



United States
Department of
Agriculture

Forest Service

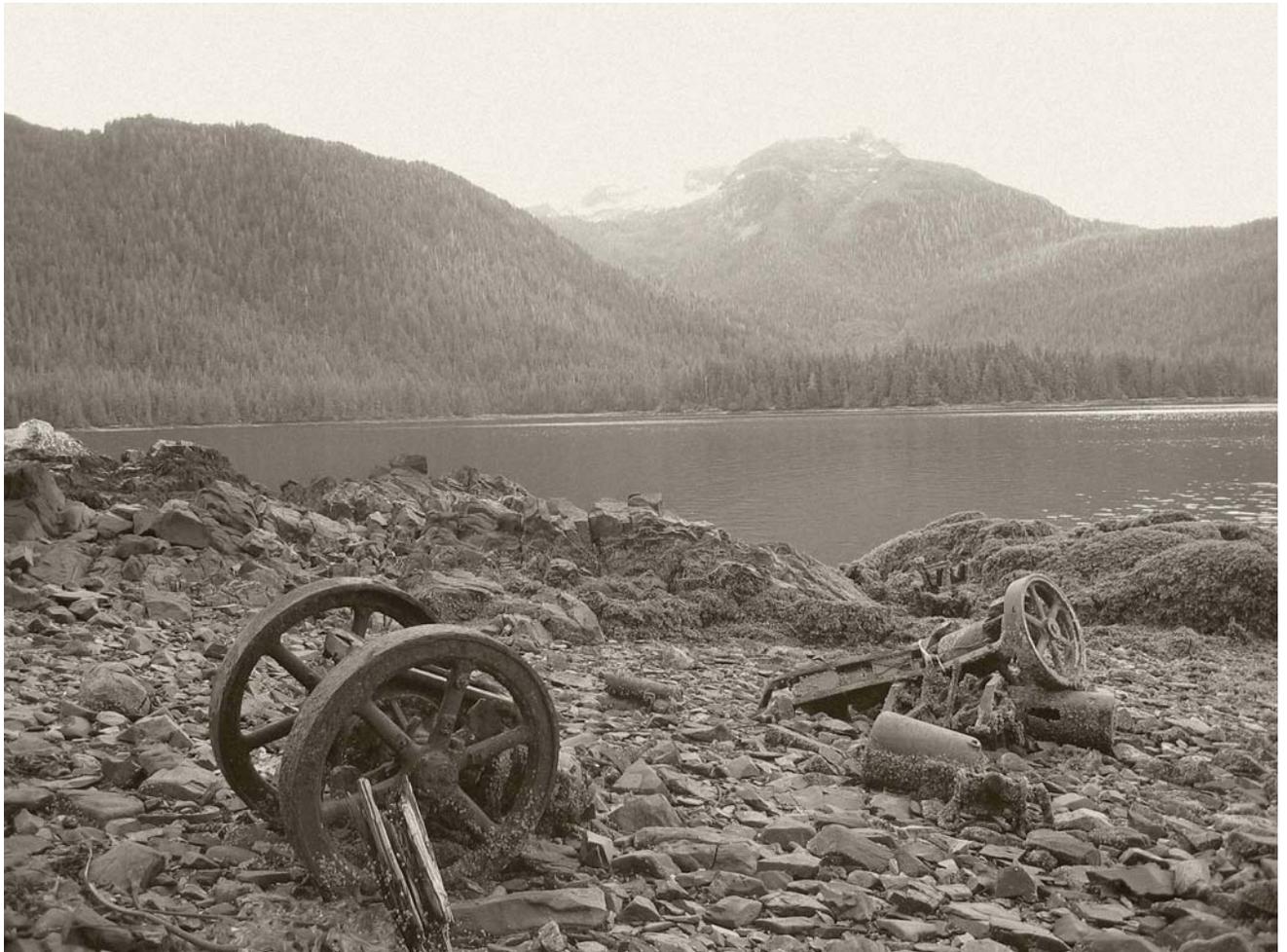
Tongass
National Forest
R10-MB-572a

November 2007

Navy Timber Sale

Draft Environmental Impact Statement

Wrangell Ranger District
Wrangell, Alaska



Navy Timber Sale Draft EIS

Key Acronyms and Other Terms

ANILCA	Alaska National Interest Lands Conservation Act
ASQ	Allowable Sale Quantity
BMPs	Best Management Practices
CCF	Hundred Cubic Feet
CEQ	Council on Environmental Quality
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
EFH	Essential Fish Habitat
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
Forest Plan	Tongass Land and Resource Management Plan, 1997, as amended
GIS	Geographic Information System
IDT	Interdisciplinary Team
LTF	Log Transfer Facility
LUD	Land Use Designation
MBF	Thousand Board Feet
MIS	Management Indicator Species
MMBF	Million Board Feet
MMIs	Mass Movement Indices
NEAT	NEPA Economic Analysis Tool
NEPA	National Environmental Policy Act of 1969
NFMA	National Forest Management Act
OGR	Old-growth Reserve
POG	Productive old-growth (forest)
RMAs	Riparian Management Areas
RMO	Road Management Objective
ROS	Recreation Opportunity Spectrum
RVD	Recreation Visitor Day
TES	Threatened, Endangered, Sensitive [species]
TTRA	Tongass Timber Reform Act
VCU	Value Comparison Unit
VQO	Visual Quality Objective
WAA	Wildlife Analysis Area

Cover photo: view of Navy Peak and Cannery Point

Errata

Tongass National Forest
Wrangell Ranger District

Navy Timber Sale Draft Environmental Impact Statement
December 2007

The page numbering in this document skips pages 77, 78, 79 and 80 due to a formatting error. There are no pages missing even though the numbering skips from 76 to 81. The pages for the Draft Environmental Impact Statement are all present; the page numbers are just incorrect. The page numbers in the Table of Contents and Index are accurate and indicate the correct pages.



File Code: 1950

Date: November 2, 2007

Dear Reader:

Here is your copy of the Draft Environmental Impact Statement (Draft EIS) for the Navy Timber Sale on the Wrangell Ranger District, Tongass National Forest. The Draft EIS proposes five action alternatives for harvesting timber and one No-action Alternative. The action alternatives would make approximately 18.7 to 97.9 million board feet (MMBF) of timber available for harvest in the Navy project area on Etolin Island. Proposed yarding systems include cable, helicopter and shovel. My preferred alternative at this point is Alternative D, which emphasizes economical timber harvest and minimizing road construction in the Navy Watershed, while meeting Forest Plan Standards and Guidelines. However, any of the alternatives may be selected in the Record of Decision for the Final EIS.

A Forest Plan amendment process is currently underway that could change management direction, pending the outcome of that analysis and decision. The Forest Plan Amendment Draft EIS was published in January 2007, and the extended public comment period ended on April 30, 2007. No decision on the amendment was made prior to the analysis displayed in the Navy Timber Sale DEIS. The decision on the Navy Timber Sale will be consistent with the Forest Plan amendment decision, following procedures in the Forest Service Handbook FSH 1909.15, section 18.

Reviewers should provide the Forest Service with their comments during the review period of the Draft EIS. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental impact statement, thus avoiding undue delay in the decisionmaking process. Written, oral, and electronic comment on the DEIS will be accepted for 45 calendar days following the date of publication of the notice of availability (NOA) in the Federal Register. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the Final EIS City of Angoon v. Hodel (9th Circuit, 1986) and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the Draft EIS should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3). Please send written comments to:

Frank Roberts, Planning Staff
Wrangell Ranger District, Tongass National Forest
P.O. Box 51
Wrangell, AK 99929
e-mail: comments-alaska-tongass-wrangell@fs.fed.us, subject line: "Navy Timber Sale"

Copies of this Draft EIS are available for review at Forest Service offices throughout the Tongass. For more information, contact the Wrangell Ranger District at 907-874-7556 during regular business hours, Monday to Friday, 8:00 am to 4:30 pm. Oral comments can be provided at the above office during normal business hours via telephone or in person, or at an official



agency function (i.e., public meeting) that is designed to elicit public comments.

For appeal eligibility rights, submissions from individuals or a representative from each organization submitting substantive comments must be signed or verification provided upon request. Comments must be received during the 45-day comment period. An electronic username is insufficient for electronic comment submittals. Your interest in the management of the Tongass National Forest is appreciated.

Sincerely,

A handwritten signature in black ink, appearing to read "Forrest Cole". The signature is fluid and cursive, with a large initial "F" and a long, sweeping tail.

FORREST COLE
Forest Supervisor

Navy Timber Sale

Final Environmental Impact Statement

Tongass National Forest
USDA Forest Service, Alaska Region

Lead Agency: USDA Forest Service
Tongass National Forest
648 Mission Street
Ketchikan, AK 99901

Responsible Official Forrest Cole
Forest Supervisor
Tongass National Forest

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Wrangell, AK 99929-0051
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Abstract:

The USDA Forest Service proposes to harvest up to approximately 97.9 million board feet (MMBF) from up to approximately 7,800 acres of NFS land on Etolin Island in one or more offerings on Wrangell Ranger District, Tongass National Forest. The actions analyzed in this EIS are designed to implement direction contained in the Tongass Land and Resource Management Plan (Forest Plan). The Draft EIS describes six alternatives, which provide differing outputs and responses to issues identified for this project. The significant issues identified include timber supply and economics, Old-growth Reserves, wildlife habitat fragmentation, inventoried roadless areas and road construction in the Navy watershed.

The alternatives include: A) No Action, proposing no harvest or road construction in the project area at this time; B) the Proposed Action Alternative, emphasizing economically efficient timber harvest, harvesting 61.7 MMBF, building 18.1 miles of NFS road and 8.4 miles temporary road; C) designed to attain the maximum timber volume allowed under the Forest Plan Standards and Guidelines, harvesting 97.9 MMBF, building 23.4 miles of NFS road and 17.5 miles temporary road; D) the Preferred Alternative designed with no road building in the Navy watershed, harvesting about 36 MMBF, building 5.7 miles of NFS road and 5.3 miles temporary road; E) address wildlife habitat impacts, harvesting about 48.9 MMBF, building 8.5 miles of NFS road and 9.2 miles temporary road; and F) no entry into inventoried roadless areas, harvesting about 18.7 MMBF, building 1.7 miles of NFS road and 3.9 miles temporary road.

Summary

Introduction

The Forest Service prepared this Draft Environmental Impact Statement (DEIS) to address the potential effects of timber harvest in the Navy project area in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations.

Project Area

The Navy project area is located on central Etolin Island approximately 22 air miles southwest of Wrangell, Alaska (Figure 1-1). The project area encompasses approximately 77,500 acres of National Forest System (NFS) land. There are approximately 14,000 acres considered suitable and available for timber management. The project area is within portions of Value Comparison Units (VCUs) 4640, 4650, 4660, 4670, and 4680. VCUs are comparable to large watersheds, and generally follow major watershed divides.

Proposed Action

A "Proposed Action" is defined early in the project-level planning process. This serves as a starting point for the IDT, and gives the public and other agencies specific information on which to focus comments. Using these comments and information from preliminary analysis, the IDT develops alternatives to the Proposed Action.

The Proposed Action for the Navy project area is to harvest approximately 61.7 million board feet (MMBF) from approximately 4,700 acres of NFS land on Etolin Island in one or more offerings. This would require about 18 miles of new NFS road construction and reconstruction; and 8.4 miles of temporary road construction. The Proposed Action includes a non-significant amendment to the Forest Plan to modify the boundaries of the Anita, Burnett, Mosman, and Quiet small old growth reserves (small OGRs). Timber harvested would be hauled to the existing Anita Bay Log Transfer Facility (LTF) and a new LTF at the entrance to Burnett Inlet, near Navy Creek. For this analysis, harvest is expected to begin in 2008. The Proposed Action is Alternative B.

Purpose and Need

The Purpose and Need for this project is to:

- manage suitable timber lands to achieve goals and objectives in the 1997 Forest Plan, as amended, to accomplish the desired conditions prescribed for the Land Use Designations (LUDs);
- assist in providing a continuous wood supply to meet society's needs; and
- contribute to the job market and the overall economy of Southeast Alaska.

Summary

Decisions to be Made

Based on the environmental analysis in this DEIS, the Tongass National Forest Supervisor will decide whether and how to make timber available from the Navy project area in accordance with Forest Plan goals, objectives, and desired conditions. This decision will include:

- The location, design, and scheduling of timber harvest, road construction and reconstruction, LTFs, and silvicultural practices;
- the estimated timber volume available from the project area, and the number and size of the individual timber sales;
- access management measures on proposed roads and LTFs;
- mitigation measures and monitoring requirements;
- whether there may be a significant possibility of a significant restriction on subsistence uses; and
- whether any changes in small OGRs should be made, and approved as a non-significant amendment to the Forest Plan.

Public Involvement

Notice of Intent

A Notice of Intent (NOI) was published in the Federal Register on January 23, 2006, when it was decided that an EIS would be prepared for the Navy Timber project. Due to a change in the original proposed action, a revised NOI was published in the Federal Register on May 21, 2007.

Public Mailings

In November 2005, approximately 250 letters were mailed to individuals and groups, which had previously shown interest in Forest Service projects in Southeast Alaska, including Federal and State agencies, Alaska Native groups, municipal offices, businesses, interest groups, and individuals. The mailing provided general information and requested public comment. Twenty-two responses to this initial mailing were received.

On January 12, 2006, a letter describing in detail, the proposed action, preliminary concerns, and preliminary alternatives was mailed to 110 individuals and groups. The eight responses to this mailing commented on concerns of old-growth habitat reserves, roadless areas, subsistence, karst, caves, economics, roads and access, timber supply and economics, and water quality.

A Navy Timber Sale project update letter was mailed to 107 individuals and groups on February 15, 2007. The letter informed the public that the proposed action changed. Comments received regarded subsistence, roads and access, wildlife species and habitat, fish, cumulative impacts, roadless areas, wilderness, timber supply and economics, karst and caves, soil stability, water quality, wetlands, old-growth habitat and reserves, recreation, harvest methods and prescription, and windthrow.

Public Open House

A public open house for the Navy project area was held in Wrangell on January 26, 2006, in conjunction with a public open house for the WRD Roads Analysis and Access Travel Management Plan. The intent of the Navy Open House was to provide project area information, maps, and discuss local concerns and interests to be addressed in the project analysis.

Tribal Consultation

Consultation with federally recognized tribal governments included government-to-government and staff level communications. Following is a list of consultation activities.

April 26, 2004 – Wrangell District Ranger sent Wrangell Cooperative Association (WCA) a letter to initiate consultation regarding the 2004 Heritage Resource Program, which included work in the Navy project area.

July 08, 2004 – Two Forest Service Archeologists met with WCA to discuss their responsibilities and program of work, including the Navy Timber Sale.

November 12, 2004 – Six Forest Service representatives met with WCA to discuss multiple timber sale projects, including the Navy Timber Sale.

May 06, 2005 – Wrangell District Ranger sent a letter to WCA to initiate consultation regarding activities on the Wrangell Ranger District, including the Navy Timber Sale.

November 21, 2005 – Three Forest Service representatives met with WCA to discuss the Navy Timber Sale.

July 14, 2006 – The Wrangell District Ranger and two Forest Service representatives met with WCA to discuss projects, including the range of alternatives that will be included in the Navy Timber Sale DEIS.

Additionally, the Navy Timber Sale Heritage Resource report was given to the WCA council for review and comment. The Forest Service also sent letters of consultation and copies of the report to the Petersburg Indian Association, the Organized Village of Kake, Kake Tribal Corporation, Sealaska Corporation, and Tlingit/Haida Central Council.

Issues

Issues for the Navy project area were identified through public and internal scoping. Issues generally suggest a problem with the proposed action such that alternative actions need to be developed to solve that problem. These issues are also used to develop mitigation and track environmental effects. Therefore, each issue includes measurements that are used to determine the effects of the different alternatives. Similar issues were combined into one statement, where appropriate. The following four issues were determined to be significant and within the scope of the project decision. The IDT developed alternatives to the Proposed Action to address these issues; Chapter 2 of this DEIS discusses and compares the alternatives. Effects to other resources were considered and addressed in Chapter 3.

Summary

Issue 1: Timber Supply and Economics

Timber harvest in the project area may affect local and regional economies.

Concerns were expressed regarding the validity of this sale since some previous sales lacked purchasers; the lack of economical timber; the amount of timber offered by the Forest Service; the economic burden placed on taxpayers to fund timber sales; and the need to provide jobs and supporting the local economy.

Measurements:

- potential volume of timber available by alternative
- indicated bid value and number of jobs equivalents
- logging and road costs per MBF

Issue 2: Old-Growth Reserves

The location and configuration of small Old-growth Reserves (OGRs) may affect their quality and value as a habitat reserve for wildlife.

A range of concerns were expressed including: the current locations of OGRs do not contain the best habitat for wildlife species; timber management should be given priority when locating OGRs; and OGRs should not be located in order to make more timber available for harvest.

Measurements:

- acres of productive old-growth (POG) habitat protected in small OGRs by alternative
- acres of interior POG habitat protected in small OGRs by alternative [Interior old growth is that portion of a contiguous old-growth patch more than 300 feet inside the edge or perimeter of the block (USDA 1997a)]
- acres of young-growth habitat contained within small OGRs, resulting from past forest management by alternative
- acres of high-quality deer winter range protected in small OGRs by alternative [High-quality deer winter range will be defined by the deer habitat capability model.]
- number of known or suspected goshawk nest territories protected in small OGRs by alternative
- acres of high-quality marbled murrelet nesting habitat protected in small OGRs by alternative
- acres of coarse canopy (volume class 6 and 7) POG habitat protected in small OGRs by alternative
- whether a small OGR includes the Anita Bay Pinchpoint

Issue 3: Wildlife Habitat Fragmentation

Concerns were expressed about the effects of fragmentation on wildlife habitat and wildlife populations by removing habitat and/or connectivity.

Measurements:

- acres of POG habitat maintained in Wildlife Analysis Area (WAA) 1901 after harvest by alternative
- acres of interior POG maintained in WAA 1901 after harvest by alternative
- acres of coarse canopy (volume classes 6 and 7) old-growth maintained in WAA 1901 after harvest by alternative

Issue 4: Inventoried Roadless Areas

Concerns were expressed that timber harvest and road construction in Inventoried Roadless Areas could affect the characteristics of the area.

Measurements:

- acres of Inventoried Roadless Areas affected by timber harvest and road construction
- miles of road proposed in Inventoried Roadless Areas

Issue 5: Road Construction in the Navy Watershed

Concerns were expressed about the construction of a remote independent road system and associated LTF in the Navy Watershed which has recreation and water quality concerns. The road system could provide road-based recreation access, which may affect abundance and distribution of wildlife and increase hunter competition.

Measurements:

- miles of road proposed in the Navy Watershed
- qualitative analysis of recreation and subsistence use in the Navy Lake vicinity
- miles of road proposed on slopes over 67% gradient

Alternatives Considered in Detail

The Proposed Action (Alternative B) and five alternatives are considered in detail.

Table S-1 and the alternative descriptions below includes a rank of each alternative by issue. The alternatives were ranked by each issue on a scale of 1-6. A ranking of “1” means that the alternative best addresses the issue; a ranking of “6” means that the alternative least addresses the issue. All measurements were weighted equally. In a few instances, multiple alternatives rank equally.

Alternative A (No Action Alternative)

The Council on Environmental Quality regulations (40 CFR 1502.14d) require that a "No Action" Alternative be analyzed in every Environmental Impact Statement (EIS). This alternative represents the existing condition against which the other alternatives are compared. The map for Alternative A Figure 2-1) shows the distribution of vegetation associated with no new timber harvest.

Summary

Timber Harvest

Alternative A proposes no new timber harvest or road construction in the Navy project area. It does not preclude management within the Navy project area at some time in the future. The project area contains approximately 4,000 acres of previous harvest.

Transportation System

This Alternative includes no proposed road construction or LTF construction. The project area contains approximately 50 miles of existing National Forest System roads and an existing LTF at Anita Bay. Under Alternative A, there would be no changes in road management. Maintenance and repair activities would continue as previously planned. Road management on Etolin Island would be performed as stated in the ATM EA Decision Notice.

Small Old-Growth Reserve Option

All small OGRs would remain in their current location.

Issue Response

This alternative addresses the following issues:

Issue 1: Timber Supply and Economics:

This alternative was not ranked because it did not provide volume or jobs.

Issue 2: Small Old-growth Reserves:

Ranking = 5, based on the acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint. The Quiet (VCU 4650) and Mosman (VCU 4670) small OGRs would remain deficient in total acres and does not meet the Forest Plan.

Issue 3: Wildlife Habitat Fragmentation:

Ranking = 1, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas:

Ranking = 1, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas .

Issue 5: Road Construction in the Navy Watershed:

Ranking = 1, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives D, E, and F.

Alternative A would defer moving the project area toward the Desired Condition described in the Forest Plan. The existing condition would continue to be influenced by natural disturbance processes.

Alternative B (Proposed Action)

Timber Harvest

The timber volume proposed for sale in Alternative B (Figure 2-2), 61.7 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 2,055 acres of old-growth stands to an even-aged condition and 2,661 acres to an uneven-aged condition. The timber would be removed by cable, shovel and helicopter yarding systems.

Transportation System

Alternative B includes 18.1 miles of new NFS road construction and reconstruction; and 8.4 miles of temporary road construction. The 6540, 51403, 51421, 51461, and 51462 road segments proposed under this alternative are less than one mile in length; and are either short extensions of existing roads, or new roads starting from the existing road system.

The temporary roads built under this alternative would be decommissioned after the timber sale. Proposed road 6546 would be maintained at a ML 2 to provide access for timber management activities and possible salvage sales along the road segment. All other roads, including the reconstructed NFS roads, would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove and the proposed Burnett Inlet LTF, to be constructed near Navy Creek.

Small Old-Growth Reserve Option

This alternative uses the IDT-developed option for Anita (VCU 4640), Mosman (VCU 4670), and Quiet (VCU 4650) small OGRs; and uses the interagency biologist recommended option for the Burnett (VCU 4680) small OGR.

Issue Response

Alternative B mainly responds to the "timber supply and economics" issue (Issue 1) by providing logical extensions of the existing Anita Bay road system. It defers harvest and road building in this entry from the southwest Mosman area, which currently has poor economic return. It uses uneven-aged management in helicopter units, which is more economical than even-aged management. It also attempts to harvest the most volume per mile of road. The ratio of volume harvested per mile of road is often used as a measurement of economics; all other factors being the same, the greater the number the better the economics. It contributes to the local and regional economies by providing a significant amount of volume and associated employment.

It also responds to the following issues:

Issue 1: Timber Supply and Economics:

Ranking = 3 (tied with Alternative E), based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves:

Ranking = 4, based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting

Summary

habitat protected and inclusion of the Anita Bay pinchpoint . This alternative ranks the same as Alternative C.

Issue 3: Wildlife Habitat Fragmentation:

Ranking = 5, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas:

Ranking = 5, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road Construction in the Navy Watershed:

Ranking = 3 ,based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient.

Alternative C

Timber Harvest

The timber volume proposed for sale in Alternative C (Figure 2-3), 97.9 million board feet (MMBF), will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 2,645 acres of old-growth stands to an even-aged condition, 317 acres to a two-aged condition, and 4,838 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative C includes 23.4 miles of new NFS road construction and reconstruction; and 17.5 miles of temporary road construction. The 51403, 51421, 51461, and 51462 road segments proposed under this alternative are less than one mile in length and are either short extensions of existing roads or new roads starting from the existing road system. The 51551 road is proposed as a short 0.3 mile extension off the proposed 6555 road.

The temporary roads built under this alternative would be decommissioned after the timber sale. Proposed road 6546 would be maintained at a ML 2 to provide access for timber management activities and possible salvage sales along the road segment. The other roads, including the reconstructed NFS roads would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove and the proposed Mosman Inlet LTF, to be constructed in Cooney Cove.

Small Old-Growth Reserve Option

This alternative uses the IDT- developed option for Anita (VCU 4640), Mosman (VCU 4670), and Quiet (VCU 4650) small OGRs; and uses the interagency biologist recommended option for the Burnett (VCU 4680) small OGR.

Issue Response

Alternative C mainly responds to the "timber supply and economics" issue (Issue 1), focusing more on the supply component. It responds to the issue by providing the most amount of timber from the project while meeting Forest Plan Standards and Guidelines. It uses uneven-aged management in helicopter units, which is more economical than even-aged management. It contributes to the local and regional economies by providing the maximum volume and associated employment.

It also responds to the following issues:

Issue 1: Timber Supply and Economics:

Ranking = 2, based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves:

Ranking = 4, based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint. This alternative ranks the same as Alternative B.

Issue 3: Wildlife Habitat Fragmentation:

Ranking = 6, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas:

Ranking = 6, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road construction in the Navy Watershed:

Ranking = 2, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient.

Alternative D (Preferred Alternative)

Timber Harvest

The timber volume proposed for sale in Alternative D (Figure 2-4), 36 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 1,190 acres of old-growth stands to an even-aged condition and 1,339 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative D includes 5.7 miles of new NFS road construction and reconstruction; and 5.3 miles of temporary road construction. The 6540, 6546, 51009, 51403, and 51421 road

Summary

segments proposed under this alternative are less than one mile in length, are either short extensions of existing roads, or new roads starting from the existing road system.

The temporary roads built under this alternative would be decommissioned after the timber sale. All NFS road constructed and reconstructed under this alternative would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove.

Small Old-Growth Reserve Option

This alternative uses the IDT- developed option for the Anita (VCU 4640) and Quiet (VCU 4650) small OGRs, and the interagency biologist recommended option for the Burnett (VCU 4680) and Mosman (VCU 4670) small OGR.

Issue Response

Alternative D mainly responds to the “management in the Navy Watershed” issue (Issue 5) by not proposing road construction or LTF construction in the Navy Watershed.

It also responds to the following issues:

Issue 1: Timber Supply and Economics:

Ranking = 1 (tied with Alternative F), based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves:

Ranking = 3, based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint .

Issue 3: Wildlife Habitat Fragmentation:

Ranking = 4, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas:

Ranking = 3, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas .

Issue 5: Road construction in the Navy Watershed:

Ranking = 1 ,based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives A, E and F.

Alternative E

Timber Harvest

The timber volume proposed for sale in Alternative E (Figure 2-5), 48.9 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 1,005 acres of old-growth

stands to an even-aged condition, 91 acres to a two-aged condition, and 3,143 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative E includes 8.5 miles of new NFS road construction and reconstruction; and 9.2 miles of temporary road construction. The 6546, 51009, 51403, and 51421 road segments proposed under this alternative are less than one mile in length, are either short extensions of existing roads, or new roads starting from the existing road system.

The temporary roads built under this alternative would be decommissioned after the timber sale. All NFS road constructed and reconstructed under this alternative would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove.

Small Old-Growth Reserve Option

This Alternative uses the interagency biologist recommended option for all small OGRs: Anita (VCU 4640), Burnett (VCU 4680), Quiet (VCU 4650) and Mosman (VCU 4670).

Issue Response

Alternative E mainly responds to “Small Old-growth Reserves” issue (Issue 2) and “Wildlife Habitat Fragmentation” issue (Issue 3). It responds to the small OGR issue by including the interagency biologist recommended option for all small OGRs. It is the only alternative that uses the interagency biologist recommended option for the Anita (VCU 4640) small OGR. It responds to the wildlife habitat fragmentation issue by incorporating the interagency recommended small OGRs for all VCUs within the project area and reducing the amount of interior and coarse canopy forests proposed for harvest. This is the only alternative that includes the critical pinchpoint at Anita Bay. Harvest is not proposed in the Navy Watershed, which contains large blocks, interior habitat and coarse canopy. Partial harvest prescriptions are also expected to reduce impacts to wildlife in the project area.

It also responds to the following issues:

Issue 1: Timber Supply and Economics:

Ranking = 3 (tied with Alternative B), based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves:

Ranking = 1 based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint.

Issue 3: Wildlife Habitat Fragmentation:

Ranking = 3, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Summary

Issue 4: Inventoried Roadless Areas:

Ranking = 4, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road construction in the Navy Watershed:

Ranking = 1, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives A, D and F.

Alternative F

Timber Harvest

The timber volume proposed for sale in Alternative F (Figure 2-6), 18.7 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 626 acres of old-growth stands to an even-aged condition and 696 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative F includes 1.7 miles of NFS road reconstruction and 3.9 miles of temporary road construction. The temporary roads built under this alternative would be decommissioned after the timber sale. The NFS roads reconstructed under this alternative would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove.

Small Old-Growth Reserve Option

This alternative uses the IDT- developed option for the Anita (VCU 4640) small OGR, and the interagency biologist recommended option for the Burnett (VCU 4680) and Quiet (VCU 4650) small OGR and the Forest Supervisor recommended option for the Mosman (VCU 4670) small OGR.

Issue Response

Alternative F was developed to respond to the “Inventoried Roadless Area” issue (Issue 4); it does so by not harvesting timber or constructing roads in Inventoried Roadless Areas.

It also responds to the following issues:

Issue 1: Timber Supply and Economics:

Ranking = 1, based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs. This Alternative ranks the same as Alternative D.

Issue 2: Small Old-growth Reserves:

Ranking = 2 based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint.

Issue 3: Wildlife Habitat Fragmentation:

Ranking = 2, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas:

Ranking = 2, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road construction in the Navy Watershed:

Ranking = 1, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives A, D and E.

Summary

Table S-1. Comparison of Alternatives by Issue

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Issue 1: Timber Supply & Economics:						
Ranking ¹	N/A ²	3	2	1	3	1
Total net volume (MMBF) ³	0	61.7	97.9	36	48.9	18.7
Indicated Bid Value (\$/MBF) ⁴	0	(\$184.67)	(\$185.60)	(\$150.17)	(\$174.99)	(\$133.08)
Direct employment (job equivalents) ⁵	0	214-304	341-483	124-176	171-243	65-92
Road costs per MBF (construction, reconstruction and LTF costs)	0	\$65.28	\$57.29	\$42.14	\$40.78	\$21.99
Logging costs per MBF	0	\$389.90	\$401.21	\$374.78	\$409.73	\$379.77
Issue 2: Small Old-growth Reserves:						
Ranking	5	4	4	3	1	2
Acres of productive old growth habitat protected in small OGRs	23,051	22,752	22,752	22,700	23,250	23,672
Acres of interior productive old growth habitat protected in small OGRs	9,745	9,408	9,408	9,768	10,140	10,354
Acres of young-growth habitat contained within small OGRs	549	555	555	375	272	470
Acres of high-quality deer winter range protected in small OGRs	5,832	5,678	5,678	5,627	5,896	5,847
Number of known or suspected goshawk nest territories protected in small OGRs	0	0	0	1	2	1
Acres of high-quality marbled murrelet nesting habitat protected in small OGRs	18,718	18,476	18,476	18,480	18,908	19,671
Acres of coarse canopy (volume class 6 and 7) productive old growth protected in small OGRs	1,214	1,211	1,211	1,315	1,423	1,401
Small OGR includes the Anita Bay Pinchpoint	No	No	No	No	Yes	No

¹ Ranking is based on the measurements listed for each issue.

² For Issue 1, only alternatives that produced an output (i.e. volume, jobs) were ranked.

³ MMBF = million board feet; this volume includes sawlog and utility

⁴ () indicate a negative value

⁵ Job equivalents range from all sawlogs processed locally to 50 percent of net volume shipped to markets outside Alaska

⁶ The ranking for this issue includes a qualitative analysis of recreation and subsistence use in the Navy Lake vicinity. See chapter 3 Issue 5 discussion for additional information.

Summary

Table S-1 cont. Comparison of Alternatives by Issue

Issue 3: Wildlife Habitat Fragmentation:						
Ranking	1	5	6	4	3	2
Acres of productive old- growth habitat maintained in WAA 1901 after harvest	60,748	58,694	57,704	59,476	59,570	60,122
Acres of interior productive old-growth habitat maintained in WAA 1901 after harvest	24,643	22,354	21,904	23,554	23,730	24,199
Acres of coarse canopy productive old-growth habitat maintained in WAA 1901 after harvest	3,922	3,537	3,539	3,681	3,730	3,857
Issue 4: Inventoried Roadless Areas:						
Ranking	1	5	6	3	4	2
Acres of Inventoried Roadless Areas affected by timber harvest and road construction	0	5,727	8,074	2,171	3,184	291
Miles of road proposed in Inventoried Roadless Areas	0	26	31	11	14	0
Issue 5: Road Construction in the Navy Watershed:						
Ranking ⁶	1	3	2	1	1	1
Miles of road proposed in the Navy Watershed	0	2.7	0	0	0	0
Miles of road proposed on slopes over 67% gradient	0	0.1	0	0	0	0

¹ Ranking is based on the measurements listed for each issue.

² For Issue 1, only alternatives that produced an output (i.e. volume, jobs) were ranked.

³ MMBF = million board feet; this volume includes sawlog and utility

⁴ () indicate a negative value

⁵ Job equivalents range from all sawlogs processed locally to 50 percent of net volume shipped to markets outside Alaska

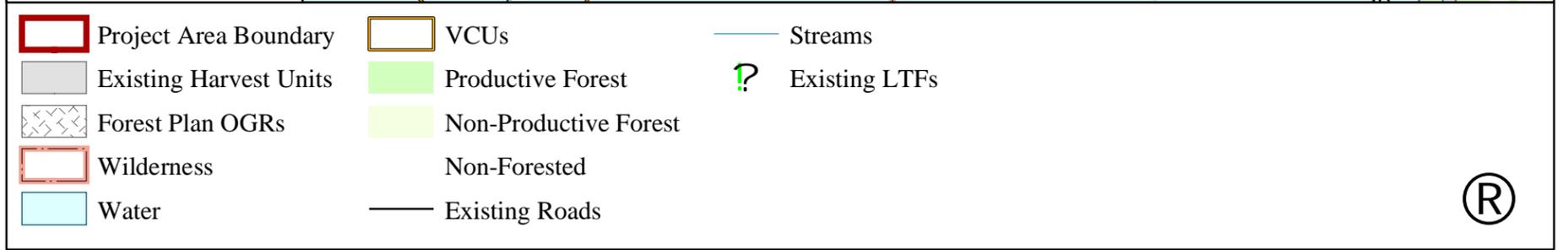
⁶ The ranking for this issue includes a qualitative analysis of recreation and subsistence use in the Navy Lake vicinity. See chapter 3 Issue 5 discussion for additional information.

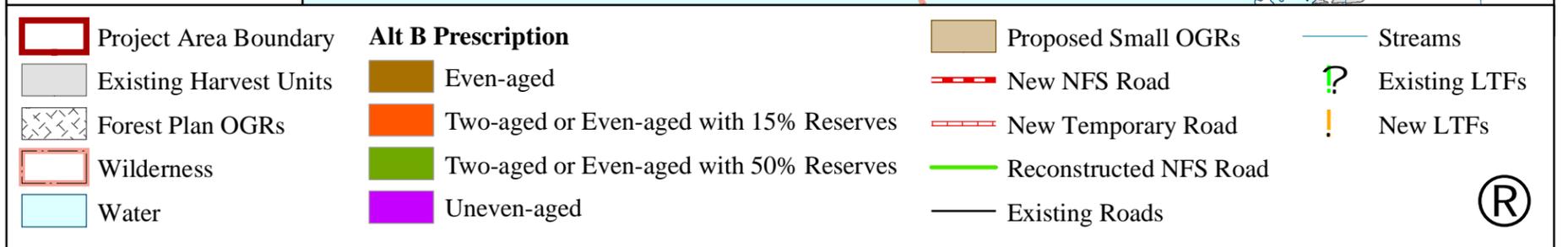
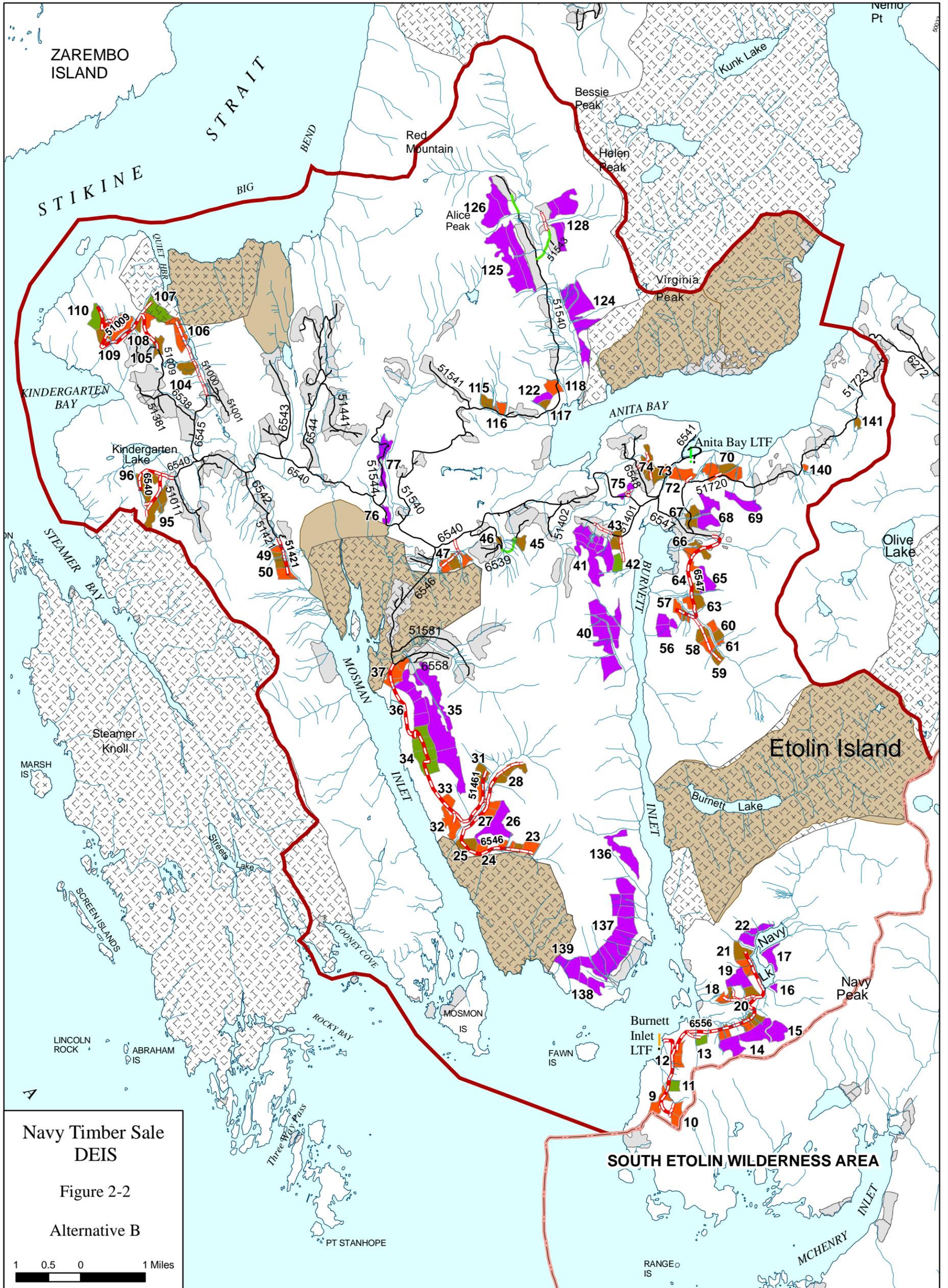
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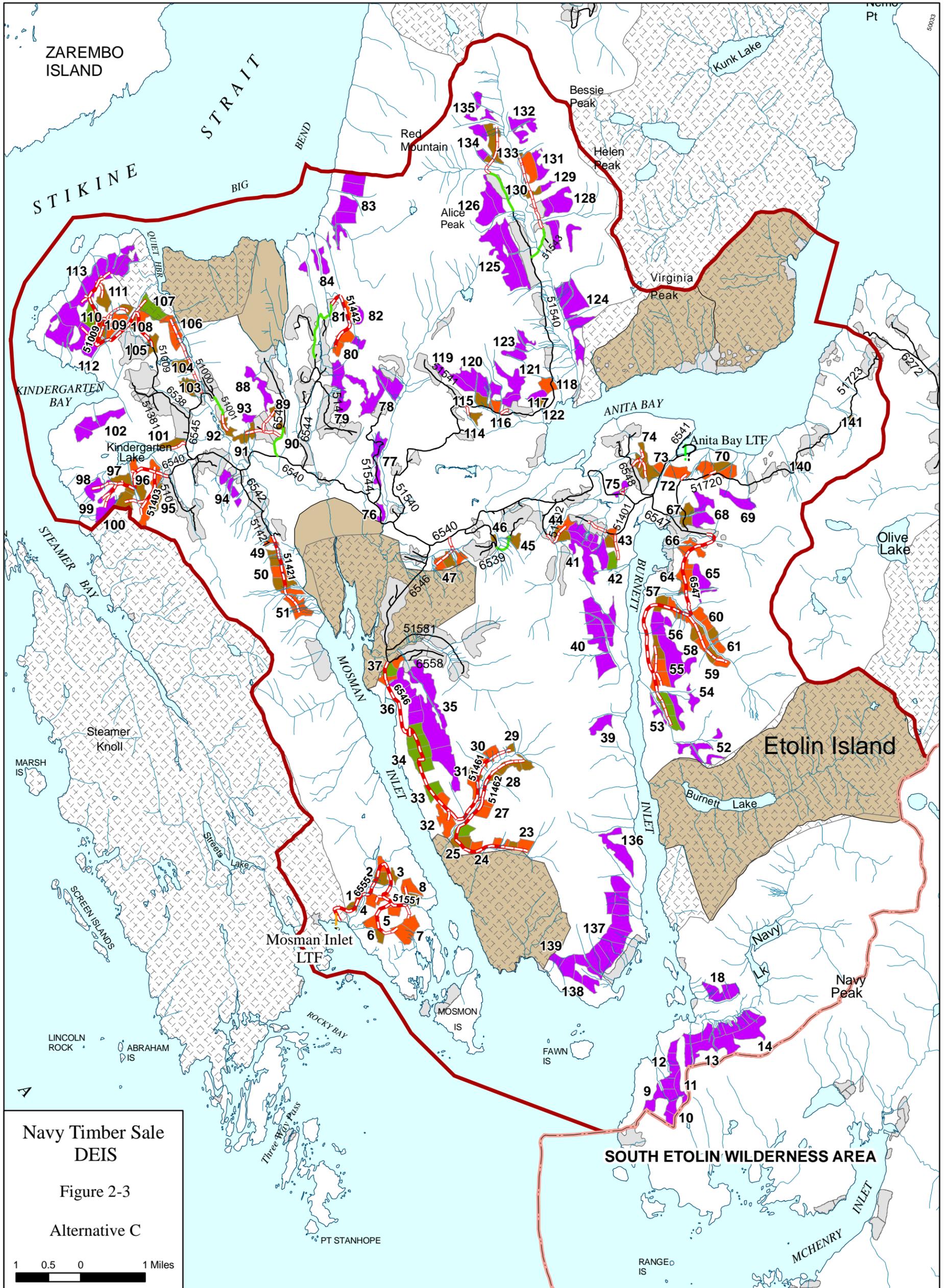
Table S-2. Alternative Design Characteristics

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Harvest acreage and volume:						
Total Acres proposed for harvest	0	4,716	7,800	2,514	4,239	1,322
<i>Acres of cable/shovel yarding</i>	0	2,137	3,443	1,354	1,351	708
<i>Acres of helicopter yarding</i>	0	2,579	4,357	1,175	2,888	614
Total net volume (MMBF)	0	61.7	97.9	36	48.9	18.7
<i>Cable/shovel yarding</i>	0	40.6	61.1	26.3	24.3	13.5
<i>Helicopter yarding</i>	0	21.1	36.8	9.7	24.6	5.2
Acres harvested by silvicultural system:						
<i>Even-aged management</i>	0	2,055	2,645	1,190	1,005	626
<i>Two-aged management</i>	0	0	317	0	91	0
<i>Uneven-aged management</i>	0	2,661	4,838	1,339	3,143	696
Roads and Log Transfer Facilities (LTF):						
Miles of proposed NFS road	0	16.9	19.9	5.0	5.2	0
Miles of proposed temporary road	0	8.4	17.5	5.3	9.2	3.9
Miles of proposed road reconstruction	0	1.2	3.5	0.7	3.3	1.7
Proposes construction of Burnett Inlet LTF?	No	Yes	No	No	No	No
Proposes construction of Mosman Inlet LTF?	No	No	Yes	No	No	No
Small Old-growth Reserve options¹:						
Anita (VCU 4640)	FP	IDT	IDT	IDT	IA	IDT
Burnett (VCU 4680)	FP	IA	IA	IA	IA	IA
Mosman (VCU 4670)	FP	IDT	IDT	IA	IA	FSR
Quiet (VCU 4650)	FP	IDT	IDT	IDT	IA	IA

¹ FP = Forest Plan; IDT = IDT- developed option; IA = Interagency biologist recommended option; FSR = Forest Supervisor recommended option



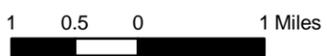




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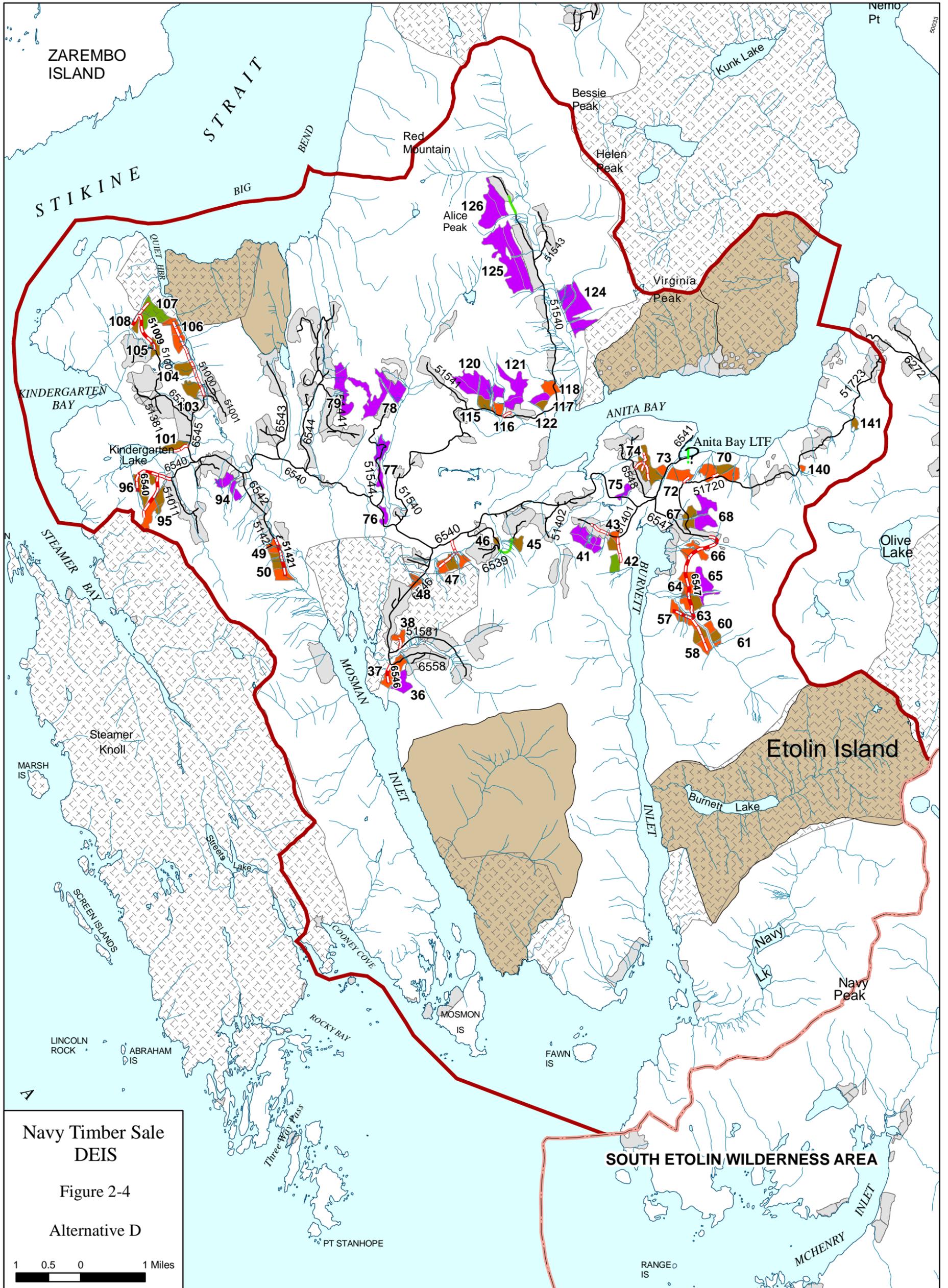
Figure 2-3

Alternative C



- | | | | |
|------------------------|---|------------------------|---------------|
| Project Area Boundary | Alt C Prescription | Proposed Small OGRs | Streams |
| Existing Harvest Units | Even-aged | New NFS Road | Existing LTFs |
| Forest Plan OGRs | Two-aged or Even-aged with 15% Reserves | New Temporary Road | New LTFs |
| Wilderness | Two-aged or Even-aged with 50% Reserves | Reconstructed NFS Road | |
| Water | Uneven-aged | Existing Roads | |





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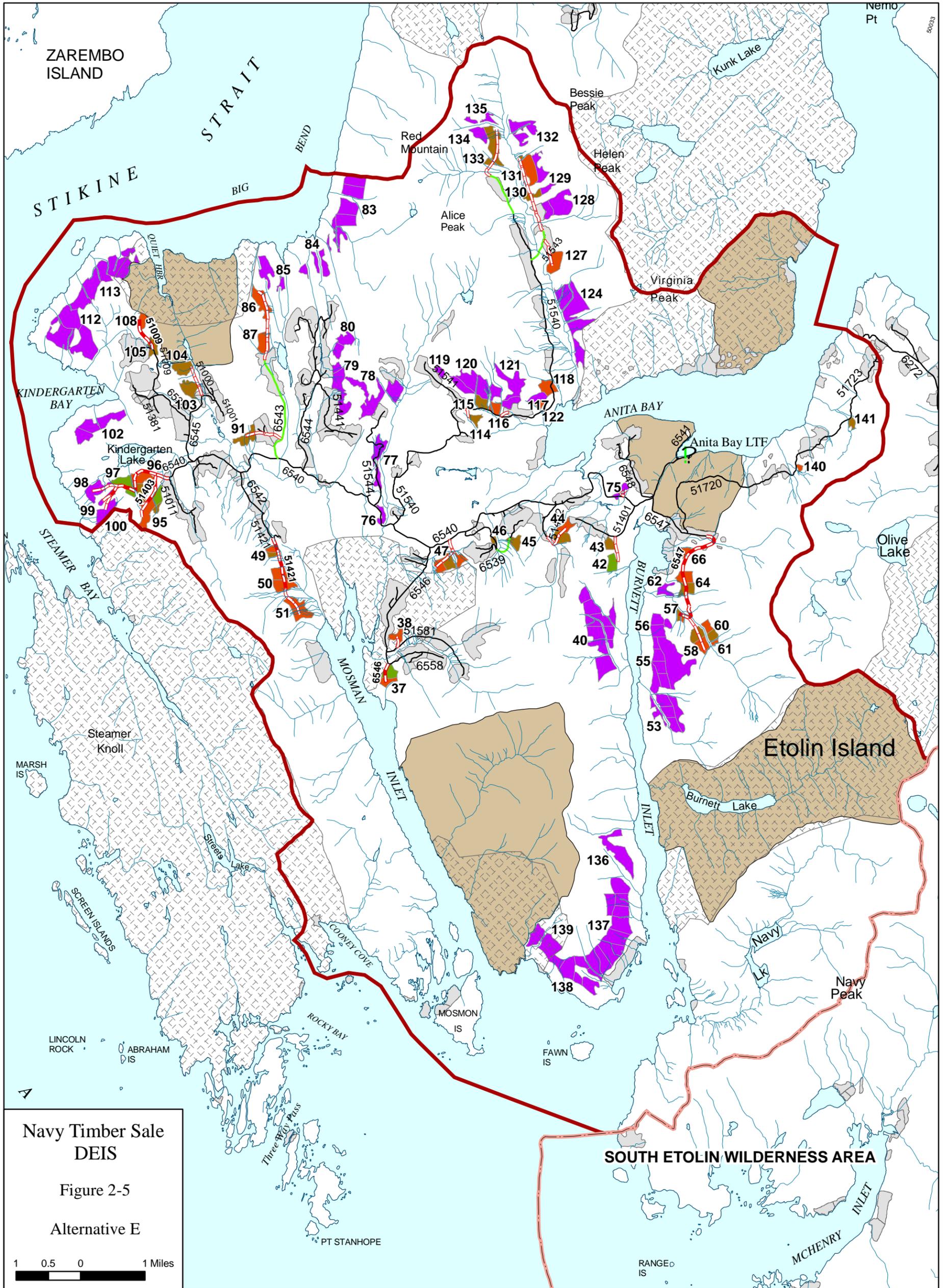
Figure 2-4

Alternative D



- | | | | |
|------------------------|---|------------------------|---------------|
| Project Area Boundary | Alt D Prescription | Proposed Small OGRs | Streams |
| Existing Harvest Units | Even-aged | New NFS Road | Existing LTFs |
| Forest Plan OGRs | Two-aged or Even-aged with 15% Reserves | New Temporary Road | |
| Wilderness | Two-aged or Even-aged with 50% Reserves | Reconstructed NFS Road | |
| Water | Uneven-aged | Existing Roads | |

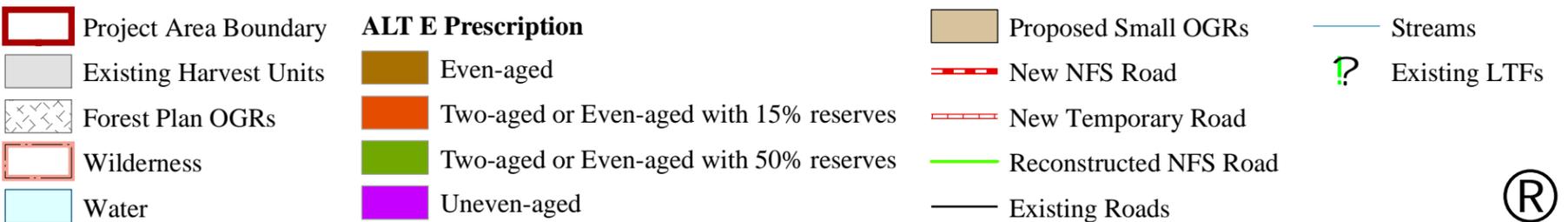
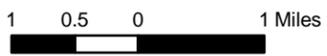




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Figure 2-5

Alternative E



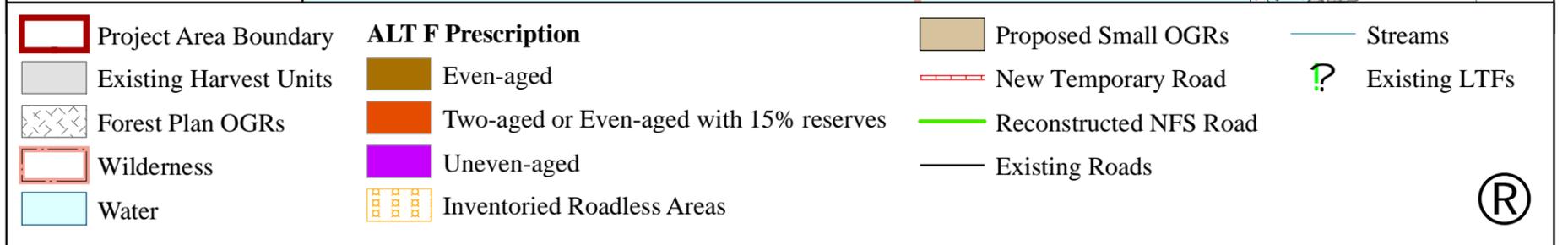
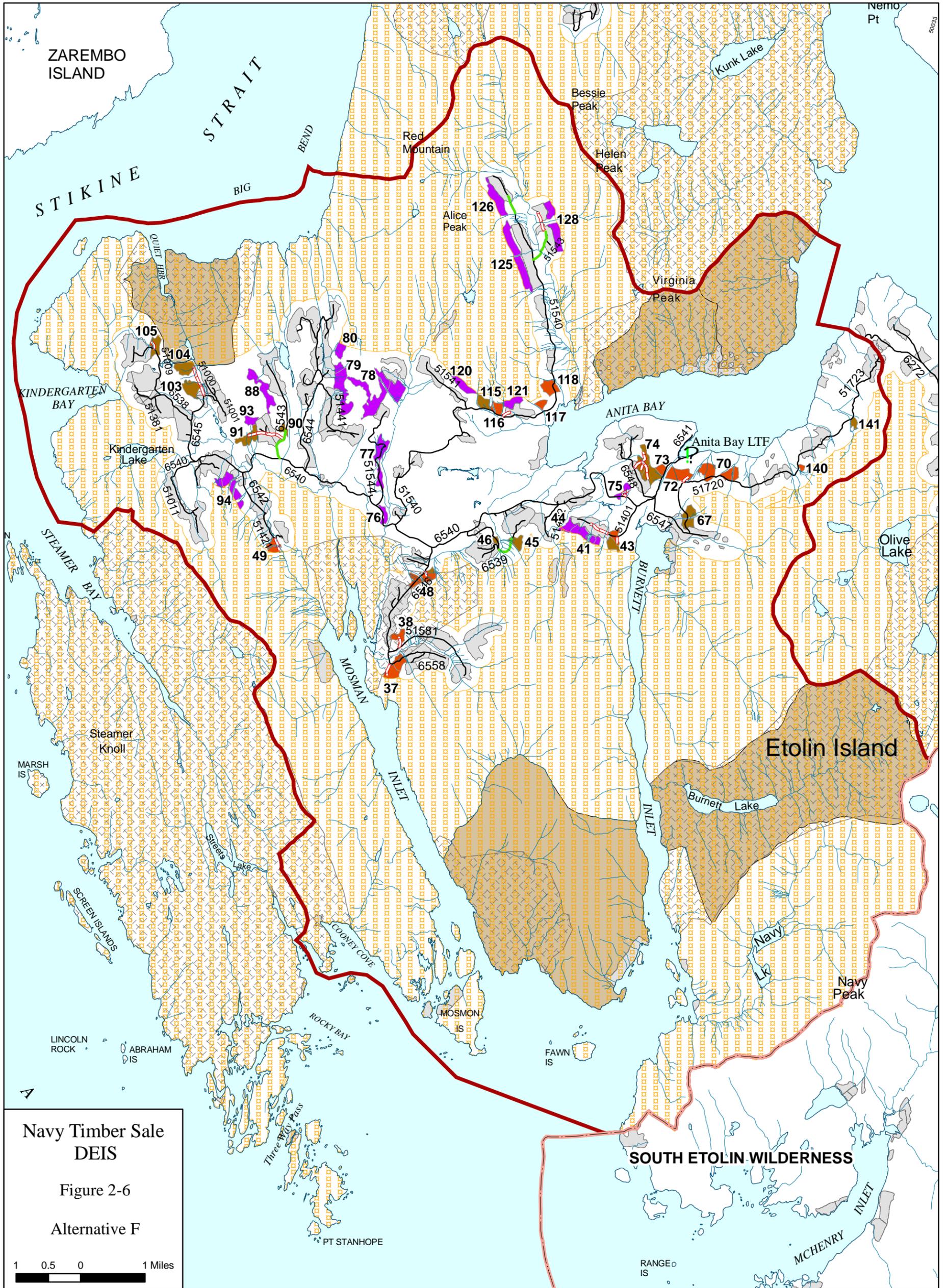


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Chapter 1

Purpose and Need

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Purpose and Need

Introduction

The Forest Service prepared this Draft Environmental Impact Statement (DEIS) to address the potential effects of timber harvest in the Navy project area (Figure 1-1) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This DEIS states the Purpose and Need for the Navy Timber Sale; and discloses the direct, indirect, cumulative environmental impacts, and any irreversible or irretrievable commitment of resources that would result from the Proposed Action and alternatives.

The project area is located on central Etolin Island, approximately 22 air miles southwest of Wrangell Island, and is within the Wrangell Ranger District, Tongass National Forest (Tongass), Alaska.

This DEIS is prepared according to the format established by the Council on Environmental Quality (CEQ) regulations implementing NEPA. (40 CFR 1500-1508)

In preparing this DEIS, the Interdisciplinary Team (IDT) used a systematic approach for analyzing the proposed project and alternatives to it, estimating the environmental effects. The planning process complies with NEPA and the CEQ regulations. Planning was coordinated with the appropriate Federal, State, local agencies, and local federally recognized tribes. The public, agencies, and tribes were involved in the planning process through meetings, letters, and personal conversations.

Document Organization

Chapter 1, in addition to explaining the Purpose and Need for the Proposed Action, discusses how the Navy project relates to the Tongass Land and Resource Management Plan (Forest Plan), and identifies the issues driving the environmental analysis.

Chapter 2, describes the Proposed Action, compares alternatives to the Proposed Action, and describes mitigation and monitoring.

Chapter 3, describes the environments potentially affected by the Proposed Action and alternatives, and discloses potential effects.

Chapter 4, contains the list of preparers, the DEIS distribution list, literature cited, glossary, and index.

Appendices provide additional information on specific aspects of the proposed project. Appendix A of this document provides information on how this project relates to the overall Tongass Timber Sale Program, and why the project is being scheduled at this time. Appendix B contains the Unit Cards. Appendix C contains the Road Cards. Appendix D contains the log transfer facility (LTF) siting information.

Additional documentation, including detailed analyses of project-area resources, may be found in the project record located at the Wrangell Ranger District Office in Wrangell, Alaska.

Additional copies of the DEIS may be obtained from Frank Roberts at the Wrangell Ranger District, P.O. Box 51, Wrangell, AK 99929, or (907) 874-2323.

1 Purpose and Need

Project Area

The Navy project area is located on central Etolin Island approximately 22 air miles southwest of Wrangell, Alaska (Figure 1-1). The project area encompasses approximately 77,500 acres of National Forest System (NFS) land. There are approximately 14,000 acres considered suitable and available for timber management. The project area is within portions of Value Comparison Units (VCUs) 4640, 4650, 4660, 4670, and 4680. VCUs are comparable to large watersheds, and generally follow major watershed divides.

Proposed Action

A “Proposed Action” is defined early in the project-level planning process. This serves as a starting point for the IDT, and gives the public and other agencies specific information on which to focus comments. Using these comments and information from preliminary analysis, the IDT develops alternatives to the Proposed Action.

The Proposed Action for the Navy project area is to harvest approximately 61.7 million board feet (MMBF) from approximately 4,700 acres of NFS land on Etolin Island in one or more offerings. This would require about 18 miles of new NFS road construction and reconstruction; and 8.4 miles of temporary road construction. The Proposed Action includes a non-significant amendment to the Forest Plan to modify the boundaries of the Anita, Burnett, Mosman, and Quiet small old growth reserves (small OGRs). Timber harvested would be hauled to the existing Anita Bay Log Transfer Facility (LTF) and a new LTF at the entrance to Burnett Inlet, near Navy Creek. For this analysis, harvest is expected to begin in 2008. The Proposed Action is Alternative B.

