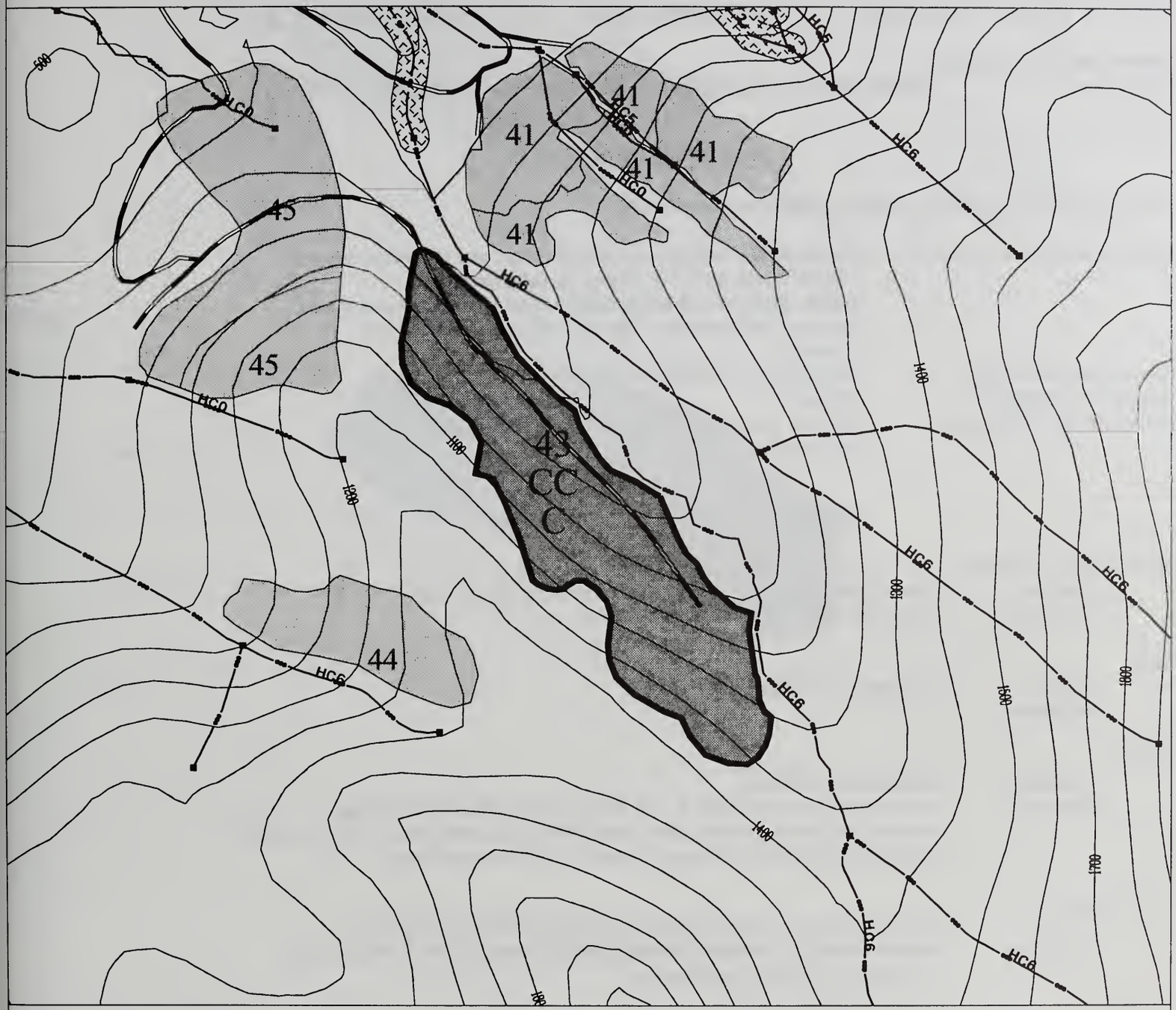
Concern:	Improved walk in access for bear hunters . Bear denning potential. Deer winter range values.
Mitigation:	Create 5-6 reserves within the unit that contain suitable denning trees (>40" DBH). Leave large low value grade 3, 7 & 8 trees with cavities, downed logs or snags. On down trees retain at least 15' of the butt log attached to the rootwad.

Visuals

Concern:	View from Bradfield Canal.
Mitigation:	Retention will help accomplish the visual quality objective.

Special Contract Concerns
Ensure stream buffers protected.

UNIT 43 ALTERNATIVE 2 58 ACRES



Proposed Roads
Class I Streams
Class II Streams
Class III Streams
Class IV Streams
Powerline

Eagle Nest Tree
Proposed cut unit
Adjacent proposed units
TTRA Buffers
1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

0 1000 2000 feet

Scale is 1 inch = 0.18 miles

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **44** In Alternatives 1 & 2

Harvest method Helicopter
Total Acres 17 Volume per Acre 24.2 MBF Total Unit Volume 412 MBF

UNIT DEVELOPMENT

Retention in the unit is high to maintain habitat for Anan bears.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 40% retention. Harvest unit while leaving a mix of species.
Silvicultural Prescription:	Helicopter with diameter limits.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality Fisheries
- Concern: Class III stream south of unit is HC6 tributary to Canal Creek.
- Mitigation: No harvest with notch of Class III stream.

Soils
- Concern: No concerns as planned
- Mitigation:

Wildlife
- Concern: Bear denning potential.
- Mitigation: Leave large low value grade 3, 7 & 8 trees with cavities, downed logs or snags for suitable denning trees (>40" DBH). On down trees retain 15' of butt log attached to rootwad. Leave 6' stumps of potential den trees.

Anan Bears
- Concern: Noise of helicopter yarding during denning and during tourist season.
- Mitigation: Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals
- Concern: Appearance of Unit from Bradfield Canal.
- Mitigation: Leave trees in unit to help meet the visual quality objective.

Special Contract Concerns
Ensure stream buffers are protected.

UNIT 44 ALTERNATIVE 1 & 2 17 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **45** In Alternative 1

Harvest method Helicopter
Total Acres 25 Volume per Acre 17.8 MBF Total Unit Volume 444 MBF

UNIT DEVELOPMENT

Unit will be helicopter yarded. This alternative will only harvest ground that could not be accessed by cable yarding in the future. Retention in the unit was increased in Alternative 1 to maintain habitat for Anan bears.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 40% retention. Harvest unit while leaving a mix of species.
Silvicultural Prescription:	Upper and lower diameter limits and reserves in the helicopter portion.
Regeneration Method:	Natural.
Possible Future Treatments:	Release, possible planting, pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Verify Class III or IV streams tributary to Canal Creek within or adjacent to unit during layout.
Mitigation:	No harvest within notch of Class III stream. Unit design (road location and helicopter yarding provides protection to both Class III and Class IV streams.

Soils

Concern:	none
Mitigation:	

Wildlife

Concern:	Improved walk in access to bear populations and habituated bears. Bear denning potential.
Mitigation:	Create 2-3 reserves within the unit that contain suitable denning trees (>40" DBH). Leave large low value grade 3, 7, & 8 trees with cavities, downed logs or snags. Retain 15' of butt logs attached to rootwads. Leave 6' stumps of potential den trees.

Anan Bears

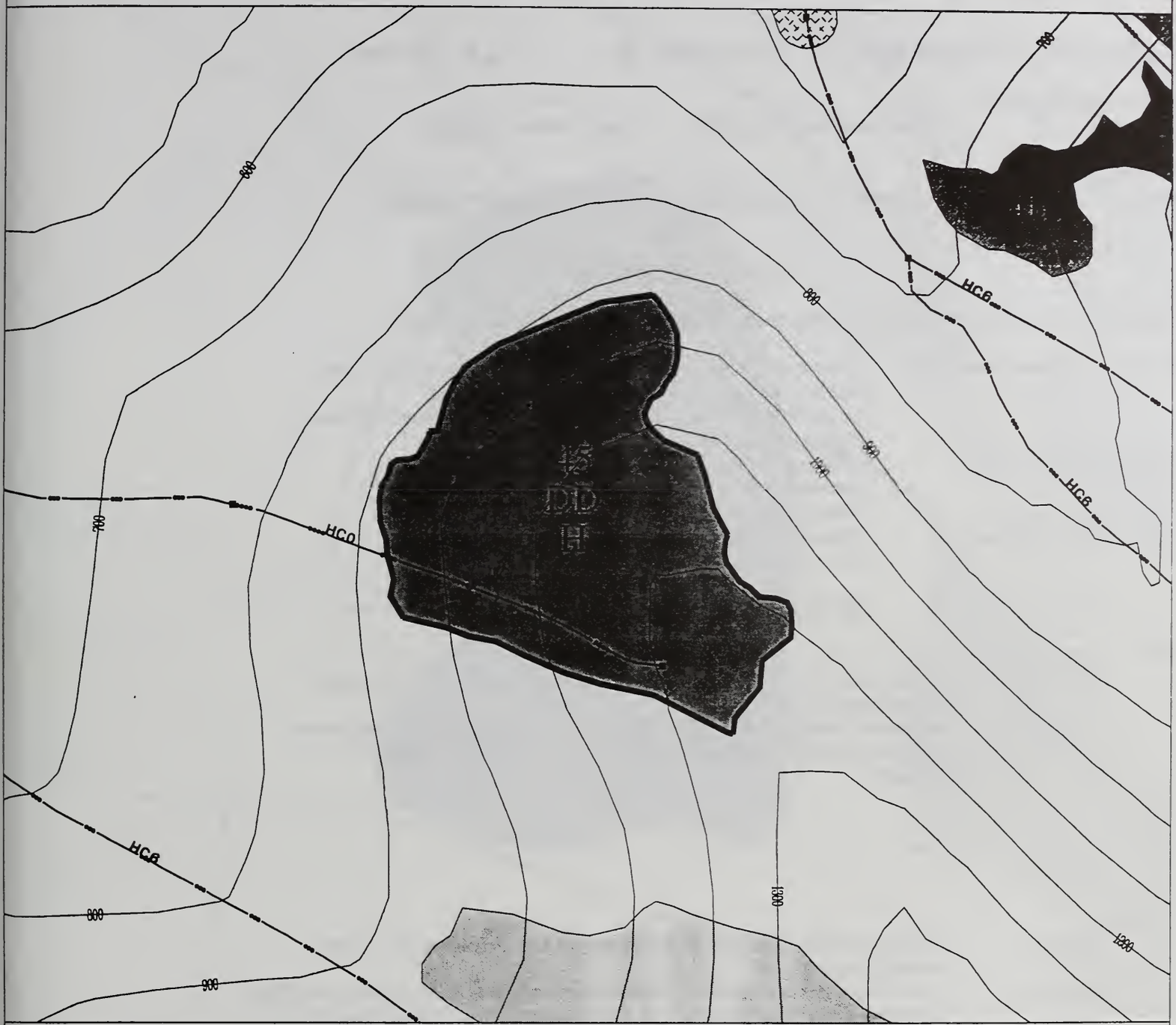
Concern:	Noise of helicopter yarding during denning and during tourist season.
Mitigation:	Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Leave trees in unit to help meet the visual quality objective.

Special Contract Concerns
Ensure stream buffers protected.

UNIT 45 ALTERNATIVE 1 25 ACRES



- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number **45** In Alternative 2

Harvest method Cable
Cable Acres 33 Volume per Acre 16.1 MBF Cable Volume 532 MBF

Harvest method Helicopter
Helicopter Acres 13 Volume per Acre 18.7 MBF Helicopter Volume 224 MBF

UNIT DEVELOPMENT

Northern portion of unit will be cable yarded and southern portion will be helicopter yarded.

Stand Management Objectives: Future stand to have several canopy layers and at least two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 15% retention .

Silvicultural Prescription: Cable portion will have reserves. Upper and lower diameter limits and reserves in the helicopter portion.

Regeneration Method: Natural.

Possible Future Treatments: Release, possible planting, pre-commercial thinning, and pruning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern: Verify Class III or IV streams tributary to Canal Creek within or adjacent to unit during layout.

Mitigation: No harvest within notch of Class III stream. Unit design (road location and helicopter yarding provides protection to both Class III and Class IV streams.

Soils

Concern: none

Mitigation:

Wildlife

Concern: Improved walking access to bear populations and habituated bears. Bear denning potential.

Mitigation: Create 2-3 reserves within the unit that contain suitable denning trees (>40" DBH). Leave large low value grade 3, 7, & 8 trees with cavities, downed logs or snags. Retain 15' of butt logs attached to rootwads. Leave 6' stumps of potential den trees.

Anan Bears

Concern: Noise of helicopter yarding during denning and during tourist season.

Mitigation: Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals

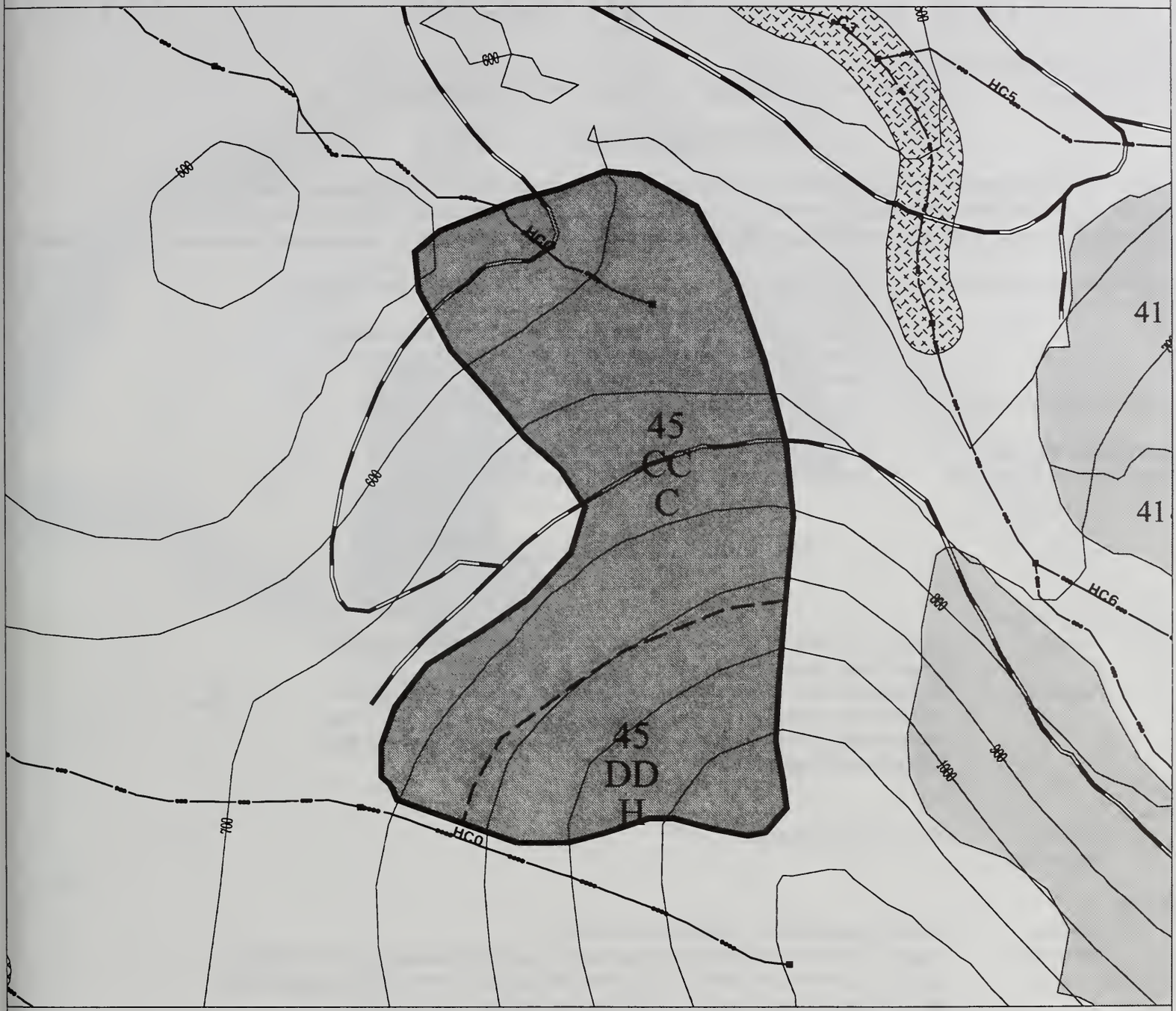
Concern: Appearance of unit from Bradfield Canal.

Mitigation: Leave trees in unit to help meet the visual quality objective.

Special Contract Concerns

Ensure stream buffers protected.

UNIT 45 ALTERNATIVE 2 46 ACRES



- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

CANAL HOYA Timber Sale Unit Number 47 In Alternative 1

Harvest method Helicopter
Total Acres 23 Volume per Acre 14.6 MBF Total Unit Volume 336 MBF

UNIT DEVELOPMENT

Unit has irregular shaped boundary. South and east boundaries provide stream buffers. The diameter limit prescription will minimize the impact to visuals. Retention in the unit is high to maintain habitat for Anan bears. There are about seven acres of non-wetland forest/forested wetlands complex in this unit.

Stand Management Objectives:	Future stand to have several canopy layers and more than two age classes. Trees are being retained to meet the visual quality objective and to provide structure. Retain trees until next rotation. 40% retention. Harvest unit while leaving a mix of species.
Silvicultural Prescription:	Helicopter with upper and lower diameter limit and reserve clumps.
Regeneration Method:	Natural.
Possible Future Treatments:	Release and pre-commercial thinning.

RESOURCE CONCERNS & MITIGATION

Water Quality/ Fisheries

Concern:	Bear Creek (Class I) AF1 flows east of unit. A Class II HC6 tributary to Canal Creek flows south of unit.
Mitigation:	No timber harvest within 140 feet of outermost channel on Bear Creek. This includes no harvest within 100 horizontal feet of stream. No timber harvest within notch on Class II stream. This includes no harvest within 100 horizontal feet of stream.

Soils

Concern	No concerns as planned.
Mitigation:	

Wildlife

Concern:	Bear denning potential. Adjacent to estuary.
Mitigation:	Create 2-3 reserves within the unit that contain suitable denning trees (>40" DBH). Leave large low value grade 3, 7 & 8 trees with cavities, downed logs or snags. On downed trees retain at least 15' of the butt log attached to the rootwad. Leave 6' stumps on potential den trees. Locate unit at least 1000' from beach.

Anan Bears

Concern:	Noise of helicopter yarding during denning and during tourist season.
Mitigation:	Restrict timing of helicopter yarding during denning period. Restrict flights over Anan during the tourist season.

Visuals

Concern:	Appearance of unit from Bradfield Canal.
Mitigation:	Retain trees in unit. Design unit with an irregular shaped boundary.

Special Contract Concerns

Ensure stream buffers are protected.

UNIT 47 | ALTERNATIVE 1 | 23 ACRES

- Proposed Roads
- Class I Streams
- Class II Streams
- Class III Streams
- Class IV Streams
- Powerline
- ★ Eagle Nest Tree
- Proposed cut unit
- Adjacent proposed units
- TTRA Buffers
- 1/4 Mile Eagle Nest Timing Buffers

E Proposed LTF Sites

HC1,MM3,... Channel Types

PRESCRIPTIONS
CC = Clearcut
DD = Diameter Limits
PP = Patch Cut

HARVEST SYSTEMS
C = Cable
H = Helicopter

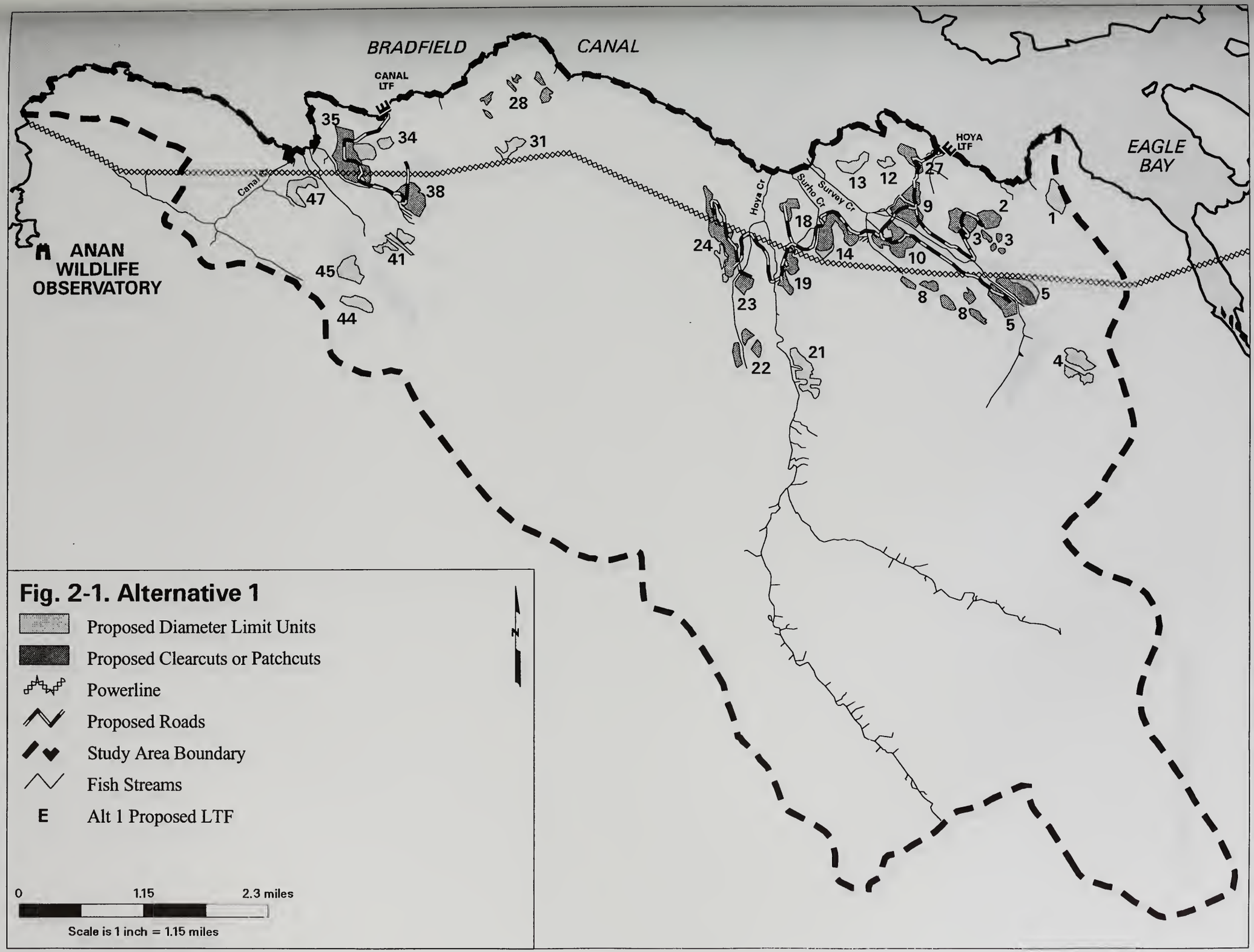
0 500 1000 feet

Scale is 1 inch = 0.09 miles

Last Updated: April 02, 1998

High Priority Units for Riparian Buffer or Other Stream Protection Verification Canal Hoya FEIS Alternative 3 (Preferred Alternative)

Unit #	Fish Stream Adjacent to Unit	Class III Riparian Buffer Within or Adjacent to Unit	Other	Sensitive Watershed
3	no	possibly one		Survey
5	four	five	skyline corridors	Survey
8	one	four	alluvial fan	Survey
9	one	three		Survey
10	three	no	alluvial fan	Survey
14	possibly three	no		
19	one	no	Class IV protection	Hoya
20	possibly three	one		Hoya
21	three	possibly one		Hoya
22	one	possibly two		Hoya
23	one	no	temp road crossing	Hoya
24	one	no		Hoya
33	no	possibly three		


BRADFIELD CANAL
CANAL LTF
HOYA LTF
EAGLE BAY
ANAN WILDLIFE OBSERVATORY
Canal Rd
Hoya Cr
Surrho Cr
Survey Cr
28
35
34
31
38
47
41
45
44
24
18
13
12
27
9
2
1
3
3
14
10
19
23
8
8
5
5
22
21
4
Fig. 2-1. Alternative 1
Proposed Diameter Limit Units
Proposed Clearcuts or Patchcuts
Powerline
Proposed Roads
Study Area Boundary
Fish Streams
E Alt 1 Proposed LTF
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

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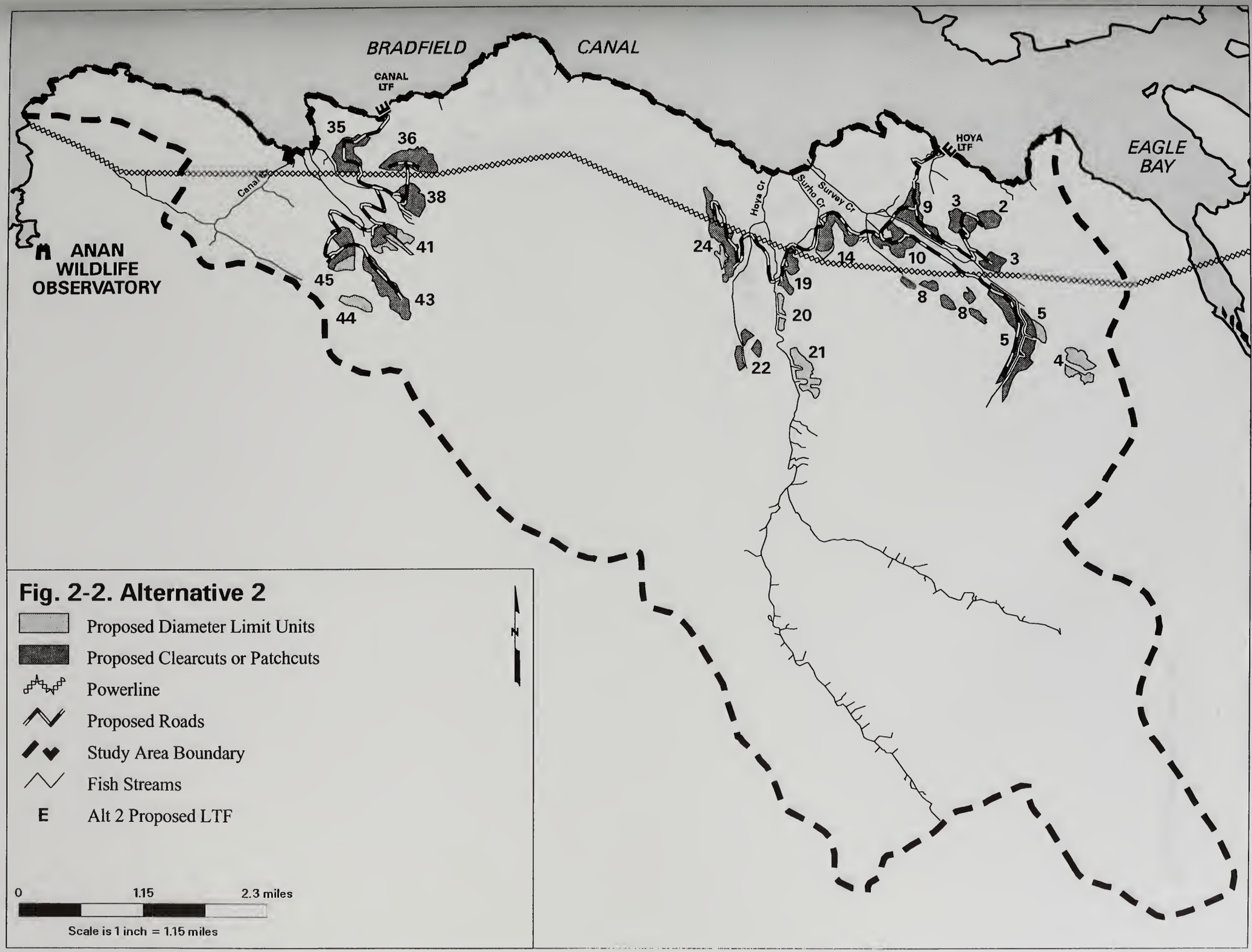
BRADFIELD CANAL
CANAL LTF
HOYA LTF
EAGLE BAY
ANAN WILDLIFE OBSERVATORY
Canal Cr
Hoya Cr
Surho Cr
Survey Cr
35
36
38
41
43
44
45
24
19
20
21
22
14
9
3
2
10
3
8
8
5
5
4
Fig. 2-2. Alternative 2
Proposed Diameter Limit Units
Proposed Clearcuts or Patchcuts
Powerline
Proposed Roads
Study Area Boundary
Fish Streams
E Alt 2 Proposed LTF
N
0 1.15 2.3 miles
Scale is 1 inch = 1.15 miles

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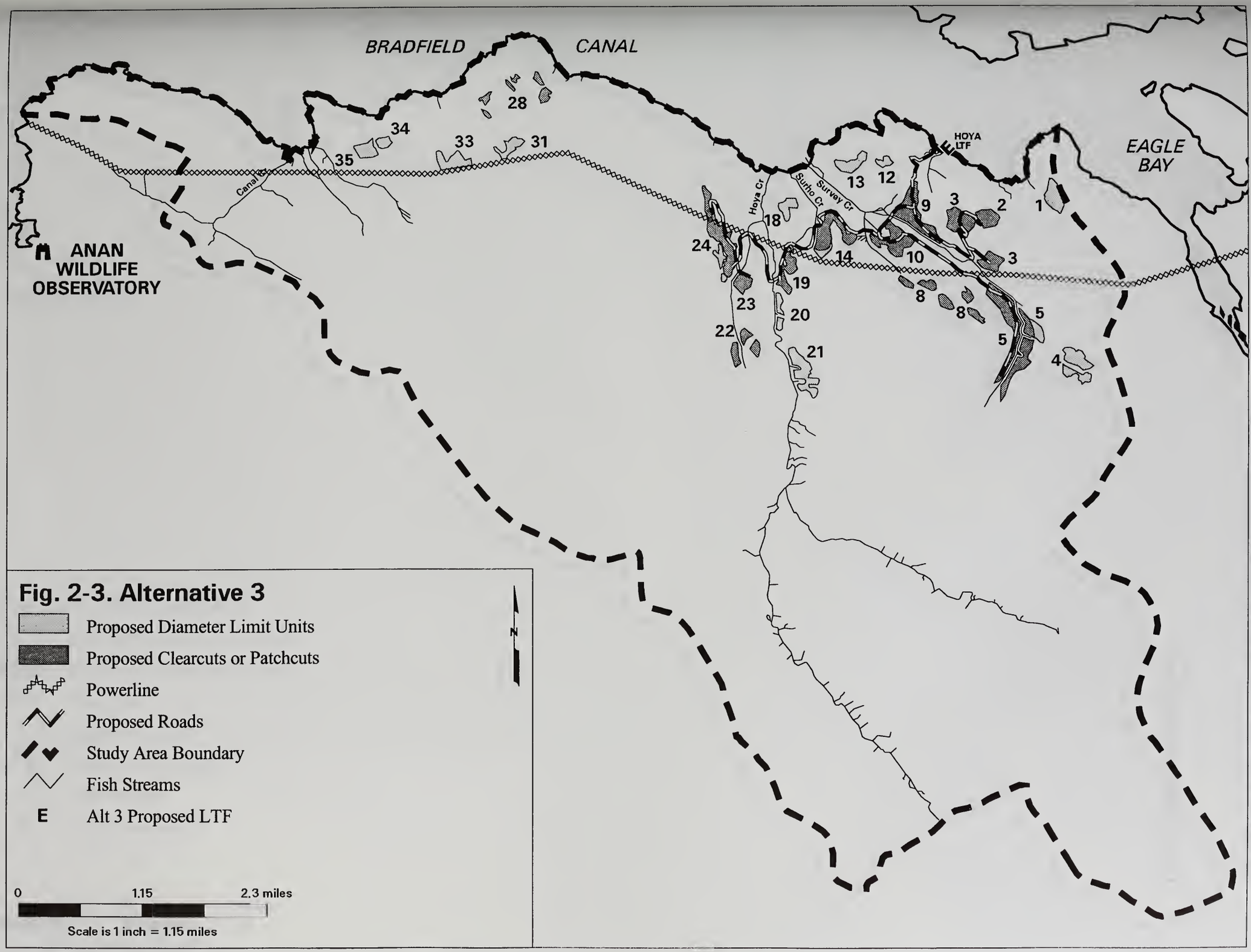
BRADFIELD CANAL
EAGLE BAY
HOYA LTF
ANAN WILDLIFE OBSERVATORY
Canal
Hoya Cr
Sutho Cr
Survey Cr
28
34
33
31
35
13
12
9
3
2
1
18
24
14
10
3
19
8
8
5
23
20
5
22
21
4
Fig. 2-3. Alternative 3
Proposed Diameter Limit Units
Proposed Clearcuts or Patchcuts
Powerline
Proposed Roads
Study Area Boundary
Fish Streams
E Alt 3 Proposed LTF
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

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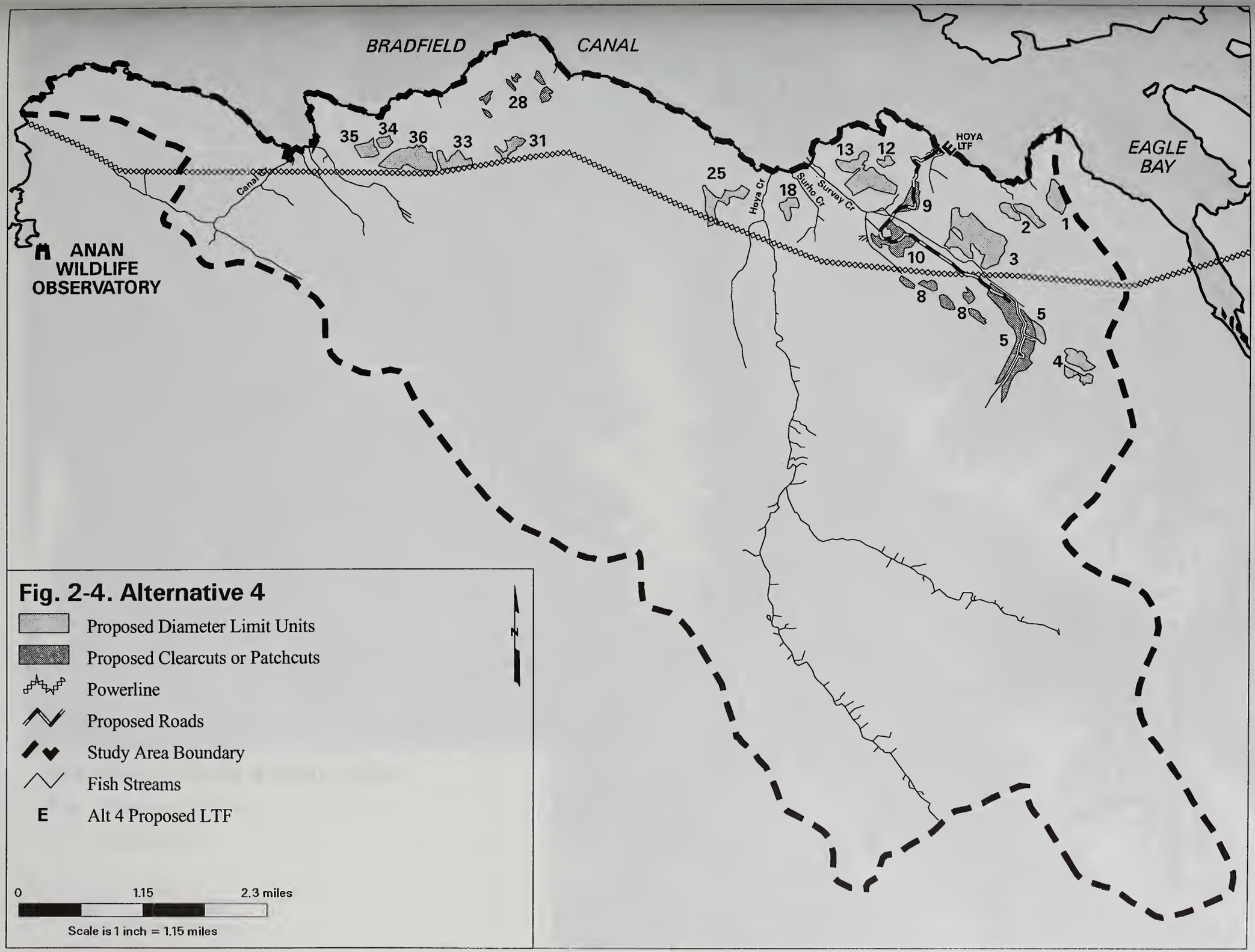
BRADFIELD CANAL
EAGLE BAY
ANAN WILDLIFE OBSERVATORY
HOYA LTF
Canal Cr
Hoya Cr
Surho Cr
Survey Cr
28
35
34
36
33
31
25
18
13
12
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5
4
3
2
1
Fig. 2-4. Alternative 4
Proposed Diameter Limit Units
Proposed Clearcuts or Patchcuts
Powerline
Proposed Roads
Study Area Boundary
Fish Streams
E Alt 4 Proposed LTF
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

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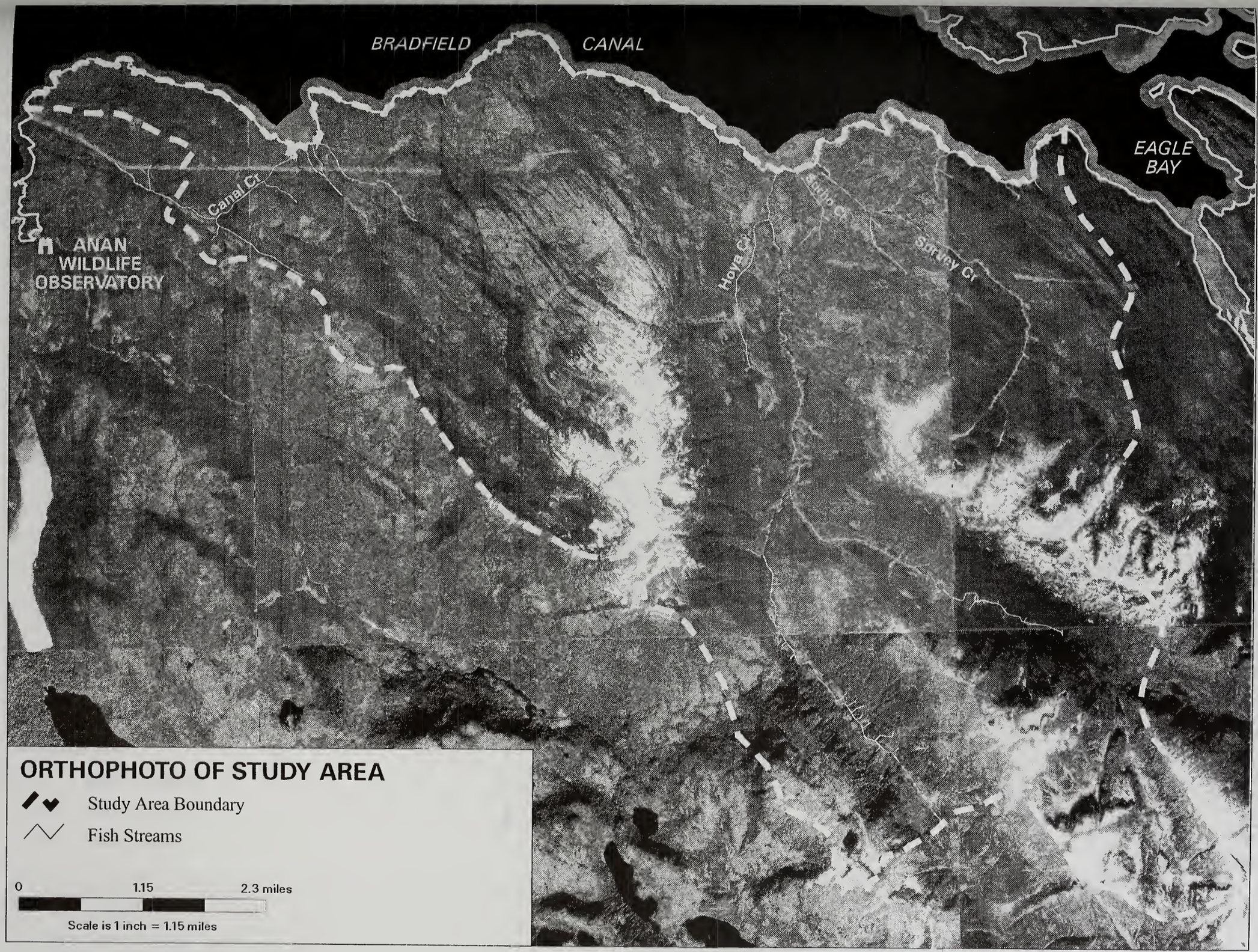

ORTHOPHOTO OF STUDY AREA

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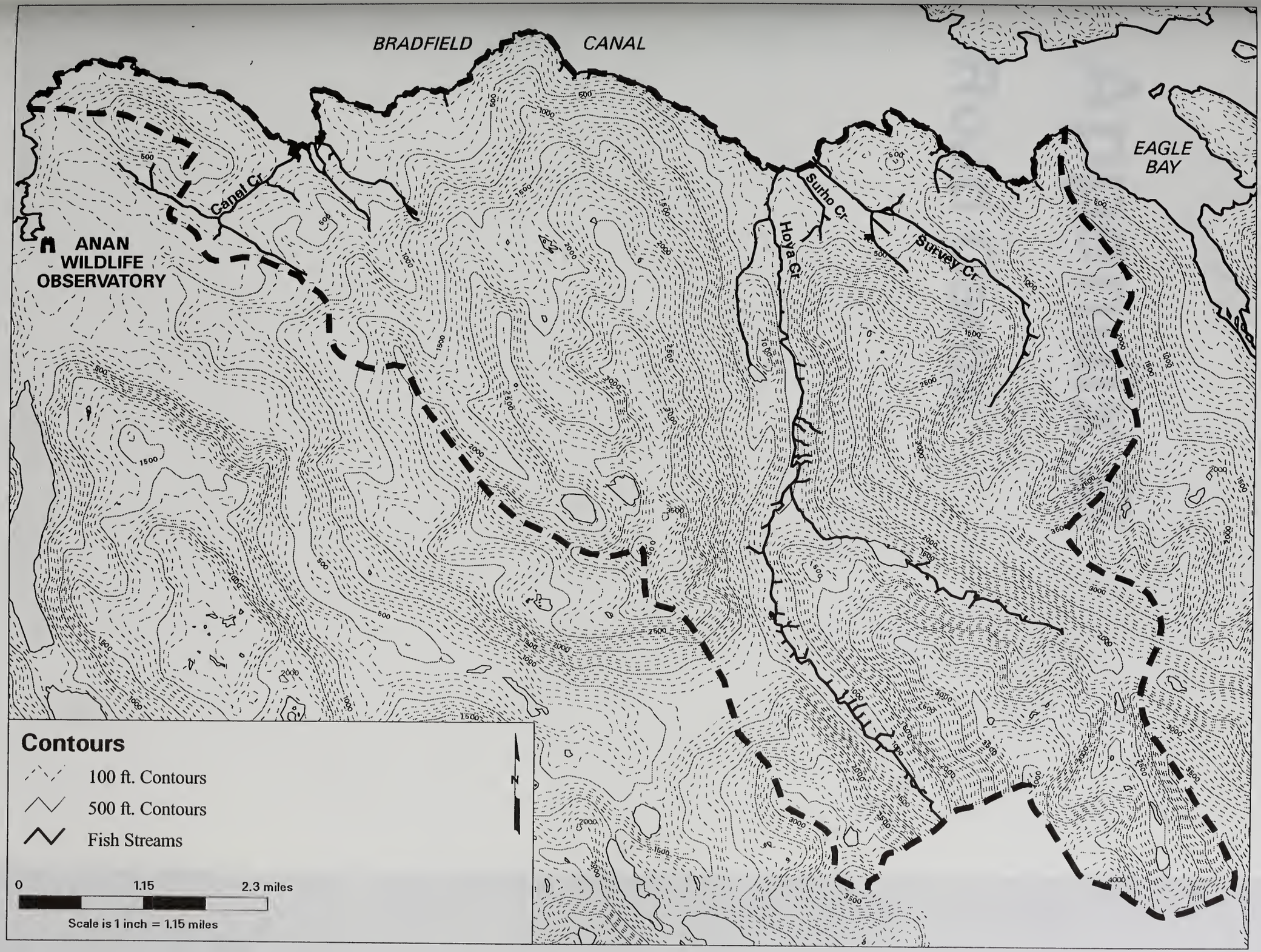
BRADFIELD CANAL
EAGLE BAY
Canal Cr.
Surho Cr.
Hoya Cr.
Survey Cr.
ANAN WILDLIFE OBSERVATORY
Contours
100 ft. Contours
500 ft. Contours
Fish Streams
N
0
1.15
2.3 miles
Scale is 1 inch = 1.15 miles

Appendix B

Road Cards

Appendix B

Road Cards

Appendix B

Road Cards

The following is a summary of interdisciplinary team (IDT) field location and analysis of the proposed road segments in each of the action alternatives discussed in the EIS. These descriptions would be used during the layout and harvest of units, and the survey and construction of the roads in the selected alternative.

Each road description tells where construction activities would need to be restricted to prevent damage to fisheries. Timing restrictions apply to in-stream work where water quality standards would not be compromised. "Timing windows" to allow in-stream construction of crossings on anadromous fish streams would be June 1 to August 1.

Closures would apply to in-stream construction activities on Survey Creek, which is the only Class I stream that would have road crossings. Deviation from the timing window would require consultation with ADFG.

Specified roads would be designed with oversized culverts, outfall riprap, armored dips adjacent to culverts, substantial ditch blocks, drivable waterbars, or other protective measure necessary to prevent culvert failure or erosion of the road surfaces and ditchlines. These measures would ensure the integrity of the specified roads in the project area during periods of inactivity.

We would close the roads to motorized vehicles (except for administrative use) after the sale is completed under all action alternatives. Two gates would be installed near the beginning of each road and an administrative closure order would be written. During harvest, the gates would be open, but only administrative use would be allowed. Following completion of the sale, only necessary administrative use, such as regeneration surveys, thinning and future harvests, would be allowed. Non-motorized travel would not be restricted.

Temporary roads would be obliterated after use by removing all drainage structures to restore natural drainage patterns, adding waterbars as needed to control runoff, and establishing vegetative cover by seeding or other methods. Red alder (Alnus rubra), an invasive species that naturally colonizes disturbed areas, and Sitka spruce are species that would be used.

In compliance with the Clean Water Act Section 404(b)(1) Guidelines (40 CFR Part 230), we would follow Best Management Practices listed on Page D-14, and we located roads around wetlands where practical. Due to grades, horizontal alignment and increased length of roads some wetlands had to be crossed. BMP 12.5 applies to road construction on wetlands. Where terrain allows, overlay construction will be used, excavation will be avoided, and extra cross drains will be installed to avoid altering subsurface flow regimes.

ROAD DESCRIPTION

PROJECT NAME: Canal Hoya VCU: 5210

ROAD NUMBER: 6950

FUNCTIONAL CLASS: Local **ENTRY CYCLE:** Intermittent

LENGTH: 3.1 mi. **TRAFFIC SERVICE LEVEL:** D **DESIGN SPEED:** **10 mph**

DESIGN VEHICLE: Logtruck **CRITICAL VEHICLE:** Lowboy

MAINTENANCE LEVELS: (ACTIVE SALE) 3 **POST SALE:** 1 **HIGHWAY SAFETY ACT:** No

INTENDED PURPOSE: To provide access for cable and helicopter logging in the Canal VCU.

TRAFFIC MANAGEMENT STRATEGY: Maintain for administrative use. Two gates will be installed near the LTF to prevent non-administrative use.

ROAD LOCATION: The road begins at the Canal LTF site. This road is typical overlay construction although some endhaul may be required in short stretches due to nearness of creeks depending on the road design.

WETLANDS: Where practical the road went around wetlands but due to grades, horizontal alignment and increased length of roads some wetlands had to be crossed. BMP 12.5 applies to wetland road construction. Where terrain allows, overlay construction will be used, excavation will be avoided, and extra cross drains will be installed to avoid altering subsurface flow regimes.

EROSION CONTROL: An erosion control plan for road construction and maintenance will be developed according to standard project specifications (BMP 14.5). Specific design measures will address erosion control in the vicinity of streams on the approach to the LTF and stream crossings. All areas of organic or mineral soil exposed during construction shall be grass seeded (with native species if possible) and fertilized (BMP 12.17, 14.8 E1).

ROCK PITS: During periods of high rainfall (as defined in current regional specifications) blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement. No quarries have been located near streams. Rock pits will require site specific erosion control plans (BMP 14.18).

FUTURE NEEDS: Will be intermittently used for general forest administration.

STREAM CROSSINGS: See road description photo for corresponding points on Road 6950. There are three Class II stream crossings: Cowboy Creek A, Cowboy Creek B, and Bear Creek A (also known as Hydro Site "CH6").

Cowboy Creek A: Stream Channel Type MM1, bankfull width 2.5 meters, incision depth 1 meter, gravel substrate, gradient 4%. Crossing site is at channel meander and may affect both riffle and pool habitat. Adjust alignment to maintain perpendicular crossing and avoid channel straightening. Maintain resident fish passage through drainage structure. There is about one mile (all tributaries considered) of resident fish habitat upstream of this site.

Cowboy Creek B: Stream Channel Type MM1, bankfull width 2 meters, incision depth 1 meter, gravel substrate, gradient 4%. Crossing site is in pool habitat. Maintain resident fish passage through drainage structure. There is about 0.75 miles (all tributaries considered) of resident fish habitat upstream of this site.

Bear Creek A (Hydro Site CH6): Stream Channel Type HC3, bankfull width 10 meters, incision depth 10 meters, boulder and cobble substrate, gradient 10%. Large pool just upstream of crossing site contains fish. Stream has large bedload and debris transport. A 65 foot bridge is planned.

ROAD NUMBER 6950

- Proposed Road Segment
- Adjacent Proposed Road Segments
- Class 1 Streams
- Class 2 Streams
- Class 3 Streams
- ★ Eagle Nest Tree
- E Proposed Log Transfer Facility
- ♦ Proposed Major Stream Crossing
- Proposed cut units
- TTRA Buffers
- Saltwater and Lakes

Last Updated: April 06, 1998

0 1320 2640 feet

Scale is 1 inch = 0.25 miles

ROAD DESCRIPTION

PROJECT NAME: Canal Hoya VCU: 5210

ROAD NUMBER: 6952

FUNCTIONAL CLASS: Local **ENTRY CYCLE:** Intermittent

LENGTH: 1 mi. **TRAFFIC SERVICE LEVEL:** D **DESIGN SPEED:** **10 mph**

DESIGN VEHICLE: Log Truck **CRITICAL VEHICLE:** Lowboy

MAINTENANCE LEVELS: (ACTIVE SALE) 3 **POST SALE:** 1 **HIGHWAY SAFETY ACT:** No

INTENDED PURPOSE: To provide access for cable and helicopter logging in Units 43, 44, and 45.

TRAFFIC MANAGEMENT STRATEGY: Maintain for administrative use.

ROAD LOCATION: The road begins at the end of Road 6950 in Unit 45. This road is typical overlay construction.

WETLANDS: Where practical the road went around wetlands but due to grades, horizontal alignment and increased length of roads some wetlands had to be crossed. BMP 12.5 applies to road construction on wetlands. Where terrain allows, overlay construction will be used, excavation will be avoided, and extra cross drains will be installed to avoid altering subsurface flow regimes.

EROSION CONTROL: An erosion control plan for road construction and maintenance will be developed according to standard project specifications (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded (with native species if possible) and fertilized (BMP 12.17, 14.8 E1).

ROCK PITS: During periods of high rainfall (as defined in current regional specifications) blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement. No quarries have been located near streams. Rock pits will require site specific erosion control plans (BMP 14.18).

FUTURE NEEDS: Will be intermittently used for general forest administration.

STREAM CROSSINGS: There are no major stream crossings.

ROAD NUMBER 6952

- Proposed Road Segment
- Adjacent Proposed Road Segments
- Class 1 Streams
- Class 2 Streams
- Class 3 Streams
- ★ Eagle Nest Tree
- E Proposed Log Transfer Facility
- ♦ Proposed Major Stream Crossing
- Proposed cut units
- TTRA Buffers
- Saltwater and Lakes

Last Updated: April 06, 1998

0 1320 2640 feet

Scale is 1 inch = 0.25 miles

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ROAD DESCRIPTION

PROJECT NAME: Canal Hoya VCU: 5200

ROAD NUMBER: 6960

FUNCTIONAL CLASS: Local **ENTRY CYCLE:** Intermittent

LENGTH: 3.30 mi. **TRAFFIC SERVICE LEVEL:** D **DESIGN SPEED:** 10 m.p.h.

DESIGN VEHICLE: Log Truck **CRITICAL VEHICLE:** Lowboy

MAINTENANCE LEVELS: (ACTIVE SALE) 3 **POST SALE:** 1 **HIGHWAY SAFETY ACT:** No

INTENDED PURPOSE: To provide access for cable and helicopter logging in Hoya VCU.

TRAFFIC MANAGEMENT STRATEGY: Maintain for administrative use. Two gates will be installed near the LTF to prevent non-administrative use.

ROAD LOCATION: The road begins at either Capsize Cove LTF (Road 69601) or Hoya LTF (Road 69602). Both Roads 69601 and 69602 will require design to control runoff adjacent to streams. This road is mostly typical overlay construction. There will be areas of full benching and some of these will require endhaul. Alignment near West Fork Survey Creek may require adjustment to accommodate crossing of overflow channels and small Class II streams. Alignment near Surho Creek tributaries will require endhaul.

WETLANDS: Where practical the road went around wetlands but due to grades, horizontal alignment and increased length of roads some wetlands had to be crossed. BMP 12.5 applies to road construction on wetlands. Where terrain allows, overlay construction will be used, excavation will be avoided, and extra cross drains will be installed to avoid altering subsurface flow regimes.

EROSION CONTROL: An erosion control plan for road construction and maintenance will be developed according to standard projects specifications (BMP 14.5). Specific design measures will address erosion control in the vicinity of streams on the approach to the LTF and stream crossings. All areas of organic or mineral soil exposed during construction shall be grass seeded (with native species if possible) and fertilized (BMP 12.17, 14.8 E1).

