APPENDIX A
SCOPING AND COMMENT SUMMARY REPORT

Tongass Forest Plan Amendment Scoping and Comment Summary Report

Tongass National Forest

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
ANILCA	Alaska National Interest Lands Conservation Act
ASQ	allowable sale quantity
CMAI	Culmination of Mean Annual Increment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
Forest Plan	Land and Resource Management Plan
Forest Service	U.S. Department of Agriculture, Forest Service
FWS	Fish and Wildlife Service
IRA	inventoried roadless area
LUD	Land Use Designation
MIS	Management Indicator Species
NEPA	National Environmental Policy Act
NFS	National Forest System
NOI	Notice of Intent
OGR	old-growth reserve
SOA	State of Alaska
TUS	Transportation and Utility System
YAC	Youth Advisory Council
YG	young growth

1.0 PROJECT SUMMARY

The U.S. Department of Agriculture, Forest Service (Forest Service) is preparing an Environmental Impact Statement (EIS) that evaluates an amendment to the 2008 Tongass National Forest Land and Resource Management Plan (Forest Plan). The Record of Decision will consider and identify changes, if any, to the current 2008 Forest Plan.

2.0 BACKGROUND

On July 2, 2013, Secretary of Agriculture, Thomas Vilsack, issued Memorandum 1044-009, *Addressing Sustainable Forestry in Southeast Alaska*, which expressed the Secretary's intent to transition the Tongass National Forest (the Tongass or Forest) to a young growth–based timber program in 10 to 15 years, more rapidly than considered in the 2008 Forest Plan. He asked that the Forest Service "strongly consider whether to pursue an amendment to the Tongass Forest Plan. Such an amendment would evaluate which lands will be available for timber harvest, especially young growth timber stands, which lands should be excluded, and additional opportunities to promote and speed transition to young growth management."

In order to achieve the young-growth (YG) transition goal of 10 to 15 years, the initial phase of the National Environmental Policy Act (NEPA) documentation has been initiated. Notice of Intent (NOI) to prepare an Environmental Impact Statement was originally published in the Federal Register on May 27, 2014. On June 23, 2016, a corrected Notice of Intent was published modifying the expected timeline, providing details on the objection process under 36 CFR 219 subpart B, and identifying M. Earl Stewart as the Forest Supervisor.

In addition, the Forest Service completed a 5-year review of the Forest Plan in September 2013. There were a total of 257 unique comment submissions and over 152,000 form letters received during the comment period for the 5-year review. Many of the comments on the 5-year review also requested a transition to young-growth timber harvesting. All of these comments were taken into consideration in identifying the scope of this Forest Plan amendment.

In January and February 2015, open houses were held in Juneau, Sitka, and Ketchikan to share information with the public about the progress being made on the Proposed Forest Plan Amendment and Draft Environmental Impact Statement, and to provide opportunity for the public to comment on the Draft Plan Monitoring Program. An informational newsletter was also published in conjunction with the open houses, providing project information and detailing how the public can participate.

3.0 PURPOSE AND NEED FOR PROJECT

The Purpose and Need for Action, as defined in the Notice of Intent (NOI), is:

> "The Forest Service is preparing an Environmental Impact Statement (EIS) to describe the effects of making proposed changes to the Tongass Forest Plan to accomplish the transition to young growth management as provided in the Secretary's Memorandum. The Forest Service will evaluate which lands should be available for timber harvest, especially young-growth timber stands, and any proposed changes to standards and guidelines and other management direction to promote and speed the transition to young-growth

management while maintaining a viable timber industry in Southeast Alaska. It will also evaluate other changes suggested in the 5-year review.**"**

4.0 PROPOSED ACTION

The Proposed Action, as defined in the Notice of Intent (NOI), is:

"The Forest Service proposes to amend the Tongass Forest Plan, using the 2012 Planning Rule, as needed to accomplish the transition to young growth management over the next 10 to 15 years while retaining the expertise and infrastructure of a viable timber industry in Southeast Alaska, as outlined by the Secretary in Memorandum 1044-009. The amendment process will address: Identifying areas suitable and not suitable for timber harvest to achieve the transition to young growth management; whether the Tongass needs to be able to harvest young growth forest stands before they reach their maximum rate of growth; what changes in management direction should be made to promote young growth management; whether the inventory of roadless areas should be updated, which may require additional rulemaking; whether changes are needed to provide for development of hydropower; updating the upper limit on the quantity of timber that may be sold from the Tongass to reflect other changes made; and how to modify the monitoring provisions of the Plan as required by the 2012 Planning Rule, including identifying focal species to monitor instead of management indicator species as required by the former planning regulations. The amendment process may address other topics relevant to promoting and speeding the transition to young growth management. It is not expected that changes made to the Tongass Forest Plan will affect the overall integrity of the Plan's conservation strategy."

5.0 OPPORTUNITIES FOR COMMENT AND PARTICIPATION

5.1 FIVE-YEAR REVIEW

The Forest currently operates under the Tongass National Forest Land and Resource Management Forest Plan, as amended in 2008. In 2013, the Forest Service completed a 5-year review to determine whether any actions are needed to clarify or adjust the plan. The Tongass solicited comments through public and stakeholders meetings, government-to-government consultation with Southeast Alaska tribes, and written comments. Press releases, radio announcements, project brochures, postcards, letters posters and email notices were used to notify the public. Additionally, letters of invitation to participate were sent to 32 tribes in 16 communities.

Public comments were accepted between January and June 30, 2013. Public meetings were hosted in February and March 2013 in the communities of Wrangell, Petersburg, Sitka, Craig, Ketchikan, Juneau and Haines. Additionally, Conservation Strategy Summits were hosted in June 2013 in the communities of Ketchikan and Juneau. Then Forest Supervisor Cole received input on a range of topics, including young-growth management, the Roadless Rule, watershed restoration, mining, renewable energy, and local economies. All of the comments received were taken into consideration in identifying the scope of this Forest Plan amendment. A detailed summary of the Five-Year Review process and comment summary is available online at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5443864.pdf (USDA Forest Service 2013)

In October 2013, the Forest Service announced its intent to modify the Forest Plan based on the conditions of the land and the demands of the public. Identification of the timber base suitable to support a transition to young-growth management in a way that supports the continued viability of the forest industry in Southeast Alaska was noted as a focus area.

5.2 SCOPING PROCESS

The NOI initiated the scoping process, which helped guide the development of the EIS. The NOI to prepare an environmental impact statement was published in the Federal Register on May 27, 2014 (79 FR 30074) initiating a 30-day public scoping period. The NOI asked for public comment on the proposal until June 26, 2014. The Forest Service received approximately 124,000 letters and of these, about 250 letters were unique.

5.3 PUBLIC MEETINGS

In January and February 2015, open houses were held in Juneau, Sitka, and Ketchikan to share information with the public about the progress being made on the Proposed Forest Plan Amendment and Draft Environmental Impact Statement, and to provide opportunity for the public to comment on the Draft Plan Monitoring Program. While comments were not solicited on the Forest Plan Amendment during these meetings, Forest Service staff were on hand and materials were made available to the public to inform them on the amendment process and how and when to provide input. Approximately 15-20 people attended each meeting.

5.4 CONSULTATION WITH FEDERALLY RECOGNIZED TRIBAL GOVERNMENTS AND TRIBAL CORPORATIONS

The Forest Service invited the following tribal governments and corporations to participate as cooperating agencies:

- Angoon Community Association
- Central Council Tlingit & Haida Indian Tribes of Alaska
- Chilkat Indian Village
- Chilkoot Indian Association
- Craig Tribal Association
- Douglas Indian Association
- Hoonah Indian Association
- Hydaburg Cooperative Association
- Organized Village of Kake
- Organized Village of Kasaan
- Ketchikan Indian Community
- Klawock Cooperative Association
- Metlakatla Indian Community
- Petersburg Indian Association
- Organized Village of Saxman
- Sitka Tribe of Alaska
- Skagway Traditional Council
- Wrangell Cooperative Association
- Yakutat Tlingit Tribe

While none of the invited tribal governments or corporations are participating as cooperating agencies, all will be engaged with through consultation.

5.5 CONSULTATION WITH OTHER AGENCIES

The Forest Service invited the Environmental Protection Agency (EPA), Fish and Wildlife Service (FWS), and the State of Alaska (SOA) to participate as cooperating agencies in the development of the EIS. . The FWS accepted this invitation and is participating as a cooperating

agency. The EPA formally declined the invitation. The EPA, FWS, and SOA submitted comments during the scoping comment period.

5.6 TONGASS ADVISORY COMMITTEE

As a result of both the 5-Year Review and the July memorandum from the Secretary of Agriculture, Memorandum 1044-009, a Federal Advisory Committee was established to provide advice on identifying ways to support the transition and provide for a viable forest industry in Southeast Alaska. The Tongass Advisory Committee (TAC) was federally chartered in 2014 to advise the Secretary of Agriculture on developing an ecologically, socially, and economically sustainable forest management strategy for the Tongass National Forest. The TAC was tasked with developing recommendations about how to transition within 10 to 15 years from old-growth to predominantly young-growth timber management in a way that is economically viable for the existing industry, while recognizing and balancing the other unique and equally important resource values of the Tongass. The TAC was comprised of fifteen members from the timber industry, conservation community, Native interests, State and local government, and other interests. The TAC provided recommendations to the Secretary of Agriculture in May 2015 and the Forest Service developed an alternative based on these recommendations to be included in the EIS.

5.7 YOUTH ADVISORY COMITTEE

The 2012 Planning Rule requires the responsible official to provide meaningful opportunities for public participation throughout the planning process. It gives direction for providing such opportunities, including for outreach. In 2014, Tongass National Forest officials reached out to a Ketchikan High School guidance counselor who assembled 8 students to form the Ketchikan High School Youth Advisory Council (YAC). Three YAC meetings were held at Ketchikan High School from fall 2014 through spring 2015. The objective was to involve the YAC members in the public participation process for the proposed Forest Plan Amendment, including having them actively participate in a Forest Service public open house meeting in Ketchikan. This meeting allowed YAC members to better understand the scope of the Forest Plan Amendment and the issues that were raised during the scoping process. They gathered information at each station, examined maps, and talked with Forest Service subject matter experts. In May 2015, several members of the YAC had the opportunity to meet with Forest Service staff and the Tongass Advisory Committee, a Federal Advisory Committee during a social event at Ward Lake Recreation Area where they discussed the importance of collaboration and civic involvement.

For the school year 2015-2016, the YAC is comprised of 11 students, both Juniors and Seniors, who have demonstrated leadership tendencies, have a high grade point average, and are interested in understanding the scope of Forest Planning and how they can participate in the effort. A meeting was held on October 21, 2015 to welcome new YAC members. The goal of the YAC is to formulate consolidated comments on the proposed Forest Plan and associated DEIS during the 90-day comment period.

6.0 ISSUE DEVELOPMENT

The Interdisciplinary Team identified the significant issues described in the following section. These issues consider internal scoping and comments received from federal agencies, the SOA, individuals, special interest groups, non-governmental organizations, businesses, and a

native corporation. Each comment was reviewed and considered in defining the significant issues, other environmental and social considerations, and other considerations for plan alternatives. These will guide the analysis throughout the NEPA process. Each comment was assigned to one or two themes (e.g., young-growth transition, or climate change) so they could be easily evaluation. Additionally, each comment was given one or more of the following 12 categories relative to how the comment would be addressed (if it needed to be addressed). Comments received during the 5-year review were also considered:

- Addressed by Forest Plan and Forest Plan Land Use Designations (LUD).
- Addressed through implementation of Forest Plan standards and guidelines and Best Management Practices.
- Addressed through implementation of project-specific planning, implementation, and mitigation measures.
- Addressed during processes or impact analyses routinely conducted by the Interdisciplinary Team.
- Addressed through spatial location of alternatives.
- Used to drive or partially drive an alternative.
- Beyond the scope of the project.
- Support amendment project.
- Oppose amendment project.
- Other request or comment
- Addressed by law, regulation, or departmental direction
- Consider recommendation for analysis

6.1 SIGNIFICANT ISSUES

The following are significant issues developed during the scoping process described above, and developed in consideration of the purpose and need of this EIS. These issues are used to drive or partially drive alternatives or will be analyzed in the greatest detail in the EIS. Section 5.2 identifies other environmental considerations, which are not considered significant issues for this EIS but will also be addressed. Finally, Section 5.3 provides a summary of all comments received during scoping.

Issue 1 – Young-Growth Transition

Issue Statement: The Secretary of Agriculture requested the Forest Service to transition to a YG–based timber program on the Tongass in 10 to 15 years, more rapidly than considered in the 2008 Forest Plan. This transition is intended to move the Tongass National Forest to a more ecologically, socially, and economically sustainable forest management program and reduce old-growth harvest while providing economic timber to support the local forest products industry.

The issue concerns financial efficiency, salability, and volume of future timber sales. It also relates to the potential local employment and revenues generated for communities in the local area. YG timber growth rates, sustainable harvest rates, the amount of old-growth harvest needed during transition to sustain the timber industry, and the locations where young-growth harvest would take place are some of the factors to be considered.

Units of Measure

- Timber volume of young growth vs. old growth

- Acres of harvest of young growth vs. old growth by harvest and logging system by location
- Financial efficiency of young-growth vs. old-growth harvest
- Number of annualized direct jobs supported
- Timber demand vs. amount of harvest made available to meet demand

Issue 2 – Renewable Energy

Issue Statement: The Forest Plan should promote the development of renewable energy projects to help Southeast Alaska communities reduce fossil energy dependence, where it is compatible with National Forest purposes and to ensure that the planning, construction, and operation of projects protect and effectively use National Forest System lands and resources. Management of National Forest System (NFS) lands should support the intent of the State of Alaska legislature to receive 50 percent of its electrical generation from renewable energy sources by 2025 (House Bill 306 [2010]).

Units of Measure

- Proportion of known potential renewable energy projects potentially allowed under the Forest Plan

Issue 3 – Protection of Roadless Areas

Issue Statement: The protection of roadless areas (particularly high-value roadless areas) from development and timber harvest on the Tongass is of local and national importance, particularly relative to wildlife and biodiversity, recreation, and tourism. Whether or not the Tongass will be exempt from the 2001 Roadless Rule is not clear.

Many people believe roadless areas should be allowed to evolve naturally through their own dynamic processes and should be afforded protection that ensures this will occur. The Tongass includes very large undeveloped land areas with several portions of the Forest consisting of contiguous roadless areas that exceed 1 million acres and represent large, unfragmented blocks of wildlife habitat. This large scale of roadless lands does not exist on any other National Forest, except the Chugach National Forest in Southcentral Alaska.

Roadless areas are considered important because of their wildlife habitat and recreation values and their importance for tourism. They are also important because of the passive-use and ecosystem services values they provide.

Units of Measure

- Acres of inventoried roadless areas protected under each alternative
- Values of lands protected under each alternative

Issue 4 – Protection of Wildlife Habitat and the Old-growth Conservation Strategy

Issue Statement: The Tongass National Forest supports a unique and important assemblage of wildlife including the largest population of brown bears and breeding bald eagles in the world, the Alexander Archipelago Wolf, species of high importance for subsistence (e.g., Sitka black-tailed deer), an extensive array of endemic mammals, and a large number of species that are at least partially dependent on old-growth habitats (e.g., marten and goshawk). The Tongass Old-growth Conservation Strategy is considered important for the continued health of the unique wildlife and plant populations in Southeast Alaska.

Timber harvest and road development can have important effects on populations of many of these species and the biodiversity of Southeast Alaska. Although less than 10 percent of the productive old-growth habitat on the Tongass has been converted to young growth, the

percentage is much higher for certain types of old growth, such as lowland and large-tree old growth. In addition, a high percentage of non-NFS lands have been harvested at a much higher rate. Therefore, the cumulative effects of harvest and road building on wildlife in Southeast Alaska are greater than the effects for the Tongass by itself.

Units of Measure

- Acres of productive old growth protected under each alternative
- Percentage of biogeographic provinces protected in reserves
- Changes in road densities
- Indicators of habitat capability using habitat models
- Cumulative harvest and road development on all Southeast Alaska lands

6.2 OTHER ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

The following list of other environmental and social considerations will be analyzed in the EIS, in addition to the significant issues identified in the previous section.

- Air Quality
- Climate Change
- Geology, Karst, and Caves
- Soils
- Water
- Wetlands
- Fish
- Plants (including sensitive plants and invasive species)
- Forest Health
- Lands
- Transportation and Utilities
- Minerals
- Recreation and Tourism
- Scenery
- Subsistence
- Heritage Resources and Sacred Sites
- Wilderness, Wild and Scenic Rivers, and other special LUDs
- Economics and Social Environment
- Environmental Justice

6.3 FIVE-YEAR REVIEW COMMENT SUMMARY

During the comment period for the Five-Year review, 252 unique submissions were received, along with 152,182 form letters (some of which contained unique content). The range of topics, including young-growth management, the Roadless Rule, watershed restoration, mining, renewable energy, and local economies.

The Forest Service developed 515 Statements of Concern (grouped into 24 topics) based on the comments. Among the comments received, some issues were raised more frequently than others. The five SOC Topics with the most comments received were Tongass National Forest management issues, timber, Land Use Designations, socioeconomics, and energy. A detailed summary of the Five-Year Review process and comment summary is available online at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5443864.pdf (USDA Forest Service 2013)

6.4 SCOPING COMMENT SUMMARY

The following sections provide a summary of the scoping comments received, sorted by issue category. Some comments were identified as part of one or more issue categories and may be duplicated. This summary covers comments related to the significant issues as well as the other environmental and social considerations. Some comments below have been taken directly from

comments received while many have been summarized or paraphrased to represent several similar comments. All comments were considered individually. This list is not inclusive; a complete record of comments is available in the planning record.

6.4.1 Climate Change

Climate change was a common theme among many comments. Some commenters requested that climate change be identified as a significant issue. Others requested that the effects of the alternatives on the climate be considered, as well as the effect of climate change on every resource. Examples of climate change comments include the following:

- EPA recommends that the Forest Plan EIS discuss the anticipated impacts associated with past, present, and future changes in climate throughout the forest and provides suggested references.
- Please treat climate change as a significant issue in the purpose and need for this proposed amendment. All federal agencies must manage for climate preparedness and resilience (Executive Order 13653) and Secretary Vilsack has recognized the Tongass' global significance as a carbon-rich reserve.
- The DEIS needs to consider the critical temporal relationship between present carbon emissions and the future effects of climate change. The immediate release of carbon from logging will have significant impacts compared to the much longer-term release of biomass from the death and decomposition of live trees in decades or centuries.
- In addition with the carbon dioxide problem, cutting down forests only accelerates the climate problems. Don't make a short-term decision with long-term negative consequences. We have too few forests as it is.
- If we want to control global warming, we need to preserve all out healthy trees
- Analyze the effects of alternatives on carbon sequestration and long-term storage potential.
- The current Conservation Strategy fails to recognize the role of climate change in the maintenance of biodiversity. The effects of climate change must be considered if the Conservation Strategy is re-evaluated.
- The alternative that best optimizes carbon and other values on the Tongass is one that rapidly transitions out of industrial old-growth logging.

6.4.2 Economics

Many comments addressed issues or concerns related to economics. Comments concerned the economics associated with transition to YG management, the economics of the current timber program, and the economics associated with non-timber resources. Examples of economic comments are provided in the following subsections.

6.4.2.1 Transition Economics

- The analysis should evaluate the economic viability of YG management only, rather than a mix of YG and old-growth logging.
- If existing mills close, it will not be possible to maintain the economies of scale to support timber operations on the forest or to bring new operators into the region. Forest Service needs to invest in transition.
- Transition should create local jobs and require local, value-added manufacturing.
- The outcome of any "transition" alternative should reward local, value added manufacturing and end existing export and transshipment policies on the Tongass. The

successful Tongass micro-sale program that currently exists on Prince of Wales Island encourages local processing and the manufacture of high value-added wood products.
- Evaluate the economic outlook for YG forest products and analyze the need to export YG materials to build a YG program.
- Emphasize value-added forest product uses.
- The current appraisal system favors large operators and does not fully capture the value that YG timber offers the region. The system needs to be revised to encourage business investment and development, job growth, and value-added manufacturing in Alaska.
- All alternatives should focus on creating local timber jobs.
- Consider alternatives favoring management for deer and wildlife habitat, healthy salmon streams, and a local wood economy for Southeast Alaska.

6.4.2.2 Economics of Current Timber Program

- Criticism of the Tongass timber program as a market failure in which taxpayers and other forest users pay for below-cost timber program.
- Recent YG harvests have not been economical.
- The Forest Service is not meeting its annual timber targets and the lack of timber supply is responsible for decline of timber manufacturing.
- The Forest Service should update and revise its forecasts for market demand of Tongass timber. The economic analysis used by the Forest Service in its timber sale planning is inaccurate and outdated, and greatly overestimates market demand for Tongass timber.
- The Forest Service must also revise its forecasts of market demand for timber, which have consistently proved to be much higher than actual market results.
- As part of the Amendment process, the Tongass National Forest needs to revisit its methodology for estimating market demand and its series of market demand scenarios, because they overestimate actual demand.
- For YG, the Forest Service needs to move away from using export based criteria. In this land management plan, the Forest Service needs to analyze what markets for Tongass timber they are “seeking to meet.”
- Stop systematically overestimating timber demand.
- Stewardship contracts to not recoup actual cumulative effects and opportunities lost.

6.4.2.3 Non-timber Economics and Competition with Timber Program

- The DEIS should evaluate how Forest Plan Amendment implementation will impose real costs, monetary and otherwise, on non-timber forest values and give these values equal consideration.
- The DEIS needs to consider all non-timber-related economics and number of jobs supported by forested habitat including: recreation, tourism, hunting, fishing and subsistence.
- Stop giving timber a preference over other Tongass multiple uses by systematically overestimating market demand.
- Support tourism and fishing in place of logging old growth.
- The Forest Service should support local communities by seeking ways to improve protections for important fish and wildlife habitat and enhance visitor services. At the same time, the Forest Service should end its large-scale old-growth timber sale program.

- As part of the plan amendment, enact sensible budgets for recreation, heritage, and wilderness programs in the Tongass that can support diverse and sustainable economic opportunities for southeast Alaskans. We urge you to shift resources to support our growing tourism and recreation economy.
- Recreation is now bringing in more money than logging, shift the funds to it. Preserve the forests so that this remains viable.
- The DEIS should include a detailed public investment analysis that discloses the full cost of administering the TLMP timber sale program accompanied by a more thorough analysis of benefits provided by intact old growth forests to recreation, fisheries and subsistence.

6.4.3 Fish

A number of commenters addressed concerns associated with fish and fish habitat protection. Examples of comments related to fish include:

- Refocus resources and management toward projects that protect and restore vital watersheds and important fish and wildlife habitat, while promoting a diverse and sustainable economy in Southeast Alaska based on fishing, tourism, and recreation.
- Consider alternatives favoring management for deer and wildlife habitat, healthy salmon streams, and a local wood economy for Southeast Alaska.
- The EIS should describe the current quality and potential capacity of habitat, its use by fish and wildlife throughout the forest, and identify known fish and wildlife corridors, migration routes, and areas of seasonal fish and wildlife congregation.
- The EIS should evaluate effects on fish and wildlife from various management strategies as well as any proposed habitat alteration, aquatic and terrestrial habitat fragmentation caused by roads, land use, and management activities, and human activity.
- The Forest Plan currently fails in the area of demonstrating and focusing management of Tongass lands as working lands for the production of salmon. An amendment should include sufficient study to show what lands on the Tongass are producing fish, the baseline production a) currently, b) prior to industrial logging (1954), c) prior to fish traps and canneries, and d) projections into the future under various management regimes and climate change impacts. Part of the assessment should include calculations of the value of contributions to the economy from Tongass National Forest lands and management activities. An assessment should be made as to areas that need to be designated as salmon producing watersheds and well defined goals should be set for an acceleration of restoration activities to bring all salmon systems that have legacy impacts from historic industrial logging to be restored to full production capacity.
- Consider alternatives favoring management for deer and wildlife habitat, healthy salmon streams, and a local wood economy for Southeast Alaska.

6.4.4 Karst

Several comments were received stressing protection of karst landscapes. Comments relating to karst landscapes include:

- Karst protection in south Southeast Alaska should be kept in place or strengthened due to past and future corporate big tree logging, from both Native and private corporations. Karst is important for maintaining clean water and a healthy Tongass eco-system.
- Preserve all karst areas.
- The richness of our forests, with karst and muskegs and unique soil microbiology and salmon streams, is irreplaceable after logging of the old growth.

6.4.5 Lands

A number of commenters identified general concerns related to lands, as well as specific concerns related to proposed land exchanges and specific land areas. Comments relating to lands include:

- Support for efforts of the Alaska Mental Health Trust Authority and the Forest Service that resulted in the proposed land exchange document dated September 4, 2012. The proposed land swap will provide much needed timber harvest activity for the southern southeast region economy.
- Include the Trust Land Exchange as an action common to all alternatives of the Forest Plan Amendment. The Trust Land Office manages lands for the Alaska Mental Health Trust and has begun the planning process to implement the objectives outlined by Secretary Vilsack (Memo 1044-009, July 2, 2013.). It appears that the Trust Land exchange creates a positive working solution to support the Secretary's transition plan. Identifying the proposed exchange as an alternative in the forest plan amendment would promote that potential outcome.
- Recommendation to include land patterns and shared boundaries that would exist upon passage of the Sealaska legislation in the amended Tongass Plan.
- A request for analysis and consideration of other unfulfilled Native land entitlements.
- Requests specific to Traitors Cove, Southern Kruzof Island, and Connell Lake.
- A request for the federal government to turn all federal lands (within the Borough) over to the Ketchikan Gateway Borough.

6.4.6 Land Use Designations

6.4.6.1 Transportation and Utility LUD

Several comments requested modification to or clarification of Transportation and Utility System (TUS) LUD Standards and Guidelines to remove permitting and development barriers. Specifically, it was requested that the current TUS LUD should be amended to change the criteria to allow the TUS LUD to apply to hydropower projects and other renewable energy projects within TUS Avoidance Areas and to allow for public and private hydropower development in all LUDs.

6.4.6.2 Renewable Energy LUD

Several commenters requested or supported the development of a Renewable Energy Resource Plan and/or Renewable Energy LUD to facilitate the development of these projects. Representative comments include:

- A Renewable Energy Resource Plan, including a Renewable Energy Resource Development LUD, should be added to the Forest Plan to promote and support all forms of renewable energy development (including geothermal) and related transmission lines within the Tongass National Forest
- A Renewable Energy LUD that promotes the development of hydroelectric projects with a minimum of regulatory impediment and cost will be the key to a successful transition from fossil based fuels in the Tongass to clean renewable energy for all of Southeast Alaska.
- The renewable energy LUD should allow development of all clean energy technology (wind, biomass, geothermal, tidal) and associated transmission and access roads.

- Plans for and interest in hydropower development, mining, transmission, geothermal, and transportation projects exist and should be considered and evaluated in this amendment. Necessary changes to Land Use Designations and other use decisions present a management challenge that would be appropriate to consider in the LRMP revision process. We encourage the Forest Service to consider the potential for project right-of-way and siting needs, as land use determinations are established or revised. Based on this analysis, it may also be appropriate to expand upon the standards and guidelines related to land ownership to include additional standards and guidelines related to these types of activities. We recommend that the Forest Service work closely with the FWS and the Alaska Department of Fish and Game, as well as other potentially affected stakeholders, on these changes."
- Changes to further hydropower development are outside the essential core purpose of the amendment and should not be part of the amendment.

6.4.6.3 Tongass Community Economic Development Zone LUD

Some commenters requested a new Tongass Community Economic Development Zone LUD to promote and support economic development and activities for communities with lower per capita incomes or high energy prices or unemployment.

6.4.6.4 Minerals and Strategic Minerals LUD

Some commenters requested a new Mineral and Strategic Mineral LUD to promote and support mineral and strategic mineral development and related access roads consistent with national security and national strategic mineral policies.

6.4.7 Minerals

In addition to the Mineral and Strategic Mineral LUD recommended by some commenters (see Section 5.2.6.4, above), some commenters requested that the term “reasonable access” be defined for purposes of the Forest Plan to provide timely (30-day turnaround) issuance of Forest Service Special Use Permits for those who hold a mining claim or Federal Energy Regulatory Commission (FERC) preliminary permit to authorize these operations to investigate and develop lawfully permitted federal resources.

6.4.8 Old-Growth Reserves

Several comments were received specific to old-growth reserves (OGR). These comments addressed OGR design criteria, protection of OGRs, and additional evaluation of the efficacy of existing OGRs. Example comments include:

- The FWS recommends specific changes to OGR design criteria to ensure comparable conservation value within Value Comparison Units when OGRs are proposed to be relocated.
- Treatments in OGRs, beach fringe, estuary, riparian, and other buffers, or other areas important for conservation should be to improve habitat value.
- Harvests in OGRs should be designed specifically to accelerate succession to old-growth conditions and maintain non-timber resources.
- Current OGRs should be reviewed by an interdisciplinary state and federal teams to understand how they are working, consider issues associated with altering their locations and sizes, how removal of second growth stands from OGRs would affect

them, and assess how possible modifications would be expected to affect fish, wildlife, and their uses.
- OGRs appear to be located to exclude old-growth habitat (to allow for high-grade logging) avoid the most important deer winter habitat to make these areas and trees available for logging.
- The scope of the Tongass Forest Plan Amendment needs to be expanded to evaluate the entire system of old-growth reserves in order to demonstrate their efficacy. Wildlife outputs must be analyzed in the context of projected demand rather than just what is needed to meet minimum viable populations.

6.4.9 Planning/Alaska National Interest Lands Conservation Act (ANILCA)

Many comments addressed general planning issues, including the 2012 Planning Rule, the 5-year review, plan revision, ANILCA, multiple-use planning and other issues. Examples of these comments include:

- The NOI is disappointingly too broad in scope and lacks appropriate direction for the Forest Service to respond urgently to the need to phase out industrial-scale old growth logging immediately.
- We are still concerned about the 2012 Planning Rule and its impact on the ability of the Forest Service to provide a cost-effective, workable framework for national forest planning that is consistent with the National Forest Management Act and other statutory direction. The 1982 Rule was used for the 2008 plan and should be used for any amendment as well.
- Do not "test drive" the 2012 planning rule on the Tongass until other “early adopters” have had a chance to report back
- The Forest Service has yet to outline how the analysis from the five-year TLMP review makes the case for amending the forest plan to accomplish a transition to young-growth timber harvesting within the next 10 to 15 years.
- Any section of the Forest Plan amended during this planning process must also ensure that ANILCA continues to be properly recognized. To help ensure there is no confusion during implementation, we request the Forest Plan specifically acknowledge that the Forest Service intends for all Forest Plan provisions, including administrative designations and prescriptions to be consistent with ANILCA. However, in the event of a conflict, ANILCA prevails.
- Consider a process or plan to coordinate its resource harvest and other management activities with adjacent landowners
- What is needed instead of an amendment to the Forest Plan is a complete revision of the 1997 Forest Plan and 2008 Amendment. A full revision of the Forest Plan is long overdue.
- Suggest the Forest Service use an analysis approach called OPTIONS that identifies eight factors that must be addressed in order to effectively define and implement a sustainable, defensible and auditable forest management strategy.
- The scope of the amendment should be narrowed to ensure the Plan is amended during the current presidential administration.
- The YG transition should be directed to the Federal Advisory Committee Act committee and a future planning process, rather than addressed in the current plan amendment.

- It is vital that the Forest Service pare the plan amendment process down to its bare essentials. Numerous issues that could be dealt with, but can await some future process, need to be identified as non-core and deferred.
- We believe that the focus on maintaining the existing timber industry fails to provide for multiple uses. The scope of the proposed Amendment does not reflect the broad need for changes, does not reflect a realistic assessment of changed conditions, and consequently will fail to appropriately guide the achievement of ecological, social and economic sustainability in the planning area. [36 Code of Federal Regulations (CFR) 219.8]

6.4.10 Purpose and Need

A range of comments addressed the purpose and need. Examples of these comments include:

- We request that you develop a revised purpose and need for the amendment that does not prioritize timber development "over the competing environmental and recreational goals without justification sufficient to support the agency's balancing of these goals."
- The Forest Service is encouraged to consider expanding scope of analysis.
- Only limited attention should be paid to the suitability or availability of land for logging
- The amendment should focus on the goal to preserve the exceptional natural values on the Tongass, rather than the goal of ensuring that communities are economically viable.
- Apply 2012 Planning Rule. TLMP amendment should not thwart the spirit and intent of NFMA and further delay a long overdue economic analysis of all the Tongass resources.
- The Forest Service needs a new paradigm where timber is relegated to its economic value relative to other forest resources- since other forest uses are productive and above cost.
- The Amendment's limited purpose aimed at timber industry objectives falls short of the NEPA obligation to "rigorously explore and objectively evaluate all reasonable alternatives." [40 CFR. § 1502.14(a)]. You could fix this problem by either focusing narrowly on alternatives that immediately end old-growth logging, or by broadening the scope of the Amendment by developing alternatives that enhance recreation opportunities in the Tongass National Forest and alternatives that focus on mitigating damage to salmon habitat through an emphasis on completing deferred road maintenance.

6.4.11 Plants

Some comments were received stressing that the EIS evaluate impacts on plant species, their habitats, and invasive species.

6.4.12 Recreation and Tourism

Several comments were received stressing the importance of other industries, including recreation and tourism, to the economic opportunities of communities. Some suggested the Forest Service should reallocate its priorities and resources to support these industries and stop giving timber a preference over them.

6.4.13 Renewable Energy

Many comments addressed renewable energy. Some of these comments were general in nature, and many dealt with hydropower or biomass. Examples include:

- The EIS should consider alternative investments in efficiency programs, wind turbines, tidal energy, and solar and thermal energy.
- The Forest Service should solicit information from the renewable energy industry with regard to potential renewable energy sites and utilize that information in the identification of specific areas within the Renewable Energy Resource LUD within the Forest Plan.
- Roadless area restrictions negatively impact access to and development of renewable energy, in conflict with state and national goals for clean energy
- Ensure that Renewable Energy Resource Policies are promptly included in the Forest Plan without the needed for a Plan amendment process.
- The Draft EIS should assess the social and economic impacts of renewable energy development
- The amendment should address the needs relating to developing renewable energy resource on the Tongass National Forest to the maximum extent possible.
- Recommends that the Plan amendment process be utilized to level the playing field for consideration of renewable energy with other important resource values within the TNF.
- The renewable energy component of the plan should encompass both ongoing maintenance requirements and the evaluation and development of new renewable energy resources.
- The Forest Plan EIS should consider expansion of existing and development of future renewable energy facilities and transmission lines.
- Lands permanently cleared for a Renewable Energy project should be considered unsuitable for timber production.
- A Renewable Energy Resource Plan, including a Renewable Energy Resource Development LUD, should be added to the Forest Plan to promote and support all forms of renewable energy development (including geothermal) and related transmission lines within the Tongass National Forest

6.4.13.1 Hydropower

- The Forest Service should modify the Tongass Forest Plan in a manner which allows for hydropower development within the Tongass National Forest, and provides for equal treatment of hydropower development proposals regardless of market location or funding source.
- The Forest Plan should consider all known potential hydroelectric energy sources located in the Tongass National Forest and provide for their future development.
- Incorporate Lake Grace Hydropower into the Forest Plan.
- Changes to further hydropower development are outside the essential core purpose of the amendment and should not be part of the amendment.
- We support development of fish-friendly hydropower to meet local power needs in southeast Alaska, and the Tongass Plan already makes ample provision for it.

6.4.13.2 Biomass

- Conversion to biomass for heat and/or potential energy generation is fatally flawed. The Draft EIS should disclose impacts to human health and carbon sequestration, as well as the cost to taxpayers

- To consider alternatives that redirect the public investment in alternative energies to cleaner and real renewable energy sources, not biomass. Federal investment in biomass facilities is a lost opportunity cost that will divert funds from energy alternatives that can better meet the region's needs
- The EIS needs to evaluate the life-cycle greenhouse gas emissions associated with biomass industry development
- The Forest Plan should consider biomass heating and energy systems and the potential to manufacture biomass-based fuels.
- The EIS should evaluate health risks associated with increased utilization of biomass for energy and heat.
- Recommends the inclusion of biomass as a forest resource.

6.4.14 Restoration

A number of comments concerned forest restoration, watershed restoration, and restoration projects in general. Examples of the comments include:

- A Plan "standard" that discloses the costs of restoration projects in all timber sale planning documents must be adopted in the Amendment.
- We request that the EIS consider reasonable alternative funding mechanisms for habitat amelioration projects rather than an exclusive focus on so-called "stewardship" contracting. [40 CFR. § 1502.14(a); Sierra Forest Legacy, 577 F.3d at 1025 – 1027]. The Tongass National Forest has never provided a NEPA analysis that evaluates the feasibility of stewardship contracting or alternative ways to fund projects for habitat mitigation and other remedial forest management needs. Programmatic analysis may show that it would be more cost-effective to emphasize service contracts for road storage and decommissioning and red pipe remediation, rather than to liquidate old-growth forests in order to fund perceived needs for remedial work.
- Refocus resources and management toward projects that protect and restore vital watersheds and important fish and wildlife habitat, while promoting a diverse and sustainable economy in Southeast Alaska based on fishing, tourism, and recreation.
- The need to work on forest restoration, which duplicates the natural condition rather than uniformed canopied, second growth tree farms.

6.4.15 Roadless Areas

Many comments addressed roadless areas. Some comments were of a general nature, many supported preserving roadless areas, and many supported exempting activities from the roadless rule. Examples include:

- Analysis should consider how the forest should be managed with Roadless Rule not enforced and also if it remains in force.
- LUDs that allow logging in inventoried roadless areas (IRA) should be revised.
- Roadless area restrictions negatively impact access to and development of renewable energy, in conflict with state and national goals for clean energy
- Updating the roadless area inventory is fine for the amendment exercise, although it may or may not be pertinent.
- The Forest Service should not consider IRAs as a determining factor for amending LUDs or defining the suitable and available land base. Update the inventoried roadless area maps to omit roaded portions (i.e., "roaded roadless" areas) due to their substantially altered condition.

- Possible rulemaking related to roadless areas should not be allowed to complicate the transition amendment.
- The amendment should not include an update to the inventory of roadless areas.
- Decisions regarding IRAs should be addressed in a separate process.

6.4.15.1 Preserve Roadless Areas

- Opposes roads in roadless areas.
- Conservation of inventoried roadless areas should be a significant feature of all transition alternatives.
- The plan amendment is not a prudent vehicle for decisions about Tongass roadless areas.
- The Forest Service was encouraged to update its LUDs to remove inventoried roadless areas from the suitable timber base.
- Conservation of inventoried roadless areas should be a significant feature of all transition alternatives.
- If rulemaking is needed it should address only the simple issue of supplying a missing end-date for the self-described “temporary” exemption of the Tongass from the Roadless Area Conservation Rule. The effects analysis in the EIS for the transition amendment should assume that roadless areas will not in any likely scenario be logged.
- Conservation of inventoried roadless areas should be a significant feature of all transition alternatives.

6.4.15.2 Favors Exemption to the Roadless Rule

- Consider amending the Roadless Rule as applied to the Tongass to permit the development of geothermal power, transmission lines, and access to them.
- The Forest Service should engage in rulemaking to once again exempt the Tongass National Forest from the 2001 Roadless Rule.
- The Forest Supervisor and District Rangers should have the authority to permit development in IRAs.
- Suggests modification of Roadless Rule to open up viable timber.
- Modification to Roadless Rule needed to allow hydropower.
- Modification to Roadless Rule needed to provide reasonable access to mines.
- Recognize the negative impacts incurred by the restrictive access in roadless areas to critical resources within the Ketchikan Borough.
- The EIS should consider appropriate road access in IRAs for timber harvest and other management activities, mineral development, and renewable and alternative energy
- Implementation of the Roadless Rule in Alaska violates ANILCA.
- The Roadless Area Conservation Rule should not inhibit hydropower development in the Tongass.
- The Roadless Area Conservation Rule, as an administrative regulation, does not affect hydropower applicants’ ability to seek roads pursuant to the Federal Power Act.
- Resolve ambiguities in the preamble to the 2001 Roadless Rule, as applied to the Tongass, regarding the Forest Service's authority to permit new hydropower facilities, transmission lines and access to them for which application is made after January 12, 2001.
- Supports Tongass exemption from 2001 Roadless Rule.

- Limits on access to the Tongass, due to continued application of the 2001 Roadless Rule, impede SEAPA's ability to access its facilities to provide core maintenance and also hinders the key work necessary to plan and develop future energy resources.

6.4.16 Special Uses

Several commenters requested methods to streamline special use permitting for those that hold a mining claim or FERC preliminary permit to authorize these operations to investigate and develop lawfully permitted federal resources. These methods included providing a 30-day review and issuance of Special Use Permits for exploratory and study activities.

6.4.17 Subsistence

Several commenters stressed the protection of continued subsistence uses on the Forest. Examples include:

- The Tongass Plan EIS should evaluate the best methods and processes for monitoring, researching, and sustaining fish and wildlife resources in the Forest.
- The Forest Plan must provide for continued subsistence and sustainable harvest of national forest resources
- Subsistence uses need to be factored into Tongass Forest Plan land use planning from the very beginning of the process.
- The EIS should consider road access to resources for subsistence, recreational, cultural, and social activities important to the southeast communities.

6.4.18 Timber

Many comments were assigned to the timber theme. Some supported an immediate or rapid end to old-growth logging, or opposed clearcuts or logging on the Tongass in general. On the other end of the spectrum, some supported more timber harvests. Example comments include:

- The Forest Service should quantitatively consider how timber harvest can be accomplished while supporting sustainable populations of fish and wildlife that are managed for a variety of uses.
- Harvest of old-growth wood in selective harvest regimes and/or wildlife thinning needs to be monitored for windthrow and for long-term effects and benefits.
- The Amendment process must revisit, in particular, plan components that allow clearcutting and plan components that allow for clearcuts larger than 100 acres. Tongass Forest Plan standards and guidelines for clearcutting need to reflect and appropriately balance impacts to other resources.
- Request for substantial reduction in lands currently deemed suitable for timber production and that the Forest Service develop alternatives that provide primarily for non-timber uses.

6.4.18.1 Reduce Old-growth Harvest and Clearcutting

- Preserve old growth; protect all remaining old-growth forests.
- Leave all remaining old growth in the Tongass for the next generations.
- Use selective logging practices - not clear cuts.
- Clearcuts contribute to erosion, flooding, establishment of nonnative and particularly invasive and noxious vegetation.
- Stop logging the beautiful rainforest of Alaska, the Tongass National Forest.
- We should be phasing out old growth logging altogether.

- Stop old growth logging. These forests act as a carbon sink and natural water purification system.
- Old growth forests cannot be replaced simply by planting more trees after logging.

6.4.18.2 Increase Harvest Levels

- The Forest Service should make available at least 350 million board feet (MMBF) of timber annually.
- Any further removal of Tongass lands from the approved timber base violates ANILCA.
- Need to provide the lumber needed to build houses.
- Please increase old-growth logging immediately. Please support a dual transition in which a firm Allowable Sale Quantity is split between old-and second-growth components. Old-growth allowable sale quantity (ASQ) should be increased drastically and immediately.
- Proposes timber preference over other forest uses.

6.4.19 Transportation

Transportation-related comments include those that encouraged keeping roads open to access YG or other resources, addressed water quality or maintenance concerns, or requested specific actions, like recognizing proposed roads. Example comments include:

- Stop removing existing road systems that will be needed to harvest YG in the future.
- Recommendation that the road and trail system evaluated through the Forest Plan reflect realistic, long-term funding expectations. The NEPA analysis for this planning process should discuss resources available to build and maintain the road and trail system. Please indicate the likelihood for adequate maintenance funding for each of the action alternatives.
- Plan should recognize a land access route to Blank Inlet, providing economic and recreational opportunities important to the Ketchikan Borough.
- Encourages the Forest Service to amend the Forest Plan to recognize the proposed Vallenar Bay Road and include it on the LUD map.
- Plan amendment should take into better account updates to the State of Alaska's Southeast Transportation Plan and the Alaska Energy Authority's 2011 Southeast Regional Integrated Power Plan.
- Action alternatives should not propose changes to the Forest Plan that may affect existing roads or other transportation facilities.
- The EIS should consider road access to resources for subsistence, recreational, cultural, and social activities important to our southeast communities.
- The current Tongass Forest Plan fails to provide standards to adequately assess and make known the impacts of existing roads and proposed project road activities on watersheds, riparian areas, streams, and fish habitats.
- The Forest Plan should be updated to include a non-negotiable standard of every Tongass timber project planning process, for assessments of road-stream connectivity and consequent impacts on peak flows and sediment delivery from roads.

6.4.20 Tribal Consultation

One comment noted that the Plan should provide a framework for Alaska Native Corporation and Tribal participation in implementing access, subsistence, and other important provisions of ANILCA. Additionally, EPA provided direction for conducting intergovernmental issues with federally-recognized tribes.

6.4.21 Water

Some comments stressed the protection of watersheds and streams and requested the strengthening of Forest Plan requirements to emphasize protection. Example comments include:

- The forest must also place more emphasis on project level impairment to watersheds.
- Recommendation that Forest Plan revisions address a framework for project level watershed and water quality analysis. The EIS should summarize existing baseline watershed and water quality conditions.
- Concern over effects of management actions on drinking water sources and lists requests for the EIS to identify.
- Concern over effects of management actions on surface water quality.
- Requests revisions to standards and guidelines for stream protection and watershed health associated with road-stream connectivity.
- Various watersheds have been identified as especially important for fish and wildlife, and should be identified as unsuitable for timber harvest.
- Protect drainages that are crucial for healthy habitat.