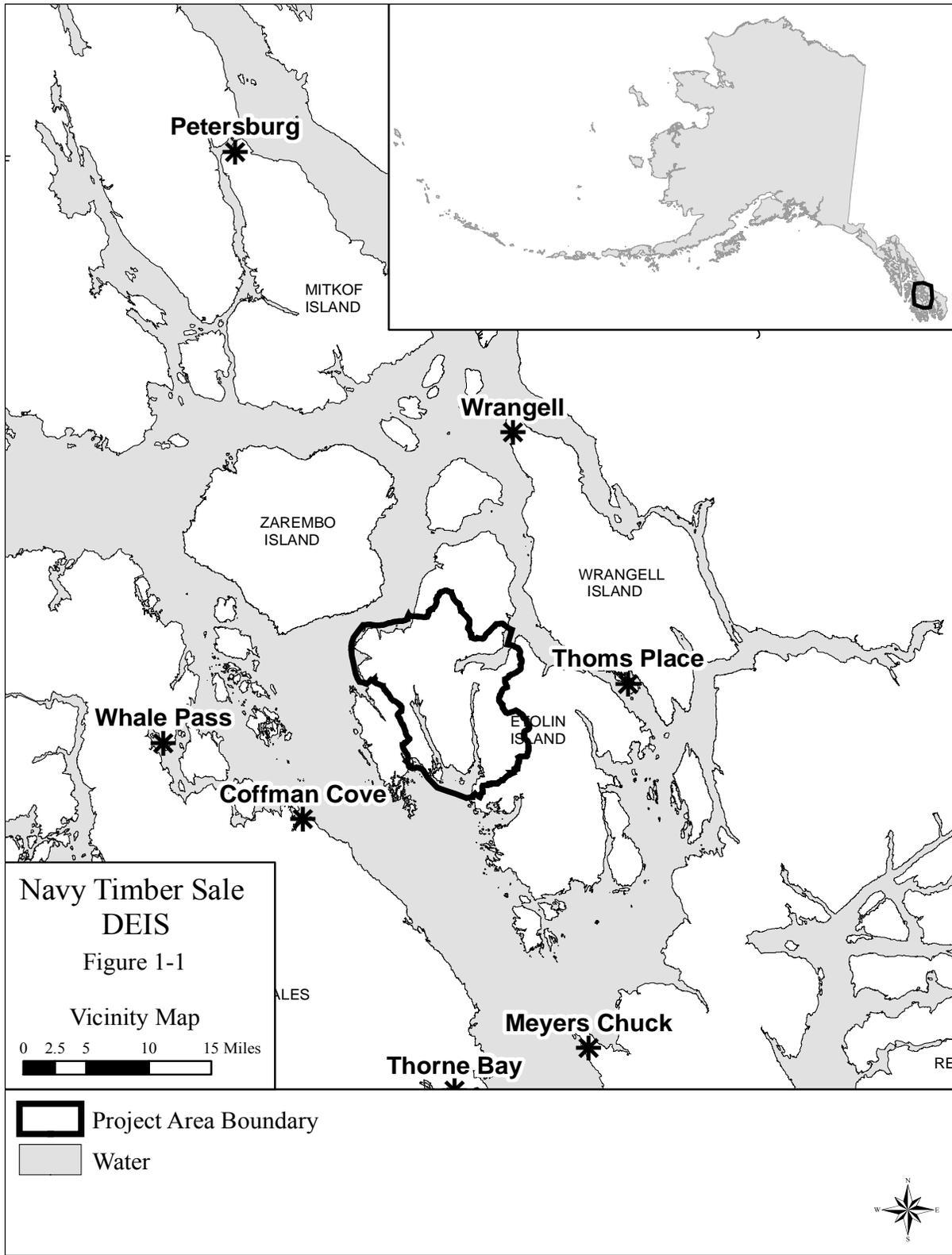
Purpose and Need

The Purpose and Need for this project is to:

- manage suitable timber lands to achieve goals and objectives in the 1997 Forest Plan, as amended, to accomplish the desired conditions prescribed for the Land Use Designations (LUDs);
- assist in providing a continuous wood supply to meet society’s needs; and
- contribute to the job market and the overall economy of Southeast Alaska.

Harvesting timber on Etolin Island is reasonable to propose, based on the evaluated information contained in Appendix A and the September 2006, Etolin Island Landscape Assessment (Etolin LA), which listed several timber opportunities and recommendations. The Etolin LA stated “...the project area continues to play an important role in the region’s economy. The area’s geographic location places it within easy reach of three medium-sized sawmills. Additionally, several small sawmills are located in the area. These small sawmills have moved away from procuring logs from private entities, mainly due to the closure of the regions large sort yards, and have begun purchasing timber sales on the open market. These smaller sawmills rely on lower investment, road accessible timber. The current road system in the project area makes it a potential location of viable timber for both the small and medium sawmills.” Also, “(h)istorically 95 percent of the saw timber milled in Southeast Alaska has come from the Tongass (Forest Plan FEIS 3-261). In recent years, due to the significantly reduced harvest levels of Tongass timber this percentage has decreased, but is expected to again increase if the forest products industry is to remain a viable portion of the regions economy” (page 189, Etolin LA).

Figure 1-1. Vicinity map



Source: GIS

1 Purpose and Need

Forest Plan Goals and Objectives

The Forest Plan includes both forest-wide goals and objectives, and area-specific LUD goals, objectives, and desired conditions. The Navy project is proposed to move the project area towards desired conditions described in the Forest Plan. Applicable forest-wide goals and objectives (Forest Plan, Chapter 2 pages 3-4) include:

- Manage the timber resource for production of sawtimber and other timber products from suitable lands available for timber harvest, on an even-flow, long-term sustained yield basis, and in an economically efficient manner.
- Seek to provide a timber supply sufficient to meet the annual market demand for Tongass timber, and the market demand for the planning cycle.
- Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska.
- Support a wide range of natural-resource employment opportunities within Southeast Alaska's communities.

Goals, objectives, and desired conditions of the LUDs within the project area are described in the section, "Relationship to the Forest Plan."

Decisions to Be Made

Based on the environmental analysis in this DEIS, the Tongass National Forest Supervisor will decide whether and how to make timber available from the Navy project area in accordance with Forest Plan goals, objectives, and desired conditions. This decision will include:

- The location, design, and scheduling of timber harvest, road construction and reconstruction, LTFs, and silvicultural practices;
- the estimated timber volume available from the project area, and the number and size of the individual timber sales;
- access management measures on proposed roads and LTFs;
- mitigation measures and monitoring requirements;
- whether there may be a significant possibility of a significant restriction on subsistence uses; and
- whether any changes in small OGRs should be made, and approved as a non-significant amendment to the Forest Plan.

Relationship to the Wrangell Access and Travel Management Environmental Assessment

During the Navy Timber Sale planning process another planning effort, the Wrangell Access and Travel Management Plan Environmental Assessment (ATM EA) was being conducted. The ATM

EA made decisions that affected existing roads within the Navy Project Area. The Navy Timber Sale DEIS incorporates the decisions made by the ATM EA for the Road Management Objectives of existing roads (not proposed roads). The costs associated with closing existing roads as decided in the ATM EA will be associated with the ATM EA rather than the Navy Timber Sale.

Relationship to the Forest Plan

The Forest Plan is an extensive forest-level analysis. It sets forth in detail the direction for managing the land and resources of the Tongass.

The Navy Timber Sale DEIS is a project-level analysis; its scope is confined to addressing the significant issues and possible environmental effects of the project. This DEIS does not attempt to address decisions made at higher levels. However, it does, implement direction provided at those higher levels. Where appropriate, the Navy DEIS tiers to the Forest Plan Final Environmental Impact Statement (FEIS), as encouraged by 40 CFR 1502.20.

Forest Plan 1997 Record of Decision

In *AFA v. USDA* (J99-0013 CV (JKS)), the U.S. District Court, District of Alaska, vacated the 1999 Record of Decision (ROD) for the Tongass Forest Plan and upheld the 1997 ROD. The Navy project is consistent with the 1997 ROD for the Revised Tongass Land Management Plan.

Forest Plan Supplemental EIS

In *Sierra Club v. Lyons* (J00-0009 CV (JKS)), the U.S. District Court, District of Alaska, directed the Forest Service to prepare a Supplemental Environmental Impact Statement (SEIS) that evaluates and considers roadless areas within the Tongass for recommendation as potential wilderness areas. The Notice of Availability for the Final SEIS and Record of Decision (ROD) appeared in the Federal Register on March 7, 2003. In the SEIS ROD, the No-action Alternative was selected, in which no additional wildernesses were recommended, and the existing LUDs were maintained. The roadless inventory and roadless area descriptions were updated to support the SEIS, and were incorporated into the Navy Timber Sale DEIS analysis.

Forest Plan Amendment

A Forest Plan amendment process is currently underway that could change management direction, pending the outcome of that analysis and decision. The Forest Plan Amendment Draft EIS was published in January 2007, and the extended public comment period ended on April 30, 2007. No decision on the amendment was made prior to the analysis displayed in the Navy Timber Sale DEIS. The decision on the Navy Timber Sale will be consistent with the Forest Plan amendment decision, following procedures in the Forest Service Handbook FSH 1909.15, Section 18.

Forest Plan Land Use Designations

The Forest Plan uses LUDs to guide the management of NFS lands within the Tongass. Each designation provides for a unique combination of activities, practices, and uses. The Navy project area includes five LUDs, shown in Figure 1-2. Goals, objectives, and desired conditions of each are included or summarized below. Chapter 3 of the Forest Plan contains a detailed description of each LUD.

Table 1-1 gives the acreages within the project area of each LUD. There is no private or State land within the project area. Figure 1-2 displays the location of the land allocations within the project area.

1 Purpose and Need

Table 1-1. Acres within the Project Area by Land Use Designation

Timber Production	Modified Landscape	Scenic Viewshed	Semi-Remote Recreation	Old-growth Habitat	Total Acres
28,385	22,089	11,662	561	14,752	77,449

Source: J. Roberts, GIS, LUDs feature class

Timber Production (TM)

The goals of this designation are to:

- maintain and promote industrial wood production from suitable timber lands;
- providing a continuous supply of wood to meet society's needs;
- manage these lands for sustained long-term timber yields;
- seek to provide a supply of timber from the Tongass, which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this LUD.

Timber Management objectives of this LUD include:

- seek to reduce clearcutting when other methods will meet land management objectives;
- improve timber growth and productivity on commercial forest lands; and
- plan, inventory, prepare, offer, sell, and administer timber sales and permits to ensure the orderly development of timber production.

The desired condition includes a sustained yield of timber; healthy tree stands in a balanced mix of age classes from young stands to trees of harvestable age; a road system providing access for timber management to include recreation opportunities, hunting, fishing, and other public uses. Wildlife habitats are predominantly in the early and middle successional stages.

Modified Landscape (ML)

The goals of this designation are to:

- maintain and promote industrial wood production from suitable timber lands;
- providing a continuous supply of wood to meet society's needs;
- seek to provide a supply of timber from the Tongass which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this LUD;
- provide a sustained yield of timber, and a mix of resource activities, while minimizing the visibility of developments in the foreground distance zone;
- recognize the scenic values of suitable timber lands viewed from identified popular roads, trails, marine travel routes, recreation sites, bays, and anchorages, and modify timber harvest practices accordingly.

When seen from visual priority travel routes and use areas, the scenery objective is to apply the Partial Retention visual quality objective (VQO) in the foreground distance zone, and Modification in the remaining zones.

The desired condition accepts a somewhat modified landscape, but emphasizes scenic quality in foreground distance zones. Recreation opportunities associated with natural appearing to modified settings are available. A variety of successional stages provides a range of wildlife habitat conditions.

Scenic Viewshed (SV)

The goals of this designation are to:

- seek to provide a supply of timber from the Tongass which meets the annual and planning-cycle market demand, consistent with the standards and guidelines of this LUD;
- provide a sustained yield of timber, and a mix of resource activities, while minimizing the visibility of developments as seen from visual priority travel routes and use areas;
- recognize the scenic values of suitable timber lands viewed from selected popular roads, trails, marine travel routes, recreation sites, bays, and anchorages, and modify timber harvest practices accordingly.

When seen from visual priority travel routes and use areas, the scenery objective is to apply the Retention VQO in the foreground distance zone, and Partial Retention in the remaining zones.

The desired condition emphasizes a natural-appearing landscape as viewed by users of visual priority travel routes and use areas. Recreation and tourism opportunities in a range of settings are available. A variety of successional stages providing wildlife habitat occur, although late successional stages predominate.

Semi-Remote Recreation (SM)

The goals of this designation are to:

- provide predominantly natural, or natural-appearing, settings for semi-primitive types of recreation and tourism; and for occasional enclaves of concentrated recreation and tourism facilities;
- provide opportunities for a moderate degree of independence, closeness to nature, and self-reliance in environments requiring challenging motorized or non-motorized forms of transportation.

The desired condition emphasizes a generally unmodified natural environment. Some areas offer motorized opportunities and others non-motorized opportunities. Facilities and structures will be in harmony with the natural setting.

Old-growth Habitat (OG)

The goals of this designation are to:

- maintain areas of old-growth forests and their associated natural ecological processes to provide habitat for old-growth associated resources;
- manage early seral conifer stands to achieve old-growth forest characteristic structure and composition based upon site capability.

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- Applicable objectives of Old-growth Habitat include:
- provide old-growth forest habitats, in combination with other LUDs, to maintain viable populations of fish and wildlife species that may be closely associated with old-growth forests;
- contribute to the habitat capability of fish and wildlife resources to support sustainable human subsistence and recreational uses;
- maintain components of flora and fauna biodiversity and ecological processes associated with old-growth forests.

The desired condition is that all forested areas attain old-growth forest characteristics and provide a diversity of old-growth habitat types, associated species, and ecological processes.

Public Involvement

Scoping

The Council on Environmental Quality (CEQ) defines scoping as “...an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action” (40 CFR 1501.7). A significant portion of the scoping process is used to invite public participation, to help identify public issues, and to obtain public comment at various stages of the EIS process. Scoping begins early in the EIS process, and is a continuing process until the final decision is made. In addition to the following specific activities, the Navy project has been listed on the Tongass Schedule of Proposed Actions since January 2006. This Schedule is available on the Internet at <http://www.fs.fed.us/r10/tongass/>. Scoping notices about the Navy Timber project were published in the Wrangell Sentinel, Ketchikan Daily News, and Juneau Empire. In January 2006, KSTK aired an interview with Wrangell District Ranger, Mark Hummel, regarding the Navy project.

Notice of Intent

A Notice of Intent (NOI) was published in the Federal Register on January 23, 2006, when it was decided that an EIS would be prepared for the Navy Timber project. Due to a change in the original proposed action, a revised NOI was published in the Federal Register on May 21, 2007.

Public Mailings

In November 2005, approximately 250 letters were mailed to individuals and groups, which had previously shown interest in Forest Service projects in Southeast Alaska, including Federal and State agencies, Alaska Native groups, municipal offices, businesses, interest groups, and individuals. The mailing provided general information and requested public comment. Twenty-two responses to this initial mailing were received.

On January 12, 2006, a letter describing in detail, the proposed action, preliminary concerns, and preliminary alternatives was mailed to 110 individuals and groups. The eight responses to this mailing commented on concerns of old-growth habitat reserves, roadless areas, subsistence, karst, caves, economics, roads and access, timber supply and economics, and water quality.

A Navy Timber Sale project update letter was mailed to 107 individuals and groups on February 15, 2007. The letter informed the public that the proposed action changed. Comments received regarded subsistence, roads and access, wildlife species and habitat, fish, cumulative impacts, roadless areas,

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wilderness, timber supply and economics, karst and caves, soil stability, water quality, wetlands, old-growth habitat and reserves, recreation, harvest methods and prescription, and windthrow.

Public Open House

A public open house for the Navy project area was held in Wrangell on January 26, 2006, in conjunction with a public open house for the WRD Roads Analysis and Access Travel Management Plan. The intent of the Navy Open House was to provide project area information, maps, and discuss local concerns and interests to be addressed in the project analysis.

Tribal Consultation

Consultation with federally recognized tribal governments included government-to-government and staff level communications. Following is a list of consultation activities.

April 26, 2004 – Wrangell District Ranger sent Wrangell Cooperative Association (WCA) a letter to initiate consultation regarding the 2004 Heritage Resource Program, which included work in the Navy project area.

July 08, 2004 – Two Forest Service Archeologists met with WCA to discuss their responsibilities and program of work, including the Navy Timber Sale.

November 12, 2004 – Six Forest Service representatives met with WCA to discuss multiple timber sale projects, including the Navy Timber Sale.

May 06, 2005 – Wrangell District Ranger sent a letter to WCA to initiate consultation regarding activities on the Wrangell Ranger District, including the Navy Timber Sale.

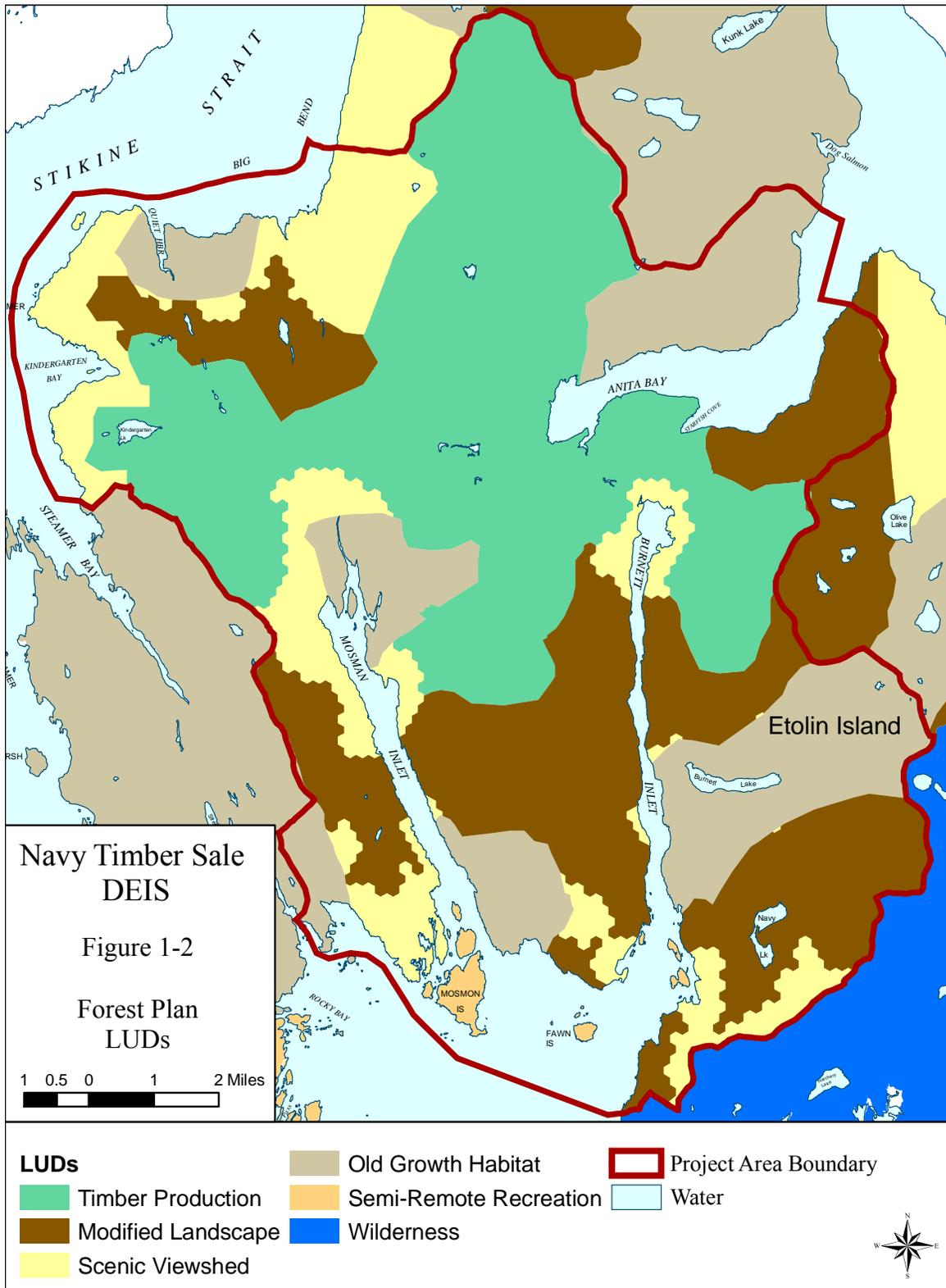
November 21, 2005 – Three Forest Service representatives met with WCA to discuss the Navy Timber Sale.

July 14, 2006 – The Wrangell District Ranger and two Forest Service representatives met with WCA to discuss projects, including the range of alternatives that will be included in the Navy Timber Sale DEIS.

Additionally, the Navy Timber Sale Heritage Resource report was given to the WCA council for review and comment. The Forest Service also sent letters of consultation and copies of the report to the Petersburg Indian Association, the Organized Village of Kake, Kake Tribal Corporation, Sealaska Corporation, and Tlingit/Haida Central Council.

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Figure 1-2. Land Use Designations



Source: GIS

Issues

Issues for the Navy project area were identified through public and internal scoping. Issues generally suggest a problem with the proposed action such that alternative actions need to be developed to solve that problem. These issues are also used to develop mitigation and track environmental effects. Therefore, each issue includes measurements that are used to determine the effects of the different alternatives. Similar issues were combined into one statement, where appropriate. The following four issues were determined to be significant and within the scope of the project decision. The IDT developed alternatives to the Proposed Action to address these issues; Chapter 2 of this DEIS discusses and compares the alternatives. Effects to other resources were considered and addressed in Chapter 3.

Issue 1: Timber Supply and Economics

Timber harvest in the project area may affect local and regional economies.

Concerns were expressed regarding the validity of this sale since some previous sales lacked purchasers; the lack of economical timber; the amount of timber offered by the Forest Service; the economic burden placed on taxpayers to fund timber sales; and the need to provide jobs and supporting the local economy.

Measurements:

- potential volume of timber available by alternative;
- indicated bid value and number of jobs equivalents;
- logging and road costs per MBF.

Issue 2: Old-Growth Reserves

The location and configuration of small Old-Growth Reserves (OGRs) may affect their quality and value as a habitat reserve for wildlife.

A range of concerns were expressed including: the current locations of OGRs do not contain the best habitat for wildlife species; timber management should be given priority when locating OGRs; and OGRs should not be located in order to make more timber available for harvest.

Measurements:

- acres of productive old-growth (POG) habitat protected in small OGRs by alternative;
- acres of interior POG habitat protected in small OGRs by alternative [Interior old growth is that portion of a contiguous old-growth patch more than 300 feet inside the edge or perimeter of the block (USDA 1997a)];
- acres of young-growth habitat contained within small OGRs, resulting from past forest management by alternative;
- acres of high-quality deer winter range protected in small OGRs by alternative [High-quality deer winter range will be defined by the deer habitat capability model.];
- number of known or suspected goshawk nest territories protected in small OGRs by alternative;
- acres of high-quality marbled murrelet nesting habitat protected in small OGRs by alternative;

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- acres of coarse canopy (volume class 6 and 7) POG habitat protected in small OGRs by alternative; and
- whether a small OGR includes the Anita Bay Pinchpoint.

Issue 3: Wildlife Habitat Fragmentation

Concerns were expressed about the effects of fragmentation on wildlife habitat and wildlife populations by removing habitat and/or connectivity.

Measurements:

- acres of POG habitat maintained in Wildlife Analysis Area (WAA) 1901 after harvest by alternative;
- acres of interior POG maintained in WAA 1901 after harvest by alternative; and
- acres of coarse canopy (volume classes 6 and 7) old-growth maintained in WAA 1901 after harvest by alternative.

Issue 4: Inventoried Roadless Areas

Concerns were expressed that timber harvest and road construction in Inventoried Roadless Areas could affect the characteristics of the area.

Measurements:

- acres of Inventoried Roadless Areas affected by timber harvest and road construction and
- miles of road proposed in Inventoried Roadless Areas

Issue 5: Road Construction in the Navy Watershed

Concerns were expressed about the construction of a remote independent road system and associated LTF in the Navy Watershed which has recreation and water quality concerns. The road system could provide road-based recreation access, which may affect abundance and distribution of wildlife and increase hunter competition.

Measurements:

- miles of road proposed in the Navy Watershed;
- qualitative analysis of recreation and subsistence use in the Navy Lake vicinity; and
- miles of road proposed on slopes over 67% gradient.

Issues Outside the Scope of the Project

Several comments were made that included issues that were outside of the scope of the project. These included issues that were decided at the Forest Plan level or through other legislation or direction, were outside the project area or were addressed through implementation of the Forest Plan Standards and Guidelines.

- Some of the comments were about management of wilderness areas. Wilderness area management was decided in the Wilderness Act and will not be changed through any actions of this project.

- Other comments concerned LUD locations. The LUD areas are decided in the Forest Plan. Some of the project alternatives do consider a Forest Plan amendment to set boundaries for old-growth habitat reserves. This type of amendment was presumed to occur in the Forest Plan. Larger LUD changes that include changing LUD areas to Wilderness are outside the scope of this project and are decided by Congress.
- Some comments preferred that no timber harvest or road building occur on the Tongass National Forest. The decision to harvest timber on the Tongass was made by the Tongass Timber Reform Act and the Forest Plan. This decision is outside the scope of this project.

Other Environmental Effects

A detailed discussion of the following resources is found in the resource reports and is summarized in Chapter 3: Botany, Geology, Heritage, Recreation, Scenery, Silviculture, Soils, Subsistence, Transportation, Watershed and Fisheries, Wetlands, and Wildlife.

Federal and State Permits, Licenses, and Certifications

Prior to implementation of the proposed timber sale, various permits would need to be obtained from Federal and State agencies. The following permits will be obtained:

U.S. Army Corps of Engineers

- Approval of discharge of dredged or fill material into waters of the United States (Section 404 of the Clean Water Act of 1977, as amended).
- Approval of construction of structures or work in navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899).

U.S. Environmental Protection Agency

- Storm water discharge permit.
- National Pollutant Discharge Elimination System review (Section 402 of the Clean Water Act).

State of Alaska, Department of Natural Resources

- Authorization for occupancy and use of tidelands and submerged lands.
- Under the Coastal Zone Management Act (CZMA)

To make the process more efficient, categories of activities may be evaluated and reviewed together under what is called a “general consistency determination” (GCD). Upon approval of a GCD, activities within that category do not require an individual consistency determination or review. The Forest Service had developed a GCD for timber harvest activities conducted on the Tongass National Forest, and the State of Alaska has agreed that Tongass timber harvest activities are consistent to the maximum extent practicable with the enforceable policies of the ACMP.

Due to limits on the types of activities that qualify for a GCD, and provisions of the Alaska Forest Resources and Practices Act (FRPA), certain activities are outside the scope of the GCD and will continue to require individual ACMP consistency review. The GCD does not apply to any activity that requires a State or Federal authorization under any authority other than FRPA. Nor does it apply to any activity related to the planning, construction, modification, or removal of any structure or facility intended for use by the general public.

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Specifically, it does not apply to logging camps or construction of log transfer facilities that require State or Federal permits, or to construction of roads that require such non-FRPA permits. The Navy timber sale proposes new log transfer facilities that are not covered by the scope of the GCD and will require an individual consistency determination. The scope of that determination and consistency review will be limited to that portion of the project not covered by the GCD.

State of Alaska, Department of Environmental Conservation

- Certification of compliance with Alaska Water Quality Standards (Section 401 Certification).
- Solid Waste Disposal Permit (Section 402 of the Clean Water Act).

Applicable Laws and Executive Orders

Shown below is a partial list of Federal laws and executive orders pertaining to project-specific planning and environmental analysis on Federal lands. While most pertain to all Federal lands, some of the laws are specific to Alaska. Disclosures and findings required by these laws and orders are contained in Chapter 3 of this DEIS.

Alaska Native Claims Settlement Act (ANCSA) of 1971

Alaska National Interest Lands Conservation Act (ANILCA) of 1980

American Indian Religious Freedom Act of 1978

Archeological Resource Protection Act of 1980

Bald and Golden Eagle Protection Act of 1940 (as amended)

Cave Resource Protection Act of 1988

Clean Air Act of 1970 (as amended)

Clean Water Act of 1977 (as amended)

Coastal Zone Management Act of 1972 (as amended)

Endangered Species Act (ESA) of 1973 (as amended)

Executive Order 11593 (cultural resources)

Executive Order 11988 (floodplains)

Executive Order 11990 (wetlands)

Executive Order 12898 (environmental justice)

Executive Order 12962 (aquatic systems and recreational fisheries)

Executive Order 13007 (Indian sacred sites)

Executive Order 13175 (government-to-government consultation)

Executive Order 13443 (facilitation of hunting heritage and wildlife conservation)

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)

Magnuson-Stevens Fishery Conservation and Management Act of 1996

Marine Mammal Protection Act of 1972

Migratory Bird Treaty Act of 1918 (amended 1936 and 1972)

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Multiple-Use Sustained-Yield Act of 1960

Native American Graves Protection and Repatriation Act (NAGPRA) of 1990

National Environmental Policy Act (NEPA) of 1969 (as amended)

National Forest Management Act (NFMA) of 1976 (as amended)

National Historic Preservation Act of 1966 (as amended)

National Transportation Policy (2001)

Organic Act of 1897

Rivers and Harbors Act of 1899

Tongass Timber Reform Act (TTRA) of 1990

Wild and Scenic Rivers Act of 1968, amended 1986

Availability of the Project Record

This DEIS provides sufficient site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and ways to mitigate the impacts. The project record contains documentation the NEPA process and analysis.

The project record is located at the Wrangell Ranger District office in Wrangell, Alaska. Reference documents, such as the Forest Plan and the Tongass Timber Reform Act are available for review at public libraries and Forest Service offices throughout Southeast Alaska, including the Forest Supervisor's office in Ketchikan. The Forest Plan is available on the Internet (<http://www.fs.fed.us/r10/tongass/>).

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Chapter 2

Alternatives

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Chapter 2

Alternatives

Introduction

This chapter describes and compares the alternatives considered by the Forest Service for the Navy Timber Sale. It includes a discussion of how alternatives were developed, a description and map of each alternative considered in detail, items common to all alternatives, alternatives considered but eliminated from detailed study, mitigation measures, monitoring, and findings and disclosures. Alternative D is identified as the preferred alternative. Chapter 2 is intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. (40 CFR 1502.14)

Some of the information used to compare alternatives at the end of Chapter 2 is summarized from Chapter 3, "Affected Environment and Environmental Effects." Chapter 3 contains the detailed scientific basis for establishing baselines and measuring the potential environmental consequences of each of the alternatives. For a full understanding of the effects of the alternatives, readers will need to consult Chapter 3.

Alternative Development Process

During the early stages of planning, a logging system and transportation analysis was completed for the project area. This analysis divides the project area into potential harvest areas.

The potential harvest areas and the roads necessary to access them were then evaluated in the field. Potential harvest areas were validated, modified, dropped and/or deferred based on findings of the field investigations. Modifications were made as needed to meet the 1997 Tongass Land and Resource Management Plan (Forest Plan) Standards and Guidelines. The result was a pool of units that could be included in an alternative. The responsible official identified the Proposed Action as described in Chapter 1 and considered in detail as Alternative B.

The Interdisciplinary Team (IDT) took information from public scoping, including the issues identified for the project (Chapter 1), in conjunction with the field-verified unit pool to develop alternatives to the Proposed Action. All of the Action Alternatives presented in this Draft Environmental Impact Statement (DEIS) address the issues to varying degrees and meet the Purpose and Need. The No Action Alternative does not meet the Purpose and Need for the Navy Timber Sale.

Each action alternative represents a site-specific proposal developed through intensive interdisciplinary evaluation and field verification. Within the range of options they provide, the decision maker can consider various combinations of the alternatives in determining the Selected Alternative.

2 Alternatives

Description and Comparison of Alternatives Considered in Detail

This section describes the alternatives considered in detail and compares the alternatives by issue. The discussions of effects are summarized from Chapter 3, which should be consulted for a full understanding of these and other environmental effects. Table 2-1 provides an overview comparison of information from the alternative descriptions and Chapter 3 relevant to the issues. This information will be used in the discussions, which follow. The Proposed Action (Alternative B) and five alternatives are considered in detail.

Table 2-1 and the alternative descriptions below include a rank of each alternative by issue. The alternatives were ranked by each issue on a scale of 1-6. A ranking of “1” means that the alternative best addresses the issue compared to the other alternatives; a ranking of “6” means that the alternative least addresses the issue. All measurements were weighted equally. In a few instances, multiple alternatives rank equally.

Table 2-1. Comparison of Alternatives by Issue

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Issue 1: Timber Supply & Economics:						
Ranking ¹	N/A ²	3	2	1	3	1
Total net volume (million board feet (MMBF)) ³	0	61.7	97.9	36	48.9	18.7
Indicated Bid Value (\$/thousand board feet (MBF)) ⁴	0	(\$184.67)	(\$185.60)	(\$150.17)	(\$174.99)	(\$133.08)
Direct employment (job equivalents) ⁵	0	214-304	341-483	124-176	171-243	65-92
Road costs per MBF (construction, reconstruction and LTF costs)	0	\$65.28	\$57.29	\$42.14	\$40.78	\$21.99
Logging costs per MBF	0	\$389.90	\$401.21	\$374.78	\$409.73	\$379.77
Issue 2: Small Old-growth Reserves (small OGRs):						
Ranking	5	4	4	3	1	2
Acres of productive old growth habitat protected in small OGRs	23,051	22,752	22,752	22,700	23,250	23,672
Acres of interior productive old growth habitat protected in small OGRs	9,745	9,408	9,408	9,768	10,140	10,354
Acres of young-growth habitat contained within small OGRs	549	555	555	375	272	470
Acres of high-quality deer winter range protected in small OGRs	5,832	5,678	5,678	5,627	5,896	5,847
Number of known or suspected goshawk nest territories protected in small OGRs	0	0	0	1	2	1
Acres of high-quality marbled murrelet nesting habitat protected in small OGRs	18,718	18,476	18,476	18,480	18,908	19,671
Acres of coarse canopy (volume class 6 and 7) productive old growth protected in small OGRs	1,214	1,211	1,211	1,315	1,423	1,401
Small OGR includes the Anita Bay Pinchpoint	No	No	No	No	Yes	No
Issue 3: Wildlife Habitat Fragmentation:						
Ranking	1	5	6	4	3	2
Acres of productive old- growth habitat maintained in WAA 1901 after harvest	60,748	58,694	57,704	59,476	59,570	60,122
Acres of interior productive old-growth habitat maintained in WAA 1901 after harvest	24,643	22,354	21,904	23,554	23,730	24,199
Acres of coarse canopy productive old-growth habitat maintained in WAA 1901 after harvest	3,922	3,537	3,539	3,681	3,730	3,857

¹ Ranking is based on the measurements listed for each issue.

² For Issue 1, only alternatives that produced an output (i.e. volume, jobs) were ranked.

³ MMBF = million board feet; this volume includes sawlog and utility

⁴ () indicate a negative value. Thousand board feet (MBF)

⁵ Job equivalents range from all sawlogs processed locally to 50 percent of net volume shipped to markets outside Alaska

⁶ The ranking for this issue includes a qualitative analysis of recreation and subsistence use in the Navy Lake vicinity. See Chapter 3 Issue 5 discussion for additional information.

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Table 2-1 Cont. Comparison of Alternatives by Issue

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Issue 4: Inventoried Roadless Areas:						
Ranking	1	5	6	3	4	2
Acres of Inventoried Roadless Areas affected by timber harvest and road construction	0	5,727	8,074	2,171	3,184	291
Miles of road proposed in Inventoried Roadless Areas	0	26	31	11	14	0
Issue 5: Road Construction in the Navy Watershed:						
Ranking ⁶	1	3	2	1	1	1
Miles of road proposed in the Navy Watershed	0	2.7	0	0	0	0
Miles of road proposed on slopes over 67% gradient	0	0.1	0	0	0	0

¹ Ranking is based on the measurements listed for each issue.

² For Issue 1, only alternatives that produced an output (i.e. volume, jobs) were ranked.

³ MMBF = million board feet; this volume includes sawlog and utility

⁴ () indicate a negative value. Thousand board feet (MBF)

⁵ Job equivalents range from all sawlogs processed locally to 50 percent of net volume shipped to markets outside Alaska

⁶ The ranking for this issue includes a qualitative analysis of recreation and subsistence use in the Navy Lake vicinity. See Chapter 3 Issue 5 discussion for additional information.

Table 2-2. Alternative Design Characteristics

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Harvest acreage and volume:						
Total Acres proposed for harvest	0	4,716	7,800	2,514	4,239	1,322
<i>Acres of cable/shovel yarding</i>	0	2,137	3,443	1,354	1,351	708
<i>Acres of helicopter yarding</i>	0	2,579	4,357	1,175	2,888	614
Total net volume (MMBF)	0	61.7	97.9	36	48.9	18.7
<i>Cable/shovel yarding</i>	0	40.6	61.1	26.3	24.3	13.5
<i>Helicopter yarding</i>	0	21.1	36.8	9.7	24.6	5.2
Acres harvested by silvicultural system:						
<i>Even-aged management</i>	0	2,055	2,645	1,190	1,005	626
<i>Two-aged management</i>	0	0	317	0	91	0
<i>Uneven-aged management</i>	0	2,661	4,838	1,339	3,143	696
Roads and Log Transfer Facilities (LTF):						
Miles of proposed NFS road	0	16.9	19.9	5.0	5.2	0
Miles of proposed temporary road	0	8.4	17.5	5.3	9.2	3.9
Miles of proposed road reconstruction	0	1.2	3.5	0.7	3.3	1.7
Proposes construction of Burnett Inlet LTF?	No	Yes	No	No	No	No
Proposes construction of Mosman Inlet LTF?	No	No	Yes	No	No	No
Small Old-growth Reserve options¹:						
Anita (VCU 4640)	FP	IDT	IDT	IDT	IA	IDT
Burnett (VCU 4680)	FP	IA	IA	IA	IA	IA
Mosman (VCU 4670)	FP	IDT	IDT	IA	IA	FSR
Quiet (VCU 4650)	FP	IDT	IDT	IDT	IA	IA

¹ FP = Forest Plan; IDT = IDT- developed option; IA = Interagency biologist recommended option; FSR = Forest Supervisor recommended option

Alternative A (No Action Alternative)

The Council on Environmental Quality regulations (40 CFR 1502.14d) require that a "No Action" Alternative be analyzed in every Environmental Impact Statement (EIS). This alternative represents the existing condition against which the other alternatives are compared. The map for Alternative A Figure 2-1) shows the distribution of vegetation associated with no new timber harvest.

Timber Harvest

Alternative A proposes no new timber harvest or road construction in the Navy project area. It does not preclude management within the Navy project area at some time in the future. The project area contains approximately 4,000 acres of previous harvest.

Transportation System

This Alternative includes no proposed road construction or LTF construction. The project area contains approximately 50 miles of existing National Forest System roads and an existing LTF at Anita Bay. Under Alternative A, there would be no change in road management. Maintenance and

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repair activities would continue as previously planned. Road management on Etolin Island would be performed as stated in the ATM EA Decision Notice.

Small Old-Growth Reserve Option

All small OGRs would remain in their current locations.

Issue Response

This alternative addresses the following issues:

Issue 1: Timber Supply and Economics: This alternative was not ranked because it did not provide volume or jobs.

Issue 2: Small Old-growth Reserves: Ranking = 5, based on the acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint. The Quiet (VCU 4650) and Mosman (VCU 4670) small OGRs would remain deficient in total acres and would not meet the Forest Plan Standards and Guidelines.

Issue 3: Wildlife Habitat Fragmentation: Ranking = 1, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas: Ranking = 1, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road Construction in the Navy Watershed: Ranking = 1, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives D, E, and F.

Alternative A would defer moving the project area toward the Desired Condition described in the Forest Plan. The existing condition would continue to be influenced by natural disturbance processes.

Alternative B (Proposed Action)

Timber Harvest

The timber volume proposed for sale in Alternative B (Figure 2-2), 61.7 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 2,055 acres of old-growth stands to an even-aged condition and 2,661 acres to an uneven-aged condition. The timber would be removed by cable, shovel and helicopter yarding systems.

Transportation System

Alternative B includes 18.1 miles of new NFS road construction and reconstruction; and 8.4 miles of temporary road construction. The 6540, 51403, 51421, 51461, and 51462 road segments proposed under this alternative are less than one mile in length; and are either short extensions of existing roads, or new roads starting from the existing road system.

The temporary roads built under this alternative would be decommissioned after the timber sale. Proposed road 6546 would be maintained at a ML 2 (reference in Chapter 3) to provide access for timber management activities and possible salvage sales along the road segment. All other roads,

including the reconstructed NFS roads, would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove and the proposed Burnett Inlet LTF, to be constructed near Navy Creek.

Small Old-Growth Reserve Option

This alternative uses the IDT-developed option for Anita (VCU 4640), Mosman (VCU 4670), and Quiet (VCU 4650) small OGR; and uses the interagency biologist recommended option for the Burnett (VCU 4680) small OGR.

Issue Response

Alternative B mainly responds to the "timber supply and economics" issue (Issue 1) by providing logical extensions of the existing Anita Bay road system. It defers harvest and road building in this entry from the southwest Mosman area, which currently has poor economic return. It uses uneven-aged management in helicopter units, which is more economical than even-aged management. It also attempts to harvest the most volume per mile of road. The ratio of volume harvested per mile of road is often used as a measurement of economics; all other factors being the same, the greater the number the better the economics. It contributes to the local and regional economies by providing a significant amount of volume and associated employment.

It also responds to the following issues:

Issue 1: Timber Supply and Economics: Ranking = 3 (tied with Alternative E), based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves: Ranking = 4, based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint. This alternative ranks the same as Alternative C.

Issue 3: Wildlife Habitat Fragmentation: Ranking = 5, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas: Ranking = 5, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas .

Issue 5: Road Construction in the Navy Watershed: Ranking = 3, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient.

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Alternative C

Timber Harvest

The timber volume proposed for sale in Alternative C (Figure 2-3), 97.9 million board feet (MMBF), will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 2,645 acres of old-growth stands to an even-aged condition, 317 acres to a two-aged condition, and 4,838 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative C includes 23.4 miles of new NFS road construction and reconstruction; and 17.5 miles of temporary road construction. The 51403, 51421, 51461, and 51462 road segments proposed under this alternative are less than one mile in length and are either short extensions of existing roads or new roads starting from the existing road system. The 51551 road is proposed as a short 0.3 mile extension off the proposed 6555 road.

The temporary roads built under this alternative would be decommissioned after the timber sale. Proposed Road 6546 would be maintained at a ML 2 to provide access for timber management activities and possible salvage sales along the road segment. The other roads, including the reconstructed NFS roads would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove, and the proposed Mosman Inlet LTF, to be constructed in Cooney Cove.

Small Old-Growth Reserve Option

This alternative uses the IDT- developed option for Anita (VCU 4640), Mosman (VCU 4670), and Quiet (VCU 4650) small OGR; and uses the interagency biologist recommended option for the Burnett (VCU 4680) small OGR.

Issue Response

Alternative C mainly responds to the "timber supply and economics" issue (Issue 1), focusing more on the supply component. It responds to the issue by providing the greatest amount of timber from the project while meeting Forest Plan Standards and Guidelines. It uses uneven-aged management in helicopter units, which is more economical than even-aged management. It contributes to the local and regional economies by providing the maximum volume and associated employment.

It also responds to the following issues:

Issue 1: Timber Supply and Economics: Ranking = 2, based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves: Ranking = 4, based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint. This alternative ranks the same as Alternative B.

Issue 3: Wildlife Habitat Fragmentation: Ranking = 6, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas: Ranking = 6, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction, and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road construction in the Navy Watershed: Ranking = 2, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient.

Alternative D (Preferred Alternative)

Timber Harvest

The timber volume proposed for sale in Alternative D (Figure 2-4), 36 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 1,190 acres of old-growth stands to an even-aged condition and 1,339 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative D includes 5.7 miles of new NFS road construction and reconstruction; and 5.3 miles of temporary road construction. The 6540, 6546, 51009, 51403, and 51421 road segments proposed under this alternative are less than one mile in length, are either short extensions of existing roads, or new roads starting from the existing road system.

The temporary roads built under this alternative would be decommissioned after the timber sale. All NFS road constructed and reconstructed under this alternative would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove.

Small Old-Growth Reserve Option

This alternative uses the IDT- developed option for the Anita (VCU 4640) and Quiet (VCU 4650) small OGR, and the interagency biologist recommended option for the Burnett (VCU 4680) and Mosman (VCU 4670) small OGR.

Issue Response

Alternative D mainly responds to the “management in the Navy Watershed” issue (Issue 5) by not proposing road construction or LTF construction in the Navy Watershed.

It also responds to the following issues:

Issue 1: Timber Supply and Economics: Ranking = 1 (tied with Alternative F), based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves: Ranking = 3, based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint.

Issue 3: Wildlife Habitat Fragmentation: Ranking = 4, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

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Issue 4: Inventoried Roadless Areas: Ranking = 3, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road construction in the Navy Watershed: Ranking = 1, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives A, E, and F.

Alternative E

Timber Harvest

The timber volume proposed for sale in Alternative E (Figure 2-5), 48.9 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 1,005 acres of old-growth stands to an even-aged condition, 91 acres to a two-aged condition, and 3,143 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative E includes 8.5 miles of new NFS road construction and reconstruction; and 9.2 miles of temporary road construction. The 6546, 51009, 51403, and 51421 road segments proposed under this alternative are less than one mile in length, are either short extensions of existing roads, or new roads starting from the existing road system.

The temporary roads built under this alternative would be decommissioned after the timber sale. All NFS road constructed and reconstructed under this alternative would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove.

Small Old-Growth Reserve Option

This Alternative uses the interagency biologist recommended option for all small OGRs: Anita (VCU 4640), Burnett (VCU 4680), Quiet (VCU 4650) and Mosman (VCU 4670).

Issue Response:

Alternative E mainly responds to “Small Old-growth Reserves” issue (Issue 2) and “Wildlife Habitat Fragmentation” issue (Issue 3). It responds to the small OGR issue by including the interagency biologist recommended option for all small OGRs. It is the only alternative that uses the interagency biologist recommended option for the Anita (VCU 4640) small OGR. It responds to the wildlife habitat fragmentation issue by incorporating the interagency recommended small OGRs for all VCUs within the project area and reducing the amount of interior and coarse canopy forests proposed for harvest. This is the only alternative that includes a small OGR at the critical pinchpoint at Anita Bay. Harvest is not proposed in the Navy Watershed, which contains large POG blocks, interior habitat and coarse canopy. Partial harvest prescriptions are also expected to reduce impacts to wildlife in the project area.

It also responds to the following issues:

Issue 1: Timber Supply and Economics: Ranking = 3 (tied with Alternative B), based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs.

Issue 2: Small Old-growth Reserves: Ranking = 1 based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality

deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint.

Issue 3: Wildlife Habitat Fragmentation: Ranking = 3, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas: Ranking = 4, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road construction in the Navy Watershed: Ranking = 1, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives A, D, and F.

Alternative F

Timber Harvest

The timber volume proposed for sale in Alternative F (Figure 2-6), 18.7 MMBF, will provide opportunities for timber harvesting by local operators. It will also help move the project area towards the Desired Condition of the Forest Plan by converting 626 acres of old-growth stands to an even-aged condition and 696 acres to an uneven-aged condition. The timber would be removed by cable, shovel, and helicopter yarding systems.

Transportation System

Alternative F includes 1.7 miles of NFS road reconstruction and 3.9 miles of temporary road construction. The temporary roads built under this alternative would be decommissioned after the timber sale. The NFS roads reconstructed under this alternative would be stored at the end of the timber sale. Timber harvested would go through the Anita Bay LTF, located in Starfish Cove.

Small Old-Growth Reserve Option

This alternative uses the IDT- developed option for the Anita (VCU 4640) small OGR, the interagency biologist recommended option for the Burnett (VCU 4680) and Quiet (VCU 4650) small OGR, and the Forest Supervisor recommended option for the Mosman (VCU 4670) small OGR.

Issue Response

Alternative F was developed to respond to the “Inventoried Roadless Area” issue (Issue 4); it does so by not harvesting timber or constructing roads in Inventoried Roadless Areas.

It also responds to the following issues:

Issue 1: Timber Supply and Economics: Ranking = 1, based on potential volume of timber available, indicated bid value, number of job equivalents, and logging and road costs. This Alternative ranks the same as Alternative D.

Issue 2: Small Old-growth Reserves: Ranking = 2 based on acres of POG protected, acres of interior POG protected, acres of coarse canopy protected, acres of young growth habitat, acres of high-quality deer winter habitat protected, number of goshawk territories protected, acres of marbled murrelet nesting habitat protected and inclusion of the Anita Bay pinchpoint.

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Issue 3: Wildlife Habitat Fragmentation: Ranking = 2, based on acres of productive old-growth habitat remaining in WAA 1901 after harvest, acres of interior old-growth habitat remaining in WAA 1901 after harvest and acres of coarse canopy habitat remaining in WAA 1901 after harvest.

Issue 4: Inventoried Roadless Areas: Ranking = 2, based on acres of Inventoried Roadless Areas affected by timber harvest and road construction and miles of road proposed in Inventoried Roadless Areas.

Issue 5: Road construction in the Navy Watershed: Ranking = 1, based on miles of road proposed in the Navy watershed, qualitative analysis of recreation and subsistence use in the Navy Lake vicinity, and miles of road proposed on slopes over 67% gradient. This Alternative ranks the same as Alternatives A, D, and E.

Alternatives Considered but Eliminated from Detailed Study

Ten action alternatives were considered during the planning process. Five of those were analyzed in detail. The following alternatives were considered but have not been included in the DEIS for detailed study. These are described briefly below, along with the reasons for not considering them further.

Original Proposed Action

The original Proposed Action was developed to provide a mix of cable and helicopter harvest areas while developing the infrastructure necessary to support future entries. It proposed harvesting 70 – 80 MMBF of timber and building 33 miles of new roads. It included a proposal to relocate the boundary of the south Mosman (VCU 467) small OGR to the west side of Mosman Inlet. The interagency wildlife biologists did not support the relocation of the south Mosman small OGR; a new Proposed Action was developed.

No New System or Temporary Roads

An alternative was developed that included no new NFS or temporary road construction. It proposed harvesting 38 MMBF using cable and helicopter yarding systems. The helicopter units would have a prescription of 75% retention. This alternative was eliminated from further consideration because it would require helicopter yarding units that could be cable yarded with temporary roads. Helicopter yarding where cable yarding is feasible could affect present and future timber harvest economics. Elements of this alternative were incorporated into Alternative F, which is being analyzed in detail.

Helicopter Yarding Only

This alternative proposed helicopter yarding 36 MMBF to 72 MMBF using uneven aged management. It included no new road construction. This alternative was eliminated from further consideration because it would require helicopter yarding units that could be cable yarded with temporary roads. Helicopter yarding where cable yarding is feasible could affect present and future timber harvest economics.

Windthrow Risk Reduction

This alternative was developed to reduce the likelihood of blowdown by not harvesting in high windthrow risk areas, specifically the Mosman Inlet area. It proposed harvesting 51 MMBF using cable and helicopter yarding. This alternative was eliminated from further consideration because windthrow risk was reduced by unit design and silvicultural prescriptions.

No Harvest or Road Building in Inventoried Roadless Areas

This alternative proposed harvesting 31 MMBF of timber using cable and helicopter harvesting systems. This alternative was eliminated from further consideration because of concerns over potential cumulative harvest percentages in the Duckbill and Kindergarten Lake Creek watersheds. Elements of this alternative were incorporated into Alternative F, which is being analyzed in detail.

Project-specific Mitigation Measures

Mitigation measures may be developed to prevent adverse impacts that might occur from implementation of the alternatives. Mitigation includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

The analysis documented in this DEIS discloses the possible adverse effects that may occur from implementing each alternative. Mitigation measures have been included in alternative design to reduce effects.

Best Management Practices (BMPs) and site-specific mitigation measures are listed on the Unit Cards (Appendix B) and Road Cards (Appendix C). Mitigation measures may be refined further until final unit layout.

Monitoring

Monitoring activities can be divided into Forest Plan monitoring and project-specific monitoring. The National Forest Management Act requires that national forests monitor and evaluate their forest plans (36 CFR 219.11). Chapter 6 of the Forest Plan includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation. There are three categories of Forest Plan monitoring:

Implementation monitoring: used to determine if the goals, objectives, standards and guidelines, and practices of the Forest Plan are implemented in accordance with the Forest Plan.

Effectiveness monitoring: used to determine if the Forest Plan Standards and Guidelines and practices, as designed and implemented are effective in accomplishing the desired result.

Validation monitoring: used to determine whether the data, assumptions, and estimated effects used in developing the Forest Plan are correct.

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Implementation Monitoring

Implementation monitoring assesses whether the project was implemented as designed, and whether or not it complies with the Forest Plan. The information on the Unit Cards (Appendix B), Road Cards (Appendix C), and unit silvicultural prescriptions are used to determine whether recommendations were implemented.

Implementation monitoring is part of timber sale contract administration. The sale administrators and road inspectors ensure that the direction contained on the Unit and Road Cards and the unit silvicultural prescriptions are incorporated into contract documents; they then monitor performance relative to contract requirements.

Tongass National Forest (Tongass) staff annually conducts a review of BMPs implementation and effectiveness. Monitoring results are summarized in a Tongass Annual Monitoring and Evaluation Report. This report provides information about how well the management direction of the Forest is being carried out and measures the accomplishment of anticipated outputs, activities, and effects.

The Tongass Land Management Plan addresses the Desired Condition of heritage resources through a monitoring and evaluation plan. As specified in the Programmatic Agreement (2002), the Forest Service monitors selected areas of direct impact during and/or after the actual ground disturbance.

Project-specific Monitoring

No project-specific monitoring is proposed because monitoring is covered through the Forest Plan monitoring.



USDA Forest Service File Photo: Camp Creek

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Chapter 3

Environment and Effects

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Chapter 3

Environment and Effects

Introduction

This chapter describes the existing environment of the Navy project area and potential environmental effects of the alternatives. All significant or potentially significant effects are disclosed. Effects are quantified where possible; qualitative discussions are also included. Ways to mitigate the effects are also described. The discussions of resources and potential effects use existing information included in the Forest Plan Final Environmental Impact Statement (FEIS), project-specific resource reports and related information sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The project record for the Navy project includes all project-specific information including resource reports, field data, and public involvement. The project record is located at the Wrangell Ranger District Office in Wrangell, Alaska, and is available for review during regular business hours.

Land Divisions

The land area of the Tongass National Forest (Tongass) has been divided in several different ways to describe the resources. These divisions vary by resource since the relationship of each resource to geographic conditions and zones varies. The allocation of Forest Plan Land Use Designations (LUDs) (discussed in Chapter 1, Figure 1-2) is one such division.

Value Comparison Units

These are distinct geographic areas, each encompassing a drainage basin containing one or more large stream systems. The boundaries usually follow major watershed divides. The Navy project area includes portions of Value Comparison Units (VCUs) 4640, 4650, 4660, 4670, and 4680. Chapter 2 includes a map (Figure 2-1) showing their location.

Wildlife Analysis Areas

This land division corresponds to the harvest areas used by the Alaska Department of Fish and Game (ADF&G) to report community harvests of selected wildlife species. The project area includes part of Wildlife Analysis Area (WAA) 1901. Information estimated by WAA was used in the wildlife and subsistence analyses.

Watershed

Watershed refers to the area that contributes water to a drainage or stream or to that portion of a landscape in which all surface water drains to a common point. Watersheds can range from a few acres that drain a single small intermittent stream, to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams. Figure W-1 displays the location of the watersheds within the Navy project area.

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Inventoried Roadless Area

Inventoried Roadless Areas are undeveloped areas typically exceeding 5,000 acres, and that met the minimum criteria for wilderness consideration under the Wilderness Act. These were inventoried during the Forest Service Roadless Area Review and Evaluation process, subsequent assessments, or forest planning. Roadless Areas were updated in 2003, during the analysis for the Final Supplemental Environmental Impact Statement (SEIS) to the Forest Plan. Portions of Inventoried Roadless Areas 232, 233, and 234 (Figure R-1) are within the Navy project area. The Roadless Area analysis in this Draft Environmental Impact Statement (DEIS) used the 2003 inventory.

Biogeographic Province

The Biogeographic Province refers to 21 ecological subdivisions of Southeast Alaska that are generally identified by distinct ecological, physiogeographic, and biogeographic features. The Navy project is included in the Etolin Island Biogeographic Province. Effects of management at this scale are analyzed as part of the Forest Plan.

Analyzing Effects

Environmental effects are the effects of implementing an alternative on the physical, biological, social, and economic environment. The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) includes the following specific categories to use for analyzing environmental effects.

Direct environmental effects are effects occurring at the same time and place as the initial cause or action.

Indirect effects: effects that occur later in time or are spatially removed from the activity.

Cumulative effects: effects that result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative Effects

The following list includes past, present, and all reasonably foreseeable future activities that may have been used in the analysis for this project. Human activities such as subsistence use, personal use timber, and recreation have been ongoing and it is assumed they will continue into the future.

- Past timber management activities in the Navy Project area include about 4,100 acres that have been harvested using even-aged management. Most of this harvest occurred between 1983 and 1999.
- The Starfish Timber Sale was offered to the Ketchikan Pulp Corporation under their long term contract, and the Granite, Quiet, Etolin, Camp Mossy Timber Sales, and miscellaneous small sales were prepared under the Wrangell Ranger District Timber Sale Program.
- Beach clearcut logging and individual tree hand logging has occurred in various locations along the shoreline.
- Silvicultural treatments including planting, pruning, thinning and burning
- Alaska Steep Pass in Navy Pass
- Navy Creek stream gauge

Environment and Effects 3

- Maintenance and repair of existing National Forest System (NFS) roads
- Hazardous Waste Clean-up
- Elk Introduction
- Historic Land Use (i.e. Fur Farm, Canneries)
- Canoe Portage at the head of Burnett Inlet

The Forest Service views reasonably foreseeable future actions, as actions that are currently planned or scheduled to occur. They include the following:

- The Porcupine Salvage Timber Sale authorized the salvage harvest of approximately 766 thousand board feet (MBF) of blown down sawtimber and utility volume from 26 acres. This project does not authorize any new road construction. This sale has a decision, has been previously offered and will be reoffered in 2008.
- Fishtrap Salvage Timber Sale authorized the harvest of approximately 208 MBF of cedar decline and blown down sawtimber and utility volume from 240 acres adjacent to existing roads. This sale is currently being advertised.
- North Etolin Salvage Timber Sale could authorize the harvest of approximately 200 MBF of cedar decline and blown down sawtimber and utility volume along the existing road system. This sale does not have a decision.
- Maintenance and repair of existing NFS roads is an ongoing process that occurs on a periodic basis.
- Road closure projects
- There is a proposal to widen the Anita Bay North Log Transfer Facility (LTF) lower barge ramp and widen the roadway between the current parking lot (old campsite) and the Anita Bay North LTF.
- Silvicultural Treatments including pre-commercial thinning, yellow-cedar release thinning and wildlife habitat enhancement
- Special Use Permits including the Cannery Cove waterline permit, Oyster Farm, Outfitter Guide permits, Burnett Creek Hatchery permit, and Communication Site permit.
- All the land within the project area is National Forest System Lands. The State has two areas on Etolin Island (McHenry Anchorage and Olive Cove) that were considered as part of the wildlife analysis. The State has no planned harvest in the reasonably foreseeable future

Unavoidable Adverse Effects

Implementation of any alternative could cause some adverse environmental effects that cannot be effectively mitigated. Unavoidable adverse effects often result from managing the land for multiple resources. Many adverse effects can be mitigated by limiting the extent or duration of effects. The interdisciplinary procedure used to identify specific harvest units and roads was designed to eliminate or lessen significant adverse consequences. The application of Forest Plan Standards and Guidelines, Best Management Practices (BMPs) and project-specific mitigation measures are all intended to further limit the extent, severity, and duration of potential effects. Such measures are discussed throughout this chapter. Regardless of the use of these measures, some adverse effects could occur. The purpose of this chapter is to disclose these effects.

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Short-term Use and Long-term Productivity

Short-term uses and their effects are those that occur annually or within the first few years, of project implementation. Long-term productivity refers to the capability of the land and resources to continue producing goods and services long after the project has been implemented. Under the Multiple-Use Sustained-Yield Act and the National Forest Management Act, all renewable resources are to be managed in such a way that they are available for future generations. By meeting Forest Plan Standards and Guidelines, this project meets the requirements of the Multiple-Use Sustained-Yield Act and the National Forest Management Act.

Irreversible and Irretrievable Commitments

Irretrievable. This is a term that applies to the loss of production, harvest, or use of natural resources. For example, some or all of the timber production from an area is lost irretrievably while an area is serving as a winter sports site. The production lost is irretrievable but the action is not irreversible. If the use changes, it is possible to resume timber production.

Irreversible. This is a term that describes the loss of future options. Irreversible applies primarily to the effects of use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as soil productivity that are renewable only over long periods of time.

Generally, timber harvest and associated activities are considered irretrievable commitments of resources.

Available Information

Much of the resource data resides in an electronic database formatted for a Geographic Information System (GIS). The Forest Service uses GIS software to assist in the analyses of these data. GIS data is available in numerical format and as plots displaying data in map format. For this DEIS, all the maps and most of the numerical analyses are based on GIS resource data.

There is incomplete knowledge about many of the relationships and conditions of wildlife, fish, forests, jobs, and communities. The ecology, inventory, and management of a large forest area are complex and developing sciences. The biology of wildlife species prompts questions about population dynamics and habitat relationships. The interaction of resource supply, the economy, and communities is the subject matter of an inexact science. However, the basic data and central relationships are sufficiently well established in the respective sciences for the deciding official to make a reasoned choice between the alternatives, and to adequately assess and disclose the possible adverse environmental effects.

Environment and Effects of the Issues

The CEQ issues guidance to Federal agencies to determine the significant issues concerning any proposal and to eliminate those issues that are not significant or that are outside the scope of this document. With the help of the public and other agencies, the Forest Service has identified five issues (see Chapter 1) to be examined in detail for the proposed project. The following sections describe the environmental effects of each alternative by issue. Where appropriate, effects to other resources are discussed in this chapter.

Issue 1: Timber Supply and Economics

Timber harvest in the project area may affect local and regional economies.

Concerns were expressed regarding the validity of this sale since some previous sales lacked purchasers, the lack of economical timber, the amount of timber offered by the Forest Service, the economic burden placed on taxpayers to fund timber sales, and the need to provide jobs and supporting the local economy.

Measurements:

- potential volume of timber available by alternative,
- indicated bid value and number of jobs equivalents, and
- logging and road costs per MBF.

The measurements were analyzed using the Region 10 NEPA Economic Analysis Tool Residual Value (NEAT_R) version 2.13.

Affected Environment

Employment in Southeast Alaska

Approximately 80 percent of Southeast Alaska is within the Tongass National Forest. With little private land available, the region is sparsely settled. Approximately 74,000 people live in 33 towns and villages located in and around the Tongass. The communities of Southeast Alaska depend on the Tongass National Forest to provide the foundation for natural resource-based industries, which include wood products, commercial fishing and fish processing, recreation, tourism, and mining. Many residents also depend heavily on subsistence hunting and fishing to meet their basic needs. There is very little private land in the region to provide these resources. Appropriate management of the Tongass' natural resources is, therefore, extremely important for local communities and the overall regional economy. An overview of regional employment is found in the Tongass Land Management Plan Revision SEIS.

