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United States  
Department of  
Agriculture

Forest Service

Tongass  
National Forest

R10 - MB-332

October 1996



# Upper Carroll Timber Sale

## Final Environmental Impact Statement

### Summary





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DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EVC	Existing/Expected Visual Condition
FEIS	Final Environmental Impact Statement
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information System
IDT	Interdisciplinary Team
KPC	Ketchikan Pulp Company
KV	Knutsen-Vandenberg Act
LTF	Log Transfer Facility
LUD	Land Use Designation
LWD	Large Woody Debris (same as LOD)
MBF	One Thousand Board Feet
MELP	Multi-Entry Layout Process
MIS	Management Indicator Species
MM	Maximum Modification
MMBF	One Million Board Feet
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
P	Primitive
PR	Partial Retention
R	Retention
RM	Roaded Modified
RN	Roaded Natural
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
SHPO	State Historic Preservation Officer
SPM	Semi-Primitive Motorized
SPNM	Semi-Primitive Nonmotorized
TLMP	Tongass Land Management Plan
TRUCS	Tongass Resource Use Cooperative Survey
TTRA	Tongass Timber Reform Act
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
VCU	Value Comparison Unit
VQO	Visual Quality Objective
WAA	Wildlife Analysis Area

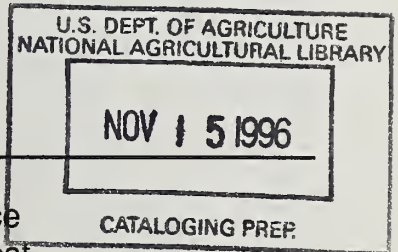
### Acknowledgments

Front cover: By Cindy Ross Barber, 1992. The design illustrates the range of interconnected issues addressed in the EIS.

## Final Environmental Impact Statement

# Upper Carroll Timber Sale

United States Department of Agriculture  
Forest Service—Alaska Region



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Lead Agency: U.S.D.A. Forest Service  
Tongass National Forest  
Ketchikan Administrative Area

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### Abstract

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The USDA Forest Service proposes to harvest up to approximately 70 million board feet (MMBF) of timber in the Upper Carroll Project Area, Ketchikan Ranger District, Ketchikan Administrative Area, Tongass National Forest. Timber volume would be offered to the Ketchikan Pulp Company (KPC) under the KPC Long-term Timber Sale Contract (A10fs-1041) and/or the Ketchikan Area independent timber sale program. The actions analyzed in this EIS are designed to implement direction contained in the Tongass Land Management Plan (TLMP, 1979a, as amended) and the Tongass Timber Reform Act. The EIS describes 6 alternatives which provide different combinations of resource outputs and spatial locations of harvest units. The alternatives include: 1) No Action, proposing no new harvest from the Project Area at this time; 2) configure harvest units to provide the maximum amount of timber within Forest Plan Standards and Guidelines; 3) configure harvest units to emphasize timber sale economics, fisheries, wildlife, and subsistence values; 5) emphasize helicopter yarding in Neets Bay while allowing harvest at the Forest Plan implementation level in most other zones; 6) avoid harvest in Neets Bay and in potential goat winter range, minimize impacts to the west side of Carroll Creek through the use of helicopter logging; and 7) emphasize helicopter logging, visuals, and subsistence values.

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# Summary

## Key Terms

**Alternative**—one of several policies, plans, or projects proposed for decision making.

**Allowable Sale Quantity (ASQ)**—the maximum quantity of timber that may be sold each decade from a national forest.

**BMPs**—Best Management Practices—practices used for the protection of water quality.

**Land Use Designation (LUD)**—method of classifying land uses allocated by the Forest Plan.

**MMBF** - million board feet.

**Management Area**—an area for which management direction was written in the Forest Plan (TLMP 1979a, as amended 1986) management areas encompass one or more Value Comparison Units (VCUs).

**Old-growth Forest**—an ecosystem distinguished by old trees and related structural attributes. Old-growth forests encompass the latter stages of stand development. They typically differ from earlier stages of stand development in a variety of characteristics which may include tree size, accumulation of large dead woody material, number of canopy layers and tree species composition, and ecosystem function.

**Primary Sale Area (PSA) and Contingency Area**—the "sale area" designated in the long-term timber sale contract is composed of portions of Allotments E, F, and G. The sale area is often termed the "Primary Sale Area." The remainder of Allotments E, F, and G are often termed the "Contingency Area" for the contract. Allotments E, F, and G approximately correlate to the Ketchikan Administrative Area of the Tongass National Forest.

**Tongass Land Management Plan (TLMP)**—the ten-year land allocation plan for the Tongass National Forest, also known as the Forest Plan. The TLMP was completed in 1979 and was amended in 1986 and again in 1991 (TLMP 1979a, as amended). The TLMP is currently undergoing revision; the Draft Environmental Impact Statement (DEIS) for the Proposed Revised Forest Plan was issued in 1990; a supplement to the TLMP Revision DEIS was issued in 1991 (TLMP Revision Supplement DEIS 1991a); and a Revised Supplement to the TLMP Revision Supplement DEIS was issued in 1996 (Revised Supplement Draft TLMP EIS 1996a). Reference in the Upper Carroll EIS to the Revised Supplement Draft TLMP EIS (TLMP RSDEIS, 1996a) is to the DEIS as proposed to be implemented in the Preferred Alternative of the Revised Supplement, unless otherwise noted. Until the Forest Plan Revision is completed, the TLMP (1979a, as amended) remains in effect.

**Scoping Process**—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.

**Subsistence**—the customary and traditional uses by rural Alaskan residents of wild renewable resources for direct personal or family consumption and for customary trade.

**Value Comparison Unit (VCU)**—areas which generally encompass a drainage basin to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

### Introduction

In compliance with the National Environmental Policy Act (NEPA) and other relevant State and Federal laws and regulations, the Forest Service has prepared this Environmental Impact Statement (EIS) on the effects of timber harvest in the Upper Carroll Project Area (Figure Sum-1) on Revillagigedo Island of the Ketchikan Administrative Area, Tongass National Forest. The proposed action would make up to approximately 70 million board feet (MMBF) of timber available to the Ketchikan Pulp Company (KPC) under its long-term timber sale contract with the Forest Service (Ketchikan Pulp and Paper Co. 1951, as amended in 1991), and/or the Ketchikan Area independent timber sale program. The EIS discloses the direct, indirect, and cumulative environmental impacts and any irreversible or irretrievable commitment of resources that would result from each proposed alternative.

### Public Participation in the Decision-making Process

Public involvement has been instrumental in identifying issues, formulating alternatives, and influencing this decision. Public scoping and involvement activities for the Upper Carroll Project are listed in Chapter 1 and in Appendix L of the Final Environmental Impact Statement (FEIS). A summary of the significant issues used to govern this interdisciplinary analysis is provided later in this document, and the issues are addressed in Chapters 1 and 2 of the FEIS.

Public scoping, data gathering and analysis, and document production for the Upper Carroll Project began with publication of the Notice of Intent in the Federal Register on August 31, 1994. The Notice of Availability for the Draft Environmental Impact Statement (DEIS) was published in the Federal Register on January 26, 1996, and the public comment period for the DEIS closed on March 11, 1996. The FEIS discloses the environmental effects of the alternatives considered and the Record of Decision documents the decision for authorization of activities within the Project Area.

### Subsistence Hearings

Subsistence hearings were held in Ketchikan, Cape Fox Lodge, February 22, 1996, and Saxman, Saxman City Hall, February 23, 1996. Announcement of the times and locations of the hearings was included in the letter accompanying every document and was announced by public media as described above. Comments were recorded. Open houses to describe the analysis process and answer public questions were held in conjunction with the subsistence hearings.

### Final Environmental Impact Statement (FEIS)

#### Response

Approximately 373 individuals, agencies, and organizations submitted written comment on the Upper Carroll Draft Environmental Impact Statement (DEIS). In addition, nine verbal testimonies were received at the two subsistence hearings. The 45-day comment period officially closed March 11, 1996; however, all letters were accepted and the comments were analyzed and incorporated into the Final Environmental Impact Statement (FEIS) as appropriate.

For a complete analysis of public comment and the Forest Service response to public comment, see FEIS Appendix L.

## Decision to be Made

Based on the information contained in this EIS, the Forest Supervisor will decide to (1) select one of the alternatives presented in the FEIS, (2) modify an alternative as long as the environmental consequences of the modified action have been analyzed within the FEIS, or (3) reject all alternatives and request further analysis. If an alternative is selected, it will be documented in the Record of Decision (ROD).

## Availability of the Planning Record

An important consideration in preparation of this EIS has been reduction of paperwork as specified in 40 CFR 1500.4. 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 upon issuance of the EIS at the Forest Supervisor's Office, Ketchikan, Alaska. Other reference documents such as the Tongass Land Management Plan (TLMP, as amended 1979a), the Revised Supplement Draft Tongass Land Management Plan EIS (TLMP RSDEIS, 1996a), the Tongass Timber Reform Act, the Resources Planning Act, and the Alaska Regional Guide EIS, are available at public libraries around the region as well as at the Supervisor's Office in Ketchikan.

## Project Area

The 47,942 acre Upper Carroll Project Area is located approximately 30 air miles northeast of Ketchikan, Alaska (Figure Sum-1). It encompasses an area of northcentral Revillagigedo (Revilla) Island that extends from the head of Carroll Inlet north to Neets Bay. It includes the drainages associated with Neets Creek and Carroll Creek. There are no communities within or adjacent to the Project Area. Access to the Project Area is by floatplane or boat, generally originating in Ketchikan.

The Project Area includes Forest Plan (TLMP 1979a, as amended) Management Area K32, West Revilla, and Management Area K35, Carroll-Thorne. The West Revilla Management Area includes Value Comparison Units (VCUs) 737 and 744. The Carroll-Thorne Management Area includes a small portion of VCU 746. VCU boundaries generally follow major watershed divides with a few minor exceptions. The Project Area is partially within the contract Primary Sale Area; the remainder is within the contract Contingency Area.

Figure Sum-1  
Project Vicinity Map



## Purpose and Need

The purpose and need for this project is to implement direction contained in the Tongass Land Management Plan (TLMP 1979a, as amended), to help provide a sustained level of timber supply to meet annual and TLMP planning cycle market demand, and to provide local employment in the woods products industry, consistent with providing for the multiple use and sustained yield of all renewable forest resources. Another objective would be to provide timber volume that will contribute to a three-year current timber supply under the KPC long-term timber sale contract (No. A10fs-1042; Sections B0.61 and B0.62) and/or the Ketchikan Area Independent Timber Sale Program. The alternatives and actions considered are possible approaches to meeting this purpose and need. The EIS study process was designed to help insure that, in meeting this purpose and need, the Forest Service makes the most informed decision possible for this Project Area specifically, and for the Tongass National Forest generally. The Upper Carroll Project is expected to provide up to approximately 70 MMBF of timber, given the guidance of the Forest Plan.

### Implement TLMP

The Project Area is partially within the long-term contract Primary Sale Area; the remainder is within the Contract Contingency Area. Under TLMP, 100 percent of the Project Area has been given Land Use Designation (LUD) IV. The TLMP schedules timber sale preparation for all Management Areas in the Project Area. A comparison of the Desired Future Condition for the Project Area, as reflected in TLMP direction, with the existing condition shows the need to convert suitable stands of old growth to managed productive stands capable of long-term timber production.

### Timber Demand

Section 101 of the Tongass Timber Reform Act of 1990 (TTRA), directs the USDA Forest Service "... 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." Section 101 of the TTRA specifies that Forest Service efforts to seek to meet market demand are subject to appropriations, National Forest Management Act (NFMA) requirements, and other applicable laws. Providing a timber supply from the Tongass for sustained local wood products industry employment and related economic and social benefits is an objective of the TLMP, the Alaska National Interest Land Conservation Act (ANILCA), as amended by the TTRA, and the long-term contract.

There is demonstrated mill capacity in the region to process logs, if a supply of timber is available. There is also a projected need for the timber volume being considered from this Project Area for the Forest Service to come closer to meeting an objective of providing a three-year supply of timber under contract to the existing dependent industry (see Appendix A), as a means of providing for stability in relation to fluctuating market demand (Morse, 1995). There is a substantial component of the economy of Southeast Alaska that is dependent on a viable timber industry. Based on these factors, the need for the project is clearly indicated.

# Reasons for Scheduling the Environmental Analysis of the Upper Carroll Project Area

Reasons for scheduling the Upper Carroll Project Area at this time, for detailed consideration of timber harvest under the long-term timber sale contract between Ketchikan Pulp Company (KPC) and the Forest Service (Contract No. A10fs-1042) and/or under independent timber sales, may be summarized as follows:

- The Upper Carroll Project Area contains a sufficient amount of harvestable timber volume designated as LUD III or IV, and is therefore appropriate for harvest under the Tongass National Forest Land Management Plan (TLMP). Available information indicates harvest of the amount of timber being considered for this project can occur consistent with TLMP standards and guidelines and other requirements for resource protection. Analysis also indicates harvest of the amount of timber being considered can occur consistent with the proposed TLMP standards and guidelines and other resource protection requirements.
- Areas with available timber both inside and outside the designated long-term contract sale area will be necessary for harvest in order to meet timber supply requirements under the contract. The Upper Carroll Project Area is partially within the long-term timber sale contract Primary Sale Area; the remainder is within the contract contingency Area. The contract requires the Forest Service to look first to the designated sale area for timber to meet the contract's supply requirements before offering timber outside that area.
- Areas with available timber both within and outside the designated sale area will also be necessary to consider for harvest in order to 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, pursuant to Section 101 of the Tongass Timber Reform Act (TTRA).
- Effects on subsistence resources are projected to differ little according to which sequence these areas are subjected to harvest. Harvesting other areas on the Tongass National Forest with available timber is expected to have similar potential effects on resources, including those used for subsistence because of widespread distribution of subsistence use and other factors. Harvest of these other areas is foreseeable, in any case, over the forest planning horizon under either the existing or proposed revised TLMP.
- Providing substantially less timber volume than required by the long-term contract with KPC and/or to meet TLMP and TTRA Section 101 timber supply and employment objectives in order to avoid harvest in the Upper Carroll Project Area or other project areas would not meet contract requirements and is otherwise not necessary or reasonable.
- It is reasonable to schedule harvest in the Upper Carroll Project Area at the present time rather than other areas in terms of previous harvest entry and access, level of controversy over subsistence and other effects, and the ability to complete the National Environmental Policy Act (NEPA) process and make timber available to meet long-term contract requirements by the time it is reasonably necessary to do so. Other areas that are reasonable to consider for harvest in the near future are the subject of other project EISs that are currently ongoing or scheduled to begin soon.



Additional information about why the Upper Carroll area was selected is provided in Appendix A.

Appendix A was revised for the FEIS to present the latest projections of demand for timber supply and it addresses the projected need for timber supply from outside the Primary Sale Area. The updating of the Appendix A information does not result in a different conclusion regarding the purpose and need for the Upper Carroll Sale. The changes to these sections are not so substantial in light of environmental concerns or range of alternatives as to require supplementation of the EIS.

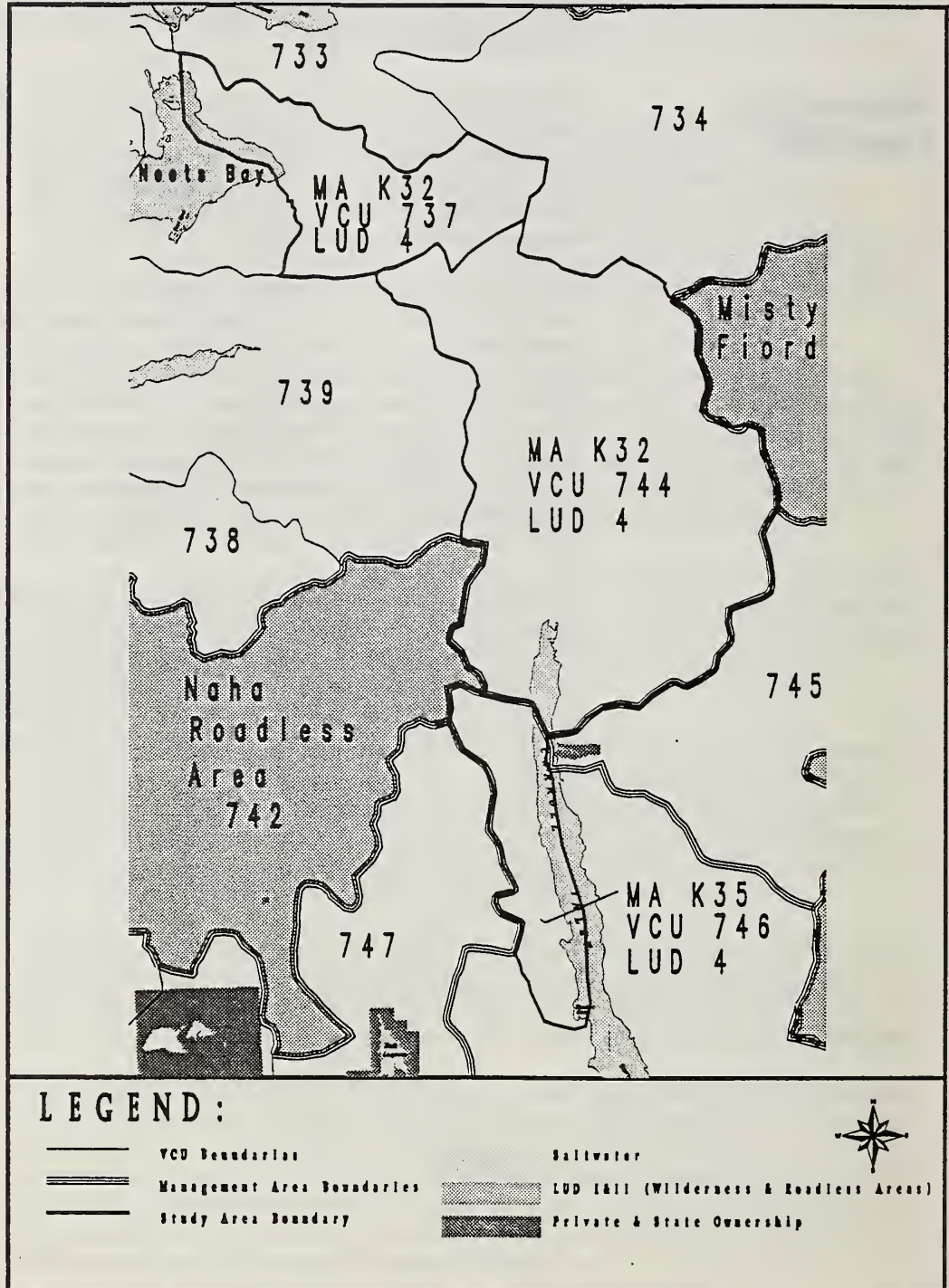
## Relationship to Forest Plan

The National Forest Management Act of 1976 (NFMA) directs each National Forest to prepare an overall plan of activities. The Forest Plan provides land and resource management direction for the Forest. It establishes Land Use Designations (LUDs) to guide management of the land for certain uses. The LUDs describe the activities that may be authorized within the Value Comparison Units (VCUs), the boundaries of which usually follow easily recognizable watershed divides.