6.4.22 Wildlife

Several comments provided wildlife concerns or management recommendations. A common theme was the protection of Alexander Archipelago wolf. Example comments include:

- Recommendation for use of an advisory committee of expert biologists for development standards and guidelines to maintain wildlife populations.
- Recommendation that standards designed to conserve wolves (and deer habitat) should be strengthened to reduce vulnerability of wolves.
- Current Forest Service old-growth logging practices harm habitat and threaten wolf populations.
- Recommendation to use the best available information, including work of the Interagency Wolf Task Force.
- FWS requests clarification of when permits are needed for eagle nest disturbance, requests to participate in focal species discussion with Forest Service staff, and provides specific measures for the protection of goshawks.
- Concern for other species, including pollinators (e.g., bees, bats, and butterflies), marbled murrelets, Queen Charlotte goshawks, marten, bears, flying squirrel and their habitat.
- Impacts to subsistence.
- Requests that any changes to Management Indicator Species (MIS) be made in a separate amendment process directed specifically at wildlife conservation and peer-reviewed by an independent scientific panel, or part of a full Forest Plan revision.
- Recommendation that the Conservation Strategy not be weakened in any way that could reduce species viability or increase risk to vulnerable species. Any modifications should be peer reviewed.
- Consider alternatives favoring management for deer and wildlife habitat, healthy salmon streams, and a local wood economy for Southeast Alaska.
- The Forest Service should meet future demands for fish and wildlife-beyond providing for minimal viable populations.
- Forest Service should review the existing Forest Plan conservation strategy using an interdisciplinary approach.

- The EIS should describe the current habitat capacity and identify known wildlife corridors, migration routes, and congregation areas and evaluate the effects of the alternatives upon these.
- The EIS needs to evaluate timberland suitability determinations in terms of the cumulative loss of habitat that has occurred due to high-grading the better quality old growth forests that provide optimum fish habitat and winter carrying capacity for deer. We request that your analysis:
    - disclose the cumulative effect of continued high-grading across the southern Tongass and discuss ending the practice;
    - assess potential impacts of any reasonably foreseeable future high-grading on all land ownerships;
    - consider high-grading at multiple scales and by different land ownerships in light of remaining large-tree productive old growth at the stand level relative to past selections of large tree and high value species and future harvests of these species, at the landscape scale and at the biogeographic landscape scale.
- Potential changes to the conservation strategy should be outside the scope of the plan amendment.
- Replacing MIS with focal species should be outside the scope of the plan amendment
- Requests to develop alternatives that maintain well-distributed populations of focal species across the Tongass, including those in prior forest plans as MIS.
- Consider alternatives favoring management for deer and wildlife habitat, healthy salmon streams, and a local wood economy for Southeast Alaska.

6.4.23 Young-Growth Transition

Numerous comments addressed the transition to young growth. Varying suggestions for old- and young-growth harvest levels over time, methods to open up YG, and suggestions for where timber should come from were received. Example comments are provided in the following subsections.

6.4.23.1 Need More Rapid Transition to Young Growth

Many comments were received that supported a transition away from old-growth harvests but at a rate faster than 10 to 15 years. Some supported an immediate stop to old-growth harvest while others recommended the transition be completed as soon as possible, in 2 years, or no more than 5 years or faster than 10 years. Example comments include:

- Support a dual transition in which a firm ASQ is split between old- and second-growth components. Old-growth ASQ should be reduced drastically and immediately. The young-growth component should support ecological, economic, and community health linking restoration and stewardship with local wood product manufacturing.
- Delaying the transition for another 10-20 years or more will result in unacceptable risks.

6.4.23.2 Culmination of Mean Annual Increment (CMAI)

Some comments suggested relaxation of the CMAI standard, or a limited relaxation if necessary to facilitate the young growth transition. Others commented that the transition should be delayed until more young growth has reached CMAI and allow old growth to be harvested in IRAs in the interim or that CMAI relaxation is not needed to secure the desired reduction in old-growth logging.

6.4.23.3 Effects on Local Industry and Communities

Concerns were raised about the effects of a premature transition to young growth on local mills that would require retooling. Others expressed support for small, value-added mills in communities.

- Support small value-added mills in our communities. Do not support export-oriented, industrial-scale, old-growth clearcuts.
- A premature transition to YG will force mill closures because inadequate supplies are available and the transition would require total retooling of existing sawmills.
- The current timber industry can be maintained through the transition through implementation of the Tongass Integrated Plan (February 2013).
- Request for alternatives favoring jobs, sustained yield forestry, and a viable wood products industry based on 10-year contracts.

6.4.23.4 Location of Young Growth Harvests

- The Forest Service should consider restricting logging, from the time of the Record of Decision on, to a subset of the current roaded, suitable, and available timber base to reduce potential impacts to other resources.
- Long-term availability of YG should be addressed later. In the meantime, YG harvest should be limited to non-controversial LUDs and YG should be separately stated (and capped) from old growth.
- YG logging should avoid prime wildlife habitat.
- Post-transition YG logging should be restricted to a subset of the current suitable and available land base that the agency identifies as least likely to entail significant environmental risks. Obvious exclusions, which could be implemented either through standards and guidelines or changes to the designated timber base, include roadless areas, karst lands, and high value deer winter habitat.

6.4.23.5 Harvest Volume

- Forest Service will have to offer substantially more than its recent average of timber and will have to build up a stockpile of sales so that commercial financing for a timber industry can be attained.
- Reassure the existing timber industry that the Forest Service is committed to providing sufficient old-growth timber for a long enough period to permit private commercial-bank financing to pay for new mill equipment and to fund the expense of pioneering new markets for young-growth timber- all steps vital to support an Alaska timber industry.
- A transition plan for YG that does not provide sufficient timber would violate the requirement of the Tongass Timber Reform Act to seek to meet the demand for timber.
- It is unrealistic to expect a widespread YG transition to begin within the next 20 to 30 years, without continued old-growth sales to make such a transition economic.
- The ASQ should be revised to reflect the sustainable young growth timber base and small old growth sale program.

6.4.23.6 Other Young Growth Transition Comments

- Industrial-scale old-growth logging projects are in complete contradiction to the original transition plan.
- All transition alternatives should focus on creating Alaskan jobs using Alaskan wood for available markets.

- The current planning process should consider timber growth rates, the landscape logging can occur on, the consequences of logging on ecosystem function, and the overall goals of Tongass management activities and how they balance with the strategic goals of overall Forest Service land management
- The Forest Service should give consideration to conservation strategies for young growth resources and how these stands can be managed to provide for adequate, economically viable timber harvests while conserving and facilitating fish, wildlife, and their uses.
- Transition alternatives should focus on the least vulnerable types of forest – red alder, conifer second growth, and cedar dieback.
- Lands that would be opened up for YG have better use if left to evolve into old-growth habitat.
- Both young- and old-growth timber programs are poor vehicles to stabilize communities. The Tongass Forest Plan amendment must evaluate all other alternatives to diversify and strengthen local economies
- Postpone transition decision until results of YG inventory are available.
- USFWS recommends establishing limits on the volume of old growth that may be cut in any year, with declining volumes allowed in subsequent years.

7.0 REFERENCES

USDA Forest Service. 2013. Five-Year Review of the 2008 Land and Resource Management Plan: Public Outreach and Comment Analysis Report. November 2013. Available online at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5443864.pdf

APPENDIX B
MODELING AND ANALYSIS

Appendix B

Modeling and Analysis

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Appendix B
Modeling and Analysis

Planning Situation

The National Forest Management Act of 1976 (NFMA) directs each National Forest to prepare a comprehensive land and resource management plan. The Tongass National Forest produced its first comprehensive Plan in April 1979. The NFMA also directs that these management plans be revised at least every 15 years. The Tongass began the Revision process in 1987, published a Draft Environmental Impact Statement (DEIS) in June 1990, and prepared the Supplement to the DEIS (SDEIS) as a result of the November 1990 Tongass Timber Reform Act (TTRA). The SDEIS was published in August 1991 and the Revised SDEIS (RSDEIS) was published in April 1996. The Final EIS for the Forest Plan Revision was published in 1997 along with a comprehensive Appendix B that detailed the analytical process followed. In 2002 a Draft Supplemental EIS (SEIS) was published and in 2003 a Final SEIS was developed; an Appendix B for modeling and analysis also accompanied the Final SEIS. In 2008, the Forest Plan was amended and another Appendix B was developed for the Final EIS (2008) to describe the major analytical processes and models used in the 2008 Forest Plan Amendment EIS. This Appendix B is also designed to include descriptions, which document the analytical processes and models used for the 2015 Forest Plan Amendment Draft EIS.

Due to the magnitude (17 million acres) and complexity (e.g., 19 land use designations) of the planning process, a number of analytical methods are used. This discussion includes basic assumptions, modeling components and inputs, rules, methods, and constraints. The information supplements the broader, less technical descriptions included in the body of Chapters 2 and 3 and Appendix C of the EIS. Additional information and documents used in the analysis process are contained in the planning record. The planning record in its entirety is incorporated here by reference.

Forest Management Modeling

Analysis-related Changes between the 2008 and 2015 EISs

As the assessment, development, and analysis of geographic information is a continuous process, aspects and attributes of existing databases are continually changing. These improvements and additions to the databases often have direct results on models, model results, and the assumptions used within the models themselves. A wide range of changes and updates were incorporated during the years between the 1997 FEIS and the 2008 FEIS. These covered changes to resource inventories, coefficient development, and assumptions, all of which played a role in the recalculation of alternative outputs. Appendix B to the 2008 Final EIS includes a description of these changes. This section describes the changes that occurred since the 2008 Final EIS. They include:

Recalculation of the Suitable Land Base for each Alternative—More accurate information about the landscape has been captured in the Forest's GIS resource layers (e.g., streams, slopes, karst). This information was used to update the suitable land bases. In addition, the model used in the identification of suitable forest lands was refined. See Appendix A of the Forest Plan and Chapter 3 of this EIS for more detailed information on how more current information was included in the suitability analysis.

Changes to Scenery Management System— Scenic Integrity Objectives were mapped for each alternative, based on Seen Areas, Distance Zones, and Land Use Designations (LUDs). Seen Areas and Distance Zones are based on modeling of these using Visual Priority Routes and Use Areas (see Appendix F in the Forest Plan). The Visual Absorption Capability was remodeled and mapped and based

on updated GIS layers. Regulation Class layers (see below) were developed for use in Woodstock modeling.

Land Adjustments—Since 2008, a number of land adjustments have occurred; foremost among these are the land adjustments resulting from Public Law 113-291 in 2014. These adjustments have been incorporated into the current analysis as they have affected the total National Forest System (NFS) land base as well as the suitable forest land bases.

Inventory and Data—The inventory step of the planning process consists of the collection, development, and documentation of data to address the public issues, management concerns and resource opportunities, and planning criteria. Two basic types of information are needed to facilitate the analysis and development of alternatives. The first consists of information related to the classification of land into categories with unique properties. This classification can be based on any attribute significant to planning issues. This type of information is tied directly to the map base. In the case of the Tongass National Forest, this map base is its GIS database. The second type of information is not directly tied to a map base, but has more to do with the estimation of how land will respond to certain management activities. This type of information comes from many sources: Regional procedural handbooks, research studies, available literature, etc. The most up-to-date and verifiable information available was used for the EIS. Several Forest-wide inventory data sources have been updated and improved for the 2015 DEIS. The primary changes and updates to the inventory, data, and modeling include:

- The timber harvest map was updated to reflect timber harvested through 2015.
- The inventory of young-growth forest stands was updated.
- Forest Planning and Projection System (FPS) model runs were conducted to estimate young-growth yields, including commercial thins. These runs were based off of a combination of FIA and forest-level data collected on young-growth stands.
- New site index information was developed for young-growth stands.
- New roads were added to the roads data base.
- Changes in land ownership due to conveyances to the state and Native corporations and other adjustments were addressed in the data base (noted above).
- Improvements and updates were made to most other resource databases, including suitable lands for timber production, streams, slopes, karst, and other data.

The major modeling changes were:

- The forest management model was built using Woodstock, replacing the Spectrum model used in the previous plan (2008).
- The forest management model was run for 20 five-year periods.
- Analysis areas were defined using attributes not used previously (e.g., beach buffers, karst, etc.)
- The updated Tongass young-growth timber inventory was used to model the young-growth land base. The Woodstock model maintained stand-level detail for the young-growth acres. Old-growth acres were modeled as strata per the 2008 planning analysis.
- All timber values were recalculated to reflect current information.
- Watershed constraints were recalculated based on the suitable acres in each alternative.
- Logging costs for young growth were calculated based on stand characteristics, using the equations found in the Region 10 appraisal spreadsheets.
- Model implementation reduction factors (MIRFs – see below) were incorporated.

- New treatment options including group selection and variable retention harvest were developed in some alternatives
- Minimum rotation ages were established based on log-product objectives, in some alternatives.
- Harvest levels were established at a pre-determined target during the period of transition from old-growth to young-growth harvest.
- A broader array and definition of land allocation constraints were developed.
- Tongass National Forest acres transferred under Public Law 113-291 were removed from the model and do not contribute to the outputs, benefits and costs discussed in the EIS.

The Forest Planning Model Woodstock

Woodstock is a commercially available forest management modeling system developed and sold by RemSoft (www.remsoft.com). It is widely used by private and state land managers to develop and evaluate long-term timber harvest schedules designed to meet management objectives given constraints or limitations on management activities. Woodstock allows planners to create a detailed forest management model with the available data. In this planning effort, Woodstock was used to ensure that land allocations and output schedules for alternatives are realistic and meet standards and guidelines in a cost-efficient manner.

Woodstock is similar to Spectrum, the modeling system used in the 2008 Forest Plan. Both are linear programming models that assume that relationships between outputs and the land base are linear (e.g. harvesting twice the number of similar acres yields twice the timber volume). A management objective is specified (e.g., maximize present net value of revenues from harvest) as well as any constraints that may affect that objective (e.g., land allocations, limits on harvest flow over time, limits on silvicultural choices, etc.). An in-depth technical discussion of linear programming and its use in forest management applications can be found in Davis et al. (2001).

Woodstock was used instead of Spectrum for several reasons:

1. Woodstock has a greater capacity than Spectrum. This allowed the use of stand-specific yields for the approximately 8,400 young-growth stands. Greater capacity also provided for a single model for suitable Tongass National Forest lands, as opposed to the three Spectrum models to cover the same land base.
2. Woodstock provides more capacity and flexibility in specifying yields. For the young-growth yield tables, for example, volumes were split into five species groups and four size classes. The yield tables also contained information used to control rotation ages, as well as logging costs specific to stand conditions.
3. Woodstock provides more control for modeling. For example, minimum rotation ages could be established such that each stand reached 95 percent of CMAI.
4. A previous Woodstock model offered a good starting point. Before beginning work for the Tongass National Forest, the modeling subcontractor had already built a Tongass Woodstock model under contract to The Nature Conservancy. Most of that model had been constructed in coordination with Tongass National Forest staff. It was easier to convert that model to use for the Tongass than to start over with a new program.

The Woodstock solution process involves three steps: 1) create a linear programming (LP) model, 2) find the optimal solution to the LP model, and 3) prepare reports of the model solution. Woodstock's matrix generator portion translates the management objective, constraints and assumptions about the land base into a matrix of numbers that can be solved with Mosek – a commercial LP solver software package. The solver software determines a system of management prescriptions that results in the highest possible management objective value (e.g., Net Present Value) within the constraint parameters (meeting desired conditions and appropriate standards and guidelines). Woodstock's report writer portion then translates

the LP output into reports, such as costs, revenues, landscape condition, and long-term sustained yield capacity. For some alternatives, Woodstock's spatial solution generator was used to map the solution for use in other analytical tools.

Results from the modeling process are only approximations of what to expect when any given alternative is implemented. The main purpose of modeling is to aid planners in estimating likely future consequences of management prescriptions. A choice between alternatives can be made even though the model may lack precision in describing specific attributes of a given alternative.

The Tongass Woodstock Models

Large Linear Programming models can be difficult or impossible to solve. While the Woodstock model offers more capacity than the Spectrum model, some of the limitations of the previous Spectrum models were imposed on the Woodstock model. Specifically, the Woodstock models for the Tongass only analyze land classified as suitable for timber production. Those lands considered "unsuitable" for timber production were omitted from the models. The process for determining suitability can be found in Appendix A, "Timber Suitability Classification," of the Forest Plan.

Woodstock Model Components

A Woodstock model has five main components: 1) the objective function, 2) land base development types, 3) management prescriptions, 4) activities and outputs, and 5) constraints. The objective function is the overall management strategy objective of the model. Examples of typical objective functions are "maximize net present value," "maximize timber volume," and "minimize cost." Only one objective function can be used for each model run; however, forests typically find it beneficial to use the results of one objective function run to learn about the specific nature of their management problem or to formulate desired conditions used with another objective function. Detailed information on objective functions used by the Tongass is found in the solution process section of this appendix.

The last three components of the Woodstock model greatly influence how the second (the land base) will be defined. The Tongass models are designed to analyze the activities and outputs associated with timber harvest scheduling; therefore, the land base is defined by those characteristics significant to the timber resource. Other resources are dealt with through the LUD allocation process and model constraints. The management prescriptions applied to the Forest differ by types of regimes, rotation age and dispersion amount (portion of the trees removed from the stand). The costs associated with timber harvesting are documented below as are the volumes and value of the wood fiber. The constraints differ by alternative but often refer to a particular timber classification, specific geographic area, activity or output volumes allowed, and management allocation. Constraints are used to ensure desired condition achievement, compliance with appropriate standards and guidelines, and that the resultant management strategy is feasible.

Vegetation Inventory

The Tongass Geographic Information System (GIS) library was used as the source of all spatial information used in the forest management model. The timber inventory came from two sources:

Old-Growth Inventory – The Woodstock model used the same old-growth inventory data that was used for the 2008 Forest Plan. Specifically, 15 strata are used to define timber volumes and yields. They span 3 stocking levels and 5 geographic ranges.

Young-Growth Inventory – Inventory projections for the young-growth acres were based on the recently completed young-growth stand-based inventory, and the recently completed site index layer. There are about 8,100 young-growth stands in the Tongass inventory. About 40,000 cruise plots were established in a subset of the young-growth stands, distributed across the forest. Plot data was compiled and average forest conditions expanded to establish inventory on the un-cruised stands using strata based on District, size class and density class. Each stand was grown forward with the FPS growth model, using the site index specific for that stand. At

each five-year period, the stand table was merchandized into six species groups and four size classes.

Land Base Analysis Areas

Analysis Areas represent unique combinations of the different Identifiers used to stratify the mapped suitable land base. The mapped suitable land base is different for each alternative and is displayed in the EIS. Analysis Areas represent between 378,000 and 1.5 million acres, depending on the alternative. It is important to note that they include the unmapped unsuitable lands accommodated for by the Model Implementation Reduction Factor (MIRF – see below for detailed discussion). If information was perfect, and all unsuitable lands could be mapped, the actual suitable would be somewhat less than the land base represented by the Analysis Areas.

An analysis area is an operational aggregation of land resource polygons that have the same characteristics, are expected to have similar responses management prescriptions, and have similar costs and benefits associated with management prescriptions. By an extension of this logic, analysis areas differ from each other in management prescription response and the costs and benefits associated with those prescriptions. Analysis Areas are unique combinations of the Analysis Area Identifies described below.

Analysis Area Identifiers. Fourteen attributes were used to classify the land base for the Woodstock models. An analysis area is a unique combination across all attributes. The attributes describe characteristics that: (a) affect timber growth and yield; (b) describe the existing timber stand; (c) affect timber management costs and/or revenues; (d) affect land allocation and/or management restrictions in some or all alternatives. The attributes are described below.

Stand ID: Existing inventories were used to produce current and future yield values for all current young growth stands. These yields were stand based and referenced by Woodstock using the Stand ID.

Old Growth Strata: There are 15 strata assigned to the old growth stands. They span 3 stocking levels and 5 geographic ranges. In lieu of yield produced at the individual stand level, yields for old growth stands are assigned by one of these 15 strata.

Regulation Class: Regulation class is determined by the combination of Scenic Integrity Objective, LUD designation, Distance Zone and Visual Absorption Capacity. Regulation class affects the intensity of potential harvesting activities and is used to assign management regimes.

Site Class: There are 9 site index classes utilized in this model. The primary use of site index is by the growth model when generating future yields, the primary use of site class is to assign management regimes and regeneration yields. All site indices are base age 50, and correspond to the site productivity values in FPS.

Timber Phase: Old growth strata and young-growth stands can be categorized in one of 3 land phases, based on the Tongass Timber Sale Adaptive Management Strategy. All alternatives can access timber in Phase I and some alternatives can access timber in Phases II and III as well.

District: There are 10 districts in this model. District is used for both reporting and for assigning regeneration yields. Northern districts did not include cedar as a part of the regeneration species mix, while those in the southern districts did.

Steep Slopes: The designator for oversteepened slope is just a simple yes/no. The assignment is based on an average slope percent of 72 being called oversteepened. Steep slope is used to assign management regimes.

Land Use Designation (LUD): There are five LUD classifications in this model. LUD is used to assign management regimes.

Road Classification: Road classification specifies whether an area is presently roaded or unroaded. The roaded/unroaded condition of an area influences the cost of harvesting the timber. Unroaded areas require more costly road construction; roaded areas require less costly road maintenance and repair when harvesting activities are conducted.

Riparian Management Area: Similar to slope, riparian areas are only identified by yes/no. Riparian management area is used to assign management regimes.

Beach Buffer: Stands that border saltwater are designated as within the beach and estuary fringe (also referred to as beach buffers). Beach buffers are used to assign management regimes. In Alternative 5, a 200-ft fringe right along the water is never planned for treatment. These stands received a 21% reduction in acres to account for a fringe area right along the water that will never be assigned management in any alternative addressed by this model.
Karst: Karst landscapes have been categorized as low, moderate, and high vulnerability. Karst is used to assign management regimes.

Value Comparison Unit (VCU): VCUs, which generally represent large watersheds, are used to assign hauling costs.

Logging System: Logging systems consist of the three basic categories of ground, cable, and helicopter. Cable and helicopter have additional levels depending on yarding distance. Logging systems are used to assign logging costs.

Table B-1
Woodstock Themes

Theme	Attributes
Old Growth Strata	North Island Low Volume North Island Medium Volume North Island High Volume North Mainland Low Volume North Mainland Medium Volume North Mainland High Volume South Island Low Volume South Island Medium Volume South Island High Volume South Mainland Low Volume South Mainland Medium Volume South Mainland High Volume Yakutat Island Low Volume Yakutat Island Medium Volume Yakutat Island High Volume
Regulation Class	Ineligible for management Reg Class 1 Reg Class 2 Reg Class 3
Site Class	SI 1 to 35 SI 36 to 45 SI 46 to 55 SI 56 to 65 SI 66 to 75 SI 76 to 85 SI 86 to 95 SI 96 to 105 SI > 105
District	Admiralty Craig Hoonah

Theme	Attributes
	Juneau
	Ketchikan
	Petersburg
	Sitka
	Thorne Bay
	Wrangell
	Yakutat
LUD	Modified Landscape
	Old Growth Reserves
	Scenic Viewshed
	Timber Management
	All Others
Roadless	Roadless between 1000 and 5000 acres
	Roadless less than 1000 acres
	Roadless less than 1000 acres
	Roadless Roadless
	Roaded
	Roaded Non-Roadless
Karst	None
	Low
	Medium
	High
	Unknown
Logging System	Ground
	Cable Short span
	Cable Long span
	Helicopter Distance <0.75 Mile
	Helicopter Distance 0.75-2 Miles
	Helicopter Distance >2 Miles

Modeled Analysis Areas. Using the 14 attributes, there were about 120,000 unique combinations of acres. Many of these analysis areas had less than one acre and we eliminated small polygons in order to make the model run more efficiently. Young growth analysis areas that were less than 0.5 acre and old-growth analysis areas less than 1.0 acre were eliminated. This reduced the number of potential young-growth analysis areas by about 36,000 and reduced old-growth analysis areas by about 6,300 acres from the model.

Management Prescriptions

A prescription is a management practice or group of management practices applied to a specific land area. The planning process involves assignment of the land base to the available prescriptions. This is facilitated by the Woodstock model and is based on forest constraints, the given management alternative, and the objective function.

Prescriptions were developed by the interdisciplinary team to represent the full range of possible management activities and outputs. Since the Tongass models are concerned primarily with timber harvest scheduling, only prescriptions related to timber harvest were modeled. The interdisciplinary team quantified the outputs, costs, and revenues that would occur when these timber prescriptions were applied to a given analysis area. This quantification process produced the output, cost, and revenue coefficients that are used in Woodstock yield and economic tables. The interdisciplinary team, during its development of standards and guidelines for all prescriptions, ensured that the specific management requirements set forth in 36 CFR 219.27 would be met in accomplishing the goals and objectives for the Tongass.

Woodstock prescriptions were developed to allow consideration of a full range of management activities in the analysis areas. A grow only or no-harvest prescription was created for each analysis area as well as several different harvest options. The only criterion used to eliminate timber options from the models was technical feasibility. For example, ground-based/shovel logging was not considered on slopes greater than 35 percent. Consideration of timber prescriptions for any given Analysis Area was not

directly limited by economic efficiency, in order to allow they may be chosen in efficient fulfillment of a forest-wide desired condition (CFR 219.14(f)(8)). Available timber options were not eliminated from consideration because they produced a negative NPV or even a lesser NPV than some other timber option. A full range of timber options with varying levels of economic efficiency was available to the model, and the Woodstock model was able to consider the economic efficiency of each prescription during the solution process.

The prescriptions analyzed are briefly described below. Note that all regimes assume natural regen, and that all existing young-growth stands 20 years or less, and all regeneration stands are assumed to have a precommercial thinning to bring the stands to desirable stocking levels.

Grow only or Minimum Level/Maintenance. Applies minimum custodial direction for the timber resource. There is no commercial timber harvest and no production of outputs related to timber harvest. This is the prescription assigned to lands not scheduled for timber harvest

Clearcut. Removal of all merchantable commercial trees within a stand in one operation. This prescription is only available for old-growth stand and existing young-growth stands past the age of precommercial thinning.

Precommercial thinning and clearcut. All young-growth stands 20 years old and younger receive a precommercial thinning. Final harvest removes all merchantable commercial trees within a stand in one operation. This prescription is available for young-groowth stands 20 years and less, and regenerated stands.

Commercial thinning and clearcut. One commercial thin at age 60, 65, 70, 75, 80 70, 75, or 80. Clearcut at choice of rotation ages.

Precommercial thinning, commercial thinning and clearcut. Young-growth stands 20 years old and less receive a precommercial thinning. One commercial thin at age 60, 65, 70, 75, 80 70, 75, or 80. Clearcut at choice of rotation ages. This prescription is available for young-growth stands 20 years or less and regenerated stands.

Commercial thinning, no subsequent harvest. One commercial thin at age 60 or older; no further entries are allowed. This prescription is available for young-growth stands in certain land allocations, defined for each alternative.

Young Growth Group selection. This regime creates an uneven-age class distribution across space by creating smaller even-aged openings. Up to 35% of the stand is harvested in small openings, no larger than 10 acres in size. Opeings will naturally regenerate, and precommercial thinning may be scheduled to coincide with a subsequent harvest entry. This prescription is available for young-growth stands in certain land allocations, defined for each alternative.

Old Growth Partial Cut. On first entry into old-growth stands, 75% of the standing volume is harvested. The remaining 25% of the stand is harvested every 50 years. This prescription is available for old-growth stands in Regulation Class 3.

Minimum rotation age

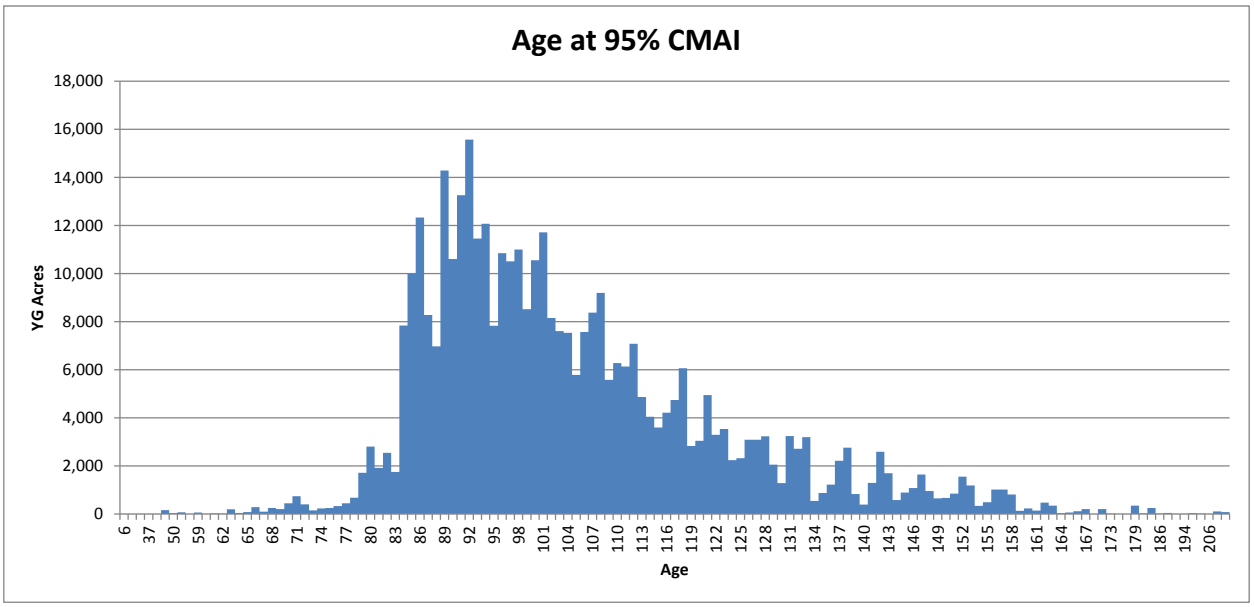
The National Forest Management Act establishes the minimum rotation age for even-aged harvest as the age at which stands have “generally reached culmination of mean annual increment” . The planning regulations define this more specifically as the time that stands reach 95 percent of mean annual increment.

To define this for modeling, young-growth stands were grown forward and the age at which each stand was projected to reach CMAI indicated that most stands would not reach 95 percent CMAI prior to age 90, and many stands would take longer than that, as shown in Figure B-1 below.

Public Law 113-291 of 2014 made provision for shorter rotations on a limited basis – up to 1,500 acres per year in the first 10-year period, and no more than 50,000 acres in the first 20 years, could be harvested at ages less than 95 percent CMAI. This standard was used as the basis for Alternative 1. However, after 20 years, minimum harvest age was defined by 95 percent CMAI.

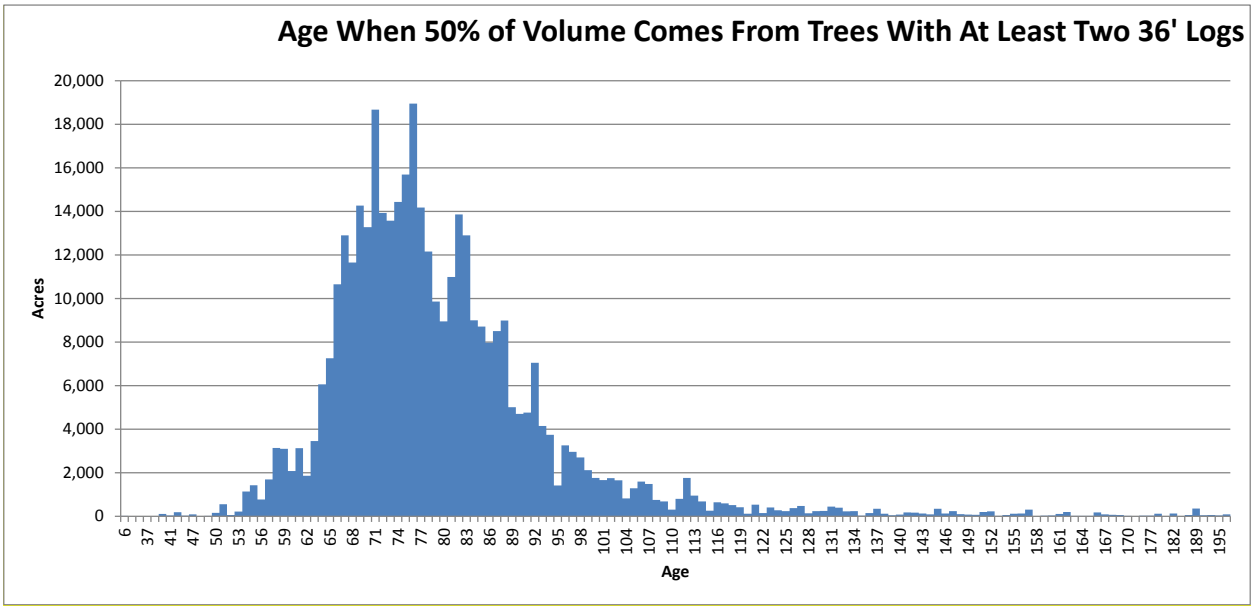
To increase the transition speed to a young-growth harvest program, rotations shorter than 95 percent CMAI were used in Alternatives 2, 3, 4, 5, and 7 (Alternative 7 is the very short-rotation alternative, which was evaluated but not analyzed in detail), and in calculation of the Sustained Yield Limit. Alternative 6 (the State-recommended alternative, which was evaluated but not analyzed in detail) used 95 percent CMAI exclusively.

Figure B-1. Frequency distribution for age at 95 percent CMAI for young-growth stands.



Minimum rotations less than 95 percent CMAI were based on an analysis of the log products that could be made from young-growth stands. A number of different standards were evaluated. Ultimately, minimum rotation ages for young-growth stands were set at the age at which at least 50 percent of the total volume comes from trees with at least two full 36-ft. logs. Comparing Figure B-2 with Figure B-1 shows that this standard reduces the minimum rotation age for most stands.

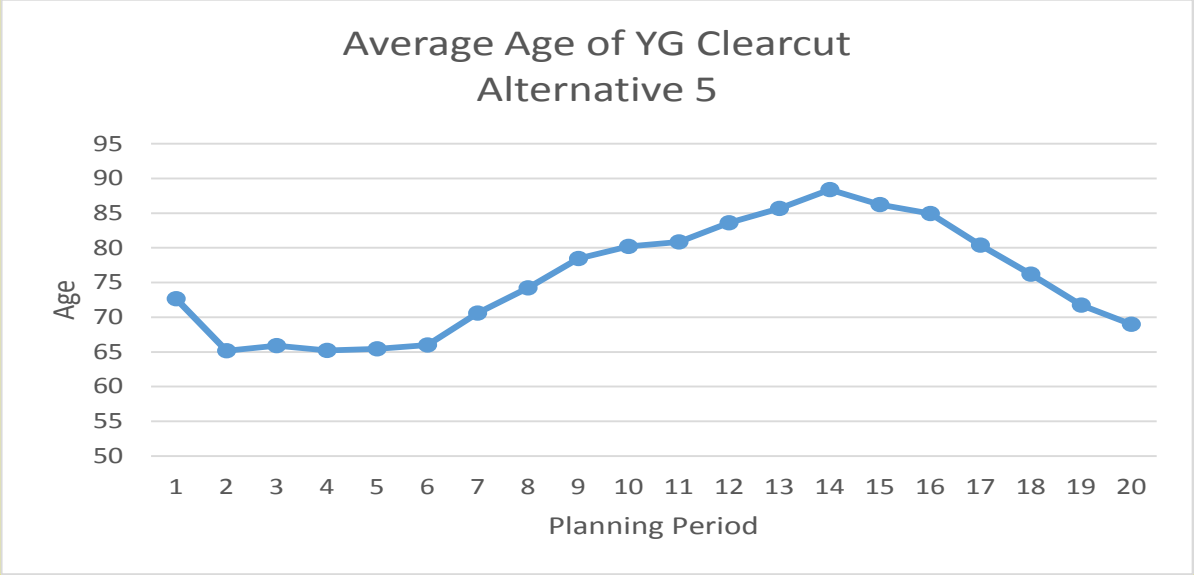
Figure B-2. Frequency distribution for Age when 50% of Volume comes from Trees with at least two 36-ft. Logs.



Further analysis indicated that most young-growth stands with a site index of 90 or greater would reach this standard at age 65, and that most stands with site index less than 90 would reach this standard by age 75.

Minimum rotations in the harvest scheduling model were set at 65 for higher site stands (site index 90+) and at 75 for lower site stands (site index less than 90). These minimum rotation ages establish the first time that a young-growth stand could be considered for harvest. Due to the current young-growth age-class distribution, much of the harvest in the early planning periods would come from stands harvested at these minimum rotation ages, as shown in Figure B-3.

Figure B-3. Average age of Young-growth Clearcuts in Alternative 5 by 5-year planning period.



Activities and Outputs

Activities are the costs associated with Woodstock-assigned timber harvests. Outputs are the timber volumes and prices associated with the same harvests. Each Activity and Output used in the model is described below.

Activities (Costs). All costs and values used in the Woodstock are based on the current USFS Region 10 appraisal system. Costs in the model are costs incurred by the timber sale purchaser – logging, haul and presale costs. The actual cost figures used in the analyses are available in the planning records.

Coefficient Development and Estimation of Effects. The GIS enables identification and stratification of land into logical groupings. The response of these groups to management activities was determined from a wide variety of existing data. All coefficients and assumptions made in the modeling process have been developed from the following information sources.

Yarding/Logging Costs
Information Source: Calculated using equations from USFS Region 10 timbers sale appraisal spreadsheets.

Occurs With or Varies By: For OG, varies by volume class, logging operability, geographic zone, productivity group, stand age, and prescription. This cost is incurred according to net sawlogs removed per acre. For YG, varies by volume per acre, logging operability and harvest method.

Assumptions: These costs include road maintenance relative to logging, profit and risk relative to yarding, landing construction, and yarding. Logging costs increase as operability becomes more difficult. The logging operability classification of the area heavily influences the logging costs due primarily to the different harvest systems required. The size of the logs influences logging costs. Typically, larger logs result in less logging cost per 1,000 board feet. For OG, volume class and productivity groupare used to estimate the average log size and volume per acre for each unit. For YG, pieces p

Logging systems include ground-based/shovel, short-span cable and long-span cable. Helicopter costs will also be determined by three categories of distance (0.5 mile, 1.25 mile, and 2+ mile). Helicopter costs are constant costs independent of volume strata and geographic zone, so they can be applied wherever helicopter logging must be used. Young-growth harvest costs were determined initially from FVS outputs at age 80. They were then adjusted for geographic zone, age, and prescription (i.e., clearcut or thin) using South Islands (POW, where the data was collected) as a reference point. Cost curves from 1996 were used as the basis of this adjustment.

Felling and bucking coefficients
Information Source: Based on most recent USFS Region 10 appraisal spreadsheets.

Occurs With or Varies By: Tracked on a per volume basis (MBF). For OG, varies by volume class. For YG, coefficients are based on projected yields for each stand.

Assumptions: Felling and bucking costs were split out separately from logging costs. OG costs varied by Geographic zone and volume strata.

Outputs(Benefits). The economic benefits associated with timber harvest are based on appraised value. Value is based on tree size, species composition, amount of defect, and assumptions about domestic manufacture and export. Timber benefits are measured as pond log value. Pond log values used in the Woodstock model are the estimates of price a timber buyer would pay for a log at the mill site, less the markup charged by the logger (profit and risk). To get the stumpage value of this log, all estimated costs that are incurred to get the log to the mill must be subtracted from the pond log value. The resulting stumpage price is assumed to be the price the timber buyer pays for the log (bid price). Bid price represents money to the U.S. Treasury.

Sawtimber (board feet and cubic feet)
Information Source: Timber values were determined using timber appraisal methodologies for Southeast Alaska (FSH 2409.22) as reflected in the most recent USFS Region 10 appraisal spreadsheets.

Merchantable volume of existing OG timber stands was based on FIA plot analysis by volume strata within each identified Geographic Zone and are the same volumes used in the 2008 Plan.

Yields for existing YG timber stands were derived from a recent YG inventory and a recently updated site index map. In the Woodstock model, each of the approximately 8,100 YG stands were grown forward and those unique yield projections were each used in the model. Stands 20 years old and younger were assumed to have a precommercial thin to achieve desirable stocking levels.

Yields for future regenerated stands were based on a subset of the YG yields. All future stands are assumed to have desirable stocking due to precommercial thinning.

Occurs With or Varies By: At harvest, the OG volume of merchantable timber produced generates a per mbf revenue that varies by Geographic Zone and volume class. Geographic zone affects this revenue due to differences in species composition and wood quality. YG harvest revenue is based on the species and size class of the harvested logs.

Assumptions: For existing OG stands, piece size and species composition is determined from a tree-by-tree analysis of the FIA plot summary data. For YG and regenerated stands, piece size and species composition is based on a tree-by-tree analysis of the FPS model outputs. It is assumed that existing old-growth volumes are constant (i.e., through time, growth equals mortality). Young- growth (regenerated) stands grow at a rate determined by the FPS model. Pond values are ba sed on the assumption that for species that are exported, half of the volume will be exported, and half will be processed by domestic manufacturers.

Woodstock Constraints

Constraints in a linear programming model are the rules that must be followed when determining an optimal problem solution. Without constraints, the solution of a Woodstock model may represent a management strategy that is impractical, inconsistent with the forest plan, or in conflict with Forest Service policy. Thus, constraints are included in Woodstock models to ensure that their results are useful and meaningful.

There are two categories of constraints within a Woodstock linear matrix: implicit and explicit. Implicit constraints are common to all Woodstock models. For example, all acres in the model must be allocated to some prescription (even if it is the “no management” prescription), or the number of acres assigned to each prescription must not be negative. These types of constraints are exercises in logic and need not be discussed further.

Explicit constraints are those constraints added to Woodstock models by planners. These constraints come in many forms and are applied to mimic regulations and laws such as NFMA, standards and guidelines set forth in the forest plan, and on-the-ground operating conditions. An example is the non-declining yield constraint. Proven ability to maintain a constant flow (non-declining yield) of harvested timber volume in perpetuity is Forest Service policy. A constraint is added to the Woodstock data set that forces all timber harvest volumes to be at least as great as the previous decade's harvest volume (see below for further discussion). Another example may be a constraint that forces a certain area to be managed specifically for wildlife habitat. There are many explicit constraints in the Tongass models. They vary by land attributes, geographic area, and by management alternative. The explicit constraints used in the Woodstock models fall into two categories: timber policy constraints and operational constraints. A detailed discussion of the intent of these constraints follows. They are summarized in Table B-2 for comparison of their application across the alternatives.

Timber policy constraints. These constraints are included in the Woodstock models to represent legal or policy requirements of national forest timber management. The primary requirements regarding timber management incorporated into Tongass Woodstock models are:

Non-declining Yield. The Tongass models have a constraint that ensures harvest volume (in board feet) will not decline in any period over the 100-year planning horizon per national policy. Harvest volumes may increase, but all subsequent harvests must be at least as much as the previous decade's harvest.

Sustained Yield. The harvest in any decade of the planning horizon must not exceed the Long-Term Sustained Yield that can be maintained on the forest. Long-term sustained yield is measured in cubic feet. It is calculated as the average yearly volume yielded from a chosen management action, summed across all management actions for all stands chosen by the model. For instance, if a management action yields 50 cubic feet every 100 years, the Long-Term Sustained Yield for that management action is 0.5 cubic feet per year.

Minimum harvest age. The age at which a managed stand is harvested is called the rotation age. Agency policy is that rotation age can be no earlier than the age at which 95% of culmination of mean annual increment (CMAI) occurs. CMAI is the age at which the stand achieves its highest average volume. The Woodstock models have constraints that allow timber harvest only when a stand has reached 95 percent of this CMAI age. On the Tongass, this translates to a range of rotation ages of about 60 to 170 years. CMAI varies by stand productivity, management prescription, and administrative area and is calculated using merchantable cubic foot volume.

Constraints Common Across All Alternatives. There are four constraints common to all seven alternatives. They are: (1) Non-declining yield, (2) Harvest during the first three periods – can only come from Craig, Thorne Bay, Ketchikan, Petersburg, and Wrangell Districts; after that - all nine timber districts are available become available, (3) Normal operability constraints, and (4) Old growth high volume strata constraints.

Compatibility Matrices Specific to Each Alternative. The Tables below show which management regimes are compatible with each land use allocation, under each alternative. These "compatibility matrices" were used to build the land allocation constraints into the Woodstock models.