Employment in the Project Area

The community of Wrangell is most directly affected by this project. Additionally, residents of Wrangell, Etolin, and Prince of Wales Islands may be affected by this project.

Wrangell is a historic community, which lies next to the Stikine River on the northern tip of Wrangell Island. Commercial fishing, fish processing and the timber industry have been the economic foundation of the community. After the closure of the Alaska Pulp Company (APC) sawmill in 1994, the timber-related economy declined. The APC mill was sold to Silver Bay Logging and reopened in 1998. According to the mill capacity and utilization studies conducted by the Juneau Economic Development Council, the Silver Bay Logging mill has an installed production capacity of 65 MMBF annually. In 2000, the mill processed approximately 14 MMBF. During calendar years 2004 and 2005, the company processed approximately 3.4 and 8.7 MMBF, respectively. Overall sawmill employment in Wrangell has decreased from 55 jobs in 2000 to 29 jobs in 2005. Wrangell's present day economy includes commercial fishing, fish processing, education, health services, government, tourism, and timber. Fishing and hunting are important subsistence and recreational activities for area residents, and provide employment and income for residents involved in outfitting and guiding services.

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Forest Products Employment

The forest products industry has been an important part of the economy of Southeast Alaska since the 1950s. Recent forest products employment data are presented in Table 3-1.

Table 3-1 - TM-1: Forest Products Industry Employment in Southeast Alaska 2000 to 2005

Year ¹	Tongass Logging ²	Sawmill	Pulp Mill	Tongass - Related Employment ³	Other sawmil ¹	Other Logging	Total Industry Employment
2000	340	280	2	623	-	371	994
2001	109	300 ⁴	2	409	-	391	800
2002	63	110	-	173	40	299	512
2003	108	91	-	199	64	298	561
2004	82	95	-	177	53	220	450
2005	88	96	-	184	52	263	499

Source: Alaska Department of Labor

¹ Calendar years

²Tongass National Forest logging estimated based on the ratio of Tongass timber harvest to total timber harvest in Southeast Alaska.

³Through 2001, assumes all sawmill and pulp mill employment is dependent upon Tongass National Forest timber supply. From 2002 to 2004, this assumption no longer held. Data from Kilborn and others (2004) and from subsequent mill studies show that Federal timber supplied 73% of the wood sawn in Southeast Alaska mills in 2002, 59% in 2003, 64% in 2004 and 65% in 2005. Tongass National Forest sawmill employment from 2002 through 2005 is estimated based on sawmill employment numbers and the ratio of sources of wood (Federal versus the total) reported by Kilborn et al. (2004) and Brackley et al. 2006 and in mill studies by the Juneau Economic Development Council.

⁴Beginning in 2001, employment estimates are being published under a new classification system. The Standard Industrial Classification (SIC) system has been replaced by the North American Industrial (NAI) Classification system. "Sawmill" in this table is reported by the Alaska Department of Labor as "wood manufacturing" which in the NAI system includes sawmills, wood preservation, veneer, plywood, engineered wood, and other wood products. In Southeast Alaska, this category is assumed to represent only sawmill employment.

Past, present, and reasonably foreseeable future timber harvest in the Project Area (or Central Etolin Island)

Past timber management activities in the Navy Project area include about 4,100 acres that have been harvested using the clearcut even-aged management system. Most of this harvest occurred between 1983 and 1999. This included the Starfish Timber Sale that was offered to the Ketchikan Pulp Company under their long term contract, and the Granite, Quiet, Etolin, and Camp Mossy Timber Sales and miscellaneous small sales that were prepared under the Wrangell Ranger District Timber Sale Program. Beach clearcut logging occurred in various locations along the shoreline prior to development of the road system. Hand logging of individual trees has also occurred in the beach buffer.

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Timber sale planning has been completed on the Porcupine Salvage and Fishtrap Salvage Timber Sale Projects. The Porcupine Salvage Project is a salvage harvest of approximately 766 MBF of blown down sawtimber and utility volume from 26 acres with no new road construction. The Fishtrap Salvage Project, which was sold in 2007, will harvest approximately 208 MBF of cedar decline and blown down sawtimber and utility volume from 240 acres adjacent to existing roads.

The proposed Navy Project is a component of the timber sale program. Two timber sales, Three Sisters and Mosman, from this project are identified on the Fiscal Year 2007 5-Year Timber Sale Plan to be offered in Fiscal Years 2008 and 2009. No other Forest Service or State timber sales are in the foreseeable future for central Etolin Island.

Timber Supply and Market Demand

Determining market demand is a complex process. Detailed explanations of the rationale for considering timber harvest in the Navy Project Area and market demand for wood products is located in Appendix A of this document. More information can also be found in the 1997 Forest Plan FEIS, Part 1 (pages 3-248 to 3-307) and the 2003 Forest Plan Supplemental EIS. The Forest Plan Amendment Draft EIS (2007) describes the latest timber demand analyses and projections.

All action alternatives will affect employment as shown in Table 3-2, which displays the estimated direct employment that will result from logging and milling the volume in the timber sale.

Payments to the State of Alaska

Prior to 2000, 25 percent of the returns to the US Treasury from revenue producing activities such as timber sales were returned to each state containing national forests for distribution to counties (or in Alaska, boroughs) having national forest within their boundaries. Those payments were commonly referred to as the 25 percent fund and by law were dedicated to funding schools and roads. Under that approach, as specific revenues from national forest lands increased or decreased so did the payments to states.

In October 2000, the Secure Rural Schools and Community Self-Determination Act was enacted to stabilize those federal payments to states in response to declining federal receipts from national forests. The legislation was originally authorized for implementation from 2001 through 2006. In May 2007, emergency supplemental legislation extended the legislation for one year, for fiscal year 2007.

Under the Secure Rural Schools legislation, payments to the state are not linked to actual annual revenues from national forest lands; rather, they are based on a high 3-year historic average. As a result, during the period 2001 through 2007, Alaska received payments of approximately \$9 million per year, primarily for schools and roads, with provisions for special project funding to boroughs who decide to convene citizen Resource Advisory Committees (RACs).

If that legislation is not extended or reauthorized, payments to states will revert back to the 25 percent approach, which means funding amounts would increase or decrease as revenue-generating activities, like timber sales, increase or decrease.

Opportunities to Improve Economics

There are many variables that can increase the cost of timber sale offerings and may carry significant economic risk for potential purchasers. Increased costs can be incurred as a result of road construction methods, helicopter yarding, certain silvicultural prescriptions, limited operating periods, and other factors. All of the alternatives for the Navy project include helicopter yarding. Those increased costs affect the selling value of the timber included in the alternatives. The value of the

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sawn products from the timber for sale must be sufficient to cover the stump to truck costs, transportation and milling costs, and offer a potential for profit to purchasers.

There are several factors that enhance the economic potential of the Navy project area and may in turn affect the timber supply to the forest products industry. These factors include an existing road system and log transfer facility infrastructure, a relatively high proportion of conventional cable and shovel logging systems, proximity to processing facilities, and all helicopter yarding units incorporate uneven-aged management prescriptions in an effort to increase the value of the timber yarded and offset the high yarding costs.

Utility volume could be left in the woods under the optional removal contract clause. The NEAT_R program also amortizes all costs of road construction over the timber volume removed. Additionally, some years, public works funds are available to pay for all, or a portion of, road construction or reconstruction costs in a timber sale. Single tree selection prescriptions can be modified to increase the overall pond log value of the material removed. By concentrating harvest on the most valuable species and the most valuable size classes of these species, the indicated bid value could increase.

Appraisal of Tongass National Forest timber sales changed as a result of the March 14, 2007 policy change by the Alaska Region Regional Forester that approved limited interstate shipments of unprocessed Sitka spruce and western hemlock. The policy allows shipment to the lower 48 states of unprocessed Sitka spruce and western hemlock sawlogs smaller than 15 inches in diameter at the end of a 40-foot log, and grade 3 or 4 logs of any diameter. Shipments are limited on each sale to a maximum of 50 percent of total sawlog contract volume harvested of all species, including western redcedar and yellow-cedar, unless the Regional Forester grants an exception in advance based on case-specific unusual circumstances.

The limited interstate shipment policy significantly increases the likelihood that timber sales in parts of the Tongass National Forest will have a positive appraisal under current market conditions. The policy also very likely will increase the utilization of timber harvested on the Tongass. Sawmills in Southeast Alaska generally cannot profitably process the smaller diameter and low grade material eligible for interstate shipment under this policy. Operators can choose which small diameter and low-grade material they can effectively saw and which they prefer to ship to other states. Under the policy, timber sale purchasers are allowed, not required, to ship such material out of state. The policy enhances opportunities for local supply to manufacturers who depend on Tongass timber by increasing the probability that sales will appraise positive as required by what is commonly referred to as Section 318 (Section 416 of the Department of the Interior, Environment, and Related Agencies Appropriations Act, 2006, PL 109-54).

Opportunities for Small Sales

The timber volume in any of the action alternatives could be administratively separated into several smaller sales.

Effects

Projected Employment and Income

The action alternatives would have direct and indirect impacts to the economies of the local communities. Indirect employment effects are not calculated in this analysis since indirect employment coefficients are applicable for large scale analyses, such as large regional or statewide assessments. They are not useful for local scale analyses, such as individual timber sales.

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In Southeast Alaska, sawmilling results in 3.31 (annualized) jobs per MMBF of net sawlog volume harvested on the Tongass (Kilborn et al. 2004 and Brackley et al. 2006) and the Alaska Department of Labor and Workforce Development (<http://almis.labor.state.ak.us>). Annualized jobs means this is all the employment this amount of sawlog input produces, no matter how long the project is. Each sawmilling job represents an average (2001-2005) of \$31,690 per year. The income data comes from the Alaska Department of Labor (see previous reference) for sawmilling, a report included under wood product manufacturing. Sawmilling produces an average direct income of \$115,250 per MMBF of net utilized sawlog volume, or \$115 per MBF, for people employed in sawmilling.

Logging results in 2.31 annualized jobs per MMBF net sawlog volume harvested on the Tongass. This number is calculated from Tongass employment and net sawlog volume harvested, 2001-2005, from the ANILCA 706(a) report for 2001 to 2005 (in review). Each job represents an average of \$42,257 per year (income data from Alaska Department of Labor for forestry and logging). Logging produces an average income of \$95,983 per MMBF, or \$96 per MBF of sold volume. This data for forestry and logging includes road building.

Direct employment and income likely to result from timber harvest is estimated by converting board feet to jobs and income, using the sawmilling and logging coefficients above. Table 3-2 displays estimated direct logging and sawmilling-related employment and income. Alternative A would not generate timber-related jobs since no timber would be sold.

Table 3-2 - TM-2: Estimated Project Employment and Income¹

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Employment ²						
Logging	0	125	199	72	100	38
Sawmills ³	0	89-179	142-284	52-104	71-143	27-54
Total Jobs	0	214-304	341-483	124-176	171-243	65-92
Income (\$ million)	0	\$8.3-11.4	\$13.2-18.1	\$4.8-6.6	\$6.6-9.1	\$2.5-3.4

Source: S. Alexander, Alaska Region Economist

¹Estimates based on alternative volume and Southeast Alaska multipliers calculated for the period 2001-2005

² Annualized job years.

³ Sawmill jobs range from all sawlogs processed locally to 50 percent of net volume shipped to markets outside Alaska.

The number of sawmill jobs and related income is provided as a range in Table 3-2 to reflect the variety of options the timber purchaser has. The purchaser may elect to process all the sawlogs locally or to ship up to 50 percent of the total sawlog volume to markets outside Alaska.

The upper end of this range assumes all of the timber sold, including yellow-cedar is processed in Southeast Alaska. The lower end of this range assumes that the maximum of 50 percent of total sawlog volume is shipped to markets outside Alaska. The number of jobs and related income will likely fall somewhere between the high and low end of this calculated range, based on factors such as current timber markets and mill configuration.

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Logging Systems and Costs

The action alternatives include the use of ground-based cable and shovel yarding systems and helicopter yarding. Table 3-3 displays the acres by yarding system for each alternative.

Conventional systems include cable and shovel yarding. Cable yarding systems are best suited for steep slopes and are most efficient using the clearcut harvest method. Shovel yarding is the least costly yarding method used in this analysis relative to the average pond log value of harvested trees. Shovel yarding is best suited for slopes less than 30 percent, with a normal yarding distance less than 400-500 feet. Depending on slope and ground conditions, longer distances are possible. Shovel yarding does provide some flexibility in the selection of trees to be harvested. This makes shovel yarding more suitable for partial harvest prescriptions.

Helicopter yarding is the most expensive yarding method. Yarding distance, turn time (the time it takes the helicopter to make a round trip from landing to the unit and return), and the value of timber yarded influence the economic viability of helicopter yarding. Helicopter yarding is used where roads are not constructed to access the timber harvest units and works well for partial harvest prescriptions.

Table 3-3 - TM-3: Comparison of Alternatives – Harvest Systems

	Unit of Measure	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Harvest System							
Conventional ¹	Acre	0	2,137	3,443	1,354	1,351	708
	MMBF ²	0	34.9	53.6	22.9	21.4	11.8
Helicopter	Acre	0	2,579	4,357	1,175	2,888	614
	MMBF ²	0	19.1	32.4	8.5	21.7	4.6

¹ Includes Cable and Shovel yarding systems

² Net Sawlog Volume

Although individual harvest units may or may not be economical to harvest by themselves, the management of less productive land or land containing a high percentage of defective timber will help to increase future timber yields. The harvest of units with higher value can help compensate for less economical harvest units.

The NEPA Economic Analysis Tool Residual Value (NEAT_R) version 2.13 was used to evaluate the alternatives for the Navy Project. The logging and road costs used in the NEAT_R program incorporate the same current costs used in the Alaska Region’s appraisal program. Those costs reflect actual cost data collected from timber sale purchasers in Southeast Alaska, as well as production studies. The costs and values used reflect data updated for the 2nd Quarter of 2006. At times, certain situations and sales may have higher or lower costs than the regional averages, based on site specific circumstances.

These values from NEAT_R version 2.13 include the adjustments for the changes in values due to the limited interstate shipping policy (Bschor, 3/14/07). This policy authorizes the shipment to the lower 48 States of unprocessed Sitka spruce and western hemlock sawlogs that are: a) smaller than 15 inches in diameter at the small end of a 40-foot log, or b) grade 3 or grade 4 logs of any diameter. Shipments will be limited on each sale to a maximum of 50 percent of total sawlog contract volume harvested of all species; including western redcedar and yellow-cedar, unless the Regional Forester expressly grants an exception in advance based on case-specific unusual circumstances.

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Table 3-4 - TM-4: Alternative Volumes, Costs, and Values ¹

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Sitka Spruce (MBF)	0	14,659	23,706	8,037	13,144	4,285
Hemlock (MBF)	0	24,354	37,396	15,025	17,515	7,610
Yellow-cedar (MBF)	0	6,798	11,519	3,641	5,792	1,988
Western Redcedar (MBF)	0	8,223	13,325	4,673	6,670	2,465
Total Net Sawlog MBF	0	54,034	85,946	31,376	43,121	16,348
Logging Cost per MBF	0	\$389.90	\$401.21	\$374.78	\$409.73	\$379.77
Road Cost per MBF	0	\$65.28	\$57.29	\$42.14	\$40.78	\$21.99
Indicated Value	0	\$(9,978,327)	\$(15,951,801)	\$(4,711,581)	\$(7,547,760)	\$(2,175,631)
Indicated Bid Value/MBF	0	\$(184.67)	\$(185.60)	\$(150.17)	\$(174.99)	\$(133.08)

¹ () indicates negative value

² some numbers may not total due to rounding

Source: K. Welch, NEAT-R version 2.13

The harvest volumes, indicated value, costs and net stumpage values used in this document are current estimates. These estimates are useful for comparing the relative differences among alternatives and may be used for determining estimated sale volume, costs or values. Merchantable timber within units and any road right-of-way located on National Forest System lands will be cruised to determine the quantity, quality and value of timber for the contract under which that volume of timber is offered. The final sale appraisal will include current quarter selling values, current cost information and a normal profit and risk allowance to determine the minimum advertised stumpage value at the time of offering.

Financial Efficiency Analysis

One method to compare the effects of the different alternatives is through a financial efficiency analysis. A financial efficiency analysis is a comparison of those costs and benefits that can be quantified in terms of actual dollars spent or received within the project area. This type of analysis does not account for non-market benefits, opportunity costs, individual values, or other values, benefits, and costs that are not easily quantifiable. This is not to imply that such values are not significant or important, but to recognize that non-market values are difficult to represent by appropriate dollar figures. Therefore, financial efficiency should not be viewed as a complete answer but as one tool decision makers can use to gain information about resources, alternatives, and trade-offs between costs and benefits.

Forest Service Costs

Financial efficiency analysis compares estimated Forest Service direct expenditures with estimated financial revenues. Average financial costs used in the Alaska Region's budget allocation process are

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subtracted from indicated values to estimate net present value. The Forest Service costs used in the analysis are: \$41/MBF for environmental analysis and documentation (NEPA), \$23/MBF for sale preparation, \$49/MBF for sale administration and \$28/MBF for engineering support.

Environmental analysis and documentation costs include field inventory, data analysis, public involvement, and preparation of documents that satisfy the requirements of the National Environmental Policy Act.

Sale preparation costs include unit layout, cruising, appraisal and contract development. Sale administration consists of administering the timber sale contract from the time the sale is awarded until the sale is completed. Normally, costs are associated with office documentation, timber sale accounting, and site visits to the sale area, which is generally adjacent to a new or existing road system. Engineering support consists of planning and timber sale contract administration activities associated with new facility and road construction, use of existing facilities and road maintenance.

Although the environmental analysis cost is based on timber volume, costs fluctuate with the amount of area to be examined and the accessibility of that area. Sale preparation costs increase significantly when implementing partial harvest units, as compared to clearcut harvest units. Accessibility to the units is another major cost factor. The Navy project units will probably be more expensive to prepare for sale and administer contracts due to the amount of helicopter harvest and road construction, with the exception of Alternative F, which is located within the existing roaded area. All of these factors could cause the cost estimates in Table 3-5 to be higher or lower than regional averages. These cost estimates are useful to compare relative differences among alternatives.

Table 3-5 - TM-5: Estimated Forest Service Financial Costs and Revenues

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Forest Service Costs¹						
Analysis and Documentation²	\$2,215,394	\$2,215,394	\$2,215,394	\$2,215,394	\$2,215,394	\$2,215,394
Sale Preparation	\$0	\$1,242,782	\$1,976,735	\$721,648	\$991,806	\$376,004
Sale Administration	\$0	\$2,647,666	\$4,211,305	\$1,537,424	\$2,112,978	\$801,052
Engineering Support	\$0	\$1,512,952	\$2,406,460	\$878,528	\$1,207,416	\$457,744
Total Project Costs	\$2,215,394	\$7,618,794	\$10,809,894	\$5,352,994	\$6,527,594	\$3,850,194
Indicated Bid Value³	\$0	\$(9,978,327)	\$(15,951,801)	\$(4,711,581)	\$(7,547,760)	\$(2,175,631)
Net Present Value⁴	\$(2,215,394)	\$(17,597,121)	\$(26,761,695)	\$(10,064,575)	\$(14,075,354)	\$(6,025,825)

Source: K. Welch, NEAT-R version 2.13, 2nd Quarter 2006

¹ Based on Alaska Region's average budget allocation for cost centers

² Analysis and documentation costs are based on the proposed action (Alternative B).

³ () indicates negative value.

⁴ Indicated bid value minus total project costs, () indicates negative value.

Direct Effects

Alternative A – No timber volume would be offered for sale under this alternative, no contribution would be made to the local or regional Southeast Alaska economy, and there would be no support of local or regional non-Forest Service timber-related employment.

Alternative B - This alternative has the highest road costs (\$65.28/MBF) and the third lowest logging cost (\$389.90/MBF). This alternative produces the second highest amount of volume and economic activity. The indicated bid value is the fourth lowest of all the action alternatives.

Alternative C –This alternative produces the most volume and consequently the most support for timber-related jobs in Southeast Alaska. The indicated bid value is the lowest of all alternatives. This alternative proposes harvest on approximately 55% of the suitable and available acres in the project area. The largest proportion, 4,357 acres, of this harvest utilizes helicopter-logging systems and only removes approximately 30% of the existing basal area.

Alternative D – This alternative has the second highest indicated bid rate and produces the second lowest volume harvested and subsequently generates the second lowest economic activity. This alternative also has the lowest logging cost (\$374.78/MBF).

Alternative E - This alternative incorporates the highest proportion (50%) of helicopter yarding as a percentage of total volume harvested. This alternative has the second lowest road costs (\$40.78/MBF) and the highest logging cost (\$409.73/MBF). It produces the third lowest amount of volume and economic activity of the alternatives that propose timber harvest.

Alternative F – This alternative does not build any National Forest System road to access harvest units. The volume harvested and economic activity generated is the lowest of all alternatives that propose timber harvest, approximately 20% of Alternative C. The indicated bid value is the highest of all alternatives, and the road costs are the lowest (\$21.99/MBF). Logging costs are the second lowest (\$379.77/MBF).

Table 3-6 - TM-6: Comparison of Alternatives – Harvest Volume and Roads

	Unit of Measure	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Harvest Volume							
Net Sawlog	MMBF	0	54.0	85.9	31.4	43.1	16.3
Utility	MMBF	0	7.7	12.0	4.6	5.8	2.4
Total	MMBF	0	61.7	97.9	36.0	48.9	18.7
Roads							
New NF System	Mile	0	16.9	19.9	5.0	5.2	0
Temporary	Mile	0	8.4	17.5	5.3	9.2	3.9
Reconstruction	Mile	0	1.2	3.5	0.7	3.3	1.7
LTF Construction	#	0	1	1	0	0	0

¹ Includes cable and shovel yarding systems

Cumulative Effects

Alternative A

No timber would be harvested from the project area at this time. Timber needed to meet the estimated demand would have to be harvested from other areas on the Tongass National Forest.

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Alternatives B, C, D, E, and F

A stable timber industry in Southeast Alaska depends on a steady flow of economic timber sales in order for operators and processors to make investments in machinery and employ qualified workers. The volume generated could contribute to meeting market demand. Volume from the Navy project area, in combination with other timber sales offered on the Tongass National Forest, could contribute to the long-term timber supply and stabilization of the local and regional economies. Appendix A of this DEIS includes information how the Tongass timber program is structured.

Issue 2: Old-Growth Reserves

The location and configuration of small old-growth reserves (small OGRs) may affect their quality and value as a habitat reserve for wildlife.

A range of concerns were expressed including: the current location of old-growth reserves (OGRs) do not contain the best habitat for wildlife species; timber management should be given priority when locating OGRs; and that OGRs should not be located in order to make more timber available for harvest.

Measurements:

- acres of productive old-growth (POG) protected in small OGRs by alternative;
- acres of interior POG protected in small OGRs by alternative. (Interior old-growth is that portion of a contiguous old-growth patch more than 300 feet inside the edge or perimeter of the block (USDA 1997b),);
- acres of young-growth habitat contained within small OGRs resulting from past forest management by alternative;
- acres of high-quality deer winter range protected in small OGRs by alternative. (High-quality deer winter range will be defined by the deer habitat capability model.);
- number of known or suspected goshawk nest territories protected in small OGRs by alternative;
- acres of high-quality marbled murrelet nesting habitat protected in small OGRs by alternative;
- acres of coarse canopy (volume class 6 and 7) POG protected by small OGRs by alternative; and
- whether a small OGR includes the Anita Bay Pinchpoint.

Old Growth

The Forest Plan maintains old-growth habitat for wildlife species in several ways. To begin with, it includes a system of mapped large, medium, and small old-growth habitat reserves as a part of a forest-wide habitat conservation strategy designed to protect the integrity of the existing old-growth ecosystem. Non-development lands and islands smaller than 1,000 acres are protected. The 1,000 foot beach fringe, along with estuary and riparian buffers provide additional protection of old-growth habitat. This system provides a reasonable assurance of protecting adequate habitat to maintain viable fish and wildlife populations (Forest Plan, page 2-2 USDA 1997c).

Affected Environment

Most of the forested areas in the Tongass are considered old-growth; timber inventory data suggest that 95% of trees in unharvested stands are greater than 150 years old; and this is the age used to separate old-growth and young-growth (USDA 1997 Forest Plan FEIS, page 3-18). Old-growth forests contain trees of multiple ages, sizes, and conditions, including dead standing trees (snags).

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Productive Old-Growth

Old-growth can be broken in to two categories: productive and unproductive. Productive old growth (POG) produces at least 20 cubic feet per acre per year (minimum of 8 MBF/acre), while unproductive old growth produces less than this amount. Unproductive forest is usually described as “scrub” and is often located along the edges of muskegs.

Interior Old-Growth

Interior old-growth is that portion of a contiguous old-growth patch or block more than 300 feet inside the edge or perimeter of the block (USDA 1997d). Larger patches of old-growth more often provide interior habitat conditions. Large, contiguous blocks of interior forest habitat are uncommon in the analysis area given natural fragmentation. Interior old-growth tends to have different characteristics than the old-growth forest at the edge of a block, due to light interception by surrounding trees, buffering from the effects of wind, and the general absence of transitional plant species. Interior old-growth provides wildlife with habitats protected from predator or competitor species that primarily use openings and the adjacent edges of forested areas. Species associated with interior forests, but not with forest edges, are of concern since timber harvest tends to decrease the amount of interior forest (USDA 1997e). An assessment of interior old-growth is one way to measure the amount of fully functional and undisturbed old-growth habitat that is available to wildlife.

Coarse Canopy

Coarse canopy forests provide the general attributes associated with old-growth forests: canopy gaps, fewer but larger trees, a multiple layer canopy, and abundant forage species. They provide a high level of snow interception and are therefore especially important during the winter for cover and movement. Caouette, Kramer, and Nowacki (2000) analyzed the differences in various methods of describing forest stands at a large scale and found that volume class designations probably more accurately portray forest stand structure than they do volume. Figure HF-2 (in the Issue 3 section) displays the location of high probability coarse canopy stands.

The cornerstone of the Forest Plan conservation strategy is a coarse-filter approach to addressing wildlife viability and the conservation of biodiversity consisting of a system of small, medium, and large OGRs. Small OGRs, beach, and riparian corridors provide landscape connectivity between medium and large reserves, as well as other non-development LUDs. Forest Plan Standards and Guidelines, such as those mandated for marten and riparian areas, contribute to retaining some forest structure within the stand after harvest and help maintain connectivity through the matrix (that area outside reserves).

The location and configuration of OGRs can affect their quality and value as wildlife habitat. Appendix K of the Forest Plan provides OGR criteria. Analyses focus on how alternatives would affect different components of POG habitat protected by proposed OGR configurations and these components are evaluated relative to the Appendix K criteria.

The analysis area under consideration is WAA 1901 (see Figure WL-1 in the wildlife section of this DEIS) unless otherwise specified.

Old-Growth Reserves

The old growth effects area (WAA 1901) includes small OGRs in Value Comparison Units (VCUs) 4620, 4640, 4650, 4670, 4680, and 4690. In addition, medium OGRs occur in VCUs 4630 and 4660 (see Figure WL-1 in the wildlife section of this DEIS). This area encompasses most of the development portion of Etolin Island; the South Etolin Wilderness encompasses most of the remainder of the Island. No changes are proposed to OGRs in VCUs 4620 and 4690 by this DEIS,

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because they are outside the project area boundary; WAA acres presented in this analysis use the existing Forest Plan acres for these reserves. This DEIS considers proposed changes to two of the three reserves found to be deficient in total acres (Quiet - VCU 4650 and Mosman - VCU 4670), but the third reserve (Southwest – VCU 4710) is outside the project boundary. The DEIS also considers changes to the small reserves in VCUs 4680 (Burnett) and 4640 (Anita).

An interagency review of the small reserves on Etolin Island identified three small OGRs that were deficient in acreage as required by the reserve design criteria identified in the Forest Plan (Appendix K, USDA 1997f) but all small reserves met the minimum acres of POG. The interagency biologists provided suggestions for amendments to correct deficiencies, to make the OGRs easier to identify on the ground, and to improve their functionality with regard to their roles in preserving old-growth habitat and providing connectivity (Grossman et al. 2005a). The project interdisciplinary team (IDT) also developed a configuration of small OGRs in the Navy project area designed to meet the minimum acreage requirements described in Appendix K of the Forest Plan (Cole letter 2005). VCUs 4700 and 4710 are located along the east side of the Island and include small OGRs that were reviewed by the interagency team but are not within WAA 1901, so are not included as part of this analysis. During the Forest Plan Amendment process the Forest Supervisor developed an additional small OGR option referred to as FSR in Table 2-1. This option was used for the Quiet small OGR in Alternative F.

A summary of proposed changes is presented below and is displayed in Table 3-7; additional information on acres and reasoning for each of the biologically preferred reserves can be found in the Interagency Old-Growth Reserve Report (Grossman et al. 2005b) in the project record. The planning record also contains information on development of the IDT-developed reserves.

Table 3-7 - OG-1: Proposed small OGR options by Alternative

Small Old-growth Reserve	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Anita (VCU 4640)	FP ¹	IDT ²	IDT	IDT	IA	IDT
Burnett (VCU 4680)	FP	IA ³	IA	IA	IA	IA
Mosman (VCU 4670)	FP	IDT	IDT	IA	IA	FSR ⁴
Quiet (VCU 4650)	FP	IDT	IDT	IA	IA	IA

Source: J. Roberts

¹FP = 1997 Forest Plan option; this is the small OGR as it currently exists.

²IDT = Option developed by the Navy Interdisciplinary Team

³IA = Interagency biologists recommended option

⁴FSR = Forest Supervisor recommended option

VCU 4640 (Anita)

Interagency option: Biologists would like to split this reserve into a north reserve and a south reserve; the existing reserve is located wholly on the north side of Anita Bay. If site-specific project analyses identify deficiencies in landscape connectivity, the Forest Plan provides the opportunity to re-examine small habitat reserves, which may be adjusted to provide the necessary connectivity. The biologically preferred reserve would protect POG across the narrow piece of land that ties the north and south parts of Etolin Island together (“Anita pinchpoint”). This geographic bottleneck was identified by an interagency team of biologists as a critical component of the island’s overall connectivity. Currently,

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this land is in development LUDs, primarily Timber Production (TM), which allows for maximum modification of the landscape. Precedent for special consideration and protection of similar areas was provided in Appendix N of the Forest Plan FEIS (USDA 1997a), where six other similar geographic “pinchpoints” were identified and protected under the Forest Plan as OGRs or other non-development LUDs where possible.

The proposed split reserve would preclude further development of the area which contains one of the three known northern goshawk nest territories on Etolin Island (includes three nests). This territory is one of the most consistently active territories on the forest, having been active at least seven of the last ten years (unpublished data, Wrangell Ranger District). The pinchpoint area also contains high-value deer winter range and complex structural components. Field visits noted large (> 40 inch Diameter Breast Height (DBH)) trees and snags, downed woody debris, and large moss-covered limbs (potential marbled murrelet nesting platforms). These items provide valuable structural diversity and occur at a higher frequency than the other small reserves, which were reviewed.

The south reserve would exclude the immediate vicinity of the existing Anita Bay LTF, but a portion of the main road that accesses the east side of the Island would traverse the reserve. Biological consensus is that the habitat protected by this reserve is important enough to allow the continued use of the LTF and roads in the area. However, further development of roads or timber harvest in this area will contribute to a reduction in connectivity between the northern and southern halves of Etolin Island.

Should habitat fragmentation continue in this area, wildlife species primarily restricted to terrestrial travel such as deer, elk, wolves, and bear, may experience reduced opportunities to travel between the two halves of the island. Increased isolation of previously connected populations of wildlife typically makes these isolated populations more vulnerable to population declines or local extinction.

The north reserve would remain where the eastern portion of the existing reserve is and would continue to protect important south aspects and connectivity to the adjacent medium reserve to the north while reducing the amount of second growth contained in the reserve. The total reserve would have fewer total acres than the existing reserve but would contain a higher percentage of POG.

IDT option: Placing the OGR around the LTF and existing road that form the primary access to Etolin Island could affect the use of these facilities in the future. Therefore, the reserve north of Anita Bay was maintained to protect POG on the south aspects, as well as the interior habitat in the current reserve, but adjusted the west boundary to follow more identifiable ground features and bring the reserve to minimum acreage requirements. This reserve does not provide the additional OGR protection for the known goshawk nests on the south side of Anita Bay, although the nests will receive protection under Forest Plan Standards and Guidelines. This option, as well as the existing reserve, would leave the Anita pinchpoint open for further development. The old-growth in the pinchpoint is in a Timber Management LUD and near existing roads; this increases the biological concern for this area. If the pinchpoint is harvested and old-growth access is not available between the north and south halves of the Island, isolation of populations could occur. For larger more mobile species such as wolves, bear, and deer, the South Etolin Wilderness can serve as a source population from which individuals can disperse to the rest of the Island. However, for small and/or less mobile species, and for those species that do not tolerate open habitats, Etolin Island could eventually function as two isolated populations if the pinchpoint is harvested.

VCU 4650 (Quiet)

Interagency option: The existing Forest Plan reserve falls short on total acres but does meet POG requirements. Biologists recommended adjusting this reserve to better identify boundaries and achieve the minimum acres. The adjustment would increase the proportion of high-volume POG in

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the reserve and would extend up the creek, protecting more of the drainage. It protects most of a large block of POG, which contains much interior habitat and includes much of the top-quartile deer habitat around the head of Quiet Harbor. The expansion up the drainage also keeps the basic shape of the reserve circular (one of the Appendix K considerations).

IDT option: This option was designed to increase the total acres to meet the minimum required while reducing the amount of POG acres contained in the reserve. The IDT was concerned that the west side of the current reserve (and the interagency option) could limit future opportunities to access timber on the west side of Quiet Harbor via road. This option tries to follow logical boundaries but does create more of an L-shape for the reserve by shifting the reserve completely to the east of Quiet Harbor. However, other considerations were not included in the design of the IDT option. Some of the deer winter range and a portion of the large block of POG included in the existing and interagency OGRs are excluded from this reserve option.

VCU 4670 (Mosman)

Interagency option: The existing Forest Plan reserve did not meet total acreage requirements but did meet POG acres. However, it was split between a north reserve and a south reserve. Biologist consensus on this reserve was to combine the north and south Forest Plan reserves into one reserve to protect important structural characteristics noted during field surveys and a large contiguous block of POG. This reserve would follow more readily identifiable boundaries. In addition, several raptor species, marbled murrelets, and wolf activity were noted during field surveys in the proposed reserve. This reserve would contain no existing roads or past harvest and would provide more interior habitat than the existing north reserve.

IDT option: This option would keep two separate reserves in this VCU. The south reserve would be maintained in its existing condition, and the north reserve would be expanded to meet the total acreage requirement. The north reserve would protect the important estuary area at the head of Mosman Inlet; Forest Plan Standards and Guidelines already place a 1000-foot buffer around estuaries. POG located in the north reserve is primarily on north aspects, which are of less value to wildlife. The north reserve also contains several open roads and a large second growth stand.

An alternative design for Mosman (VCU 4670) was considered and one was developed to meet the Forest Plan minimum POG acre requirement. This option was included in the original proposed action (see alternatives considered, but eliminated from further study), but the Forest Wildlife Program manager, USFWS, and the Alaska Department of Natural Resources did not support the relocation of the Mosman small OGR so the alternative and option were discarded.

Forest Supervisor recommended option: The Forest Supervisor recommended modifying the biologically preferred OGR in this VCU to encompass the south portion of the peninsula between Mosman and Burnett Inlets. Appendix K allows for up to 30% of the acreage in a small OGR to extend into the adjacent VCU for ecological reasons. More than 30% of this option is in the adjacent VCU 4680. This reserve does contain more acres and more POG than the biological reserve and protects interior habitat.

VCU 4680 (Burnett)

Interagency option: The Forest Plan placement of this reserve meets the intended spacing and size criteria and provides connectivity to the neighboring (VCU 4690) small OGR. After considering other options, consensus by the interagency biologists was that only slight modifications were needed to make the boundaries of the reserve better follow logical landmarks. Therefore, all action alternatives incorporate this option.

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IDT option: Interagency adjustments to this reserve reduced the total acres and POG acres closer to the minimum Forest Plan criteria. IDT members agreed to adopt the interagency option.

Direct and Indirect Effects

Alternative E incorporates all four of the biologically preferred (interagency) small OGR configurations recommended by the interagency team. Alternatives B and C incorporate the interagency OGR at Burnett and the IDT OGRs at Anita, Quiet, and Mosman. Alternative D incorporates the biologically preferred OGRs at Mosman and Burnett and the IDT options for the Quiet and Anita reserves. Alternative F incorporates the interagency OGRs at Quiet and Burnett, the IDT option at Anita, and the Forest Supervisor recommended option at Mosman.

Table 3-8 - OG-2. Key habitat features protected in OGRs by Alternative in WAA 1901¹.

	Acres of Habitat				
	Alt A	Alts. B and C	Alt D	Alt E	Alt F
POG	23051	22752	22700	23250	23672
Interior POG	9745	9408	9768	10140	10354
Coarse Canopy	1214	1211	1315	1423	1401
Young Growth	549	555	375	272	470
Top Quartile Deer Habitat	5832	5678	5627	5896	5847
Goshawk Territories	0	0	1	2	1
Murrelet Nesting Habitat	18718	18476	18480	18908	19671
Maintains Habitat in Anita Bay Pinchpoint	No	No	No	Yes	No
Suitable/available ^{2,3}		3025	3610	3826	3813

Source: pog2.xls

¹ Numbers for the WAA include the medium reserves in VCUs 4660 and 4630 and the small reserves in VCUs 4620, 4640, 4650, 4670, 4680, and 4690

² Suitable and available refers to those acres that would be harvestable if they were not in a non-development LUD; this is not a criteria in Appendix K, but is considered in accordance with direction in the Cole 2005 letter

³ Suitable/available acres given for small OGRs only because no changes are proposed for the medium reserves

Alternative A (No Action)

This alternative will not make changes to any of the small OGRs including those deficient in total required acres. Reserves would contribute to protecting habitat but will not incorporate interagency or IDT recommendations. Therefore, the OGRs under this alternative do not fully function as they are intended as part of the Forest-wide conservation strategy and do not always follow logical or identifiable boundaries. However, this alternative contains less second growth and protects more POG, interior habitat, coarse canopy forest, high quality-deer-winter-habitat, and potential marbled murrelet nesting habitat than Alternatives B and C, which use the IDT configurations for all but one small OGR (Table 3-8).

Alternatives B and C

These two alternatives use the interagency design for the Burnett OGR (VCU 4680) and the IDT options for the other OGRs. Although these alternatives meet the total and POG requirements for all small reserves, they decrease the amount of interior habitat protected by the existing reserves, increase the amount of second growth, and do not include a small OGR at the important pinchpoint at Anita Bay. The IDT options at Quiet (VCU 4650) and Mosman (VCU 4670) do not include the same amount of interior and coarse canopy forest that are important to some wildlife species. Several raptor species were noted in the biologically preferred reserve in VCU 4670, including possible nesting territories for goshawk and barred owl; these would not be protected in the IDT option under these two alternatives.

Alternative C includes construction of a new LTF (Mosman Inlet LTF) that would be located in the southeast edge of the medium OGR in VCU 4660. Associated road construction (0.4 mile) would pass through the OGR to reach timber in the neighboring Modified Landscape (ML) and Scenic Viewshed (SV) LUDs. New road and LTF construction is generally inconsistent with the objectives for OGRs (USDA 1997g Forest Plan, page 3-81), especially in the large and medium reserves; which are designed to provide habitat refugia. If no other feasible alternatives exist, new construction can be considered, but facilities and roads should be managed in a manner compatible with old-growth objectives. Other sites for the proposed LTF were considered but would have required additional miles of new road within the beach buffers and medium reserve or crossing a Class I (anadromous) stream. This medium reserve is short on high volume POG acres; although, it does meet total acre and overall POG requirements. Impacts to the reserve should be avoided since the reserve already includes several small, non-development, neighboring islands in the total acres.

Alternative D

Although this alternative protects the least POG, it does contain more interior and coarse canopy forest than Alternatives A, B, and C; these are important components of old-growth habitat, so this alternative is intermediate in its benefits. The OGR configuration for this alternative also includes one of the goshawk nesting territories on the Island.

Alternative E

This is the only alternative that incorporates the biologically preferred (interagency) option for all of the small reserves within the project boundary. It is the only alternative to locate a small OGR that includes the critical Anita Bay pinchpoint and the associated goshawk nests. It would protect the most coarse canopy (a rare feature) and the most top quartile deer habitat (see the wildlife section of the DEIS for information on the deer model). This alternative contains the fewest acres of second growth within reserves. Overall, this alternative considers the most factors listed in Appendix K and therefore comes the closest to meeting the intent of the small reserve criteria.

Alternative F

Alternative F ranks a close second to Alternative E for the OGR design. It incorporates the biologically preferred reserve for the Quiet and Burnett OGRs, the Forest Supervisor's OGR at Mosman, and the IDT's option for the Anita Bay reserve. This configuration encompasses the most total POG, the most interior POG, and the most potential marbled murrelet nesting habitat, along with the second most coarse canopy and deer winter habitat. This combination of OGRs meets the intent of the Appendix K criteria, with the exception of the Anita Bay pinchpoint (connectivity) not included in a small OGR. The Forest Supervisor's OGR at Mosman has more than 30% of the total acreage in an

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adjacent VCU, but does meet the acreage requirements; it actually protects the most POG of the OGR options.

Cumulative Effects

The Navy project is tiered to the comprehensive landscape old-growth habitat reserve strategy designed for the Tongass. This strategy was developed to provide a system of reserves that provide for the viability of species, even with the maximum timber harvest allowed under the Tongass Forest Plan for a full 100 years. The Forest Plan conservation strategy maintains POG in OGRs and other natural setting LUDs and provides connectivity by limiting harvest in beach buffers, riparian buffers, etc.

The South Etolin Wilderness contributes to the overall conservation strategy in the area, but because it is across the Anita Bay pinchpoint from the majority of the development area, it may not fully function as a source area for populations of animals with limited dispersal capabilities. Only Alternative E incorporates the interagency option for the Anita OGR, which would include this pinchpoint.

Issue 3: Wildlife Habitat Fragmentation

Concerns were expressed about the effects of fragmentation on wildlife habitat and wildlife populations by removing habitat and/or connectivity.

Measurements:

- acres of POG habitat maintained in WAA 1901 after harvest by alternative;
- acres of interior POG maintained in WAA 1901 after harvest by alternative; and
- acres of coarse canopy (volume classes 6 and 7) old-growth maintained in WAA 1901 after harvest by alternative.

Habitat Fragmentation

Habitat that is fragmented as a result of timber harvest and associated road construction may affect wildlife populations. The distribution of productive old-growth forest on Etolin Island is naturally fragmented. Muskegs, scrub-shrub wetlands, riparian areas, forested wetlands, and island topography all contribute to the fragmented distribution of POG on Etolin Island. The availability and spatial arrangement of OGRs, non-development LUDs, and riparian, estuary, and beach buffers are important in maintaining habitat connectivity and providing habitat for wildlife on Etolin Island. This analysis focuses on how much POG habitat is left, particularly those portions of POG considered interior forest or coarse canopy forest.

Interior Old-Growth

Large, contiguous blocks of interior forest habitat are uncommon in the analysis area given natural fragmentation and the additional fragmentation caused by past harvest within the analysis area.

Interior forest habitat is already somewhat limited in the analysis area given the naturally fragmented character of the analysis area, coupled with the additional fragmentation caused by past harvest. Figure HF-1 depicts the spatial distribution of interior old-growth around the WAA.

Coarse Canopy

Table 3-9 displays the acreage of high probability coarse canopy stands. Figure HF-2 displays the location of high probability coarse canopy stands. Of the 3,922 acres of coarse canopy in the WAA, 2,928 acres (75%) are protected by non-development LUDs, beach and estuary buffers, riparian management areas, and other areas not suitable for timber harvest.

Direct and Indirect Effects

Table 3-9 summarizes the amount of POG, interior POG, and coarse canopy proposed for harvest (excluding partial harvest prescriptions) by alternative.

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Table 3-9 - HF-1. POG habitats proposed for clear-cut harvest¹ by alternative.

	Acres / Percent of Habitat Harvested ¹					
	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
POG	0	2054 (3%)	3044 (5%)	1272 (2%)	1178 (2%)	626 (1%)
Interior POG	0	2289 (9%)	2739 (11%)	1089 (4%)	913 (4%)	448 (2%)
Coarse Canopy²	0	385 (10%)	383 (10%)	241 (6%)	192 (5%)	65 (2%)

Source: POG1.xls

¹ Harvest prescriptions other than Single Tree Selection

² Defined as Volume Class 6 and 7

Alternative 1 (No Action)

Alternative A, the no action alternative is the only alternative that proposes no harvest of coarse canopy stands or interior forest. Since these are limited resources, this is the only alternative to maintain these specialty habitats in their current condition.

Alternatives B and C

Alternative B proposes the most coarse canopy harvest, while Alternative C proposes the most harvest of interior habitat. These two alternatives pose the greatest risk to species dependent on these habitat types. The area between Mosman and Burnett Inlets and the area around Navy Lake contain some of the larger blocks of interior habitat present in the WAA; much of the existing interior habitat present in these areas will be harvested under these alternatives. These are the only alternatives that propose harvest in the Navy Lake area.

Alternatives D and E

These two alternatives propose approximately a 4% decrease in the amount of interior habitat in the WAA and similar decreases in the amount of coarse canopy forest. These alternatives are intermediate in effects to species requiring large blocks of habitat. Both of these alternatives propose the interagency option for the Mosman OGR, which will protect a large block of interior habitat along the east side of the inlet. These alternatives also propose no harvest in the Navy drainage and will not impact the interior habitat there.

Alternative F

Alternative F proposes the least amount of harvest of all of the action alternatives for both interior and coarse canopy and, therefore, the least affect to large patches of habitat (and the species associated with large patches of habitat). Much of the interior habitat, especially the large patches, will be left intact if this alternative is chosen since no harvest is planned in the Navy drainage and minimal harvest is planned near Mosman or Burnett Inlets.

Cumulative Effects

As there will be no management in WAA 1910 the cumulative effects area for habitat fragmentation analysis will be WAA 1901.

About 94% of the POG present on Etolin Island 100 years ago is still intact and has not been harvested. Under the 1997 Forest Plan approximately 66% of POG that originally existed on Etolin Island is largely unavailable for timber harvest and development through protection in beach buffers, RMAs, and non-development LUDs. Timber harvest, road construction, or other activities that significantly alter forest vegetation cover will continue to fragment habitat and reduce habitat connectivity within the analysis area.

Table 3-10 - HF-2. Habitat Maintained in WAA 1901 After Harvest.

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
POG (acres)	60748	58694	57704	59476	59570	60122
Interior POG (acres)	24643	22354	21904	23554	23730	24195
Coarse Canopy (acres)	3922	3537	3539	3681	3730	3857

Source: interior_pog_postharvest.xls and pog2.xls 1 only considers affects by clearcut harvest. This analysis assumes that structure retained in partial harvest prescriptions will be sufficient to retain old-growth characteristics (Deal 2001).

As habitat is fragmented, large patches become smaller and often these become isolated from one another. As patches become smaller or more linear in shape, they will not provide as much interior habitat. Larger patches are preferred by some species. The red-breasted sapsucker and the hairy woodpecker, both management indicator species, prefer patches at least 250 and 500 acres, respectively (USDA 1997 Forest Plan FEIS pages 3-356 and 3-357). In addition, interior habitat appears to be important to the brown creeper, also a management indicator species. Decreases in large patches of POG can reduce the preferred habitat for these species, as well as others, and lead to reduced populations. In general, there is a trend toward more, smaller patches across WAA 1901; the old-growth resource report in the project planning record contains more information on patch size and distribution.

Historically, much of the area between Mosman and Burnett Inlets provided interior habitat; past harvest has reduced this to smaller patches of interior that currently exist. Alternatives B and C propose additional harvest between Mosman and Burnett Inlets and harvest near Navy Lake that contains a large patch of interior; therefore these alternatives will greatly reduce the amount of interior habitat available in the analysis area. Other alternatives would have less impact on the interior habitat available, and thus on species such as brown creeper, that prefer interior condition. Alternatives D, E, and F propose the biologically preferred (interagency recommended) OGR for Mosman, which would protect much of the interior along the east side of Mosman Inlet. These alternatives also propose no harvest in the Navy drainage interior habitat. In addition, Alternative F does not propose harvest along the northeast side of Burnett Inlet, which would protect more interior habitat.

As habitat fragmentation increases and patches of old-growth habitat become smaller and more isolated, whether from natural or human-caused disturbances, connections between these patches become an increasingly important feature of the landscape. Connectivity is defined as a measure of the extent that forest areas between or outside reserves provide habitat for breeding, feeding, dispersal, and movement (USDA 1997h 7-7). By providing connective links between patches of suitable habitat that allow for the migration and dispersal of wildlife between larger patches,

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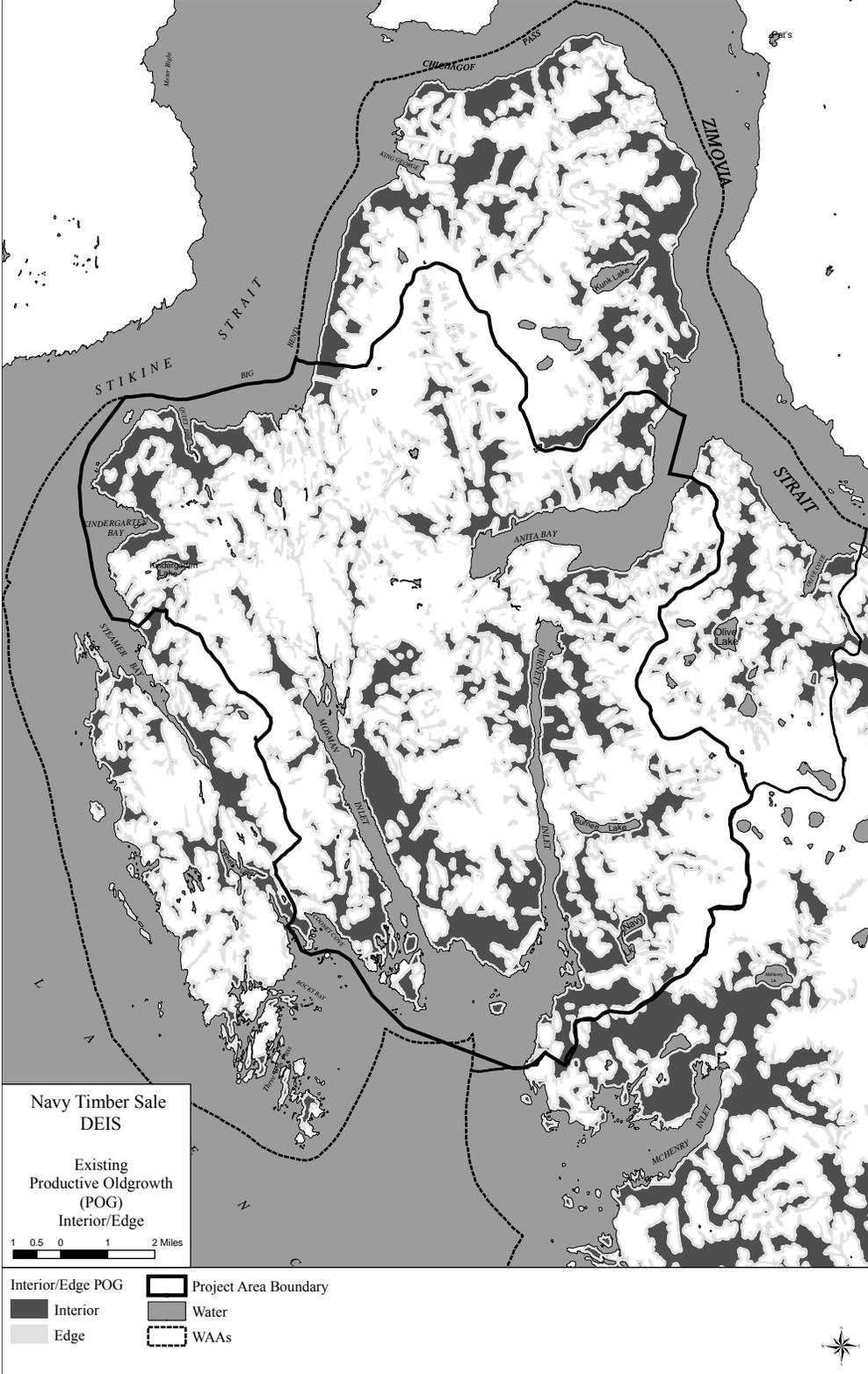
connectivity functions in maintaining biodiversity. The Forest Plan states that habitat connectivity should be addressed to assess whether blocks of contiguous old-growth forest habitat between large and medium OGRs and other non-development LUDs are maintained.

Maintenance of connectivity between old-growth forest reserves is important to minimize the isolation and decline of wildlife species associated with these reserves (Harris 1984), and may be equally as important as maintaining the reserves themselves. In the absence of adequate connectivity, movement of wildlife between suitable habitats may be restricted, which can lead to increases in the susceptibility of wildlife populations to local extinctions and reductions in species diversity.

Forested connections are important travel corridors for species that avoid crossing openings and other non-forested habitats. Forested corridors along slopes are often used for the seasonal movement of certain wildlife between summer and winter range. Travel through most managed stands can be difficult for some wildlife species due to slash and dense shrub cover or coniferous second growth. Low-elevation passes, beach fringe, and riparian areas provide natural connections between forested blocks and are important areas for migrating and dispersing wildlife.

The Forest Plan's conservation strategy maintains connectivity between large and medium OGRs and other non-development LUDs by establishing no-harvest buffers around beach and estuary fringes, some riparian areas, and by strategic placement of small OGRs. An analysis of habitat connectivity on Etolin Island compared the number of OGRs and other non-development LUDs that are connected to each other via continuous POG as mapped in the Forest Service corporate GIS data. All of the OGRs or non-development LUDs are connected to at least one other component of the conservation strategy by contiguous POG, though most of the connections are less than 1,000 feet wide (TPIT 1998). Contiguous POG connections between OGRs on the north half of the island and the south half of the island are lacking, particularly in the area between Anita Bay and Burnett Inlet. This pinchpoint is discussed under the OGRs. Further information on connectivity can be found in the old-growth resource report in the project planning record.

Figure HF-1. Existing Interior Habitat within WAA 1901



Issue 4: Inventoried Roadless Areas

Concerns were expressed that timber harvest and road construction in Inventoried Roadless Areas could affect the characteristics of the area.

Measurements:

- acres of Inventoried Roadless Areas affected by timber harvest and road construction and
- miles of road proposed in Inventoried Roadless Areas.

Roadless area is a generic term that includes inventoried roadless areas and unroaded areas. An Inventoried Roadless Area is an undeveloped area typically exceeding 5,000 acres that meets the minimum criteria for wilderness consideration under the Wilderness Act. Inventoried Roadless Areas are discussed in detail in the 2003 Forest Plan SEIS (USDA 2003). An unroaded area is an undeveloped area typically less than 5,000 acres, but of a size and configuration sufficient to protect the inherent characteristics associated with its unroaded condition.

Nationally, roadless areas have important values and characteristics that are becoming increasingly scarce as lands are developed. Roadless areas provide: places to recreate away from roads and developments; undisturbed landscapes; habitat for plants, birds, fish, and other wildlife; and opportunities to study natural ecosystems.

Roadless Analysis

The most recent roadless inventory was prepared for the 2003 Forest Plan SEIS, and is used for this analysis.

To determine changes in the roadless character by alternative, existing, and proposed roads were buffered by 1,200 feet, and cable unit boundaries were buffered by 600 feet. This buffer area is called a zone of influence; it is assumed that effects do not occur beyond this zone of influence. The effects to roadless areas were measured by the miles of new proposed road, and the amount of acres affected by harvest of cable units (including the area within the zone of influence).

Additional characteristics used to analyze the effects to roadless areas include: soil, water, and air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species; primitive, semi-primitive non-motorized, and semi-primitive motorized classes of recreation opportunities; surrounding landscapes; landscape character, and scenic integrity; traditional cultural properties and sacred sites; and locally identified unique characteristics. Since the roadless areas are within the analysis area for all resources, the effects to the characteristics listed above are described in each resource report, and in Chapter 3 of the DEIS under each resource section.

Affected Environment

The Navy project area includes portions of three Inventoried Roadless Areas: North Etolin Roadless Area #232, Mosman Roadless Area #233, and South Etolin Roadless Area #234.

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Table 3-11 - R-1: Total Inventoried Roadless Acres and acres within the project area

Roadless Area	Size (Acres)	Acres within the Project Area
North Etolin (#232)	41,740	17,348
Mosman (#233)	56,757	41,063
South Etolin (#234)	28,679	575

In addition, the project area includes 1,945 acres of unroaded area. The total roadless area (Inventoried Roadless Areas and unroaded areas) in the project area is 60,931 acres.

North Etolin Roadless Area #232

The North Etolin Inventoried Roadless Area is located on the north end of Etolin Island and is bounded by Chichagof Pass to the north, Stikine Straight on the northwest, Zimovia Strait on the east, and Anita Bay forms the boundary to the south.

The only known unique value in the area is the presence of elk on Etolin Island.

A detailed description of the North Etolin Roadless Area can be found in Appendix C of the Final SEIS (pages C1-286 to 296).

Mosman Roadless Area #233

The Mosman Roadless Area is located in the central-western portion of Etolin Island. Road construction and timber harvest activities have separated the Mosman Roadless Area into three distinct areas separated from one another by Burnett and Mosman Inlets. It is bounded by Clarence Strait on the west and a portion of the south, the South Etolin Roadless Area on the east, the South Etolin Wilderness on a portion of the south and east, Ernest Sound to the south, and an area of roads and harvest units to the north.

The only known unique value in the area is the presence of elk on Etolin Island.

A detailed description of the Mosman Roadless Area #233 can be found in Appendix C of the Final SEIS (pages C1-297 to 306).

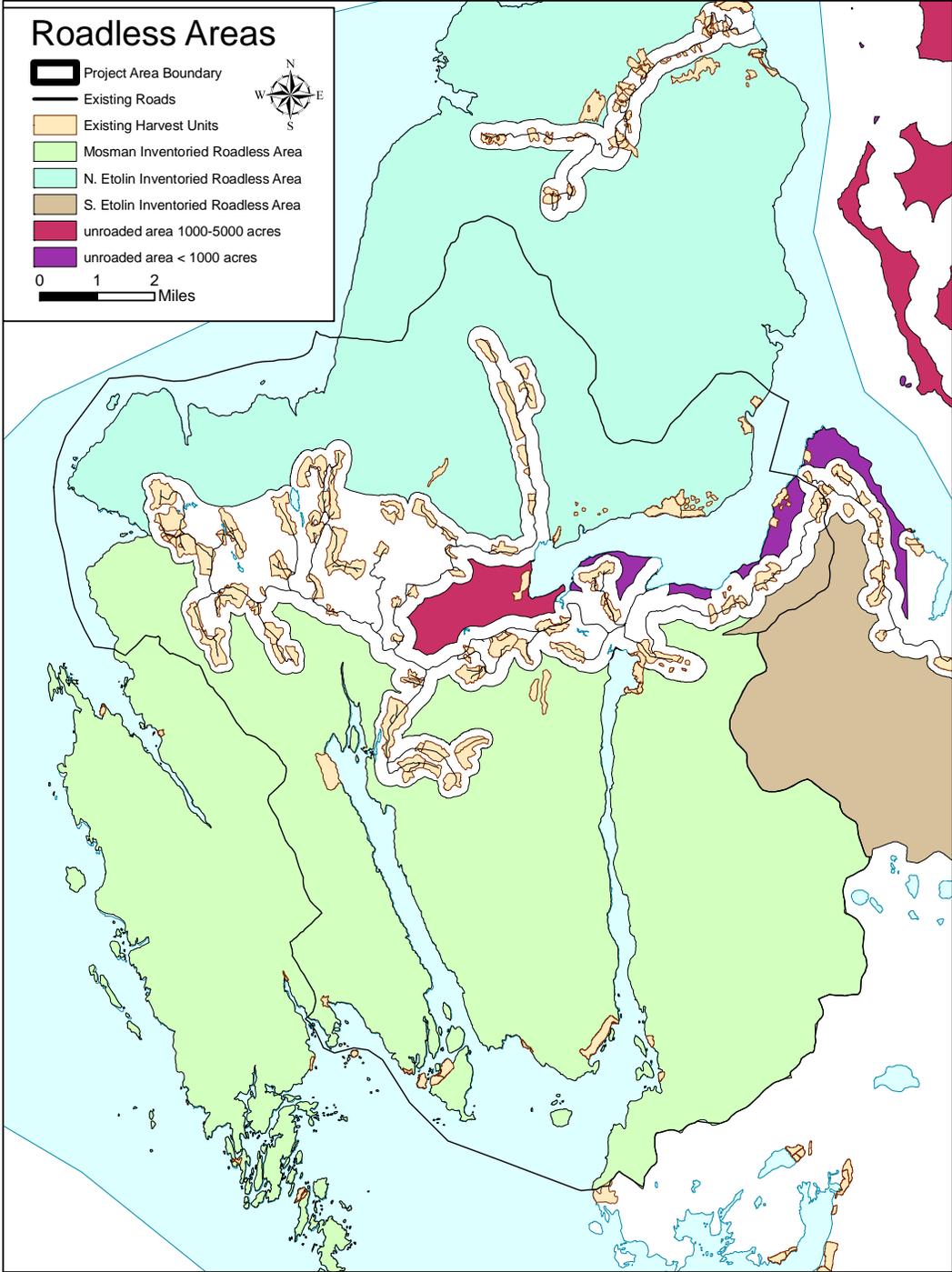
South Etolin Roadless Area #234

The South Etolin Roadless Area is located on the east side of southern Etolin Island. It encompasses the east peninsula, as well as, a more centrally located portion of the island. The area is bordered to the east by Zimovia Strait, by forest roads and associated harvest units to the north, by the Mosman Roadless Area to the west, and the South Etolin Wilderness and Menefee Inlet extend north into the area.

The only known unique value in the area is the presence of elk on Etolin Island.

A detailed description of the South Etolin Roadless Area #234 can be found in Appendix C of the Final SEIS (pages C1-308 to 316).

Figure R-1 displays roadless areas on Etolin Island.



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Unroaded Area

The unroaded area is located at the head of Anita Bay, south of the North Etoilin Roadless Area, and North of the Mosman Roadless Area.