For the Tongass National Forest, the Forest Plan is the TLMP of 1979, as amended in 1986 and again in February 1991 as a result of the Tongass Timber Reform Act (TTRA). The Forest Plan currently is undergoing revision, as required by the NFMA. A supplement to the TLMP DEIS (the Draft Revision) was issued in 1991 (1991 TLMP Revision Supplement DEIS). A Revised Supplement to the 1991 TLMP Revision Supplement DEIS was issued in 1996 (TLMP RSDEIS 1996a). Until the Record of Decision (ROD) for the TLMP Revision is signed, the TLMP (TLMP 1979a, as amended) remains in effect. References in this document to the TLMP RSDEIS (1996a) mean the Preferred Alternative of the March 1996 Revised Supplement DEIS, unless otherwise noted. Figure Sum-2 displays the VCUs, Management Areas, and LUDs defined by the TLMP (1979a, as amended).

The Upper Carroll EIS tiers to the TLMP EIS (TLMP 1979a, as amended) and the Alaska Regional Guide EIS (1983). It also proposes management consistent with the Preferred Alternative Standards and Guidelines in the TLMP RSDEIS (1996a). In some cases, it incorporates documented analysis from TLMP or the TLMP RSDEIS by reference (40 Code of Federal Regulations [CFR] 1502.21) rather than repeating it in this EIS. In cases of conflicting land use designations, the most restrictive standards and guidelines were applied.

Figure Sum-2  
 Management Area and VCU Boundaries



## Issues

The significant public issues, management concerns, and resource opportunities identified through the public and internal scoping process were used to formulate issue statements. Some of these issues were raised by the public and some reflect Forest Service concerns. Similar issues and concerns were grouped when appropriate.

Issues 1 through 8 were determined to be significant and within the scope of the project. All these issues will be addressed in all alternatives. Issues A-H were considered but eliminated from detailed study because their resolution falls outside the scope of the Upper Carroll project.

### Significant Issues

#### **Issue 1: Timber Economics and Supply**

This issue encompasses public concern with the amount of timber available and proposed for harvest, methods of timber harvest, whether timber harvest should be continued, and balancing timber production with other forest uses. It includes the issue of how the Project Area contributes to the long-term timber supply. It also includes concern for ensuring cost-effective timber harvest.

#### **Issue 2: Fish Habitat and Water Quality**

This issue addresses public concern for maintaining water quality in streams which provide suitable habitat for anadromous and resident fish. Fish and shellfish within the Upper Carroll Project Area are important to sport, commercial, and subsistence users throughout Southeast Alaska. The Southern Southeast Alaska Regional Aquaculture Association (SSRAA) operates a fish hatchery at Neets Bay under special use permit from the Forest Service. This issue also includes concerns about timber harvesting on steep slopes, mass movement of soil, stream temperature sensitivity, as well as karst and cave protection.

#### **Issue 3: Recreation and Scenic Quality**

Forest management activities could affect existing recreational pursuits for users of the Upper Carroll Project Area. More specifically, increased human access, timber harvest, and other developments could affect recreation values and opportunities including: hunting, fishing, scenic quality, and recreation use areas. Comments mentioned the importance of protecting the scenic quality along inlets and bays. Other aspects of this issue were related to the visual impacts to flight-seeing, the visual appearance along the proposed Swan Lake-Lake Tye Powerline intertie route, and potential impacts, if any, to Misty Fiords National Monument.

#### **Issue 4: Wildlife**

This issue includes concerns over several wildlife species and the habitats critical to the maintenance of those wildlife populations; Alaskan wildlife is valuable for aesthetic, economic, recreational, ecological, and subsistence purposes. Of primary concern are the effects of timber harvest and associated road construction upon wildlife species dependent on old-growth habitat. There is also a concern regarding the proportion of Volume Classes 6 and 7 remaining after harvest in each management area. The long-term disposition of previously mapped old-growth areas (commonly referred to as retention areas) in the Project Area was identified as part of this issue. Related to the overall concern is the question of whether timber harvest operations would further fragment existing large blocks of old-growth habitat and result in declines in biological diversity. The need for a project specific old-growth habitat strategy that ties into a larger scale habitat strategy was also identified.

## **Issue 5: Subsistence**

Primary concern is for the potential effect, as well as the cumulative effects of timber harvest and road construction, upon the abundance and distribution of subsistence resources. For many, subsistence consists of hunting, fishing, trapping, and gathering to supplement their food sources, income, and other needs. For Southeast Alaska's Natives, it is a way of life directly related to preserving their culture and traditions. The Alaska National Interest Lands Conservation Act (ANILCA) specifically requires the Forest Service to determine if the proposed activities may significantly restrict subsistence use. Other aspects to be evaluated are competition from non-rural subsistence users and access to the resources.

## **Issue 6: Transportation/Utility Corridor**

The State of Alaska (Alaska Energy Authority) recently completed a feasibility study for the utility/transportation corridor located partially within the Project Area. Ketchikan Public Utilities has awarded a contract to Foster Wheeler Environmental Corporation to complete an EIS for the proposed electrical intertie from Swan Lake to Lake Tyee. The Swan Lake-Lake Tyee DEIS was published in March 1996. The preliminary preferred route includes approximately 30 to 40 miles within the Upper Carroll EIS study area. The two proposed actions appear to be similar actions (40CFR 1508.25) because of the potential road locations, common timing, and geography. The degree to which each alternative could contribute to a potential transportation/utility link will be documented in the EIS.

## **Issue 7: Social and Economic Effects**

This issue reflects concerns about effects on community employment and income, population, community stability, and life-styles. The economies of most communities in Southeast Alaska depend almost exclusively on the Tongass National Forest to provide natural resources for uses such as fishing, tourism, recreation, timber harvesting, mining, and subsistence. Many Southeast Alaskans want to maintain the natural environment which makes their life-style unique. At the same time, they want to continue maintaining their economic livelihood.

## **Issue 8: Marine Environment**

The marine waters and their associated mud flats and estuaries found in protected coves and bays within the Project Area provide habitat for species such as Dungeness crab and juvenile salmon. Since coves and bays are the points of concentrated activity associated with marine transport of logs, logging camps, and sort yards, some marine species are subject to effects from log transfer and storage facilities. Four potential or existing Log Transfer Facility (LTF) sites are under consideration in the alternatives.

## **Issues Outside the Scope of this Analysis**

The following public issues were considered but eliminated from detailed study because their resolution is beyond the scope of this document.

### **Issue A: Land Use Designations**

This issue focuses on the stated desire of some commenters to change TLMP Land Use Designations to eliminate, reduce, or increase the level of harvest and/or maximize specific resources.

Land use allocation is a Forest planning issue. The current Forest Plan is under revision and provides a forum for people who wish to see the area managed in a manner that differs from the current direction.

## **Issue B: Bradfield Road Transportation Link**

Some members of the public expressed a concern that the Bradfield Road Transportation Link be evaluated in whole or in part in this EIS.

The Bradfield road connection (excluding Revillagigedo Island) is not a connected or reasonably foreseeable action that is ripe for a decision. The portion of the proposed transportation link located within the Project Area that could be influenced by the proposed activities will be addressed.

## **Issue C: Development Outside the Project Area**

Comments regarding the general level of development outside the Project Area are not considered issues ripe for decision under the Upper Carroll EIS. These areas include Cleveland Peninsula, Prince of Wales Island, and Orchard Creek (including Orchard Lake).

## **Issue D: Below Cost Timber Sales**

Below-cost timber sales are a national issue and not within the scope of this project. The financial impacts of the alternatives, based on a mid-market analysis, are displayed in Chapter 3 in this EIS.

## **Issue E: Timber Supply and Demand**

Timber supply and demand is a regional issue and exceeds the scope of this analysis. A site-specific environmental analysis documents the effects of the proposed activities; it does not constitute the selling or conveyance of property rights. The volume of timber cleared in any NEPA document may be offered (sold) in part, in whole, or not at all.

The timber offered for sale (timber offerings) may occur in one year or be spread over a three- to five-year period. Trying to predict the effects of the proposed activities upon the regional timber supply or demand is, therefore, beyond the capability and scope of this document beyond concluding that timber offerings that implement the project will contribute volume to the timber supply and help meet demand.

The issue of how the Project Area contributes to the long-term timber supply is addressed as part of Issue 1: Timber Economics and Supply.

## **Issue F: Manage Upper Carroll for Sustained Yield**

The National Forest Management Act (NFMA) directs that a sustainable level of harvest be identified for each National Forest. A sustainable level of harvest is one in which the level of harvest is equal to or less than the rate of growth over a period of time (ten years in the case of NFMA). There is no direction or intent to establish a sustainable level of harvest for individual project areas or small geographic subdivision of the Forest.

## **Issue G: Wild and Scenic Rivers**

Several comments were received requesting that Carroll Creek be managed as a wild and scenic river. This is a Forest Planning issue. Carroll Creek was thoroughly analyzed for Wild and Scenic River eligibility as a part of previous Forest planning efforts. Carroll Creek was analyzed as part of the TLMP Revision to determine if it was eligible to be included under the Wild and Scenic Rivers Act. That analysis determined that no segment of Carroll Creek was eligible for inclusion under the Wild and Scenic Rivers Act.

## **Issue H: Cancel the KPC Long-term Sale Contract**

The issue of cancelling the KPC Long-term Sale Contract is outside the scope of this project. Cancelling the KPC contract would not serve the purpose and need for the project. The No Action Alternative is considered in detail in both the DEIS and FEIS.

# Development of Alternatives

Each action alternative presented in this EIS is a different response to the significant issues discussed in Chapter 1. For this EIS, five action alternatives were developed to meet the stated purpose and need of the project, while minimizing or avoiding environmental impacts. Each action alternative represents a site specific proposal developed through intensive interdisciplinary unit and road design using high resolution topographic maps, GIS mapping capabilities, and aerial photos coupled with resource inventories and site inspections.

The alternative formulation process has been guided by several concepts and principals of sound resource management. Each alternative follows the standards, guidelines, and direction contained in the Forest Plan, the Alaska Regional Guide, and applicable Forest Service manuals and handbooks. Because the timber volume may be used to satisfy part of the contractual requirements of the KPC Long-term Timber Sale Contract, they are also designed to meet the proportional harvest requirements of the Tongass Timber Reform Act (TTRA).

## Ecosystem Management

Ecosystem management is a concept incorporated into forest management in recent years. The philosophy is to emphasize ecological, physical, and social sciences to guide resource management to sustain the health, productivity, and intangible values of the land. These concepts were considered in the selection and design of individual harvest units and roads included in the alternatives.

Ecosystem management looks at forest management on two levels: (1) the landscape level, which may be a geological province (geoprovince) or a large watershed; and (2) the stand level, which deals with individual harvest units. The forest plan incorporates ecosystem management at the **landscape level** through land use allocation and the development of Standards and Guidelines. This separates incompatible uses and spreads impacts out over time and space. Many issues—such as maintaining large unfragmented blocks of old growth over time and maintaining the connectivity between those blocks—can only be resolved over the entire rotation through the land use allocation or forest planning process. A site-specific project level plan evaluates the assumptions made in a higher level plan. It then implements that direction and responds to public comments through the development of alternatives which determine which stands are treated and how they are managed.

Some tools employed at the **stand level** may include:

- a deferred entry
- reducing harsh edges through unit placement, looking for opportunities to retain small patches of uncut timber in harvest units (where feasible and practical)
- maintaining existing travel corridors
- leaving snags in harvest units (where safety regulations allow)
- trying nonstandard harvest practices where resource issues and physical limitations permit.

The Upper Carroll IDT utilized a combination of public scoping issues and resource knowledge to subdivide the Upper Carroll Project Area into a variety of important landscape zones. Definition of these landscape zones considered such aspects as the amount, distribution and fragmentation of old-growth forests, the level and distribution of previous timber harvest and roading, travel and dispersal corridors between zones that can be used by animals, the existing and potential road network for accessing timber, subsistence uses, visually sensitive areas, and important recreation areas. The landscape zones also considered the recommendations of the Viable Population (VPOP) Committee on such aspects as small, medium, and large Habitat Conservation Areas (HCAs). The landscape level considerations included the characteristics of the Upper Carroll Project Area itself as well as its relationship to adjacent areas such as the Naha Roadless Area, North Revilla, Orchard Lake and Creek, Misty Fiords National Monument, Swan Lake hydroelectric facility, and Shelter Cove. Consideration was given to social factors (including subsistence use, visual concerns, SSRAA Fish Hatchery, timber harvest economics, and transportation/utility corridors), and proposed land use designations in the development of landscape zones. Table Sum-1 displays the Landscape Management Zones identified by the Interdisciplinary (ID) Team for the Upper Carroll Project Area.

# Summary

Table Sum-1  
Upper Carroll Landscape Management Zones

Landscape Management Zones	Description
1. Large and Medium sized old-growth habitat reserve blocks	Large and medium Habitat Conservation Areas (HCAs) as defined in the 1994 Draft Interim Habitat Management Guidelines EA. No final decision has been issued. The shape and configuration displayed represents one potential way of providing core areas of unfragmented old-growth habitat reserves where significant populations of old-growth dependent species can be maintained.
1(A) Naha Block	This large old-growth habitat reserve block is comprised of the Naha LUD II Roadless Area (timber harvest is not allowed) plus a portion of Value Comparison Unit (VCU) 744 that connects to the estuary at the head of Carroll Inlet. This block is approximately 40,088 acres in size.
1(B) Traitor's Cove Block	This medium sized old-growth habitat reserve block was originally identified as old-growth retention in the North Revilla Record of Decision (ROD). It is located inside the Salt Chuck in Traitor's Cove. This block is approximately 5,498 acres in size.
1(C) Orchard Lake Block	This medium sized old-growth habitat reserve block is proposed to be managed as a Semi-remote Recreation Land Use Designation (LUD) in the TLMP RSDEIS-Preferred Alternative, which would not allow commercial timber harvest. Orchard Lake and Creek are eligible for inclusion under the National Wild and Scenic Rivers Act. The North Revilla ROD designated this block as old-growth retention for the life of the project in 1993. This block is approximately 15,087 acres in size.
1(D) Swan Lake Block	This medium sized old-growth habitat reserve block is currently designated LUD IV timber emphasis. This block is located south of the Swan Lake Hydropower facility. This block is approximately 13,474 acres in size.
2. Carroll Creek Block	The west side of Carroll Creek represents a small block of unfragmented old-growth habitat located inside the project boundary. The southwest portion of this area is adjacent to the Naha Block (see 1(A) above). This block is approximately 6,077 acres in size.
3. Late-successional Travel Corridors	Travel corridors approximately one-quarter (1/4) mile wide that provide connectivity between core areas of unfragmented old-growth habitat. These corridors generally follow riparian zones or other areas of gentle topographic relief commonly utilized for migration between areas.
4. Low and Very Low Economic Zones	<p>These zones represent areas which are only economical to harvest during market cycles with very high stumpage rates for timber or if augmentation (contributed funds) helps to offset costs.</p> <p>West side of Carroll Inlet - Estimated road costs to connect the Shelter Cove Road System north to the head of Carroll Inlet exceed a million dollars per mile. Virtually all of the timber within this zone has been classified as unsuitable for timber harvest due to very high mass movement potential (MMI 4 soils). There is, therefore, insufficient timber value to recover the road construction costs.</p>