Table B-2.0
Key for codes found in tables B-2.1-7

Code	Description
NH	No Harvest
CC	Clearcut
GS	Group Selection
VR	Variable Retention
CT	Commercial Thin
Par	Partial Harvest
YG	Young Growth
OG	Old Growth
x1	x1 = Phase 1 only
x2	Remove 33% of volume
x3	Only CC harvest in Period 1-3, then CT but no CC
x4	Patch cutting in Moderate, clearcut in Low
x5	Minimum age 60/70
x6	Where also OG and RMA, minimum age 65/75

Appendix B

Table B-2.1
Compatibility Matrix Alternative 1

	YG				OG		
	NH	CC	CT CC	CT	NH	CC	Par
Roadless	x	-	-	-	x	-	-
Phase I, II and III	x	x	-		x	x	x
Roaded Roadless	x	-	-	-	x	-	-
BeachBuffer	x	-	-	-	x	-	-
Karst - High	x	-	-	-	x	-	-
Karst - Moderate & Low	x	x	-		x	x	x
LUD - Non Development	x	-	-	-	x	-	-
RMA outside TTRA Buffer	x	-	-	-	x	-	-
Steep Slope, MMI 4	x	x	-	-	x	-	-
LUD - Modified Landscape	x	x	-	-	x	x	x
LUD - Scenic Viewshed	x	x	-	-	x	x	x
LUD - Timber Production	x	x	-	-	x	x	X

*Relax CMAI on 50,000 acres in first 20 yrs (1st decade 15,000 ac, no more than 1500 ac per year)
*FP Scenery Standards apply (Reg class constraints by VCU)
*YG use 2 log trigger
*If YG+OG > 46, then OG volume = 5, else OG+YG = 46
*Total harvest during transition <= 46

Table B-2.2
Compatibility Matrix Alternative 2

	YG				OG		
	NH	CC	CT CC	CT	NH	CC	Par
Roadless	x	-	-	-	x	-	-
Phase I, II and III	x	x	-		x	x	x
Roaded Roadless	x	x	-	-	x	x	x
BeachBuffer	x	x3	-	x	x	-	-
Karst - High	x	-	-	x	x	-	-
Karst - Moderate & Low	x	x	-		x	x	x
LUD - Non Development	x	x	-	-	x	-	-
RMA outside TTRA Buffer	x	-	-	x2	x	-	-
Steep Slope, MMI 4	x	x	-	-	x	-	-
LUD - Modified Landscape	x	x	-	-	x	x	x
LUD - Scenic Viewshed	x	x	-	-	x	x	x
LUD - Timber Production	x	x	-	-	x	x	X

*Relax CMAI on 50,000 acres in first 20 yrs (1st decade 15,000 ac, no more than 1500 ac per year)
*FP Scenery Standards apply (Reg class constraints by VCU)
*YG use 2 log trigger
*If YG+OG > 46, then OG volume = 5, else OG+YG = 46
*Total harvest during transition <= 46

Table B-2.3
Compatibility Matrix Alternative 3

	YG				OG		
	NH	CC	CT CC	CT	NH	CC	Par
Roadless	x	x	-	-	x	x	x
Phase I, II and III	x	x	-		x	x1	x1
Roaded Roadless	x	x	-	-	x	x	x
BeachBuffer	x	-	-	x	x	-	-
Karst - High	x	-	-	x	x	-	-
Karst - Moderate & Low	x	x	-		x	x	x
LUD - Non Development	x	x	-	-	x	-	-
RMA outside TTRA Buffer	x	-	-	-	x	-	-
Steep Slope, MMI 4	x	x	-	-	x	-	-
LUD - Modified Landscape	x	x	-	-	x	x	x
LUD - Scenic Viewshed	x	x	-	-	x	x	x
LUD - Timber Production	x	x	-	-	x	x	X

*Relax CMAI on 50,000 acres in first 20 yrs (1st decade 15,000 ac, no more than 1500 ac per year)
*FP Scenery Standards apply (Reg class constraints by VCU)
*YG use 2 log trigger
*If YG+OG > 46, then OG volume = 5, else OG+YG = 46
*Total harvest during transition <= 46

Table B-2.4
Compatibility Matrix Alternative 4

	YG				OG		
	NH	CC	CT CC	CT	NH	CC	Par
Roadless	x	-	-	-	x	-	-
Phase I, II and III	x	x1	-	-	x	x1	x1
Roaded Roadless	x	-	-	-	x	-	-
BeachBuffer	x	-	-	x	x	-	-
Karst - High	x	-	-	x	x	-	-
Karst - Moderate & Low	x	x	-		x	x	x
LUD - Non Development	x	-	-	-	x	-	-
RMA outside TTRA Buffer	x	-	-	-	x	-	-
Steep Slope, MMI 4	x	x	-	-	x	-	-
LUD - Modified Landscape	x	x	-	-	x	x	x
LUD - Scenic Viewshed	x	x	-	-	x	x	x
LUD - Timber Production	x	x	-	-	x	x	X

*Relax CMAI on all acres and time periods
*FP Scenery Standards apply (Reg class constraints by VCU)
*YG use 2 log trigger
*If YG+OG > 46, then OG volume = 5, else OG+YG = 46
*Total harvest during transition <= 46

Table B-2.5
Compatibilty Matrix Alternative 5

	YG						OG		
	NH	CC	CT CC	GS	VR	CT	NH	CC	Par
Roadless	x	-	-	-	-	-	x	-	-
Phase I, II and III	x	x	-	-	-	-	x	x	x
Roaded Roadless	x	-	-	-	-	-	x	-	-
BeachBuffer	x	-	-	-	x6	x	x	-	-
Karst - High	x	-	-	-	-	-	x	-	
Karst - Moderate & Low	x	x4	-			-	x	x	x
LUD - Non Development	x	-	-	x5	-	-	x	-	-
RMA outside TTRA Buffer	x	-	-	x5	-	x	x	-	-
Steep Slope, MMI 4	x	-	-	-	-	-	x	-	-
LUD - Modified Landscape	x	x	-	-	x6	-	x	x	x
LUD - Scenic Viewshed	x	x	-	-	x6	-	x	x	x
LUD - Timber Production	x	x	-	-	-	-	x	x	X

*Relax CMAI on all acres and time periods
*FP Scenery Standards apply (Reg class constraints by VCU)
*YG use 2 log trigger
*If YG+OG > 46, then OG volume = 5, else OG+YG = 46
*Total harvest during transition <= 46

Table B-2.6
Compatibility Matrix Alternative 6

	YG				OG		
	NH	CC	CT CC	CT	NH	CC	Par
Roadless	x	x	-	-	-	x	x
Phase I, II and III	x	x	-	-	-	x	x
Roaded Roadless	x	x	-	-	-	x	x
BeachBuffer	x	-	-	-	-	-	-
Karst - High	x	-	-	x	x	-	-
Karst - Moderate & Low	x	x	-		x	x	x
LUD - Non Development	x	-	-	-	x	-	-
RMA outside TTRA Buffer	x	-	-	-	x	-	-
Steep Slope, MMI 4	x	-	-	-	x	-	-
LUD - Modified Landscape	x	x	-	-	x	x	x
LUD - Scenic Viewshed	x	x	-	-	x	x	x
LUD - Timber Production	x	x	-	-	x	x	X

*95% CMAI on all acres and time periods
*No FP Scenery Standards in this alternative
*Total acreage in even-aged stands less than 150 years would be limited to 33% of the forested acres within a VCU.
*If YG+OG > 46, then OG volume = 5, else OG+YG = 46
*Total harvest during transition <= 46

Table B-2.7
Compatibility Matrix Alternative 7

	YG				OG		
	NH	CC	CT CC	CT	NH	CC	Par
Roadless	x	-	-	-	x	-	-
Phase I, II and III	x	x	x		x	x	x
Roaded Roadless	x	-	-	-	x	-	-
BeachBuffer	x	-	-	-	x	-	-
Karst - High	x	-	-	-	x	-	-
Karst - Moderate & Low	x	-	-		x	x	x
LUD - Non Development	x	-	-	-	x	-	-
RMA outside TTRA Buffer	x	-	-	-	x	-	-
Steep Slope, MMI 4	x	-	-	-	x	-	-
LUD - Modified Landscape	x	x	x	-	x	x	x
LUD - Scenic Viewshed	x	x	x	-	x	x	x
LUD - Timber Production	x	x	x	-	x	x	X

*Relax CMAI on all acres and time periods
*FP Scenery Standards apply (Reg class constraints by VCU)
*Short log min CC age = 55
*Long log min CC age = 65/75
*Transition ends @ 5 years-OG harvest levels out at 3.5 MMbf/year
*If YG+OG > 46, then OG volume = 5, else OG+YG = 46
*Total harvest during transition = 35

Model Implementation Reduction Factor Constraints (MIRF). These constraints are designed to accommodate for unmapped unsuitable lands that were missed during the suitability determination. It is assumed that when harvest activities occur, a certain percentage of the assumed suitable land will be off-limits for management due to several economic or ecological considerations. These constraints are applied to each old-growth volume strata of each of the six operability harvest systems as well as to young-growth stands. The constraint is implemented by forcing the model to never harvest a certain percentage of the acres in the model. The effect is to control the maximum amount of acres from the suitable land base that are actually harvested. See below for a discussion of how MIRF factors were determined.

Dispersion and Adjacency Constraints. To meet visual quality and Regulation Class objectives, dispersion and adjacency constraints were incorporated into the models. "Dispersion" refers to spreading harvests across the landscape rather than focusing all activities in a concentrated area. The dispersion limits are taken from proxies developed by Tongass landscape architects for each LUD. These visual guidelines estimate how much of a viewshed can be "disturbed" at any one time and still meet the adopted scenic integrity objectives of the area. They also specify length of time before harvest of adjacent units is permissible and the maximum size of these harvest units. Table B-7 (below) shows the constraints that were used for each Regulation Class. The "Visual Disturbance" factors were used in the constraints section of the model and the "Adjacency" definitions were defined in the outputs section of the model. Together, these two definitions (as well as treatment options available to each regulation class) distinguish the regulation classes in the model. Detailed information about these constraints is found in the "Regulation Class" section of this appendix (below).

Woodstock Solution Process

The following sections describe some of the steps involved in solving the Woodstock models. The concept of "objective function" is discussed as the final model component. Following that is a brief discussion of how the Tongass evaluated economic efficiency of the alternatives. Last is a discussion of how the Woodstock model was used to gain insight into the management situation of each alternative and make more informed decisions.

Appendix B

Objective Functions

The objective function of a linear programming model defines the overall management objective of the forest quantitatively. It is generally expressed as a "minimize" or "maximize" function. The LP solution software finds the largest (or smallest) value possible of the objective function within the boundaries of the model constraints. Linear programming principles guarantee that the solution is optimal; that is, the best answer possible. Two different objective functions were used to explore the nature of the Tongass management problem. While only the "maximize present net value" objective function was used for the final results, the other ones may have been used at intermediate steps in the analysis process. Some of the objective functions used in the modeling process include:

Maximize Net Present Value. Net Present Value (NPV) is defined as the benefits less the costs of a management prescription, discounted at 4% annually to the present day, summed over all management prescriptions of all Analysis Areas. Because the model is formulated in 5-year time periods, discounting is done from the middle of each period. This is the objective function that was used for all final model runs presented in this Final EIS.

Maximize Discounted Timber Volume. Timber volume is tracked for each management action of each Analysis Area in each period. Each volume is discounted to the present and the total amount is maximized. The Woodstock model was used to determine how quickly the Tongass could transition to a sustainable timber sale program comprised primarily of YG harvest, and how high the YG harvest could be, given the land allocation and other management constraints. Maximizing discounted volume ensured that the model had the incentive to get as much YG volume as possible, early in the harvest schedule. The non-declining yield constraint ensure that the YG harvest was sustainable, and allowed the harvest to increase over time as the YG age class distribution was regulated. The discount rate used for this calculation was 16%. This objective function was used only in the initial run.

The solution process for each alternative consisted of making a set of Woodstock model runs designed to find the most cost efficient way to transition to a YG harvest program as rapidly as possible. The general procedure was as follows:

Initial run - Determine the highest level of sustainable YG harvest, given the land allocation constraints. This model includes only the YG acres. Management regimes are limited to those compatible with the land allocation. Harvest is limited to non-declining flow – harvest may increase from one period to the next, but may not decrease. The objective function maximizes discounted harvest volume. This run produces the highest level harvest in the early periods that is sustainable through time.

First OG run – the OG acres are added to the model. YG harvest is constrained to meet the level established in the initial run through the transition period. OG harvest is constrained such that total harvest meets the target volume during the transition period (46 MMbf per year, in most alternatives). After the transition period, OG harvest is established at 5 MMbf per year. The maximize NPV objective function was used on this an all subsequent runs.

Intermeidate OG runs – Constraints affecting the selection OG harvest are added sequentially to ensure that the model results are in the expected range. These constraints include the OG operability constraints, the constraints limiting the harvest of RegClass 3 OG acres, and constraints limiting the harvest of high volume OG stands.

Final Run – All constraints are included and the model is run to maximize net present value (NPV). This ensures that the objectives and constraints are met in a cost efficient manner.

At each step, the Woodstock model results are evaluated to ensure that the solutions are consistent with the design of each Alternative.

Iterative Process

The Woodstock model was used to test the assumptions and problem formulation strategies used in this analysis. The final solution for each alternative is often the result of several runs that were used to test to test the solution space given the land allocation constraints, and to observe the impact that the implementation constraints had on the solution. Early on, model runs were made to validate the model and compare it to previous models. A number of runs were made to test the solution space, especially around the question of potential YG harvest levels under different potential harvest policies.

Economic Efficiency

The Woodstock model was used to help measure the economic efficiency of the timber management activities of each alternative. Timber management activities can be thought of as a portion of the net public benefits associated with each alternative. Net public benefits are the "overall long-term value, to the nation, of all outputs and positive effects (benefits) less all associated Forest inputs and negative effects (costs) whether they can be quantitatively valued or not" (36 CFR 219.3). Net public benefit represents the sum of the net value of priced outputs plus the net value of non-priced outputs. The EIS Chapter 3 explains and describes the elements of public benefits that may be a function of Forest planning and management activities. In the Tongass Woodstock analyses, the only economic efficiency directly considered was related to timber management.

Present Net Value Formulation. Economic benefits from the Woodstock model were calculated as Present Net Value, or PNV, of the scheduled timber management activities. This calculation was done by the Woodstock model using pond log values, costs to the logger, and costs to the agency for administering the sale. The formula used to calculate the PNV of each potential management prescription is:

$$PNV = [PLV – LC – AC]/(1 + d)^t$$

PLV = pond log value (adjusted to exclude logger profit and risk)
LC = Logging costs (operability, haul, LTF, camp/commute, felling and bucking, road building)
AC = Agency costs (regeneration certification, sale preparation and administration)
t = time (year) of harvest into the future
d = discount rate (4% annually)

The dollar values of outputs used to calculate PNV in the Woodstock model are pond log values measured at mill sites less the profit and risk to the seller. The costs weighed against these values included all of the expenses incurred from removing the timber from the site to the mill (logging costs, haul costs, LTF costs, road building costs, etc. – see above). This is a more detailed approach than a typical Woodstock application, but is done so to account for the variability in stumpage values that occur over such a large land area that is the Tongass National Forest. Stumpage value is the value of the timber at the site and is considered receipts to the federal government for a timber sale. In other words, it is what a purchaser will pay for the timber after considering all of the expenses (LC in the equation above) that are incurred in removing it to the mill. Stumpage, while not explicitly calculated before it is entered into the Woodstock model, it is an inherent part of the above equation [PLV – LC] that is calculated by Woodstock for all potential management prescriptions.

See the above section on “Activities and Outputs” for more detailed information on each of the costs and timber values used in the Woodstock model.

Appendix B

Supplemental Information on Other Model Assumptions

Stage II Suitability Analysis

Each acre classified as suitable for timber harvest was analyzed to determine the costs and benefits for a range or management intensities (36 CFR 219.14(b)). For the purpose of this analysis, the planning area was stratified into categories of land with similar costs and returns according to the Analysis Area Identifiers described above. The stratification also took into account those factors that influence costs and returns such as physical and biological conditions of the site (affecting logging system) and transportation requirements (by VCU).

Stage II analysis is used to identify management intensities of timber production for each category of land that results in the largest amount of discounted net revenues. Stage II analysis provides insight into the overall economic condition of the suitable land base and what types of land are most cost efficient for management. The costs and benefits used for this analysis are described above and include pond log value, the cost of logging, removing, and transporting the timber to the mill. This analysis does not account for the utility volume costs or revenues, as the current market conditions do not favor its removal.

Stage II analysis was conducted for all applicable management intensities: Intensive even-aged management with thinning regimes to very small clearcuts and group selection prescriptions (regulation class 3 areas).

The Regulation Class Process

To recognize the varying intensities of timber harvests that may occur on the landscape, the regulation class concept was developed. Regulation Class is a methodology developed to distill the unique combinations of Land Use Designation (LUD), Distance Zone (DZ), Scenic Integrity Objective (SIO), and Visual Absorption Capacity (VAC) into four management categories, or Regulation Classes. These classes group lands that allow similar allowable harvest unit size, visual disturbance, and re-entry times (adjacency). Regulation Classes are numbered 0 to 3, with 0 being ineligible for management. Most of the following discussion is focused on Regulation Classes 1-3.

Land Use Designation (LUD) For each alternative, a unique assignment and map of Land Use Designations was developed. Every Land Use Designation, or LUD, delineates a unique set of standards and guidelines that apply to that area. For each Alternative, up to 19 LUDs were recognized, but only three were allowed to produce timber counted towards Allowable Sale Quantity (ASQ): Scenic Viewshed, Modified Landscape, and Timber Production. These three LUDs were evaluated in the Regulation Class process. See the supplemental Alternative LUD maps and Chapter 3 of the Forest Plan for more specific information on LUDs.

Distance Zone (DZ) The amount of allowable timber harvesting also is affected by distance zone (DZ). Distance zone is the proximity of an area to a view-point. Distance zone varies from Foreground (within a 0.25 mile), Middle Ground, Background, to Not-Seen, which is completely out-of-view from selected viewing points. Again, available treatment intensity is usually greater on lands with more hidden Distance Zones.

Scenic Integrity Objectives (SIO) Scenic Integrity Objectives are a function of LUD and Distance Zone and describe the desired quality of the scenery to be maintained in each classification. The categories include “High,” “Moderate,” “Low,” and “Very Low” objectives. Further description of SIOs is found in the “Scenery” section of Chapter 4 in the Forest Plan. SIOs for each of the LUD/Distance Zone combinations are shown in Table B-3.

Visual Absorption Capability (VAC) The VAC is a measure of an area's ability to "absorb" (make visually less noticeable) ground disturbing activities (i.e., timber harvesting). VAC is simplified to three categories: Low, Interim, and High. VAC is used to define the intensity of management treatments that

can be used to maintain each SIO. Generally, areas with greater VAC can sustain a more intensive treatment while still maintaining the desired SIO. Table B-4 shows the management unit size allowed for each SIO/VAC combination.

Tongass landscape architects developed some general timber harvesting guidelines, or proxies, for various VACs, SIOs, and LUDs. Although the exact harvest intensity an area receives is determined during the timber sale layout stages, estimates of allowable disturbance were needed in order to facilitate modeling. Each LUD has a series of adopted SIO and VAC objectives. Associated with these objectives are the estimated allowable disturbance factors. The proxies for each LUD and SIO/VAC setting were grouped by similar harvest method and unit size, cumulative visual disturbance, and height to adjacent stand criteria. Grouping the proxies of similar standards resulted in the creation of four distinct categories. These groups became the four regulation classes used in Woodstock modeling. These groups range from no harvest allowed to large clearcutting with minimal visual concerns. The GIS is then used to provide Woodstock with the regulation class allocations by alternative for each Analysis Area. Table B-5 summarizes the approximate disturbance factors by LUD, Distance Zone, SIO, and VAC.

Table B-3
SIO for Distance Zone/LUD from Scenery Standards and Guidelines

LUD	Foreground	Middle Ground	Background	Not Seen
Scenic Viewshed	Retention	Partial Retention	Partial Retention	Max Modification
Modified Landscape	Partial Retention	Modification	Modification	Max Modification
Timber Production	Modification	Max Modification	Max Modification	Max Modification

Table B-4
Maximum Unit Size based on Visual Absorption Capability

SIO	Low VAC	Interm. VAC	High VAC
Retention	< 2	5-15	15-30
Partial Retention	5-10	15-40	40-60
Modification	15-40	40-60	80-100
Max Modification	50-75	80-100	80-100

R = Retention, PR = Partial Retention, M = Modification, MM= Maximum Modification

The percentages in Table B-5 are rough estimates intended to depict the possible level of disturbance one may encounter when viewing these areas. For modeling purposes, these visual disturbance zones were aggregated into groups with similar standards and economic response (e.g., logging costs). Because the percent of visual disturbance includes all visible terrain, tests had to be conducted to "recalculate" disturbance thresholds since only suitable lands are being modeled. These tests involved a series of iterative mapping exercises where varying levels disturbance factors were applied to the separate groups. The feasibility of the harvest level was then compared to the standards and guidelines and reviewed by Tongass National Forest landscape architects. This work was conducted under the following assumptions:

1. The items in the database (e.g., distance zone, visual absorption capability) were correct,
2. The standards and guidelines are modeled to their limits, and
3. The "viewshed" was a large area (e.g., as viewed from a boat).

This work indicated a need to further review the scenery components of the database but in general the process worked well in terms of modeling the intent of the standards and guidelines. This work resulted in three distinct regulation classes that permit timber harvest activities. The final allocation of regulation classes to the various disturbance zones is shown in Table B-6.

Table B-5
Percent Allowable Visual Disturbance

Land Use Designation	Distance Zone	SIO	Low VAC	Interm VAC	High VAC
Scenic Viewshed	Foreground	R	8	10	10
	Mid. Ground	PR	8	15	20
	Background	PR	20	20	20
	Not Seen	MM	20	20	20
Modified Landscape	Foreground	PR	8	15	20
	Mid. Ground	M	15	20	25
	Background	M	25	25	25
	Not Seen	MM	25	25	25
Timber Production	Foreground	M	15	20	25
	Mid. Ground	MM	50	50	50
	Background	MM	50	50	50
	Not Seen	MM	50	50	50

Table B-6
Regulation Class Allocation

Land Use Designation	Distance Zone	SIO	Low VAC	Intermediate VAC	High VAC
Scenic Viewshed	Foreground	R	3	3	2
	Mid. Ground	PR	3	3	2
	Background	PR	3	2	1
	Not Seen	MM	1	1	1
Modified Landscape	Foreground	PR	3	3	1
	Mid. Ground	M	2	2	1
	Background	M	2	1	1
	Not Seen	MM	1	1	1
Timber Production	Foreground	M	2	2	1
	Mid. Ground	MM	2	1	1
	Background	MM	1	1	1
	Not Seen	MM	1	1	1

R = Retention, PR = Partial Retention, M = Modification, MM= Maximum Modification

There are two main components of scenery constraints applied to the Regulation Classes in each VCU: the total visual disturbance and adjacency considerations. Total visual disturbance is the percent of land within a viewshed (VCU) that is classified as disturbed (Table B-7). Adjacency refers to the amount of time required before a harvest unit can be placed immediately next to an existing harvest unit (often referred to as the “green-up” period). These constraints are shown in Table B-7.

There are several important things to remember regarding the above table:

1. Disturbance percent is applied to suitable lands only, not the entire viewshed.
2. These values are entered into the models as constraints for each VCU.
3. The disturbance and adjacency factors for Regulation Class 3 are based on the use of small patch cutting (less than 2 acres). Optimally, disturbance and adjacency would not be an issue with carefully planned uneven-aged management (i.e., partial stand removal).

Variation by Alternative. Because LUD is one factor in determining Regulation Class, the breakdown of each of the seven alternatives into regulation class was recalculated for each alternative. A GIS map of

Regulation Class was developed and used to intersect with the other layers used in Analysis Area development. Regulation Class was then used as an attribute to help define Analysis Areas.

Table B-7
Generalized Visual Constraints
Regulation Class Visual Disturbance Adjacency

Regulation Class	Visual Disturbance	Adjacency
1	40%	20 Years
2	30%	35 Years
3	20%	50 Years

Model Implementation Reduction Factors (MIRF)

To reiterate what was stated in the "Constraints" section (above), the use of MIRF is designed to accommodate for unmapped unsuitable lands that cannot be directly eliminated from the suitable land base but should be. It is known that when harvest activities occur, a certain percentage of the assumed suitable land will be ineligible for management (unsuitable) due to a number of physical, biological, or economic considerations. However, reasonable assumptions can be made to estimate the average amounts of these elements on the ground. Their effect on actual suitable land can be incorporated into the Woodstock model as constraints. Constraints are applied to each old-growth volume strata of each of the six operability harvest systems as well as to young-growth stands. The constraints are implemented by forcing the model to never harvest a certain percentage of the acres in the model. The effect is to control the maximum amount of acres from the "pre-MIRF" suitable land base that are actually harvested. A discussion of these elements and their estimated amounts follows.

MIRF Elements. Each of the nine MIRF subfactors used in the 1997 FEIS (Riparian Habitat was previously divided into two subfactors so there were 10 identified in 1997) was re-evaluated for the 2008 Final EIS. This review was conducted again for the current Forest Plan Amendment EIS and it was decided to leave the subfactors alone, as defined for the 2008 Final EIS. A detailed description of the derivation of MIRF is presented in Appendix B of USDA Forest Service (2008). Each of the subfactors and their values are described in the following paragraphs.

Land Selections – This subfactor is the reduction in suitable lands due to the conveyance of selected lands to the State of Alaska and Native interests. In 2008 the value of this subfactor was calculated as 1% for old growth and young growth. Public Law 113-291 significantly affects the number of acres to be conveyed in the future; however, because the factor is already small and because it is believed that the percentage of suitable in remaining acres of potential conveyance lands could be larger than previously assumed, it was left alone.

TTRA Stream Buffers – This subfactor estimates the reduction in the suitable land base due to unmapped Class I and II stream buffers. It is assumed that the percentage reduction due to this subfactor is 2% for old growth and 1% for young growth.

Non-Commercial Forest – This subfactor estimates the reduction in the suitable land base due to volume class mapping errors. It is associated with the low-volume stratum and is defined as the net percent change in suitable acres due to low-volume POG being mapped as non-commercial (unsuitable) and non-commercial forest being mapped as low-volume POG. It is estimated as a 10% reduction in suitable for old growth and no reduction for young growth.

Slope/Soil Hazard – This subfactor estimates the reduction in the suitable land base due to unmapped steep slopes. It represents the additional acreage of steep slopes identified during project implementation that is not already mapped, divided by the mapped suitable acres. This subfactor varies according to administrative area: the Chatham MIRF for this subfactor is estimated at 26% for old growth and 10% for young growth and the Ketchikan and Stikine MIRFs are estimated at 1% for both old growth and young growth.

- Cost Efficiency – This subfactor excludes the stands with the lowest economic potential from the suitable land base. It varies with operability class and volume stratum and the reduction is estimated at 25% for Difficult/Low Volume and Isolated/Medium Volume and 50% for Isolated/Low Volume. For young growth, no reduction is assumed.

Riparian Habitat (Class III streams) – This subfactor estimates the reduction in the suitable land base due to unmapped Class III stream buffers. It is estimated at 8% for old growth and 4% for young growth.

Karst/Caves – This subfactor estimates the reduction in the suitable land base due to a change in karst classification from low – moderate to high vulnerability. This subfactor varies according to administrative area: the Ketchikan, Stikine, and Chatham reductions are estimated at 6%, 0%, and 1% for old growth and 3%, 0%, and 1% for young growth, respectively.

- Remaining Standards and Guidelines – This subfactor estimates the reduction in the suitable land base due to unmapped eagle/osprey nests, goshawk nests, murrelet nests, wolf dens, goat habitat, and other factors. It is estimated at a 1% reduction for both old growth and young growth.

Overall Results. The sum of these subfactors produces the overall MIRF for each category (Administrative Area, volume strata, operability class). MIRFs were applied identically for all alternatives. Specific calculated MIRF values are in the planning record. The range of MIRFs (varying with operability class) for the different volume strata and Administrative Areas are as follows:

	Low Volume	Medium Volume	High Volume
Chatham	49% – 99%	39% – 64%	39%
Stikine	23% – 73%	13% – 38%	13%
Ketchikan	29% – 79%	19% – 44%	19%

Estimation of Past and Future Harvest and Road Construction for Effects Analysis

The quantification of the direct, indirect, and cumulative effects of the alternatives on fish, wildlife, plants, and other resources was based heavily on the estimation of past and future harvest of old growth and young growth and the amount of road construction. These tasks were conducted for both National Forest System (NFS) and non-NFS lands. This section describes the process followed and the major assumptions.

Estimation of Past and Future Harvest

The estimation of the direct, indirect, and cumulative effects of the alternatives on POG habitats and the fish, wildlife, and plants that use these habitats required three major steps. First, it was necessary to assemble the inventory of existing vegetation on both NFS and non-NFS lands. The second step was the estimation of the original POG on NFS and non-NFS lands and the classification of this original POG into POG types for the purpose of evaluating the level of disproportionate past harvest. The third step was the estimation of future harvest and the amount of POG in various POG categories that would be remaining after future harvest on NFS lands under each alternative, and for all lands combined, including factors for future harvest on non-NFS lands.

Vegetation Inventory

For NFS lands, the existing vegetation information from the Tongass Geographic Information System (GIS) library was used. Specifically, the Size Density Model (SDM) (see Affected Environment in the *Biodiversity* section) was used for the classification of existing vegetation on the Tongass. Using this model, POG is defined by seven old-growth types: SD67, SD5N, SD5S, SD5H, SD4N, SD4S, and SD4H. Young growth is defined by six types, depending on the approximate age and origin of the stand; natural young growth (e.g., young growth originating from blowdown) is divided into three types (S1, S2, and S3) and young growth that originated from timber harvest is classified into three types (HS1, HS2, and HS3). It is noted that the stands covered by these young-growth categories are not all even-age stands. Young-growth under even-aged management was identified separately using harvest activity information.

For non-NFS lands, a number of sources of information were used to produce the most updated and accurate mapping available for non-NFS lands in Southeast Alaska. These sources included:

- Sealaska Regional Corporation provided updated GIS layers for vegetation and harvest on their lands throughout Southeast Alaska; these layers were used for mapping all Sealaska lands.
- The State of Alaska provided GIS layers for harvesting on state lands in Southeast Alaska. These layers were used for most state lands.
- Audubon Alaska and The Nature Conservancy recently completed a conservation assessment for Southeast Alaska (Albert and Schoen 2007) that included the development of a reasonably accurate vegetation map of the entire region based on Tongass GIS vegetation data (SDM mapping), augmented with timber inventory data from Haines State Forest and with classified Landsat Multi-spectral Scanner (MSS) imagery from the Interim Landcover Mapping Program of the U.S. Geological Survey, and 1997 aerial photography. This mapping was used for most of the remainder of Southeast Alaska.
- Forest Service orthophotography and aerial photography was interpreted in some areas to fill in gaps in the above layers.
- The Working Forest Group provided more recent southeast Alaska harvest mapping.

Based on the above information, a Catalogue of Past Harvest for all of Southeast Alaska was developed that itemizes the acres harvested for each land ownership category, landowner, and biogeographic province, and breaks this harvest down by approximate decade, where the decade of harvest is known or can be reasonably estimated. In addition to the spatial information described above, statistics on the implementation of the Alaska Forest Resources and Practices Act and information on State timber sales in Southeast Alaska were collected from the Alaska Department of Natural Resources, Division of Forestry. This information is presented in Appendix C.

Original POG by Category

Next, the original POG was estimated on NFS and non-NFS lands in each biogeographic province and ecological subsection by category. This was done for the purpose of evaluating the level of disproportionate past harvest.

Original POG is defined in this EIS as the POG that existed, outside of the developed areas associated with towns, prior to all mapped timber harvest. Therefore, all young growth originating from timber harvest (mapped as HS1, HS2, and HS3 on NFS lands) was assumed to be original POG. Natural young growth (mapped as S1, S2, and S3 on NFS lands) was assumed to be in a steady state of succession and replacement; therefore, it was not assumed to be original POG. On the Tongass, about 1,100 acres of young growth were mapped as having been harvested between 1750 and 1900 and a total of about 10,800 acres were mapped as having been harvested after 1900 but prior to 1954, which is generally accepted as the approximate year that large-scale logging began. The vast majority (about 409,400 acres on the Tongass) of the harvest occurred from 1954 through the present.

In addition to total POG (represented by the seven SDM types), two other categories of POG were used to represent the larger tree types: high-volume POG, which includes the three types with the largest trees

(SD5S, SD5N, SD67), and large-tree POG, which is defined as SD67 by itself. To estimate original high volume- and large-tree POG, an estimate was first made of the percentage of past harvest in these categories using the SizeDensity1954 layer, which was based on timber type mapping from the mid-1980s and other GIS layers. The following compositions of harvest were determined for NFS and non-NFS lands:

- For NFS lands, prior harvest was estimated to have been 29 percent large-tree POG and 64 percent high-volume POG.
- For non-NFS lands, prior harvest was estimated to have been 37 percent large-tree POG and 62 percent high-volume POG.

Future Harvest

The estimation of future harvest on non-NFS lands was made by examining the amount of POG remaining on these lands and making reasonable assumptions regarding the percentage of that POG that would be harvested in the future. Estimates were conservatively high, in general.

Estimation of Past and Future Road Construction

The estimation of the direct, indirect, and cumulative effects of the alternatives associated with road construction required two major steps. First, it was necessary to assemble the inventory of existing roads on both NFS and non-NFS lands. The second step was the estimation of future road development for NFS lands under each alternative, and for all lands combined, including factors for future road development on non-NFS lands.

Road Inventory

For NFS lands, the existing road information from the Tongass GIS library was used. The "roads with core attributes RSW" layer was used for the inventory of system roads and the definition of maintenance levels to determine whether they were open or closed. The "non-routed other roads" layer was used to estimate additional unauthorized roads. For non-NFS lands, existing roads were inventoried using the following sources:

- Tongass GIS non-routed other roads layer, which contains most roads on non-NFS lands.
- Mapping of roads on Sealaska lands provided by Sealaska Regional Native Corporation.
- GIS layers for roads on many non-NFS lands in Southeast Alaska provided by State of Alaska.
- Other available GIS layers (e.g., ESRI's StreetMap) were used for urban and rural areas around towns and settlements.
- Orthophoto and aerial photograph interpretation were used to "fill in holes" in other sources.

Future Road Construction and Reconstruction

Future road construction/reconstruction assumptions were different for old-growth versus young-growth harvest. The ratios derived are based on a review of Big Thorne and other recent timber sale projects.

For young growth, it was first assumed that 100% of all Maintenance Level 1 (ML 1) roads (closed roads) would be reconstructed if all young growth on the Forest were to be harvested. Then the miles of reconstruction for each alternative was extrapolated from this by using the proportion of young-growth to be harvested in that alternative. In addition, it was assumed that in some young-growth stands, construction of new roads would have less impact than reconstruction of old roads; thus an additional one mile of new road per 400 acres of young-growth harvest and one mile of new road over previously decommissioned road per 600 acres of harvest was assumed. It was also assumed that 10% of new roads and new roads over decommissioned road grades would remain open, while the remaining 90% would be closed.

For old-growth harvest, future road construction was estimated based on the ratio of one mile of new road construction per 150 acres of harvest plus one mile of new road construction over previously decommissioned road grade per 800 acres of harvest. In addition, one mile of road reconstruction per 300 acres of harvest was assumed. Further, it was assumed that 10% of new roads and new roads over decommissioned road grades would remain open, while the remaining 90% would be closed.

On non-NFS lands, future increases in road density were projected after examining existing road densities and making reasonable assumptions regarding the additional road density that would be developed in the future. Estimates were conservatively high, in general. All future non-NFS roads were assumed to remain open.

Deer Model Assumptions and Application

The TLMP or DeGayner Deer Model was used in the EIS to (1) evaluate reductions in winter habitat capability under each alternative, as indicated by changes in the DeGayner Deer Model habitat suitability index (HSI) scores, (2) estimate the percentage of high value deer winter range that could be harvested under each alternative, and 3) estimate the number of WAAs across the Tongass that exceed the 18 deer per square mile index in the wolf standards and guidelines. Changes in winter habitat capability and harvest of high-value winter range were based on projected 1954 (point at which large-scale timber harvest began) conditions, to be consistent with past analyses done at the Forest planning level. Analyses were run at the WAA level, as this is the land division used by the ADF&G for deer inventories and planning. A cross-walk was developed to reclassify the new Forest-wide vegetation model (the SDM) into the deer model vegetation categories (high, medium, low volume old-growth). High-volume stands included SDM vegetation categories SD5N, SD5S, and SD67; medium volume stands include SD4N, SD4S, and SD5H; and low volume stands include SD4H. HSI scores from this model range from 0 to 1.3 but were standardized to range from 0 to 1.0 by dividing all values by 1.3, because outputs from such models represent a range from 0 to 100 percent habitat suitability, with higher values indicating higher habitat capability. Greater details are documented in the project planning record.

To estimate 1954 habitat suitability, it was necessary to “grow back” the vegetation in previously harvested units. Previously harvested units were assumed to have been stands of POG. The variable for volume class (VolClass) in the Existing Veg layer, which exists for most stands that have recently been harvested, was used as an indicator of their 1954 VolStratum categories. Stands with an Existing Veg VolClass of 4 or 5 were assumed to have been medium volume POG in 1954, following the assumption that few low VolStrata stands were harvested; stands with a VolClass of Null, 3, 6, or 7 were assumed to have been high VolStratum POG. VolStratum 6 and 7 were obviously in high VolStratum and it was assumed that the remainder of the stands that were harvested many years ago were in the high VolStratum also. All stands with a date of origin prior to 1954 were not modified.

Future habitat suitability was based on maximum timber harvest after full implementation of the Forest Plan under each alternative. For POG, it was assumed that the harvested acreage would be in the stand in the stem exclusion stage (E) of stand development after full implementation.

To estimate the percentage of 1954 winter range habitat capability that currently remains, and would remain under each alternative after full implementation of the Forest Plan, the1954 HSI score was divided by the current and future HSI score for each WAA, respectively. This illustrates the cumulative effect of timber harvest on estimated deer habitat capability, from the beginning of large-scale timber harvest on NFS lands in 1954 to the present and to the year 2105.

To take into account effects on deer across the Tongass inhabiting areas that vary naturally in their habitat quality, high quality habitat was defined as the quartile of the current land base with the highest HSI scores within each WAA. This was defined by using the following process:

- Sorting HSI scores within each WAA from highest to lowest by polygon;
- Filtering out all polygons with HSI scores = 0 (this area was not included when identifying the area percentages);

- Identifying the polygons that are in the highest 25% based on the WAA acreage, by accumulating the acreages starting with the polygons with the highest HSI scores and working down until 25% of the area was included; and
- Determining the percentage of these acres (which represent the highest quality deer winter range within each WAA) that are harvested under each alternative.

Deer per square mile were calculated to develop an index of the effects of the alternatives on the wolf standard and guideline that deals with deer habitat capability. For this analysis, habitat capability in terms of deer density was calculated by assuming a density of 100 deer per square mile for an HSI of 1.0. Only WAAs where wolves potentially occur (GMUs 1, 2, 3, and 5) were included and WAAs with naturally very low deer densities (WAAs 4302-4607) were excluded from the analysis.

APPENDIX C
CUMULATIVE EFFECTS

Appendix C
Cumulative Effects

CONTENTS

TABLES

ATTACHMENT

Appendix C
Cumulative Effects

Introduction

Cumulative effects are defined in the Council on Environmental Quality (CEQ) regulations as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Cumulative actions are defined as "actions, which when viewed with other proposed actions, have cumulatively significant impacts and should therefore be discussed in the same impact statement" (40 CFR 1508.25). Cumulative effects are discussed in detail for each resource in the Environmental Impact Statement (EIS). This document discusses the projects considered and records which projects were considered for each resource.

Assumptions

Projects and actions incorporated into the cumulative effects analysis were identified by reviewing past records, reviewing scoping comments, interviewing knowledgeable individuals, analyzing the existing condition of the project area using the Tongass and other geographic information system (GIS) layers, reviewing current plans, and, where necessary, making reasonable assumptions. These assumptions sometimes permit quantitative assessments.

Major assumptions used in this analysis are documented in Appendix B of the EIS, which also documents assumptions used for analyzing direct and indirect effects. The primary assumptions are related to past and reasonably foreseeable timber harvest and road construction and reconstruction.

Timeframe for Analysis

The timeframe for this cumulative effects analysis encompasses past and future activities. Past activities include timber harvest and other activities that date back well over 70 years, while future activities consider timber harvest at 25 years into the future, as well as at 100 years in the future. Most other future activities can only be considered as reasonably foreseeable about 25 years into the future because of uncertainties beyond that point.

Analysis Area

The region or study area considered for cumulative effects analyses varies according to the resource being assessed. For most aquatic or watershed-related resources, the area within the proclaimed Forest boundary (approximately 17.9 million acres, including 1.2 million acres of non-National Forest System [NFS] lands) is used. For aquatic and watershed-related resources, this area is subdivided by 5th-field watersheds. For wildlife and other terrestrial resources, all of Southeast Alaska from Yakutat Bay southeast to the southeastern end of Alaska (approximately 21.6 million acres, including 4.8 million acres of non-NFS lands) is used as the study area for some analyses, although some analyses are based on the area within the Forest boundary, depending on the availability and quality of information. The Southeast Alaska area includes all of Glacier Bay National Park and the State, Bureau of Land Management, and other lands in the vicinity of Haines and Skagway. Often Wildlife Analysis Areas (WAAs) are used to summarize information within these study areas. In addition, biogeographic provinces

are used to summarize cumulative effects information for biodiversity and some wildlife resources. For social and economic, recreation, and related human uses, all of Southeast Alaska and beyond, is given consideration for cumulative effects, especially regarding economic, market, and other factors.

Relevant Past, Present, and Reasonably Foreseeable Actions

Based on a review of published material and available information about the Tongass National Forest and adjoining lands on various agency websites and the scoping process, an initial list of existing, proposed, and reasonably foreseeable actions in the region was compiled to be assessed for inclusion in this cumulative effects evaluation. Resources drawn from include the Forest Service Schedule of Proposed Actions (SOPA) report, April 2015 through March 2015 (Forest Service 2015); Tongass Integrated Plan (TIP) 2015-2019; the Alaska Department of Transportation and Public Facilities Project Statewide Transportation Improvement Program and Southeast Alaska Transportation Plan (ADTPF 2004, 2014); the Energy Resource Report for the Tongass National Forest (Tetra Tech 2015) the results of the scoping process, and other sources. In the case of timber harvest, this cumulative effects analysis attempts to quantify the effects of past human actions by adding up all prior actions on an annual or decadal basis (see Attachment 1). It also attempts to examine other past projects, but most importantly, by looking hard at current conditions, residual effects of past human actions and natural events are captured, regardless of which particular action or event contributed those effects. The Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." For these reasons, the primary method of analyzing past actions is based on the cumulative change in environmental conditions to the present, as described in the affected environment sections of the EIS. To keep the cumulative effects analysis useful, manageable, and concentrated on the effects that are meaningful, greater effort is given to future activities that are more certain and geographically close to the project with a focus on issues of greatest concern.

Table C-1 lists and describes the past projects and actions that are considered for analysis of cumulative effects. An updated catalog of past timber harvest is also provided in Attachment 1. Table C-2 lists the present and reasonably foreseeable projects and actions that are considered for analysis. Some projects or actions could be listed as past and present, as well as reasonably foreseeable (e.g., a currently operating mine that was built 20 years ago and is expected to continue operating into the reasonably foreseeable future). These projects are listed in Table C-2 and only completed projects or actions are listed in Table C-1. Table C-3 identifies the primary areas with potential interactions among the identified projects and actions and the primary resource areas.

Table C-1
Past Actions and Projects Considered in Cumulative Effects Analyses

Past Actions	Location	Year(s)	Description
Climate Change and Natural Processes			
Climate Change - General	Throughout Southeast Alaska	Past 25 years	Some climate models for Southeast Alaska have predicted rising temperatures, a 10 percent decrease in summer precipitation in portions of the region, and decreased soil moisture due to increased evaporation during warmer, dryer summer weather. These climate change-related processes may have already been initiated.
Yellow Cedar Decline	Primarily in a wide band from western Chichagof and Baranof Islands to the Ketchikan area	Past 50 years	Yellow-cedar decline and mortality, has dramatically changed many of the forests of Southeast Alaska and this decline is believed to have been climate related. Aerial surveys have mapped approximately 585,000 acres of decline in a wide band from western Chichagof and Baranof Islands to the Ketchikan area (USDA Forest Service and ADNR 2015). In 2014, approximately 20,000 acres of dying (i.e., active decline) yellow-cedar trees were mapped (USDA Forest Service and ADNR 2015).
Fire	Throughout Southeast Alaska	Historical	Because of high precipitation levels, fire has not been a major factor in shaping the forests of Southeast Alaska. However, approximately 400 to 500 acres have burned annually on the Tongass.
Insects and Disease	Throughout Southeast Alaska	Historical	A range of insects and diseases have taken their toll in Southeast Alaska forests; however, their severity has varied substantially over the years. Surveys have documented that individual insect pest species typically affect a few thousand acres to hundreds of thousands of acres each year. In addition to insects, stem decays cause substantial loss in all tree species in unmanaged stands. Tree death and stem breakage resulting from decay contribute to the structural diversity in stands and may be a major factor in small-scale disturbance in Southeast Alaska (Hennon and McClellan 2003). Dwarf mistletoe has also had high infestation levels in many hemlock stands below 500 ft in elevation (Shaw and Hennon 1991, Shaw et al. 2008).
Windthrow Events	Throughout Southeast Alaska	Historical	Small-scale windthrow events are very common throughout Southeast Alaska forests. These small events involve individual trees or small groups of trees. The open gaps in the canopy that result, allow young trees to colonize and fill the openings. Therefore, over time, complex, mixed-aged stands are produced. Insect and disease infestations are major contributing factors. These small-scale openings cover about 6 to 13 percent of Southeast Alaska forest canopies (Nowacki and Kramer 1998). Areas not protected by topographic barriers from the severe effects of infrequent, major storms are subject to large-scale windthrow events that cause catastrophic damage. Entire stands have blown down in the past, resulting in the regeneration of more even-aged stands with more uniform canopies (Nowacki and Kramer 1998). Both forms of windthrow are a part of the natural forest generation, growth, and development. Juday et al. (1998) concluded that there was a high risk of increased large-scale blowdown across Southeast Alaska as well as increased windthrow around harvest units as a result of climate change.
Watershed Effects	Throughout Southeast Alaska	Past 25 years	Climate change effects on water quality, water quantity, and fish to date are not clear, if they have occurred at all.