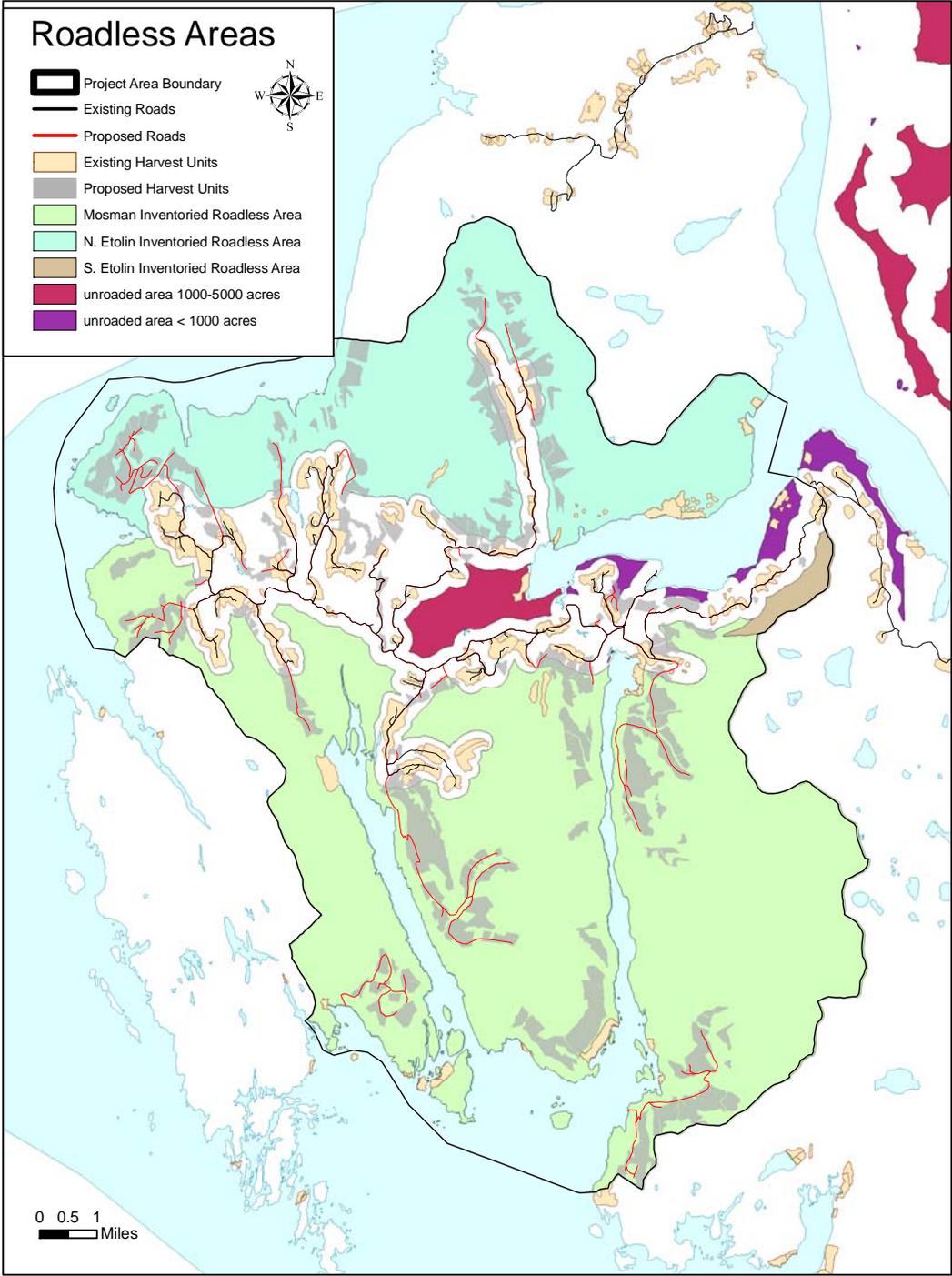
Environmental Effects

The effects to soil, water, air, species diversity, recreation value, scenic value, wildlife habitat and traditional cultural properties and sacred sites are located in the Resource Reports and Chapter 3 of the DEIS under each resource section.

The unroaded portion of the project area has been and will continue to be influenced by the surrounding roads and harvest units. The proposed activities could decrease the size of the unroaded area.

Table R-2 lists the number of acres of roadless area affected, and the miles of new proposed roads in roadless areas. The acres affected include the area residing in the zone of influence around units and roads. In Alternative F, there are no roads or units proposed within Inventoried Roadless Areas; the acres affected in Alternative F reside solely in the zone of the influence.

Figure R-2 displays the proposed harvest units and roads in relation to the Roadless Areas.



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Table 3-12 - R-2: Acres of Roadless areas affected by harvest and road construction by Alternative

	Mosman Roadless Area	North Etolin Roadless Area	South Etolin Roadless Area	Unroaded Area
Total Acres	56,757	41,740	28,679	N/A
Acres in the Project Area	41,063	17,348	575	1,945
Acres Affected by Alternative¹				
Alt A	0	0	0	0
Alt B	4,857	864	6	77
Alt C	6,038	2,030	6	85
Alt D	1,647	518	6	77
Alt E	2,129	1,049	6	15
Alt F	181	104	6	68
Miles of New Road Proposed				
Alt A	0	0	0	0
Alt B	22	4	0	0
Alt C	23	8	0	0
Alt D	9	2	0	0
Alt E	11	3	0	0
Alt F	0	0	0	0

Source: GIS

¹Acres affected by alternative includes the zone of influence defined as 1,200 feet from existing and proposed roads, and 600 feet from cable harvest units.

Cumulative Effects

The potential for timber harvest, road construction, and development in the future have the potential to affect the character of the roadless areas. At this time, no other Forest Service timber sales or development projects are planned for Etolin Island. Therefore, no cumulative effects are anticipated. Pre-commercial thinning is anticipated in the project area; thinning projects would use existing roads; thinning would occur in developed areas, so no additional impacts would occur. Road maintenance would continue on a periodic basis, but would not have additional impacts on the roadless areas.

Issue 5: Road Construction in the Navy Watershed

Concerns were expressed about the construction of a remote independent road system and associated LTF in the Navy Watershed which has recreation and water quality concerns. The road system could provide road-based recreation access, which may affect abundance and distribution of wildlife and increase hunter competition.

Measurements:

- miles of road proposed in the Navy Watershed;
- qualitative analysis of recreation and subsistence use in the Navy Lake vicinity,
- miles of road proposed on slopes over 67% gradient.

Affected Environment

The Navy Watershed is a scenic undeveloped area that shares its southern boundary with the South Etolin Wilderness Area, and the northern boundary with the Burnett small OGR (VCU 4680). The watershed is a long narrow, steep sided glacial trough. Navy Lake, accessible from salt water, is nestled in the valley bottom with views of the rugged mountain peaks along the watershed boundary. The upper valley has steep sidewalls marked with numerous landslide tracts. The lower valley is heavily timbered; timber quantity is low in the upper 1/3 of the valley. The valley is a pristine and relatively undisturbed area for wildlife, providing habitat for many wildlife species including deer and brown bear.

Extensive field work was conducted in the area to determine resource concerns associated with road building and timber harvest. Some areas were removed from further consideration including road construction beyond the lower half of the lake. Areas of particular concern for the road construction were dynamic stream crossings, steep slopes directly above the lake, and the need to traverse a landslide prone slope.

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Table 3-13 - NW-1: Amount of proposed harvest, proposed road construction and LTF construction in the Navy Lake Watershed by alternative

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Proposed harvest (acres)	0	419	293	0	0	0
Proposed road construction (miles)	0	2.71	0	0	0	0
Miles of road on slopes >67%	0	0.1	0	0	0	0

Source: GIS

All alternatives avoid road construction on the landslide prone slope adjacent to the upper part of the lake, they avoid the dynamic channel crossing at the head of the lake, and they avoid the

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alluvial/colluvial channel crossings near the middle of the lake. Only Alternatives B and C propose timber harvest or road and LTF construction in the Navy watershed.

Alternative B proposes the construction of the Burnett Inlet LTF and a 3.25 mile road system of which 2.71 miles are in the Navy watershed. The proposed road does not go beyond the lower portion of the lake, where the potential for road failure is the highest. The road crosses several Navy Creek tributaries and traverses the slope uphill of the lake. There is a short section where the road is located on slopes greater than 67% gradient to avoid the lake buffer. Just below the outlet of the lake, the road encroaches on the stream buffer. The road location is a result of grade and the adjacent hillslope. Sedimentation from the road and adjacent slopes is a concern for downstream spawning habitats. The road will be stored at the end of timber sale activities by removing all stream crossing structures and providing adequate cross drainage.

Alternative C does not propose road or LTF construction in the Navy watershed, but would harvest and helicopter yard approximately 293 acres using a prescription that would retain 70% of the basal area. Timber would be yarded to saltwater barges for processing. Proposed harvest areas are within 2 miles of the saltwater. Alternative C is not expected to have a significant effect on the watershed condition due to the high retention and limited proposed harvest area.

As stated in the subsistence section, project-related activities are not expected to restrict access to deer for subsistence use. Roads will increase opportunities for subsistence hunting and they will open areas to hunting that historically have been relatively inaccessible. Roads, open or closed, will also increase opportunities for other hunters, and it is likely that both legal harvest and illegal poaching of deer will increase, especially with an open road system. Increased harvest of deer is expected ultimately to lead to increased competition for deer between rural and non-rural hunters, particularly in areas like Navy Lake where road access was previously not available. According to deer hunter surveys, demand is not high and the area has not been reported as an important area to any one community. Therefore, a significant possibility of a significant restriction on subsistence use of deer is not expected as a direct result of this project.

As stated in the recreation section, Alternative B would have the most effect on the Navy Creek recreation place; implementing this alternative would change the inherent character of this recreation place by introducing a road system into a previously unroaded area.

Proposed harvest in Alternative C would impact the scenic condition of the Navy Creek recreation place.

Botany

This section summarizes the botanical data collected for the Navy project and analyzes the proposed harvest areas and road locations pertaining to threatened, endangered, sensitive (TES) and rare plants.

Forest-wide goals, objectives, and standards and guidelines for this resource are found on pages 2-2 (Biodiversity), 4-88 through 4-90, and 4-93 (Threatened, Endangered and Sensitive) of the Forest Plan (USDA 1997i).

Survey Methods

Sixty-six sensitive and rare plant Level 3 and 4 surveys were conducted for this project between 2004 and 2007. Priority in site selection was given to: 1) proposed roads included in more than one alternative, 2) proposed cable or shovel harvest in units, which occur in more than one alternative, and 3) proposed helicopter harvest in units that occur in four of the alternatives. Additional surveys were conducted throughout the project area.

Affected Environment

Two hundred fifty-five vascular plant taxa were identified within the project area.

Threatened and Endangered Plants

No threatened or endangered plants are known or suspected to occur in Southeast Alaska and the Tongass; therefore, effects on federally listed plants will not be discussed further.

Sensitive Plants

Of the 19 plant species listed as sensitive in Region 10 (Alaska), 7 are known or suspected to occur within the Navy project area.

Platanthera gracilis Lindl is on the Region 10 sensitive plants list and is suspected within the Navy project area. However, it will not be considered in this analysis because it will be removed during the next update of the R10 sensitive species list (Stensvold pers. comm. 2005a).

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Table 3-14 - B-1: Known or suspected R10 sensitive plants and their associated habitat within the Navy project area.

Species	Known (K) or suspected (S)	Common name	Habitat (DeLapp 1992, Stensvold 2005)
<i>Carex lenticularis var. dolia</i>	S	Goose-grass sedge	Wet meadows and edges of snow beds; lake margins, marshy areas; subalpine and alpine
<i>Cirsium edule</i>	S	Edible thistle	Wet meadows, woods; forest and stream edges, and dry meadows
<i>Glyceria leptostachya</i>	K	Davy mannagrass	Wet lowland habitats; streamside, lake margins, marshy areas, and shallow freshwater
<i>Isoetes truncata</i>	S	Truncate quillwort	Shallow freshwater.
<i>Ligusticum calderi</i>	S	Calder's lovage	Alpine and subalpine forest edges, and wet meadows
<i>Poa laxiflora</i>	S	Loose-flowered bluegrass	Moist open lowland woods; maritime beach and upper beach meadows; and streamside near saltwater
<i>Hymenophyllum wrightii</i>	K	Wright's filmy fern	Base of trees and rock outcrops in damp, humid woods; forest and forest edge

Rare Plants

Rare plants in Alaska are determined by the Alaska Natural Heritage Program (ANHP), considering rarity within Alaska and the global distribution (Lipkin and Murray 1997). Rare plants on the Tongass are defined as those that:

- are on the ANHP Vascular Plant Tracking List that are known, or suspected, to occur on the Tongass (ANHP 2006) and are generally considered S1 (critically imperiled in state) and S2 (imperiled in state) under the state ranking; some S3 (rare or uncommon in state) are considered;
- are proposed upon consultation and agreements among Tongass ecologists, District botanists, and the Region 10 botanist, as rare on the Tongass (i.e., plants on the fringe of their range or disjunct populations on the Tongass, but not yet given a state ranking on the ANHP list);
- have population viability concerns on the Tongass and have not been thoroughly evaluated or designated as sensitive; and
- have been raised as an issue because of rarity or conservation concerns through the NEPA process (Dillman and Krosse 2007).

Table 3-15 - B-2: Rare plants found within the Navy project area and their associated habitat.

Species	Common name	Known Habitat
<i>Botrychium lanceolatum</i> var. <i>lanceolatum</i>	Lance-leaf moonwort	Mesic to wet rocky slopes and woods (Douglas et al. 2000)
<i>Carex gynocrates</i>	Yellow bog sedge	Bogs, marshes; stream side and open canopy forest; generally on calcareous soils (Tande and Lipkin 2003)
<i>Cypripedium montanum</i>	Alpine ladies' slipper	Moist woods (Hultén 1968)
<i>Galium kamtschaticum</i>	Boreal bedstraw	Moist, mossy places (Hultén 1968)
<i>Listera convallarioides</i>	Broad-lipped twayblade	Moist places (Hultén 1968)
<i>Lycopus uniflorus</i>	Northern bugleweed	Wet places (Hultén 1968)
<i>Malaxis paludosa</i>	Bog adder's mouth orchid	Wet Sphagnum bogs (Hultén 1968)
<i>Platanthera orbiculata</i>	Round-leaf orchid	Forested areas (Hultén, 1968)
<i>Tiarella trifoliata</i> var. <i>laciniata</i>	Lacinate foamflower	Moist forests, meadows and stream banks (Douglas et al. 2000)

Environmental Effects

Determination of risks to populations of sensitive plants takes into account: size, density, vigor, habitat requirements, location of the population, and consequence of adverse effect on the species as a whole; within its range and within the National Forest. The direct and indirect effects analysis area consists of the Navy project area. The cumulative effects analysis area is the Tongass; therefore, the determination of effects is based on population viability of each species across the Tongass.

Direct and Indirect Effects

Plants or their habitats can be affected by timber harvest, road construction, or related activities. Effects may be viewed as adverse, depending on the extent of the impacts. These effects include:

- crushed or buried plants or habitat;
- altered hydrologic processes leading to desiccation or drowning plants;
- altered light regime leading to loss of reproductive potential or death of plants;
- reduced plant habitat; and/or
- introduction of non-native plants.

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Observed Sensitive Plants

Table 3-16 lists the sensitive plants found within the Navy project area and the percent of the observed population affected by proposed project activities. Additional occurrences of the known and suspected sensitive plants may occur within the project area, as the entire project area was not surveyed.

Table 3-16 - B-3: Percentage of observed sensitive plant populations in the Navy Project Area potentially affected by alternative

Species	Number of Populations	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Davy mannagrass	1	0%	100%	100%	100%	100%	100%
Wright's filmy fern	34	0%	26%	35%	24%	18%	24%

Wright's filmy fern is the only sensitive plant observed whose populations will be directly impacted by the proposed alternatives.

The population of Davy mannagrass observed at the old logging camp is not within proposed units or road; however, activities associated with harvest may affect the population. This developed site presently serves as a parking lot, and is a logical location for staging heavy equipment and other vehicles. The population could be trampled either by foot traffic or by vehicles.

See the Unit Cards and Road Cards (Appendix B & C) for area-specific information.

Suspected Sensitive plants

Table 3-17 lists the sensitive plants suspected in the Navy project area that may be affected by project activities. No effects would occur for Alternative A. In areas surveyed, these plants were not found within the project area.

Table 3-17 - B-4: Activities that could affect suspected sensitive plant species.

Sensitive Plant Species	Activity associated with effects of Alternatives B-F
Goose-grass sedge	Road construction
Edible thistle	Timber harvest and road construction
Truncate quillwort	Road construction
Calder lovage	Road construction
Loose-flowered bluegrass	Road and LTF construction

Rare Plants

Table 3-18 lists the rare plants that were found within the Navy project area and the percentage of populations potentially affected by project activities. Three of the rare plants could be directly affected by timber harvest and/or road construction. Six of the nine could be affected by indirect

effects, the other three, yellow bog sedge, Boreal bedstraw and Northern bugleweed populations, are likely outside the reach of any project-associated impacts.

Table 3-18 - B-5: Percentage of observed rare plant populations potentially affected by alternative

Alternatives	Number of populations	A	B	C	D	E	F
Species							
Lance-leaf moonwort	1	0%	100%	100%	0%	0%	0%
Yellow bog sedge	1	0%	0%	0%	0%	0%	0%
Alpine ladies' slipper	1	0%	0%	100%	100%	0%	0%
Boreal bedstraw	3	0%	0%	0%	0%	0%	0%
Broad-lipped twayblade	6	0%	0%	33%	33%	17%	17%
Northern bugleweed	1	0%	0%	0%	0%	0%	0%
Bog adders' mouth orchid	3	0%	0%	33%	33%	0%	0%
Round-leaf orchid	3	0%	33%	33%	33%	33%	33%
Lancinate foamflower	11	0%	36%	73%	0%	9%	0%

See the Unit Cards and Road Cards (Appendix B & C) for area-specific information.

Lance-leaf moonwort

There is one population of this plant in the project area. Lance-leaf moonwort occurs at the edge of Unit 11, within the clearing of proposed Road 6556.

Yellow bog sedge

There is one population of yellow bog sedge observed within the project area, but not near proposed units or roads. The population is near an existing road that will be traveled for accessing units.

Alpine ladies' slipper

There is one population within a wetland discharge zone below Unit 101. An existing road upslope of the existing population would be used to access units. This rare plant is not directly impacted by the proposed activities; however, indirect effects could occur.

Boreal bedstraw

There are three populations of boreal bedstraw within the project area.

Broad-lipped twayblade

There are six populations within the project area, one of which will be directly affected by the activities in Alternatives C, D, E, and F (Unit 103). An additional population may be indirectly affected by the proposed activities in Alternatives C and D (Unit 101). The remaining four populations are unlikely to be affected.

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Northern bugleweed

There is one population of northern bugleweed within the project area. It is located within the Navy Creek riparian management area.

Bog adder's mouth orchid

Three populations occur within the Navy project area. One of the populations is within a wetland discharge zone below Unit 101.

Round-leaf orchid

Three populations were located within the Navy project area, which includes the northernmost extent of documented populations on the Tongass. All were located in riparian areas, only one of which may be indirectly impacted by timber harvest in all alternatives. The spur road as currently mapped would directly affect the population.

Lancinate foamflower

Eleven populations were identified within the project area.

Cumulative Effects

Cumulative effects describe the effects of past, present and potential future management activities upon sensitive plant individuals, populations, and their reproductive and dispersal capabilities within the analysis area. The purpose of the analysis is to determine whether or not viable populations are being maintained on the Tongass (USDA 1993). The range for each species is determined using the Alaska Region Sensitive Plants matrix and the suspected distribution of these species (Stensvold 2005). The Tongass is being used as the cumulative effects analysis area for all species. The principle activities that may impact rare and sensitive plant populations and their habitat, as well as the populations associated with existing management activities, are described in the Navy botany resource report and Biological Evaluation (Johnson 2007a, Johnson 2007b).

There have been 1,461 documented rare plant surveys conducted on the Tongass covering roughly 0.005% of the land base (USDA Rare plant survey database 2006c). For the sensitive plants suspected or known to occur within the Navy project area, *C. lenticularis* var. *dolia* has been found on 1% of the total surveys across the Tongass, *C. edule* on 0.5%, *G. leptostachya* on 0.9%, *H. wrightii* on 3.6%, *I. truncata* on 0.2%, *L. calderi* on 1.5%, and *P. laxiflora* has been found on 3% of the total surveys across the Tongass (Tongass rare plants database 2006c, AKNHP 2006).

Sensitive plants

The cumulative effects of Navy project activities upon the sensitive plant populations and their habitat is assessed using what is known about the plants' biology and preferred habitat, as well as the association of the plant with past, present and future activities across the Tongass. Due to the absence of documented surveys prior to 1992, past effects are largely unknown for all sensitive plants. The following cumulative effects evaluation assesses whether the Navy project's impacts on sensitive plants and/or their habitat might adversely impact the viability of the known populations within the Tongass. Species and their associated general habitats are listed in Table 3-14.

Wright's filmy fern

Thirty-four of the sixty-nine documented populations on the Tongass are associated with management activities such as those which occur within the Navy project area. The cumulative impact of

management activities upon population viability may be mitigated by maintaining habitat of known populations elsewhere within the analysis area (the TNF).

Alternative A

No cumulative effects would occur in this alternative.

Alternatives B, C, D, E, and F

Between 9 and 12 of the known 69 total populations on the Tongass would be impacted by the proposed Navy alternatives B-F, as discussed in the direct and indirect effects section. This equates to 17 percent of the known populations on the Forest. Wright filmy fern habitat will continue to be affected, both within the project area and across the Tongass (Johnson 2007a). The consequences of adverse effects due to the Navy project are moderate; populations within units and the proposed road corridor will be affected. This particular species is likely more common than previously thought – the handful of populations found prior to 2005 and the 65 sightings since 2005 suggest that it has been overlooked in previous surveys. Cumulative effects are possible in Alternatives B-F.

Davy mannagrass

One population was documented within the Navy project area. Three of the 13 documented occurrences on the Tongass may be directly or indirectly affected by management activities, while the majority of the documented populations fall on State, private or city land. Forest Plan wetland and riparian standards and guidelines largely protect habitat across the Tongass; however, roads may be constructed in wetlands.

Alternative A

No cumulative effects would occur in this alternative.

Alternatives B, C, D, E, and F

The consequences of adverse effects to this sensitive plant due to Navy project activities are low in alternatives B-F. This assessment is based upon evidence indicating that this plant may occur more commonly and more abundantly on the Tongass than previously thought (Johnson 2007a). Cumulative effects are possible, but unlikely, because multiple abundant populations occur on the Tongass and some activities can be mitigated where the population occurs in the Navy project.

Suspected sensitive plants

For the sensitive plants suspected, but not found, in the Navy project area, additional impacts to undocumented populations or habitat could occur. Habitat on the Tongass is protected to some degree through Forest Plan wetland, riparian and beach standards and guidelines. Similar habitat could also exist within old-growth reserves and non-development LUDs.

Goose-grass sedge

No populations were documented in the Navy project area; however, not all probable habitats were surveyed. On the Tongass, 5 of the 16 documented populations are associated with management activities. The consequences of adverse effects to this sensitive plant habitat due to Navy project activities are low due to the unlikely event that harvest or road construction will impact lake margins or alpine habitat. Additionally, due to a change in taxonomy, the abundance of this species has increased across the Tongass.

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Edible thistle

No populations were documented in the Navy project area; however, not all probable habitats were surveyed. On the Tongass, seven of the eight documented populations occur within designated Wilderness; thus, this non-development LUD protects the majority of the known occurrences from management disturbance. In the Navy project area, forest edges are not protected; therefore, the consequences of adverse effects to this sensitive plant habitat due to project activities are moderate.

Truncate quillwort

No populations were found within the Navy project area; however, not all habitats within the Navy project were surveyed. The three known populations on the Tongass are not associated with management activities. Forest Plan wetland standards and guidelines protect habitat; however, road construction could occur in wetlands when there is no “practicable” alternative. The consequences of adverse effects to this sensitive plant habitat due to Navy project activities are low because shallow freshwater is generally avoided during timber harvest and road building.

Calder lovenge

No populations were found in the Navy project area; however, not all probable habitats in the Navy project were surveyed. On the Tongass, 17 of the 22 documented populations are associated with management activities. The consequences of adverse effects to this sensitive plant habitat due to Navy project activities are low because subalpine habitat is minimally impacted and FP standards and guidelines direct avoidance of wetlands where “practicable.”

Loose-flowered bluegrass

On the Tongass, 1 of the 45 documented populations is associated with management activities. No populations have been found in the Navy project area. The consequences of adverse effects to this sensitive plant’s habitat are low due to the possibility of this species occurring at the LTF area designated at Navy Creek. Surveys were conducted and no populations were found in the area. Across the Tongass, Forest Plan beach and riparian buffers protect *Poa laxiflora* habitat.

Sensitive plant determinations

The determination of effects for each plant is based on the analysis of direct, indirect and cumulative effects. Determinations reflect the impact of the Navy project upon the viability of the plant and its habitat within the Tongass National Forest.

Table 3-19 - B-6: Determinations of effects for the Navy project on each suspected sensitive plant considered within the Tongass cumulative effects area, presented by alternative

Species	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Goose-grass sedge	No impact	May adversely impact ¹				
Edible thistle	No impact	May adversely impact ¹				
Truncate quillwort	No impact	May adversely impact ¹				
Davy mannagrass	No impact	May adversely impact ¹				
Calder lovage	No impact	May adversely impact ¹				
Loose-flowered bluegrass	No impact	May adversely impact ¹	May adversely impact ¹	No impact	No impact	No impact
Wright's filmy fern	No impact	May adversely impact ¹				

¹May adversely impact individuals, but not likely to result in a loss of viability in the Tongass or cause a trend to Federal listing (FSM 2672.42. 2005).

Rare plants

The cumulative effects of Navy project activities upon the rare plant populations and their habitat is likewise assessed using what is known about the plants' biology and preferred habitat, as well as the association of the plant with past, present and future activities across the Tongass (1982 Planning Rule, Sect 219.12). Due to the absence of documented surveys prior to 1992, past effects are largely unknown for all rare plants. The following evaluation assesses the effects of the Navy project area on the rare plant populations and their habitat on the Tongass. Species and their associated general habitats are listed in Table 3-15.

Refer to the Botany Resource Report (Johnson 2007b) for specific information regarding the location of these rare plant populations and their habitats as well as a detailed narrative of their cumulative effects. A summary of the risk assessment for cumulative effects is listed in Table 3-20.

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Summary of effects upon rare plants

The risk assessment presented below uses the direct, indirect and cumulative effects of the proposed project to determine the level of consequence and level of likelihood that plant populations and their habitats on the Tongass will be affected by the Navy project. The definitions for the risk assessment are included in the botany Navy resource report (Johnson 2007b).

Table 3-20 - B-7: Risk assessment for the effects of the Navy project on rare plants and their habitat

Alternatives	A	B	C	D	E	F
Species						
Lance-leaf moonwort						
consequences of adverse effects	low	mod*	mod	low	low	low
likelihood of adverse impacts	none	mod	mod	none	none	none
overall risk	none	mod	mod	none	none	none
Yellow bog sedge						
consequences of adverse effects	low	low	low	low	low	low
likelihood of adverse impacts	none	none	none	none	none	none
overall risk	low	low	low	low	low	low
Alpine ladies' slipper						
consequences of adverse effects	low	low	mod	mod	low	low
likelihood of adverse impacts	none	none	mod	mod	none	none
overall risk	none	none	mod	mod	none	none
Boreal bedstraw						
consequences of adverse effects	low	low	low	low	low	low
likelihood of adverse impacts	none	none	none	none	none	none
overall risk	none	none	none	none	none	none
Broad-lipped twayblade						
consequences of adverse effects	low	low	mod	mod	mod	mod
likelihood of adverse impacts	none	none	mod	mod	mod	mod
overall risk	none	none	mod	mod	mod	mod
Northern bugleweed						
consequences of adverse effects	low	low	low	low	low	low
likelihood of adverse impacts	none	low	low	none	none	none
overall risk	none	low	low	none	none	none
Bog adders' mouth orchid						
consequences of adverse effects	low	low	mod	mod	mod	low
likelihood of adverse impacts	none	none	mod	mod	mod	none
overall risk	none	none	none	mod	mod	none
Round-leaf orchid						
consequences of adverse effects	low	mod	mod	mod	mod	mod
likelihood of adverse impacts	none	mod	mod	mod	mod	mod
overall risk	none	mod	mod	mod	mod	mod
Lancinate foamflower						
consequences of adverse effects	low	mod	mod	low	low	low
likelihood of adverse impacts	none	mod	high	none	mod	none
overall risk	none	mod	high	none	mod	none

* "mod" is moderate

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Mitigation

Where possible, consider locating marten retention so that it also includes rare and sensitive plant populations.

Unit 1: relocate road if practicable and buffer the population within the harvest unit if possible

Two individuals of *Tiarella trifoliatia* var. *laciniata* (laciniate three-leaf foamflower) were documented in setting M276 within the unit. These populations have been flagged and if any retention is required for wildlife concerns, try to place retention with this population.

Unit 11: relocate road and adjust unit boundary if practicable

Unit 75: assure buffer along the riparian management area is windfirm and relocate the spur road if practicable

Unit 103: if practicable, adjust the unit boundary to provide a buffer

Monitoring

Implement inventory and monitoring program

Submit project proposals during out-year planning to evaluate the effectiveness of mitigation measures as well as project effects upon rare and sensitive plant populations.

Submit project proposals during out-year planning for additional floristic surveys outside of the project area for the purpose of better evaluating cumulative effects.

Geology

Karst and Caves

Forest cave and karst resources management direction is based on the Federal Cave Resources Protection Act (FCRPA, 1988) and the Tongass Land Management Plan (Forest Plan). FCRPA defines a significant cave as follows: "...determined to have biotic, cultural mineralogical, paleontologic, geologic, hydrologic, and/or other resources that have important values." Preliminary geology/karst mapping was done along the existing roads in 1999, (report located at Wrangell Ranger District). Additional information was collected while doing stream surveys and routine road and unit reconnaissance.

A discontinuous band of marble is mapped from Marble Point, at the southern end of Mosman Inlet, to the head of the bay, continuing northwest toward Kindergarten Bay. In the project area, there is well-developed epikarst with numerous sink holes, losing streams, stream resurgence, and a cave. Karst lands contribute water to the Kindergarten Lake, Murkwood, Quiet, and the unconsolidated Steamer Point Frontal watersheds. Vulnerability assessment of the karst lands to management activities was based on potential to affect the karst system. Specific concerns for other resources (e.g. soil and fish habitats) are addressed by resource area.

The largest marble exposure, approximately 1,500 acres in size, is located north of Kindergarten Lake. Much of the commercial timber in this area has already been harvested. Squirrel Cave was located in a harvest unit in 1992, and later mapped by members of the Tongass Cave Project. The harvest unit boundary was adjusted to avoid harvesting adjacent to the cave. A member of the Tongass Cave Project did a cursory survey of the surrounding area and found no areas with a high likelihood of having significant caves (Kevin Allred, personal communication).

A well developed karst area was found in the small eastern sub-watershed of Mirkwood. Epikarst features are 3 to 8 feet deep. Internal drainage systems have developed in the marble. A Class IV stream draining the wetlands east of Unit 49 flows into a sinkhole at the western edge of the marble. The exact resurgence area was not located; it appears there are a number of springs where the water resurfaces. The western fork of Mirkwood Creek isolates the management related disturbance associated with Units 49, 50, and 51, with road construction from the karst area.

A portion of Unit 101 is underlain by marble bedrock. The stream (near the northern boundary) is a resurgence stream, surfacing at the contact of the marble and phyllite bedrock, and is then partially lost before crossing Road 6545. Below the road, there are numerous small upwellings, which contribute water to a nutrient rich wetland that supports a number of rare plant species. A windfirm buffer is prescribed on the unit, recognizing that timber exposed to the southeasterly winds in this area has a very high potential for blowdown.

A well developed karst area was found in the northwest portion of Unit 49. A sink hole and other collapse features will be protected with a windfirm buffer. A small resurgent stream is located below the proposed 51421 road; it drains into the Kindergarten Lake Creek watershed.

A marble canyon was located in Unit 109, it is a deeply- incised canyon with banded marble. A small area adjacent to the stream was excluded from the unit because it has shallow organic soils over bedrock. It appears that this is a narrow linear rock unit, as no additional karst features were found outside the riparian management area.

Marble was also located in Unit 105 northwest of the proposed 51009 road. Wetlands on the north end of the unit, and those adjacent to the Class IV streams are enriched from nutrients associated with

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karst. The road will be located to avoid the karst area; ground disturbance in the unit will be minimized on and adjacent to the karst. Southwest of Unit 105, marble was found on the hillside north of Twin Lakes (west of Unit 104) with a small stream (less than 1 foot) that flows into a sinkhole resurfacing downslope approximately 100 feet. No harvest is proposed in this area.

Effects of Alternatives

None of the action alternatives will have an affect on caves. None of the alternatives propose harvest that would affect the forest surrounding Squirrel Cave.

Alternative C and D propose harvest of Unit 101. There is a risk that blowdown of timber adjacent to the Class IV stream on the northeast side of the unit may contribute sediment to the stream. Transport of the sediment to wetlands downslope could alter the wetland habitat where rare plants are located. Retention of a windfirm buffer along the stream will decrease the risk of affecting the rare plant habitat.

All of the action alternatives propose to construct Road 51421 through Unit 49. The road will be located to minimize effects to the internal drainage system that contributes water to the resurgent stream. It is anticipated that if there is an effect on the stream it would be insignificant. Rock pits adjacent to, or on, karst lands will be approved by the Forest Karst specialist prior to development.

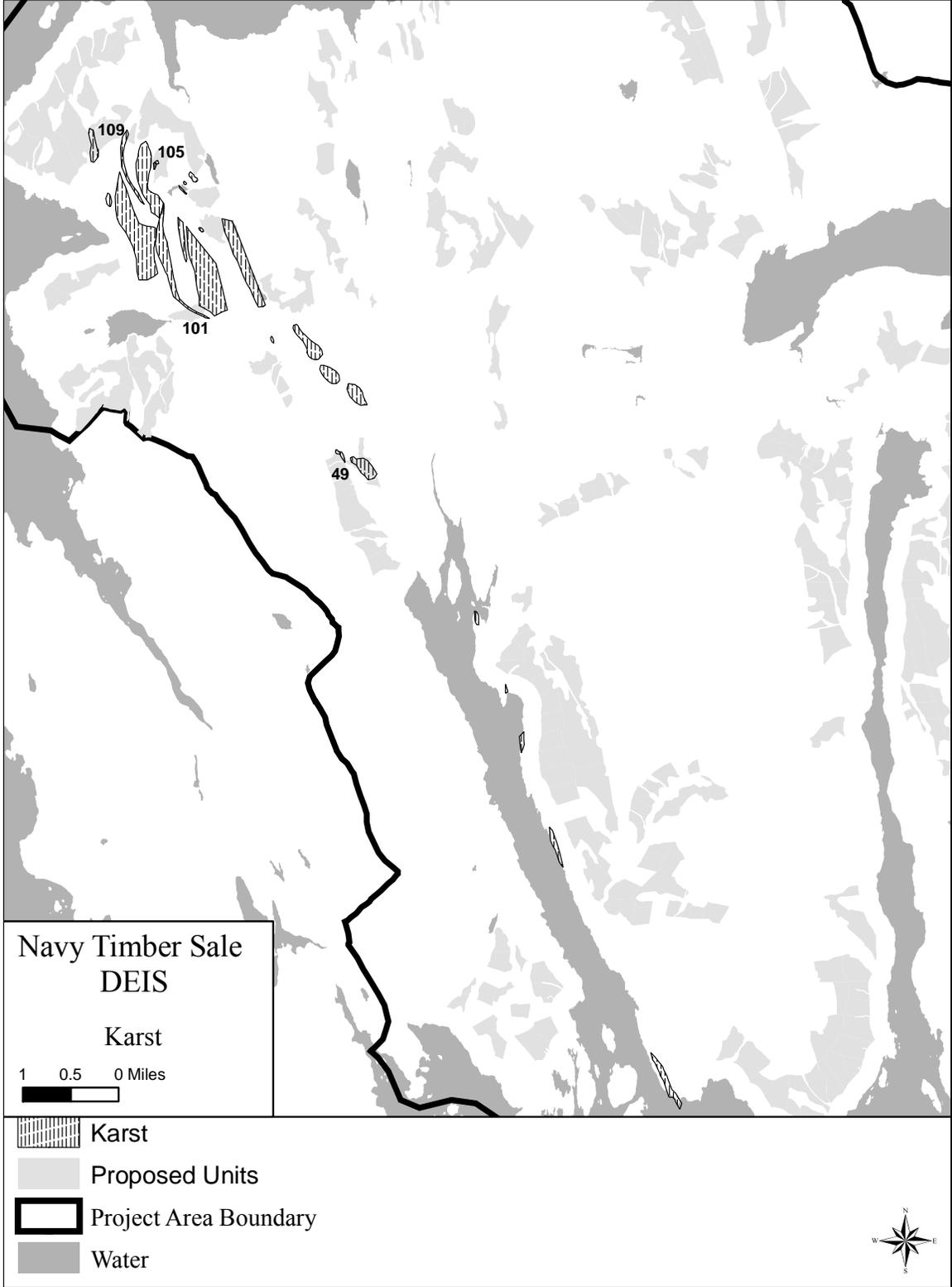
All of the action alternatives propose to construct Road 51009 through Unit 105. The road will be located to minimize impacts to the downslope wetlands. There may be some wetland soil disturbance associated with the yarding of trees; partial suspension of the logs will be required on the wetlands adjacent to the karst in the northwest part of Unit 105 to minimize soil disturbance.

Alternatives B and C will build the 51009 road up Marble Canyon, and harvest units with marble bedrock. There were no surface features indicating well developed karst along the proposed road line. The road will be located to avoid features if they are found during final road layout.

Cumulative Effects

Past road construction and timber harvest may have altered the wetlands east of the 6545 road, which is inhabited by rare plants. This project may have cumulative impacts to the wetland by altering flow, water temperature, or water chemistry of the contributing waters. Retaining trees along the stream with RAW buffer is expected to minimize stream impacts which will minimize effects to downstream wetlands.

Figure K-1. Karst areas in relation to proposed harvest units



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Heritage Resources

Heritage resources include an array of historic and prehistoric cultural sites and traditional cultural properties. The National Historic Preservation Act (NHPA) sets forth Government policy and procedures regarding "historic properties"; districts, sites, buildings, structures, and objects included in, or eligible for, the National Register of Historic Places. Section 106 of the NHPA, requires that Federal agencies consider the effects of their actions on such properties, following regulations issued by the Advisory Council on Historic Preservation (ACHP)(36 CFR 800).

The Section 106 review process seeks to consider historic preservation concerns with the needs of Federal actions. Review occurs through consultation with the Alaska State Historic Preservation Officer (SHPO), the ACHP, Indian Tribes, and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. One of the goals of consultation is to identify historic properties that potentially may be affected by the undertaking and assess potential effects and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties. The Forest Service consulted with the Wrangell Cooperative Association (WCA), the tribal group which is culturally affiliated with the project area. Forest Service archaeologists and other members of the team met with WCA concerning the planned project and supplied them with a copy of the Heritage Resource Report entitled Cultural Resource Survey in the Navy Timber Sale Project Area, Etolin Island, Alaska for review and comment (Esposito and Smith 2007). Copies of the report were also sent to Central Council Tlingit and Haida Tribes of Alaska, Kake Tribal Corporation, the Organized Village of Kake, the Petersburg Indian Association, and Sealaska Corporation.

To ensure that the procedural requirements of 36 CFR 800 were met, a cultural resource investigation of the Navy project area was conducted. In accordance with the Programmatic Agreement (2002) among the Forest Service Alaska Region, the ACHP, and the SHPO, a resource report was submitted under 36 CFR 800 regulations implementing Section 106 of the NHPA. The SHPO concurred with the Forest Service finding of No Historic Properties Affected for this project.

Affected Environment

According to oral tradition and various historical accounts, the Tlingit are the dominant native group of Southeast Alaska. The Navy project area lies within the traditional territory of the Stikine Tlingit, who occupied a large territory, extending up the Stikine River as far as Telegraph Creek, and encompassing the mainland shore from Union Bay on the Cleveland Peninsula north to Cape Fanshaw. The territory reaches west to include portions of Kupreanof and Prince of Wales Islands, and all of Etolin, Mitkof, Wrangell, and Zarembo Islands.

Etolin Island archaeological sites represent the typical array of site types in central Southeast Alaska. These include both prehistoric and historic period sites, some of which may date to several thousand years. Site types include prehistoric period camps, villages, forts, fish traps and weirs, petroglyphs, an alpine rock cairn, a canoe, and a garden. Historic period sites include cabins, canneries, and a hatchery. Forest Service records show there are 27 sites in the project area, none of which will be affected by the planned activities.

Analysis and Inventory Methodology

The heritage resource evaluation of the Navy Timber Sale began with a literature search of past cultural resource surveys in and around the project area. The Forest Service consulted with the local tribal group (WCA), and reviewed various historical and ethnographic accounts: Alaska Heritage

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Resource Survey (AHRs) listings, Petersburg/Wrangell Heritage files and atlases, special use files, GIS archaeological site and survey covers, and the Tongass Site Database.

Over the past several decades Forest Service archaeologists have conducted 23 archaeological surveys on Etolin Island, 14 of which were located in the project area. Approximately 6,150 acres representing 2.8% of the island landmass has received some sort of archaeological examination. A total of approximately 2,110 acres, representing 2.8% of the project area, have been surveyed.

In addition to the background research, the Forest Service conducted a pedestrian survey of 670 acres of various types of terrain in search of undiscovered sites and other heritage resources. The Forest Service surveyed a sample of proposed timber harvest units and new road locations, paying special attention to fish streams and cedar stands, resources used by the Tlingit people. Survey methods are based on a probability model developed over the past several decades. It is further described in the Programmatic Agreement (2002).

Environmental Consequences

Direct and Indirect Effects

There are 27 AHRs sites within the project area boundaries. Five of these sites were discovered during cultural resource surveys for this project (Table 3-21).

Table 3-21 - H-1. Sites Discovered during the Navy Project Cultural Resource Survey.

USGS Quad	AHRs Number	Name	Eligibility Status	Effect
Petersburg A-2	49PET530	Navy Stone Arc	Yes	No Effect
Petersburg A-2	49PET531	Two Loons Midden	Yes	No Effect
Petersburg A-2	49PET558	Goose Midden	Yes	No Effect
Petersburg A-2	49PET573	Quiet Harbor Fish Weir	Yes	No Effect
Petersburg A-2	49PET574	Mosman Fish Weir	Yes	No Effect

Source: Tongass Site Database

Nearly all of the archaeology sites in the project area are located within a protected buffer established along the beach and estuary fringe and defined in the Forest Plan Standards and Guidelines (USDA-FS 1997j:4-4). All of the alternatives propose to harvest timber from inland locations, and none will encroach on the buffer zone. The Etolin Canoe site is the only site that lies outside the buffer zone; no project activities are proposed within approximately 1,900 feet of the canoe.

None of the proposed alternatives will have a direct or indirect effect upon known cultural sites in the project area. All the alternatives propose to use coastal LTFs, and some alternatives plan to construct a new road within the coastal buffer zone. No LTF or road construction will directly or indirectly affect known cultural sites.

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Cumulative Effects

The cumulative effects analysis area coincides with the project area boundaries and the area of potential effect. Cumulative impacts to heritage resources on the Tongass may result from natural erosion, weathering, sedimentation, and wind events; cultural processes such as public use, commercial development, timber harvest, and road construction. Logging and road access by hunters are the primary activities that occur within the EtoLin project area. Most of the recorded cultural sites are concentrated near the marine shore; increased visitation and expanded use of the beach and estuary fringe could have a cumulative effect on heritage resources in the form of vandalism, looting, or inadvertent damage, such as ground compaction from trampling and/or camping. There are no foreseeable cumulative effects to historic properties associated with proposed activities with project implementation. Additional foreseeable activities that may take place in the project area vicinity include salvage timber harvest projects; these projects will occur adjacent to existing roads and not cause effects on historic properties.

Intensive cultural resource surveys and site monitoring have been implemented since the 1980s. The current archaeological research and survey designs are based on the results of this work, as well as, more modern methodology and technology. These methods are designed to preserve and protect significant sites and provide information that will help guide future research and resource management. In addition, continued public education by the Forest Service to increase awareness concerning cultural resources and site stewardship assists the agency in effectively managing the region's heritage sites.

Mitigation and Monitoring

The Tongass Land Management Plan addresses the desired future condition of heritage resources through a monitoring and evaluation plan. As specified in the Programmatic Agreement (2002), the Forest Service monitors selected areas of direct impact during and/or after the actual ground disturbance. If inadvertent discoveries are made during project implementation, the Forest Service shall fulfill its consultation requirements in accordance with 36 CFR 800.13. Mitigation measures would be agreed upon and implemented before project activities may proceed.

Recreation

Introduction

The alternatives in the Navy project propose various levels of development, with some having little overall effect to the existing recreation resource. Others propose development of new areas that would provide new recreation opportunities; while potentially displacing recreation users who prefer areas remain in an undeveloped state. This section discusses how the alternatives proposed for the Navy Timber Sale may affect the recreational use and opportunities in the Navy project area.

Recreation Opportunity Spectrum – Affected Environment

Recreation Opportunity Spectrum (ROS) is a system for planning and managing recreation resources that categorize recreation opportunities into seven classes. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs based on the extent to which the natural environment has been modified, types of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. In timber planning projects, roads tend to have the most influence in changing the setting from a natural setting, to a developed one. Harvest units can have an affect as well, depending on the prescription used. The seven classes (from most natural to least natural) are: Primitive; Semi-Primitive Non-motorized; Semi-Primitive Motorized; Roded Natural; Roded Modified; Rural; and Urban. Detailed description of these classes can be found on pages 4-46 to 4-52 of the Forest Plan.

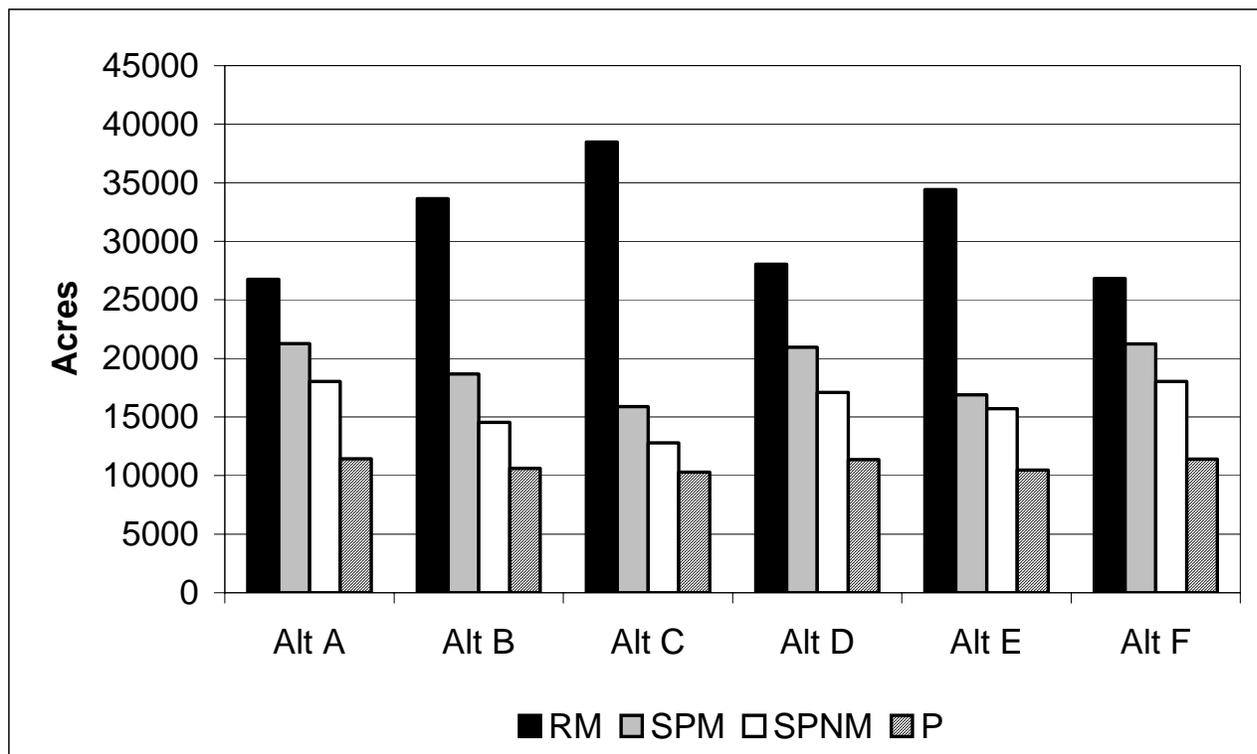
In the Navy project area, there are four ROS classes present. They are displayed as Alternative A (Existing Condition) in Figure RC-1 below.

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Environmental Effects

Figure RC-1 displays the acres that would be inventoried in each ROS category as a result of implementing the proposed alternatives.

Figure RC-1 –ROS Acres by Alternative for the Navy Project Area



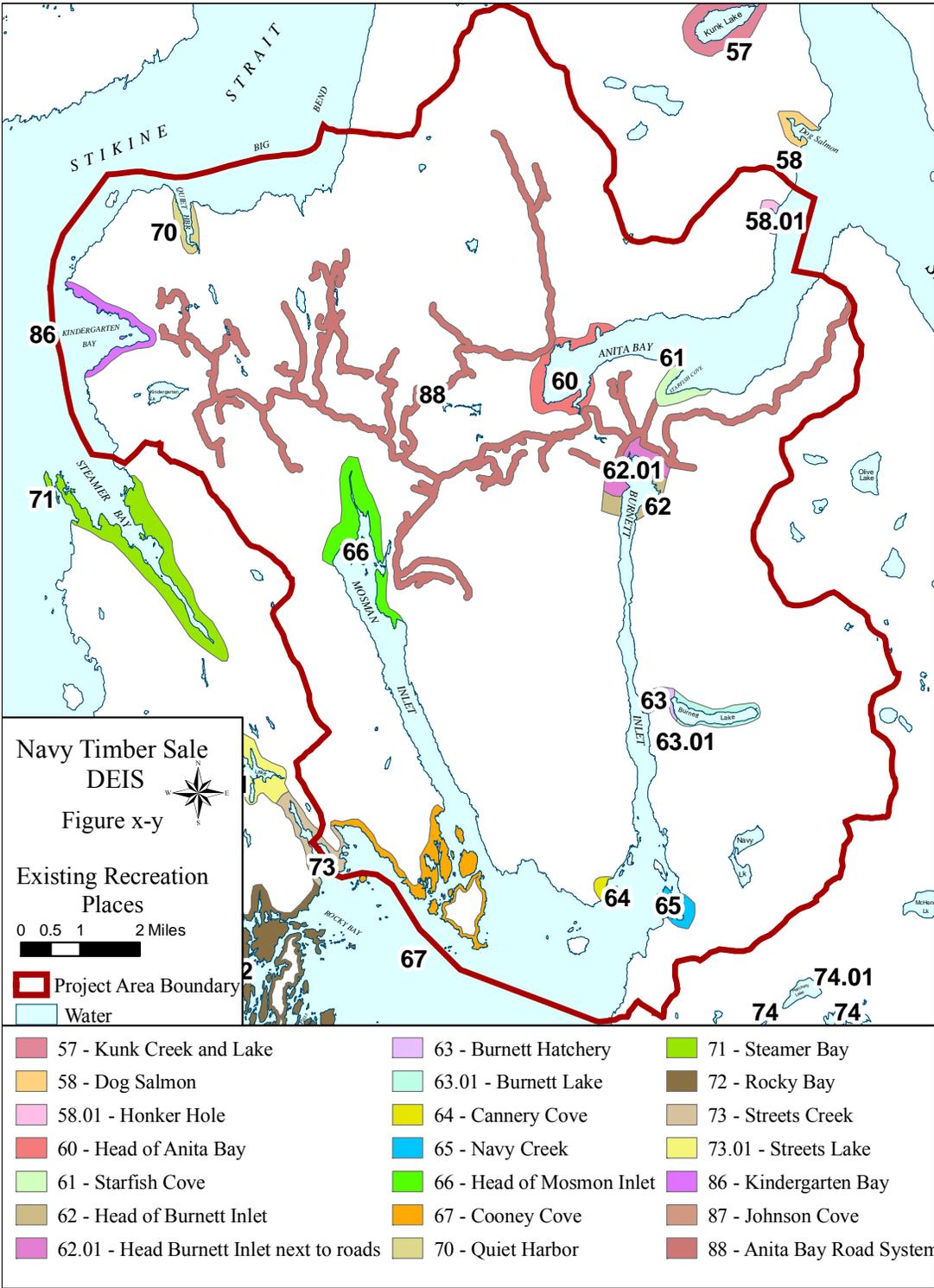
Source: GIS: j:\fsfiles\office\gis\navy\rec\Etolin_rec.mdb\rec_polys_ed

The main effect to the ROS is the conversion of acres from a Semi-Primitive setting (either motorized or non-motorized) to a roaded setting. The acres inventoried in P vary slightly between alternatives. The major difference between the alternatives is the conversion of currently inventoried “semi-primitive” acres to a “roaded” setting.

Inventoried Recreation Places – Affected Environment

There are 13 inventoried recreation places, and portions of an additional two inventoried recreation places within the Navy project area. See Figure RC-2 for a map of the inventoried recreation places in and near the Navy project area.

RC-2 for a map of the inventoried recreation places in and near the Navy project area



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Table 3-22 - RC-1: Navy Project Area Inventoried Recreation Places and Associated Activities

Recreation Place	Major Recreation Activities Associated with Rec Place
Honker Hole (58.01)	Anchorage, big game hunting, waterfowl hunting
Head of Anita Bay (60)	Stream fishing, big game hunting, waterfowl hunting
Starfish Cove (61)	Boating site, dock, anchorage, access to Anita Bay Road System
Head of Burnett Inlet (62), and Head of Burnett Inlet Roads (62.01)	Anchorage, boating, big game hunting, waterfowl hunting, scenery, overland (cross-country) access to road system from inlet
Burnett Hatchery (63)	Anchorage (dock use with permission), boating, access to dispersed hiking
Burnett Lake (63.01)	Hiking, big game hunting, wildlife viewing, lake fishing
Cannery Cove (64)	Anchorage, boating, big game hunting, wildlife viewing, dispersed hiking
Navy Creek (65)	Anchorage, scenery, wildlife viewing, dispersed hiking to lake setting, stream fishing, big game hunting
Mosman Inlet (66)	Anchorage, boating, scenery, stream fishing, waterfowl hunting, big game hunting, beachcombing, wildlife viewing
Quiet Harbor (70)	Anchorage, saltwater fishing, boating, big game hunting
Kindergarten Bay (86)	Anchorage, saltwater fishing, boating, big game hunting
Anita Bay Road System (88)	Approximately 50 miles of drivable road providing access to a variety of dispersed recreation activities including hunting, hiking, wildlife viewing, stream fishing, and viewing scenery
Cooney Cove/Streets Creek (67 & 73)	Anchorage, beachcombing, camping, big game hunting

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Table 3-23 - RC-2: Indirect and Direct Effects to Inventoried Recreation Places

Inventoried Recreation Place	Indirect Effects					
	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Honker Hole	No	No	No	No	No	No
Head of Anita Bay	No	Yes	Yes	Yes	Yes	Yes
Starfish Cove	No	Yes	Yes	Yes	Yes	Yes
Head of Burnett & roads	No	No	No	No	No	No
Burnett Hatchery	No	No	No	No	No	No
Burnett Lake	No	No	No	No	No	No
Cannery Cove	No	No	No	No	No	No
Navy Creek	No	Yes	Yes	No	No	No
Mosman Inlet	No	Yes	Yes	Yes	Yes	Yes
Quiet Harbor	No	No	No	No	No	No
Kindergarten Bay	No	No	No	No	No	No
Anita Bay Road System	No	Yes	Yes	Yes	Yes	Yes
Cooney Cove/Streets	No	No	Yes	No	No	No
	Direct Effects					
	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Honker Hole	No	No	No	No	No	No
Head of Anita Bay	No	Yes	Yes	Yes	Yes	Yes
Starfish Cove	No	Yes	Yes	Yes	Yes	Yes
Head of Burnett & roads	No	Yes	Yes	Yes	Yes	Yes
Burnett Hatchery	No	Yes	Yes	No	Yes	No
Burnett Lake	No	No	No	No	No	No
Cannery Cove	No	Yes	Yes	No	Yes	No
Navy Creek	No	Yes	Yes	No	No	No
Mosman Inlet	No	Yes	Yes	Yes	Yes	Yes
Quiet Harbor	No	Yes	Yes	Yes	No	No
Kindergarten Bay	No	Yes	Yes	No	Yes	Yes
Anita Bay Road System	No	Yes	Yes	Yes	Yes	Yes
Cooney Cove/Streets	No	No	Yes	No	No	No

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Indirect Effects to Inventoried Recreation Places

Indirect effects to recreation places caused by implementation of any of the action alternatives include those impacts that are temporary in nature, with no lasting effects to the recreation place once the timber sale activities are completed (i.e. noise from logging traffic). Due to the different areas proposed for harvest in the alternatives, each will result in indirect effects to recreation places near the proposed activity. Table 3-23 displays which alternatives may result in indirect and direct effects to the recreation place during the life of the timber sale.

Direct Effects to Inventoried Recreation Places

Head of Anita Bay

The Head of Anita Bay recreation place is located mostly within the beach buffer, with none of the action alternatives proposing harvest within the inventoried recreation place. All action alternatives propose harvest along Road 51540, adjacent to northwest boundary of the recreation place. Logging activities, in general, will have a direct impact to the recreation place, as all action alternatives will increase traffic at the Starfish Cove LTF, and within the bay as a whole. Noise from logging activities nearby, and congestion from operations near Starfish Cove will impact use of this recreation place during the life of the sale. Once active logging ceases, the use of this recreation place will return to pre-sale conditions.

The Starfish Cove recreation place is located in the beach buffer, with none of the alternatives proposing harvest within the recreation place. All of the action alternatives propose harvest that would require the use of this area for logging operations during the life of the sale. Activities Starfish Cove associated with an ongoing timber sale are likely to displace recreation users temporarily, as most would elect to avoid the noise, traffic, and congestion associated with moving logs through an LTF. After the sale is complete, the Starfish Cove recreation place would continue to serve as an access point to the Anita Bay road system in much the same way it currently does.

Navy Creek

Alternative B would have the most effect on the Navy Creek recreation place; implementing this alternative would change the inherent character of this recreation place by introducing a road system into a previously unroaded area. Effects from Alternative B would reach beyond the currently inventoried recreation place surrounding the creek estuary, following Navy Creek up to Navy Lake to the north, and along the proposed road system towards the South Etolin Wilderness boundary to the south. If Alternative B is implemented, it would result in the creation of a new recreation inventoried place that includes the new Navy road system. This new recreation place would include 4.3 miles of NFS road, and 1.2 miles of temporary road. Public scoping for this project reveals a wide range of opinions on whether these effects would be negative or positive. Some comments expressed concern that roading this area would ruin the character of an area that had been traditionally used for dispersed hiking, camping, freshwater fishing, and hunting in a non-motorized environment. Other comments expressed excitement at the prospects of opening the Navy Creek drainage to roaded recreation opportunities. How a person judges the value of these potential impacts will depend on his or her personal perspective. Alternative B has the most potential to have an impact on the Navy Creek recreation place.

Alternative C would have an impact to the Navy Creek recreation place. Alternative C proposes harvest near the Navy Creek recreation place that would have the potential to displace users during the harvest and yarding activities. No road is proposed in this alternative, so lasting effects to this recreation place would be limited to the scenic condition of the area resulting from the harvest proposed.

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Alternatives D, E, and F do not propose any road construction or harvest in the Navy Creek drainage and would not have an affect on the Navy Creek recreation place.

Mosman Inlet

All of the action alternatives have the potential to affect the Mosman Inlet recreation place, as all propose some harvest directly to the east of this recreation place off Road 6558. Alternatives B and C have the most potential to affect the recreation place, as they both propose new road construction down the eastern shore of Mosman Inlet. Logging activities associated with all action alternatives may displace recreation users during the active sale. Alternatives B and C would result in obvious long-term changes to the scenery resource in Mosman Inlet. Alternatives D, E, and F all propose harvest to the east of the recreation place, with Alternative E likely to have the most effect of these three, due to the additional harvest proposed to the northwest of the recreation place, off Road 51421. Alternative F would have the least likelihood of impact, as it proposes the least amount of harvest near the recreation place.

Anita Bay Road System

All of the action alternatives propose road construction that will increase the amount of roads to this recreation place. New roadbeds, whether open to motorized vehicles or not, provide a surface for a variety of recreation uses, from hiking to driving. The future management of roads on Etolin Island will be decided as part of the Wrangell Ranger District ATM Environmental Assessment (EA). This discussion is limited to the amount of road proposed to be added to the Anita Bay Road System with the different alternative proposed in the Navy project.

Alternative C proposes the most addition, with 14.1 miles of NFS road, and 5.8 miles of temporary road added to this recreation place. Most of the new road construction proposed in this alternative includes the new road along the east shore of Mosman Inlet. Other main road additions proposed in this alternative include the extension of Road 6547 south toward Burnett Lake, and the extension of road 51009 to harvest units between Kindergarten Bay and Quiet Harbor in the northwest section of the project area. Alternative C also proposes the construction of a new road system near Cooney Cove (see Cooney Cove recreation place discussion), which is not included in the totals above.

Alternative B proposes an addition of 12.6 miles of NFS road, and 6.6 miles of temporary road to the Anita Bay road system. Alternative B proposes extending roads south along the east shore of Mosman Inlet, and south off road 6547 towards Burnett Lake. Alternative B proposes new road construction in the Navy watershed, (see Navy Creek recreation place discussion) which is not included in the totals above.

Alternatives D and E are similar in their proposed additions of road to the Anita Bay Road System. Alternative D proposes 5.0 miles of NFS Road, and 4.8 miles of temporary road; Alternative E proposes 5.2 miles of NFS Road, and 8.3 miles of temporary road. Both propose an extension of road 6547 south towards Burnett Lake (similar to Alternative B), but neither propose the long extension of road south along the eastern shore of Mosman Inlet.

Alternative F has the least impact to the Anita Bay road system, with no proposed addition of NFS Road, and only 2.8 miles of temporary road proposed within the already roaded portion of the Navy Project Area.

Cooney Cove/Streets Creek

Alternative C has the potential to impact Cooney Cove and Streets Creek the most out of all the action alternatives. Alternative C proposes construction of an LTF and road system in a previously unroaded area. Similar to the road system proposed for the Navy Creek drainage in Alternative B,

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how this impact is viewed would depend on a person's perspective. Alternative C would result in the creation of a new road-based recreation place, the Cooney Cove Road System, with 5.8 miles of NFS road, and 0.8 mile of temporary road. Creation of this road system will change the character of the Cooney Cove and Streets Creek recreation places over the long term by introducing opportunities for road-based recreation, and will likely displace current recreation users who prefer the existing character of the area.

Alternatives B, D, E, and F do not propose a road system or any timber harvest near the Cooney Cove or Streets Creek recreation places and none of them would result in long term impacts to these recreation places.

Current Recreation Uses – Affected Environment

Outfitter and guide use on Etolin Island is relatively low. From 1997 through 2004, the total service days by the commercial sector ranged from a low of 10 in 2000, to a high of 171 in 2004. In 2005, there were 1,039 service days reported for the same area, largely due to camping use reported by one not-for-profit organization that began using this area. Along with other areas of the District, as part of their wilderness therapy and environmental education programs based on the operation plans for 2006 and 2007, the organization requested similar amount of service days on the Wrangell Ranger District. Although this not-for-profit organization provides a positive economic impact to the community of Wrangell due to local employment and purchasing, it is currently exempt from paying fees for use on National Forest System lands.

