USDA United States Department of Agriculture

Forest Service

Tongass National Forest

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Sea Level Timber Sale

Draft Environmental Impact Statement

Summary

Acronymns And Symbols

ADF&G	Alaska Department of Fish and Game
AHMU	Aquatic Habitat Management Unit
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ASQ	Allowable Sale Quantity
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFL	Commercial Forest Land
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act of 1976
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information System
IDT	Interdisciplinary Team
KV	Knutsen-Vandenberg Act
LTF	Log Transfer Facility
LUD	Land Use Designation
LWD	Large Woody Debris (same as LOD)
MBF	Thousand Board Feet
MIS	Management Indicator Species
MM	Maximum Modification
MMBF	Million Board Feet
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
SHPO	State Historic Preservation Officer
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.

Draft Environmental Impact Statement

Sea Level

United States Department of Agriculture
Forest Service—Alaska Region

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Abstract

The USDA Forest Service proposes to harvest up to approximately 60 million board feet of timber in the Sea Level Project Area, Ketchikan Ranger District, Ketchikan Administrative Area, Tongass National Forest. The actions analyzed in this Draft Environmental Impact Statement (EIS) are designed to implement direction contained in the Tongass Land Management Plan (TLMP). The Draft 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 the TLMP Standards and Guidelines; 3) configure harvest units to emphasize timber sale economics, fisheries, wildlife, and subsistence values; 4) minimize harvest in important subsistence areas, wildlife travel corridors, and in the Sea Level Creek watershed; 5) avoid harvest in the Elf Point and Marble Creek areas and in wildlife travel corridors; and, 6) limit logging to the Shelter Cove area to minimize effects of roading on subsistence, fisheries, and wildlife habitat.

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Key Terms

Alternative—one of several options proposed for analysis and decision.
Best Management Practices (BMPs)—practices used for the protection of water quality.
Desired Future Condition—a desired condition of the land to be achieved sometime in the future but has no specific date by which it is to be completed.
Land Use Designation (LUD)—method of classifying land uses, presented in the Forest Plan (Tongass Land Management Plan, TLMP 1997).
MMBF—million board feet.
Management Prescriptions—management practices and intensities selected and scheduled for application on a specific area (e.g., a land use designation) to attain multiple-use and other goals and objectives.
Mitigation—measures designed to counteract or reduce environmental effects.
Roadless Area—an area of undeveloped public land with no improved roads, generally over 5,000 acres, as identified in the TLMP.
Scoping—activities used to determine the significance of a proposed action, what analysis is required, what data is needed, and what public participation is appropriate.
Subsistence—customary and traditional uses by rural Alaskan residents of wild renewable resources for personal or family consumption.
Value Comparison Unit (VCU)—areas which generally encompass a drainage basin where resource inventories and interpretations made.

Introduction

In compliance with the National Environmental Policy Act (NEPA) and other relevant laws and regulations, the Forest Service has prepared this Draft Environmental Impact Statement (EIS) on the effects of proposed timber harvest and related activities in the Sea Level Project Area on Revillagigedo (Revilla) Island of the Ketchikan Administrative Area, Tongass National Forest (Figure Summary-1).

Proposed Action

The proposed action would make available approximately 60 million board feet (MMBF) of timber, in multiple sales, to the Ketchikan Area timber sale program. The Sea Level Project Draft EIS discloses the direct, indirect, and cumulative environmental impacts and any irreversible or irretrievable commitment of resources that would result from five proposed action alternatives.

Decision to be Made and Responsible Official

The Council on Environmental Quality (CEQ) regulations for implementing NEPA states that an EIS "...should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker..." This EIS , in accordance with CEQ regulations, is not a decision document in itself, but is written to provide sufficient information for the decision-maker.

The Ketchikan Area Forest Supervisor is the responsible official for this Project. He must decide whether or not, and if so how, to make timber available from the Sea Level Project Area in accordance with the implementation of the Tongass Land Management Plan (TLMP 1997). Furthermore, if he selects an alternative which proposes timber harvest, he must decide:

- The volume of timber to make available in this area, in one or more timber sales;
- The locations of timber harvest units;
- The locations of arterial and collector roads; and
- The necessary standards and guidelines, mitigation measures, and enhancement opportunities for sound resource management

The decision will be documented in the Record of Decision expected in September 1998.

Project Area

The 91,747-acre Sea Level Project Area is located approximately 18 air miles northeast of Ketchikan, Alaska (Figure Summary-1). It encompasses an area of south central Revilla Island that extends from Swan Lake south along both sides of Carroll Inlet and includes the lands adjacent to Thorne Arm. 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 portions of Value Comparison Units (VCUs) 746, 753, 754.2, 755.2, 756, 757, and 759. VCU boundaries generally follow major watershed boundaries.

Purpose and Need for Action

The Sea Level Project is proposed at this time to move the Project Area toward the desired future condition identified in the Forest Plan (TLMP 1997) to attain the goals and objectives identified for the Project Area, as noted below.

The Forest Plan identified Forest-wide multiple-use goals and objectives (TLMP, pages 2-2 to 2-5), and are achieved through the allocation of lands to Land Use Designations (LUDs), through implementation of the Standards and Guidelines specified for these LUDs. Objectives are achieved by implementing the management prescriptions for each of the LUDs. Some of the goals and objectives listed for the Timber Production, Modified Landscape, and Scenic Viewshed LUDs include, among others:

- Improve timber growth and productivity on suitable timber lands made available for timber harvest, and manage these lands for long-term sustained yield of timber;
- Contribute to a timber supply to meet market demand; and
- Provide opportunities for local employment in the wood products industry, which in turn contribute to the local and regional economies of Southeast Alaska.

The Sea Level Project is designed to meet these goals and objectives. This Project will move the Area towards the desired condition by managing suitable timber lands for the production of sawtimber and other wood products, and by creating a variety of successional stages to provide a range of wildlife habitat conditions (TLMP, pages 3-127, 3-135 to 3-136, and 3-144).

Timber Growth and Productivity

Losses of the timber resource caused by age decay and disease are considerable in old-growth forests. It is not uncommon for well over 30 percent of the timber volume in old-growth stands to be defective and thus unusable for wood products. Tree vigor tends to decrease with maturity, causing an increase in susceptibility to pathogens and insects. Disease and decay processes are a natural part of forest ecosystems, and play a key role in providing wildlife habitat in old-growth forests.

The Forest Plan allocated approximately 53 percent of the land within the Sea Level Project Area to the Timber Production LUD. The desired condition for this LUD, as identified by the Forest Plan, states that suitable timber lands are to be managed for the production of sawtimber and other wood products.

An additional 20 percent of the land within the Sea Level Project Area is allocated to the Modified Landscape and Scenic Viewshed LUDs respectively. The desired future condition for these lands is to produce a yield of timber which contributes to the Forest-wide sustained yield (TLMP, pages 3-136 and 3-127).

The remaining 27 percent of the Project Area is allocated to non-development LUDs, mostly Semi-remote Recreation (12 percent) and Old-growth Habitat (12 percent). The desired condition for the Semi-remote Recreation LUD is to provide for recreation and tourism in natural appearing settings with ecological processes and natural conditions being only minimally affected by past or current human activities. The desired condition for the Old-growth Habitat LUD states that all forested areas will have attained old-growth forest characteristics, providing a diversity of old-growth habitat types and associated species and subspecies and ecological processes. Timber volume from either LUD (such as salvage) does not contribute to the Forest-wide allowable sale quantity.

Timber Market Demand

Section 101 of the Tongass Timber Reform Act of 1990 (TTRA) provides direction 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," to the extent consistent with the multiple use and sustained yield of all renewable forest resources and other direction. Market demand for Tongass National Forest timber is derived from factors which include: Southeast Alaska's timber industry mill capacity; local, national, and international timber markets; and projected local, national, and world-wide timber supplies.

The Forest Service intent is to provide the opportunity for the timber industry as a whole to acquire a supply of purchased, but unharvested timber equal to about 3 years of timber consumption, considering the average rate of harvest for the past few years and any indicators of change in that rate from planning cycle projections or other sources. This supply is a means of providing for stability in relation to fluctuating market demand. It is estimated that a 3-year supply of timber, based on medium demand projections, is 399 mmbf.

Summary

As of September 30, 1997 there is 504 MMBF of unharvested timber volume under contract to the timber industry (Automated Timber Sales Accounting System Report 900, September 30, 1997). Of this volume, however, 300 mmbf is allocated to the Ketchikan Pulp Company under the terms of the long-term contract settlement agreement, with 204 MMBF under independent industry contract. Thus in order to meet the intent of having a 3-year supply, approximately 195 mmbf of timber needs to be cleared through the NEPA process and offered to industry. It takes approximately 3 years for timber to be cleared through the NEPA process. At this time, there is approximately 624 MMBF proposed under other ongoing NEPA analyses on the Tongass for the 1998 to 2002 period. Any timber volume from the Sea Level Project Area will contribute to the 3-year supply.

Timber volume from the Sea Level Project will be provided as a component of the 10-year timber program identified by the Forest Plan, which attempts to provide timber to industry in an even flow over the planning cycle. The Forest Plan states that the Ketchikan Area is expected to contribute up to a maximum of 121 mmbf per year for the next 10 years (TLMP 1997, Appendix L-8).