Table C-1 (continued)
Past Actions and Projects Considered in Cumulative Effects Analyses

Past Actions	Location	Year(s)	Description
Timber Harvest Activities			
Past Harvest – Tongass National Forest	Throughout Southeast Alaska, but concentrated on Prince of Wales and adjacent islands with large portions on Wrangell, Mitkof, Kupreanof, Kuiu, Revillagiggedo, and Baranof Islands.	Mostly 1954 to present	Approximately 462,000 acres of forest land have been harvested on the Tongass National Forest. Of these, about 422,000 acres were clearcut and are in even-aged management. Close to 70 percent of this harvest took place in the 1960s, 1970s, and 1980s; therefore the majority of young growth originating from harvest is 25 to 55 years of age. Less than 10 percent is greater than 55 and less than 4 percent is greater than 65 years of age. Attachment 1 to this appendix is a Catalogue of Past Harvest for Southeast Alaska and is broken down by ownership and year/decade.
Past Harvest – State and Private Lands (non-NFS)	Throughout Southeast Alaska, wherever private or state lands are present; mostly on Prince of Wales and adjacent islands, Kupreanof, and Baranof Islands.	Mostly 1975 to present	Approximately 453,000 acres of forest land have been harvested on non-NFS lands within the Tongass National Forest boundary. The vast majority of this harvest took place in the 1980s and 1990s, so it is mostly younger than the young growth on NFS lands. Attachment 1 to this appendix is a Catalogue of Past Harvest for all of Southeast Alaska and is broken down by ownership and year/decade.
Past Road Construction for Timber Harvest	Throughout Southeast Alaska, but concentrated on Prince of Wales and adjacent islands along Wrangell, Mitkof, Kupreanof, Kuiu, Revillagiggedo, Baranof, and other islands.	Mostly 1950s to present	To date, approximately 8,666 miles of road have been constructed on the Tongass National Forest and adjacent non-NFS lands within the Tongass boundary; 5,006 miles are on NFS land and 3,660 miles are on non-NFS land. The vast majority of these roads were developed for timber harvest purposes although these miles include state highways and local roads, in and around communities. Of the 8,666 miles, only 5,682 miles are open roads (2,303 miles on NFS land and 3,379 miles on non-NFS land). The remaining 2,984 miles are either closed roads (1,444 miles) or decommissioned roads (1,540 miles).
Past Log Transfer Facility (LTF) Construction	Throughout Southeast Alaska, but concentrated on Prince of Wales and adjacent islands along Wrangell, Mitkof, Kupreanof, Kuiu, Revillagiggedo, Baranof, and other islands.	Mostly 1950s to present	LTFs are used to transfer logs to barges or rafts for towing. About 116 LTFs currently exist on the Tongass and there are 55 marine access points suitable for transferring logs to barges that have current permits on NFS lands. Another 10 marine access points no longer have permits. In addition, there are about 126 LTFs on State land and another group of LTFs exist on private lands.
Land Adjustments			
Misty Fjords National Monument Wilderness Inholdings	KMRD	2012	The 68 acre inholding located on the Eulachon River was acquired in 2012.

Table C-1 (continued)
Past Actions and Projects Considered in Cumulative Effects Analyses

Past Actions	Location	Year(s)	Description
Public Law 113-291	Many parts of the Tongass, but especially Prince of Wales and adjacent islands	2015	Public Law 113-291 amended ANCSA and provided Sealaska Regional Corporation final Section 14(h)(8) ANCSA entitlement. On March 9, 2015, Sealaska Corporation received its final ANSCA entitlement and conveyance of 70,075 acres. This conveyance affected multiple areas, LUDs and ranger districts on the Tongass. Public Law 113-291 also amended Section 508 of ANILCA by adding 8 new LUD II areas, containing 152,000 acres. The new LUD II designations changed the previous LUD designations for these lands (both development and non-development LUDs) to LUD II.
Boomer Land Swap	Sitka	2015	48-acres of cleaned-up lands impacted by mining were acquired near Sitka in trade for lands flooded when the Blue Lake dam was raised.
Other land adjustments	Tongass-wide	Prior to 2015	NFS Lands have been conveyed to Non-Federal parties under the Native Allotment Act, Alaska Native Claims Settlement Act (ANCSA), Alaska National Interest Lands Conservation Act (ANILCA) and other authorities.
Mining			
Various Mines	Tongass-wide	From 1867 to present	Mining history in Southeast Alaska dates back to the first mineral location in 1867, prior to the existence of the Tongass. During the late 1800s, gold was discovered in Southeast Alaska and mining ventures began to pop up. Historic mines include the Treadwell Mine and the Alaska Juneau Mine in Juneau; the Kensington and Jualin mines north of Juneau (recently reopened); the Ross-Adams uranium mine on Prince of Wales Island; the undeveloped Quartz Hill molybdenum deposit in the non-Wilderness Misty-Fjord National Monument; copper mines in the Ketchikan area; and many other deposits that were explored or developed throughout the Tongass. Mineral exploration and extraction has continued, at some level, since the first discoveries.
Recreation and Tourism			
Cruise Ships	Tongass-wide, especially the major ports	Late 1880s to present	The Southeast Alaska cruise ship industry has developed and grown to substantial levels. The first cruise ships sailed in the late 1880s and the number of passengers now numbers about 1 million per year. Modern cruise ships began sailing to Alaska in the 1970s and the number of passengers reached about 500,000 in 1995 and the number of passengers doubled in the next 20 years. These ships use the major ports of Southeast Alaska.
Outfitter Guides	Tongass-wide	Mostly 1920s to present	Outfitters and guides have provided services throughout Southeast Alaska for many years, Beginning primarily as hunting and fishing guides in the early years, they have expanded the services they provide. The Forest Service issues special use permits to manage and control the number and distribution of outfitters and guides.
Helicopter Landings and Tours	Mostly the JRD		With the advent of the cruise ship industry, helicopter tours and landings developed into a secondary industry. The majority of these occur in the Juneau Icefield. Helicopter landing tours also occur in a number of locations elsewhere on the Forest, including the Skagway Icefield and Baird Patterson Glaciers. These tours involve high volumes of people concentrated at specific locations for short periods of time, typically 2 to 4 hours.

Table C-1 (continued)
Past Actions and Projects Considered in Cumulative Effects Analyses

Past Actions	Location	Year(s)	Description
Dispersed Recreation and Subsistence Gathering	Tongass-wide	Mostly 1920s to present	Dispersed recreation has steadily increased in Southeast Alaska along with the growth of the tourism industry, the growth of communities, and the development of roads. Gathering of subsistence resources has also increased, although more slowly, with the growth of subsistence communities.
Fishing and Recreation Lodges	Tongass-wide	Mostly 1940s to present	Numerous lodges have been developed on private lands adjacent to the Tongass. Some of these have gone out of business but most continue to operate.
Recreation site development and closure	Tongass-wide	Mostly 1960s to present	A wide range of recreation facilities have been developed on the Tongass. They include 25 campgrounds and camping areas, 10 day-use areas, 35 picnic sites, 155 cabins/lookouts, 44 shelters, 68 trailheads and 885 miles of trail, and many other facilities.
Community Development			
Community Development	Tongass-wide	Mostly 1890s to present	Settlement and community development in Southeast Alaska occurred primarily from the late 1800s to the present. Mining, fishing, and fish canneries were the primary early factors encouraging settlement, later followed by logging. As a result, today there are 32 communities in Southeast Alaska. Eleven of these communities have less than 100 people ranging up to Juneau with over 33,000. The footprint of these communities ranges in size from a few acres for the smallest ones to several thousand acres for Juneau. Road development is associated with community development and is covered above under timber harvest activities.
Wildlife Habitat Enhancement and Regulatory Actions			
Habitat Enhancement	Tongass-wide	Mostly 1960s to present	A range of wildlife habitat enhancement projects has occurred throughout Southeast Alaska. These projects were designed primarily to improve forest and riparian habitats for wildlife. They include extensive pre-commercial thinning, some with wide-spacing, riparian thinning and snag creation.
State Hunting and Trapping and Federal Subsistence Regulations	Tongass-wide	Mostly 1959 to present	State regulations have been in place since shortly after Statehood (1959) to control hunting and trapping activities. These regulations set bag limits and seasons and limit the hunting and trapping methods that can be used in pursuit of game animals, game birds, and furbearers. Prior to Statehood, federal regulations governed hunting and trapping. In addition, a Federal Subsistence Board establishes subsistence regulations for many areas of the State.
Watershed and Aquatic Habitat Improvement and Aquatic Regulatory Actions			
Restoration Projects	Tongass-wide	Mostly 1960s to present	The Forest Service has conducted numerous watershed improvement projects including: watershed monitoring and assessments; instream and riparian rehabilitation; placement of large woody debris in streams; conducting landslide assessments; improving fish passage in streams (creating jump pools, barrier modifications, culvert replacements); stream and lake stocking, and lake fertilization; decommissioning roads; and maintain fish passage structures. The number and locations and of projects have varied year to year based on funding and need.

Table C-1 (continued)
Past Actions and Projects Considered in Cumulative Effects Analyses

Past Actions	Location	Year(s)	Description
State Fishing and Federal Subsistence Regulations	Tongass-wide	Mostly 1959 to present	State regulations have been in place since shortly after Statehood (1959) to control fishing and shellfish collecting. These regulations set bag limits and seasons and limit the methods that can be used to pursue resources. Prior to Statehood, federal regulations governed fishing. In addition, a Federal Subsistence Board establishes subsistence regulations for many areas of the State.

Table C-2
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses.

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Climate Change and Related Natural Perturbations			
General – Climate Change	Throughout Southeast Alaska	2015 and beyond	Some climate models for Southeast Alaska predict rising temperatures, a 10 percent decrease in summer precipitation in portions of the region, and decreased soil moisture due to increased evaporation during warmer, dryer summer weather. These factors may lead to an increase in fire frequency and severity, further yellow-cedar decline, higher rates of insect and disease infestations, more severe windthrow events, and effects on stream flows, water temperature, and fisheries.
Yellow Cedar Decline	Primarily in a wide band from western Chichagof and Baranof Islands to the Ketchikan area	2015 and beyond	As the climate continues to warm, cedar decline is likely to continue to spread, especially in the south and east. Conversely, yellow-cedar appears to be spreading northward as climate warms, into areas that retain snow longer into the spring.
Fire	Throughout Southeast Alaska	2015 and beyond	Approximately 400 to 500 acres burn annually on Tongass. Due to climate change, there may be an increased risk of forest fires but the effects are likely to be minor at the forest level.
Insects and Disease	Throughout Southeast Alaska	2015 and beyond	If the current warming trend continues, damage to trees from insects and rot are likely to increase, both from species currently present in Southeast Alaska and from new species invading the area from other parts of North America or elsewhere. Consider stem and root decay, hemlock dwarf-mistletoe; Heart rot; spruce beetle; spruce aphids; and species not yet present.
Windthrow Events	Throughout Southeast Alaska	2015 and beyond	Both small-scale and large-scale forms of windthrow are a part of the natural forest generation, growth, and development. Juday et al. (1998) concluded that there was a high risk of increased large-scale blowdown across Southeast Alaska as well as increased windthrow around harvest units as a result of climate change.

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Watershed Effects	Throughout Southeast Alaska	2015 and beyond	Climate change will likely produce increases in air temperature in the winter months with increases in precipitation expected in the fall and winter, with much of the precipitation occurring as rain instead of snow (EcoAdapt 2014). The warmer air temperatures would contribute to the melting of glaciers, higher peak flows in the fall and winter in most streams other than glacier-fed streams, and lower summer flows primarily in snow-melt and rain dominated watersheds (Shanley and Albert 2014, Shanley et al. 2015). In addition, the warmer air temperatures may result in increased stream temperatures, but the degree this would occur depend greatly on local factors and any potential increase may be lessened by the potential increases in rainfall occurring in the summer and fall (EcoAdapt 2014). Climate change could also result in sea-level rise, which could inundate estuarine rearing areas for fish. Other effects on fish are likely to be both positive and negative and have a high degree of uncertainty.
Timber Harvest Activities including roads and other actions (Thinning and Commercial Thinning not differentiated) – NFS Lands			
Listed below, are the forecasted acres to be harvested and roads to be constructed during the next 25 years and during the next 100 years for each alternative.			
Projected Future Harvest and Road Construction and Reconstruction over 25 years for Each Alternative	Suitable forest lands on Tongass under each alternative (see large color suitable area maps)	2016 - 2040	Alternative 1: YG Harvest = 7,271 acres OG Harvest = 40,140 acres Road Construction = 158 miles Road Reconstruction = 35 miles Alternative 2: YG Harvest = 69,362 acres OG Harvest = 12,927 acres Road Construction = 50 miles Road Reconstruction = 335 miles Alternative 3: YG Harvest = 52,094 acres OG Harvest = 13,856 acres Road Construction = 64 miles Road Reconstruction = 252 miles Alternative 4: YG Harvest = 37,073 acres OG Harvest = 22,636 acres Road Construction = 86 miles Road Reconstruction = 179 miles Alternative 5: YG Harvest = 37,390 acres OG Harvest = 23,223 acres Road Construction = 87 miles Road Reconstruction = 180 miles

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Projected Future Harvest and Road Construction and Reconstruction over 100 years for Each Alternative	Suitable forest lands on Tongass under each alternative (see large color suitable area maps)	2016 - 2115	Alternative 1: YG Harvest =263,417 acres OG Harvest = 62,413 acres Road Construction = 245 miles Road Reconstruction = 1,068 miles Alternative 2: YG Harvest =360,533 acres OG Harvest = 30,017 acres Road Construction = 116 miles Road Reconstruction = 1,756 miles Alternative 3: YG Harvest =335,590 acres OG Harvest = 31,198 acres Road Construction = 142 miles Road Reconstruction = 1,620 miles Alternative 4: YG Harvest =266,644 acres OG Harvest = 42,831 acres Road Construction = 163 miles Road Reconstruction = 1,189 miles Alternative 5: YG Harvest =305,017 acres OG Harvest = 43,167 acres Road Construction = 161 miles Road Reconstruction = 1,392 miles
Listed below are specific timber harvest projects that are being implemented or are in planning stages for the next 5 years. These are included within the 25-year and 100-year estimates above.			
Big Thorne	Prince of Wales Island, TBRD	2015-2019+	100-150 MMBF offered for sale. 70 miles of roads maintained and 64 miles or roads restored. Restore and enhance 4.6 miles of stream; thin 10 riparian acres and 1,000 upland acres. Remove 8 fish barrier culverts. (Approximately 98 MMBF have already been sold as of November 2015)
Greater Staney Area	Prince of Wales Island, TBRD	2016-2019+	47 MMBF offered for sale. Restore and enhance 2 miles of stream; thin 54 riparian acres and 1,500 upland acres. Remove or replace 28 barrier culverts
Wrangell Island	WRD	2016-2019+	70 MMBF offered for sale and 1,300 acres for precommercial thin. 52 miles of roads maintained; 9.5 miles of roads reconstructed; 12 miles of roads stored; and 2.5 miles of road decommissioned. Remove or replace 9 barrier culverts.
Zarembo	WRD	2016-2019+	60 MMBF offered for sale and 2,000 acres for precommercial thin. 80 miles of road maintained; 18 miles of road stored. Restore and enhance 7.6 miles of stream; thin 162 riparian acres and 1,460 upland acres. Replace 48 barrier culverts.
TwelveMile	Prince of Wales, CRD	2017-2019+	13 miles of roads maintained. Restore and enhance 2.5 miles of stream; thin 40 riparian acres and 65 upland acres. Remove or replace 10 fish barrier culverts.
Neck Lake/Alder Creek	Prince of Wales Island, TBRD	2016-2019+	40 MMBF offered for sale. 18 miles of roads maintained and 29 miles or roads stored. Restore and enhance 1.5 miles of stream; thin 50 riparian acres and 300 upland acres. Replace 4 fish barrier culverts.
Kuiu Roaded	PRD	2016-2019+	25 MMBF offered for sale. 5 miles of roads maintained; 18 miles of roads reconstructed; 9 miles of roads stored; and 7 bridges replaced. Restore and enhance 3 miles of stream. Remove or replace 10 barrier culverts.
Thomas Bay	PRD	2017-2019+	15 MMBF offered for sale (5 MMBG young growth). 4 miles of roads maintained and 4 miles or roads stored. Replace 2 bridges. Restore and enhance 1 mile of stream; thin 1,000 riparian acres and 312 upland acres. Replace 2 fish barrier culverts.

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Traitors Cove	KMRD	2017-2019+	10 MMBF offered for sale. 4 miles of roads maintained; and 4 miles of roads stored. Restore and enhance 3 miles of stream; thin 100 riparian acres. Remove or replace 8 barrier culverts.
Kosciusko Vegetation Management & Watershed Improvement Project	TBRD	2016-2019+	MMBF offered for sale (MMBF young growth). 11 miles of roads maintained; 1 bridge replaced, and one log transfer facility developed. Restore and enhance 0.75 mile of stream; thin 45 riparian acres and 400 upland acres. Remove or replace 22 barrier culverts.
Iris and Shelikof	SRD	2015-2019	Restoration and Enhancement thinning. 20 miles of roads stored. Restore and enhance 4 miles of stream; thin 500 riparian acres and 3,500 upland acres. Remove 1 barrier culvert.
Saddle Lakes	KMRD	2016-2019	40 MMBF offered for sale. 8 miles of roads maintained; and 6 miles or road reconstructed. Restore and enhance 3 miles of stream. Remove or replace 28 barrier culverts.
Shrimp Bay	KMRD	2015-2018	10 MMBF offered for sale and 1,000 acres precommercial thin. 3 miles of roads maintained. Remove or replace 5 barrier culverts.
Kennel Creek	HRD	2015-2018	Restoration and Enhancement thinning. 4 miles of road maintained. Restore and enhance 0.5 miles of stream; thin 350 upland acres. Remove 4 barrier culverts.
Sitka Ranger District	SRD	2017-2019	Precommercial thin 400 acres. Watershed restoration including riparian thinning, instream work, and pond and road work.
Mitkof	PRD	2015	10 MMBF offered for sale.
Control Lake-Angel Wings	TBRD	2015	0.5 MMBF offered for sale.
Control Lake – Rush Firewood	TBRD	2015	0.2 MMBF offered for sale.
Navy	WRD	2015	10 MMBF offered for sale.
Elf Point	KMRD	2017	10 MMBF offered for sale.
Heceta	TBRD	2018	5 MMBF offered for sale.
Vallenar	KMRD	2019	20 MMBF offered for sale.
No Name Bay	PRD	2020+	70 MMBF offered for sale.
Frosty Bay	WRD	2020+	10 MMBF offered for sale.
Timber Harvest Activities – State and Private Lands			
Listed below, are the forecasted acres to be harvested and roads to be constructed during the next 25 years and during the next 100 years for each alternative. State and private harvests usually represent more intensive harvest and road development than for NFS lands; however, these sales will be governed by the Alaska Forest Resources and Practices Act which is designed primarily to protect fish habitat, water quality and promote rapid reforestation.			

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Projected Future Harvest and Road Construction and Reconstruction over 25 years for Each Alternative	Almost all State and Private Lands within the Tongass Boundary	2016 - 2040	<u>The vast majority of State and Private harvest will be old growth</u>: Alternative 1: Harvest = 67,954 acres Road Construction = 577 miles Road Reconstruction = 61 miles Alternative 2: Harvest = 67,954 acres Road Construction = 576 miles Road Reconstruction = 61 miles Alternative 3: Harvest = 67,954 acres Road Construction = 576 miles Road Reconstruction = 61 miles Alternative 4: Harvest = 67,954 acres Road Construction = 576 miles Road Reconstruction = 61 miles Alternative 5: Harvest = 67,954 acres Road Construction = 576 miles Road Reconstruction = 61 miles
Projected Future Harvest and Road Construction and Reconstruction over 100 years for Each Alternative	Almost all State and Private Lands within the Tongass Boundary	2016 - 2115	<u>The vast majority of State and Private harvest will be old growth</u>: Alternative 1: Harvest = 271,816 acres Road Construction = 2,308 miles Road Reconstruction = 245 miles Alternative 2: Harvest = 271,816 acres Road Construction = 2,303 miles Road Reconstruction = 245 miles Alternative 3: Harvest = 271,816 acres Road Construction = 2,303 miles Road Reconstruction = 245 miles Alternative 4: Harvest = 271,816 acres Road Construction = 2,304 miles Road Reconstruction = 245 miles Alternative 5: Harvest = 271,816 acres Road Construction = 2,305 miles Road Reconstruction = 245 miles
Listed below are specific timber sales that are being implemented or are in planning stages for the next 5 years. These are included within the 25-year and 100-year estimates above.			
Coffman Cove (State sale)	Prince of Wales Island	2015+	1,628 acre sale. 13.1MMBF. 5.8 mile of road. Approximately 412 acres of old growth timber with an estimated volume of 7,177 MBF will be sold in 2015.
South Thorne Bay Area (State sale)	Prince of Wales Island (Kasaan Peninsula)	2015+	153 acre sale. 3.0MMBF(Active)
North Thorne Bay (State sale)	Prince of Wales Island (Thorne Bay)	2015+	5.8MMBF

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
North Hollis (State sale)	Prince of Wales Island (Hollis)	2015+	263 acres of old growth; 108 acres of young growth. 5.3 MMBF old growth; 2.2 MMBF young growth.
Kosciusko Island (State sale)	Kosciusko Island (Prince of Wales)	2015, 2016	1,383-acre sale; 28 MMBF. New sort LTF and sort yard.
Heceta (State sale)	Heceta Island (Prince of Wales)	2015, 2016	30 MMBF. (10 MMBF old growth, 20 MMBF young growth)
El Capitan (State sale)	Prince of Wales Island	2016	1,700 acres; 5 miles of new road. 17 MMBF
Whale Pass (State sale)	Prince of Wales Island	2016	441 acres; 2 miles new road; 6.6 MMBF
Exchange Cove (State sale)	Prince of Wales Island	2016	116 acres.1.2 MMBF
Bostwick Bay (State sale)	Gravena Island (Ketchikan)	2017	583 acres. 5 miles new road. Road to cross Bostwick Creek. 8.9MMBF
Vallenar (State sale)	Gravena Island (Ketchikan)	2017	300 acres old growth. 300 acres young growth. 12 MMBF. 8 miles new road; 1.5 mile reconstructed road.
Little Coal Bay (State sale)	Prince of Wales (Kasaan Bay)	2017	1,000 acres. 5.2 MMBF
Kitkun Bay (State sale)	Prince of Wales (Cholmondeley Sound)	2017	1,051 acres.
Port Dolores (State sale)	Prince of Wales (Sumez Island)	2018	12.2 MMBF Old Growth; 3.8 MMBF young growth. 1,109 acres. 4.7 miles of new road on state land. 1,500 feet of new road on NFS land.
Hook Arm (State sale)	Dall Island	2018	960 acres. 11.5MMBF. 4.4 miles new road.
Naukati (State sale)	Prince of Wales (Naukati)	2018	162 acres. 3.7MMBF. Short spur roads.
Control Lake (State sale)	Prince of Wales (Control Lake)	2018	170 acres 3.4MMBF. 1.4 miles new road.
Mitkof Island (State sale)	Mitkof Island (Petersburg)	2019	210 acres; 4.0 MMBF
Thomas Bay (State sale)	Thomas Bay (Petersburg)	2019	816 acres; 20.2 MMBF (4.9 MMBF old growth; 15.3 MMBF young growth). 3.7 miles new road; 1.7 Miles road reconstructed.
Earl West Cove (State sale)	Wrangell Island	2019	700 acres; 12.5 MMBF; 5.0 miles new road
Leask Cove (State sale)	Revillagigedo Island (George Inlet)	2019	316 acres; 6.3 MMBF; 1.8 mile spur road
Other State Sales	Variable	2015 and beyond	Right-of-way sales; blowdown sales; sales less than 10 acres. Five to 10 small sales totaling approximately 2.0 MMBF of timber will be offered for Calendar Year 2015.

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Alaska Mental Health Trust Commercial Forestlands	Variable	2015 and beyond	The Alaska Mental Health Trust Land Office is comparable to a private forestland manager. Approximately 265 million board feet of the Trust's commercial forestland lies in southeast Alaska. A large portion of this forestland is community and environmentally sensitive. The Trust will be looking at these sensitivities in more detail in the future. The Trust Land Office is currently overseeing one large timber sale contract near Icy Cape (18,000 acres). To better understand the forestland assets owned by the Trust, forest resource inventory work is currently underway in the vicinity of Wrangell and Thorne Bay.
Sealaska and other Alaska Native Corporations	Native Corporation Lands	2015 and beyond	Projected harvest of 6.2 MMBF in 2016 increasing annually to 7.2 MMBF by 2030.
Land Adjustments			
Alaska Mental Health Trust land exchange	Ketchikan, Petersburg, Wrangell, Sitka, Juneau, Myers Chuck, Naukati, and Hollis, Alaska	2015-2020 or later	The Alaska Mental Health Trust is working the Tongass National Forest on a land exchange proposal involving 18,000 acres of Non-Federal lands in scenic viewsheds and approximately 20,000 acres of Federal timber production lands across eight separate remote communities in Southeast Alaska. In order to better align land ownership patterns with the inherent missions of both the Forest Service and the Alaska Mental health Trust Authority. An equal value land exchange has been proposed. A feasibility Analysis was completed in 2015, and both parties have signed an Agreement to Initiate.
Remaining land conveyances due to the Alaska Statehood Act	Tongass-wide	2015-2025 or later	The State of Alaska was granted and entitled to select up to 400,000 of National Forest Lands in Alaska for the purpose of furthering the development of and expansion of communities under the Alaska Statehood Act (43 CFR 2627.1(a)) On the Tongass National Forest, the State of Alaska has approximately 12,145 acres remaining of land entitlement under the Act. The adjudication process and conveyances are initiated by the Bureau of Land Management, Alaska State Office.
Cube Cove land acquisition	Admiralty Island	2016 or later	The 22,890 acres surface estate within the Admiralty Island National Monument and Kootznoowoo Wilderness would be purchased from Shee Atiká, Inc. The purpose of this acquisition is to conserve and enhance significant scenic, recreation, cultural and wildlife/plant resources within National Monument/Wilderness and to protect wilderness values from development.
Sealaska Land Entitlement Finalization Act	Tongass-wide	2015-2017	Within 2 years of enactment of the "Carl Levin and Howard P. 'Buck' McKeon national Defense Authorization Act for Fiscal Year 2015", Sealaska may submit applications for the conveyance under section 14(h)(1)(A) of the Alaska Native Claims Settlement Act (43 U.S.C. 1613(h)(1)(A)) of not more than 76 cemetery sites and historical places, amounting to approximately 500 acres.

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Alaska Veteran Native Allotment Land Equity Act	Tongass-wide	Not scheduled	The proposed legislation is specific to National Forest Lands in Alaska, but includes a clause regarding approval of formerly rejected Native Allotment Cases under the "Shields v. USA" case. The Shields case closed 200 Native allotment cases under 1906 Native Allotment Act which were applied for under ancestral uses v. individual use and occupancy. Most Shield's cases were previously identified on the Tongass. Native Allotment applications are 160 acres each and thus approximately up to 32,000 acres of the Tongass that could become private lands in the future. This legislation was introduced in May 2015 and has not become law.
Unrecognized Southeast Alaska Native Communities Recognition and Compensation Act	Native Villages of Haines, Ketchikan, Petersburg, Tenakee, and Wrangell	Not scheduled	The proposed legislation would amend the Alaska Native Claims Settlement Act to permit the Native residents of each of the Native Villages of Haines, Ketchikan, Petersburg, Tenakee, and Wrangell, Alaska, to organize as Urban Corporations and to receive certain settlement land pursuant to this Act. The entitlement would consist of one township of land or 23,040 acres (Total Approximate Acres= 184,320) and require the conveyance of all roads, trails, log transfer sites, leases, and appurtenances on or related to the land conveyed to the new urban corporations. This legislation was introduced in May 2015 and has not become law.
Alaska State Forest Proposal	Prince of Wales Island	Not scheduled	State officials or interests have at times advocated the establishment of an additional Alaska State Forest to be managed to provide income for state government programs. One concept for such a management unit was for a 2-million-acre area on or near Prince of Wales Island, which would require transfer of extensive areas of current Tongass NFS lands to the State. To date, no federal legislation to implement such a proposal has been introduced in Congress and this action is not considered reasonably foreseeable.
Alaska Native Allotment Act conveyances	Tongass-wide	Unknown	The Alaska Native Allotment Act provided for Native individuals who had occupied lands prior to their designation as national forest to apply for conveyance of up to 160 acres, under conditions prescribed by the Act and federal regulations. As of August 2015, about 45 Native allotment cases remain on the Tongass National Forest and are pending adjudication by the Bureau of Land Management. This number may increase due to unknown circumstances by either quite title action, re-instatement applications, or new legislation proposals.
Mining (Tongass)			
Greens Creek Mine (Active)	Admiralty Island (Juneau)	Present – 2025 or beyond	Underground polymetalic mine. Ore is processed on site and exported by sea. Waste water, waste rock and tailings are managed onsite. Power is provided by line (AEL&P) and diesel generators. Green Creek Land Exchange Act allows mining to continue through 2095. Annually, the mine continues exploration in and around the mine.
Kensington Mine (Active)	Juneau	Present-2025 or beyond	Underground gold mine. Waste water, waste rock and tailings are managed onsite. Power is provided diesel generators. Annually, the mine continues exploration in and around the mine.
Bokan Mountain	Prince of Wales (Kendrick Bay)	Unknown	Bokan Mountain is a potential rare earth mine. Developers estimate 190 employees. It would be powered by LNG generators.
Niblack	Prince of Wales (Moira	Unknown	Niblack Project is a potential polymetalic mine. Developers estimate 200 employees.

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
	Sound)		
Other Locatable Minerals	Tongass-wide	Continual	Mining exploration is expected to continue in many areas of the Forest. Existing projects submit annual operating plans that describe exploration activities.
Mineral Materials	Various	Continual	New and existing mineral materials sources will be developed. Stone, crushed rock, gravel and other saleable materials will be used for road building and maintenance and other purposes. Materials may be used in-service (by the Forest Service) or sold to private parties.
Mining (Canada)			
Kerr-Sulphurets-Mitchell	Unuk River watershed		Seabridge Gold proposes to reopen this polymetallic mine in northwest British Columbia about 18 miles east of the Alaska/B.C. border. These deposits would be mined as open pits until later in the project when the Mitchell deposit would continue as an underground mine.
Red Chris	Stikine River Watershed	2015-2045	Imperial Metals recently opened the Red Chris copper/gold mine in northwest British Columbia.
Tulsequah Chief	Taku River Watershed		Chieftan Metals Inc. seeks to open this underground polymetallic mine in northwest British Columbia about 40 miles northeast of Juneau.
Energy			
Kake-Petersburg Intertie	Mitkof and Kupreanof Islands	2016 and beyond	The Southeast Alaska Power Agency (SEAPA) proposes to build a new electric transmission line that would connect the isolated electric system presently serving the city of Kake with SEAPA's interconnected electric network, in or near Petersburg. The proposed action alternatives range from 52 miles to 60 miles in total length, with 82 percent to 88 percent of their total length located on NFS lands. The proposed transmission line would be built to transmit power at either 69 - or 138 – kilovolts. All three action alternatives follow existing NFS system roads to the extent possible, with the length along existing roads ranging from 58 percent to 72 percent of the total. The action alternatives all cross Inventoried Roadless Areas. No new roads would be built under any of the alternatives. Construction access in unroaded areas would be via temporary shovel trail s and matting panels, with helicopter support, as needed. The action alternatives would all involve marine crossings.
Bell Island Geothermal	KMRD	Unknown	No specific projects are proposed at this time, although SEAPA is conducting preliminary investigations for geothermal power generation.
Angoon Thayer Creek Hydroelectric	Admiralty Island (Angoon)	Unknown	Kootznoowoo, Inc. proposes to construct a 1 MW run of river hydroelectric facility on Thayer Creek. The project includes a 10-foot diversion dam, 10- to 20-acre impoundment above the dam, 1.2-mile penstock, powerhouse, underground transmission lines, and access roads
Sweetheart Lake Hydroelectric	JRD	Unknown	Juneau Hydropower, Inc. proposes to construct the 20 MW hydroelectric project that includes a 111-foot tall dam, 1,700 acre reservoir, 9,621-foot tunnel, powerhouse, tailrace. Occupy 2,058 acres of NFS land 36 acre wetland loss Anadromous fish below damn, but not reaching dam. Concern over sediment supply (decrease) to anadromous reach. Does not meet SIO for semi-remote LUD.

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Soulé River Hydroelectric	Hyder (KMRD)	Unknown	Soulé Hydro, LLC proposes to construct the 77.4 MW project on the Soulé River near Hyder. The project would include a 265-foot tall dam, intake structure, 1,072 acre reservoir, 3.1 mile access road; a bridge over the Soule River, powerhouse, tailrace, substations, marine access, and a submarine cable to Stewart, B.C. Fish: (non-anadromous river. DV present but dam at natural barrier) Wildlife. Bears, beavers Inconsistent with remove recreation LUD Will implement invasive species management plant Would implement wildlife mitigation and monitoring plan; bear safety plan
Swan Lake expansion	KMRD	2016-2017	SEAPA intends to expand the Swan Lake Reservoir near Ketchikan. The expansion would raise the spill elevation 15 feet and add 25% additional storage for winter hydropower generation, displacing up to 12,000 MWhrs of diesel generation (800,000 gallons) annually.
Crooked Creek/Jim's Lake	Elfin Cove	Unknown	The community of Elfin Cove proposes to develop a 672 GW hydroelectric facility. The project includes a 4-foot tall diversion structure, 1,450-foot long penstock, powerhouse, tailrace, and underground transmission line.
Indian River/Tenakee Springs	Tenakee Springs	2016-2018	The community of Tenakee Springs proposes to develop a 180 KW run-of-river hydroelectric project on Indian River. The Project will supply approximately 90% of the city's electricity, reducing diesel use by about 31,400 gallons annually.
Other Renewable Energy Projects	Varies	Unknown	A variety of energy projects could be developed across the Forest. These could include additional hydropower projects or other generation types, such as wind, tidal, or geothermal. The Energy Resource Report, available in the project record, identifies addition projects that could be proposed in the future.
Communication Sites			
Existing and Future Communications Sites	Tongass-wide	Present and continuing	Sites approved for telecommunication facilities are characterized by antennas, electronic transmitters, equipment shelters, and a wide variety of electronic communication support equipment. Proposals for new communications uses on the Tongass National Forest will be encouraged to co-locate on an approved communications site, unless the proponent demonstrates that communication sites approved in the Forest Plan are not technically feasible due to geographic location, or are incompatible with the requested use. Currently, there are about 80 approved communication sites on the Tongass.
Transportation			
Regional Transportation Systems	Tongass-wide	2015 and continuing	The State of Alaska will continue to maintain and improve its regional transportation system including road and marine systems.
Angoon Airport	Angoon	Est. 2016	The Alaska Department of Transportation and Public Facilities proposed a land-based airport for Angoon. The proposed location is on private lands. Two alternative airport locations being considered are within the Admiralty Island National Monument and Kootznoowoo Wilderness.
Clark Bay Ferry Terminal Parking Expansion	Hollis (Prince of Wales)	Est. 2016	The Alaska Department of Transportation and Public Facilities intends to expand the existing parking area at the Clark Bay (Hollis) ferry terminal by about 50 parking spaces.

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
Juneau Access	Juneau/Haines	2016 or later	Extend Glacier Highway/State Route 7 northward from its current terminus to the north side of the Katzehin River delta, in a series of stages, per the preferred alternative in the Final Environmental Impact Statement (EIS) and construct terminal near Katzehin River.
Gravina Access	Gravina and Revillagigedo Islands	2016 or later	Design and construct improved access to Gravina Island
Ketchikan-Shelter Cove Road	Ketchikan to Shelter Cove	2015??	Construct between 9 and 10 miles of new, single lane, unpaved roadway and bridges and upgrade between 10 and 19 miles of existing logging roads to connect Revilla Road near Ketchikan to the USFS Road system at Shelter Cove on Carroll Inlet. Project provides Ketchikan residents increased access for recreational and subsistence activities. Project will also facilitate resource development along the new roadway corridor and in the Shelter Cove area. Approximately 1.61 miles of road would be routed through wetlands or other jurisdictional waters of the United States, while the other 5.68 miles would be routed through uplands. In the long term, the project is an identified road segment supporting implementation of the 2004 Southeast Alaska Transportation Plan by providing Ketchikan with access from the northern end of Revillagigedo Island to connect with future links to the North American Highway system via the Bradfield Canal and Cassiar Highway in Canada
Naukati Bay Road	Naukati (Prince of Wales)	2015?	Upgrade and pave Naukati West Access Road to a two lane road between the North POW Road and the Naukati Seaplane Float.
Sitka-Katlian Bay Road	Sitka	2016 and beyond	This project will provide access to public lands at the head of Katlian Bay from the end of Halibut Point Road near Starrigavan Bay. The approximate 9 mile single lane road will provide access for recreational activities on USFS lands beyond the private lands in Katlian Bay. The road could also provide access to a material source for development purposes in Sitka.
Kake-Access	Kake (Kupreanof Island)	unknown	Construct approximately 27 miles of new single lane, unpaved roadway and bridges and improve approximately 26 miles of existing logging roads on the north end of Kupreanof Island to provide Kake road access to Petersburg via a short shuttle ferry link. The very low volume road is intended to improve Kake's surface transportation access to Petersburg, the regional transportation system.
Sandy Beach Road	Thorne Bay (Prince of Wales Island)	2015?	Reconstruct and realign FSR30 from the intersection of Freeman Drive MP 0.0 in Thorne Bay to MP 0.5 at the City of Thorne Bay's Bypass Loop Rd and city limits. This is the first phase of the fully designed 6.58 miles of trails and roadwork to the Sandy Beach
Alaska Marine Highway and Interisland ferry	Southeast Alaska (non-NFS)	2016 and beyond	Construction of new passenger terminal buildings and other improvements in Angoon and Kake (2015); various marine terminal improvements in Ketchikan, Skagway, Gustavus, Sitka, Juneau, Tenakee Springs, and Haines (2015); maintenance and refurbishment of vessels
Other Transportation Projects	Southeast Alaska (NFS and non-NFS)	2016 and beyond	Annually, the Forest Service will conduct many smaller transportation projects which will vary year to year based on funding and need. These include maintaining or improving existing roads and bridges, placing roads in storage, paving existing dirt roads, and improving fish passage at culverts. The State and local communities will also implement

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
			various transportation projects such as paving or resurfacing roads, road realignments, safety improvements, vessel and marine terminal improvements, etc.
Recreation and Tourism			
Cruise Ships	Tongass-wide	2015 and beyond	Expected growth in recreation and tourism businesses based on continued growth in the cruise ship industry
Outfitter Guides	Tongass-wide	2015 and beyond	Outfitter guide services may include guided hunts or trapping, camping, fishing, cross country skiing, hiking or other commercial recreational activities. Outfitter and guide services are generally provided within ½-mile inland of the shoreline but may extend further for some activities (e.g. goat hunting, canoeing, freshwater fishing). The Forest Service is currently evaluating the amount of outfitter guide use in a separate analysis with the goal of maintaining high quality commercial and non-commercial recreation experiences without degrading forest resources and in balance with other uses.
Helicopter Landings and Tours	Mostly the JRD	2015 and beyond	About 17,000 landings occur on the Juneau Icefield for tours and activities annually (based on 2004-2007 data), which accounts for about 75% of the helicopter tours/landings in Southeast Alaska. Helicopter landing tours also occur in a number of locations elsewhere on the Forest, including the Skagway Icefield and Baird Patterson Glaciers. This action is likely to grow in the future if the Forest Service allows it.
Dispersed Recreation and Subsistence Gathering	Tongass-wide	2015 and beyond	There increasing recreational demand as the tourism industry continues to grow and increasing recreation around communities with population growth. Gathering of subsistence resources is also expected to increase, although more slowly than recreation, with the growth of subsistence communities.
Fishing and Recreation Lodges	Tongass-wide	2015 and beyond	Numerous lodges occur on private lands adjacent to the Tongass. It is expected that most of these lodges will continue to operate, and new lodges will be opened, providing additional recreational opportunities.
Recreation site development and closure	Tongass-wide	2015 and beyond	Continued use, maintenance and improvement of existing developed recreation sites (e.g., cabins, campgrounds, visitor centers, trails, and viewing areas, and other facilities) and creation of new sites are expected to occur. Similarly, the State or communities may develop, improve, or modify recreation sites.
Communities			
Population changes	Tongass-wide	Ongoing	Human settlement expansion is expected to occur around the region's larger cities, such as Juneau and Sitka, with residential expansion also expected as a result of state land auctions.
State land Offerings	Tongass-wide	Ongoing	The State periodically offers land for settlement and development. Often, these lands are adjacent to NFS lands. No NFS lands are included in these State land offerings.
POW Borough	Prince of Wales Island	unknown	The Prince of Wales Community Advisory Council is investigating the formation of a Prince of Wales Borough. (speculative)
Wildlife			
Pre-commercial thinning		2016 and beyond	The Tongass Integrated Plan provides details on planned precommercial thinning projects that would benefit wildlife. A summary of acres by Ranger district is below. HRD: About

Table C-2 (continued)
Present and Reasonably Foreseeable Actions and Projects Considered in Cumulative Effects Analyses

Present/Reasonably Foreseeable Actions	Location	Year(s)	Description
			2,270 acres; JRD: About 640 acres (Couverden); KMRD: About 2,780 acres; PRD: About 3,890 acres; TBRD: About 6,000 acres (Big Thorne Stewardship); WRD: About 1,460 acres.
Mitkof Island Deer Habitat Enhancement	Petersburg Ranger District	2016	Treat up to 1,114 acres of young-growth stands to benefit deer.
Sport and Subsistence Harvest	Tongass-wide	2016 and beyond	Sport and subsistence harvests will continue throughout the forest. Prediction of the future extent and intensity of such activities has a high degree of uncertainty associated with it on a Forest-wide basis over a broad time scale.
Watershed Restoration			
Restoration Projects	Tongass-wide	2016 and beyond	Annually, the Forest Service will conduct watershed improvement projects including: watershed monitoring and assessments; instream and riparian rehabilitation; placement of large woody debris in streams; conducting landslide assessments; improving fish passage in streams (creating jump pools, barrier modifications, culvert replacements); decommissioning roads; and maintain fish passage structures. The number of locations and number of projects will vary year to year based on funding and need.

Appendix C

Table C-3
Interactions Between Resources and Actions or Projects

Actions or Projects	Climate and Air	Geology/Karst	Soils	Water	Wetlands	Fish	Plants	Forest Health	Biodiversity	Wildlife	Lands	Timber	Transportation	Energy/Utility Lines	Minerals	Recreation/ Tourism	Scenery	Subsistence	Heritage	Roadless	Wilderness	Socioeconomic	Communities
PAST ACTIONS																							
Climate Change and Natural Processes																							
Climate Change - General	x								x	x													
Yellow Cedar Decline								x	x			x											
Fire	x							x	x			x											
Insects and Disease								x	x			x											
Windthrow								x	x			x											
Watershed Effects				x		x			x	x													
Timber Harvest Activities																							
Past Harvest - NFS		x		x	x	x	x		x	x		x				x	x	x	x	x		x	x
Past Harvest – non-NFS		x		x	x	x	x		x	x		x				x	x	x	x	x		x	x
Past Road Construction/Use		x		x	x	x	x		x	x		x	x			x	x	x	x	x		x	x
Past LTF Construction/Use				x	x	x	x		x	x						x	x	x	x	x		x	x
Land Adjustments																							
Misty Fjords National Monument Wilderness Inholdings (2012)											x										x		
Public Law 113-291		x		x		x	x		x	x	x	x	x	x	x	x	x	x	x	x		x	x
Boomer Land Swap									x	x	x												
Other land adjustments				x		x			x	x	x	x					x			x		x	x
Mining																							
Various Mines		x	x	x	x	x	x		x	x		x			x	x	x						
Recreation and Tourism																							
Cruise Ships	x									x						x					x	x	x
Outfitter Guides										x						x					x	x	
Helicopter Landings and Tours										x						x					x	x	x
Dispersed Recreation and Subsistence Gathering						x	x		x	x						x		x					
Fishing and Recreation Lodges						x	x		x	x		x				x	x		x			x	
Recreation site development and closure						x	x		x	x		x				x	x		x			x	

Table C-3 (continued)
Interactions Between Resources and Actions or Projects

Actions or Projects	Climate and Air	Geology/Karst	Soils	Water	Wetlands	Fish	Plants	Forest Health	Biodiversity	Wildlife	Lands	Timber	Transportation	Energy/Utility Lines	Minerals	Recreation/ Tourism	Scenery	Subsistence	Heritage	Roadless	Wilderness	Socioeconomic	Communities
Community Development																							
Community Development									x	x	x		x	x		x	x	x	x			x	x
Wildlife Habitat Enhancement and Regulatory Actions																							
Habitat Enhancement					x	x	x		x	x								x					
State Hunting/Trapping and Federal Subsistence Regulations										x								x					
Watershed and Aquatic Habitat Improvement and Aquatic Regulatory Actions																							
Restoration Projects				x	x	x												x					
State Fishing and Federal Subsistence Regulations					x	x												x					
PRESENT AND REASONABLY FORESEEABLE ACTIONS																							
Climate Change and Natural Processes																							
General – Climate Change	x			x		x		x	x	x		x		x		x						x	x
Yellow Cedar Decline								x	x			x											
Fire	x							x	x			x											
Insects and Disease								x	x			x											
Windthrow Events								x	x			x											
Watershed Effects				x		x			x	x													
Timber Harvest Activities																							
Future Harvest - NFS		x		x	x	x	x		x	x		x				x	x	x	x	x		x	x
Future Harvest – non-NFS		x		x	x	x	x		x	x		x				x	x	x	x	x		x	x
Future Road Construction/Use		x		x	x	x	x		x	x		x	x			x	x	x	x	x		x	x
Future LTF Construction/Use				x	x	x	x		x	x						x	x	x	x	x		x	x
Land Adjustments																							
Land Adjustments		x		x		x	x		x	x	x	x	x	x	x	x	x	x	x	x		x	x
Mining																							
Various Mines		x	x	x	x	x	x		x	x		x			x	x	x						
Energy																							
Hydroelectric Projects	x		x	x	x	x	x		x	x		x	x	x		x	x		x	x		x	x
Other Renewable Energy Projects	x		x	x	x	x	x		x	x		x	x	x		x	x		x	x		x	x

Table C-3 (continued)
Interactions Between Resources and Actions or Projects

Actions or Projects	Climate and Air	Geology/Karst	Soils	Water	Wetlands	Fish	Plants	Forest Health	Biodiversity	Wildlife	Lands	Timber	Transportation	Energy/Utility Lines	Minerals	Recreation/ Tourism	Scenery	Subsistence	Heritage	Roadless	Wilderness	Socioeconomic	Communities
Transmission Lines			x	x	x	x	x		x	x		x	x	x		x	x		x	x		x	x
Communication Sites																							
Existing & Future Communications Sites							x		x	x				x			x		x				
Transportation																							
Regional Transportation Systems	x	x	x	x	x	x	x		x	x			x	x		x	x	x	x			x	x
Local Transportation Systems	x	x	x	x	x	x	x		x	x			x	x		x	x	x	x			x	x
Alaska Marine Highway & Interisland Ferry	x					x				x			x			x						x	x
Recreation and Tourism																							
Recreation Developments/Actions	x					x	x		x	x		x				x	x	x	x		x	x	x
Communities																							
Community Expansion/Development	x		x	x	x	x	x		x	x	x		x	x		x	x	x	x			x	x
Wildlife																							
Pre-commercial thinning & habitat enhancement							x		x	x		x						x					
Sport and Subsistence Harvests										x								x					
Watershed Restoration																							
Restoration Projects			x	x	x	x	x		x	x													

Attachment 1

Catalogue of Past Harvest

CONTENTS

TABLES

Attachment 1
Catalogue of Past Harvest

Introduction

This appendix presents a catalogue of past harvest for Southeast Alaska. It is based on updated and extensive mapping of past harvest based on the Tongass GIS library, GIS data layers provided by Sealaska Regional Native Corporation, the State of Alaska, and Audubon Alaska/The Nature Conservancy, as well as supplemental interpretation of orthophotography and other aerial photography. It is also based on tabular information collected from the State of Alaska, Department of Natural Resources regarding state harvests and harvests under the Alaska Forest Resources and Practices Act. Appendix B provides more detailed information on the inventory methodology.