The majority of non-commercial recreational use on Etolin Island is associated with the hunting of big game, particularly elk and Sitka black-tail deer. Non-guided hunters hike cross-country and travel the roads with light trucks, motorcycles, and/or ATV's in search of animals. Most deer hunters are from nearby communities; while elk hunters are selected by lottery by the ADF&G permit system, and come from different areas of the state. Most access to the road system is through developed portals at Honeymoon Creek and Starfish Cove. These sites were initially developed as LTFs for timber harvest. For elk hunting, people use floatplanes to access high-elevation lakes in the South Etolin Wilderness, stay on boats and access hunting areas by skiff and cross-country hiking, or establish a base camp at various locations.

Other recreational activities on Etolin Island include dispersed camping related to travel by personal watercraft, beachcombing, dispersed hiking along the shoreline, trapping, and berry picking along the roads in old harvest units.

Current Recreation Uses – Environmental Effects

The action alternatives proposed for the Navy Timber Sale would result in varying degrees of change to the character of the project area. The following assumptions were used to rank the alternatives and are listed in order from most likely to result in a change of the overall recreation character to least likely:

Introducing new road systems into previously unroaded areas has the most potential to change the way an area is used by recreation visitors, both non-commercial and commercial.

Extending road systems that are already in place with an established access point (usually an LTF) has potential to change the character of previously unroaded area. However, with an LTF already in place and road based recreation already established nearby, this change is not as extreme as a completely new road system.

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Timber harvest changes the immediate surrounding area of a recreation place, which can change the way a person feels about using the area for recreation, but as trees regenerate in the harvest units, the scenery recovers over time.

- a) Generally, cable yarded units are quite obvious, and take longer to recover visually, than helicopter yarded units, so are considered more intrusive and likely to displace recreation users.
- b) The least intrusive harvest activity is helicopter harvest of an area without the establishment of roads. Although harvest may be visually evident for some time in an area that is helicopter yarded without roads, the overall character of the area remains unroaded and, as harvest units recover visually, the area returns to conditions that were present prior to timber harvest.

It is difficult to rate a potential impact because the recreation resource can be as much social as it is physical. For example, a new LTF and road system in a previously unroaded area would undoubtedly be a change from current conditions and would be considered an impact to the recreation resource, but is it a favorable or unfavorable change? Two reasonable people who have an attachment to the specific area and a desire to use it for recreation purposes could come to different conclusions. A person, who values road-based recreation opportunities for motorized recreation activities, or simply for easier hiking access, would find this potential change favorable as it opens up new areas for exploration. A person who has accessed the area for most of their life by hiking, and values the solitude and unique characteristics of the area they have discovered over time, may feel that their recreation opportunities are threatened by the same proposal. It is impossible to say one view is more acceptable than the other. The following ranking represents the degree to which the various alternatives change the recreation character of the project area from its current condition.

Alternative C would result in the most overall change to the area. Alternative C constructs the Mosman Inlet LTF and introduces a road system in Cooney Cove, extends a road down the eastern shore of Mosman Inlet, extends a road down the eastern shore of Burnett Inlet, expands the road system in the northwest corner of the project area between Kindergarten Bay and Quiet Harbor. It also helicopter harvests timber in the Cannery Cove and Navy Creek areas.

Alternative B would result in significant changes to the project area as well. With the Burnett Inlet LTF and road system proposed in the Navy drainage, it may have more potential to change the area than Alternative C. This conclusion is based on comments received during public scoping that demonstrated that the public is more attached to the Navy drainage than to the Cooney Cove area. However, Alternative B does not propose the level of road building down the east side of Burnett inlet, nor the extension in the road system in the northwest corner of the project area. Additionally, Alternative B leaves the Cooney Cove area untouched, thus resulting in less overall impact to the project area as a whole than Alternative C.

Alternatives D, E, and F are similar in their overall potential to change the character of the Navy project area. All cable harvest proposed in these alternatives would occur on the Anita Bay road system without the need for new LTF construction or new road systems in currently unroaded areas. Of the three, Alternative E would have the most impact as it proposes the most overall road construction and harvest, with helicopter harvest of the Cannery Cove and Quiet Harbor areas. Alternatives D and F propose harvest activities within the portion of the project area that already receives road-based, motorized recreation use; and neither propose road construction or harvest in new areas, thus resulting in little change to the overall character of the Navy project area.

Cumulative Effects

The cumulative affects analysis area is Etolin Island. Past timber sales have altered the recreation character of the island with the introduction of roads associated with the LTF at Starfish Cove in Anita Bay (central), and at Honeymoon Creek (north). The south end of the island is designated as the

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South Etolin Wilderness, with no past, present, or future activities proposed that would alter the character of the southern portion of Etolin Island. The reasonably foreseeable activities expected to occur on Etolin include two salvage sales with no new road construction proposed.

Any activities proposing new road building will change the type of recreation use available in an area, regardless of whether or not the road is open to the public for motorized vehicle use after the timber sale is complete. Open roads provide motorized vehicle access, while closed roads provide hiking access. Both lessen the degree of effort needed to reach previously isolated areas and change the character of an area from undeveloped to developed.

The Navy alternatives propose varying amounts of road construction that will add to the existing roads on the north end of Etolin Island. The alternatives that propose extensions off the existing road system at Starfish would have less of a cumulative effect to the recreation use of the island than those that propose new road systems with LTFs at Navy Creek and Cooney Cove. Building roads at either Cooney Cove or Navy Creek would result in a more developed character for Etolin Island with increased portals for road-based recreation.

Non-Recreation Land Use

Special Use Authorizations

The following special use permits are authorized within the Navy project area. Potential effects to these authorizations are discussed below:

Mariculture Oyster Farm, Mosman Island

The permit is issued for the purpose of operating and maintaining structures and developments necessary to support mariculture for the commercial cultivation of oysters. None of the proposed action alternatives propose harvest or road building on Mosman Island, and therefore, would not result in interference with the operation of this oyster farm. Alternative C proposes construction of a road system and LTF at Cooney Cove. Watering logs could potentially introduce debris. Should Alternative C be selected, the proposed LTF site would need to be permitted. The Forest Service would need to work closely with the permit holder to address environmental concerns associated with a new LTF at this site. Alternatives B, D, E, and F do not propose harvest or road building in Cooney Cove, and would not have an effect on the land use authorized under special use permit.

Etolin Island Communications Site - Unnamed Peak North of Burnett Lake

There are two leases authorized for communication facilities at this site. This communication site is located in an area that is in the old-growth LUD. No road building or timber harvest is proposed near this site in any of the action alternatives. The Navy timber sale would have no affect on the land use authorized under special use permit.

Burnett Hatchery – Burnett Inlet and Anita Bay

The Southern Southeast Regional Aquaculture Association, Inc. (SSRAA) holds three special use permits for facilities associated with their hatchery operation in Burnett Inlet. These include a mooring point authorization in Anita Bay, an authorization for a Federal Energy Regulatory Commission (FERC)-licensed hydroelectric project at the outlet of Burnett Lake, an authorization for the fish hatchery, and associated full time residence in Burnett Inlet.

The land associated with this special use permit is located within the old-growth LUD. None of the action alternatives proposes harvest or road construction near the permit area. Alternatives B, C, and E propose harvest activities near the Burnett Hatchery, which may result in temporary impacts to the

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permit holder and workers at the hatchery, as the noise and activity associated with logging is likely to be noticed from the hatchery. These impacts will cease with the close of the sale activities. Alternatives D and F would have the least effect, as logging activities associated with these alternatives are not likely to be noticed from the hatchery.

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Scenery

Affected Environment

Etolin Island, including the Navy project area, lies within the Coastal Hills visual character type (Visual Character Types, USDA Forest Service, 1979) which is typified by steep, highly dissected landforms rising sharply out of saltwater.

The little area of lowland plains that are evident occur mainly at the heads of Anita and Mosman Bays, southeast of Steamer Knoll, at the south end of the island from McHenry Inlet at Canoe Passage, at the head of Menefee Inlet and Whaletail Cove, and around Olive Cove. The associated island group to the south of Etolin to include Onlsow, Eagle, Stone, and Carlton Islands are relatively flat. Portions of Brownson Island (closely associated with Etolin on the east side) are fairly rolling in nature.

Most of the alpine areas, small island complexes, and several bays were given a distinctive variety class rating. Much of the rest of the mountainous portion of the island was rated common, while the lower rolling portions rated minimal.

The existing scenery condition of the Navy Project Area is a result of timber sales that took place from 1916 until 2001. The earlier sales (1916 – 1954), took place in what is now designated as beach buffer at the head and mouth of Burnett Inlet, and mouth of Mosman Inlet. Visual evidence of these early harvests is virtually non-existent today.

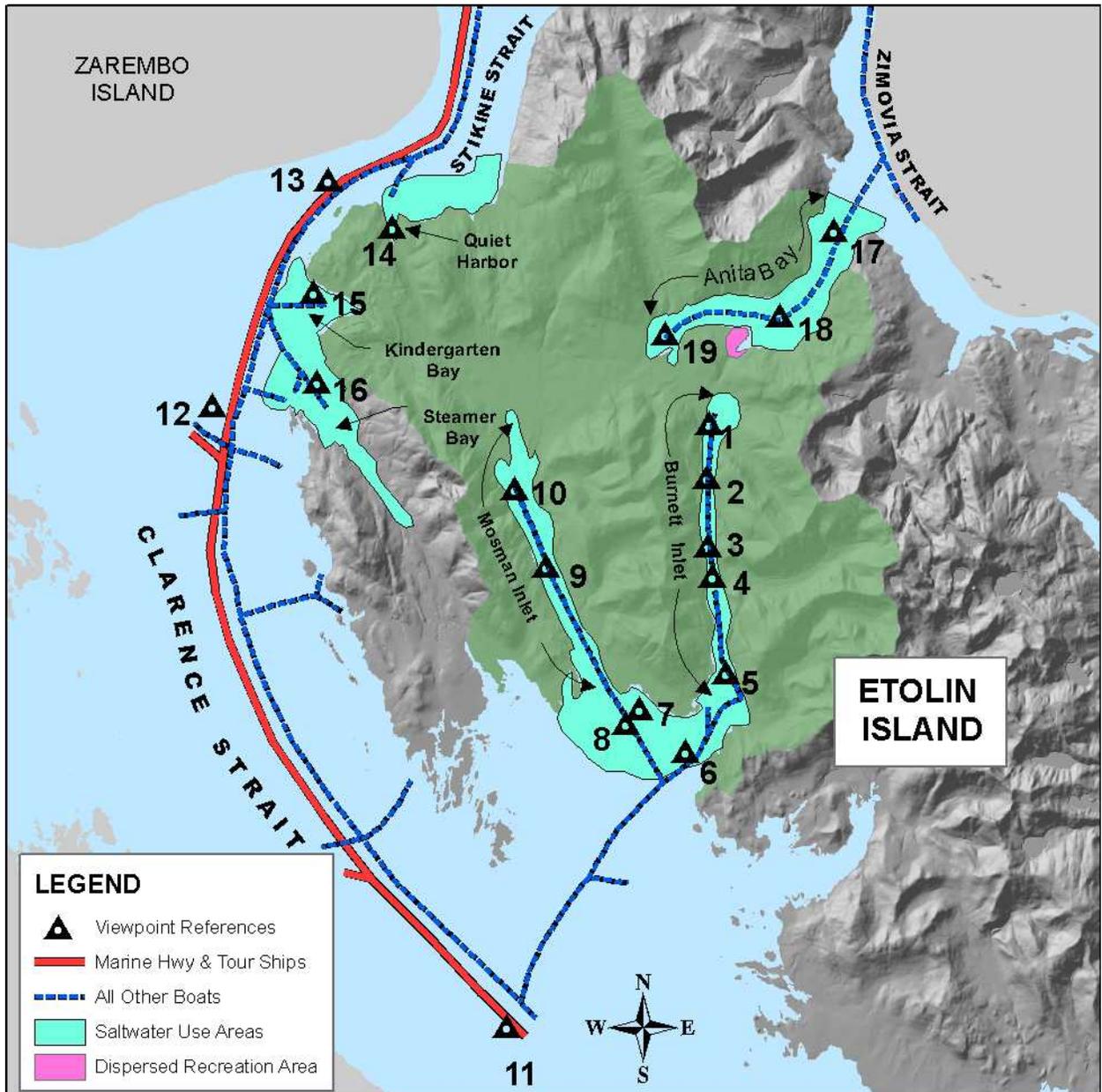
Much of the harvest activity in the Navy project area has occurred over the past 25 years, and is concentrated mostly in the north central to northwest portion of the island. Visual evidence of these sales is prominent at the head of Mosman and Burnett Inlets, and all of Anita Bay, Kindergarten Harbor, and from Clarence Strait (looking towards Kindergarten Harbor).

Priority Travel Routes, Use Areas, and Viewpoints

The Forest Plan (1997 Forest Plan, Appendix F) identifies places from which scenery is to be emphasized on the Forest for each Ranger District. These can be routes which cruise ships, ferry boats, and personal watercraft frequently travel or destinations used for anchorage. They can also be drivable roads, cabins, recreation areas, and/or hiking trails.

For the Navy project, 19 viewpoints were established in areas most likely viewed by casual observers (Figure S-1).

Figure S-1. Viewpoint locations in reference to priority travel routes and use areas.



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VISUAL QUALITY OBJECTIVES

Visual Quality Objectives (VQOs) refer to the degree of acceptable alteration to the characteristic landscape. VQOs vary by LUD and whether the area is seen from Visual Priority Travel Routes and Use Areas.

The Forest Service uses VQOs to describe the desired future visual condition of the landscape as seen by the casual observer. The following VQOs apply to the Navy project area:

Retention (R): Activity on the landscape is not readily evident.

Partial Retention (PR): Activity is visible, but does not dominate landscape. This objective is to be accomplished within six months following project completion.

Modification (M): Activity can dominate, but must blend with surrounding landscape. This VQO should be met within one year in the foreground distance zone and within five years in the middle ground distance zones.

Maximum Modification (MM): Activity clearly dominates, but must blend to some degree when viewed as background.

Table 3-24 - S-1. Required VQO based on LUD and Distance Zone

Land Use Designation (LUD)	Foreground Distance Zone (0 – 1/4 mile)	Middleground Distance Zone (1/4 – 3 miles)	Background Distance Zone (3 miles +)	Not Seen
Modified Landscape	Partial Retention	Modification	Modification	Maximum Modification
Timber Production	Modification	Maximum Modification	Maximum Modification	Maximum Modification
Scenic Viewshed	Retention	Partial Retention	Partial Retention	Maximum Modification
Old-Growth Habitat	Retention	Retention	Retention	Retention
Semi-remote Recreation	Retention	Retention	Retention	Retention

Source: Forest Plan

All seen units (except those viewed from Clarence Strait) are in the middleground distance zone. Most units seen from Clarence Strait are in the background distance zone.

VISUAL ABSORPTION CAPABILITY

Visual Absorption Capability (VAC) is defined as an estimate of the relative ability of a landscape to accept management manipulations (e.g., timber harvesting) without significantly affecting its visual character; a measure of the relative capacity of the land to absorb visual change.

The criterion found in Chapter 500 of the Landscape Management Handbook (FS 2309.22) was used to determine VAC.

VAC is rated as High, Intermediate, or Low. High VAC means the landscape has a higher estimated tolerance for activity, Low VAC means a lower tolerance for activity and Intermediate is in between.

EXISTING AND FUTURE VISUAL CONDITIONS

Existing Visual Condition (EVC) is a measurement that rates the degree of change that has already occurred on the ground. EVC is based on actual observation and is rated on a scale of I – VI.

EVC describes the existing visual condition at the landscape level, while VQO, discussed previously, describes the future visual condition.

Table 3-25 describes the EVC rating and compares it to its corresponding VQO.

Table 3-25 - S-2: Existing Visual Condition and Corresponding VQO

EVC Type	Visual Condition	Corresponding VQO
I	Appears to be untouched by human activities, except for trails needed for access; only ecological changes have occurred. (natural)	Preservation
II	Changes in the landscape are not noticed unless pointed out. (natural appearing)	Retention
III	Changes in the landscape are noticed as minor disturbances, but the natural appearance of the landscape remains dominant. (slightly altered)	Partial Retention
IV	Changes in the landscape are easily noticed and perceived as disturbances, but resemble natural patterns. (moderately altered)	Modification
V	Changes stand out as a dominant impression on the landscape, yet are shaped to resemble natural patterns from 3-5 miles or more distant. (heavily altered)	Maximum Modification
VI	Changes are in glaring contrast to the landscape’s natural appearance; excessive visual alteration has occurred.	N/A

Timber Harvest Guidelines for Meeting VQO

The Forest Plan Standards and Guidelines recommends approximate unit size and harvest prescription for managing scenery based on the combination of VQO, VAC, and LUD. All proposed units for all action alternatives followed these Standards and Guidelines.

As stated in the Forest Plan (p. 4-75) size, shape, orientation to viewer, color, and texture are critical elements in determining whether assigned VQOs are being met. Landscape settings are different and should be evaluated on a case-by-case basis. There may be instances where the VQO can be met while the proposed activity (e.g., unit size) is greater than the guideline, or where the activity must be smaller to meet the intent of the VQO.

Direct and Indirect Effects

Each action alternative has the potential to change the form, line, color, and texture of the natural landscape of the Navy project area.

Representative three dimensional views were created in GIS (Arcscene) for this analysis.

Effects were analyzed for each priority travel route and use area from various viewpoints where scenic quality is a concern

Table 3-26 displays the analysis process and results. Although old-growth and Semi-remote recreation LUDs are found in the project area, harvest is not permitted in them so they are not presented in the table.

3 Environment and Effects

Table 3-26 - S-3: Analysis process and summary of direct and indirect effects

<u>IF</u> area where unit is proposed is in a...	<u>THEN</u> the prescribed visual quality objective is...	<u>AND</u> when combined with a VAC rating of...	<u>ACCEPTABLE RX:</u> Clearcut sizes (without reserves) in the following size range are acceptable according to Forest Plan Standards and Guidelines...	<u>RESULT 1.</u> The following units meet visual quality objectives based upon this method. The previous steps are not the only determinant for meeting VQOs (unless unseen). Factors such as prescription, reserves, size, shape, texture, integrity, distance, orientation to viewer, etc, need consideration.	<u>RESULT 2:</u> Not all units met VQO based on the previous steps. Some required additional design attention to ensure that VQO are met. Direction for achieving this is written in the scenery section of the unit card. The units include...
Unseen Area	Maximum Modification	Any	80 - 150	(101 total) 1, 100, 101, 103, 104, 105, 106, 108, 109, 111, 112, 113, 114, 115, 116, 117, 124, 126, 127, 128, 129, 13, 130, 131, 132, 133, 134, 135, 137, 138, 139, 14, 141, 16, 17, 18, 2, 20, 21, 22, 25, 27, 28, 29, 3, 30, 31, 32, 35, 36, 37, 4, 40, 43, 44, 45, 47, 48, 49, 5, 51, 52, 53, 123, 125, 55, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67, 73, 74, 75, 76, 77, 78, 79, 80, 82, 83, 84, 85, 86, 87, 88, 89, 9, 90, 91, 92, 94, 95, 96, 97, 99	
Timber Production LUD (middle and background)	Maximum Modification	Low	50 - 70	(25 total) , 118, 119, 120, 121, 122, 123, 125, 135, 35, 36, 37, 41, 43, 44, 46, 50, 64, 65, 67, 68, 72, 74, 78, 93, 95,	
	"	Intermediate	80 - 100		
	"	High	80 - 150		
Modified Landscape LUD (middle and background)	Modification	Low	15 - 40	(28 total) 136, 137, 138, 139, 14, 140, 18, 19, 23, 24, 25, 26, 33, 35, 36, 37, 38, 39, 40, 41, 52, 53, 54, 55, 56, 69, 79, 8	34, 70
	"	Intermediate	40 - 60		
	"	High	60 - 100		

Table 3-26 cont. - S-3: Analysis process and summary of direct and indirect effects

IF area where unit is proposed is in a...	THEN the prescribed visual quality objective is...	AND when combined with a VAC rating of...	ACCEPTABLE RX: Clearcut sizes (without reserves) in the following size range are acceptable according to Forest Plan Standards and Guidelines...	RESULT 1. The following units meet visual quality objectives based upon this method. The previous steps are not the only determinant for meeting VQOs (unless unseen). Factors such as prescription, reserves, size, shape, texture, integrity, distance, orientation to viewer, etc, need consideration.	RESULT 2: Not all units met VQO based on the previous steps. Some required additional design attention to ensure that VQO are met. Direction for achieving this is written in the scenery section of the unit card. The units include...
Scenic Viewshed LUD (middle and background)	Partial Retention	Low	5 - 10 acres, or Group selection (less than 2 acres)	(33 total) 10, 102, 107, 11, 110, 112, 113, 137, 138, 139, 12, 13, 14, 15, 18, 36, 37, 40, 41, 42, 50, 51, 56, 57, 6, 67, 81, 82, 83, 84, 85, 97, 98,	7, 8
	"	Intermediate	15-40		
	"	High	15-30		

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Alternative A

Alternative A proposes no new timber harvest, road construction, or other projects within the project area. This alternative maintains the existing visual character of the landscape. Previously harvested units within the project area would continue to mature and develop the visual characteristics of a more natural appearing and undeveloped forest.

Alternative B

For Alternative B, the visual effects of timber harvest would be most apparent to people in boats at the head and mouth of Burnett Inlet, the central portion of Mosman Inlet, and from the center of Anita Bay. No activity is proposed in the viewsheds seen from Stikine Strait, Quiet Harbor, Kindergarten Bay, and Steamer Bay.

The LTFs at Anita Bay and mouth of Burnett Inlet would only be visible from very specific points along the travel routes. (Alternative B is the only alternative to propose an LTF in Burnett Inlet Viewshed). No existing roads were seen during the existing conditions analysis.

The new roads along the units in Mosman Inlet and the mouth of Burnett Inlet would be mostly unseen. They are located at the toes of the slopes, or bottom portions of the units they serve, and are situated behind the shoreline vegetation in the vast majority of cases. They are effectively obscured from sight to the casual observer. Alternative B will meet the Forest Plan adopted VQO.

Alternative C

Alternative C would have the greatest impact to scenery of all the alternatives because more units are seen than in any of the others. Therefore, the chance to see disturbance is inherently greater. Most of the proposed roads will be unseen for the reasons given under Alternative B. If seen, only aspects will be visible and appear where they traverse through the upper sloped portions of seen units like Units 57 (vicinity of Burnett Inlet), and the cluster of Units 6, 7, and 8 (southwest portion of Mosman Inlet) where a road is proposed for the LTF at Cooney Cove.

The only priority travel route within the line of site of the LTF at Cooney Cove is Clarence Strait. However, the distance from the ferry route to the LTF is 6 - 8 nautical miles, and will likely be unseen to the casual observer. Alternative C will meet the Forest Plan adopted VQO.

Alternative D

Alternative D is similar to Alternative B. No harvest, LTF construction, or roads are proposed in the southwest mouth of Mosman Inlet location or at the east end mouth of the Burnett Inlet Viewshed. There is minimal activity in Quiet Harbor, Kindergarten Bay, Steamer Bay, and the mouths of Burnett and Mosman Inlets. Alternative D will meet the Forest Plan adopted VQO.

Alternative E

The effects to the viewshed of Burnett Inlet are the same as Alternative D. The Quiet Harbor, Kindergarten Bay, Steamer Bay, and Stikine Strait viewsheds are affected in the same manner as Alternative C, but Unit 13 as seen from Stikine Strait is helicopter logged instead of shovel. Less activity is proposed in the Mosman Inlet and Anita Bay viewsheds under Alternative E than under B, C, and D. The road and LTF plans are the same as under Alternative D (minus the central Mosman Inlet units), so effects are the same. Alternative E will meet the Forest Plan adopted VQO.

Alternative F

This alternative has the least effect on the scenic resource. The only viewsheds where effects would be noticed are the head of Mosman Inlet, and along Anita Bay. No new roads are proposed, and all new units are in the vicinity of previously harvested units. Activity takes place in TM or ML LUDs almost exclusively. Only Unit 37 occurs in a section of SV LUD. Alternative F will meet the Forest Plan adopted VQO.

Cumulative Effects by Viewshed

Cumulative effects can result from timber harvest, road and landing construction, and visual contrasts created by slash and second growth. These effects are dynamic and, in general, would diminish over time.

Few impacts due to past harvests are noticeable in the Navy project area. Most of the harvesting that took place in the past occurs in the north central portion of the island, in the TM LUD away from the shorelines, and is mostly unseen.

The cumulative effects of past and proposed activity may change EVC ratings, as discussed by viewshed below, but all areas would still meet the Forest Plan adopted VQO.

Stikine Strait

The entire shoreline along the northwest corner of the Navy project area is seen from Stikine Strait, where approximately 2/3 of the viewshed is in the SV LUD, and 1/3 is in the OG LUD.

For the old-growth LUD, the EVC is rated as I (natural) and will remain unchanged.

The EVC for the SV LUD will change from I (natural) to III (slightly altered).

The cumulative effects will result in a future visual condition that corresponds with a partial retention VQO, and will meet the Forest Plan Scenery Standards and Guidelines.

Clarence Strait

Only a small portion of previous harvest can be seen from Clarence Strait, a unit from a 1988 sale, at the head of Kindergarten Bay, which is in a TM LUD. The EVC for that unit is rated as IV (heavily altered), and corresponds with a maximum modification VQO.

The distance from Clarence Strait travel route (mostly by ferry and tour ship) to the shoreline of the project area is 5 – 8 miles. Therefore, effects of the partial retention and STS prescriptions are likely to be unseen or unnoticed by the casual observer.

The cumulative effects will result in a future visual condition that corresponds with retention/partial retention VQO, and will meet the Forest Plan Scenery Standards and Guidelines.

Anita Bay

Anita Bay is the heaviest altered viewshed in the Navy project area, with evidence of harvest activity from 1926 to 1999. As a result, the viewshed's EVC is diverse, with areas rated as I (natural), II (natural appearing), IV (moderately altered), and V (heavily altered).

The areas of past harvests that are seen (and where new units are proposed) exist in TM and ML LUDs, where visual quality objectives are Maximum Modification and Modification.

The cumulative effects will change the EVC rating in the following two areas, but will meet the overall VQO for the viewshed.

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The current EVC I area near the proposed Anita Bay LTF would change to a future visual condition rating of IV (or corresponding VQO of modification).

The current EVC I area, north to northwest of the head of Anita Bay, would change to a future visual condition rating of III (or corresponding VQO of partial retention).

Quiet Harbor

The viewshed of Quiet Harbor is small; only a hilltop looking west is noticeable beyond the height of the shoreline trees. The current EVC rating for this area is I (natural); no past harvest is evident.

The future visual condition would change the area's current rating from I to III (slightly altered).

The cumulative effects will result in a future visual condition that corresponds to the partial retention VQO, and will meet the Forest Plan Scenery Standards and Guidelines.

Kindergarten Bay

The edge of a unit from a 1988 harvest is visible from the middle of Kindergarten Bay, resulting in an EVC rating of V (heavily altered). However, that unit is in a TM LUD, and the visual condition corresponds to the Maximum Modification VQO.

The units proposed to the north and south of Kindergarten Bay are a helicopter harvested, STS prescription, in a Partial Retention VQO. The EVC for these areas are I (natural), but will change to either II (naturally appearing) or III (slightly altered). The corresponding VQO for the future condition will be Partial Retention at most.

The cumulative effects will result in a future visual condition that meets the Forest Plan Scenery Standards and Guidelines.

Steamer Bay

No past harvests are visible from the Steamer Bay viewshed, which has areas with EVC ratings of I (natural) and V (heavily modified). Of the two new seen units, one is in the TM LUD, and the other in the SV LUD.

The EVC for the area that is in the TM LUD is currently rated as a V; it will not change. The area currently rated as I will likely change to II (naturally appearing) in the future. Both would still meet the VQO of Maximum Modification and Partial Retention for their respective LUDs.

The cumulative effects will result in a future visual condition that meets the Forest Plan Scenery Standards and Guidelines.

Mosman Inlet

The areas located at the mouth and all along the channel to the head of the inlet are in the SV and ML LUD and are currently rated as a I. Past harvests in this area occurred between 1917 and 1945, but were not noticed during analysis. The corresponding VQO of partial retention and modification will be met.

The area at the head of the inlet, to the east and north is in a TM LUD and is currently rated as a V. Past harvest in this area is clearly noticeable, since it took place in the late 1980s to mid 1990s. The corresponding VQO of maximum modification will be met.

The cumulative effects will result a future visual condition that meets the Forest Plan Scenery Standards and Guidelines.

Burnett Inlet

As with Mosman, the EVC rating of the Burnett Inlet Viewshed is either I (natural) or V (heavily altered), though a small section of EVC IV (moderately altered) exists to the west of the inlet's head.

Most of Burnett Inlet is rated EVC I (natural), even though a large portion of it is in the TM LUD at the northeast side of the channel. Past harvest in the EVC I area at the mouth of the inlet occurred from 1917 to 1953, but was not noticed during analysis. The corresponding VQO of partial retention and modification will be met.

The past harvests in the EVC V rated area are clearly noticeable, since they took place in the 1980s and 1990s. The corresponding VQO of maximum modification will be met.

The cumulative effects will result in a future visual condition that meets the Forest Plan Scenery Standards and Guidelines for scenery.

Visual Recovery Rates

The potential for timber harvest to visually dominate is greatest immediately following the activity.

Activities such as cut and fill slopes, rock pits, stumps, debris, and turnouts are typically seen when viewed up close. As viewed in the middleground, vivid distinction in texture, line, and color between the mature forest and the harvest unit would be apparent. Newly exposed trunks and limbs would dominate the visual setting when openings are present.

The following recovery rate guidelines are used to predict when past harvest activity will resort to a natural state, or to a condition that meets visual quality objectives, if not currently met.

Years 1 – 5: By the fifth year of regeneration, the new forest would be filling out with low-lying vegetation. On poor and disturbed mineral soils, alder would be present. In the Foreground, the visual effects of the clearcut would be evident, but shrubby vegetation and young trees would begin to cover the stumps and exposed ground. In the Middleground the harvest unit would contrast with the natural landscape to varying degrees, depending on the level of retention.

Years 5 – 25: Young trees would become established and reach a height of approximately twenty feet. Foreground views created within the original harvest unit would become limited. In the Middleground, the contrast between the new forest and mature forest would still be obvious but not dominate so much to the casual observer.

Years 25 – 50: At the end of 50 years, trees would reach heights of 50 to 60 feet. As seen in the Middleground, the stand would be approximately half the height of adjacent mature stands. Boundaries between the harvested stand and mature stands would begin to blur. At this time, the canopy would be fairly closed and the new forest very dense. As a general rule, large harvested areas on steep slopes would appear “near natural” to casual forest visitors. Smaller units on gentler slopes would appear “near natural” somewhat sooner.

Years 50 – 80: 80 years, the stand would reach about 75% of its mature height. From the Middleground there would still be some distinction between this stand and adjacent mature forest.

Years 80 – 100: At 100 years, trees would be about 100 feet tall. The canopy would appear healthy, lush, and full. In the Middleground, color and texture would be similar to adjacent over mature stands. These previous harvests may still be discernible from over-mature stands, due to their lack of scattered dead tops and a generally more regular growth pattern.

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Roads and Log Transfer Facilities (LTFs) Mitigations

Helicopter harvesting will help reduce visual effects caused by additional roads. In most cases, where new roads are proposed, they are obscured by the shoreline trees and they are located at the toe of slopes and unseen portions of the unit. Retaining shoreline trees adjacent to LTFs would increase scenic integrity for boaters looking upon the landscape, within the vicinity of these sites.

Silviculture

Analysis area

The Navy Project Area is composed of approximately 77,000 acres of which approximately 14,000 acres are suitable and available for timber harvest. The Navy project area is the analysis area that was utilized to determine the direct and indirect effects to the silviculture resource. Etohin Island, except the South Etohin Wilderness Area makes comprises the analysis area for the silvicultural cumulative effects.

Inventory and Methods

Timber stands that were identified as suitable and available for harvest were inventoried. This data is used to develop stand prescriptions. Stand inventory information is available at the Wrangell Ranger District office.

Affected Environment

Forest Stand Structure

Stand structures in the Navy project area include uneven-aged (multi-storied), two-aged (two-storied), and even-aged (single-storied). Uneven-aged structure accounts for approximately 94% of the suitable timber lands and is typically greater than 300 years old within the project area. Western hemlock is typically dominant overstory tree species, with cedars and spruce present in the upper-stories in varying amounts. Lower stories are also typically dominated by hemlock.

Most of these stands are of wind disturbance origin. Single large wind events and several smaller wind events have resulted in the variety of stand age and structural characteristics found across the landscape.

Species Composition and Plant Associations

The project area tree species composition by basal area includes: western hemlock (53%), mountain hemlock (4%), Sitka spruce (7%), yellow-cedar (17%) and western redcedar (19%).

Plant associations are climax plant communities which develop on sites with similar ecological characteristics. These associations can be used to help predict site productivity, value to wildlife, and consequences of management actions (for a complete description see the Silvicultural Resource Report). The conifer series in the project area consists of: western hemlock (4,060 acres), western hemlock/ yellow-cedar (840 acres), western hemlock/redcedar (3,389 acres), mixed conifer (5,040 acres), Sitka spruce (700 acres). Mountain hemlock and shore pine were not significant within the project area.

Volume Strata

Volume classes were replaced with volume strata during the revision of the Forest Plan. Volume strata were developed which incorporated volume classes with soils and slope. These volume strata provide an indication of the capability to produce different timber volumes depending on soil productivity and slope characteristics. These are:

High Volume Strata - Areas within timber inventory volume classes 5, 6, and 7 on non-hydric soils, and on hydric soils with slopes greater than 55 percent.

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Medium Volume Strata - Areas within timber inventory volume classes 5, 6, and 7 on hydric soils with slopes less than or equal to 55 percent; areas within timber inventory volume class 4 that are either on non-hydric soils, or are on hydric soils greater than 55 percent.

Low Volume Strata - Areas within timber inventory volume class 4 that are on hydric soils with slopes less than or equal to 55 percent.

These strata were determined by using the GIS volume class layer and combining it with the soils layer to determine hydric soils.

Table 3-27 - SC-1: Volume Strata in the Navy Project Area

Volume Strata	Acres in Proposed Harvest Units by Alternative					
	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Low	0	667	1189	403	499	209
Medium	0	1726	3012	821	1612	451
High	0	2323	3599	1314	2128	662
Totals	0	4716	7800	2529	4239	1322

Source: Forest Service GIS Data

Forest Health/Natural Disturbances

The following disturbance factors affect forest health within the project area.

Wind Disturbance

Wind is the major natural disturbance agent in the Navy project area. It occurs in two forms: small-scale gap-phase disturbance and large-scale stand-replacing disturbance. Most of the island is subject to gap-phase windthrow events. Individual trees, or small groups of trees, blow over during wind storms, opening the canopy and allowing young trees to grow to fill the openings. This results in complex, multi-aged stands. Areas exposed to severe but infrequent storms are subject to large-scale windthrow events resulting in complete or partial stand replacement. The resulting stand structure is typically even-aged or two-aged, depending on the level of disturbance. Stands in high-risk wind-hazard areas rarely attain ages greater than 250 years old, and are more often replaced before reaching 150 years old. In such areas, even-aged management is the preferred regeneration method. Two-aged and uneven-aged systems should be used with caution, and with the expectation of windthrow, potentially stand replacing.

Nearly all forested lands in Southeast Alaska contain evidence of past windthrow, but not all lands are subject to the same windthrow risk (Harris 1999). Wind hazard can be strongly influenced by topography (Harris 1999, Harcombe et al. 2004) increasing with slope, elevation, soil hazard and aspect (exposure to prevailing winds) (Nowack and Kramer 1998, Kramer et al. 2001). Windthrow patches can be the result of single wind events or multiple events over time (Harcombe et al. 2004). Most windthrow along harvest edges has been observed to take place in the first few years after harvest (Alexander 1964, Harris 1999).

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Stands were analyzed for risk of stand-replacing windthrow using Kramer's model in conjunction with ground observations and aerial photo interpretation of stands generated by past windthrow. Kramer's wind model rates the level of windthrow risk based on four abiotic factors (slope, elevation, soil stability, and exposure to prevailing storm winds (aspect)) (Nowack and Kramer 1998, Kramer et al. 2001). Ground observations and aerial photo interpretation of past windthrow in adjacent past harvested units, appearance of wind-damaged crowns, mound-and-pit topography (Harris 1999), and appearance of even-aged structure without indications of other disturbance processes were also used to indicate substantial windthrow risk. Wind influences are of particular concern in these areas when determining appropriate silviculture systems, leave area windfirmness, and in unit layout.

Windfirm Buffers

The Forest Plan Standards and Guidelines direct the Forest Service to provide for a Reasonable Assurance of Windfirmness (RAW) to RMA buffers when harvesting units. Risk to buffers and other leave areas can be minimized if the buffers are located on edges of natural openings or windfirm cutting lines, outside of rot pockets, in deep, well-drained soils, in areas containing naturally windfirm trees or located in more protected areas such as in small draws, and are oriented parallel to the prevailing storm wind direction (Ruth and Yoder 1953, Alexander 1964) except in narrow valleys. In addition, risk can further be avoided by not placing leave areas and leave trees on the lee side of low saddles or upper one-third of slopes, on secondary ridges that are orientated at right angles to the wind, ridge tops, or on flats of high ridges (Ruth and Yoder 1953, Alexander 1964, Harris 1999) where wind can be channeled up valleys and accelerated.

Most of the time leave areas, such as stream buffers, cannot be relocated to lower windthrow risk locations. In these cases, RAW buffers are placed along the edges of leave areas. These prescribed RAW buffers are composed of an unharvested strip, a thinned or "feathered" strip composed of the most windfirm trees, or a combination of both depending on the site-specific conditions. The width of the RAW buffers generally ranges from 50 feet to 120 feet depending on wind risk, composition, and the buffer's orientation to the prevailing wind direction. The leave trees in the RAW buffers should be selected based on the following characteristics: short in height, low height-to-diameter ratios (low form class), high live-crown ratios, low evidence of tree decay, contain support roots on the leeward side, and preference tree species that are relatively more wind resistant (Ruth and Yoder 1953, Nowack and Kramer 1998, Harris 1999). Western redcedar and Alaska yellow-cedar are considered the most windfirm species in Southeast Alaska (Harris 1999), followed by Sitka spruce and finally western hemlock (Ruth and Yoder 1953).

All the proposed units were reviewed, modeled, and rated for wind hazard. Some degree of windthrow in buffers and other leave areas may occur in each action alternative. RAW buffer prescription and location are designed to minimize windthrow and therefore not expected to reduce the integrity of these areas under any alternative. Units with RAW buffer needs have been identified and can be found in the unit cards. A final determination for the need of additional RAW buffers will be made during layout.

Hemlock Dwarf-mistletoe

Dwarf mistletoe (*Arceuthobium tsugense*), a parasitic plant, reduces the vigor and growth rate of western and mountain hemlock and often produces low quality timber. Cankerosus swellings often occur at the point of infection on limbs and main stems. These cankers offer an entrance for wood-destroying fungi, which can lead to heart rot. Dwarf mistletoe is best managed with even-aged silvicultural systems. Removing the overstory removes the source of infection. Partial removals do not completely remove the source of infection to the new developing stand. The occurrence of dwarf mistletoe varies throughout the project area.

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Yellow-cedar Decline

Yellow-cedar mortality became abnormal around 1900 and has accelerated (Forest Health Conditions in Alaska-2006, R10-PR11, April 2007). Mortality occurs in open canopy stands occupying wet, poorly drained soils (Hennon et al., 1997.). Research suggests that the primary cause of the approximate 500,000 acres of yellow-cedar mortality in Southeast Alaska is not associated to organisms such as fungi, insects, nematodes viruses, and phytoplasmas. Current thought has focused on the possibility that one or more abiotic factors have instigated the decline. In particular, freezing and soil toxicity have been proposed as the causal factors (Schaberg et al., 2005).

Ongoing research and evidence favors freezing of the plant tissue as the casual agent of yellow-cedar decline (Forest Health Conditions in Alaska-2006, R10-PR11, April 2007). Over the past 100 years, a climate warming trend has been diminishing the historic protective snow pack at lower elevations, allowing solar radiation to penetrate and warm up the forest floor earlier, triggering early loss of cold tolerance in the cedar's shallow fine-root system, and predisposing the Alaska yellow-cedar to suffer some form of late spring freezing injury (Forest Health Conditions in Alaska-2006, R10-PR11, April 2007). Yellow-cedar decline occurrence appears to be influenced by elevation and aspect. Yellow-cedar forests appear healthy at higher elevations and on northerly aspects that favor patterns of snow persistence in spring. In two case study areas, mortality was found up to 1,000 ft. or slightly higher on some southern aspects, but only to about 500 ft. on nearby northern aspects (Forest Health Conditions in Alaska-2006, R10-PR11, April 2007). The Navy Project Area has some occurrence of yellow-cedar decline, especially in the low-volume, less-productive soil sites. The cedar mortality ranges in intensity from scattered patches to larger contiguous areas.

Decay Fungi

Decay fungi are present in the project area at various levels and types throughout the study area. Approximately one-third of the volume of old-growth in southeast Alaska is defective due to heart rot (Forest Health Conditions in Alaska-2006, R10-PR11, April 2007). Root diseases are also considered significant. The silviculture systems chosen are designed to remove infected trees with harvest treatments. Even-aged systems can be utilized to effectively remove infected timber. Decay fungi are not expected to impact regeneration.

Porcupine Damage

Porcupine (*Erethizon dorsatum*) is island specific in presence in Southeast Alaska; Etolin Island has a well established resident porcupine population. Porcupine can negatively affect tree regeneration, defect, and growth in young stands, particularly stands 15 to 35 years of age (Sullivan and Cheng 1989). The inner bark of dominant and co-dominant spruce and hemlock trees is the major foods for porcupine during the winter months; in summer they prefer grasses, forbs, and shrubs (Sullivan et al. 1986). Cumulative porcupine damage to regenerating stands can result in slower tree growth, creation of entry points for stem decay due to scarring, and eventually girdling of the tree causing dead tops or tree mortality. These effects can dramatically alter the stands future merchantable volume, future economic value of the stand, stand rotation length (Sullivan and Cheng 1989), and can allow defective trees to occupy growing space. For these reasons, strategies for minimizing porcupine impacts in timber producing LUDs should be addressed. Based on field examination of existing damage on Etolin Island, the porcupine do not prefer western red or yellow-cedar, thus the planting of both is a possible method of reducing porcupine damage to crop trees.

The population size of porcupine and the potential for future damage is considered high for the project area.

Past Management

To date, 4,147 acres (GIS) have been harvested within the Navy project area boundary. Harvest along the beach fringe first occurred in 1917 and continued through the 1970's. Large-scale clearcut harvest began in the project area in the 1980s.

All stands within the project area have been successfully regenerated. 3,007 acres were naturally regenerated and 1,140 acres were regenerated using tree planting. Site preparation was performed in some harvest units prior to planting, this composed of 155 acres of broadcast burning.

Some of the past harvest areas may be available for treatments that would contribute to the goals, objectives and desired condition of the land use designation in which they occur. Precommercial tree thinning and other treatments, which manipulate the vegetation, can be of benefit not only to timber production but also to wildlife habitat, riparian function, and scenic quality, and should be considered for these lands.

Precommercial thinning tends to open up stands with closed canopies to additional sunlight, allowing understory vegetation to persist longer. It can speed up stand development to obtain later seral stages sooner, diversify the stand structure, and encourage a desired species mix in the regenerated stand. Tree diameter growth is increased, yielding stands with merchantable timber in less time than if left alone.

Some precommercial thinning has occurred within the project area. To date, 111 acres (FACTS) in the project area has been precommercially thinned for timber production and 15 acres have been thinned for wildlife habitat enhancement. In addition to thinning, 58 acres have also been pruned to provide improvement in wood quality.

Silvicultural Systems

Even-aged Systems

Clearcut: Essentially all trees in a harvest unit are removed in a single operation that regenerates into a single-aged stand. In the Navy project area, clearcutting method is prescribed to reduce levels of mistletoe infections, decay fungi, ensure regeneration desired tree species, and/or to minimize losses to and risk of windthrow. Natural regeneration is expected to fully stock the stand with desirable trees by year 4.

Clearcut with reserve trees present: Even-aged management clearcut with reserve trees present results in most of the trees are removed in a single operation with some trees retained for purposes other than regeneration. Reserve trees are scattered or clumped, and are normally retained throughout a rotation to serve a purpose. Depending on the individual unit prescription 15% to 50% of the original stand basal area will be retained. In the Navy project area, reserve trees would be retained for wildlife habitat, to reduce visual impact of timber harvest and/or to further enhance wind firmness of leave areas (i.e. RMAs, high hazard soils, visual retention patches, etc.). Natural regeneration is expected to fully stock the stand with desirable trees by year 4.

Two-aged Systems

Clearcut with reserve trees present: Two-aged management clearcut with reserve trees present results in stands that have two distinct cohorts with the retention of reserve trees comprising at least 15% of the stands original basal area with standing green trees constituting a distinct age class separated in age by more than 20% of the rotation. Some of the stands in this project are prescribed with 15% reserve trees and others 50%. Reserve trees are usually selected in aggregations,

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individually tree marked, or designated by description. Aggregations and individual reserve trees must be somewhat well distributed; a majority of the reserves cannot be clumped along the unit boundary. This resulting stand structure is similar to stands that develop naturally from completely regenerating because of two distinct disturbance events such as windthrow. Two-aged management can produce stands of greater structural diversity than even-aged management. This method may be used where windthrow or disease are not major threats or can be tolerated (Forest Plan, p. 4-98). In some areas, windthrow or damage to residual trees can be tolerated because the dead or fallen trees would continue to provide structure and wildlife habitat. In the Navy project area, reserve trees would be retained for wildlife habitat, to reduce visual impact of timber harvest and/or to further enhance wind firmness of leave areas (i.e. RMAs, high hazard soil areas, visual retention patches, etc.). Natural regeneration is expected to fully stock the stand with desirable trees by year 4.

Uneven-aged Systems

Single-tree Selection: An uneven-aged stand contains trees of three or more distinct age classes, intermixed throughout the stand. Uneven-aged stands are created through silvicultural pathways that include uneven-aged systems or small-scale periodic disturbance (gap phased) that allows for recruitment/release of trees resulting in a multi-storied stand structure. Harvest trees are either selected through individually tree marking or designated by description. No more than 30% of the total original stand basal area will be removed and no more than 50% of the original stand basal area of spruce or cedar will be removed in this entry. These stands will continue to develop, and be available for additional future entries (recommended in 40 years). This system is not expected to appreciably increase the likelihood of windthrow in these stands.

Direct and Indirect Effects

Timber harvest would affect the structure of the forest. Even-aged and Two-aged management would create primarily second-growth stands with or without older residual trees. Uneven-aged harvest would create stands with a variable stand and age structure, depending on the site-specific prescriptions. Forest health concerns, including the removal of trees with disease or that face imminent mortality, could be used as factors in determining which trees to harvest. Refer to Appendix A of the Silvicultural Resource Report or Appendix B- Unit Cards of the DEIS for specific unit information.

Alternative A

This alternative represents no management actions at this time. Silvicultural treatments and harvest prescriptions in this area are deferred to a later date. Forest lands located elsewhere would need to be harvested to meet market demand for timber.

Disturbance processes would continue, including gap-phase, small-scale disturbance as well as stand-replacing wind-generated stand re-initiation. Some high wind-hazard stands are likely to experience large-scale stand-replacing events in the next decade, resulting in more structure in the early, even-aged stage of development. Other stands will likely experience moderate disturbance resulting in more two-aged structure. Protected stands (from wind) are likely to continue experiencing individual tree mortality and gap-phase disturbance processes resulting in continued old-growth structure.

Alternative B

This alternative would create 4,716 acres of new managed stands and would produce approximately 61.7 MMBF of saw timber. It would harvest 1,757 acres using even-aged systems, 297 acres using two-aged systems and 2,662 acres using uneven-aged systems.

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Alternative C

This alternative would have the greatest effect on vegetation in the Baht project area. Approximately 7,800 acres would be converted to managed stands and would produce approximately 97.9 MMBF of saw timber. It would harvest 2,662 acres using even-aged systems, 382 acres using two-aged systems and 4,756 acres using uneven-aged systems.

Alternative D

This alternative would create 2,529 acres of new managed stands and produce approximately 36 MMBF of saw timber. This alternative would harvest 1,175 acres using even-aged systems, 97 acres using two-aged systems and 1,257 acres using uneven-aged systems.

Alternative E

This alternative would create 4239 acres of new managed stands and produce approximately 48.9 MMBF of saw timber. This alternative would harvest 1,078 acres using even-aged systems, 100 acres using two-aged systems and 3,061 acres using uneven-aged systems.

Alternative F

This alternative would create 1322 acres of new managed stands and would produce approximately 18.7 MMBF of saw timber. This alternative would harvest 1,113 acres using even-aged systems and 209 acres using uneven-aged systems. No two-aged systems are used in this alternative

In all the action alternatives forest health would be improved by targeting the removal of dwarf mistletoe-infected trees and by creating younger, faster-growing forests or reducing stand densities. Potential windthrow mortality would be captured in even-aged managed units. Long-term productivity and growth and yield would be enhanced in the even-aged and two-aged harvest units. Wildlife habitat, visuals, riparian habitat, and other resources would be protected with the various retention amounts provided by each silvicultural system and by unit design. These alternatives are consistent with the Forest Plan, management direction, and the National Forest Management Act (NFMA). See Table 3-28 for a comparison of acres harvested by alternative and silvicultural system.

Table 3-28 - SC-2: Acres harvested by Alternative and Silvicultural System

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Even-aged	0	2,055	2,645	1,190	1,005	626
Two-aged	0	0	317	0	91	0
Uneven-aged	0	2,661	4,838	1,339	3,143	696
Total Acres	0	4,716	7,800	2,529	4,239	1,322

Source: GIS: navy\alternatives.mdb\altpolys (alt_x_rx)

Cumulative Effects

The analysis area for the cumulative effects for this project includes Etohin Island, except for the South Etohin Wilderness Area. This analysis includes past activities and is limited to management activities within the foreseeable future. Timber harvest on the island first occurred along the beach fringe in the 1914 and continued through the 1970's and large scale clearcut harvest began in the

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early 1980's. To date, 6,646 acres have been harvested on the island and only 6% of the original productive old-growth and 13% of the original productive old-growth in development LUDs (Etolin Landscape Assessment 2006). All these harvested acres are in early successional stages of stand development (stand initiation and stem exclusion). Approximately 949 acres of young growth are over the age of 65 with 792 acres that were even-aged harvested. The Navy Timber Sale proposes harvesting an additional 1,322 to 7,800 acres (approximately 3% to 18% of the original productive forest land in development LUDs) depending on the alternative (Etolin Landscape Assessment 2006).

To assess future effects, five years was chosen, given the inherent future uncertainty, as the reasonably foreseeable future. Within the next five years, four other timber sales may be implemented on Etolin Island. The first is the Red Mountain Timber Sale consisting of 639 acres of helicopter harvest removing approximately 5.89 mbf of saw timber. This sale has been sold and is scheduled to be competed at the end of the fiscal year 2007. This sale is located entirely outside of the Navy project area. The second is the Fishtrap Salvage Sale located along the FS 51540 road by Fishtrap Creek. This sale authorizes the roadside harvest of approximately 208 mbf of cedar decline and windthrow saw timber and utility volume from 240 acres. The third is the Porcupine Salvage Sale authorizing the harvest of 766 mbf of wind thrown saw timber and utility volume from 26 acres. This sale is planned to be re-offered in fiscal year 2008. The fourth timber sale is the North Etolin Salvage Sale located along NFS road 6549. It could authorize the roadside harvest of approximately 200 mbf of cedar decline and windthrown timber. This sale is expected to be offered in the fiscal year 2008 and is outside of the Navy project area. There is currently no timber harvest activities listed on the states 5-year timber sale plan.

All of the past harvested stands on Etolin Island have been successfully regenerated with either natural regeneration or with planting and natural regeneration. A total of 306 acres of young growth have been precommercially thinned on the island (FACTS). This includes thinning for wildlife habitat enhancement and timber production. An additional 522 acres of young growth is planned or proposed to be thinned in the next 5 years. The precommercial thinning should increase stand health and improve wind hazard ratings but do not contribute to the Navy Timber Sale unit stand health or wind hazard ratings. Risk of porcupine damage will be evaluated prior to thinning operations.

Soils

Affected Environment

Timber harvest and associated road construction can result in decreased soil productivity, soil erosion and sedimentation of lakes and streams. Soil Quality Standards (R-10 Supplement 2500-92-1) and Forest Plan Standards and Guidelines (Forest Plan 1997 4-83 to 4-85) have been established to meet the direction in the National Forest Management Act of 1976, and other legal mandates. The guidelines were developed to ensure that management activities will be accomplished without incurring permanent impairment to soil productivity. For this project, effects and potential effects of each alternative will be compared based on the amount of soils disturbance and the amount of timber harvest on slopes over 72% gradient in harvest units, and the amount of road built on slopes steeper than 67% gradient in the project area.

The basic source of information for characterizing soil in the project area is the Draft Soil Resource Inventory Report for the Stikine area (Krosse, 1999) and field information gathered during project planning. Light Detection and Ranging (LIDAR) data was used to derive slope information where it was available in the project area; where it was not available, a 30 meter digital elevation model (DEM) was used.

The high precipitation and moderate temperatures of the maritime climate influence soil development. Soils range from moderately deep, well-drained soils that support productive forests to very poorly drained organic soils that support muskeg vegetation. Soil productivity in the project area is primarily a function of soil drainage and in some cases soil depth. Most soils are covered with an organic mat, or duff layer, 6 to 10 inches thick. This organic mat prevents erosion of the underlying mineral soil from raindrop impact and supplies many nutrients for plant growth.

Disturbances

Windthrow, landslides, and fire are the dominant natural soil disturbance factors recognized in the project area. Soils are affected by the continual mixing caused by overturning tree roots associated with blowdown events. The west shoreline from Rocky Pass to Kindergarten Bay is especially affected due to the north-south oriented troughs and the channeled winds of Clarence Straits.

Landslides

Landslides commonly occur in association with windthrow events. This is attributed to saturated soils and the soil disturbance caused by rocking trees, which eventually topple over. Landslides are common on the west coast of Etolin Island in steep areas exposed to strong winds.

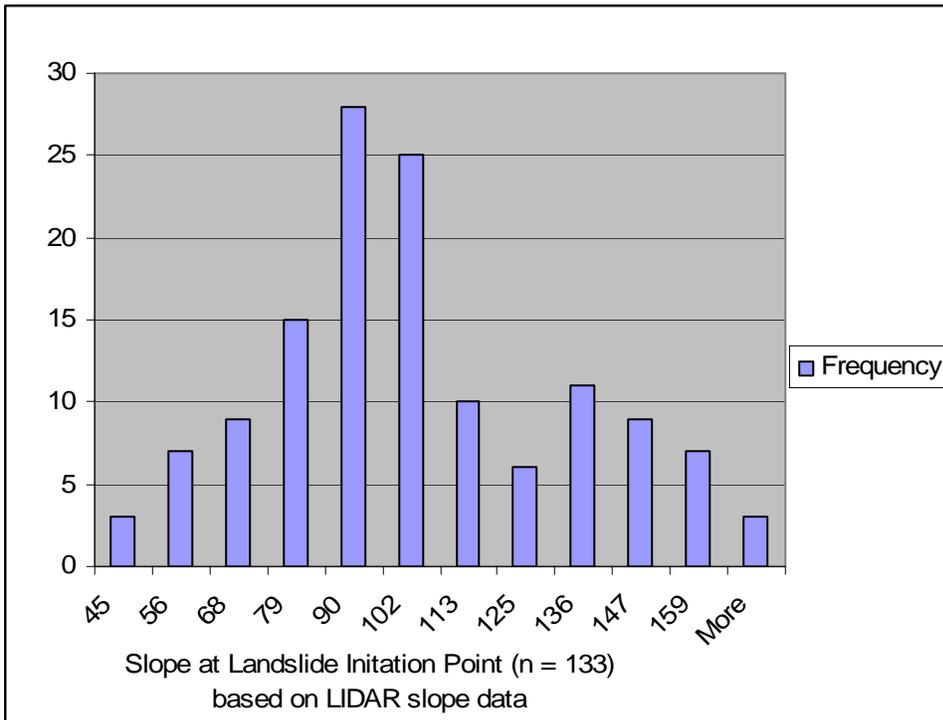
Landslides, both naturally-occurring and management-related dominate soil movement processes on steep forest lands in Southeast Alaska. Landslides deliver eroded material to streams more quickly and in greater quantity than surface erosion. Soil productivity is decreased in the landslide tract. The area where the eroded material accumulates typically provides a new productive growing site.

A study of landslides occurring between 1963 and 1983, by Swanston et al, 1989, found that roughly 10% of the landslides occurred in harvested areas or were directly associated with timber harvesting, whereas roughly 90% happened in unlogged areas. On a per-acre basis, landslides occurred in clearcut areas about three times as frequently as in unlogged areas. Landslides in unlogged areas were found to be larger and longer than those in logged areas. Clearcutting results in loss of rooting strength, when roots of harvested trees decompose, increasing the risk of landslides after harvest.

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A landslide inventory using aerial photos was completed in 2003, for Etolin Island (excluding the South Etolin Wilderness). An analysis of the slope at the point where the landslide initiated found most landslides to have initiated at slopes between 90 and 110% slope. Landslides occurred on slopes ranging from 50 to 160%.

Figure SL-1. Landslide Initiation



Relatively few of the landslides are associated with management activity. Two landslides on the south side of Anita Bay occurred during road construction. Four landslides are known to have occurred in previously harvested stands. The remaining landslides are not likely associated with management activities.

Fire

Etolin Island has more evidence of fire history than other areas on the Wrangell District. The fire history is neither well researched nor recorded. Evidence of fire occurring 200 years ago was found in several locations between Streets Lake, Cooney Cove, and Mosman Inlet, and is believed to have affected much of the area south and southwest of the Keating Range. A smaller fire of approximately 50 acres occurred on the east side of Mosman Inlet approximately 150 years ago. There is additional fire evidence around Kindergarten Lake and in the Cannery Cove area. Charcoal was observed in soil pits at the 1,200 feet elevation above Cannery Cove.

Fire has been used as a management tool to obtain silvicultural objectives with mixed results on Etolin Island. Fire has the potential to consume the nutrient rich surface organic soil, leaving the soil with decreased productivity. Burning is not proposed as a silvicultural treatment in any alternative. Additional environmental analysis would be undertaken prior to conducting any burning.

Soil Productivity

Soil productivity is the inherent capacity of a soil to support the growth of specific plants, plant communities, or a sequence of plant communities. It is primarily a function of soil depth, soil drainage, bedrock material, and coarse fragment content.

Soil productivity affects the productivity of other forest resources. Tree growth, wildlife habitat, and recreational uses are in part dependent on the quality of soils. In Southeast Alaska, in terms of tree growth, soil productivity is high on well-drained soils and decreases as drainage becomes poorer. It decreases as latitude and elevation increase. The most productive forest sites occur on colluvial foot slopes, alluvial fans, and floodplains.

Soil productivity and nutrient status can be influenced in a number of ways by timber management activities. Removing the canopy of mature and over-mature forest allows increased solar radiation to warm the soil. Increased soil temperature accelerates microbial activity and nutrient cycling, thus increasing the availability of soil nutrients, particularly nitrogen. The result is a proliferation of rapidly growing forbs, shrubs, and tree seedlings. Consequently, the net annual biomass production after timber harvest may be greater than it was in the old-growth forest. This effect is relatively short-lived, however, and tends to diminish as the forest canopy closes and again shades the soil surface.

Management-induced landslides, severe burning, and soil displacement due to roads, skid trails, landings, or rock pits are the primary soil disturbance mechanisms associated with a timber sale project. Because most of the nutrients are within the upper soil layers, destroying these layers can reduce the site productivity.

The Region 10 Soil Quality Standards (FSM 2500 R-10 Supplement 2500-92-1) establishes threshold limits of detrimental soil properties. It defines detrimental soil conditions for soil compaction, puddling, displacement, and etc. It is assumed that long-term soil productivity is maintained if these soil properties remain within the standards. Some types of soil disturbance can have a positive effect on soil productivity. Mixing the upper organic soil layers with the underlying mineral horizons generally increases soil tilth, permeability, and available minerals in the upper soil profile (Bormann and Kramer 1998).

Direct and Indirect Effects

In order to minimize effects on soil resources, BMPs are applied to all land-disturbing activities to protect the beneficial uses of water and soil. BMPs for soils are specified on Unit and Road Cards (see Appendix B and C of this DEIS) and include the following:

- Partial suspension of logs (lead end of log is suspended above the ground) to prevent excessive displacement of nutrient-rich surface soil layers (BMP 13.9).
- Full suspension of logs (both ends of the log suspended above the ground) by skyline cable systems or helicopter yarding is designated where needed to prevent excessive erosion or landslides (BMP 13.9).
- Shovel yarding may be designated on gently sloping sites. Use of puncheon may be required to minimize rutting and reduce soil disturbance (BMP 13.9).
- Roads are designed to maintain the natural drainage pattern to prevent excessive instream erosion and detrimental changes in soil drainage (BMP 14.3).
- When bare mineral soil is exposed by management activities, the site will generally be revegetated with grass seed to prevent soil erosion and sedimentation (BMP 12.17).
- Blasting is restricted after heavy rainfall when soils are saturated (BMP 14.6).

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Timber harvest with cable yarding or shovel yarding on well-drained soils is not expected to adversely affect either short-term or long-term productivity beyond the 15% guideline (FSM 2500 R-10 Supplement 2500-92-1) for any harvest unit. The slight increase in soil wetness due to tree removal may result in a temporary reduction in soil productivity. Soil wetness is expected to return to preharvest condition when cover is reestablished with a new stand of timber.

Monitoring data (Landwehr and Nowacki, 1999) indicate that areas logged with partial or full suspension, typically have less than 5% of a harvest unit with detrimental soil disturbance. Based on the monitoring data, it is not likely that yarding practices will result in soil disturbance that exceeds the Region 10 Soil Quality Standards.

Harvest Unit Acres on slopes greater than 72%

Units with slopes exceeding 72% were identified and mapped using LIDAR information and a 30-meter DEM. These areas are removed from the suitable timber base; however, harvest is allowed, provided an on-site slope stability analysis has been completed. All areas in units with slopes steeper than 90% will be excluded from harvest.

Harvest on steep slopes poses a risk for management-induced soil disturbance. A risk assessment was made of each unit based on aerial photo interpretation and field information where it was available. Results are in the project file. Risk is based on a number of factors including site conditions, extent of activities, and harvest method and prescription. In helicopter units, full suspension would provide surface protection for soils during the yarding process. Partial cutting (retaining 70% of the stand) would help ensure an adequate amount of live root mass remains intact to preserve slope stability. Helicopter yarding results in less soil disturbance resulting in less disruption of the root mat and subsequently more root strength is retained than if the soil is disturbed (Swanston 1974).

Alternatives are compared based on the number of units that have slopes steeper than 72% and the number of acres with slopes >72%.

Alternative B has 46 units (420 acres) with slopes greater than 72%. Alternative C has 75 units (580 acres) with slopes greater than 72%. Alternative D has 75 units (160 acres) with slopes greater than 72%. Alternative E has 38 units (290 acres) with slopes greater than 72%. Alternative F has 18 units (180 acres) with slopes greater than 72%.