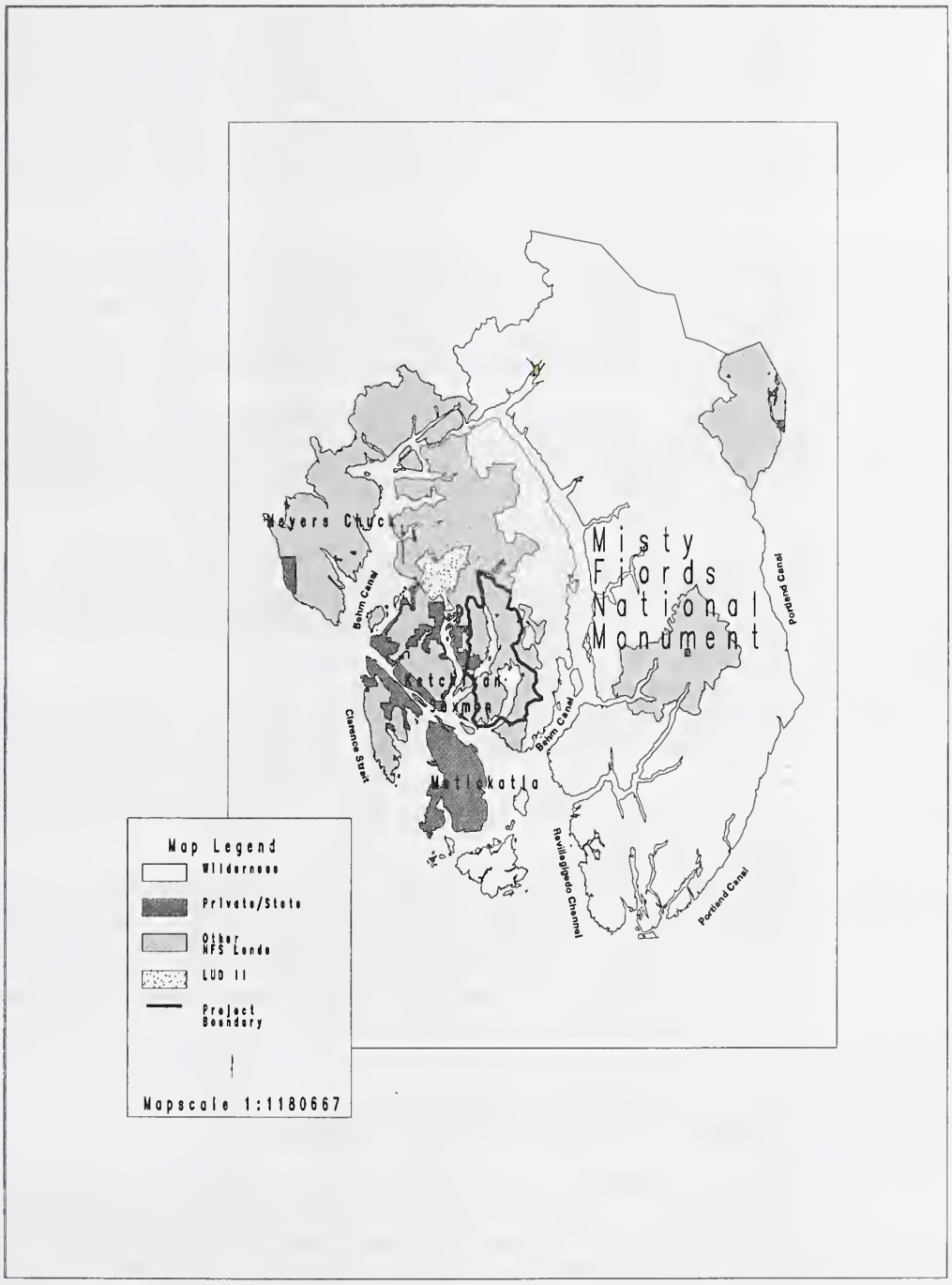
Appendix A of this Draft EIS provides a detailed rationale for why the Sea Level Project Area was selected for analysis at this time.

Local Employment Opportunities

Timber is one of several valuable resources on the Tongass and many people depend on it for their livelihood. Timber from the Tongass is harvested for sawn wood products such as lumber and cants and wood chip exports, and is the basis for a major industry in Southeast Alaska that provided about 1,749 direct jobs in Fiscal Year 1996 (Alaska Department of Labor, May 1997).

The Tongass timber program is part of a long-term cooperative effort between the Federal government, the State of Alaska, and local governments to provide economic diversity and stability in Southeast Alaska and year-round employment. The Sea Level Project would contribute to this, providing the opportunity for approximately 494 jobs and $21.0 million in associated income.

Figure Summary-1
Project Area Vicinity Map



Public Participation in the Decision-making Process

Scoping

The NEPA process (40 CFR 1501.7) was used to determine the scope of the issues to be addressed and identify major concerns by inviting public participation and collecting initial comments. This process began formally in May 1997 with the mailing of a scoping package to approximately 623 individuals and groups that had previously shown interest in Forest Service projects in Southeast Alaska. The mailing included eight Federal agencies, 18 State agencies and divisions, 67 Native and municipal offices, and 213 businesses and other organizations and groups, in addition to individual citizens. Forty-nine responses to this initial mailing were received.

Announcements about the project were printed in the Ketchikan Daily News, Island News, Wrangell Sentinel, Sitka Sentinel, Petersburg Pilot, and Juneau Empire. A scoping document describing the project was placed in the Ketchikan Daily News. A news release was issued to all Southeast Alaska news outlets (radio/TV/newspaper). A Notice of Intent to prepare an Environmental Impact Statement (EIS) was published in the Federal Register on May 9, 1997.

Two open house public meetings were held in Ketchikan in May 1997 at the Saxman Tribal House in Saxman and at the Cape Fox Lodge in Ketchikan. Additional briefings were held on issues and alternatives April 1997 through February 1998 with various individuals and organizations. Consultation with tribal, local, state and federal government agencies also occurred during this time.

An open IDT meeting was provided to offer the public a chance to comment on the significant issues and the range of alternatives the IDT had identified for the Draft EIS as a result of public scoping. The results of the meeting were documented in an article by the Ketchikan Daily News in November 1997.

Draft EIS

Public Comment Period for Draft EIS

Release of the Draft EIS will initiate a minimum 45-day comment period during which time written or verbal comments will be welcomed from interested parties. The period for public comments on this Draft EIS and the deadline for receipt of comments are identified in the cover letter accompanying this document and will be published in the local news media.

Subsistence Hearings

Subsistence hearings on the Draft EIS will be held in the communities of Saxman and Ketchikan, Alaska. Open houses to describe the analysis process and to answer public questions will be held in conjunction with the subsistence hearings. Public comment on the Draft EIS will also be accepted at that time. Comments will be recorded and transcribed. Dates, times, and locations are included in the cover letter accompanying this document and will be publicized in the local media.

Issues To Be Addressed

The significant public issues, management concerns, and resource opportunities identified through the public and internal scoping process were used to formulate issue statements. Issues were raised by individuals, organizations, other Federal agencies, State and local agencies, as well as affected Alaska Native governments. In addition, some of these issues reflect Forest Service concerns. Similar issues and concerns were grouped when appropriate.

Significant Issues

Issues 1 through 7 were determined to be significant and within the scope of the project. All these issues will be addressed in all alternatives. Issues A-F were considered but eliminated from detailed study because their resolution falls outside the scope of the decision to be made.

Issue 1: Timber Harvest 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 a concern of how the Project Area contributes to the timber supply. It also includes concern for ensuring cost-effective timber harvest.

The units of measure that will be analyzed for effects regarding this issue are total harvest volume, harvest method by acres, harvest method by volume, and total acres deferred from harvest by volume.

Issue 2: Fish Habitat, Water Quality and Soils

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 Sea Level Project Area are important to sport, commercial, and subsistence users throughout Southeast Alaska. 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.

Units of measure that will be analyzed for effects regarding this issue include changes in sedimentation levels, stream water temperatures, risk of landslides on high mass movement soils, total road miles in stream buffers, and number of stream crossings.

Issue 3: Recreation and Scenic Quality

Forest management activities could affect existing recreational pursuits for users of the Sea Level Project Area. Specifically, increased human access, timber harvest, and other development activities could affect recreation values and opportunities including: hunting, fishing, scenic quality, and recreation use areas. Comments emphasized the importance of protecting existing scenic quality along inlets and bays, particularly from the Fish Creek cabin at the upper end of Thorne Arm. The quality and types of recreation activities available to forest users could be enhanced by planning, facilitating, or developing a road system that, when eventually linked to Ketchikan, would allow increased access to existing and potential recreation sites.

Units of measure that will be analyzed for effects regarding this issue include changes in acres by Recreation Opportunity System classification, by Recreation Place, and by roadless acreage. Scenic or visual quality will be measured by whether or not proposed visible disturbance activities (harvest units, roads, rock pits, LTFs and logging camps) would be consistent with the Forest Plan visual quality objectives when viewed from sensitive saltwater and recreation use area viewpoints.

Issue 4: Wildlife Habitat

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. Related to the overall concern is the question of whether timber harvest operations would further fragment existing large blocks of old-growth habitat with resulting declines in biological diversity.

Units of measure that will be analyzed for effects regarding this issue include changes in acres of wildlife and MIS habitat capability, high value marten habitat, unfragmented old growth reserves, and late successional travel corridors.

Issue 5: Subsistence Use

Primary concern is for the 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. Other aspects to be evaluated are competition from non-rural subsistence users and access to the resources.

Units of measure that will be analyzed for effects regarding this issue include the abundance and distribution of subsistence resources (such as habitat capability of deer), competition from other resource users by community, and the ability of subsistence resource users to access the Project Area.

Issue 6: Social and Economic Effects

This issue reflects concerns about Project 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.

Units of measure that will be analyzed for effects regarding this issue include an estimate of timber receipts returned to local communities and governments expressed in mid-market net stumpage, the annual number of direct and indirect jobs opportunities and estimated annual average wages created by this Project.

Issue 7: 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. Three potential or existing Log Transfer Facility (LTF) sites are under consideration in the alternatives.

Units of measure that will be analyzed for effects regarding this issue include the number and location of LTFs and logging camps, and acres of bank embankment and bark deposition affected.

Issues Beyond the Scope of This Project

The following public issues were considered but eliminated from detailed study because their resolution is beyond the scope of the decision to be made.

Issue A: Regional Timber Supply and Demand

Analysis of timber supply and demand is a regional issue which exceeds the scope of this analysis. This issue was addressed as part of the TLMP Revision process (TLMP, 1997a). A site-specific environmental analysis documents the effects of the proposed activities. The volume of timber cleared in a NEPA document may be offered (sold) in whole, in part, or not at all, depending upon rapidly changing market conditions or other factors important in the overall management of the National Forests. Therefore, trying to predict the effects of the proposed activities upon the regional timber supply and demand is beyond the capability and scope of this document, other than concluding that timber offerings that implement the project will contribute volume to the timber supply and will help meet demand.

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

Issue B: Manage the Sea Level Project Area for Sustained Yield

The National Forest Management Act (NMFA) 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 (10 years in the case of

NMFA). There is no direction or intent to establish a sustainable level of harvest for individual Project Areas or small geographic subdivisions of the Forest. All proposed action alternatives considered meet Forest Plan standards and guidelines.