Part II presents a tabular summary of information provided by the State of Alaska Department of Natural Resources, Division of Forestry.

Part I – Acreage of Past Harvest by Ownership Category, by Landowner, by Biogeographic Province, by Approximate Decade

Table I-1
Acreage of Past Harvest by Landowner

Ownership Category	Landowner	Est. Approx. Harvest Decade	Acres Harvested
Yakutat Forelands Biogeographic Province			
Tongass National Forest	Tongass National Forest	1950s	28
	Tongass National Forest	1970s	553
	Tongass National Forest	1980s	1,812
	Tongass National Forest	1990s	229
	Tongass National Forest	2000s	987
	Tongass National Forest	--	18
	Total NFS Lands		**3,627**
State of Alaska	State of Alaska	1970s–1990s	1,315
	Total State Lands		**1,315**
	Yak-tat Kwaan Village Corporation	1980s	12,541
	Other	--	134
Private & Other Lands	**Total Private/Other Lands**		**12,675**
	TOTAL PROVINCE HARVEST		**17,618**
Yakutat Uplands Biogeographic Province			
Tongass National Forest	Tongass National Forest	1980s	665
	Tongass National Forest	1990s	173
	Tongass National Forest	2000s	552
	Tongass National Forest	--	21
	Total NFS Lands		**1,411**
State of Alaska	**Total State Lands**		0
Private & Other Lands	**Total Private/Other Lands**		0
	TOTAL PROVINCE HARVEST		**1,411**

Appendix C

Table I-1
Acreage of Past Harvest by Landowner

Ownership Category	Landowner	Est. Approx. Harvest Decade	Acres Harvested
East Chichagof Island Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	1,016
	Tongass National Forest	1950s	1,527
	Tongass National Forest	1960s	6,053
	Tongass National Forest	1970s	13,232
	Tongass National Forest	1980s	10,501
	Tongass National Forest	1990s	11,713
	Tongass National Forest	2000s	60
	Tongass National Forest	--	105
	Total NFS Lands		**44,207**
State of Alaska	State of Alaska	1980s	200
	State of Alaska	1990s	227
	State of Alaska	2000s	70
	Total State Lands		**497**
Private & Other Lands	Hoonah	--	252
	Huna Totem Village Corporation	--	11,449
	Sealaska Regional Corporation	1970s	1,352
	Sealaska Regional Corporation	1980s	7,670
	Sealaska Regional Corporation	1990s	6,400
	Sealaska Regional Corporation	2000s	6,825
	Other Private Owners	--	81
	Total Private/Other Lands		**37,007**
	TOTAL PROVINCE HARVEST		**81,711**
West Chichagof Island Biogeographic Province			
Tongass National Forest	**Total NFS Lands**		**0**
State of Alaska	**Total State Lands**		**0**
Private & Other Lands	**Total Private/Other Lands**		**0**
	TOTAL PROVINCE HARVEST		**0**
East Baranof Island Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	197
	Tongass National Forest	1950s	223
	Tongass National Forest	1960s	8,158
	Tongass National Forest	1970s	2,725
	Tongass National Forest	1990s	2,227
	Total NFS Lands		**13,530**
State of Alaska	**Total State Lands**		**0**
Private & Other Lands	Other Private Land Owners	--	2
	Total Private/Other Lands		**2**
	TOTAL PROVINCE HARVEST		**13,532**
West Baranof Island Biogeographic Province			
Tongass National Forest	Tongass National Forest	1950s	1,085
	Tongass National Forest	1960s	9,812
	Tongass National Forest	1970s	5,556
	Tongass National Forest	1980s	10
	Total NFS Lands		**16,978**
State of Alaska	State of Alaska	1980s	696
	State of Alaska	1990s	204
	Total State Lands		**900**
Private & Other Lands	Shee Atika Village Corporation	1980s	1,184

Table I-1
Acreage of Past Harvest by Landowner

Ownership Category	Landowner	Est. Approx. Harvest Decade	Acres Harvested
	Other Private Owners	--	271
	Total Private/Other Lands		**1,455**
	TOTAL PROVINCE HARVEST		**19,332**
Admiralty Island Biogeographic Province			
Tongass National Forest	Tongass National Forest	Prior to 1950	3,202
	Tongass National Forest	1950s	771
	Tongass National Forest	1960s	3,305
	Tongass National Forest	1970s	1,108
	Tongass National Forest	1990s	17
	Tongass National Forest	2000s	105
	Tongass National Forest	--	88
	Total NFS Lands		**8,595**
State of Alaska	**Total State Lands**		**0**
Private & Other Lands	Shee Atika Village Corporation	1980s–1990s	20,080
	Other Private Owners	--	110
	Total Private/Other Lands		**20,190**
	TOTAL PROVINCE HARVEST		**28,785**
Lynn Canal Biogeographic Province			
Tongass National Forest	Tongass National Forest	1960s	2,129
	Tongass National Forest	1970s	1,177
	Tongass National Forest	1980s	545
	Tongass National Forest	1990s	1,527
	Total NFS Lands		**5,377**
State of Alaska	State of Alaska	1980s	214
	Total State Lands		**214**
Private & Other Lands	Other Private Owners	1990s	335
	Total Private/Other Lands		**335**
	TOTAL PROVINCE HARVEST		**5,926**
North Coast Range Biogeographic Province			
Tongass National Forest	Tongass National Forest	1950s	221
	Total NFS Lands		**221**
State of Alaska	State of Alaska	--	24
	Total State Lands		**24**
Private & Other Lands	Goldbelt Village Corporation	1980s	20,389
	City and Borough of Juneau	--	1
	Other Land Owners	--	147
	Total Private/Other Lands		**20,537**
	TOTAL PROVINCE HARVEST		**20,782**
Kupreanof/Mitkof Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	1,573
	Tongass National Forest	1950s	1,096
	Tongass National Forest	1960s	6,781
	Tongass National Forest	1970s	10,183
	Tongass National Forest	1980s	8,335
	Tongass National Forest	1990s	5,539
	Tongass National Forest	2000s	2,234
	Total NFS Lands		**35,742**
State of Alaska	State of Alaska	1980s	3,648
	State of Alaska	1990s	884

Appendix C

Table I-1
Acreage of Past Harvest by Landowner

Ownership Category	Landowner	Est. Approx. Harvest Decade	Acres Harvested
	State of Alaska	2000s	54
	Total State Lands		**4,587**
Private & Other Lands	Kake	--	126
	Petersburg	--	484
	Kake Village Corporation	1970s–1990s	17,471
	Sealaska Regional Corporation	<1980	3,755
	Sealaska Regional Corporation	1980s	1,831
	Sealaska Regional Corporation	1990s	551
	Sealaska Regional Corporation	2000s	6,009
	Other Private Owners	--	823
	Total Private/Other Lands		**31,050**
	TOTAL PROVINCE HARVEST		**71,379**
Kuiu Island Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	2,570
	Tongass National Forest	1950s	344
	Tongass National Forest	1960s	3,428
	Tongass National Forest	1970s	8,989
	Tongass National Forest	1980s	7,852
	Tongass National Forest	1990s	4,644
	Tongass National Forest	2000s	667
	Total NFS Lands		**28,494**
State of Alaska	State of Alaska	--	9
	Total State Lands		**9**
Private & Other Lands	Sealaska Regional Corporation	<1980	22
	Other Private Owners	--	113
	Total Private/Other Lands		**135**
	TOTAL PROVINCE HARVEST		**28,638**
Central Coast Range Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	159
	Tongass National Forest	1950s	910
	Tongass National Forest	1960s	3,574
	Tongass National Forest	1970s	1,087
	Tongass National Forest	1980s	164
	Tongass National Forest	1990s	586
	Total NFS Lands		**6,479**
State of Alaska	State of Alaska	1970s–1980s	1,421
	Total State Lands		**1,421**
Private & Other Lands	Other Land Owners	--	13
	Total Private/Other Lands		**13**
	TOTAL PROVINCE HARVEST		**7,913**
Etolin Island and Vicinity Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	2,565
	Tongass National Forest	1950s	1,728
	Tongass National Forest	1960s	2,593
	Tongass National Forest	1970s	12,666
	Tongass National Forest	1980s	8,964
	Tongass National Forest	1990s	6,532
	Tongass National Forest	2000s	1,016
	Tongass National Forest	--	4

Table I-1
Acreage of Past Harvest by Landowner

Ownership Category	Landowner	Est. Approx. Harvest Decade	Acres Harvested
	Total NFS Lands		**36,066**
State of Alaska	State of Alaska		3,764
	Total State Lands		**3,764**
Private & Other Lands	Wrangell		643
	Other Land Owners		68
	Total Private/Other Lands		**712**
	TOTAL PROVINCE HARVEST		**40,542**
North Central Prince of Wales Island Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	1,772
	Tongass National Forest	1950s	11,460
	Tongass National Forest	1960s	50,216
	Tongass National Forest	1970s	47,190
	Tongass National Forest	1980s	35,623
	Tongass National Forest	1990s	33,507
	Tongass National Forest	2000s	4,343
	Tongass National Forest	--	15
	Total NFS Lands		**184,125**
State of Alaska	State of Alaska	--	15,384
	Total State Lands		**15,384**
Private & Other Lands	Hydaburg	--	48
	Kasaan	--	16
	Thorne Bay	--	180
	Haida Village Corporation	1980s–1990s	2,465
	Kavilco Village Corporation	1990s	11,811
	Klawock-Heenya Village Corporation	1980s–1990s	12,073
	Sealaska Regional Corporation	<1980	3,240
	Sealaska Regional Corporation	1980s	32,741
	Sealaska Regional Corporation	1990s	24,452
	Sealaska Regional Corporation	2000s	22,835
	Shaan Seet Village Corporation	1980s–1990s	6,858
	Other Private Land Owners	--	3,304
	Total Private/Other Lands		**120,022**
	TOTAL PROVINCE HARVEST		**319,531**
Revilla Island/Cleveland Peninsula Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	2,181
	Tongass National Forest	1950s	6,812
	Tongass National Forest	1960s	6,389
	Tongass National Forest	1970s	8,443
	Tongass National Forest	1980s	5,827
	Tongass National Forest	1990s	11,477
	Tongass National Forest	2000s	4,470
	Tongass National Forest	--	60
	Total NFS Lands		**45,658**
State of Alaska	State of Alaska		4,043
	Total State Lands		**4,043**
Private & Other Lands	Ketchikan	--	39
	Sealaska Regional Corporation	<1980	151
	Cape Fox Village Corporation	1980s–1990s	13,266
	Other Land Owners	1980s–1990s	7,406

Appendix C

Table I-1
Acreage of Past Harvest by Landowner

Ownership Category	Landowner	Est. Approx. Harvest Decade	Acres Harvested
	Total Private/Other Lands		**20,862**
	TOTAL PROVINCE HARVEST		**70,563**
Southern Outer Islands Biogeographic Province			
Tongass National Forest	Tongass National Forest	1950s	569
	Tongass National Forest	1960s	3,737
	Tongass National Forest	1970s	3,058
	Tongass National Forest	1980s	5,737
	Tongass National Forest	1990s	1,683
	Tongass National Forest	2000s	354
	Total NFS Lands		**15,138**
State of Alaska	State of Alaska	1990s	2,102
	Total State Lands		**2,102**
Private & Other Lands	Haida Village Corporation	--	4
	Klawock-Heenga Village Corporation	--	366
	Sealaska Regional Corporation	2000s	31
	Shaan Seat Village Corporation	1980s–1990s	3,324
	Total Private/Other Lands		**3,725**
	TOTAL PROVINCE HARVEST		**20,965**
Dall Island and Vicinity Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	77
	Tongass National Forest	1950s	79
	Tongass National Forest	1960s	213
	Total NFS Lands		**369**
State of Alaska	**Total State Lands**		**0**
Private & Other Lands	Haida Village Corporation	1980s–1990s	365
	Klukwan Villa Village Corporation	1980s–1990s	17,265
	Sealaska Regional Corporation	<1980	630
	Sealaska Regional Corporation	1980s	4,549
	Sealaska Regional Corporation	1990s	1,831
	Sealaska Regional Corporation	2000s	8,011
	Other Land Owners	--	265
	Total Private/Other Lands		**32,916**
	TOTAL PROVINCE HARVEST		**33,285**
South Prince of Wales Island Biogeographic Province			
Tongass National Forest	Tongass National Forest	<1950	410
	Tongass National Forest	1950s	60
	Tongass National Forest	1960s	467
	Tongass National Forest	1970s	368
	Tongass National Forest	1980s	276
	Tongass National Forest	1990s	994
	Tongass National Forest	2000s	716
	Tongass National Forest	--	1
	Total NFS Lands		**3,292**
State of Alaska	State of Alaska	--	351
	Total State Lands		**351**
Private & Other Lands	Sealaska Regional Corporation	<1980	79
	Sealaska Regional Corporation	2000s	79
	Haida Village Corporation	1980s–1990s	589
	Kootznoowoo Village Corporation	1980s–1990s	13,491

Table I-1
Acreage of Past Harvest by Landowner

Ownership Category	Landowner	Est. Approx. Harvest Decade	Acres Harvested
	Other Land Owners	--	25
	Total Private/Other Lands		**14,184**
	TOTAL PROVINCE HARVEST		**17,827**
North Misty Fiords Biogeographic Province			
Tongass National Forest	Tongass National Forest	1950s	81
	Tongass National Forest	1960s	960
	Tongass National Forest	1980s	68
	Tongass National Forest	--	260
	Total NFS Lands		**1,370**
State of Alaska	State of Alaska	--	818
	Total State Lands		**818**
Private & Other Lands	Sealaska Regional Corporation	1980s	16
	Sealaska Regional Corporation	2000s	8
	Total Private/Other Lands		**23**
	TOTAL PROVINCE HARVEST		**2,211**
South Misty Fiords Biogeographic Province			
Tongass National Forest	**Total NFS Lands**		**0**
State of Alaska	**Total State Lands**		**0**
Private & Other Lands	**Total Private/Other Lands**		**0**
	TOTAL PROVINCE HARVEST		**0**
Ice Fields Biogeographic Province			
Tongass National Forest	Tongass National Forest	1960s	1,732
	Tongass National Forest	1970s	1,311
	Tongass National Forest	1980s	996
	Tongass National Forest	2000s	5
	Total NFS Lands		**4,044**
State of Alaska	**Total State Lands**		**0**
Private & Other Lands	**Total Private/Other Lands**		**0**
	TOTAL PROVINCE HARVEST		**4,044**
Glacier Bay/Fairweather Range Biogeographic Province			
Tongass National Forest	**Total NFS Lands**		**0**
State of Alaska	**Total State Lands**		**0**
Private & Other Lands	Glacier Bay N.P.	--	200
	Total Private/Other Lands		**200**
	TOTAL PROVINCE HARVEST		**200**
Chilkat River Complex Biogeographic Province			
Tongass National Forest	**Total NFS Lands**		**0**
State of Alaska	State of Alaska	1980s–2000s	17,069
	Total State Lands		**17,069**
Private & Other Lands	BLM	--	136
	Glacier Bay N.P.	--	568
	Private/Other	--	2,864
	Total Private/Other Lands		**3,568**
	TOTAL PROVINCE HARVEST		**20,637**

Part II – Statistics on the Alaska Forest Resources and Practices Act Implementation and State Timber Sales in Southeast Alaska

Part II presents a tabular summary of information provided by the State of Alaska Department of Natural Resources, Division of Forestry. Statistical information is not available for harvests prior to the Alaska Forest Resources and Practices Act (AFRPA), nor for some years since the Act. Tables II-1 through II-5 provide statistics regarding the AFRPA, as it has been applied to private and other lands in Southeast Alaska. Tables II-6 through II-18 provide information on State timber sales in Southeast Alaska.

Table II-1
Forest Practices Act – Summary Statistics for Southeast Alaska, 1991–1998

	1991	1992	1993	1994	1995	1996	1997	1998
New Notifications								
SSE	103	117	145	124	131	146	123	87
NSE	2	0	8	0	3	1	0	0
TOTAL	**105**	**117**	**153**	**124**	**134**	**147**	**123**	**87**
Harvest Acreage in New Notifications Received								
SSE	21,016	37,971	28,769	33,038	22,745	30,509	26,034	16,291
NSE	110	0	824	100	227	80	0	0
TOTAL	**21,126**	**37,971**	**29,593**	**33,138**	**22,972**	**30,589**	**26,034**	**16,291**
# Inspections								
SSE	146	134	98	119	93	90	42	56
NSE	2	0	8	1	5	0	0	0
TOTAL	**148**	**134**	**106**	**120**	**98**	**90**	**42**	**56**
# Variation Trees Reviewed (=approved, denied, and other (e.g., withdrawn)								
SSE	350	1,344	3,581	1,660	1,054	1,116	2,571	4,113
NSE	83	0	0	0	0	0	0	0
TOTAL	**433**	**1,344**	**3,581**	**1,660**	**1,054**	**1,116**	**2,571**	**4,113**

Table II-2
Forest Practices Act – Summary Statistics for Southeast Alaska, 1999–2006

	1999	2000	2001	2002	2003	2004	2005	2006
New Notifications								
SSE	79	104	36	43	51	47	43	51
NSE	0	0	19	10	6	6	5	3
TOTAL	**79**	**104**	**55**	**53**	**57**	**53**	**48**	**54**
Harvest Acreage in New Notifications Received								
SSE	11,705	20,542	5,599	7,667	12,197	30,488	27,733	37,313
NSE	0	3,779	9,619	5,839	1,780	1,969	344	413
TOTAL	**11,705**	**24,321**	**15,218**	**13,506**	**13,977**	**32,457**	**28,077**	**37,726**
# Inspections								
SSE	32	89	44	43	58	35	59	20
NSE	0	0	25	24	11	9	13	9
TOTAL	**32**	**89**	**69**	**67**	**69**	**44**	**72**	**29**
# Variation Trees Reviewed (=approved, denied, and other (e.g., withdrawn)								
SSE	1,522	330	103	58	336	948	411	0
NSE	0	0	144	20	199	17	0	0
TOTAL	**1,522**	**330**	**247**	**78**	**535**	**965**	**411**	**0**

Table II-3
Forest Practices Act – Summary Statistics for Southeast Alaska, 2007–2014

	2007	2008	2009	2010	2011	2012	2013	2014
New Notifications								
SSE	34	27	32	61	54	32	14	14
NSE	7	2	8	8	6	3	5	0
TOTAL	41	29	40	69	60	33	19	14
Harvest Acreage in New Notifications Received								
SSE	10,263	18,988	7,752	17,532	5,577	8,373	4,717	1,724
NSE	1,039	211	1,858	1,740	2,241	6,379	40	0
TOTAL	11,302	19,199	9,610	19,272	7,818	14,752	4,757	1,724
# Inspections (Department of Forestry)								
SSE	39	42	29	37	18	6	20	31
NSE	8	5	3	1	2	1	3	3
TOTAL	47	47	32	38	18	7	23	34
# Variation Trees Reviewed (=approved, denied, and other (e.g., withdrawn)								
SSE	0	538	222	14	6	46	312	202
NSE	0	0	0	0	0	0	243	0
TOTAL	0	538	222	14	6	46	555	202

NR=Not reported in ADOF Annual Report

Table II-4
Forest Practices Act – Road Miles Summary for State of Alaska, 1997–2006

Road Miles Notified	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
SSE	156	104	101	130	39	58	71	69	34	25
NSE	0	0	0	0	104	20	10	3	4	3
Mat-Su/SW	13	3	28	0	0	3	5	13	12	46
Kenai-Kodiak	195	50	146	44	65	146	96	57	25	11
COASTAL	364	157	275	174	208	227	182	142	75	85
Fairbanks	1	0	0	3	0	1	7	3	0	0
Delta	0	0	0	0	0	0	0	0	4	0
Tok	3	0	0	0	0	0	0	60	58	0
Copper R.	7	5	0	0	0	0	0	46	0	0
NORTHERN	11	5	0	3	0	1	7	109	62	0
TOTAL	**375**	**162**	**275**	**177**	**208**	**228**	**189**	**251**	**136**	**85**

Appendix C

Table II-5
Forest Practices Act – Road Miles Summary for State of Alaska, 2007-2014

Road Miles Notified	2007	2008	2009	2010	2011	2012	2013	2014
SSE	23	23	30	55	28	15	15	16
NSE	1	0	0	0	10	16	0.3	0
Mat-Su/SW	2	1	0	0	61	64	0	0
Kenai-Kodiak	24	16	3	66	0	0	6	44
COASTAL	50	40	33	122	99	95	21	60
Fairbanks	0	0	0	3	0	6	4	2
Delta	0	1	0	0	0	0	0	0
Tok	0	0	0	0	27	31	0	1
Copper R.	0	0	0	0	1	0	0	0
NORTHERN	0	1	0	3	28	37	4	3
TOTAL	**50**	**41**	**33**	**124**	**127**	**132**	**26**	**63**

Table II-6
State Timber Sales Sold

Year	Volume sold (MBF[1]) North-Central	South-Central	Southeast
1983	5,964	51,985	54
1984	14,735	4,445	1,907
1985	12,182	4,698	3,298
1986	4,450	2,587	424
1987	9,352	3,081	7,174
1988	16,510	4,513	6,452
1989	13,872.5	1,990	5,738
1990	14,317.9	3,398.8	18,064.5
1991	9,519	565	72.2
1992	20,613	3,306	186
1993	17,208	1,020	9,065
1994	1,569	5,564	8,903
1995	107,521	28,332	4,455
1996	182,131	9,368	1,109
FY97	15,528	129	5,942
FY98	13,211	17,754	14,623
FY99	6,836	2,803	4,797
FY00	6,637	5,774	8,365
FY01	6,064	1,857	954
FY02	4,207	1,333	11,340
FY03	4,813	3,779	4,094
FY04	2,708	957	8,064
FY05	5,594	4,934	16,003
FY06	12,478	6,638	10,777
FY07	6,420	30,110	24,437
FY08	7,163	4,316	4,059
FY09	11,036	1,451	5,597
FY10	5,445	2,460	4,626
FY11	7,281	3,913	12,865
FY12	8,815	11,067	1,346
FY13[2]	2,662	1,918	4,976
FY14	19,621	379	8,512

[1] Converted from Mcf.
[2] FY13 values are timber volume offered.
Note: data collection changed from calendar year (CY) to fiscal year (FY) with some overlap between 1996 and FY97.

Table II-7
FY 97 State Timber Sales Sold – Southeast

Area	Sale Name	Acres	Sale Date	Use	Vol MBF
Ketchikan	Ronald Brown		7/22/1996	local	37
Ketchikan	Pat Richter	4	8/21/1996	local	43
Ketchikan	Ernie Eads	9	8/22/1996	local	34
Ketchikan	Last Chance Enterprises	5	1/13/1997	local	55
Ketchikan	Ernie Eads	1	2/3/1997	local	8
Ketchikan	Pat Richter	1	3/3/1997	local	4
Ketchikan	Warren Jones	2	3/7/1997	local	46
Ketchikan	Norman Canaday	5	3/18/1997	local	14
Ketchikan	Ralph Porter	1	5/26/1997	local	34
Ketchikan	Daryl Tinkness	1	6/16/1997	local	19
Ketchikan	Ernie Eads	9	6/9/1997	local	228
Ketchikan	Pete Smit	8	5/30/1997	local	54
SUBTOTAL	**12**	**52**			**576**
Haines	Pond View	22	10/14/1996	local	249
SUBTOTAL	**1**	**22**			**249**
Juneau	Shadow	45	7/26/1996	Export	1,455
Juneau	Corner	12	9/30/1996	local	141
Juneau	Blackheart	14	11/7/1996	local	425
Juneau	Nufie	79	2/11/1997	local	1,700
Juneau	Thumb Nail	45	2/11/1997	local	802
Juneau	Pt. Frederick #6	9	3/7/1997	Export	446
Juneau	Silas Triangle	6	6/30/1997	mixed	106
Juneau	Magazine Road	3	6/30/1997	Export	42
SUBTOTAL	**8**	**213**			**5,117**

Table II-8
State Timber Sales Sold – FY 98 – Southeast

Area	Sale Name	Acres	Sale date	Use	Vol MBF
Ketchikan	Fleenor	5	7/25/1997	local	178
Ketchikan	Sneather	0	10/21/1997	local	7
Ketchikan	Whale pass assoc. I	0	11/3/1997	local	55
Ketchikan	Whale pass assoc. Ii	0	2/26/1998	local	67
Ketchikan	Tinkess	1	11/14/1997	local	5
Ketchikan	Trumble	1	11/24/1997	local	1
Ketchikan	Fleenor #2	8	3/6/1998	local	147
Ketchikan	Gray	1	12/8/1997	local	2
Ketchikan	Smith	3	PENDING	local	16
Ketchikan	Eads	2	5/12/1998	local	44
Ketchikan	Hammar	3	5/12/1998	local	21
Ketchikan	Hollis Comm. Council	0	5/12/1998	local	74
Ketchikan	Kitkun	160	6/29/1998	local	4,300
Subtotal	**13**	**184**			**4,917**
NSE	Thunder Creek	565	7/15/1997	export	4,331
NSE	Buster Benson	7	8/18/1997	local	80
NSE	Highline	8	9/2/1997	local	244
NSE	Alaska Power & Tele.	0	9/18/1997	local	6
NSE	Fred Strong	4	10/9/1997	local	32
NSE	Scott Rossman	5	5/8/1998	local	23
NSE	Scott Rossman #2	2	5/28/1998	local	12
NSE	Scott Rossman #3	2	6/15/1998	local	58
NSE	Banana Pt. Salvage	2	7/9/1997	local	40
NSE	Roy's Breakdown	41	7/23/1997	local	1,339
NSE	Silas	14	7/23/1997	local	466
NSE	Roy Sokol Salvage	1	7/29/1997	local	9
NSE	Thumbnail Unit 3	2	9/12/1997	local	229
NSE	Thumbnail ii	29	9/15/1997	local	607
NSE	Mitkof Hwy Row	1	11/21/1997	local	16
NSE	Hemlock Salvage	0	11/21/1997	local	9
NSE	Shadow Salvage	0	11/24/1997	export	120
NSE	Hermit Creek	4	12/22/1997	local	102
NSE	Pt. Frederick #6	0	6/5/1998	local	58
NSE	Eastern Passage I	83	2/23/1998	local	1,681
NSE	Nufie II	19	6/9/1998	local	244
Subtotal	**21**	**788**			**9,706**

Table II-9
State Timber Sales Sold – FY 99 Coastal Region

Area	Sale Name	Acres	Sale Date	MBF	Use
Ketchikan	Fleenor No. 3	6	07/27/98	125	Local
Ketchikan	Small #2	4	08/17/98	123	Local
Ketchikan	Small #3	3	09/28/98	68	Local
Ketchikan	Small #4	6	11/30/98	382	Local
Ketchikan	Small #5	4	11/30/98	308	Local
Ketchikan	Small #6	1	11/24/98	18	Local
Ketchikan	Small #7	3	12/11/98	80	Local
Ketchikan	Small #8	3	12/24/98	67.7	Local
Ketchikan	Small #9	0.1	03/26/99	10	Local
Ketchikan	Small #10	9.9	05/19/99	357	Local
Ketchikan	Small #11	4.7	06/01/99	150	Local
Subtotal	**11**	**44.7**		**1,688.7**	
NSE	Thumbnail III	74	09/21/98	1,613	Local
NSE	Eastern Passage I	52	06/01/99	1,429	Local
NSE	McCormack Creek Rd. Project ROW	0	08/03/98	37.25	Local
NSE	Del Mikkelsen	5	12/03/98	29	Local
Subtotal	**5**	**131**		**3,108**	

Table II-10
State Timber Sales Sold – FY 00 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Mcf	Use
Ketchikan	SE-959K	1	07/13/99	3		Local
Ketchikan	Coffman Cove	214	07/27/99	5,515		Local
Ketchikan	SE-960K	1	09/21/99	14		Local
Ketchikan	SE-962K	5	09/21/99	117		Local
Ketchikan	SE-1019K	1	03/13/00	12		Local
Ketchikan	SE-1021K	5	04/07/00	491		Local
Ketchikan	SE-970K	2	05/22/00	27		Local
Ketchikan	SE-971K	1	06/08/00	8		Local
Ketchikan	SE-1020K	1		34		Local
Ketchikan	SE-972K	5		468		Local
Ketchikan	SE-973K	8		257		Local
Subtotal	**11**	**244**		**6,945.9**		
NSE	Small #1, SE-474J	3	07/19/99	139		Local
NSE	Eastern Passage I, Unit 4	24	12/30/99	656		Local
NSE	Devils Elbow	2	07/19/99	24		Local
NSE	Porcupine Snow		12/22/99	41		Local
NSE	High Extension	8	02/01/00	49		Local
NSE	Porcupine Wings	24	03/28/00	419		Any
NSE	Porcupine Heights	5	04/05/00	38		Local
NSE	Roy's Favorite	3	06/02/00	53		Local
Subtotal	**8**	**69**		**1,419**		

Table II-11
State Timber Sales Sold – FY 01 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Purchaser	Use
SSE	SE-979-K	1	01/12/01	20	Jack Dupertuis	local
SSE	SE-983-K	2	03/14/01	28	Sealaska	export
SSE	SE-1020-K	2	10/16/00	34	Naukati Adventures	local
SSE	SE-976-K	7	10/03/00	391	Pat Richter	local
SSE	SE-980-K	0	12/08/00	10	Evergreen Timber	export
SSE	SE-981-K	2	12/08/00	30	Hummer Enterprises	local
SSE	SE-982-K	4	05/16/01	80	B&W Lumber	local
SSE	SE-984-K	0	05/17/01	10	Hummer Enterprises	local
Subtotal	**8**	**17**		**603**		
NSE	Ski Hill	5	07/29/00	34	The Stump Co.	local
NSE	37Mile	6	04/10/01	104	The Stump Co.	local
NSE	Chilkat Lake	2	04/10/01	19	Bob Jensen	local
NSE	Knob 4	2	04/10/01	28	Tophat Logging	local
NSE	Birch Hill Knob	1	04/30/01	9	Eager Beaver	local
NSE	Extension Knobs	1	06/18/01	1	Sage Thomas	local
NSE	Backside	5	06/25/01	24	Carl Smith	local
NSE	Half Load Knob 3	1	01/18/01	11	Hidden Valley	local
NSE	Extension	2	02/05/01	16	Green Diamond	local
NSE	Daisy	3	02/23/01	65	Hidden Valley	local
NSE	SE-741	1	02/26/01	11	Don Peterson	local
NSE	Three Peaks	2	03/12/01	20	Green Diamond	local
NSE	Knob ABC	2	03/21/01	9	Green Diamond	local
Subtotal	**13**	**33**		**351**		

Table II-12
State Timber Sales – FY 02 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Use
SSE	Naukati West	70	04/29/02	2,685	V-A
SSE	East Pass #5	50	04/01/02	1,110	V-A
SSE	Tuxecan	134	04/15/02	4,018	V-A
SSE	Richter #2	4	07/09/01	187	V-A
SSE	Richter #3	3	02/08/02	90	V-A
SSE	Jones 1	0	09/18/01	13	V-A
SSE	Sunde 1	0	05/30/02	7	V-A
SSE	Clark Bay Group	3	11/02/01	26	V-A
SSE	Gildersleeve1	1	09/17/01	24	V-A
SSE	Thorne Bay #1	80	09/14/01	2,539	V-A
Subtotal	**10**	**345**		**10,699**	
NSE	37.5 Mile Fall	4	10/25/01	51	V-A
NSE	37-Mile Addition	4	07/24/01	28	V-A
NSE	Daisy Salvage	1	10/16/01	31	V-A
NSE	Birch Road A	2	07/13/01	17	V-A
NSE	Birch Pole	1	01/08/02	3	V-A
NSE	Backside 2	3	07/10/01	19	V-A
NSE	Daisy 2	7	05/24/02	117	V-A
NSE	Birch road	2	07/06/01	10	V-A
NSE	Daisy Dead	2	06/06/02	9	V-A
NSE	LS Mountain	10	07/09/01	357	V-A
Subtotal	**10**	**36**		**641**	

Table II-13
State Timber Sales Sold – FY 03 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Use
SSE	Yatuk Creek #1	4	10/15/02	179	VA
SSE	Yatuk Creek #2	5	10/15/02	228	VA
SSE	Yatuk Creek #3	2	10/15/02	80	VA
SSE	Yatuk Creek #4	4	10/15/02	41	VA
SSE	Yatuk Creek #5	6	10/15/02	205	VA
SSE	Yatuk Creek #6	4	10/15/02	112	VA
SSE	Yatuk Creek #7	4	10/15/02	308	VA
SSE	Yatuk Creek #8	3	10/15/02	151	VA
SSE	Yatuk Creek #9	64	01/06/03	2,064	VA
SSE	Frederick Rd. #1	4	10/14/02	125	VA
SSE	Thorne Bay Burn #4	2	11/01/02	53	VA
SSE	Thorne Bay Burn #5	2	11/01/02	40	VA
SSE	Sandy Road #1	6	11/01/02	87	VA
SSE	Sunde #2	<1	05/06/03	10	VA
Subtotal	**14**	**110**		**3,683**	
NSE	Starigavin ROW NSE-1026	1	09/27/02	6	VA
NSE	Tidy Stump SE-759	1	08/23/02	25	VA
NSE	Farm Wood	3	01/17/03	50	VA
NSE	Jensen Skid Road	3	02/18/03	19	VA
NSE	Hemlock Switch	5	02/10/03	67	VA
NSE	Spruce Addition	1	02/04/03	10	VA
NSE	20 Mile Xing	2	02/26/03	13	VA
NSE	Half Dozen	1	02/28/03	4	VA
NSE	Wolf Pack	1	03/10/03	13	VA
NSE	Chilkat Lake Road	2	03/27/03	5	VA
NSE	Spruce Log	2	01/03/03	10	VA
NSE	Hemlock Home	1	01/13/00	13	VA
NSE	Porcupine Clean	1	11/04/02	11	VA
NSE	Farm Birch	2	12/17/02	6	VA
NSE	Wolf Skid	2	04/04/03	4	VA
NSE	Spruce Tap	2	05/05/03	7	VA
NSE	Hemlock Corner	2	05/05/03	41	VA
NSE	37 Mile Patch	1	05/19/03	10	VA
NSE	38 Mile Draw	9	05/21/03	84	VA
NSE	Daisy Cleanup	3	06/13/03	64	VA
Subtotal	**20**	**45**		**462**	

Appendix C

Table II-14
State Timber Sales Sold – FY 04 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Use
SSE	Boy Scout	19	08/21/03	990.18	local
SSE	Intertie ROW	n/a	07/21/03	172.00	local
SSE	Coffman Cove R	1	08/18/03	40.40	local
SSE	Kasaan 1	149	10/21/03	3,238.00	local
SSE	East Naukati	135	05/06/04	3,164.00	local
SSE	Thorne Bay ROW	1	12/12/03	42.43	export
Subtotal	**6**	**305**		**7,647.01**	
NSE	Deats 1-N. Douglas	1	03/14/04	1.00	local
NSE	Little Salmon Mt.	8	10/03/03	357.00	local
NSE	38-mile Draw 5	1	10/02/03	10.00	local
NSE	Spruce Rose	1	07/08/04	11.00	local
NSE	Big Hemlock	2	07/23/03	34.00	local
NSE	Boulder Spruce	3	08/10/03	52.00	local
NSE	Boulder Spruce 2	10	10/30/03	24.00	local
NSE	38 Mile Pocket	1	11/25/03	33.00	local
NSE	Stretch Time	2	12/10/03	29.00	local
NSE	Ice Road	2	02/06/04	28.00	local
NSE	Boulder 6 x 6	1	05/03/04	21.00	local
NSE	Stretch Melt	2	06/10/04	31.00	local
NSE	Nataga Skid	3	06/10/04	5.24	local
NSE	Stretch	6	11/28/03	53.00	local
NSE	38 Mile Extension	1	12/09/03	22.00	local
Subtotal	**15**	**44**		**711.24**	

Table II-15
State Timber Sales Sold – FY 05 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Use
SSE	2058 Road 1/Jones #2	3	07/09/04	36	local
SSE	2058 Road 2/Jones #3	2	07/09/04	28	local
SSE	2058 Road 4/Jones #1	2	07/09/04	19	local
SSE	2058 Road 5/Thorne Bay WP	6	07/27/04	107	local
SSE	2058 Road 6/Thorne Bay WP	3	07/21/04	65	local
SSE	Sandy Road 2	20	08/20/04	419	local
SSE	Coffman Cove ROW #2	1	08/23/04	8	local
SSE	Thorne Bay 2	130	10/30/04	4130	local
SSE	Control Lake 1-mid	112	11/15/04	3627	local
SSE	Shady Tie-in	40	11/29/2004	987	local
SSE	Kasaan 6	6	11/17/04	179	local
SSE	Control Lake 2	5	12/03/04	121	local
SSE	Control L. 3	8	12/03/04	189	local
SSE	Control L. 4	17	12/09/04	491	local
SSE	Kasaan 2	108	12/17/04	4028	local
SSE	Mt. Point #1	3	05/12/05	149	export
SSE	Choker Setter Cir.	1	06/28/05	23	local
Subtotal	**17**	**466**		**14,606**	
NSE	Boulder Load	1	7/6/2004	8	local
NSE	Boulder Six X Six 2	1	7/12/2004	8	local
NSE	Alder Rerun	2	7/23/2004	27	local
NSE	Alder Rerun 2	2	9/1/2004	41	local
NSE	Nataga Skid 2	1	8/12/2004	17	local
NSE	Alder III	2	9/17/2004	59	local
NSE	Porcupine Mining	1	9/10/2004	20	local
NSE	Porcupine Mining II	1	9/10/2004	23	local
NSE	Klehini U14 Corner	2	12/11/2004	32	local
NSE	Porcupine Mining III	1	10/15/2004	13	local
NSE	Takshanuk Trail	3	11/7/2004	14	local
NSE	37 Mile Ridge	2	11/11/2004	15	local
NSE	Porcupine Low Road	1	11/12/2004	10	local
NSE	Battleship Island	1	12/12/04	2	local
NSE	West Herman 2	9	1/3/2005	185	local
NSE	37 Mile Bowl	2	1/4/2005	27	local
NSE	37 Mile Bowl 2	1	1/24/2005	38	local
NSE	Purlin	1	02/16/05	1	local
NSE	Pondside	2	02/28/05	31	local
NSE	West Draw	2	03/14/05	21	local
NSE	West Herman 1	23	03/01/05	594	local
NSE	West Draw #2	1	04/01/05	21	local
NSE	Knobs Rerun	2	05/21/05	49	local
NSE	Fabrizio Mining	6	05/27/05	82	local
NSE	Birch Reload	1	05/18/05	6	local
NSE	Nataga Sky	1	06/10/05	22	local
NSE	Dunit Bench	2	06/20/05	31	local
Subtotal	**27**	**74**		**1,397**	

Table II-16
State Timber Sales Sold – FY 06 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Use
SSE	2058 Rd 8 small/Gutchi Creek #2	5	08/02/05	108	local
SSE	SSE 1230/2058 Rd 8 mid	18	10/01/05	588	local
SSE	Eastern Passage units 6-12	395	11/01/05	9110	local
SSE	Steep Drive	1	10/19/05	20	local
SSE	South Thorne Arm #1	0	10/01/05	2	local
SSE	Leask Lake Sort Yard	5	09/22/05	60	export
SSE	Kasaan 6	6	3/28/2006	179	local
Subtotal	**7**	**430**		**10,067**	
NSE	Tatshunak Trail	1	8/2/2005	5	local
NSE	Knobs B-C Timber	1	7/25/2005	16	local
NSE	Nataga Stretch	18	7/25/2005	173	local
NSE	Glacier Salvage	10	10/1/2005	100	local
NSE	Spruce Corner	1	10/3/2005	27	local
NSE	KB West Spur 1	10	10/10/2005	144	local
NSE	1424 Hemlock Ridge	1	12/29/2005	46	local
NSE	1425 Porcupine Salvage	3	1/6/2006	25	local
NSE	1426 Billy Goat	3	1/6/2006	24	local
NSE	1427 Farm Special	5	2/1/2006	38	local
NSE	1428 Farm Spur 2	3	03/15/06	37	local
NSE	1429 Billy Goat 2	3	04/11/06	55	local
NSE	Boulder Firewood	1	04/11/06	10	local
NSE	Porcupine Firewood	2	06/26/06	10	local
Subtotal	**14**	**62**		**710**	

Table II-17
State Timber Sales Sold – FY 07 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Use
SSE	Bostwick #1	362	11/29/06	12,687	local
SSE	2058 Road Small	6	07/10/06	182	local
SSE	2058 Road Small	4	07/10/06	98	local
SSE	Control Lake Fir	1	08/25/06	0	local
SSE	Leask Lake Aide	1	08/25/06	19	research
SSE	South Thorne Bay	128	07/02/06	3,330	local
SSE	D-1 #1	1	04/02/07	7	export
SSE	20 Road	26	05/29/07	5,145	local
SSE	Whipple Creek	26	04/02/07	2,334	export
SSE	Bostwick Trail Lo	0	6/20/2007	13	local
Subtotal	**10**	**555**		**23,815**	
NSE	KB2	1	7/28/2006	17	local
NSE	Cabin Log	4	8/10/2006	41	local
NSE	Spur Road	1	8/10/2006	12	local
NSE	West Herman 3	4	8/25/2006	105	local
NSE	Porcupine Spruce	3	9/12/2006	132	local
NSE	Hemlock Spruce	3	9/12/2006	55	local
NSE	KB3	6	10/26/2006	42	local
NSE	Winds	2	11/2/2006	119	local
NSE	Porucpine Road	1	11/7/2006	5	local
NSE	Warm Springs	5	10/01/06	1	local
NSE	Hidden	2	01/03/07	16	local
NSE	35 Mile Snow Co	10	04/09/07	9	local
NSE	Sunlight Salvage	2	05/11/07	45	local
NSE	Ski Hill	3	06/05/07	23	local
Subtotal	**14**	**47**		**622**	