Alternative A would pose no increased risk of potential management-induced landslides. Alternative C poses the greatest risk with 580 acres of harvest on slopes greater than 72%, followed by alternative B (420 acres). Alternative D and F have the fewest acres of harvest on slopes greater than 72% and would pose the least risk. Alternative E is intermediate.

Roads

Most of the potentially adverse impacts to soil productivity would be from road construction. Road construction and rock pit development replace productive growing sites with rock and overburden. NFS roads are intended to be a permanent use of the land, and as such, they are not considered detrimental soil disturbance, though they do take lands out of timber production. Temporary roads are intended for a one-time use. Placement of rock fill to construct temporary roads reduces site productivity.

Table 3-29 - SL-1: Acres¹ of Land converted to Road

Road Type	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
NFS Road	0	110	142	35	52	0
Temporary	0	53	106	32	56	24
Total Acres	0	163	248	67	108	24

¹ Acre conversion is calculated using a 50 feet road width, which would include pullouts, turnouts, and rock pits.

Source: GIS: j:fsfiles/office/gis/navy/alts/alternatives.mdb/allroads

Temporary road construction for this project would convert an estimated 0 to 106 acres of productive forest lands to roads, depending on which alternative is selected. Alternative C converts the most acres, Alternatives B and E are intermediate; Alternative D and F would convert the least acres. Alternative A would have not converted any acres.

Roads on slopes greater than 67%

Forest Plan Standards and Guidelines recommend avoiding roads on slopes greater than 67%, where feasible. Roads constructed on steep slopes typically pose a high risk for initiating landslides and the potential for an increased amount of soil erosion. Table 3-30 displays the amount of NFS and temporary road constructed on slopes greater than 67%.

Table 3-30 - SL-2: Total Miles of Proposed Road on Slopes greater than 67% by Alternative

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
NFS	0	.61	1.0	.2	0.3	0
Temporary	0	.2	.6	.2	0.4	0
Total	0	.81	1.6	.4	.7	0

Source: GIS: Roads/LIDAR slope>67%

Specific areas that propose road construction on slopes greater than 67% include the 6556 road adjacent to the lower Navy Lake, the 6547 road south of Detailer Creek, and the 51442 road accessing Unit 80. The 6547 and 51421 roads have some short steep sections.

Full bench construction and end haul of overburden will be required when constructing these roads. Even with these practices, there is a risk of slope failure. Alternative C poses the highest risk followed by Alternative B, E, and D. Alternative F has no roads proposed on slopes greater than 67%.

Cumulative Effects

On the Tongass, there are typically no cumulative effects of timber management activities to soils at the stand level. This is because the proposed activity is typically the first entry in the stand, and there

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are no other proposed ground-disturbing activities, such as prescribed burning, brush piling, or disposal.

At the project scale, cumulative effects are viewed as a summation of the disturbance or potential soil disturbances. Activities resulting in cumulative effects on soil resources in the project area include past and future timber harvest, roads and natural disturbances such as windthrow and landslides. Future timber harvest that follows Forest Plan Standards and Guidelines and implements BMPs should not cumulatively result in negative effect to the soil resource. Road construction results in soil productivity loss and contributes to soil erosion. The incremental increase in the amount of NFS road over time has a negative effect on the soil resource. The average road density for watersheds in the project area is .417 mi/sq mile (0.4% of the area). Road maintenance, as well as use, can lead to increased soil erosion; the amount is not quantified but is expected to be relatively low. Over time, temporary roads revegetate and regain productivity. Landslides and windthrow may negatively affect soil quality by accelerating soil erosion; the amount is not quantified but is expected to be relatively low.

Subsistence

This analysis tiers directly to the Forest Plan Standards and Guidelines for subsistence (USDA 1997m, pp 4-86 & 4-87), the Forest Plan Final Environmental Impact Statement (FEIS) (USDA 1997 pp 3-210 through 3-229, 3-523 through 3-685 & Appendix H), and the Forest Plan Supplemental Environmental Impact Statement (SEIS) (USDA 2003b, pp 3-168 through 3-178, 3-308 through 3-439, and Appendix E). Refer to the FEIS and the SEIS for in-depth discussions on the history of subsistence use and community information. Since non-Native rural residents qualify, subsistence activities are not the same as Native cultural and traditional use even though overlap occurs.

ANILCA

The Alaska National Interest Lands Conservation Act (ANILCA), passed by Congress in 1980, mandates that rural residents of Alaska be given a priority for subsistence uses of fish and wildlife. Section 810 of ANILCA requires the Forest Service, in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of NFS land in Alaska, to evaluate the potential effects on subsistence uses and needs, followed by specific notice and determination procedures should there be a significant possibility of a significant restriction of subsistence uses.

The Alaska Land Use Council's definition of "significantly restrict subsistence use" is one guideline used in this evaluation. It states,

“A proposed action shall be considered to significantly restrict subsistence uses, if after any modification warranted by consideration of alternatives, conditions or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources.”

Considerations of abundance and distribution, access, and competition (by non-rural residents) are mentioned. The U.S. District Court Decision of Record in *Kunaknana v. Watt* provided additional clarification. In part, it states, “restriction for subsistence uses would be significant if there were large reductions in abundance or major redistribution of these resources, substantial interference with harvestable access to active subsistence-use sites, or major increases in non-rural resident hunting” (Forest Plan SEIS USDA 2003c, pp 3-172 & 3-173).

Subsistence Resources and Uses

Salmon and other finfish, shellfish, marine plants and mammals, terrestrial wildlife including deer and other mammals, berries, cedar bark, and timber are all subsistence resources harvested by rural communities in Southeast Alaska. Eighty-five percent of rural Southeast Alaska households reported harvesting subsistence food (Kruse and Muth 1990). In 1987, over half of all households reported harvesting more than 80 pounds of edible subsistence foods per person, and a quarter of households harvested more than 250 pounds per person. Almost one-third of rural households obtained at least half of their food from harvest of subsistence resources. By weight, fish and marine invertebrates account for 61% of subsistence resource harvest. Deer, other land mammals, and marine mammals represent 21, 4, and 3%, respectively, of subsistence harvest (USDA 1997n).

Affected Environment

Communities Using North Etolin Island (Wildlife Analysis Area 1901)

The project area for the Navy Timber Sale falls within documented community use areas for Coffman Cove and Wrangell (USDA 1997o). Wrangell and Coffman Cove are classified as rural and receive subsistence priorities. Although north Etolin Island, including the Navy project area, may be

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important to some individuals, substantial community use was not documented for any communities prior to 1994 (Forest Plan FEIS, (USDA 1997 Appendix H, pages H-20, H-21, H-36, H-37, H-40 to H-43, H-46, H-47, H-60, H-61). Wrangell reported the highest percentage of any community's total deer harvest coming from north Etolin Island at only 1-3% (Forest Plan FEIS, (USDA 1997 Appendix H, page H-61), and WAA 1901 was not identified by any community as a location contributing to 75% of annual deer harvest (Forest Plan FEIS, USDA 1997 Appendix H, pages H-64 to H-95). Since 1996, Wrangell residents have used north Etolin for deer hunting more consistently than residents of any other community. The percentage of Wrangell's total deer harvest derived from WAA 1901, as estimated by deer hunter surveys, fluctuated between 1% in 1998 to 15% in 1997, and remained less than 10% from 1998 to 2003. Ketchikan hunters also regularly use WAA 1901 to harvest deer. Ketchikan is classified as a non-rural community and residents do not have a subsistence priority under ANILCA.

Subsistence Resources

Subsistence resources reported to be most commonly used by residents of Wrangell and Coffman Cove include Chinook salmon, halibut, trout and char, deer, Dungeness crab, and berries (Forest Plan FEIS, USDA 1997 Pages 3-533 and 3-670).

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Direct, Indirect, and Cumulative Effects

Subsistence Use of Resources Other than Deer

The distribution and abundance of, access to, or competition for Chinook salmon, halibut, trout and char, Dungeness crab, and berries are not likely to be restricted by management activities related to the Navy timber sale. Timber harvest may increase availability of berries in harvest units in the short term, but may decrease availability over the long term. However, the Navy project area is not heavily used for berry-picking because there are no communities on the Anita Bay road system. Aquatic and marine subsistence resources are not likely to be significantly impacted by project-related activities. Therefore, it is not expected that a significant restriction of the opportunity for rural communities to continue to harvest these subsistence resources will occur.

The Forest Plan FEIS (USDA 1997p, 1997q, 1997r) provided a comprehensive analysis of subsistence resources and potential effects of management activities, both Tongass-wide and for each rural community in Southeast Alaska. That analysis concluded that Forest-wide, under full implementation of the Forest Plan, the only subsistence resource that may be significantly restricted in the future is subsistence use of deer (USDA 1997s, 1997t). Public comments identified concerns about abundance, access, and competition for deer, particularly in the Navy Lake area. Therefore, the remainder of this section focuses on the impacts of the proposed alternatives on the abundance and distribution of, access to, and competition for deer.

Distribution and Abundance of Deer

One estimate of deer abundance in the project area is based on the interagency deer habitat model, which estimates and measures change in winter deer habitat. Analysis was done at the WAA 1901 level to be consistent with hunter harvest data reports. Model results and analysis are described in detail in the Wildlife Resource Report. In addition, this analysis looked at Alaska Department of Fish and Game (ADF&G) deer hunter survey reports and annual pellet count data for trends.

Changes in deer distribution and abundance are expected ultimately to reflect loss of habitat from conversion of old-growth forest into second-growth stands by timber harvest. In the 25 to 30 years following timber removal, harvest units will retain some value as deer habitat by providing a flush of understory forage plants that is expected to be available to deer, except under deep snow conditions. After that time, as stands enter the stem-exclusion stage, harvest units will have almost no value as winter deer habitat. The stem exclusion effect from past harvest would override the short-term increase of forage in the new clearcuts.

This analysis assumes that timber harvest is done using the traditional clearcut method. However, other prescriptions (uneven-aged or two-aged), which probably have less effect on deer habitat capability, will be used to a varying degree on all of the action alternatives.

Declines in deer habitat are measurable and will occur under all action alternatives in areas where timber is harvested. Under the alternatives analyzed in this Draft Environmental Impact Statement (DEIS), the possibility of a change in abundance vary by alternative (Table 3-31). Some slight localized shifts in distribution could occur as a result of proposed timber harvest, but this is not expect to change the overall distribution within WAA 1901 or cause mass migration of deer to adjacent WAAs.

Table 3-31 - SB-1: Sitka Black-tailed Deer Habitat Capability Effects by Alternative

		Percent Decline in Habitat Capability ¹ by Alternative					
		Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Direct and Indirect Effects ²	0-25 years	0	6.5	6.8	2.6	3.9	1.3
	26-150 years	2.4	8.2	9.0	3.5	4.8	1.7
Cumulative Effects ³	26-150 years	11.3	18.6	19.3	14.4	15.5	12.9

¹Based on interagency deer model; these numbers are presented for comparison purposes only; they do not reflect actual, known numbers of deer

²Reported as percent decline from existing condition

³Reported as percent decline below estimated habitat capability in 1900 to demonstrate cumulative effects of past harvest + proposed harvest under each alternative

Although deer numbers in some areas may increase temporarily in response to increased food availability in harvest units, it is expected that deer abundance will ultimately decline approximately in proportion to timber harvest intensity. The deer model does not incorporate all factors known to influence actual deer populations; however, it does provide a tool to compare differences between alternatives. Reduced deer abundance could lead to increased competition between rural and non-rural hunters (see below).

Pellet count data indicates that deer populations appear to be stable to slightly increasing in Wildlife Analysis Area (WAA) 1901. Information from ADF&G also indicates that deer harvest rates have

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been fairly stable. Field surveys noted browsing in the project area. At this time, there is no reason to believe the deer population in the project area is suffering a decline.

Access to Deer

Project-related activities are not expected to restrict access to deer for subsistence use. In fact, access will improve as a result of roads associated with Alternatives B, C, D, and E. Although most roads will be closed after timber removal is complete, roadbeds would still improve opportunities for walk-in subsistence deer hunting. Roads will increase opportunities for subsistence hunting and they will open areas to hunting that historically have been relatively inaccessible. Roads, open or closed, will also increase opportunities for other hunters, and it is likely that both legal harvest and illegal poaching of deer will increase, especially with an open road system. Increased harvest of deer is expected ultimately to lead to increased competition for deer between rural and non-rural hunters (see below).

Competition for Deer

As described above, expected declines in deer abundance resulting from timber harvest and increased access to deer by both rural and non-rural hunters will lead to increased competition for deer. A deer population, at carrying capacity, should be able to support a hunter harvest (demand) of approximately 10% that is sustainable and that provides a reasonably high-level of hunter success (USDA 1997u). Hunter success can be expected to decline in areas where demand represents 10 to 20% of habitat capability. If demand exceeds 20% of habitat capability, harvest of deer by hunters may be directly or indirectly restricted (USDA 1997v). Table 3-32 displays current and projected hunter demand for deer with respect to deer habitat capability predicted by the interagency deer model after a 36% predation factor was applied (Cole letter 2005c).

Table 3-32 - SB-2: Estimated Deer Harvest by All Hunters as a Percent of Current and Projected Deer Habitat Capability in WAA 1901.

	Estimated WAA 1901 Deer Harvest (Percent of Deer Habitat Capability)	
	Deer per Square Mile ¹	Percent Hunter Demand of Habitat Capability ²
Existing Condition in 2007	18	3.3%
Year 2033: Alternative A	17	3.4%
Year 2033: Alternative B	16	3.7%
Year 2033: Alternative C	16	3.7%
Year 2033: Alternative D	17	3.5%
Year 2033: Alternative E	17	3.6%
Year 2033: Alternative F	17	3.5%

¹Based on interagency deer model; these numbers are presented for comparison purposes only; they do not reflect actual, known numbers of deer

²Percent harvest assumes 78 deer per year, based on 1997-2005, maximum estimated deer harvest estimated from ADF&G hunter survey

The Forest Plan (FEIS, USDA 1997 Appendix H) did not estimate projected demand in WAA 1901 for any community, because this WAA did not substantially contribute to 75% of any community's subsistence harvest of deer. According to hunter surveys, deer harvest appears to have dropped since the mid-1990s, and has remained relatively stable the last 5 years. Average deer harvest for 1997-

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2005, was 39 deer. This analysis assumes a demand of 78 deer per year, which is the maximum number of deer harvested 1997-2005, as estimated by deer hunter surveys (ADFG 1997-2005). Furthermore, this analysis only estimates effects for 26 years after proposed harvest, and assumes no further harvest will take place during that time. Assuming hunter demand does not increase above 78 deer per year, and that no further timber harvest or substantial habitat alteration occurs in the next 26 years in WAA 1901, none of the alternatives would result in hunter demand exceeding 10% of habitat capability. This analysis would imply that hunter success should not decline as a result of changes in habitat capability associated with this sale in the next 26 years, and that harvest of deer by hunters should not be directly or indirectly restricted by competition.

A habitat capability of 18 deer per square mile is assumed to be necessary to support both predation and hunter harvest (USDA 2001c, Page 2-155). Existing habitat capability is 18 deer per square mile, and habitat capability under all of the alternatives 26 years after harvest (Year 2033) would be below this level. This indicates that there may be increased competition between hunters, because the habitat may not support enough deer to support wolves and meet hunter demand. This is especially true due to uncertainty in the deer model (see the wildlife section of the DEIS) for use in predicting effects to wolves and hunters. As a result, hunter effort may increase to obtain the same number of deer or hunter success may decrease.

Increased access created through new road construction under some alternatives has the potential to increase competition between rural and urban hunters, particularly in areas like Cooney Cove and Navy Lake where road access was previously not available. However, because demand is not high and the WAA has not been reported as an important WAA to any one community (less than 10% of Wrangell deer harvest from this WAA), a significant possibility of a significant restriction on subsistence use of deer is not expected as a direct result of this project.

Finding

Consistent with Section 810 of ANILCA, the alternatives were evaluated for potential effects on subsistence uses and needs, as described above. Based on that evaluation and ANILCA definitions of significance, it was determined that, in combination with other past, present, and reasonably foreseeable future actions, all of the action alternatives would result in a significant possibility of a significant restriction on subsistence use of deer due to reductions in abundance and increases in competition. This is consistent with the cumulative determination in the Forest Plan which stated that implementation of the Forest Plan may result in a significant restriction to subsistence use of deer due to the potential effects of projects on the abundance and distribution of these resources, and on competition for these resources (USDA 1997, FEIS ROD, Page 36). None of the Navy Timber Sale alternatives would result in a significant possibility of a significant restriction on any other subsistence resources and uses.

Consistent with current Forest policy, subsistence hearings will be held in affected communities after publication and distribution of the DEIS.

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Transportation

The effects of roads on resources are discussed in the specific resource sections.

Affected Environment

Anita Bay, where most of the road system begins, is located about 25 miles south of Wrangell, Alaska. Etolin Island's transportation system is remote; there are no private landowners along the road system. The road system has no direct land-based access from communities. Access for motorized vehicles on the Etolin Island road system is most frequently obtained by taking an Off-highway vehicle (OHV) by private boat or a larger vehicle by commercial barge to a Marine Access Facility (MAF). The MAFs are generally built as Log Transfer Facilities (LTF), and the two terms are used interchangeably in this document. The Anita Bay MAF consists of two sites, Anita Bay South, an LTF, and Anita Bay North, equipment loading log bulkhead and adjacent dock. These two sites provide access to the majority of the road system.

The NFS roads were originally built for logging and the associated administration, though substantial recreational and subsistence use occurs primarily during the spring, summer, and fall. All of the roads fall under Forest Service jurisdiction. The island has approximately 50 miles of NFS roads.

The road system within the project area began in 1983, with the construction of the Anita Bay LTF and nearby road segments. Soon after it was built, timber harvest associated with the road system began. By 1986, the road system stretched toward Burnett Inlet, Mosmon Inlet, and Kindergarten Bay. In 1993 and 1994, the miles of road increased dramatically as the 51540 road was constructed to access timber in the Fishtrap Creek valley. Also in 1994, the road system was extended along the southeast side of Anita Bay to within a quarter mile of the Olive Cove road system, which lies outside of the project area.

Road Access Management

Forest roads are classified as NFS roads, Unauthorized Roads, and Temporary Roads by 36 CFR 212.1. The definitions and additional information are shown below.

NFS road. "A forest road other than a road which has been authorized by a legally documented right-of-way held by a state, county, or other local public road authority."

NFS roads are generally required to provide long-term or intermittent motor vehicle access. These roads receive constant or intermittent use depending upon the timing of timber harvest(s) and other activities. NFS roads form the primary transportation network in the project area.

Temporary road or trail. "A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas."

Temporary roads are intended for short-term use and maintained for a limited time usually to access a timber harvest unit. Temporary roads are decommissioned by removing culverts and bridges after a timber harvest.

Road decommissioning activities result in the stabilization and restoration of unneeded roads to a more natural state. The term generally refers to temporary roads constructed for timber harvests that have had stream courses restored, culverts removed, waterbars added where needed, and cut and fill slopes re-vegetated.

Road Maintenance

Road maintenance consists of superficial periodic repairs to an existing road surface, brushing, cleaning, and repairing drainage features. These tasks are performed to keep the roads in the safe and useful condition for which they were designed. Repairs may be accomplished as annual maintenance.

Road reconditioning is heavier maintenance of an existing road, such as culvert replacement, surface rock replacement, and subgrade repair.

Road maintenance and reconditioning consists of performing the work necessary to retain the road's traffic service level. The amount and level of maintenance and repair is dependent upon road management objectives and maintenance criteria.

Roads are often built and operated at a higher maintenance level during the timber sale than they are afterwards. The operational maintenance level is the maintenance level assigned to a road considering the immediate needs, road condition, budget constraints, and environmental concerns; in other words, it defines the level at which roads would be maintained during the timber sale. The objective maintenance level is the maintenance level assigned to the road after timber harvest. It considers future road management objectives, traffic needs, budget constraints, and environmental concerns.

Maintenance Levels (MLs) discussed in the Road Management Objectives (RMOs) includes MLs 1, 2, and 3. The definitions for MLs are found in FSH 7709.58. The purpose of the MLs is to define the level of service provided by, and maintenance required for, a specific road or road segment.

- ML 1. Assigned to intermittent service roads during the time they are closed to vehicular traffic. Emphasis is normally given to maintaining drainage facilities and runoff patterns.
- ML 2. Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Log haul may occur at this level.
- ML 3. Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities.
- MLs 4 and 5. Maintained to higher levels of comfort for a driver in a standard passenger car.

Roads Analysis

The roads in the Navy project area were analyzed in the Wrangell Ranger District Roads Analysis (RA USDA 2006d). This analysis was completed in August 2006. The analysis identifies issues specific to the road system. Table 3-33 displays information for the roads within the Navy project area, as well as recommendations from the Wrangell Ranger District RA, for the existing road system.

Please note that while the RA listed many problems with the roads maintenance has been ongoing, and some of the road maintenance problems listed below have been corrected.

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Table 3-33 - T-1. Roads within the Navy project area.

Route Number	Route Name	Milepost	Action	OBML
6538	Kindergarten Bay	0.0 to 0.76	Keep at ML2 and keep open to OHV and high clearance vehicles (HIC). Replace missing ditch and inlet covers. Clean drainage structures and catch basins. Portion of road is located in additional old-growth habitat and in high quality marten habitat.	2
6538	Kindergarten Bay	0.0 to 1.22	Downgrade from ML2 to ML1 and store. Portion of road is located in high quality wolf habitat, in additional old-growth habitat, and in high quality marten habitat.	1
6539	Snow Ridge	0.0 to 1.37	Keep at ML2 until 2013, for silvicultural activities, then downgrade to ML1 and store. To maintain accessibility until 2013, add pipe where needed, repair road sloughing, rough road, clear vegetation, and clean drainage structures, and shape ditches. Portion of road is located in wetland habitat, in additional old-growth habitat, in high quality wolf habitat, and in high quality marten habitat.	1
6540	Mussel Shell	0.0 to 10.23	Downgrade from ML3 to ML2 and keep open to OHV and HIC. Replace red pipes at MP 0.322, 3.473, and 8.866, and repair potential red pipes. Repair washed out road at mile 0.187. Clear beaver damage and vegetation from road. Add pipe, repair stress fracture, clean drainage structures, and shape ditches. Replace shot-up sign. Develop control measures for reed canary grass along road. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high quality marten habitat.	2
6541	Anita Bay Access	0.0 to 0.49	Downgrade from ML3 to ML2 and keep open to OHV and HIC. Repair red pipe at MP 0.045, water on road, repair or replace pipes where needed, and add riprap for erosion control. Clean ditches and outlet and shape ditches. Portion of road is located in additional old-growth habitat, in high quality wolf habitat, and in high quality marten habitat.	2
6541A		0.0 to 0.04	Keep open at ML2, open to OHV and HIC. Inventory and add to Road Condition Surveys (RCSs) database. It is a connector. Portion of road is located in additional old-growth habitat and in high quality marten habitat.	2

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Route Number	Route Name	Milepost	Action	OBML
6542	Mosman Inlet	0.0 to 0.78	Keep at ML2, storm-proof, and leave open for OHV and HIC. Needed for silvicultural activities until 2015. Clean ditches. Portion of road is located in wetland habitat. Portion of road is located in additional old-growth habitat, in high quality wolf habitat, and in high quality marten habitat.	2
6543	Little Lake	0.0 to 1.68	Keep at ML2, storm-proof and leave open for OHV and HIC. Needed for silvicultural activities until 2025. Repair road sloughing, clean drainage structures, and shape ditches. Clear vegetation from road. Develop control measures for reed canary grass along roadway. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high quality marten habitat.	2
6544		0.0 to 2.25	Keep at ML2, storm-proof, and keep open to OHV and HIC. Needed for silvicultural activities until 2017. Repair red pipe at MP 2.569, road sloughing, and erosion problems. Remove blowdown, clean drainage structures, shape ditches, and clear vegetation from road. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high quality marten habitat.	2
6544		2.25 to 2.7	Upgrade from ML1 to ML2, storm-proof, and keep open to OHV and HIC. Keep open to 2017, for silviculture activities. Clear brush. Portion of road is located in high quality marten habitat.	2
6545	Almost Quiet	0.0 to .42	Keep at ML2 and keep open to OHV and HIC. Needed for silvicultural activities until 2018. Repair road sloughing; replace dented inlet and ditch cover, clean drainage structures, shape ditches, and clear vegetation from road. Develop control measures for reed canary grass along roadway. Portion of road is located in wetland habitat, in additional old-growth habitat, in high quality wolf habitat, and in high quality marten habitat.	2
6546	East Mosman Inlet	0.0 to 2.07	Keep at ML2 and keep open to OHV and HIC. Repair holes in the road, road sloughing, clear vegetation from the road, clean drainage structures, and shape ditches. Develop control measures for reed canary grass along roadway. Portion of road is located in wetland habitat, in OGR, in additional old-growth habitat, and in high quality marten habitat.	2

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Route Number	Route Name	Milepost	Action	OBML
6547	Burnett Inlet	0.0 to 0.89	Downgrade from ML3 and keep open at ML2 to administrative site. Repair red pipe at MP 0.359, repair water on road, clean and repair catch basins, clean drainage structures, seed the banks, shape ditches, and clear vegetation from road. Three goshawk nests are within ½ mile of road. Portion of road is located in additional old-growth habitat, in high-quality wolf habitat, and in high-quality marten habitat.	2
6547	Burnett Inlet	0.89 to 1.2	Downgrade to ML1 and store. Portion of road is located in wetland habitat.	1
6548	Tidal Flat	0.0 to 0.66	Keep at ML2 and keep open until 2015, for silvicultural activities, then downgrade to ML1 and store. Clear vegetation from road. Clean the catch basins, shape the ditches, and seed the banks. Develop control measures for reed canary grass along roadway. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high quality marten habitat.	1
6558	Mosman Spur	0.0 to 0.57	Keep at ML2 and keep open until 2024, for silvicultural activities, then downgrade to ML1 and store. To maintain access for silvicultural activities, repair erosion problems, shape ditches, and seed the bank. Portion of road is located in wetland habitat, in OGR, in additional old-growth habitat, and in high-quality marten habitat.	1
6560	Lake Spur	0.0 to 0.52	Downgrade from ML2 to ML1 and store. Portion of road is located in wetland habitat.	1
51000	Harbor Creek	0.0 to 0.37	Currently ML2, remove from system and decommission. Portion of road is located in additional old-growth habitat and in high-quality marten habitat.	0
51001	Harbor Creek Spur	0.0 to 0.26	Currently ML2, remove from system and decommission.	0
51009	Kindergarten Pass	0.0 to 1.22	Keep at ML2, storm-proof, and keep open to OHV and HIC. Repair large dip in road. Repair surface erosion, slide, and road sloughing. Portion of road is located in wetland habitat, in additional old-growth habitat, in high-quality wolf habitat, and in high-quality marten habitat.	2
51011	Cedar Cliff	0.0 to 1.20	Keep at ML2 and keep open until 2018, for silvicultural activities, then downgrade to ML1 and store. Repair red pipes at MP 0.460 and 0.110, water on road, erosional problems, inlets and culverts, seed the bank, and clear vegetation. Portion of road is located in wetland habitat.	1

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Route Number	Route Name	Milepost	Action	OBML
51011	Cedar Cliff	1.20 to 1.32	Currently ML2, remove from system and decommission.	0
51381	Kindergarten	0.0 to 0.28	Downgrade from ML2 to ML1 and store. Portion of road is located in additional old-growth habitat. Portion of road is located in high-quality marten habitat.	1
51401	East Sort yard	0.0 to 0.53	Keep at ML2, open to OHV and HIC. Needed for silvicultural activities until 2025. Repair and clean ditches. Develop control measures for reed canary grass along roadway. Portion of road is located in wetland habitat and in high-quality marten habitat.	2
51401	East Sort yard	0.53 to 0.74	Downgrade from ML2 to ML1 and store. Portion of road is located in wetland habitat. Portion of road is located in additional old-growth habitat.	1
51402	West Sort yard	0.0 to 0.60	Keep at ML2 until 2013, for silvicultural activities, then downgrade to ML1 and store. To maintain access for silvicultural activities, repair water on road and clean catch basins. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high-quality marten habitat.	1
51421	West Mosman Inlet	0.0 to 0.45	Downgrade from ML2 to ML1 and store. Portion of road is located in additional old-growth habitat. Portion of road is located in high-quality marten habitat.	1
51441	Upgrade	0.0 to 1.24	Downgrade from ML2 to ML1 and store. Repair numerous erosion problems, road sloughing, and unstable banks. Clean ditches and inlets. Portion of road is located in wetland habitat.	1
51540	Fishtrap	0.0 to 6.91	Keep at ML2 and keep open to OHV and HIC. Needed for silvicultural activities until 2024. Repair red pipes at MP 0.216, 0.345, and 1.414. Repair water on road and clean drainage structures. Seed the bank and add riprap as erosion control. Retain seasonally closed gate. Two goshawk nests are within ½ mile of road. Portion of road is located in additional old-growth habitat and in high-quality marten habitat.	2
51540	Fishtrap	6.91 to 8.41	Downgrade from ML2 to ML1 and store. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high-quality marten habitat.	1

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Route Number	Route Name	Milepost	Action	OBML
51541	North Pump	0.0 to 0.91	Downgrade from ML2 to ML1 and store. Needed for silvicultural activities until 2024. Road can be re-opened when needed. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high-quality marten habitat.	1
51543	East Fishtrap	0.0 to 0.53	Keep at ML1 and stored. No action.	1
51544	North Fork Creek	0.0 to 1.97	Keep at ML2, storm-proof, and keep open to OHV and HIC. Needed for silvicultural activities until 2023. Repair red pipe at MP 0.226, water on road, and clean beaver activity. Replace outlet and clear vegetation. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high-quality marten habitat.	2
51581	Wetbeck	0.0 to 1.44	Keep at ML2, storm-proof, and leave open to OHV and HIC. Replace smashed pipe and remove blowdown from road. Clean drainage structures, shape ditches, and clear vegetation from road. Portion of road is located in wetland habitat, in OGR, in additional old-growth habitat, and in high-quality marten habitat.	2
51720	Anita	0.0 to 3.58	Keep at ML2 and keep open to OHV and HIC. Repair water on road, erosional problems, and remove blowdown. Seed the bank, add riprap, install pipe, and clean drainage structures. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high-quality marten habitat.	2
51723	Upper Anita	0.0 to 1.85	Keep at ML2, storm-proof, and keep open to OHV and HIC. Needed for silvicultural activities until 2024. Repair road sloughing, slides, and erosion problems. Seed the bank and clean drainage structures. Portion of road is located in wetland habitat, in additional old-growth habitat, and in high-quality marten habitat.	2

Wrangell Ranger District Access and Travel Management Plan Environmental Assessment:

The Wrangell Ranger District Access and Travel Management Plan Environmental Assessment (ATM EA, USDA 2007) is necessary to comply with the new management direction contained in the 2005 travel management rule (USDA 2005). The Wrangell District has also seen a dramatic decrease in available road maintenance funds, and subsequently a decision document was needed to manage the roads in a cost-effective and environmentally responsible manner.

The ATM EA combines the Zarembo Roads Analysis (2005) (USDA 2005) and the Wrangell Ranger District RA (excluding Zarembo Island) published in 2006. The selected alternative, Alternative Four

with Modifications, uses the average annual road maintenance budget projections as sideboards for the number of roads that could be maintained, and at what levels. This alternative closes several roads in the Navy project area. The roads that will remain open within the project area are the 6538, 6540, 6541, 0.68 miles of the 6545, 6546, 0.89 miles of the 6547, 0.80 miles of the 51009, 0.53 miles of the 51401, and 6.91 miles of the 51540, 51720, and the 51723. Almost all the other roads would be changed to ML1 (closed). The preferred alternative of the ATM EA is compatible with any Navy Timber Sale alternative. The ATM EA does not stipulate exactly when roads will be closed, this allows for use of the roads during the Navy Timber Sale.

The ATM EA was sent to the public for comment in April 2007. The decision for the ATM EA was made in August 2007 and includes appropriate changes in road maintenance levels and allowable types of access on NFS roads. As part of the decision, roads not needed for long-term management would be decommissioned. Roads used intermittently would be converted to an ML1 condition.

Environmental Effects

The alternatives contain up to 23.4 miles of proposed NFS roads, and up to 17.5 miles of proposed temporary roads. Temporary roads would be decommissioned after the timber sale. Only Alternative C proposes to build all the described roads.

Alternative A would not change the current road system. Alternative C proposes the maximum new road system considered. Alternatives B, D, E, and F offer a mix of NFS and temporary roads. Table 3-34 displays the type of road construction, and number of miles, by alternative.

Table 3-34 - T-2. Miles of Proposed Roads by Road Type and Alternative¹

Road Type	Alternative					
	A	B	C	D	E	F
NFS Road	0.0	16.9	19.9	5.0	5.2	0.0
NFS Road Reconstruction	0.0	1.2	3.5	0.7	3.3	1.7
Total NSF Road	0.0	18.1	23.4	5.7	8.5	1.7
Temporary Road ²	0.0	8.4	17.5	5.3	9.2	3.9
Totals	0.00	26.5	40.9	11.0	17.7	5.6

Source: GIS: j:\fsfiles\office\gis\navy\alts\Alternatives.mdb/allroads

¹Actual road lengths (miles) will differ slightly from the totals shown in this table, which were taken from the GIS data

²In some cases, old temporary roads that have been decommissioned have a discernable road prism. These road beds will be reused to minimize environmental effects

Proposed Road Concerns

There are no major concerns about the feasibility of constructing the proposed road system. Typical to any addition to the road system in the Tongass, there are short sections of full bench construction and numerous stream crossings. Portions of the proposed roads have been relocated to avoid rare plants and nest buffers found in the vicinity of the preliminary road alignment. Similar situations may arise during the implementation process, in which case every effort will be made to find a responsible solution.

In general, resource concerns and mitigation measures identified in the RMOs consist of the following.

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- Cutslope erosion will be mitigated by timely erosion control.
- Side slopes of greater than 72% will be mitigated by full bench construction and slope stabilization, if necessary.
- Road construction across muskegs will be mitigated by using wetland protection measures.

Additional details of specific road construction challenges, concerns, and mitigation measures are shown in the RMOs (Road Cards) located in Appendix C of the DEIS.

All construction and reconstruction of NFS and temporary roads will require the use of rock pits. Where feasible, existing rock pits will be used; however, most new road construction will require the development of new rock pits.

Log Transfer Facilities and Other Associated Facilities

Due to the remote nature of Etolin Island, harvested timber is hauled by log trucks to a LTF, transferred to the saltwater or barges, and towed to a lumber mill.

Timber harvested along the road system associated with Alternatives B, C, D, E, and F would go through the Anita Bay LTFs, located in Starfish Cove. Alternative B proposes the construction of the Burnett Inlet LTF near Navy Creek and associated road system. Dive surveys for the site have been conducted, but the design has not been completed as of the date on this report. Permitting for the site will begin only if Alternative B is selected. Alternative C proposes the construction of the Mosman Inlet LTF at Cooney Cove. Similarly, dive surveys have been conducted at this site, but the design has not been completed. Permitting for this site will begin only if Alternative C is selected. Where feasible, timber will be transferred by helicopter to barges on the water.

The current Anita Bay South Tideland Lease from the Alaska Department of Natural Resources expires January 2010. The leases stipulate that dive surveys must be conducted prior to each operating season for monitoring of bark accumulation, unless a waiver is granted. The last dive at this site was completed in 2000. An Army Corps of Engineers permit was obtained for the construction of the facility. The Anita Bay South permit number is 071-OYD-1-800384. The National Pollutant Discharge Elimination System (NPDES) permit, AK-G70-0014, was issued July 31, 2003, and was to expire March 21, 2005. A new permit has been applied for, but due to a backlog of permit requests, the Alaska Department of Environmental Conservation extended the existing permit administratively until a new permit can be issued.

The Anita Bay North facility was originally constructed as a barge ramp. A subsequent modification in 1995, updated the facilities. The current Anita Bay North Tideland Lease extends to January 11, 2014. The leases stipulate that dive surveys must be conducted prior to each operating season for monitoring of bark accumulation, unless a waiver is granted. The last dive at this site was completed in 2000. There is no authorization to water logs at the north LTF (so no NPDES permit is necessary).

As part of the logging operations, it is typical that a sort yard, fuel facility, equipment compound, repair shop, and field office will be located at one or multiple LTF sites. Activities with potential for spills of hazardous materials, such as fuel, require Spill Prevention, Control and Countermeasure plans (SPCC). Forest Service environmental engineers will review all SPCC plans prior to any petroleum products being on site. These plans must comply with all State and Federal permits and laws.

Camp facilities could be located either on land or on a barge near an LTF. Existing sites will be used where possible. All camps must obtain the appropriate State permits.

Land and float camps typically include: a water supply, garbage disposal, and sewage disposal. Water would be sourced from streams. Garbage would be disposed of by incineration, or transported to a

municipal disposal site. Land camps' sewage would require an approved drain field or septic tank; a float camp's sewage would be treated prior to discharge into the ocean.

Sort Yards

The primary sort yard associated with the Anita Bay LTF is located on the 6540 road at Mile Post 3.1. It was last used for the Starfish Cove Timber Sale in 1993, and now has a significant crop of alder growing on portions of it. The yard is surfaced with rock.

If the Burnett Inlet LTF (associated with Alternative B) were constructed, a small sort yard would be necessary. It may be feasible to use the first large developed rock pit near the LTF for log storage/sorting. It is estimated that two acres would provide enough space for short-term storage and sorting.

If the Mosman Inlet LTF (associated with Alternative C) were constructed, a sort yard would be necessary. It may be feasible to use the first large developed rock pit near the LTF for log storage/sorting. It is estimated that two acres would provide enough space for short-term storage and sorting.

Direct and Indirect Effects

Alternative A

Under Alternative A, there would be no changes in road management. Maintenance and repair activities would continue as previously planned. Road management on Etolin Island would be performed as stated in the ATM EA Decision Notice.

Table 3-35 - T-3. Current Miles of existing road system.

Road Miles			
Decommissioned	ML1	ML2	ML3
11.1	1.6	36.6	11.9

Source: GIS: j:\files\office\gis\navy\covers\Navy.mdb\road_arcs

Alternative B

Alternative B proposes the construction of 16.9 miles of NFS roads, and 8.4 miles of temporary roads; additionally this alternative would require 1.2 miles of NFS road reconstruction. The proposal to construct the new 5.4 mile 6546 road segment would enable substantial harvest along the east side of Mosmon Inlet. Future entries that harvest timber along this road would be possible. The proposed 2.0-mile extension of the 6547 road enters the Detailer Creek basin, crosses it, and extends toward Burnett Inlet before ending near the beach buffer. Future harvest along this road is a possibility, but future extensions of the road may be impractical because of construction difficulties due to the terrain, which would require road construction in the beach buffer. The proposed 3.3-mile 6556 road would begin at the new Burnett Inlet LTF near Navy Creek and extend east, eventually leading to the north side of Navy Lake. Although it would be possible to extend the road in the future, the volume of timber per mile of road would drop substantially; however, there will be future harvest opportunities along the road. A portion of the proposed 2.5-mile 51009 road segment extends into the Scenic Viewshed (SV) Land Use Designation (LUD), and provides opportunity for current and future harvest along the proposed segment. Extensions of this road may be practical. The 1.0-mile segment of proposed road 51561 extends south of the Navy LTF, and provides access to almost all of the suitable

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and available forest land in that area. Future extensions of this road will not be possible due to beach buffer and wilderness constraints.

The 6540, 51403, 51421, 51461, and 51462 road segments proposed under this alternative are less than one mile in length; and are either short extensions of existing roads, or new roads starting from the existing road system.

The 8.4 miles of temporary roads built under this alternative would be decommissioned after the timber sale. Proposed road 6546 would be maintained at a ML 2 to provide access for timber management activities and possible salvage sales along the road segment. If this alternative is chosen: all of the other roads, including the 1.2 miles of reconstructed NFS roads, would be stored at the end of the timber sale.

Alternative C

Alternative C proposes the construction of 19.9 miles of NFS roads and 17.5 miles of temporary roads; additionally this alternative would require reconstruction of 3.5 miles of NFS road. The proposed 1.3-mile extension of the 6540 road would provide opportunities for timber management along the road. With short temporary roads, additional harvest could be considered. Future extension of the 6540 road is unlikely, due to a beach buffer to the west and the Mosman SOGR to the south. The proposal to construct the new 5.4-mile 6546 road segment would enable substantial harvest along the east side of Mosmon Inlet; although future extensions of the 6546 are not likely due to the location of an OGR. The proposed 2.2-mile extension of the 6547 road enters the Detailer Creek basin, crosses it, and extends toward Burnett Inlet before ending near the beach buffer. Future harvest along this road is a possibility, but future extensions of the road may be impractical because of construction difficulties due to the terrain, which would require road construction in the beach buffer. The proposed 6555 road begins at the Mosman Inlet LTF in the Steamer Bay Medium Old-Growth Reserve (MOGR). The road passes through the MOGR and into SV LUD and ML LUD. The road provides access to land that would otherwise be inaccessible to conventional logging systems. The total road length extends 2.8 miles, and although future extensions of the road are unlikely, the present road would offer future opportunities for harvest. A portion of the proposed 3.0-mile 51009 road segment extends into the SV LUD, and provides opportunity for current and future harvest along the proposed segment. Opportunity for future 51009 road extensions is unlikely due to beach buffer and the proximity of an OGR. The proposed 1.1-mile segment of the 51442 road would be located on the side of a ridge in order to access timber. Future extensions of this road are possible, although construction may be difficult due to steep slopes.

The 51403, 51421, 51461, and 51462 road segments proposed under this alternative are less than one mile in length and are either short extensions of existing roads or new roads starting from the existing road system. The 51551 road is proposed as a short 0.3 mile extension off the proposed 6555 road.

The 17.5 miles of temporary roads built under this alternative would be decommissioned after the timber sale. Proposed road 6546 would be maintained at a ML 2 to provide access for timber management activities and possible salvage sales along the road segment. The other roads would be stored at the end of the timber sale. This includes the 3.5 miles of NFS roads that would be reconstructed under this alternative.

Alternative D

Alternative D proposes the construction of 5.0 miles of NFS road and 5.3 miles of temporary roads; additionally this alternative would require reconstruction of 0.7 miles of NFS road. The proposed 2.0-mile extension of the 6547 road enters the Detailer Creek basin, crosses it, and extends toward Burnett Inlet before ending near the beach buffer. Future harvest along this road is a possibility, but future extensions of the road may be impractical because of construction difficulties due to the terrain, which would require road construction in the beach buffer.

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The 6540, 6546, 51009, 51403, and 51421 road segments proposed under this alternative are less than one mile in length, are either short extensions of existing roads, or new roads starting from the existing road system.

The 5.3 miles of temporary roads built under this alternative would be decommissioned after the timber sale. All NFS road constructed under this alternative would be stored at the end of the timber sale; including the 0.7 mile of NFS roads that would be reconstructed under this alternative.

Alternative E

Alternative E proposes the construction of 5.2 miles of NFS road and 9.2 miles of temporary roads; additionally this alternative would require reconstruction of 3.3 miles of NFS road. The proposed 1.3-mile extension of the 6540 road would provide opportunities for timber management along the road. With short temporary roads, additional timber management could be considered. Future extension of the 6540 road is unlikely due to a beach buffer to the west and an old-growth reserve (OGR) to the south. The proposed 1.8-mile extension of the 6547 road enters the Detailer Creek basin, crosses it, and extends toward Burnett Inlet, before ending near to the beach buffer. Future harvest along this road is a possibility, but future extensions of the road beyond 0.4 miles may be impractical because of construction difficulties due to the terrain, which would require road construction in the beach buffer.

The 6546, 51009, 51403, and 51421 road segments proposed under this alternative are less than one mile in length, are either short extensions of existing roads, or new roads starting from the existing road system.

The 9.2 miles of temporary roads built under this alternative would be decommissioned after the timber sale. All NFS road constructed under this alternative would be stored at the end of the timber sale. This includes the 3.3 miles of NFS roads that would be reconstructed under this alternative.

Alternative F

Alternative F does not propose any miles of NFS road construction. It proposes 3.9 miles of temporary roads and reconstruction of 1.7 miles of NFS road. The 3.9 miles of temporary roads built under this alternative would be decommissioned after the timber sale. The 1.7 miles of NFS roads reconstructed under this alternative would be stored at the end of the timber sale.

Cumulative Effects

The effects of the change proposed to the transportation system on the other resources are considered in their respective resource sections or reports. The previous ATM EA section divulges cumulative effects, and is incorporated into this section by reference.

Maintenance and reconditioning of existing NFS roads is an ongoing process that occurs on a periodic basis. Normally, this type of road work is determined to fit the category of routine repair and maintenance of roads that do not individually or cumulatively have a significant effect on the quality of the human environment and may be categorically excluded. (FSH 1909.15, 31.12) The maintenance and reconditioning of NFS roads on the project area may occur before, during, and after the project analysis. This work is done through separate service contracts to reduce the backlog of deferred maintenance, recondition roads to comply with BMPs, maintain the existing infrastructure for the proposed timber sale or future harvest entries, and other National Forest management activities. The timing of this work may coincide with this project's analysis, but is not part of the project. Any effects from the road maintenance and reconditioning work are included in the cumulative effects analysis for this project.

The change authorized under any of the Navy Project alternatives to the Anita Bay road system is not expected to impact long-term access or travel management on the existing Anita Bay road system.

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During the timber sale, there may be periods of time where the purchaser maintains specific existing roads. Roads may also be temporarily blocked to move equipment or for safety purposes during logging operations. These temporary conditions will not likely have a long-term cumulative impact.

Maintenance of existing NFS roads will be ongoing in the project area during the life of the project. Road maintenance of some type is generally performed annually on most of the ML2 and ML3 collector roads in the Anita Bay road system. In 2009, another round of brushing is planned for the ML3 roads, and if funding and time allow, some of the more frequently used ML2 roads will be brushed. Any potential contracts for maintenance and reconditioning would be designed to avoid interference with the proposed timber sale. No other potential conflicts are foreseen at this time.

Road maintenance and reconditioning projects since 2005 include the brushing along the ML2 and ML3 roads and hand-road maintenance. Hand-road maintenance consists of clearing trees from the roadway, cleaning partially or completely blocked culverts, sign installation, and other miscellaneous road maintenance. Additionally, in 2006, there was a small maintenance contract that cleared a blocked culvert along the 51720 road.

At the Anita Bay North LTF there is a proposal to widen the lower barge ramp and widen the roadway between the current parking lot (old camp site) and the Anita Bay North LTF. This will enable small operators to use the lower barge ramp for loading logs. The steep slope between the parking lot and LTF will be laid back at a gentler slope, which will reduce the chances of cut-slope erosion. The design for this project is complete; but due to the present funding situation, it is impossible to predict exactly when it will be completed.

Watersheds and Fisheries

Introduction

This section describes the existing condition of watershed and fisheries resources in the Navy Project Area and discloses the direct, indirect, and cumulative effects of the proposed alternatives.

Watersheds are defined as an area that contributes surface and subsurface water to a single point. Key watershed components include: stream channels, groundwater, karsts, riparian areas, wetlands, lakes, and soils, these components transport, filter, and store, water and sediment.

Analysis Area

The analysis area is shown in Figure W-1.

The Navy Project Area on Etolin Island consists of 32 7th field¹ Hydrologic Units (HUCs), referred to as watersheds, totaling 81,575 acres (Figure W-1). Seventeen of these are true watersheds, with one outlet and no inlets. Fifteen are frontal watersheds, which have multiple streams draining directly into saltwater. The project area is characterized by north-south trending ridges up to 3,920 feet high separated by glacially carved valleys feeding into bays and inlets. A large low-elevation area is located in the center of the project area where these glacial valleys converge. These landforms determine the arrangement of natural channel types, fish habitat, and sediment risk.

Existing uses of water in and around the Navy Project Area include growth and propagation of fish, use by other aquatic life and wildlife, recreation use, seasonal water supply at the Forest Service field camp (a small creek at the head of Burnett Inlet), hydropower, salmon aquaculture, water supply at the Burnett Fish Hatchery (Burnett Creek), salmon aquaculture in marine waters near the mouth of Fishtrap Creek in Anita Bay, and oyster aquaculture in marine waters south of Cooney Cove.

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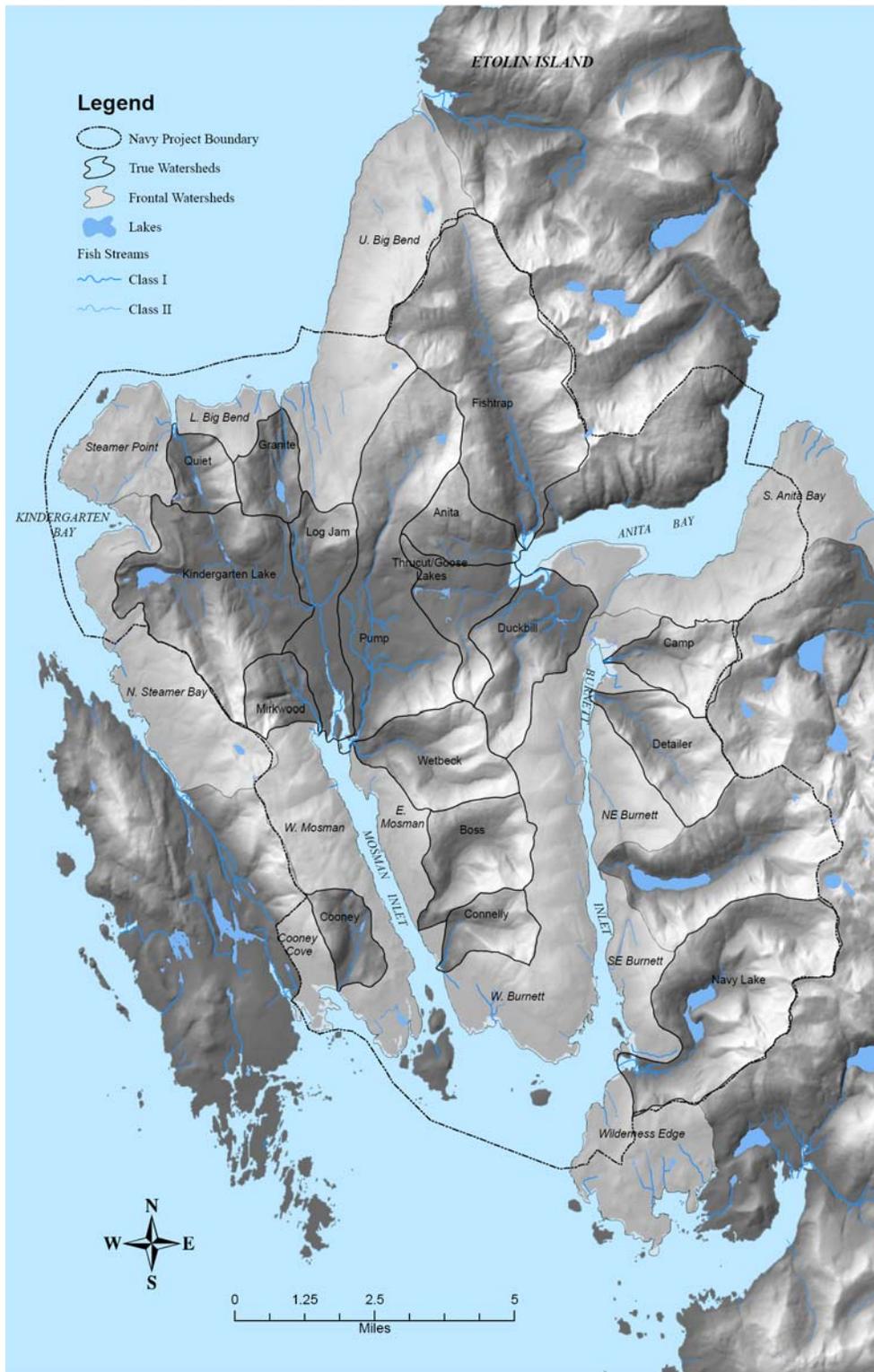
Existing uses of water in and around the Navy Project Area include growth and propagation of fish, use by other aquatic life and wildlife, recreation use, seasonal water supply at the Forest Service field camp (a small creek at the head of Burnett Inlet), hydropower, salmon aquaculture, water supply at the Burnett Fish Hatchery (Burnett Creek), salmon aquaculture in marine waters near the mouth of Fishtrap Creek in Anita Bay, and oyster aquaculture in marine waters south of Cooney Cove.

The Burnett Lake Creek watershed is in the project area, but does not have any harvest or road building proposed. None of the proposed timber sale activities will affect the watershed, the aquaculture operations, hydropower, or water supply present; therefore, it will not be discussed in detail.

¹ Hydrologic Units Codes (HUCs) are a hierarchical system of numbering watersheds, and the fields correspond to size. Etolin Island is a 5th field HUC containing several 6th field HUCs, which in turn are combinations of 7th field HUCs. Each HUC is delineated along drainage divides.

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Figure W-1. Watershed and Fisheries Analysis Areas



The true watersheds provide more fish habitat than frontal watersheds (85 miles of fish streams versus 32), and are more vulnerable to cumulative effects as the larger, fish-bearing streams are downstream of all activities in the watershed. In frontal watersheds, there are many small-unconnected streams, most of which only contain fish habitat near the shoreline. Thus, effects of activities in these areas are not concentrated downstream.

Data Sources

- Field reconnaissance was completed from 2004-2006, to map streams in the project area and survey watersheds to determine their sensitivity to past management activities.
- Road Condition Surveys (RCS) were completed on the Anita Bay road system from 1998 to 2004.
- Other streams were located and classified based on aerial photographs and Laser Detection and Ranging (LIDAR) data from 1997 and 2004.
- Approximately 21.6 miles of valley bottom anadromous streams and 56 fish trapping locations are included in the ADF&G Anadromous Catalog of 2006 in the Navy Project Area.
- Fish habitat extent was updated with electro-shocking of streams within and around unit boundaries.
- Stream Surveys conducted on Duckbill, Navy, Pump, Wetbeck, and Camp Creeks.

Affected Environment- Stream Channels and Riparian Management Areas (RMA'S)

The Navy Project Area contains 376 miles of mapped streams which provide habitat for aquatic organisms and store and transport water and sediment. Streams are differentiated by process group, channel type, and by Aquatic Habitat Management Unit (AHMU) class.

Process groups describe the geomorphic properties of stream channels and their general location in the landscape, while channel types further differentiate channels within process groups (Paustian 1992). The process group code is explained in Appendix B (Unit Cards).

Streams are further classified based on their ability to produce fish, which is determined by physiological and biological data.

- Class I. Streams and lakes with anadromous or adfluvial fish or fish habitat; or, high quality resident fish waters, or habitat above fish migration barriers known to provide reasonable enhancement opportunities for anadromous fish. There are approximately 44 miles of mapped class I streams in the project area watersheds.
- Class II. Streams and lakes with resident fish or fish habitat and generally steep (6 to 25 percent or higher) gradients where no anadromous fish occur, and otherwise not meeting class I criteria. There are approximately 72 miles of mapped class II streams in the project area watersheds.
- Class III. Streams are perennial and intermittent streams that have no fish populations or fish habitat, but have sufficient flow or sediment and debris, transport to directly influence downstream water quality or fish habitat capability. There are approximately 189 miles of mapped class III streams in the project area watersheds.
- Class IV. Other intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to directly influence downstream water quality or fish habitat capability. There are approximately 71 miles of mapped class IV streams in the

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project area watersheds; the actual length is considerably higher due to the difficulty to map small streams without extensive ground reconnaissance.

The Navy Project Area contains 550 acres of lakes, which provide habitat for aquatic organisms and store and transport water and sediment. Important project area lakes include Kindergarten Lake, Burnett Lake, and Navy Lake. All three are upstream of anadromous fish barriers and provide high-quality resident fish habitat.

Riparian Management Areas

Riparian Management Areas (RMAs) are areas adjacent to streams and lakes that transition from the aquatic to the vegetative environment. RMAs include the stream channel or lake and adjacent lands that have a direct effect on aquatic habitat. At the watershed scale, RMAs form the complex network of features required to sustain hydrologic, geomorphic and ecological processes that occur where water meets land. Protecting RMAs preserves these processes.

Stream RMAs are delineated according to stream value classification and channel type process groups. Minimum protection standards are defined for harvest activities and road building activities. RMAs are delineated for every stream within or adjacent to proposed harvest units. Lake RMAs are delineated as 100 feet from the lake unless soil conditions require a larger RMA.

A total of 258 acres of riparian area along Class I, II, and III streams has been harvested in the Navy Project Area (Table 3-36) by previous management.

Table 3-36 - W-1. Existing RMA harvest in the Navy Project Area

Name	Acres of RMA	Percentage of RMA Harvested
Camp Creek	87	37.5%
Duckbill Creek	312	10.2%
Fishtrap Creek	564	1.9%
Granite Creek	113	9.3%
Kindergarten Lake Creek	430	13.4%
Log Jam Creek	211	9.8%
Pump Creek	601	3.7%
Quiet Creek	82	2.4%
South Anita Bay Frontal	183	6.1%
Southeast Burnett Frontal	71	1.1%

Environmental effects - Stream Channels and Riparian Management Areas

All alternatives implement Forest Plan Standards and Guidelines, which do not allow for harvest in RMA areas. Therefore, no adverse effects to stream habitat is expected from timber harvest. Stream crossings and harvest corridors will limit impacts to RMA where feasible.

All class I and II streams are protected from harvest activities with a minimum horizontal distance of 100 feet from the bankfull margins. Harvest activities near class I, II, and III streams require that trees be felled away from the stream, and that trees be yarded across or along stream courses be fully

suspended. Additional measures are taken to protect streams based on their process group classification. Logging debris introduced into class IV streams must be removed.

Windfirm riparian no-harvest buffers, as described in the unit cards (Appendix B), are implemented in all alternatives, and are expected to prevent direct effects and minimize indirect and cumulative effects to stream habitat. The Forest Service anticipates incidental windthrow associated with some buffers. Stream reaches with past riparian harvest may experience some impacts associated with loss of large wood, regardless of which alternative is selected. The Navy Timber Sale will not worsen those impacts.

Unit cards (Appendix B) show the specific locations of RMAs and provide instructions for specific mitigation measures designed to protect water quality and fish habitat, and measures to assure windfirmness of RMAs.

Affected Environment –Water Yield and Stream Habitat

Water yield may be adversely affected by timber harvest activities. In turn, it may indirectly affect fish habitat.

Changes in annual water yield following timber harvest and road building have been documented in numerous studies in the Pacific Northwest and are commensurate with the proportion of watershed harvested (Bosch and Hewlett 1982, Harr 1986, Jones and Grant 1996, Jones 2000, Moore and Wondzell 2005). Timber harvest changes water yield by altering processes that control the amount and timing of water delivered to streams: rain interception, snow storage, snow melt, soil moisture, evaporation and transpiration. Mid-slope roads can intercept subsurface flow paths, converting subsurface waters to surface waters (McGee 2000). Road ditches combine with and extend the stream network, thereby increasing transport efficiency to streams (Montgomery 1994, Wemple et al. 1996).

Recovery of pre-harvest streamflow conditions is reported to occur at between 10 and 30 years in the Pacific Northwest (Jones 2000). Road effects on water yield may not recover until flow paths are reclaimed during road decommissioning.

Cumulative harvest levels that exceed 20% in watersheds may indicate potential effects on water yields. Currently, cumulative harvest levels range from 0 to about 16% for true watersheds. Road density does not exceed 2 mi/sq mi (a threshold suggested for properly functioning watersheds, (NMFS 1996) in any true watersheds.

There is no baseline streamflow data available for the project area. Based on the current levels of cumulative watershed harvest and roads, and field-based assessment of channel conditions, it is unlikely that water yields have been measurably changed by past harvest or roads in any of the Navy Project Area watersheds.

Increases in peak streamflow could result in changes in channel morphology and habitat features. Higher levels of stream flow during dry periods could be beneficial to aquatic life, while lower levels of stream flow during dry periods could limit fish migration, reduce pool depth, and increase stream temperature. We have concluded above, based on best available science, that stream flows in the project area have probably not been affected by past management.

Environmental Effects – Water Yield

Alternatives that result in 20% of the watershed being harvested over the past thirty years may change water yields. Every alternative except F exceeds this level in at least one true watershed. In most cases, effects will be minimized through partial harvest with high retention and helicopter yarding. Road density will only exceed 2 mi/sq in Alternative C for the Kindergarten Lake Watershed but will be greatly reduced following ATMP implementation. Alternative C poses the most risk for changes

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in water yields, but the changes are not expected to result in indirect effects to water quality or essential fish habitat. Partial retention and location of harvest were important factors in reducing risks to water yield.

Affected Environment - Water Quality

Water quality may be adversely affected by timber harvest activities. In turn, it may indirectly affect fish habitat.

Timber harvest activities in Southeast Alaska affect stream temperature and sediment. Water quality impacts from timber sale activities may be short-lived or chronic depending on the extent of land disturbance. For instance, sediment may be released into streams from disturbed soil in yarding corridors during storms for 1 to 2 years while the area re-vegetates. If not addressed, a larger landslide may release sediment for 5-10 years, while sediment release from an eroding road prism may continue indefinitely.

Temperature

Stream temperature can increase when riparian forests or streamside vegetation is harvested or experiences blow down. Stream temperatures may also increase when large areas of hillsides are clearcut, increasing soil temperatures higher in the watershed.

No stream temperature data is available for the project area. However, given the relatively small proportion of existing riparian harvest in most watersheds, and the recovery of canopy since riparian forest along fish streams has been harvested (prior to TTRA in 1991), it is unlikely that stream temperatures have been measurably increased by past timber harvest in the Navy Project Area.

Sediment

Sediment can be introduced into streams by timber harvest, channel erosion, road construction, road erosion, road failures, landslides, debris flows, storms, and rain splash on bare soils. The delivery of sediment to streams from these events depends on their connection to streams (Gomi et al 2005).

TNF monitoring data indicate that harvested areas are consistently within the established standard of less than 15 percent detrimental soil disturbance (USDA Forest Service 2005).

Landslides have been inventoried and are discussed in the Soils section and Soils Resource Report. RCS were conducted throughout the project area to identify erosion features that may be a source of sediment. Erosion features include fill and cut-slope erosion, road surface erosion, ditch erosion, and other problems that can shed excess sediment into streams. Table 3-38 displays the number of erosion features in the project area. A maintenance contract in 2006 addressed significant erosion features that were contributing sediment to stream courses. As a standard part of the timber sale contract, road maintenance and erosion control will be required for roads used in the Navy Timber Sale.

Table 3-38 also displays current numbers of stream crossings in the project area, an indication of past short term sediment increases and current sediment entry points from road systems.

Table 3-37 - W-2: Harvest Proposed in True Watersheds by Alternative and Proposed Road in True Watersheds by Alternative

3 Environment and Effects

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Table 3-38 - W-3: Erosion features and stream crossings by watershed

Watershed Name	# of Erosion Features	# of stream crossings
Anita Creek	5	12
Camp Creek	1	0
Duckbill Creek	4	20
Fishtrap Creek	4	28
Granite Creek	2	2
Kindergarten Lake Creek	10	57
Log Jam Creek	14	14
Pump Creek	5	34
South Anita Bay Frontal	21	42
Steamer Point Frontal	2	0
Thrucut/ Goose Lakes Creek	5	8
Upper Big Bend Frontal	1	1
West Burnett Frontal	2	8
Wetbeck Creek	2	6

Source: Wrangell Ranger Districts road condition survey database.