Issue C: 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 is not a connected nor reasonably foreseeable action ripe for decision.

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 are displayed in Chapter 3 of this Draft EIS.

Issue E: Ketchikan to Shelter Cove Transportation Link

This issue reflects the resource concerns, as well as the opportunity, to coordinate the construction of logging roads and potential future connections to the road system on other parts of Revilla Island, specifically Ketchikan to Shelter Cove on Carroll Inlet Several alternative routes could connect the Ketchikan road system to the Shelter Cove road system. All these routes are outside the Sea Level Project Area, and no connection is anticipated under any alternative. A road connection would not be constructed and available for use for another 10 years. A preliminary analysis indicates that it would be cheaper to raft the logs back to Ketchikan or elsewhere, and therefore a timber sale would not facilitate a road connection in any case. While the two actions appear to be linked because of geography, the timing is not similar. Nor are the two actions inextricably linked; the timber sale may proceed without a road connection and a road connection may be constructed without a timber sale. The reasonably foreseeable cumulative effects of a road connection will, however, be addressed in this Draft EIS.

Issue F: Heritage Resources

The Project Area lies largely within the area traditionally claimed by two Southern Tlingit groups, the Tantakwan (also referred to as the Tongass or Ketchikan Tribe) and the Sanyakwan (also referred to as the Saxman or Cape Fox Tribe). Because of the importance of preserving the Tlingit culture and traditional values, the National Historic Preservation Act (NHPA) directs Federal agencies to take into account the effect of proposed actions on historic heritage or cultural properties. The Forest Service has avoided all known heritage resource sites in the Project Area or otherwise specified stipulations to protect them.

Development of Alternatives

The action alternatives in this EIS were developed as site-specific proposals which could clearly display environmental consequences. Collectively, they explore ways to satisfy public concerns and resolve the issues discussed in Chapter 1 of the EIS, while responding to the stated purpose and need for the project. Each action alternative responds differently to the issues. Each alternative represents a site-specific proposal developed through intensive interdisciplinary harvest 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 and guidelines contained in the Forest Plan, the Alaska Regional Guide, and applicable Forest Service manuals and handbooks.

The first step in formulating alternatives was to develop a logging plan that identified a "pool" of timber harvest units and associated road systems from the tentatively suitable land base.

The pool was examined in the field and reviewed by the Sea Level interdisciplinary team before it was finalized. Then, harvest units were selected from the pool and assigned to each of the alternatives.

Alternatives Considered for Detailed Study

Six alternatives (five action alternatives and a no-action proposal) were considered in detail for this project. Each action alternative is consistent with the Forest Plan (TLMP 1997). Each alternative was developed to respond differently to the issues, and to provide a range of choices for the decision maker. Maps are included (distributed with the Draft EIS) which display the proposed roads and harvest units for each of the alternatives. Alternatives are compared by issue in detail later in this chapter and are summarized in Table Summary-1.

Alternative 1 (No Action)

Emphasis

The emphasis of this alternative is to propose no new timber harvest and roads from the Sea Level Project Area at this time. It does not preclude timber harvest from other areas at this time, or from the Sea Level Project Area at some time in the future. The Council on Environmental Quality (CEQ) regulations 40 CFR 1502.14d requires a "No Action" alternative be analyzed in every EIS. Alternative 1 represents the existing conditions in the Project Area and serves as a benchmark by which effects of the other action alternatives are measured.

Outputs

There are no new timber harvest outputs associated with this alternative. Visual quality, wildlife habitat quality, subsistence use, semi-remote 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 in 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 Forest Plan 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 within the Project Area (see Appendix A).

Outputs

Implementation of this alternative would schedule the harvest of 2,843 acres, in 108 harvest units for approximately 71 MMBF of sawlog and utility volume, indicating an average unit size of 26 acres. Of this harvest, 427 acres are planned for individual tree mark (ITM) partial cut; the remainder are planned for patch clearcut harvest. To implement this level of harvest, 59 miles of new road would be constructed, and 23 miles of existing road would require reconstruction. Road construction clearing will yield an additional 6 MMBF of right-of-way volume. This indicates an average of 102 MBF per mile of new road construction for Alternative 2. Alternative 2 schedules 232 acres for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of a positive $71.78 per MBF.

The use of three existing LTFs will be required to implement this alternative. Floating or land based logging camps and log sort yards are anticipated at the Shelter Cove, Shoal Cove and Elf Point LTFs.

Alternative 3

Emphasis

The objective of this alternative is to emphasize timber economics by harvesting stands with the greatest potential for economic return. The location of harvest units, selection of silvicultural prescriptions, logging systems, and transportation network is primarily based upon maximizing the appraised timber value. This approach emphasizes a positive net economic return for the proposed harvest units, by seeking to minimize logging and road construction costs. This entry proposes only limited helicopter timber yarding. Alternative 3 minimizes impacts to old-growth habitat blocks, late-successional corridors, riparian habitat, and wetlands.

Outputs

Alternative 3 schedules the harvest of 63 individual harvest units, totaling 39 MMBF of sawlog and utility volume from 1,620 acres, indicating an average unit size of 26 acres. Of this harvest, 194 acres are planned for ITM partial cut; the remainder are planned for patch clearcut harvest. This alternative requires the construction of 39 miles of new specified roads plus 18 miles of reconstruction. Road construction clearing will yield an additional 3 MMBF of right-of-way volume. This indicates an average of 78 MBF per mile of new road construction. Alternative 3 schedules 43 acres for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of a positive $32.22 per MBF.

The use of three existing LTFs will be required to implement this alternative. Floating or land based logging camps are anticipated at the Shelter Cove, Shoal Cove and Elf Point LTFs.

Alternative 4

Emphasis

The emphasis of this alternative is to meet the stated purpose and need while responding to public comments to avoid timber harvest in the Minx Flat area. Minx Flats is avoided to maintain more connective habitat between the Carroll Point medium old-growth habitat reserve and Misty Fiords National Monument, and to address high value marten habitat concerns in VCU 7560. Alternative 4 also avoids harvest in the Sea Level watershed. Harvest unit selection and road locations attempt to minimize the harvest of high value subsistence, riparian and wildlife habitat, while maintaining the integrity of large, unfragmented blocks of old-growth forest to the maximum extent practicable.

Outputs

Alternative 4 schedules the harvest of 45 individual harvest units, totaling 27 MMBF of sawlog plus utility volume from 1,226 acres, indicating an average unit size of 27 acres. Of this harvest, 49 acres are planned for ITM partial cut; the remainder are planned for patch clearcut harvest. This alternative requires the construction of 26 miles of new specified roads plus 20 miles of reconstruction. Road construction clearing will yield an additional 2 MMBF of right-of-way volume. This indicates an average of 77 MBF per mile of new road construction. Alternative 4 schedules 43 acres for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of a positive $34.26 per MBF.

The use of three existing LTFs will be required to implement this alternative. Floating or land based logging camps are anticipated at the Shelter Cove, Shoal Cove and Elf Point LTFs.

Alternative 5

Emphasis

The emphasis of this alternative is to meet the stated purpose and need while responding to public comments to avoid timber harvest in the Minx Flats, Elf Point, and Marble Creek areas. This alternative avoids harvest in the Minx Flats area to address wildlife habitat connectivity concerns in that area. This alternative is similar to Alternative 4 except it avoids timber harvest and road construction in the Elf Point area to protect wolf and deer habitat.

Outputs

Alternative 5 schedules the harvest of 31 individual harvest units, totaling 20 MMBF of sawlog plus utility volume from 847 acres, indicating an average unit size of 27 acres. Of this

harvest, 59 acres are planned for ITM partial cut; the remainder are planned for patch clearcut harvest. This alternative requires the construction of 22 miles of new roads plus 19 miles of reconstruction. Road construction clearing will yield an additional 2 MMBF of right-of-way volume. This indicates an average of 91 MBF per mile of new road construction. Alternative 5 schedules 35 acres for helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of a positive $2.33 per MBF.

The use of two existing LTFs will be required to implement this alternative. Floating or land based logging camps are anticipated at the Shelter Cove and Shoal Cove LTFs.

Alternative 6

Emphasis

The objective of this alternative is to respond to public comments suggesting that only those units in the Shelter Cove area accessed by existing road systems should be considered for harvest. The remainder of the Project Area would be deferred to emphasize other resource values. Avoiding new road construction addresses the subsistence use, fish and water quality, and wildlife habitat issue of roaded access in a different manner than with standard road construction and subsequent road closures.

Outputs

Alternative 6 schedules the harvest of 13 individual harvest units, totaling 8 MMBF of sawlog plus utility volume from 390 acres, indicating an average unit size of 30 acres. Of this harvest, no acres are planned for ITM partial cut; all the units are planned for patch clearcut harvest. This alternative requires the construction of 11 miles of new specified roads plus 7 miles of reconstruction. Road construction clearing will yield approximately 1 MMBF of right-of-way volume. This indicates an average of 91 MBF per mile of new road construction. Alternative 6 schedules no helicopter yarding. Preliminary analysis indicates a net mid-market stumpage value of a negative $8.90 per MBF.

Use of the existing LTF at Shelter Cove will be required to implement this alternative; a floating and/or land-based logging camp is anticipated.

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 Draft EIS. A final determination will be made by the Tongass Forest Supervisor in the Record of Decision (ROD).

Comparison of Alternatives

The comparison of alternatives draws together the conclusions from the analysis presented throughout the document and provides a summary of the results. The following sections provide a comparison of alternatives by: (1) summary comparison of outputs and environmental consequences; (2) proposed activity; and (3) significant issues.

Table Summary-1 provides a summary of activities, outputs, and environmental consequences by which the alternatives may be compared.