Table Sum-1 (continued)  
**Upper Carroll Landscape Management Zones**

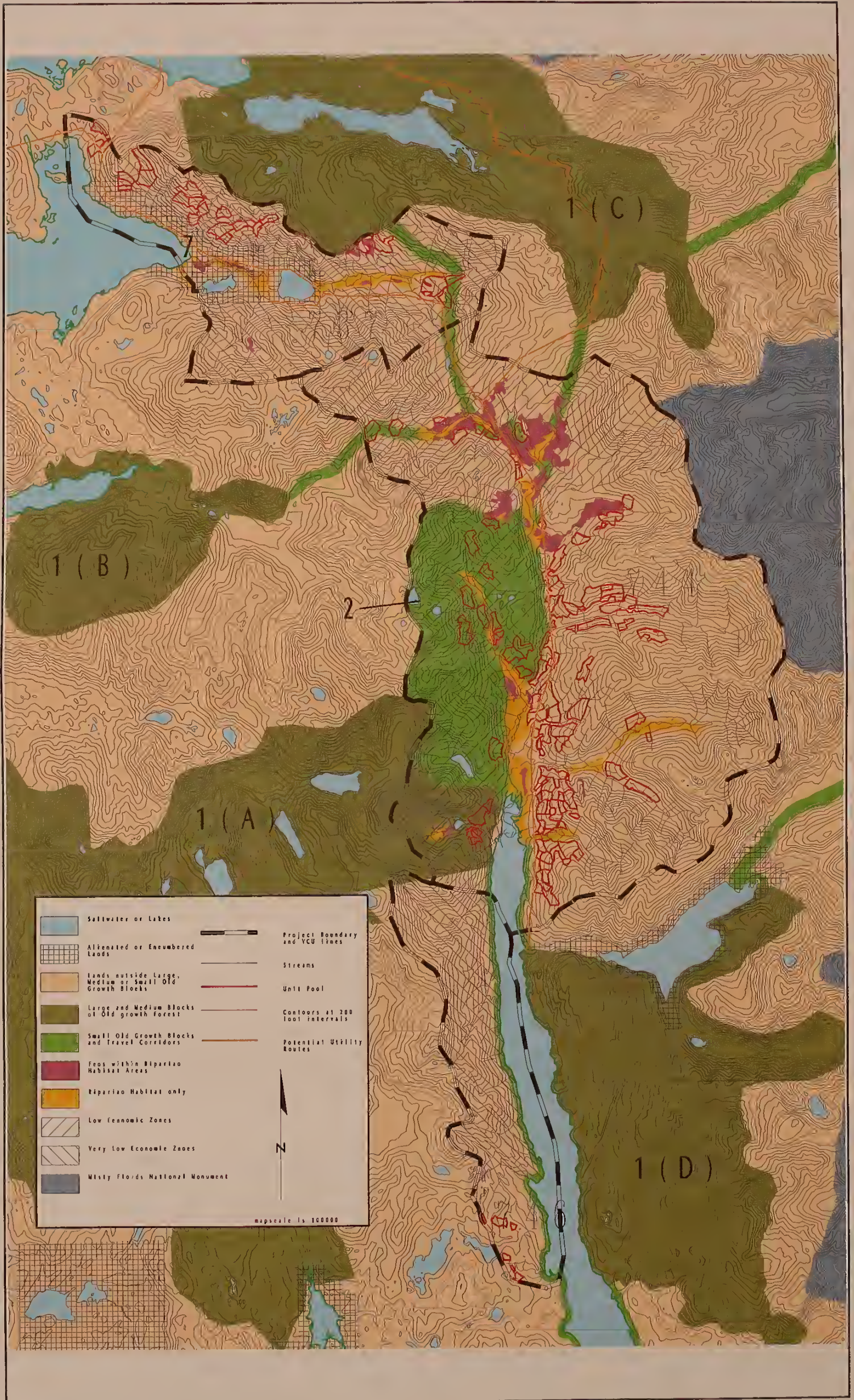
Landscape Management Zones	Description
	<p>West side of Carroll Creek and the northern one-third (1/3) of VCU 744—there are three pockets of timber within these zones; each requires a major bridge crossing (span in excess of 100-feet) of Carroll Creek. The cost for each bridge is estimated at approximately \$500,000. The possibility does exist of pulling one of the bridges in lower Carroll and re-using it in the northern portion of VCU 744 if offered as a separate offering/sale several years after lower Carroll is sold.</p>
	<p>Neets Creek VCU 737—the head of Neets Bay is within a state land selection, with the majority of the valley bottom having been extensively harvested during the 1960s. The existing road would require major reconstruction prior to being re-used. The entire southern half of the VCU and the mid-slope portion of the northern half of the VCU have been classified as unsuitable for timber harvest due to potentially unstable slopes (MMI 4 soils). The remaining upper third of the slope is located at high elevations with low volume, difficult road construction, and long helicopter yarding distances, all contributing to reduce the timber economic value of this area.</p>
5. Riparian Habitat	<p>Riparian areas are made up of plant communities in the vicinity of streams that are adapted to periodic inundation by water from precipitation, snowmelt, or other flood events. Riparian areas are important to the stream ecosystem because: (1) they provide shade which regulates stream temperature; (2) they provide a source of woody debris for fish habitat; (3) they help maintain the structural integrity of the streambank; and (4) litter from vegetation provides nutrients to the stream. This landscape zone contains riparian areas identified as part of the Watershed Analysis (see Chapter 3 and Appendix F).</p>
6. Riparian Fens	<p>Riparian fens are an important type of wetland found in footslope or valley bottom areas adjacent to lakes and streams. Hydrologically they act like a saturated sponge, slowly transferring sub-surface water from neighboring hillslopes to the stream or lake. Because fens are not stagnant, they provide a steady supply of well-oxygenated, nutrient-rich recharge to receiving water bodies. For streams, riparian fens also act as flow regulators; they capture excess runoff during storm events, store it, and then slowly release it during drier periods. This process helps maintain low flows during droughts and, to a point, buffers the stream from excessive peak flow during storms. This landscape zone contains fen areas identified as part of the Watershed Analysis (see Chapter 3 and Appendix F).</p>
7. SSRAA Fish Hatchery	<p>Located in VCU 737 where Neets Creek enters Neets Bay - The Southern Southeast Regional Aquaculture Association (SSRAA) operates the Neets Bay Fish Hatchery under a special use permit from the Forest Service. Fresh water from Bluff Lake is used in the hatchery operation. Water quality, particularly sedimentation, is a major concern. The Neets Bay Fish Hatchery is economically significant to the local fishing industry.</p>
8. Utility Corridor	<p>The utility corridor runs north from the Swan Lake hydropower facility along the eastern shore to the head of Carroll Inlet, then follows Carroll Creek north to Neets Creek. At this point, one potential route proceeds northward around Orchard Lake outside the Project Area. A second route turns west down Neets Creek and would generally follow the existing and proposed road locations toward Shrimp Bay until leaving the Project Area. This corridor is identified here because the roads constructed for timber harvest could potentially reduce the powerline construction and maintenance costs. It is also used to help address future potential effects on scenic quality and recreation.</p>

Chapter 3 and the Appendices contain additional maps that present some of the features described above in greater detail. The landscape zones described in the previous table (Table Sum-1) are displayed by location in Figure Sum-3 on the following page.

# Summary

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# Landscape Management Zones - Upper Carroll Area





## Alternatives Eliminated from Detailed Study

A number of alternatives were examined, but not considered for detailed study in this FEIS. This section presents those alternatives and the rationale for excluding them from further consideration.

### Alternative A

#### Single Resource or Issue

Alternatives that focused upon one resource or issue were eliminated from consideration as implementable alternatives. While alternatives constructed around a single resource may not be implementable, the issue itself may still be significant. Each alternative will be evaluated against all the significant issues.

### Alternative B

#### Transportation/Utility Corridor between Ketchikan and the Project Area

The proposed road link and utility corridor are separate projects and independent from this FEIS. The road link project is not reasonably foreseeable. Ketchikan Public Utilities has awarded a contract to Foster Wheeler Environmental Corporation to complete an EIS for the proposed electrical intertie (including associated roads, if any) from Swan Lake to Lake Tye. The preliminary preferred powerline route includes approximately 30 to 40 miles within the Upper Carroll Project Area. The two proposed actions appear to be similar because of the potential road locations and opportunity for cooperative agreements. The similar time lines could make the issue ripe for a decision as well. Alternative 2, looks at how much timber and associated roads could be built and still meet Forest Plan Standards and Guidelines. The question as to how much of the transportation/utility corridor could be built is addressed for each alternative, with Alternative 2 serving as the upper level benchmark. A separate alternative, which maximizes road construction for the transportation/utility corridor is, therefore, unnecessary.

### Alternative C

#### Avoid Previously Mapped Old-growth Retention Areas

Several commenters asked the Forest Service to analyze an alternative that would keep intact all previously mapped old-growth retention during this entry. Under the TLMP RSDEIS (1996a) 16 out of 19 land use designations preclude or severely restrict timber harvest, including the establishment of old-growth habitat reserves. The standards and guidelines for the remaining LUDs retain unaltered old-growth habitat in beach, estuary, and TTRA buffers, as well as in unsuitable commercial forest land. Previously mapped old-growth retention areas are consequently considered as part of the tentatively suitable and available timber base, unless otherwise excluded. Approximately 5,147 acres of retention were established as part of previous project level EISs.

The IDT examined the possibility of constructing an alternative which avoided all previously mapped old-growth retention areas. Due to the location and disjointed smaller patch size, it was impossible to construct an economically viable alternative which completely avoided existing retention with all roads and units. Many of the retention blocks were located at higher elevations, in low volume stands, were small and narrow, and did not logically connect to other high value areas. Current conservation biology theory places greater emphasis on larger blocks of old-growth which have logical connections for wildlife movement. This alternative was, therefore, not considered in detail. The effects of the alternatives on previously mapped old-growth areas are considered in Chapter 3.

### Alternative D

#### Neets Bay/Orchard Lake Alternative

Several commenters asked the Forest Service to eliminate specific areas or individual units that were of concern to them. For example, the Southern Southeast Alaska Regional Aquaculture Association (SSRAA) operates the Neets Bay Fish Hatchery under special use permit from the Forest Service. A number of comments received indicated that the proposed

## Summary

harvest in Neets Bay would pose a sedimentation risk to the fish hatchery operation. A citizen's alternative recommended dropping the Neets Bay harvest units and making up the volume from the Orchard Lake area.

Harvesting in the Orchard Lake area was not considered because: (1) it is a recommended semi-remote recreation area under the TLMP RSDEIS (1996a), Preferred Alternative; (2) Orchard Lake and Creek have been determined to be eligible for possible inclusion in the National Wild and Scenic Rivers System; and (3) it is outside the Project Area boundary.

Concern about sedimentation from timber harvest and associated roads was addressed in various ways. Alternatives 3, 6 and 7 do not propose any harvest in the Neets Creek watershed, while Alternatives 2 and 5 propose distinctly different levels of harvest and road construction within the watershed. A watershed analysis which looks at sedimentation risk was conducted for both the Neets Creek and Carroll Creek drainages (see Chapter 3). Forest Service Standards and Guidelines, as well as BMPs to protect soil and water quality, apply to all alternatives.

### Alternative E

#### Helicopter Logging Alternative

Public comments expressed a concern for the effects of road and LTF construction on the marine environment as well as the Carroll Creek estuary, water quality, fisheries, and subsistence values. Alternative E in the Upper Carroll DEIS was originally developed as a project alternative by the IDT but eliminated from detailed study due to poor economic returns and not meeting the project's stated purpose and need.

In conversations with members of the Ketchikan Indian Corporation's subsistence board the Forest Service received clarification regarding new roads versus existing roads. The primary concern was to avoid the construction of new roads to limit additional subsistence impacts. The ability to reconstruct the existing roads is critical to the viability of this alternative, since it reduces the yarding/flight distances by several miles. This is due to the fact that the shallow water in Carroll Estuary prohibits the placement of a barge closer than the proposed LTF location used in the other alternatives. The reconstruction of the existing roads results in additional volume and improved economics.

Alternative E from the DEIS has been modified as described above and is considered for detailed study in the FEIS as Alternative 7.

### Alternative F

#### "Fishermen's Alternative"

The proposed "Fishermen's Alternative" was evaluated by the Upper Carroll IDT. Constraints applied by the commenter were that no harvesting occur north of, and including unit No. 49 (DEIS) (first drainage to the east of Carroll Creek). The alternative would need to meet proportionality, which would be very difficult because all of the remaining units in VCU 744 but one are composed of high volume stands. The constructed alternative would have resulted in approximately 6 MMBF of harvest in Management Area K32 (VCU 744) and approximately 1-2 MMBF in Management Area K35 (VCU 746).

This alternative was considered but eliminated from detailed study because:

- it does not address any significant issues in a way that is meaningfully different;
- the economic viability is hampered by the low volume to spread fixed costs against;
- the alternative does not respond to the underlying purpose and need for the project (40 CFR 1502.13).

**Alternative G**

In public comments received on the DEIS, Alternatives 3 and 4 received a considerable amount of support from individuals and agencies who emphasize the protection of water quality, fisheries and wildlife habitat. Fewer acres of timber harvest, less road construction, avoiding impacts to the SSRAA facility and the west side of Carroll Creek were commonly mentioned reasons. Most of the commenters indicated that they saw little difference between Alternatives 3 and 4, but preferred Alternative 3 because it constructed less road, harvested fewer acres of old-growth timber, and was economically more efficient.

In the DEIS, Alternative 4 harvested the northern portion of VCU 744 while Alternative 3 did not. Additional analysis after the DEIS resulted in units 75 (DEIS) and 129 (DEIS) being deleted for low volume (less than 8 MBF/acre). As a result, units 15 and 108 located adjacent to the units listed above could no longer support the roading costs associated with providing access. The end result being that Alternatives 3 and 4 would have had no meaningful difference if both were carried forward to the FEIS.

DEIS Alternative 3 plus units 73, 74, 130, 131 and 132 (DEIS) (approximately 3.5 MMBF) from Alternative 4 will be presented in the FEIS as Alternative 3. Alternative 4 has been eliminated from further detailed study.

**Alternatives Considered for Detailed Study**

Six alternatives for making timber available to local timber purchasers from the Upper Carroll Project Area were considered in detail. Each alternative is consistent with the TLMP (1979a, as amended) and Preferred Alternative of the TLMP RSDEIS (1996a). For each alternative this section provides a discussion of: (1) the emphasis or intent of the alternative; (2) various resource outputs associated with implementation; and (3) environmental consequences. Alternatives are compared in detail later in this chapter and summarized in Table Sum-2.

**Alternative 1  
(No Action)**

**Emphasis**

The emphasis of this alternative is to propose no new timber harvest from the Upper Carroll Project Area at this time. It does not preclude timber harvest from other areas at this time, or from the Upper Carroll Project Area at some time in the future. The Council of Environmental Quality (CEQ) regulations 40 CFR 1502.14d requires a “No Action” alternative be analyzed in every EIS. This alternative serves as a benchmark by which effects of the other action alternatives are to be measured. The Existing Condition map shows the distribution of vegetation associated with no new timber harvest.

**Outputs**

There are no new timber harvest outputs associated with this alternative. Visual quality, wildlife habitat quality, semi-primitive recreation opportunities, as well as other resource values would remain at their current condition.

**Alternative 2**

**Emphasis**

The emphasis of this alternative is to accelerate progress toward the desired future condition for timber management while meeting Forest Plan Standards and Guidelines for other resources. Timber volume made available to local timber purchasers is maximized this entry under this alternative. This alternative is designed to evaluate the effects of harvesting as much of the Project Area as possible in a combination that still meets Standards and Guidelines. This alternative serves as an upper level benchmark that can be used to project the cumulative affects of the reasonably foreseeable future activities (see Appendix A) within the Project Area. Another feature of this alternative is that it looks at the maximum amount of road that could be constructed as part of a commercial timber sale that could be used to facilitate the development of a potential transportation/utility intertie within the Project Area. The environmental effects and cost of a road connection between Shelter Cove and Carroll Inlet have been incorporated into this alternative.

## Outputs

Implementation of this alternative would schedule the harvest of 1,996 acres, in 72 harvest units for approximately 61 MMBF of sawlog and utility volume, indicating an average unit size of 27.7 acres. Of this harvest, 13 units totaling 332 acres are planned for partial cut; the remainder are planned for clearcut harvest. To implement this level of harvest, 61 miles of new road would be constructed, and 7 miles of existing road would require reconstruction. Road construction clearing will yield an additional 3 MMBF of right-of-way (ROW) volume. This indicates an average of 1.1 MMBF per mile of new road construction and a total of 0.9 MMBF per mile of road. It schedules 368 acres or 11.2 MMBF of volume for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of \$-158.40 per MBF. This alternative would result in approximately 31.9 miles of road located within a proposed transportation corridor or 23.2 miles within a utility corridor that could facilitate its future construction and/or maintenance.

The use of two existing LTFs will be required to implement this alternative. Floating or land based logging camps are anticipated with the Shelter Cove and Shrimp Bay LTFs. The road connection between Shelter Cove and Carroll Inlet would eliminate the need for the Carroll Inlet LTF and floating log camp. The Alternative 2 map provides the spatial relationship among roads, units and other geographic features of the Upper Carroll Project Area.

## Alternative 3 Preferred Alternative

### Emphasis

The objective of this alternative is to emphasize timber economics and conventional cable yarding methods. The location of harvest units, selection of silvicultural prescriptions, logging systems, and a transportation network is primarily based on maximizing the mid-market value. This entry proposes only limited helicopter timber harvest. This approach emphasizes a positive net economic return for the proposed harvest units, by avoiding the low and very low economic zones. Due to the juxtaposition of the landscape management zones within the Project Area, this alternative minimizes impacts to old-growth habitat blocks, late-successional corridors, riparian habitat, fens, the SSRAA Fish Hatchery in Neets Bay, and avoids the west side of Carroll Creek. Development of the transportation/utility corridors would be minimized as a consequence of harvesting a lesser amount of timber and constructing fewer miles of road.

### Outputs

Alternative 3 schedules the harvest of 40 individual harvest units, totaling 33 MMBF of sawlog and utility volume from 1,074 acres, indicating an average unit size of 26.9 acres. Of this harvest, 3 units totaling 15 acres are planned for partial cut; the remainder are planned for clearcut harvest. This alternative requires the construction of 21 miles of new specified roads plus 4 miles of reconstruction. Road construction clearing will yield an additional 1 MMBF of right-of-way (ROW) volume. This indicates an average of 1.6 MMBF per mile of new road construction and a total of 1.4 MMBF per mile of specified road. It schedules 51 acres or 1.3 MMBF of volume for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of \$+15.82 per MBF. This alternative would result in approximately 4.2 miles of road located within a proposed transportation corridor or 6.5 miles within a utility corridor that could potentially facilitate its future construction and/or maintenance.