ROCK PITS: During periods of high rainfall (as defined in current regional specifications) blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement. One quarry has been located near Class II Surho Creek tributary. Rock pits will require site specific erosion control plans (BMP 14.18).

FUTURE NEEDS: Will be intermittently used for general forest administration.

TIMING RESTRICTIONS: Instream construction activities on the East Fork and West Fork of Survey Creek will be restricted to the period between June 1 and August 1 based on the likelihood of pink salmon, chum salmon, or coho salmon eggs in gravel immediately downstream of these proposed road crossings during the rest of the year (BMP 14.6).

STREAM CROSSINGS: See road description photo for corresponding points on Road 6960. There are five major fish stream crossings: East Fork Survey Creek (Hydro Site H2), West Fork Survey Creek (Hydro Site H3), Mainstem Hoya Creek (Hydro Site H4), West Fork Hoya Creek A (Hydro Site H6) and West Fork Hoya Creek B (temporary road). Also four Class II stream crossings tributary to the West Fork Survey Creek and two possible Class II crossings tributary to Surho Creek.

East Fork Survey Creek: Stream Channel Type MC2 (transition to FP3). Bankfull width 15 meters, incision depth 1 meter, cobble and gravel substrate, gradient 3%. Crossing is at riffle habitat just upstream of transition into floodplain stream with side channels. Anadromous fish observed at crossing site. Bridge (60 feet plus) is planned.

West Fork Survey Creek: Stream Channel Type is HC2 (transition to MM1). Main channel bankfull width 7 meters, incision depth 1 meter, boulder and cobble substrate, gradient 10%. A 3-5 meter wide (recently active) overflow channel initiates upstream of the crossing site and flows west of main channel. Crossing is at steep riffle habitat just upstream of transition into lower gradient anadromous fish habitat. Cutthroat trout observed at crossing site. Maintain resident fish passage (0.5 miles habitat upstream of crossing site). Concern for large bedload and debris transport at this site. Structure design must account for overflow channel as well as main channel. Road crosses four tributaries immediately west of main channel crossing. All are Channel Type MM1, bankfull width 1 meter, incision depth <1 meter, cobble substrate, gradient 2-6%. All contain cutthroat trout, though upstream habitat ends within 100-200 feet of each crossing site.

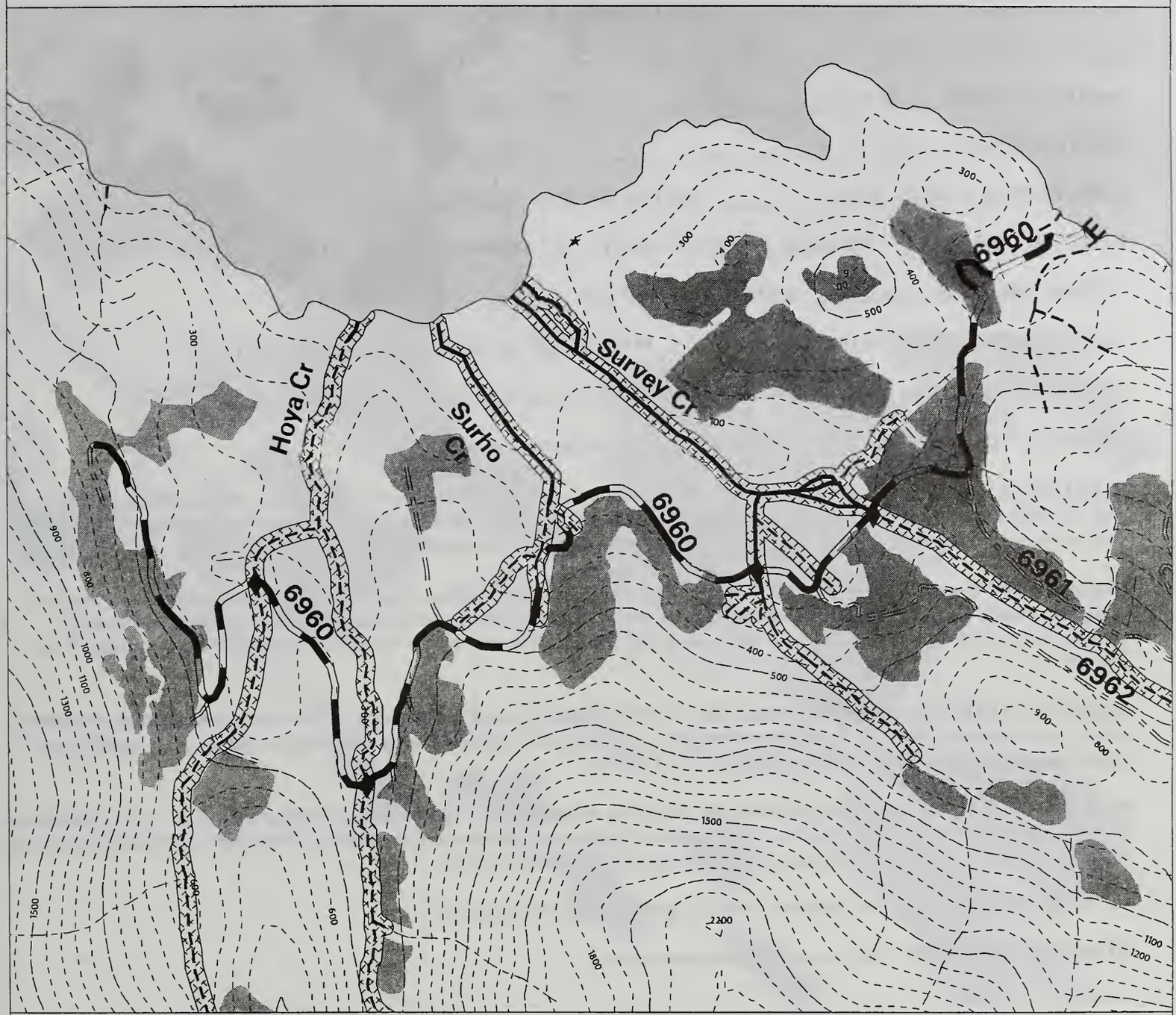
Two Class II crossings tributary to Surho Creek: East tributary stream Channel Type is MM1. Bankfull width is <1 meter, incision depth <1 meter, gravel substrate, gradient 3%. Resident fish observed downstream of crossing, habitat ends about 100 feet upstream of crossing. West tributary stream Channel Type is HC5. Bankfull width is <1 meter, incision depth 3 meters, cobble and boulder substrate, gradient 15%. Resident fish observed downstream of crossing, habitat ends about 100 feet upstream of crossing.

Mainstem Hoya Creek: Stream Channel Type is MC2. Bankfull width is 12 meters, incision depth 5 meters, cobble and boulder substrate, gradient 8%. Resident fish observed upstream of crossing. Crossing is in between impassable bedrock falls. Concern for large debris and bedload transport at this site.

East Fork Hoya Creek A: Stream Channel Type is MM1. Bankfull width is 7 meters, incision depth 1 meter, cobble and gravel substrate, gradient 3%. Resident fish observed at crossing. Maintain fish passage (over one mile of habitat upstream).

East Fork Hoya Creek B: Stream Channel Type is MM1. Crossing similar to downstream crossing. This is a temporary road accessing Unit 23 (Alternative 1 only) This site is a temporary crossing suitable for log stringer bridge which would be removed upon completion of logging activities. Maintain fish passage (0.7 miles habitat upstream).

ROAD NUMBER 6960



- Proposed Road Segment
- Adjacent Proposed Road Segments
- Class 1 Streams
- Class 2 Streams
- Class 3 Streams
- ★ Eagle Nest Tree
- E Proposed Log Transfer Facility
- ♦ Proposed Major Stream Crossing
- Proposed cut units
- TTRA Buffers
- Saltwater and Lakes

Last Updated: April 06, 1998

0 1760 3520 feet

Scale is 1 inch = 0.33 miles

ROAD DESCRIPTION

PROJECT NAME: Canal Hoya VCU: 5200

ROAD NUMBER: 6961

FUNCTIONAL CLASS: Local **ENTRY CYCLE:** Intermittent

LENGTH: 0.9 mi. **TRAFFIC SERVICE LEVEL:** D **DESIGN SPEED:** 10 mph

DESIGN VEHICLE: Log Truck **CRITICAL VEHICLE:** Lowboy

MAINTENANCE LEVELS: (ACTIVE SALE) 3 **POST SALE:** 1 **HIGHWAY SAFETY ACT:** No

INTENDED PURPOSE: To provide access for cable and helicopter logging in Units 2, 3, and 9.

TRAFFIC MANAGEMENT STRATEGY: Maintain for administrative use.

ROAD LOCATION: The road begins at road 6960 at mile post 0.68 in Unit 9. This road is typical overlay construction to mile post 0.8. After mile post 0.8 (in the vicinity of the switchback near Unit 3) there are several sections that will require full bench rock cut. Due to the length of steep side slopes or proximity of steams some endhaul will be required.

WETLANDS: Where practical the road went around wetlands but due to grades, horizontal alignment and increased length of roads some wetlands had to be crossed. BMP 12.5 applies to road construction on wetlands. Where terrain allows, overlay construction will be used, excavation will be avoided, and extra cross drains will be installed to avoid altering subsurface flow regimes.

EROSION CONTROL: An erosion control plan for road construction and maintenance will be developed according to standard project specifications (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded (with native species if possible) and fertilized (BMP 12.17, 14.8 E1).

ROCK PITS: During periods of high rainfall (as defined in current regional specifications) blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement. No quarries have been located near streams. Rock pits will require site specific erosion control plans (BMP 14.18).

FUTURE NEEDS: Will be intermittently used for general forest administration.

STREAM CROSSINGS: There are no major stream crossings:

ROAD NUMBER 6961

- Proposed Road Segment
- Adjacent Proposed Road Segments
- Class 1 Streams
- Class 2 Streams
- Class 3 Streams
- ★ Eagle Nest Tree
- E Proposed Log Transfer Facility
- ♦ Proposed Major Stream Crossing
- Proposed cut units
- TTRA Buffers
- Saltwater and Lakes

Last Updated: April 06, 1998

0 1320 2640 feet

Scale is 1 inch = 0.25 miles

ROAD DESCRIPTION

PROJECT NAME: Canal Hoya VCU: 5200

ROAD NUMBER: 6962

FUNCTIONAL CLASS: Local **ENTRY CYCLE:** Intermittent

LENGTH: 1.9 mi. **TRAFFIC SERVICE LEVEL:** D **DESIGN SPEED:** **10 mph**

DESIGN VEHICLE: Log Truck **CRITICAL VEHICLE:** Lowboy

MAINTENANCE LEVELS: (ACTIVE SALE) 3 **POST SALE:** 1 **HIGHWAY SAFETY ACT:** No

INTENDED PURPOSE: To provide access for cable and helicopter logging in Units 4, 5, 8, and 10.

TRAFFIC MANAGEMENT STRATEGY: Maintain for administrative use.

ROAD LOCATION: The road begins at road 6960 at mile post 1.05. The first 0.6 mile of this road is a series of full bench rock cuts followed by a filling through a notch then staying on top of a ridge beyond M.P. 0.6 the road is typical overlay construction. All road beyond this point will be temporary.

WETLANDS: Where practical the road went around wetlands but due to grades, horizontal alignment and increased length of roads some wetlands had to be crossed. BMP 12.5 applies to road construction on wetlands. Where terrain allows, overlay construction will be used, excavation will be avoided, and extra cross drains will be installed to avoid altering subsurface flow regimes.

EROSION CONTROL: An erosion control plan for road construction and maintenance will be developed according to standard project specifications (BMP 14.5). All areas of organic or mineral soil exposed during construction shall be grass seeded (with native species if possible) and fertilized (BMP 12.17, 14.8 E1)

ROCK PITS: During periods of high rainfall (as defined in current regional specifications) blasting operations will be suspended at quarries near potentially unstable sites where ground vibration may induce mass movement. No quarries have been located near streams. Rock pits will require site specific erosion control plans (BMP 14.18).

FUTURE NEEDS: Will be intermittently used for general forest administration

STREAM CROSSINGS: There are no major stream crossings:

ROAD NUMBER 6962

- Proposed Road Segment
- Adjacent Proposed Road Segments
- Class 1 Streams
- Class 2 Streams
- Class 3 Streams
- ★ Eagle Nest Tree
- E Proposed Log Transfer Facility
- ♦ Proposed Major Stream Crossing
- Proposed cut units
- TTRA Buffers
- Saltwater and Lakes

Last Updated: April 06, 1998

0 1320 2640 feet

Scale is 1 inch = 0.25 miles

Section 404 of the Clean Water Act Exemptions
Best Management Practices for Forest Road Construction
33 CFR 323.4 (a) (6)

33 CFR 323.4 (a) (6) identifies Best Management Practices (BMPs) which must be met in order to claim an exemption from Section 404 permitting requirements for forest roads which are constructed for the sole purpose of silvicultural activities. These are in addition to, although in many cases are similar to, BMPs developed by the Forest Service and the State of Alaska, which are discussed throughout this EIS.

Permanent roads, temporary access roads, and skid trails in waters of the US shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming, silvicultural, or mining operations, and local topographic and climatic conditions;

ii. All roads, temporary or permanent, shall be located sufficiently far from streams or other water bodies (except for portions of such road which must cross water bodies) to minimize discharges of dredged or fill material into waters of the U.S.;

iii. Road fill shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows;

iv. Road fill shall be properly stabilized and maintained during and following construction to prevent erosion;

v. Road fill shall be made in a manner that minimizes encroachment of heavy equipment within waters of the U.S., (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself;

vi. Vegetative disturbance in waters of the U.S. shall be kept to a minimum;

vii. Road crossings shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body;

viii. Borrow material shall be taken from upland sources whenever feasible;

ix. The discharge shall not take, or jeopardize the continued existence of a threatened or endangered species as defined under the Endangered Species Act, or adversely modify or destroy the critical habitat of such species;

x. Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practical alternatives exist;

xi. The road fill shall not be located in the proximity of a public water supply intake;

xii. The discharge shall not occur in areas of concentrated shellfish production;

xiii. The discharge shall not occur in a component of the National Wild and Scenic River System;

xiv. The road fill shall consist of suitable material free from toxic materials in toxic amounts;

xv. All temporary fills shall be removed in their entirety and the area restored to its original elevation.

Appendix C

Monitoring and Improvement Projects

Appendix C

Monitoring and Improvement Projects

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Monitoring and Improvement Projects

Monitoring Plan

Log Transfer Facility

Objective: Determine permit compliance according to permit requirements.
Method: SCUBA divers run transects and record depth and areal extent of bark accumulation once before and annually during logging activities.
Action: Notify EPA if bark deposition encompasses 100% coverage of an area one acre or larger in which the depth of bark exceeds ten centimeters at any point in that area. EPA may require removal of bark.
Cost: $1000

Best Management Practice Implementation

Objective: Evaluate application of BMPs for water quality and fish habitat protection.
Method: Follow Alaska Region BMP implementation monitoring protocols. Randomly select completed roads and units.
Action: If protection is inadequate, apply corrective measures. If protection measures are inadequate or unsuitable, modify future recommendations.
Cost: $1000

Best Management Practice Effectiveness

Objective: Address priorities indicated in Tongass National Forest effectiveness monitoring strategy. Monitoring sites may or may not be selected within the Canal Hoya Project Area.
Action: If protection is inadequate, modify BMP.
Cost: Variable

C - Monitoring and Improvement Projects

Predicted Timber Volume

Objective: Determine if harvest prescriptions achieved predicted timber volume.
Method: Prior to harvest, compare cruise volumes of various units with anticipated volumes based on prescription assumptions. During harvest, work with timber purchaser to obtain volume information if lump sum sale. If scaled sale, check harvest records as units are logged. District monitoring team would be responsible for implementing.
Action: Refine estimates for future sales.
Cost: $2000

Regeneration

Objective: To determine if there is adequate natural stocking within each unit four years after harvest.
Method: Field exams of each unit.
Action: If adequate stocking is not present in any harvest unit, it will be planted to bring stocking up to at least 300 trees per acre.
Cost: $15,000 - $35,000 depending on the alternative selected.

Prescription Accomplishment

Objective: To determine if timber sale prescriptions met the resource objectives after harvest. Did the leave trees release? How are leave trees affecting the growth and health of regeneration? Were adequate bear den trees left in the units? Are the reserves in harvested units being used by wildlife?
Method: IDT members will do a field review of selected units and discuss the results.
Action: Use the results to refine future prescriptions.
Cost: $5000

Blowdown

Objective: To determine if there is any blowdown in reserve clumps, partial harvest units, and unit edges.
Method: Aerial flights and ground reconnaissance.
Action: Use the results to refine future prescriptions.
Cost: $1000

Scenic Resources

Objective: Determine if harvest prescriptions were implemented and effective in meeting the visual quality objectives. Determine how close resulting harvest is to the desired condition.
Method: Before and after photos will be evaluated and site inspections will be made two years following harvest.
Action: Produce a chart showing the number of acres treated, the prescription and the result.
Cost: $2000

Marine Slash

Objective: To determine if the amount of slash escaping from the processing barge poses a hazard to navigation or creates problems for sport and commercial fishing.
Method: Have the timber sale administrators and operators watch for floating slash and require the operator to retrieve it. Request comments from fishermen and boat operators in the area. Use an underwater camera to determine the amount of debris on the ocean floor.
Action: The contract will require slash containment and pick-up by the operator.
Cost: $2000

C - Monitoring and Improvement Projects

Wildlife Harvest

Objective: Determine if changes in harvest of big game and furbearers are consistent with predictions in the EIS and subsistence report. Harvest rates are important in assessing whether the supply of game is adequate to meet demand by subsistence hunters and trappers (marten), to ensure viability of certain species (wolves), and to assess effects on bears that may also use the Anan Wildlife Viewing Area.
Method: Annually review ADFG harvest data to determine subsistence versus non-subsistence harvest and changes in the rate of harvest over time. If a marked increase or decrease in harvest is observed, consult with ADFG to determine the cause.
Action: If non-subsistence harvest or increasing total harvest trends indicate that future populations may be insufficient to meet subsistence demand, assess hunting regulations and travel management (road access) to determine needed changes. This monitoring is also an essential part of the adaptive management strategy for road construction alternatives in future entries.
Cost: $350 per year

Road Closure Effectiveness

Objective: To determine if gates are effective in eliminating motorized vehicle traffic and to determine the extent of administrative use and foot travel occurring on the roads during various seasons. This will give us an idea of the amount of disturbance and hunting that is occurring in the Project Area.
Method: Traffic counters (pressure activated and/or motion detection), track plates or cameras will be used.
Action: If unauthorized vehicle use occurs, additional barriers will be installed. If administrative use is heavy, restrictions on the season of use will be implemented. If foot traffic during hunting seasons is heavy, road construction alternatives in future entries should be adjusted accordingly. Gates that are damaged or not functioning will be replaced or improved.
Cost: $2000 per year

Road Maintenance

Objective: To inspect roads for maintenance needs.
Method: A maintenance crew will inspect the road system annually to ensure that the road is not causing resource damage.
Action: The crew will perform hand work such as culvert cleaning and seeding as necessary. If other maintenance needs are identified (requiring heavy equipment), maintenance projects will be planned as necessary.
Cost: $1000 per year

Raptor Nests

Objective: To determine if protection measures are adequate to promote continued use of raptor nests.
Method: The sharp-shinned hawk nest found in the Hoya drainage will be visited annually for not less than two years following harvest to determine if the nest remains active.
Action: If the nest is inactive for two years, protection measures may be removed; however, the size of the buffer for nests located in the future may need to be increased to promote continued use of the nest.
Cost: $300 annually

Anan Bears

Objective: To assess changes in the Anan bear population.
Method: Compare information on bear numbers, sex and age composition that is annually gathered at the Anan Wildlife Viewing Area with bear harvest data for the Canal Hoya area.
Action: If significant increases in bear harvest levels correspond with changes in the population or age/sex composition of the bears at Anan, assess hunting regulations and travel management for the Canal Hoya area with ADFG. Modify the design and location of future timber sales if appropriate.
Cost: $2000 annually (as part of the Anan monitoring program)

Sale Area Improvement

Tree planting - Units that are not adequately stocked within 5 years after harvest will be planted to increase stocking. Units may also be planted to increase the species diversity of Sitka spruce. This project complies with Forest Service K-V Handbook direction (FSH 2409.19) and may be listed in the Canal Hoya Sale Area Improvement Plan.

Appendix D

LTF Site Selection, Design, and Marine Effects

Appendix B

LTF Site Selection, Designation, and Monitoring Efforts

Appendix D

LTF Site Selection, Design, and Marine Effects

Log Transfer Facility

Log transfer facilities (LTFs) are necessary to transfer logs from a ground-based transport system of roads and trucks to a water-based transport system of rafts, barges, and tugboats. The following guidelines are taken from Appendix G of the Forest Plan (USDA, 1997a). They were developed by the Alaska Timber Task Force Log Transfer Facility Guidelines Technical Subcommittee in 1985. The guidelines identify physical characteristics necessary for safe and efficient log transport as well as minimum requirements for mitigation of water quality and aquatic habitat effects. We consider all of the guidelines and develop LTFs which represent the best mix: allowing activities to proceed while meeting all applicable statutory and regulatory requirements. The LTFs undergo a complex and rigorous permitting process involving multiple federal and state agencies. The information contained in this appendix is intended to facilitate the permitting process and provide an opportunity for the EIS reader to comment on Canal Hoya LTF location, construction, operation, and monitoring.

Early in the planning process, we identified four potential LTF sites for the Canal Hoya Project Area. In 1997, a fifth site was identified to respond to project scoping concerns associated with Capsize Cove. Sites 2, 4 and 5, which have the most potential for development, are shown on Figure D-1 and have been named as follows:

Site 1 - Canal Bay
Site 2 - Canal
Site 3 - Hoya Bay
Site 4 - Capsize Cove
Site 5 - Hoya

Surveys were initially conducted in 1984. US Fish and Wildlife Service personnel conducted SCUBA surveys at Canal Bay, Canal, and Capsize Cove in 1996, and at Hoya in 1997 (USFWS unpublished LTF field investigation reports, 1996 and 1997). Canal Bay was dropped in accordance with their recommendations. It does not meet siting guidelines related to site productivity (S6) and sensitive habitats (S7). Responses to project scoping also expressed strong opposition to this site from commercial fishermen and guides. Hoya Bay was dropped for similar reasons. It is near Hoya Creek and would have required an access road crossing Hoya Creek near the estuary.

Two sites remain proposed for this project: the Canal site for the Canal VCU road system, and the Hoya site for the Hoya VCU road system. The Hoya Log Transfer Facility site was selected and the Capsize Cove LTF site was dropped in all alternatives. The Hoya LTF site poses more risk to adjacent resident fish habitat than the Capsize Cove LTF, but the risk can be mitigated through design and erosion control measures. The Hoya LTF site is preferred because it has less impact on visuals, wildlife habitat, and anchorage; and there is less road construction needed. Site specific information pertaining to the guidelines for the two proposed LTFs follows.

Siting Guidelines

S1. Proximity to Rearing and Spawning Areas: Avoid sites within 300 feet of the mouth of anadromous fish streams, or in areas known to be important for fish spawning or rearing.

None of the sites is near important spawning or rearing areas. Canal is about 3200 feet shoreline distance west of the nearest anadromous fish stream (Flying V Creek). Hoya is about 3300 feet shoreline distance west of the nearest anadromous fish stream (Hardrock Creek). Hoya is the only site in close proximity to resident fish streams.

The Hoya site is bounded on both sides by small streams (less than 2 m width) containing cutthroat trout. Both streams were surveyed by electroshocker in 1994 and 1997. The west stream has a steep mouth at salt water which creates a natural barrier to fish migration at all tides. The east stream mouth is less steep and may be accessible by salmon at high tide, but no salmon have been observed there. Erosion control and sediment detention will be prominent design features of the LTF and access road at Hoya to ensure the protection and maintenance of fish habitat in these streams. The proposed access road to the Hoya site is situated on a ridge between the two streams, therefore providing opportunity for a crowned road bed with frequent drainage to vegetated filtering areas between the road and the streams.

S2. Protected Locations: Choose sites in weather-protected waters with bottoms suitable for anchoring and with at least 20 acres for temporary log storage and log booming.

Protection from wind and high seas is limited throughout the Bradfield Canal. Both sites are somewhat exposed to westerly winds, which are expected to be of most concern during the normal operating season. Canal is also exposed to northerly winds out of Blake Passage and Hoya is exposed to northeasterly winds out of the Bradfield River. The design of the facilities and the log booming and rafting areas will consider site exposure.

S3. Upland Facility Requirements: Choose sites with proximity to at least five acres of relatively flat uplands. The LTF should provide at least 60 linear feet of operating face along the water.

Canal is within 1000 feet of its proposed sort yard and could accommodate a small work and storage area at the top of the access grade into the LTF. This sort yard will be within the 1000 foot beach fringe. Topography at the other two sites would probably not accommodate a waterfront storage and work area. Only truck unloading and turnaround would be possible. Hoya is within 2000 feet of the proposed sort yard. This sort yard is outside of the 1000 foot beach fringe buffer. The size of the sort yards will be limited to about 2 acres. None of the LTF or sort yard sites could accommodate log storage areas of sufficient size to stockpile logs for barge-only operations.

All sites will require at least 70 feet of tree clearing at the high water line for passage of log bundles. The actual operating face of the LTF structure may be narrower, depending on the design. There is adequate room at all sites for 60 feet of operating face along the water. However, visual mitigation measures incorporated into the LTF designs limit the operating face at any site, and resident fish streams adjacent to Hoya limit the length of its fill structure.

S4. Safe Access to a Facility from the Uplands: Choose sites where access roads to the LTF can maintain a grade of ten percent or less.

Terrain at both sites presents difficulties in access road design. The LTF areas themselves are flat, but incoming road grades may exceed 10% for pitches up to 2000 feet in length. Due to surrounding steep terrain, logs will have to be brought into the LTFs by truck only. Loaders would not be able to carry logs perpendicular to the road center line.

S5. Bark Dispersal: Choose sites where currents are likely to disperse sunken or floating wood debris.

Slopes are quite steep off of both the Canal and Hoya sites. Although currents are generally slow in the area they are anticipated to be sufficient to disperse sunken and floating debris.

S6. Site Productivity: Choose sites with the least productive intertidal and subtidal zones.

None of the sites are considered highly productive. LTF development will probably have minimal impacts on biological productivity in or adjacent to the Project Area. Canal is situated on steeply plunging bedrock. Intertidal slopes are also steep at Hoya.

S7. Sensitive Habitat: Avoid sites on or adjacent to sensitive habitats: extensive tideflats, salt marshes, kelp or eelgrass beds, seaweed harvest areas or shellfish concentration areas.

Both sites are located well away from the most sensitive Project Area habitats meeting this criteria (Canal and Hoya estuaries). Design measures will protect resident fish habitat adjacent to the Hoya site.

S8. Safe Marine Access to Facilities: Choose sites that are safely accessible to tugboats with log rafts at most tides and on most winter days.

Tide changes will not affect accessibility at any site. Winter weather (wind and high seas) may be a limiting factor at both sites. Winter weather is likely to be a limiting factor for all logging operations in the Bradfield Canal.

S9. Storage and Rafting: Choose sites where stored logs, log bundles, or log rafts will not ground at low tide. Minimum depths of 40 feet Mean Lower Low Water are preferred for log storage areas.

Both sites provide log storage areas with sufficient water depth at Mean Lower Low Water.

S10. Bald Eagle Nest Trees: Avoid sites within 330 feet of bald eagle nests.

None of the sites are within 330 feet of bald eagle nests. Canal is about 1800 feet west of the nearest eagle nest. Hoya is about 4900 feet west of the nearest eagle nest.

Construction and Operation Guidelines

C1. LTF Design: Design LTFs to be least environmentally damaging as practicable, considering economics, facility requirements, physical site constraints, site usage (timber volume) and duration, water quality and habitat mitigation, other potential uses.

Most environmental concerns are addressed through the siting guidelines described above for each site. Remaining concerns associated with erosion control, fish habitat protection, and visuals are addressed through design measures and operating guidelines described below.

Physical constraints due to steep topography, as well as visual objectives, present design challenges at both sites. For example, Hoya may not accommodate any activities requiring more space than log truck unloading and turnaround. Each site will require separate, upland sites for sorting, storage, and equipment maintenance.

We anticipate a maximum potential wood volume of about 17 MMBF this sale. Depending on the alternative, a proportion of this volume will go directly from harvest units to barge by helicopter, bypassing the LTF entirely (see Table 3-31). A floating log slide with a minimal-height bulkhead made from native log materials is the most likely design at each site, with sloped access roadway to the adjacent log unload area (about 150 to 200 feet from the high tide line).

C2. Fill Structures: Design and construct fill structures to prevent erosion, pollution, and structural displacement.

Existing beach topography will be incorporated into the design as feasible. Fill structures will be necessary to provide bulkheads and minimize access road grades coming into the LTF. These structures will be minimum height native log and/or stable rock revetments reinforced with riprap below storm tide level to protect fill from erosion.

C3. Timing of Inwater Construction: If necessary, limit adverse impacts to marine resources and avoid conflicts with other users through construction and operation timing restrictions.

Development of the Hoya LTF will avoid conflicts with commercial fishing and charter boats needing safe anchorage at Capsize Cove during LTF construction and during logging operations. No construction or operation timing restrictions specific to LTFs are proposed. We anticipate that herring attempting to spawn at LTF sites may be temporarily displaced by construction and logging operations. However, based on our observations of current spawning substrate, it is likely that herring would eventually spawn on LTF bulkheads and riprap.

C4. Bark Accumulation Management: Use Best Management Practices to control intertidal and submarine accumulations of bark and other debris.

The size limitations imposed by terrain at both sites limits the amount of activity (sorting, trimming, etc.) that can take place at the LTF, thereby limiting the amount of bark and debris accumulation at the shoreline. LTF design will ensure low entry speed of log bundles into the water.

Some bark and debris will inevitably accumulate in the water during entry and rafting operations. The use of log booms will contain most of the floating and near-submerged debris that may be of concern to boat navigators in the area. The contract administrator will ensure that the operator is aware of this concern. The contract will include provisions to ensure that the operator immediately removes logging-related debris from the water. The monitoring plan (below and in Appendix C) also addresses this concern.

C5. Solid Waste Management: Remove solid wastes, including wood, generated from the LTF and dispose of it at an approved upland solid waste disposal site.

The contract will include provisions to ensure proper disposal of solid waste in accordance with NPDES and other permits. Disposal methods may vary with type of waste accumulated. Daily cleanup of the LTF is required when accumulations of bark and other wood debris area present.

C6. Bark Accumulation: Comply with permitting agency cleanup requirements (if any) if intertidal and submarine bark accumulations exceed standards (100% coverage exceeding one acre or an accumulation exceeding ten centimeters at any point).

To date, cleanup has not been required at existing LTF sites known to exceed these standards. There is still some question as to whether cleanup is feasible or even beneficial. Cleanup efforts will require cooperative efforts between the Forest Service and permitting agencies. If cleanup or remediation plans are developed, they would address alternative transfer devices and methods, operational practices, and removal of bark from the ocean bottom. Remediation plans would be approved by ADEC and permitting agencies.

C7. Bundle Speed: Control log bundle entry into receiving waters to the slowest speed practicable.

Log bundle entry speeds will be limited through passive friction between the log bundles and the proposed log slide skid and platform beams, and by contractual requirements which will prohibit the watering of logs during tide levels which cause the slide to be at a slope greater than the maximum slope which limits log bundle water entry velocity to the maximum allowable speed of 3 feet per second.

C8. Surface Drainage Management: Use Best Management Practices to control surface water runoff from LTFs.

LTF designs, including upland work/storage areas, will meet EPA General Permit NPDES requirements. Designs will include settling ponds, gradient control, berms, site cleanup requirements, and maximum utilization of existing natural features for inexpensive, functional, and maintainable drainage features for the collection and sediment

deposition of surface runoff. Removal of collected sediment and debris from each site will be in accordance with specific contract provisions.

Sort yards have been located well away from LTFs to minimize bare ground adjacent to marine waters. Grade control, sediment detention ponds, cross-drains and site cleanup requirements will address erosion and sediment transport associated with surface water runoff. Both LTFs and their access roads are in close proximity to small streams which will require protection. Only the Hoya site is in close proximity to fish habitat.

C9. Control of Hydrocarbons: Utilize oil pollution prevention plans (BMP 12.8) and oil pollution contingency plans (BMP 12.9) to minimize petroleum products entering waters.

Petroleum product storage and equipment servicing and refueling will be controlled through specific contract provisions. Spill Prevention Control and Countermeasure plans provide organizational structure and procedures for responding to oil spills.

C10. Onshore Log Storage: Where feasible, give preference to onshore storage and barging of logs.

Commercial and charter fishermen have expressed the concern that log rafting will interfere with their operations in the Bradfield Canal. This issue is addressed under marine resources and recreation discussions in Chapter 3 of this Final EIS.

Onshore storage to facilitate a barge-only operation would require many acres of sort yard space for log storage in both VCUs. LTF design to accommodate barging would require increased excavation and fill at saltwater, thereby increasing beach fringe disturbance and visual impacts. We anticipate that the amount of timber produced by this sale will not support the costs of a barge-only operation. For these reasons, it appears that a mixture of floating LTF development and helicopter-to-barge operations (as described in each alternative) is preferable from both an environmental and economic standpoint for this timber sale.

C11. Facility Maintenance and Reclamation: Maintain active and intermittent LTFs and restore abandoned LTFs.

LTFs in both VCUs will be treated similarly to the Frosty Bay LTF. These LTFs are considered intermittent and will be seeded upon completion of logging operations. Motorized access will be restricted within the Project Area; ramps and docks will not be provided in order to be consistent with road management objectives after the sale.

Monitoring and Reporting Guidelines

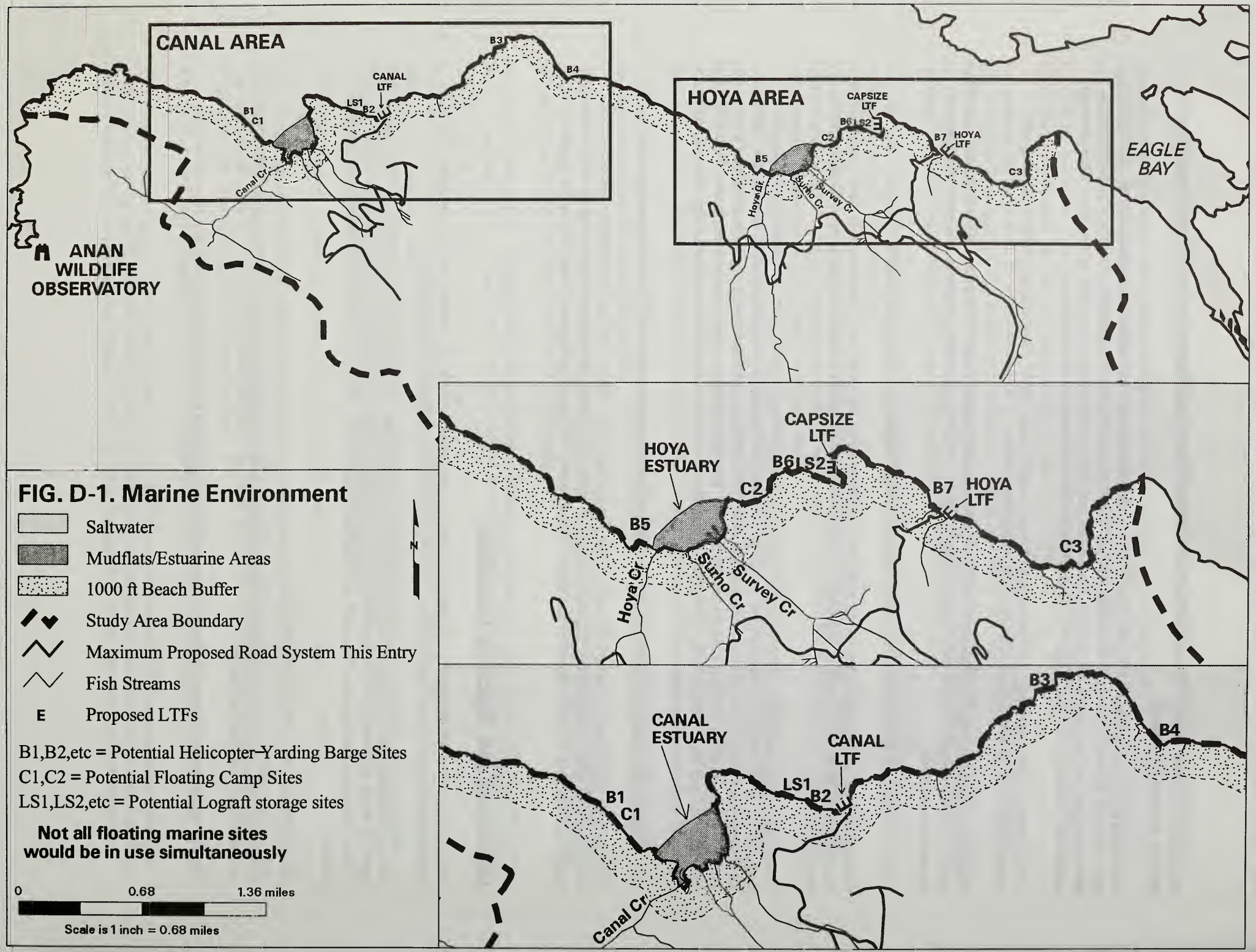
M1-6. Monitoring Requirements: Monitor for bark accumulations, oil sheen, surface runoff associated with LTF construction, operation and maintenance. Assure that corrective actions occur if necessary.

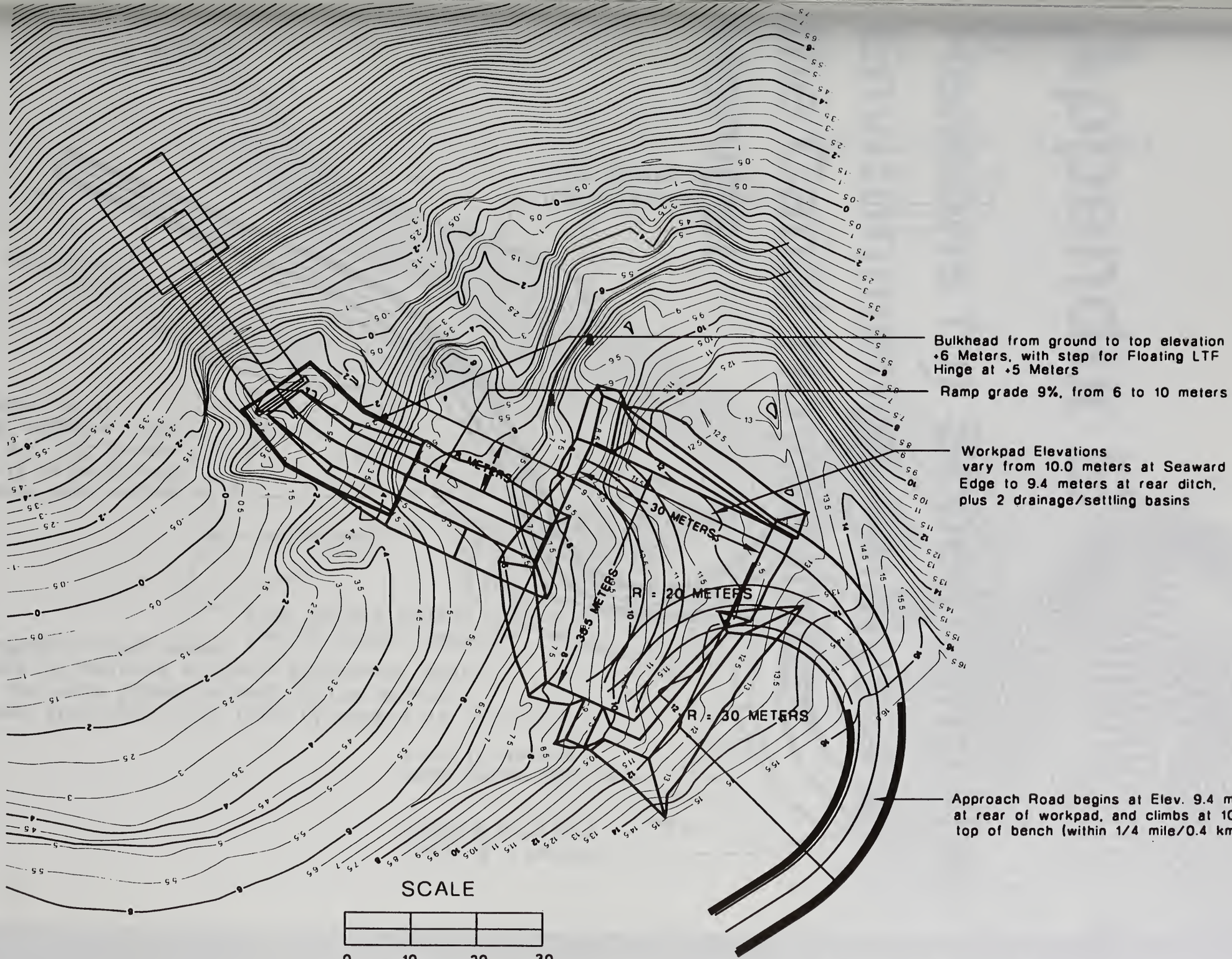
The LTF permits will specify monitoring requirements and methods. Typically, bark accumulation is monitored annually at the beginning of each operating season according to specific protocols by SCUBA surveys at active LTFs. Waters in the vicinity of the LTF are monitored daily for the presence of visible oil sheens during LTF operation.

M7. Report results of monitoring annually.

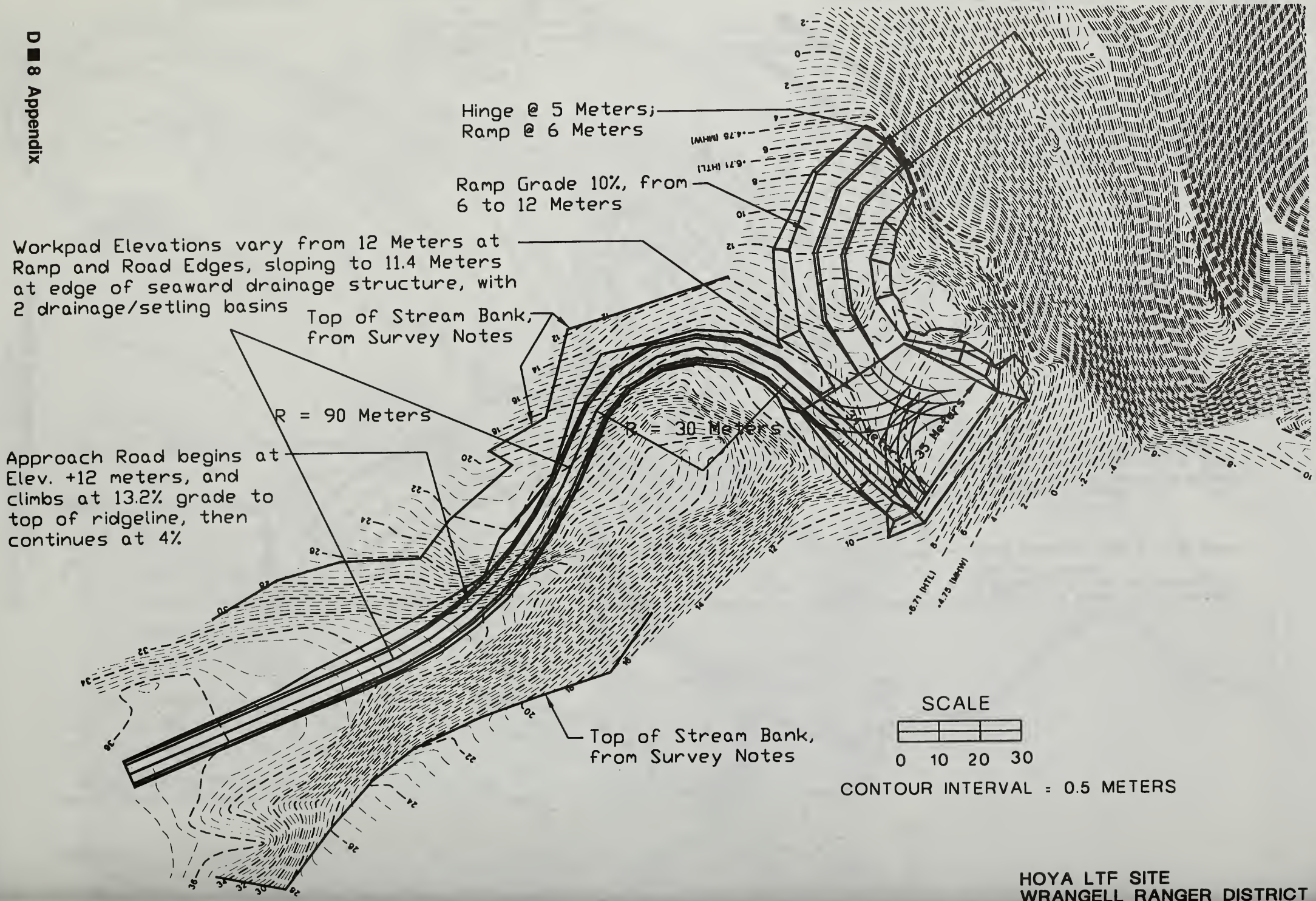
A summary of LTF monitoring results is available and reports are submitted annually to EPA and ADEC. LTF permits establish reporting procedures.

The following pages represent conceptual drawings of the proposed LTF sites for the Canal and Hoya drainages.


CANAL AREA
HOYA AREA
ANAN WILDLIFE OBSERVATORY
EAGLE BAY
CANAL LTF
CAPSIZE LTF
HOYA LTF
HOYA ESTUARY
CANAL ESTUARY
B1
C1
LS1
B2
B3
B4
B5
B6
LS2
C2
B7
C3
Canal Cr
Hoya Cr
Surho Cr
Survey Cr
N
FIG. D-1. Marine Environment
Saltwater
Mudflats/Estuarine Areas
1000 ft Beach Buffer
Study Area Boundary
Maximum Proposed Road System This Entry
Fish Streams
E Proposed LTFs
B1,B2,etc = Potential Helicopter-Yarding Barge Sites
C1,C2 = Potential Floating Camp Sites
LS1,LS2,etc = Potential Lograft storage sites
Not all floating marine sites would be in use simultaneously
0
0.68
1.36 miles
Scale is 1 inch = 0.68 miles



CANAL LTF SITE
WRANGELL RANGER DISTRICT



HOYA LTF SITE
WRANGELL RANGER DISTRICT

Appendix E

Reasons for Scheduling the Environmental Analysis of the Canal Hoya Timber Harvest

Appendix E

Reasons for Scheduling the Environmental Analysis of the Canal Hoya Timber Harvest

SUMMARY

The purpose of this Appendix is to address the following questions regarding the relationship of this timber sale project to the Wrangell Ranger District, Stikine Area, and Tongass National Forest Independent Timber Sale Program:

1.) Why are we planning timber harvest projects?
2.) Why are we planning to harvest timber here?
3.) Why are we planning to harvest timber in this area now?
4.) Why can't we harvest timber in another location at this time?
5.) Why are we planning to harvest the amount of volume identified for this project?

INTRODUCTION

A goal of the Tongass Land Management Plan (1997) is to mange the Forest to produce desired resource values, products, services and conditions in ways that also sustain the diversity, function and productivity of ecosystems. The goals and objectives of the Forest Plan describe a mosaic of land and resource conditions desired for the forest in the future. The forest mosaic will include areas designated to remain in an old-growth condition such as Wilderness, National Monument, Congressionally designated Land Use Designation II (LUD II), and Old-Growth Habitat; while timber harvest is permitted to varying degrees in Modified Landscape, Scenic Viewshed and Timber Production zoned areas. The timber resource will be managed for production of sawtimber and other wood products from timber lands available for timber harvest in a sustainable manner (Tongass Land Management Revision, Record of Decision, page 2).

WHY ARE WE PLANNING TIMBER HARVEST PROJECTS?

Tongass Timber Reform Act (1990)

Section 101 of the Tongass Timber Reform Act amended the Alaska National Interest Lands Conservation Act (ANILCA); P.L. 96-487) by deleting the following provision:

> Sec. 705(a) The Congress authorizes and directs that the Secretary of the Treasury shall make available to the Secretary of Agriculture the sum of at least $40,000,000 annually or as much as the Secretary of Agriculture finds necessary to maintain the timber supply from the Tongass National Forest to dependent industry at a rate of four billion five hundred million board feet measure per decade. Such sums will be drawn from receipts from oil, gas, timber, coal, and other natural resources collected by the Secretary of Agriculture and the Secretary of the Interior notwithstanding any other law providing for the distribution of such receipts: Provided, That such funds shall not be subject to deferral or rescission under the Budget impoundment and Control Act of 1974, and such funds shall not be subject to annual appropriation.

and inserting in lieu thereof:

> Sec. 705. (a) Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act (P.L. 94-588); except as provided in subsection 9d) of this section, the Secretary shall, the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the annual market demand from such forest for each planning cycle.

The Ninth Circuit found in Alaska Wilderness Recreation and Tourism Association v. Morrison that "TTRA envisions not an inflexible harvest level, but a balancing of the market, the law, and other uses, including preservation. It thus gives the Forest Service leeway to choose among various site-specific plans, provided it follows the procedural requirements of the applicable statutes." The District Court of Alaska likewise found in Alaska Forest Association v. United States of America that "[a]llocating timber for sale is simply one of many factors which the Forest Service is to consider within its discretion in determining whether to make timber in the Tongass available for sale." The court also found: "TTRA's reference to seek to meet market demand was not a mandate. Instead, it was an admonition to be considered together with other goals in establishing a timber plan for the Tongass."

Forest Plan

In light of TTRA and the findings of the Ninth Circuit Court, timber volume is one of the desired forest resource outputs identified in the decision of the Forest Plan signed by Regional Forester, Phil Janik on May 23, 1997. To provide this output, the Forest Service must balance its availability as stated in the Forest Plan (1997) and the demand for the volume in Southeast Alaska against other forest uses and funding allocations made by Congress.

The Tongass Land Management Plan (1997) sets forth the management prescriptions that describe how land managers should operate on the Tongass National Forest. The Forest Plan provides the expectations and limits on how and where activities will be conducted. The prescriptions include Land Use Designations (LUD's) with a range of management objectives, and specific standards and guidelines designed to ensure attainment of those objectives.

Land use prescriptions have been established for 19 LUD's. Four groups of LUD's similar in management direction and environmental effects have been identified. Table E-1 shows the 19 LUD's for the Forest Plan, as they fall within the four groups. The first two groups are also sometimes referred to as "non-development" LUD's, and the latter two groups as "development" LUD's.

Management prescriptions consist largely of standards and guidelines. Standards and guidelines govern resource management activities and are key to successful implementation of the Forest Plan. Some of these standards and guidelines apply to all lands, others to specific LUD's. These standards and guidelines take precedence over annual targets or projected outputs. No project or program will be funded for which the applicable standards and guidelines cannot be carried out.

E -Reasons for Scheduling the EA for the Canal Hoya Timber Harvest

Table E-1
Land Use Development (LUDs) for the Tongass National Forest

Tongass National Forest (16.8333 million acres) 1/	
Non-development LUD's *(13,428,299 acres)*	**Development LUD's** *(3,866,036 acres)*
Wilderness and National Monument *(5,885,387 acres)*	**Intensive Development** *(2,747,036 acres)*
Wilderness National Monument Nat. Monument Wilderness	Timber Production Minerals Transportation/Utility Systems
Mostly Natural (7,542,912 acres)	**Moderate Development** (1,119,000 acres)
LUD II Old-growth Habitat Research Natural Area Remote Recreation Semi-Remote Recreation Municipal Watershed Special Interest Area Wild River Scenic River Recreational River Experimental Forests	Scenic Viewshed Modified Landscape

1/ In this table, the total area within each LUD is included. However, in some cases, more than one Land Use Designation can be applied to the same area (such as a Special Interest Area within Wilderness). Therefore, totaling the acres of the LUD's will exceed the total National Forest Acreage. No acreage has been calculated for the Transportation/Utility Systems LUD.

The Record of Decision (May 23, 1997) for the Tongass Land Management Plan (1997) states that the Tongass National Forest will continue to allow timber harvest while maintaining sustained yield and multiple use goals. The forest-wide standards and guidelines for timber include general direction to "ensure that silvicultural systems other than clearcutting are considered through an appropriate project level analysis process. However, uneven-aged management systems will be limited to areas where yarding equipment suited to selective logging can be used" (Forest Plan, chapter 4, Timber)

The timber standards and guidelines include direction to "use clearcutting only where such a practice is determined to be the best system to meet the objectives and requirements of Land Use Designations (Forest Plan, Even-aged Systems, page 4-96)." The Plan estimates that clearcutting, using even-aged management, will predominate regeneration timber harvesting (about 80 percent). The timber standards and guidelines also state that the two-aged management system, in which some of the harvest unit is left uncut to provide structural diversity and a biological legacy in the regenerated timber stand, "may be used where windthrow or dwarf mistletoe are not major threats or can be tolerated" (Forest Plan, Chapter 4, Timber). This harvest method will account for at least 20 percent of regeneration harvests.

Forest-wide, considering all land allocations where timber harvesting is permitted, it is estimated that 65 percent of harvesting will involve clearcutting, with the remaining 35 percent utilizing other methods (TLMP ROD, 1997, page 5).

Lands Suitable for Timber Harvest

The Forest Plan classifies lands suitable for timber production and determines where on those lands timber harvesting should be allowed, in accordance with NFMA regulations, 36 CFR 219.14(e), and Section 102 of the TTRA. Appendix A of the Forest Plan (1997) details the criteria and process used to determine the forest lands tentatively suitable for timber production. These are the lands capable of producing commercial volumes of timber on a sustained-yield basis,

and are not in areas legislatively withdrawn from timber harvest. They are the only lands where regularly scheduled commercial timber harvesting may occur.

The LUD's further define where timber management may occur. Many areas in LUD's that do not allow commercial timber harvest contain tentatively suitable forest lands, but these lands will be managed for resource uses other than timber production. LUD's which allow timber management; Timber Production, Modified Landscape, Scenic Viewshed, Scenic River, and Recreational River; total approximately 3.7 million acres, or 22 percent of the Tongass National Forest, and contain 1.3 million acres of tentatively suitable forest lands. Three of these LUD's; Timber Production, Modified Landscape, and Scenic Viewshed; account for nearly all of the 676,000 acres suitable and available for timber management under the Forest Plan.