Table Summary-1
Summary Comparison of Alternatives

Activity/Resource	Units	Alternatives 1	2	3	4	5	6
Timber							
Units	Number	0	106	61	45	31	13
Estimated harvest unit volume	MMBF	0	71	39	27	20	8
Estimated right-of-way (ROW) volume	MMBF	0	6	3	2	2	1
Individual tree mark	Acres	0	444	198	56	68	0
Patch clearcut/clearcut/group select	Acres	0	2,399	1,422	1,170	779	390
Total harvest	Acres	0	2,843	1,620	1,226	847	390
Shovel harvest	Acres	0	180	128	44	44	8
Cable harvest	Acres	0	2,431	1,449	1,139	1,907	382
Helicopter harvest	Acres	0	232	43	43	35	0
Estimated Net-stumpage (mid-market rates)	$ / MBF	0	71.78	32.22	34.26	2.33	(8.90)
Total receipts to State of Alaska	$Millions	0	5.12	2.88	1.92	1.54	.01
Average annual jobs over 4 years	No. of jobs/year	0	157	91	58	49	16
Roads and Transportation							
New road construction	Miles	0	58.8	39.1	26.0	22.4	10.7
Road reconstruction	Miles	0	23.1	18.3	19.5	18.8	7.2
Roads crossing Class I or II streams	Number	0	20	5	4	3	5
Biodiversity							
Unfragmented old-growth patches remaining							
1,000 Acres and larger	Acres	5,695	4,287	4,901	5,464	5,553	5,695
500 - 1,000 Acres	Acres	4,397	714	3,641	3,673	3,353	4,397
100 - 500 Acres	Acres	4,732	5,676	4,172	4,137	4,738	4,554
Corridors connecting old growth blocks	Acres harvested	0	98	98	0	0	0
Old growth acres remaining in Project Area	Acres	17,534	14,128	15,699	16,220	16,577	17,251
Percent of 1954 old-growth remaining	Percent	54	43	48	50	51	53
Wildlife - Project Area							
1997 MIS - deer	Habitat capability	2411	2311	2350	2366	2380	2400
1997 MIS - bear	Habitat capability	172	172	172	172	172	172
1997 MIS - marten	Habitat capability	160	154	156	157	158	159
1997 MIS - gray wolf	Habitat capability	7.0	6.7	6.9	6.9	6.9	7.0
Subsistence - WAAs 405 and 406							
Deer Habitat Capability (percent of 1954)	Percent	87	85	86	86	86	87
Deer Population Needed to Support Current Harvest (Percent of 1954 Habitat Capability)	Percent	22	22	22	22	22	22
Soils							
Very high mass movement	Acres harvested	0	0	0	0	0	0
High mass movement	Acres harvested	0	1,367	649	513	283	229
Wetlands harvested	Acres	0	914	556	444	309	260
Wetlands roaded	Miles	0	34	22	17	12	6
Roadless Areas							
Roadless areas	Acres (M)	34,413	24,925	30,217	27,440	29,954	34,413

Source: Griffin 1998.

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. Chapter 3 contains the detailed evaluation of the potential effects of timber harvest and road construction activities under each alternative on forest resource. The following section compares the action alternatives by identified issue, proposed activity, and environmental consequence. This comparison draws together conclusions from information presented throughout the EIS and briefly summarizes analysis results. Alternative 1 is the baseline for comparisons (see Table Summary-1 for numerical comparisons).

Issue 1: Timber Harvest Economics and Supply

Logging Systems

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

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 2 proposes the most helicopter acreage (232), while Alternative 6 proposes none. Table Summary-1 displays the acres of harvest proposed for each logging system proposed in each alternative.

Mid-market Value

The analysis of timber values in the Silviculture and Timber section of Chapter 3 looks at the mid-market estimates for each alternative. Table Summary-1 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). The stumpage value expresses the net dollar value of the timber volume after subtracting the production, manufacturing and profit/risk costs from the log values.

Alternatives 2, 3, 4 and 5 show a positive net-stumpage of $72, $32, $34, and $ 2 respectively, while Alternative 6 shows a negative $ 9 per MBF.

Timber Supply

The Sea Level Project Area is composed of moderately difficult topography from a logging standpoint. Alternative 2 would harvest 2,843 acres yielding 77 MMBF (including ROW volume) and Alternative 6 would harvest 390 acres yielding 9 MMBF (including ROW volume). Alternative 3, 4, and 5 would harvest 1,620 acres, 1,226 acres, and 847 acres respectively (see Table Summary-1).

Public concern has been focused on the effects of timber supply on community stability and rates of harvest scheduled in the Forest Plan. The TLMP Revision has addressed this issue by incorporating updated information into the Forest Plan which includes not only the effects on timber supply, but land use allocations and revised standards and guidelines. The Ten Year Sale Action Plan in Appendix A reflects the updated Forest Plan and its application to the Sea

Level Project Area. The Sea Level project is consistent with the TLMP standards and guidelines.

Issue 2: Fish Habitat and Water Quality

Best Management Practices

We anticipate no measurable effects 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 site specific stream buffers that range from 100 to 500 feet wide 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 (FSH 2509.22) during the design of units and roads minimize the potential direct effects to fish as well. Site-specific BMPs are noted on the individual unit and road cards in Appendix H of the Sea Level Draft EIS.

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-Aquatic Resources of the Draft EIS). During placement of culverts or bridges, sediment is introduced into streams which will have short-term effects on water quality. Improper application of BMPs could result in long-term habitat degradation. Alternative 5 proposes the fewest stream crossings, while Alternative 2 proposes the most.

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. Increased stream sedimentation can result in loss or impairment of fish spawning and rearing habitat. Table Summary-1 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 that have been retained in the unit pool. These sites have been examined by a professional soil scientist during unit reconnaissance.

Sediment Transfer and Deposition

A number of 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 D (Watershed Report) of the Draft EIS. 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 consider when planning activities on areas linked to important aquatic habitat.

Results of sediment transport and deposition risk assessment for roads and units in the Sea Level action alternatives indicate that Alternatives 4, 5, and 6 have a lower overall risk of sediment delivery to streams than the other action alternatives. Alternative 6 harvests the fewest acres, and avoids most sensitive areas. Alternative 3 reduces overall risk by minimizing harvest unit location and road construction near some stream courses. Alternative 2 poses the highest risk of sediment delivery from road-related sediment.

Issue 3: Recreation and Scenic Quality

Scenic Quality

Management activities could affect existing recreational pursuits of users of the Sea Level project area. Increased access, timber harvest, and other developments could affect recreation values and opportunities including: hunting, fishing, scenic quality, and existing recreation use areas. Comments mentioned the importance of protecting the scenic quality along inlets and bays, particularly around the Fish Creek Cabin. The quality and types of recreation activities available to forest users could be enhanced by developing a road system that, when linked to Ketchikan, would allow increased access to existing and potential recreation sites. Other aspects of this issue were related to the visual impacts to flight-seeing.

There are six key viewsheds within the Project Area. The visual quality objectives (VQOs) for this project establish the minimum scenic management standards for these viewsheds: Saddle Lakes, Middle Carroll Inlet, Lower Carroll Inlet, Upper Thorne Arm, Lower Thorne Arm, and Fish Creek. Alternative 1 represents the existing visual condition. In all viewsheds for all action alternatives, the proposed harvest units and roads achieve the Forest Plan visual quality objectives.

Roadless Areas

The 1997 TLMP 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 5,000 acres to be considered roadless. Table Summary-1 displays the acres of roadless area that will remain after implementation of each alternative. Neither Alternative 1 nor Alternative 2 affect the roadless areas. Alternative 2 would reduce the roadless area acreages the most (by approximately 10,000 acres) and Alternative 3 would reduce roadless area acreages the least of the remaining alternatives (by approximately 4,000 acres).

Issue 4: Wildlife Habitat

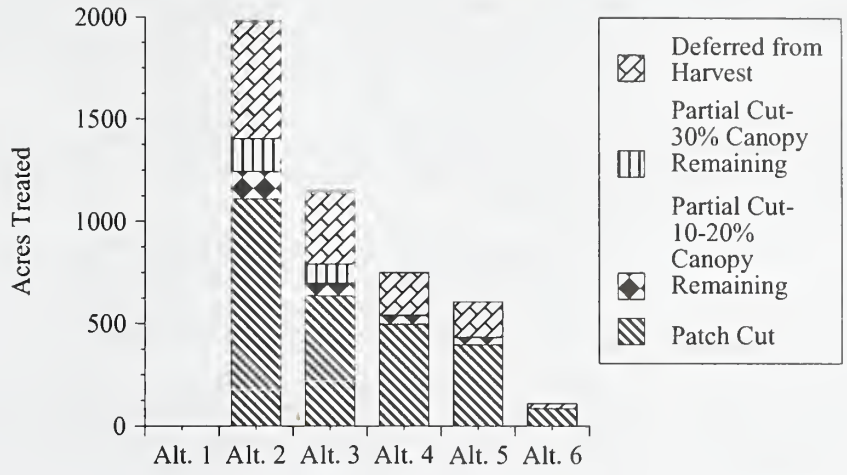
This issue includes concerns over several wildlife species and the habitats critical to maintenance of those wildlife populations, as Alaskan fish and wildlife are valuable for aesthetic, economic, recreational, and subsistence purposes. Of primary concern are the effects of timber harvest and associated road construction upon wildlife species dependent on old growth habitat. 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 (incorporating the issues of connectivity and open road densities) that ties into a larger scale (Forest Plan) habitat strategy was also identified.

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 (1997) and the Forest-wide Standards and Guidelines.

Table Summary-1 displays wildlife habitat capabilities, as estimated by habitat capability models, for the key Management Indicator Species (MIS) found in the Sea Level Project Area.

The TLMP defines high value marten habitat as stands below 1,500 feet elevation in high volume productive old growth strata. There are approximately 19,821 acres of high value marten habitat in the Project Area. Figure Summary-2 compares the amount of TLMP high value marten habitat harvested under each alternative.

Figure Summary-2
Acres of the TLMP High Value Marten Habitat Treated, by Alternative



Source: Burns 1997. Data derived from GIS database.

In all alternatives, over half of the TLMP high value marten habitat is treated using patch cuts. About twice as many acres are patch cut as are deferred from harvest. Acres with partial cut treatments fall into two categories. Those in VCUs with less than 33 percent of the productive old growth harvested retain 10 to 20 percent of the original stand structure per TLMP marten standards and guidelines. Those VCUs with over 33 percent of the productive old growth harvested retain 30 percent canopy closure to meet TLMP marten standards and guidelines.

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. The Project Area contains a significant amount of old-growth habitat in blocks over 1,000 acres in size. Table Summary-1 displays the number of acres of old-growth habitat in large blocks that will remain after implementation of an alternative.