Sediment Risk Assessment

The Sediment Risk Assessment (Geier 1998) is a descriptive model developed for the TNF that uses watershed characteristics such as slope, amount of harvest, road density and stream density to estimate the potential risks of mass movement, sediment transport, and storage of stream channels in each watershed.

A sediment risk assessment was conducted for watersheds of the Navy project.

This analysis focused attention to watersheds that may have inherently higher risk for sediment transport, and delivery.

Environmental Effects – Water Quality

Temperature

Windfirm riparian no-harvest buffers, as described in the unit cards (Appendix B), are expected to prevent measurable direct, indirect, or cumulative effects to stream temperature.

Sediment

All alternatives may result in short-term increases in sediment. In particular, road construction and drainage structure installation and removal are expected to temporarily increase sediment delivery to streams. The temporary increase would not degrade water quality or fish habitat. Implementation of BMP described in the unit and road cards are expected to maintain water quality within standards established under the Clean Water Act, and minimize impacts to essential fish habitat.

3 Environment and Effects

According to the Sediment Risk Assessment, Quiet Creek Watershed is the most susceptible to sediment. Connelly Creek Watershed and Navy Creek Watershed ranked relatively high for sediment sensitivity, due to steep slopes and amount of hazardous soils. Some of this risk was mitigated by deferring harvest in parts of these three watersheds to protect sensitive streams and slopes within the watersheds. Roads have been located to reduce risk of sedimentation and will be stored after timber sale activities are completed. The other watersheds in the project area have a considerably lower sediment risk.

Road construction in Southeast Alaska requires substantial ground disturbance, which may result in at least short term increases in sediment transport (Paustian 1987). As the amount of road increases, the potential for sediment increases. Table 3-36 compares road construction by alternatives by watershed.

A number of existing roads have been recommended for storage in the WRD ATM EA. Storage of several roads identified will have significant beneficial effects to watershed condition.

Practices that will minimize erosion and sediment introduction to streams are listed in the unit and road cards.

Affected Environment - Marine Habitat

The accumulation of bark and other woody debris on the ocean floor associated with the transfer and storage of logs can impact marine habitats by smothering organisms or creating unfavorable chemical conditions. Tideland fills at Marine Access Facilities can destroy marine habitats and displace organisms.

There are currently two existing LTFs in the Navy Project Area. They are both located in Starfish Cove on the South side of Anita Bay. Anita Bay North is used primarily for equipment loading but has had 6.6 MMBF moved across it associated with small timber sales. Bark deposition surveys were conducted in 2000 and found bark deposits covered 0.5 acres of marine habitat in front of the LTF facility. These facilities are subject to state and federal permits which specify bark deposition thresholds of less than one acre of continuous coverage 10 cm thick. The existing levels are less than the permit threshold.

The South Anita Bay facility has had 102.85 MMBF moved across associated with larger timber sales including the Granite Timber sale that built the LTF in the early 1980s. Dive surveys in 2000 indicate that an area of 0.8 acres of marine habitat have continuous bark coverage; no timber has moved across LTF from 2000 to the present. This measure is below the 1 acre permitted threshold.

There are two new LTF locations proposed for the Navy Timber Sale. Alternative B proposes the construction of the Burnett Inlet LTF south of Navy Creek and Alternative C proposes the construction of the Mosman Inlet LTF at Cooney Cove. A marine dive survey was completed in April 2007. The survey found that marine life, benthic diversity, vegetation and bathymetric properties appear to be stable and of common abundance for both sites. The dive surveys results concluded that both LTF sites meet the Forest Plan and Coastal Zone Management Criteria for LTF development.

Environmental Effects - Marine Habitat

Most of the proposed timber harvest on the road system will go through the South Anita Bay facility. Alternatives B and C would have the most impact on the marine habitat, due to larger quantities of log transfer, as well as the construction of the Burnett Inlet LTF and Mosman Inlet LTF. The timber sale operator will direct barge transfer for this timber sale or have to apply for additional permits to water logs. Direct and indirect impacts include bark deposition and potential for pollution associated with transfer of fuel or other hazardous materials at the facility. Bark deposition is not expected to

exceed permitted thresholds at any of the LTFs. Fuel transport and storage procedures are governed by contract specifications and subject to spill contingency and reporting requirements.

None of the alternatives are expected to affect marine-based aquaculture in Anita Bay or near Cooney Cove.

Affected Environment - Fish Habitat

Timber harvest activities may also affect fish habitat by altering riparian vegetation and stream channels, or impeding fish migration at road-stream crossings.

Fish habitat in the Navy Project Area supports populations of pink salmon (*Oncorhynchus gorbuscha*), chum salmon (*Oncorhynchus keta*), coho salmon (*Oncorhynchus kisutch*), and steelhead (*Oncorhynchus mykiss*). Additional fish populations include resident and anadromous forms of cutthroat trout (*Oncorhynchus clarkii*) and Dolly Varden (*Salvelinus malma Walbaum*).

Sustaining the production of salmon and trout is partially dependent upon habitat protection, and is a prominent objective of the Forest Plan Standards and Guidelines and the Tongass Timber Reform Act (TTRA) provisions that are applied to timber harvest activities and road construction in the TNF.

Detailed stream habitat surveys were completed in 2005 and 2006 for Duckbill, Navy, Pump, Wetbeck, and Camp Creeks. There were no measures that indicated that these stream segments were significantly impaired by sediment increases or RMA harvest. Stream habitat data signified relatively healthy aquatic habitat for Duckbill, one of the most developed watersheds in comparison to the natural range of variability across the Tongass NF (Thompson 2006). Specific attributes that may be affected by past harvest are discussed in the individual watershed descriptions.

Environmental Effects – Fish habitat

Direct effects on fish stream habitat would be associated with fish stream drainage structure installation or removal. Instream work would result in short term sediment increases as described above. BMPs would minimize sediment increases. Windfirm riparian no-harvest buffers, as described in the unit cards and implemented in all alternatives, are expected to prevent direct effects and minimize indirect and cumulative effects to stream habitat. We anticipate incidental windthrow associated with some buffers since it is impossible to prevent all windthrow. We anticipate that stream reaches with past riparian harvest may experience some impacts associated with loss of large wood regardless of which alternative is selected. The Navy Timber Sale will not worsen those impacts.

Essential Fish Habitat

The Magnuson-Sevens Fisheries Conservation and Management Act of 1996 requires Federal agencies to consult with the NMFS on activities that may affect Essential Fish Habitat, defined as “those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity.” The Act promotes the protection of these habitats through review, assessment, and mitigation of activities that may adversely affect these habitats.

Description of Proposed Action

The proposed action (Alternative B) for the Navy Timber Sale would harvest 9716 acres of FS land on Etolin Island. Logs will be barged from the Anita Bay North (LTF) and Navy Bay (LTF) (only alt B). A complete description of the proposed action and all of the alternatives can be found in Chapters 1 and 2 of this document. The other four action alternatives propose harvest ranging from 1,322 to 12,800 acres. Various yarding systems including cable, shovel, and helicopter are proposed. New road construction would range from 3.9 to 37.4 miles and include both temporary and system roads.

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The Navy Timber Sale may adversely affect freshwater EFH because class I streams are directly affected by harvest and stream crossings. Impacts to these waters are expected to be minimal for the following reasons (site specific details are shown on unit and road cards):

- The majority of the proposed roads will be stored following timber sale activities.
- All class I and II streams in the Navy Project area would be protected by a minimum 100' no-harvest RMA buffer with more area protected for different process groups, sensitive riparian soils, elevated windthrow concern, and other relevant resource concerns.
- Class III streams will be protected at least by a no-harvest buffer to the top of the side slope (v-notch) according to the Forest Plan.
- Maintenance will be built into road construction contracts that will correct existing erosion features.
- Site specific data was collected on all fish streams in the project area to ensure proper windfirmness buffers, proper channel classification, and size of riparian management areas.
- BMPs would be implemented to protect water quality and aquatic habitats for all freshwater streams in the project area.
- Windfirmness has been incorporated into buffer design to protect wind all stream and lake buffers.

According to the database (<http://www.fakr.noaa.gov>), NMFS has identified the saltwater habitat in the vicinity of Etolin Island as EFH for arrowtooth flounder, atka mackerel, capelin, chinook salmon, pink salmon, sockeye salmon, chum salmon, coho salmon, eulachon, greenland turbot, octopus, pacific cod, pacific ocean perch, rex sole, rock sole, flathead sole, dover sole, yellowfin sole, sablefish, sand lance, sculpin, shark, shortraker and roughey rockfish, yelloweye rockfish, skate, squid, walleye pollock, and weathervane scallop.

The Navy Timber Sale may adversely affect marine EFH in the project area. Impacts to these waters are expected to be minimal for the following reasons:

- LTF footprint will be minimized to reduce sediment production and land disturbance.
- LTF locations are located in areas where bark and fine sediments will be dispersed by strong tidal currents.
- Habitat surveys have been completed to determine marine habitat and potential impact areas. Location of new LTFs considered siting guidelines as described in the Forest Plan (Appendix G). Site specific information is displayed in Appendix D of this DEIS.
- Cumulative bark deposition is expected to remain within permit thresholds.
- There are no effects expected to affect marine-based aquaculture in Anita Bay or near Cooney Cove.

The Forest Service believes that these mitigation measures will minimize the effects of the proposed activities on EFH. A copy of this DEIS will be given to NMFS and the Forest Service will continue the consultation process with the NMFS.

Affected Environment - Fish Passage

Fish migration impediments on Etolin Island exist on some anadromous and resident fish streams. Impediments to fish migration are usually because of outfall barriers, excessive water velocity, insufficient water depth in culverts, disorienting turbulent flow patterns, lack of resting pools below

culverts, or a combination of these conditions (Furniss et al 1991). There are currently 12 fish culverts that do not meet the current fish passage standard (“red culverts”) at road/stream intersections in the Navy Project Area (Table 3-39). These red pipes do not allow passage of the smallest weakest swimming fish at all flows except the highest that occur about 2% of the time. Red culverts often provide passage for stronger swimming adult fish.

Table 3-39 - W-4: Red culverts by watershed

Watershed Name	# of red culverts
Kindergarten Lake Creek	2
Pump Creek	5
South Anita Bay Frontal	2
Thrucut/ Goose Lakes Creek	1
Upper Big Bend Frontal	1
West Burnett Frontal	1
Total	12

Source: Wrangell Ranger District Road Condition Survey data

Environmental Effects - Fish Passage

Efforts are being made to prioritize and fix fish passage problems across the Tongass. The Forest Service does not anticipate any direct or indirect effects on fish passage. Drainage structures that would be installed for Navy Timber Sale roads would meet fish passage standards. Site information is provided in road cards. Roads 51011, 6544, and 51544 are scheduled to be stored under implementation of the ATMP which will remove 3 red pipes.

Description of True Watersheds in the Navy Project Area

The following section describes individual watersheds in the Project Area that have development proposed.

Navy Lake Creek

The Navy Lake Creek watershed is mostly undeveloped and shares a project and watershed boundary with the South Etolin Wilderness Area. The watershed is characterized by a glacial U-shaped valley with steep walls and a high percentage of high hazard soils. Landslides are common throughout the watershed; a sediment risk assessment ranked the watershed high.

With anadromous fish barriers approximately one mile upstream of the mouth on the main channel, it still is one of the highest fish producing streams on Etolin Island. Fish spawning and rearing habitat is limited, but critical, in the depositional streams segments present in the lower portions of the watershed.

Navy Lake is a scenic place with the only isolated population of rainbow trout on the District. Above the lake is an expansive alluvial fan complex that was deemed un-feasible for road building and harvest due to Forest Plan standards and guidelines. The upper basin is separated by a scenic canyon with a large waterfall at the terminus of a large landslide that dammed up Navy Creek in recent history.

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Stream Survey results for Navy Creek show proper functioning stream habitat characteristics. Residual pool depth was low for the reach sampled, but in the range of natural variability for this pristine drainage.

The proposed road in Alternative B was stopped before the upper end of Navy Lake where steep slopes and unstable slopes were a concern.

Log Jam Creek Watershed

Log Jam Creek watershed was broken out into two sub-watersheds representing the main stem of Log Jam Creek. Log Jam is one of the highest fish producing streams on Etolin Island, having approximately 5 miles of anadromous habitat.

RMA harvest (10% of RMA) is a concern because it directly affects Class I spawning and rearing habitat where sediment deposition can have the greatest impact.

The 14 erosion features and stream crossings provide another source of sediment. This watershed has relatively high road density (1.44mi/mi²) and moderate harvest (12.8%).

Concerns were mitigated by not proposing road in any alternative and limiting harvest to the headwaters.

Kindergarten Creek Watershed

Kindergarten Lake Creek Watershed is the other sub-watershed of the Log Jam Creek Watershed. It was separated out because it has a large barrier just above its confluence with Log Jam Creek restricting passage of anadromous fish.

It is a fairly large, relatively flat watershed with 62% of its slopes under 35%. It has a high road density (1.52 mi/mi²) and the highest percentage of harvest (16.4%) of all watersheds on Etolin Island.

Most of the watershed's streams (84%) are transport process groups. This is one of the primary reasons the SRA score is fairly low, but it also means that sediment entering the streams is going to be transported downstream and deposited in the Log Jam Watershed, which contains more anadromous fish habitat and cause for concern.

Kindergarten Lake, at the headwaters of the watershed, is one of the largest lakes on Etolin Island and an important rearing area for resident fish. The watershed contains limestone and karst features.

Past riparian harvest and road encroachment on streams are conditions that do not meet current Forest Plan standards and guidelines. Currently 13.4% of the RMA area has been harvested. The encroachment of the 51011 road on a tributary of Kindergarten Lake Creek is a concern. When timber sale operations are completed, the road is scheduled to be decommissioned under implementation of the ATMP.

RCS information identifies 57 stream crossings, the highest of any watershed on Etolin Island. Of those 57 stream crossings, there are 2 red pipes that do not meet fish passage standards and will be removed or replaced as funding allows.

Duckbill Watershed

Duckbill is a moderate sized watershed and has high-gradient contained streams in its headwaters and broad depositional channels in the valley bottom. There is a fairly high amount of anadromous fish habitat at 4.83 miles.

The watershed has the highest road density (1.53mi/mi²) on Etolin Island and the second highest percentage of watershed harvested (14.9%). Stream survey data indicate the watershed has a

relatively healthy aquatic habitat in comparison to the natural range of variability across the TNF (Thompson 2006).

Duckbill has just over 10% of its RMA area harvested. Road maintenance, prior to timber hauling will reduce impacts of roads on the watershed.

Wetbeck

Wetbeck Creek Watershed is a moderate size watershed with relatively high road density and harvest percentage. The anadromous habitat is limited to the lower half mile of the watershed.

Fourteen percent of the RMA has been harvested. Proposed harvest should not compound current issues. Riparian harvest of the main channel of Wetbeck Creek has reduced large woody debris recruitment. Large channel changes after class III RMA harvest led a debris torrent event which left a portion of the 6558 road impassible. Road storage associated with the ATM EA and the proposed timber sale would reduce sediment impacts to the downstream environments.

Stream Survey results for Wetbeck showed most metrics to be functioning properly. Although pool length was low, the higher gradient of the reach may have influenced these measurements. Future loss of LWD recruitment from harvested RMAs may decrease habitat parameters.

Granite Creek

Granite Creek Watershed is a small lake-influenced watershed with relatively low road density and moderate harvest levels. There is less than one mile of anadromous habitat and most of the anadromous use is restricted to intertidal spawning (F&W internal document).

Windthrow is a concern for the Granite Creek watershed. Because it is susceptible to high winds, RAW buffers will be used to protect the integrity of the RMA buffers.

Camp Creek

Camp Creek watershed is a small scenic watershed with a moderate amount of harvest; some of which dates back to 1916. Historic harvest of the RMA has impacted 37.5% of the RMA; the highest of any watershed on Etolin Island. Historic harvest was selective cutting, where trees were yarded to the shore so riparian impacts were not compounded by road building.

Stream surveys for the Camp Creek show low residual pool depth and pool length, which may be attributed to the removal of large trees from the flood plain during historic logging. It may also be due to the relative high gradient of the stream reach.

Pump Creek

Pump Creek Watershed has the most anadromous fish habitat (8.1 miles); and is one of the top fish producing anadromous fish streams on Etolin Island.

It has a relatively high road density (1.2mi/mi²), and 5 “red” pipes, the most of any watershed on Etolin Island. More than a mile of habitat is impacted by these fish passage restrictions. Efforts are being made to prioritize and fix fish passage problems across the Tongass.

The watershed has a fairly high amount (15%) of depositional channels, which are important fish habitat for spawning and rearing areas. Stream crossings and erosion features can increase sediment accumulation in those areas. Under the ATM EA, pre-haul road maintenance and storage of auxiliary roads would reduce impacts from roads.

Stream survey results for Pump Creek showed all metrics to be properly functioning. The only metric that was in the lower 25th percentile was pool spacing, but long deep pools characteristic of low-gradient reaches were present and provided adequate habitat.

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Anita Creek

Anita Creek Watershed is a small watershed with a fairly high road density and high number of stream crossings for such a small watershed. Road storage of the 51541 road would have the greatest beneficial impact to this watershed; it is scheduled to be stored in the Wrangell ATM EA.

Thrucut/Goose Lakes Creek

Thrucut/ Goose Lakes Creek Watershed is a moderate-sized watershed with very little anadromous fish habitat. The lower portions of the watershed are flat and consist primarily of non-forested vegetation.

The upper part of the watershed is very steep and transitional channels play an important roll in storing eroded materials from the upper high-gradient stream network. Roads located at the foot of the slope could interfere with the dynamic nature of these channels. Storage of road 6539 (scheduled in ATM EA) would prevent sediment production for this watershed. Alluvial channels have washed out portions of the road and historic deposition forecast more problems in the future.

A fish pass located near salt water could access a fair amount of rearing habitat. The size, channel, and amount of habitat are not significant enough at this time to make the project economically viable.

Fishtrap Creek

Fishtrap Creek, a fairly large watershed, is characterized by a classic U-shaped glacial valley with steep walls on both sides leading up to the two highest peaks on Etolin Island. Blowdown in the valley has been a problem in previously harvested units.

The main stem has a few miles of anadromous fish habitat. This stream also receives stray anadromous fish from the aquaculture facility located east of the mouth of the stream.

Quiet Creek

Quiet Creek is a small watershed with high wind exposure that is prone to landslides. A historic landslide has dammed the creek, creating a small lake. Initial reconnaissance shows that the dam may be an anadromous fish barrier. A fish enhancement project may be feasible to increase rearing habitat in the watershed.

Quiet Creek Watershed had the highest sediment risk assessment score of all Etolin Watersheds, primarily due to the amount of high hazard soils present. Proposed harvest is concentrated in areas where soils are more stable with gradual slopes. To alleviate sediment concerns, units on the east side of the stream, where historic landslide activity is evident, were not considered for the Navy Timber Sale.

Mirkwood

Mirkwood Watershed is a small undeveloped watershed with some karst features at the headwaters. The watershed is fairly steep and is characterized by high-gradient transport and transitional channels with limited anadromous habitat in the lower reaches. All units that may impact karst resources were removed from the alternatives.

As part of a forest-wide monitoring effort, a MIS site has been located in the upper reaches of the watershed, to monitor impacts to resident fish populations and their habitats associated with logging activities.

Boss Creek

Boss Creek Watershed is a moderate size bowl-shaped watershed with no fish present. There is no current development or harvest in this watershed. There is a fair amount of high hazard soils,

increasing the risk of mass wasting. The headwaters of the main channel begin at the toe of a large historic landslide. Harvest and roads were located to avoid impacting sensitive channel types and high hazard soils.

Cooney Creek

Cooney Creek Watershed is a small undeveloped isolated watershed with no anadromous fish present. Windthrow is a concern; there is evidence of large windthrow events throughout the watershed.

Beaver activity is common in the watershed. Road crossings on a remote road system will be designed to address maintenance concerns. The entire road system will be stored at the end of timber sale activities, reducing future risk to watershed resources.

Detailer Creek

Detailer Creek Watershed is moderate sized and undeveloped. There is a small amount of anadromous habitat in the lower main channel. Steep slopes and high hazard soils are a concern in this watershed. Harvest is proposed lower in the watershed, where steep slopes and high hazard soils are limited.

Connelly Creek

Connelly Creek Watershed is relatively small and undeveloped. There is limited anadromous fish habitat. Connelly ranked one of the highest watersheds for sediment risk.

The depositional channels in the lower watershed coupled with the amount of high hazard soils make this watershed prone to sediment disturbance. RAW buffers will help reduce the risk of sediment disturbance.

Effects by Alternative

All action alternatives implement BMP and Forest Plan standards and guidelines. Although the alternatives vary in their relative risks to watershed resources, none of the alternatives are expected to result in significant direct, indirect, or cumulative impacts to watershed resources.

Effects on watersheds due to harvest and road building can be difficult to measure due to the number of variables involved. Table 3-40 compares alternatives using a general qualitative risk measure for water yield and sedimentation.

The qualitative measure for water yield was determined by comparing the following variables: amount of proposed harvest; yarding method (helicopter or cable); harvest prescription; harvest location; windthrow risk; existing harvest; and geology factors, including karst. Water yield is more closely related to amount of harvest proposed in a watershed.

The qualitative measure for sedimentation was determined by comparing the variables listed above, as well as: amount, type, location, and future status (open or closed) of roads; existing condition; and number of stream crossings. Sedimentation is more closely related to the amount of road in a watershed.

General risk factors were determined using professional judgment, on the ground knowledge, and quantitative data. Quantitative data used to determine the risk measure can be found in the Hydrology Resource Report and project record.

In general, watersheds that have very little or no harvest or roads proposed had no risk to water yield and sedimentation. Watersheds that had some harvest and/or road proposed, but development was limited to areas that were not compounded by other factors discussed in the watershed description section, were recorded as low.

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Moderate risk factors were given to watersheds for a variety of reasons, usually due to the amount of road or harvest proposed. Compounding factors such as anadromous fish populations, sensitive channel types, and steep slopes also contributed to a moderate risk factor which was the case for Navy Creek’s risk for sedimentation.

A high risk factor was given to watersheds that had a relatively high amount of cumulative harvest and road proposed as well as compounding factors. For example, Kindergarten Lake Creek in alternative C has a post sale road density of 2.1 mi/mi², cumulative harvest would be 25.1% of the watershed, and karst geology and windthrow could compound those water yield and sedimentation effects.

The cumulative effects area used for analysis is all watersheds that are included in the project area.



Photo: Camp Creek

Table 3-40 - W-5: Risk of the Alternatives on Sedimentation and Water Yield by Watershed

Watershed Name	Risk ¹ to Sedimentation					Risk ¹ to Water yield				
	Alt B	Alt C	Alt D	Alt E	Alt F	Alt B	Alt C	Alt D	Alt E	Alt F
Anita Creek	low	mod	mod	mod	low	low	mod	mod	mod	low
Boss Creek	mod	mod	none	none	none	mod	mod	none	none	none
Camp Creek	mod	mod	low	low	none	mod	mod	mod	low	none
Connelly Creek	low	low	none	none	none	low	low	none	none	none
Cooney Creek	none	mod	none	none	none	none	low	none	none	none
Detailer Creek	mod	mod	mod	mod	none	low	low	low	low	none
Duckbill Creek	low	mod	low	low	low	mod	high	mod	mod	mod
Fishtrap Creek	low	mod	low	mod	mod	mod	mod	mod	mod	low
Granite Creek	none	low	none	mod	low	none	mod	none	mod	mod
Kindergarten Lake Creek	mod	high	mod	mod	mod	mod	high	mod	mod	mod
Log Jam Creek	none	low	low	low	low	none	mod	mod	mod	mod
Mirkwood Creek	low	mod	low	mod	low	low	low	low	low	low
Navy Lake Creek	mod	low	none	none	none	low	low	none	none	none
Pump Creek	mod	mod	mod	mod	low	low	low	low	low	none
Quiet Creek	mod	mod	mod	low	low	mod	mod	mod	low	low
Thrucut/ Goose Lakes Creek	low	low	low	low	low	low	low	low	low	low
Wetbeck Creek	mod	mod	low	low	low	mod	mod	mod	mod	mod
Average Risk¹ Factor	1.6	1.8	1.0	1.2	0.8	1.2	1.6	1.2	1.2	0.9
Combined Risk Factor²	Alt B 1.4		Alt C 1.7		Alt D 1.1		Alt E 1.2		Alt F 0.8	

¹ Risk Factor high=3, mod=2, low=1, none=0

² Combined Risk Factor Combines Risk of Water Yield and Sedimentation

Source: K. Weinner

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Alternative A

Since no activities are proposed in this alternative, no direct or indirect effects would occur.

Alternative B

Alternative B is the only alternative that proposes an LTF and road system in the Navy watershed.

This alternative has the second highest amount of proposed harvest and road proposed.

The proposed 6546 road through the East Mosman frontal watersheds crosses several areas of steep slopes that may be landslide prone. Alternative B proposes several stream crossings on lower Navy Creek and builds the 6556 road above lower Navy Lake on a hillside that has several natural landslides. The hillside of the Lower Lake is more stable than the hillside of the upper lake, but landslides are still a concern. Both roads will be stored at the end of timber sale activities to reduce the risk of slope failure and to protect water quality.

Cumulative watershed harvest acreage would exceed 20% in the Duckbill watershed. The miles and location of road proposed for this alternative increases the risk of sedimentation in several watersheds.

Alternative C

Proposed harvest in the Cooney Cove area would require the construction of a new LTF. Alternative C is the only alternative that proposes a road south of the Detailer Creek Watershed, and on the north side of Steamer point.

The proposed 6546 road through the East Mosman frontal watersheds crosses several areas of steep slopes that may be landslide prone. The 6547 road, south of Detailer Creek in the Northeast Burnett frontal watershed, has steep slopes in the beach buffer, where small frontal stream segments could have a higher chance of mass wasting. Storage of these roads following timber sale activities will help reduce risk of slope failure and to protect water quality.

Cumulative harvest acreage would exceed 20% in three watersheds: Anita, Duckbill, and Kindergarten Lake. This alternative has the highest risk of sedimentation and increased water yield and potential to affect watershed resources.

Alternative D

This alternative builds relatively short extensions from the existing road system and limits road and harvest near sensitive channel types. Cumulative harvest acreage would exceed 20% in the Anita and Kindergarten Lake watersheds. This alternative builds the second lowest amount of roads which decreases the risk of sedimentation.

Alternative E

This alternative utilizes more helicopter harvest which reduces the impacts on watershed resources. Cumulative harvest acreage would exceed 20% in three watersheds: Anita, Granite, and Kindergarten Lake watersheds. Proposed roads in Mirkwood, Fishtrap, and Granite Creek increase the sedimentation risk for this alternative.

Alternative F

Alternative F has the lowest amount of road construction and harvest acres. Cumulative harvest acreage would not exceed 20% in any watersheds. Alternative F has the lowest risk to sedimentation and water yield of all action alternatives.

Monitoring

Monitoring in the Navy Project area will occur in conjunction with ongoing Forest-wide Monitoring (BMP Implementation and Stream Buffer Stability). Resident fish MIS monitoring will be conducted in Upper Mirkwood Creek.

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Wetlands

Affected Environment

Wetlands are defined as: "those areas that are inundated or saturated by surface or groundwater with a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (40 CFR 230.41 (a) (1)). Identification of wetlands is based on the Corps of Engineers three-parameter system described in U.S. Army Corps of Engineers Wetlands Delineation Manual (US Army Corps of Engineers 1987).

Wetlands are valued for their physical, chemical, and biological functions. Wetlands moderate flooding, reduce runoff and sedimentation, provide wildlife and plant habitat, and may help sustain stream flow during dry periods. Physical functions may include flood conveyance, surface and ground water regulation, sediment retention, and temperature moderation. Chemical functions may include nutrient storage, pH moderation, and carbon storage. Biological functions include habitat for terrestrial, aquatic, and marine plants and animals. Additionally, forested wetlands are an important component of the forest land base.

The Forest Service is directed to avoid alteration of, and new construction on, wetlands wherever there is a practical, environmentally preferred alternative. On the Tongass, however, it is usually impossible to avoid all wetlands in large timber development projects that involve road construction; this is due to the large proportion of wetlands in the landscape. Where avoidance of wetlands is not practical, the Forest Service needs to demonstrate that the amount of new construction has been minimized. The Forest Service also needs to apply appropriate mitigation measures to minimize the magnitude of impacts and/or maintain wetland function. The strategy, therefore, is to avoid those wetland types that are scarce in the immediate landscape, and/or those wetlands recognized as having a "high value" to the ecosystem, such as estuaries, floating bogs, raised dome bogs, and sedge fens associated with streams and lakes.

All roads constructed for this project will be constructed and maintained in accordance with BMPs for Forest Road Construction (33 CFR 323.4(a)(6)), and as such will be considered exempt from regulation under Section 404 of the Clean Water Act. There are no proposed trails, sort yards, buildings, or etc. that would be located on wetlands.

Wetlands occupy 30% of the land area (approximately 23,625 wetland acres) in the Navy project area. For a detailed description of specific wetland types see the Wetlands Resource Report.

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The effects to an individual wetland would depend on the amount and type of disturbance, wetland location, distribution in the watershed, the distance to other wetlands and water-bodies, and connectivity of hydrology and habitat between them. Timber harvest, road construction, and off-road OHV use associated with the new road construction have the potential to adversely affect wetlands.



Figure WT-1. Tall sedge fen, Cooney Creek

Harvest on Wetlands

Harvest on wetland sites could directly affect wetland sites and indirectly affect adjacent or nearby wetlands by:

- altering hydrology which affects soil productivity and stand regeneration,
- changing nutrient pathways,
- generating and delivering sediment,
- changing plant species composition and growth, and
- reducing shading.

Harvest results in a short-term loss in hydrologic and biogeochemical wetland functions, which return when a forest cover is reestablished. Julin and D'Amore (2003) found that organic soil forested wetlands successfully regenerate and grow after clearcutting at the minimum rate necessary to be considered commercial forest lands.

Harvest on wetlands temporarily affects wetland hydrology. An increase in soil moisture levels following clearcutting may result in slower growth of the regenerating stand. Soil moisture conditions remain elevated until evapotranspiration surfaces in the canopy of the young stand become equivalent to pre-harvest conditions. Depending on the soil moisture status of the wetland, this effect can range from negligible or last more than 20 years, but in all cases the effect is expected to be temporary. In partially harvested stands, retention of a portion of the canopy cover would further minimize the effect of timber harvest on soil moisture. Many forested wetlands in the area support commercial stands of timber. Some of these stands have been harvested in the past and some are proposed for harvest in the Navy Timber Sale.

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Table 3-41 - WT-1. Effects of timber harvest on wetlands by alternative

Wetland Type	Acres in the Project Area	Acres Harvested in the Past	Proposed Harvest Acres					
			Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Forested Wetlands	8,260	317	0	442	785	250	471	176
Muskeg/Forested Wetland Mosaic	12,609	107	0	215	372	118	109	45
Grand Total		424	0	657	1157	368	580	221

Source: GIS: Soil/ManagedStands/ProposedUnits

Table 3-42 - WT-2. Effects of road construction on wetlands by alternative

Wetland Type	Acres in the Project Area	Miles of Existing Road	Acres affected by Existing Roads	Proposed Miles of Roads ¹					
				Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Forested Wetlands	8,260	9.5	58	0.0	1.7	2.9	0.8	2.2	0.3
Muskeg	670	0.16	1	0.0	0.1	.2	0.1	0.1	0.1
Muskeg/Forested Wetland Mosaic	12,609	16.2	98	0.0	2.7	5.1	1.6	2.0	0.7
Sedge Fen	99	0.14	1	0.0	0.4	.4	0.0	0.0	0.0
Total		26.1	158	0	4.9 (29 ac)	8.6 (52 ac)	2.5 (15 ac)	4.3 (26 ac)	1.1 (6 ac)

¹ acres affected are displayed for total only

Source: GIS: Soil/Roads

Road construction on wetlands

Road construction on wetlands converts the wetland to upland; wetland functions within the road corridor are lost. There have been limited studies done on the effects of forestry roads constructed in the past on wetlands in the Tongass; the studies (Glaser 1999, Kahklen and Moll 1999, McGee 2000) suggest that the hydrologic effects of forest roads are limited to within a few meters of the road. For

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this project, a road width of 50 feet is used to calculate the affected area. Roads across sloping wetlands may affect hydrologic connectivity across the wetland due to road ditches or road fills. In the project area, 158 acres of wetland have been converted to non-wetland by roads associated with past management activities. Roads are primarily constructed using shot rock overlay which allows water to seep through.

Effects by Alternative

Acres of harvest on forested wetlands, and acres of wetland converted to upland due to road construction are used to compare the effects on wetlands.

See Table 3-40 and Table 3-41 for a comparison of the effects by alternatives.

None of the alternatives would have a direct effect on the identified nutrient rich muskegs. However, there may be indirect impacts associated with a change in the hydrochemistry in the wetlands as a result of upslope harvest or road construction.

The proposed road location avoids wetlands where practicable. Roads are located in wetlands to meet safety and engineering design constraints, and in areas where there was no other option.

Cumulative Effects

The analysis area for cumulative effects is the project area. At this time, there are no plans for additional harvest or road building in the project area. Other uses in the area include recreational hunting and trapping, subsistence gathering, and guided backpacking trips.

Table 3-43 - WT-3: Cumulative Acres and Percentage of Wetland Affected by Timber Harvest

Wetland Type	Project Area Total	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Forested Wetlands	8,260 acres	317 acres (4%)	759 acres (9%)	1,102 acres (13%)	567 acres (7%)	788 acres (10%)	493 acres (6%)
Muskeg/Forested Wetland Mosaic	12,609 acres	107 acres (>.8%)	322 acres (3%)	479 acres (4%)	225 acres (2%)	216 acres (2%)	152 acres (1%)
Total	20,869 acres	424 acres (2%)	1,111 acres (5%)	1,622 acres (8%)	798 acres (4%)	1,012 acres (5%)	650 acres (3%)

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Table 3-44 - WT-4: Cumulative Acres of Wetlands converted to roads by alternative.

Wetland Type	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Forested Wetlands	58	60	68	60	66	59
Muskeg	1	2	2	2	1	2
Muskeg/Forested Wetland Mosaic	98	105	111	104	104	102
Sedge Fen	1	1	1	1	1	1
Total	158	168	182	167	172	164

Table 3-45 - WT-5: Percentage of Wetlands converted to non-wetland due to road construction.

Wetland Type	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Forested Wetlands	<1%	<1%	<1%	<1%	<1%	<1%
Muskeg	<1%	<1%	<1%	<1%	<1%	<1%
Muskeg/Forested Wetland Mosaic	<1%	<1%	<1%	<1%	<1%	<1%
Sedge Fen	<1%	<1%	<1%	<1%	<1%	<1%

Based on information presented in the tables, the potential for cumulative effects to wetlands due to harvest and road construction would be highest for Alternative C, followed by B and E; and lowest for Alternative F. Impacts associated with other uses of the area would depend on how access is managed in the future. Alternative C, which builds the most roads, would pose the greatest potential for disturbance from other users such as off-road OHV use. Alternative B, E, D, and F follow it.

Monitoring

Wetland BMPs Implementation Monitoring is done on an annual basis as part of the Tongass Annual Monitoring and Evaluation report. All constructed roads and harvested units will be eligible for monitoring. Contract administrators conduct routine monitoring in the course of administering the contract to ensure that BMPs are implemented as required by the contract. No project-specific wetland monitoring is proposed.

Wildlife

The project area Old-growth Reserve (OGR) system is described in the Biodiversity and Old-Growth section of this document. The Unit and Road Cards (Appendix B and C) for the project contain additional site-specific information and requirements.

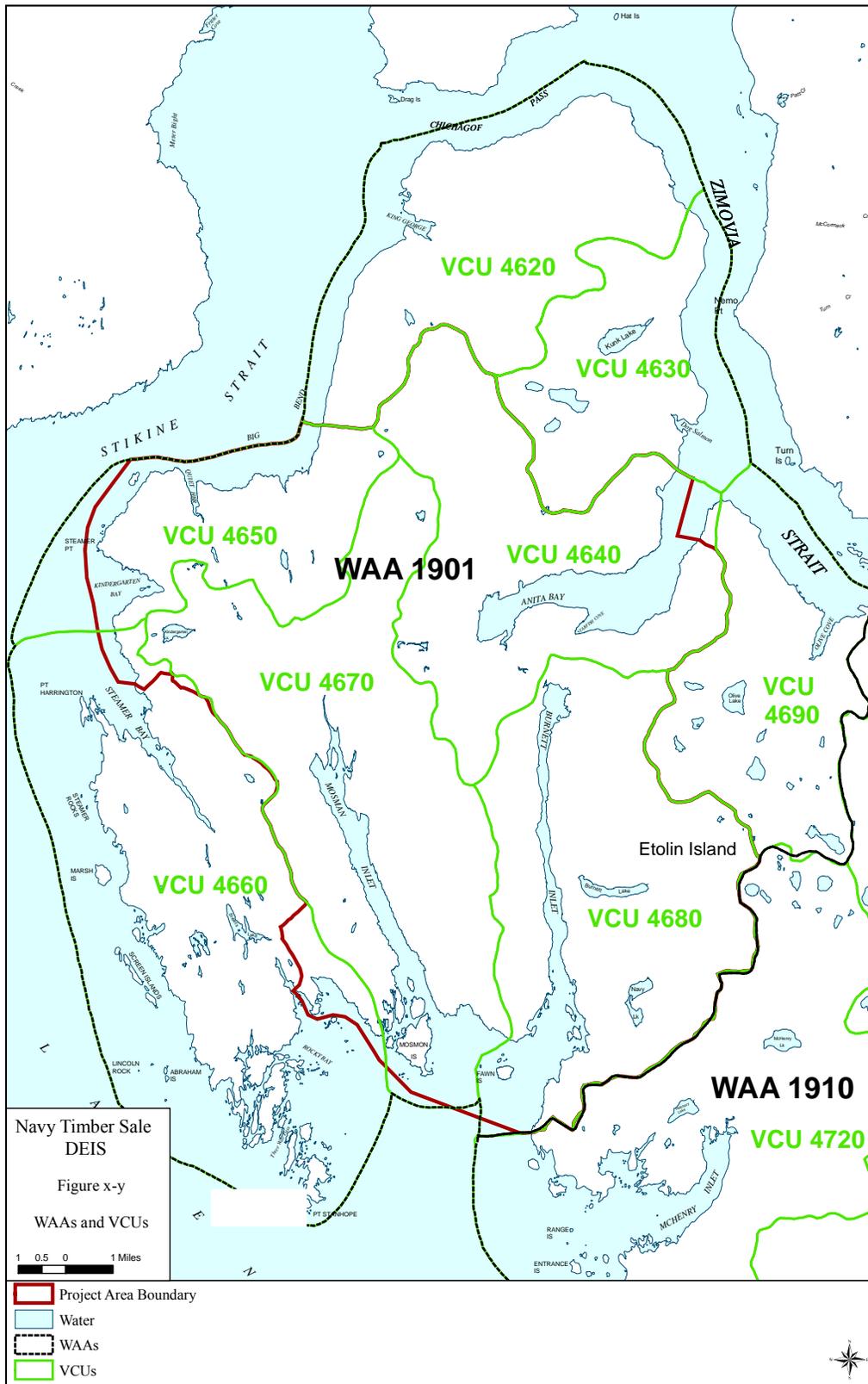
Affected Environment

Game Management Units (GMUs) are geographical areas defined by the Alaska Department of Fish and Game (ADF&G) to manage wildlife populations. Etolin Island is within GMU 3. Wildlife Analysis Areas (WAAs) are further subdivisions of GMUs and are used by ADF&G for data collection purposes. Value Comparison Units (VCUs) are National Forest System (NFS) land divisions that usually approximate large watersheds. The Navy project area is in WAA 1901 and consists of VCUs 4640, 4650, 4660, 4670, and 4680 (Figure WL-1). VCUs 4620, 4630, and 4690, are also included within WAA 1901, which was used for much of the wildlife analyses. Deer and wolves are generally analyzed at the WAA level to correspond with harvest data available from the State; and because of the large home range size of wolves (USDA 1997w). The Navy project is in the Etolin Island and Vicinity biogeographic province; and is designated in the Forest Plan as higher risk for marten, and therefore requires marten Standards and Guidelines be implemented.

Wildlife species depend on a variety of forest structure to meet their habitat needs. Although each action alternative proposes harvest of forested wildlife habitat, Forest Plan Standards and Guidelines protect some key habitats under all alternatives. These include riparian habitats, beach and estuary fringe habitats, high-value American marten habitat, nest buffers, wolf dens, and areas not suitable for timber harvest. The OGRs and other non-harvest areas contribute to the protection of large blocks of old-growth and key wildlife habitats (see Old-growth discussion).

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Figure WL-1. Analysis area designations



Management Indicator Species

Management Indicator Species (MIS) are those wildlife species whose responses to land management activities are thought to reflect the likely responses of other species with similar habitat requirements. Under the MIS concept, the responses to management activities of a relatively few species are studied and monitored in an effort to determine the impacts to entire groups of species and associated habitats. MIS are used to assess population viability and biological diversity, and for management of game species at the Forest level. MIS are also used to help establish management goals for other species in public demand. The following have been selected as MIS for the Navy project:

Table 3-46 - WL-1: Management Indicator Species selected for analysis.

Species	Basis for Selection
Sitka black-tailed deer	Important subsistence and game species; range of forested habitats but particular dependence on low-elevation old growth for winter habitat
Alexander Archipelago wolf	Furbearer and game species; wide array of habitat, but particularly sensitive to prey availability and road density
American marten	Represents low-elevation, high-volume old-growth forest
Bald eagle	Represents beach and estuary fringe habitats

Source: Forest Plan FEIS

These species were selected because they were deemed the most likely to be impacted by timber harvest activities on the project area. Interagency panels constructed habitat suitability models for deer and marten during the development of the current Forest Plan. Deer model results are also used to assess habitat quality for wolves, because deer are such an important prey species.

The following species are identified as Tongass National Forest (Tongass) MIS, but were not selected as Navy project MIS. The rationale is summarized below.

Table 3-47 - WL-2: Management Indicator Species not selected for analysis.

Species	Basis for Non-Selection
Brown bear and black bear	Critical habitat components such as salmon streams and beach fringe are already protected by Forest Plan Standards and Guidelines
River otter, Vancouver Canada goose	Primary habitat protected by Forest Plan Standards and Guidelines. No harvest is scheduled in these habitats
Hairy woodpecker, brown creeper, red-breasted sapsucker, red squirrel	Habitat protected under Forest Plan Old growth Reserves, Standards and Guidelines for marten and cavity-nesters, and other non-harvest areas
Mountain goat	Does not occur in the project area

Source: Forest Plan FEIS

Both brown and black bears are habitat generalists, and rely on different resources at different times of the year. Estuary, riparian, and forested coastal habitats receive the highest use by bears. River otters prefer habitat, especially old-growth forest, immediately adjacent to coastal and fresh water environments (Forest Plan FEIS, USDA 1997 page 3-364). Vancouver Canada geese use wetlands in

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estuary, river, and upland areas of the Forest (Forest Plan FEIS, USDA 1997, page 3-364). The majority of these habitats is protected by Forest Plan Beach and Estuary Fringe Standards and Guidelines (USDA 1997x, Forest Plan, pages 4-4& 4-5), Riparian Standards and Guidelines (USDA 1997y Forest Plan, pages 4-53 thru 4-57), and Waterfowl Standards and Guidelines (USDA 1997z Forest Plan, pages 4-115 & 4-116), and is not proposed for harvest under the Navy project.

Hairy woodpeckers, brown creepers, red-breasted sapsuckers, and red squirrels are protected through Old-growth Reserves, old-growth in other non-harvest LUDs and buffers, cavity nester Standards and Guidelines (USDA 1997a1 Forest Plan, pages 4-117 & 4-118), and reserve trees/snag retention requirements within high value marten habitat (USDA 1997b1 Forest Plan, pages 4-119). Live trees left to meet marten Standards and Guidelines contribute to future recruitment of snags.

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Sitka Black-tailed Deer

The Sitka black-tailed deer was chosen as an MIS because it is associated with old-growth forests, and important game and subsistence species. This species receives the highest subsistence and sport hunting use of all mammals in Southeast Alaska. Research conducted in Southeast Alaska indicates that low-elevation, high-volume productive old-growth habitats are particularly important to deer, especially during severe winters (Schoen et al. 1985, Hanley and Rose 1987, Yeo and Peek 1992). These mature old-growth stands intercept snow, provide thermal cover, and support the largest biomass of herb and shrub forage for deer (Alaback 1982). Deer populations are impacted by the combination of deep-snow winters and the conversion of winter habitat to second-growth. Snow reduces or eliminates forage availability in young clearcuts, while closed canopy second-growth stands provide little forage (USDA 1997 FEIS, pages 3-365 thru 3-368).

Deer Habitat Modeling

The current deer model assumes a linear relationship between habitat and capability: it calculates habitat suitability indices (HSIs) based on vegetation, aspect, elevation, and typical snowfall. Average snow levels expected for the area under consideration and the volume strata system used in the Forest Plan are applied. Other factors such as predator/prey interactions, severe winters and other catastrophic events, birth/mortality rates, habitat patch size, juxtaposition (fragmentation), and competition are not part of the model, but were considered by the project biologist during effects analysis.

There is controversy over the use of the interagency deer model developed during the 1997 Forest Plan process to evaluate potential winter habitat capability during project analyses (Forest Plan website <http://www.fs.fed.us/r10/tongass/>). However, the analysis for this project used the model in accordance with the Forest direction (Cole letter 2005), because a new model is not yet approved for use.

HSI values, generated by the model, range from zero in areas that have no value as winter habitat to 1.3 in optimal habitat. Low-elevation, high-volume old-growth stands with southern aspects in low snowfall areas provide the best deer winter habitat and receive the highest possible score in the model. All habitat above 1,500 feet elevation is assumed to have no value as winter habitat, because snow levels are expected to bury forage. An HSI of 1.0 (high volume strata, low elevation, south aspect, moderate snow) represents a habitat capability of 100 deer/mile² (Cole letter 2005, Person et al 1998, DeGayner 1995). The values generated by the deer model are used to estimate changes that result from timber harvest and do not reflect actual known deer numbers; they are used only for comparing potential effects to habitat capability among timber harvest alternatives. Although the coefficient of 100 deer/mile² has changed over the years, the current number is based on pellet count

data in a moderate snow area in northern Southeast Alaska with no wolves present (Person et. al. 1998, DeGayner 1995).

The model estimates habitat capability for different time periods. In the shrub-sapling stage (first 25 years after harvest), habitat capability in high-volume stands decreases by about 42 to 95%, depending on typical snowfall. In low snow areas, habitat capability in medium- and low-volume stands increases after harvest by about 20% and 90%, respectively, due to increased forage availability in the shrub-sapling stage. During the stem exclusion stage (beginning at year 26 in the model), habitat capability is reduced 90 to 98% from the original stand value, regardless of snowfall, aspect, and elevation. The most significant and longest lasting impacts to habitat capability are those that occur during the stem exclusion stage; these are the effects discussed in this section.

The habitat capability model assumes that all timber harvest is done using even-aged (clearcut) silvicultural systems. However, other silvicultural systems will be used on some harvest acres for this project. Therefore, the results of the model may overestimate the impact of timber harvest on deer habitat capability in partial harvest areas. Non-federal ownerships, which comprise less than 1% of WAA 1901, are included in the analysis.

Direct and Indirect Effects

The deer model estimated current habitat capability in WAA 1901 to be about 91% of the habitat capability that existed across WAA 1901 prior to any timber harvest, which occurred in the early 1900s. These numbers are slightly different than the Forest Plan (Forest Plan FEIS, p. 3-372) due to updated project GIS information and inclusion of private land. For the action alternatives, deer habitat capability would be decreased in WAA 1901 by approximately 1 to 7% from existing condition for the first 25 years after harvest, and about 2 to 9% during the stem exclusion stage (Table WL-3).

The deer model generated HSI scores ranging from 0.0 to 1.30. The range of HSI scores between 0.60 to 1.3 equate to the best 25% of the acres (quartiles) present in WAA 1901 prior to large-scale timber harvest, estimated at approximately 15,863 acres in 1900. These acres represent high quality deer winter range and have been reduced by 15% by past harvest. Figure WL-2 shows the current distribution of quartiles in WAA 1901.

Alternative A (No Action)

Alternative A will not reduce habitat capability. The decline in habitat capability caused as units harvested in the past continue to age and enter the stem exclusion phase is included under cumulative effects. No habitat will be harvested and no new roads will be built. This alternative will maintain current habitat conditions within the WAA and deer will not be affected. Wolves and hunters will continue to have access to deer at their current levels under this alternative, barring unforeseen circumstances unrelated to the project, such as severe winters or disease conditions.

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Table 3-48 - WL-3: Sitka Black-tailed Deer Habitat Capability¹ Percent Decline by Alternative

Habitat Capability Scale and Timeframe	Percent Decline of Habitat Capability by Alternative					
	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
WAA 1901, 0-25 years	0	7	7	3	4	1
WAA 1901, 26-150 years	0	8	9	4	5	2

Source for alternatives:

J:\fsfiles\office\wrn\nepa_projects\navy\06_Resource_Folders\n_Wildlife\References\Navy_model_data_waa1901_2033.xls

¹ Habitat capability does not equal actual deer; it is used as a tool to compare alternatives 20 – 25 years reported as percent decline from existing condition; 26 – 150 years reported as percent decline below Alternative 1 to eliminate cumulative effects of past harvest

Alternatives B-F

Among the action alternatives, Alternative C would have the greatest negative impact on deer in WAA 1901, while Alternative F would have the least. Alternatives D, E, and B would have intermediate impacts from least to greatest, respectively (Table 3-47). This is based on the acres of top quality winter habitat harvested and on expected declines in habitat capability.

Alternative C will harvest the most acres of top quartile habitat (1708 acres, or 13% by the stem exclusion phase). Because these acres are important winter habitat, deer could be negatively impacted by this alternative. Deer could have more difficulty finding forage during the winter months when snow is present, or may have to compete with other deer or the introduced elk for the available forage. Lack of quality winter habitat may have disproportionate effects in areas of deep snow. In addition, deer must expend more energy in the snow (Hanley 1984) and may be restricted during periods of snow to fewer and/or smaller habitat patches, which can deplete available resources and expose the deer in these patches to more predation (Person et al. 1996, McNay and Voller 1995). Alternative C also proposes the most road construction which increases access to deer by hunters.

Alternative B is expected to have similar effects as Alternative C. Alternative B will harvest 1184 acres (9%) of the top quality winter range by stem exclusion. Most of the harvest in the top quartile is scheduled for more than 50% basal area removal, which will have a greater impact than partial harvest prescriptions. A reduction of about 8% in habitat capability could occur as a result of this alternative during the stem exclusion phase. Effects could be similar to Alternative C.

Alternative F should have little effect on deer within the WAA, with about a 2% decrease in habitat capability expected, and a 2% decrease in the top quality winter range acres proposed for harvest.

By the time proposed harvest reaches the stem exclusion stage, Alternatives D and E would reduce acres within the top 25% of available habitat by 699 (5%) and 1,158 (9%) acres, respectively. Although Alternative E proposes almost the same amount of total harvest in the top quartile habitat as Alternative B, over 60% of that harvest is scheduled with partial harvest prescriptions which will reduce the effects of Alternative E; a long-term (stem exclusion phase) habitat capability reduction of about 5% could occur under Alternative E. Alternative D is estimated to have about a 4% habitat capability reduction. In a severe winter, effects could be similar to C, but are not expected to be as detrimental.

Cumulative Effects

The cumulative effects area is WAA 1901. Combined with previous timber harvest, implementation of the current project will result in a cumulative reduction in historical (1900) deer habitat capability on the project area of between 11 and 19%, depending on alternative (Table 3-48). There are no other “reasonably foreseeable” future timber sales scheduled in WAA 1901 area at this time. Salvage logging sales proposed in the area are not expected to change habitat capability. There are no “reasonably foreseeable” future projects proposed for non-National Forest lands in the area.

Non-development LUDs, including neighboring areas such as the South Etolin Wilderness, may provide source populations which can disperse into and throughout WAA 1901 as habitat conditions allow. The use of harvest prescriptions other than clearcut may also help offset some of the negative effects to deer.

Table 3-49 - WL-4: Sitka Black-tailed Deer Habitat Capability Remaining by Alternative

Area	Percent of 1900 Habitat Capability ¹ Remaining by Year / Alternative							
	1900 ²	2007	Past + Alt A ³	Past + Alt B ³	Past + Alt C ³	Past + Alt D ³	Past + Alt E ³	Past + Alt F ³
WAA 1901 ⁴	100	91	89	81	81	86	85	87

¹ Habitat capability does not equal actual deer; it is used as a tool to compare alternatives

² Source:

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³ Reported for the stem exclusion phase, approximately 26 – 150 years after harvest

⁴ Source for alternatives:

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Alternative A (No Action)

This alternative will not harvest any deer habitat. However, the habitat capability in WAA 1901 will decline another 2% from existing condition as past harvest enters the stem exclusion phase, resulting in an 11% cumulative reduction since the beginning of large-scale, commercial timber harvest. This alternative has a cumulative decline of about 15% in the top quartile (important deer winter range), less than a 1% change from existing condition because 16 acres of existing managed stand are currently in the top quartile. This alternative will have the least negative effect on deer habitat capability of all of the alternatives. No roads will be constructed and access to deer by humans will remain at the current level. Fragmentation will not be increased as a result of this alternative. Therefore, deer will continue to have access to the current old-growth patches to help find forage and avoid predators during the winter. Negative effects would be expected mainly after a severe winter.

Alternative B

As harvest proposed under Alternative B reaches the stem exclusion stage, this alternative will result in a cumulative decrease in habitat capability of almost 19% from estimated habitat capability in WAA 1901 prior to large-scale, commercial timber harvest. This alternative will further reduce top quartile habitat by 9%, for a cumulative decline of about 23%, very similar to Alternative C.

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Alternative C

As harvest proposed under Alternative C reaches the stem exclusion stage, this alternative will result in a cumulative decrease in habitat capability of about 19% and a cumulative decrease in top quartile habitat of 25% from those estimated in WAA 1901 prior to large-scale, commercial timber harvest. This alternative also proposes the most road construction. This alternative will have the greatest negative impact to deer habitat capability among all of the alternatives. With cumulative harvest of one-fourth of the top quartile habitat, deer may have more difficulty finding forage in the winter months in those areas that receive higher snow fall and with fewer large patches of old-growth, deer may have more difficulty avoiding wolves in WAA 1901. Winter survival rates could decrease, resulting in fewer deer available to wolves and hunters. Effects could be larger than expected if a severe winter occurs because deer populations could have a long recovery (difficulty rebounding) due to reduced habitat quality and predator presence, compounded by competition for resources with the elk on the Island.

Alternative D

As harvest proposed under Alternative D reaches the stem exclusion stage, this alternative will result in a cumulative decrease in habitat capability of 14% from estimated habitat capability in WAA 1901 prior to large-scale, commercial timber harvest. A further reduction of 5% in top quartile habitat will occur, for a total reduction of 20% in this important winter range. Negative effects would be expected mainly after a severe winter. Less road construction reduces fragmentation effects and not constructing the proposed Burnett Inlet LTF in the Navy watershed reduces access effects of Alternatives B and C.

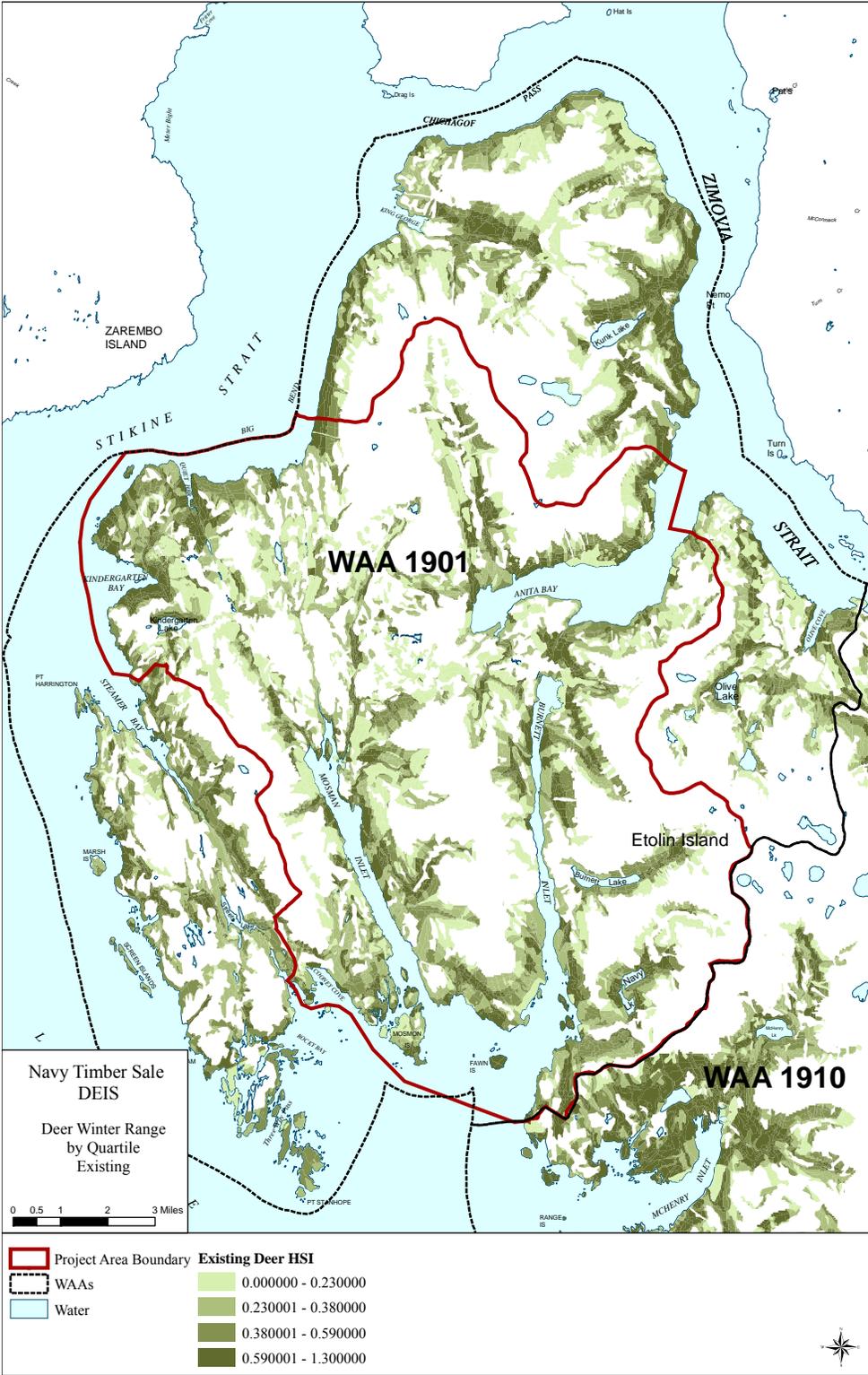
Alternative E

As harvest proposed under Alternative E reaches the stem exclusion stage, this alternative will result in a cumulative decrease in habitat capability of almost 16% from estimated habitat capability in WAA 1901 prior to large-scale, commercial timber harvest. Although the top quartile reduction from current conditions is 9% like Alternative B, the cumulative reduction is less, and this alternative proposes less road construction, fewer acres of even-aged harvest, and no Burnett Inlet LTF in the Navy watershed. More uneven-aged harvest should reduce overall negative impacts to deer. In addition, this is the only alternative to incorporate all the biologically preferred small OGRs in the project area as recommended by the interagency review (see the Old Growth section of this DEIS). Negative effects would be expected mainly after a severe winter.

Alternative F

As harvest proposed under Alternative F reaches the stem exclusion stage, this alternative will result in a cumulative decrease in habitat capability of 13% from estimated habitat capability in WAA 1901, prior to large-scale, commercial timber harvest and a cumulative reduction of 17% of the top quartile habitat. It also proposes no LTF in the Navy drainage, minimal road construction in other areas of the WAA, and incorporates all but one (Anita) of the small OGRs recommended by the interagency team; the Mosman small OGR was a combination of interagency and Forest Supervisor recommendations. This alternative will have the least negative effect on deer habitat capability of all of the action alternatives. Negative effects would be expected mainly after a severe winter.

Figure WL-2. Deer HSI distribution quartile, WAA 1901



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Alexander Archipelago Wolf

The decision by the USFWS not to list this subspecies as threatened under the Endangered Species Act was based in large part on the Forest Service's commitment to enhance habitat protection and population monitoring for the wolf. In Southeast Alaska, wolves inhabit the mainland and most large islands south of Frederick Sound. The population has been estimated at fewer than 1,000 individuals and as many as approximately 250 are harvested annually (Kirchhoff 1991). At least one wolf pack is known on Etolin Island, but no den sites have been found to date.

The Wolf Conservation Assessment (Person et al. 1996) identified three key issues that influence wolf populations in Southeast Alaska: 1) the loss of long-term carrying capacity for deer, due primarily to timber harvesting, 2) higher wolf mortality associated with increased human access from roads, and 3) continued high levels of wolf harvest by humans. Similarly, the Forest Plan identified the maintenance of adequate deer habitat capability and the control of road density and human access as key factors for maintaining viable, well-distributed wolf populations (Forest Plan FEIS, p. 3-356). Both sources agreed that maintaining long-term deer habitat capability is the most important consideration for wolf population viability.

Analysis of factors influencing wolf populations are considered at two scales for this project. WAA 1901 encompasses all of the roaded area on Etolin Island, all of the proposed timber harvest, and most of the past timber harvest. This WAA was analyzed separately to describe potential impacts in the area where the most past and future habitat modification will occur. However, due to the large range of wolves, it is recommended that factors affecting wolves be analyzed at the scale of multiple WAAs (Forest Plan page 4-116), therefore cumulative effects have also been analyzed at the scale of WAAs 1901 and 1910 combined, which encompasses all of Etolin Island, including the South Etolin Wilderness.

Wolf-Deer Interactions

Sitka black-tailed deer are the principal prey of Alexander Archipelago wolves, and long-term viability of wolves is dependent on long-term deer habitat capability (Forest Plan FEIS, Appendix N, p. N-30). For the purposes of Navy project wolf habitat analysis, only winter habitat capabilities calculated from the deer model and expressed as deer/mile² are discussed here. Based on Biogeographic Provinces, a Forest wide average habitat capacity of 18 deer/mile² should be maintained to provide for current levels of deer harvest by hunters, trappers, and wolves (USDA Forest Service 2001, Page 2-155). The same model outputs described in the deer section above were used for the wolf analysis; estimated deer density is rounded to the nearest whole number due to uncertainty in the deer model. The impacts to habitat capability are greatest during the stem exclusion stage.

Road Density and Wolves

Hunting and trapping of wolves is greatest along shorelines and roads (Person et. al. 1996, page 26). Roads whether open or closed, increase human access to areas that were previously difficult to reach, especially when these roads are built in close proximity to human population centers. Roads may increase both legal harvest and illegal poaching of wildlife (Forest Plan Final EIS, p. 3-310). In Southeast Alaska there is a clear relationship between road density and legal and illegal harvest of wolves. Person reported that wolves in GMUs 2 and 3 experienced higher mortality from hunting and trapping in WAAs with higher road densities, and that harvest of wolves by humans increased twofold in WAAs where road density exceeded 0.7 miles/mile² (Person, et. al. 1996). Roads connected to a community are of greatest concern because easy access by hunters and trappers may lead to wolf mortality. The Forest Plan (page 4-116) suggests maintaining open road densities at or below 0.7 to 1.0 miles/mile² where wolf mortality is a concern. Prince of Wales Island is the only

place on the Tongass National Forest where there wolf mortality is a management concern affecting road density, at this time. Person et al. (1996, page 25) found that harvest rates may double in areas where total road density exceeds 0.66 miles/mile².