Generation of the Allowable Sale Quantity

The ASQ (Allowable Sale Quantity) for timber on the Tongass National Forest is established at 2.67 billion board feet per decade from the 676,000 acres of suitable and available acres where timber harvest can occur. The 2.67 billion board feet per decade ceiling is equivalent to an annual average of 267 million board feet (MMBF). While the decadal amount is an upper ceiling which can not be exceeded, the annual harvest from the Tongass can vary from year to year.

Although the maximum amount of timber that could be harvested during the first decade of the Forest Plan implementation is an average of 267 MMBF per year, a level of 200 MMBF or less is more likely to be offered over the next few years, given current market conditions and the transition that both the timber industry and the Forest Service is experiencing. Therefore, the public can expect the amount of timber to be offered annually to vary between 200 MMBF or less and 267 MMBF (TLMP ROD, 1997, page 8).

Distribution of the Allowable Sale Quantity Among the Tongass National Forest Administrative Areas

The three Administrative Areas of the Tongass National Forest (Chatham, Stikine and Ketchikan) play a combined role in providing timber volume for harvest. Each Area is allocated portions of the timber harvest program based on the availability of suitable and available acres, to meet the goals of the Forest Plan, the Organic Act and implementation of Section 101 of the Tongass Timber Reform Act (1990). The distribution of the planned ASQ harvest (267 MMBF) among the three administrative areas is as follows (All volumes are identified as sawlog plus utility) :

Table E-2

Distribution of ASQ Among the Tongass National Forest Administrative Areas

Area	Volume (MMBF)
Chatham	51
Stikine	95
Ketchikan	121
Total	267

The ASQ consists of two Non-Interchangeable Components (NIC's): NIC I, which is 2.2 billion board feet of timber per decade, and NIC II, which is .47 billion board feet per decade. While binding as an upper limit, NIC components are estimates and do not reflect all of the factors that may influence actual sales. NIC components are non-interchangeable because lower sale levels in one component may not be compensated for by higher sale levels in the other. The separate limits on each component are binding on a decadal basis. The NIC I component includes land that can be harvested with normal logging systems. The NIC II component includes land that has high logging costs due to isolation or special equipment requirements. About 80% of the ASQ comes from NIC I land and about 20% comes from NIC II lands. This represents a higher reliance on lands in the NIC II component than in the past. The distribution of the NIC I and NIC II components among the three administrative Areas of the Tongass is as follows (volumes shown are sawlog plus utility):

Table E-3

Distribution of ASQ NIC I and NIC II Quantities Among the Tongass National Forest Administrative Areas

	Non-Interchangeable Components (MMBF)	
Administrative Area	NIC I	NIC II
Chatham	35	16
Stikine	77	18

Ketchikan	107	14
Total	219	48
Grand Total	267	

The Forest Planning Model (FORPLAN)

FORPLAN is the primary modeling tool used to ensure that land allocations and output schedules for alternatives are realistic and meet standards and guidelines in a cost-efficient manner. FORPLAN also is also used to conduct "benchmark" analysis of forest outputs. A benchmark is a set of values that indicate a maximum (or minimum) level of production capable under certain, often limited, constraints.

FORPLAN is used to translate forestland, yield, and constraint information into a linear programming model. This model is read into a program designed to solve and optimize series of simultaneous mathematical equations. Results from the modeling process are only approximations of what to expect when any given alternative is implemented. The objective of modeling is to aid planners in estimating likely future consequences of management actions (alternatives). A choice between alternatives can be made even though the model may lack precision in describing specific attributes of a given alternative. FORPLAN, very simply does two things: 1) creates a linear programming model, and 2) interprets the linear programming results.

FORPLAN models for the Tongass only analyze land classified as tentatively suitable for timber harvest. Tentatively suitable land are those lands which are capable of producing a growth of 20 cubic feet per acre per year, have not been withdrawn from timber harvest by law or land use designation, are capable of producing timber without irreversible damage to soil productivity or watershed conditions, and can be restocked with trees within 5 years after harvest.

The FORPLAN model uses numerous constraints to develop the ASQ, e.g., land management prescriptions, land use designations, standards and guidelines, and regulation classes, (see the Tongass Land Management Plan Revision FEIS Appendix B, Modeling and Analysis Process for additional information on the FORPLAN program). To calculate the ASQ, the model first maximizes timber harvest in the first decade of the 160-year planning horizon. This proceeds while adhering to all resource, legislative, and operational constraints. One constraint implemented is that all harvest in the first decade be sustained for the entire planning horizon. The model seeks to maximize the present net value for the planning horizon.

FORPLAN is a tool used to determine the mathematical allowable sale quantity outputs given numerous resource constraints and conditions. Given the linear programming function of the program and the models direction to maximize the present net value of timber outputs to the end of the planning horizon, FORPLAN is not a decision tool for timber harvest scheduling used by the three administrative areas on the Tongass. It simply provides an upper limit on the amount of timber that may be harvested as part of the regularly scheduled timber sale program. The actual scheduling of sales is a management function which takes factors such as infrastructure in place, location of proposed projects to other activities taking place on the Forest, economics, desired outputs relative to acres available, and many more.

The Tongass Timber Schedule

Each of the three administrative areas of the Tongass National Forest are responsible for planning and implementing their timber sale programs. In so doing, each annually develops a timber sale schedule based on current year and outyear timber demand, volume currently under contract, anticipated Congressional funding levels, and availability of resources to prepare sales for offer. Generally, the goal of each administrative area is to have a combined annual offer level of approximately 220 MMBF which parallels the NIC I component of the ASQ and the expectations stated in the Record of Decision for the Tongass Land Management Plan (1997).

An initial plan is developed at the beginning of each fiscal year and submitted in combination with the other two for budget allocations. Between October and December (1st quarter of the fiscal year) initial allocations to the Areas are made so work can commence on all or a portion of the initial sale plan submissions. During the second quarter of the fiscal year (January-March), final allocations are transmitted to the Areas. Should insufficient funding levels be allocated to the Areas to work on all projects submitted, then projects are delayed into the out-years. Conversely, should Congress identify a specific volume for offer higher with corresponding funds to produce the projects, sales are moved from the out-year to current year work. The sale plans become very dynamic in nature due to the number of influences on each of the three administrative areas of the Tongass.

The following table represents a snapshot in time of what is anticipated from each of the three administrative areas of the Tongass. Table E-4-Tongass Timber Sale Schedule Summary depicts only the total volume anticipated to be offered for each of the fiscal years (October-September). This summary was created from the initial budget FY98 submissions. This table is subject to change as described in the preceding paragraphs.

Table E-4

Tongass Timber Sale Schedule Summary. Volume (MMBF) by Fiscal Year

Administrative Area	FY97	FY98	FY99	FY00	FY01	FY02	Average
Chatham	64	46	43	44	40	44	43
Stikine	58	72	88	86	79	79	81
Ketchikan	84	102	104	96	97	104	101
Tongass Total	206	220	235	226	216	228	225

The Stikine Area Timber Schedule

The Stikine Area coordinates with the Chatham and Ketchikan Areas of the Tongass National Forest to supply timber volume to the Forest's Independent Timber Sale Program. Each Administrative Area plans timber sale preparation based on a ten year period. This schedule allows the necessary time to complete preliminary analysis, resource inventories, environmental documentation, field layout preparations and permit acquisition, appraisal of timber resource values, advertisement of sale characteristics for potential bidders, bid opening, and physical award of the timber sale. The schedule is reviewed at least annually. The current ten year timber sale schedule is shown in Figure E-1. The schedule lists a program level of approximately 77 MMBF per year over a ten year period.

WHY ARE WE PLANNING TO HARVEST TIMBER HERE?

The Stikine Area of the Tongass National Forest has identified a ten year timber sale schedule which includes the Canal Hoya Project Area location (Stikine Area Timber Sale Plan signed by Acting Forest Supervisor, Patricia Grantham, 10/30/97).

Reasons for scheduling the Canal Hoya Project Area may be summarized as follows:

1. The Canal Hoya Project Area contains a sufficient number of acres allocated to development land use designations to make timber harvest in the area appropriate under the Forest Plan. There is an adequate amount of suitable and available land for timber harvest opportunities. Available information indicates harvest of the amount of timber volume being considered for this project can occur consistent with the Forest Plan standards and guidelines and other resource protection requirements. The Canal Hoya Project and proposed timber harvest volume contributes to achieving the goals and objectives of implementing the Forest Plan.

2. The anticipated effects of timber harvest activities on subsistence at the volume ranges identified is within the effects disclosed in the Forest Plan (1997). The potential effects on subsistence resources are projected to differ little according to which sequence these proposed timber sale projects are subjected to harvest. Harvesting other Tongass National Forest project areas with available timber in lieu of the Canal Hoya Project Area is expected to have similar potential effects on other resources, including those used for subsistence. This expectation is due to the widespread distribution and use by southeast Alaska residents. The Canal Hoya Project Area displays similar use patterns as the rest of the Tongass.

3. The investment in infrastructure (roads, bridges, log transfer facilities, rock pits, etc.) is necessary for sustainable timber harvest offerings over the course of the rotation.

4. Based on anticipated current year and outyear timber volume demand; volume currently under contract; anticipated Congressional allocations; and the availability of resources to fully prepare and offer this project for sale, this project is consistent with Forest Service Policy in the Alaska Region, Regional Guide (11/83); the Tongass Land Management Plan (1997); and all other laws and regulations governing the removal of timber from National Forest System Lands.

E -Reasons for Scheduling the EA for the Canal Hoya Timber Harvest

Figure E-1

The Stikine Area Timber Schedule

10 Year Timber Sale Worksheet
Area: Stikine
Date: February 26, 1998

	NEPA Project	Decision Date	Vol S+U (MMbf)	Sale Name	Vol S+U (MMbf)	Class	TSSA Volume 6	FY98 Gate 2	FY98 Gate 3	FY98 Gate 5	FY99 Gate 2	FY99 Gate 3	FY99 Gate 5	FY00 Gate 2	FY00 Gate 3	FY00 Gate 5	FY01 Gate 2	FY01 Gate 3	FY01 Gate 5	FY02 Gate 2	FY02 Gate 3	FY02 Gate 5	FY03 Gate 2	FY03 Gate 3	FY03 Gate 5	FY04 Gate 2	FY04 Gate 3	FY04 Gate 5	FY05 Gate 2	FY05 Gate 3	FY05 Gate 5	FY06 Gate 2	FY06 Gate 3	FY07 Gate 5
				Rowan Settlement		O	11.44																										
				Sagaruna		S	24.041																										
				Boherma		S	31																										
				Little Hamilton Salvage		S	0.331																										
				Shamrock		S	24.28																										
				King George		S	24.79																										
	TSSA			Loop		S	0.526																										
	Volume Under Contract and			Tatonka		S	0.067																										
	Sales Bid But Not Awarded			South Lindy		S	10.5																										
				One Ring		S	0.051																										
				Bowl		S	0.234																										
				APC Permit		L	0.002																										
				Roy Sokol		S	0.009																										
				Brown's Cove		S	0.006																										
				Nootkatensis		S	0.12																										
				Pathway		S	0.299																										
				PRD ATC		O	8.544																										
	Shamrock EIS	Jan-96		Clover	12	S			12	12																						
	Etolin EA	FY97		Etolin	2.2	S				2.2																						
	Turn EA	FY97		Turn	1.7	S				1.7																						
	Crane/Rowan EIS	x	23	Rowan Mountain	16	S		23	16	16																						
	Crane/Rowan EIS	x		Crane	7	S			7	7																						
	Todahl Backline EA	x	6	Todahl Backline	6	S		6	6	6		PRD	48.03																			
	Twin Creek EA	x	3	Twin Creek	3	S		3	3	3		WRD	27.15																			
'98	Canal/Hoya EIS	x	15	Canal/Hoya	15	O		15	15	15		Area	75.18																			
	Nemo Loop CE	x	3	Nemo Loop	3	S		3	3	3																						
	Swan/Tyee Powerline EIS	FY97		Powerline	5	S			5	5																						
	Mossy EA		0.25	Mossy	0.25	S		0.25	0.25	0.25																						
	South Lindenberg EIS	Dec-96		Dakota	0.33	S			0.33	0.33																						
	South Lindenberg EIS	Dec-96		S Lindy SS 1	1	S			1	1																						
	South Lindenberg EIS	Dec-96		S Lindy SS 2	1	S			1	1																						
	South Lindenberg EIS	Dec-96		S Lindy SS 3	1	S			1	1																						
	Bohemia Mountain EIS	Jun-95		Bo	0.7	S			0.7	0.7																						
	Houghton/Fanshaw EIS	x	37	Fanshaw I	31	O		37				0	0																			
	Crystal Creek EIS	x	16	Crystal Creek	10	S		16				10	10																			
'99	Skipping Cow EIS (X)	x	25	Skipping Cow	20	O		25				20	20																			
	Kuakan EIS	x	17	Kuakan	17	S		17				17	17																			
	WRD Misc Sales EA		2	WRD Small Sales	2	S					2	2	2																			
	South Lindenberg EIS	Dec-96		S Lindy I	2	S						2	2																			
	Madan EIS	x	25	Madan	25	O					25				25	25																
	King George EIS	FY97		Honeymoon	2	S									2	2																
	South Lindenberg EIS	Dec-96		South Lindenburg II	10	S					10					10																
	Woodpecker EIS	x	15	Woodpecker	10	S					15				10	10																
'00	East Kuiu EIS		42	Kuiu I	22	O					42				20	20																
	Etolin EA			Camp Carl	1	S									1	1																
	WRD Misc Sales EA		1	WRD Small Sales	1	S								1	1																	
	Shamrock EIS	Jan-96		Shamrock SS	2	S									2	2																
	Douglas EIS (X)		30	Douglas I	30	O								30				30	30													
	Frenchy EA		3	Frenchy	3	S								3	3				3													
	Woodpecker EIS	x		Track	5	S						5							5													
'01	Etolin EIS (X)		50	Mosman	15	O								50	15				15													
	Woronkofski EIS		10	Woronkofski	10	S								10				10	10													
	WRD Misc Sales EA		5	WRD Small Sales	5	S											5	5	5													
	South Lindenberg EIS	Dec-96		S Lindy SS 4	1	S												1	1													
	South Lindenberg EIS	Dec-96		South Lindy II	2	S												2	2													
	Etolin EIS (X)			Whaletail	15	S											15			15												
	Sunny Bay EIS		10	Sunny Bay	10	S											10			10	10											
	East Kuiu EIS			Kuiu III	20	O														22	22											
'02	Sumner EA		6	Sumner	6	S											6	6			6											
	WRD Misc Sales EA		5	WRD Small Sales	5	S														5	5	5										
	South Lindenberg EIS	Dec-96		S Lindy SS 5	1	S															1	1										
	South Lindenberg EIS	Dec-96		South Lindy III	2	S															2	2										
	East Kuiu EIS			Kuiu III	0	O															0		0									
	Scott Peak EIS (X)		15	Scott Peak	15	S														15		15	15									
	Overlook EA		5	Overlook	5	S														5	5		5									
	Crystal Creek EIS	x		Ess Lake	5	S									5								5									
	Eolin EIS (X)		10	Olive Cove	10	S														10	10		10									
'03	Back Channel EIS		10	Back Channel	10	S															10		10									
	South Lindenberg EIS	Dec-96		South Lindy IV	2	S																2	2									
	South Lindenberg EIS	Dec-96		S Lindy SS 6	1	S																1	1									
	South Lindenberg EIS	Dec-96		S Lindy SS 7	1	S																1	1									
	WRD Misc Sales EA		2	WRD Small Sales	2	S																2	2	2								
	PRD Misc Sales EA		2	Salvage	2	S														2	2			2								
	Critten EIS		30	Critten	20	O																30	20			20						
	Douglas EIS (X)			Douglas II	0	S																	0			0						
'04	North Kupreanof EIS (X)		40	North Kupreanof I	19	O																40	19			19						
	Dry Strait EIS		7	Dry Strait	7	S																7	7			7						
	South Lindenberg EIS	Dec-96		S Lindy SS 8	2	S																			2	2						
	WRD Misc Sales EA		5	WRD Small Sales	5	S																		5	5	5						
	PRD Misc Sales EA		2	Salvage	2	S																		2	2	2						
	North Kupreanof EIS (X)			North Kupreanof II	20	O																			20			20				
	Kuiu EIS		41	Backline	26	O																		41	26			26				
'05	Wrangell Island EA		2	Wrangell	2	S																		2	2			2				
	Zarembo EA		5	Bahl	5	S																		5	5			5				
	Mad Bay EA		7	Mad Bay	7	S																		7	7			7				
	Point Ward EA		10	Point Ward	10	S																		10	10			10				
	South Lindenberg EIS	Dec-96		South Lindy V	2	S																						2	2			
	Whiskey EIS		6	Whiskey	6	S																		6	6			6				
	WRD Misc Sales EA		2	WRD Small Sales	2	S																					2	2	2			
	PRD Misc Sales EA		3	PRD Small Sales	3	S																					3	3	3			
	Fools/SE Cove EIS		10	Fools	10	S																					10	10		10		
	Midway EA		5	Midway	5	S																					5	5		5		
'06	Rynda EA		5	Rynda	5	S																					5	5		5		
	South Fanshaw EIS		25	South Fanshaw	25	O																		25				25		25		
	Kuiu EIS			Backline II	15	S																						15		15		
	South Lindenberg EIS	Dec-96		S Lindy	2	S																						2		2		
	WRD Misc Sales EA		5	WRD Misc Sales	5	S																							5	5	5	
	PRD Misc Sales EA		7	PRD Misc Sales	7	S																							7	7	7	
	Dry Bay EIS (X)		15	Dry Bay	15	O																		15						15		
	South Blind Slough EA		4	South Blind	4	S																							4			4
	Overlook II EA		4	Overlook 2	4	S																							4			4
	Central Kupreanof EIS		15	Central Kupreanof	15	S																							15	15		
'07	Muddy River EA		5	Muddy River	5	S																							5			5
	Todhal Cable EA		5	Todahl Cable	5	S																							5			5
	So. Kupreanof Helicopter EA		2	So. Kupreanof Helo	2	S																							2			2
	Critten EIS			Critten II	10	O																										10
	Etolin EA		10	Backline	10	S																							10			10
	WRD Misc Sales EA		5	TBD	5	S																							5			5
							TSSA	FY98			FY99			FY00			FY01			FY02			FY03			FY04			FY05			FY06		FY07
	NEPA TOTAL		665	SALE TOTAL	700		156	145	71	75	84	66	51	84	84	71	21	69	71	37	67	61	79	67	53	118	85	55	25	69	63	62	42	74	0	45

Total By Gate:			Sale Plan Average
	Gate 2	665	66.5
	Gate 3	665	66.5
	Gate 5	669	66.9

Funding Needs (M$'s):			PLN	FNL	PLN	FNL	PLN	FNL	PLN	FNL
	TM	Exams, Planning, Prep, Admin, Support	6501		4834		4150		4519	
	ENG	Engineering Support	2105		1428		1988		1988	
		Total	8605.8		6,262		6148.4		6507	

NEPA Project- Bold Print=Contract EIS, Bold Print (x)=Potential NEPA Contract

Prepared By: /s/ Forrest Cole, Resources Staff Officer — Date: October 24, 1997
Submitted By: /s/ Stephen Brady, Wrangell District Ranger — Date: October 24, 1997
Submitted By: /s/ George Doyle, Acting Petersburg District Ranger — Date: October 30, 1997
Approved By: /s/ Patricia Grantham, Acting Forest Supervisor — Date: October 30, 1997

The Canal Hoya Project Area Land Base by Land Use Designation (LUD)

The Canal Hoya Project Area is comprised of three land use designations (Table E-5) which encompass 25,660 acres of the Stikine Area. 15,190 acres are in development LUD's where 3670 acres are suitable and available for timber harvest.

Table E-5
Land Base of the Project Area

Non-development LUDs (10,470 acres)	Development LUDs (15,190 acres)
Old-Growth-Reserve	Modified Landscape Timber Production

Project Area Land Base

The purpose and need for action specifies the project proposal. The purpose and need for the Canal Hoya project identifies an expected outcome of 10-17 MMBF. The volume quantity was derived at by performing a site-specific analysis of available suitable forest land in LUD's that permit timber harvest. The volume is not a target assigned to this project area but an amount of timber volume that can be produced from the project area in concert with meeting the LUD prescriptions, the standards and guidelines, and Best Management Practices while maintaining options for future harvest entries in the project area. The identified volume represents the estimate of volume that can be harvested at this time parallel to the capabilities of the land. The purpose and need is analyzed numerous times during the planning process, for example when reviewing deer winter range, wildlife travel corridors, scenery management etc. During the alternative formulation process different harvest units are selected based on meeting various issues and public concerns. The balancing of resource and public issues are kept in focus during the alternative development process and evaluated during the environmental effects analysis. The volume of timber identified in the purpose and need is used as a basis to build and compare alternatives to the No-Action baseline alternative.

WHY ARE WE PLANNING TO HARVEST TIMBER IN THIS AREA NOW?

Scheduling sales to meet the needs of the industry is a complex task. If the Stikine Area had one potential operator capable of harvesting 77 MMBF per year from one project area, then one could expect to see one project or a combination of projects each year from the Stikine at approximately 77 MMBF. However, this is not the case. The timber industry is comprised of a number of operators from southeast Alaska as well as the remainder of the U.S. Demand for sales ranges in size from one tree to large sales where investments can be spread over time. To compound the complexity of this demand, some purchasers have interest in certain species of timber, have limited harvest and road building capabilities, own or don't own processing facilities of varying sizes, meet Small Business concerns, are large business entities, are community dependent, are capable of large operations with limited support facilities, etc. While the Forest Service strives to meet the needs of various operators, any individual, depending on how a sale is advertised, can bid and acquire a timber sale. Should a sale be purchased by a company other than those being targeted, then a shortage is generated by one segment of the industry.

After termination of the long-term timber sale contracts on the Tongass, the three administrative areas have more flexibility in producing a wider variety of sales to meet the anticipated needs of the industry. Generally, first entry sales (timber sales offered in areas of the Tongass that have previously not had harvest activities, have no infrastructure, or have limited infrastructure in place to move volume from the stump to the water) have higher volumes in order to pay for and establish the necessary facilities to move the timber volume. These sales begin the construction of the log transfer facilities, the primary road system, sort yards, camp facilities, rock sources, and other necessities which support the personnel and equipment. Once the infrastructure is in place, the Forest Service has the ability to offer smaller sales tailored to specific industry needs. Examples of where infrastructure is in place are Mitkof Island, Wrangell Island, the north end of Kuiu Island, portions of Etolin Island, and Zarembo Island. Should timber harvest only be allowed where infrastructure is currently in place, the ASQ of the Tongass would be substantially less due to the fact that the volume available would have to be sustainably harvested from less acres over the rotation cycle. The Tongass National Forest is one of the few in the system that has not developed full access to its suitable and available land for timber harvest purposes. First entry costs for timber harvest activities is more expensive here than in other portions of the National

Forest System for this reason. Where infrastructure is in place, sales on the Tongass are significantly less expensive than first entry sales.

Generally, the volume removed is expected to pay for the infrastructure in place. When a project is selected in undeveloped areas, approximately one-third of the volume from suitable and available timber harvest acres is necessary to pay for the cost of the timber harvest facilities. This amount of volume varies greatly depending on the quality of the timber in terms of recovery per acre harvested, the species of trees contained within the project area, the number of miles of new road construction necessary to harvest the timber, and the protection measures of other resource concerns.

Once the primary road system is in place, the Forest Service then has the ability to schedule significantly less volume on each successive timber sale entry. Rather than three entries removing one third of the volume each harvest entry, one can expect approximately one-third of the volume removed on the first entry, small sales following to harvest timber along existing road systems, then another large sale establishing road access into a portion of the remaining timber, followed again by small sales. The life cycle of this scheduling is through the timber rotation cycle. Once completed, the cycle is anticipated to begin again. A significant point of this scheduling cycle is that in order to meet the anticipated ASQ in whole or in part (e.g. NIC I component of approximately 220 billion board feet and the NIC II of approximately .47 billion board feet) for the entire rotation, all of the suitable and available lands scheduled for timber harvest must be entered.

The Stikine Area Timber Sale Plan (signed by Acting Forest Supervisor, Patricia Grantham, 10/30/97) represents a reasonable solution to meet the Forest Plan goals and objectives while providing a wide variety of timber harvest opportunities. The Sale Plan responds to allocating harvest across available lands to balance the need and to mitigate impacts of making timber volume available to the industry. Regardless of the number of sales, the same amount of acres would be planned for harvest and all suitable and available acres would eventually be entered in order to meet the anticipated demand for timber volume from the Tongass.

WHY CAN'T WE HARVEST TIMBER IN ANOTHER LOCATION AT THIS TIME?

In order to achieve the Regional Forester's objective of approximately 200 MMBF of annual timber offer in the near-term as documented in the Record of Decision for the Tongass Land Management Plan (1997), the Stikine Area's timber resource goal is to supply approximately 77 million board feet of timber volume annually as part of the total Tongass National Forest output. The Ketchikan Area's portion of the Regional Forester's goal is 107 MMBF and the Chatham Area's portion is 35 MMBF.

In essence, all areas with suitable and available timber are being analyzed for timber harvest projects. The goal of the Stikine has been to provide a wide variety of sales over multiple areas in order to meet the needs of the industry and limit the effects of timber harvest to a minimum on each entry.

WHY ARE WE PLANNING TO HARVEST THE AMOUNT OF VOLUME IDENTIFIED FOR THIS PROJECT?

The amount of volume identified for this project is based on 1) the availability of the suitable and available acres within the project area; 2) the amount of and timing of previous harvest; 3) other resource and subsistence use issues; 4) current volume under contract and its location of activities; 5) anticipated demand for timber in the future; 6) the amount of timber volume being prepared on the District, on the Area, and on the Tongass in relation to the availability of resources to produce the sale; and 7) the funding allocations.

How the volume identified for the project is analyzed has been the subject of many appeals and law suits over recent times. NEPA requires a reasonable range of alternatives to be addressed through public disclosure but is silent on range of volume. The Forest Service has presented environmental documents for projects that display a number of alternatives with a wide range of volume as well as projects that display a number of alternatives with a vary narrow range of

volume. In all cases, the Forest Service discloses an anticipated volume to be produced from the project either in the Notice of Intent to Prepare an Environmental Impact Statement, the Purpose and Need statement of the environmental document or the Proposed Action statement.

The goal of the Forest Service in analyzing effects associated with timber harvest activities is to provide the decision maker, as well as the public, with adequate knowledge of the anticipated effects in order to make a well informed decision or provide substantive comments for project consideration. When an anticipated volume is disclosed and the alternatives center around a narrow range of volume, the decision maker can adequately compare difference between each of the alternatives on other resources. When an anticipated volume is disclosed and the alternatives have significant differences in the volume produced (acres impacted), it is difficult to weigh the differences between a two million board foot sale and a sale of thirty million board feet.

By law, the Forest Service is obligated to disclose a no action alternative which serves as the baseline for any activities which may be approved. This alternative responds to the public that requests that no harvest activities take place. When the issue of wildlife habitat impacts is raised concerning the similar volume alternatives, spatial movement of the harvest units can have the same effect as lessening volume (acres impacted) in one alternative verses another alternative. By treating each alternative similarly, distinct trade-offs can be seen by meeting the same anticipated volume expectations from the sale.

For the Canal Hoya Timber Sale Project, the anticipated volume to be removed from the sale is approximately 14 MMBF. The alternatives displaying the effects of the project vary in outputs from 12 MMBF to 17 MMBF. The anticipated volume is the amount needed to achieve the goal of the Regional Forester's decision for the Tongass Land Management Plan (1997) and the intent of Section 101 of the Tongass Timber Reform Act.

Timber Demand

Southeast Alaska Economic Market Situation
Timber demand in Southeast Alaska varies dramatically on an annual basis. The level of demand is difficult for the Forest Service and the Timber Industry to predict with any precision. Numerous factors influence the demand for Southeast Alaska timber, including interest rates, housing starts, business cycles in the United States and overseas, the value of the dollar with respect to foreign currencies, changes in import tariffs and changes in export policies locally and abroad. It can be summarized by stating, demand is not a single number but a set of relationships over a specific period of time.

The demand for Southeast Alaska timber depends to some extent on how successful local processors are in competing for market shares in the global economy. Federal timber manufacturers of the Tongass must be able to produce products from a wide array of species and grades of timber to be competitive given the transportation cost to market and federal regulations that restrict export. Success of Alaska's wood products industry hinges on manufacturers achieving a competitive position in wood markets in the lower 48 and overseas. Alaskan manufacturers face steep competition from traditional and non-traditional wood suppling countries.

The timber industry in Southeast Alaska is currently in a period of transition from the long-term sales (Alaska Pulp Corporation and Ketchikan Pulp Company) to a total Independent Timber Sale program. New mills are under construction (Silver Bay in Wrangell, the Seley Mill in Ketchikan) and others are under going upgrades (e.g., Viking Lumber Company in Klawock). The capacity of sawmills in Southeast Alaska was estimated to be 284 million board feet at the close of calendar year 1997 (Fred Walk, Director of Forest Management, December 1997).

Demand can be estimated by using historical figures of actual output or using a set of relationships to determine a range of timber to offer based on installed mill capacity, mill utilization rates, harvest projections and contribution to competitive operation of the region and the role in global markets.

Timber Buffer Stock (Volume Under Contract)
For all of the reasons mentioned above, the Forest Service does not try to predict and budget for the actual demand in any specific year. Instead, the Forest Service approaches annual demand with the concept of a "buffer stock" timber supply. The approach is to seek to provide an opportunity for the timber industry as a whole to acquire a supply of purchased but unharvested timber equal to about three years of timber consumption . At the close of calendar year 1997 this amount of timber would be in the range of 600-700 MMBF of uncut volume under contract, (Kathleen Morse, R-10

Regional Economist, work in progress). This quantity considers the average rate of harvest for the past few years, and any indicators of change in the rate from planning cycle projections or other sources. The idea is that if demand for lumber and chip grade logs in any year suddenly increases, producers will have enough harvestable timber on hand to respond to the increase in demand for forest products without waiting for the Forest Service or for Congress to take action. Normally, the Forest Service would expect that the volume under contract would be drawn down during high points in the business cycle and would be built up during the low points.

Changes in buffer stocks, the volume under contract, serve as signals to the Forest Service to consider adjusting its budget and program of work. When harvest activity reduces volume under contract below target levels, the Forest Service on the Tongass National Forest will consider requesting additional funds from the Regional Office, and ultimately from Congress, to prepare additional timber sales. Conversely, when the volume under contract goes above target levels, the Tongass will consider decreasing funding requests and sale preparation efforts. The timber volume in the process of being prepared for offering is often referred to as the timber "pipeline'. The "pipeline" consists of all activities associated with timber sale preparation and accounted for by the "Gate System" where the gate is considered completed when various milestones are produced:

Gate 1- Position Statement
Gate 2- Sale Area Design, Environmental Documentation and Decision
Gate 3- Plan Implementation and Field Layout
Gate 4- Appraisal Offering Package
Gate 5- Bid Opening
Gate 6- Award
Post Formal Gate Process- Sale Administration
Monitoring
Reforestation
Timber Stand Improvement

The Forest Service' ability to respond in this way will, of course, be limited by the fiscal policies established by Congress and the Administration. Timber industry representatives as well as other interested parties have access to the Regional Forester, other Executive branch officials, and Congress in determining funding for Tongass timber sales through the appropriations process each year (AFA v. US, et al., Declaration of Frederick Norbury, October 14, 1994).

CONCLUSION

The conclusion is that the timber volume being considered in the Canal Hoya Project Area is reasonable in placement, timing, and amount; is consistent with the Forest Plan and Record of Decision as well as timber demand estimates by the Pacific Northwest Research Station, Brooks and Haynes, and Kathleen Morse (Economist, Region 10). The timber volume identified for the project is necessary to meet overall program goals as stated in the Forest Plan and is a reasonable and consistent interpretation of the Tongass Timber Reform Act (1990). Based on the above, the Stikine Area Independent Timber Sale Program is responsive to public issues, subsistence needs, and the timber industry.

Appendix F

Public Comments to the DEIS

Appendix F

Public Comments to the DEIS

TONY KNOWLES, GOVERNOR

PLANNING REC:
NO. 2.1.29

OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET
DIVISION OF GOVERNMENTAL COORDINATION

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PH: (907) 271-4317/FAX: (907) 272-0690

March 17, 1998

Mr. Scott Posner
USFS, Wrangell Ranger District
P.O. Box 51
Wrangell, AK 99929

RECEIVED
MAR 24 1998
SERVICE

Dear Mr. Posner:

SUBJECT: CANAL HOYA TIMBER HARVEST
STATE I.D. NO. AK 9801-04JJ
FINAL CONSISTENCY FINDING

The Division of Governmental Coordination has completed coordinating the State's review of the United States Forest Service's (USFS) proposed project for consistency with the Alaska Coastal Management Program (ACMP) and has developed this finding based on reviewers' comments.

The State has reviewed the Draft Environmental Impact Statement (DEIS) for the USFS's proposed Canal Hoya Timber Sale on the south shore of the Bradfield Canal, thirty miles southeast of Wrangell, Alaska. Specifically, this sale proposes to harvest between 12 and 17 MMBF of timber from approximately 610 to 800 acres, and to construct between 2.8 and 14.2 miles of road, depending on the alternative chosen. In addition, up to two log transfer facilities (LTF) are proposed at locations near Canal Creek and Hoya Creek. The LTF's will undergo a separate ACMP consistency review, and will be subject to a Department of Environmental Conservation Certificate of Reasonable Assurance (401 Certification). All inwater construction activities below the ordinary high water mark on the East Fork and West Fork of Survey Creek will be restricted to the period between June 1 and August 1 to protect the habitats of spawning and rearing fish.

The USFS has identified Alternative 3 as the preferred alternative for this project. This alternative proposes to harvest approximately 15 MMBF of sawlog and utility timber from 700 acres in 21 units around Canal Creek and Hoya Creek, and to construct a total of 8.9 miles of

specified and temporary roads as well as the LTF near Hoya Creek. Harvest methods include clearcuts with reserve trees, patch cuts, and partial cuts with diameter limits. In addition, of the total 15 MMBF of timber to be harvested, approximately 3 MMBF will be flown by helicopter directly to a barge.

Consistency Finding

This consistency finding, developed under 6 AAC 50, applies to the federal consistency determination required for the project per 15 CFR 930 Subpart C.

The State has three broad areas of concern for coastal resources affected by federal timber harvest activities: fish and fish habitat, wildlife and wildlife habitat, and water quality. The State enforceable policies that address these concerns are found in the Alaska Forest Resources and Practices Act (FPA) and its implementing regulations.

The State reviewed the proposed timber harvest activity to determine if state coastal resource concerns are adequately addressed and to determine if the State agrees that the activity is consistent, to the maximum extent practicable, with ACMP enforceable policies. Based on the review of the timber harvest activity by the Alaska Departments of Environmental Conservation, Fish and Game, and Natural Resources and the Wrangell coastal district, the State concurs with the FS determination of consistency, provided the following alternative measures are employed during project implementation:

1. If Alternative 3 remains the selected alternative for the ROD, then the West Fork Survey Creek crossing structure on Road 6960 shall be designed to avoid the high risk of failure described in the DEIS.

RATIONALE: This alternative measure is necessary to protect habitats, in accordance with 11 AAC 95.185(a). Alternative 4 avoids this unstable crossing site.

2. Specified roads must be designed with oversized culverts, outfall riprap, armored dips adjacent to the culverts, substantial ditch blocks, drivable waterbars, or any other protective measure necessary to prevent culvert failure or erosion of the road surfaces and ditchlines.

RATIONALE: Given the isolated nature of the project area, it is unrealistic to expect the specified roads will be effectively maintained. This alternative measure is necessary to ensure the integrity of the specified roads in the project area during inactivity, in accordance with 11 AAC 95.315(c)(1-3).

3. Upon completion of the timber sale, all structures must be removed from temporary roads.

RATIONALE: It is unknown when the next timber harvest entry will occur in the project area. Additionally, due to the remote location of the area and the difficulty of mobilizing equipment, road maintenance is unlikely and increases the risk of failure associated with drainage structures. This alternative measure is necessary to be consistent with the road closure standard of 11 AAC 95.320.

Advisories

Please be advised that the State appreciates the conscientious approach the Canal Hoya team has taken in keeping the natural resource agencies informed of issues and developments throughout the planning process and commends them for their efforts.

Please be advised that the State recommends the selection of Alternative 4 for this timber sale. Alternative 4 proposes less road construction and fewer stream crossings than the other alternatives and adequately addresses concerns over management-induced landslides from roads or units on steep slopes. If Alternative 3 remains the selected alternative for the ROD, the State prefers that the yarding prescription for Unit 5 be changed from cable to helicopter. Alternative 3 requires yarding across Survey Creek and the cutting of yarding corridors through the riparian buffer. Though the Tongass Timber Reform Act and the Tongass Land Management Plan allow yarding corridors, helicopter yarding would minimize the number of stream crossings and the amount of road construction required for this timber sale.

Please be advised that memorandums from the Alaska Department of Fish and Game and the Alaska Department of Environmental Conservation are attached to this consistency finding. The memorandums contain general comments and NEPA comments for FS consideration.

Please be advised that you are still required to meet all applicable State and federal laws and regulations. Your consistency finding may include reference to specific laws and regulations, but this in no way precludes your responsibility to comply with other applicable laws and regulations.

If changes to the approved project are proposed prior to or during its siting, construction, or operation, you are required to contact this office immediately to determine if further review and approval of the revised project is necessary. If the actual use differs from the approved use contained in the project description, the State may amend this consistency finding.

Should cultural or paleontological resources be discovered as a result of this activity, we request that work which would disturb such resources be stopped, and that the State Historic Preservation Office be contacted immediately (269-8720).

If you have any questions regarding this finding, please contact me at 465-8798 or email Jackie_Timothy@gov.state.ak.us.

Sincerely,

Jackie Timothy
Project Review Coordinator

Cc:

** Kevin Hanley, DEC, Juneau
** Jim Cariello, DFG, Petersburg
** Bill Hanson, DFG, Juneau
** Jim McAllister, DNR, Juneau
** Bob Palmer, DNR, Juneau
** Rex Blazer, DGC, Juneau
Judith Bittner, DNR/SHPO, Anchorage
** Ralph Thompson, COE, Juneau
** Mark Jen, EPA, Anchorage
** Duane Petersen, FWS, Juneau
** Steven Zimmerman, NMFS, Juneau
** Carol Rushmore, coastal district, Wrangell
Buck Lindekugel, SEACC, Juneau
Tom Waldo, SCLDF, Juneau
Richard Harris, Sealaska

* = fax
** = email

MEMORANDUM

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME
HABITAT and RESTORATION DIVISION

TO: Jackie Timothy
Project Review Coordinator
Division of Governmental Coordination
Juneau

DATE: February 20, 1998

PLANNING RECORD NO. 2.1.4

THRU:

FAX NO: 465-4272
PHONE NO: 465-4292

FROM: Bill Hanson
Regional Management Coordinator
Habitat & Restoration Division
Douglas

SUBJECT: Canal-Hoya DEIS

The Alaska Department of Fish and Game (ADF&G) submits these comments for use in the consistency review of the U.S. Forest Services' (FS) Canal Hoya Timber Sale Draft Environmental Impact Statement (DEIS). The ADF&G concludes that the DEIS is largely consistent with the ACMP. Specific actions required to achieve full consistency with the ACMP are identified separately from comments related to the NEPA process.

GENERAL COMMENTS

The Canal-Hoya timber sale project proposes to harvest 10-17 mmbf of timber from 600-800 acres requiring 3 to 11 miles of new road construction in VCUs 5200 and 5210 on the south shore of Bradfield Canal in the Wrangell Ranger District. The Forest Service has identified Alternative 3 as the preferred alternative for this project.

The major wildlife concerns with the Canal-Hoya project are associated with bears and mountain goats. The project area is sandwiched between two notable bear areas: the viewing facility at Anan Creek and the very productive brown bear area of the Eagle River drainage. The ranges of many of these bears must inevitably overlap the project area. In addition to the bear issue, the southern portion of the project area is mountain goat range with a moderate, huntable population of goats.

We are disappointed that the sale does not include a Helicopter-Only alternative. This type of alternative would have greatly relieved our concerns over effects on the unique wildlife resources in the area and eliminated the issues related to roading on steep slopes. According to the DEIS (page 2-6), a helicopter only alternative was considered by the planning team for the Canal Hoya project, but was eliminated from further review due to concerns that it might not meet FS scenic resource objectives and because it might negatively affect the economic viability of future road entries.

Given the success of other helicopter sales in the area, especially the Campbell Timber Sale, we question whether this analysis is accurate. Since the timing and location of future entries into the area are not addressed by the DEIS in detail, it is difficult to evaluate how these may relate to the concerns that we are expressing for the current alternatives. It seems reasonable, however, to expect

that additional volume outside the currently identified units might become accessible under a helicopter alternative. Specific concerns related to roads are addressed in the sections below.

Far more than with most Forest Service timber sales, members of the IDT have consulted ADF&G staff often and kept us informed of issues and developments throughout the planning process. We commend the team and appreciate their conscientious approach to involving our agency in a meaningful manner. To a great degree, the DEIS does an excellent job describing the wildlife issues and concerns of this proposed timber sale. These include: the importance of various habitat types to bears, the effects on bears of habitat loss and roading, effects of disturbance and access changes on bears and mountain goats, the effects of logging high volume old growth on species dependant on such habitat, and the importance of Anan Creek. To us the DEIS description of the area's values and issues point to the need for a markedly different approach to timber harvest than traditional roading-clearcut-cable methods. Some of the alternatives move in that direction but clearcutting from roads still plays too large a role in most alternatives. We urge the Forest Service to weigh carefully the difficulty of mitigating the effects of roads, increased access, and habitat loss with the special multi-resource values of neighboring Anan Creek and Eagle River. We hope the link between the wildlife issues presented in the EIS and the Record of Decision will be evident.

We are pleased that the preferred alternative does not road the Canal Creek drainage and that timber harvest there is limited to selective cut helicopter logging. Its proximity to Anan Creek makes the Canal VCU unsuitable for any more extensive development activity, particularly in the absence of any conclusive evidence that Anan bears will not be adversely affected by nearby operations. Because of the world class value of the Anan Creek bear viewing facility we believe it is advisable that forest management in areas used by Anan bears proceed conservatively.

Consequently, if logging must occur in Canal-Hoya, we recommend Alternative 4 be selected as it affects the fewest number of acres, constructs the fewest roads and that is least likely to adversely affect Anan bears. Considering, as the DEIS notes, pg. 3-41, "the effect of roads on bears is greater than the direct effects of removing habitat", the advantages to wildlife of Alt. 4 over the preferred Alternative 3 are considerable. In exchange for reducing road mileage 70% from Alt. 3, Alt. 4 would result in only a 17% reduction in sale timber volume. The DEIS acknowledges that if road costs were included, Alt. 4 would be the most economical to implement. We disagree with the DEIS statement on page 3-10 that "the value of roads and LTFs may outweigh the immediate cost of the sale." In an area like this where roading may be especially detrimental to other resources, the value of roads is highly questionable if not greatly diminished. The Forest Service needs to revise its concept of values when in comes to irreplaceable, one-of-a-kind resources such as Anan Creek.

ACMP COMMENTS

Roads

Although the preferred alternative avoids building road in the Canal Creek Watershed, it still proposes to construct road through rugged terrain with several difficult stream crossings. We question the need and the economics of construction of road beyond Hoya Creek due to the small amount of suitable and operable timber accessed by this road as shown in Figure 3-2. The preferred alternative harvests most of the available timber south of the powerline in the Hoya drainage during the first entry. We assume hydro sites H3, H4 and H6 on Road 6960 will be bridges although this is not specified on the road cards. In addition, we are concerned with the West Fork of Survey Creek (H3) which as stated on page 3-84, "has a high risk of failure."

The portion of road number 6961 in Unit 3 (Alt 1,2,3) is a concern due to the steep terrain, which requires full bench construction and endhaul. We recommend eliminating this portion of road and making Unit 2 helicopter.

We recommend ending road 6962 at the north end of unit 5 as proposed in Alternative 4. This can be accomplished by changing the portion of the unit on the east side of Survey Creek and the narrow portion of the unit to the south from cable to helicopter yarding to avoid the need for yarding corridors. A short length of temporary road could extend into the north end of the unit for cable yarding.

ADF&G strongly recommends selection of Alternative 4 which proposes fewer miles of road construction and stream crossings. This is the only alternative, which adequately addresses concerns over management-induced landslides from roads or units on steep slopes (as identified in Issue 5 : Freshwater and Marine Resources.

Due to the high risk of failure associated with drainage structures in this area, length of time between entries and difficulty in getting equipment on site, the roads should be put to bed and all structures should be removed upon completion of the sale

Unit Concerns

Unit 5, Alt 2,3: This unit would be better suited for helicopter to avoid yarding corridors and eliminate a mile of road construction in close proximity to a Class II stream.

Unit 19, Alt 1,2,3: It appears that yarding the portion south of the Class 4 stream will likely drag logs down the channel unless full suspension can be achieved.

LTF location and design

We strongly agree with the concerns expressed by ADEC concerning the design, operation and location of the proposed LTF.

Anadromous Fish Stream Crossings

As correctly identified on the road card, Appendix B-9, the two crossings on Survey Creek will require timing windows of June 1 to August 1.

NEPA COMMENTS

Anan bear telemetry study

We ask that the Final EIS acknowledge the cooperation and contributions of ADF&G/DWC to the Anan Bear Telemetry study. The DEIS, while briefly describing the study on page 3-33 does not mention ADF&G's involvement. In fact, ADF&G/DWC contributed the expertise and key staff needed to capture the bears, and division personnel flew at least 44 hours of telemetry surveys of radio-collared bears during the study. This was a majority of the flight time for the project. A substantial portion of the cost of our assistance to the project was borne by ADF&G. We believe this merits mention.

Much of the planning for this sale and alternative development appears to have been linked to the results of the Anan bear telemetry study of 1993-1995. Although it is a useful study in many respects, we believe the data set is too small for us to be confident it comprehensively describes Anan bears' use of the project area. Although the study obtained radio relocations for about three years, bears were captured and marked only the first year of the study. The data are better than no data at all, however, and they do indicate that there is considerable use of the western portion of the project area by Anan bears. It seems evident that the eastern portion of the area is used less than the western portion. But too few bears were sampled to conclude, as the data and DEIS

imply, that Anan black bears do not use Survey Creek and lower Hoya drainages and would be mostly unaffected by timber harvest there.

Roading and access management plan

If logging occurs in the Canal-Hoya project area it is important that roading be kept to a minimum and roads that are built be effectively closed to ATV use as well as highway vehicle use immediately after logging. . ATVs are the most likely vehicles used on such an isolated road system. Gating would not be effective mitigation as it has proved of little use in restricting ATVs. The DEIS gives little indication of the interval before the next timber sale entry to the project area. If that interval is 10 years or more, we believe that water quality concerns as well as wildlife interests argue for removal of culverts and other drainage structures.

Mountain goats

We believe gating the road up Hoya Creek would not mitigate the effect of improved access to the mountain goat population. See above on the need to close roads to ATV use. Expansion of the Hoya old growth reserve goes a long way toward alleviating our habitat concerns about mountain goats in this sale.

Brown bears

Not only is the project area bordered by the Anan bear population on the west but it is bordered on the east by Eagle River, the most important brown bear hunting area in terms of harvest on the mainland of Southeast Alaska. Legal brown bear harvest typically increases significantly during logging or other development operations in or near good brown bear habitats. Both improved access as a result of development, and more importantly, a greater number of hunters living and working close to the area are responsible for the increased harvest. This has occurred in the past notably at Bradfield River near Canal-Hoya. At the same time that logging in Canal-Hoya is planned, work will likely be proceeding on the Swan Lake-Tyee intertie project through the Eagle River-Eagle Lake valley. The simultaneous presence and activities of crews from both projects may increase pressure on the brown bear population . With the harvest rate of Eagle River bears now about 5% of estimated habitat capability and with females making up a larger than desirable proportion of recent harvest, we are concerned about cumulative effects on the brown bears of the area.

Anecdotal evidence and observations at Anan Creek suggest that brown bear populations may be increasing in the area. Nevertheless, without knowing the current population we cannot be certain it will support a significant increase in harvest even if only short-term. Consequently we request that the Forest Service explore with the contractors ways to avoid project-related increases in brown bear harvest. Mining companies at Greens Creek and Kensington in northern Southeast Alaska have prohibited hunting in the project area during both on and off-hours as a condition for employment with the company. Limiting or prohibiting hunting of both bears and mountain goats in the project area and nearby during operations would substantially alleviate our concerns over increased harvest.

Another road management tool the Forest Service should consider is daily prohibiting vehicle traffic for recreation use on the road system after work hours.

We welcome other measures the Forest Service has proposed for reducing impacts to bears including the use of a floating logging camp and accepting ADF&G's recommendation of 500-foot buffers on Hoya, Survey, and "Surho" creeks.

Monitoring plan

It behooves the Forest Service to monitor closely and thoroughly the effects of logging in Canal-Hoya on the bear populations of both Anan Creek and Eagle River. Ostensibly the Forest Service expects more logging to occur here. It is likely that future actions will enter Hoya and Canal creek drainages to a substantially greater degree than this one. Probably more roading will be proposed

in the future particularly in Canal Creek if all the suitable timber is to be accessed. With such a renowned wildlife resource possibly at risk, the burden of proof that further development will be innocuous must lie on those proposing logging. We believe that such a proof is not possible with the meager monitoring plan proposed in the DEIS.

An expanded study of Anan bears with a larger sample size and data set and a study of Eagle River brown bears should be done prior to any new logging entry in Canal-Hoya.

Many factors could contribute to a change in the Anan bear population. An effort needs to be made to determine if changes in Canal-Hoya affect Anan bears. Marking and monitoring bears in the project area as well as at Anan is one way of increasing knowledge about bears' use of both areas. This technique was useful in studying brown bears' use of the Hoonah dump. It would also provide information on use of the project area by Eagle River brown bears.

Monitoring of the nature of post-project road use is as important as monitoring the quantity of use.

Old growth reserve review

Interagency consultation and cooperation in review of the small old growth reserves in the project area was strong. We believe the process was good and that it worked. Starting the reserve review process early in planning for the sale was an important reason for its success. U.S. Fish and Wildlife Service, U.S. Forest Service, and ADF&G biologists were able to come to consensus on the boundaries of the reserves. A field visit to the proposed Canal reserve by ADF&G biologists was very useful in coming to a final decision. We are pleased the Forest Service has agreed to expand the Hoya reserve (pp. 2-3, 3-61).

Retention

The DEIS states on page 3-7 "The closure of the pulp mills has drastically reduced the demand for utility and low grade sawlogs which have historically been processed into pulp products." We don't understand why so little retention is designated for most of the units when the trees would have much more value for wildlife if left standing. This is especially true of helicopter units, many of which are only designed to have 10% retention.

In fact Unit 3, Alt 1,2,3 strangely designates10% retention for the cable portion and only 5% in the helicopter portion.,

We strongly encourage the FS to review utilization standards in light of current market conditions. Lowering utilization standards might significantly improve the economics of some sales and units while moderating the influences on wildlife. This is only true, however for retention of live trees, not for the cutting of low/unmerchantable material and leaving of such material on the ground.

Thank you for the opportunity to comment.

c: Jackie Timothy, DGC
Carol Hale, USFWS
Steve Brockman, USFWS
Kevin Hanley, ADEC
Jim Cariello, ADFG/DH&R
Ed Crain, ADFG/DWC
Kim Titus, ADFG/DWC

cc: Tom Paul, ADF&G WC, Douglas
Lana Shea Flanders, ADF&G H&R, Douglas
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Kevin Hanley, DEC, Juneau
Richard Enriques, FWS, Juneau
Cindy Hartmann, NMFS, Juneau

MEMORANDUM

State of Alaska

Department of Environmental Conservation

PLANNING RECORD NO. 2.E.3

RECEIVED
FEB 26 1998
FOREST SERVICE

TO: Jackie Timothy
Project Review Coordinator
OMB - DGC

DATE: February 20, 1998

FILE NO: AK9801-04JJ

THRU:

TELEPHONE NO: 465-5364

SUBJECT: Canal Hoya Timber Sale DEIS

FROM: Kevin J. Hanley KJH
Environmental Specialist
Division of Air and Water Quality

The Department of Environmental Conservation has reviewed the Draft Environmental Impact Statement (DEIS) for the U.S. Forest Service's proposed Canal HoyaTimber Sale on the south shore of Bradfield Canal. Specifically, this sale proposes to harvest between 12 and 17 MMBF of timber from approximately 610 to 800 acres, and to construct between 2.8 and 14.2 miles of road, depending on alternative. In addition, up to two log transfer facilities are proposed at locations near Canal Creek and Hoya Creek. These facilities will undergo a separate Alaska Coastal Management Program (ACMP) consistency review, and will be subject to a DEC Certificate of Reasonable Assurance (401 Certification).

The Forest Service has identified Alternative 3 as the preferred alternative for this project. This alternative proposes to harvest approximately 15 MMBF of timber from 700 acres, and to construct a total of 8.9 miles of specified and temporary roads as well as the LTF near Hoya Creek. In addition, of the total 15 MMBF of timber to be harvested, approximately 3 MMBF will be flown by helicopter directly to a barge. We offer the following comments pursuant to 6 AAC 50 of the ACMP and Section 319 of the Clean Water Act (CWA). These comments collectively address ACMP, CWA Section 319, and NEPA concerns, with ACMP standards cited, where applicable.