Large and medium sized blocks of old growth (Misty Fiords National Monument, Carroll Point, and Swan Lake) are adjacent to the Project Area. Several small reserves of unfragmented old-growth habitat located inside the project boundary. None of the alternatives propose harvest in small, medium or large old growth reserves as established in TLMP 1997.

Late successional corridors that provide connectivity between core areas of unfragmented old-growth habitat were identified. Alternatives 2 and 3 would impact the corridors to the

largest degree (98 acres). Alternatives 4, 5 and 6 do not harvest any of the connecting corridors.

All alternatives are consistent with the viable population strategy in the 1997 Forest Plan.

Issue 5: Subsistence Use

Primary concern is 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. Aspects to be evaluated are competition from non-rural subsistence users and access to the resources.

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 6 would cause the least reduction to deer habitat capabilities, while Alternative 2 would reduce deer habitat capabilities the most within the Project Area.

The Project Area is located within portions of two Wildlife Analysis Areas (WAA), 405 and 406. The harvest is 110 deer per year based on ADF&G hunter surveys for both complete WAAs. Approximately 22 percent of the original (1954) habitat capability is needed to support this level of deer harvest. Currently (1997) the 2 full WAAs provide 87 percent of the original habitat capability for deer. The habitat capability through the year 2007 is projected to be approximately 85 percent of the original (1954) habitat capability.

Table Summary-1 displays the percent of 1954 deer habitat capability for each alternative compared to the percent needed to support current deer harvest levels in WAAs 405 and 406. The full WAA habitat capability has not been reduced for the effects of fragmentation.

Competition for subsistence resources in the Project Area is an 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 rural residents' ability to obtain subsistence resources. In the Wildlife Section, the cumulative analysis discussed a potential road connection between Shelter Cove and Ketchikan. If such a connection is made, it could increase the amount of rural and non-rural use of the area. This may lead to an increase in the amount of competition to the point that there could be a significant restriction in subsistence use of deer and marten in the Project Area.

At that point the Federal Subsistence Board could exercise its authority to regulate non-rural harvest of deer and prioritize the harvest of deer among rural residents 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 analysis indicates that the actions proposed in Alternatives 2 through 6 will not represent a significant possibility of a significant restriction on subsistence use of deer, black bear,

marten or otter in the Project Area. Direct effects may cause a significant possibility of a significant restriction for wolves. This is based on a comparison between harvest levels and habitat capability in WAAs 405 and 406.

Increasing human population coupled with future reductions of habitat capability for deer, black bear, 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, black bear, marten, and wolf at some point in the future (next 100 years) for all alternatives including the No Action Alternative.

Issue 6: Social and Economic Effects

This issue reflects concerns about effects on community employment, income, community stability, and lifestyles. The economics 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 lifestyle unique. At the same time, they want to maintain their economic livelihood.

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 schools and roads. Table Summary-2 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 layout sale volumes, appraised rates, bid premiums and may differ from this estimate, which is based on mid-market rates.

Table Summary-2
Estimated Returns to State of Alaska from Sale of Timber*

Alternative	Estimated total volume (MMBF)	Estimated Total receipts ($)	Estimated State of Alaska returns ($)	Estimated Ketchikan (KGB) returns** ($)
1	0	0	0	0
2	77	5,527,000	1,381,000	6,079
3	42	1,353,000	338,000	1,488
4	29	993,000	248,000	1,092
5	22	51,260	12,815	56
6***	9	34,830	8,707	38

Source: Marks, 1998.
* Based on mid-market rates timber receipts.
** Based on historical average percent distribution.
*** Alternative 6 receipts are base rate values

Table Summary-3 displays the employment (jobs) and personal income (salaries) associated with each alternative averaged over a 4-year period. The jobs and salaries listed include those both directly and indirectly dependent upon the timber industry.

Table Summary-3
Timber Industry Average Annual Employment and Income by Alternative

	Alternative					
	1	2	3	4	5	6
Volume Harvested (MMBF)	0	77	42	29	22	9
4-Year Average	0	19	11	7	6	2
Employment (Jobs/year)	0	157	91	58	49	16
Personal Income (Million$/year)	0	6.65	3.85	2.45	2.10	0.70

Source: Marks, 1998.

In these alternatives, the total volume (including ROW volume) harvested ranges from 9 MMBF in Alternative 6 to 77 MMBF in Alternative 2. Alternatives 3, 4 and 5 provide 42 MMBF, 29 MMBF, and 22 MMBF respectively. These volumes could be sold to timber purchasers.

Under Alternative 1, the no-action alternative, none of the employment described above would result from timber harvest in the Sea Level Project Area. This would have a negative effect on timber harvest employment if timber purchasers are not be able to substitute volume from other sources. The effects of Alternative 1 are not predictable and could range from elimination of shifts to partial or full shutdown of local mills for unspecified periods of time.

The projected long-term effects of different harvest levels on the Tongass National Forest are contained in the TLMP Final EIS (1997). 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 7: 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. The Project Area includes Thorne Arm and Carroll Inlet which are important commercial, subsistence, and sport fishing areas. 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. Three existing LTF sites are under consideration in the alternatives.

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.

The No-action Alternative would have no measurable additional effect on the marine environment, while Alternatives 2, 3, 4, 5, and 6 affect the marine system 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 continuing to use the existing LTFs.

Mitigation Measures

Mitigation measures were considered and identified during the planning phase of this project. The Forest Service uses numerous mitigation and preventive measures in the planning and implementation of land management activities. The standards, guidelines, and direction contained in the Forest Plan, 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.

Specific mitigation measures were identified that reduce or eliminate adverse effects. These measures are identified on the respective unit and road cards found in Appendix H of the Sea Level Draft EIS. Unit and road cards are an important tool for implementing the project, as they list the standards and guidelines and provide a mechanism for tracking project implementation. Unit and road cards have been developed for each individual unit and road that occurs in an alternative.

Implementation Monitoring

Implementation monitoring is designed to determine if standards and guidelines, and resource management objectives of the Sea Level project have been met. The results are used to verify the timely implementation and effectiveness of selected mitigation measures. Regardless of the alternative selected, monitoring activities will be conducted over the course of the project. Monitoring activities proposed for the Sea Level Draft EIS can be found in Chapter 2.

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 field 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 Sea Level 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.

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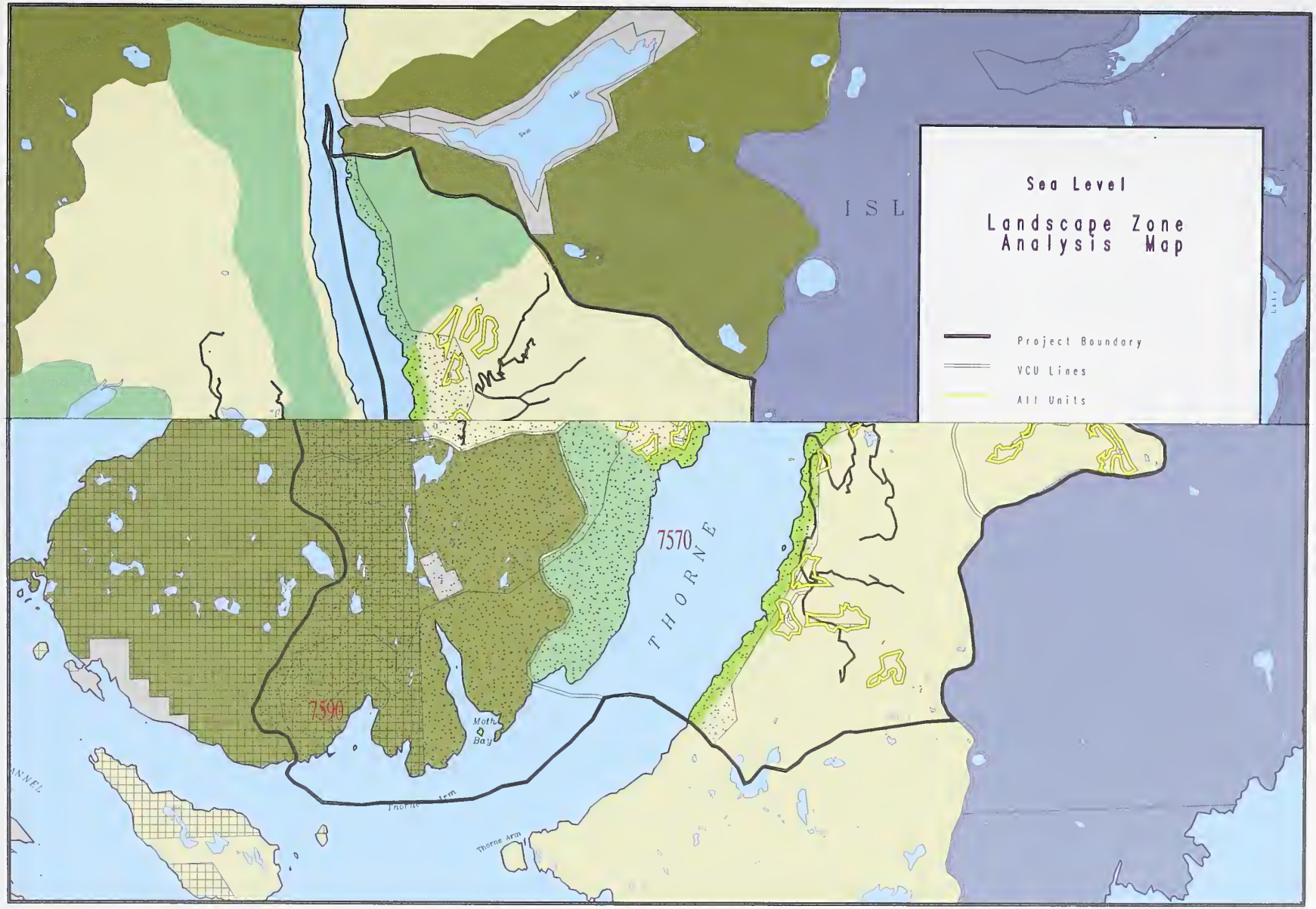

Sea Level
Landscape Zone
Analysis Map
Project Boundary
VCU Lines
All Units
ISL
7570
7590
THORNE
Moth
Bay
Thorne Arm
Thorne Arm

Sea Level

Landscape Zone Analysis Map

- Project Boundary
- VCU Lines
- All Units
- Existing Roads
- Alternative Roads
- Saltwater and Lakes
- Encumbered Lands
- Private-State Lands
- TRUCS and Other Subsistence Use Areas
- Large and Medium Old Growth
- Small Old Growth Blocks
- Travel Corridors or Beach Fringe
- Misty Fiords National Monument or Restricted Lands

N

Note: Compiled from various Digital Geographic Data. This map may not meet National Map Accuracy Standards.