The development of one new Log Transfer Facility (LTF) and one existing LTF will be required to implement this alternative. Floating or land based logging camps are anticipated with the Shelter Cove and Carroll Inlet LTFs. The Alternative 3 map provides the spatial relationship among roads, units, and other geographic features of the Upper Carroll Project Area.



## Alternative 5

### Emphasis

The emphasis of this alternative is to meet the stated purpose and need while responding to public comments to avoid road construction in Neets Bay (VCU 737) by helicopter logging the units to the north of the SSRAA facility and dropping the remaining roaded access units located further upstream from the SSRAA Fish Hatchery. This alternative differs from Alternative 2 in that less volume is harvested, no road construction occurs in the Neets Bay Drainage (VCU 737), no harvest occurs in the Naha large old-growth block, and the road tie from Shelter Cove to Carroll Inlet would not be constructed.

### Outputs

Alternative 5 schedules the harvest of 60 individual harvest units, totaling 51 MMBF of sawlog plus utility volume from 1,618 acres, indicating an average unit size of 27.0 acres. Of this harvest, 15 units totaling 252 acres are planned for partial cut; the remainder are planned for clearcut harvest. This alternative requires the construction of 40 miles of new specified roads plus 8 miles of reconstruction. Road construction clearing will yield an additional 2 MMBF of right-of-way (ROW) volume. This indicates an average of 1.3 MMBF per mile of new road construction and a total of 1.1 MMBF per mile of specified road. It schedules 393 acres or 13 MMBF of volume for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of \$-53.64 per MBF. This alternative would result in approximately 6.8 miles of road located within a proposed transportation corridor or 8.9 miles with a utility corridor that could potentially facilitate its future construction and/or maintenance.

The development of one new Log Transfer Facility (LTF) and two existing LTFs will be required to implement this alternative. Floating or land based logging camps are anticipated with the Shelter Cove, Shrimp Bay and Carroll Inlet LTFs. The Alternative 5 map provides the spatial relationship among roads, units, and other geographic features of the Upper Carroll Project Area.

## Alternative 6

### Emphasis

The emphasis of this alternative is to meet the stated purpose while responding to public comments to minimize or avoid impacts to goat winter range, the SSRAA Fish Hatchery, and the west side of Carroll Creek. This alternative would avoid road construction in the old-growth block located on the west side of Carroll Creek through the use of helicopter yarding. Neets Creek drainage (including the SSRAA Fish Hatchery) and potential goat winter range would be completely avoided.

### Outputs

Alternative 6 schedules the harvest of 42 individual harvest units, totaling 32 MMBF of sawlog plus utility volume from 1,032 acres, indicating an average unit size of 24.6 acres. Of this harvest, 5 units and 100 acres are planned for partial cut; the remainder are planned for clearcut harvest. This alternative requires the construction of 19 miles of new specified roads plus 4 miles of reconstruction. Road construction clearing will yield an additional 1 MMBF of right-of-way (ROW) volume. This indicates an average of 1.7 MMBF per mile of new road construction and a total of 1.4 MMBF per mile of road. It schedules 288 acres or 9.0 MMBF of volume for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of \$-8.64 per MBF. This alternative would result in approximately 6.8 miles of road located within a proposed transportation corridor or 8.9 miles within a utility corridor that could potentially facilitate its future construction and/or maintenance.

The development of one new Log Transfer Facility (LTF) and one existing LTF will be required to implement this alternative. Floating or land based logging camps are anticipated with the Shelter Cove and Carroll Inlet LTFs. The Alternative 6 map provides the spatial relationship among roads, units, and other geographic features of the Upper Carroll Project Area.

# Summary

## Alternative 7

### Emphasis

The emphasis of this alternative is to meet the stated purpose while responding to public comments to avoid new road construction and utilize helicopter yarding. Under this alternative the existing road in Carroll Creek would be reconstructed to minimize helicopter yarding costs. Avoiding new road construction addresses the subsistence, fisheries and wildlife issue of roaded access differently than standard road closures. The Naha and West Carroll old-growth blocks receive a light entry under this alternative. Development of the transportation/utility corridors would be minimized as a consequence of only reconstructing the existing roads.

### Outputs

Alternative 7 schedules the harvest of 24 individual harvest units, totaling 19 MMBF of sawlog plus utility volume from 591 acres, indicating an average unit size of 24.6 acres. Of this harvest, 3 units and 37 acres are planned for partial cut; the remainder are primarily planned for Type II clearcut harvest. This alternative requires the reconstruction of 4 miles of specified roads. Road reconstruction clearing will yield no right-of-way (ROW) volume. It schedules 540 acres or 17.1 MMBF of volume for helicopter yarding with the Shelter Cove area (VCU 746) continuing to be cable logged from the existing road system. Preliminary analysis indicates a net mid-market stumpage value of \$-17.43 per MBF. This alternative would result in approximately 0.4 miles of road located within a proposed transportation corridor or 2.7 miles within a utility corridor that could potentially facilitate its future construction and/or maintenance.

The development of one new Log Transfer Facility (LTF) and one existing LTF will be required to implement this alternative. Floating or land based logging camps are anticipated with the Shelter Cove and Carroll Inlet LTFs. The Alternative 7 map provides the spatial relationship among roads, units, and other geographic features of the Upper Carroll Project Area.

## Forest Service Preferred Alternative

Using an evaluative process that compares the benefits and adverse effects of each alternative against the issues, the USDA Forest Service has identified Alternative 3 as the preferred alternative for this EIS. A final determination will be made by the Ketchikan Area Forest Supervisor in the Record of Decision (ROD)

## Summary Comparison

Table Sum-2 provides a summary of outputs and environmental consequences by which the alternatives may be compared.

**Table Sum-2**  
**Summary Comparison of Alternatives**

Activity/Resource	Units	Alternatives					
		1	2	3	5	6	7
<b>Timber</b>							
Units	Number	0	72	40	60	42	24
Estimated harvest unit volume	MMBF	0	61	33	51	32	19
Estimated right-of-way (ROW) volume	MMBF	0	3	1	2	1	0
Partial cut (shelterwood)	Acres	0	332	15	252	100	37
Clearcut harvest (Type I and II)	Acres	0	1,664	1,059	1,366	932	554
Total harvest	Acres	0	1,996	1,074	1,618	1,032	591
Units over 100 acres	Number	0	1	1	2	0	0
Shovel harvest	MMBF	0	1.3	0.9	1.0	0.8	0.2
Running Skyline	MMBF	0	44.2	29.3	33.9	21.6	1.2
Live Skyline (Shotgun)	MMBF	0	3.1	1.2	2.6	0.9	0
Slackline harvest	MMBF	0	1.4	0	0.7	0	0
Helicopter harvest	MMBF	0	11.2	1.3	12.7	9.0	17.1
Estimated stumpage (mid-market rates)	\$ / MBF	0	-158.40	+19.06	-53.64	-8.64	-17.43
Estimated stumpage (current rates)	\$ / MBF	0	-137.42	+51.05	-33.50	+9.26	-0.43
Receipts to State of Alaska	\$M	0	3,318	2,208	2,915	1,758	118
Average annual jobs over 4 years	No. of jobs	0	119	65	99	63	36
Proportionality Remaining (K32 - TTRA Base 8.82%)	Percent	8.95	8.87	8.84	8.82	8.88	8.88
Proportionality Remaining (K35 - TTRA Base 5.39%)	Percent	5.54	5.55	5.55	5.54	5.54	5.55
<b>Roads &amp; Transportation</b>							
Specified road construction	Miles	0	61.2	21.1	39.8	19.3	0.0
Road reconstruction	Miles	0	6.6	3.7	7.9	3.7	3.7
Temporary road construction	Miles	0	10.9	7.4	10.2	5.2	0.5
New Log Transfer Facilities	Each	0	0	1	1	1	1
Reconstruction/Use of existing Log Transfer Facilities	Each	0	2	1	2	1	1
Roads crossing Class I or II streams	Number	0	40	22	34	23	9
<b>Transportation/Utility Corridor</b>							
Transportation Corridor (32-45 miles)	Miles	0	31.9	4.2	6.8	6.8	0.4
Utility Corridor (25 miles)	Miles	0	23.2	6.5	8.9	8.9	2.7
Road Connection from Shelter Cove to Carroll Creek	Response	No	Yes	No	No	No	No
Road Connection from Carroll Creek to Neets Creek Road	Response	No	Yes	No	No	No	No
Road Connection from Carroll Creek to Shrimp Bay	Response	No	Yes	No	No	No	No
<b>Biodiversity</b>							
Unfragmented old-growth patches remaining							
1,000 Acres and larger	Acres	11,735	4,563	7,135	4,494	7,940	7,724
500-1,000 Acres	Acres	2,270	5,881	4,381	6,282	4,058	4,601
100-500 Acres	Acres	2,243	3,492	3,329	3,607	2,920	3,027
Naha old growth habitat - large block	Acres harvested	0	48	0	0	0	48
Carroll Creek old growth habitat - small block	Acres harvested	0	302	0	317	237	43
Corridors connecting old growth blocks (2,737 acres)	Acres harvested	0	73	25	60	60	1
Old growth acres remaining in Project Area	Acres	17,641	15,644	16,567	16,023	16,609	17,050
Percent of original old-growth remaining	Percent	81	72	76	74	77	79
<b>Wildlife - Project Area</b>							
1997 MIS - deer	Habitat capability	389	357	371	364	367	376
1997 MIS - bear	Habitat capability	70	66	67	67	67	68
1997 MIS - marten	Habitat capability	45	40	42	41	42	43
1997 MIS - river otter	Habitat capability	17	16	16	16	16	16
1997 MIS - hairy woodpecker	Habitat capability	341	303	320	311	318	325
1997 MIS - Vancouver Canada goose	Habitat capability	74	67	68	67	68	69
1997 MIS - bald eagle	Habitat capability	40	40	40	40	40	40
1997 MIS - brown creeper	Habitat capability	497	444	468	455	468	477
1997 MIS - red squirrel	Habitat capability	22,714	21,226	21,890	21,554	21,858	22,178
1997 MIS - gray wolf	Habitat capability	1.1	1.0	1.1	1.0	1.1	1.1
1997 MIS - goat winter range (2044 acres)	Acres harvested	0	229	274	229	71	30
<b>Subsistence - WAAs 406 and 510</b>							
Deer Habitat Capability (percent of 1954)	Percent	81	81	81	81	81	81
Deer Population Needed to Support Current Harvest (percent of 1954)	Percent	19	19	19	19	19	19

# Summary

Table Sum-2 (continued)  
Summary Comparison of Alternatives

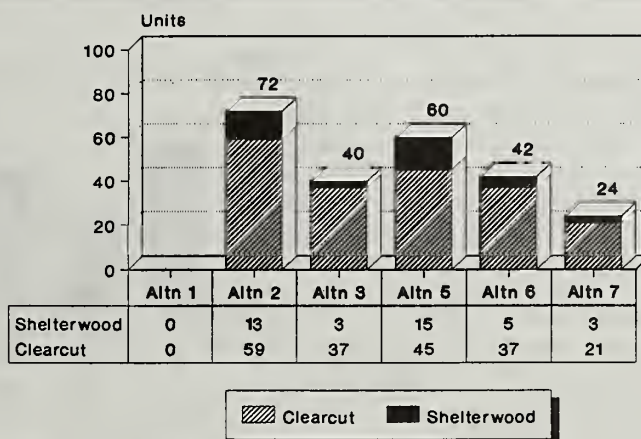
Activity/Resource	Units	Alternatives					
		1	2	3	5	6	7
<b>Significant Possibility of a Significant Restriction</b>							
Deer	Response	No	No	No	No	No	No
Bear	Response	No	No	No	No	No	No
Furbearers	Response	May	May	May	May	May	May
Salmon	Response	No	No	No	No	No	No
Other Finfish	Response	No	No	No	No	No	No
Waterfowl	Response	No	No	No	No	No	No
Marine Mammals	Response	No	No	No	No	No	No
Indirect & Cumulative Effects of Implementing the Forest Plan over the entire rotation	Response	May	May	May	May	May	May
<b>Cultural Resources</b>							
Impacts to known cultural resources	Response	No	No	No	No	No	No
<b>Watershed and Fisheries</b>							
Fens (watershed assessment) 1,192 acres	Acres harvested	0	0	0	0	0	0
Riparian habitat (watershed assessment) 1,912 acres	Acres harvested	0	0	0	0	0	0
<b>Neets Creek Watershed (contains SSRAA Fish Hatchery)</b>							
Acres of harvest	Acres	0	366	0	201	0	0
Miles of road construction and reconstruction	Miles	0	17	0	0	0	0
Harvest unit acres with high potential for sediment delivery to Neets Creek	Acres	0	26	0	26	0	0
Road miles with high potential for sediment delivery to Neets Creek	Miles	0	1.2	0	0	0	0
<b>Carroll Creek Watershed</b>							
Acres of harvest	Acres	0	1,581	1,025	1,397	1,020	541
Miles of road construction and reconstruction	Miles	0	45	25	33	23	4
Harvest unit acres with high potential for sediment delivery to Class I streams	Acres	0	192	142	192	86	0
Road miles with high potential for sediment delivery to Class I streams	Miles	0	6.2	2.3	5.5	0.8	0.0
<b>Soils</b>							
Very high mass movement	Acres harvested	0	0	0	0	0	0
High mass movement	Acres harvested	0	520	245	455	231	107
Medium mass movement	Acres harvested	0	1,156	679	973	655	350
Low mass movement	Acres harvested	0	320	150	190	146	135
Wetlands harvested/roaded	Acres	0	386	70	275	231	66
Total Karstlands in each Alternative	Acres	0	0	0	0	0	0
<b>Visual Quality</b>							
<b>Consistent with Forest Plan Objectives</b>							
Carroll Inlet at Shelter Cove - VCU 746	Response	Yes	Yes	Yes	Yes	Yes	Yes
Carroll Estuary - VCU 744	Response	Yes	Yes	Yes	Yes	Yes	Yes
Head of Neets Bay - VCU 737	Response	Yes	Yes	Yes	Yes	Yes	Yes
<b>Roadless Areas</b>							
Change in ROS class from SPNM to RM	Percent	0	22	13	17	10	4
Roadless areas	Acres (M)	34,413	24,925	30,217	27,440	29,954	34,413

SOURCE: Nightingale 1996

**Comparison of Alternatives by Proposed Activity**

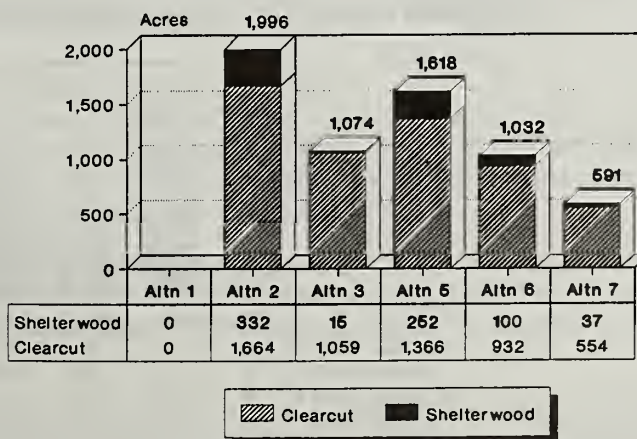
The action alternatives propose the harvest of from 24 to 72 individual units. Alternative 5 proposes the most units for partial cutting (15), while Alternative 3 and 7 propose only three units for partial cutting. Figure Sum-4 shows the number of units proposed for harvest under each alternative by silvicultural system.

**Figure Sum-4  
Number of Units Proposed for Harvest by Silvicultural System**



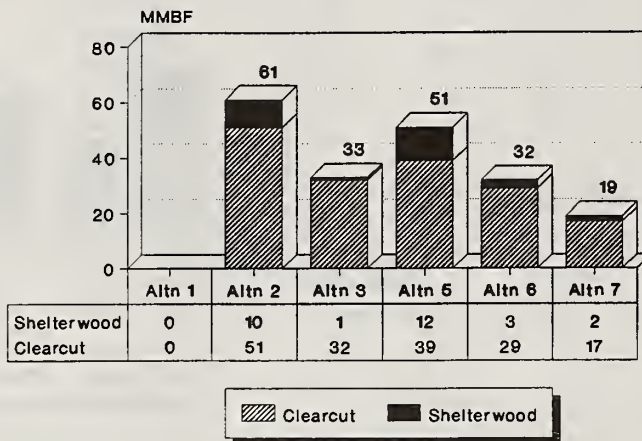
Alternative 2 proposes the highest level of harvest with approximately 1,996 acres of timber harvest. Of the action alternatives, Alternative 7 proposes the lowest level of harvest with 591 acres. Figure Sum-5 shows the number of acres proposed for harvest by each alternative by silvicultural system.

**Figure Sum-5  
Total Acres Proposed for Harvest by Silvicultural System**



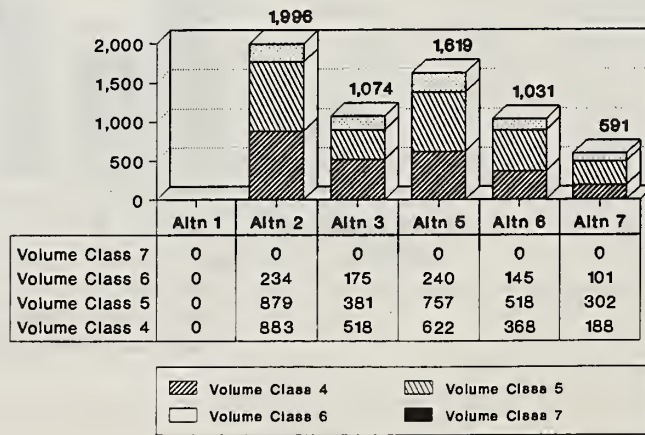
Excluding right-of-way (ROW) volume each action alternative generated less volume than identified as part of the purpose and need. Alternative 7 provides the least volume at 19 MMBF and Alternative 2 comes closest to 70 MMBF with 61 MMBF. Figure Sum-6 shows the volume of timber proposed for harvest by each alternative by silvicultural system.