Overall, we appreciated the concise format of the DEIS and the non-technical manner in which the information was presented. In addition, we were very pleased to see the site-specific stream crossing information that was included in the road cards in Appendix B. This type of information is extremely useful in that it provides an indication of the channel characteristics at the crossing sites, including stream width, gradient, incision depth, substrate, and the type of fish habitat present. We do, however, have concerns regarding the alternatives that were considered in detail and the selection of the preferred alternative, the lack of information concerning road maintenance, and the design of the proposed log transfer facilities. These concerns are outlined as follows:

1. Alternatives considered in detail, and the selection of Alternative 3 as the preferred alternative

Given the success of the Campbell Timber Sale, we were surprised and somewhat disappointed to see that a helicopter only alternative wasn't included as part of the Canal Hoya project. That sale, which was located directly across Bradfield Canal from the Canal Hoya project area, involved the selective harvesting of 11.6 MMBFof timber, and was yarded entirely by helicopter with no road construction. The issues of concern for the sale were very similar to those identified for the Canal

Hoya project, including impacts to bear habitat and scenic and recreation values. Those issues, however, were effectively mitigated through the implementation of the selective helicopter harvesting prescription. The Record of decision for the Campbell Sale states *"Public land managers face an increasing challenge to supply a growing national demand for jobs and wood fibre while at the same time managing ecosystems to provide aesthetic, wildlife and fishery resources. I believe we have met that challenge in the Cambell project area by the selected alternative while at the same time trying* ***new harvest methods that may be applicable to other equally difficult landscapes we manage****. The selected alternative does not propose any clearcutting"* (emphasis added). Given the steepness of the terrain, and its immediate adjacency to the Anan Creek LUD II and wildlife viewing area, the Canal Hoya project area clearly constitutes an *"equally difficult landscape"* for which the selective helicopter harvest methods used for the Campbell Timber Sale should be considered as an action alternative for this project. We would very much support such an alternative and recommend that road construction be deferred or avoided in the project area.

According to the DEIS (page 2-6), a helicopter only alternative was considered by the planning team for the Canal Hoya project, but was eliminated from further review because *"Harvesting sufficient timber volume to meet the Purpose and Need for this project would have required adding units to this alternative that would not have met our desires for the scenic resource nor left enough timber along potential road corridors to maintain the economic viability of road construction for future entries."* However, according to Figures 3-2 and 3-3 in the DEIS, it appears that more than sufficient volume exists within one mile of saltwater to accommodate selective helicopter harvesting while meeting the Purpose and Need for this project. This is especially true within VCU 5200 which contains a relatively large amount of medium and high volume timber. It also appears that this volume could be obtained from areas outside of the potential road corridors that are depicted on the alternative maps.

Regarding the concern for the scenic resource, according to the Record of Decision for the Cambell Timber Sale (page 2), it appears that this concern can be effectively mitigated through the selective harvest prescription -- *"I was also concerned about the scenic and recreation values of the Bradfield Canal area. I believe my decision provides for the continuation of many of the established uses of the area because of Alternative P's reliance on helicopter, overstory removal methods, lack of roads, and no harvest in the Tom Creek area. Although some people may notice the harvest areas they will not be in stark contrast to the surrounding landscape. In addition, the pattern of human use will remain virtually the same. This will protect wildlife and fishery values as well as primitive and semi-primitive recreation experiences which I believe will continue to be in demand on a national, regional, and local scale."* As is indicated on page 2-6 of the DEIS, a selective helicopter harvesting alternative would also be *"consistent with the Forest Plan objective of avoiding changes to semi-primitive non-motorized settings in Modified Landscape management prescription areas, when feasible."*

The chief concern that we have with a roaded alternative is the remote location of the project area and the associated unrealistic expectation that the roads will be effectively maintained. This is particularly true for the preferred alternative which proposes to construct approximately 7.3 miles of specified (permanent) road that will require twelve fish stream crossings, several of which appear to be problematic. Specifically, according to the DEIS (pages 3-38, 3-81, and 3-84), the proposed location of the West Fork Survey Creek crossing on the 6960 Road is *"an unstable site with overflow channels"* and *"a high risk of failure."* In addition, just beyond this crossing, the proposed

alignment crosses four Class II streams in less than 500 feet, with all of the crossing sites located immediately upstream of Class I anadromous fish habitat. In addition to the localized impacts associated with the installation of such a high density of crossing structures, the ability to maintain the structure at the West Fork Survey Creek crossing is highly questionable, especially given the overflow channels and *"large bedload and debris transport at this site."* Consequently, this road should not be constructed, at least not in the proposed location.

Although we believe that yarding should be conducted exclusively by helicopter within this project area, if the Forest Service continues to pursue an alternative that employs both cable and helicopter yarding, then we strongly recommend that Alternative 4 be selected for the ROD. This alternative is much more environmentally preferred as it constructs the least amount of specified road (2.6 miles), crosses only two fish-bearing streams, avoids the *"unstable," "high risk of failure"* crossing site on West Fork Survey Creek, and still establishes the "infrastructure" (LTF and initial road system) for future entries. In addition, it avoids harvesting within the Hoya Creek watershed which, according to the DEIS (page 3-83), *"has a relatively high proportion of steep slopes"* and *"significant natural sediment source areas in combination with a relatively high proportion of low gradient streams that are sensitive to sediment deposition"*

However, if Alternative 3 remains as the selected alternative for the ROD, then the alignment of the 6960 Road must be moved north of its present location to avoid the unstable crossing site on West Fork Survey Creek and the four Class II streams located just beyond this site. Given the topographic features on the unit card and road card maps, it appears that such a relocation is feasible and, therefore, necessary to be consistent with **11 AAC 95.285(a)(6)**, which states "An operator shall minimize the number of stream crossings." In addition, the yarding prescription for Unit 5 should be changed from cable to helicopter, as is prescribed for this unit under Alternative 4. This would avoid the necessity of yarding across Survey Creek and the cutting of yarding corridors through its riparian buffer. It would also ensure consistency with **11 AAC 95.285(a)(1)** which states "An operator shall minimize the amount of road construction."

2. Road Maintenance

According to the DEIS (page 2-2), all specified roads will be closed to motor vehicles by gates following completion of this timber sale; however, no information is provided concerning the post-sale maintenance of these roads. In addition, although the road cards indicate that each road has been designated for post-sale Maintenance Level 1, no indication is provided as to what this level of maintenance will consist of. This is especially confusing given that Maintenance Level 1 has been defined differently across the Tongass, with definitions ranging from bridge removal and organic encroachment, with all culverts left in place, to "basic custodial maintenance" of the road surface and drainage structures. Regardless of how it is defined for this timber sale, all of the inactive specified roads in the project area must be maintained consistent with the standards of **11 AAC 95.315(c)(1-3)**, which include: (1) keeping ditches and drainage structures maintained as necessary to assure water flow and fish passage, (2) Keeping the road surface crowned, outsloped, waterbarred, or otherwise left in a condition not conducive to erosion, and (3) keeping ditches and drainage structures clear and in good repair.

However, as indicated above in item 1., given the isolated nature of the Canal Hoya project area, it is unrealistic to expect that these roads will be effectively maintained, let alone monitored, on a

routine basis. This is especially true given the high costs of mobilizing equipment for the maintenance of roads in such a remote location, costs which are exponentially higher for road systems as short as those proposed under the action alternatives for this project (i.e., high cost per mile of road maintained).

Although future timber harvest entries will undoubtedly occur within this project area, the DEIS does not indicate when the next entry will be. Consequently, given the unknown length of time during which these roads will be inactive, and the apparent unrealistic objectives for road maintenance, all roads within the project area should either be effectively closed consistent with standards of **11 AAC 95.320**, or they should be designed with the knowledge that maintenance is unlikely (e.g., outsloped road surfaces, oversized culverts, outfall riprap, armored dips adjacent to the culverts, substantial ditch blocks, waterbars, etc.). However, as indicated before, we believe that a road system should not be established within this project area, and that yarding should be done exclusively by helicopter

3. Log Transfer Facility Design

As depicted in the schematic drawings on page 3-30 of the DEIS, and as described in Appendix D, the *"floating log slide"* design of the proposed LTF(s) for this project is essentially that of a "beaver slide;" a design that is generally no longer used because of the substantial loss of bark that results from the uncontrolled high velocity at which the log bundles enter the water. Bark loss has been shown to be directly correlated with log entrance velocity which, in turn, is dependent upon the angle of the slide. Depending on the tidal stage, the slide angle at which this design would operate varies from 6 degrees at a +15' tide to 23 degrees at a -4' tide (see attachment). These angles will actually increase during log transfer operations as the weight of the log bundles submerges the free floating end of the skid rails further into the water.

A similar facility at Sawmill Cove in Yakutat was examined by the U.S. Fish and Wildlife Service (USFWS) to determine the degree of bark loss associated with this type of LTF (Robinson-Wilson and Jackson - no date). The mean percentage of bark loss from each bundle entering the water at that facility was determined to be approximately 28 percent. This amount of bark loss was associated with entrance velocities that ranged from 22 feet per second (fps) to 25 fps. Subtidal investigations by the USFWS at that facility identified bark accumulations on the benthic substrate of up to 36 inches thick (USFWS 1984). Given the design similarities between the proposed LTF(s) for the Canal Hoya project and the Sawmill Cove beaver slide, relatively similar degrees of bark loss can be expected to occur. Consequently, unless it can be demonstrated that the entrance velocity of the log bundles will be controlled to 3 fps or less, an alternative design for the LTF(s) must be considered and must be limited to those which are capable of controlling the speed at which the bundles enter the water (e.g., crane, double A-frame, low-angle slide, continuous chain). This is necessary in order to ensure consistency with **6 AAC 80.130** (Habitats) and **6 AAC 80.140** (Air, Land, and Water Quality). In addition, by the time the Forest Service goes through the permitting process for the LTF(s), the EPA NPDES General Permit for LTFs in Alaska will have been finalized. This permit stipulates that the speed of log bundles entering receiving waters shall not exceed 3 feet per second. Consequently, in addition to being required for consistency with the ACMP, an alternative design will need to be developed in order for the LTF(s) to be authorized under the General Permit.

We appreciate the opportunity to comment.

cc: Jim Ferguson, ADEC
Deena Henkins, ADEC
Jim Cariello, ADF&G
Bill Hanson, ADF&G
Tom Paul, ADF&G
Carol Hale, USFWS
Bill Ryan, USEPA
Scott Posner, USFS
Steve Brady, USFS

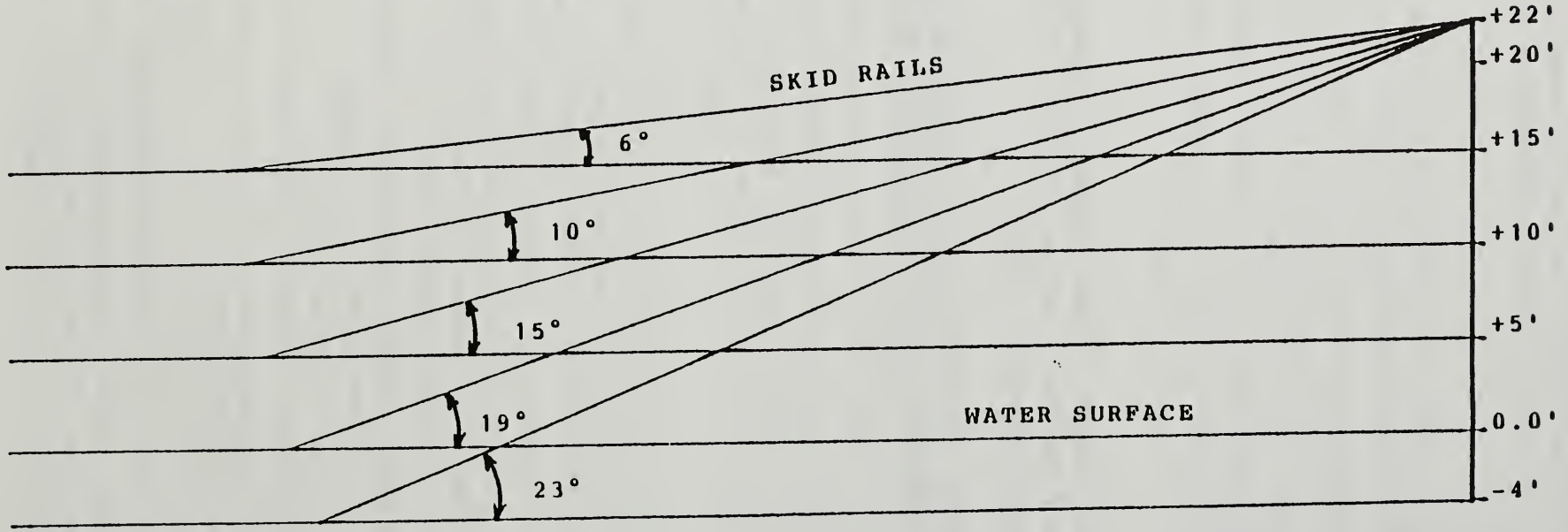
Literature Cited

Robinson-Wilson, E.F., and R. Jackson. No date. Relationship between bark loss and log transfer method at five log transfer facilities in southeast Alaska. U.S. Forest Service. Alaska Region Administrative Document Number 157. 28 pp.

U.S. Fish and Wildlife Service. 1984. Distribution of subtidal bark deposits at Sawmill Cove, Yakutat, Alaska. USFWS, S.E. Alaska Ecological Services, Sitka Substation. Unpublished report. 12 pp

Attachment

ATTACHMENT



ANGLES OF SKID RAILS AT VARIOUS TIDAL ELEVATIONS

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Jackie Timothy
Project Review Coordinator
Division of Governmental Coordination
P.O. Box 110030
Juneau, Alaska 99811-0030

Dear Ms. Timothy,

Thank you for your ACMP review and comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I appreciate the time and effort you have taken in coordinating with us to resolve issues that came up during the review. I would like to take this opportunity to respond to the comments in your letter and the letters that you forwarded from ADFG and ADEC.

Consistency Finding

"If Alternative 3 remains the selected alternative for the ROD, then the West Fork Survey Creek crossing structure on Road 6960 shall be designated to avoid the high risk of failure described in the DEIS."

We were able to find a new stable crossing about 150-200 meters downstream from the original crossing. It avoids 4 fish stream crossings as well as the stability problems associated with the original site. Please also note that I have dropped the final 1.3 miles of Road 6960 from the selected alternative for the reasons explained in the Record of Decision.

"Specified roads must be designed with oversized culverts, outfall riprap, armored dips adjacent to the culverts, substantial ditch blocks, drivable waterbars, or any other protective measure necessary to prevent culvert failure or erosion of the road surfaces and ditchlines."

We have reviewed 11 AAC 95.315 as well as the other pertinent road construction and maintenance provisions and we have determined that our standard road design, construction, and maintenance practices are fully consistent with the Alaska Forest Resources and Practices Regulations and the above stipulations. We plan regular inspections and maintenance of the specified road system in this sale area.

"Upon completion of the timber sale, all structures must be removed from temporary roads."

This will be done and was listed as a mitigation measure common to all alternatives on page 2-2 of the DEIS.

Advisories

"Please be advised that the State recommends the selection of Alternative 4 for this timber sale."

Careful consideration was given to Alternative 4; however I selected Alternative 3 because I feel it achieves a better balance of meeting the social, economic and resource concerns for the project area. Alternative 3 has been refined including some of your suggestions as discussed above. I believe Alternative 3, while fully meeting Forest Plan standards, more closely follows the intent of the Forest Plan in regard to the timber resource and maintains future options for viable economic timber harvest south of the powerline. Alternative 4 does not provide for such harvest south of the power line and considerable area available for timber harvest exists in this area. For this reasons and others described in the Record of Decision I preferred Alternative 3 as, in my opinion, a more balanced decision consistent with the Forest Plan objectives. Note that Alternative 3 has been modified as previously noted to reduce total specified roads by 1.3 miles.

"If Alternative 3 remains the selected alternative for the ROD, the State prefers that the yarding prescription for Unit 5 be changed from cable to helicopter."

We have already reduced the amount of road construction and stream crossings in this unit by dropping the road originally proposed to cross Survey Creek and access the eastern portion of Unit 5. This road would have required at least three major stream crossings, two of which represented high risk of failure. Instead, the use of skyline logging corridors was proposed to eliminate the need for road on the east side of Survey Creek and stream crossings in the unit, thereby reducing water quality and fish habitat impacts while still allowing for relatively economical cable yarding. The road on the west side of Survey Creek in Unit 5 crosses no major streams. Skyline yarding across Survey Creek will result in less impact than new road construction and stream crossings. Stream protection measures are detailed in the unit card. We will design Unit 5 to be fully consistent with the Alaska Forest Resources & Practices Regulations for road location (11 AAC 95.285) as well as cable yarding and stream protection (11 AAC 95.360). If the yarding corridors across Survey Creek cannot be designed to be fully consistent with all regulations and BMPs, we will require the portion of Unit 5 east of Survey Creek to be helicopter yarded.

ADFG Comments

"We are disappointed that the sale does not include a Helicopter-Only alternative."

The Campbell Timber Sale is cited as an example of a timber sale that provided timber without roads or clearcuts. Roads are needed to harvest timber in Canal Hoya because of helicopter limits and the power line. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the available timber would be isolated and uneconomical to havest in most economic markets.

No roads will be constructed in the Canal VCU this entry. Alternative 4 provided the decision maker with an option to select "helicopter yarding only" by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). We have expanded our discussion of that option in the FEIS.

"We disagree with the DEIS statement on page 3-10 that "the value of roads and LTFs may outweigh the immediate cost of the sale."

The Forest Service does view specified road developments as a long term economic benefit (capital improvement) because specified roads provide access for a variety of silvicultural activities including; timber harvest, tree planting, precommercial and commercial thinnings both for the first entry and any future entries.

"The portion of road number 6961 in Unit 3 (Alt 1,2,3) is a concern due to the steep terrain, which requires full bench construction and endhaul."
Since the road design was not completed when the DEIS was published, we did not include the length of full bench construction needed, so this road may have looked like it would have more resource impacts than would actually occur. This road segment would only require about 200 feet of full bench road construction with end haul of excavated material to an acceptable stable location.

"...The roads should be put to bed and all structures should be removed upon completion of this sale."
We will pull all drainage structures on temporary roads and restore the drainages to their original pattern. Temporary road beds would also be seeded and revegetated. We will maintain the specified roads in a drivable condition so we can drive on them to conduct road maintenance work, regeneration surveys, thinning and other administrative work. The specified roads are considered "transportation infrastructure" for silvicultural purposes only. The Forest Service does not plan to use the roads for any other purpose at this time. To mitigate wildlife habitat security concerns, the roads will be closed during and after sale completion to unauthorized motorized vehicle access by means of gates and an Administrative road closure order.

"Unit 19, Alt 1,2,3: It appears that yarding the portion south of the Class 4 stream will likely drag logs down the channel unless full suspension can be achieved."
It does appear from the unit card that partial suspension may be difficult to achieve over this Class IV stream. However, we would like to further evaluate the situation in the field prior to suggesting unit modifications. We will ensure during unit layout that 1) the stream is in fact a Class IV stream suitable for partial suspension, 2) terrain, road location and unit boundaries (tailholds, etc.) assure adequate suspension over the stream in accordance with 11 AAC 95.360. We will invite the State to review this unit in the field with us during layout to determine if unit modifications are necessary.

"We ask that the Final EIS acknowledge the cooperation and contributions of ADF&G/DWC to the Anan Bear Telemetry study."
We regret the omission and have made the correction in the Final EIS.

"... too few bears were sampled to conclude, as the data and DEIS imply, that Anan black bears do not use Survey Creek and lower Hoya drainages and would be mostly unaffected by timber harvest there."
We realize there are limitations to this data, yet it represents 19% of the black bear population at Anan, by our best estimates, which some would argue is a reasonable sample of the population. We believe it is worthwhile to use information we gained from 3 years of telemetry research. The only sure way of obtaining an estimate of home range for all Anan bears would be to collar all of the bears. Aside from the risk of losing animals, it is doubtful that this would be acceptable to tourists or to the guides. The home range size of the black bears we collared matched what has been found in other studies. The Hoya VCU is outside of this range for black bears.

"Gating would not be effective mitigation as it has proved of little use in restricting ATVs."
The area is fairly inaccessible. The roads will not connect to any community and the only way to get a vehicle to the area is by boat and there will be no loading or unloading ramps. We believe that our design and location for LTF's and post sale closure of the LTF's will be such that the effort to use boat access will not be encouraging to most users to transport and off- load ATVs at the LTF sites. Two gates will be designed such that ATVs cannot go under them and they will be placed in

locations that will be extremely difficult to get around. The first gate will be made of iron - not the usual perforated steel, so ATVs will not have the power to pull over or destroy the barricade. Non-motorized access will be improved in areas where roads are constructed. Roads will not be constructed in the Canal VCU this entry. This gives us time to monitor and evaluate the effectiveness of road closures in the Hoya VCU before constructing roads in the Canal VCU.

"Brown Bears"

An entire section of the DEIS covers the impacts of roads on bears (p 3-44) and cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself (FEIS 1997). We are managing human access by gating all the roads and only allowing motorized traffic for administrative purposes during and after the sale. The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We have also followed the recommendations of State and USFWS biologists who visited the site.

"Monitoring the nature of post-project road use is as important as monitoring the quantity of use."

This will be done as part of the monitoring shown in Appendix C.

"We strongly encourage the FS to review utilization standards in light of current market conditions."

We recognize the value of leaving low grade sawlogs for wildlife habitat and are attempting to develop a strategy by which we can leave those trees without significantly increasing marking costs or conflicting with regulations prohibiting "high-grading." Please note that even those prescriptions we are calling "clearcuts" will retain at least 10% of the original stand on the site. We anticipate that our choice of leave trees can help address the issue you raise.

ADEC Comments

Most of the ADEC comments have been addressed above.

"...although the road cards indicate that each road has been designated for post-sale Maintenance Level 1, no indication is provided as to what this level of maintenance will consist of.

This has been corrected in the FEIS on page 4-12.

Maintenance Level 1. This level is assigned to intermittent service roads during the time management direction requires that the road be closed or otherwise blocked to traffic. Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level. Drainage facilities and runoff patterns are maintained.

"Log Transfer Facility Design"

A contract stipulation will require the entrance velocity of log bundles be controlled to 3 fps.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Craig Flatten
P.O. Box 9411
Ketchikan, AK 99901
907-225-2444

Scott Posner
Team Leader, Canal Hoya Timber Sale
USDA Forest Service
P.O. Box 51
Wrangell, AK 99929

March 1, 1998

Dear Scott:

The following are comments I am submitting for the Canal Hoya Timber Sale DEIS. As a wildlife biologist with the Alaska Department of Fish and Game in Ketchikan, I was involved in the collection of bear relocation data at Anan in 1993-95, and prepared this information for GIS digitizing at the request of former Wrangell Ranger District biologist Dennis Chester. This past August I also visited the Anan Creek bear viewing area over a four day period. As such, I have some intimate knowledge of both the bear relocation data presented in the DEIS and the Anan area.

With regard to the Canal Hoya Timber Sale DEIS, my primary concern is that this document has not adequately addressed the possible negative impact of timber harvest and associated activities on the bears that inhabit this region and frequent the Anan Creek area. The importance and value of Anan Creek as a world class wildlife resource cannot be overemphasized and any development which may impinge upon the integrity and future well-being of this resource must be thoroughly researched. This has not been done. Though the cooperative research project supplied preliminary data on the movements and habitat use of a small sample of the bears in the Anan Creek, Canal Creek, and Hoya Creek areas, this effort cannot be viewed as more than a pilot study with cursory and inconclusive results. While this data may be useful for beginning to understand the basics of bear movements in this area, I believe it is certainly inadequate --especially in terms of sample size and depth of analysis-- to be considered as the basis for identifying bear use areas and habitat, and speculating on the future impacts of proposed timber harvest in this area, as was done in the DEIS.

A total of 203 relocations were collected from 13 tagged bears, including 12 black bears and 1 brown bear, during 26 relocation flights over a two year period. This represents an average of only 14 relocations per bear and only 7 relocations per bear per year. It is recognized that for most wildlife species even the most basic estimates of minimum convex polygon home range require at least 30 relocations per year (Kenward R., 1987. Wildlife Radio Tagging. Academic Press. 222 pp). Certainly, much larger sample sizes of both bears and relocations are needed to perform the in-depth data analyses that are necessary to assess the impacts of the timber harvest and other developments, as proposed in Alternatives 1 through 4 of the Canal Hoya Timber Sale. Simply put,

as derived from the telemetry relocation data and presented in the DEIS, I strongly believe that the bear use areas, habitat associations, proximities to VCUs, and inferences regarding the impacts of proposed harvest units on bears in this area, are all very speculative and very weakly supported.

The quantity and quality of telemetry data can greatly affect the suitability of subsequent management decisions based on this kind of information. Recently, I attended a presentation by ADF&G biologists who are studying brown bears on the Kenai Peninsula. These researchers have been gathering and analyzing telemetry data collected from brown bear collars that contain both a traditional VHF transmitter and a GPS receiver. At this presentation, as an example comparison of the quantity and quality of data that can be collected by each method, an overlay was first presented showing the VHF transmitter relocations collected by plane from one bear over a period of a year at a rate of about one location per week (~50 relocations). A second overlay showing the satellite-fixed relocations from the GPS receiver worn by the same bear during the same time period and collected at a rate of about one location every third day (~120 relocations), was then placed on top of the first overlay. The difference between the data sets was astounding. The GPS data not only showed a home range 2-3 times larger than the VHF data, but the concentrated use areas identified in each data set were very different. In fact, the VHF data failed to identify bear presence in areas where roading and timber harvest were being considered by land managers.

To allow the best possible management decisions for Kenai Peninsula brown bears, these researchers are conducting a minimum of five to ten years of study using the best research technology available, involving the collection of hundreds of telemetry relocations from each of many tagged bears. The tremendous value of this wildlife resource is understood and the most thorough methods of data collection and analysis available are being used to assure that the best management decisions are made. The bears at Anan are equally an irreplaceable resource and, certainly, both they and the future generations of people who will go there to enjoy them deserve no less than this kind of effort.

Of course, telemetry data forms only one facet of the research necessary to begin to understand this complex ecosystem at a baseline level before we can venture to propose changes that may have lasting negative effects. The uniqueness and value of the bears in this area make it implicit that research on a much greater scale is required. We need to invest the time and resources required to develope a thorough knowledge and understanding about this great resource before we can even begin to entertain thoughts about making significant changes in this area. As wildlife managers, I believe this is one of our most trusted duties to both current and future generations and I strongly recommend that Alternative 5 (No Action) be accepted for the Canal Hoya Timber Sale until a thorough and comprehensive study of this area and its wildlife can be performed.

Thank you for the opportunity to comment.

Sincerely,

Craig Flatten

Craig Flatten
Wildlife Biologist

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Craig Flatten
P.O. Box 9411
Ketchikan, AK 99901

Dear Mr. Flatten,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to your comments. Your main concern seems to be that the radio telemetry data was not adequate to fully assess the effects of the Canal Hoya Timber Sale on bears.

We realize there are limitations to this data, yet it represents 19% of the black bear population at Anan, by our best estimates, which some would argue is a reasonable sample of the population. We believe it is worthwhile to use information we gained from 3 years of telemetry research. Since it is a small sample, we also used other more traditional methods of comparing alternatives including the most recent versions of the black bear and brown bear habitat capability models and measures of road density. The only sure way of obtaining an estimate of home range for all Anan bears would be to collar all of the bears. Aside from the risk of losing animals, it is doubtful that this would be acceptable to tourists or to the guides. The home range size of the black bears we collared matched what has been found in other studies. The Hoya VCU is outside of this range for black bears.

We did not solely use information from the one collared brown bear to make management decisions. Decisions were also based on research findings such as the impacts of roads and harvesting to brown bears that were collared on Chichagof. Estimating brown bear populations in a forested landscape is inherently difficult and population estimates usually have a high degree of error associated with them. It is our belief that we are proceeding with the best information available.

An entire section of the DEIS covers the impacts of roads on bears (p 3-44) and cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself (FEIS 1997). We are managing human access by gating all the roads and only allowing motorized use for administrative purposes during and after the sale. The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We have also followed the recommendations of State and USFWS biologists who visited the site.

In the Record of Decision I have chosen Alternative 3 with modifications stemming from public and agency comments we received on the draft EIS. One of my reasons to prefer Alternative 3 was that

it did not construct roads in the Canal watershed at this time. Roading, at its closest, will be about 6 miles east of Anan. Based on public and agency comment we will also close all roads that do exist upon construction and will provide either a State or Forest Service area closure on hunting from roads during the life of the sale. In taking this approach, I believe we can monitor impacts from the harvest and roading in the Hoya watershed without making the commitment of roads nearer Anan and in areas of likely higher frequency of use by the Anan bears. I believe we are making good use of sound existing data and have been conservative so as to not misrepresent the value of the data we do have. Additional data is always desirable for every decision, however, I do think the data we have, the way in which we have used it, and the nature of the decision I have made are sufficient to protect the Anan bears without more data gathering. I realize this resource is very important to you. I also have a high degree of concern for the Anan bears and have carefully considered them as I weighed the overall impacts of this decision on the resources, social issues, and multiple uses within and near the Canal Hoya area.

Thank you again for your comments. A copy of the FEIS will be mailed to you directly from the printer.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Alaska Wilderness Recreation & Tourism Association

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March 2 . 1998

Scott Posner. Team Leader
USDA Forest Service
Tongass National Forest, Wrangell Ranger District
P.O. Box 51
Wrangell, AK 99929

Re: Comments on Canal Hoya Timber Sale DEIS

Dear Mr. Posner;

The following comments are submitted on behalf of the Alaska Wilderness Recreation and Tourism Association (AWRTA) on the Canal Hoya Timber Sale Draft Environmental Impact Statement (DEIS). AWRTA is a trade association (501 (c) (6) representing more than 250 nature-based travel businesses in Alaska. More than 70 of our members operate in the Tongass National Forest.

1) We are concerned that the DEIS fails to thoroughly identify and evaluate potential impacts of the proposed sale on recreation and on tourism businesses.

While the DEIS discusses potential effects on scenic values and on visitor use from active logging operations. it does not discuss the economic effects on recreation and tourism businesses of potential changes in Anan bear populations. It does not identify how many businesses use the area and rely on opportunities for bear viewing at Anan Creek, or their economic reliance on these resources. Anan is one of the few places in the world where people can watch brown bears and black bears feeding at the same spot. The DEIS fails to analyze how potential impacts on brown bear populations will affect recreation and tourism businesses. While it provides an economic analysis of the different alternatives in terms of timber production. it fails to provide comparable analysis with respect to recreation and tourism values, as required by NEPA (40 C.F.R. 1502.23).

2) The DEIS does not adequately address potential impacts on brown bear populations or consider alternatives that would not impact bear populations.

As noted above, brown bears are part of the attraction of Anan. Road construction is one of the greatest threats to brown bear populations. The DEIS fails to adequately address and evaluate the potential impacts on brown bears from this management activity in the Canal Hoya Project Area.

It also fails to address the potential long-term value of maintaining and protecting brown bear habitat for future wildlife viewing and nature-tourism. By not considering any alternative that does not include road construction it does not provide a full range of options that could protect bear populations.

3) Finally, we are concerned that the DEIS does not adequately identify and evaluate the cumulative effects of projects in Bradfield Canal.

A number of non-timber projects are proposed for the Bradfield area. It seems likely that other timber sales will be proposed that will affect the bears of Anan as well other recreation and tourism resources in the area. Without full consideration of this bigger picture, and particularly in combination with lack of information on the economic role of other uses of resources, including recreation and tourism, this makes it impossible for affected interests and communities to understand and comment on the cumulative impacts of the proposal.

Thank you for considering our comments.

Sincerely,

Steven Behnke
Executive Director

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Steven Behnke
Executive Director
Alaska Wilderness Recreation and Tourism Association
P.O. Box 22827
Juneau, AK 99802

Dear Mr. Behnke,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to your comments.

"The DEIS fails to thoroughly identify and evaluate potential impacts of the proposed sale on recreation and tourism businesses."
We described many of the factors that will affect the recreation and tourism businesses, such as changes to the scenic resource and vulnerability of Anan bears. We also included mitigation measures in all alternatives, such as retaining trees in the units and road restrictions and hunting closures, to protect those resources. In the Final EIS we included a section about economic value of outfitter/guide operations using the area. We used an average gross income/client for guides using the Bradfield or Anan areas to determine a total potential value for these guides if there was no action on this sale. The effects of the sale are disclosed by discussing potential changes to the area and how that may affect operations along with a relative ranking between the alternatives.

"The DEIS does not adequately address potential impacts on brown bear populations or consider alternatives that would not impact bear populations."
An entire section of the DEIS covers the impacts of roads on bears (p 3-44) and cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself (FEIS 1997). We are managing human access by gating all the roads and only allowing motorized use for administrative purposes during and after the sale. The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We have also followed the recommendations of State biologists who visited the site.

Roads are needed to harvest timber in Canal Hoya because of helicopter limits and the powerline. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the usable timber would be isolated. No roads will be constructed in the Canal VCU this entry. Alternative 4 provided me with an option to select "helicopter yarding only" by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). We have expanded our discussion of that option in the FEIS. As I weighed alternatives on this

project for formulation of my final choices in the Record of Decision, I did have the opportunity to consider both the context of recreational use in the area, and the site specific impacts on a unit by unit basis for all yarding options.

Some of those providing comments suggested the need for an alternative which maximized the use or roading and clearcuts. Other commentors, such as yourself, suggested that the analysis has been limited by not having a "no road" option. The use of tools like roads, clearcuts and selective harvests are ones that I did consider on a site by site, unit by unit basis. I feel this is the most rationale and appropriate way to apply or not apply these tools rather than on an "alternative wide" basis. I believe the range of alternatives presented in the EIS do provide a very good range of reasonable options for me, as well as the public, to weigh the trade offs and balances within the area. I believe, however, that Alternative 3, as it has been modified in the Record of Decision, strikes a better balance between environmental impacts, meeting Forest Plan objectives for the area, and offering a reasonable timber sale in the area.

"The DEIS does not adequately identify and evaluate the cumulative effects of projects in the Bradfield Canal."

We have added sections to chapter 3 of the EIS discussing cumulative effects and other projects near the area. We considered cumulative effects of past and present projects in the area, but such activities are not likely to lead to significant cumulative effects beyond those disclosed in the EIS. Under Forest Plan goals and objectives, more harvest would likely take place in the area, but is not likely to occur for many years and is not scheduled at this time. Our best estimate is that additional timber harvest in the project area is not likely to take place for 20 to 30 years. We do not believe the effects of such possible harvests are reasonably foreseeable; nor are environmental and regulatory conditions that would exist in 20 to 30 years well enough known to forecast effects of such a possible entry. Any activities nearby known to us or which we can foresee are either largely well removed and/or unconnected to the project area, or are far enough in the future as to be highly speculative in terms of possible effects.

Past projects near Canal Hoya which can be considered in a cumulative effects analysis include Frosty Bay Timber Sale (1992-1993), Campbell Timber Sale (1995), and the Tyee Powerline (cleared and constructed through the project area in the early 1980s). Reasonably foreseeable future activities in the short-term (within 10 years) include the Swan Lake-Lake Tyee Intertie (powerline clearing and construction in the Eagle River drainage beginning in 1998), ongoing upgrade and maintenance of the existing Tyee Powerline, and timber harvest on Deer Island (1999) and south of Point Warde (primarily helicopter harvest in 2005).

Reasonably foreseeable future activities in the long-term (within 100 years) include timber sales within Frosty Bay, Canal, Hoya, and Campbell VCUs. Some possible effects of these future entries are discussed in the EIS. However, the details of these projects are for the most part unknown at this time. Cumulative effects of each of these projects will be considered as part of the analysis and decision for each project.

At a broad landscape level, we evaluated cumulative effects (except Campbell Timber Sale, which is physically--and from a terrestrial standpoint, biologically--disconnected from Canal Hoya) on changes in brown and black bear habitat (see page 3-58 of the Final EIS). We have also considered potential cumulative effects of all but Frosty Bay and Point Warde Timber Sales (which are physically--and from an aquatic standpoint, biologically--disconnected from Canal Hoya) on

freshwater and marine resources. Existing impacts to freshwater fisheries in the project area from powerline right of way clearing are negligible. Potential future impacts to freshwater fisheries in the project area are discussed on page 3-93 of the Final EIS. Campbell Timber Sale operations introduced logging debris to marine waters that interfered with fishing gear in the Bradfield Canal. It appears that this debris is rapidly decomposing (USFS memo, October 3 1997), but we have addressed this concern for future projects through mitigation and monitoring.

The two LTF sites (Canal and Hoya) shown in Alternative 2 are the only LTFs that are likely to ever be constructed in these two VCUs. It is possible that a future entry in the Campbell Timber Sale on the north side of the Bradfield Canal would construct an LTF there (north of the Canal LTF site) as shown in the Campbell Timber Sale FEIS (R10-MB-240, Sept. 1993). It is unlikely that all three of these LTFs would be in use simultaneously even if all three were eventually constructed. The cumulative bark deposition at LTF sites is monitored as a permit requirement and mitigated as discussed in Appendix C.

It is likely that conflicts between users in the Bradfield Canal will increase within the next five to ten years. Cumulative effects of the Canal Hoya timber sale in combination with construction and logging activities associated with the Swan Lake-Lake Tyee Intertie (the north end of which will be based from the Bradfield Canal) and continuing maintenance of the existing Tyee Powerline could result in displacement of or interference with commercial and charter fishing activities.

In summary, potential cumulative effects associated with past and near-future projects in and around Canal Hoya have been considered and addressed as part of the decision on this project. At this time, cumulative effects are not an environmental concern in the project area. Mitigation measures and monitoring will play an important role in ensuring that cumulative effects do not become a concern in the near future.

Thank you again, Steve, for your comments. A copy of the FEIS will be mailed to you directly from the printer.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Utah State UNIVERSITY

DEPARTMENT OF FISHERIES & WILDLIFE
5210 UNIVERSITY BLVD
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2 March 1998

Scott Posner
Team Leader, Canal Hoya Timber Sale
USDA Forest Service
P.O. Box 51
Wrangell, AK 99929

Dear Mr. Posner,

Re: Canal Hoya Timber Sale/ Draft EIS

I appreciate the opportunity to comment on the DEIS for this timber sale. My familiarity with this area comes from my involvement in a cooperative study of Anan black bears (between Utah State University, Alaska Department of Fish & Game and USDA Forest Service). As a research scientist and conservation biologist who completed behavioral studies of bears with my students at Anan Creek and other wildlands of Alaska over the past 16 years I am profoundly impressed with the unique aspects of the wildlife resources in this area. As a specialist in Alaskan bear ecology I consult regularly on the effects of development and ecotourism on black and brown bears, their behavior and populations.

In reviewing the proposal for this timber sale the American public should have an informed perspective on the nature of the risk involved to the natural ecological processes as well as the economic value of the trees removed. Will this sale impose risks to the sustainable uses of the rainforest environment? After reviewing this DEIS and recognizing the admirable efforts of the team, working with very limited resources and inadequate time, it is my assessment that this report does not provide sufficient information to select other than the "no action" alternative. My specific reasons for this conclusion are as follows:

- The intrinsic value of the natural resources at risk have been summarized succinctly by Dr. Stephen Herrero in a report that he submitted to the Wrangell Ranger District after his visit to Anan in July 1994: "Anan is a unique and extremely valuable natural resource. It is either the best, or close to the best, place in North America (thence the world) to observe black bears interacting with one another, and fishing for Salmon. Because they also occasionally intereact with brown bears and people can observe all the aforementioned interactions, we consider Anan to be a world class viewing site." Although the report provides a commendable list of wildlife and other ecosystem values special to this area I believe comments like Herrero's and his report should be referenced in the text and listed in the literature cited.

- As a DEIS there should be serious concerns about the limited resources commited to this study leading to an inadequate base of information to assess the potential impacts of the roads and clearcuts on the fish and wildlife resources. The study of bear movements in the Canal and Hoya drainages is based on a very small number of animals and relocations over the subsequent years compared to other studies in Alaska. The data on

COLLEGE OF NATURAL RESOURCES

locations does not permit assessment of habitat quality or security for bears. The extapolations of potentially impacted habitat are almost certainly biased by this sampling, especially in the aerial extent of the land occupied by the black bears. There was only one brown bear collared in a population that appears to be growing in the area. Only 14 black bears of a population of perhaps 40-50 adults coming to the Anan Creek were included in the relocation sample. No information was collected on the population of bears not coming to Anan, bears presumably more dependent on the habitat proposed for clearcutting. While there are many locations to harvest timber in the Tongass NF their is only one place like Anan Creek with its pink salmon, marine life, and terrestrial wildlife

- The method of evaluating roads as an economic asset in this site rather thanthe known threat to the quality of wildlife habitat that they are can only be viewed as the product of an analysis thoroughly oriented to timber economics. This valuation is not only contrary to a plethora of scientific studies of the effects of roads on wildlife, stream habitats and other ecosystem components but would appear to be in conflict with recent pronouncement by the Chief of the USFS about changing goals in the agency.

- The responses of habituated bears (those familiar with people) to hunting or poaching is inadequately addressed. These large bears will be especially vulnerable to illegal hunting if loading facilities permit easy landing of ORVs or other motorized vehicles should logging roads be constructed. These bears are already under stress from high numbers of visitors to the Anan observatory. To subject them to additional impacts with industrial-scale logging so close to Anan without adequate assurance of refuge is not consistent with current protection for bears in Alaska.

- Missing from the DEIS is an analysis of the cumulative effects of other activites including recent extensive harvesting and helicopter logging on the Cleveland Peninsula to the southwest of Anan, the powerline and any reports or estimates of poaching in the area. Furthermore threats to the productive brown bear population in the Eagle River drainage is not adequately addressed. Logging so close to such superior wildlife habitat would appear to be present unnecesary risks to the known wildlife values of the region.

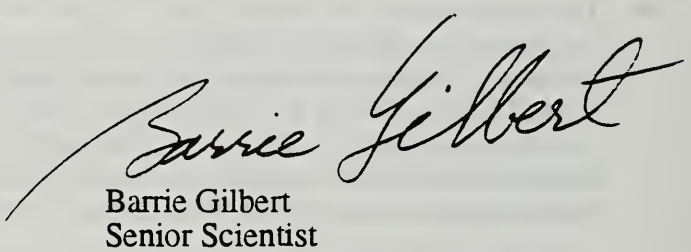
- The DEIS provides an analysis of the jobs forgone if the harvest does not occur (no change option) but does not provide an analysis of the potential for loss of economic activity and public enjoyment from recreation, tourism, commercial and sport fishing from the construction and industrial harvest activities including ocean drops of logs from large helicopters (sky cranes) making round trips every minute or less.

- There seems to be a disjunct between the recent commitment of the USFS toward ecosystem management and this DEIS which uses the Timber Production Management Prescription to introduce the discussion of the desired future condition. In view of the many very high resource values other than timber identified for the greater Anan area in this document one might wonder why these drainages are not being proposed for some larger land designation and linked with Anan Creek roadless and scenic river area for protection.

- Even without considering the recent proposals in Congress to elimitate all new roading in roadless areas the DEIS should explain why the risks of road-building for timber removal are being considered for an area with such superb other scenic values. Proposals like the Hoya and Canal Timber Sales and other logging near Anan reinforce the common perception that the USFS gives lip-service to other uses and resources but even in the most risky sites continues to put those other resources second to timber harvest.
- Current ecological planning for the future of an area like this should encompass visions of large ecosystem reserves, incorporation of areas as Research Natural Areas and as ecological base-line areas for scientific evaluation of changes that are occurring throughout the Tongass National Forest.

If I knew the riches of this land as the people who lived here for 10,000 years did, or had the wisdom of an Aldo Leopold, I could perhaps speak eloquently of what we are missing. But a plea for caution based on all too brief experience is all I can offer.

Sincerely yours



Barrie Gilbert
Senior Scientist

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Barry Gilbert
Utah State University
Department of Fisheries and Wildlife
5210 University Blvd
Logan, UT 84322-5210

Dear Mr. Gilbert,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to your comments.

"...this report does not provide sufficient information to select other than the 'no action' alternative."
My review of the EIS leads me to a different conclusion. I realize that more information is always useful and that your comment is a preface to more specific examples of what you believe is deficiencies in our information. As such we will discuss those issues as you bring them up below.

"...comments like Herrero's and his report should be referenced in the text and listed in the literature cited."
The comments by Herrero about Anan do not differ much from the description we gave of Anan in the DEIS. The value of Anan is not disputed - this value has shaped my final decision greatly as is disclosed in the Record of Decision for this project.

"The data on [bear] locations does not permit assessment of habitat quality or security for bears."
We realize there are limitations to this data, yet it represents 19% of the black bear population at Anan, by our best estimates, which some would argue is a reasonable sample of the population. Although the radio telemetry data was not used for the Utah State University study, you recommended that we use the telemetry data for estimating home ranges in your final report (*Human-Bear Interactions at Anan Creek, Tongass National Forest, Alaska,* page 79. Chi and Gilbert 1996). We believe it is worthwhile to use information we gained from 3 years of telemetry research. Since it is a small sample, we also used other more traditional methods of comparing alternatives including the most recent versions of the black bear and brown bear habitat capability models and measures of road density. The only sure way of obtaining an estimate of home range for all Anan bears would be to collar all of the bears. Aside from the risk of losing animals, it is doubtful that this would be acceptable to tourists or to the guides. The home range size of the black bears we collared matched what has been found in other studies. The Hoya VCU is outside of this range for black bears.

We did not solely use information from the one collared brown bear to make management decisions. Decisions were also based on research findings such as the impacts of roads and harvesting to brown

bears that were collared on Chichagof. Estimating brown bear populations in a forested landscape is inherently difficult and population estimates usually have a high degree of error associated with them. It is our belief that we are proceeding with the best information available.

Also note, in coming to my decision to select Alternative 3 as modified in the Record of Decision, I was very aware that we never have perfect data for any environmental decision. Our understanding of complex ecosystems is always expanding. I do believe we have good data, however, and did not over-project its value. One of the reasons I preferred Alternative 3 was that it did not build roads in the Canal watershed. This will allow for monitoring of the road system in the Hoya watershed where roads will be about six miles from the Anan bear observatory at their closest. By not building roads in Canal, I believe we leave more opportunity for monitoring and subsequent options for the future without the likelihood of significant impact on the Anan bear population. I do believe we have sufficient data to adequately (if not perfectly) project likely impacts of our actions. Further, I believe the mitigations which we will use in the selected alternative are reasonable, and are likely to be effective in reducing possible impacts on the Anan bears. The Alternative I have selected is, by the nature of its design related to roading, conservative in regard to impacts on Anan. More detail on my rationale and selected mitigations is in the final EIS and in the Record of Decision.

"...evaluating roads as an economic asset in this site rather than the known threat to the quality of wildlife habitat that they are..."

Both temporary and specified road costs are displayed in Table 3-4 for all the action alternatives. The Forest Service does view specified road developments as a long term economic benefit (capital improvement) because specified roads provide access for a variety of silvicultural activities including; timber harvest, tree planting, precommercial and commercial thinnings both for the first entry and any future entries.

An entire section of the DEIS covers the impacts of roads on bears (p 3-44) and cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself (FEIS 1997). We are managing human access by gating all the roads and only allowing motorized use for administrative purposes during and after the sale. The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We have also followed the recommendations of State and USFWS biologists who visited the site.

"...bears will be especially vulnerable to illegal hunting if loading facilities permit easy landing of ORVs or other motorized vehicles should logging roads be constructed."

The area is fairly inaccessible. The roads will not connect to any community and the only way to get a vehicle to the area is by boat and there will be no loading or unloading ramps, also the gates will be placed in places that will be extremely difficult to get around. Loading facilities which we call log transfer facilities (LTF) have been selected and will be designed so as not to invite or make easy off loading ORV's after the closure of the sale, but such illegal use might be possible for someone determined to do so. Motorized recreational use will be prohibited by forest order during and after the sale. Non-motorized access would be improved in areas where roads are constructed. Roads would not be constructed in the Canal VCU this entry. This gives the Forest Service time to monitor and evaluate the effectiveness of road closures in the Hoya VCU before considering constructing any roads in the Canal VCU.

"Missing from the DEIS is an analysis of the cumulative effects of other activities..."
We have added sections to Chapter 3 to summarize the cumulative effects of other activities. In summary, however, most of the known activities (such as the existing power line) and its impacts on the project are well documented in the EIS. Those other activities which we know about are not likely to have discernible cumulative effects on the project area for most resources, though we do make separate cumulative effects analysis for bears starting on page 3-58 of the Final EIS.

In relation to bear cumulative effect concerns, we added information in the Final EIS about cumulative effects on high value bear habitat over the Canal, Hoya, Anan, Eagle and Frosty VCUs. Our analysis indicates we are essentially having no direct impact on high value brown bear habitat. High value brown bear habitat is narrowly defined as riparian forest which is protected by current stream/beach/estuary buffers. Other projects have already resulted in a 17% loss in this type of habitat from the original condition. There would be a cumulative 0-20% loss in high value black bear habitat by alternative from the existing condition over the larger area. When compared to the original condition of the larger area, there is a 25-40% loss in high value black bear habitat by alternative.

"The DEIS...does not provide an analysis of the potential for loss of economic activity and public enjoyment from recreation, tourism, commercial and sport fishing..."
We have changed the title "Direct Effects to Recreationists and Outfitter/Guides" (page 3-32 in the Draft) to "Effects to Recreationists and Outfitter/Guides". In addition to the direct effects discussion, we included a section about economic value of outfitter/guide operations using the area. We used an average gross income/client for guides using the Bradfield or Anan areas to determine a total potential value for these guides if there was no action on this sale. The effects of the sale are disclosed in the FEIS by discussing potential changes to the area and how that may affect operations along with a relative ranking between the alternatives.

"...one might wonder why these drainages are not being proposed for some larger land designation and linked up with Anan Creek roadless and scenic river area for protection."
This concern was in the range of alternatives for the Forest Plan revision. While management area prescriptions can be modified on a site specific basis, the current prescriptions appear to be compatible with the resource values, when appropriate standards, guidelines and mitigation measures are applied. Under the current Forest Plan, 84% of the old growth forest that was present in 1954 is protected in non-development management prescription areas. 3.5 million acres of old-growth is in a reserve strategy. 90% of the existing old-growth forests are protected. In contrast, the Pacific Northwest Region has only 10% old-growth remaining.

"...the DEIS should explain why the risks of road-building for timber removal are being considered for an area with such superb other scenic values."
The Campbell Timber Sale is cited as an example of a timber sale that provided timber without roads or clearcuts. Roads are needed to harvest timber at Canal Hoya, because of helicopter limits and the powerline. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the timber available for harvest would be isolated. To help maintain the scenic values of the area, we will retain at least 10% of the trees in all harvest units in Canal Hoya. Some units will have higher amounts of retention, depending on the visibility of the unit and the value for wildlife habitat.

No roads will be constructed in the Canal VCU this entry. Alternative 4 provided the decision maker with an option to select "helicopter yarding only" by specifying in the Record of Decision that

Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). We have expanded our discussion of that option in the FEIS.

"Current ecological planning for the future of an area like this should encompass visions of large ecosystem reserves, incorporation of areas as Research Natural Areas and as ecological base-line areas..."

The Canal Hoya project area includes two small old growth reserves and is bordered on all landward sides by large areas with low-development management prescriptions (semi-primitive recreation). These areas are among the special management areas that were identified in the Forest Plan Record of Decision (page 9), which also include Research Natural Areas, Wild and Scenic Rivers, and Research and Education areas.

Thank you again for your comments. Your plea for caution in an area of high multiple resource values is expressed eloquently. I believe my final decision as expressed in the Record of Decision is indeed a cautious one that moves forward with implementing the forest plan and offering a viable timber sale with its attendant benefits, but does not make too many changes near Anan. To that extent I see Alternative 3 as adaptive and consistent with the many resource values in the area. Any decision has inherent risks and the resources in the Canal Hoya area have made me be conservative in our approach in that area. I do believe, however, that we can have a timber sale in Canal Hoya which accomplishes the objectives of the project and advances the goals of the Forest Plan without undue risk to the valuable resources of the area.

A copy of the Final EIS will be mailed to you directly from the printer.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

January 29, 1998

Mr. Scott Posner
PO Box 51
Wrangell, Alaska 99929

Dear Mr. Posner:

Enclosed are comments on the Draft Environmental Impact Statement for Canal Hoya Timber Sale, Stikine Area, Petersburg, Alaska. We hope our comments will assist you. Thank you for giving us an opportunity to review this document.

Sincerely,

Susan Fruchter

Susan B. Fruchter
Acting NEPA Coordinator

Enclosure

MEMORANDUM FOR: Susan B. Fruchter
Acting NEPA Coordinator

FROM: Charles W. Challstrom
Acting Director, National Geodetic Survey

SUBJECT: DEIS-9801-06-Canal-Hoya Timber Sale, Stikine Area, Petersburg, Alaska

The subject statement has been reviewed within the areas of the National Geodetic Survey's (NGS) responsibility and expertise and in terms of the impact of the proposed actions on NGS activities and projects.

All available geodetic control information about horizontal and vertical geodetic control monuments in the subject area is contained on the NGS home page at the following Internet World Wide Web address: http://www.ngs.noaa.gov. After entering the NGS home page. please access the topic "Products and Services" and then access the menu item "Data Sheet." This menu item will allow you to directly access geodetic control monument information from the NGS data base for the subject area project. This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project.

If there are any planned activities which will disturb or destroy these monuments, NGS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. NGS recommends that funding for this project includes the cost of any relocation(s) required.

For further information about these monuments, please contact Rick Yorczyk; SSMC3, NOAA, N/NGS; 1315 East West Highway; Silver Spring, Maryland 20910; telephone: 301-713-3230 x142; fax: 301-713-4175.

United States Department of Agriculture
Forest Service
Alaska Region
Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Susan B. Fruchter
Acting NEPA Coordinator
United States Department of Commerce
Office of the Under Secretary for
Oceans and Atmosphere
National Geodetic Survey
Washington, D.C. 20230

Dear Ms. Fruchter,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. No geodetic control monuments will be disturbed as a result of this project.

Sincerely,

CAROL J. JORGENSEN
Assistant Forest Supervisor

FOREST SERVICE EMPLOYEES FOR ENVIRONMENTAL ETHICS
P.O. BOX 11615
EUGENE, OR 97440
(541) 484-2692

March 2, 1998

Scott Posner, Team Leader
USDA - Forest Service
P.O. Box 51
Wrangell, AK 99929

Dear Mr. Posner:

Thank you for the opportunity to comment on the Canal Hoya DEIS.