Mapscale 1:115732

Salt Lagoon

Shelter Cove

7460

CARROLL INLET

Shoal Cove

7530

Nine Islands

Map 14

Coal Cove

7560

Snipe Island

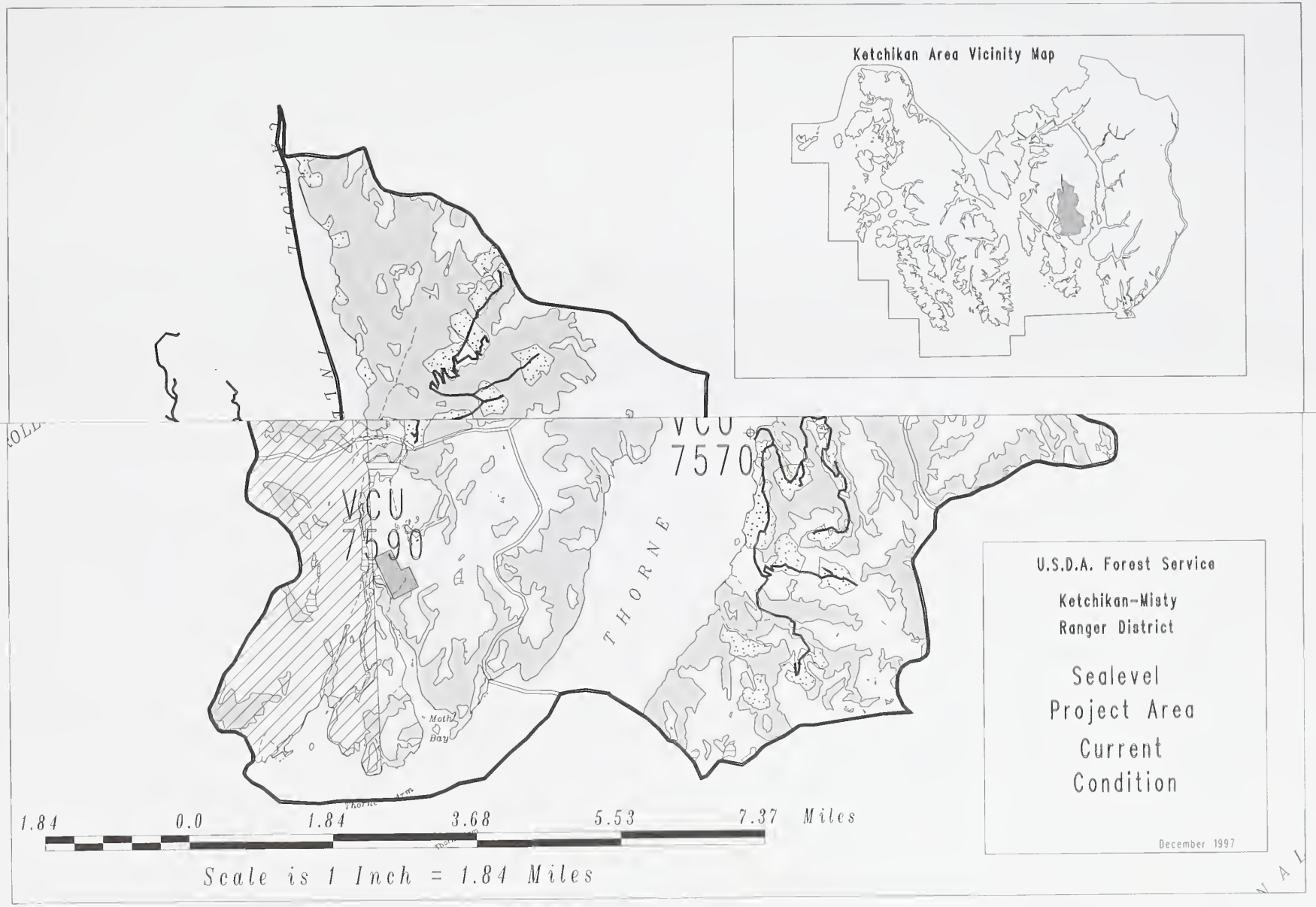
7552

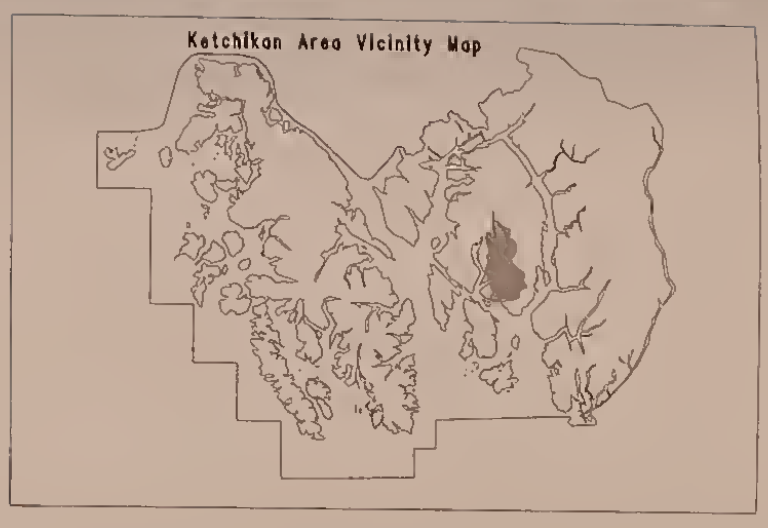
GEORGE INLET

THORNE ARM

7570

Moth Bay


Ketchikan Area Vicinity Map
VCU
7590
VCU
7570
THORNE
Moth
Bay
1.84
0.0
1.84
3.68
5.53
7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan-Misty
Ranger District
Sealevel
Project Area
Current
Condition
December 1997



VCU 7460

VCU 7530

VCU 7542

VCU 7560

VCU 7552

VCU 7570

VCU 7590

Key Legend

- Private Lands
- Encumbered Lands
- Fresh Water
- Commercial Forest Lands
- Previous Harvest
- Existing road system
- Anadromous Stream
- Project Boundary
- VCU Boundary
- Existing LTF

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NOTE: Compiled from various DIGITAL Geographic Data. This map may not meet National Map Accuracy standards.