Figure Sum-6  
Total Volume Proposed for Harvest



Commercial forest land (CFL) is divided into Volume Class Strata according to the Ketchikan Area's timber type map. This volume class information is used in calculating volume harvested and economic analysis. Figure Sum-7 shows volume class strata breakdown for each alternative. Inclusions of stands typed as non-commercial forest that were field verified to be merchantable were aggregated into the volume class 4 acres.

Figure Sum-7  
Proposed Harvest by Volume Class Strata



The Tongass Timber Reform Act (TTRA 1990) modified the Long-term Timber Sale Contracts in Alaska to "...eliminate the practice of harvesting a disproportionate amount of old-growth timber by limiting the volume harvested over the rotation in volume class 6 and 7." The Forest Service developed the Forest Service Handbook procedures and implementation instructions for conducting proportionality analysis in January 1992, and updated the procedures in August 1993. The calculation of proportionality is based on dividing the Timber Type Map (TIMTYP) high volume class acres by the total volume class acres within a Management Area. The proportionality in a Management Area after timber harvest is compared with the proportionality calculated for December 1990 conditions to verify that TTRA is satisfied.

The Kelp Bay Timber Sale (Record of Decision February 1992) was the first timber offering completed using the proportionality analysis as directed by Forest Service Handbook (FSH) guidelines. A lawsuit was brought against the Forest Service challenging this method. In April 1994, the federal district court ruled in favor of the plaintiffs (Wildlife Society, et al. v. Barton, J93-001 CV, D. Alaska) and directed the Forest Service to develop a more accurate method of calculating proportionality for the purpose of TTRA based on timber volume, or to better explain its reasons for rejecting the methods proposed by plaintiffs.

In response, the Forest Service developed a transition method of calculating volume-based proportionality using existing timber inventory information (*Alternatives to Using the Timber Type Map for Determining Proportionality Under the Tongass Timber Reform Act*, Wilson and Golnick, 1995). Upon review by the plaintiffs, they requested that the transition method not be implemented pending findings of a pilot study being conducted by Enserch Environmental Corporation in Management Area K15 of the Control Lake Project Area (*Evaluation of Photo-Point Inventory Methods for the Estimation of Timber Volume and Proportionality in Southeast Alaska*, Foster Wheeler Environmental Corporation with Harza Northwest, 1995). This study was based on previous methods identified by Wilson et al. which look at the feasibility of using double sampling methods in association with existing stand exam data. Based on the need for additional information and evaluation of this study, the Forest Service extended the original contract with Foster-Wheeler Environmental Corporation to test the accuracy of the low-altitude photo measurement procedure. Their report, *Estimation of Timber Volume in Southeast Alaska Using Low-Altitude Fixed Base Aerial Photography* (Foster Wheeler Environmental Corporation with Richard A. Grotefendt, 1996) is currently being assessed by the Forest Service. Further negotiations with litigants have been proceeding. Until a final agreement is reached, and updated FSH guidelines are established, the Upper Carroll FEIS proportionality analysis will follow the procedures established in the current FSH as well as the transition method that was developed by Wilson in 1994.

### **Acre or Timber Type Map Method**

The Project Area is primarily located within Management Area K32 and contained 8.82 percent proportion of Volume Class 6 and 7 timber as of November 1990 (Date TTRA became law). The current proportionality is 8.95 percent. All alternatives would result in a proportionality equal to or in excess of 8.82 percent.

A small portion of Management Area K35 (VCU 746) is located within the Project Area. The TTRA baseline proportion is 5.39 percent and the current proportionality is 5.54 percent. All of the action alternatives will maintain or slightly increase proportionality over the existing condition.

Table Sum-3 displays the proportion of Volume Class 6 and 7 acres proposed for harvest by Management Area using the Forest Service Handbook (FSH 2409.18-93-3) method. Under this method alternatives are considered within the required proportion if the difference or change from base value is positive. If the difference or change from base is negative, the alternative is considered out of proportion.

Table Sum-3  
**Proportion of Volume Classes 6 and 7 Proposed for Harvest by Management Area as Described by Proportionality Analysis Method FSH 2409.18-93-3**

	Total Timber Base (acres)	Volume Class 6 & 7 (acres)	Proportionality (percent)	Difference (percent) <sup>1/</sup>
<b>Management Area K32</b>				
TTRA Baseline (on November 28, 1990)	83,049	7,328	8.82	
Post TTRA Harvest	76,084	6,812	8.95	+0.13
Alternative 1	76,084	6,812	8.95	+0.13
Alternative 2	74,138	6,578	8.87	+0.05
Alternative 3	75,060	6,637	8.84	+0.02
Alternative 5	74,486	6,572	8.82	+0.00
Alternative 6	75,064	6,666	8.88	+0.06
Alternative 7	75,543	6,711	8.88	+0.06
<b>Management Area K35</b>				
TTRA Baseline (on November 28, 1990)	47,314	2,552	5.39	
Post TTRA Harvest	46,058	2,552	5.54	+0.15
Alternative 1	46,058	2,552	5.54	+0.15
Alternative 2	46,008	2,552	5.55	+0.16
Alternative 3	46,008	2,552	5.55	+0.16
Alternative 5	46,038	2,552	5.54	+0.15
Alternative 6	46,046	2,552	5.54	+0.15
Alternative 7	46,008	2,454	5.55	+0.16

SOURCE: Nightingale and Marks, 1996

<sup>1/</sup> A positive difference indicates that the percent of Volume Classes 6 and 7 remaining in the Management Area is higher than the TTRA baseline. A negative difference indicates a lower percentage than the TTRA baseline.



**Transition Proportionality Analysis Method**

The Transition Proportionality Analysis Method developed by Wilson and Golnick in 1994 is also used to determine the proportionality within Management Areas K32 and K35. This method was developed in response to the Wildlife Society lawsuit. The Transition Method uses the methodology of adjusting the total acres of each volume class to correct for inaccuracies in the TIMTYP mapping of volume classes present at the local level. This adjustment is based on previously collected field data for each Administrative Area. The acres in each volume class are then multiplied by the average volume per acre for each volume class (also based on Administrative Area field data) to calculate the total volume present in each volume class. The volume of Volume Classes 6 and 7 is then divide by the total volume present in Volume Classes 4 through 7 to determine the proportion of high volume with the management area.

This approach differs from the acreage-based approach in two ways. First, this approach uses volume instead of acres to determine the proportion. Second, the process includes an adjustment to account for incorrectly mapped stands in all volume classes. Because this approach is based on volume, and volume per acre varies between volume classes, harvest of Volume Class 7 acres will have a greater effect on proportionality than harvest of Volume Class 6 acres. Similarly, harvest of Volume Class 5 will be more effective in meeting the proportionality requirement, acre per acre, than the harvest of Volume Class 4.

Table Sum-4 displays the proportionality for each alternative using the transition method developed by Wilson and Golnick.

Table Sum-4  
**Proportion of Volume Classes 6 and 7 Proposed for Harvest by Management Area as Described by the Transition Proportionality Analysis Method**

	Total Timber Base (MBF Vol.) <sup>1/</sup>	Volume Class 6 & 7 (MBF Vol.)	Proportionality (percent)	Difference (percent) <sup>2/</sup>
<b>Management Area K32</b>				
TTRA Baseline (on November 28, 1990)	2,120,769	789,617	37.2	
Post TTRA Harvest	1,943,069	732,155	37.7	+0.4
Alternative 1	1,943,069	732,155	37.7	+0.4
Alternative 2 <sup>3/</sup>	1,891,015	712,647	37.7	+0.5
Alternative 3	1,915,206	724,584	37.8	+0.6
Alternative 5	1,898,714	712,159	37.5	+0.3
Alternative 6	1,914,476	718,360	37.5	+0.3
Alternative 7	1,926,796	724,238	37.6	+0.4
<b>Management Area K35</b>				
TTRA Baseline (on November 28, 1990)	1,126,040	243,088	21.6	
Post TTRA Harvest	1,098,803	243,088	22.1	+0.5
Alternative 1	1,098,803	243,088	22.1	+0.5
Alternative 2	1,097,799	242,921	22.1	+0.5
Alternative 3	1,097,799	242,921	22.1	+0.5
Alternative 5	1,098,585	243,088	22.1	+0.5
Alternative 6	1,098,700	243,088	22.1	+0.5
Alternative 7	1,097,799	242,921	22.1	+0.5

SOURCE: Nightingale and Marks, 1996

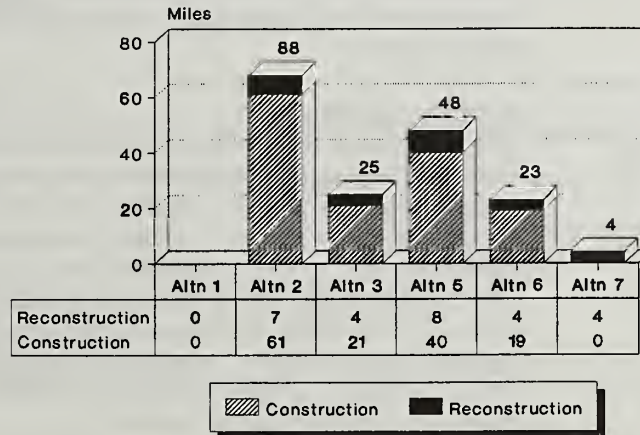
1/ Total Timber Base volumes derived using the Transition Method of adjustment in net MBF.

2/ A positive difference indicates that the percent of Volume Classes 6 and 7 remaining in the Management Area is higher than the TTRA baseline. A negative difference indicates a lower percentage than the TTRA baseline.

3/ Project alternative volumes derived from site specific stand exam net volumes.

Road development is divided into two main categories—construction and reconstruction. Figure Sum-8 shows the number of miles of new road construction and reconstruction proposed to access the harvest units for each alternative.

**Figure Sum-8  
Proposed New Road Construction & Reconstruction**



There are two existing LTFs and one new LTF required to implement the various alternatives. Alternative 2 would not utilize the Carroll Inlet LTF (road connection from Shelter Cove). Only Alternatives 2 and 5 utilize the Shrimp Bay LTF. This analysis has roughly estimated which units or groups of harvest units would most economically be hauled to a given LTF. Actual haul may be different. Table Sum-5 shows the volume of harvest projected to be hauled to each LTF.

**Table Sum-5  
Proposed Harvest, by Existing & New Log Transfer Facility, in MMBF**

	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
Shrimp Bay	0	12	0	7	0	0
Shelter Cove	0	48	2	< 1	< 1	2
Carroll Inlet*	0	0	31	44	32	17

SOURCE: Oien, 1996

\* New Log Transfer Facilities

## Comparison of Alternatives by Significant Issue

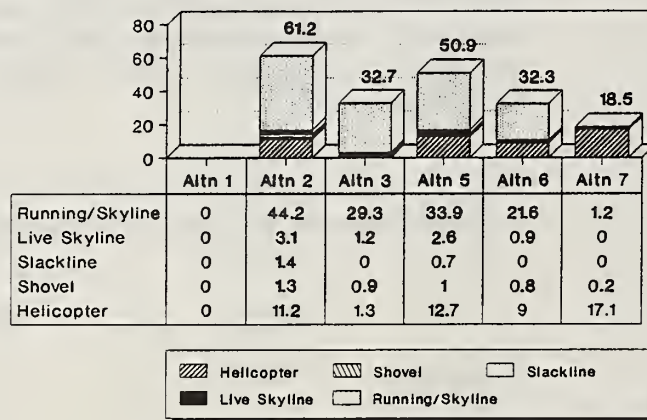
Chapter 1 presents in detail the significant issues that are the focus of this EIS and the key indicators for evaluating the impacts of timber harvest on each issue. This section compares the alternatives in terms of these issues. The baseline for comparing alternatives is Alternative 1, the No-Action Alternative. Chapter 3 contains the detailed evaluation of the potential effects of timber harvest and road construction activities under each alternative on forest resources.

### Issue 1. Timber Harvest Economics and Supply

#### Logging Systems

Estimated timber economics focuses on the residual value (stumpage) of the timber after all associated logging and transportation costs are subtracted. Generally, the most expensive logging method is helicopter, followed by slackline, highlead, live skyline (shotgun), running skyline and shovel yarding. Average yarding distance, uphill versus downhill yarding, volume per acre, species composition and value, in combination with other factors, will influence the relative cost of each yarding method. Helicopter yarding is necessary in areas where it is impractical to build road or where aerial logging is necessary to meet specific Standards and Guidelines. Alternative 7 proposes the most helicopter volume (17 MMBF), while Alternative 3 proposes very little (1 MMBF). Figure Sum-9 compares the logging systems proposed for each alternative.

Figure Sum-9  
Timber Harvest by Logging System



#### Mid-market Value

The analysis of timber values in the Timber section of Chapter 3 looked at both the mid-market and current-market value estimates for each alternative. The current-market values are considerably higher than the average or mid-market values which indicate that: (1) consumer demand is higher; (2) timber supplies are limited; or (3) some combination of the above is true.

Alternatives 3 and 6 show a positive net stumpage at current-market values, while only Alternative 3 is positive at mid-market values. Over the last year current timber price indices have been dropping. If this trend continues, Alternative 3 will be the only economically viable alternative.

Table Sum-6 compares the economics of timber harvest in dollars per thousand board feet (\$/MBF) for each alternative under mid-market conditions (generally representing the average market condition and product mix) and current-market conditions. The conversion rate expresses the net dollar value of the timber volume after subtracting the production costs from the log values.

**Table Sum-6  
Estimated Mid-market and Current-market Stumpage Value**

Components	Alternatives					
	1	2	3	5	6	7
Mid-market						
Conversion Rate (\$/MBF)	0	-158.40	+19.06	-53.64	-8.64	-17.43
Current-market						
Conversion Rate (\$/MBF)	0	-137.42	+51.05	-33.50	+9.26	-0.43

SOURCE: Marks, 1996

### Timber Supply

The Upper Carroll Project Area is composed of moderately difficult topography from a logging standpoint. The roughly 8,000 acres of suitable ground represents well under 1 percent of the suitable lands available for harvest on the Tongass National Forest. Project specific falldown was determined to be 47 percent (see Chapter 3, Timber). This would indicate that the Project Area will contribute less volume than originally scheduled over the rotation. Conversely, it will retain more old-growth for wildlife, subsistence and other amenity values.

Public concern has been focused on the effects of falldown on community stability and the rate of harvest (ASQ) scheduled in the Forest Plan. The Forest Service has addressed this issue by incorporating updated information into the Forest Plan Revision (TLMP RSDEIS, 1996a) which includes not only the effects of falldown, but land use allocations and revised Standards and Guidelines. The Ten-Year-Sale-Action-Plan included as part of Appendix A in this document has been updated to reflect these changes for both the Tongass National Forest and the Upper Carroll Project Area. The Upper Carroll project is consistent with the existing Forest Plan (TLMP, 1979 as amended) and the Standards and Guidelines for the Preferred Alternative of the TLMP RSDEIS (1996a).

In addition to the actions listed above, the Upper Carroll Project includes a range of alternatives that would harvest from 26 percent (Alternative 7) to 90 percent (Alternative 2) of the volume originally scheduled. The remaining alternatives would harvest approximately 47 percent (Alternatives 3 and 6) and 75 percent (Alternative 5) of the scheduled volume.

# Summary

## Issue 2. Fish Habitat and Water Quality

### Best Management Practices

There is no measurable effect on water quality or fisheries production by any of the timber harvest or associated activities proposed by any of the action alternatives. All alternatives meet the requirements and intent of the Clean Water Act. Implementation of project specific stream buffers that range up to 500 feet meet or exceed the TTRA requirements to provide a minimum 100-foot buffer on Class I streams and Class II streams flowing directly into Class I streams would effectively mitigate direct stream channel impacts from proposed timber harvest and road construction. Adherence to Best Management Practices (BMPs) outlined in the Soil and Water Conservation Handbook (USDA FSH 2509.22) during the design of units and roads will minimize the potential direct effects to fish as well. Site-specific BMPs were developed and selected to minimize the potential for impact to fish habitat. These site-specific BMPs are noted on the individual Harvest Unit and Road Design cards in FEIS Appendix K.

### Habitat Capability

Fish habitat capability models are used to estimate the effects of timber harvest on the capability of streams to provide habitat for selected species of salmon and trout. Because there are many factors which influence fish populations—including commercial/sport harvest, oceanic conditions, and predation—these computer models provide only relative measures of habitat capability. These models indicate that there is no change in habitat capabilities for coho and pink salmon, or for Dolly Varden char and the species which they represent, among the alternatives including the no-action alternative.

### Cumulative Watershed Effects

Every major watershed within the Project Area has experienced prior timber harvest and road construction. Reentering these drainages may generate a greater potential risk for impacts on water quality, with the risk expected to be greater in those watersheds with the higher cumulative percents of harvest. Table Sum-7 shows the existing direct and indirect effects of timber harvest and road construction by third order or larger watershed during the 15 year period, 1982-1997.

Table Sum-7  
**Cumulative Watershed Effects, Percentage of Watershed Harvested and Roaded in Third Order or Larger Watersheds**

Watershed Number	Watershed Harvested and Roaded 1982-1997					
	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
C41B	0	3	0	1	0	0
C43A	0	19	0	19	0	0
C58A	0	4	0	0	0	3
D69B	0	3	1	2	2	0
D70C	0	8	5	6	5	2
D71A	0	4	8	11	3	3
D74A	0	1	0	0	0	0
D79A	10	23	22	18	18	22
D80B	0	0	0	0	0	0

SOURCE: Babik, 1996

### Stream Crossings

Another measure of potential risk to fish habitat from timber harvest is the associated new road construction and road reconstruction which crosses streamcourses (see Chapter 3- Fisheries). During placement of culverts or bridges, sediment may be introduced into the streams which may have short- or long-term effects on water quality. Alternative 7 proposes the fewest stream crossings, while Alternative 2 proposes the most. This is shown in Table Sum-8.