Timber Demand

As you may know, FSEEE has appealed the Tongass Land Management Plan (TLMP), which sets the goals and objectives for this project area. You may obtain a copy of our appeal from your regional office. Among other things, the appeal asserts that TLMP fails to properly balance protection of non-timber uses with meeting market demand for timber over the planning period, as required by the Tongass Timber Reform Act (TTRA). TLMP's failure results from its arbitrary designation of 267 mmbf as the allowable sale quantity (ASQ), an amount far exceeding the agency's own projections of timber demand over the planning period. See Brooks and Haynes, "Timber Products Output and Timber Harvests in Alaska: Projections for 1997-2010."

The Canal Hoya DEIS relies upon TLMP's flawed projections of timber demand for the DEIS's Purpose and Need. See Canal Hoya DEIS at 1-5. FSEEE has explained in its TLMP appeal the many flaws in TLMP's economic analysis; in particular, that the Forest Service arbitrarily ignored its own expert economists' analysis. To the extent the Canal Hoya DEIS relies upon that analysis, it is similarly deficient.

Inexplicably, the Canal Hoya Appendix E, which purports to estimate demand for timber, completely ignores the agency's acknowledged best analysis of timber demand – the Brooks and Haynes report (nor is this study cited anywhere in the DEIS). Instead, the DEIS planning team puts forward its own timber demand "analysis" in Appendix E, which can only be dismissed as amateurish, given the fact that the Canal Hoya planning team includes not a single qualified economist.

Notwithstanding the Forest Service's apparent intent to sell less timber in the up-coming several years than allowed by TLMP's overstated and illegal allowable sale quantity (ASQ), the damage TLMP's inflated ASQ does to the land base available for multiple-use protection is real and substantial. But for the inflated ASQ, the amount of old-growth forest, such as that proposed for logging in the Canal Hoya DEIS, available to be protected for fish, wildlife, water quality, and other resources would be substantially greater. The Canal Hoya timber sale(s) would foreclose the opportunity to protect these forests in a revised TLMP, as FSEEE has requested in its TLMP appeal.

FSEEE's Tongass Land Management Alternative

FSEEE submitted a comprehensive land management alternative for consideration in the TLMP revision process. The Forest Service arbitrarily refused to consider our alternative among the range of alternatives assessed in TLMP's final EIS. We have protested this violation of the National Environmental Policy Act in our TLMP appeal.

The Canal Hoya timber sale would foreclose full consideration and implementation of FSEEE's alternative plan for the Tongass. For example, this sale proposes to log old-growth forests that FSEEE's plan proposes for protection and fails to provide the stream protection measures called for by FSEEE's alternative.

In sum, this sale's foreclosure of FSEEE's alternative land management plan, without adequate consideration by TLMP, violates NEPA. If you do not have a copy of FSEEE's alternative for review, please contact us and we will send you one.

Endemic Mammals

As FSEEE documented in its TLMP appeal, TLMP fails to provide for a viable population of endemic mammals and the marten. Insofar as there is habitat for these species that would be harmed by this timber sale, this sale violates NFMA's duty to protect viable populations of all native vertebrate species. FSEEE asks that the sale's supplemental EIS evaluate the presence of endemic mammals, marten, and their habitats in the sale area, the effect the sale would have on these species, and the adequacy of TLMP's protective measures for these species.

Clearcutting

TLMP defends clearcutting as the appropriate dominant silvicultural system on the Tongass. In this respect, the Tongass is unique among all 156 national forests as the only forest to buck the nation-wide trend toward decreased reliance on clearcutting. For 25 years, since the Church Clearcutting Hearings of the early 1970s, the U.S. Congress and American people have been steadfastly telling the Forest Service that they don't want their public lands clearcut. 16 U.S.C. § 1604(g)(3)(F)(i). And, for 25 years, the Forest Service has slowly been getting the message. Chief directive of June 4, 1992. Today almost all national forests have reduced their use of clearcutting substantially. Clearcutting on the national forest system has dropped from 283,000 acres annually in 1988 to 133,000 in 1993, and is projected to drop to 50,000 by 2000. Forest Service Program for Forest and Rangeland Resources: A Long-Term Strategic Plan (1995) at III-38. Today clearcutting accounts for fewer than 15% of all acres harvested and is projected to drop to 4% by 2045. Id.

FSEEE's TLMP appeal rebuts each of TLMP's defenses of clearcutting, as follows:

1. Forest health reasons:

Dwarf mistletoe is a ubiquitous, native western hemlock parasite that reduces tree growth, lowers fiber quality and provides an entry for decay fungi. Mistletoe creates important habitat niches for many species, including marbled murrelets. Generally trees out grow their initial mistletoe infections; the parasite rarely, if ever, is a direct cause of tree mortality. The Chief's 1992 policy allows clearcutting only where lands require "rehabilitation" from disease. Thus, dwarf mistletoe simply cannot be used to justify clearcutting. These stands do not require rehabilitation; they are healthy forests that sustain a wide variety of forest uses, including timber. To do so, as the TLMP does, allows the disease exception in the Chief's policy to swallow the general rule that clearcutting should be utilized only in rare circumstances. Nor does dwarf mistletoe adversely affect "forest health." It is a natural part of the biological diversity of the native forests of southeast Alaska. There is no evidence that dwarf mistletoe incidence has gone beyond the bounds of natural variability, nor does TLMP even attempt to evaluate this central concept of forest health and ecosystem management.

The Chief's policy allows clearcutting to "rehabilitate" stands adversely impacted by windstorms. TLMP argues for clearcutting because it decreases blowdown within harvest units (there's nothing left to blowdown), but admits the practice increases blowdown along cutting boundaries. Id. at G-8. Regardless, neither justification fits the Chief's criterion for rehabilitation after catastrophic blowdown. Nor does blowdown adversely affect forest health. Down trees are a natural part of a healthy forest environment. They play important roles in nutrient recycling and wildlife habitat. In fact, TLMP requires down trees be left after logging in many management prescriptions. TLMP cannot on the one hand argue that blowdown is "bad" to

justify clearcutting and on the other hand argue that it must provide for down logs because they are good for biological diversity.

Clearcutting is also allowed under the Chief's policy to reduce the adverse effects of logging damage, and TLMP argues that clearcutting does so. Id. at G-8. However, clearcutting is not "essential" to accomplish this end, as the Chief's policy further requires. Other silvicultural techniques, such as group selection, and other logging methods, such as helicopter logging, can accomplish the same reduction in logging damage as clearcutting. TLMP's failure to even consider these alternatives in its assessment of clearcutting violates the Chief's policy and NFMA's directive that clearcutting be used only where it is optimal.

TLMP argues that clearcutting should be permitted because it will improve forest productivity. Id. at G-8. Even if true, the Chief's policy does not grant any forest productivity exception for clearcutting. Nor is forest productivity a component of forest health. According to TLMP, Alaskan soils in old-growth forests have naturally "low soil temperatures, poor soil aeration, excess water, and deep humus mats." Id. Thus, by TLMP's admission, this is the natural, healthy condition of these forests. These forests are already healthy; they don't clearcutting to make them any healthier.

2. Clearcutting favors spruce.

TLMP provides no evidence that the Tongass suffers from a spruce shortage. Absent such a showing, there is no rational justification for believing that spruce needs whatever additional assistance clearcutting might provide over group selection. In fact, TLMP fails even to consider the option of group selection as a spruce reproduction technique, although there is every reason to believe group selection would offer the same "open environment" and "increased sunlight" provided by clearcutting.

3. Clearcutting requires less road development.

Road criteria are not among the factors the Chief's policy allows to justify clearcutting. Thus, this justification, even if true, violates the Chief's directive. Further, helicopter logging eliminates the need for many roads, regardless of silvicultural system.

4. Clearcutting provides viable harvest economics.

Once again, harvest economics is not among the factors the Chief's policy allows to justify clearcutting. Thus, even if true, this justification violates the Chief's directive. In any event, it is irrational for the Forest Service to use harvest economics to justify clearcutting when the agency loses tens of millions of dollars each year through its timber sales program. If the agency really cared about economic efficiency, it would simply stop selling timber on the Tongass.

5. Clearcutting provides excellent natural regeneration.

The quality of regeneration is not among the factors the Chief's policy allows to justify clearcutting, so long as minimum stocking levels are met. Ironically, by TLMP's own admission, clearcutting provides not excellent regeneration, but excessive regeneration. Id. at G-9 ("Stocking control is usually necessary between the ages of 15 and 20, and almost all sites require some degree of stocking control."). The fact is, TLMP fails to demonstrate that regeneration is a concern for group selection or other non-clearcutting silvicultural systems.

6. Clearcutting is compatible with the use of standard logging systems.

Again, no where does the Chief's policy speak to logging systems as a permissible justification for clearcutting. It defies commonsense that the reluctance of southeast Alaska's timber industry to invest in appropriate logging equipment should justify TLMP's decision to violate national policy disfavoring clearcutting.

7. Clearcutting provides a viable timber management program.

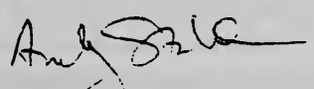
This last justification is the lamest of all. First, once again, it is not among the Chief's permissible justifications. Second, it alleges that clearcutting is necessary to "meet our contractual obligations to the long-term Contractors." Well, there ain't none anymore. This is one more example of TLMP living in the past. Third, TLMP claims that clearcutting is necessary to provide a timber program large enough to meet demand. But, as discussed above, TLMP grossly overstates demand. Finally, TLMP claims that clearcutting "permits the allocation of large parts of the Forest for other than timber management purposes." But, so would reducing the allowable sale quantity to a level consistent with actual demand, without any clearcutting.

In sum, to the extent that the Canal Hoya timber sale relies upon clearcutting, FSEEE believes that reliance is illegal, arbitrary and capricious, and violates the Chief's directive. We do not believe that the Forest Service can justify clearcutting under the law and challenge this sale's planners to address head on the points we raise above.

Summary

We recognize that district and area-level staff are faced with a difficult job of implementing a forest-wide plan that is poorly conceived and illegal. We would have preferred to have the issues we raise in these comments to have been acknowledged and resolved by TLMP. They have not been. It would be imprudent to proceed with on-the-ground implementation of a fatally flawed TLMP. Thus, we raise these issues here in the hope that the Forest Service will re-think TLMP and grant the relief we seek in our TLMP appeal. If it does not, we may appeal this timber sale or seek its stay pending resolution of our TLMP appeal.

Sincerely,



Andy Stahl
Executive Director

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Andy Stahl
Executive Director
Forest Service Employees for Environmental Ethics
P.O. Box 11615
Eugene, OR 97440

Dear Mr. Stahl,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to the comments in your letter.

Timber Demand
The Brooks and Haynes report was used and is cited on page 3-7 of the Canal Hoya DEIS. I recognize your disagreement with the Forest Plan analysis of timber demand; however, verification of the Forest Plan demand analysis is beyond the scope of this project. The FEIS Appendix E has some additional discussion on timber demand.

FSEEE's Tongass Land Management Alternative
There is no stipulation or requirement that project level planning should be postponed because of an appeal on the new Forest Plan. Unless there is a stay or court ordered injunction on the new Forest Plan, we plan to continue the NEPA process to completion.

Endemic Mammals (and marten)
Effects on marten were addressed in the DEIS (page 3-73) and will also be included in the FEIS. The concern for endemic small mammals is primarily due to concerns for subspecies isolated on islands - since Canal Hoya is on the mainland, we were not required by the Forest Plan to do an analysis of endemic small mammals.

Clearcutting

I note that your letter disputes the Tongass Land Management Plan's allowance of the use of clearcutting. The Forest Plan's allowance of the use of a particular prescription is beyond the scope of the Canal Hoya timber sale EIS and decision. Though you do not cite specific reference to how clearcutting is used on Canal Hoya EIS, this letter will clarify the use of the prescription in Canal Hoya.

The Canal Hoya EIS is well within Forest Plan standards for the use of clearcutting. The Forest Plan Record of Decision estimates that clearcutting will represent about 80% of the regeneration harvesting done on the Tongass (Record of Decision, page 5). As the table below shows, clearcutting will be used much less than this on the Canal Hoya timber sale.

The choice of which harvest method to use was based on many site specific factors, primarily yarding systems and steepness of slopes. At times close observation of the site specific situation makes the consideration of a given prescription (such as clearcutting) or harvest tool (such as helicopter) not wise or feasible and at other times, these may be the optimum tools based on a particular stand or unit's situation. For instance, clearcutting is more economical with cable systems, whereas partial harvest maintains soil stability better on steep slopes. Therefore, all units that are located on cable operable ground have prescriptions of clearcut with retention, except where steeper slopes or visual concerns prompted us to prescribe partial harvest for a portion of the unit.

Typically, clearcutting is defined as harvesting all merchantable trees within the unit. Each clearcut unit proposed for the Canal Hoya Timber Sale has from 10 to 30 percent retention to address Forest Plan standards for visuals, and wildlife concerns. Retention was increased in units that are more visible from likely viewpoints, or based on concerns such as whether a given area is used for bear denning or is an important travel corridor. This type of clearcutting, even though some trees are left with visual and wildlife benefits, still provides sufficient space between trees and sufficient volume removed per acre to make cable yarding more feasible and economic. Since cable yarding equipment is much more common and is typically less expensive to use than helicopter yarding, this prescription, when properly used, can provide a balance that provides for environmental and social concerns while providing a reasonable economic opportunity with the timber sale offering.

Both clearcuts and partial harvesting prescriptions are practical with helicopter yarding systems. The helicopter units within the action alternatives have either a diameter limit or patch cut prescription. Since some of the trees are to be retained in the Canal Hoya units, partial harvesting of helicopter yarded units was preferred. This allows us to more evenly distribute the retention, which enhances the visual quality of the unit, provides diverse stand structure throughout the unit, and allows more volume to be harvested than if the trees were retained in clumps. The FEIS has additional discussion of what prescriptions were used and where they were used.

It should be noted from the above discussion that in the Canal Hoya harvest units, the primary difference between a clearcut with reserves and a partial harvest unit, will be in whether the leave trees are distributed throughout the unit or grouped in clumps, not whether or not there will be <u>any</u> trees left in the units. The reason for the difference in distribution of leave trees is that randomly distributed trees in cable yarded units are likely to be damaged or knocked down by the cables or logs as they are dragged to the landings. Helicopters are able to lift the trees up and out of the units and avoid most of the damage to the leave trees.

A conceptual image of a clearcut with reserves would be a mottled landscape within a unit, with linear clumps of trees that generally run parallel to the yarding corridors. Between the reserve clumps, there would be open ground, with some random individual trees. Individual leave trees would normally be in the upper third of the unit, where they are not as likely to be damaged by cables or moving logs. In addition, the clumps left in the clearcuts may have some trees that will be larger than those left under a diameter limit prescription.

The four action alternatives have a wide range of acres harvested in clearcut and non-clearcut prescriptions that are consistent with the Forest Plan Land Use Designations for the Project Area (Modified Landscape and Timber Production). This table illustrates the variation between the action alternatives and the amounts of clearcut or partial cut prescription (road right-of-way acres not included):

	CC with reserves	Patch cut	Diameter limit	TOTAL
Alternative 1	440 ac. (56%)	83 ac. (11%)	258 ac. (33%)	781 ac.
Alternative 2	595 ac. (75%)	52 ac. (6%)	151 ac. (19%)	798 ac.
Alternative 3	367 ac. (56%)	73 ac. (11%)	218 ac. (33%)	658 ac.
Alternative 4	144 ac. (24%)	53 ac. (8%)	412 ac. (68%)	609 ac.

Thank you again for your comments.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Jackie Canterbury
Alaska Coordinator
Forest Service Employees for Environmental Ethics (FSEEE)
PO 3280
Ketchikan AK 99901
907 225 5225

Scott Posner, Team Leader
USDA Forest Service
PO Box 51
Wrangell AK
99929

RE: Canal Hoya Timber Sale
Supplemental comments from FSEEE

Scott,

First, thank you for the opportunity to comment on this important sale.

Anan Creek is the site of one of the best bear viewing areas in the nation, and probably the world. The watersheds which surround Anan provide the arterials for travel, the denning sites and the foods eaten by both brown and black bears. To cut timber and punch roads into the watersheds near Anan is a travesty - both to the bears of Anan and to the American people who depend on the the Forest Service to manage this special place for its' unique and special functions. Though one might argue that it is "just a little timber", it is this incremental loss of habitat that is responsible for the demise of many of our most valuable ecosystems. Once a road is carved into Anan, it is forever changed, both as a functioning system and in the perception of Anan as a wild and magic place.

I have worked with bears in Hyder for the Forest Service, so speak with some knowledge of their behavior and needs. Roads and bears do not mix. It is much easier not to build the road, then to deal with the many conflicts that occur after a road is built.

I will provide you with supplemental comments from FSEEE under each issue heading:

Issue: Alternatives

- The Forest Service (FS) did not provide an appropriate range of alternatives. The FS did not provide a no roading/clearcutting/LTF alternative. Instead, the FS is continuing to use roads and timber to drive each alternative. The consideration of alternatives is the heart of the impact statement and must attempt to resolve conflicts concerning alternatives. The conflicts of roading and bears were not resolved in any of the alternatives. In fact, there is no alternative which would maximize public benefits and resolve conflicts, consistent with applicable law.
- The FS limited its consideration of alternatives to those that would result in 'getting out the cut'. The FS is still operating on the premise that there are two pulp mills, when in fact the major mills are closed. The only alternative which offered viable options was eliminated because "it did not leave enough timber along potential road corridors to maintain the economic viability of road construction for future entries"
- There is no alternative or group of alternatives which consider selective logging as the predominate silvicultural system. All rely on clearcutting in some measure. The helicopter alternative was eliminated from consideration. This is not acceptable in an area such as Anan.

Issue: Bears

- The 1996 brown bear panel evaluators for TLMP stated; "The first priority of the FS should be to retain currently unroaded watersheds in a roadless condition." This DEIS contradicts the persistent recommendations of scientists.
- The FS suggests that removing habitat will have little influence on bears. However, bears are often unwilling to cross open areas to traditional feeding sites. Loss of traditional feeding sites because of the unwillingness of bears to cross open clearcut areas will have a negative impact on the bears.
- The FS has extrapolated information from the collaring of 13 bears. The original study was to look at disturbance/human bear interactions not habitat use. Although the bears were collared and movement was depicted, this information should not be extrapolated to habitat relationships. Also, the sample size (13 bears out of the total of about 70 bears) is too small to provide an unbiased estimate.
- On page 3-43 you suggest that "acres of highly suitable habitat do not disappear, but move". The incremental roading and clearcutting of habitat is the problem. Another entry, another sale - the cumulative impacts are the critical factor. This is not examined thoroughly.

- There is inadequate knowledge of the brown bear population. One brown bear was collared, which certainly does not give the agency the information necessary to make land management decisions which adequately portray impacts to bears.
- A recommendation of VPOP (which the FS has ignored)was a Population Viability Analysis(PVA) for brown bears. This should be accomplished before the FS rushes to place timber sales in valuable bear habitat.
- Titus and Schoen (1993) found that roads have adverse impacts on brown bear populations. Their work, and that of others who link bear declines to roads, was not adequately addressed or detailed in your DEIS. Mitigating the effects on bear populations through road closures is not enough. As we all know, bears have eliminated from most of their North American range by similar mitigation measures. The only mitigation is no roads.
- The home ranges of all the bears at Anan should be determined. Estimations could provide the protection necessary for the existing population. Use McNeil River as an example in providing the necessary protection for Anan bears.
- Black and brown bears use the alpine for denning and foraging. These areas must be included in the plan.

Issue: Goshawks

- It seems the FS again extrapolated information from an inadequate data set to justify timber harvest. This approach violates the intent of all laws set to balance harm with resource extraction.

Issue: Roads

- Canal Hoya is an unroaded area. I am sure the FS is aware of the controversy surrounding roads throughout the country. Politics eliminated the Tongass from this decision to protect roadless areas, not good science or prudence. It is imperative that the agency comprehend the biological and esthetic significance of roading in Anan and the importance of maintaining roadless areas on our National forest lands.
- Market Costs of each alternative are interesting. In your market value analysis you neglect to tell the public the fixed costs of the new roads to the taxpayer. Road construction is a cost benefit to the Forest Service because of purchaser road credits. On average, according to Randall O'toole, 60% of the timber receipts are from purchaser road credits. You are viewing roads as a capital improvement. These roads do not increase the value of Anan. In fact, they decrease the value proportionately.
- There must be no road built in this project area. The risks are too great. The bears of Anan are habituated to people and are very susceptible to human interference, particularly hunting. Even though a road is closed, it is still a structure and makes entry to the area easier. This makes bear hunting of habituated bears easier.

- The FS mentions on page 2-6 the consideration of a no roading alternative with partial harvest methods emphasizing wildlife. The FS decided this was not feasible because of visual concerns. We feel there is no comparison between visuals and the protection of Anan bears. It is not acceptable to potentially jeopardize the bears and other wildlife for visual concerns. This alternative should not have been eliminated.

- The FS selected an alternative which builds 10 miles of road but then closes the road because of conflicts. Then the FS discusses the roads as a transportation infrastructure on 3-10. Which is it? The Forest Service needs to provide information that displays true costs of roads (how purchaser road credits work) and then continue to extrapolate the costs to other forest values such as esthetics, bear values and biodiversity. The FS must also be clear about the true intent of the road, is it transportation or silviculture?
- The Forest Service has a poor history of closing roads. In fact, on POW the Forest Service has admitted there in inadequate funding to adequately monitor and assure the closure of roads.
- Nationally, the Forest Service states; "fewer that half of the 400 ,000 miles of forest roads - eight times the mileage of the interstate system - are properly maintained." Why would the Tongass be any different?

Issue: Inventory and Monitoring Obligations

With respect to the Forest Service's inventorying and monitoring obligations, the Forest Service is not collecting population data on wildlife to ensure viable populations, particularly brown bears. The Forest Service instead is relying on hypothetical models to assess habitat capability, or extrapolating information from other studies and then assuming that viable populations of species are in existence and well-distributed on the forest land. The Forest Service's failure to collect population data forecloses its ability to evaluate forest diversity in terms of wildlife and to adequately determine the effects of its management activities. Sufficient inventorying and monitoring of forest resources is vital to making sound, forest-management decisions and ultimately protecting the Tongass resources from permanent impairment.

Issue: Deficit Sale

- On page 3-9, ATL 3 suggests a net stumpage of 0 excluding road costs.

Issue: Wetlands

- Executive order 11990 provided new direction for the management of our nation's wetlands: " The Nations coastal wetlands and inland wetlands are vital natural resources of critical importance to the people of the country. . . The unwise use and development of wetlands will destroy many of their special qualities and important natural functions." Executive Order 11990 initiated

standards to avoid impacts when there were alternatives "each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands . . .".

- The majority of this project areas is located in wetlands, which cover 12,200 acres of this project area. You state on 3-93 that "because wetlands are so extensive in the project area, it is not feasable to avoid all wetland areas." The selection of this area is contradictory to mandated protection of wetlands.
- TLMP standards and guidelines state; "minimize the destruction loss or degradation of wetlands." The DEIS does not attempt to minimize the degradation of wetlands by clearcutting and roadbuilding throught the selection and range of alternatives.
- The building of forest roads through wetlands causes degradation.

Issue: Forested Wetlands

Forested wetlands seem to be one of the most vulnerable wetland types to clearcut timber harvest. In question is the regeneration capability and sustainability of these sensitive and slow growing sites. Scant data exists which can be used to predict the effects of management activities on forested wetlands on the Tongass. One 1979 unpublished report from Kupreanof Island in southeast Alaska, identifies stunted second growth stands, chlorotic seedlings and pole-sized trees on Kaikli, Karheen and Maybeso soil series . A growth reduction occurred abruptly when these trees reached 7 to 10 years of age. The analysis of soils showed the stunted trees were deficient in nitrogen. Studies in other areas suggest similar conclusions on the effects of logging on forested wetlands.

- Please explain what proportion of the sale is in forested wetland soils which were removed from the timber base in TLMP due to regeneration concerns.
- Please define more clearly to the reader what the effects of clearcut harvest are to each wetland type within the project area.
- Discuss the problems with sustainability and regeneration on certain soil types and their prevalence in the project area
- The process is flawed by the initial selection of an area with a preponderance of wetlands.
- The cumulative loss of wetlands is an issue. Even though this sale is perceived as small, it is the cumulative loss of similar areas throughout the Tongass that come into question.
- Logging in alpine wetlands is not sustainable. The issue to regeneration is a real concern. Alpine sites on Prince of Wales, which are much more productive than sites in the Bradfield, are experiencing regeneration questions. Without adequate regeneration, sustainability is an issue.

Issue: Roads in Wetlands

The forest road provision is very specific and assumes that if a 404 exemption is used, the "road is intended to be used solely for such forest functions . . if a road through a national forest would principally serve tourists visiting a recreational site in the forest, not the actual business of silviculture, it would not be a forest road." (Regulatory Guidance Letter-03, 4-4-86 ,EPA). If the Forest Service uses the exemption to build roads to access timber, then they must follow their own regulations or Best Management Practices (BMPs) which give clear direction for minimizing the impacts to wetlands by keeping permanent or temporary access roads for forestry to a minimum feasible number, width and total length and locating roads far from streams or other water bodies.

- How are you avoiding wetlands, and how are you keeping the number to a minimum?

Issue: LTFs

Log transfer facilities and their related effects on the marine environment have been of concern since the early 1970's. The specific environmental concerns are the facilities themselves because of fuel transfer, camps and docks; the accumulation of bark and wood waste into the water at the site and the resultant biological effects; the location of the LTFs. The accumulated bark both physically smothers organisms and may create anoxic conditions or toxic gas. Estuaries are sinks for sediments and can be dramatically effected by the debris associated with LTFs. LTF's also esthetically degrade an area.

- Options such as barging or helicoptering to a barge should be examined. With the scale of logging on the Tongass beginning to change, the FS must look at other alternatives to LTFs.
- An LTF is especially objectionable in an area such as Anan.

Issue: Steep slopes

- Logging on steep slopes jeopardizes soil and water quality.

Issue: Alternatives to Clearcutting

- The Forest Service must give good faith, meaningful consideration to alternatives to clearcutting as a means of timber harvest. The Forest Service is using clearcutting techniques as the rule instead of using it only in exceptional circumstances.

- On sites with steep slopes, riparian areas, and viability concerns (bears), selective logging techniques may have significant advantages over clearcutting. We advocate no timber harvest in any drainages near this significant bear area. If however, timber harvest were to occur outside the boundaries Canal Hoya, the FS should begin to consider the elimination of clearcut harvest where applicable.

- Group selection should provide the closest emulation of natural disturbance processes on the Tongass. This would provide a more diverse structure since multiple size classes of trees would exist within a stand.

- Individual tree selection would provide the greatest number of canopy layers and the most diverse structure

- Snags and coarse woody debris are key elements in stand structure but are generally lost with standard 100 year rotational silviculture and clearcutting. Snags and low volume timber often provide key structural elements.

- The preferred alternative has clearcuts of up to 86 acres in size with 20% reserves. Clearcut logging is not acceptable at this juncture in forest management.

Issue: Pulp

- I have heard FS employees struggle with the issue of "where does the pulpwood go?" The demand for wood is lower and there are no pulp mills to use the lower grade wood. This gives the FS all the more reason to leave those trees in the woods and pursue alternatives to clearcut timber harvest. At no time in the agencies history on the Tongass is looking at other alternatives more applicable and more possible.

Issue: Mitigation

- The logging camp should have regulations of no hunting, trapping or consumptive use of any resources if a small camp remains in the area of Anan.

Issue: Notification

- We are all well aware that Anan is one of the most significant bear viewing areas in the world. It is essential that all visitors, past and present, know about the agencies intent to road and clearcut near Anan.

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Jackie Canterbury
Alaska Coordinator
Forest Service Employees for Environmental Ethics
P.O. Box 3280
Ketchikan, AK 99901

Dear Ms. Canterbury,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to the comments in your letter.

Alternatives
You expressed concern that there was not an alternative that did not include roads and had selective harvesting as the predominate silvicultural system. Roads are needed to harvest timber in Canal Hoya because of helicopter limits and the power line. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the timber available for harvest would be isolated.

No roads will be constructed in the Canal VCU this entry. Alternative 4 provided the decision maker with an option to select "helicopter yarding only" by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). We have expanded our discussion of that option in the FEIS.

You fault the EIS as not providing an adequate range of alternatives because there is not a specific "no roading/clearcutting/LTF' alternative. In reviewing the EIS to come to my decision; I look upon the yarding systems, prescriptions, and LTF's as tools and not ends in themselves. Other commentors have suggested that I needed to look at a maximization of roads and clearcutting alternatives to come to a reasoned decision. In order for me to make a reasoned decision based on the site specific situations found on the ground, I weighed the capability of the land and the resource issues identified by the public and State and other Federal agencies. We did not formulate alternatives by imposing any given prescription or harvest method unilaterally to form an alternative. Such a way to construct alternatives is not likely to lead to reasoned, practical, or implementable alternatives that fit the varied situations on the ground. The range of alternatives allowed me to compare reasoned choices between options which were developed with site specific information. These alternatives could be implemented on the ground and the range of these alternatives serves to demonstrate reasoned trade offs. A vast number of permutations of alternatives exist and the ID-team and myself considered many. Had the most reasonable sum of these situations yielded an alternative such as you propose, I could have modified a proposed alternative to choose it.

In making my decision, I considered all issues and took into account the competing interests and values of the public. The selected alternative provides a beneficial mix of resources for the public within the framework of public needs, desires and capability of the land and resources. With the modifications made to this alternative from public and agency comments made in response to the DEIS, I believe this alternative will better meet the purpose and need for the project while mitigating or avoiding most of the concerns you cite. Please note that one of the reasons for my preference for Alternative 3 is that under it there would not be any roading in the Canal watershed which is adjacent to Anan. Alternative 3 does allow roading in the Hoya watershed, but under this alternative the nearest road building would be about 6.5 miles from the Anan observatory and waters flowing into the Anan watershed would not be affected in any way. This alternative further mitigates the effects of roads by road closures, motorized use restriction, and hunting closures. The measures are described in more detail below in the Final EIS and in the Record of Decision.

The choice of which harvest method to use was based on many site specific factors, primarily yarding systems and steepness of slopes. At times close observation of the site specific situation makes the consideration of a given prescription (such as clearcutting) or harvest tool (such as helicopter) not wise or feasible and at other times, these may be the optimum tools based on a particular stand or unit's situation. For instance, clearcutting is more economical with cable systems, whereas partial harvest maintains soil stability better on steep slopes. Therefore, all units that are located on cable operable ground have prescriptions of clearcut with retention, except where steeper slopes or visual concerns prompted us to prescribe partial harvest for a portion of the unit.

Typically, clearcutting is defined as harvesting all merchantable trees within the unit. Each clearcut unit proposed for the Canal Hoya Timber Sale has from 10 to 30 percent retention to address Forest Plan standards for scenery, and wildlife concerns. Retention of residual trees was increased in units that are more visible from likely viewpoints, or based on concerns such as whether a given area is used for bear denning or is an important travel corridor.

Both clearcuts and partial harvesting prescriptions are practical with helicopter yarding systems. The helicopter units within the action alternatives have either a diameter limit or patch cut prescription. Since some of the trees are to be retained in the Canal Hoya units, partial harvesting of helicopter yarded units was preferred. This allows us to more evenly distribute the retention, which enhances the visual quality of the unit, provides diverse stand structure throughout the unit, and allows more volume to be harvested than if the trees were retained in clumps. The FEIS has additional discussion of what prescriptions were used and where they were used.

It should be noted from the above discussion that in the Canal Hoya harvest units, the primary difference between a clearcut with reserves and a partial harvest unit will be in whether the leave trees are distributed throughout the unit or grouped in clumps, not whether or not there will be <u>any</u> trees left in the units. The reason for the difference in distribution of leave trees is that randomly distributed trees in cable yarded units are likely to be damaged or knocked down by the cables or logs as they are dragged to the landings. Helicopters are able to lift the trees up and out of the units and avoid most of the damage to the leave trees.

A conceptual image of a clearcut with reserves would be a mottled landscape within a unit, with linear clumps of trees that generally run parallel to the yarding corridors. Between the reserve clumps, there would be open ground, with some random individual trees. Individual leave trees would normally be in the upper third of the unit, where they are not as likely to be damaged by cables or

moving logs. In addition, the clumps left in the clearcuts may have some trees that will be larger than those left under a diameter limit prescription.

The four action alternatives have a wide range of acres harvested in clearcut and non-clearcut prescriptions that are consistent with the Forest Plan Land Use Designations for the Project Area (Modified Landscape and Timber Production). This table illustrates the variation between the action alternatives and the amounts of clearcut or partial cut prescription (road right-of-way acres not included):

	Clearcut with reserves	Patch cut	Diameter limit	TOTAL
Alternative 1	440 ac. (56%)	83 ac. (11%)	258 ac. (33%)	781 ac.
Alternative 2	595 ac. (75%)	52 ac. (6%)	151 ac. (19%)	798 ac.
Alternative 3	367 ac. (56%)	73 ac. (11%)	218 ac. (33%)	658 ac.
Alternative 4	144 ac. (24%)	53 ac. (8%)	412 ac. (68%)	609 ac.

Bears

"The DEIS contradicts the persistent recommendations of scientists" [1996 bear panel evaluators]. An entire section of the DEIS covers the impacts of roads on bears (p 3-44) which cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself (FEIS 1997). We are managing human access by gating all the roads and only allowing motorized use for administrative purposes during and after the sale. The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We have also followed the recommendations of State and USFWS biologists who visited the site.

"The FS has extrapolated information from the collaring of 13 bears. The original study was to look at disturbance /human bear interactions not habitat use."

The purpose of collaring 14 bears (13 black bears and 1 brown bear) at Anan was to look at habitat use and distribution prior to the Canal Hoya timber sale. A second study by researchers at Utah State University focused on bear/human interactions at Anan. Although the radio telemetry data was not used for the Utah State University study, the researchers did recommend that we use the telemetry data for estimating home range in their final report (*Human-Bear Interactions at Anan Creek, Tongass National Forest, Alaska,* page 79. Chi and Gilbert 1996).

We realize there are limitations to this data, yet it represents 19% of the black bear population at Anan, by our best estimates, which some would argue is a reasonable sample of the population. We believe it is worthwhile to use information we gained from 3 years of telemetry research. Since it is a small sample, we also used other more traditional methods of comparing alternatives including the most recent versions of the black bear and brown bear habitat capability models and measures of road density. The only sure way of obtaining an estimate of home range for all Anan bears would be to collar all of the bears. Aside from the risk of losing animals, it is doubtful that this would be acceptable to tourists or to the guides. The home range size of the black bears we collared matched what has been found in other studies. The Hoya VCU is outside of this range for black bears.

We did not solely use information from the one collared brown bear to make management decisions. Decisions were also based on research findings such as the impacts of roads and harvesting to brown

bears that were collared on Chichagof. Estimating brown bear populations in a forested landscape is inherently difficult and population estimates usually have a high degree of error associated with them. It is our belief that we are proceeding with the best information available.

"...the cumulative impacts are the critical factor. This is not examined thoroughly."
We have added information in the Final EIS (page 3-58) about cumulative effects on high value bear habitat over the Canal, Hoya, Anan, Eagle and Frosty VCUs. Our analysis indicates we are essentially having no direct impact on high value brown bear habitat. High value brown bear habitat is defined as riparian forest which is protected by current stream/beach/estuary buffers. Other projects have already resulted in a 17% loss in this type of habitat from the original condition. There would be a 0-20% loss in high value black bear habitat by alternative from the existing condition over the larger area. When compared to the original condition of the larger area, there is a 25-40% loss in high value black bear habitat by alternative.

In response to comments such as yours we have also added sections in chapter 3 or the FEIS which describe other known or reasonably foreseeable activities in the area. We considered cumulative effects of past and present projects in the area, but such activities are not likely to lead to significant cumulative effects beyond those disclosed in the Final EIS. Under Forest Plan goals and objectives, more harvest would likely take place in the area, but is not likely to occur for many years and is not scheduled at this time. Our best estimate is that additional timber harvest in the project area is not likely to take place for 20 to 30 years. We do not believe the effects of such possible harvests are reasonably foreseeable; nor are environmental and regulatory conditions that would exist in 20 to 30 years well enough known to forecast effects of such a possible entry. Any activities nearby known to us or which we can foresee are either largely well removed and/or unconnected to the project area, or are far enough in the future as to be highly speculative in terms of possible effects.

[A brown bear population viability analysis] ***"should be accomplished before the FS rushes to place timber sales in valuable bear habitat."***
The brown bear viability panel met in 1997 and assisted in the development of a Forest Plan that would ensure brown bear population viability. The panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself and we are managing human access as described above.

Removing habitat does have an impact on bears which is discussed under both the black bear and brown bear habitat sections of the DEIS (3-35 and 3-42). Road use has a greater impact than habitat removal for this study area using the most recent version of the bear habitat capability models for both of these species. We have maintained forested corridors between the Old Growth Reserves and within riparian/beach/estuary buffers which will allow bears to move through the area without having to cross clearcut openings. We have a high degree of retention within many of the harvest units which will also provide cover. The brown bear viability panel listed riparian habitat as the most important for brown bears. We are applying standard buffers on all the fish streams in the area and an additional 500 foot buffer on identified brown bear foraging streams.

Population viability analyses and other similar type models are based on our best estimates of life history parameters, habitat use, rules of dispersal, environmental stochasticity and density dependence -- factors that we know little about for most species. Therefore, predictions based on these models are generally based on several assumptions and unknowns -- and their ability to predict

future viability may be no better than what we have predicted based on intensive field work, cumulative effects habitat-based modeling and our best biological opinion. The brown bear viability panel assisted with the design of the Revised Forest Plan and considered viability across the Tongass.

"Black and brown bears use the alpine for denning and foraging."
We would not construct roads or harvest in alpine and would not affect bear dens in those areas under any of the action alternatives.

Goshawks
"It seems the FS again extrapolated information from an inadequate data set..."
It is unclear what is meant by an inadequate dataset. A model was developed to represent goshawk nesting habitat using the best information available on preferred breeding habitat obtained by the State (elevation < 800 feet and slope < 35%). There is a limited amount of this habitat within Canal Hoya and a large percentage of it is within the beach/estuary and riparian buffers. As stated on p. 3-64 of the DEIS: "the North Misty Fiords province is not an area of high risk for the persistence of goshawk populations before the year 2055".

Roads
"... the importance of maintaining roadless areas on our National forest lands."
We understand the importance that some people place on roadless areas, while others commented that they would like to see more roads constructed to provide access to the National Forest lands. The Canal Hoya project area is surrounded on three sides by areas with low development management prescriptions, which limit road construction. We disclosed that there are no roads in the project area on page 1-2 and 3-31, and discussed the effects of the roads under the various significant issues. The introduction of roads to an unroaded area was described as being a major change to the recreation character of the area on page 3-31.

"You are viewing roads as a capital improvement."
Both temporary and specified road costs are displayed in table 3-4 for all the action alternatives. We view specified road developments as a long term economic benefit (capital improvement) because specified roads provide access for a variety of silvicultural activities including; timber harvest, tree planting, precommercial and commercial thinnings both for the first entry and any future entries.

Purchaser's credit is credit earned by the purchaser's construction of specified roads, and when such construction is accepted by the Forest Service, shall be applied to the purchaser's account. The Purchaser credit estimate is the Forest Service engineer's total estimate of cost for specified roads with an allowance for profit and risk. 36 CFR 223.62 states, "Appraisal may also establish stumpage value as if unconstructed roads or other developments needed by the purchaser for removal of the timber were in place. When timber is appraised and sold on such basis, purchaser credit for road construction, not to exceed the estimated construction cost of such roads or other developments specified in the timber sale contract, shall, when such construction is accomplished by the purchaser, be deducted from the stumpage payments made by or due from the purchaser under the timber sale contract for other than minimum stumpage and required deposits for slash disposal and road maintenance."

We added a section in the FEIS that displays an estimate of the minimal payments to the State of Alaska for each of the action alternatives.

"Even though a road is closed, it is still a structure and makes entry to the area easier."
The area is fairly inaccessible. The roads will not connect to any community and the only way to get a vehicle to the area is by boat and there will be no loading or unloading ramps, also the gates will be placed in places that will be extremely difficult to get around. Non-motorized access would be improved in areas where roads are constructed. However, motorized access would be prohibited for all but administrative uses by Forest order. Roads would not be constructed in the Canal VCU this entry. This gives the Forest Service time to monitor and evaluate the effectiveness of road closures in the Hoya VCU before considering constructing any roads in the Canal VCU.

"The FS must also be clear about the true intent of the road, is it transportation or silviculture?"
We are proposing to maintain the specified roads in a drivable condition so we can drive on them to conduct road maintenance work, regeneration surveys, thinning and other administrative work. The specified roads are considered "transportation infrastructure" for silvicultural purposes only. The Forest Service does not plan to use the roads for any other purpose at this time. To mitigate wildlife habitat security concerns, the roads will be closed during and after sale completion to unauthorized motorized vehicle access by means of gates and an Administrative road closure order.

"Why would the Tongass be any different?" [in regard to roads that are not properly maintained on a national level].
The Frosty Bay Timber Sale is an example of an isolated road system on the Wrangell Ranger District that has been maintained after the sale and has not had significant resource problems.

Deficit Sale
As discussed on page 3-10 of the DEIS, "Recent bidding on Stikine Area timber sales has shown a strong competitive demand for stumpage that far exceeds the advertised rates." We have also reduced the number of acres in Alternative 3 that would require helicopter yarding, which would make the sale more economical. Therefore, it is likely that Alternative 3 would show a positive return when specified roads are excluded and based on recent bidding patterns, it is likely that the sale would be purchased and likely would be bid up.

Wetlands
"Executive Order 11990 requiring each Federal Agency to provide leadership and take action to minimize destruction, loss and degradation of wetlands..."
This Executive Order is acknowledged and stated in the DEIS. In designing a timber sale that uses ground based logging systems, a plethora of resource concerns are considered, of which wetlands is one. In some cases it makes better sense to locate the road on relatively flat, forested wetlands or muskegs, instead of on steep hill sides, or adjacent to streams; the trade-offs are typically fewer road miles, and road location in the least impactive area overall.

"The majority of this project area is located in wetlands... [the DEIS states] on page 3-93 that "because wetlands are so extensive in the project area, it is not feasible to avoid all wetland areas." The selection of this area is contradictory to the protection of wetlands."
Tables 3-33 and 3-34 in the FEIS show the miles of road that will be constructed through wetlands and the acres of harvest planned on wetlands. They are a minor percent of the total miles of road to be constructed and acres to be harvested, not a *majority* as stated in the FSEEE letter. The Canal Hoya area is not untypical of much of southeast Alaska in terms of abundance of wetlands of various types. Nearly 47% of the project area contains wetlands and we largely seek to avoid wetlands whenever possible, but on such a landscape this is not entirely possible. The data referenced in the

EIS clearly shows that about 1% percent of the 12200 acres of wetlands in the project area are likely to be impacted by roads or harvest under the selected alternative.

"TLMP standards and guidelines state, "minimize the destruction loss or degradation of wetlands." The building of forest roads through wetlands causes degradation."
Road location was a major consideration in designing all alternatives, and avoiding wetlands was a consideration in planning road locations. Road location in wetlands was minimized to the extent possible. We considered the fill area of the road prism a direct loss of wetlands, which is more severe than "degradation," and we disclosed that in our analysis.

Forested Wetlands
What proportion of the sale is in forest wetland soils which were removed from the base?
The organic soils (Kaikli, Karheen and Maybeso) were not removed from the timber base because of regeneration concern. All of the areas harvested in the past which have organic soils appear to have adequate regeneration. These areas were removed from the base until there is more information on **regrowth rates**. The Forest Plan allows for up to two acre inclusion of areas with organic soil. Using both field reconnaissance and mapping data available to us, we have avoided unit placement on organic soils removed from the base to the best of our knowledge. Inclusions of two acres or less may exist in some units, but we are not aware of any at this time.

"Please define more clearly to the reader what the effects of clearcut harvest are to each wetland type within the project area." "Discuss the problems with sustainability and regeneration on certain soil types and their preponderance in the project area."
A more thorough explanation of effects is provided in the FEIS on page 3-105.

"The cumulative loss of wetlands is an issue."
This is a Forest Plan level issue, discussed on page 3-323 in the Forest Plan FEIS.

"Logging in alpine wetlands is not sustainable."
There are no proposed harvest units in alpine wetlands, alpine sites generally do not even support commercial timber stands.

"How are you avoiding [road construction in] wetlands, and how are you keeping the number to a minimum?"
Where grade, alignment and road length are not impacted significantly the wetlands are gone around. We use aerial photos for initial road reconnaissance to find preliminary routes and avoid wetlands within the physical limitations in getting from one control point to another. Field reconnaissance refines route selections, and route changes are made to avoid wetlands if possible. At times the alternative locations to avoiding wetlands may have more environmental impacts than crossing a particular wetland (for example proximity to creeks and riparian areas, moving a road location up, but onto an erosive slope, etc.) and in such situations the best choice may be to keep the location in the wetland. At other times, to reach a control point with a road that is feasible to drive on, it may not be possible to avoid a given wetland. There generally is an economic incentive to avoid wetlands if possible in that road costs increase going through wetlands due to the larger amount of rock borrow required to provide a stable road bed, so if possible they are avoided.

LTFs
Chapter 3 of the FEIS describes potential impacts of the LTFs and how these impacts are mitigated. Appendix D contains detailed information describing how LTF site selection, design, construction, operation and monitoring address these concerns. For example, LTFs were purposely located away from estuaries to avoid impacting these sensitive areas. See specifically the discussion under C10 in Appendix D. A mixture of floating LTF development and helicopter-to-barge operations (as proposed in the selected alternative) is preferable from both an environmental and economic standpoint for this timber sale. Visitors to Anan will not be able to see LTFs proposed under any alternative from Anan. By boat, they would have to travel a mile north of Anan and then about seven miles east into the Bradfield Canal before they would be able to see the proposed Hoya LTF. Anan visitors may be able to see barges or log rafts passing into Ernest Sound or the Blake Channel on their way to secondary log processing areas. We do not anticipate any LTF effects on Anan estuary.

"Logging on steep slopes jeopardizes soil and water quality."
We acknowledge that logging on steep slopes can cause accelerated erosion affecting soil productivity and water quality degradation. We have avoided slopes over 72% unless field verified as low risk, and have discussed that issue on page 3-93 of the DEIS.

Alternatives to Clearcutting
This was discussed above under "Alternatives."

Pulp
The demand for pulp quality logs is lower but the demand for sawlogs remains high. The closure of the Alaska Pulp Corporation (APC) and the Ketchikan Pulp Corporation (KPC) pulp mills, along with recent downturns in pulp markets has reduced the demand for utility or pulp quality logs. Currently, in Southeast Alaska there are a limited number of mills with "chipping" operations that process this type of wood into chips that are subsequently sold to other manufacturing businesses. Many of the harvest units in Canal Hoya have prescriptions that will retain varying percentages of "leave trees". There are potential economic, visual and wildlife benefits from leaving some lower quality trees uncut.

Mitigation
"The logging camp should have regulations of no hunting, trapping or consumptive use of any resources if a small camp remains in the area of Anan."
The State manages hunting through their regulations and process, and it is our understanding that there is a proposal from the Wrangell Advisory Committee to close hunting in the Canal Hoya area during the life of the sale, if roads are constructed. We support that effort. If the State does not close hunting, we would implement a Forest closure order (36 CFR 261.58(v)) on bear hunting within 1/2 mile of any roads constructed in the Canal Hoya Sale Area during the life of the sale.

"It is essential that all visitors, past and present, know about the agencies intent to road and clearcut near Anan."
We notified all who were on the project mailing list or expressed an interest in the sale and provided a variety of opportunities for public comment, as described on page 1-8 of the DEIS.

Thank you again for sharing your concerns.

Sincerely,

CAROL J. JORGENSEN
Assistant Forest Supervisor

Scott Posner
US Forest Service
Wrangell, AK

Re: Proposed Canal Hoya Timber Sale

Scott,

Having had the opportunity to review the DEIS Alternatives I continue to have very strong concerns for the proposed timber sale. I don't believe that the bears that use Anan Creek (and the proposed timber sale area for habitat) are being sufficiently considered. Anan Creek is one of the best bear viewing areas in Alaska. Our company brings people from across the United States, Canada and Europe to visit Anan every summer. This is a world class destination and I don't see this being reflected by the Forest Service. And it is the Forest Service that the public rely on to make good management decisions to protect the Tongass and specifically the bears at Anan Creek.

Roads - My strongest concerns for the bears center around road construction. All remaining alternatives base access to timber around road construction. I believe there is already strong evidence that combining roads and especially brown bears doesn't work. With the increasing use of Anan by brown bears over the past few years, protecting their habitat is only more critical. Once a road is built into Canal Hoya, the Anan Creek ecosystem will be changed forever - and I don't think that is acceptable. Roads reduce habitat, denning sites, place barriers to travel (along with clearcuts and LTF's) and most importantly allow easy access to hunting of bears habituated to humans. I don't believe this relatively small timber sale is worth risking when compared to the long term, sustainable employment, and non-consumptive impact that tourism brings. Tourism remains the future for the Tongass, and land use decisions need to protect the key sites that have already been developed. By developing Anan Creek and allowing its promotion, the Forest Service now has a special responsibility to protect the wildlife there.

The Forest Service mentions that a no road alternative would have a greater visual impact. Though of course, I share the interest of tourists in seeing the wilderness left wild, I think it is short term thinking to hide the timber harvesting better while risking the bears more. If you are going to go ahead with a timber sale and risk both these bears and the tourist experience at Anan, then show people the clearcuts. The roads present the greater and more insidious risk to wildlife.

The Forest Service talks about closing the roads. I can't imagine how one can actually stop access via closed roads for hunting. In my mind the only true guarantee would be the removal of the roads after harvest. Has this been considered?

I don't understand why the DEIS does not include the costs of road construction. As these roads only provide a negative to the Anan ecosystem, and no long term benefit are these costs being adequately included in the costs of timber harvest?

Bears - I don't believe the Forest Service has conducted sufficient research to truly know the impact of the proposed timber sale on the bears. The original studies at Anan Creek focused on human / bear interactions, not the impacts of habitat loss and timber harvesting. Only a small number of bears were collared to provide any habitat use information. And most noteworthy only one brown bear was collared so how can the impacts on brown bears even be estimated?

Across North America the bears are losing habitat acre by acre. In an area as important as Bradfield /Anan how is it acceptable to lose even a small proportion of bear habitat. Thousands of tourists every year are coming to Anan and counting on seeing the wildlife and bears.

Wetlands - I am not a forest ecologist, however, even a tourism operator becomes concerned when the DEIS states that "because the wetlands are so extensive it is not feasible to avoid all wetland areas". Issues of wetland protection are heard everywhere. Is this timber sale appropriately situated if wetlands cannot be protected? What impact will the roads have upon the wetlands? And can these areas once impacted ever recover? It doesn't seem like a sustainable timber harvest area.

Public Knowledge - Before a decision is made visitors past and present to Anan need to be informed about the Forest Services intentions to road and harvest near Anan. There has been little or no indication of these plans presented at Anan for visitors.

Clearcuts -. I am greatly concerned on the effect that clearcuts have in changing bear behaviour - placing barriers to food sites, traditional denning areas, etc. Have selective logging alternatives been thoroughly examined?

As a representative of the tourism industry, and the growing thousands of the public who come to Alaska to see wildlife, I would strongly advocate no timber harvesting near Anan Creek.

Sincerely,

Randy Burke
Owner, Bluewater Adventures

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Randy Burke
Bluewater Adventures
3-252 East First Street
North Vancouver, BC
Canada V7L 1B3

Dear Mr. Burke,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to your comments.

Roads and Bears

Your concern for road construction as it might effect the Anan bears it well noted. Other commentors share your concern as do I. An entire section of the DEIS covers the impacts of roads on bears (p 3-44) and cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself (Forest Plan FEIS 1997). The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We are managing human access by gating all the roads and only allowing motorized use for administrative purposes during and after the sale. We have also followed the recommendations of State and USFWS biologists who visited the site.

Partially because of the possible impacts of roads on the Anan bears, I have decided to select Alternative 3 which will build no road in the Canal watershed adjacent to Anan. My decision also incorporates road closures to all motorized recreational (non administrative) use upon construction of even these roads. I did not choose the no-action alternative or an option of one of the alternatives which utilized helicopter harvest only. This is because my review of the EIS indicated to me that it would be possible to offer a more economic sale while meeting the issues raised by the public, State and other Federal agencies. More detail on my rationale is provided below and in the record of decision which you will be receiving.

Alternatives Without Roads

Roads are needed to harvest timber in Canal Hoya because of helicopter limits and the power line. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the usable timber would be isolated.

No roads will be constructed in the Canal VCU this entry. Alternative 4 provided the decision maker with an option to select "helicopter yarding only" by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). We have expanded our discussion of that option in the FEIS.

Road Management

Several methods of managing the roads after the sale have been considered. Removal of the rock and restoration of road beds was considered, but was not included as a mitigation measure due to the expense and additional impacts. Obliterating roads would increase the road cost by 75% to remove the rock and stockpile, remove all structures and seed. We have decided to pull all drainage structures on temporary roads and restore the drainages to their original pattern. Temporary road beds would also be seeded and revegetated.

Road Costs

Both temporary and specified road costs are displayed in table 3-4 for all the action alternatives. The Forest Service does view specified road developments as a long term economic benefit (capital improvement) because specified roads provide access for a variety of silvicultural activities, including timber harvest, tree planting, pre-commercial and commercial thinnings both for the first entry and any future entries.

Bear Studies

The purpose of collaring 14 bears at Anan was to look at habitat use and distribution prior to the Canal Hoya timber sale. A second study by researchers at Utah State University focused on bear/human interactions at Anan. We realize there are limitations to this data, yet it represents 19% of the black bear population at Anan, by our best estimates, which some would argue is a reasonable sample of the population. We believe it is worthwhile to use information we gained from 3 years of telemetry research. Since it is a small sample, we also used other more traditional methods of comparing alternatives including the most recent versions of the black bear and brown bear habitat capability models and measures of road density. The only sure way of obtaining an estimate of home range for all Anan bears would be to collar all of the bears. Aside from the risk of losing animals, it is doubtful that this would be acceptable to tourists or to the guides. The home range size of the black bears we collared matched what has been found in other studies. The Hoya VCU is outside of this range for black bears.