Salt Lagoon

Shelter Cove

Carroll Inlet

Mary Islands

Wop Pt

Goat Cove

Snipe Island

Thorne Arm

Walker Bay

1.84 0.0 1.84 3.68 5.53 7.37 Miles

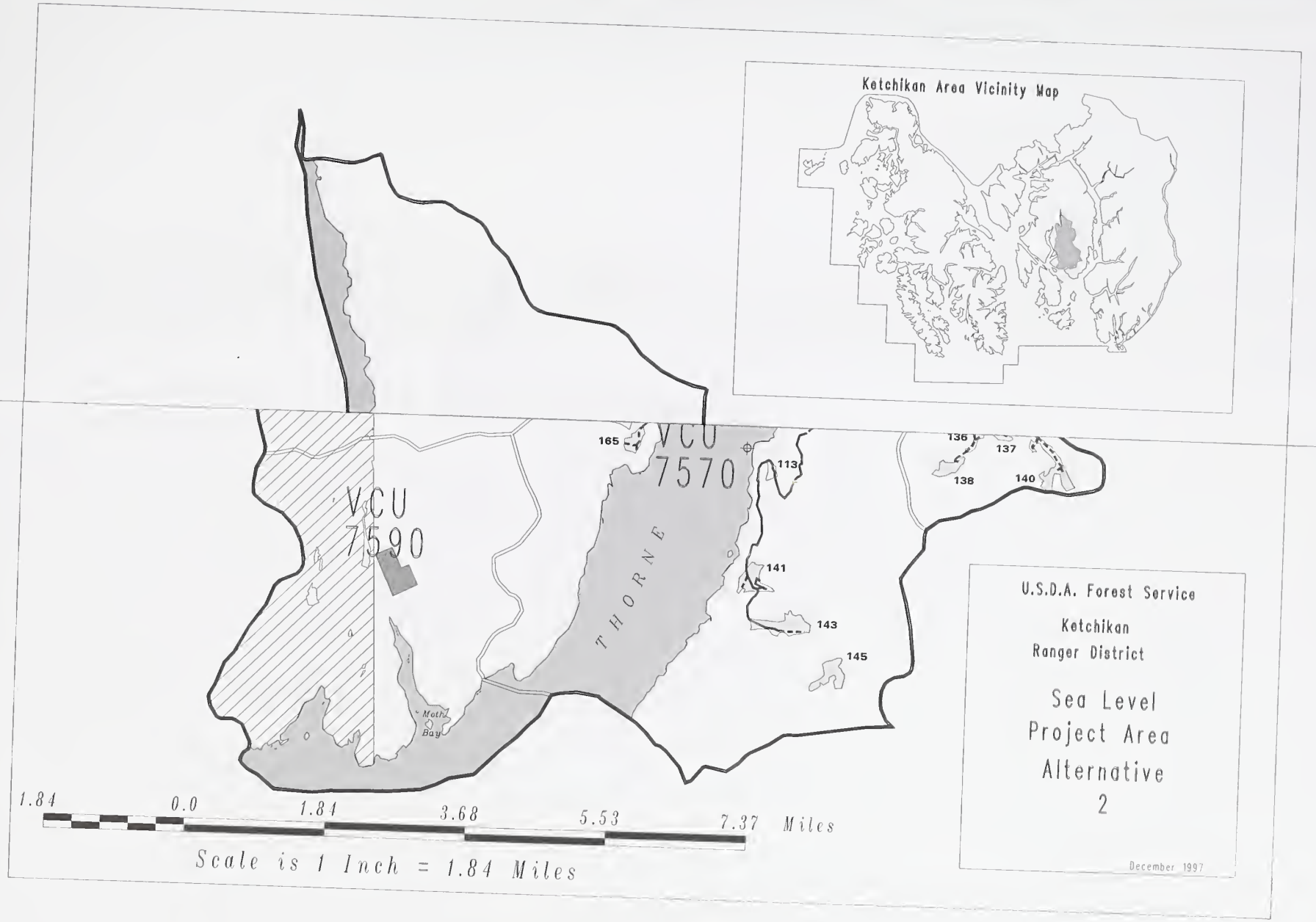
Scale is 1 Inch = 1.84 Miles

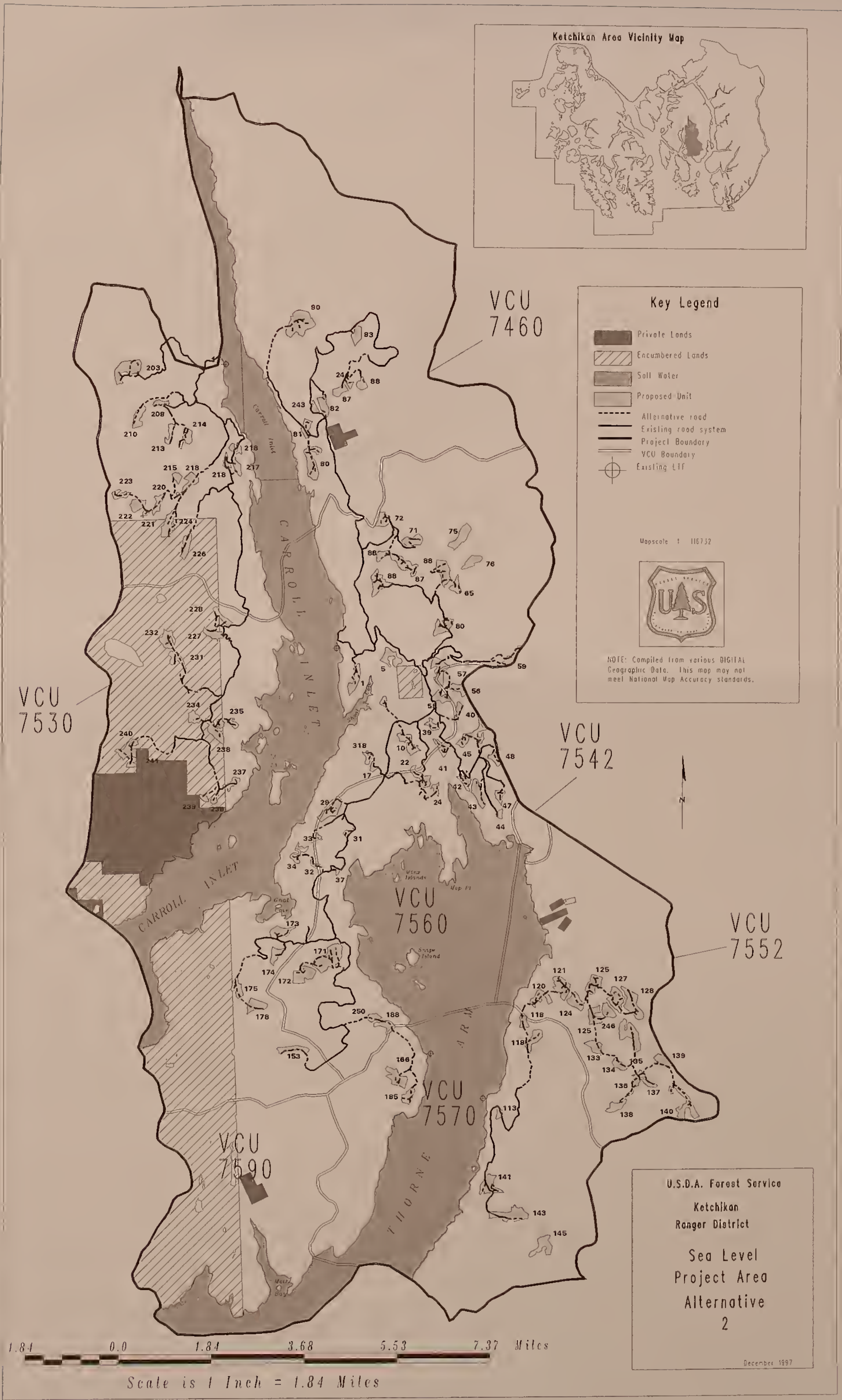
U.S.D.A. Forest Service

Ketchikan-Misty Ranger District

Sealevel Project Area Current Condition

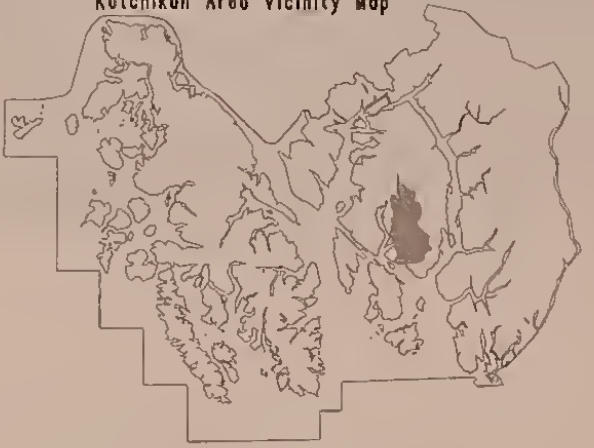
December 1997


Ketchikan Area Vicinity Map
VCU
7590
VCU
7570
THORNE
165
113
136
137
138
140
141
143
145
Moth
Bay
1.84
0.0
1.84
3.68
5.53
7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan
Ranger District
Sea Level
Project Area
Alternative
2
December 1997


Ketchikan Area Vicinity Map
Key Legend
Private Lands
Encumbered Lands
Salt Water
Proposed Unit
Alternative road
Existing road system
Project Boundary
VCU Boundary
Existing LTF
Mapscale 1 116732
NOTE: Compiled from various DIGITAL Geographic Data. This map may not meet National Map Accuracy standards.
VCU 7460
VCU 7530
VCU 7542
VCU 7552
VCU 7560
VCU 7570
VCU 7590
CARROLL INLET
Carroll Inlet
THORNE ARM
Goat Cove
Moth Bay
N
1.84 0.0 1.84 3.68 5.53 7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan
Ranger District
Sea Level
Project Area
Alternative
2
December 1997


Ketchikan Area Vicinity Map
VCU
7590
VCU
7570
113
141
143
THORNE
Moth
Bay
1.84
0.0
1.84
3.68
5.53
7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan-Misty
Ranger District
Sea Level
Project Area
Alternative
3
December 1997

Ketchikan Area Vicinity Map



VCU 7460

VCU 7530

VCU 7542

VCU 7560

VCU 7552

VCU 7570

VCU 7590

Key Legend

- Private Lands
- Encumbered Lands
- Salt Water
- Proposed Unit
- Previous Harvest
- Alternative road
- Existing road system
- Project Boundary
- VCU Boundary
- Existing LTF

Mapscale 1 : 115732

NOTE: Compiled from various DIGITAL Geographic Data. This map may not meet National Map Accuracy standards.