Table Sum-8  
**Stream Crossings to be Constructed**

	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
Class I	0	15	11	17	10	8
Class II	0	25	11	17	13	1
Class III	0	127	72	74	52	3
<b>Total Crossings</b>	<b>0</b>	<b>167</b>	<b>94</b>	<b>100</b>	<b>108</b>	<b>12</b>

SOURCE: Oien, 1996

**Mass Movement Index (MMI)**

Following timber harvest, there is an increased risk of landslides until second growth and the brush layer become firmly established. One way of analyzing this risk is to determine the amount of timber harvest on slopes which have high mass movement index (MMI) soils. This rating does not imply that such a mass-wasting event will occur; rather, it ranks the alternatives on the basis of the potential for a mass-wasting event to occur, which may or may not result in an increase in stream sediment. This increased stream sedimentation may result in some loss or impairment of resident and anadromous fish spawning and rearing habitat. Table Sum-9 displays the proposed harvest on high MMI and very high MMI soils by alternative. Virtually all very high MMI soils have been removed from the timber base. Only those sites that appear to be small inclusions or mistyped have been retained in the unit pool. These sites have been examined by a professional soil scientist as part of unit reconnaissance.

Table Sum-9  
**Acres of High Hazard Soils Harvested by Alternative**

	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
High MMI soils	0	520	245	455	231	107
Very High MMI soils*	0	0	0	0	0	0

SOURCE: Babik, 1996

\* See Chapter 3, Soils for details of MMI classifications.

**Sediment Transfer and Deposition**

The Carroll Creek and Neets Creek watersheds were evaluated for sediment delivery and depositional potential using a watershed-level analysis (Geier and Loggy, 1995). The watersheds were divided into sub-basins and reaches. Sediment transport and deposition indices were developed based upon watershed morphology, discharge, and potential sediment sources (for a detailed description of this process see Appendix F, Sediment Transfer and Deposition Analysis Procedure). This sediment transfer index indicates where in a watershed sediment production and deposition is a potential problem for maintenance of aquatic habitat. The quantity of sediment transported and deposited depends upon a number of factors, including nature of sediment source, stream discharge, and channel morphology. These are factors that resource managers must consider when they undertake activities on areas that are linked to important aquatic habitat.

Results of this sediment transport and deposition risk assessment for roads and units in the Upper Carroll action alternatives indicate that Alternatives 7, 6 and 3 have a lower overall risk of sediment delivery to streams. Alternative 7 harvests the least acres, avoids new road construction, utilizes helicopter logging, and avoids most sensitive areas. Alternative 3 reduces overall risk by minimizing harvest unit location and road construction near stream courses in high risk sub-basins and proposing no activities in Neets Creek watershed, and in the west fork of Carroll Creek. Alternative 6 is generally similar to Alternative 3 except that it makes a helicopter entry into the west fork of Carroll Creek. This is somewhat offset by avoiding several units with high sediment deposition index (SDI) ratings in Sub-basin S04. Alternative 5 presents a higher risk of producing sediment that may affect beneficial uses, mainly by proposing road construction and timber harvest in the west fork of Carroll Creek along with helicopter logging in Neets Creek. Alternative 2 poses the highest risk of sediment delivery from road related sediment. It also proposes a number of timber harvest units and roads in the west fork of Carroll Creek, plus the Neets Creek watershed.



**Issue 3. Recreation and Scenic Quality**

**Scenic Quality**

There are 3 key viewsheds within the Project Area. The proposed visual quality objectives (VQOs) for this project establish the minimum visual quality management standards for these key viewsheds.

Table Sum-10 displays the proposed VQOs for each key viewshed and the determination of consistency for each alternative. Alternative 1 represents the existing visual condition. In all viewsheds for all alternatives, the proposed harvest units achieve the proposed visual quality objectives.

**Table Sum-10  
Consistency with Forest Plan Visual Quality Objectives**

Viewshed	Proposed VQO*	Meets Visual Objective					
		Alt. 1**	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
Carroll/Shelter Cove	PR-M	Yes	Yes	Yes	Yes	Yes	Yes
Carroll Estuary	Pr-M	Yes	Yes	Yes	Yes	Yes	Yes
Head of Neets Bay	Pr-M	Yes	Yes	Yes	Yes	Yes	Yes

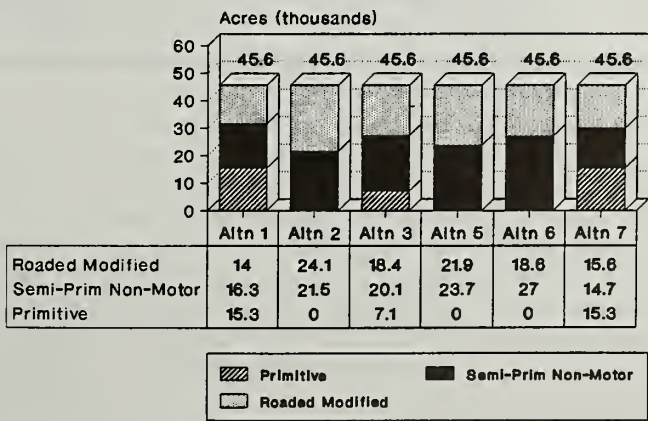
SOURCE: Angelus, 1996

\* R = Retention; PR = Partial Retention; M = Modification; MM = Maximum Modification  
\*\* Alternative 1 represents the existing condition

**Recreation Opportunity Spectrum (ROS)**

Implementing any of the action alternatives will change the existing Recreation Opportunity Spectrum (ROS) class within the Project Area. Figure Sum-10 shows the change in ROS class by alternative.

**Figure Sum-10  
Changes in ROS Class by Alternative**

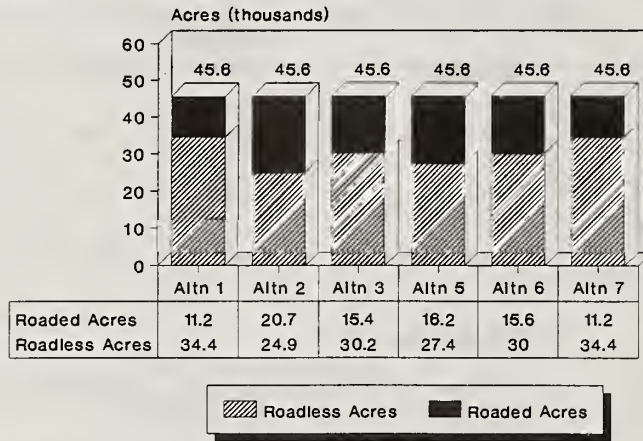


# Summary

## Roadless Areas

The TLMP Supplement Draft Revision (1991a) identified two roadless areas which lie within or partially within the Project Area. The impact of timber harvesting on roadless areas is much larger than the acres harvested because the sights and sounds associated with the harvest activity affect the surrounding area. Roadless areas generally need to be at least 5,000 acres in size to be considered roadless. Figure Sum-11 shows the number of roadless area acres that will remain after implementation of an alternative.

Figure Sum-11  
Timber Harvest within Roadless Areas



## Issue 4. Wildlife Habitat

The major effect on wildlife habitats in all action alternatives is the reduction of old-growth forest habitat. Impacts to other habitats were reduced by the interdisciplinary design of units prior to alternative formulation. All alternatives result in impacts consistent with the implementation of the TLMP (1979a, as amended) and the Preferred Alternative of the TLMP RSDEIS (1996a), Standards and Guidelines.

Table Sum-11 displays the potential reduction in wildlife habitat capabilities, as estimated by habitat capability models, for the key Management Indicator Species (MIS) found in the Upper Carroll Project Area. This table displays the 1954 long-term habitat capability and estimated short-term reduction in habitat capability after potential implementation of the alternatives.

Table Sum-11  
**Potential Changes in Habitat Capability within the Project Area for MIS in 1997**

Species	Habitat Capability		Changes from 1995 by Alternative					
	1954	1995	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
Sitka black-tailed deer	629	389	0	-32	-18	-25	-22	-13
black bear	75	70	0	-4	-3	-3	-3	-2
otter	26	17	0	-1	-1	-1	-1	-1
marten	58	44	0	-5	-3	-4	-3	-2
hairy woodpecker	501	341	0	-38	-21	-30	-23	-16
Vancouver Canada goose	86	74	0	-7	-6	-7	-6	-5
bald eagle	54	40	0	0	0	0	0	0
brown creeper	993	497	0	-53	-29	-42	-29	-20
red squirrel	24,637	22,714	0	-1,488	-824	-1,160	-856	-536
grey wolf	2.3	1.5	0	0	0	0	0	0

SOURCE: Burns, 1996

Note: Numbers do not incorporate patch size effectiveness calculations (see the Old-Growth/Biodiversity section)

\* Deer habitat capability figures assume an index value of zero for units immediately following harvest.

The habitat capability model was not used to analyze impacts to mountain goats. The model is based on distance of forage from cliffs and other escape terrain which has not been identified on Revillagiedo Island. As a result, the model showed a current habitat capability of zero for mountain goats.

Potential winter habitat for mountain goats was identified through consultation with Alaska Department of Fish and Game (ADF&G) biologists. According to ADF&G, the areas most likely used as winter habitat within the Upper Carroll Project are the south facing slopes along the Carroll River tributaries that are located west of Mount Ried. The south facing slope in the Swan Lake drainage also provides important winter habitat. Similar drainages to the east of Mount Ried in Misty Fiords National Monument also provide winter habitat. A total of 11,127 acres were identified as mountain goat winter habitat, of which 2,044 acres are located in the Upper Carroll Project Area. Acres of mountain goat winter habitat harvested by the Upper Carroll Project range from zero (Alternative 1) to 274 acres (Alternative 3). Of the action alternatives, Alternative 3 harvests the most mountain goat winter habitat (274 acres), while Alternative 7 harvests the least (30 acres).

Forest fragmentation represents a change in the overall forest landscape from large, contiguous blocks of old-growth forest to smaller blocks separated by timber harvest units. Increased amounts of forest fragmentation indicate reduced habitat potential for species which are thought to be dependent on interior old-growth forest habitat. One way to analyze forest fragmentation is to measure the reduction of large, contiguous blocks of old-growth forest as a result of timber harvest. Large and medium sized blocks of old growth (Naha Roadless Area, Misty Fiords National Monument, Traitor’s Cove Retention, Orchard Lake, and Swan Lake) are adjacent to the Project Area. In addition, the Project Area contains a significant amount of old-growth habitat in blocks over 1,000 acres in size. Table Sum-12 displays the number of acres of old-growth habitat in large blocks that will remain after implementation of an alternative.

**Table Sum-12**  
**Effect of Timber Harvest on Forest Fragmentation in Acres**

	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
Acres of large, unfragmented blocks 100-500 acres remaining after harvest	2,243	3,492	3,329	3,607	2,920	3,027
Acres of large, unfragmented blocks 500-1,000 acres remaining after harvest	2,270	5,881	4,381	6,282	4,058	4,601
Acres of large, unfragmented blocks >1,000 acres remaining after harvest	11,735	4,563	7,135	4,494	7,940	7,724
<b>Total acres of old growth remaining after harvest</b>	<b>17,641</b>	<b>15,644</b>	<b>16,567</b>	<b>16,023</b>	<b>16,609</b>	<b>17,050</b>

SOURCE: Burns and Nightingale, 1996

Note: Old-growth includes only Volume Class 4 and above.

A portion of the Naha old-growth habitat block extends outside of the LUD II area into the Project Area (see Figure Sum-3). This portion of the block is designated as a LUD IV under the current Forest Plan and is available for timber harvest. Alternative 2 and 7 propose to harvest two units totaling 48 acres within this old-growth block. The remaining alternatives do not propose any harvest within this block primarily for economic and wildlife management reasons.

The west side of Carroll Creek represents a small block of unfragmented old-growth habitat located inside the project boundary (see Figure Sum-3). The southwest portion of this area is adjacent to the Naha Block. Alternative 3 does not propose any harvest within this block primarily for economic and wildlife management reasons. Alternative 7 would harvest a very minor amount of timber (43 acres). Alternatives 2, 5 and 6 would harvest 302, 317 and 237 acres respectively from the Carroll Creek block.

Late successional corridors approximately one-quarter mile wide (see Figure Sum-3) that provide connectivity between core areas of unfragmented old-growth habitat were identified. These corridors contain 2,737 acres of which 799 acres are not commercial forest land. Alternative 2 would impact the corridors to the largest degree (73 acres), followed by Alternative 5 and 6 (60 acres), Alternative 3 (25 acres), and Alternative 7 (1 acre). The TLMP RSDEIS (1996a), Preferred Alternative Standards and Guidelines proposes travel corridors of approximately 600 feet in width. No timber harvest is proposed under any of the action alternatives that would result in a travel corridor being less than 600 feet wide.

**Issue 5. Subsistence Use**

Chapter 3 evaluates the potential site-specific effects on subsistence that could result from implementing any of the proposed timber harvest and associated road construction alternatives.

The Tongass Resource Use Cooperative Survey (TRUCS) identified areas which are most heavily used by subsistence households. Based on the TRUCS, the Project Area contains no high or moderate use subsistence areas. High and moderate use is interpreted to mean greater than 50 households ever used the area for subsistence deer hunting.

Deer hunting is one aspect of subsistence use affected by timber harvest. The Wildlife and Subsistence sections of Chapter 3 discuss the computer models used to estimate the effects of timber harvest on deer habitat capability, both long range and short range. Based on this analysis, Alternative 1 will cause no reduction of deer habitat capability. Among the action alternatives, Alternative 7 would cause the least reduction to deer habitat capabilities, while Alternative 2 would reduce deer habitat capabilities the most within the Project Area; although all action alternatives result in less than a one percent reduction in the current habitat capability for both WAAs.

Table Sum-13 displays the percent of 1954 deer habitat capability the WAAs (406 and 510) can support now and at the end of the KPC Long Term Sale (2004). The full WAA habitat capability has not been reduced for the effects of fragmentation.

**Table Sum-13  
Percent of 1954 Deer Habitat Capability for WAAs 406 and 510**

Alternative	Percent of 1954 Habitat Capability		Percent of 1954 Habitat Capability Needed to Meet Current Demand
	1997	2004	1995
1	81	78	19
2	81	78	19
3	81	78	19
5	81	78	19
6	81	78	19
7	81	78	19

SOURCE: Burns, 1996

Note: Habitat capability for entire WAAs has not been reduced for fragmentation.  
 Habitat capability assumes the harvested units are converted to the clearcut stage (0-25 years).  
 Habitat capability in 2004 assumes full implementation of the Forest Plan for all alternatives (maximum timber harvest within standard guidelines—no reduction for economic constraints).

## Summary

The Project Area is located within portions of two Wildlife Analysis Areas (WAA), 406 and 510. The harvest is 104 deer per year based on ADF&G hunter surveys for both complete WAAs. Approximately 19 percent of the original (1954) habitat capability is needed to support this level of deer harvest. Currently (1995) the two full WAAs provide 81 percent of the original habitat capability for deer. The habitat capability through the year 2004 is projected to be approximately 78 percent of the original (1954) habitat capability.

Competition for subsistence resources in the Project Area is a scoping issue. Subsistence users are concerned with competition from residents of Ketchikan. Since Ketchikan residents are considered non-rural, this competition can be regulated if it starts to restrict non-rural residents' ability to obtain subsistence resources. In the Wildlife Section, the cumulative analysis discussed a potential road connection between the Project Area and the Ketchikan road system. If such a connection is made, it would significantly increase the amount of rural and non-rural use of the area and could increase the amount of competition to the point that there would be a significant restriction in subsistence use of deer and marten in the Project Area.

The Federal Subsistence Board may use its authority to regulate non-rural harvest of deer and has authority to prioritize the harvest of deer among rural residents when necessary to protect the resource. The current deer population level does not require restrictions on non-rural users.

There is no evidence to indicate that availability of salmon, finfish, shellfish, or other food resources to subsistence users would be affected by sport or non-rural harvest. Any increase in competition from non-rural Alaskan residents and nonresidents would not be substantial because of the availability of resources in the immediate vicinity and in the surrounding areas.

The above analysis indicates that the actions proposed in Alternatives 2 through 7 will not represent a significant possibility of a significant restriction on subsistence use of deer, black bear, or otter in the Project Area. Marten harvest in WAA 510 is at the peak of the level that can be sustained. Increasing human population coupled with future reductions of habitat capability for deer, marten, and wolf, and in light of the fact that Saxman residents' use of the area is under-reported for the Project Area, there may be a significant possibility of a significant restriction of subsistence use of deer, marten, and wolf at some point in the future (next 150 years) for all alternatives including the No Action Alternative.

### **Issue 6. Transportation/ Utility Corridor**

The Tongass Land Management Plan Revision team has mapped the transportation and utility corridors on the Tongass National Forest. The maps show two corridors passing through the Project Area. The Alaska Legislature passed Senate Joint Resolution 40 during the 1992 session. This resolution urges the Forest Service to avoid actions which would preclude the use of any of the transportation and utility corridors identified by an interagency group.

The Upper Carroll Project Area contains approximately 30 to 40 miles of the various potential routes identified to date. The IDT reviewed the possibilities of action being taken on the transportation and utility corridors in the foreseeable future. The review indicated that the corridor could be used for electrical transmission lines within the next decade. The review concluded that the road connections proposed are unlikely within the foreseeable future and that no actions proposed under any alternative would preclude use of any of the transportation and utility corridors.