We did not solely use information from the one collared brown bear to make management decisions. Decisions were also based on research findings such as the impacts of roads and harvesting to brown bears that were collared on Chichagof. Estimating brown bear populations in a forested landscape is inherently difficult and population estimates usually have a high degree of error associated with them. It is our belief that we are proceeding with the best information available.

Wetlands

We considered the fill area of the road prism a direct loss of wetlands, and we disclosed that in our analysis. In designing a timber sale that uses ground based logging systems, a plethora of resource concerns are considered, of which wetlands is one. In some cases it makes better sense to locate the road on relatively flat, forested wetlands or muskegs, instead of on steep hill sides, or adjacent to streams; the trade-offs are typically fewer road miles, and road location in the least impactive area overall. Tables 3-29 and 3-30 in the DEIS show the miles of road which will be constructed

through wetlands and the acres of harvest planned on wetlands. They are a minor percent of the total miles of road to be constructed and acres to be harvested.

Public Knowledge
We notified all who were on the project mailing list or expressed an interest in the sale and provided a variety of opportunities for public comment, as described on page 1-8 of the DEIS.

Clearcuts and Selective Logging
The choice of which harvest method to use was based on many site specific factors, primarily yarding systems and steepness of slopes. At times close observation of the site specific situation makes the consideration of a given prescription (such as clearcutting) or harvest tool (such as helicopter) not wise or feasible and at other times, these may be the optimum tools based on a particular stand or unit's situation. For instance, clearcutting is more economical with cable systems, whereas partial harvest maintains soil stability better on steep slopes. Therefore, all units that are located on cable operable ground have prescriptions of clearcut with retention, except where steeper slopes or visual concerns prompted us to prescribe partial harvest for a portion of the unit.

Typically, clearcutting is defined as harvesting all merchantable trees within the unit. Each clearcut unit proposed for the Canal Hoya Timber Sale has from 10 to 30 percent retention to address Forest Plan standards for scenery, and wildlife concerns. Retention of residual trees was increased in units that are more visible from likely viewpoints, or based on concerns such as whether a given area is used for bear denning or is an important travel corridor.

Both clearcuts and partial harvesting prescriptions are practical with helicopter yarding systems. The helicopter units within the action alternatives have either a diameter limit or patch cut prescription. Since some of the trees are to be retained in the Canal Hoya units, partial harvesting of helicopter yarded units was preferred. This allows us to more evenly distribute the retention, which enhances the visual quality of the unit, provides diverse stand structure throughout the unit, and allows more volume to be harvested than if the trees were retained in clumps. The FEIS has additional discussion of what prescriptions were used and where they were used.

It should be noted from the above discussion that in the Canal Hoya harvest units, the primary difference between a clearcut with reserves and a partial harvest unit, will be in whether the leave trees are distributed throughout the unit or grouped in clumps, not whether or not there will be any trees left in the units. The reason for the difference in distribution of leave trees is that randomly distributed trees in cable yarded units are likely to be damaged or knocked down by the cables or logs as they are dragged to the landings. Helicopters are able to lift the trees up and out of the units and avoid most of the damage to the leave trees.

A conceptual image of a clearcut with reserves would be a mottled landscape within a unit, with linear clumps of trees that generally run parallel to the yarding corridors. Between the reserve clumps, there would be open ground, with some random individual trees. Individual leave trees would normally be in the upper third of the unit, where they are not as likely to be damaged by cables or moving logs. In addition, the clumps left in the clearcuts may have some trees that will be larger than those left under a diameter limit prescription.

The four action alternatives have a wide range of acres harvested in clearcut and non-clearcut prescriptions that are consistent with the Forest Plan Land Use Designations for the Project Area

(Modified Landscape and Timber Production). This table illustrates the variation between the action alternatives and the amounts of clearcut or partial cut prescription (road right-of-way acres not included):

	CC with reserves	Patch cut	Diameter limit	TOTAL
Alternative 1	440 ac. (56%)	83 ac. (11%)	258 ac. (33%)	781 ac.
Alternative 2	595 ac. (75%)	52 ac. (6%)	151 ac. (19%)	798 ac.
Alternative 3	367 ac. (56%)	73 ac. (11%)	218 ac. (33%)	658 ac.
Alternative 4	144 ac. (24%)	53 ac. (8%)	412 ac. (68%)	609 ac.

Thank you again for your comments. A copy of the FEIS will be mailed to you directly from the printer.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
JUNEAU REGULATORY FIELD OFFICE
JORDAN CREEK CENTER
8800 GLACIER HWY, SUITE 106B
JUNEAU, ALASKA 99801-8079

REPLY TO ATTENTION OF

March 12, 1998

Regulatory Branch
East Section
9-980027

Mr. Stephen J. Brady
USDA Forest Service
Tongass National Forest
Wrangell Ranger District
Post Office Box 51
Wrangell, Alaska 99929-0051

Dear Mr. Brady:

These comments are submitted in response to your letter dated February 23, 1998, regarding the Canal Hoya Timber Sale, on Bradfield Canal. On January 26, 1998, we provided comments to the original Draft Environmental Impact Statement, and we have reviewed your response. Some of the issues raised have not been adequately addressed and will be restated below. The Corps of Engineers (Corps) is responsible for determinations concerning Department of the Army permit requirements, and our comments are presented as a regulatory agency as opposed to a commenting agency. As such, the requirements detailed below are requirements of Federal law and/or regulation.

For wetland development proposals requiring Corps authorization, Corps permits are available only for projects which clearly demonstrate compliance with the Clean Water Act Section 404(b)(1) guidelines, which state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences. In those cases where a non water-dependent activity associated with a discharge is proposed for a "special aquatic site", such as wetlands, practicable alternatives are presumed to exist unless clearly demonstrated otherwise. An alternative is considered practicable if it is available and capable of being accomplished after taking into consideration costs, existing technology and logistics in light of overall project purpose.

In this regard, less damaging practicable upland alternatives appear to be available for a number of road segments which are listed as follows:

Alternative One

A portion of the harvest road accessing Harvest Unit Five is proposed to be located in wetlands. It appears that if this portion of the road were relocated to the west of the proposed location (as shown on attached Sheet A), the wetlands would be entirely avoided. Note: This comment also applies to Alternatives Two, Three and Four.

A portion of the road accessing Harvest Units 23 and 24 is proposed to be located in wetlands (See note B, Sheet B). It appears that if this portion of the road were relocated to the south of the wetlands (See note C, Sheet B), impacts to wetlands would be minimized.

A portion of the road from Canal Hoya Log Transfer Facility (LTF) to Harvest Units 35 and 38 is proposed to be located in wetlands (See note D, Sheet C). It appears that if the road were relocated to the west (See note E, Sheet C), impacts to wetlands would be minimized.

Alternative Two

A portion of the road accessing Harvest Unit 45 is proposed to be located in wetlands (See note G, Sheet D). It appears that if the road were relocated to the south, impacts to wetlands would be minimized (See note F, Sheet D).

Please provide a response addressing the practicability of using these or other alternatives which would result in less impacts to waters of the United States, including wetlands, since based on the available information, we are unable to agree that the project roads are exempt from Section 404 permitting requirements.

In addition, practicable upland alternatives appear to be available for the sort yard proposed to be constructed in wetlands near the Canal Hoya LTF. As stated in our letter dated January 26, 1998, sort yards, land based camps, and LTF access roads which are proposed to be constructed in waters of the United States, including wetlands, require Department of the Army authorization.

We look forward to continued coordination for this and future timber sales. We are available for further discussion or clarification of our comments, as necessary. Please contact

Mr. Terry J. Stone at the letterhead address, by telephone at (907) 790-4490, or by FAX at (907)790-4499 if you have any questions concerning our requirements.

Sincerely,

R. Thompson

Ralph W. Thompson
Field Office Manager

Enclosures

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Ralph W. Thompson
Department of the Army
U.S. Army Engineer District, Alaska
Juneau Regulatory Field Office
Jordan Creek Center
8800 Glacier Hwy, Suite 106B
Juneau, AK 99801-8079

Dear Mr. Thompson:

Thank you for your letter (reference number 9-980027) clarifying your earlier comments about the Canal Hoya Timber Sale. Jackie DeMontigny, from the Wrangell Ranger District office, also spoke with Terry Stone to further clarify the concerns raised in your letter. To answer your questions about why the roads have been proposed for the locations shown in the Draft EIS, Dan Barnett, the engineer on the Canal Hoya Interdisciplinary Team made notations on the attached maps.

Dan did the road locating for this sale and was not able to avoid all wetlands, because in some cases it made better sense to locate the road in a wetland instead of on a steep hillside, or adjacent to a stream. Overall, in addition to the Clean Water Act, wetlands are avoided because road costs increase in wetlands, due to the larger amount of rock fill needed.

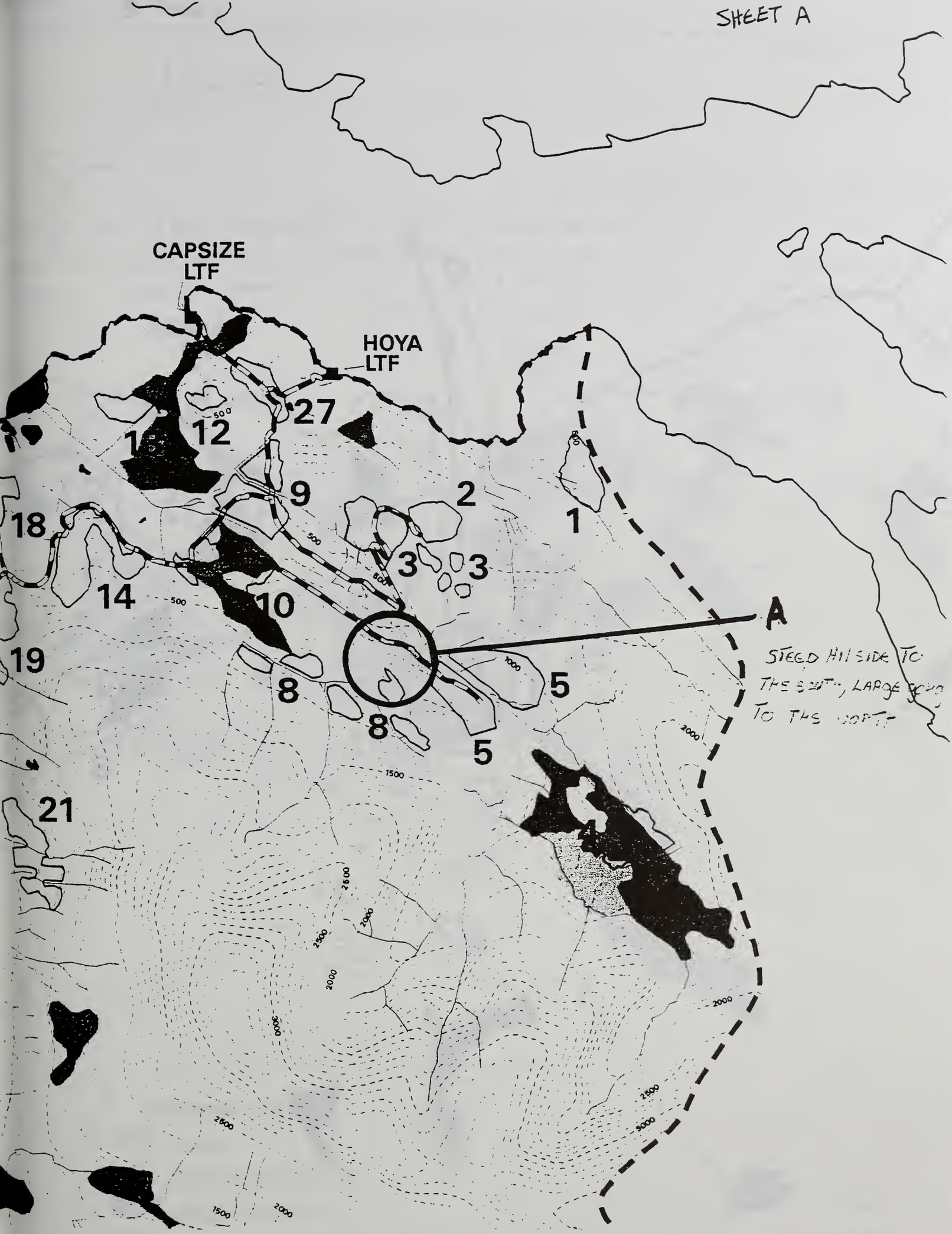
I have selected Alternative 3, with modifications from the Final EIS, so there will be no roads constructed in the Canal Value Comparison Unit, and the portion of Road 6960 past Unit 19 will not be constructed. Therefore, only location A of your notations will be in the Selected Alternative. As Dan noted on the map, this wetland crossing was necessary to avoid constructing the road on a steep hillside. The road to Unit 5 is necessary, because the timber could not be yarded by helicopter over the powerline. If you have any further questions about the road locations, please feel free to call Dan or Jackie at (907) 874-2323.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assitant Forest Supervisor

enclosure


SHEET A
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21
STEEP HILLSIDE TO
THE SOUTH, LARGE SWAMP
TO THE SOUTH
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600
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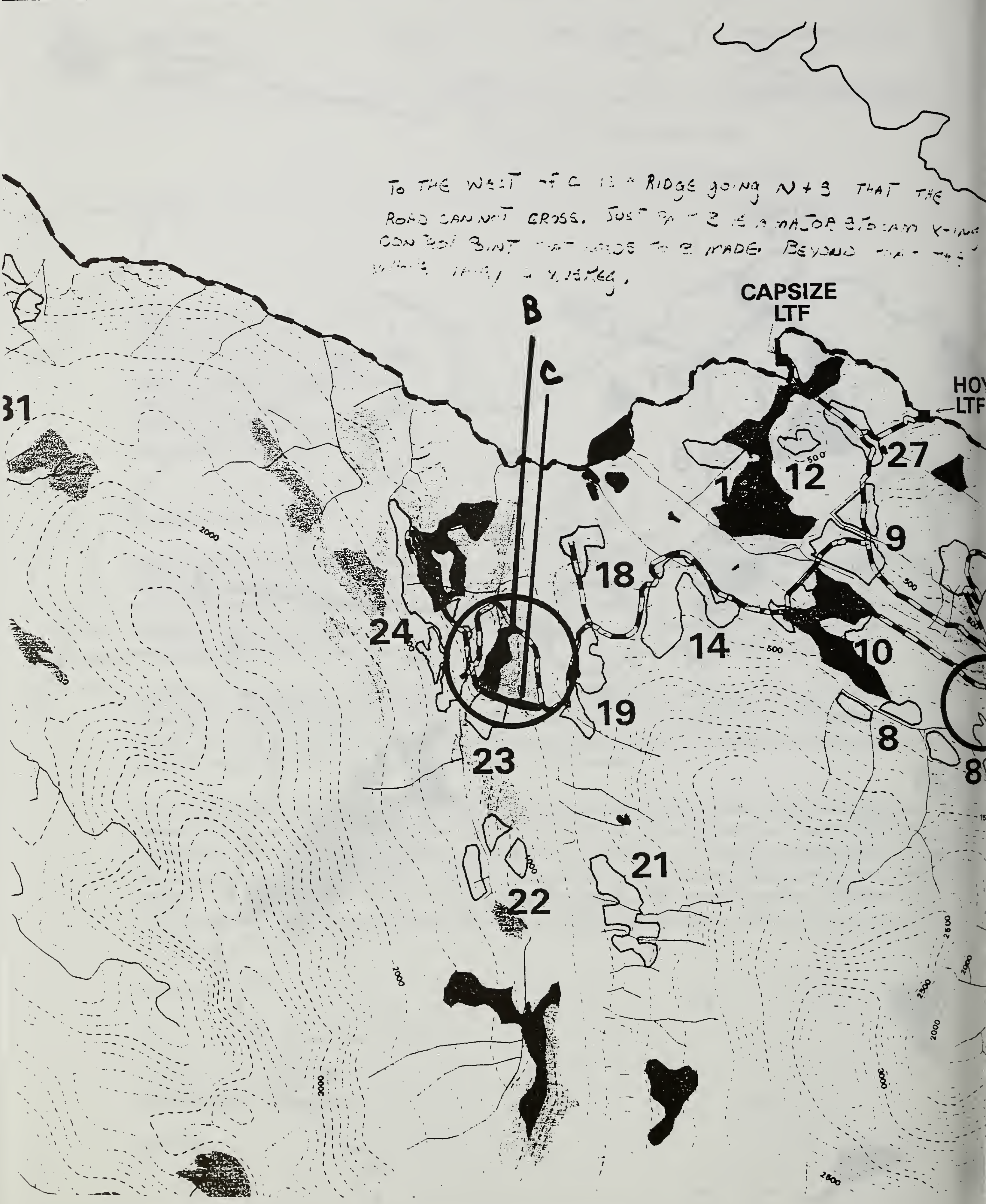
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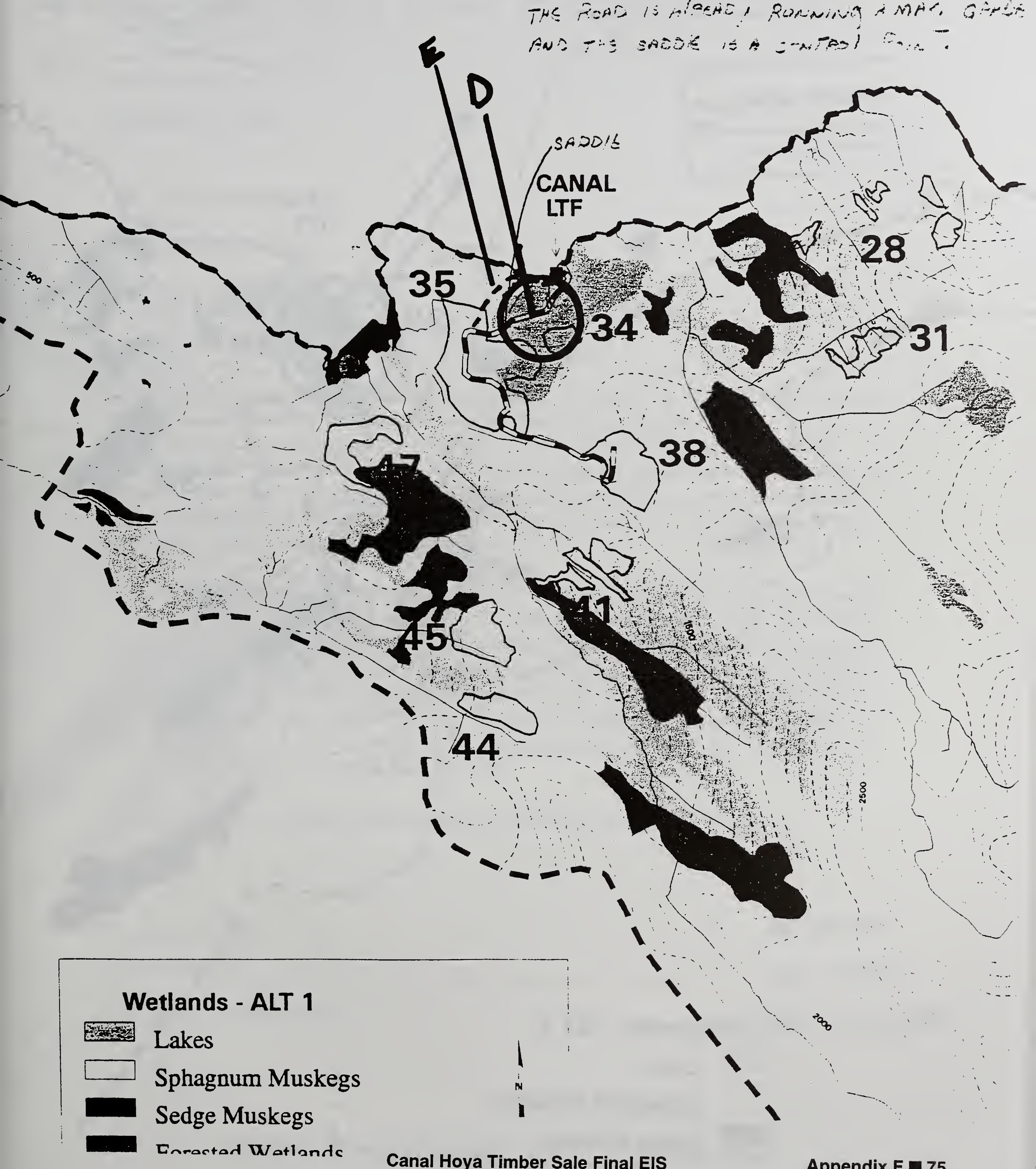
SHEET C


THE ROAD IS ALREADY RUNNING A MAX. GRADE
AND THE SADDLE IS A CONTROL POINT.
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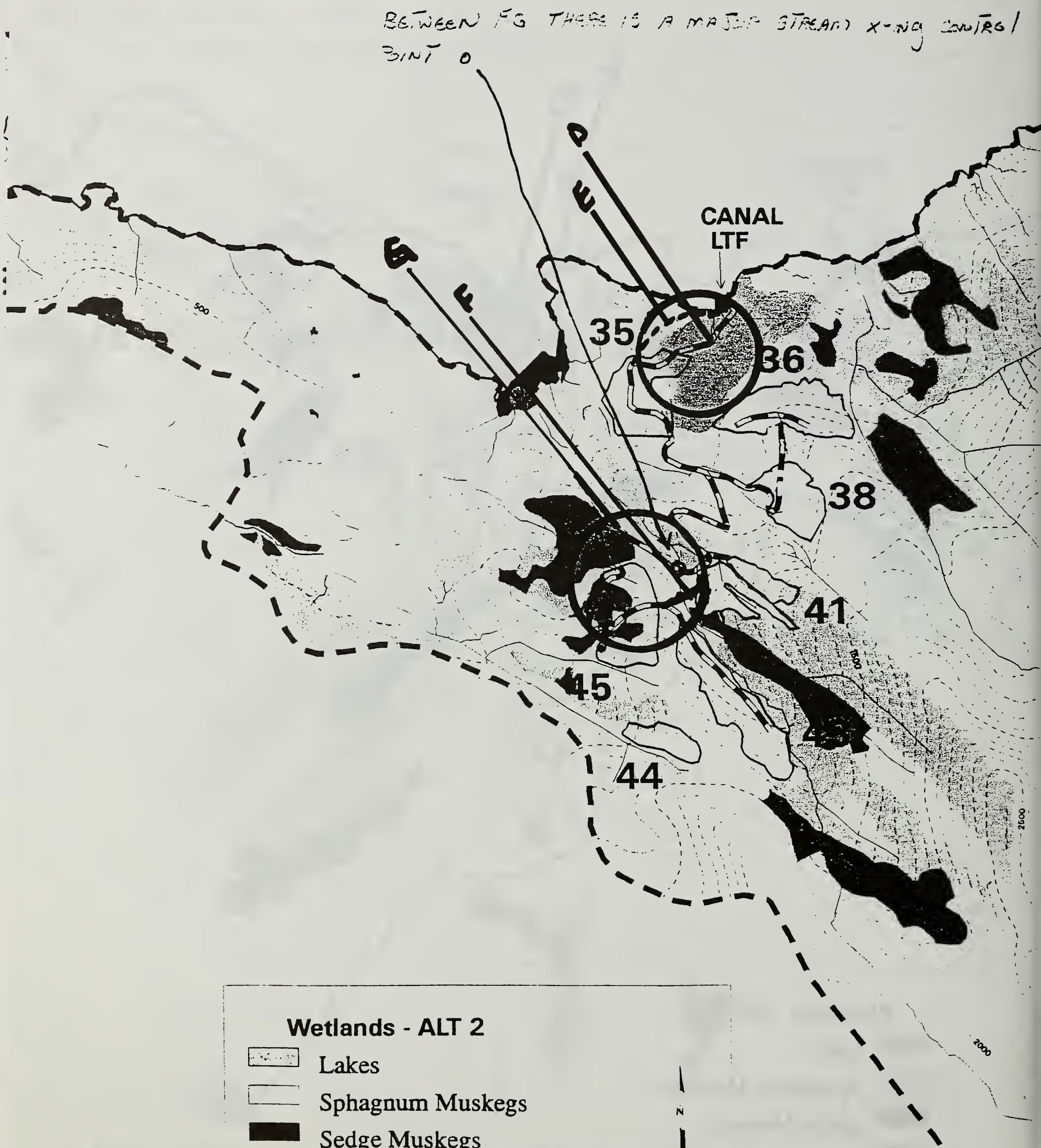
Wetlands - ALT 1
Lakes
Sphagnum Muskegs
Sedge Muskegs
Forested Wetlands
N

SHEET D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Wetlands - ALT 2
Lakes
Sphagnum Muskegs
Sedge Muskegs
N

CITY of WRANGELL, ALASKA

INCORPORATED JUNE 15, 1903

BOX 531, 99929 (907) 874-2381
FAX: (907) 874-3952

ADOPTED AUGUST 1972

PLANNING RECORD NO. _____

February 13, 1998

Mr. Scott Posner
P.O. Box 51
Wrangell, AK 99929

Ref: Canal Hoya Timber Sale

Dear Mr. Posner:

The City of Wrangell enthusiastically supports the proposed Canal Hoya Timber Sale. As I am sure you are aware, Wrangell has been adversely affected by the current administration's micromanagement of the forest and the resulting forest management policy changes. We are in support of any effort that makes timber available to Southeast Alaska timber and supporting industries, allows our citizens the opportunity for gainful employment within a traditional industry and to remain residents of Wrangell and other Southeast Alaskan communities.

We are especially pleased that road construction is being considered for the sale. Opening up the area with roads will not only make the sales more economical but will allow more and greater opportunities for hunting, camping and other forms of recreation in the area as well. As Southeast becomes more dependent upon tourism, making more areas available to more people is becoming necessary for our continued survival as a viable community. In view of the rumored, and ill-advised and, we believe, probably illegal proposed policy to prohibit the construction of new roads in roadless areas of the forest, it is refreshing to see a timber sale with road construction included.

If you have any questions, please feel free to contact me at (907) 874-2381

Sincerely,

Scott W. Seabury
City Manager

cc: Jackie Timothy, DGC

RECEIVED
FEB 18 1998
FOREST SERVICE

United States Department of Agriculture
Forest Service
Alaska Region
Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

City of Wrangell
Scott W. Seabury
City Manager
Wrangell, AK 99929

Dear Mr. Seabury:

Thank you for your comments on the Canal Hoya Draft Environmental Impact Statement. I understand your support for opening the area with roads to make the sale more economical and to provide greater opportunities for hunting, camping, and other forms of recreation. The selected alternative is one that utilizes roads both for long term economics and to provide access for more of the area in which timber harvest is allowed under the forest plan.

We will not, however, be managing the roads we construct under this project to be open for general motorized recreational use over time. The Canal Hoya area provides an important timber harvest opportunity. The area is also a particularly important area in which to balance the effects of timber harvest with the wildlife resource. The proximity of the area to Anan with its world renowned bear viewing, has made me weigh the long term and short term effects of the harvest with possible impacts on all wildlife, but particularly bears. I believe we can harvest in the area and sufficiently mitigate harmful effects to bears if we do not encourage roaded recreational use. If the roads were left open for such use, however, we believe there would be a noticeably higher chance of mortality to bears. In an area as rugged as the Canal/ Hoya area, this would be particularly true. Hunting opportunities are very limited now, but hunting would be much easier once roads are built, particularly if left open. Hunting pressure increases, coupled with a bear population that is somewhat tolerant and unwary of human presence (due to habituation at Anan) is a combination which makes me want to manage the roads as closed to motorized recreational use during and after harvest.

I believe closing the roads strikes the best economic and environmental balance. I have decided to select an alternative that includes roads in order to reach timber that would otherwise be isolated and to make the sale more economical; however, we will close the roads to public motorized use. The roads will provide access for non-motorized recreation. Thank you again for your comments.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Alaska Forest Association, Inc.

111 STEDMAN SUITE 200
KETCHIKAN, ALASKA 99901-6599
Phone 907-225-6114
FAX 907-225-5920

February 27, 1998

Scott Posner, Team Leader
U.S. Forest Service
Wrangell Ranger District
Tongass National Forest
P.O. Box 51
Wrangell, AK 99929

Re: Comments on Canal Hoya Timber Sale DEIS.

Dear Mr. Posner:

The Alaska Forest Association (AFA) has reviewed the December 1997, Draft Environmental Impact Statement for the Canal Hoya Timber Sale project, Tongass National Forest. The AFA has more than 100 members and 200 associate members throughout Alaska. The AFA, its members, their employees and the timber dependent communities of Southeast Alaska depend on the Forest Service (FS) to provide economic timber sales of sufficient volume to meet the needs of the Southeast Alaska timber industry.

The AFA believes that before the FS can provide economically viable timber sales, it needs to re-evaluate its timber demand analysis. The FS interpretation of market demand is leading to insufficient and uneconomical timber sales which will, in time, virtually eliminate any forest products industry in Southeast Alaska.

The AFA supports the implementation of Alternative 2. The FS clearly demonstrates Alternative 2 is the most economic and environmentally sound proposal. However, the AFA believes the Forest Service is capable of offering an even better proposal, and encourages it to do so. Furthermore, the AFA believes important information was left out of the Canal Hoya DEIS - inhibiting reviewers from making an informed decision on the potential timber sales. The following provide additional details on the above statements.

Canal Hoya Timber Sale Economics are Fundamentally Flawed.

1. The FS is aware of the timber industry's needs, but has chosen to ignore them. The following conclusions are either stated or can reasonably be drawn from statements in the EIS (page 3-7):
    - the current installed capacity on the Tongass is 322 MMBF and those processors are currently operating 48 percent below normal capacity ;
    - the 1997 demand analysis update from Brooks and Haynes of 110 MMBF is well below the current operating mill capacity;
    - the Forest Service fails to consider potential for an expanding timber industry when considering timber demand from the Tongass;
    - the Forest Service is directly in control of the timber supply needed by the domestic processing timber industry in Southeast Alaska.

2. While the FS seems to be willing to give some volume to the diminishing timber industry, the FS continues to underestimate the market demand for timber products sold from the Tongass National Forest. In fact, the inadequate volume of timber available from the Tongass, the lack of consideration for economics in timber sale design, and the uncertainty of supply are serious impediments to sustaining a viable forest products industry in Southeast Alaska.

3. The FS should not only acknowledge the importance of a predictable timber sale program in maintaining a viable forest products industry in Southeast Alaska, it should also consider the impact an unstable and unpredictable supply has on the timber industry. The lack of a stable timber supply in Southeast Alaska will prevent the timber industry from making the necessary investments to remain competitive in the marketplace.

4. FS should provide the maximum environmentally feasible and economically harvestable volume from each NEPA project. This will help create an economic climate in which new investments can be made to build a new forest products industry infrastructure in Southeast Alaska. It should be remembered that after the closure of the pulp mills, the FS made a commitment to support and encourage a new secondary manufacturing industry.

5. The AFA believes the FS should concentrate on the timber supply side of the supply/demand equation and leave the demand side of the equation to those who have to make the investments. When the FS offers economically viable timber sales, the timber industry will be able to manufacture products to meet market demand which, in turn, will revitalize the Southeast Alaska economy.

The FS could offer a more economically viable Canal Hoya Timber Sale program:

1. The range of alternatives considered in the Canal Hoya DEIS gave insufficient consideration to a wide choice of harvest regimes. Furthermore, the total offerings in the five alternatives were within a few million board feet of each other. An alternative with higher volume on first entry than any that were considered would have provided a better opportunity to analyze amortization of road costs and log transfer facility construction costs.

2. Since clearcutting is the preferred silvicultural prescription for Southeast Alaska an alternative which maximizes clearcutting would provide improved economics.

3. With careful planning, the FS could increase the amount of timber offered, while maintaining adequate mitigation measures ensuring the protection of fish, wildlife, and water quality.

4. In order to efficiently utilize the log transfer facilities and roads involved in the Canal Hoya project, it would be more economical to have an alternative offering a minimum of 20-30 MMBF.

Important information necessary to make an informed decision was excluded from the Canal Hoya DEIS.

1. Turn distances for helicopter yarding are not mentioned. Modifying helicopter logging may have significant impact on the economic feasibility of the sales.

2. Neither land camps or floating camps and their effects are mentioned in the DEIS.

3. Information regarding volumes and species distribution by volume classes within the entire study area and their respective harvests under each alternative are not provided.

4. Future entries are mentioned, but not addressed thoroughly. A section discussing contemplated future entries should be included so that those reviewing the sale can have a better idea of cumulative effects. This discussion should include rotation age or ages if it is expected that there will be different silviculture treatments depending on location and habitat requirements.

Alternative 2 should be the preferred alternative among those analyzed in the DEIS.

1. Of the five alternatives presented by the FS, AFA supports Alternative 2 because it is the most likely to provide the highest volume of economic timber among the alternatives considered;

2. Alternative 2 provides the most jobs;

3. Using the new TLMP Standards and Guidelines the biological needs of identified species and the visual quality objectives will be met by this alternative;

4. Alternative 2 is consistent with the Alaska Coastal Management Program;

5. There will be no measurable effects on subsistence uses as a result of Alternative 2.

The Alaska Forest Association appreciates the opportunity to participate in the planning of the Canal Hoya Timber Sale project. Please contact me at (907) 225-6114 if you have any questions concerning the above comments.

Sincerely,

Jack E. Phelps
Executive Director

jp/ram

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Jack E. Phelps
Executive Director
Alaska Forest Association, Inc.
111 Stedman Suite 200
Ketchikan, AK 99901-6599

Dear Mr. Phelps,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to the comments in your letter.

"The AFA believes that before the FS can provide economically viable timber sales, it needs to re-evaluate its timber demand analysis."
The timber demand analysis used for the Canal Hoya DEIS tiers to the Forest Plan demand analysis. Both your comments and those of some environmental interest take exception to the Tongass Land Management Plan's (TLMP) economic and demand analysis. I do not believe that a specific timber sale EIS is the best place to document rationale for the entire Tongass forests's timber program. This EIS does document the economics of the Canal Hoya timber sale and my decision on the sale utilizes this information. The TLMP timber supply analysis, however, is beyond the scope of the decision covered by this EIS. We have included some additional discussion on timber demand in the FEIS Appendix E for clarifying information at the request of you and other commentors in this regard.

"Since clearcutting is the preferred silvicultural prescription for Southeast Alaska an alternative which maximizes clearcutting would provide improved economics."
The choice of which harvest method to use depends upon many site specific factors, including yarding systems, resource values such as soil stability and slope, visual standards in the area and terrain screening of units. The choice of whether or not to use a clearcut as the prescription for a specific unit could also be based on, for example, the known use of a given area for bear denning. The reasons to use or not use clearcutting as a prescription are site specific. The National Forest Management Act requires me to consider clearcutting as a prescription on a site specific basis with economics as one of many considerations. For these reasons, I did not develop a "maximization of clearcutting" alternative for its own sake as doing so, in my judgement, would not be consistent with law. I did however look at the use of clearcutting on a site specific basis for how well it would best suit the desired future condition of each unit where it was considered.

Clearcuts with retention have been proposed for many units in this sale to address harvest economics, which is one of the significant issues identified during the scoping and analysis for this sale. Clearcutting, even with retention, is more efficient with cable yarding systems, which are typically less expensive than helicopter yarding.

The four action alternatives have a wide range of both clearcut and non-clearcut prescriptions that are consistent with the Forest Plan Land Use Designations for the Project Area (Modified Landscape and Timber Production). The helicopter units within the action alternatives have either a diameter limit or patch cut prescription. All cable units have reserves to provide stand structure and stream protection.

This table illustrates the variation between the action alternatives and the amounts of clearcut or partial cut prescription (road right-of-way acres not included):

	CC with reserves	Patch cut	Diameter limit	TOTAL
Alternative 1	440 ac. (56%)	83 ac. (11%)	258 ac. (33%)	781 ac.
Alternative 2	595 ac. (75%)	52 ac. (6%)	151 ac. (19%)	798 ac.
Alternative 3	367 ac. (56%)	73 ac. (11%)	218 ac. (33%)	658 ac.
Alternative 4	144 ac. (24%)	53 ac. (8%)	412 ac. (68%)	609 ac.

"Neither land camps or floating camps and their effects are mentioned in the DEIS."
We have included the following in Chapter 2 Measures Common to All Alternatives in the FEIS: "No land-based logging camp will be authorized. The timber purchaser will rely on floating camp facilities which are subject to permitting by other agencies."
The Marine Resources section of Chapter 3 describes the likely effects of a floating camp and the Marine Environment map in Appendix D displays possible locations for a floating camp.

"Information regarding volumes and species distribution by volume classes within the entire study area and their respective harvests under each alternative are not provided."
The predominate species in the harvest stands are western hemlock and Sitka spruce. Volume per acre and total harvest unit volume is shown on the individual unit cards in Appendix A. We have not yet cruised the sale so we do not have unit specific information on species composition. However, we have done stand "walk throughs" and some broad based cruising in the area as we prepared this EIS. Our current estimates of the species composition on the sale are: 70% hemlock, 15% spruce, 2% western redcedar, and 13% Alaska yellow-cedar. Please realize that these estimates are not based on a statistically valid cruise of the sale as we will not have this done until after the EIS has been issued. Based on your request for this information we will also add it to Chapter 3 of the final EIS.

"A section discussing contemplated future entries should be included so that those reviewing the sale can have a better idea of cumulative effects."
Under the present Forest Plan, over the next 100 years future sales may take place at Point Warde, Frosty Bay, Canal and Hoya. There are no sales planned for the Canal Hoya project area in the next 10 years. Beyond that we do not know when the next entries will be. We do anticipate, projecting TLMP standards through rotation that we would enter this area again in possibly 20 to 30 years, with another entry possible 20 to 30 years after that. Given the long time frame involved we did not think it meaningful to try to project cumulative effects of such possible entries at this time. Such impacts are simply not practically or reasonably foreseeable given that the Forest Plan would undergo several revisions in such a time frame and ecological processes would continue in such a way that a detailed cumulative effects analysis for events from 20 to 60 years away would not be meaningful or useful to me in reaching a reasoned decision on this proposal. We have, however, added a brief

section on such cumulative effects to let people know of our best current projection of possible future timber harvest.

"Alternative 2 should be the preferred alternative among those analyzed in the DEIS."
Your reasons to prefer Alternative 2 are clearly stated. I do understand your desire for employment, stability in the industry, and sale economics. My reasons to prefer Alternative 3 are based on site specific concerns for balance in this particular project area. The Canal Hoya sale can provide a valuable timber offering. The area in which Canal Hoya exists is also in close proximity to the Anan Wildlife Observatory which is world renowned for its unique opportunity to view bears. The bulk of public comment we have received on this sale clearly states a high level of concern for the continuation of Anan as a high quality viewing area. Considerable employment in Wrangell and Ketchikan is related to outfitting and transportation to Anan. Our wildlife data indicates a fair degree of use of the Canal Hoya project area by the Anan bears. Alternative 3 takes a more cautious approach in roading and harvesting closer to Anan than does Alternative 2 and the environmental differences are noted throughout the text of the EIS and are summarized on tables such as the one on page S-2 of the EIS.

In my judgement, Alternative 3 provides for timber harvest in the area while being more responsive than Alternative 2 to potential impacts to the Anan bear resource with its associated recreation and economic importance. The volume difference between Alternative 2 and Alternative 3 is 18%. The economic analysis indicates a value difference between the two alternatives of $9 per mbf if road costs are considered and a difference of $21 per mbf is road costs are not considered. Placement of roads near Anan and their possible impact to bears are less likely with more use of helicopter harvest near Anan (EIS page S-2). Alternative 3 provides for helicopter harvest in the Canal drainage while allowing road building and more harvest in the Hoya drainage, which is further from Anan. Under Alternative 2 roads would be built now within about two miles of Anan, in areas of known denning. Under Alternative 3 roads are about 6 miles away from Anan, in areas we believe from our monitoring are less used by the Anan bears and where there is less likely denning.

We will monitor how roads are used after the sale and the effectiveness of closures under Alternative 3 before trying more roading nearer to Anan as proposed under Alternative 2. Alternative 3 allows us to harvest timber in a particularly public and sensitive area while being able to observe and monitor possible effects on Anan. I believe Alternative 3 allows for more adaptation and choice for the future than does Alternative 2. For these reasons of balance I preferred Alternative 3 over Alternative 2 and that is why I selected it. Other reasons for my preference are provided in more detail in the Record of Decision.

"Turn distances for helicopter yarding are not mentioned."
Helicopter turn distances (in feet) have been calculated and are shown in the following table.

UNIT	ALT	Acres	Net MBF Volume	Yarding Distance	Elevation of Unit	Elevation Landing
1	1,3,4	22	493	2508	480	15
2	4	26	477	2142	468	15
3	4	98	1635	1584	700	520
3-Heli	1	10	166	924	876	900
4	1	32	757	4051	1480	750
4	2,3	32	757	3257	1480	800
4	4	32	757	5612	1480	880
5	4	95	2349	2995	915	880
5-Heli	1	12	295	1320	1000	750
5-Heli	2,3	9	232	1122	1020	800
8.1	1,2,3,4	6	97	1056	830	680
8.2	1	6	153	1716	1000	750
8.2	2,3	6	153	2112	1000	800
8.2	4	6	153	1452	1000	680
8.3	1,2,3,4	8	200	2112	880	680
8.4	1,2,3,4	7	156	2904	750	680
8.5	1,2,3,4	5	113	3960	780	680
12	1,3,4	6	174	1320	580	200
13	1,3	18	323	3036	350	220
13	4	63	1132	2112	340	220
14-Heli	1,2,3	5	59	924	650	270
18	3	13	209	1782	230	270
18	4	13	209	3036	230	15
20	2,3	10	288	1267	456	400
21	1,2,3	34	1249	4620	620	400
22	1,2,3	20	441	4000	873	550
24	1,2,3	9	153	763	780	550
25	4	32	544	2640	420	15
28	1,3,4	21	359	3061	485	15
31	1,3,4	14	205	4884	920	15
33	3,4	22	389	4488	470	15
34	1	8	104	1320	280	30
34	3,4	8	104	1782	280	15
35	3,4	15	237	2244	320	15
35-Heli	1	16	237	1056	320	120
36	4	52	1072	3036	530	15
41	1	22	360	2010	970	520
41	2	22	360	951	970	600
44	1	17	412	5412	1200	520
44	2	17	412	2508	1200	750
45	1	25	444	4356	1120	520
45-Heli	2	12	224	792	1000	750
47	1	23	336	2772	1000	250

Thank you for the time you spent in reviewing the DEIS. The final EIS will incorporate some of the information and improvements you have suggested. A copy of the FEIS will be mailed to you directly from the printer.

Sincerely,

CAROL J. JORGENSEN
Assistant Forest Supervisor

Pg 1

RECEIVED
MAR - 6 1998
FOREST SERVICE

CANAL HOYA TIMBER SALE

COMMENT SHEET

PLANNING RECORD NO. 2E5

This form is provided for your convenience if you would like to leave written comments tonight. Written comments may also be sent to Scott Posner, Canal Hoya Timber Sale Team Leader, USDA Forest Service, Box 51, Wrangell, AK 99929.

Name: Mark Hall

Address P.O. Box 362 Wrangell AK 99929

Comments: I would Have To Say if this SALE must Go Thru That Alternative 4 is The only one That I would Support. frankly Speaking I do not Think This SALE Should Even be considered Due To the fact That this Activity can & will have An Adverse Effect on both the Anan Bear & wildLife Viewing Quality As well As the Definite Impact it will have on the bears. According To Habitat DATA Provided by the U.S.F.S It indicates That one Brown Bear Harvested Annually is ALL This Area can Sustain. IF This SALE Goes Thru I would Strongly Recommend A closure To the Hoya-Surha & Sunny cr. Drainage to ALL Bear Hunting During The Life of The Logging & construction Activities & After completion of SALE ALL Roads Are put To bed - water Bars - Pull bridges and obstruct so AS To Prevent Any motorized vehicles from ACCESS.

Pg 2

CANAL HOYA TIMBER SALE

COMMENT SHEET

This form is provided for your convenience if you would like to leave written comments tonight. Written comments may also be sent to Scott Posner, Canal Hoya Timber Sale Team Leader, USDA Forest Service, Box 51, Wrangell, AK 99929.

Name: Mark Hall

Address _____

Comments: The Road System intersects & Parallels the most Productive fish Stream within the Entire valley. This is where the most bear activity & concentrations will be.

I do not think a buffer zone Just around the Road System will Prevent the Danger of overharvest During the logging & construction activities. Brown Bear Are not like Rabbits Deer or Even Black Bear, if the Population is knocked Down it takes much longer for Brown Bear to Bounce Back.

Also I would like to commend U.S.F.S. on the Campbell Timber Sale. Select Helicopter logging is Definitely much friendlier to the Environment no Roading Etc. I would like to See This Procedure done at Canal Hoya Sale if it must be Logged.

Sincerely, Mark Hall

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Mark Galla
P.O. Box 362
Wrangell, AK 99929

Dear Mr. Galla,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to your comments.

Selected Alternative

I understand your support for Alternative 4 or Alternative 5 (No Action) to minimize effects on bears and other wildlife. Mitigating effects on wildlife, especially bears that use Anan, was a primary concern in the development of alternatives and mitigation measures. I have decided to select Alternative 3, with some modifications to reduce the amount of harvest in the Canal Value Comparison Unit (VCU) and harvest more in the Hoya VCU. I also plan to incorporate an area closure to hunting during the sale life within 1/2 mile of any roads constructed to mitigate concerns you have expressed. If the State does not itself impose a hunting restriction during the sale life, I will implement the area closure to alleviate concerns you and others have expressed in that regard. These modifications promote an economically viable timber management program while still addressing the concerns for other resources.

My reasons to prefer Alternative 3 over Alternative 4 or 5 as you have suggested are spelled out in more detail in the Record of Decision, but let me summarize them to a degree. I know this decision is very important to you since you make your living, at least partially, from use of this area. Under Alternative 3, roads will not be placed closer than 6 miles from Anan. We will manage the road system as closed to any but administrative traffic. Roads constructed in the Hoya VCU under Alternative 3 provide a means of harvest into the area south of the powerline. A fair amount of the timber available for harvest is in the area south of the powerline. Under Alternative 4 both the powerline and yarding distances (since there would be no road south of the line) would limit the ability to access a significant portion of what has been allocated as available for timber harvest under the Forest Plan. Alternative 5 would forego harvest in the area altogether.

I think Alternative 3 will protect the resources in and around Canal Hoya while still meeting the intent of Forest Plan allocations in the area for timber harvest. I received letters on both sides of the issue in response to the DEIS. Some people would like me to chose Alternative 2 and/or add volume to Alternative 2 based on the economic benefit and employment that would be attendant to such an alternative. Other folks, such as yourself, would like to see all helicopter or no harvest.

I chose Alternative 3 (as modified) as striking the best balance, given the multiple issues to address in this area.

Alternative 3 uses a cautious approach to roading in the Canal area and will allow us to monitor effects over time before any other road is considered for construction in this sensitive area close to Anan. Due to its rugged nature and isolation, I have good reason to believe that road closures and hunting restrictions in the area can largely be effective. All alternatives, including Alternative 3, are sensitive to the visual importance of the area and we will be retaining at least 10% of the existing stand in even those units we are calling clearcuts.

Brown Bear Hunting Closure

We prefer to let the State manage hunting through their regulations and process, and it is our understanding that there is a proposal from the Wrangell Advisory Committee to close hunting in the Canal Hoya area during the life of the sale, if roads are constructed. We support that effort. If the State does not close hunting, we would implement a Forest closure order on hunting within 1/2 mile of any roads constructed in the Canal Hoya Sale Area during the life of the sale.

Put the Roads to Bed to Prevent Motorized Vehicle Access

Several methods of managing the roads after the sale have been considered. Removal of the rock and restoration of road beds was considered, but was not included as a mitigation measure due to the expense. Obliterating roads would increase the road cost by 75% to remove the rock and stockpile, remove all structures and seed.

We are proposing to pull all drainage structures on temporary roads and restore the drainages to their original pattern. Temporary road beds would also be seeded and revegetated.

We are proposing to maintain the specified roads in a drivable condition so we can drive on them to conduct road maintenance work, regeneration surveys, thinning and other administrative work. The specified roads are considered "transportation infrastructure" for silvicultural purposes only. The Forest Service does not plan to use the roads for any other purpose at this time. To mitigate wildlife habitat security concerns, the roads will be closed during and after sale completion to unauthorized motorized vehicle access by means of gates and an Administrative road closure order.

Use Selective Harvesting

The choice of which harvest method to use was based on many site specific factors, primarily yarding systems and steepness of slopes. At times close observation of the site specific situation makes the consideration of a given prescription (such as clearcutting) or harvest tool (such as helicopter) not wise or feasible and at other times, these may be the optimum tools based on a particular stand or unit's situation. For instance, clearcutting is more economical with cable systems, whereas partial harvest maintains soil stability better on steep slopes. Therefore, all units that are located on cable operable ground have prescriptions of clearcut with retention, except where steeper slopes or visual concerns prompted us to prescribe partial harvest for a portion of the unit.

Typically, clearcutting is defined as harvesting all merchantable trees within the unit. Each clearcut unit proposed for the Canal Hoya Timber Sale has from 10 to 30 percent retention to address Forest Plan standards for visuals, and wildlife concerns. Retention was increased in units that are more visible from likely viewpoints, or based on concerns such as whether a given area is used for bear denning or is an important travel corridor.

Both clearcuts and partial harvesting prescriptions are practical with helicopter yarding systems. The helicopter units within the action alternatives have either a diameter limit or patch cut prescription. Since some of the trees are to be retained in the Canal Hoya units, partial harvesting of helicopter yarded units was preferred. This allows us to more evenly distribute the retention, which enhances the visual quality of the unit, provides diverse stand structure throughout the unit, and allows more volume to be harvested than if the trees were retained in clumps. The FEIS has additional discussion of what prescriptions were used and where they were used.

It should be noted from the above discussion that in the Canal Hoya harvest units, the primary difference between a clearcut with reserves and a partial harvest unit, will be in whether the leave trees are distributed throughout the unit or grouped in clumps, not whether or not there will be any trees left in the units. The reason for the difference in distribution of leave trees is that randomly distributed trees in cable yarded units are likely to be damaged or knocked down by the cables or logs as they are dragged to the landings. Helicopters are able to lift the trees up and out of the units and avoid most of the damage to the leave trees.

A conceptual image of a clearcut with reserves would be a mottled landscape within a unit, with linear clumps of trees that generally run parallel to the yarding corridors. Between the reserve clumps, there would be open ground, with some random individual trees. Individual leave trees would normally be in the upper third of the unit, where they are not as likely to be damaged by cables or moving logs. In addition, the clumps left in the clearcuts may have some trees that will be larger than those left under a diameter limit prescription.

The four action alternatives have a wide range of acres harvested in clearcut and non-clearcut prescriptions that are consistent with the Forest Plan Land Use Designations for the Project Area (Modified Landscape and Timber Production). This table illustrates the variation between the action alternatives and the amounts of clearcut or partial cut prescription (road right-of-way acres not included):

	CC with reserves	Patch cut	Diameter limit	TOTAL
Alternative 1	440 ac. (56%)	83 ac. (11%)	258 ac. (33%)	781 ac.
Alternative 2	595 ac. (75%)	52 ac. (6%)	151 ac. (19%)	798 ac.
Alternative 3	367 ac. (56%)	73 ac. (11%)	218 ac. (33%)	658 ac.
Alternative 4	144 ac. (24%)	53 ac. (8%)	412 ac. (68%)	609 ac.

Thank you again for your comments. A copy of the FEIS will be mailed to you directly from the printer.

Sincerely,

CAROL J. JORGENSEN
Assistant Forest Supervisor

CANAL HOYA TIMBER SALE

COMMENT SHEET

PLANNING RECORD NO. 2.2.2

This form is provided for your convenience if you would like to leave written comments tonight. Written comments may also be sent to Scott Posner, Canal Hoya Timber Sale Team Leader, USDA Forest Service, Box 51, Wrangell, AK 99929.

Name: JUNIE LAIRD

Address PO BOX 2054 WRANGELL AK 99929

Comments:

I YOU HAVE TO LOG IN THE BRADFIELD CANAL AREA .. I WOULD PREFER ALTERNATIVE #4 OF THE CANAL HOYA TIMBER SALE E.I.S. .. MY CONCERN IS A HEAVELY USED RECREATIONAL AREA . AND FOR THE WELL BEING OF THE LOCAL BROWN BEAR POPULATION .... THERE SHOULD BE HUNING RESTRICTIONS PUT INTO PLACE FOR THE LOGGING EMPLOYEES WHILE THE SALE IS BEING HARVESTED ..... NO USE OF THE ROAD SYSTEM FOR RECREATIONAL PURPOSE WHILE THE SALE IS ON .. AFTER HARVESTING THERE SHOULD BE A ROAD CLOSURE TO ALL VEHICLE FOR RECREATIONAL PURPOSES .... THE ROAD SHOULD BE GATED SIGNED AND WATER BARED ..... HELI-LOGGING SHOULD BE THE METHOD FOR QUICK IN AND OUT AND THE LEAST ECOLOGICAL IMPACT ....

FEB 10 '95

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Johnnie Laird
P.O. Box 2054
Wrangell, AK 99929

Dear Mr. Laird,

Thank you for responding to the Draft Environmental Impact Statement for the Canal Hoya Timber Sale. We are incorporating many of your suggestions into the Final EIS and Record of Decision, though I have chosen Alternative 3 as modified by use of some comments such as yours.

You mentioned that you preferred Alternative 4, commenting that helicopter logging would be the best way to remove the timber with the least environmental impacts. I would like to explain my preference for Alternative 3 as we have modified it in the Final EIS and Record of Decision. More detail on my rationale and on the decision itself is contained in the Record of Decision, but I'll provide an overview here.

No roads will be constructed in the Canal VCU this entry under Alternative 3. Alternative 4 provided the decision maker with an option to select "helicopter yarding only" by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). Roads are needed to harvest timber in Canal Hoya because of helicopter limits and the power line. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the timber available for harvest would be isolated. I felt that Alternative 3 allowed for more access consistent with Forest Plan allocations in the area while still not committing roading near Anan. Under Alternative 3 roads remain over 6 miles away from Anan and will be managed for administrative use only. Only helicopter harvest will be allowed in the Canal watershed which is closer to Anan. For these reasons I thought Alternative 3 as we've modified it struck the better balance and was more consistent with Forest Plan objectives when compared to Alternative 4.