U.S.D.A. Forest Service

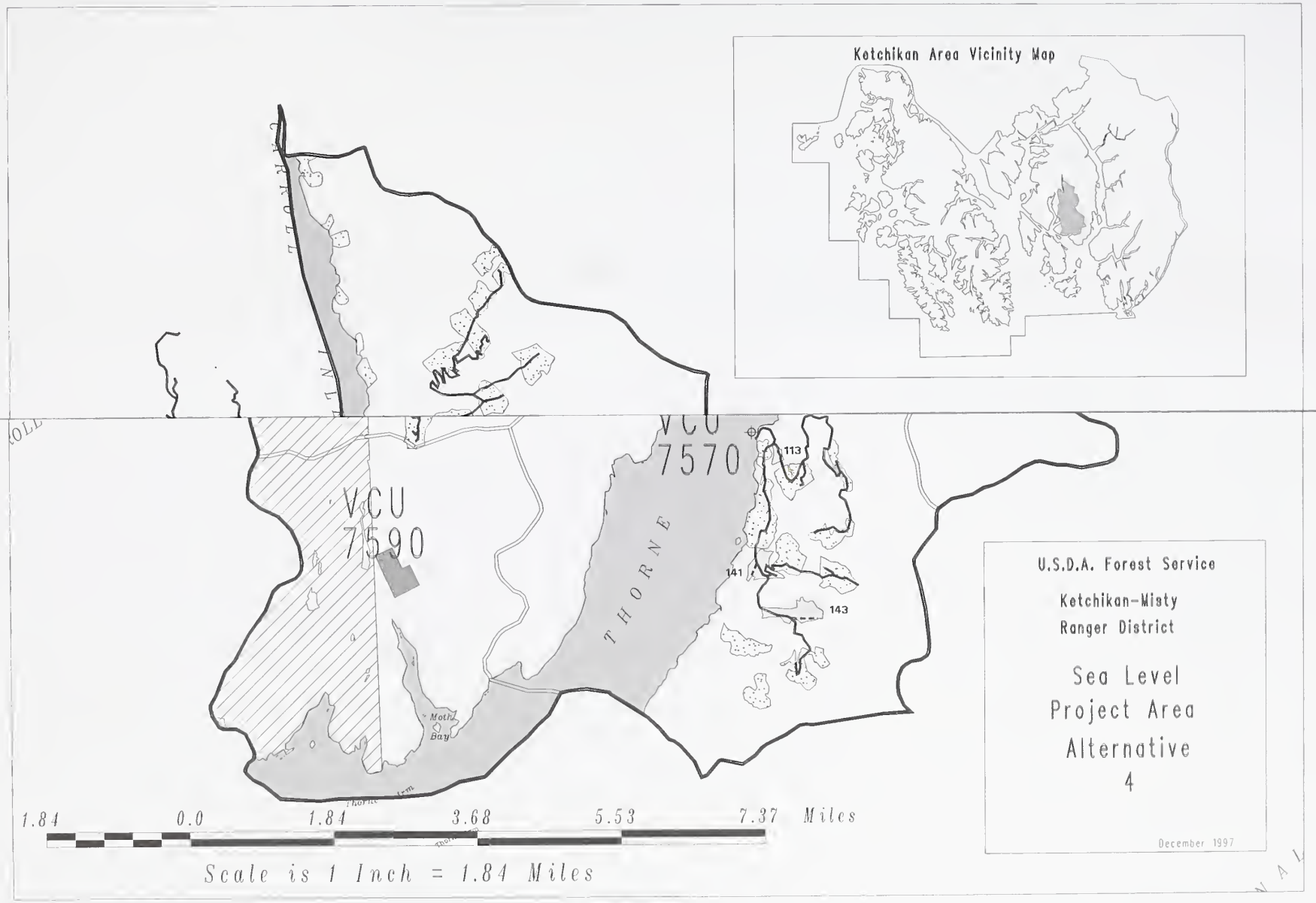
Ketchikan-Misty Ranger District

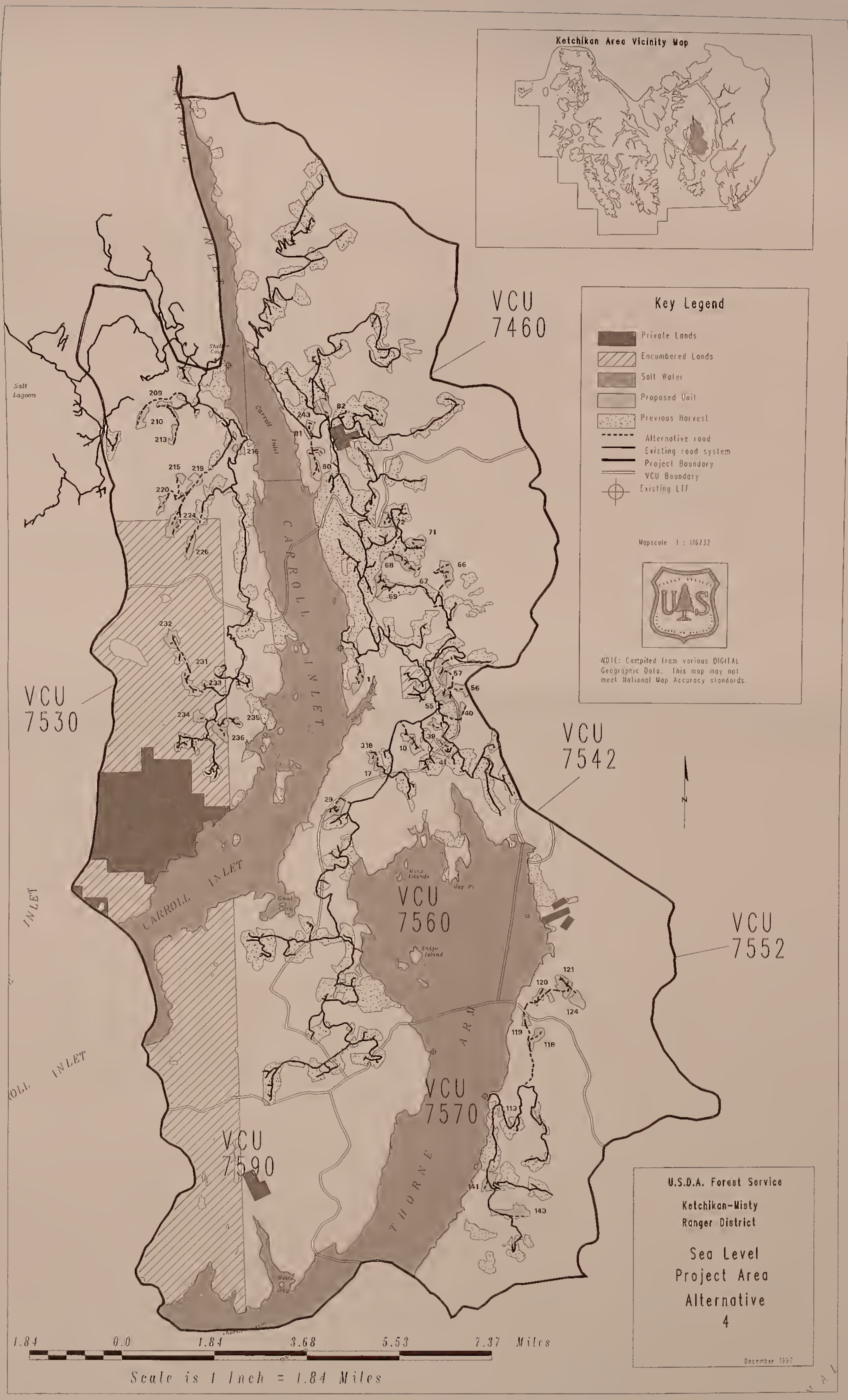
Sea Level Project Area Alternative 3

December 1997

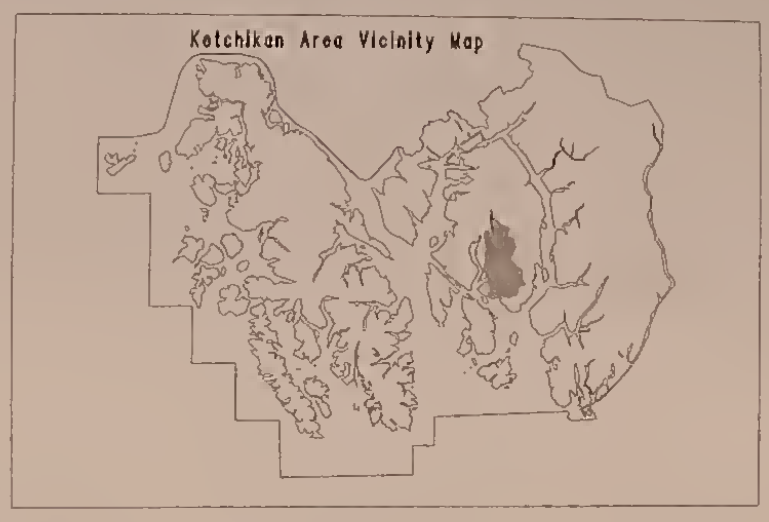
1.84 0.0 1.84 3.68 5.53 7.37 Miles

Scale is 1 Inch = 1.84 Miles


Ketchikan Area Vicinity Map
VCU
7590
VCU
7570
113
141
143
THORNE
Moth
Bay
1.84
0.0
1.84
3.68
5.53
7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan-Misty
Ranger District
Sea Level
Project Area
Alternative
4
December 1997


Ketchikan Area Vicinity Map
Key Legend
Private Lands
Encumbered Lands
Salt Water
Proposed Unit
Previous Harvest
Alternative road
Existing road system
Project Boundary
VCU Boundary
Existing LTF
Mapscale 1 : 116732
NOTE: Compiled from various DIGITAL Geographic Data. This map may not meet National Map Accuracy standards.
VCU 7460
VCU 7530
VCU 7542
VCU 7552
VCU 7560
VCU 7570
VCU 7590
CARROLL INLET
Carroll Inlet
THORNE ARM
Salt Lagoon
Shelter Cove
Gnat Cove
Snipe Island
N
209
210
213
215
216
219
220
224
226
231
232
233
234
235
236
243
82
81
80
71
68
66
67
69
57
56
55
40
39
10
318
17
29
1
121
120
124
119
118
113
141
143
1.84 0.0 1.84 3.68 5.53 7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan-Misty Ranger District
Sea Level Project Area
Alternative 4
December 1997


Ketchikan Area Vicinity Map
VCU
7590
VCU
7570
THORNE
Moth
Bay
1.84
0.0
1.84
3.68
5.53
7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan-Misty
Ranger District
Sea Level
Project Area
Alternative
5
December 199?



VCU 7460

VCU 7530

VCU 7542

VCU 7560

VCU 7552

VCU 7570

VCU 7590

Key Legend

- Private Lands
- Encumbered Lands
- Salt Water
- Proposed Unit
- Previous Harvest
- Alternative road
- Existing road system
- Project Boundary
- VCU Boundary
- Existing LTF

Mapscale 1 : 115732

NOTE: Compiled from various DIGITAL Geographic Data. This map may not meet National Map Accuracy standards.

Carroll Inlet

Thorne Arm

Salt Lagoon

Shelter Cove

Gnat Cove

Snipe Island

Volk Bay

1.84 0.0 1.84 3.68 5.53 7.37 Miles

Scale is 1 Inch = 1.84 Miles

U.S.D.A. Forest Service

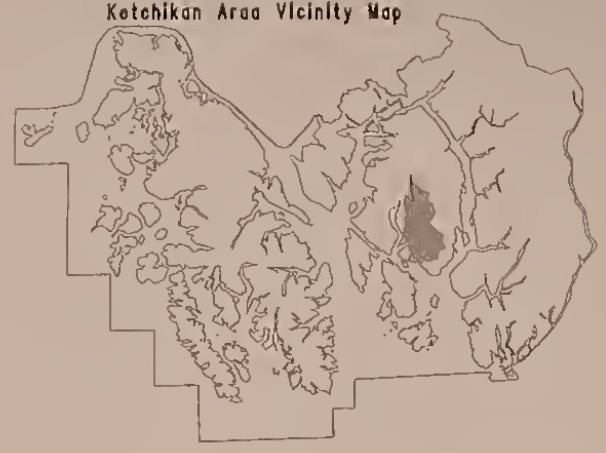
Ketchikan-Misty Ranger District

Sea Level Project Area Alternative 5

December 1997


Ketchikan Area Vicinity Map
VCU
7590
VCU
7570
THORNE
Moth
Bay
1.84
0.0
1.84
3.68
5.53
7.37 Miles
Scale is 1 Inch = 1.84 Miles
U.S.D.A. Forest Service
Ketchikan-Misty
Ranger District
Sea Level
Project Area
Alternative
6
December 1997

Ketchikan Area Vicinity Map



VCU 7460

VCU 7530

VCU 7542

VCU 7560

VCU 7552

VCU 7570

VCU 7590

Key Legend

- Private Lands
- Encumbered Lands
- Salt Water
- Proposed Unit
- Previous Harvest
- Alternative road
- Existing road system
- Project Boundary
- VCU Boundary
- Existing LTF

Mapscale 1 : 116732

NOTE: Compiled from various DIGITAL Geographic Data. This map may not meet National Map Accuracy standards.

Salt Lagoon

CARROLL INLET

THORNE ARM

209 210 213 215 219 220 224 232 231 233 234 235 236

1.84 0.0 1.84 3.68 5.53 7.37 Miles

Scale is 1 Inch = 1.84 Miles

U.S.D.A. Forest Service

Ketchikan-Misty Ranger District

Sea Level Project Area Alternative 6

December 1997