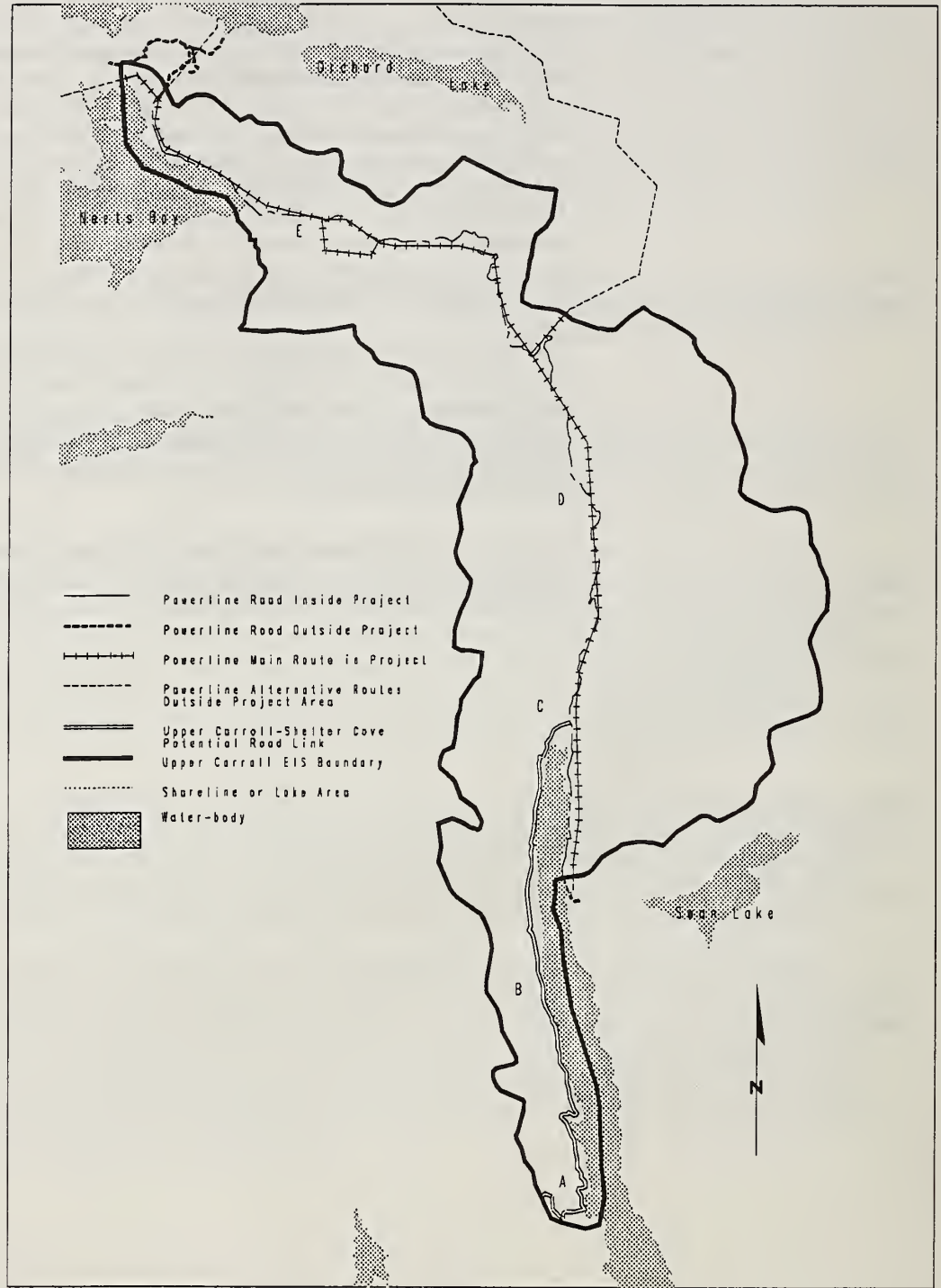
The *Lake Tyee to Swan Lake Transmission Intertie* (R.W. Beck and Association, 1992) presents a feasible electric power transmission line route within the Project Area. The preferred route identified in the R.W. Beck study passes through the Project Area by way of Carroll Creek and Neets Creek drainages. Ketchikan Public Utilities has awarded a contract to Foster Wheeler Environmental Corporation to complete an EIS for the proposed electrical intertie. A DEIS was issued in March 1996. The initial routes through the Project Area have remained essentially unchanged (Figure Sum-12).

The Ketchikan Gateway Borough and the Alaska Department of Transportation and Public Facilities cooperated in an examination of highway corridor opportunities. This study, *Ketchikan - Revillagigedo Island Corridor Study* (R&M Engineering, 1992), identified a preferred highway route that passes through the Project Area along the west side of Carroll Inlet, then north along Carroll Creek until the junction with Neets Creek and Orchard Creek. At this point one potential route heads north outside the Project Area toward Orchard Lake, the other route follows Neets Creek before heading north to Shrimp Bay. As part of the Upper Carroll field reconnaissance, the Forest Service located and flagged on the ground the preliminary route from Shelter Cove to Shrimp Bay. This alternative route uses a ferry terminal at Shrimp Bay as an alternative to the route on the north side of Orchard Lake and some very difficult highway building terrain north of Shrimp Bay.

The IDT considered these routes in alternative formulation and also evaluated them for likelihood of construction within the foreseeable future through other means. For the purpose of this analysis, the reasonably foreseeable time frame over which the indirect effects are estimated is until the end of the Ketchikan Pulp Company (KPC) Long-term Contract (the year 2004). This determination of reasonably foreseeable is based on the time frame of the KPC contract commitment.

Based on the feasibility and likelihood of findings for power transmission projects within Alaska, the IDT concluded that the construction of the Swan Lake to Lake Tyee powerline was likely within the foreseeable future.

Figure Sum-12  
Utility and Transportation Corridors inside Project Area





The effects of the possible construction of the power line within the Project Area have primary effects on the visual resource. The clearing of the corridor along the transmission lines would be seen from a number of view points.

The actions proposed in the Project Area could potentially benefit the transmission project by incidental transportation and logistics uses. The construction of the transmission lines across National Forest lands normally requires removal of all merchantable timber felled along the corridor. The road system will allow shorter flights for helicopters removing the timber which would reduce costs. The roads will also allow shorter transportation by helicopter for towers, cable, and other logistics. This activity is expected to result in a reduction of costs. Table Sum-14 displays the miles of road that would be constructed or reconstructed that could potentially serve as access to a possible utility corridor or eventually as a transportation link within the Project Area under each alternative.

**Table Sum-14**  
**Potential Transportation/Utility Corridor Access Miles**

<b>Alternative</b>	<b>Utility Corridor Miles</b>	<b>Transportation Link Miles</b>
1	0	0
2	23.2	31.9
3	6.5	4.2
5	8.9	6.8
6	8.9	6.8
7	2.7	0.4

SOURCE: Nightingale and Oien, 1996

Based on the historical nature of state highway development in Southeast Alaska and limited funding, the IDT concluded that a road connection would not reach the Project Area within the foreseeable future.

The IDT evaluated the action alternatives as requested by Senate Joint Resolution 40, and determined that none of the action alternatives will preclude the identified transportation and utility corridors within the foreseeable future.

# Summary

## Issue 7. Social and Economic Effects

The State of Alaska receives 25 percent of the sum of all net receipts from timber sold on National Forest System Lands plus any purchaser road credits. This money is earmarked for public school and road maintenance funding. Table Sum-15 shows the estimated returns to the State of Alaska and the Ketchikan Gateway Borough from the harvest of timber (from this project only) by alternative. Actual returns will be based upon sale volumes and appraised rates and may differ from this estimate, which is based on mid-market rates.

**Table Sum-15**  
**Estimated Returns to the State of Alaska from Sale of Timber\***

Alternative	Estimated Volume (MMBF)	Total Receipts (\$Millions)	State of Alaska Returns (\$Millions)	Ketchikan (KGB) Returns ** (\$Millions)
1	0	0	0	0
2	64	13.273	3.318	.149
3	34	8.110	2.208	.091
5	53	11.660	2.915	.131
6	33	7.033	1.758	.079
7	19	0.710	0.118	.008

SOURCE: Marks, 1996

\*Based on mid-market rates timber receipts

\*\*Based on historical average percent distribution

Table Sum-16 displays the employment (jobs) and personal income (salaries) associated with each alternative **averaged over a four-year period**. The jobs and salaries listed include those both directly and indirectly dependent upon the timber industry.

**Table Sum-16**  
**Timber Industry Average Annual Employment and Income by Alternative**

	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
Volume Harvested						
Total (MMBF)	0	64	34	53	33	19
4 Year Avg. (MMBF)	0	16	9	13	8	5
Employment (Jobs)	0	119	65	99	63	36
Personal Income (Millions \$)	0	4.5	2.5	3.8	2.4	1.4

SOURCE: Marks, 1996

All Alternatives provide volume, in combination with other scheduled offerings, to help meet short-term contractual obligations to KPC and/or assist the independent timber purchasers in maintaining timber-related employment in the region. In these alternatives, the total volume (including ROW volume) harvested ranges from 19 MMBF in Alternative 7 to 64 MMBF in Alternative 2. Alternatives 3, 5 and 6 provide 34 MMBF, 53 MMBF, and 33 MMBF respectively. These volumes could be provided to KPC in harvest offerings that would meet contract requirements and maintain volume for continued mill operation. They could also be sold to independent timber purchasers.

Under Alternative 1, the No-Action Alternative, none of the employment described above would be supported by timber harvest activity in the Upper Carroll Project Area. This would result in a negative effect on timber harvest employment should local timber purchasers not be able to substitute volume from another source. The effects of Alternative 1 are not predictable and could range from elimination of shifts to partial or even full shutdown of the local mills for an unspecified period of time. Selection of the No-Action Alternative could also have potential long-term ramifications to the contract holder, the core communities, and ultimately Southeast Alaska, through de-stabilization of the wood products industry.

The projected long-term effects of different harvest levels are contained in the TLMP RSDEIS (1996a). This analysis includes falldown factors such as additional streams, blind leads, unsuitable soils, and a variety of other factors.

None of the alternatives is expected to have a significant direct impact on the commercial fishing, recreation, and tourism industry or related employment.

### **Issue 8: Marine Environment**

Direct effects to the marine environment are assumed to occur only from development and use of LTFs, and are limited to the intertidal area affected by rock fill and either the intertidal or subtidal areas potentially affected by accumulations of bark debris.

A total of five potential LTF locations were considered for possible development. There are four existing LTF sites and one potential new site. The maximum number of LTFs that would be utilized under any alternative is three (one new site and two existing sites), as there are several possible sites considered for each road system. The final selection of which LTF sites to utilize was based on the interagency guidelines (Alaska Log Transfer Facility Siting, Construction, Operation, and Monitoring/Reporting Guidelines). The U.S. Fish and Wildlife Service and the National Marine Fisheries Service staff conducted subtidal surveys at the sites that appeared to best meet the interagency guidelines. The subtidal survey reports and recommendations which are included as part of Appendix G, were used to further define which of the potential LTF locations were preferable. Table Sum-17 displays the LTFs involved in the various alternatives. See also the detailed alternative maps included with the Upper Carroll FEIS.

## Summary

Table Sum-17  
Log Transfer Facilities Required by Alternative and System

LTF Name	LTF Site #	Alternative						LTF System
		1	2	3	5	6	7	
Shrimp Bay	1	N	I	N	I	N	N	A Frame
Shelter Cove	3	N	I	I	I	I	I	A Frame
Carroll Inlet #7	4*	N	N	I	I	I	I	Low Angle Ramp

SOURCE: Oien, 1996

I = Planned for intermittent use; N = Not planned for use. \* New Log Transfer Facilities

Table Sum-18 displays the number of LTFs used or developed, the total acreage of the structural embankment, and the estimated acres to be affected by bark deposition. The combination of the marine habitat covered by the structural embankment and the area potentially covered by bark deposition represents the total loss of marine benthic habitat for each alternative.

Table Sum-18  
Marine Benthic Habitat Affected by Alternative

	Alt. 1	Alt. 2	Alt. 3	Alt. 5	Alt. 6	Alt. 7
Existing LTF Sites	2	2	2	2	2	2
Proposed New LTF Sites	0	0	1	1	1	1
Structural Embankment (Acres Affected)	0.5	0.5	0.7	0.7	0.7	0.7
Bark Deposition (Acres Affected)	2.0	2.0	3.0	3.0	3.0	3.0
<b>Total Acres of Marine Benthic Habitat Affected</b>	<b>2.5</b>	<b>2.5</b>	<b>3.7</b>	<b>3.7</b>	<b>3.7</b>	<b>3.7</b>

SOURCE: Oien, 1996

The No-action Alternative and Alternative 2 would have no measurable additional effect on the marine environment, while Alternatives 3, 5, 6, and 7 affect the marine system (3.7 acres) in a similar fashion. The loss of habitat is much less than one percent of the available marine habitat in the Project Area. Since all species identified along the subtidal (underwater) survey transects are common throughout Southeast Alaska, it is concluded that there would not be a significant impact to the marine environment from constructing (or continuing to use) LTFs at the proposed sites.

## Mitigation

### TLMP Mitigation

The Forest Service uses numerous mitigation and preventive measures in the planning and implementation of land management activities. The application of these measures begins during the planning and design phases of a project. They link to the overall Forest, Ketchikan Administrative Area, and Ranger District management direction and continue through all phases of subsequent forest management. The standards, guidelines, and direction contained in the current TLMP (1979a), the TLMP RSDEIS (1996a), Alaska Regional Guide, and applicable Forest Service manuals and handbooks have been applied in the development of alternatives and design of harvest units and roads.

Public comment on the Upper Carroll DEIS was helpful in identifying when and where additional mitigation measures should be considered. Unit and road cards are an important tool for implementing the project, as they list standards and guidelines and provide a mechanism for tracking project implementation. Unit and road cards have been developed for each individual unit that occurs in an alternative and appear in FEIS Appendix K.

### Water Quality And Fish Production

#### TTRA, BMPs, Water Quality

Mitigation to protect water quality, fish habitat, and wetlands includes application of the Best Management Practices (BMPs) stated in the Soil and Water Conservation Handbook (USDA FSH 2509.22). This handbook provides standard operating procedures for all stream classes. In addition, the TTRA mandates a minimum 100-foot buffer on all Class I streams and on Class II streams that flow directly into Class I streams. The width of this buffer strip may be greater than 100 feet for reasons such as topography, riparian soils, a windfirm boundary, timber stand boundaries, logging system requirements, and varying stream channel locations. In addition, certain Class III streams flow directly into or have been identified as influencing Class I streams. These Class III streams have been buffered to the slope break of the channel or to a windfirm boundary to protect water quality. Split yarding or full suspension was built into the logging and transportation design process, as was partial and full suspension over wetland soils or soils with a higher mass movement potential. Direct in stream impacts are minimized through road construction timing and fish passage requirements on certain Class I and II streams. Refer to FEIS Appendix F (Watershed Report) for the rationale and to Appendix K (Unit and Road Cards) for the unit-specific stream buffering, suspension, passage, and timing requirements being applied. Application of BMPs and adherence to the TTRA requirements will protect water quality fish habitat and wetlands as well as riparian habitat important to other species such as deer, bear, and furbearers.

### Wildlife

Mitigation measures to protect wildlife habitat are a part of the design of the alternatives, including the location of the harvest units and roads. Harvest units and roads are intentionally located away from important wildlife habitats (to the extent practicable) to reduce the effects on wildlife. Beach and estuary habitats are completely avoided by harvest units, while road incursions are minimized to the extent practicable. Where possible, disturbance of important travel corridors is minimized to allow the undisturbed movement of wildlife.

Other measures considered to mitigate impacts include road closures, grass seeding of roadbeds, retention of snags where safe to do so, and scheduling of harvest activities which reduce disturbance to bald eagle nesting and rearing activity. Goshawk surveys (vocalizations) have been conducted. If a goshawk or marbled murrelet nest site is located during the layout process it will be protected using the latest standards and guidelines.

## Summary

### Subsistence

Because most subsistence use involves harvesting fish and game, mitigation measures that protect or enhance fish and game resources will also protect and enhance subsistence activities. By placing units and roads away from beach and estuary fringe habitats, and away from salmon bearing streams, mitigation measures were built into each of the alternatives considered in the EIS. Additional subsistence concerns were incorporated into the alternatives to varying degrees.

### Recreation

Effects of timber harvest on views from anchorages and known recreational day use areas will be reduced by leaving buffers of timber along the beaches and inland lakes. The proposed visual quality objectives for this plan emphasize the protection of the visual resource as viewed from saltwater. Neets Bay and Carroll Inlet in particular, will reduce the direct effects on visual quality. Stream riparian buffers will protect fisheries habitat and sport anglers use of Class I and II streams in the Project Area.

### Cultural Resources

Potential effects on cultural resources can be minimized by excluding project activities from most high probability areas (exceptions are LTFs, camps, a small number of units, and access roads to these facilities). The high probability areas were all surveyed in 1994 and 1995, except for exact road locations which cannot be precisely determined until after unit and road layout occurs. There are no known significant cultural sites located within any of the proposed harvest unit boundaries. Types of mitigation measures include avoidance, protective enclosures, monitoring of harvest activities, restrictions on size or road location, and recovery and documentation of materials.

### TES Plants

Choris Bog Orchid (*Platanthera chorisana*) is a designated sensitive species. Six populations of this species were discovered in muskeg openings during botanical surveys of the Project Area conducted in 1995. Populations were found within the vicinity of harvest units 20 and 59 and adjacent to a small pond in the Carroll Creek drainage. The primary risk of perturbation to these populations would be through road construction activities. Road locations have been adjusted to avoid direct impacts to known locations of Choris Bog Orchid.