In regard to your more specific comments; you suggested that there should be some hunting restrictions for logging employees during the sale. We prefer to let the State manage hunting through their regulations and process, and it is our understanding that there is a proposal from the Wrangell Advisory Committee to close hunting in the Canal Hoya area during the life of the sale, if roads are constructed. We support that effort. If the State does not close hunting, we would implement a Forest closure order on bear hunting within 1/2 mile of any roads constructed in the Canal Hoya Sale Area during the life of the sale.

You also mentioned concerns about how the roads will be managed after the sale is complete. We are proposing to maintain the specified roads in a drivable condition so we can drive on them to conduct road maintenance work, regeneration surveys, thinning and other administrative work, but will be closing them for recreational purposes as you and others have suggested. The specified roads will be left in place and are considered "transportation infrastructure" for silvicultural purposes only. The Forest Service does not plan to use the roads for any other purpose at this time. To mitigate wildlife habitat security concerns, the roads will be closed during and after sale completion to unauthorized motorized vehicle access by means of gates and an Administrative road closure order. The area is fairly inaccessible. The roads will not connect to any community and the only way to get a vehicle to the area is by boat and there will be no loading or unloading ramps. Gates will be placed in places that will be extremely difficult to get around.

Non-motorized access would be improved in areas where roads are constructed. No roads will be constructed in the Canal VCU this entry. This gives the Forest Service time to monitor and evaluate the effectiveness of road closures in the Hoya VCU before constructing any roads in the Canal VCU.

Thank you again for your comments and for the time you have taken to review the project proposal.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Southeast Alaska Conservation Council

SEACC 419 6th Street, Suite 328, Juneau, AK 99801
(907) 586-6942 phone (907) 463-3312 fax
info@seacc.org

March 2 , 1998

Scott Posner, Team Leader
USDA Forest Service
Tongass National Forest, Wrangell Ranger District
P O. Box 51
Wrangell, AK 99929

Re: Comments on Canal Hoya Timber Sale DEIS

Dear Mr. Posner;

The following comments are submitted on behalf of the Southeast Alaska Conservation Council (SEACC) on the Canal Hoya Timber Sale Draft Environmental Impact Statement (DEIS).

SEACC is a coalition of fifteen volunteer conservation groups in twelve communities across Southeast Alaska, from Yakutat to Ketchikan, including the Wrangell Resource Council. SEACC's individual members include Alaska Natives, subsistence users, commercial and sport fishermen, hunters and guides, tourism and recreation business owners, small timber operators and high value-added wood product manufacturers, as well as concerned citizens from all walks of life. SEACC is dedicated to safeguarding the integrity of Southeast Alaska's unsurpassed natural environment while providing for balanced, sustainable use of our region's resources.

Introduction

As of March 27, 1997 the last of Southeast Alaska's pulp mills has closed and the last long-term contract is terminated, per agreement. The Forest Service finally has the opportunity and responsibility to begin the transition away from the failed policies of the past towards a truly balanced, sustainable management of our largest, wettest, and wildest National Forest. With the current sea change underway on the Tongass, the Forest Service has the opportunity to provide for all of the uses of the forest while encouraging the development of a small-scale community-based high-value added wood products industry in Southeast Alaska. As the first DEIS on the Wrangell Ranger District released after the completion of the revised Tongass Plan, the Canal Hoya Timber Sale offers an opportunity to begin this transition. SEACC also takes a keen interest in this sale because it reflects how the agency will implement the new Tongass Plan.

SEACC has long fought for permanent protection for the Anan watershed. Because of the efforts of Southeast Alaskan communities and individuals, Congress protected over a million acres of key Tongass fish and wildlife areas with the passage of the Tongass Timber Reform Act of 1990 This Act protected the entire Anan watershed as a Legislated LUD II Area to maintain its wildland character in perpetuity As one of the top five pink salmon producers in all of Southeast

Alaska, and one of the world's premier bear-viewing areas, Anan represents an important resource for the future of Southeast Alaska communities. Given the fact that many Anan bears use the project area, every effort must be made in this planning process to insure the long-term health of Anan bears. Anan Management Standards EA Decision Notice at A-16. We are disappointed to learn the Forest Service failed to consider an alternative which would minimize potential adverse impacts on these bears.

I. THE PURPOSE AND NEED STATEMENT IS INCONSISTENT WITH TLMP.

A. The Purpose and Need statement is inconsistent with TLMP because it relies only on selected goals and objectives from the revised Forest Plan.

The DEIS states that the Purpose and Need for the proposed project is:

> "to respond to the goals and objectives identified by the Forest Plan for the timber resource while moving the Canal Hoya Project Area toward the desired future condition for all resources "

DEIS at 1-5. In constructing the Purpose and Need statement for this DEIS, the Forest Service cherry-picks some goals and objectives from the revised Forest Plan, while leaving out others. The DEIS pulls two goals and objectives from the timber resource discussion in the revised Forest Plan: "[m]anage the timber resource for production of saw timber and other wood products. . ." and "seek to provide a timber supply sufficient to meet the annual market demand..." Forest Plan at 2-4. The DEIS fails to disclose the other goals and objectives for the timber resource, including: "[e]valuate non-clearcutting silvicultural systems" and "[c]onduct a systematic inventory of all vegetation for Southeast Alaska..." Id. By constructing a Purpose and Need statement which uses selected goals and objectives outlined in TLMP and ignores others, the Forest Service is inaccurately construing the management direction contained in TLMP.

B. The Purpose and Need statement improperly contains a timber target, and wrongly uses this target to restrict the range of alternatives.

In the Purpose and Need statement, the Forest Service states: "[t]he Canal Hoya Timber Sale is expected to provide between 10 and 17 million board feet to the timber industry." DEIS at 1-5. Such a timber target is inconsistent with the revised Forest Plan and inconsistent with responding to the "goals and objectives identified for the timber resource" Id. According to TLMP, "the revised Forest Plan does not make site-specific decisions" Revised TLMP, FEIS, App. L at L-150. TLMP is a permissive document and doesn't mandate that certain activities occur. In fact, TLMP did not include a 10-year schedule as required by NFMA. See 36 CFR § 219.10(e). TLMP does not mandate or decide how much or when timber will come from any particular area. The Forest Service could just as well plan a timber sale which relies solely on selection logging methods and helicopter transfer of logs. By relying on this timber target to justify a narrow, out-come oriented range of alternatives, the Purpose and Need statement violates NEPA. The Forest Service lacks a reasonable basis, then, for eliminating the helicopter yarding only alternative from the range of alternatives.

II. THE DEIS FAILS TO CONSIDER A REASONABLE RANGE OF ALTERNATIVES AND THEREFORE VIOLATES NEPA.

The Forest Service simply fails to provide "a clear basis for choice among options by the decisionmaker and the public." See 40 C.F.R § 1502.14. By failing to consider an alternative which relied solely on selection logging methods and helicopter yarding with no road construction, the Forest Service has failed to consider a reasonable range of alternatives. Several recent examples demonstrate that such an alternative is indeed reasonable. Goldbelt, Inc. recently selectively logged its lands in Echo Cove and West Douglas yarding all logs by helicopter directly to barge with no roadbuilding and no LTFs. See "Goldbelt's Selective Logging at Echo Cove Receives Praise"(attached). Even the Wrangell Ranger District has used similar methods in the past. In 1993, the Campbell Timber Sale ROD approved logging 11.6 mmbf directly across Bradfield Canal from the project area, using partial cutting and helicopter logging with no new roads. And this year, the Petersburg Ranger District is evaluating the Todahl Backline Timber Harvest, in which the Preferred Alternative proposes to log 6 mmbf using selection logging methods, helicopter yarding, and no new road construction.

The CEQ regulations direct that an EIS "shall provide full and fair discussion of significant environmental impacts..." 40 C.F.R. § 1502.1. By limiting its analysis to a narrow range of alternatives, the Forest Service is unable to provide such a full and fair discussion of the costs and benefits of various reasonable alternatives. Without fully considering an alternative which relied solely on helicopter yarding and selection logging methods and evaluating its costs and benefits, the DEIS lacks a reasonable basis for its conclusion that building roads in the area is necessary.

III. THE DEIS'S DISCUSSION OF MARKET DEMAND VIOLATES THE TTRA AND NEPA.

A. The DEIS misrepresents the Brooks and Haynes Report, violating NEPA.

In its discussion of market demand for Tongass timber, the Forest Service continues to misrepresent the findings of its own economists. Referring to a credible in-house report performed by Forest Service economists (D. Brooks and R. Haynes, Timber Products Output and Timber Harvests in Alaska: Projections for 1997-2010, September 1997), the DEIS erroneously states that "Based on the recent Brooks and Haynes 1997 update of projected demand for Tongass timber, the Forest Plan estimates an average 10 year sawlog demand (1998-2007) of 110 MMBF per year " DEIS at 3-7. For all scenarios, however, the Brooks and Haynes report calculated total market demand: "[t]hese figures refer to total National Forest Harvest, including both net sawlog and utility volume." Brooks and Haynes at 3 (emphasis added). Furthermore, Brooks and Haynes estimated annual market demand for Tongass timber over five-year intervals, not over decadal periods. For the period from 1998-2002, the economists estimated market demand for Tongass timber to be 96 mmbf under the low scenario, 113 mmbf under the medium scenario, and 130 mmbf under the high scenario. Id. at 6. The Forest Service has a duty to insure that information presented in the DEIS is accurate

and of high quality. This misrepresentation of the Brooks and Haynes study violates NEPA. See 40 C.F.R. § 1500.1(b).

B. The DEIS relies on outdated information.

The "Economics" section of the DEIS is filled with outdated information. To portray employment levels in Southeast Alaska, the Forest Service cites a May 1995 *Alaska Economic Trends* prepared by the Department of Labor. This report is almost 3 years old, prepared at a time when the KPC pulp mill was still in operation. Since that time, vast changes have taken place in the timber industry. According to the February 1998 *Alaska Economic Trends*, employment in the forest products industry is down to 1500 jobs, much less than the 1950 jobs projected for 1996 by the May 1995 issue. See February 1998 *Alaska Economic Trends* at 15 (attached).

When reporting cutting levels across Southeast Alaska, the Forest Service relies on the 1994 706(a) report. Since that report was issued the Forest Service has completed a 1995 report and a draft 1996 report. See SEACC's Comments on 1996 Draft 706(a) Report (attached). Again, the Forest Service has a duty to insure that information presented in the DEIS is accurate and of high quality. Using outdated information when more recent data is available therefore violates NEPA. See 40 C.F.R. § 1500.1(b).

C. The DEIS proposes logging in excess of market demand, in violation of TTRA.

Section 101 of the Tongass Timber Reform Act states:

> Subject to appropriations. NFMA, other applicable law, and the requirements of the National Forest Management Act ... the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest, and (2) meets the market demand from such forest for each planning cycle.

16 U.S.C. 539d(a). According to Appendix A of the Indian River DEIS, Forest Service plans to offer timber from the Canal Hoya Timber Sale in FY 1998. Indian River DEIS at A-9. As stated above, expected annual market demand for this time period ranges from 96 mmbf to 130 mmbf. During this year, however, the Forest Service plans to offer a total of 220 mmbf, about double the median expected demand for Tongass Timber. DEIS at A-12. As part of the total Tongass timber sale program, the Canal Hoya Timber Sale contributes timber in excess of market demand.

D. In the near-term, the Forest Service should consider Brooks and Haynes low scenario as the most likely estimate of market demand for Tongass timber.

In all drafts of their analysis, Brooks and Haynes chose not to describe any of these alternate scenarios as most likely, however, the authors did include the statement: "a scenario in which the derived demand for Tongass timber falls to 70 million board feet is quite plausible." Brooks and

Haynes May 26, 1997 draft at 12. While this statement is conspicuously absent from the final document, several references in the final document support the same general idea.

Due to past market trends, expectation of continued high logging and manufacturing costs, and weaknesses in Japanese markets, the authors suggest that the low scenario is the most likely to occur

The 'low' scenario is predicated on the assumption that markets for Alaska wood will improve: "[I]n the low scenario, Alaska was assumed to recover some of the markets lost to other producers; the recent trends in production and market share for Alaska are reversed but only to a limited extent." Brooks and Haynes at ii. Given past trends, however, assuming any gains in market share for Alaska wood is optimistic: "Alaska's lumber production and market shares nevertheless have decreased steadily for more than 20 years, suggesting that the disadvantages may outweigh any advantage resulting from the value of Alaska's raw material." Id. at 7. "[A]ny gain [in market share] will be a reversal of trends observed over the past 20 years." Id.

In forming the 'low' scenario, Brooks and Haynes assumed that higher costs limit Alaska's share of markets The authors give no indication that these higher costs will disappear in the future:

> "Historically, harvesting and manufacturing costs in Alaska were 30 to 50 percent higher than those in the Pacific Northwest. In addition to increases in harvesting costs resulting from changes in management practices, competition for timber and the elimination of long-term timber sales have increased wood costs for Alaska mills."

Brooks and Haynes at 9

Thus, it seems likely that logging and manufacturing costs will continue to increase in Southeast Alaska, because higher cost disadvantages will not disappear. See O'Toole, Review of Tongass Forest Plan Assumptions about Timber Receipts and Costs. (Oak Grove, OR: The Thoreau Institute, Nov. 14, 1997) (attached)

Finally, recent changes in Japanese markets make the 'low' scenario even more likely. The Japanese economy has lately been in a prolonged recession. Housing starts have spiraled down from last year's levels "Housing starts in September were down 22.2 percent from the same month in 1996 - the ninth consecutive month down " See Hoshi, "Japan Market Report," *Pacific Rim Wood Market Report*, at 4 (Nov. 1997)(attached); see also "Japan: Change Ahead," *Pacific Rim Wood Market Report* at 1 (Oct. 1997)(attached). Brooks and Haynes state the importance of Japanese markets for the Alaska timber industry :"[t]his sensitivity analysis shows model results to be most sensitive to relatively small changes in Alaska's share of North American shipment of softwood lumber to Japan." Brooks and Haynes at iii. Furthermore, when discussing the state of Japanese markets, the authors admit that "[f]actors that may make our medium projection too optimistic include further weakening of the Japanese market for hemlock and even greater acceptance of engineered wood products." Id. at 15.

Finally, there is no end in sight for Japan's economic woes. See "The Yen: Down She Goes (Again)," *The Economist* (Nov 15, 1997)(attached). Japan's demand for Alaskan wood products

will likely remain reduced in the future. Therefore, there is additional reason to consider the 'low' scenario as the most likely scenario, at least in the near term. While some argue that market conditions will improve in 2-3 years, such statements are mere speculation and ignore market trends over the last 20 years.

E. The Forest Service must include recent information regarding the export of Tongass round logs in its discussion of market demand.

According to Forest Service export permits, the agency authorized export permits for over 100 mmbf of spruce, hemlock, yellow cedar, and red cedar logs in 1997. See Export Permits Granted by the US Forest Service Valid in 1997 (attached). Given the quantities of Tongass sawlogs being shipped overseas and to the Pacific Northwest for processing, the Forest Service must explain what this information indicates about demand of Southeast Alaska sawmills for Tongass timber

IV. THE DEIS'S COST / BENEFIT ANALYSIS IS FAULTY AND INCOMPLETE.

In its discussion of timber supply and economics, the DEIS considers all specified roads as a "long term economic asset." DEIS at 3-10 This underlying assumption, namely that permanent roads are a long term benefit to the public, permeates the entire economic discussion in the DEIS, and skews the Forest Service's economic analysis to favor alternatives which require more roadbuilding. This analysis is faulty and incomplete for several reasons. The Forest Service must revise its economic analysis to give a clearer understanding to the public.

A Permanent roads are a cost, not an asset

All specified road costs are funded through the system of purchaser road credits. In this system, a purchaser of a timber sale contract, may elect to exchange a portion his payment for timber in the form of road construction In effect, the American taxpayer exchanges Tongass timber for Forest Service roads. In this way, the American public pays for these roads with timber from public lands In this sense, roads are a cost to the American public. Forest Service roads also cost untold dollars to the Amercian taxpayer in the form of road layout and engineering. Thirdly, since the Forest Service counts roads as payments to the US Treasury, when the federal government pays local communities 25 percent of all Forest receipts, the US Treasury must pay communities 25 percent of the cost of road construction.

B Economic Comparison shows that helicopter logging is more economical.

When net stumpage rates are considered including specified road costs, all alternatives are far below cost, with the alternative with less roadbuilding being the most economical. Such an analysis reveals the reality of logging in Southeast Alaska logging costs are very expensive relative to the value of the timber One must ask why the Forest Service is spending so much money to create a below cost timber sale, especially given today's market conditions. The Forest Service should have at least considered an alternative which relied solely on helicopter yarding, to compare the associated costs and benefits from such an alternative.

C. The Forest Service must also provide a cost / benefit analysis showing the costs and benefits of the no action alternative.

CEQ regulations direct that an EIS "shall provide full and fair discussion of significant environmental impacts. " 40 C.F.R. 1502.1. While the Forest Service goes into great detail comparing the costs and benefits of the various action alternatives in terms of timber economics, it fails to provide a complimentary analysis of the no action alternative. The Forest Service needs to evaluate the potential costs and benefits associated with managing this area for a variety of other uses, including recreation, tourism, and alternative forest products. See 40 C.F.R. § 1502.23.

D. The Forest Service must analyze the environmental impacts of successive entries, since they are connected actions.

The DEIS uses the economic value of road construction for successive entries to affect the document's economic analysis DEIS at 3-10 It fails, however, to discuss the site-specific and cumulative environmental impacts of such successive entries. Any entry which depend on the roads constructed in this timber sale is a connected action, since it "cannot or will not proceed unless other actions are taken previously or simultaneously" (i.e., the roads are built). See 40 C F R. §1508.25(a)(1)(ii) Therefore, the environmental impacts from all successive entries must be disclosed and evaluated in the same EIS as this timber sale. See 40 C.F R. §1508.25(a)(1).

V. THE DEIS FAILS TO FULLY DISCLOSE AND EVALUATE THE POTENTIAL IMPACTS ON LOCAL BEAR POPULATIONS

As discussed in SEACC's appeal of the revised Forest Plan, the Forest Plan is inadequate in maintaining viable and well distributed populations of brown bears. See SEACC's Appeal of the 1997 Revised Tongass Plan at 27-32 (attached) The management activity which presents the greatest threat to brown bear populations is road construction The DEIS fails to fully disclose and evaluate the potential impacts on brown bears from the proposed road construction in the Canal Hoya Project Area Roads also poses the greatest threat to black bear populations. The DEIS fails to fully characterize potential impacts on black bear populations due to the proposed road construction.

All action alternatives propose between 2.6 and 14.2 miles of new permanent road construction. Roads constructed for timber sales increase human access to bear habitat and result in greater mortality to bears. Titus and Beier (1991) found a direct correlation between autumn brown bear kills and cumulative miles of road construction on northeastern Chichagof Island. Even after closure of hunting seasons, mortality continued on Chichagof Island because of defense of life and property kills and an unknown number of illegal kills. (Shoen et al. 1994). The DEIS attempts to downplay these concerns by assuming that all future use of the road system will be foot traffic. By ignoring the potential use of the proposed roads by ORVs, the DEIS fails to fully evaluate potential impacts on both black and brown bear populations.

The DEIS states "We would mitigate effects on bear populations through road closures and the development of a bear mortality monitoring plan." DEIS at 3-49 Such mitigation efforts are inadequate to maintain the long-term health of local brown bear populations. Please cite evidence

supporting the adequacy of these mitigation efforts. Hunting regulations and road closures have previously proved inadequate in curbing brown bear mortality on Chichagof Island. (Schoen et al . 1994).

Concerned about the impacts of roadbuilding on brown bears, the 1996 TLMP brown bear risk assessment panel said that the Forest Service's "first priority" should be "to retain currently unroaded watersheds in a roadless condition." Furthermore, as stated in the DEIS, "[m]ost of the long term concern for brown bear populations is related to the low density mainland bear population." DEIS at 3-48. Lastly, one of the Forest Service's own objectives for the Anan observatory is "[n]o net loss of habituated / visible bears at the falls for more than two consecutive years." DEIS at 3-51. To meet these concerns, the Forest Service must consider an alternative which doesn't build any new roads in the project area.

VI. ALL ALTERNATIVES WHICH AUTHORIZE THE CONSTRUCTION OF NEW PERMANENT ROADS ARE ILLEGAL BECAUSE THE FOREST SERVICE LACKS A FOREST DEVELOPMENT ROAD SYSTEM PLAN FOR THE TONGASS.

All of the action alternatives in the DEIS require the construction of between 2.6 and 14.4 miles of additional permanent roads in the project area. Such roadbuilding plans are illegal and inconsistent with national and regional management direction. See SEACC's Appeal of Revised Forest Plan at 78 (attached).

Therefore, in order to consider at least one alternative which meets all the requirements of law, the Forest Service should craft an alternative which doesn't build any new permanent roads. If the construction of permanent roads is necessary, then future development along the road system is reasonably foreseeable and the cumulative impacts from such development must be addressed in this EIS. See 40 C.F.R. § 1508.7.

VII. THE DEIS FAILS TO FULLY DISCLOSE AND EVALUATE CUMULATIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE PROJECTS IN BRADFIELD CANAL, VIOLATING NEPA.

Several projects are proposed for the Bradfield Canal area, including the Swan Lake - Lake Tyee Intertie, the Kuakan Timber Sale, and the Point Garde Timber Sale. The CEQ regulations require that "[c]umulative actions, which when viewed with other proposed actions have cumulatively significant impacts" must be considered in a single EIS. See 40 C.F.R. § 1508.25(a)(2). The Forest Service must fully disclose and evaluate the direct, indirect, and cumulative effects of these cumulative actions, including impacts on subsistence and sport hunting, commercial fishing, tourism, and recreation in this DEIS. The Forest Service must also fully evaluate and disclose the impacts on brown bear populations due to all of these proposed projects.

VIII. THE DEIS DEMONSTRATES THE PROBLEM INHERENT WITH THE NEW 2-STEP PLANNING PROCESS ADOPTED IN THE REVISED TONGASS PLAN FOR MAKING MANAGEMENT DECISIONS

The Revised Tongass Plan substantially hampers the public's right to know, understand and participate in decisions affecting their public lands by dropping the requirement for a mid-level planning stage. The "two-step" planning process adopted for the Tongass is unworkable. It moves from the macro level (a 17 million acre forest) to the micro level (individual mining plans, roads, timber sales, and commercial recreation permits) without an intermediate step. This practice will cripple the Forest Service's ability to conduct a credible cumulative impact analysis. Without conducting public planning at some intermediate geographic scale, such as Tenakee Inlet, the public's ability to understand and meaningfully participate in planning for the sustainable use of lands and resources important to the long-term stability of their community is impaired.

The DEIS for the Canal Hoya Timber Sale demonstrates the principal reason why the two-step process won't work on the Tongass -- the Forest Service is unwilling to fully comply with the letter and spirit of NEPA. Instead of fully integrating the NEPA process in the early stages of development in this special area, the Forest Service's approach to encouraging and facilitating public participation in the NEPA process is to issue project-level decisions in a piecemeal fashion, one project at a time.

Rather than using the NEPA process for the Canal Hoya Timber Sale to collect and analyze important resource inventories for the entire Bradfield Canal area, the Forest Service stayed focused on just a single piece of this ecological puzzle. The Forest Service thereby violated NEPA by failing to "initiate and utilize ecological information in the planning and development of resource-oriented projects." See 42 U.S.C. § 4332(2)(H). In order to fulfill its responsibility as "trustee of the environment for succeeding generations," 42 U.S.C. § 4331(b)(1), the Forest Service was obliged to collect and analyze comprehensive and accurate resource inventories for the entire Bradfield Canal area, which is almost entirely under Forest Service jurisdiction. This was not done. Such leadership would have fulfilled the Forest Service's responsibility under NEPA to encourage and facilitate informed agency and public review of the Canal Hoya Timber Sale and other actual proposed projects that will have cumulatively significant impacts on the quality of the environment in Bradfield Canal.

IX. ALL ALTERNATIVES RELY HEAVILY ON CLEARCUTTING, VIOLATING NFMA PROVISIONS LIMITING THE USE OF CLEARCUTTING

While some of the action alternatives propose more selection logging than others, all alternatives contain significant amounts of clearcutting. The Forest Service continues to emphasize clearcutting in its timber sales, even though its own analysis shows that clearcutting causes significant damage to fish and wildlife, water, soil and watershed, subsistence, recreation and aesthetic resources and that much of that damage could be prevented by using natural selection methods which mimic the dominant natural patterns of disturbance on the Tongass

Passage of the National Forest Management Act by Congress in 1976 was motivated in significant part by the public's concern over the devastating impacts of clearcutting on the National Forest System Wilkinson and Anderson 41,155 (1985). See also Sierra Club v. Thomas , 105 F.3d 248, 249 (6th Cir 1997) ("The National Forest Management Act was enacted as a direct result of Congressional concern for Forest Service clearcutting practices and the dominant role timber

production has historically played in Forest Service policies."). Though Congress did not prohibit clearcutting outright on national forests, it did impose stringent limitations on its use.

Two of the most important limitations of the NFMA are that clearcutting can be used only where (1) "it is determined to be the optimum method ... to meet the objectives and requirements of the relevant land management plan;" and (2) "such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource." 16 U.S.C.§1604(g)(3)(F); see also 36 C.F.R. §219.27(b)(1) (logging methods shall be "best suited" to the multiple-use goals established for the area, considering environmental, biological and other impacts); §219.27(c)(6) (even-aged logging methods "shall be carried out in a manner consistent with the protection of soil, watershed, fish and wildlife, recreation, and aesthetic resources, and the regeneration of the timber resource."). These provisions have recently been interpreted and applied as "extensive limitations" on the use of clearcutting. Sierra Club v. Thomas, 105 F.3d at 250. The analysis in the DEIS, however, fails to support a conclusion that clearcutting is the optimum logging method for protection of wildlife values, subsistence resources, recreation, tourism and aesthetics, water quality, watersheds, and fish in the Canal Hoya project area. Therefore, the reliance on clearcutting by the Forest Service in this DEIS violates NFMA. See SEACC's Appeal of the Revised Tongass Plan at 11-26 (attached).

X. THE DEIS FAILS TO FULLY DISLOSE AND EVALUATE POTENTIAL IMPACTS ON FRESHWATER FISH HABITAT

A. By failing to complete a watershed analysis, the Forest Service fails to fully respond to the recommendations of the Anadromous Fish Habitat Assessment (AFHA) and violates NEPA.

One of the most important recommendations of the AFHA report was that the Forest Service should perform a cumulative watershed effects analysis before project level planning begins. See SEACC's Appeal of the revised Tongass Plan at 118 (attached). By failing to perform such an analysis before allowing logging to occur in these watersheds, the Forest Service fails to fully respond to the recommendations of AFHA and violates NEPA. "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken." 40 C.F.R. § 1500.1(b) (emphasis added). Unless the Forest Service conducts a comprehensive watershed analyses before approving any logging or roading in the Canal Hoya Project Area, the Forest Service can not fulfill its duty to protect and conserve the watershed resource as required by NFMA and the planning regulations. See 16 U.S.C. §§ 1604(g)(3)(E)(i), (g)(3)(E)(iii), and (g)(3)(F)(v); 36 C.F.R §§ 219.27(a)(1), (a)(4), (b)(5), (c)(6), (e), and (f).

B. The DEIS fails to fully disclose and evaluate potential adverse effects on water quality and fish habitat, in violation of NFMA.

The Forest Planning Regulations enacted pursuant to NFMA state:

"Special attention shall be given to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water... No management activities causing detrimental changes in water temperature or chemical composition, blockages of water courses or deposits of sediment shall be permitted in these areas which seriously and adversely affect water conditions or fish habitat."

36 C.F.R. 219.27(e)(emphasis added). Action alternatives in the DEIS require from 2 to 14 fish stream crossings, resulting in increased sedimentation and increased risks of stream blockages. Specifically, the DEIS states :"[t]he west fork of Survey Creek is an unstable site with overflow channels and has a high risk of failure." DEIS at 3-81. Before installing this stream crossing with high risk of failure, the Forest Service must fully analyze the topography, vegetation type, soil, climactic conditions and management objectives for the surrounding area. Such analysis must show that the location, design and construction of the proposed crossing will not cause a serious adverse effect on water quality or water uses. The Forest Service must also supply credible monitoring data to back up its claims that proposed stream crossing will not cause " .. detrimental changes in water temperature or chemical composition, blockages of water courses or deposits of sediment shall be permitted in these areas which seriously and adversely affect water conditions or fish habitat." See 36 C.F.R. § 219.27 (e) For example, the Wrangell Ranger District should fully disclose how many miles of road currently exist in the district, the level of maintenance actually provided those roads, and the condition of all existing culverts and their effectiveness in providing fish passage Furthermore, for the public and decision makers to fully understand the relative risks and benefits of the proposed stream crossings, they must be allowed to consider and evaluate an alternative which logs timber without requiring stream crossings.

Additionally, it is unclear whether the Forest Service considered the "[t]opography, vegetation type, soil, climactic conditions" when it planned the yarding corridors through the TTRA stream buffer in Units 5. See 36 C F R 219.27(e). By not disclosing and evaluating these yarding corridors in the "Environment and Effects" chapter, the Forest Service fails to fully inform and educate the public and decisionmakers about the impacts of the proposed timber sale on fish habitat and the maintenance of buffer integrity

XI. THE DEIS FAILS TO FULLY EVALUATE THE IMPACTS ASSOCIATED WITH LOG TRANSFER.

The tidelands of the project area are relied upon heavily by commercial and sport fishermen, hunters and guides, and tourism and recreation users. In order to cause the least adverse impact possible on these uses, the Forest Service must fully disclose and evaluate all impacts related to log transfer.

The DEIS indicates that the Forest Service is considering a constructing between 1 and 2 LTFs in the Project Area for this sale The DEIS needs to expand its analysis of LTFs to include consideration of onshore storage with barging of logs, and direct helicopter transfer of logs to barge, in addition to traditional in-water log transfer

All potential impacts on the human environment from these various alternatives must be disclosed, including impacts due to bark debris and from filling tidelands. The Forest Service analysis must

show that it is not feasible and prudent to adopt any of the several zero-discharge alternatives available to it before allowing in-water transfer of logs. The Forest Service must also disclose credible and complete monitoring data showing that operation of LTFs will comply with State of Alaska water quality standards, including the State's antidegradation policy. See 18 AAC 70.011(9).

XII. THE FOREST SERVICE NEEDS TO FULLY DISCLOSE AND EVALUATE THE IMPACTS OF THIS TIMBER SALE ON THE U.S. TREASURY

While the DEIS makes much of the fact that logging jobs will produce revenue for individuals and companies, the DEIS fails to consider the economic impact of this timber sale on the U.S. Treasury. Due to high costs of road construction and relatively low returns for Tongass timber, the Tongass timber program loses tens of millions of dollars each year. Most recent estimates indicate that the U.S. Treasury lost over $30.5 million. See The Wilderness Society, *Double Trouble - The Loss of Trees and Money in Our National Forests* (January, 1998)(attached). The public has the right to know the expected losses that will occur to the U.S. Treasury due to this timber sale.

Please disclose how much this timber sale has and will cost to prepare and administer. The Forest Service should also disclose how much overhead at the regional office will be expended on this sale. Please also disclose how much available road credits will total for this sale and expected payments to communities.

With information currently available, one must use FY 1996 data to extrapolate projected losses for this sale. In preparing and selling 100 mmbf on the Tongass in 1996, the U.S. Treasury lost $30.6 million. For every mmbf of Tongass timber sold, the U.S. Treasury lost roughly $306,000. Therefore on a 15 mmbf sale, the U.S. Treasury would lose as much as $4.6 million. Obviously, the U.S. Treasury stands to lose millions of dollars on this timber sale. The Forest Service must fully disclose and evaluate all potential costs to the U.S. Treasury associated with this timber sale.

XIII. THE DEIS VIOLATES NEPA, NFMA, AND THE TTRA BY RECLASSIFYING THE TONGASS TIMBER INVENTORY AND IGNORING THE REQUIREMENT OF PREVENTING THE EARLY DEPLETION OF THE HIGHEST-VOLUME OLD GROWTH ON THE TONGASS

As explained in our appeal of the Tongass Plan, the Forest Service has a duty to accurately and completely identify the location of these stands, and evaluate the impacts of the proposed alternatives on them. See SEACC's Appeal of the Revised Tongass Plan at 85-92 (attached). By adopting the new volume strata of the new Forest Plan and failing to disclose the extent of proposed logging of VC 6&7 stands, the Forest Service has substantially impaired the public's ability to make informed decisions about impacts from this proposed project. This violates NEPA. The Forest Service has shown that such analysis is indeed possible. The Crystal Creek Timber Harvest DEIS revealed how much logging was proposed for VC 6&7 in that timber sale. See Crystal Creek Timber Harvest DEIS at 3-8. The Forest Service must disclose this information and assure the public that it is not highgrading the project area with this proposed sale and therefore violating TTRA and the diversity requirements of NFMA.

XIV. THE DEIS VIOLATES THE NATIONAL HISTORIC PRESERVATION ACT (NHPA).

The DEIS notes that Stikine Area archaeologists have recorded six heritage resource sites in the project area. DEIS at 3-91. After applying eligibility criteria, the Forest Service determined that two sites were eligible for the National Register of Historic Places.

Section 106 of the NHPA requires the Forest Service to perform an effects analysis on all historic resources which meet informal criteria, not just those sites formally found to be eligible for listing in the National Register of Historic Places. Even an informal finding of eligibility triggers the necessity to perform an effects analysis See 36 C.F.R. § 800.4(c). Therefore, the Forest Service must disclose and evaluate all potential impacts and proposed mitigation measures on all sites which were found at some point to be potentially eligible for inclusion in the National Register.

XV. THE DEIS FAILS TO FULLY DISCLOSE AND EVALUATE POTENTIAL IMPACTS ON FORESTED WETLANDS.

In the ROD for the revised Forest Plan, Regional Forester Phil Janik stated :

> "[B]ecause [effects of timber harvesting on forested wetlands] are unknown, and specific concerns for these four soil types [i.e., Kaikli, Karheen, Kitkun, and Maybeso soil series] exist, I direct the Forest Supervisors to avoid harvesting on these four forested wetland soils."

TLMP ROD at 6. However, all action alternatives in the Canal Hoya DEIS require logging on 64 to 106 acres of forested wetlands. Furthermore, the DEIS fails to disclose whether these forested wetlands include any of the above soil types. By failing to fully inform the public about the effects on these four soil types, the DEIS violates NEPA. If, in fact, the DEIS actually proposes to log on any of these four soil types, the DEIS violates the clear language of the revised TLMP ROD, and therefore violates NFMA. Section 1604(I) of the NFMA requires that all "[r]esource plans and permits, contracts, and other instruments for the use and occupancy of the National Forest lands shall be consistent with the land management plans." 16 U.S.C. § 1604(I).

XVI. THE DEIS FAILS TO DISCLOSE AND EVALUATE IMPACTS ON ROADLESS AREAS.

The Forest Service is currently performing a national review of roadless areas Planning a timber sale in an important roadless area without disclosing these effects represents an obvious departure from nationwide agency direction

According to the revised Forest Plan, this sale will affect the 175,139 acre Harding Roadless Area. = 207 We believe continuing this timber sale planning process is improper until after completion of the roadless area review process, because the agency would be committing scarce

agency resources which could prejudice final selection of an alternative for this project, such as the no action alternative, which fully preserves this area's roadless character.

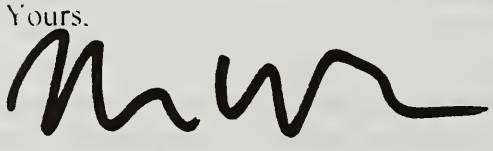
At a minimum, the Forest Service must disclose and evaluate how many acres of this roadless area will be affected by this sale. While the Tongass was not included in the interim protection strategy for roadless areas, it is unclear whether the agency will include the Tongass in its long term roadless policy. Pending such decision, the Forest Service must disclose all potential effects on roadless areas and give high priority to alternatives which would not degrade the status of existing roadless areas. The agency must furthermore explain why it is considering building new roads in unroaded areas when agency data has identified "progressive deterioration of roads from insufficient maintenance and reconstruction funds..." Coghlan and Sowa, National Forest Road System and Use 6 (USDA DRAFT, Jan. 30, 1998).

XVII. THE DEIS FAILS TO FULLY EVALUATE POTENTIAL IMPACTS ON RECREATION AND TOURISM BUSINESSES.

While the DEIS discusses potential effects on scenic values from completed units and effects on visitor use from active logging operations, it does not discuss the economic effects on recreation and tourism businesses due to potential changes in Anan bear populations. It fails to identify how many businesses use the area and rely on opportunities for bear viewing at Anan Creek, or their economic reliance on these resources. Anan is one of the few places in the world where people can reliably watch brown bears and black bears feeding at the same spot. The DEIS fails to analyze how potential impacts on brown bear populations will affect recreation and tourism businesses who depend on the marketability of this unique resource.

The DEIS also fails to identify how many businesses rely on the wildland character of the project area for guided hunting and fishing opportunities. The Forest Service should disclose how many outfitter / guides depend on the project area, how many employees they put to work, and the total value of their businesses. The agency should then evaluate potential losses to these businesses following the planned alteration of the area's wildland character. What visitors will spend thousands of dollars to come to Alaska to hunt and fish in a remote area, only to find that area full of roads and clearcuts?

Yours,



Marc Wheeler
Special Projects Coordinator

List of Attachments

- "Nonagricultural Wage and Salary Employment by Place of Work," Alaska Economic Trends, February, 1998.
- O'Toole, Randall, Review of the Final Tongass Forest Plan Revision.
- O'Toole, Randall, Review of Tongass Forest Plan Assumptions About Timber Receipts and Costs, (Oak Grove, OR: The Thoreau Institute, Nov. 14, 1997).
- Hoshi, "Japan Market Report," *Pacific Rim Wood Market Report*, November, 1997.
- Barr, Linda Keller. "Japan: Change Ahead," *Pacific Rim Wood Market Report*, October 1997.
- "Down She Goes Again," *The Economist*, Nov. 15, 1997.
- SEACC's Appeal of the Revised Tongass Plan, Sept. 25, 1997.
- Thomson, Lori, "Goldbelt's selective logging at Echo Cove receives praise," *Juneau Empire*, April 12, 1997.
- The Wilderness Society, Double Trouble : The Loss of Trees and Money in Our National Forests, January, 1998.
- Spreadsheet - Export Permits Granted by the US Forest Service Valid in 1997.
- SEACC's Comments on draft FY 1996 Timber Supply and Demand Report to Congress.

United States Department of Agriculture
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Tongass National Forest
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File Code: 1950

Date: May 15, 1998

Marc Wheeler
Special Projects Coordinator
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Dear Mr. Wheeler,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to the comments in your letter.

"The Purpose and Need Statement is Inconsistent with TLMP because it relies only on selected goals and objectives from the revised Forest Plan. The Purpose and Need statement improperly contains a timber target, and wrongly uses this target to restrict the range of alternatives."
This timber sale is one part of our overall management of the Tongass National Forest, so it is appropriate to look specifically at timber related goals for the timber sale. In order to meet the ten year sale plan, our original direction was to include a volume of timber as integral to the purpose and need for this sale. We revised the original purpose and need with a revised Notice of Intent published in the Federal Register, and the volume is now included as an "expected outcome" (10-17 MMBF) of this sale, rather than a target.

"The DEIS fails to consider a reasonable range of alternatives and therefore violates NEPA."
This comment was related to the lack of an alternative that relied solely on selection logging methods and helicopter yarding with no road construction. The Campbell Timber Sale is cited as an example of a timber sale that provided timber without roads or clearcuts. Roads are needed to harvest timber in Canal Hoya because of helicopter limits and the power line. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the timber available for harvest would be isolated.

No roads will be constructed in the Canal VCU this entry. Alternative 4 provided an option for me to select "helicopter yarding only" by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). We have expanded our discussion of that option in the FEIS to more clearly show its effects.

As the decision maker on this project, I considered the overall Forest Plan goals and objectives for the area. I also considered the site specific environmental factors for the Canal Hoya area and its surrounding environment as described in the EIS. I selected Alternative 3, as modified in the Record

of Decision. More detail is provided for my rationale in the Record of Decison, but I would like to address some of my rationale in relation to your specific comments on the range of alternatives.

I received comments which suggest that I should have developed a "a maximization of clearcut" alternative and comments, such as yours, which suggested I should have had an alternative developed to look at "selection harvest only" or a "helicopter yarding only" alternative. As I examined the EIS and formulated the Record of Decision, I had the option to consider changes such as you suggest that would result in an all-selection or all-helicopter final decision. I also had the option to use prescriptions in such a way as to select only cable units or all clearcut prescriptions for every unit. The existing alternatives could be adapted to end up with these types of options in a final decision. However, I believe that prescriptions and harvest methods are best looked at on a site specific basis. I believe clearcuts and helicopter harvest are best viewed as tools and not ends in themselves to serve as the sole basis of alternatives. Some prescriptions and/or some yarding systems may not be reasonable to consider in detail once reflected against the site specific environmental context of a given stand, area, or unit. Various prescriptions and types of yarding systems were examined in a variety of combinations that led to the alternatives developed for this project. I believe that the range of alternatives developed in this fashion are sound and reflect site specific conditions. The range afforded me ample opportunity to weigh trade offs and adapt management prescriptions as I weighed the analysis in the EIS and the comments we have received.

The DEIS misrepresents the Brooks and Haynes Report, violating NEPA."
I agree that the Brooks & Haynes figures include both sawlog and utility volume. The volumes shown for the expected outputs by alternative also include sawlog and utility volume. The Brooks & Haynes figures are not intended to be used as absolute figures. Brooks & Haynes estimates projections of harvest levels, given certain assumptions. These projections are not intended to be demand figures. The FEIS Appendix E has been expanded to include some additional discussion on timber demand.

"The DEIS relies on outdated information."
We have changed the discussion to include the most recent figures from Alaska Economic Trends and the 706(a) Report in the FEIS.

"The DEIS proposes logging in excess of market demand, in violation of TTRA."
The FEIS Appendix E has been expanded to include additional discussion on timber demand, which indicates that considering the timber harvest program objectives for the Tongass National Forest and the Stikine Area's contribution to those program objectives, the proposed harvest of 10-17 MMBF from the Canal Hoya Project Area is reasonable and valid. An individual timber sale decision is not the decision point to evaluate overall demand for timber on the Tongass National Forest. Though I understand your concerns in this regard, it is beyond the scope of the decision of the Canal Hoya timber sale. Appendix E has been expanded to provide more information on the overall demand since you and others have brought up concerns about this issue, but establishing an overall sale offering level for the Tongass is clearly beyond the scope of this individual timber sale decision.

"In the near-term, the Forest Service should consider Brooks and Haynes low scenario as the most likely estimate of market demand for Tongass timber."
For the period from 1998-2002, they do estimate Tongass market demand to be 96 mmbf under the low scenario, 113 mmbf under the medium scenario, and 130 mmbf under the high scenario. We have based our analysis on the demand estimates used for the Forest Plan.

"The Forest Service must include recent information regarding the export of Tongass round logs in its discussion of market demand."
This is outside the scope of the document.

"Permanent roads are a cost, not an asset."
Both temporary and specified road costs are displayed in table 3-4 for all action alternatives. The Forest Service does view specified road developments as a long term economic benefit (capital improvement) because specified roads provide access for a variety of silvicultural activities including; timber harvest, tree planting, precommercial and commercial thinnings both for the first entry and any future entries.

Purchaser's credit is credit earned by the purchaser's construction of specified roads. When such construction is accepted by the Forest Service, it is applied to the purchaser's account. The Purchaser credit estimate is the Forest Service engineer's total estimate of cost for specified roads with an allowance for profit and risk.

36 CFR 223.62 states, "Appraisal may also establish stumpage value as if unconstructed roads or other developments needed by the purchaser for removal of the timber were in place. When timber is appraised and sold on such basis, purchaser credit for road construction, not to exceed the estimated construction cost of such roads or other developments specified in the timber sale contract, shall, when such construction is accomplished by the purchaser, be deducted from the stumpage payments made by or due from the purchaser under the timber sale contract for other than minimum stumpage and required deposits for slash disposal and road maintenance."

We added a section in the FEIS that displays an estimate of the minimal payments to the State of Alaska for each of the action alternatives.

"Economic comparison shows that helicopter logging is more economical."
Once roads have been constructed, ground based yarding systems, such as cable yarding, are less expensive than helicopter yarding. As stated above, the Forest Service views specified road developments as a long term economic benefit.

"The Forest Service must also provide a cost/benefit analysis showing the costs and benefits of the no action alternative." "The DEIS fails to fully evaluate potential impacts on recreation and tourism businesses."
We described many of the factors that will affect the recreation and tourism businesses, such as changes to the scenic resource and vulnerability of Anan bears. We also included mitigation measures in all alternatives, such as retaining trees in the units and road restrictions and hunting closures, to protect those resources. In the Final EIS we included a section about economic value of outfitter/guide operations using the area. We used an average gross income/client for guides using the Bradfield or Anan areas to determine a total potential value for these guides if there was no action on this sale. The effects of the sale are disclosed by discussing potential changes to the area and how that may affect operations along with a relative ranking between the alternatives.

"The Forest Service must analyze the environmental impacts of successive entries, since they are connected actions." "The DEIS fails to fully disclose and evaluate cumulative effects of past, present and reasonably foreseeable projects in Bradfield Canal, violating NEPA."
We have considered cumulative effects of past and present projects in the area, but such activities are not likely to lead to significant cumulative effects beyond those that were disclosed in the EIS. Future timber sale offerings may occur in the area. Under Forest Plan goals and objectives, more harvest would likely take place in the area, but is not likely to occur for many years and is not scheduled at this time. Our best estimate is that additional timber harvest in the project area is not likely to take place for 20 to 30 years. We do not believe the effects of such possible harvests are reasonably foreseeable; nor are environmental and regulatory conditions that would exist in 20 to 30 years well enough known to forecast effects of such a possible entry. We have added short sections in Chapter 3 of the EIS to disclose projects near the area and possible future projects. Any activities nearby known to us or which we can foresee are either largely well removed and/or unconnected to the project area, or are far enough in the future as to be highly speculative in terms of possible effects if they were to occur.

We added information in the FEIS about cumulative effects on high value bear habitat over the Canal, Hoya, Anan, Eagle and Frosty VCUs. Our analysis indicates we are essentially having no direct impact on high value brown bear habitat. High value brown bear habitat is narrowly defined as riparian forest which is protected by current stream/beach/estuary buffers. Other projects have already resulted in a 17% loss in this type of habitat from the original condition.

Under the present Forest Plan, over the next 100 years future sales may take place at Point Warde, Frosty Bay, Canal and Hoya. As with this sale, high value brown bear habitat will be protected under riparian and fish standards and guides. Additional road would be constructed with these sales. Roads are more of a concern than habitat loss for brown bear viability in this sale area. We know of no specific cutoff point for road development whereupon brown bear populations will remain secure. Bear mortality will be greatly affected by hunting regulations, public education and road use. We will monitor any roads developed with this sale to assess impacts on brown bear mortality, i.e. increase in legal take or animals killed in defense of life and property.

When the Anan, Frosty and Eagle VCUs are included in the effects analysis (rather than just the Canal and Hoya VCUs) we see a 0-20% loss in high value black bear habitat by alternative from the existing condition. When compared to the original condition of the larger area, there is a 25-40% loss in high value black bear habitat by alternative. As stated in the DEIS, most high value habitat does not disappear but becomes moderate value as a result of the road disturbance buffer.

High value black bear habitat is more broadly defined than high value brown bear habitat and encompasses most medium volume forested stands. Most high value habitat is not removed directly but becomes medium value because of the road disturbance buffer. Point Warde will be a helicopter sale so we do not expect a high impact on black bears as a result of this sale. As with brown bears, we know of no specific cutoff point for road development whereupon black bear populations will remain secure.

"The DEIS fails to fully disclose and evaluate the potential impacts on local bear populations."
An entire section of the DEIS covers the impacts of roads on bears (p 3-44) and cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road

itself (FEIS 1997). We are managing human access by gating all the roads following this sale. The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We have also followed the recommendations of State and USFWS biologists who visited the site.

Removing habitat does have an impact on bears which is discussed under both the black bear and brown bear habitat sections of the DEIS (page 3-35 and 3-42). Road use has a greater impact than habitat removal for this study area using the most recent version of the bear habitat capability models for both of these species. We have maintained forested corridors between the Old Growth Reserves and within riparian/beach/estuary buffers which will allow bears to move through the area without having to cross clearcut openings. We have a high degree of retention within many of the harvest units which will also provide cover. The brown bear viability panel listed riparian habitat as the most important for brown bears. We are applying standard buffers on all the fish streams in the area and an additional 500 foot buffer on identified brown bear foraging streams.

"All alternatives which authorize the construction of new permanent roads are illegal because the Forest Service lacks a Forest Development Road System plan for the Tongass."

The Forest Service maintains a forest development transportation plan in accordance with direction found at FSM 7711. The manual states that this plan "is the official description of the forest development transportation system and consists of a base map or series of base maps showing the location of each facility and an inventory record defining their characteristics. These documents shall also serve as the forest development road system plan referenced in the National Forest Management Act." The key point is that this plan is a description of existing permanent roads.

Direction is provided at FSM 7711.2 as to how this plan is to be kept current: "Add proposed (non-existing) facilities to the plan only after a decision to construct the facility is made by the responsible official in accordance with the National Environmental Policy Act process..." Only after the record of decision for this project is signed can the permanent roads necessary to carry out the project be added to the forest development transportation plan.

"The DEIS demonstrates the problem inherent with the new 2-step planning process adopted in the revised Tongass Plan for making management decisions."
Mid level planning is not a Forest Plan or NEPA requirement. Since the Canal Hoya area is surrounded by low development management prescription areas (or water), most of the resource impacts are centered in the planning area.

"All alternatives rely heavily on clearcutting, violating NFMA provisions limiting the use of clearcutting."
The choice of which harvest method to use was based on many site specific factors, primarily yarding systems and steepness of slopes. At times close observation of the site specific situation makes the consideration of a given prescription (such as clearcutting) or harvest tool (such as helicopter) not wise or feasible and at other times, these may be the optimum tools based on a particular stand or unit's situation. For instance, clearcutting is more economical with cable systems, whereas partial harvest maintains soil stability better on steep slopes. Therefore, all units that are located on cable operable ground have prescriptions of clearcut with retention, except where steeper slopes or visual concerns prompted us to prescribe partial harvest for a portion of the unit.

Typically, clearcutting is defined as harvesting all merchantable trees within the unit. Each clearcut unit proposed for the Canal Hoya Timber Sale has from 10 to 30 percent retention to address Forest Plan standards for visuals, and wildlife concerns. Retention was increased in units that are more visible from likely viewpoints, or based on concerns such as whether a given area is used for bear denning or is an important travel corridor.

Both clearcuts and partial harvesting prescriptions are practical with helicopter yarding systems. The helicopter units within the action alternatives have either a diameter limit or patch cut prescription. Since some of the trees are to be retained in the Canal Hoya units, partial harvesting of helicopter yarded units was preferred. This allows us to more evenly distribute the retention, which enhances the visual quality of the unit, provides diverse stand structure throughout the unit, and allows more volume to be harvested than if the trees were retained in clumps. The FEIS has additional discussion of what prescriptions were used and where they were used.

It should be noted from the above discussion that in the Canal Hoya harvest units, the primary difference between a clearcut with reserves and a partial harvest unit, will be in whether the leave trees are distributed throughout the unit or grouped in clumps, not whether or not there will be any trees left in the units. The reason for the difference in distribution of leave trees is that randomly distributed trees in cable yarded units are likely to be damaged or knocked down by the cables or logs as they are dragged to the landings. Helicopters are able to lift the trees up and out of the units and avoid most of the damage to the leave trees.

A conceptual image of a clearcut with reserves would be a mottled landscape within a unit, with linear clumps of trees that generally run parallel to the yarding corridors. Between the reserve clumps, there would be open ground, with some random individual trees. Individual leave trees would normally be in the upper third of the unit, where they are not as likely to be damaged by cables or moving logs. In addition, the clumps left in the clearcuts may have some trees that will be larger than those left under a diameter limit prescription.

The four action alternatives have a wide range of acres harvested in clearcut and non-clearcut prescriptions that are consistent with the Forest Plan Land Use Designations for the Project Area (Modified Landscape and Timber Production). This table illustrates the variation between the action alternatives and the amounts of clearcut or partial cut prescription (road right-of-way acres not included):

	CC with reserves	Patch cut	Diameter limit	TOTAL
Alternative 1	440 ac. (56%)	83 ac. (11%)	258 ac. (33%)	781 ac.
Alternative 2	595 ac. (75%)	52 ac. (6%)	151 ac. (19%)	798 ac.
Alternative 3	367 ac. (56%)	73 ac. (11%)	218 ac. (33%)	658 ac.
Alternative 4	144 ac. (24%)	53 ac. (8%)	412 ac. (68%)	609 ac.

"The DEIS fails to fully disclose and evaluate potential impacts on freshwater fish habitat."
The Forest Plan requires a watershed analysis for projects that propose deviations from the standards and guidelines. The Canal Hoya Timber Sale will comply with Forest Plan standards and guidelines, so a watershed analysis is not required. Watershed sensitivity in the project area is summarized in Chapter 3 in the section titled "Watersheds". The geomorphic evaluation of watershed sensitivity, together with field surveys of fish distribution and habitat quality provided a sound basis for designing a first entry timber sale in these watersheds.

Both the DEIS and the FEIS provide detailed information about fish habitat, potential effects on fish habitat, and protection of fish habitat in the project area. As described in Chapter 3, the extent of anadromous fish habitat (as well as commercial, recreational, and subsistence fishery values) is quite low in the project area when compared to many Bradfield Canal watersheds. Nevertheless, all alternatives analyzed in the FEIS reflect thorough consideration of water quality and fish habitat based on field review of road and harvest unit concerns and mitigation. All alternatives include a high level of water quality and fisheries protection through the designation of old growth reserves, estuary, beach and riparian buffers.