Appendix C

Table II-18
State Timber Sales Sold – FY 08 through 14 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Product
	Fiscal Year 2008				
SSE	Java	44	12/14/2007	1,325	Sawlog
SSE	Gutchi Creek	24	12/14/2007	34	Sawlog
SSE	Squirrel	72	04/07/2008	-	Sawlog
SSE	Kasaan Small Sale #2	5	04/16/2008	26	Sawlog
SSE	Kasaan Small Sale #3	6	04/16/2008	8	Utility
SSE	Indian Creek	72	07/14/2008	111	Sawlog
SSE	Limestone Place	1	07/14/2008	0.4	Sawlog
SSE	Mountain Pt. #2	2	08/13/2008	14	Sawlog
SSE	Jinhi Bay	10	08/13/2008	54	Utility
SSE	Kasaan Small Sale	5	09/17/2008	4	Utility
Subtotal	**10**	**241**		**1,576**	
NSE	Old Highway 3	4	10/24/2007	21	Sawlog
NSE	Revetment	3	01/18/2008	10	Sawlog
NSE	Old Highway #4	2	04/16/2008	1	Utility
NSE	Old Highway #5	2	05/09/2008	16	Sawlog
NSE	Sunshine LSM Salvage	2	07/15/2008	100	Utility
NSE	KB 6	14	07/21/2008	12	House Log
NSE	Billy Goat Cleanup	2	08/06/2008	29	Sawlog
NSE	Roads End	5	08/14/2008	95	Utility
NSE	West Herman 4	5	09/04/2008	50	Sawlog
NSE	Glacier Side Salvage	9	09/15/2008	100	Sawlog
NSE	KB Firewood	8	09/25/2008	2	Utility
Subtotal	**11**	**52**		**436**	
	Fiscal Year 2009				
SSE	Squirrel Export	15	01/06/2009	137	Sawlog
SSE	Kasaan #2 Export	10	02/17/2009	105	Sawlog
SSE	Jinhi Bay Export	-	02/17/2009	93	Sawlog
SSE	Java Export	-	02/18/2009	0.2	Sawlog
SSE	20 Road Export	-	02/18/2009	47	Sawlog
SSE	S.Thorne Bay #1 Export	-	03/04/2009	4	Sawlog
SSE	Heceta #2	1	04/02/2009	1	Sawlog
SSE	S. Thorne Bay #2	107	06/10/2009	2,149	Sawlog
SSE	Indian Creek - Export	-	07/02/2009	185	Sawlog
Subtotal	**9**	**133**		**2,720**	
NSE	Gustavus Gravel FC	1	10/20/2008	8	Sawlog
NSE	Big Spruce	1	03/03/2009	3	Sawlog
NSE	KB-7	10	07/02/2009	25	Sawlog
NSE	Jim Nail Mining Claim	2	08/15/2009	5	House Log
NSE	Porcupine Bear II	-	09/02/2009	13	Sawlog
Subtotal	**5**	**14**		**54**	

Table II-18
State Timber Sales Sold – FY 08 through 14 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Product
	Fiscal Year 2010				
SSE	Kasaan #7 Export	1	11/07/2009	18	Sawlog
SSE	Zarembo	175	12/17/2009	1,803	Sawlog
SSE	Kasaan Closout	21	04/26/2010	22	Utility
SSE	S. Thorne Bay #2 Export	-	04/26/2010	242	Sawlog
SSE	Bradford Yellow Cedar	-	08/05/2010	3	Sawlog
SSE	Acorn	5	09/22/2010	73	Sawlog
Subtotal	**6**	**202**		**2,161**	
NSE	Glacier Creek Rd Salvage	5	10/02/2009	100	Utility
NSE	Elbow	5	10/20/2009	100	Utility
NSE	Porcupine Bear III	2	10/25/2009	2	Sawlog
NSE	Flower	5	10/25/2009	100	Utility
NSE	State 38	3	12/09/2009	12	Sawlog
NSE	38 Mile South	3	04/28/2010	2	House Log
NSE	35 Times	2	07/15/2010	10	Utility
NSE	West Herman Cleanup	1	07/15/2010	5	Utility
Subtotal	**8**	**26**		**331**	
	Fiscal Year 2011				
SSE	D1 #2	7	02/01/2011	9	Utility
SSE	D1 Heli-Dup1	8	02/17/2011	353	Sawlog
SSE	D1 Heli-Dupe2	8	02/18/2011	360	Sawlog
SSE	R/W Spruce Log	-	03/18/2011	4	Sawlog
SSE	North Thorne Bay #3	122	04/22/2011	3,063	Sawlog
SSE	Indian Creek #2	230	06/21/2011	11	Sawlog
SSE	East Pass Units 9-12	194	08/28/2011	250	Sawlog
Subtotal	**7**	**569**		**4,050**	
NSE	39 Mile ROW	2	11/17/2010	9	House Log
NSE	37.5 Salvage	5	12/17/2010	50	Utility
NSE	North 38	1	03/25/2011	3	House Log
NSE	Bear Creek	2	05/13/2011	10	House Log
NSE	Billy Goat Clean Up #2	1	06/13/2011	40	Utility
NSE	Assisted Migration	4	06/17/2011	19	Sawlog
NSE	Billy Goat Cleanup #3	1	06/27/2011	1	House Log
NSE	Bear Creek 2	3	07/07/2011	13	Utility
NSE	Jim Nail Salvage	1	07/18/2011	50	Utility
NSE	Bear Creek SMZ	1	07/20/2011	11	Sawlog
NSE	35 Times 2	2	07/21/2011	10	Sawlog
NSE	Bear Creek SMZ 2	1	08/08/2011	1	Sawlog
Subtotal	**12**	**24**		**217**	

Appendix C

Table II-18
State Timber Sales Sold – FY 08 through 14 – Southeast

Area	Sale Name	Acres	Sale Date	MBF	Product
	Fiscal Year 2012				
SSE	Chopsticks	-	10/14/2011	4	Sawlog
SSE	Blind Slough Salvage	1	01/30/2012	2	Sawlog
SSE	Beach Road #1	23	05/07/2012	191	Sawlog
Subtotal	**3**	**24**		**197**	
NSE	38 Mile Salvage	4	02/07/2012	100	Utility
NSE	37 Mile Creek	9	03/30/2012	4	Sawlog
NSE	KB7 Leftovers	3	07/03/2012	12	House Log
NSE	35 x 3	2	08/13/2012	5	Sawlog
NSE	Houselog Bonanza	3	08/22/2012	4	Sawlog
NSE	211 Road Salvage	3	08/24/2012	30	Fuel Wood
NSE	Windthrown	3	08/28/2012	6	Sawlog
Subtotal	**7**	**27**		**161**	
	Fiscal Year 2013				
SSE	S. Thorne Bay #3	196	11/17/2012	30	Sawlog
SSE	Whitman Lake Penstock	1	02/12/2013	0.2	Sawlog
SSE	Colier Tree	1	03/13/2013	8	Sawlog
SSE	Heceta Second Growth	137	07/22/2013	301	Utility
Subtotal	**4**	**335**		**339**	
NSE	Hemlock Revetment	3	10/08/2012	32	Sawlog
NSE	13 Mile Bench #2	3	02/22/2013	2	Utility
NSE	13 Mile Bench #2 Addition	1	03/14/2013	1	Sawlog
NSE	KB9	3	06/04/2013	7	House Log
NSE	KB 10	2	07/15/2013	19	Sawlog
NSE	Tenekee Hydro	4	09/09/2013	55	Sawlog
Subtotal	**6**	**16**		**116**	
	Fiscal Year 2014				
SSE	Whitman Lake Penstock #2	0.1	02/21/2014	2	Sawlog
SSE	Control Lake Timber Sale	10	02/28/2014	46	Sawlog
SSE	Hollis Slide USFS Wood	-	03/06/2014	4	Unknown
SSE	Blankenship ROW	-	03/11/2014	4	Sawlog
SSE	South Thorne Bay 4	98	03/12/2014	35	Sawlog
SSE	Naukati Decks	-	06/10/2014	2	Sawlog
Subtotal	**6**	**108**		**93**	
NSE	13 Mile Bench #5	1	02/12/2014	26	House Log
NSE	13 MIle Bench #6	1	03/14/2014	1	Sawlog
NSE	13 Mile Bench Birch	1	03/19/2014	2	Sawlog
NSE	KB14	5	07/15/2014	25	Utility
Subtotal	**4**	**8**		**54**	

APPENDIX D
EVALUATION AND INTEGRITY OF THE TONGASS NATIONAL FOREST OLD-GROWTH HABITAT CONSERVATION STRATEGY

Appendix D

Tongass National Forest

Evaluating Integrity of the Tongass National Forest Old-growth Habitat Conservation Strategy

CONTENTS

Introduction

This report provides an overview of the rationale and assumptions used for evaluating proposed changes to the 2008 Tongass Land and Resource Management Plan (2008 Forest Plan) in relation to the Tongass Old-growth Conservation Strategy (conservation strategy). The conservation strategy provides a scientific basis for an ecological approach to the Forest Plan, and consists of a system of old-growth reserves (OGRs) and management restrictions on matrix lands (non-reserve areas). Riparian, beach, and estuary habitats are considered contributing elements to the OGRs in that they were designed to maintain landscape connectivity among large and medium OGRs and non-development LUD designations.

On May 27, 2014, the Tongass National Forest initiated an amendment designed to transition from timber harvest dominated by old-growth to young-growth over the next 10 to 15 years (79 FR 30075). The need for change comes from a July 2013 memo from U. S. Department of Agriculture Secretary Tom Vilsack (Secretary's Memorandum 1044-009). In this memo, the Secretary directs the Tongass to transition its forest management program to be more ecologically, socially, and economically sustainable so that at the end of this 10 to 15 year period the vast majority of timber sold by the Tongass National Forest will be young-growth.

In response, the Forest Service is amending the 2008 Forest Plan and preparing an Environmental Impact Statement (EIS) to evaluate the proposed changes. Fiver alternatives were developed for detailed analysis, including the No Action (Alternative 1) and Proposed Action (Alternative 2) alternatives. Alternative 1 represents current management (i.e., the 2008 Forest Plan). Alternatives 2, 3, 4, and 5 were designed to accomplish a more rapid transition to young-growth management than considered in the 2008 Forest Plan, while maintaining a viable timber industry in Southeast Alaska. The alternatives vary in terms of how quickly the transition is reached, with the most aggressive alternatives allowing young-growth harvest in non-development LUDs and modifying other contributing elements of the conservation strategy.

New direction in the proposed Forest Plan was developed to facilitate this transition including the identification of young-growth stands on lands suitable for timber production. For example, under some alternatives, young-growth stands in the beach buffer and in RMAs outside of Tongass Timber Reform Act (TTRA) buffers are considered suitable for timber production. Therefore, the Forest Service has the dual responsibility of ensuring that the transition to young-growth management maintains a viable timber industry, while also maintaining the integrity of the conservation strategy. This report is written in support of the Forest Plan Amendment Environmental Impact Statement (EIS) and is incorporated as Appendix D to the Draft EIS.

The conservation strategy was designed to maintain the integrity of the old-growth forest ecosystem. The purpose of this report is to present the results of a preliminary evaluation of the ability of each of the alternatives analyzed in the EIS to maintain the integrity of the conservation strategy. Integrity is defined here based on standard language as 'an unimpaired condition' or "the quality or state of being complete or undivided" (http://www.merriam-webster.com/dictionary/integrity). It is assumed that integrity is maintained when the conservation strategy is expected to continue to function effectively regardless of alteration or modification of individual parts (i.e., its functioning is unimpaired). Accordingly, throughout this evaluation, focus is placed on the proposed modifications to contributing elements of the conservation strategy (e.g., beach and estuary fringe and RMAs) and the associated potential to affect the functioning of the conservation strategy.

This remainder of this report is broken into five major sections. They (1) provide an overview of the current conservation strategy (2) describe the scope of the analysis and discusses new science relevant to the conservation strategy since 2008, (3) summarize the status of land management on the Tongass and changes to the conservation strategy since 2008, (4) describe proposed modifications to contributing elements of the conservation strategy and evaluate these modifications in the context of the functioning of the conservation strategy, and (5) present a summary of the findings of this evaluation which can be used to support the analysis of effects to biodiversity and wildlife presented in Chapter 3 of the EIS.

Appendix D

Old-growth Habitat Conservation Strategy

The 1997 Tongass National Forest Plan established a comprehensive, science-based conservation strategy to provide for wildlife sustainability and viability across the Tongass. The conservation strategy was developed to maintain a functional and interconnected old-growth forest ecosystem on the Tongass by retaining intact, largely undisturbed habitat. Its development is described in detail in Appendix N of the 1997 Forest Plan FEIS (USDA Forest Service 1997a, b).

The conservation strategy was subsequently reviewed to confirm its validity given new conservation science since 1997 and amended for incorporation into the 2008 Forest Plan (see below for additional discussion). The conservation strategy includes two major components: (1) a forest-wide network of large, medium and small OGRs allocated to the Old-Growth Habitat LUD and other non-Development LUDs plus all islands less than 1,000 acres, and (2) a series of standards and guidelines applicable to lands where timber harvest is permitted (the matrix; USDA Forest Service 2008a, 2008b).

The system of OGRs was designed to maintain habitats of the species that have the most viability concerns (USDA Forest Service 2008b). Other non-development LUDs such as Wilderness, LUD II, Remote Recreation, and Semi-Remote Recreation also essentially maintain the old-growth ecosystem. The intent of the reserve system was to help ensure the maintenance of well-distributed, viable populations of all old-growth associated wildlife species across the Tongass, with focus on those species that are most sensitive to habitat loss and fragmentation. In general, the home range and dispersal capabilities of old-growth associated species of concern were considered in determining the size, number and spacing of reserves. For a complete review of the Forest Plan Conservation Strategy, including assumptions underlying the design of the OGR system, refer to Appendix D of the 2008 Forest Plan Final EIS (USDA Forest Service 2008b).

Within the matrix (areas outside of reserves), components of the old-growth ecosystem are maintained through standards and guidelines designed to provide for important ecological functions such as dispersal of organisms, movement between forest stands, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees (USDA Forest Service 2008b). Matrix lands include Timber Production, Modified Landscape, Scenic Viewshed, and Experimental Forest LUDs. Matrix management complements the reserve system by providing habitat at smaller spatial scales, enhancing the effectiveness of reserves, and providing for landscape connectivity (USDA Forest Service 2008b). Standards and guidelines applicable to these lands include maintaining the 1,000-foot beach buffer and estuary fringe, variable-width stream buffers (Riparian Management Areas, TTRA buffers, etc.), and project-level legacy forest structure retention requirements. In addition, other Forest-wide standards and guidelines preclude or limit timber harvest in areas of high-hazard soils, steep slopes, karst terrain, and visually sensitive travel routes and use areas, and require projects to be designed to maintain landscape connectivity (i.e., maintain corridors of old-growth forest among large and medium OGRs and other non-development LUDs at the landscape scale). Additional detail on the rationale behind the standards and guidelines within the matrix is provided in Appendix D of the 2008 Forest Plan Final EIS (USDA Forest Service 2008b).

The 1982 Planning Rule stated that the maintenance of a viable population requires providing habitat to support “at least a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area” (36 CFR 219.19). In the context of the development of the conservation strategy, this was interpreted to mean that the condition of viable and well distributed allows for gaps within a species distribution as long as the population segments of the species continue to interact and are distributed throughout the planning area. (Appendix N (p. N-3), USDA FS 1997). The 2012 Planning Rule now requires that the responsible official determine whether or not the plan components ‘‘provide the ecological conditions necessary to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area” (36 CFR 219.9). The 2012 Planning Rule defines a viable population as: ‘‘A population of a species that continues to persist over the long-term with *sufficient distribution to be resilient and adaptable to* stressors and likely future environments’’ (§ 219.19) (emphasis added). Therefore, the ability of the conservation strategy to function as intended can be gauged on the scale of the Forest and beyond; however, it is acknowledged

that there is value in being aware that some portions of the Forest may be better meeting the intent of the conservation strategy than others.

Scope of the Analysis and Acknowledgement of New Science

The scope of this analysis is the individual proposed modifications the contributing elements of the conservation strategy and the associated potential to affect the functioning of the conservation strategy. The proposed Forest Plan amendment does not propose changes to the framework of the conservation strategy or the size or spacing of OGRs (with one exception resulting from land adjustments in the Carl Levin and Howard P. "Buck" Mckeon National Defense Authorization Act for Fiscal Year 2015[1] [hereafter referred to as the National Defense Authorization Act for Fiscal Year 2015]). The proposed OGR modifications compensate for portions of individual OGRs that were located on National Forest System (NFS) lands that were conveyed to the Sealaska Native Corporation (see below). Therefore, this analysis is not intended to be a review of the underpinnings of the conservation strategy or its effectiveness as a whole. Such an evaluation is outside the scope of this proposed Forest Plan amendment and would be more appropriately conducted in the context of a Forest Plan revision, which under the 2012 Planning Rule requires an assessment of ecological sustainability and diversity of plant and animal communities.

Recent advancements in the fields of conservation science and landscape ecology and new knowledge of individual species' biological needs may warrant a more holistic evaluation of the effectiveness of certain elements of the conservation strategy. The following discussion touches on some of the new science relevant to conservation planning on the Tongass National Forest. Some of these topics and others were identified during the Interagency Forest Plan Conservation Strategy Review (USDA Forest Service 2007) conducted for the 2008 Forest Plan Amendment. This effort brought together scientists, technical experts, and land managers with expertise in conservation biology and natural resource management to review new science since the conservation strategy's development in 1997 and identify considerations for the future planning decision (see *New Relevant Science Since 1997* in Appendix D, USDA Forest Service 2008b). These topics would be taken into consideration should an overall review of the conservation strategy be deemed necessary in the future.

Recent advancements in conservation science recognize the importance of including freshwater systems in conservation strategy design (Nislow et al. 2010). The Tongass National Forest supports some of the most productive salmon spawning habitats in North America and salmon-derived nutrients are recognized as playing an important role in the productivity of coastal temperate forests (Hood et al. 2007; Fellman et al. 2008, 2009, D'Amore et al. 2011). The strong connections between aquatic and terrestrial ecosystems, as well as upstream and downstream linkages within stream and river systems, are also susceptible to disruption by human actions and are therefore important elements to be considered in conservation planning (Nislow et al. 2010). Aquatic systems and hydrologic connectivity are not addressed explicitly within the conservation strategy, although these areas are afforded protection by Forest Plan Riparian and Beach and Estuary standards and guidelines which were developed in part based on recommendations put forth in an Anadromous Fish Habitat Assessment (AFHA 1995).

Increased recognition of the contribution of matrix lands (i.e., areas where active management can occur) in supporting conservation is another new development in conservation science (e.g., the reverse-matrix model of conservation design; Schmiegelow et al. 2006). Matrix lands are critical to maintaining the connectivity of ecological flows (e.g., flows of disturbance agents, organisms, water, and nutrients) across a landscape and are also essential to the ability of protected areas to achieve their mandates for ecosystem conservation (Schmiegelow et al. 2006, Schmiegelow and Lisgo 2014). Schmiegelow et al. 2006 identify four contributions of matrix lands to conservation goals including supporting populations of species, regulating the movement of organisms, buffering sensitive areas and reserves, and maintaining the integrity of aquatic systems. Thus, the ability to achieve conservation goals is clearly dependent in part on the management of activities within matrix lands.

The conservation strategy recognizes the different functions of the reserve system and matrix lands on the Tongass National Forest. However, focus is placed on physical connectivity (i.e., protected forested

[1] Public law No. 113-291, December 19, 2014, 128 Stat. 3729, section 3720(e)(4).

corridors) in the matrix rather than functional connectivity, the value of which is dependent in part on the condition and quality of the matrix lands. Additionally, the attributes of young-growth stands are largely unacknowledged.

Young-growth stands provide a range of functions including serving as dispersal corridors between remnant old-growth stands as well as providing buffers between areas of suitable habitat and human activity (e.g., buffering remnant forests from edge effects). Additionally, over time, young-growth stands have the potential to return to old-growth conditions, a process that can be accelerated through active management (e.g., commercial thinning). However, the Old-growth Habitat LUD standards and guidelines do call for actions that would facilitate the transition to old-growth conditions. Similarly, Forest-wide standards and guidelines for landscape connectivity call for actions in young-growth stands to accelerate the development of old-growth characteristics in order to increase connectivity for wildlife. Likewise, the conservation strategy was designed without consideration of areas within the matrix where timber harvest is restricted including areas of high-hazard soils, steep slopes, karst terrain, and visually sensitive travel routes and use areas which result in additional retention of old-growth forest (Appendix D, USDA Forest Service 2008b). Overall, this makes the conservation strategy conservative in that assumptions about its effectiveness are based solely on the value of protected lands. The transition to young-growth management in the proposed Forest Plan amendment has the potential to affect the condition and quality of matrix lands, and thus their contribution to the conservation strategy. This topic is addressed below in the context of the proposed modifications to contributing elements of the conservation strategy.

Finally, the development of the original conservations strategy in 1997 was based in part on the needs of a select group of old-growth associated species (see Appendix N of the 1997 Forest Plan FEIS for a discussion of the selection of design species). In general, the home ranges and dispersal capabilities of these species were taken into account during the design of the reserve system (reserve size, spacing, and number), as well as developing provisions for matrix management (e.g., appropriate buffer widths; USDA 1997b). Since 2008, there have been research publications that address some of these species including goshawks (Smith 2013), wolves (Person and Russell 2008, 2009; Weckworth et al. 2010, 2011; ADF&G 2012; Person and Logan 2012), brown bears (Flynn et al. 2009), marten (Flynn and Schumacher 2009, Pauli et al. 2015), deer (White et al. 2009) and flying squirrels (Flaherty et al.2008, 2010; Pyare et al. 2010; Smith et al. 2011) that may warrant an assessment of the efficacy of the original conservation strategy design criteria. This type of assessment is outside of the scope of the proposed Forest Plan amendment, and would be more appropriately conducted in the context of a Forest Plan revision.

The conservation strategy was designed to maintain a resilient old-growth forest ecosystem in the face of uncertainty, including that associated with climate change. Climate change in Southeast Alaska may result in increased blowdown, increased tree mortality from insects and disease, increased fire frequency and severity, warmer temperatures and decreased precipitation, and greater weather extremes (Haufler et al. 2010, Shanley et al. 2015). These effects are anticipated to result in changes to vegetation and thus, the suitability of wildlife habitats protected by the conservation strategy, although the extent of these changes is unknown. At the time of an overall review of the conservation strategy, the most recent climate science pertaining to Southeast Alaska would be taken into account to ensure its continued efficacy.

Current Status of Land Management on the Tongass

This section describes the land management activities that have altered the context within which the conservation strategy was designed. These include actual timber harvest levels, mapping updates that have resulted in a net increase in the amount of productive old-growth (POG) forest acres on the Tongass, modifications to the conservation strategy since 2008, and Non-NFS land management decisions.

Projected Versus Actual Timber Harvest Levels

The design of the conservation strategy was intended to achieve multiple use objectives by allowing for activities such as timber harvest, recreation, and infrastructure development. Therefore, it was developed in the context of a maximum level of timber harvest assumed over the life of the approved Forest Plan.

However, market conditions and other factors have resulted in harvest levels (in both spatial extent and volume) that are much lower than anticipated. Both the 1997 and 2008 Forest Plan EISs include projections of the amount of original productive old-growth (POG) forest[2] (existing in 1954 prior to large-scale timber harvest) remaining after 100 years (timber sale rotation) based on a decadal Allowable Sale Quantity (ASQ). The conservation strategy was based on an assumed harvest rate of about 83,400 acres per decade. If harvest took place at this rate from 1998 to 2015 and then continued until 2041, approximately 334,600 acres will have been harvested. In contrast, totaling the actual acres harvested from 1998 to 2015 and adding it to the projected harvest of old growth under each of the alternatives would produce a total of 54,400 to 81,600 acres of POG harvest through 2041. The acreage difference between these scenarios would result in between 253,000 and 280,200 acres of unharvested POG by 2041. Thus, many OGRs and non-Development LUDs are surrounded by additional unharvested areas, and matrix lands contain a substantially greater amount of POG than was assumed.

The additional old-growth harvest that would occur under full implementation of the 1997 Forest Plan by 2041 (i.e., 253,000 to 280,200 acres) would result in the need to construct approximately 1,800 miles of new road. This level of new road construction would create much more access, increase road densities, and result in additional habitat fragmentation. For the Tongass, the demand for roads has primarily been a function of the demand for access to timber resources. The maintenance and reconstruction requirements of the existing system depend mainly on the volume of timber hauled and, to a lesser extent, on recreational use. The amount of future new road construction is anticipated to continue to be largely determined by the need to access timber resources, especially old-growth timber.

Overall, the conservation strategy protects slightly more than 90 percent of all existing POG forests on the Tongass National Forest. This percentage assumes that old-growth forest is harvested at the maximum allowable rate in each future decade before sufficient young-growth forest has reached harvestable size and can replace old-growth in the harvest. If this maximum rate does not occur, then the percentage of POG retained will be higher (USDA Forest Service 2008b, p. 3-220).

Ongoing GIS Mapping Updates

GIS mapping updates have resulted in substantial changes in acreages for the Tongass land base and vegetation mapping categories since 2008. The Tongass land base acreage changed as a result of two factors. First, updates were made to improve the accuracy of shoreline mapping and to reflect the land adjustments that occurred since 2008, in particular the land adjustments in the National Defense Authorization Act for Fiscal Year 2015 discussed below. These land base changes have directly affected the acreages in each vegetation category. Second, vegetation mapping is continually being updated; these updates have occurred both opportunistically (i.e., in association with individual projects) and forest-wide. A recent (January 2015), forest-wide update corrected the mapping of a large number of polygons that were incorrectly mapped as size class 3 (young-growth sawtimber, less than 150 years old). As these polygons were older than 150 years old, they were corrected to size class 4, which converted them to productive old growth.

Modifications to the Conservation Strategy Since 2008

Since 2008, one project has included modifications to the system of old-growth reserves. The Big Thorne Timber Sale project, located in north central Prince of Wales Island within the Thorne Bay Ranger District included small old-growth reserve boundary modifications intended to trade areas of inventoried roadless area (which would become Old-growth Habitat LUD) for roaded portions of old-growth reserves (which would become a development LUD and available for timber harvest). Small OGRs were modified in Value Comparison Units (VCU) 5790, 5800, 5810, 5820, 5830, 5850, and 5950, resulting in a net increase of 645 acres of Old-growth Habitat LUD. The Big Thorne FEIS analysis concluded that the old-growth reserve modifications would provide comparable achievement of Old-growth Habitat LUD goals and

[2] Old-growth forest capable of producing at least 20 cubic feet of wood fiber per acre per year, or having greater than 8,000 board feet per acre.

objectives, and therefore assumed that the functioning of the conservation strategy (USDA Forest Service 2013) would be maintained. These modifications amended the 2008 Forest Plan

A correction to the 2008 Forest Plan was made in 2012 (Forest Plan Errata, February 6, 2012), to correct a mapping error for a small OGR in VCU 7470 on the Ketchikan-Misty Fiords Ranger District. As a result of the correction, the size of the small OGR, as well as the acres of POG contained within, increased. No other changes to the spatial distribution, size, and composition of the Old-growth Habitat LUD or other non-development LUDs have occurred since approval of the 2008 Forest Plan Amendment.

External Factors that Have Affected the Conservation Strategy Since 2008

The National Defense Authorization Act for Fiscal Year 2015 conveyed 69,585 acres of NSF forest lands to the Sealaska Native Corporation to fulfil the commitment in the Alaska Native Claims Settlement Act (Public Law 113-2910). The conveyance affected old-growth reserves on Prince of Wales Island and in VCUs 5900, 5940, 6160, 6170, 6180, 6190, 6200, 6750, 6760 and 6850, and two smaller islands to the west (Kosciusko Island [VCUs 5450 and 5460] and Tuxekan Island [VCUs 5560, 5570, 5600 and 5872]). These areas are now non-NFS lands which are managed for timber production. In an effort to address these effects under the proposed Forest Plan amendment, the Forest Service elected to propose boundary modifications to compensate for the loss of OGR acres. An Interagency Old-growth Reserve Review report is included in Appendix E of this EIS which outlines the proposed OGR modifications and rationale. Collectively the boundary modifications result in a net increase in 6,171 acres of OGR and 7,148 acres of POG forest included in the reserve system from existing (post-conveyance) levels.

Another factor affecting the conservation strategy is the 2001 Roadless Area Conservation Rule (Roadless Rule). When the 2008 Forest Plan was approved, the Tongass National Forest was exempt from the requirements of the Roadless Rule per the 2003 Tongass Exemption (68 FR 75136), making the Tongass National Forest exempt from the Rule's prohibitions against timber harvest, road construction, and road reconstruction in inventoried roadless areas. However, the 2008 Record of Decision (ROD) implemented the Timber Sale Program Adaptive Management Strategy that restricted timber sales and associated road construction to the roaded and lower value roadless areas until a certain level of timber harvest was reached in consecutive years. Because the average timber harvest volume on the Tongass National Forest between 2008 and 2014 was well below the initial threshold value, moderate and higher value roadless areas were not available for timber harvest or associated road building during this period. On May 24, 2011, the Alaska District Court vacated the Tongass Exemption and reinstated the 2001 Roadless Rule on the Tongass National Forest (*Organized Village of Kake, et al. v. USDA, et al.,* No. 1:09-cv-00023). The Roadless Rule remains in effect on the Tongass National Forest pursuant to the July 29, 2015, Ninth Circuit Court of Appeals en banc panel decision upholding the district court's 2011 reinstatement of the Roadless Rule (*Organized Village of Kake, et al. v. USDA, et al.,* No. 11-35517, 9th Cir.). Thus, because inventoried roadless areas are administratively designated as not suited for timber production even though the area may fall within a Forest Plan development LUD, timber harvest is prohibited within them. Therefore, inventoried roadless areas maintain additional old-growth forest that augment the amount maintained by the contributing elements of the conservation strategy (USDA Forest Service 2008c, page 21).

Proposed Modifications to Contributing Elements of the Conservation Strategy

This section describes the proposed modifications to the contributing elements of the conservation strategy. The Tongass National Forest timber program has historically focused on economical harvest of old-growth to "seek to meet" demands as directed by TTRA and to provide jobs to local communities in Southeast Alaska. The 2008 Forest Plan (Alternative 1) "plans for" a transition to young-growth timber program in about 32 years, which reflects when the oldest young-growth stand reach Culmination Mean Annual Increment (CMAI). On the Tongass National Forest, the CMAI occurs in stands at approximately 80 to 100 years. Therefore, alternatives proposed young-growth harvest within non-development LUDs, the beach and estuary fringe, RMAs, and other areas within the matrix to speed the transition to young-growth management over the next 10 to 15 years so that at the end of this period the vast majority of

timber sold by the Tongass National Forest will be young-growth. Anticipated transition times range from 12 years under Alternative 2 to 16 years under Alternatives 4 and 5.

Overall Approach to Young-growth Management

The overall approach to young-growth management proposed under the alternatives is to speed the transition to a young-growth based timber program. Young-growth harvest activities would occur within a previously disturbed footprint, necessarily focusing activities in areas of past timber harvest, and would maximize use of existing or decommissioned roads to access harvest units where possible. The associated shift away from POG forest harvest would reduce the amount of future timber harvest and associated activities within intact and/or unroaded areas. This would enhance the conservation strategy by minimizing the expansion of timber harvest into new areas. The alternatives that propose the fastest transition times through more aggressive harvest strategies would result in less new road construction and less timber harvest in new areas than alternatives with longer transition times. This tradeoff is the paramount difference among the alternatives.

Over half of the past timber harvest on the Tongass National Forest occurred in the 1960s and 1970s during the initial period of commercial-scale timber harvest and prior to the adoption of the first Forest Plan in 1979 when relatively few restrictions were in place (USDA Forest Service 2008b). Little protection was afforded to features such as the beach and estuary fringe, RMAs, and other sensitive areas during this time. Although some of the oldest young-growth stands are now suitable for harvest, the vast majority are still too small for commercial harvest. Future young-growth management activities would be required to comply with requirements for maintaining landscape connectivity and protecting steep slopes, high vulnerability soils, karst, and TTRA buffers under the Forest Plan. Thus, young-growth harvest unit size in most cases would be smaller than the original units, and the retention of mature young-growth resulting from implementation of Forest Plan standards and guidelines would provide more habitat value and connectivity on the landscape than had been originally maintained. Additionally, commercial thinning within the beach and estuary fringe and RMAs proposed under the alternatives would enhance the habitat value of these areas by promoting the development of fewer, larger trees.

Old-growth Habitat LUD and Other Non-Development LUDs

The system of old-growth reserves (Old-growth Habitat LUD) and other non-development LUDs was established for the purpose of maintaining a functional and interconnected old-growth ecosystem (p. 3-11, USDA Forest Service 1997c). Of the 5.4 million acres of original (1954) POG that occurred on NFS lands on the Tongass National Forest about 92 percent remains in 2015. About 67 percent of the original acreage is protected within the reserve system. No changes are proposed to the size or spacing of the reserve system or the productive old-growth forest within these areas under the proposed Forest Plan amendment. Moreover, under all of the action alternatives the transition to young-growth management would substantially reduce the long-term POG forest harvest levels, with all of the alternatives retaining approximately 91 percent of the original POG after 100 years of plan implementation.

Currently, limited management of young-growth stands within the Old-growth Habitat LUD and some other non-development LUDs is allowed under the Forest Plan (Alternative 1) when conducted for the purpose of habitat enhancement (e.g., pre-commercial thinning to accelerate stand development toward old-growth conditions and other young-growth treatments to increase connectivity for wildlife). Under Alternatives 1 and 4, forest land in the non-development LUDS is identified as not suited for timber production. Under Alternatives 2, 3, and 5, forest land in non-development LUDS is identified as suited for timber production and commercial young-growth harvest in these LUDs would increase habitat fragmentation and reduce the ecological contribution of young-growth stands to the reserve system by setting back the trajectory toward late seral forest condition and delaying the development of old-growth stand characteristics such as snags, downed logs, and diverse tree canopy layers that most POG-associated species (e.g., marten, goshawks, flying squirrels). Effects would be greatest under Alternatives 2 and 3 which allow multiple entries into harvested stands and are limited in the size of created openings only by scenery issues (intensifying and prolonging effects); effects would be minimized under Alternative 5 which includes a one-time entry constraint and limits the size of created openings to less than 10 acres with maximum removal of up to 35 percent of the acres of the original harvested stand,

allowing the majority of each stand to mature to old-growth conditions after harvest (Tables 1 and 2). Under alternatives 2, 3, and 5, individual OGRs would be modified to compensate for young-growth harvest (e.g., boundary modifications would be made to add acres to the OGR equivalent to the number of acres affected by harvest). No harvest, except potentially salvage and personal use, would occur in OGRs or other non-development LUDs under Alternatives 1 and 4.

In terms of young-growth acres, land identified as suitable for timber production within the Old-growth Habitat LUD and other non-development LUDs comprise a relatively small proportion of the total acres of these LUDs, with a majority of the suitable young-growth acres in the Old-growth Habitat LUD concentrated in the North Central Prince of and East Chichagof Island biogeographic provinces and a majority of the suitable young-growth acres in other non-development LUDs concentrated in the North Central Prince of Wales, West Baranof Island, and Kuiu Island biogeographic provinces (Table 3). These biogeographic provinces are also where past timber harvest was concentrated. Under all alternatives land identified as being suitable for young-growth timber production comprise approximately 3 percent of Old-growth Habitat LUD acres Forest-wide (ranging from <1 percent to 12 percent by biogeographic province, depending on alternative) and less than 1 percent of other non-development LUD acres Forest-wide (0 to 1 percent in any biogeographic province under all alternatives; Table 3). Suitable young-growth stands within OGRs and other non-development LUDS are typically located along the shoreline or inland under existing road systems. These easily accessible stands, particularly when located near other suitable young-growth stands in development LUDs, would be selected to avoid effects to intact, relatively undisturbed POG forest within OGRs and other non-development LUDs.

Table 1
Proposed Young-growth Management in the Old-growth Habitat LUD and other Non-Development LUDs by Alternative.

	Proposed Young-growth Management in Non-development LUDs				Total Projected Harvest (Acres)
Alternative	Non-Development LUDs where Harvest Allowed	Number of Entries	Harvest Opening Limits	Stand Retention Limits	
Alternative 1	NA	NA	NA	NA	0
Alternative 2	Non-development LUDs[1]	Multiple	Limited by Scenery only	None	45,684
Alternative 3	Non-development LUDs[1]	Multiple	Limited by Scenery only	None	41,671
Alternative 4	NA	NA	NA	NA	0
Alternative 5	Old-growth Habitat LUD	One-time	10 acres or less	Maximum removal of 35 percent of original harvested stand acres	1,796

Note: NA = not applicable
[1] Does not include Experimental Forest, LUD II, Municipal Watershed, National Monument, Research Natural Area, Wilderness Monument, Wild River, and Wilderness

Young-growth forest stands have ecological values which contribute to the functioning of the reserve system. However, at the time of its development in 1997 it was assumed that the conservation strategy would maintain a functional and interconnected old-growth forest ecosystem without the additional contribution of previously harvested areas, either as young-growth or over time as these stands matured to old-growth condition. For this reason, and due to the spatial distribution and quantity of suitable young-growth acres, harvest in the Old-growth Habitat LUD and other non-development LUDs proposed under Alternatives 2, 3, and 5 would be expected to have a very low risk for Alternatives 2 and 3 and an almost zero risk for Alternative 5, of reducing the ability of the reserve system to maintain a functional and interconnected old-growth ecosystem, Therefore, all of the alternatives would maintain the integrity of the conservation strategy by maintaining the functioning of this contributing element.

Table 2
Proposed Young-growth Harvest by Treatment by Alternative.

Category	Period	Acres by Treatment				
		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Beach and Estuary Fringe	1st 15 years	0 ac	11,268 CC ac	7,950 CT ac	5,454 CT ac	3,546 GS ac
	Last 85 years	0 ac	19,624 CT ac	33,508 CT ac	9,410 CT ac	0 ac
Old-growth Habitat LUD	1st 15 years	0 ac	3,150 CC ac	2,216 CC ac	0 ac	1,796 GS ac
	Last 85 years	0 ac	29,650 CC ac	26,934 CC ac	0 ac	0 ac
RMA	1st 15 years	0 ac	1,632 CT ac	0 ac	0 ac	882 GS ac
	Last 85 years	0 ac	34,459 CT ac	0 ac	0 ac	0 ac

[1] CC = Clearcut; GS = Group Selection; CT = Commercial Thin

Note:

For CT, only 33% of the stand is removed; therefore, 1,000 ac of CT is roughly equivalent to removing 333 ac of trees spread over 1,000 ac

For GS, only 35% of the stand is removed in patches no larger than 10 ac; so 1,000 ac of GS is roughly equivalent to removing 350 acres of trees in patches spread over 1,000 ac

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Table 3
Spatial Distribution of Suitable Young-growth Acres within the Old-growth Habitat LUD and other Non-Development LUDs by Biogeographic Province and Alternative.

		Suitable Young-growth[1,2] in the Old-growth Habitat LUD (Young-growth Acres and % of Existing LUD acres)								Suitable Young-growth[1,2] in Other Non-development LUDs[3] (Young-growth Acres and % of Existing LUD acres)					
	Biogeographic Province	Alts 1 and 4		Alt 2		Alt 3		Alt 5		Alts 1, 4 and 5		Alt 2		Alt 3	
1	Yakutat Forelands	0	0%	5	<1%	5	<1%	5	0%	0	0%	19	<1%	19	<1%
2	Yakutat Uplands	0	0%	0	0%	0	0%	0	0%	0	0%	257	<1%	255	<1%
3	East Chichagof Island	0	0%	7,269	4%	4,971	2%	6,806	3%	0	0%	210	<1%	138	<1%
4	West Chichagof Island	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
5	East Baranof Island	0	0%	1,446	3%	1,143	3%	1,254	3%	0	0%	101	<1%	101	<1%
6	West Baranof Island	0	0%	2,445	2%	1,481	1%	2,365	2%	0	0%	2,831	1%	2,097	<1%
7	Admiralty Island	0	0%	0	0%	0	0%	0	0%	0	0%	22	<1%	69	<1%
8	Lynn Canal	0	0%	1,012	3%	383	1%	960	3%	0	0%	30	<1%	29	<1%
9	North Coast Range	0	0%	0	0%	0	0%	0	0%	0	0%	18	<1%	194	<1%
10	Kupreanof/Mitkof Island	0	0%	2,967	3%	2,834	3%	2,463	2%	0	0%	624	<1%	603	<1%
11	Kuiu Island	0	0%	1,123	4%	1,077	4%	1,044	4%	0	0%	1,414	<1%	1,346	<1%
12	Central Coast Range	0	0%	58	<1%	57	<1%	58	0%	0	0%	573	<1%	473	<1%
13	Etolin Island & Vicinity	0	0%	2,876	2%	2,798	2%	2,519	2%	0	0%	0	0%	0	0%
14	North Central Prince of Wales	0	0%	14,059	6%	13,258	5%	12,694	5%	0	0%	5,825	2%	5,518	2%
15	Revilla Island/ Cleveland Pen.	0	0%	2,372	2%	2,429	2%	2,014	2%	0	0%	999	<1%	1,269	<1%
16	Southern Outer Islands	0	0%	688	5%	666	4%	657	4%	0	0%	905	1%	853	1%
17	Dall Island and Vicinity	0	0%	0	0%	0	0%	0	0%	0	0%	271	<1%	268	<1%
18	South Prince of Wales	0	0%	337	1%	383	1%	282	1%	0	0%	154	<1%	153	<1%
19	North Misty Fiords	0	0%	272	5%	102	2%	272	5%	0	0%	55	<1%	55	<1%
20	South Misty Fiords	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
21	Ice Fields	0	0%	1,378	12%	867	8%	1,378	12%	0	0%	103	<1%	49	<1%
	Forest-wide	**0**	**0%**	**38,309**	**3%**	**32,454**	**3%**	**34,771**	**3%**	**0**	**0%**	**14,411**	<1%	**13,488**	<1%

[1] Suitable young growth is defined as young-growth stands growing on lands determined to be appropriate for timber production, based on the desired conditions applicable to those lands. Suitability excludes lands where timber production is prohibited by statute, Executive order, or regulation; lands withdrawn from timber production; where technology is not currently available for conducting timber harvest without causing irreversible damage to soil, slope, or other watershed conditions; where there is no reasonable assurance that such lands can be adequately restocked within 5 years after final regeneration harvest; and that is not forest land.
[2] For modeling purposes, it was assumed, based on an evaluation of economics, that the minimum harvestable age for young growth is 65 to 75 years old, depending on site index.
[3] Does not include Experimental Forest, LUD II, Municipal Watershed, National Monument, Research Natural Area, Wilderness Monument, Wild River, and Wilderness

Standards and Guidelines

This section describes the proposed modifications to contributing elements of the conservation strategy that are specifically addressed through Forest Plan standards and guidelines.

Beach and Estuary Fringe

The beach and estuary fringe is a 1,000-ft wide corridor adjacent to saltwater shorelines; it is consists of POG, but is also comprised of unproductive forest and non-forest types. It serves as a transition zone between interior forest and saltwater influences, and as such is distinguished as a separate ecosystem (microclimate) within the larger old-growth forest ecosystem. It is considered a high value habitat for many species including brown bears, black bears, bald eagles, goshawks, deer, marten, and others (Appendix D, USDA Forest Service 2008b). The beach and estuary fringe also provides horizontal or low-elevation connectivity between watersheds, many of which otherwise have very steep slopes and/or non-forested ridge tops, offering important travel corridors for wildlife. Although not explicitly discussed in the conservation strategy, the beach and estuary fringe also provides an important function to the marine and estuarine environment by reducing downslope effects to marine waters (e.g., sediment runoff), shading shoreline beach areas, providing large-woody debris and other organic inputs to the marine and estuarine systems, and providing bank stability (root system of large trees). The beach and estuary fringe is particularly critical on the Tongass National Forest given the extensive amount of shoreline (more than 17,000 miles) that exists on more than 22,000 islands. Young-growth stands within the beach and estuary fringe comprise lower value habitat for old-growth associated wildlife species; however, they maintain functional connectivity for the movement and dispersal of wildlife and serve as buffers between areas of suitable habitat and human activity. It can be assumed that the integrity of the conservation strategy is maintained when the beach and estuary fringe continues provide these functions (i.e., acts as a transition zone between interior forest and saltwater influences, provides landscape connectivity, and provides water quality and habitat benefits to the marine environment).

The 2008 Forest Plan includes forest-wide Beach and Estuary Fringe standards and guidelines that prohibit timber harvest within 1,000 feet inland from mean high tide. This buffer was intended to provide effective landscape linkages to enhance the reserve system, protect bald-eagle habitat, buffer the primary beach fringe zone (0 to 500 feet of the shoreline) from wind throw, maintain a functional interior forest zone within the beach fringe, and sustain habitats for goshawks (Appendix D, USDA Forest Service 2008b). Currently, limited management of young-growth stands within the beach and estuary fringe is allowed under the Forest Plan (Alternative 1) when conducted for the purpose of habitat enhancement (e.g., pre-commercial thinning to accelerate stand development toward old-growth conditions).

Under Alternatives 2, 3, 4, and 5 forest land in the beach and estuary fringe is identified as suitable for young-growth timber production, and commercial young-growth harvest and road construction/reconstruction in the beach and estuary fringe is allowed under these alternatives (Table 4). Young-growth harvest in the beach and estuary fringe has the potential to locally decrease buffer width and reduce its effectiveness in facilitating the movement of organisms across the landscape and providing habitat for wildlife species that are negatively affected by edge. Alternatives that allow clearcutting (Alternative 2), group selection (Alternative 5), or the greatest amounts of road construction/reconstruction (Alternatives 2 and 3) are most likely to increase habitat fragmentation if openings are too large to be crossed by species with limited dispersal capabilities. Young-growth harvest would also delay the development of old-growth stand characteristics in the beach and estuary fringe.

Table 4
Proposed Young-growth Management in the Beach and Estuary Fringe by Alternative.