Wolves spend most of their time below 1,200 feet elevation and Person et al. (1996, page 24) suggests calculating road density to reflect this; open and closed roads were included in his calculations. This analysis used both open road density and total road density to account for differences in the methods used in the Forest Plan and by Person. Road density levels are given for elevations only below 1,200 feet (USFS unpublished Appendix 13, 1997). This analysis used current operational maintenance level (OML) of roads to determine open and closed status; it is assumed that a drivable road is open regardless of the road management objective.

For this analysis, “open roads” refers to roads that are accessible for motorized use and are drivable by the public, regardless of their objective maintenance level. This analysis assumes that all temporary roads will be closed and not accessible for motorized use after proposed activities are completed. It also assumes that National Forest System (NFS) roads will be open for motorized use by the public and drivable after proposed activities are completed. This assumption errs on the side of caution because many of the proposed new roads and currently existing NFS roads, associated with this project are proposed to be closed after project completion. Because it is unknown how long newly-constructed NFS roads will be open, it is reasonable to assume they will be open for the purposes of this analysis. A decision has been made for the Wrangell Access and Travel Management Plan Environmental Analysis (ATM EA), which may also reduce road densities during implementation of that decision.

ADF&G wolf harvest records in GMU 3 indicate that the most common method of transport for hunters harvesting wolves is boating (average of 77% from 1988-2001), whereas other methods of transport that might use roads, including highway vehicles, off-highway vehicles, and snow machines are much less common (average of 21% from 1988-2001). The road systems on Etolin Island are isolated from communities, so hunting and trapping pressure is less than if the roads were connected to a community.

Direct and Indirect Effects

Availability of Primary Prey: Deer

Current deer habitat capability is estimated at approximately 18 deer/mile² in WAA 1901, or about 91% of the historical capability. This estimated habitat capability is at the minimum 18 deer/mile² recommended to support both wolves and hunter demand. All action alternatives for the Navy Timber Sale would further reduce deer habitat capability in the short and the long term (Tables WL-3, WL-4). The impacts of proposed timber harvest on deer habitat capability (in WAA 1901, 0-25 years after harvest), and therefore wolves, would be greatest under Alternative C, followed, in order of decreasing effect, by Alternatives B, E, D, F, and A, respectively.

Alternatives C and B will decrease important deer winter habitat and the resulting habitat capability by the most of the alternatives. These alternatives also propose the most road construction and a new LTF in the Navy drainage, and will incorporate only one of the interagency small OGR option (Burnett). Therefore, these alternatives have the greatest potential to affect the prey base (deer) for wolves and to increase human access to the project area. The combination of these two factors could increase hunting and trapping take on wolves while decreasing the primary food source of wolves. Therefore, the wolf population in WAA 1901 could decrease.

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Road Impacts and Human Harvest of Wolves

All of the action alternatives in this project propose building roads to access timber.

Road building associated with previous harvest activities has resulted in 57.7 miles of open road below 1,200 feet elevation in WAA 1901. Existing open road density is less than 0.7 miles/mile² (Table 3-49); total road density slightly exceeds this level. All of the action alternatives propose substantial increases in total road density, ranging from 10% to 37% increase of roads/mile² under 1,200 feet elevation. Under all alternatives, road density (both open and total) will exceed 0.2 miles/mile² (Table 3-53) for roads at all elevations. Total road density will reach 0.6 miles/mile² under Alternative C (which has the most road miles) for roads at all elevations.

Table 3-50 - WL-5: Road density below 1200 feet elevation by alternative in WAA 1901

	Density ¹ /Percent Change By Alternative											
	Alt A		Alt B		Alt C		Alt D		Alt E		Alt F	
Open Road Density²	0.45	0%	0.67	49%	0.69	53%	0.58	29%	0.58	29%	0.51	13%
Total Road Density³	0.71	0%	0.93	31%	0.97	37%	0.83	17%	0.83	17%	0.78	10%

Source:

J:\fsfiles\office\wrd\nepa_projects\navy\06_Resource_Folders\n_Wildlife\References\etolin_allroads_byWAAelev1200mc2.xls

¹ Calculated as miles of road per square mile below 1200 feet elevation.

² Open road density includes any roads currently existing and drivable + proposed NFS roads.

³ Total road density includes all NFS and temporary roads, whether or not they are drivable.

Open road density will not exceed 0.7 miles/mile² in WAA 1901 under any of the alternatives. Although total road density in WAA 1901 will exceed this level under all alternatives, none of the alternatives will increase total road density above 1.0 mile/ mile². Increased road access could increase the human harvest of wolves, especially short term during the active phases of the project. However, long-term effects to wolves from road density are expected to be minimal.

In GMU 3, which includes Etolin Island, each hunter may legally harvest five wolves between August 1 and April 30. Wolves may also be trapped in GMU 3 from November 10 to April 30; there is no bag limit for trapping. Between 1986 and the spring of 2006, 102 wolves (5.7 per year) were legally harvested from Etolin Island (ADF&G, unpublished data). Mean number of wolves harvested during this time period has been very similar in WAAs 1901 and 1910, 2.7 and 2.9 wolves per year, respectively. During the 2004-2005 hunting and trapping seasons, 18 wolves were harvested from Etolin Island, the highest recorded total since 1986.

The number of wolves in a pack varies seasonally and among years. The size and number of packs on Etolin Island are unknown. New road systems proposed on Etolin Island could result in increased harvest of wolves and, therefore, a higher likelihood that in any given year an entire pack could be harvested. This likelihood would be greatest under Alternative C, followed in order of decreasing effect by Alternatives B, D, E, F, and A, based on open or total road miles alone.

Cumulative Effects

At the WAA 1901 scale, as well as the scale of Etolin Island, prey availability as estimated by the deer habitat capability model will be at or below the level suggested to maintain healthy populations

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of wolves while satisfying hunter demand for deer. Deer habitat capability will not exceed 18 deer/mile² under any alternative at either scale in the stem exclusion stage, 26-150 years from now.

Table 3-51 - WL-6: Deer¹ per square mile for WAA 1901 and Etolin Island 0-25 years post harvest and 26-150 years post harvest.

	0-25 years Post harvest		26-150 years Post harvest	
	WAA 1901	Etolin Island	WAA 1901	Etolin Island
Alt A	18	18	17	18
Alt B	17	17	16	17
Alt C	17	17	16	17
Alt D	17	18	17	18
Alt E	17	18	17	17
Alt F	18	18	17	18

Source:

J:\fsfiles\office\wr\nepa_projects\navy\06_Resource_Folders\n_Wildlife\References\deer_per_square_mile.xls

¹Based on interagency deer model; these numbers are presented for comparison purposes only; they do not reflect actual, known numbers of deer.

Both open and total road densities are well below the suggested 0.7 miles/mile² under all of the alternatives for WAAs 1901 and 1910 combined. Alternatives with higher road densities will provide greater access for both legal and illegal harvest of wolves on Etolin Island. However, since wolves have large home ranges, the presence of the South Etolin Wilderness Area provides a possible refugia for wolves and this area could serve as a source for the developed areas of the Island. Long-term effects to wolves are not expected as a result of increased road access under the action alternatives, although a short-term increase in hunting and trapping may occur during the active phases of the project.

Table 3-52 - WL-7. Road density below 1200 feet elevation by alternative on Etolin Island (WAAs 1901 and 1910)

	Density ¹ /Percent Change By Alternative											
	Alt A		Alt B		Alt C		Alt D		Alt E		Alt F	
Open Road Density²	0.25	0%	0.37	48%	0.37	48%	0.31	24%	0.31	24%	0.28	12%
Total Road Density³	0.38	0%	0.51	34%	0.53	39%	0.45	18%	0.45	18%	0.42	11%

Source:

J:\fsfiles\office\wr\nepa_projects\navy\06_Resource_Folders\n_Wildlife\References\etolin_allroads_byWAAe lev1200mc2.xls

¹ Calculated as miles of road per square mile below 1200 feet elevation.

² Open road density includes any roads currently existing and drivable + proposed system roads.

³ Total road density includes all NFS and temporary roads, whether or not they are drivable.

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Alternative A

Alternative A will result in reduction of prey habitat capability as past harvest enters the stem exclusion stage, but will not directly contribute to further habitat or prey declines. Because this alternative proposes no road building, it presents the least risk of providing additional access that could lead to over-harvest of wolves in the area. With the current deer habitat capability (deer density) already estimated to be at the minimum level recommended by the Forest Plan to provide for both wolves and human harvest, this alternative provides the best chance for predator-prey interactions to continue at their existing level while still providing for human harvest of deer.

Alternatives B-F

Based on habitat capability for primary prey and risk of harvest associated with road density, Alternative C will have the greatest negative effect on wolves, and Alternative F the least among the action alternatives. Other alternatives, ranked from greatest negative effect to least are Alternative B, E, and D. Alternatives E and D would result in very similar road densities and habitat capability for deer. Alternative F is the only action alternative predicted to have habitat capability of 18 deer/mile² in the short term (25 years after harvest) at both the WAA level and the Island level; it therefore has the greatest chance of maintaining the wolves on Etolin island while still providing a good opportunity for human harvest of deer. Under the other action alternatives, especially B and C, there may be a chance that human harvest of deer on Etolin will become more difficult (increased time to harvest deer or decreased number of deer taken). Wolves are efficient predators and the deer may have a difficult time rebounding if there is an unexpected sharp decline in population due to a severe winter, disease, or other unforeseen events.

American Marten

The American marten was chosen as an MIS because it represents species requiring old-growth habitat. Like deer, marten are dependent on high-quality winter habitat, which consists of low-elevation (below 1,500 feet), high-volume old-growth forest, especially in coastal and riparian areas. These habitats intercept snow, provide cover and denning sites, and provide habitat for prey species.

The Navy project area is part of the Etolin Island and Vicinity Biogeographic Province, which is considered a high-risk province for marten habitat (Forest Plan, p. 4-118). In such areas, timber harvest units that contain high-value marten habitat must meet specific Forest Plan Standards and Guidelines. Because less than 33% of the original POG forest has been harvested in each of the VCUs in the project area, Standards and Guidelines include retaining:

- 10-20% of the original stand structure,
- an average of at least four large trees (20-30 inch DBH or greater) per acre for future snag recruitment,
- an average of at least three large decadent trees per acre, and
- an average of at least three pieces per acre of down material (logs 20-30 inches or greater in diameter and 10 feet long), generally distributed throughout the harvest unit.

Retained trees should have a reasonable assurance of windfirmness and should be uniformly distributed throughout the stand, but they may be clumped for operational concerns or ecological opportunities (Forest Plan, p. 4-119). Current direction is that retained trees and clumps should be near external or setting boundaries in units to minimize operational concerns (Cole letter 2005).

Marten Habitat Modeling

An interagency model (Suring et al. 1992) was developed to evaluate marten habitat capability and to estimate potential impacts of timber harvest. The model calculates HSIs based on timber volume strata (high, medium, low), elevation, and landscape position (riparian versus upland area). Low-elevation, high-volume old-growth stands, especially in beach fringe or riparian areas, provide the best marten winter habitat. HSI values range from 0.0 in areas that have no winter habitat value to 1.0 in optimal habitat. These values are used to estimate changes in habitat capability that could result from timber harvest.

A multiplier of 2.71 marten/mile² is used to convert HSI values into theoretical habitat capability numbers. These estimates of habitat carrying capacity do not reflect actual marten numbers; they are used only for comparing potential impacts to habitat capability among alternatives and for assessing cumulative impacts of timber harvest. Normally, the habitat capability model assumes that all timber harvest is accomplished using even-aged (clearcut) silvicultural systems. Where single-tree selection that harvests less than 35% of the basal area is prescribed, post harvest volumes for these stands have been estimated based on predicted volume removal as estimated by stand exams. Non-National Forest lands make up less than 1% of WAA 1901 and are included in the analysis.

Road Density and Marten

Marten are easily trapped and can be over-harvested, especially where trapping pressure is heavy and not effectively controlled. This corresponds closely to the availability of road access. Because of their susceptibility to trapping, marten densities decline in areas where road density exceeds 0.2 mile of road per square mile of land. Marten density may be reduced as much as 90% when road density approaches 0.6 miles/ mile² (Suring, et al 1992).

Direct, Indirect, and Cumulative Effects

Timber Harvest / Marten Habitat Modeling

The marten model estimates current habitat capability in WAA 1901 at 87% of the historic condition. The action alternatives propose harvesting timber that will result in 0-2% further reduction in current marten habitat capability in WAA 1901 from estimated conditions in 1900 (Table 3-52). There are no other “reasonably foreseeable” timber sales scheduled for National Forest land in WAA 1901 at this time. Salvage sales slated for the area will not substantially change habitat capability in the foreseeable future. Non-National Forest lands were incorporated in this analysis, but comprise < 1% of the area, and no activities that would measurably reduce marten habitat capability are scheduled in these areas at this time. Combined with previous timber harvest, implementation of the current project will result in a cumulative reduction in historical marten habitat capability in WAA 1901 of between 13 and 15% (Table 3-52).

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Table 3-53 - WL- 8: Percent reduction in high value habitat and habitat capability for marten in WAA 1901 by alternative compared to historic and existing conditions

	Habitat Capability¹	Amount of High Value Marten Habitat (percent remaining)
1900	100%	8086 acres (100%)
Existing Condition: 2007	87%	4137 (51%)
Percent Remaining 26 Years¹ Post harvest, Given: Alt. A	87%	4137 (51%)
Alt. B	87%	3987 (49%)
Alt. C	85%	3881 (48%)
Alt. D	87%	3987 (49%)
Alt. E	87%	3945 (49%)
Alt. F	87%	4094 (51%)

Source:

J:\fsfiles\office\wrd\nepa_projects\navy\06_Resource_Folders\n_Wildlife\References\Navy_Marten_Analysis_brainard_6_12_07.xls

¹Based on interagency marten model; these numbers are presented for comparison purposes only; they do not reflect actual, known numbers of marten.

¹When stand reaches stem exclusion stage.

Road Impacts and Human Harvest on Marten

Currently, there are approximately 91 miles of open and closed (both system and temporary) roads on Etolin Island, mostly concentrated in lower elevation areas of WAA 1901. From regulatory years 1996 to 2005, ADF&G documented 133 marten harvested from WAA 1901, compared to only 25 marten from WAA 1910 (South Etolin Wilderness). Marten harvest was particularly high in 1996 and 1997 (55 and 50 animals documented, respectively), and has not exceeded 8 animals any year since then. It is unclear whether reduced marten harvest levels in WAA 1901 are due to reduced marten populations which led to less trapping success for similar effort or if the trapping effort declined. Population declines could have resulted from reduced habitat capability, the high marten harvest levels in 1996-97, disease, a reduced prey base, lower birth rates, or other factors. Reduced trapping effort could have been through either fewer trappers or less time spent in WAA 1901.

All of the action alternatives in this project propose building roads or short extensions of roads to harvest timber. Under all alternatives, road density (both open and total) will exceed 0.2 miles/mile² (Table 3-53). Total road density will reach 0.6 miles/mile² under Alternative C.

Table 3-54 - WL-9: Road density by alternative in WAA 1901

	Density ¹ /Percent Change By Alternative											
	Alt A		Alt B		Alt C		Alt D		Alt E		Alt F	
Open Road Density²	0.2 8	0%	0.4 1	46%	0.4 2	50%	0.3 6	29%	0.3 6	29%	0.3 1	11%
Total Road Density³	0.4 3	0%	0.5 7	33%	0.6 0	40%	0.5 1	19%	0.5 1	19%	0.4 8	12%

Source: J:\fsfiles\office\wrp\nepa_projects\navy\06_Resource_Folders\n_Wildlife\References\etolin_allroads_marten.xls

¹ Calculated as miles of road per square mile for all of WAA 1901. ² Open road density includes any roads currently existing and drivable proposed system roads. ³ Total road density includes all system and temporary roads, whether or not they are drivable.

Alternative A (No Action)

This alternative would result in no additional roads and no further reductions in habitat capability for marten. This alternative is the least likely to negatively affect marten populations on Etolin Island. Access to marten by trappers will remain in its current status. Marten should continue in similar abundance and distribution patterns as currently exist on the Island, with no impacts expected to marten or trappers.

Alternatives B, D, and E

These alternatives are intermediate among the action alternatives between Alternative C and Alternative F in terms of their potential impacts on marten populations on Etolin Island. Alternatives B, D, and E, all propose very similar reductions in habitat capability and high value marten habitat relative to what was estimated to have been available in 1900. Existing high value habitat would be reduced by 4 to 5% in these alternatives, for cumulative reductions of 51% since 1900. All of these will increase open and total road density. With over 50% of the high value marten habitat expected to be harvested by the end of these alternatives, reduced marten populations could result. Trapping pressure could increase, but is more likely influenced by weather conditions than the road density, as described under Alternative C, except during the active phases of road construction and logging when there may be an increase in trapping due to convenience.

Alternative C

Alternative C proposes the greatest reduction in high value marten habitat and construction of the most new roads. Total road density may increase by 40% in WAA 1901 to approximately 0.6 miles/mile². Marten density may be reduced as much as 90% when road density approaches this level due to ease of access for harvest (Suring, et al 1992). High value marten habitat will be reduced about 6%, for a cumulative reduction of 52% since historic times. Alternative C is the most likely to negatively affect marten populations on Etolin Island through reductions in habitat capability and providing increased access for both legal and illegal harvest. However, trapping pressure on an Island with no communities, such as Etolin, is unlikely to be influenced solely by the number of roads. Access to WAA 1901 is limited during the winter months (trapping season) by weather conditions, but marten are harvested here as noted by the harvest records. Decreased habitat in combination with increased access could lead to reduced marten populations which could lead to reduced trapping success. As noted above, it is unclear why there has been a recent decline in harvest numbers in WAA 1901. Trapping pressure could increase during the active phases of the project because of more

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people working in the WAA, but is expected to return to about the same as currently exists in the long-term.

Alternative F

Among the action alternatives, Alternative F would have the least impact on marten habitat capability because it proposes the least amount of new road construction, and the smallest reduction in high value marten habitat. High value habitat is expected to decline by 43 acres (1%) under this alternative, for a cumulative reduction of 49% (same as existing condition). Marten should continue to exist in the current abundance and distribution patterns, with similar access to marten by trappers.

Bald Eagle

Bald eagles are protected by Federal law under the Bald and Golden Eagle Protection Act. In Southeast Alaska, most bald eagle nests are in old-growth trees within the beach fringe, with some nests along other large riparian areas. Eagles also prefer the shoreline for perching and winter roosting habitat. Nesting, perching, and winter roosting habitat for the bald eagle is protected by Forest Plan Standards and Guidelines, primarily beach and estuary buffers and riparian management areas, and through a 2002 Memorandum of Understanding (MOU) between the USDA Forest Service and the U.S. Fish and Wildlife Service (USFS 2002).

The MOU establishes a minimum 330-foot radius management zone around all bald eagle nests. Activities within this zone are usually restricted to those that will not disturb a nesting pair. The zone remains in effect even if the nest is inactive or lost. In addition, repeated helicopter flights (especially those used for yarding timber) should be avoided within ¼ mile of all active nests and blasting activities may be restricted within ½ mile of active nests. All nests are considered active from March 1 through May 31 as this is the nest site selection period. From June 1 through August 31, active nests are those with known eggs, nestlings, or those where adults are observed in nesting activities.

Existing Condition

The effects area selected for bald eagle includes the beach and estuary fringe along the edges of WAA 1901. There are 17,805 acres of beach and estuary fringe habitat in WAA 1901. In addition, a ½ mile radius around each known nest in the wildlife effects area was considered.

One-hundred forty-six bald eagle nest sites are known to exist in the wildlife effects area (WAA 1901). It is unknown at this time if any of these nests are active; this will be monitored and determined during each season in which operations occur.

There are approximately 4.04 miles of existing roads (including both system and temporary roads) in the beach fringe in the wildlife effects area. Thirty-four nests are within ½ mile of existing system or temporary roads. Only one known eagle nest is within ½ mile of the existing Anita Bay LTF. The WAA 1901 has been subject to past harvest, some of which was in the beach fringe. Harvest in the beach and estuary fringe reduced the amount of POG in habitat important for bald eagles. Project planning for all of the beach harvest was completed prior to implementation of the current Forest Plan, and therefore Standards and Guidelines requiring a 1,000-foot beach fringe did not apply. Many managed stands in the beach fringe have few or no trees of a suitable size for bald eagle nests, though a few nests occur in these areas (approximately 5% of nests in the wildlife effects area).

Direct and Indirect Effects

Current Forest Plan Standards and Guidelines do not allow for programmed timber harvest within the 1,000-foot wide beach and estuary fringe, so no further reduction in bald eagle nesting, perching, or winter roosting habitat will occur as a result of timber harvest. All known eagle nests are >700 feet

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from the nearest harvest units. Field surveys will be completed prior to implementation to determine activity status of nests. The Interagency Bald Eagle MOU provides additional protection to bald eagle nest sites. Effects to bald eagles are therefore expected to be minimal. Road construction, construction of new LTFs, and helicopter yarding could affect bald eagles, their nesting, and roosting habitat. Implementation of seasonal restrictions in accordance with the Interagency Bald Eagle MOU will minimize disturbances of active bald eagle nests within ¼ mile of any unit that may propose helicopter yarding, new roads, blasting along roads to be reconstructed, or in new or existing rock pits is subject to the same seasonal restrictions.

Portions of proposed roads are subject to blasting restrictions under the Interagency Bald Eagle MOU. Units and roads that will need eagle protection are noted on Unit and Road Cards.

Table 3-55 - WL-10: Bald Eagle Habitat Effects

	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Miles of proposed roads through beach fringe ¹	0	2.27	2.37	0.01	0.01	0
Number of nests where helicopter yarding restrictions may apply	0	17	34	4	30	2
Number of nests where variance to MOU may be necessary ^{2,3}	0	2	3	0	0	0

¹ Includes all roads, both NFS and temporary.

² Variances will be necessary for roadside vegetation clearing within 330 feet of nests.

³ Variances may be necessary if new road construction requires blasting that can not be accomplished outside of the seasonal restrictions.

Source: Wrangell Ranger District GIS.

Alternative A

Alternative A proposes no timber harvest, road construction, blasting, or helicopter yarding. This alternative would have no effect on bald eagles.

Alternatives B and C

Alternatives B and C both propose construction of new roads in the beach and estuary fringe that will affect bald eagle nesting and roosting habitat, and either of these alternatives would require a variance from the USDAFS and USFWS MOU because of encroachment within the 330 foot management area around an eagle nest.

A variance will be required should Alternative B be chosen, due to road construction on Road 6546 where it passes through the beach buffer at the north end of Mosman Inlet, and for construction of the Burnett Inlet LTF; both are within 330 feet of a known eagle nest. A variance will be required should Alternative C be chosen due to road construction on Road 6546 where it passes through the beach fringe within 330 feet of one nest at the north end of Mosman Inlet, and for road construction on Road 6547 where it passes through the beach fringe within 330 feet of two nests at the north end of Burnett Inlet.

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Both of these alternatives also propose units where helicopter yarding will likely occur within ¼ mile of known eagle nests (Table 3-54). Seasonal restrictions on helicopter yarding near active nests will be enforced in accordance with the Bald Eagle MOU and should therefore minimize disturbance to these nests.

These two alternatives propose the greatest reduction in bald eagle habitat of the alternatives under consideration, with impacts being slightly greater in Alternative C than Alternative B. While individual eagles could be affected by proposed activities, and disturbances allowed under variances could result in nest abandonment, these alternatives will not contribute to an overall reduction in bald eagle populations.

Alternative D and E

Alternatives D and E both currently propose about 71 feet of road in the beach fringe (Table 3-54). No proposed roads or units are within 330 feet of any bald eagle nest in either of these alternatives. Both of these alternatives propose units where helicopter yarding will likely occur within ¼ mile of known eagle nests (Table 3-54). However, seasonal restrictions on helicopter yarding near active nests will be enforced in accordance with the Bald Eagle MOU, and should therefore minimize disturbance to these nests.

These two alternatives propose less reduction in bald eagle habitat than Alternatives B and C, but slightly more than alternatives A and F. While individual eagles could be affected by proposed activities, these alternatives will not contribute to an overall reduction in bald eagle populations.

Alternative F

Alternative F proposes no timber harvest, road construction, or blasting in beach fringe habitats. This alternative proposes units where helicopter yarding will likely occur within ¼ mile of known eagle nests (Table 3-54). However, seasonal restrictions on helicopter yarding near active nests will be enforced in accordance with the Bald Eagle MOU, and should therefore minimize disturbance to these nests. This alternative should have no effect on bald eagles.

Cumulative Effects

Cumulative effects for bald eagle were analyzed for WAA 1901, the same scale as for direct effects. All non-National Forest lands were included in the analysis. Eagles generally use the same habitat throughout the year. Since activity restrictions pertain to the area surrounding nests, it is unnecessary to analyze a larger scale than the vicinity of the proposed project.

Harvest for the Red Mountain Timber Sale is scheduled for summer of 2007 and has already been included as part of the existing condition since it will be completed prior to completion of this document.

The Wrangell District Access and Travel Management Plan Environmental Assessment (ATM EA) may recommend several miles of road closure in the wildlife analysis area, but very little of the existing road is located within the 1,000 foot beach fringe. While, a decision notice has been published for the EA, implementation has not been started. Therefore, changes to the road system proposed under the ATM EA are not considered in this analysis, but will be considered after an implementation plan has been made. No other reasonably foreseeable projects in the cumulative effects area should affect bald eagles.

Prior harvest has led to a 6% reduction in potential bald eagle nesting habitat in the beach and estuary fringe in WAA 1901. This habitat will gradually return to eagle nesting and roosting habitat over the next 150 years. Once the beach buffer has fully recovered to POG, eagle habitat in the wildlife effects area will approximate that of historic conditions. Current Forest Plan Standards and Guidelines do not

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allow for programmed timber harvest within the 1,000 foot wide beach and estuary fringe, so impacts to bald eagle habitats will be limited to locations where roads or LTFs are proposed within the beach fringe as described above. In addition, the Memorandum of Understanding between the Forest Service and the U.S. Fish and Wildlife Service provides protection to bald eagle nest sites.



Photo: Bald eagle at Anan Creek

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Findings and Disclosures

The following findings and disclosures apply to all alternatives considered in detail in this DEIS.

Alaska National Interest Lands Conservation Act

An ANILCA Section 810 subsistence evaluation was conducted. The subsistence evaluation indicate that in combination with other past, present, and reasonably foreseeable future actions, all of the alternatives would result in a significant possibility of a significant restriction on subsistence use of deer due to reductions in abundance and increases in competition. This is consistent with the cumulative determination in the Forest Plan which stated that implementation of the Forest Plan may result in a significant restriction to subsistence use of deer due to the potential effects of projects on the abundance and distribution of these resources, and on competition for these resources” (FEIS ROD 1997, Page 36). None of the Navy Timber Sale alternatives would result in a significant possibility of a significant restriction on any other subsistence resources and uses. No significant restrictions on the abundance and distribution of, access to, or competition for subsistence resources in the project area are anticipated. Subsistence hearings will be held as required.

Bald and Golden Eagle Protection Act of 1940

All alternatives will be in accordance with the Interagency Agreement established with the U. S. Fish and Wildlife Service to maintain habitat to support long term nesting, perching and winter roosting habitat for bald eagles.

Clean Air Act

Emissions anticipated from the implementation of any project alternative will be of short duration and are not expected to exceed State of Alaska ambient air quality standards. (18 AAC 50)

Clean Water Act

Project activities meet all applicable State of Alaska Water Quality Standards. Congress intended the Clean Water Act of 1972 (Public Law 92-500) as amended in 1977 (Public Law 95-217) and 1987 (Public Law 100-4) to protect and improve the quality of water resources and maintain their beneficial uses. Section 313 of the Clean Water Act and Executive Order 12088 of January 23, 1987 addresses Federal agency compliance and consistency with water pollution control mandates. Agencies must be consistent with requirements that apply to "any governmental entity" or private person. Compliance is to be in line with "all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution."

The Clean Water Act (Sections 208 and 319) recognized the need for control strategies for nonpoint source pollution. The National Nonpoint Source Policy (December 12, 1984), the Forest Service Nonpoint Strategy (January 29, 1985), and the USDA Nonpoint Source Water Quality Policy (December 5, 1986) provide a protection and improvement emphasis for soil and water resources and water-related beneficial uses. Soil and water conservation practices (BMPs) were recognized as the primary control mechanisms for nonpoint source pollution on National Forest System lands. The EPA supports this perspective in their guidance, "Nonpoint Source Controls and Water Quality Standards" (August 19, 1987).

The Forest Service must apply BMPs that are consistent with the Alaska Forest Resources and Practices Act (AFRPA) to achieve Alaska Water Quality Standards. The site-specific application of

Environment and Effects **3**

BMPs, with a monitoring and feedback mechanism, is the approved strategy for controlling nonpoint source pollution as defined by Alaska's Nonpoint Source Pollution Control Strategy (October 2000). In 1997, the State approved the BMPs in the Forest Service Soil and Water Conservation Handbook (FSH 2509.22, October 1996) as consistent with AFRPA. This handbook is incorporated into the Forest Plan.

A discharge of dredge or fill material from normal silvicultural activities such as harvesting for the production of forest products is exempt from Section 404 permitting requirements in waters of the United States, including wetlands (404(f)(1)(A)). Forest roads qualify for this exemption only if they are constructed and maintained in accordance with BMPs to assure that flow and circulation patterns and chemical and biological characteristics of the waters are not impaired (404(f)(1)(E)). The BMPs that must be followed are specified in 33 CFR 323.4(a). These specific BMPs are incorporated into the Soil and Water Conservation Handbook under BMP 12.5.

The designs of harvest units for the alternatives were guided by standards, guidelines and direction in the Forest Plan, and applicable Forest Service manuals and handbooks. The unit cards and road cards (Appendices B and C in the Draft EIS) contain details on practices prescribed to prevent or reduce nonpoint sediment sources. All roads, landings, and rock pits for this project will be constructed according to best management practices listed in 33 CFR 323.4(a).

Coastal Zone Management Act

To make the process more efficient, categories of activities may be evaluated and reviewed together under what is called a "general consistency determination" (GCD). Upon approval of a GCD, activities within that category do not require an individual consistency determination or review. The Forest Service has developed a GCD for timber harvest activities conducted on the Tongass National Forest, and the State of Alaska has agreed that Tongass timber harvest activities are consistent to the maximum extent practicable with the enforceable policies of the ACMP.

Due to limits on the types of activities that qualify for a GCD, and provisions of the Alaska Forest Resources and Practices Act (FRPA), certain activities are outside the scope of the GCD and will continue to require individual ACMP consistency review. The GCD does not apply to any activity that requires a State or Federal authorization under any authority other than FRPA. Nor does it apply to any activity related to the planning, construction modification, or removal of any structure or facility intended for use by the general public. Specifically, it does not apply to logging camps or construction of log transfer facilities that require State or Federal permits, or to construction or reconstruction of roads that require such non-FRPA permits. The Navy timber sale proposes new log transfer facilities that are not covered by the scope of the GCD and will require an individual consistency determination. The scope of that determination and consistency review will be limited to that portion of the project not covered by the GCD.

Effects on Prime Farm Land, Range Land, and Forest Land

No prime farm land or range land will be adversely impacted by the action alternatives. Forest land will maintain its long-term productivity.

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Effects on Consumers, Civil Rights, Women, and Minorities

This project will not cause adverse impacts to consumers, civil rights, women or minorities.

Endangered Species Act

None of the alternatives is anticipated to have a direct, indirect, or cumulative effect on any threatened or endangered species in or outside the project area. Biological Evaluations will be completed following Forest Service Manual (2670) direction.

Executive Order 11988

The numerous streams in the Navy project area make it essentially impossible to avoid all floodplains during timber harvest and road construction. Forest Plan Standards and Guidelines for riparian areas exclude most commercial timber harvesting from floodplains. Roads may be constructed in or through floodplains subject to the design requirements of the BMP. Effects on floodplains from project activities have been avoided or minimized as much as possible.

Executive Order 11990

Because wetlands are so extensive in the Navy project area, it is not feasible to avoid all wetland areas. Soil moisture regimes and vegetation on some wetlands may be altered in some harvest units; however, the affected wetlands will meet wetland classification and will still function as wetlands in the ecosystem.

Road construction through wetlands is avoided to the extent practicable. Where wetlands cannot be avoided road construction will adhere to State approved BMPs, which include at a minimum the federal baseline provisions in 33 Code of Federal Regulation (CFR) 323.

Executive Order 12898

Implementation of any project alternative is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations. (ANILCA Section 810)

Executive Order 12962

With application of Forest Plan Standards and Guidelines, including those for riparian areas, no significant adverse effects to freshwater or marine resources will occur. Road closures could limit access to some recreational fishing opportunities; however, any adverse effects would be minimal.

Executive Order 13007

Executive Order 13007 directs federal agencies to accommodate access to and ceremonial use of American Indian sacred sites by Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. There are no known sacred Indian sites in the Navy project area.

Executive Order 13186

Executive Order 13186 directs federal agencies to evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern. None of the proposed activities are expected to have a measurable negative effect on migratory bird populations, although individuals or small groups and their nests may be affected. See the Wildlife Resource Report for additional information.

Executive Order 13443

Executive Order 13443 directs federal agencies to facilitate the expansion and enhancement of hunting opportunities and management of game species and their habitat. All alternatives manage game species habitat while meeting Forest Plan Standards and Guidelines.

Federal Cave Resource Protection Act

No known significant caves in the project area will be directly or indirectly affected by project activities. Forest Plan Karst and Caves Standards and Guidelines are applied to areas known, or suspected, to contain karst resources.

Magnuson-Stevens Fishery Conservation Act of 1996

The Magnuson-Stevens Fishery Conservation Act (1996) requires that all Federal agencies consult with the National Marine Fisheries Service (NMFS) when any project “may adversely affect” Essential Fish Habitat (EFH). The Forest Service’s position is that harvesting timber near Class I streams and wetlands, and the use of the LTFs may have an adverse effect on EFH. However, by following Forest Plan Standards and Guidelines and BMP, the effects on EFH will be minimized.

According to the agreement between NMFS and the Forest Service dated August 25, 2000, an assessment will be done that will include:

- A description of the proposed action
- An analysis of individual and cumulative effects of the proposed action on the essential fish habitat, the managed species, and associated species such as major prey species, including affected life histories,
- The Forest Service’s views regarding effects on EFH, and
- A discussion of proposed mitigation, if applicable.

A copy of this DEIS, which includes the specified assessment, will be sent to NMFS for review.

National Forest Management Act

The Forest Plan complies with all resource integration and management requirements of 36 CFR 219 (219.14 through 219.27). Application of Forest Plan direction for the Navy project ensures compliance at the project level. No proposed harvest units in the Navy project area would result in opening greater than 100 acres.

National Historic Preservation Act

Cultural resource surveys of varying intensities have been conducted, following inventory protocols approved by the SHPO. Native communities have been contacted and public comment was

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encouraged. The SHPO has been consulted and concurred with the Forest Service finding that no known historic properties will be affected by this project.

Tongass Timber Reform Act

Application of Forest Plan Riparian Standards and Guidelines ensures that no commercial timber harvest will occur within 100 feet of any Class I streams and Class II streams flowing directly into a Class I stream, as required in Section 103 of TTRA.

If an action alternative is selected, the timber would provide part of the timber supply to the Tongass National Forest's timber program to seek to meet market demand.

Table 3-37 - W-2. Harvest Proposed in True Watersheds by Alternative and Proposed Road in True Watersheds by Alternative

Watershed		Existing		Acres of Proposed harvest					Total Proposed % Of Watershed Harvested						Miles of Proposed Road					Post Sale Road Density					
Name	Area (ac)	harvest <30 years (ac)	Roads (mi)	Alt B	Alt C	Alt D	Alt E	Alt F	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F	Alt B	Alt C	Alt D	Alt E	Alt F	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
Anita Creek	1330.5	68.5	2.82	69.6	271.6	257.7	271.6	97	5.1%	10.4%	25.6%	24.5%	25.6%	12.4%	0	0.16	0	0.16	0	1.36	1.43	1.43	1.36	1.43	1.36
Boss Creek	2116.4	0	0	281	286.7	0	0	0	0.0%	13.3%	13.5%	0.0%	0.0%	0.0%	2.95	2.95	0	0	0	0	0.89	0.89	0	0	0
Camp Creek	1509.4	132.4	0.48	59.9	59.9	58.5	15.9	0.2	8.8%	12.7%	12.7%	12.6%	9.8%	8.8%	1.29	1.29	0.77	0.77	0	0.20	0.75	0.75	0.53	0.53	0.2
Connelly Creek	1309	0	0	91.5	73.9	0	0	0	0.0%	7.0%	5.6%	0.0%	0.0%	0.0%	0.88	0.88	0	0	0	0	0.43	0.43	0	0	0
Cooney Creek	1046	0	0	0	125.1	0	0	0	0.0%	0.0%	12.0%	0.0%	0.0%	0.0%	0	2.59	0	0	0	0	0	1.58	0	0	0
Detailer Creek	2082.5	0	0	203	279.5	203	135.5	0	0.0%	9.8%	13.4%	9.7%	6.5%	0.0%	1.64	2.09	1.42	1.27	0	0	0.5	0.64	0.44	0.39	0
Duckbill Creek	2530.4	376.6	6.04	199	244.7	112.1	89.2	111.3	14.9%	22.7%	24.6%	19.3%	18.4%	19.3%	0.36	0.86	0.17	0.81	0.34	1.53	1.62	1.74	1.57	1.73	1.61
Fishtrap Creek	7091.1	276.3	4.87	656	1038.6	517	605.6	207.2	3.9%	13.1%	18.5%	11.2%	12.4%	6.8%	0	1.68	0	2.01	0	0.44	0.44	0.59	0.44	0.62	0.44
Granite Creek	1106.2	145	0.95	0	18.7	0	95.9	18.7	13.1%	13.1%	14.8%	13.1%	21.8%	14.8%	0	0	0	1.13	0	0.55	0.55	0.55	0.55	1.2	0.55
Kindergarten Lake Creek	5072.5	830.2	12.07	122	441	232.5	258.9	176.3	16.4%	18.8%	25.1%	21.0%	21.5%	19.8%	2.02	4.17	2.14	2.96	0.63	1.52	1.78	2.05	1.79	1.9	1.6
Log Jam Creek	2271.2	290.7	5.1	0	91.9	91.9	91.9	91.9	12.8%	12.8%	16.8%	16.8%	16.8%	16.8%	0	0	0	0	0	1.44	1.44	1.44	1.44	1.44	1.44
Mirkwood Creek	945.7	0	0	67.8	168.5	73.1	135.8	15.4	0.0%	7.2%	17.8%	7.7%	14.4%	1.6%	0.52	1.21	0.52	1.21	0.11	0	0.35	0.82	0.35	0.82	0.07
Navy lake Creek	5319.1	0	0	419	293.3	0	0	0	0.0%	7.9%	5.5%	0.0%	0.0%	0.0%	2.71	0	0	0	0	0	0.33	0	0	0	0
Pump Creek	5718	443.4	10.68	123	223	229.5	205.7	196.1	7.8%	9.9%	11.7%	11.8%	11.4%	0.0%	0.6	0.6	0.6	0.6	0.09	1.2	1.26	1.26	1.26	1.26	1.21
Quiet Creek	934.2	22.5	0.1	114	114.9	114.9	33.2	33.2	2.4%	14.7%	14.7%	14.7%	6.0%	6.0%	1	1	1	0.23	0.23	0.07	0.76	0.76	0.76	0.23	0.23
Thrucut/Goose Lakes Creek	1664.2	39.9	2.5	14.4	14.4	14.4	14.4	14.4	2.4%	3.3%	3.3%	3.3%	3.3%	3.3%	0	0	0	0	0	0.96	0.96	0.96	0.96	0.96	0.96
Wetbeck Creek	2267.2	330	3.29	121	120.9	52.3	27.2	49	14.6%	19.9%	19.9%	16.9%	15.8%	16.7%	0.12	0.12	0.4	0.4	0.3	0.93	0.96	0.96	1.04	1.04	1.01
Total				2541	3867	1957	1981	1011							14.09	19.6	7.02	11.55	1.7						

¹ Includes harvests proposed and harvest that has occurred over the past 30 years.

² Includes NFS and Temporary roads

Source: Wrangell Ranger District GIS layers

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Chapter 4

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Chapter 4 - LISTS

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A copy of the Navy Timber Sale Draft EIS was sent to the following parties. These parties either commented on the project, requested a copy of the DEIS during the scoping process or at some other time in the NEPA process, are part of the Forest Service’s mandatory mailing list (Forest Service Handbook 1909.15, Sections 23.2 and 63.1).

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Honorable Mayor Valerie McCandless, City of Wrangell
Bob Prunella, City of Wrangell
Carol Rushmore, City of Wrangell
The Wilderness Society

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Glossary

Adfluvial

Migrate between lakes, rivers, and streams.

Alaska Forest Resource Protection Regulations (AFRPR)

Under the Alaska Forest Resources and Practices Act of 1979, as amended, Forest Service timber harvest projects satisfy the Coastal Zone Management Act (CZMA) consistency requirement if the Forest Plan and all related standards and guidelines applicable to the project provide no less resource protection than the AFRPA requires for timber harvest projects on State land, except that the AFRPA specifies a different minimum riparian standard for Federal projects than for State projects. The Forest Plan Standards and Guidelines and mitigation measures described in Chapters 2 and 3 of this document meet or exceed the State standards.

Alaska National Interest Lands Conservation Act (ANILCA)

Passed by Congress in 1980, this legislation designated 14 National Forest Wilderness areas in Southeast Alaska. ANILCA of December 2, 1980, Public Law 96-487, 96th Congress, 94 Stat. 2371-2551, Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

Alaska Native Claims Settlement Act (ANCSA)

Public Law 92-203, 92nd Congress, 85 Stat. 2371-2551. Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Alaska Natives and for other purposes.

Alluvial Fan (AF)

A cone-shaped deposit of organic and mineral material made by a stream where it runs out onto a level plain or meets a slower stream.

Anadromous Species

One whose individuals are born in freshwater, but migrate to, and feed in, the sea before returning to freshwater to breed.

Background Distance Zone

The distant part of a landscape, which is the seen or viewed area located from 3 or 5 miles to infinity from the viewer (see also "Foreground" and "Middleground").

Beach Fringe

The beach fringe is an area of approximately 1,000 feet inland from mean high tide on all marine coastlines. Programmed timber harvest is not allowed; and when possible roads are located outside the fringe.

Best Management Practice (BMP)

Practices used for the protection of water quality. BMPs are designed to prevent or reduce the amount of pollution from non-point sources or other adverse water quality impacts while meeting other goals and objectives. BMPs are standards to be achieved, not detailed or site-specific prescriptions or solutions. BMPs as defined in the USDA Forest Service Soil & Water Conservation Handbook are mandated for use in Region 10 under the Tongass Timber Reform Act.

Biological Diversity (Biodiversity)

The variety of life in all its forms and at all levels. This includes the various kinds and combinations of: genes; species of plants, animals, and microorganisms; populations; communities; and ecosystems. It also includes the physical and ecological processes that allow all levels to interact and survive. The most familiar level of biological diversity is the species level, which is the number and abundance of plants, animals, and micro-organisms.

Blowdown

The act of trees being uprooted by the wind. In Southeast Alaska, Sitka spruce and hemlock trees are shallow rooted and susceptible to blowdown. There generally are three types of blowdown:

- Endemic: where individual trees are blown over;
- Catastrophic: where a major windstorm can destroy hundreds of acres; and
- Management Related: where the clearing of trees in an area make the adjacent standing trees vulnerable to blowdown.

Board Foot

This is a unit of wood that measures 2" x 12" x 1". One acre of commercial timber in Southeast Alaska on the average yields 28,000-34,000 board feet per acre (ranging from 8,000-90,000 board feet per acre).

Buffer

An area around a resource where timber harvest is restricted or prohibited. It is assumed that effects do not occur beyond this zone of influence. For example, the Tongass Timber Reform Act requires that timber harvest be prohibited in an area no less than 100 feet on each side of all Class I streams and Class II streams which flow directly into Class I streams. This 100-foot area is known as a "stream buffer".

Cairn

A rock pile, usually used as a marker, burial, or blind.

Clearcut (CC)

The harvesting in one cut of all trees on an area. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield. Clearcut size on the Tongass National Forest is limited to 100 acres, except for specific conditions noted in the Alaska Regional Guide.

Coastal Zone Management Act (CZMA)

Under the Coastal Zone Management Act of 1972, as amended, Forest Service activities and development projects that affect the coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the Alaska Coastal Management Program (ACMP). Such "consistency determinations" are made by the Forest Service, and are reviewed by the State of Alaska, as required by the CZMA.

Code of Federal Regulations (CFR)

A codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

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Commercial Thinning

Thinning a stand where the trees to be removed are large enough to sell.

Connectivity

A measure of the extent that forest areas between or outside reserves provide habitat for breeding, feeding, dispersal, and movement.

Corridor

Connective links of certain types of vegetation between patches of suitable habitat which are necessary for certain species to facilitate movement of individuals between patches of suitable habitat. Also refers to transportation or utility rights-of-way.

Cover

Refers to trees, shrubs, or other landscape features that allow an animal to partly or fully conceal itself.

Critical Habitat

Specific terrain within the geographical area occupied by threatened or endangered species. Physical and biological features that are essential to conservation of the species and which may require special management considerations or protection are found in these areas.

Crown

The tree canopy or the upper part of a tree or woody plant that carries the main branch system and foliage.

Deer Winter Habitat

Locations that provide food and shelter for Sitka black-tail deer under moderately severe to severe winter conditions.

Diameter Breast Height (DBH)

The diameter of a tree at breast height; breast height is measured at 4.5 ft. from ground level.

Diversity

The distribution and abundance of different plant and animal communities and species within an area.

Eagle Nest Tree Buffer Zone

A 330-foot radius around eagle nest trees established in an agreement between the U.S. Fish and Wildlife Service and the Forest Service.

Ecosystem

An ecosystem is a community of organisms and its physical setting. An ecosystem, whether a fallen log or an entire watershed, includes resident organisms, non-living components such as soil nutrients, inputs such as rainfall, and outputs such as organisms that disperse to other ecosystems.

Effects

Effects, impacts, and consequences as used in this environmental impact statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historical, cultural, economic, or social, and may be direct, indirect, or cumulative.

- **Direct Effects:** Results of an action occurring when and where the action takes place.
- **Indirect Effects:** Results of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future.
- **Cumulative Effects:** The impacts on the environment resulting from additional incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant actions, occurring over time.

Endangered Species

Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as Endangered in accordance with the 1973 Endangered Species Act. See also Threatened Species, Sensitive Species.

Erosion

Erosion is the wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

Estuary

For the purpose of this Draft Environmental Impact Statement process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are treeless except for scattered spruce or cottonwood.

Estuary Fringe

The estuary fringe is an area of approximately 1,000 feet inland from mean high tide on all marine coastlines. Programmed timber harvest is not allowed; and when possible roads are located outside the fringe.

Even-aged Management

This is the application of a combination of actions that result in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of that age of the stand at harvest rotation age. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands.

Executive Order

An order or regulation issued by the President or some administrative authority under his or her direction.

Floodplain (FP)

A floodplain is that portion of a river valley, adjacent to the river channel, which is covered with water when the river overflows its banks at flood stages.

Foreground Distance Zone

The stand of trees immediately adjacent to a scenic area, recreation facility, or forest highway; area located less than 1/4 mile from the viewer. See also Background and Middleground.

Forest Plan

The Tongass Land Management Revision, signed in 1997, revised 1999. This is the 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the Forest.

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Fragmentation

An element of biological diversity of separate habitat blocks or patches that describe the natural condition of habitats in terms of the size and distribution, the extent to which they are interconnected, the effects of management on these natural conditions, and the process of reducing the size and connectivity of stands within a forest.

Forest or Forest Land

See timber classification.

Forested Wetland

A forested wetland has vegetation that is characterized by an overstory of trees that are 20 feet or taller.

Game Management Units (GMU)

GMUs are geographical areas defined by the Alaska Department of Fish and Game to manage wildlife populations.

Geographic Information System (GIS)

GIS is an information processing technology to input, store, manipulate, analyze, and display spatial and attribute data to support the decision-making process. It is a system of computer maps with corresponding site-specific information that can be electronically combined to provide reports and maps.

Groundwater

Groundwater is water within the earth that supplies wells and springs.

Guideline

A preferred or advisable course of action or level of attainment designed to promote achievement of goals and objectives.

Habitat

Habitat is the sum total of environmental conditions of a specific place occupied by an organism, population, or community of plants and animals.

Habitat Capability

Habitat capability is an estimate of the number of healthy animals that a habitat can sustain. Used in wildlife models to calculate rough population estimates for management indicator species.

Habitat Suitability Index (HSI)

This is a value assigned to a unit of land using a computerized model that related vegetative and geographic characteristic (e.g. stand volume, proximity to a stream, cliff, slope, aspect, or etc.) to the land unit's value for a particular wildlife species. Values generally range from 0 to 1, with 1 being the best. The Habitat Capability Models used to generate HSIs were developed by interagency teams of biologists using the best available information including research results and best professional judgments.

Heritage Resources (Cultural Resources)

Historic or prehistoric objects, sites, buildings, structures, and their remains, resulting from past human activities are all cultural resources.

Interdisciplinary Team (IDT)

A group of people with different backgrounds assembled to research, analyze, and write a project Environmental Impact Statement. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze a proposed action and its alternatives.

Issue

An issue is a point, matter, or section of public discussion or interest to be addressed or decided.

Karst and Cave

Karst is a comprehensive term that applies to the unique topography, surface and subsurface drainage systems, and landforms that develop by the action of water on soluble rock; in Southeast Alaska, limestone and marble. The dissolution of the rock results in the development of internal drainage, producing sinking streams, closed depressions, and other landforms such as sinkholes, collapse channels and caves.

Land Use Designation (LUD)

A defined area of land specific to which management direction is applied in the Tongass Land and Resource Management Plan as amended (Forest Plan).

Landslides

The moderately rapid to rapid down slope movement of soil and rock materials that may or may not be water-saturated.

Large Organic Debris (LOD)

Any large piece of relatively stable woody material having a diameter of at least 4 inches and a length greater than 3 feet that intrudes into the stream channel is considered LOD.

Log Transfer Facility (LTF)

A LTF is a facility that is used for transferring commercially-harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and location and construction are regulated by the 1987 Amendments to the Clean Water Act.

Management Indicator Species (MIS)

Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.

Mass Movement

This is defined as the downslope movement of a block or mass of soil. This usually occurs under conditions of high soil moisture and does not include individual soil particles displaced as surface erosion.

Memorandum of Understanding (MOU)

A legal agreement between the Forest Service and others agencies resulting from consultation between agencies that states specific measures the agencies will follow to accomplish a large or complex project. A memorandum of understanding is not a fund obligating document.

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Microclimate

The temperature, moisture, wind, pressure, and evaporation (climate) of a very small area that differs from the general climate of the larger surrounding area is defined as a microclimate.

Middleground Distance Zone

The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly for the landscape; area located from 1/4 to 5 miles from the viewer. See also Foreground and Background.

Million board feet (MMBF)

A million board feet net sawlog and utility volume.

Mining Claims

A geographic area of the public lands held under the general mining laws in which the right of exclusive possession is vested in the locator of a valuable mineral deposit.

Mitigation

Measures designed to counteract environmental impacts or to make impacts less severe. These may include: avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Mixed Conifer

In Southeast Alaska, mixed conifer stands usually consist of western hemlock, mountain hemlock, Alaska yellow-cedar, Western redcedar, and Sitka spruce species. Shore pine may occasionally be present depending on individual sites.

Model

A representation of reality used to describe, analyze, or understand a particular concept. A model may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations. A model has limits to its effectiveness, and is used as one of several tools to analyze a problem.

Monitoring

Monitoring is a process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring can occur at different levels: to confirm whether mitigation measures were carried out in the manner called for, to determine whether the mitigation measures were effective, or to validate whether overall goals and objectives were appropriate. Different levels call for different methods of monitoring.

Multiple-aged Stands

These stands generally have two or three distinct tree canopy levels occurring within a single stand.

Muskeg

In Southeast Alaska, a type of bog that has developed over thousands of years in depressions or flat areas on gentle to steep slopes, also called peat lands.

National Environmental Policy Act (NEPA) of 1969

An Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, Agricultural Handbook 453 (USDA Forest Service, 359 pp.).

National Forest Management Act (NFMA)

A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

No-action Alternative

The most likely condition expected to exist in the future if current management direction were to continue unchanged.

Notice of Intent (NOI)

A notice printed in the Federal Register announcing that an Environmental Impact Statement will be prepared. The NOI must describe the proposed action and possible alternatives, describe the agency's proposed scoping process, and provide a contact person for further information.

Old-growth

Ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of forest stand development that typically differ from earlier stages in a variety of characteristics which may include larger tree size, higher composition, and different ecosystem function. The structure and function of an Old growth ecosystem will be influenced by its stand size and landscape position and context.

Patch

A patch is defined as a non-linear surface area differing in appearance from its surroundings.

Planning Area

The planning area is the portion of the National Forest System controlled by a decision document.

Plant Communities

Plant community is an aggregation of living plants having mutual relationships among themselves and to their environment. Plant communities are more than one of these aggregates.

Population Viability

This is the ability of a population to sustain itself over time.

Productive Old Growth (POG)

Old-growth forest that is capable of producing at least 20 cubic feet of wood fiber per acre per year, or having greater than 8,000 board feet per acre.

Project Record

A project record is a record of decisions and activities that result from the process of developing a forest plan, revision, or significant amendment or environmental analysis.

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Public Participation

Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service activities.

Record of Decision (ROD)

A document separate from, but associated with an Environmental Impact Statement, which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not.

Recreation Opportunity Spectrum (ROS)

ROS is a system for planning and managing recreation resources that categorize recreation opportunities into seven classes [(from most natural to least natural): Primitive (P); Semi-Primitive Non-motorized (SPNM); Semi-Primitive Motorized (SPM); Roaded Natural (RN); Roaded Modified (RM); Rural (R); and Urban (U)]. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs based on the extent to which the natural environment has been modified, types of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. In timber planning projects, roads tend to have the most influence in changing the setting from a natural setting, to a developed one. Harvest units can have an affect as well, depending on the prescription used.

Reforestation

Reforestation is the natural or artificial restocking of an area with trees.

Regeneration

Regeneration is the process of establishing a new crop of trees on previously-harvested land.

Resident Fish

Resident fish are not anadromous and reside in freshwater on a permanent basis. Resident fish include non-anadromous Dolly Varden char and cutthroat trout.

Revegetation

The re-establishment and development of plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through reforestation or reseeding.

Riparian Area

An area next to a stream, river, or lake, which has distinctive resource values and characteristics that contain elements of aquatic and riparian ecosystems, which can be geographically delineated.

Roadless Area

An area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

Rotation

The planned number of years (approximately 100 years in Alaska) between the time that a forest stand is regenerated and its next cutting at a specified stage of maturity.

Rotation Age

This is the age of a stand when harvested at the end of a rotation.

Scenic Viewshed (SV)

The desired future condition emphasizes a natural-appearing landscape as viewed by users of visual priority travel routes and use areas. Recreation and tourism opportunities in a range of settings are available. A variety of successional stages providing wildlife habitat occur, although late successional stages predominate.

Scoping Process

Early and open activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate. Scoping focuses on the issues surrounding the proposed action, and the range of actions, alternatives, and impacts to be considered in an Environmental Assessment or an Environmental Impact Statement.

Scrub-Shrub Wetland

Wetlands dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. In Southeast Alaska this includes forested lands where trees are stunted because of poor soil drainage.

Second Growth

Second growth is the forest that becomes established following some disturbance such as cutting, serious fire, or insect attack; these are stands that grow back on a site after removal of the previous timber stand.

Sediment

Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface.

Sensitive Species

Sensitive species are plant and animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on a non-official State list, or that are recognized by the Regional Forester as needing special management to prevent placement on Federal or State lists.

Silviculture

Silviculture is the science of controlling the establishment, composition, and growth of forests.

Snag

A snag is a standing dead tree, usually greater than 5 feet tall and 6 inches in diameter at breast height.

Soil Productivity

Soil productivity is the capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

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Stand (Tree Stand)

A stand is an aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

Standard

This is a course of action or level of attainment required by the 1997 Forest Plan as amended to promote achievement of goals and objectives.

State Historic Preservation Officer (SHPO)

This Officer is a State-appointed official who administers Federal and State programs for cultural resources.

Storage

Storage is a term used only for NFS roads. The physical on-the-ground changes are similar to a decommissioned road; however, roads in storage are considered part of the long-term forest road transportation system and may be opened to vehicular traffic in the future. The process/action of storage involves closing a road to vehicle traffic and placing it in a condition that requires minimum maintenance to protect the environment and preserve the facility. Drainage structures in live drains are completely removed to restore natural drainage patterns. Ditch relief culverts may be left in place and supplemented with deep water bars to minimize the cost of reusing the roads in the future.

Storm Proofing

Construction of drivable water-bars, ditch blocks, rolling dips or outsloped road prism to channel flows from streams or ditches in the event the drainage structures are blocked by a storm event. The above structures are placed so that when a culvert or ditch is blocked the water will be channeled over the road to reduce the chronic and catastrophic sediment load that would result from the entire road prism being washed away in the case of blocked culvert or ditch.

Stream Class

Streams are classified based on their ability to produce fish, which is determined by physiological and biological data.

- Class I. Streams and lakes with anadromous or adfluvial fish or fish habitat; or, high quality resident fish waters, or habitat above fish migration barriers known to provide reasonable enhancement opportunities for anadromous fish. There are approximately 44 miles of mapped class I streams in the project area watersheds.
- Class II. Streams and lakes with resident fish or fish habitat and generally steep (6 to 25 percent or higher) gradients where no anadromous fish occur, and otherwise not meeting class I criteria. There are approximately 72 miles of mapped class II streams in the project area watersheds.
- Class III. Streams are perennial and intermittent streams that have no fish populations or fish habitat, but have sufficient flow or sediment and debris, transport to directly influence downstream water quality or fish habitat capability. There are approximately 189 miles of mapped class III streams in the project area watersheds.
- Class IV. Other intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to directly influence downstream water quality or fish habitat capability. There are approximately 71 miles of mapped class IV streams in the project area watersheds; the actual length is considerably higher due to the difficulty to map small streams without extensive ground reconnaissance.

Stumpage

The value of timber as it stands uncut in terms of dollar value per thousand board feet.

Subsistence

The customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible by-products of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade.

Subsistence Use Area

Important Subsistence Use Areas include the "most reliable" and "most often hunted" categories from the Tongass Resource Use Cooperative Survey and from subsistence survey data from Alaska Department of Fish and Game, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Suitable Forest Land

See timber classification.

Sustained Yield

The amount of renewable resources that can be produced continuously (through time) at a given intensity of management is the sustained yield.

Thinning

The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight.

Thousand board feet (MBF)

A thousand board feet net sawlog and utility volume.

Threatened Species

Plant or animal species which is likely to become endangered throughout all or a significant portion of its range within the foreseeable future, as defined in the Endangered Species Act of 1973, and which has been designated in the Federal Register by the Secretary of the Interior as a Threatened Species. See also Endangered Species, Sensitive Species.

Tiering

Tiering eliminates repetitive discussions of the same issue by incorporating by reference. The general discussion in an environmental impact statement of broader scope; e.g., this document is tiered to the Tongass Land and Resource Management Plan, as amended.

Timber Classification

Forested land is classified under each of the land management alternatives according to how it relates to be management of the timber resource. The following are definitions of timber classifications used for this purpose.

- Commercial Forest: Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

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- **Nonforest:** Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.
- **Forest:** National Forest System lands currently supporting or capable of supporting forests at a density of 10 percent crown closure or better. Includes all areas with forest cover, including old growth and second growth, and both commercial and non-commercial forest land.
- **Suitable or Suitable Available:** Forest land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions, and for which there is reasonable assurance that such lands can be adequately restocked, and for which there is management direction that indicated that timber production is an appropriate use of that area. Land to be managed for timber production on a regulated basis.
- **Unsuitable:** Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as inappropriate for timber production in the Forest planning process.

Understory

The trees and shrubs in a forest growing under the canopy or overstory of other trees is the understory.

Uneven-aged Management

Uneven-aged forest management employs techniques which simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes.

Unsuitable

See timber classification.

Value Comparison Unit (VCU)

Areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. Established to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

Viable Population

The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

Viewshed

A viewshed is defined as an expansive landscape or panoramic vista seen from a road, marine waterway, or specific viewpoint.

Visual Quality Objectives (VQO)

Measurable standards reflecting five different degrees of landscape alteration based upon a landscape's diversity of natural features and the public's concern for high scenic quality. The five categories of VQOs are:

- **Preservation:** Permits ecological changes only (applies to Wilderness areas and other special classified areas). Management activities are generally not allowed in this setting.

- **Retention:** Provides for management activities that are not visually evident to the casual forest visitor.
- **Partial Retention:** Management activities remain visually subordinate to the natural landscape.
- **Modification:** Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally-established form-line color and texture so that the visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.
- **Maximum Modification:** Management activities may dominate the landscape but should appear as a natural occurrence when viewed as background.

V-Notches

A v-notch is a deeply incised valley along some waterways that would look like a "V" from a cross-section. These abrupt changes in terrain features are often used as harvest unit or yarding boundaries.

Volume Strata

Categories of timber volume derived from the timber type data layer and the common land unit data layer. Three volume strata (low, medium, and high) are recognized in the Forest Plan.

- **Low Strata:** The lowest range of volume for commercial forest land based on per acre volume estimates. The Forest Plan estimated the low volume class strata to contain approximately 13.9 MBF/Acre.
- **Medium Strata:** The middle range of volume for commercial forest land based on per acre volume estimates. The Forest Plan estimated the medium volume class strata to contain approximately 23.3 MBF/Acre.
- **High Strata:** The high range of volume for commercial forest land based on per acre volume estimates. The Forest Plan estimated the high volume class strata to contain approximately 29.9 MBF/Acre.

Watershed

The area that contributes water to a drainage or stream or that portion of the forest in which all surface water drains to a common point is defined as a watershed. Watersheds can range from a few tens of acres that drain a single small intermittent stream to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams.

Wetland

Areas that are inundated by surface or groundwater frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include: swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Wilderness

Areas designated by congressional action under the 1964 Wilderness Act, ANILCA, and TTRA. Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation; areas of at least 5,000

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acres are practical for preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

Wildlife Analysis Area (WAA)

A WAA is a division of land used by the Alaska Department of Fish and Game for wildlife analysis.

Wildlife Habitat

Wildlife habitat is where a species may be found and where the essentials for its development and sustained existence are obtained.

Windfirm Trees

Trees that have been exposed to the wind throughout their life and have developed a strong root system or trees that are protected from the wind by terrain features are considered windfirm.

Windthrow

See blowdown.

Winter Range

An area, usually at lower elevation, used by wildlife (usually refers to big game) during the winter months.

Yarding

Yarding is the mechanical hauling of timber from the stump to a collection point; this can be done with a shovel, cable, or helicopter system.

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