"The DEIS fails to fully evaluate the impacts associated with log transfer."
Chapter 3 of the FEIS describes potential impacts of the LTFs and how these impacts are mitigated. Appendix D contains detailed information describing how LTF site selection, design, construction, operation and monitoring address these concerns. For example, LTFs were purposely located away from estuaries to avoid impacting these sensitive areas. See specifically the discussion under C10 in Appendix D. A mixture of floating LTF development and helicopter-to-barge operations (as proposed in the selected alternative) is preferable from both an environmental and economic standpoint for this timber sale. Visitors to Anan will not be able to see LTFs proposed under any alternative from Anan. By boat, they would have to travel a mile north of Anan and then about seven miles east into the Bradfield Canal before they would be able to see the proposed Hoya LTF. Anan visitors may be able to see barges or log rafts passing into Ernest Sound or the Blake Channel on their way to secondary log processing areas. We do not anticipate any LTF effects on Anan estuary.

"The Forest Service needs to fully disclose and evaluate the impacts of this timber sale on the U.S. treasury."
The FEIS displays an estimate of the minimum payments to the State of Alaska for each of the action alternatives. We also included some information on Forest Service planning, sale preparation and administration costs.

"The DEIS violates NEPA, NFMA, and the TTRA by reclassifying the Tongass timber inventory and ignoring the requirement of preventing the early depletion of the highest-volume old growth on the Tongass."
Proportionality analysis was only required for sales prepared for the long term contracts. There was no volume class 7 in the project area. There is only one unit proposed for harvest in volume class 6.

"The DEIS violates the National Historic Preservation Act (NHPA)."
The analysis completed for the Canal Hoya Timber Sale is consistent with the legally mandated process described by federal law and a Memorandum of Understanding between the Forest Service and the State Historic Preservation Officer and the Advisory Council on Historic Preservation. The Forest Service disclosed and evaluated all potential impacts regardless of potential eligibility status. A more complete report was sent to the State Historic Preservation Officer, and is on file, but is not available for public review, due to the sensitive nature of the information.

"The DEIS fails to fully disclose and evaluate potential impacts on forested wetlands."
The Forest Plan allows for up to two acre inclusions of areas with organic soil (Kaikli, Karheen and Maybeso). We attempted to avoid them and believe the field work we've conducted has largely been successful in this goal, but recognize that some inclusions may exist in harvest units. We have added more information on effects to wetlands in Chapter 3 of the Final EIS.

Effects to wetlands in the project area can be divide into two categories: permanent loss, a long-term effect; and disturbance, a temporary or short term effect. Road construction results in the filling of wetlands creating a permanent loss of wetland habitat. Effects will be minimized by not using wetlands as sites for overburden disposal. Implementation of BMPs such as minimizing ditching and providing adequate cross drainage, can minimize the affected area.

The harvest of trees in wetlands converts needle-leaved, evergreen, forested wetlands to deciduous shrub wetland types. The conversion from forested to shrub wetland is not expected to result in long-term loss of any wetland values, only a conversion from one set of wetland functions to another. Silviculturists on the Tongass National Forest have concluded that all wetlands that have been harvested over the past 20 years are adequately restocked (USDA Forest Service, 1995). Because there is a lack of response information on regrowth rates, wetlands with organic soils will not be harvested. The wetlands considered for harvest are primarily low volume forests with low site indexes. Regeneration of the second growth stand on these sites is expected to be slower growing then stands on sites with well drained mineral soils. Shovel yarding in wetlands can cause detrimental soil disturbance, all wetlands considered for shovel harvest will be inspected by Soil Scientists prior to logging.

"The DEIS fails to fully disclose and evaluate impacts on roadless areas."
We disclosed that there are no roads in the project area on page 1-2 and 3-31 of the DEIS, and discussed the effects of the roads under the various significant issues. The introduction of roads to an unroaded area was described as being a major change to the recreation character of the area on page 3-31 of the DEIS.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

STICKEEN WILDERNESS ADVENTURES

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Stikine River Rat

PLANNING RECORD NO. _____

Mr. Steve Brady
Tongass National Forest
Stikine Area
P.O. Box 51
Wrangell, AK 99929

February 23, 1998
The Klondike Centennial

Dear Steve,

This letter is in response to our conversation February 19, 1998 in your office about the Anan Black Bear / Wildlife Observatory and the Canal Hoya Timber Sale.

I would not like to see any more improvements made at Anan, including the photo blind on the fish pass. We should concentrate on maintaining the existing "improvements" and keeping the trail and observatory deck clear of brush, vegetation, and low hanging limbs etc. This will lessen the chance of bear encounters of the close kind. Please do not allow the brush and vegetation to grow up around the observatory deck so the bears will not see **"The Railing Rush".** The Rail Rush can be taken care of with education from the Outfitters/Guides and U.S.F.S. interpreters.

For over 100 years humans have been using Anan Creek for fishing and wildlife observation with black bears and Pink salmon being the main attraction. Since the late 1970's I have been conducting wilderness tours in the Wrangell area, and became the first U.S.F.S. permitted Outfitter and Guide in the Wrangell area in 1987. At that time I was led to believe that being an Outfitter/Guide and a team player would be good for me, and the future of my business. The regulations and guidelines being put into effect would protect and preserve the bears, Anan Creek, and the Stikine River for generations to come.

In with the **NEW** US Forest Service, out with the **OLD**. Team members have changed many times and so have the RULES. In the last ten years, I have watched the U.S.F.S. manage Anan, with some of the management being good and some of it for their own justification.

With my involvement at Anan and knowledge of what has been done to minimize the impact of the bears in that area, I find it hard to believe that the US Forest Service would even consider putting up a timber sale that is so closely located within the bear's backyard.

In the Canal Hoya Timber Sale draft EIS, Environment and Effects, chapter 3 ; "Many tourists visit Southeast Alaska to get a glimpse of a bear... The Anan Wildlife Viewing Area, located 1.5 miles to the west of the Canal Hoya Project Area boundary, is the kind of place where tourists and locals can make this dream a reality. The Pink salmon that return to Anan creek in July attract numerous eagles, seals, gulls, bears and humans. More than 2000 people visit Anan each

year to view wildlife, especially the 30-60 black bears and 8-12 brown bears that frequent the area between July and September....."

"Anan is an internationally renowned site and a world-class bear viewing area.....in 1997 2,504 visitors stopped at Anan.....Nine of the 14 radio-collared black bears at Anan denned or foraged in the Canal Hoya area. If we extrapolate this to our population estimate – as many as 45 of the Anan black bears may spend time in the Canal Hoya area. ....The Canal Hoya project area is well within the home range averages we reported for the Anan bear population – 3.5 square miles for females and 13.9 square miles for males.....The four collared female black bears spent an average of 42% of their time in the Canal Hoya area. The one brown bear we collared for this study spent 55% of her time in Canal Hoya.....Canal is an important denning area for Anan black bears....We were unable to analyze the use of clear-cuts by Anan bears but research in other areas indicates that the benefits of clear-cuts to bears are **short-lived**. Clear-cuts provide forage for black bears in the form of berries and receive high habitat suitability scores. These same areas are considered completely unsuitable after 25 years when canopy closure of the stand severely reduces available food supplies."

My questions to you are, can Wrangell afford to lose one of it's major attractions for the next 25 years while mother nature corrects your mistake? Is the loss of Anan, as we now know it, an even exchange for logging the bears back yard for the next 3-5 years? I support the logging industry, but I don't believe that we should be willing to take the chance on logging within two miles of the Anan Black Bear / Wildlife Observatory, I do not support this sale.

My conclusion after reading the Bear study done by Danielle K. Chi (Utah State University) for the U.S.F.S., the U.S.F.S. Anan Management Standards Environmental Assessment, and the Canal Hoya Timber Sale (draft environmental impact statement) is Alaskans are becoming a threaten and endangered species.

Todd E Harding

Todd E. Harding
Owner/Operator

cc: Dave Brown
Patricia A. Grantham
Ben Grussendorf
Tony Knowles
Don McConachie
Frank Murkowski
Ted Stevens
Robin Taylor
Don Young
Mayor Bill Privett
Jeff Angerman
John Baker
Bruce Harding
Ruth E. Knight
Fern Neimeyer
Teddy Williams

United States Department of Agriculture
Forest Service
Alaska Region
Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Todd Harding
Stickeen Wilderness Adventures
P.O. Box 934
Wrangell, AK 99929

Dear Mr. Harding,

Thank you for your comments on the Anan Photoblind and the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to your comments about the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale.

I understand your concern for the bears that use Anan. The effects on Anan bears and on those whose enjoyment and livelihoods are connected to the bears were a major consideration in the development of alternatives and mitigation measures. Those effects, as well as concerns for visuals and soil and water resources have led me to decide to select Alternative 3, which does not include road construction in the Canal Value Comparison Unit (VCU), which is the area nearest to the Anan VCU. I have modified Alternative 3 in the Record of Decision to eliminate the western segment of Road 6960, so the nearest road will be about 6.5 miles east of Anan Wildlife Observatory. Although, as you suggested, the no action alternative would have been the most protective of Anan bears, I did not select that alternative because it did not meet our objectives of providing timber to meet society's needs and to provide employment and stability to the Alaska timber industry. We have incorporated additional mitigation measures suggested in response to the draft environmental impact statement, including a bear hunting closure near roads during the life of the sale, and other unit specific measures that are described in the final EIS and in my Record of Decision.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Wrangell Resource Council

P. O. Box 1727
Wrangell, Alaska 99929
(907) 874-3504 fax (907) 874-3431

March 3, 1998

PLANNING RECORD NO. 2.1.14

RECEIVED
MAR - 3 1998
FOREST SERVICE

Scott Posner, Team Leader
USDA Forest Service
P. O. Box 51
Wrangell, Alaska 99929

Re: Canal Hoya Timber Sale

Dear Scott,

Thanks for the opportunity to comment on the Canal Hoya Timber Sale Draft Environmental Impact Statement.

Wrangell Resource Council is a grassroots volunteer conservation group dedicated to preserving the integrity of our local ecosystems. WRC is a member group of Southeast Alaska Conservation Council (SEACC).

WRC has a number of concerns with the Canal Hoya DEIS:

1. The Forest Service Failed to Consider a Wide Range of Alternatives, Including an Alternative Using Only Helicopter Yarding and Selection Logging. Although some alternatives propose more selection logging than others, all alternatives propose significant amounts of clear-cutting. The nearby Campbell Sale employed only helicopter yarding and selective logging; Why can't the same thing happen in Canal Hoya? The Forest Service's own studies have shown time after time that clear-cutting causes significant damage to fish and wildlife, water, soil, and watershed, subsistence, recreation and aesthetic resources, and that much of that damage could be prevented by using natural selection methods which mimic the dominant natural patterns of disturbance on the Tongass.

As SEACC points out in their Appeal of the Revised Tongass Land Management Plan (TLMP), the Forest Service's continued reliance on clear-cutting in both the Canal Hoya DEIS and the TLMP is a violation of the National Forest Management Act (NFMA).

2. The Forest Service Failed to Fully Analyze Impact on Brown Bears Due to Road Construction. We agree with SEACC's point in the appeal of the revised Forest Plan that the Forest Plan is inadequate in maintaining viable and well distributed populations of brown bears. Another problem with reliance on clear-cuts and roads is the impact on wildlife, especially brown bear. The DEIS fails to fully disclose and evaluate the impacts on brown bear in the sale area. Experience on Chichagof Island has proven that even if the roads are blocked and hunting seasons closed, bear mortality increased due to increased access. This is another reason for the Forest Service to not build any new roads in the area.

In addition, bear hunting in the area should be closed during the logging contract, and measures taken to prevent killing bears in defense of life and property, such as a floating camp.

We also agree with SEACC's point of appeal that all alternatives which authorize the construction of new permanent roads are illegal because the FS lacks a forest development road system plan for the Tongass. U.S. taxpayers pay for new logging roads on the Tongass through purchaser road credits. Since these proposed roads will only benefit a few private corporations and ultimately hurt the fish and wildlife, they should not be built.

3. The Forest Service Failed to Consider the Cumulative Impacts of All Actions Planned for the Surrounding Area. The Swan Lake Intertie, Kuakan Sale, and Pt. Garde Sale should be looked at in the DEIS to predict cumulative impacts for the area. In addition, road construction implies planned future entries. The FS must analyze the environmental impacts of these successive entries, since they are connected actions.

4. A Cost/Benefit Analysis Should Be Done For a No-Action Alternative. As it did in the nearby Campbell Sale, the FS must recognize the economic benefits of leaving the land in its natural state. The area is currently heavily used by outfitter guides, independent travelers and recreationists, as well as sport hunters and fishers, commercial fishers, and trappers. These uses will undoubtedly increase, along with the economic benefits they provide. The FS must analyze the present and projected economics of a no-action alternative, as well as the costs to the above stakeholders a timber sale would incur.

5. The Proposed Sale is Going to Have a Significant Impact on Water Quality and Fish Habitat. Action alternatives in the DEIS require from 2 to 14 fish stream crossings, some across the unstable and vulnerable Survey Creek. In addition, the DEIS plans to yard timber through already minimal TTRA buffers in Unit 5 (plans for these yarding corridors were hard to find, buried in Appendix A, rather than in the "Environment and Effects" chapter). Roads and yarding could be kept out of valuable and sensitive watersheds by considering a selective logging, helicopter yarding alternative

6. Alternatives to LTF's Should Be Considered. The DEIS proposes 1 or 2 LTF's to be constructed. These facilities, in addition to requiring roads and quarries to provide fill material, are very destructive to valuable tidelands. Alternatives should be considered which eliminate the need for LTF's such as direct transfer of logs from helicopter to barge. Care must be taken in any case to keep all debris out of the water.

7. The DEIS Violates the National Historic Preservation Act (NHPA). The six historical sites found in the sale area must undergo an effects analysis as required by NHPA.

With the closure of the big pulp mills and termination of the long-term contracts, we had hoped the FS would take this historic opportunity to begin a transition to a small-scale, value-added, community-based wood products industry that respects and recognizes the benefits of the Tongass that doesn't require timber extraction. This DEIS indicates that the FS doesn't "get it" though, and is carrying on with "get the cut out" business as usual. In fact, with the Canal Hoya sale, in combination with other sales on the Tongass, the FS is offering more than twice the market demand as predicted by its own economists.

Let's take this opportunity to make the Canal Hoya Sale a step in the right direction.

Sincerely,

Peter Branson

cc: SEACC

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Peter Branson
Wrangell Resource Council
P.O. Box 1727
Wrangell, AK 99929

Dear Mr. Branson,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I would like to take this opportunity to respond to your comments.

"The Forest Service failed to consider a wide range of alternatives, including an alternative using only helicopter yarding and selection logging."
Roads are needed to harvest timber in Canal Hoya because of helicopter limits and the powerline. Helicopters cannot safely yard timber over the powerline. Also, economics generally restrict helicopters to one mile sling loads for timber. Without roads the majority of the timber available for harvest would be isolated.

I have selected Alternative 3, with modifications, so no roads will be constructed in the Canal VCU this entry. Alternative 4 provided me an option for me to select "helicopter yarding only" by specifying in the Record of Decision that Alternative 4 is to be implemented without the road (which would also omit the units to the south of the powerline). We have expanded our discussion of that option in the Final EIS (page 2-6).

Concerning your comments about clearcutting, I would point out that the clearcut prescriptions used on Canal Hoya call for retention of at least 10% of the existing stand cover. Each unit has its site specific setting. I do not believe that clearcuts, as used in the selected alternative, will cause significant damage to fish, wildlife, water, soil, watersheds, subsistence, recreation or esthetic resources as stated in your letter. The EIS and Record of Decision provide more specific rationale in this regard.

"The Forest Service failed to fully analyze impact on brown bears due to road construction."
An entire section of the Canal Hoya Draft EIS (DEIS) covers the impacts of roads on bears (p 3-44) and cites several recent studies linking bear mortality with road density. The brown bear viability panel specifically clarified that the issue was human access and use of roads and not necessarily the physical nature of the road itself (Forest Plan FEIS 1997). We are managing human access by gating all the roads and only allowing motorized use for administrative purposes during and after the sale. The DEIS takes the recommendations of many leading bear researchers into account (see Literature cited 4-22) by reducing miles of road and managing access. We have also followed the recommendations of State and USFWS biologists who visited the site. We believe that the remoteness of the area and our LTF design coupled with road closures will result in a situation where it is physically somewhat challenging to get to the site even to walk roads once the sale is closed. Though we do believe some walking use of the roads will occur we do not think it likely to be extensive and we have considered this in planning our closures, LTF locations, and the designs for the LTF's.

We prefer to let the State manage hunting through their regulations and process, and it is our understanding that there is a proposal from the Wrangell Advisory Committee to close hunting in the Canal Hoya area during the life of the sale, if roads are constructed. We support that effort. However, based on input such as yours and others in review of the DEIS, if the State does not close hunting, the Forest Service would implement a Forest closure order on hunting within 1/2 mile of any roads constructed in the Canal Hoya Sale Area during the life of the sale.

Regarding your comments about a floating camp, we have included the following in Chapter 2 Measures Common to All Alternatives in the FEIS: "No land-based logging camp will be authorized. The timber purchaser will rely on floating camp facilities which are subject to permitting by other agencies."

"...the FS lacks a forest development road system plan for the Tongass."
The Forest Service maintains a forest development transportation plan in accordance with direction found at FSM 7711. The manual states that this plan "is the official description of the forest development transportation system and consists of a base map or series of base maps showing the location of each facility and an inventory record defining their characteristics. These documents shall also serve as the forest development road system plan referenced in the National Forest Management Act." The key point is that this plan is a description of existing permanent roads. Direction is provided at FSM 7711.2 as to how this plan is to be kept current: "Add proposed (nonexisting) facilities to the plan only after a decision to construct the facility is made by the responsible official in accordance with the National Environmental Policy Act process..." Only after the record of decision for this project is signed can the permanent roads necessary to carry out the project be added to the forest development transportation plan.

"The Forest Service failed to consider the cumulative impacts of all actions planned for the surrounding area."
We considered cumulative effects of past and present projects in the area, but such activities are not likely to lead to significant cumulative effects beyond those disclosed in the Final EIS. Under Forest Plan goals and objectives, more harvest would likely take place in the area, but is not likely to occur for many years and is not scheduled at this time. Our best estimate is that additional timber harvest in the project area is not likely to take place for 20 to 30 years. We do not believe the effects of such possible harvests are reasonably foreseeable; nor are environmental and regulatory conditions that would exist in 20 to 30 years well enough known to forecast effects of a possible entry. Activities nearby known to us or which we can foresee are either well removed and/or unconnected to the project area, or are far enough in the future as to be highly speculative in terms of possible effects.

Past projects near Canal Hoya which can be considered in a cumulative effects analysis include Frosty Bay Timber Sale (1992-1993), Campbell Timber Sale (1995), and the Tyee Powerline (cleared and constructed through the project area in the early 1980s). Reasonably foreseeable future activities in the short-term (within 10 years) include the Swan Lake-Lake Tyee Intertie (powerline clearing and construction in the Eagle River drainage beginning in 1998), ongoing upgrade and maintenance of the existing Tyee Powerline, and timber harvest on Deer Island (1999) and south of Point Warde (primarily helicopter harvest in 2005). Reasonably foreseeable future activities in the long-term (within 100 years) include timber sales within Frosty Bay, Canal, Hoya, and Campbell VCUs. Some possible effects of these future entries are discussed in the EIS. However, the details of these projects are for the most part unknown at this time. Cumulative effects of each of these projects will be considered as part of the analysis and decision for each project.

At a broad landscape level, we evaluated cumulative effects (except Campbell Timber Sale, which is physically--and from a terrestrial standpoint, biologically--disconnected from Canal Hoya) on changes in brown and black bear habitat (see page 3-58 of the Final EIS). We have also considered potential cumulative effects of all but Frosty Bay and Point Warde Timber Sales (which are physically--and from an aquatic standpoint, biologically--disconnected from Canal Hoya) on freshwater and marine resources. Existing impacts to freshwater fisheries in the project area from powerline right of way clearing are negligible. Potential future impacts to freshwater fisheries in the project area are discussed on page 3-93 of the Final EIS. Campbell Timber Sale operations introduced logging debris to marine waters that interfered with fishing gear in the Bradfield Canal. It appears that this debris is rapidly decomposing (USFS memo, October 3 1997), but we have addressed this concern for future projects through mitigation and monitoring.

The two LTF sites (Canal and Hoya) shown in Alternative 2 are the only LTFs likely to ever be constructed in these two VCUs. It is possible that a future entry in the Campbell Sale area on the north side of the Bradfield Canal would construct an LTF there (north of the Canal LTF site) as shown in the Campbell Timber Sale FEIS (R10-MB-240, Sept. 1993). It is unlikely that all three LTFs would be in use simultaneously even if all three were eventually constructed. The cumulative bark deposition at LTF sites is monitored as a permit requirement and mitigated as discussed in Appendix C. It is likely that conflicts between users in the Bradfield Canal will increase within the next five to ten years. Cumulative effects of the Canal Hoya timber sale in combination with construction and logging activities associated with the Swan Lake-Lake Tyee Intertie (the north end of which will be based from the Bradfield Canal) and continuing maintenance of the existing Tyee Powerline could result in displacement of or interference with commercial and charter fishing activities.

In summary, potential cumulative effects associated with past and near-future projects in and around Canal Hoya have been considered and addressed as part of the decision on this project. At this time, cumulative effects are not an environmental concern in the project area. Mitigation measures and monitoring will play an important role in ensuring that cumulative effects do not become a concern in the near future.

"A cost/benefit analysis should be done for a no-action alternative."
In response to your input and those of other commentors; we included a section in the FEIS about economic value of outfitter/guide operations using the area. We used an average gross income/client for guides using the Bradfield or Anan areas to determine a total potential value for these guides if there was no action on this sale. The effects of the sale are disclosed by discussing potential changes to the area and how that may affect operations along with a relative ranking between the alternatives.

"The proposed sale is going to have a significant impact on water quality and fish."
At least 14 fish stream crossings originally proposed in the project area were dropped from all alternatives during the course of the analysis. Only six fish stream crossings are proposed in the selected alternative. All proposed roads and stream crossings intentionally avoid the best quality fish habitat in the project area. Both the DEIS and the FEIS provide detailed information about fish habitat, potential effects on fish habitat, and protection of fish habitat in the project area. As described in Chapter 3, the extent of anadromous fish habitat (as well as commercial, recreational, and subsistence fishery values) is quite low in the project area when compared to many Bradfield Canal watersheds. Nevertheless, all alternatives analyzed in the FEIS reflect thorough consideration of water quality and fish habitat based on field review of road and harvest unit concerns and mitigation. All

alternatives include a high level of water quality and fisheries protection through the designation of old growth reserves, estuary, beach and riparian buffers.

"Alternatives to LTFs should be considered."
Alternatives that do not include road construction in the Canal VCU would require direct transfer of logs from helicopter to barge, rather than via an LTF. Chapter 3 of the FEIS describes potential impacts of the LTFs and how these impacts are mitigated. Appendix D contains detailed information describing how LTF site selection, design, construction, operation and monitoring address these concerns. For example, LTFs were purposely located away from estuaries to avoid impacting these sensitive areas. See specifically the discussion under C10 in Appendix D. A mixture of floating LTF development and helicopter-to-barge operations (as proposed in the selected alternative) is preferable from both an environmental and economic standpoint for this timber sale. Visitors to Anan will not be able to see LTFs proposed under any alternative from Anan. By boat, they would have to travel a mile north of Anan and then about seven miles east into the Bradfield Canal before they would be able to see the proposed Hoya LTF. Anan visitors may be able to see barges or log rafts passing into Ernest Sound or the Blake Channel on their way to secondary log processing areas.

"The DEIS violates the National Historic Preservation Act."
The analysis completed for the Canal Hoya Timber Sale is consistent with the legally mandated process described by federal law and a Memorandum of Understanding between the Forest Service and the State Historic Preservation Officer and the Advisory Council on Historic Preservation. The Forest Service disclosed and evaluated all potential impacts regardless of potential eligibility status. A more complete report was sent to the State Historic Preservation Officer, and is on file, but is not available for public review, due to the sensitive nature of the information.

"...with the Canal Hoya sale, in combination with other sales on the Tongass, the FS is offering more than twice the market demand as predicted by its own economists."
Verification of the Forest Plan demand analysis is beyond the scope of this project. The Canal Hoya FEIS Appendix E has some additional discussion on timber demand.

I appreciate the time you have taken to review the document and provide your comments. Comments such as yours have helped to make a better final decision. An area closure to bear hunting within 1/2 mile of a road is now a mitigation measure in my final decision and will be used if State regulations are not implemented in response to reasoned comments such as yours. We have added additional information to the FEIS to clarify specific questions raised by you and other members of the public. The selected alternative (Alternative 3), as refined in the Record of Decision was developed with considerable public input during initial scoping prior to release of the DEIS, and comments made during the DEIS scoping period. All alternatives have been refined from the initial scoping through the final EIS to reflect reasoned public and agency suggestions for improvement. Thank you again for your comments. A copy of the FEIS will be mailed to you directly from the printer in about 2-3 weeks.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Ketchikan Pulp Company

Post Office Box 6600
Ketchikan, Alaska 99901
USA
TEL 907 225-2191
FAX 907 225-3260

CC WRI

2/6/98

Patricia A. Grantham
Acting Forest Supervisor
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

Dear Ms. Grantham,

Thank you for the opportunity to comment on the Canal Hoya DEIS. All of the independent timber sale purchasers are depending on the potential volume the Canal Hoya area will provide. Any volume produced from the Canal Hoya area will help to maintain the timber industry.

Some debate may exist over the cause of the decline in the timber industry since 1994, but at least some of the loss is directly attributable to the policies and practices of the Forest Service (FS). Table 3-1 in the DEIS shows, 250 forest products jobs were lost between 1994 and 1996, and these numbers do not include the 500 employees laid off at the KPC operations during 1997. Alternative 2 appears to be the best alternative for maintaining jobs for the timber workers. Table 3-3 shows the Canal Hoya can contribute 128 jobs over the life of the sales.

While jobs are important, jobs cannot exist without positive economics. According to table 3-4, Alternative 2 produces the most economical timber sales. Alternative

2 will yield the FS a net of $25/MBF, excluding specified roads which are long term assets.

Along with providing jobs, and a positive net return to the FS, Alternative 2 will be using the new Standards and Guidelines for implementing the preferred alternative. The new S&G's will more than satisfy the biological needs of identified species in the sale areas and meet the visual quality objectives set forth in the Forest Plan. In addition, all of the proposed alternatives in the DEIS are consistent with the Alaska Coastal Management Program, and there will not be a significant restriction on subsistence uses as a result of the alternatives.

KPC's hope remains that the FS will produce economic timber sales that will provide jobs for the hard working people who have chosen to make Southeast Alaska their home.

Sincerely,

Kent P. Nicholson
Contract Manager

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Kent P. Nicholson
Ketchikan Pulp Company
Contract Manager
P. O. Box 6600
Ketchikan, AK 99901

Dear Mr. Nicholson:

Thank you for your comments on the Canal Hoya Draft Environmental Impact Statement. I would like to take this opportunity to respond to your concerns regarding the need to supply timber for the independent timber sale purchasers. As you noted in your comments, Alternative 2 has the potential to provide the most jobs and a higher stumpage rate. The challenge is to provide a viable timber sale and address other concerns unique to the project area at the same time. I selected Alternative 3 with some modifications to enhance the economics of the sale and to mitigate effects to wildlife.

Your reasons to prefer Alternative 2 are clearly stated and I do understand your concerns for employment and sale economics. My reasons to prefer Alternative 3 are based on site specific concerns for balance. The Canal Hoya sale can provide a valuable timber offering. The area in which Canal Hoya exists is also in close proximity to the Anan Wildlife Observatory which is world renowned for its unique opportunity to view bears. Considerable employment and enjoyment related to viewing this resource occurs in this area. In my judgement, Alternative 3 provides for timber harvest in the area while being more responsive than Alternative 2 to issues of road proximity and harvest near Anan. The volume difference in harvest between Alternative 2 and Alternative 3 is 3MMBF (18% of the total of Alternative 2). I weighed the margin of economic and volume benefit of Alternative 2 compared to the roading and harvest impact to wildlife (particularly Anan bears) and concluded that Alternative 3 offered a better balance of environmental and economic benefit. Under Alternative 3 roading is used to help the economics and long term timber management of the area, but roads are kept about 6 miles from Anan and the higher density denning areas near Anan are not roaded at this time. This will allow us to see the effects of harvest and roading with less committed development near Anan and preserving more options for the future under Alternative 3. For those reasons I selected Alternative 3. More rationale for my choice is included in the Record of Decision.

I appreciate your time in reviewing and responding to this project. You will be receiving a copy of the final EIS directly from the printer.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

FOREST GUARDIANS

FOIA

POSTMARK BY 3/25/98

PLANNING RECORD NO. 2.1.2

February 18, 1998

Freedom of Information Act Officer
Tongass National Forest - Stikine Area
415 North 12th Street
PO Box 309
Petersburg, AK 99833-0309

RE: 1. Request to be put on mailing list for all future timber sale decisions, E.A.s, E.I.S.s, and C.E.s
2. Please forward our comments on any timber sales now in 30 day comment period (comments attached)
3. FOIA request for economic analysis documents

Dear FOIA Officer:

This is a joint request on behalf of two non-profit environmental organizations: Forest Guardians and Forest Conservation Council. Both organizations are registered with the IRS as non-profit educational establishments. Our members include individuals and businesses throughout the United States whose interests are affected by management of national forest system lands. Our mission is to protect and restore the natural ecological conditions of such lands, so that the biological and economic values of these lands can be maintained in perpetuity. All correspondence to our organizations can be addressed to:

Forest Guardians and FCC
Attention: John Talberth
1413 Second Street
Santa Fe, New Mexico 87505

Our main phone number is: (505) 988-9126

If you have an old mailing address for Forest Conservation Council, please delete that address and send all future mailings to the address indicated above.

1. Request to be put on mailing list for all future timber sale decisions and E.A.s

Both Forest Guardians and Forest Conservation Council wish to be put on your mailing list to receive all future decision notices or decision memos for timber sales. This request applies to all timber sales that involve a commercial component, regardless of size. We wish to review and comment on these sales as early in the planning process as possible, so please also send us scoping notices as well as draft environmental assessments or environmental impact statements as they are published. Also send all final environmental assessments, environmental impact statements, and categorical exclusion notices for timber sales when they are completed.

If we are already receiving these notices from you, please disregard this request.

2. Please forward our comments on any timber sales now in 30 day comment period

In the event that there are timber sale projects currently in the 30 day comment period established by Forest Service regulations, please forward the comments below before the end of that comment period. We are submitting these comments to you because we cannot be assured that timber sale E.A.s that are now ripe for comment will reach us through the mail in time. We wish to preserve our rights to review any final timber sale decisions that are made, so it is necessary for us to provide some comments on these sales now. The comments below address economic issues that are common to all timber sales, regardless of size or location. If we have already commented on any particular sale now in the 30 day comment period, please supplement our comments with those provided below.

1413 Second Street, Suite One ▼ Santa Fe, New Mexico 87505 ▼ 505-988-9126 ▼ Facsimile 505-989-8623

Forest Supervisor
Comments on any timber sales currently in the 30 day comment period

Forest Guardians and Forest Conservation Council are tax exempt, public interest organizations with individual and business members throughout the United States. We are concerned with the adverse economic effects of the national forest logging program, and the Forest Service's failure to quantify such effects at the project level or for the program as a whole. The logging program increases costs of water purification and filtration, decreases the value of private timberlands, unfairly competes against alternative fiber and building material businesses, increases wildfire risk, increases repair and maintenance costs for highways and public roads, and decreases the number of jobs in recreation, tourism, fisheries, and alternative forest products.

In addition, the ecosystem service values of standing forests, especially native forests, including their value in providing clean water, mitigating floods, supporting recreation, hunting, fishing, and wildlife viewing, enhancing long term forest productivity, and mitigating agricultural pests are systematically undervalued or not valued at all. Finally, the opportunity costs of the logging program, which includes both the uses forgone on areas logged as well as the alternative uses of the money now spent on the logging program have not been evaluated on a project basis or for the logging program as a whole.

Before a final decision is made on any current timber sales, the Forest Service has a duty to fully consider the external costs and opportunity costs of the logging program, and incorporate those costs into planning decisions so that the true costs and benefits of the program to the public can be determined. Thank you for the opportunity to comment, please keep us on the list to receive all future documents related to your timber sale program.

Sincerely,

John Talberth
Forest Guardians/ Forest Conservation Council

3. FOIA request for economic analysis documents

Please provide the following documents pursuant to the Freedom of Information Act, 5. U.S.C 552 and the Department of Agriculture Regulations implementing the Act. If these documents are part of a larger document, such as an EIS for the Forest Plan, we will accept the larger document as long as the specific page numbers of the documents we are requesting are identified:

(A) All documents produced by the U.S. Forest Service or in the agency's or the federal government's possession that quantify the *adverse* economic effects and economic costs of the commercial and personal use timber sale/ permit program on this national forest. This includes, but is not limited to documents that quantify the economic value of:

(i) loss of jobs and business revenue related to fisheries, recreation, tourism, alternative forest products and hunting;
(ii) decreased private land values in "matrix" of industrialized federal public land;
(iii) lost jobs and income to private timberland owners, especially those utilizing more costly but more ecologically sustainable logging techniques, who face unfair competition from subsidized federal timber;
(iv) lost jobs and income to alternative and recycled fiber and construction material businesses who face unfair competition from subsidized federal timber;
(v) increased costs for water quality management incurred by states, counties, and municipalities in watersheds subject to sedimentation from public lands logging;
(vi) increased costs related to wildfire damage and wildfire suppression for fires which originate in timber sale slash;
(vii) increased road maintenance costs incurred by counties and states forced to implement repairs of roadways and bridges damaged by logging-induced landslides and damaged by heavy log truck traffic;
(viii) death and injury on roadways caused by increased heavy truck traffic related to public lands logging;
(ix) lost hydro-electric generating capacity from reservoirs clogged by logging-induced siltation, and;
(x) flood damage, including loss of property and farmland in watersheds damaged by public land logging operations.

(B) All documents produced by the U.S. Forest Service or in the agency's or the federal government's possession that quantify the non-timber economic values associated with this national forest. This includes, but is not limited to documents that quantify the economic values associated with:

(i) the national forest's role in regulating the flow of water, specifically, their role in mitigating flash floods and other catastrophic precipitation events;
(ii) the national forest's role in purifying water for downstream users;
(iii) the unlogged portion of this national forest's role in maintaining long term forest productivity. Native forests provide a source of native organisms and ecological processes vital to regeneration and forest development in surrounding areas. In addition, older and larger trees in this national forest are a genetic reservoir of immense value to reforestation efforts;
(iv) non-timber uses of the national forest including gathering of forest products, recreation, hunting, fishing, and wildlife observation, and;
(v) the national forest's role in mitigating pests. Structurally diverse forests in unlogged areas support bird and bat species that prey upon insects and rodents harmful to forest and cropland health.

(C) All documents received from the Washington office, the regional office, or internal to this national forest providing guidance or direction for how to assess the economic effects of the timber sale program or individual timber sales, as well as documents describing the procedures used to conduct the quantitative and qualitative analysis described in part "D" of this request, below.

(D) The most up-to-date document describing and summarizing the results of the specific quantitative and qualitative analysis this forest relies upon to insure that national forest lands are being managed in a manner that "maximizes long term net public benefits" pursuant to 36 C.F.R. 219.1(a).

Since the Freedom of Information Act provides for non-disclosure of documents and portions of documents that are exempt from disclosure, Forest Guardians and Forest Conservation Council request that all non-exempt portions of documents covered by this request be made available to us, and that the Forest Service specifically identify any documents or portions of documents that will not be disclosed, and justify those non-disclosures.

Because this information is vital to thousands of our individual and business members nationwide who wish to participate more effectively in the forest planning process, and because Forest Guardians and Forest Conservation Council will make this information accessible to the public, we request a waiver of any fees associated with providing the information requested above. We believe we are entitled to a fee waiver for the following reasons:

(a) the subject of this request will help the public understand the operations and activities of the government. Forest Guardians and FCC's members have identified the information requested as vital for monitoring the economic impacts of management activities throughout the national forest.
(b) the information requested is highly informative, permitting our members to understand the cumulative economic impacts of management activities on a forest-wide scale.
(c) the information requested will enhance public understanding of management activities on the national forest by providing information on the economic impacts of current management, as well as information about internal Forest Service procedures for assessing economic impacts.
(d) Forest Guardians and FCC have no commercial interest in the information requested. We are a tax-exempt, public interest organization that is compiling this information for use by our members and the general public. We do not charge fees or resale this information in any way.

Please don't hesitate to call me to clarify this request. I can be reached at (505) 988-9126. Thank you for your prompt reply, and for forwarding the request for future timber sale information as well as our comments on existing E.A.s to the appropriate staff.

Sincerely,

John Talberth
for Forest Guardians and Forest Conservation Council

3

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

John Talberth
Forest Guardians/Forest Conservation Council
1412 Second Street, Suite One
Santa Fe, NM 87505

Dear Mr. Talberth,

Your comments on any timber sales currently in the comment period were reviewed for the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I understand that you are concerned with external costs and opportunity costs of timber harvest about any sales in general, though you have no specific comments about Canal Hoya Timber Sale specifically. In response to specific comments from other individuals the Canal Hoya Timber Sale regarding this issue we have included a section in the FEIS about economic value of outfitter/guide operations using the area. We used an average gross income/client for guides using the Bradfield or Anan areas to determine a total potential value for these guides if there was no action on this sale. The effects of the sale are disclosed by discussing potential changes to the area and how that may affect operations along with a relative ranking between the alternatives.

Thank you for your comments. A copy of the FEIS will be mailed to you directly from the printer.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

Terri Fenale
USDA Forest Service
P.O. Box 51
Wrangell, AK 99929

1/14/98

PLANNING RECORD
NO. ____________

Dear Scott Posner,

I am in favor of alternative #2 on the Canal Hoya timber sale. This makes the most timber available and also puts more road for public use after the sale is complete.

The unique growth rate in southeast Alaska makes timber a true natural resource that really is renewable. Please think of 4 generations from now when the future Southeasterners will be able to harvest in this same area. Unfortunately for most of us we only think of the present and forget about the future a 100 or 200 years down the road not just 5 or 10 years.

respectfully

William B. Privett
P.O. Box 775
Wrangell, AK
99929

thanks for keeping my name on the list to receive information.

FOREST SERVICE
JAN 16 1998
RECEIVED

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

William B. Privett
P. O. Box 775
Wrangell AK 99929

Dear Mr. Privett:

Thank you for your comments on the Canal Hoya Draft Environmental Impact Statement. I would like to take this opportunity to respond to your concerns regarding the need to supply timber for the local economy and a desire for future road access. The challenge is to provide a viable timber sale and address the other concerns at the same time. I selected Alternative 3 with some modifications to enhance the economics of the sale. My reasons to select this alternative are given in more detail in the Record of Decision, but I would like to summarize them for you in relation to Alternative 2 for which you voiced support.

Alternative 3 provides about 18% less timber than Alternative 2, but it is a much more balanced and, I believe reasonable approach to harvest in an area that is near the Anan observatory. I considered all issues and took into account all competing interests and public values. There were many divergent views on the issues and this decision may not completely satisfy any one particular group or individual. Anan is the biggest issue for us to deal with on the Canal Hoya timber sale EIS. Anan is world renowned and is very important to the local economy, to local recreation and to local cultural traditions. In contrast to Alternative 2, Alternative 3 does not road in the Canal drainage which is adjacent to the Anan drainage. By choosing Alternative 3 (with modifications made by suggestions to the draft EIS), we can road in the Hoya drainage at a greater distance from Anan, gain access south of the powerline for present and possible future harvest in that drainage while retaining options for the future in the more sensitive Canal watershed. By observing the effects of the roads in Hoya at a greater distance from Anan we can decide if further roading at Canal will be prudent in the future. In weighing the risks, trade offs and public and agency input, I believe that Alternative 3 best meets the overall land management objectives for the Canal Hoya area at this time.

I understand your support for opening the area with roads to provide greater opportunities for hunting, camping, and other forms of recreation. Numerous other comments have been received that are opposed to the construction of roads and the related possible impacts on bears. To mitigate the possible impacts of roads, particularly the possibility of significant hunting impact to the somewhat "human habituated" Anan bear population, I have decided to select Alternative 3 with mitigations that include roads closures on any new specified roads and permanent closure of temporary roads (the latter being our normal procedure). All such roads would be available to non-motorized use after the sale.

The local Fish and Game advisory committee is considering proposing changes to State regulations to close the area to bear hunting during the life of the sale. We would support such a mitigation, but if it does not go through, I am also proposing an area closure to hunting within 1/2 mile of any roads built by this sale. These areas are very rugged and not commonly hunted at present. These regulations should not significantly impact any current hunting opportunities and could greatly mitigate the potential for adverse impact to the Anan bear populations and to the public and guides who utilize Anan and the bear viewing resource.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1689 C. Street, Room 119
ANCHORAGE, ALASKA 99501-5126

ER98/27

February 27, 1998

Mr. Steve Posner
USDA Forest Service
Tongass National Forest - Stikine Area
P.O. Box 51
Wrangell, Alaska 99929

Dear Mr. Posner:

In response to your January 6, 1998 request, we have reviewed the Draft Environmental Impact Statement (EIS) for the Canal Hoya Timber Sale. We offer the following comments for your consideration.

We appreciate the friendly and cooperative manner demonstrated by the Canal Hoya interdisciplinary team, and the opportunity to be involved at an early stage in the project planning. We commend the U.S. Forest Service Wrangell District for a well written, informative document. The Wildlife Habitat and Species Conservation section describes the local and national significance of the project and included a thorough description of possible project impacts on the various wildlife species and their habitats within the project area. The document also responded well to every concern contained in the U.S. Fish and Wildlife Service's February 5, 1997, letter.

Our main concerns are with the effects of the proposed action on fish and wildlife habitats and populations. We support maintaining opportunities for fish and wildlife-oriented recreation. Issues of particular interest relate to old growth habitat and connectivity, road management, bears, and beach and estuarine habitats.

OLD GROWTH HABITAT

We believe that the location of the Canal Old Growth Reserve (OGR) would protect areas used by denning bears that also use the Anan Wildlife Observatory area for feeding. We also support the location of the Hoya OGR, and agree that it be enlarged to meet the Tongass Land Management Plan (TLMP) minimum size requirement for small OGRs and to include the high value goat habitat and the isolated forest stands to the south.

OLD GROWTH RESERVE CONNECTIVITY AND BEACH AND ESTUARY FRINGES

We appreciate that the Draft EIS maps show all non-development Land Use Designations (LUD) and existing blocks and corridors of old growth habitats, in and near the project area. These maps

simplified our review of possible project impacts.

We believe that the small OGRs in the project area could eventually become isolated and of reduced value as habitat for some old growth dependent species unless connectivity with other old growth stands is maintained. Although TLMP established OGRs in the project area, we believe it is important to manage the highly fragmented forested areas between them so that they do not become isolated patches that can no longer sustain old growth dependent wildlife populations. Natural fragmentation must be clearly understood before further management-induced fragmentation can be evaluated (Kiester and Eckhardt 1994). Habitat connectivity is an important component of a landscape conservation strategy (Kiester and Eckhardt 1994, Lidicker 1995). Corridors of undisturbed habitat connecting the various non-development LUDs containing old growth stands allow movement of animals between these increasingly fragmented islands of habitat. We further recommend maintaining the best available connectivity between OGRs and other natural settings in the project area (Forest Plan, XVIII, page 4 -120; Landscape Connectivity Standards and Guidelines). We suggest additional evaluation of the impacts of fragmentation and connectivity be included in the Final EIS.

The Draft EIS describes the significance of the beach fringe as a major component of the TLMP wildlife travel corridor between old growth reserves and other non-development LUDs on the Tongass National Forest (page 3-59). Harvest Units 13 and 47 may be within the TLMP designated beach and estuary fringes. We suggest that the boundaries of these units be reviewed and moved out of these important habitats if the boundaries are found to encroach upon the beach and estuary fringes, and that the impacts of such changes be discussed in the Final EIS.

According to the Canal Hoya project Geographic Information System database, the beach fringe contains a 2 mile long, 40 year-old managed (previously cut), stand in the Hoya Creek area. This second growth stand appears to be up to 350 feet wide in some places. Second growth in the beach fringe decreases the effectiveness of the fringe as connectivity for old growth reserves as intended by TLMP. We believe as an option, the width of the beach fringe around this second growth area should be expanded to allow at least a 1000 foot wide old growth forested corridor, and that timber harvest in those parts of Units 1, 13, 18, and 25 be deferred. We suggest that this issue be discussed in the Final EIS.

The Draft EIS states (page 3-61), that the TLMP Standards and Guidelines direct planning teams to maintain 600 foot wide corridors between all OGRs. It is the our understanding that there is no requirement to connect small OGRs with medium or large OGRs; nor is there a specific width requirement for corridors. We believe, however, that small OGRs should be connected to at least one other non-development LUD, such as another OGR. We suggest that discussion of these connectivity issues be expanded in the Final EIS.

The interagency Tongass Plan Implementation Team is currently clarifying connectivity standards and guidelines on corridor design in order to ensure that these corridors are "... of

sufficient width to minimize edge effect and provide interior forest conditions." (Forest Plan, XVIII, page 4-120; Landscape Connectivity). According to the Draft EIS (page 3-35), the analysis on edge effects defined forest edge as "forested habitat within 300 feet of a non-forested opening of 5 acres or more." Using this definition, a corridor of 600 feet in width is all edge, and we suggest the impacts of such a corridor be further analyzed in the Final EIS. Furthermore, we believe that a wider forested corridor should be maintained to provide interior forest conditions and blowdown protection.

ROAD MANAGEMENT

Currently, the project area is unroaded and fairly inaccessible. The Draft EIS proposes to construct up to 5.3 miles of road (Alternative 2), in Value Comparison Unit (VCU) 5210 that adjoins the Anan Wildlife Observatory area. The Draft EIS also states that a log transfer facility and roads in this VCU could become an attractive camping area for hunters and Anan visitors. Public access may cause adverse impacts to wildlife populations, particularly black bears, brown bears, and wolves (see BLACK AND BROWN BEARS section below). We, therefore, support the recommendation that the Canal area remain unroaded, as depicted in Alternatives 3 and 4.

The Draft EIS proposes to close all new roads by the use of gates during and after the completion of the project. Recent monitoring efforts have shown inconsistent approaches to closing roads and questionable results. Also, once the public becomes accustomed to road access, closing a road at that point is frequently difficult, even when it is scheduled during planning. Gates are not always effective, particularly for off-road vehicles. Although we support closing all new roads, including those to be temporarily unused but left in place, we suggest that the effectiveness of past techniques to close roads be further discussed in the Final EIS.

We suggest removing any roads that will not be used again for timber harvest. We believe that regrading roadbeds to establish original contours may be most effective at avoiding future impacts. We believe that culverts left in place are likely to become plugged with debris, often causing mass failures of the roadbed. Also, sowing the roadbeds with alder seed can accelerate alder growth; cutting alder branches in the fall and spreading them on closed roadbeds to serve as a seed source is the recommended method. We suggest that the Final EIS road removal discussion be expanded to include the value of culvert removal and alder seeding on abandoned roads that remain after the harvest.

BLACK AND BROWN BEARS

We support protection of habitats used by bears that frequent the Anan Wildlife Observatory area. The Draft EIS states that the Anan area, which adjoins the project area to the west, is "an internationally renowned site and a world-class bear viewing area" that has local economic benefits (page 3-33). The Canal Creek area is important to the Anan bears for denning and

feeding (page 3-35). The Draft EIS also states that tourism is expected to increase in the Anan area and it is likely that the Canal area could become a public use area if access is made easier with roads. Although the Canal Creek area is in a LUD identified in the revised TLMP that allows timber harvest, logging, and roading; such actions could adversely affect the Anan brown and black bears (Pages 3-38 to 3-51). Project planning allows for site-specific natural resource evaluation and consideration when proposing land management actions allowed by TLMP. Considering that Anan black bears use the Canal area extensively, we recommmend that project impacts on bears be reduced by keeping the area roadless.

From the maps provided in the Draft EIS, it appears that the east side of Unit 47 is within high-value brown bear habitat that the Anan Creek bears may use. Other project harvest units that appear to include high-value brown bear habitat are: Units 9, 10, 13, 14, and 18. We suggest that these brown bear habitat areas be deferred from timber harvest, and that the implications of harvesting brown bear habitat be further discussed in the Final EIS.

We request that copies of the completed Canal Hoya Wildlife and Timber Resource reports to be sent to: U.S. Fish and Wildlife Service, Southeast Alaska Ecological Services, 3000 Vintage Boulevard, Suite 201, Juneau, Alaska 99801.

We appreciate the opportunity to participate in the planning of the Canal Hoya Timber Sale Project. Please contact Carol Hale, U.S. Fish and Wildlife Service, (907) 586-7240, if you have any questions concerning the above comments, or when opportunities arise for participation in future meetings or field work.

Sincerely,

Paul D. Gates
Regional Environmental Officer - Alaska

LITERATURE CITED

Kiester, A.R. and C.Eckhardt. 1994. Review of wildlife management and conservation biology on the Tongass National Forest: A synthesis with recommendations. Pac. NW Research Station, Corvallis, OR. 281pp.

Lidicker, W.Z. ed. 1995. Landscape approaches in mammalian ecology and conservation. Univ. Minnesota Press. Minneapolis.

United States Department of Agriculture | Forest Service | Alaska Region | Tongass National Forest
Stikine Area
P.O. Box 309
Petersburg, Alaska 99833

File Code: 1950

Date: May 15, 1998

Paul D. Gates
Regional Environmental Officer - Alaska
U.S. Department of the Interior
Office of Environmental Policy and Compliance
1689 C. Street, Room 119
Anchorage, AK 99501-5126

Dear Mr. Gates,

Thank you for your comments on the Draft Environmental Impact Statement for the proposed Canal Hoya Timber Sale. I appreciate the effort that Carol Hale put into coordinating with us on this sale. The time she put into coordinating and meeting with us about the Canal Hoya Timber Sale helped to make this a better project. I would like to take this opportunity to respond to the comments in your letter.

"We suggest additional evaluation of the impacts of fragmentation and connectivity be included in the Final EIS."
We believe that our evaluation and analysis of the impacts on fragmentation and connectivity is complete. There is a high degree of natural fragmentation in the study area and options for corridors are limited. Possible corridors were identified on maps and photos and ground-verified. As a result we avoided placing units in important wildlife travel corridors. Measuring fragmentation in this landscape is inherently difficult due to the resolution of our GIS data layers and the complexity of the landscape. Programs such as FRAGSTATS have been used in other areas of the Tongass with limited success. The measure applied in the DEIS to evaluate fragmentation, an edge/interior ratio, is believed to be sufficient.

"Harvest Units 13 and 47 may be within the TLMP designated beach and estuary fringes."
These units are designed to be outside the beach fringe. The layout crew will mark the boundaries at least 1000 feet from the beach.

"...the width of the beach fringe around this second growth area should be expanded to allow at least a 1000 foot wide old growth forested corridor, and that timber harvest in those parts of Units 1, 13, 18 and 25 be deferred."
The presence of springboard stumps in the area in question shows that there was some selective harvest that occurred in the beach fringe in the past. The selective nature of the harvest left sufficient trees to maintain the integrity of the beach fringe as a travel corridor, and there is still a substantial width of beach fringe that was not harvested adjacent to the area that was. It does not appear that any adjustment in the beach fringe is necessary.

"We, therefore, support the recommendation that the Canal area remain unroaded, as depicted in Alternatives 3 and 4."
Protection of bears was a significant consideration in my determination of a preferred and selected alternative.

"Gates are not always effective, particularly for off-road vehicles."
The area is fairly inaccessible. The roads will not connect to any community and the only way to get a vehicle to the area is by boat and there will be no loading or unloading ramps. Two gates will be designed such that ATVs cannot go under them and they will be placed in locations that will be extremely difficult to get around. The first gate will be made of iron - not the usual perforated steel, so ATVs will not have the power to pull over or destroy the barricade. Non-motorized access would be improved in areas where roads are constructed. Roads will not be constructed in the Canal VCU this entry. This gives the Forest Service time to monitor and evaluate the effectiveness of road closures in the Hoya VCU before constructing any roads in the Canal VCU.

"We suggest removing any roads that will not be used again for timber harvest."
Several methods of managing the roads after the sale have been considered. Removal of the rock and restoration of road beds was considered, but was not included as a mitigation measure due to the expense. Obliterating roads would increase the road cost by 75% to remove the rock and stockpile, remove all structures and seed. We are proposing to pull all drainage structures on temporary roads and restore the drainages to their original pattern. Temporary road beds would also be seeded and revegetated.

"We suggest that these brown bear habitat areas [Units 9, 10, 13, 14, 18 and 47] ***be deferred from timber harvest."***
Unit 47: The eastern portion is considered high value brown bear habitat. Partial harvesting with helicopter yarding will mitigate these effects
Units 9,10: The portions of these units that are close to the streams are considered high value. Reserves placed near the streams will mitigate these effects. In Unit 10 we will retain den trees.
Unit 13 : Is not within high value brown bear habitat.
Unit 14: Based on ground verification this unit is not believed to contain high value brown bear habitat.
Unit 18: Lies between two streams utilized by brown bears. This unit will be partial-harvested by helicopter to mitigate the effects.

"We request that copies of the completed Canal Hoya Wildlife and Timber Resource reports be sent to USFWS."
Copies of those reports have been sent.

Sincerely,

Carol J. Jorgensen

CAROL J. JORGENSEN
Assistant Forest Supervisor

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

February 26, 1998

Reply To
Attn Of: ECO-088

Ref: 96-097-AFS

Scott Posner
Wrangell Ranger District
Tongass National Forest
P.O. Box 51
Wrangell, Alaska 99929

Dear Mr. Posner:

The U.S. Environmental Protection Agency (EPA) has received the Draft Environmental Impact Statement (draft EIS) for the **Canal Hoya Timber Sale** for review in accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act.

EPA Region 10 has used a screening tool to conduct a limited review of the draft EIS and, based upon the screen, we do not foresee having any environmental objections to the proposed project. Therefore, we will not be conducting a detailed review of the draft EIS.

Should you have any questions, please contact Bill Ryan of my staff at (206) 553-8561.

Sincerely,

Richard B Parkin

Richard B. Parkin, Manager
Geographic Implementation Unit

cc: Kevin Hanley, ADEC
Ralph Thompson, ACOE-Juneau

USDA Forest Service
Wrangell Ranger District
P.O. Box 51
Wrangell, AK 99929

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