	Beach and Estuary Fringe Management Approach					
Alternative	Number of Entries	Harvest Opening Limits	Stand Treatments and Timing Restrictions[1]	Timber Removal Limits	Additional Measures	Projected Harvest over 100 yrs (Acres)
Alternative 1	NA	NA	NA	NA	NA	0
Alternative 2	Multiple	Limited by Scenery only	CC for first 15 years; CT thereafter	None	1,000-foot-wide corridor adjacent to even-aged harvest units	30,892
Alternative 3	Multiple	NA	CT only (no time limit)	Maximum removal of 33 percent basal area	None	41,489
Alternative 4	Multiple	NA	CT only (no time limit)	Maximum removal of 33 percent basal area	None	14,865
Alternative 5	One-time	Less 10 acres	GS or CT for first 15 years	Maximum removal of up to 35 percent of original stand acres	200-ft buffer adjacent to shoreline	3,546

Note: NA = not applicable
[1] CC = Clearcut; GS = Group Selection; CT = Commercial Thin

The most intensive young-growth harvest in the beach and estuary fringe would occur under Alternative 2 which proposes the greatest amount of harvest acres and would allow clearcutting to the shoreline during the first 15 years after plan approval and commercial thinning thereafter (Table 2). However, Alternative 2 includes the following management approach: When even-aged management of young growth occurs in the beach and estuary fringe, the intent is to maintain an approximate 1,000-foot wide protected corridor adjacent and inland of the harvest unit to function as an alternate, low elevation, forested habitat and corridor. This corridor should be in POG or young-growth, where present, that meets the objectives of the beach fringe, and should be located less than 800 feet in elevation. Beach and estuary standards and guidelines would apply as if this were the original beach buffer. Effects under this alternative would be long-term as multiple entries into stand would be allowed.

Less intensive effects to the beach and estuary fringe would occur under Alternatives 3 and 4 (second and third most young-growth acres proposed for harvest, respectively) which would allow commercial thinning (multiple entries) throughout Forest Plan implementation (Tables 2 and 4). Commercial thinning would maintain more of the functions of the beach and estuary fringe than clearcutting or group selection; however, some harvested stands would be managed (i.e., could have more than one entry) over the long-term (i.e., 60 or more years after initial entry).

The lowest effects to the beach and estuary fringe would occur under Alternative 5 which proposes the least amount of harvest. Although Alternative 5 would allow group selection or commercial thinning, harvest would be limited to the first 15 years after Forest Plan approval (Tables 2 and 4) and only 3,550 acres of young-growth are projected to be managed (with no more than 35 percent of each stand harvested). Alternative 5 also includes a 200-foot-wide forested buffer along the shoreline adjacent to harvest units which would continue to protect some old-growth forest in the beach and estuary fringe (connectivity and habitat) while harvested stand mature. Thus, the functioning of the beach and estuary fringe may be reduced in places due to the reduced buffer, but effects would be short-term and more localized.

Overall, suitable young-growth comprises a small portion of the total amount of beach and estuary fringe within each biogeographic province, most of which occurs in the Etolin Island and Vicinity, North Central Prince of Wales, and Revilla Island/Cleveland Peninsula biogeographic provinces (Table 5). Forest-wide approximately 2 to 4 percent of the beach fringe consists of suitable young-growth, ranging from 0 to 9

percent by biogeographic province (Table 5). Moreover, projected harvest would range from approximately 41,490 acres of commercial thinning (this assumes multiple entries in some stands; all impacts within 4 percent of the Forest-wide beach and estuary fringe) under Alternative 3 to 3,550 acres under Alternative 5 (less than 1 percent of the Forest-wide beach and estuary fringe). Due to the localized nature of anticipated effects, under all of the alternatives the beach and estuary fringe would continue to act as a transition zone between interior forest and saltwater influences, maintain landscape connectivity, and provide benefits to the marine environment across the planning area. Therefore, it would be expected that there may be localized reductions in the ability of the beach and estuary fringe to function as intended under the conservation strategy under each of the alternatives but Forest-wide effects would not measurably reduce the functioning of this contributing element of the conservation strategy.

Table 5
Spatial Distribution of Suitable Young-growth in the Beach and Estuary Fringe by Biogeographic Province and Alternative.

Biogeographic Province		Suitable Young-growth[1,2] in the Beach Fringe (Young-growth Acres and % of Existing Acres of Beach Fringe)									
		Alt 1		Alt 2		Alt 3		Alt 4		Alt 5	
1	Yakutat Forelands	0	0%	13	0%	13	0%	6	0%	12	0%
2	Yakutat Uplands	0	0%	0	0%	0	0%	0	0%	0	0%
3	East Chichagof Island	0	0%	3,757	5%	1,866	2%	909	1%	2,729	4%
4	West Chichagof Island	0	0%	0	0%	0	0%	0	0%	0	0%
5	East Baranof Island	0	0%	2,753	8%	1,876	5%	1,293	4%	2,046	6%
6	West Baranof Island	0	0%	2,144	2%	1,499	2%	300	0%	525	1%
7	Admiralty Island	0	0%	22	0%	65	0%	0	0%	0	0%
8	Lynn Canal	0	0%	472	2%	238	1%	22	0%	375	2%
9	North Coast Range	0	0%	142	0%	64	0%	0	0%	77	0%
10	Kupreanof/Mitkof Island	0	0%	3,950	8%	3,865	8%	820	2%	2,605	5%
11	Kuiu Island	0	0%	1,735	2%	1,685	2%	520	1%	1,153	1%
12	Central Coast Range	0	0%	1,057	4%	961	3%	391	1%	488	2%
13	Etolin Island & Vicinity	0	0%	5,409	9%	5,320	9%	3,520	6%	3,946	7%
14	North Central Prince of Wales	0	0%	8,818	9%	8,407	9%	5,108	5%	5,054	5%
15	Revilla Island/ Cleveland Pen.	0	0%	6,570	6%	6,500	6%	4,444	4%	4,268	4%
16	Southern Outer Islands	0	0%	1,419	3%	1,308	3%	1,275	3%	1,065	2%
17	Dall Island and Vicinity	0	0%	161	1%	160	1%	0	0%	0	0%
18	South Prince of Wales	0	0%	754	1%	702	1%	272	0%	419	1%
19	North Misty Fiords	0	0%	80	0%	78	0%	1	0%	29	0%
20	South Misty Fiords	0	0%	0	0%	0	0%	0	0%	0	0%
21	Ice Fields	0	0%	0	0%	0	0%	0	0%	0	0%
	Forest-wide	**0**	**0%**	**39,257**	**4%**	**34,608**	**3%**	**18,879**	**2%**	**24,791**	**2%**

[1] Suitable young growth is defined as young-growth stands growing on lands determined to be appropriate for timber production, based on the desired conditions applicable to those lands. Suitability excludes lands where timber production is prohibited by statute, Executive order, or regulation; lands withdrawn from timber production; where technology is not currently available for conducting timber harvest without causing irreversible damage to soil, slope, or other watershed conditions; where there is no reasonable assurance that such lands can be adequately restocked within 5 years after final regeneration harvest; and that is not forest land.

[2] For modeling purposes, it was assumed, based on an evaluation of economics, that the minimum harvestable age for young growth is 65 to 75 years old, depending on site index.

Appendix D

Riparian Management Areas

Riparian areas are the corridors along streams and rivers which provide an interface between upland forests and riverine influences, distinguishing them as a unique ecosystem within the larger old-growth forest ecosystem. Riparian areas support some of the most productive stands of old-growth on the Tongass National Forest, and provide habitat for species associated with aquatic environments (e.g., amphibians and furbearers such as river otters) and terrestrial species for which fish are an important food sources (e.g., brown bears and black bears). Riparian areas follow the dendritic nature of river systems and provide forested corridors connecting higher elevation regions in upper watersheds with lower elevation forests in the valley bottoms, providing connectivity within watersheds. Young-growth stands within the riparian areas comprise lower value habitat for old-growth associated wildlife species; however, they maintain functional connectivity for the movement and dispersal of wildlife and serve as buffers between areas of suitable habitat and human activity.

Riparian areas are protected through use of the Fish and Riparian Standards and Guidelines that prohibit timber harvest within a certain distance of streams (depending on stream type or process group). These areas include the 1990 TTRA 100-foot-wide buffers and additional distances intended to preserve the functions of the riparian areas with the sum of both designated as RMA (Section 102 of TTRA). They are intended to maintain anadromous fish habitat (e.g., supplying large-woody debris), maintain water quality (shading, reducing sediment runoff), and provide elevational connectivity within watersheds (Appendix D, USDA Forest Service 2008b). It can be assumed that the integrity of the conservation strategy is maintained when riparian areas continue to support aquatic and terrestrial habitats, maintain water quality and provide landscape connectivity. .Currently, limited management of young-growth stands within RMAs is allowed under the 2008 Forest Plan (Alternative 1) when conducted for the purpose of habitat enhancement (e.g., pre-commercial thinning to accelerate stand development toward old-growth conditions).

Commercial young-growth harvest and road construction/reconstruction in the RMA (outside of TTRA buffers), is proposed under alternatives 2 and 5; no young-growth harvest would occur in the RMA under alternatives 1, 3, and 4 (Tables 2 and 6). Alternative 2 would allow commercial thinning throughout the life of the Forest Plan. Alternative 5 would be more intense in that it would allow group selection or commercial thinning within RMAs, but only during the first 15 years after Forest Plan approval. Young-growth harvest in the RMA has the potential to locally decrease buffer width and reduce its effectiveness in facilitating the movement of organisms across the landscape and reduce the function of riparian areas. Young-growth harvest would also delay the development of old-growth stand characteristics in RMAs. Effects to the conservation strategy would be least under Alternative 5 due to the one-time entry constraint and limited number of harvested acres (Table 6). Under both alternatives, TTRA buffers would continue to protect aquatic systems and maintain functions such as large-woody debris input, shading, and nutrient inputs to streams. Additionally TTRA buffers would maintain elevational connectivity, though locally at a reduced level through narrower corridors.

Overall, suitable young-growth comprises a small portion of the total amount of RMA (outside of TTRA buffers) within each biogeographic province. Suitable young-growth in RMAs is spread throughout the forest, with larger concentrations occurring in the North Central Prince of Wales, West Baranof Island, and East Baranof Island biogeographic provinces (Table 7). Forest-wide approximately 4 percent of the RMAs consists of suitable young-growth, ranging from 0 to 13 percent by biogeographic province (Table 7). Moreover, projected harvest would range from approximately 36,990 acres under Alternative 2 (assumes multiple entries; all impacts within 4 percent of the Forest-wide amount of RMA outside of TTRA) to approximately 880 acres under Alternative 5 (less than 1 percent of the Forest-wide amount of RMA outside of TTRA). Due to the localized nature of anticipated effects, under all of the alternatives riparian areas would continue to maintain aquatic and terrestrial habitats, maintain water quality, and provide landscape connectivity across the planning area. Therefore, it would be expected that there may be localized reductions in the ability of the beach and estuary fringe to function as intended under the conservation strategy under each of the alternatives but Forest-wide effects would not measurably reduce the functioning of this contributing element of the conservation strategy.

Table 6
Proposed Young-growth Management in Riparian Management Areas (Outside of TTRA buffers) by Alternative.

Alternative	RMA Management Approach					Total Projected Harvest (Acres)
	Number of Entries	Harvest Opening Limits	Stand Treatments and Timing Restrictions[1]	Timber Removal Limits	Additional Measures	
Alternative 1	NA	NA	NA	None	NA	0
Alternative 2	Multiple	NA	CT only (no time limit)	None	NA	36,092
Alternative 3	NA	NA	NA	None	NA	0
Alternative 4	NA	NA	NA	None	NA	0
Alternative 5	One-time	< 10 acres	GS or CT for first 15 years	Maximum removal of up to 35 percent of original harvested stand acre	NA	882

Note: NA = not applicable
[1] CC = Clearcut; GS = Group Selection; CT = Commercial Thin

Table 7
Spatial Distribution of Suitable Young-growth in Riparian Management Areas by Biogeographic Province and Alternative.

	Biogeographic Province	Suitable Young-growth[1,2] in RMAs Outside of TTRA Buffers (Young-growth Acres and % of Existing Acres of RMA)					
		Alts 1, 3, and 4		Alt 2		Alt 5	
1	Yakutat Forelands	0	0%	37	0%	37	0%
2	Yakutat Uplands	0	0%	29	0%	27	0%
3	East Chichagof Island	0	0%	13,686	11%	13,069	10%
4	West Chichagof Island	0	0%	0	0%	0	0%
5	East Baranof Island	0	0%	4,016	13%	3,758	12%
6	West Baranof Island	0	0%	5,076	9%	4,295	7%
7	Admiralty Island	0	0%	0	0%	0	0%
8	Lynn Canal	0	0%	2,231	4%	2,213	4%
9	North Coast Range	0	0%	133	0%	81	0%
10	Kupreanof/Mitkof Island	0	0%	675	3%	581	2%
11	Kuiu Island	0	0%	1,022	5%	949	4%
12	Central Coast Range	0	0%	1,037	2%	887	2%
13	Etolin Island & Vicinity	0	0%	893	4%	793	4%
14	North Central Prince of Wales	0	0%	7,859	11%	7,272	10%
15	Revilla Island/ Cleveland Pen.	0	0%	2,112	3%	1,874	2%
16	Southern Outer Islands	0	0%	468	7%	387	6%
17	Dall Island and Vicinity	0	0%	4	0%	0	0%
18	South Prince of Wales	0	0%	196	1%	166	1%
19	North Misty Fiords	0	0%	368	1%	367	1%
20	South Misty Fiords	0	0%	0	0%	0	0%
21	Ice Fields	0	0%	1,137	2%	1,083	2%
	Forest-wide	**0**	**0%**	**40,978**	**4%**	**37,841**	**4%**

[1] Suitable young growth is defined as young-growth stands growing on lands determined to be appropriate for timber production, based on the desired conditions applicable to those lands. Suitability excludes lands where timber production is prohibited by statute, Executive order, or regulation; lands withdrawn from timber production; where technology is not currently available for conducting timber harvest without causing irreversible damage to soil, slope, or other watershed conditions; where there is no reasonable assurance that such lands can be adequately restocked within 5 years after final regeneration harvest; and that is not forest land.
[2] For modeling purposes, it was assumed, based on an evaluation of economics, that the minimum harvestable age for young growth is 65 to 75 years old, depending on site index.

Legacy Forest Structure

The Legacy Forest Structure (Legacy) standard and guideline was added to the Forest Plan in 2008, and was intended as an ecological approach to Forest-wide retention of old-growth habitat characteristics (e.g., large trees, downed logs, and snags) in high risk biogeographic provinces. The Legacy standard and guideline evolved from considerations presented at the Interagency Conservation Strategy Review workshop (USDA Forest Service 2007) and replaced species-specific goshawk foraging and marten standards and guidelines. It applies to seven biogeographic provinces that have had or are anticipated to have high levels of timber harvest (a list is provided in the Forest Plan; USDA Forest Service 2008a) for harvest openings greater than 20 acres in size.

Alternatives 2, 3, 4, and 5 would include the Legacy standard and guideline as written with a proposed clarification that the list of VCUs where the Legacy standards and guidelines apply should be verified during project-specific planning and analysis based on harvest standards above. The proposed clarifications to the Legacy Forest Structure standard and guideline would continue to maintain habitats used by old-growth associated species in the VCUs where it applies.

Wildlife

Alternatives 2, 3, 4, and 5 propose a revision to the Goshawk standards and guidelines which address nesting habitat. These standards and guidelines expand the requirement to maintain 100 acres of POG forest surrounding a nest tree or nest site to include the largest diameter young-growth forest if POG alone is not sufficient. The proposed modification would provide greater protection to goshawks and their habitat, and therefore would strengthen this standard and guideline.

Other Non-wildlife Standards and Guidelines

There are a number of other standards and guidelines which preclude or significantly limit timber harvest to protect resources other than wildlife. They apply to areas of high hazard soils, steep slopes, kart terrain, visually sensitive travel routes and use areas (scenic integrity objectives (SIO)) and timber stands that are technically not feasible to harvest. Although the retention of old-growth forest provided by these standards and guidelines enhances the conservation strategy, the conservation strategy was designed without consideration of their contribution (Appendix D, USDA Forest Service 2008b).

Alternatives that modify non-wildlife standards and guidelines to make young-growth available for harvest would reduce the amount of the “additional” retention of forest within the matrix; however, they would not result in additional POG harvest. Alternatives 2, 3, and 4 would allow commercial thinning of young-growth in high vulnerability karst areas. Alternatives 2, 3, and 5 would relax the SIO to varying degrees for young-growth harvest. Given that the contributions of non-wildlife standards and guidelines were not considered in the development of the conservation strategy, modifications to these Forest Plan components would have no effect on the functioning of the conservation strategy.

Integrity of the Conservation Strategy

Land management on the Tongass National Forest presents a careful balance between ecological, economic, and social (community) values. The conservation strategy is intended to maintain ecological values, while allowing other multiple uses (e.g., timber production, renewable energy/infrastructure development, recreation, tourism, mining, and subsistence) to occur on the Tongass National Forest. As such, the conservation strategy is not “risk free” but is intended to balance an acceptable level of risk in ensuring support of well-distributed, viable wildlife populations while meeting the requirements of the National Forest Management Act (PL 86-517; 16 USC §528) and Multiple Use Sustainable Yield Act (PL 94-588; 16 USC §1600).

Overall, the conservation strategy is functioning under conditions that are much better than anticipated at the time of its development. Actual and projected old-growth harvest levels under the current Forest Plan (Alternative 1) are far below levels predicted under the 1997 Forest Plan, which formed the context within which the conservation strategy was intended to function. This has occurred largely because of economics and a significant decline in the timber industry. Moreover, with the Roadless Rule in effect, inventoried roadless areas (approximately 2,148,000 acres of development LUDs in roadless areas containing about

828,000 acres of POG) make an additional contribution to the maintenance of ecological function on the Tongass National Forest but do so outside of the elements of the conservation strategy. As a result of these factors, the Tongass contains about 111,000 more acres of POG today, than was predicted under full implementation of the 1997 Forest Plan. In 2041, about 25 years after implementation of the 2016 Forest Plan Amendment, the Tongass would contain about 253,000 to 280,000 more acres of POG (depending on the alternative) than was predicted under full implementation (Table 8). Further, in 2070, when the vast majority of suitable old growth would have been harvested with full implementation of the 1997 Plan, the Tongass would contain about 331,000 to 362,000 more acres of POG.

These additional acres of POG occur in the matrix; no POG in the reserves of the conservation strategy will have been affected. Because many of these POG acres will occur in small to large patches, mostly within roadless areas, they will function as additional reserves. Other smaller patches will occur adjacent to harvest units and will result in increased effectiveness of the matrix.

Proposed modifications to contributing elements of the conservation strategy (e.g., beach and estuary fringe, RMAs, and non-development LUDs) under Alternatives 2, 3, 4, and 5 have the potential to result in localized reductions in the functioning of these elements. That is, young-growth harvest may locally alter forest structure and reduce connectivity, but the beach and estuary fringe and RMAs would continue to function as intended across the planning area by serving as ecological transition zones, maintaining freshwater and marine aquatic and terrestrial habitat, and providing landscape connectivity. Additionally, as noted above, the transition to young-growth management would result in a significant reduction in the amount of projected old-growth harvest. Therefore, none of the alternatives would reduce the ability of the conservation strategy to maintain a functional and interconnected old-growth ecosystem across the planning area and the overall functioning of the conservation strategy in terms of its ability to maintain viable, well-distributed populations of wildlife across the planning area would not be affected.

Under all of the alternatives the extent of localized effects to contributing elements of the conservation strategy would depend on project-level decisions and strategic implementation of standard and guidelines, such as the landscape connectivity standard and guideline, which are intended to provide important safeguards towards ensuring the sustainability of populations of old-growth associated species. The consideration of geographic scale is important on the Tongass National Forest because it is an island ecosystem, with individual islands functioning as metapopulations (many independent populations with limited interchange) for some species. The responsibility for ensuring the effectiveness of the conservation strategy at smaller scales (i.e., biogeographic provinces or groups of island), and ensuring that a localized effect does not become significant, falls on decisions made at the project scale taking into account the advantages and limitations of individual landscapes. Some portions of the planning area have experienced disproportionate amounts of timber harvest and associated development (e.g., the North Central Prince of Wales biogeographic province). These areas require more careful project planning to ensure that wildlife populations, particularly those with source populations in highly affected areas (e.g. Alexander Archipelago wolf) or those with limited ranges (e.g., Prince of Wales flying squirrel, Prince of Wales spruce grouse, and other endemic species) continue to be supported at a local level. Thus, the primary difference among alternatives is how the transition to young-growth management would be reached (timing, intensity, and extent of old vs. young-growth harvest), and thus they vary in terms of how well the integrity of the conservation strategy is maintained.

The following paragraphs summarize the ability of each alternative to maintain the integrity of the conservation strategy starting with the current Forest Plan (Alternative 1). The action alternatives are then described in order of the level of risk they present for resulting in localized reductions in the functioning of contributing elements of the conservation strategy, from greatest to least risk.

Under Alternative 1, the current Forest Plan, the integrity of the conservation strategy would be maintained because no modifications to its contributing elements are proposed. The conservation strategy would continue to function as designed, and therefore it is expected that viable, well-distributed wildlife populations would be maintained across the planning area (USDA Forest Service 2008b). The level of old-growth harvest would be much lower than allowed by the existing Forest Plan, in order to transition toward a greater level of young-growth harvest. However, Alternative 1 would not expedite the

transition to young-growth management to the degree of the action alternatives, and therefore, would result in the greatest amount of old-growth timber harvest among the alternatives.

Alternative 2 would have the greatest risk of resulting in localized reductions in the functioning of contributing elements of the conservation strategy because it would result in the most young-growth harvest, would allow clearcutting young growth in non-Development LUDs, would allow clearcutting young growth in the beach and estuary fringe for the first 15 years after Forest Plan approval, and would allow commercial thinning of young growth in RMAs (Table 8). Alternative 2 would mitigate beach fringe harvest by shifting the beach and estuary fringe inland, maintaining some level of connectivity between watersheds but reducing its ability to serve as a transitional zone between interior forest and marine influence. Alternative 2 would result in the shortest transition time (about 12 years) and would therefore result in the lowest amount of old-growth harvest, minimizing the amount of new road construction and POG harvest in undeveloped/intact areas.

Alternative 3 would have the second greatest risk of localized reductions in the functioning of contributing elements of the conservation strategy. It would result in the second highest amount of young-growth harvest, but unlike Alternative 2 would not allow clearcutting in the beach and estuary fringe (commercial thinning only) or any harvest in RMAs. However, this alternative would involve the greatest amount of road construction/reconstruction some of which would occur within the beach and estuary fringe. Alternative 3 would result in the second shortest transition time (about 13 years), and therefore would result in the second lowest amount of POG harvest (Table 8).

Alternative 5 would have the third greatest risk of localized reductions in the functioning of contributing elements of the conservation strategy. It would allow group selection or commercial thinning of young growth in the beach and estuary fringe and RMAs but only during the first 15 years after Forest Plan approval; effects to wildlife habitat and connectivity would be minimized by limiting the size of harvest openings, allowing removal of a maximum of 35 percent of a previously harvested stand, and implementing a one-time entry stipulation. Additionally, Alternative 5 would maintain a beach and estuary buffer, albeit at a reduced width (200-feet-wide), adjacent to the shoreline, which would maintain some connectivity. Alternative 5 would allow young-growth harvest in the Old-growth Habitat LUD during the first 15 years after Forest Plan approval, but would not allow harvest in any other non-development LUD (Table 8). Alternative 5 would result in the third shortest transition time (about 16 years), and would result in the third lowest amount of POG harvest.

Alternative 4 would have the lowest risk of localized reductions in the functioning of contributing elements of the conservation strategy because no harvest would occur in any non-development LUD or within RMAs, and only commercial thinning of young growth would be allowed within the beach and estuary fringe. Alternative 4 would affect the smallest land base (Phase I lands only), and would result in the third shortest transition time (about 16 years; same as Alternative 5), but with the least amount of total harvest (Table 8).

One of the objectives of the 2008 Forest Plan was to “”[P]rovide sufficient habitat to preclude the need for listing of species under the Endangered Species Act, or from becoming listed as Sensitive due to National Forest habitat conditions” (USDA Forest Service 2008a p. 2-4). Although no terrestrial species in Southeast Alaska are listed under the ESA, petitions have been filed for the Alexander Archipelago wolf (2011), Queen Charlotte goshawk (1994), and Prince of Wales flying squirrel (2011). The conservation strategy was designed to conserve, and thereby avoid the need to list these and other old-growth associated species. All of the alternatives are expected to maintain a functional and interconnected old-growth ecosystem, capable of supporting well-distributed, viable wildlife populations of wildlife across the planning area; therefore none of them are expected to increase the likelihood of species listing under the ESA.

Monitoring, the systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships (36 CFR 219.19), is a quality control process for implementation of the Tongass Forest Plan. It provides the public, the Forest Service, and other involved resource agencies with information on the progress and results of Forest Plan implementation. As such, monitoring, along with the evaluation of that monitoring, comprise an essential feedback mechanism within an adaptive management framework to keep the Forest Plan dynamic and responsive to changing conditions. The evaluation process also provides feedback that can trigger corrective action, adjustment of plans and budgets, or both, to facilitate feasible and meaningful action on the ground.

The Forest Plan monitoring program is an important mechanism for confirming that the transition to young-growth management is achieving the desired effects. It allows the Forest Service to respond to new information and/or changing conditions, thereby working to ensure that there are no unintended consequences of the transition to a young-growth based timber program. The monitoring program is being modified concurrently with the proposed Forest Plan amendment to meet the requirements of the 2012 Planning Rule (Forest Service Handbook 1909.12, chapter 30, section 32.3). The Forest Service is developing monitoring questions associated with biodiversity, wildlife, and streams and fish habitat (among other topics) which speak to the effects of young-growth management. Draft monitoring questions address the ability of young-growth harvest to improve habitat for wildlife and timber production, and the ability of riparian vegetation to support key riparian functions. Monitoring data will allow the Forest Service to evaluate and change silvicultural prescriptions and other practices as needed to ensure continued functioning of contributing elements of the conservation strategy across the planning area.

Table 8
Summary of Effects by Alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Projected acres of POG harvested under 1997 Forest Plan through 2041	334,632	334,632	334,632	334,632	334,632
Actual acres of POG harvested from 1997 to 2014 plus projected acres of POG harvest under FP Amendment through 2041	81,607	54,397	55,322	64,102	64,692
Total Projected Young-growth Harvest under the FP Amendment through 2041	7,271	69,362	52,094	37,073	37,390
Estimated Transition to Young-growth Management	32 years	12 years	13 years	16 years	16 years
Percent of Acres Suitable for Young-growth Harvest Old-growth Habitat LUD	0%	3%	3%	0%	3%
Percent of Acres Suitable for Young-growth Harvest in Other Non-Development LUDs	0%	<1%	<1%	0%	0%
Projected Young-growth Harvest in Non-Development LUDs	0	45,684	41,671	0	1,796
Percent of Acres Suitable for Young-growth Harvest in Beach and Estuary Fringe	0%	4%	3%	2%	2%
Projected Young-growth harvest in Beach and Estuary Fringe	0	30,892	41,489	14,865	3,546
Percent of Acres Suitable for Young-growth Harvest in RMAs	0%	4%	0%	0%	4%
Projected Young-growth harvest in RMAs	0	36,092	0	0	882

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APPENDIX E
INTERAGENCY OLD GROWTH RESERVE REVIEW

Interagency Old Growth Reserve Review
Sealaska Land Conveyance
September 2015

Meeting date: Craig Ranger District, February 3-5, 2015

Attendees: Steve Brockmann (USFWS), Steve Bethune (ADF&G), Mark Minnillo (ADF&G); USFS: Brian Logan, Marla Dillman, Ray Slayton, Sally Burch, Lucy Maldonado (Day 1 only), Molly Simonson (note taker).

INTRODUCTION

The Sealaska Land Entitlement finalization of the Carl Levin and Howard P. 'Buck' McKeon National Defense Authorization Act for Fiscal Year 2015 conveyed 69,585 acres of Tongass National Forest lands to Sealaska Corporation to fulfill the commitment in the Alaska Native Claims Settlement Act. Included in these acres are areas that are designated as Old Growth Reserves (OGRs) in the 2008 Tongass Land and Resource Management Plan (Forest Plan). All of the OGRs reduced by the conveyance addressed here are on Prince of Wales Island and two smaller islands to the west.

On February 3, 2015 an interagency review team (IRT) met to develop a biologically preferred option for OGRs that meets Forest Plan Appendix K criteria and to document why other proposals are not recommended. The IRT was comprised of biologists from the U.S. Fish and Wildlife Service (USFWS), the Alaska Department of Fish and Game (ADF&G), and the U. S. Forest Service (USFS) who met in Thorne Bay to review the small OGRs affected by the land conveyance.

This meeting addressed how small OGRs have been affected by the Sealaska Land Entitlement finalization. The IRT came up with an interagency recommendation (biologically preferred location IOGRs) for each small OGR affected and one medium OGR.

The 2008 Forest Plan uses Land Use Designations (LUD) to guide the management of NFS lands within the Tongass. Each designation provides for a unique combination of activities, practices and uses. LUD II areas are congressionally designated areas in a roadless state to retain the wildland character. Wildlife and fish habitat improvement and primitive recreational facility development may be permitted. Timber harvesting is limited to insect and disease control. Roads will not be built except to serve mining and other authorized activities and vital Forest transportation and utility system linkages. LUD IIs are also designated as large OGRs. Large OGRs have not been reviewed since 1997. Some of the LUD IIs changed as a result of the land conveyance. The 2008 Forest Plan defines LUD II as Congressionally designated areas that should be managed in a roadless state to retain the wildland character. Wildlife and fish habitat improvement and primitive recreational facility development may be permitted. Timber harvesting is limited to insect and disease control. Roads will not be built except to serve mining and other authorized activities and vital Forest transportation and utility system linkages.

Our process was to look at large and medium OGRs and then move on to small OGRs.

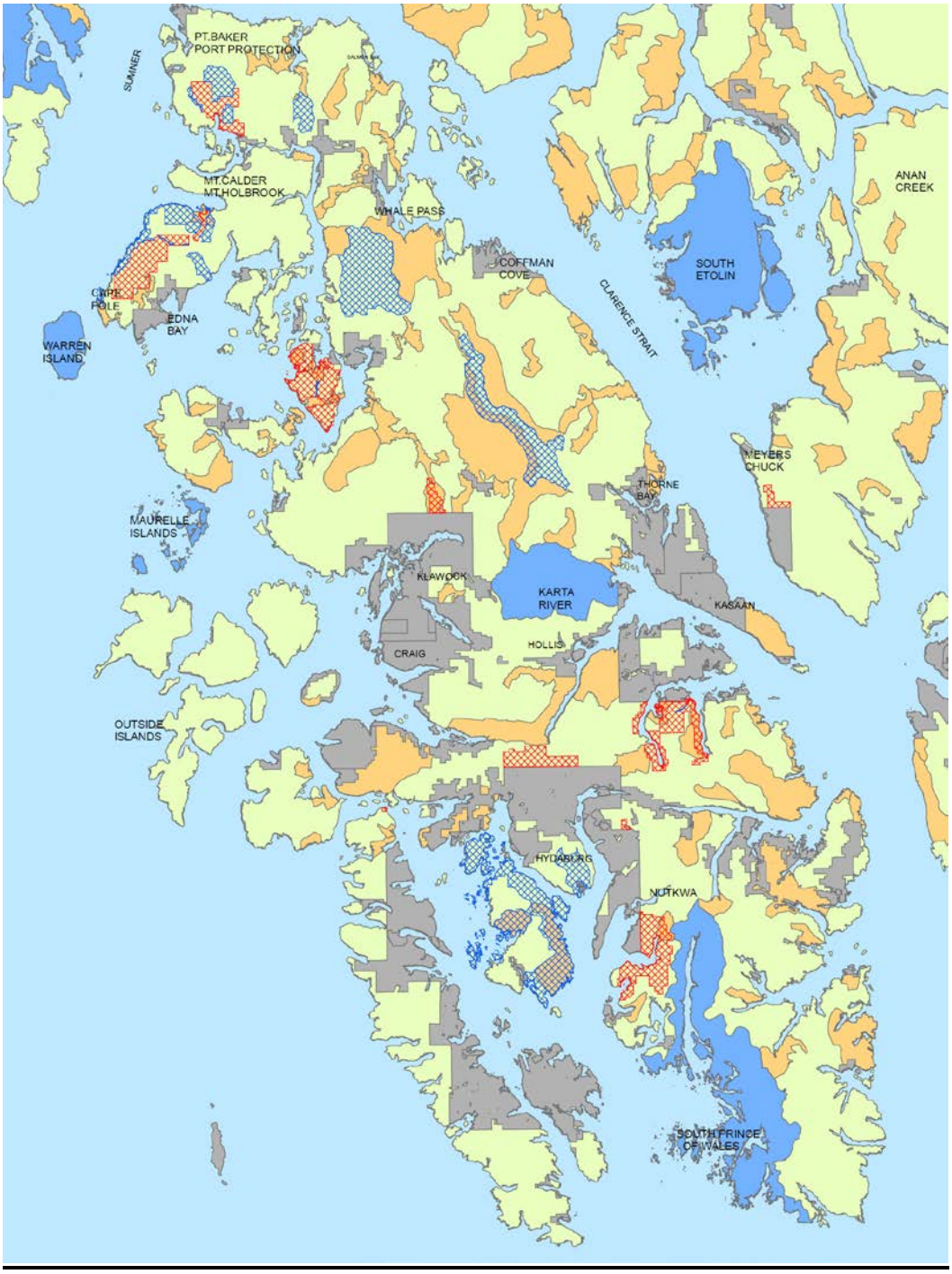
The land conveyance directly affected OGRs on POW, and neighboring islands) in VCUs 5450,

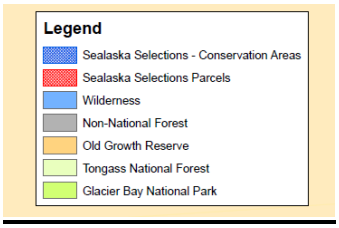
5460, 5560, 5570, 5600, 5872, 5900, 5940, 6180, 6190, 6200, and 6850 (see map 1).

This document will discuss the effects to the VCUs listed above as well as OGRs in VCUs that were indirectly impacted by the land conveyance; most of these VCUs involve the medium OGR. These VCUs include 6160, 6170, 6750 and 6760.

VCUs 5450, 5460 are on Kosciusko Island; 5560, 5570, 5600 and 5872 are on Tuxekan Island; while 5900 and 5940 (Election Creek); 6180, and 6190 were a medium OGR in the Old Thom's Research Natural Area; 6200 (Dog Salmon) and 6850 (Nutkwa) are all Prince of Wales Island.

The 2015 Interagency review team proposal for the medium also affects VCUs 6160, 6170, 6750 and 6760.





Map 1

Conservation Strategy

Small OGRs were analyzed extensively during the 2008 Forest Plan Amendment process (USFS 2008), and many were modified. This review is discussed as the 2006 IRT. The Forest Plan allows line officers to further modify the size and location of OGRs under certain circumstances (Forest Plan Appendix K). Modifications of small OGRs require an interagency review to ensure that OGRs meet Forest Plan criteria. Alternative locations for OGRs "must provide comparable achievement of Old–growth Habitat LUD goals and objectives" (Forest Plan, p. 3-57 and 3-62).

Goals

- 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. Use old growth definitions as outlined in Ecological Definitions for Old-growth Forest Types in Southeast Alaska (R10-TP-28).

Objectives

- Provide old-growth forest habitats, in combination with other LUDs, to maintain viable populations of native and desired non-native fish and wildlife species and subspecies 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.
- Allow existing natural or previously harvested early seral conifer stands to evolve naturally to old-growth forest habitats, or apply silvicultural treatments to accelerate forest succession to achieve old-growth forest structural features. Consider practices such as thinning, release and weeding, pruning, and fertilization to promote accelerated development of old-growth characteristics.
- To the extent feasible, limit roads, facilities, and permitted uses to those compatible with old-growth forest habitat management objectives.
- Significant modifications to OGRs (e.g. a land conveyance or substantial timber harvest) require consideration and review of factors such as connectivity, size, and shape of the reserve, as well as the basic assumptions behind the existing reserve location.

Pursuant to Forest Plan Appendix K, OGR boundary changes require an interagency team of USDA Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), and Alaska Department of Fish and Game (ADF&G) biologists to jointly evaluate the location and habitat composition of the OGRs by reviewing such things as productive old growth (POG) blocks within a VCU.

One goal of the Forest Plan is to maintain healthy forest ecosystems with a mix of habitats at different spatial scales capable of supporting the full range of naturally occurring flora, fauna, and ecological processes characteristic of Southeast Alaska. To accomplish this goal, an old-growth habitat conservation strategy was incorporated into the Forest Plan. This strategy consists of two components. The first is a forest-wide system of old-growth reserves (OGRs) comprised of lands classified by the Forest Plan as non-development land use designations (LUDs). These LUDs include, among others, Wilderness, Wilderness National Monument, Remote and Semi-Remote Recreation, Wild Rivers, Municipal Watersheds, and Old-growth Habitat LUDs. The Old-growth Habitat LUD is further subdivided into small, medium, and large old-growth

reserves. The second component of the old-growth strategy is the set of standards and guidelines for habitats that occur within the "matrix" or lands outside of the non-development LUDs.

OGR Criteria

The Forest Plan Appendix K and 2008 Forest Plan FEIS Appendix D describe the requirements for OGRs in detail. Primary OGR habitat criteria are summarized below. OGR calculations are based on the acres of National Forest Service lands within the VCU.

- Small OGRs should encompass a contiguous landscape representing at least 16 percent of each VCU with at least 50 percent of that area in productive old growth (POG). The preferred biological objective is for each small OGR to contain at least 800 acres of POG.
- OGRs must contain a minimum of 400 acres of POG.
- Where VCU boundaries do not match watershed or ecological boundaries, up to 30 percent of the OGR may be mapped in an adjacent VCU if the OGR objectives are met.
- VCUs that are separated by saltwater channels, reserves may be separated, but attempt to retain 800 acres of productive old growth in each.
- OGR boundaries should follow recognizable features that are identifiable on the ground such as streams, roads, distinctive ridges, watershed boundaries, or v-notches.
- OGRs should be located so that spacing is maintained in the four cardinal directions.
- Reserves should be more circular rather than linear to maximize the amount of interior forest habitat.
- The amount of early seral habitat (young growth) and roads should be minimized within the OGRs.
- Existing large blocks of contiguous high-volume old-growth forest should not be further fragmented by timber harvesting or road building.
- Incorporate wider corridors. Designed corridors should be of sufficient width to minimize edge effect and provide interior forest conditions.
- Do not differentially cut low altitude, high-volume old growth [represented by marten winter habitat: high-POG $\leq$800 feet elevation]
- Site-specific factors in placing reserves should be considered to help meet multiple biodiversity or wildlife habitat objectives. Factors include, but are not limited to:
    1. The largest remaining blocks of contiguous old growth within a watershed. Old-growth forest that constitutes scattered fragments of unsuitable timberland generally did not contribute to meeting small reserve design.
    2. Rare features such as underrepresented forest plant associations or stands with some of the Forest's highest volume timber stands (defined as high-POG and particularly SD67).
    3. Known or suspected goshawk nesting habitat (defined as high-POG <1000 feet elevation).
    4. Known or suspected marbled murrelet nesting habitat. [Represented by large tree SD67]
    5. Important deer winter range to maintain important deer habitat capability to meet public demand for use of the deer resource (defined as high-POG <800 feet elevation

on south and west aspects for deep snow habitat and POG <1500 feet elevation for average winter habitat).

Other Forest Plan Direction

Forest Plan Management Prescriptions for Old-growth Habitat (Forest Plan FEIS p. 3-62)

- During project-level environmental analysis, for projects areas that include or are adjacent to mapped old-growth habitat reserves, the size, spacing, and habitat composition of mapped reserves may be further evaluated (See Appendix K for mapping criteria.)
- Adjust reserves not meeting the minimum criteria to meet or exceed the minimum criteria. Reserve location, composition, and size may otherwise also be adjusted.
- Alternative reserves must provide comparable achievement of the Old-growth Habitat LUD goals and objectives. Determination as to comparability must consider the criteria listed in Appendix K.
- Adjustments to individual reserves are not expected to require a significant plan amendment. Adjustments Forest-wide shall be monitored yearly to assess whether a significant plan amendment is warranted on the basis of cumulative changes.

Forest-wide Standards and Guidelines for Landscape Connectivity (Forest Plan p. 4-91):

Design projects to maintain landscape connectivity. The objective is to maintain corridors of old-growth forest among large and medium Old-growth Habitat reserves (Appendix K) and other Non-development LUDs at the landscape scale. Review forest connectivity within and between OGRs and non-development LUDs during environmental review of projects proposing timber harvest, road construction, or other significant vegetation alteration. Where existing corridors are insufficient or vulnerable to harvest, stands of POG should be provided as corridors or small reserves should be relocated.

HISTORY OF THE OGRS

The following documents provide the history of OGRs:

Developmental and National Setting LUD's and VPOP (February 1997)
Forest Plan (1997)
Prince of Wales Island Interagency OGR Review Report (2002)
Final Forest Plan (2008) OGR spreadsheet (09_092909_OGR_Tracking_Table.xls)

Individual NEPA documents that included OGRs analysis:

Central Prince of Wales (CPOW) EIS (1993) -VCU 5542
Polk Inlet EIS (1995) - VCUs 6180, 6190 and 6200
Control Lake EIS (1998) -VCUs 5940, 5950 and 5960
Cholmondeley EIS (1998) -VCUs 6160, 6170, 6750 and 6760
Kosciusko DEIS (2002) -VCUs 5450 and 5460
Tuxekan Timber Sale DEIS (update 2004) – VCUs 5560, 5570, 5600 and 5872
Staney Timber Sale (TEAMS) (2005) –VCU 5900
Big Thorne EIS (2013) -VCU 5950

Not covered under any previous NEPA (except Forest Plan) – 6850

ANALYSIS OF THE OGRS

Past reviews of the small OGRs include the 2002 Review of the OGRs on Prince of Wales Island (2002 POW review team) and a 2006 Tongass wide review of the OGRs, including those on Prince of Wales, for the 2008 Forest Plan amendment (2006 IRT).

The goals of the 2015 IRT included:

- Review purpose, rational, and objectives used by previous interagency review teams for locating current OGRs;
- Identify biologically preferred OGR locations for OGRs located in VCUs 5450, 5460, 5560, 5570, 5600, 5872, 5900, 5940, 6180, 6190, 6200, and 6850.

ANALYSIS OF OGRS by VCU

Kosciusko Island

Pre-conveyance: During the 2006 OGR review for the 2008 Forest Plan amendment the designated OGRs in VCUs 5450 and 5460 were combined. All the OGR in VCU 5460 were counted towards the OGR in VCU 5450. The acres designated as a Special Interest Area (SA) LUD in VCU 5460 function and count as OGR acres in VCU 5460. The required amount of acres for a small OGR is met in VCU 5460 by the designation of an SA in this VCU under the 2008 Forest Plan. Both OGRs were modified to exclude units proposed in the Kosciusko Timber Sale. Acknowledge The IRT recommended that that Forest Road 1525225 which occurs within the OGR be closed.

Post Conveyance: On Kosciusko Island the Defense Authorization Act for 2015 conveyed almost 12,000 acres of National Forest land to the Sealaska Corporation. Nearly all of the acres were productive forest lands (11,161 acres) and the majority of these acres are young growth timber (7,328 acres).

The land conveyance minimally affected the currently designated small OGR boundaries in VCU 5450 and 5460. The conveyance removed a small portion of the OGR in VCU 5450 in the southwest corner and the OGR in VCU 5460 lost the small western finger.

VCU 5450 -Survey Cove

In the 1997 TLMP there were two disconnected OGRs in this VCU that are mapped as small OGRs (see Figure 1). The western OGR is overlap from and applies to VCU 5450.

Pre-conveyance: The 2002 POW review team relocated the 1997 TLMP small OGR to increase POG acres because the 1997 TLMP OGR was mostly muskeg. The 2002 POW review team proposal expanded the OGR to the south and northeast to pick up POG acres. Since there is not enough POG remaining in this VCU the 2002 POW review team expanded the OGR into adjacent VCU 5460. This OGR was linear, contained second growth, roads, and higher elevation stands. The OGR did not include preferred habitat but it did include the only remaining habitat.

2006 IRT recommended adopting the 2002 POW review team OGR. The proposed 2006 IRT OGR in VCU 5450 overlaps into VCU 5460.

The 2006 IDT noted that the 2006 IRT OGR (that was originally proposed by the 2002 POW review team) included units in the Kosciusko Timber Sale and modified the IOGR to exclude these units. A project level review was recommended to consider adding second growth habitat to make the OGR more circular.

Post Conveyance: The conveyance removed a small southwest portion of the OGR in VCU 5450. The land conveyance resulted in the removal of 68 acres from the OGR in VCU 5450; 53 of these acres were POG. The resulting OGR still meets minimum Forest Plan acre and POG acre requirements.

2015 IOGR Rationale/Notes: This VCU has been heavily impacted by past harvest. There are no large contiguous blocks of POG left in VCU 5450. In order to replace the acres of POG lost due to the land conveyance the 2015 IRT proposes adding acres from adjacent VCU 5460. The block of POG added from VCU 5460 is one of the largest remaining patches of contiguous old growth in that VCU. The 2015 IRT proposal also adds acres and POG acres to the OGR in VCU 5450 from the adjacent VCU (5460) to try to compensate for the overall loss of POG in VCU 5450. Adding the acres from VCU 5460 to the proposed 2015 biologically preferred OGR also helps to maintain connectivity through the central portion of south Kosciusko Island; this is especially important at the landscape scale when considering that this area is now surrounded by lands in other ownerships. The 2015 IRT proposal would add 1260 total acres and 904 acres of POG to the OGR. As a result of these additional acres the 2015 IRT OGR would exceeds both the minimum acre requirements and the POG acres requirements. The 2015 IRT felt this was necessary given the amount of past harvest in the area, the current lack of remaining POG and lack of connectivity in this portion of Kosciusko Island (see Figure 1).