## Monitoring

Monitoring activities can be divided into three broad categories: Forest Plan monitoring, routine implementation monitoring, and project-specific effectiveness monitoring. These broad types are discussed in the following sections.

### Forest Plan Monitoring

The National Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). The significance of this requirement is emphasized by the recent development of a National Monitoring and Evaluation Strategy (Forest Service 1993). The Strategy is designed to focus agency attention and resources on evaluating implementation of forest plans to provide the Forest Service with information necessary to ensure responsive and efficient management of National Forests. Embodied in the National Monitoring and Evaluation Strategy are three principles: (1) evaluation of results will be readily available to the public, agencies, and other groups; (2) monitoring and evaluation will focus on ecosystems and emphasize interrelationships among biotic and abiotic components; and (3) the strategy will be flexible to meet local needs while encompassing forest, regional, and national requirements.

Three levels of monitoring are incorporated into Forest Plan monitoring and evaluation.

**Implementation Monitoring** is used to determine if goals, objectives, standards and guidelines, and management prescriptions are implemented as detailed in the Forest Plan and project specifications;

**Effectiveness Monitoring** is used to determine if goals, objectives, standards and guidelines, and management prescriptions, as designed and implemented, are effective in meeting Forest Plan goals and objectives; and

**Validation Monitoring** is used to determine whether the data, assumptions, and coefficients used in the development of the Plan are correct.

Most monitoring elements involve the mitigation measures described previously. The mitigation measures are part of a process that includes these three types of monitoring to determine if the measure was implemented and is effective or needs revision. The feedback provided by monitoring results can be used to develop improved methods or additional treatments to ensure that the mitigation will be effective in the future.

## Mitigation/Monitoring Feedback Loop

An annual monitoring report is prepared by each Administrative Area of the Tongass and incorporated into one report at the end of each year. This report addresses all monitoring questions contained in the applicable Forest Plan; references all monitoring being conducted on the Area/Forest; assesses progress toward achieving the goals and objectives described in the Forest Plan; and either certify that the Forest Plan is sufficient to guide management of the Forest over the next year or propose needed changes and an approach for dealing with those changes.

Forest Plan monitoring is conducted over the entire Forest on a sample basis. Samples may or may not be taken within the Upper Carroll Project Area; however, monitoring results are designed to answer questions regarding the implementation and effectiveness of mitigation within the Project Area. A total of 36 implementation, effectiveness and validation monitoring items are identified in the forest-wide monitoring plan described in the TLMP RSDEIS (1996a). All monitoring is subject to funding and personnel limitations imposed upon the Agency.

## Routine Implementation Monitoring

Routine implementation monitoring assesses whether the project was implemented as designed and whether or not it complies with the Forest Plan. Planning for routine implementation monitoring began with the preliminary design of harvest units and roads. Specialists used on-the-ground inventories, computer inventories, and aerial photographs to prepare the documents called unit cards for each harvest unit in each of the alternatives. Cards were also prepared for each segment of road. Resource specialists wrote their concerns on the cards and then described how the concerns could be addressed in the design of each unit and road segment. Resource concerns and mitigation measures will be refined further during final layout when specialists will have one more opportunity to revise the unit and road card recommendations. The unit and road card documents will be the basis for determining whether recommendations were implemented for various aspects of the Upper Carroll Project.

Routine implementation monitoring is part of the administration of a timber sale contract. The sale administrators and road inspectors ensure that the prescriptions contained on the unit and road cards are incorporated into contract documents and then monitor performance relative to contract requirements.

## Effectiveness Monitoring

Effectiveness monitoring seeks answers about the effectiveness of design features or mitigation measures in protecting natural resources and their beneficial uses. Monitoring records will be kept by the responsible staff. Project-specific monitoring tasks are described in detail in Chapter 2.

## Validation Monitoring

Validation monitoring is conducted to show if the assumptions or models used in planning are correct. It is usually carried out at the Regional level in conjunction with research. Validation monitoring may or may not occur within the Upper Carroll Project Area since this type of monitoring is built into a Forest-wide Action Plan.





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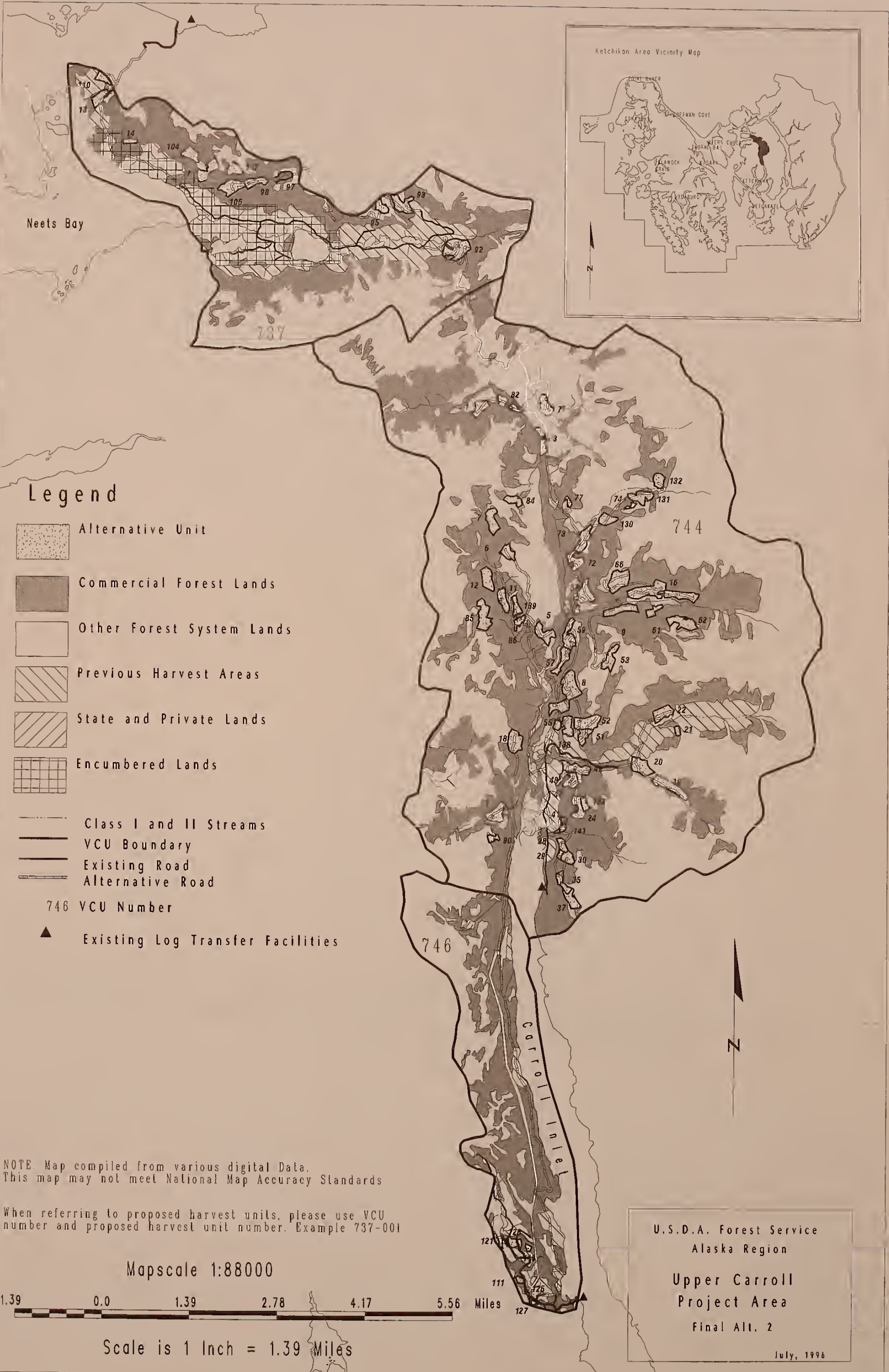
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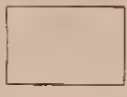




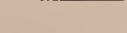
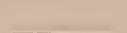


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**Legend**

-  Alternative Unit
-  Commercial Forest Lands
-  Other Forest System Lands
-  Previous Harvest Areas
-  State and Private Lands
-  Encumbered Lands
-  Class I and II Streams
-  VCU Boundary
-  Existing Road
-  Alternative Road
- 746 VCU Number
-  Existing Log Transfer Facilities

NOTE: Map compiled from various digital Data.  
 This map may not meet National Map Accuracy Standards

When referring to proposed harvest units, please use VCU number and proposed harvest unit number. Example 737-001

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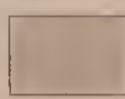
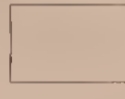


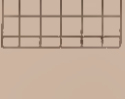




Scale is 1 Inch = 1.39 Miles

U.S.D.A. Forest Service  
 Alaska Region  
 Upper Carroll  
 Project Area  
 Final Alt. 2  
 July, 1996





**Legend**

-  Alternative Unit
-  Commercial Forest Lands
-  Other Forest System Lands
-  Previous Harvest Areas
-  State and Private Lands
-  Encumbered Lands
-  Class I and II Streams
-  VCU Boundary
-  Existing Road
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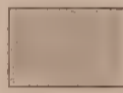
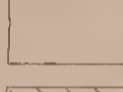








U.S.D.A. Forest Service  
Alaska Region  
Upper Carroll  
Project Area  
Final Alt. 3  
July, 1996







**Legend**

-  Alternative Unit
-  Old Growth Stands
-  Other Forest System Lands
-  Previous Harvest Areas
-  State and Private Lands
-  Encumbered Lands
-  Class I and II Streams
-  VCU Boundary
-  Existing Road
-  Alternative Road
- 746 VCU Number
-  Existing Log Transfer Facilities

NOTE: Map compiled from various digital Data.  
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When referring to proposed harvest units, please use VCU number and proposed harvest unit number. Example 737-001

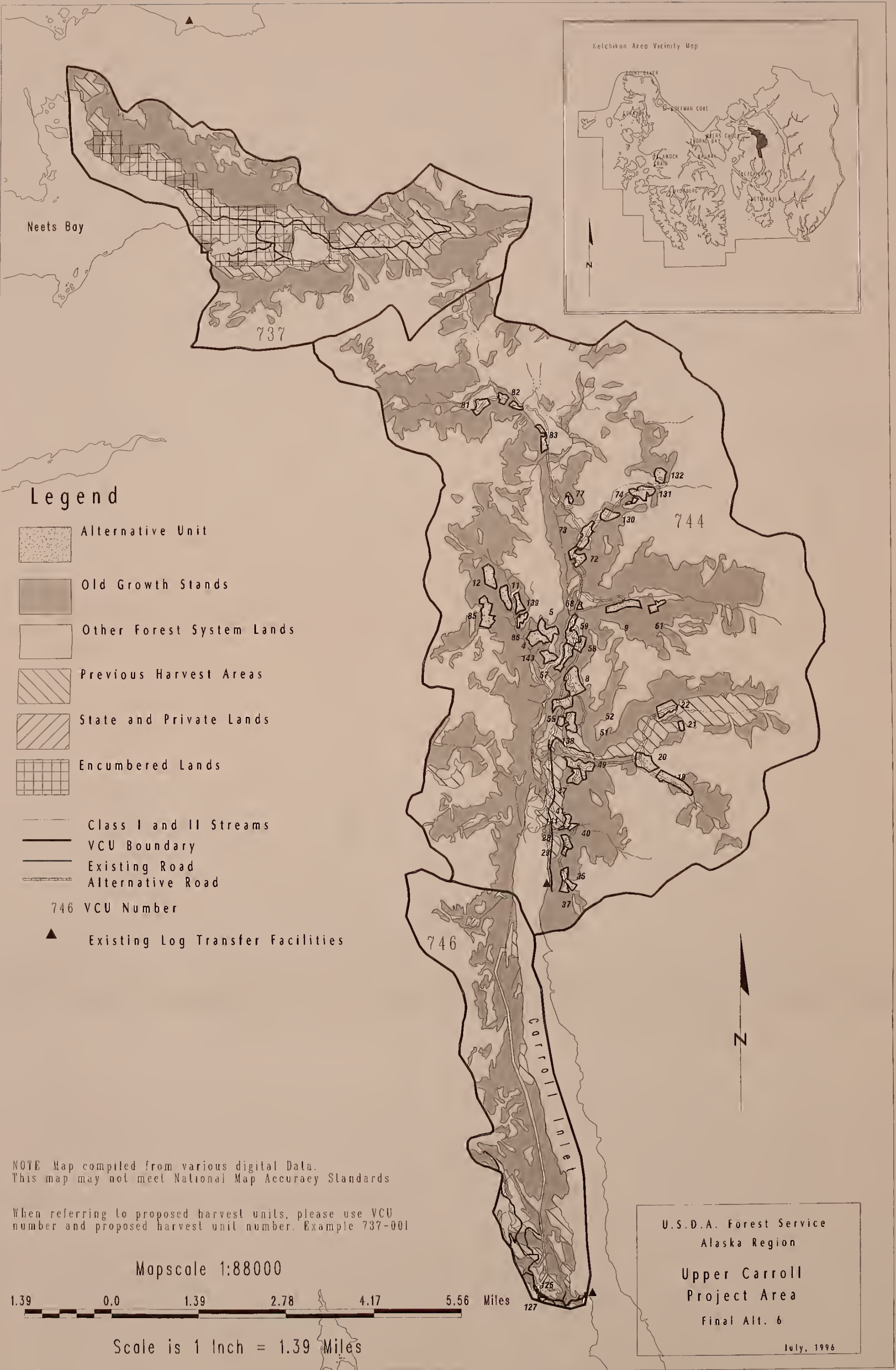
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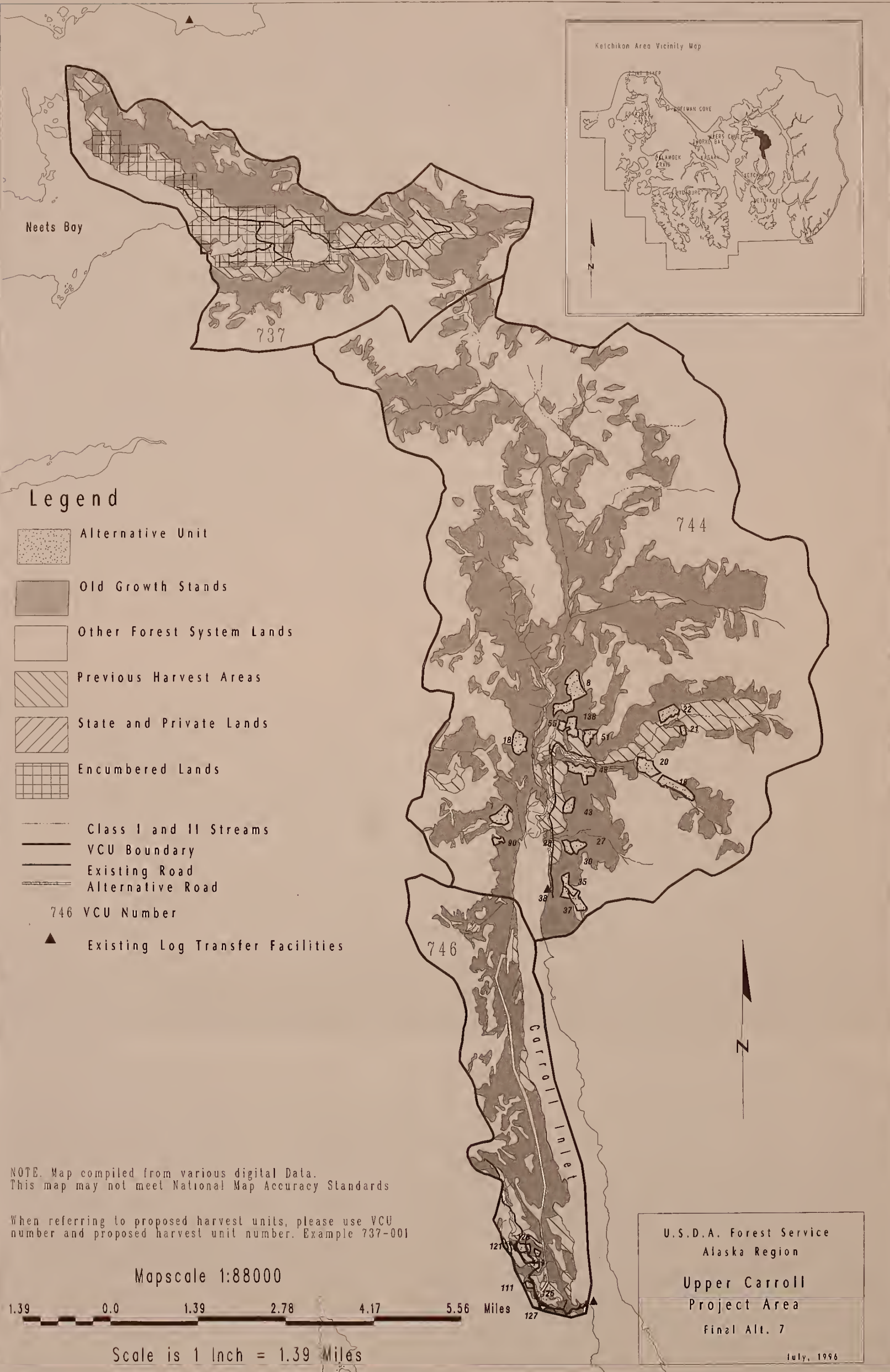
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Upper Carroll  
Project Area  
Final Alt. 5  
July, 1996







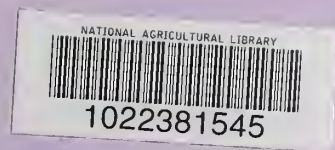


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When referring to proposed harvest units, please use VCU number and proposed harvest unit number. Example 737-001

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 Project Area  
 Final Alt. 7  
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