Comparison of Small OGR in VCU 5450

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)		10,764	
Non-NFS land (acres)	3,109	6,249	6,249
NFS land Total (acres)	7,655	4,515	4,515
16% of NFS land (Min. Req. OGR acres)	1,211	722	722
All Non-development LUD in VCU	1,993	1,917	1,994
Small OGR (total acres)[1/]	1,454	1,386	2,652[1/]
8% of NFS land (Min. POG Req. acres)	605	361	361
OGR POG (total acres)[2/]	867	814	1,718
All Non-development POG (acres)	1,267	1,220	1,468
Acreage requirements met? (Total/POG)	Yes/Yes	Yes/Yes	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU 5460			
Total OGR Acres	266	260	1,448
OGR POG Acres	266	260	1,159
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	Yes	Yes
Minimizes roads (total road miles)	3.9	3.9	4.8
Includes streams (Class I stream miles)	0.0	0.0	6.2
Minimizes early seral habitat (acres)	293	293	463
Includes largest remaining block of POG in VCU?	No	No	Yes
Rare/Underrepresented features (large tree POG acres) [3/]	499	453	1,016
Deep snow deer/marten habitat (acres) [4/]	297	271	742
Goshawk and murrelet nesting habitat (acres) [5/]	703	656	1,273
Other Considerations			
Maintains Connectivity	No	No	Yes
Low elevation POG (acres)[6/]	423	391	1,150

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types; see Issue 3)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 5460 -Edna Bay

Pre Conveyance: In the 1997 TLMP there were two disconnected areas in this VCU that were both designated as small OGRs (see Figure 1). The western OGR was overlap from and applies to the OGR in VCU 5450. The eastern OGR counted towards the OGR in this VCU (5460). The acres in the western OGR that count towards the OGR in VCU 5450 are discussed above under that VCU.

Since eastern OGR was short total acres the 2006 IRT recommended expanding it to the north to create a more circular reserve and form a connection with the low elevation pass between Van Sant Creek and Trout Creek (in VCU 5430), where evidence of high deer use has been observed. This OGR includes the high vulnerability karst on west side of Van Sant Creek and a portion of the POG remaining at Van Sant Cove. The 2006 IRT recommended prioritizing second growth included in the OGR for thinning.

The 2006 IRT IOGR included units proposed in the Kosciusko Timber Sale. The 2006 IRT responded that it was preferable that the IOGR maintain the travel corridor/pass located on the east side of the VCU. The modified the IOGR excluded the Kosciusko Timber Sale units but maintains the low elevation east-west travel corridor/pass between Van Sant Creek and Trout Creek (in VCU 5430). The 2006 team recommended that Forest Service Road 1525225 be closed.

For the 2008 Forest Plan the eastern OGR designation was changed from small OGR to SA; the boundary of the OGR was not changed. The acres now designated as SA count and function as the OGR in this VCU. A portion of this SA overlaps into adjacent VCU 5430. The contiguous acres of this SA in VCU 5430 also count towards the OGR in VCU 5460. There is another non-contiguous SA in VCU 5430 that functions as the OGR for VCU 5430

Post conveyance: The land conveyance resulted in the loss of the western finger of the western OGR in this VCU; however these acres count towards the OGR in VCU 5450. The land conveyance also changed the area that was designated as SA to a LUD II designation. The boundaries of the SA/LUD II area were not changed (see Figure 1).

2015 IOGR Rationale/Notes: For 2015 IRT comments on the affects to the western OGR see discussion under VCU 5450 above.

Under the 2008 Forest Plan the SA in VCU 5460 functioned as the OGR in this VCU. As part of the defense bill the SA LUD in VCU 5460 was converted to a LUD II which the 2015 IRT believes meets the intent of and functions as an OGR in this VCU. The minimum acreage criteria and POG acres required for a small OGR are met by the LUD II area. Therefore no changes are recommended and no additional acres are required for this SA/LUD II/OGR.

Acreage differences in this OGR/SA/LUD II shown in the comparison table between pre conveyance and post conveyance are due to GIS edits, no changes were made to the boundary (see Figure 1).

Comparison of Small OGR in VCU 5460*

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	14,655		
Non-NFS land (acres)	4,055	5,326	5,326
NFS land Total (acres)	10,600	9,329	9,329
16% of NFS land (Min. Req. OGR acres)	1,697	1,493	1,493
All Non-development LUD in VCU	1,508	1,501	1,501
Small OGR (total acres)[1/]	0	1, 656	1, 656
8% of NFS land (Min. POG Req. acres)	849	746	746
OGR POG (total acres)[2/]	0	1,167	1,167
All Non-development POG (acres)	1,214	1,207	1,207
Acreage requirements met? (Total/POG)	Yes/Yes	Yes/Yes	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU 5430			
Total OGR Acres	519	519	519
OGR POG Acres	305	305	305
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	No	No	No
Minimizes roads (total road miles)	3.2	3.2	3.2
Includes streams (Class I stream miles)	0.6	0.6	0.6
Minimizes early seral habitat (acres)	360	360	360
Includes largest remaining block of POG in VCU?	Yes	Yes	Yes
Rare/Underrepresented features (large tree POG acres) [3/]	935	935	935
Deep snow deer/marten habitat (acres) [4/]	494	494	494
Goshawk and murrelet nesting habitat (acres) [5/]	1,068	1,068	1,068
Other Considerations			
Maintains Connectivity	Yes	Yes	Yes
Low elevation POG (acres)[6/]	561	561	561

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)
*Acreage differences between pre and post conveyance due to GIS map edits and not boundary changes

Sealaska Land Conveyance effect to SA/OGR in VCU 5410 with ROW at Shipley Bay

There are no mapped OGR acres in this VCU; all acres are mapped as SA or LUD II acres. The SA in this VCU is in two separate pieces. The northwestern piece functions as the OGR for VCU 5430. This piece was originally contiguous with the large Mt Calder-Mt Holbrook LUD II; however due to the land conveyance Sealaska now has a road right of way (ROW) through here to potentially connect to the old LTF/MAF in Shipley Bay. As a result of the ROW the portion of the OGR/LUD II in VCU 5430 is now disconnected from the large Mt Calder –Mt Holbrook LUD II area (see Figure 1).

These acres in the northwestern mapped SA/OGR in VCU 5430 are contiguous with the western OGR/SA acres in VCU 5410. Combining the northern SA/OGR in VCU 5430 (4,669 acres) with the western portion of SA/OGR in VCU 5410 (3,234 acres) for a total of 7,933 acres. The POG acres when these two areas are combined equal 6,008 acres. The small OGR requirements for this VCU are at least 2,522 acres with 1,261 acres of POG (without the reduction in required acres in the OGR due to the overall loss of Forest Service acres in the VCU). The Sealaska land conveyance resulted in a portion of the SA/OGR in this VCU being disconnected to the Mt Calder-Mt Holbrook LUD II area; however, despite loss of the connectivity between the OGR/LUD II in VCU 5430, the area still has adequate protected habitat to meet minimum small OGR requirements in this VCU. The 2015 IRT recommends no additional OGR designations in this VCU.

VCUs 5450 and 5460 and Right of Way in VCU 5410

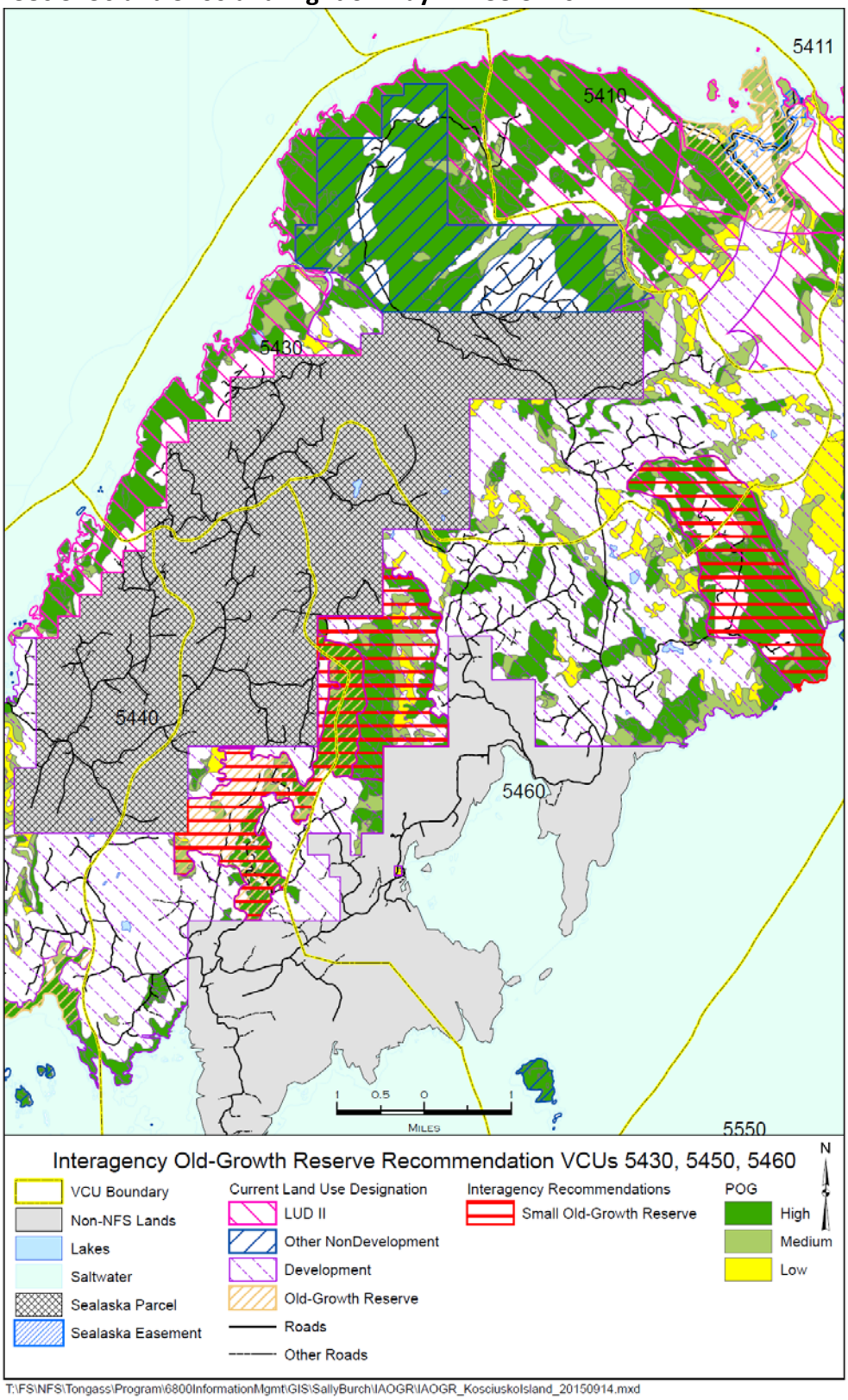


Figure 1

Tuxekan Island

VCU 5560 -Northwest Tuxekan

Pre Conveyance: The 2006 IRT proposed to adopt the POW 2002 Review and Tuxekan Timber Sale Draft ROD proposal to relocate 1997 Forest Plan small OGR. This proposal added the largest remaining block of POG that includes south-facing slopes, high value deer winter range, and goshawk and murrelet nesting habitat. This proposal increased total acres in the OGR and includes some young growth acres.

The 2008 Forest Plan Amendment reduced the size of the small OGR to meet minimum acre criteria but retained the largest remaining block of POG, south-facing slopes, high value deer winter range, and potential goshawk and murrelet nesting habitat.

The OG LUD was added to this VCU because while the non-development LUD acres in this VCU meet the acre criteria for a small OGR these acres occur on a series of small islands and not on Tuxekan Island.

Post Conveyance: Most of the land in this VCU is now in Sealaska ownership including the entire area that was designated as small OGR in this VCU. The remaining acres of non-development LUD in this VCU are on small islands mostly to the north of Tuxekan Island. These acres of non-development meet the Forest Plan minimum acres requirements for a small OGR.

2015 IOGR Rationale/Notes: Most of the remaining Forest Service acreage in VCU 5560 is on El Cap Island and other small, isolated, non-timbered islands. There is only one substantial block of POG in Forest Service ownership left in this VCU on Tuxekan Island. The 2015 IRT recommends that this block be included in the OGR. Most of the block of POG is within the beach buffer and therefore low elevation POG. The 2015 IRT recommends that the OGR in this VCU connect with the OGR in VCU 5570 to maintain this block. The 2015 IOGR proposal in VCU 5560 is contiguous with the 2015 IOGR proposal in VCU 5570. These two OGRs provide some connectivity between Tuxekan Island and mainland POW via a saltwater channel (see Figure 2).

Comparison of Small OGR in VCU 5560

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	6,789		
Non-NFS land (acres)	843	4,359	4,359
NFS land Total (acres)	5,946	2,430	2,430
16% of NFS land (Min. Req. OGR acres)	951	374	374
All Non-development LUD in VCU	3,055	1,866	2,321
Small OGR (total acres)[1/]	1,016	0	455
8% of NFS land (Min. POG Req. acres)	476	187	187
OGR POG (total acres)[2/]	882	0	378
All-Non-development LUD POG (acres)	2,167	1,229	1,609
Acreage requirements met? (Total/POG)	Yes/Yes	No/No	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU	NA	NA	NA
Total OGR Acres			
OGR POG Acres			
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	No	Yes
Minimizes roads (total road miles)	1.6	0.0	0.0
Includes streams (Class I stream miles)	4.2	0	0.6
Minimizes early seral habitat (acres)	0	0	57
Includes largest remaining block of POG in VCU?	Yes	No	Yes
Rare/Underrepresented features (large tree POG acres) [3/]	361	0	331
Deep snow deer/marten habitat (acres) [4/]	418	0	363
Goshawk and murrelet nesting habitat (acres) [5/]	418	0	363
Other Considerations			
Maintains Connectivity	Yes	No	Yes
Low elevation POG (acres)[6/]	882	0	381

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.

2/ Should be approximately 50% of OGR acres

3/ SD67 type

4/ High-volume POG ≤ 800 feet in elevation

5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)

6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 5570 -Northeast Tuxekan

VCU 5570 is separated by a saltwater channel with a portion of the VCU on Tuxekan Island and part on Prince of Wales Island.

Pre conveyance: The OGR in VCU 5570 overlaps into both VCU 5560 and VCU 5600. This overlap is not required to meet acre criteria but to follow recognizable features. The 2006 IRT adopted the 2006 Tuxekan Timber Sale Draft ROD OGR that relocated the small OGR to increase POG, maintain low elevation habitat, deer winter range, murrelet nest, and potential goshawk nesting habitat. The 2006 IRT OGR was adopted in the 2008 Forest Plan.

Post Conveyance: The Sealaska land conveyance resulted in the loss of most the acres designated as small OGR in this VCU. The remaining acres of OGR are now isolated and surrounded by lands in other ownership.

2015 IOGR Rationale/Notes: The 2015 IRT recommends replacing the acres remaining in the existing small OGR on Tuxekan with acres on the northern tip of the island adjacent to the 2015 IRT proposed OGR in VCU 5560 (see Figure 2). The intent of these acres is to provide connectivity between the large LUD II area around Sarkar Lake in VCUs 5541 and 5542 (on POW mainland) and the IRT proposed small OGR in VCU 5560 (on Tuxekan). The connectivity factor is of higher importance than trying to exclude the second growth that occurs within the 2015 IRT proposed OGR. The 2015 IRT recommends selecting an area, mostly beach buffer, which is across the saltwater channel on mainland POW. Most of these proposed acres on mainland POW are still in VCU 5570; however in order to provide compete connectivity to the large LUD II area acres in VCU 5542 were also included. These acres across the channel would extend from just south of Dargon Point north to Kahli Cove. Even though these two areas are separated by a saltwater channel they will contribute to the connectivity across to mainland POW. The saltwater channel is at the most about 1 mile across; however this channel is interspersed with many smaller islands which would facilitate dispersal. By selecting the acres on mainland POW connectivity is improved between Tuxekan Island and the large LUD II area around Sarkar Lake. This LUD II area is then connected to other OGRs and LUD II areas on POW.

Comparison of Small OGR in VCU 5570

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	8,520		
Non-NFS land (acres)	1,487	3,812	3,812
NFS land Total (acres)	7,033	4,708	4,708
16% of NFS land (Min. Req. OGR acres)	1,128	738	738
All Non-development LUD in VCU	1,556	737	2,304
Small OGR (total acres)[1/]	1,309	328	1,566
8% of NFS land (Min. POG Req. acres)	564	369	369
OGR POG (total acres)[2/]	884	280	810
All Non-development LUD POG (acres)	4,097	576	1,328
Acreage requirements met? (Total/POG)	Yes/Yes	No/No	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU 5560			
Total OGR Acres	103	0	0
OGR POG Acres	55	0	0
Small OGR LUD Overlap into Adjacent VCU			
VCU 5600			
Total Acres	93	0	0
POG Acres	62	0	0
Small OGR LUD Overlap into Adjacent VCU			
VCU 5542			
Total Acres	0	0	70
POG Acres	0	0	58
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	No	Yes
Minimizes roads (total road miles)	3.4	0.4	4.4
Includes streams (Class I stream miles)	4.0	0.6	2.6
Minimizes early seral habitat (acres)	9	9	734
Includes largest remaining block of POG in VCU?	Yes	No	Yes
Rare/Underrepresented features (large tree POG acres) [3/]	444	66	432
Deep snow deer/marten habitat (acres) [4/]	567	102	666
Goshawk and murrelet nesting habitat (acres) [5/]	567	102	666
Other Considerations			
Maintains Connectivity	Yes	No	Yes
Low elevation POG (acres)[6/]	884	280	810

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 5600 -Southwest Tuxekan

Pre Conveyance: The 2006 IRT proposed to adopt the 2002 POW IRT and Tuxekan Timber Sale Draft ROD that modified the small OGR to increase acres to meet total and POG acre requirements; include both deer winter range and the largest contiguous block of POG, as well as the low elevation pass between the east fork of Karheen Creek and the large lake in VCU 5800. This modified OGR also follows recognizable features and improves connectivity. The OGR is linear in shape because VCU is fragmented by past harvest. The OGR was designed to include remaining POG and maintain connectivity.

Post Conveyance: Due to the Sealaska land conveyance there is very little Forest Service land remaining in this VCU. Conveyance reduces connectivity between OGRs in VCUs 5600 and 5872, which were linear spanning Tuxekan Island.

2015 IOGR Rationale/Notes: The Sealaska land conveyance results in little National Forest Service (NFS) land remaining in this VCU. The 2015 IRT suggested OGR includes most of the remaining NFS land in the VCU and as a result exceeds the 16 percent of NFS land in the VCU requirement in the Forest Plan (see Figure 2). Biologically Preferred OGR enhances connectivity to the beach.

Comparison of OGR in VCU 5600

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	6,026		
Non-NFS land (acres)	2	5,264	5,264
NFS land Total (acres)	6,024	762	762
16% of NFS land (Min. Req. OGR acres)	964	122	122
All Non-development LUD in VCU	1,213	563	761
Small OGR (total acres)[1/]	1,059	556	755
8% of NFS land (Min. POG Req. acres)	482	61	61
OGR POG (total acres)[2/]	788	373	526
All Non-development LUD POG (acres)	861	373	526
Acreage requirements met? (Total/POG)	Yes/Yes	Yes/Yes	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU	NA	NA	NA
Total OGR Acres			
OGR POG Acres			
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	No	No	Yes
Minimizes roads (total road miles)	0.9	0.0	0.0
Includes streams (Class I stream miles)	5.2	3.8	4.8
Minimizes early seral habitat (acres)	0	0	21
Includes largest remaining block of POG in VCU?	No	No	No
Rare/Underrepresented features (large tree POG acres) [3/]	382	95	116
Deep snow deer/marten habitat (acres) [4/]	474	165	299
Goshawk and murrelet nesting habitat (acres) [5/]	506	165	299
Other Considerations			
Maintains Connectivity	Yes	No	Yes
Low elevation POG (acres)[6/]	756	373	526

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 5872 -Southeast Tuxekan

Pre Conveyance: The 2006 IRT recommended adopting the past interagency proposal and Tuxekan Timber Sale Draft ROD that recommended relocating the small OGR to include the largest remaining block of POG and increase deer winter range.

Post Conveyance: Due to the Sealaska land conveyance there is very little Forest Service land remaining in this VCU. The 2015 IRT suggested OGR includes most of the remaining NFS land in the VCU and as a result exceeds the 16 percent of NFS land in the VCU requirement in the Forest Plan.

2015 IOGR Rationale/Notes: The 2015 IRT recommend the 1997 TLMP OGR boundary with some modifications (see Figure 3). Nichen Cove on Tuxekan Island has human impacts and activities (log transfer facility and roads etc.). The 2015 IRT determined that it was less important to include the Nichen Cove area in the OGR as one criterion is to reduce road miles in an OGR.

The conveyance eliminates connectivity with the small OGR in VCU 5600 (see Figure 2). The Biologically Preferred OGR adds connectivity to the beach.

Comparison of Small OGR in VCU 5872

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	3,310		
Non-NFS land (acres)	0	2,087	2,087
NFS land Total (acres)	3,310	1,223	1,223
16% of NFS land (Min. Req. OGR acres)	530	196	196
All Non-development LUD in VCU	553	228	858
Small OGR (total acres)[1/]	536	227	857
8% of NFS land (Min. POG Req. acres)	265	98	98
OGR POG (total acres)[2/]	501	219	474
All Non-development LUD POG (acres)	501	219	474
Acreage requirements met? (Total/POG)	Yes/Yes	Yes/Yes	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU	NA	NA	NA
Total OGR Acres			
OGR POG Acres			
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	No	Yes
Minimizes roads (total road miles)	1.8	0.0	0.0
Includes streams (Class I stream miles)	0.7	0.5	3.5
Minimizes early seral habitat (acres)	1	1	5
Includes largest remaining block of POG in VCU?	Yes	No	Yes
Rare/Underrepresented features (large tree POG acres) [3/]	293	32	36
Deep snow deer/marten habitat (acres) [4/]	295	36	51
Goshawk and murrelet nesting habitat (acres) [5/]	314	36	51
Other Considerations			
Maintains Connectivity	Yes	No	Yes
Low elevation POG (acres)[6/]	482	219	474

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 5560, 5570, 5600 and 5872

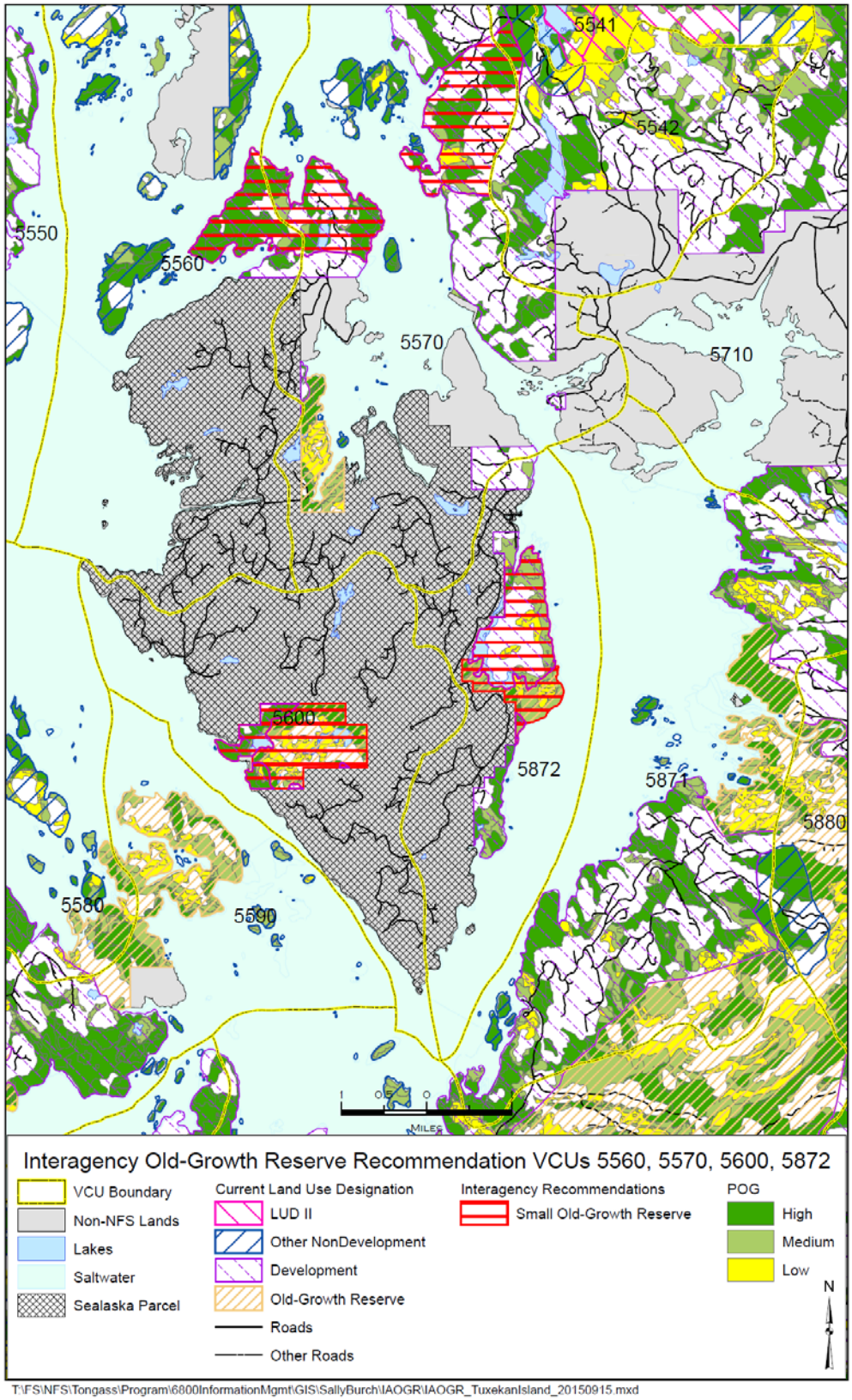


Figure 2

VCU 5940 -Election Creek

Pre-Conveyance: During the 2006 review it was proposed to revert to the 1997 TLMP OGR to exclude contracted Timber Sale units. The 2006 IRT proposed to add an area east of the 1997 TLMP OGR to maintain connectivity.

A project level review was recommended because the 2006 IDT Forest Plan proposed OGR did not maintain east/west connectivity. Although the proposed OGR does maintain the largest contiguous block of POG and north/south connectivity, it is important to also maintain east/west connectivity in the area because of the amount of past harvest that has occurred in this area.

Post Conveyance: The land conveyance resulted in the loss of the largest contiguous block of POG as well as connectivity between VCU 5940 and VCU 5900 (north/south connectivity). The connectivity between VCUs 5940 and 5900 provided connectivity between the OGR in VCU 5940 and OGRs in VCUs to the north.

2015 IOGR Rationale/Notes: Most of the existing small OGR in this VCU was conveyed to Sealaska. The 2015 IRT proposes that the small remaining portion of the original OGR along the western edge of the land conveyance be dropped. The 2015 IRT proposed the small portion along the eastern edge of the Sealaska land conveyance be kept and expanded to the east to the VCU line with VCU 5950 to connect with the current OGR that exists in VCU 5950 (see Figure 3). This will provide the east/west connectivity mentioned in the 2006 review. This connectivity will help to compensate for the loss of the north/south connectivity lost due to the land conveyance.

The 2015 IRT proposed OGR in VCU 5940 is short both total and POG acres; however the IRT determined that this was acceptable due to the fact that the proposed OGR is adjacent to the IRT proposed OGR in VCU 5950 and the connectivity that the placement of the OGR here provides. The OGR in VCU 5950 connects to the large Honker OGR complex via roadless. The 2015 IRT OGR includes all remaining acres in this VCU east of the land conveyance; any additional acres in this VCU would be separated by Sealaska land.

The conveyance splits this small OGR. The Biologically Preferred alternative maintains connectivity to small OGRs in VCUs 5900 and 5950 (see Figure 3).

Comparison of Small OGR in VCU 5940

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	33,334		
Non-NFS land (acres)	15,737	17,587	17,587
NFS land Total (acres)	17,597	15,747	15,747
16% of NFS land (Min. Req. OGR acres)	2,816	2,520	2,520
All Non-development LUD in VCU	2,770	1,072	1,952
Small OGR (total acres)[1/]	2,270	1,072	1,499
8% of NFS land (Min. POG Req. acres)	1,408	1,260	1,260
OGR POG (total acres)[2/]	1,824	438	607
All Non-development LUD POG (acres)	1,824	438	805
Acreage requirements met? (Total/POG)	No/Yes	No/No	No/No*
Small OGR LUD Overlap into Adjacent VCU			
VCU	NA	NA	NA
Total OGR Acres			
OGR POG Acres			
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	No	No
Minimizes roads (total road miles)	3.9	1.2	1.2
Includes streams (Class I stream miles)	5.3	0.2	0.2
Minimizes early seral habitat (acres)	83	83	90
Includes largest remaining block of POG in VCU?	Yes	No	No
Rare/Underrepresented features (large tree POG acres) [3/]	735	71	71
Deep snow deer/marten habitat (acres) [4/]	786	32	53
Goshawk and murrelet nesting habitat (acres) [5/]	1,344	243	203
Other Considerations			
Maintains Connectivity	NA	No	Yes
Low elevation POG (acres)[6/]	945	65	125

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)
*See discussion for this VCU and VCU 5950

VCU 5950 -Big Salt

The land conveyance did not impact the OGR in this VCU directly; however, the 2015 IRT proposes expanding the OGR in this VCU to the north and west (see Figure 3). The 2015 IRT also proposes an expansion of the current OGR to the southeast to include an area of contiguous high volume POG (HPOG). This additional HPOG in VCU 5950 helps to compensate for loss of high volume POG in VCU 5940. This area of HPOG in VCU 5950 is currently mapped as roadless.

The existing 2008 Forest Plan OGR in VCU 5950 was modified under the Big Thorne EIS. The current proposed 2015 IRT expansions avoid Big Thorne units.

The east/west connectivity that this OGR modification helps to provide includes a connection with currently mapped roadless acres in VCU 5950 that then connects to the OGR in VCU 5960 which is included as part of the large Honker OGR complex (OG LUD designated areas as well as other non-development LUDs).

Comparison of Small OGR in VCU 5950

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	21,465		
Non-NFS land (acres)	3,741	3,741	3,741
NFS land Total (acres)	17,724	17,724	17,724
16% of NFS land (Min. Req. OGR acres)	2,836	2,836	2,836
All Non-development LUD in VCU	4,230	4,230	5,215
Small OGR (total acres)[1/]	2,037	2,037	3,567
8% of NFS land (Min. POG Req. acres)	1,418	1,418	1,418
OGR POG (total acres)[2/]	1,261	1,261	1,969
All Non-development LUD POG (acres)	2,161	2,161	2,694
Acreage requirements met? (Total/POG)	No/No	No/No	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU	NA	NA	NA
Total OGR Acres			
OGR POG Acres			
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	Yes	Yes
Minimizes roads (total road miles)	2.6	2.6	5.5
Includes streams (Class I stream miles)	2.9	2.9	6.3
Minimizes early seral habitat (acres)	256	256	295
Includes largest remaining block of POG in VCU?	No	No	No
Rare/Underrepresented features (large tree POG acres) [3/]	477	477	755
Deep snow deer/marten habitat (acres) [4/]	488	488	786
Goshawk and murrelet nesting habitat (acres) [5/]	875	875	1,223
Other Considerations			
Maintains Connectivity	Yes	Yes	Yes
Low elevation POG (acres)[6/]	755	755	1,100

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 5900 -North Election Creek

Pre Conveyance: This OGR is directly north of and contiguous with the OGR in 5940. As mapped the small OGR in VCU 5900 is 2,406 acres in size with 1,161 acres of POG (and 571 acres of high volume POG).

The 2002 POW review team modified 1997 TLMP small OGR to increase total acres. This proposal removed high-elevation areas from side slopes of middle fork of Staney Creek and adds low elevation stands along the north fork of Staney Creek, adds high value deer winter range and potential goshawk and murrelet nesting habitat. Addition of POG will aid in maintaining flying squirrel habitat. About 50 percent of POG is in riparian buffer. This OGR provides connectivity through the Staney Creek watershed to the Small OGR in VCU 5940. The 2006 Forest Plan adopted this proposal.

Pre Conveyance: The land conveyance reduced the OGR in this VCU by 83 acres. As a result of the land conveyance the OGR in this VCU does not meet the minimum acres and POG acres requirements for a small OGR in this VCU (see Figure 3).

2015 Rationale/Notes: The 2015 IRT did not evaluate the OGR in this VCU. This OGR will still connected to the remaining OGR in VCU 5940 and so is connected through that OGR and the OGR in VCU 5950 to the Honker OGR. Via e-mails the OGR in this VCU was modified to improve the connectivity between this OGR and the OGR in VCU 5940. As a result of the land conveyance the remaining corridor connecting these two OGRs was less than 1,000 feet wide. With the proposed modification the corridor width now exceeds 1,000 feet in width. The modification results in the addition of about 395 total acres with about 189 of those acres being POG. The modification also added about 60 acres of young growth to the OGR.

Comparison of Small OGR in VCU 5900

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)		13,795	
Non-NFS land (acres)	0	168	168
NFS land Total (acres)	13,795	13,627	13,627
16% of NFS land (Min. Req. OGR ac)	2,207	2,180	2,180
All Non-development LUD in VCU	2,406	2,323	2,323
Small OGR (total acres)[1/]	2,406	2,232	2,627
8% of NFS land (Min. POG Req. acres)	1,104	1,090	1,090
OGR POG (total acres)[2/]	1,172	1,098	1,287
All Non-development LUD POG	1,172	1,098	1,287
Acreage requirements met? (Total/POG)	Yes/Yes	Yes/Yes	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU	N/A		
Total OGR Acres			
OGR POG Acres			
Small OGR LUD Overlap from Adjacent VCU			
VCU	N/A		
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	Yes	Yes
Minimizes roads (total road miles)	6.9	6.6	7.2
Includes streams (Class I stream miles)	12.5	11.7	11.7
Minimizes early seral habitat (acres)	435	435	+60
Includes largest remaining block of POG in VCU?	No	No	No
Rare/Underrepresented features (large tree POG ac) [3/]	532	489	519
Deep snow deer/marten habitat (acres) [4/]	592	548	554
Goshawk and murrelet nesting habitat (acres) [5/]	615	571	648
Other Considerations			
Maintains Connectivity	Yes	Yes	Yes
Low elevation POG (acres)[6/]	1,114	1,041	1,041

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCUs 5900, 5940 and 5950

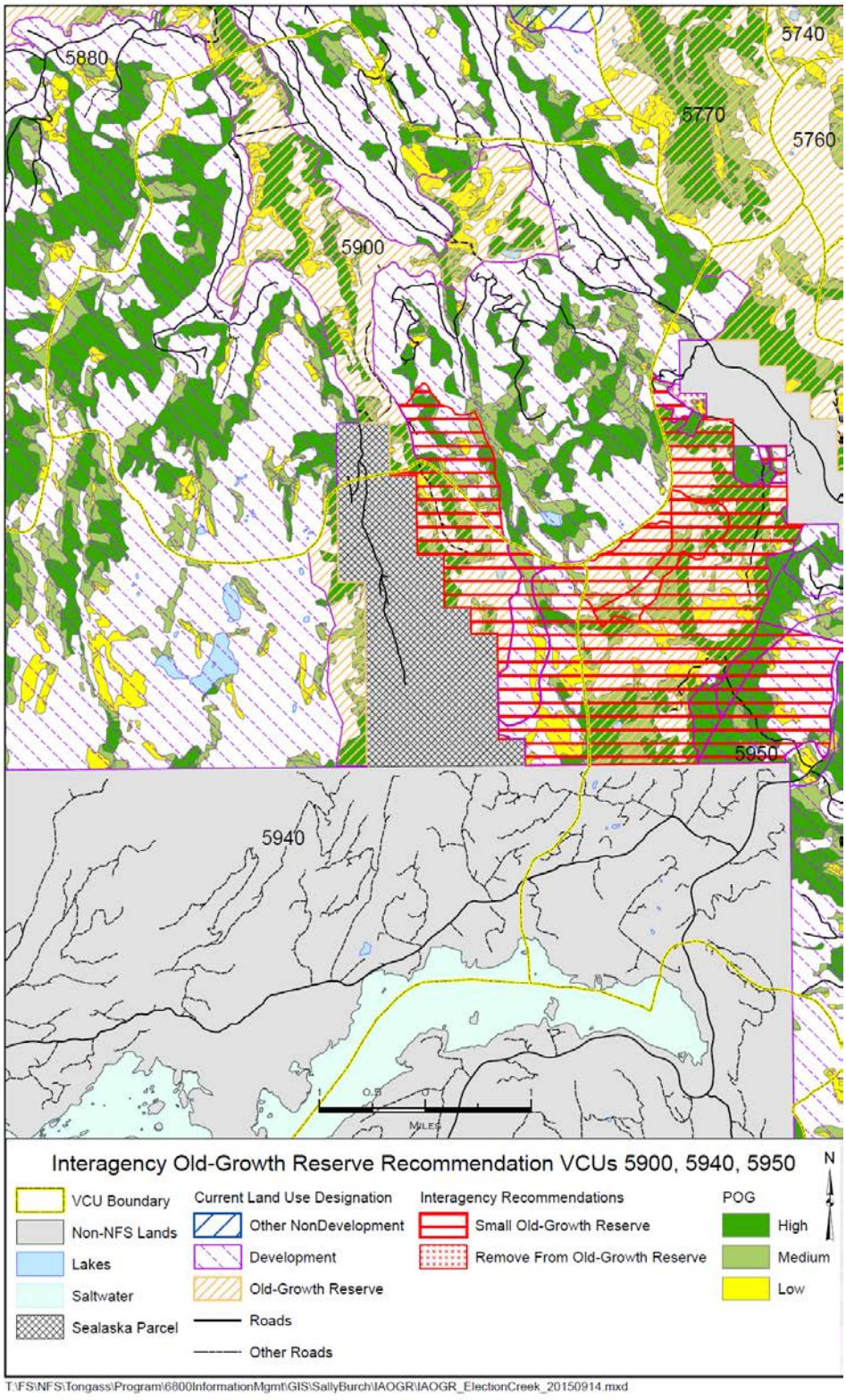


Figure 3

VCU 6850 -Nutkwa

Pre Conveyance: The OGR in this VCU is contiguous with non-development LUDs in VCU compartments of this VCU; VCU 6851 and VCU 6852.

The OGR maintains HPOG, deer winter range, and a low elevation corridor connecting Keeta Inlet to Nutkwa Lagoon.

Post Conveyance: The land conveyed to Sealaska consisted of mostly high volume POG; however even with land conveyance the remaining OGR will still be contiguous with the SPOW wilderness as well as Nutkwa LUD II area. The remaining OGR maintains some low elevation connection between Keeta Inlet and Nutkwa Lagoon.

2015 Rationale/Notes: The 2015 IRT recommends moving the OGR to the south to include the largest remaining contiguous block of POG outside the existing OGR. This modified OGR also includes potential murrelet and goshawk nesting habitat, western facing slopes, and provides an elevational corridor from the alpine to the saltwater (see Figure 4).

Comparison of Small OGR in VCU 6850

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)		17,490	
Non-NFS land (acres)	5,248	14,241	14,241
NFS land Total (acres)	12,242	3,249	3,249
16% of NFS land (Min. Req. OGR acres)	1,959	520	520
All Non-development LUD in VCU	2,221	1,001	1,985
Small OGR (total acres)[1/]	2,058	914	984
8% of NFS land (Min. POG Req. acres)	980	260	260
OGR POG (total acres)[2/]	1,458	453	555
All Non-development LUD POG	1,500	484	1,038
Acreage requirements met? (Total/POG)	Yes/Yes	Yes/Yes	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU 6870			
Total OGR Acres	16	16	7
OGR POG Acres	3	3	0
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	No	Yes
Minimizes roads (total road miles)	0.0	0.0	0.0
Includes streams (Class I stream miles)	1.0	0.0	0.0
Minimizes early seral habitat (acres)	0	0	0
Includes largest remaining block of POG in VCU?	No	No	Yes
Rare/Underrepresented features (large tree POG acres) [3/]	468	16	120
Deep snow deer/marten habitat (acres) [4/]	501	11	90
Goshawk and murrelet nesting habitat (acres) [5/]	858	227	342
Other Considerations			
Maintains Connectivity	Yes	No	Yes
Low elevation POG (acres)[6/]	745	16	1,119

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 6850

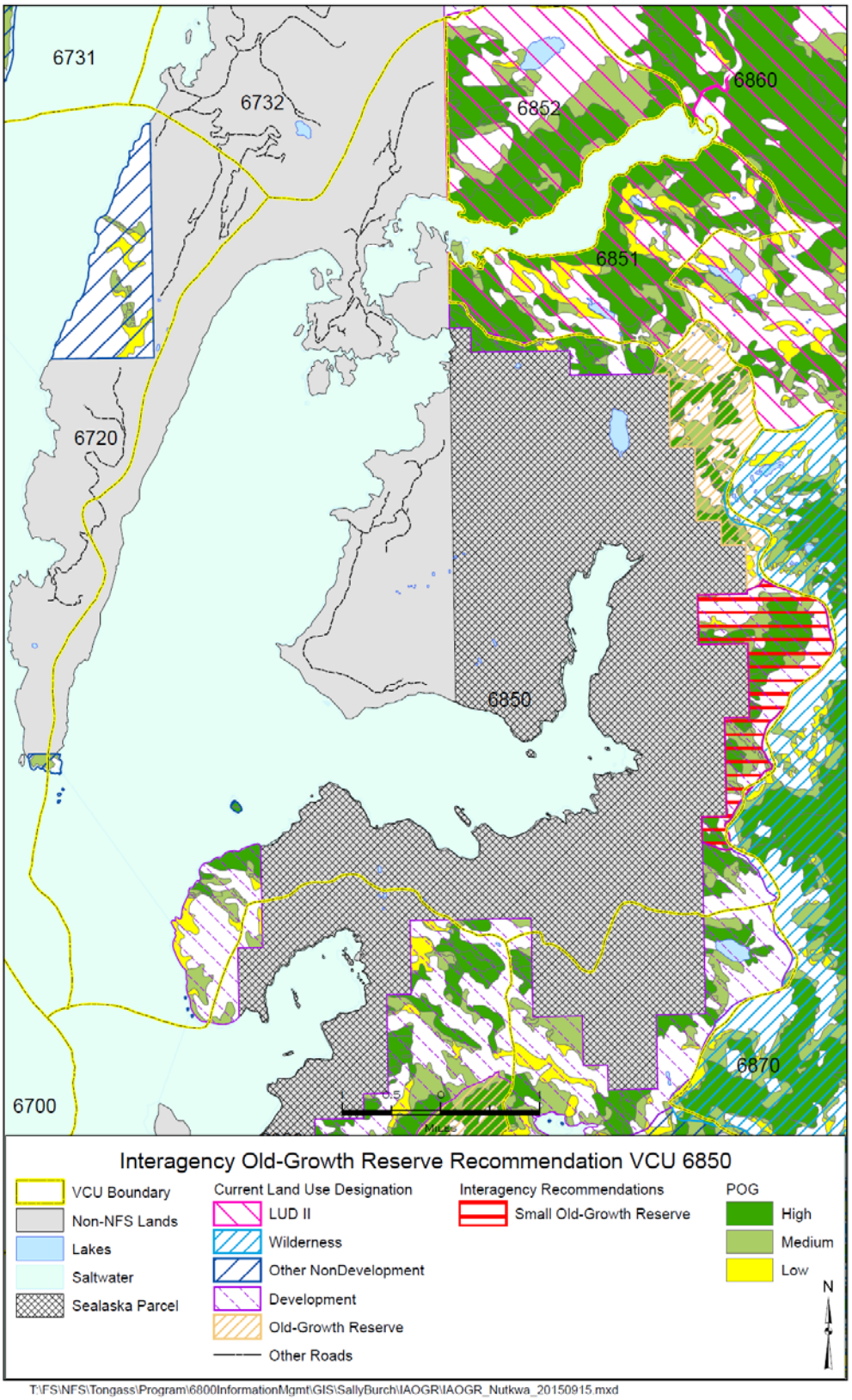


Figure 4

VCU 6200 -Dog Salmon

This small OGR was only minimally impacted by the land conveyance; however most of these acres were high volume POG. The OGR was adjusted to compensate for this loss. The 2015 IRT recommendation includes the addition of a similarly sized piece of high volume POG just to the south of what was conveyed (see Figure 5).

Comparison of Small OGR in VCU 6200

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	24,800		
Non-NFS land (acres)	1,310	4,013	4,013
NFS land Total (acres)	23,490	20,787	20,787
16% of NFS land (Min. Req. OGR acres)	3,758	3,326	3,326
All Non-development LUD in VCU	3,874	3,710	3,943
Small OGR (total acres)[1/]	3,827	3,707	3,940
8% of NFS land (Min. POG Req. acres)	1,879	1,663	1,663
OGR POG (total acres)[2/]	1,907	1,836	1,919
All Non-development LUD POG (acres)	1,918	1,836	1,919
Acreage requirements met? (Total/POG)	Yes/Yes	Yes/Yes	Yes/Yes
Small OGR LUD Overlap into Adjacent VCU			
VCU	NA	NA	NA
Total OGR Acres			
OGR POG Acres			
Small OGR LUD Overlap from Adjacent VCU			
VCU	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	Yes	Yes
Minimizes roads (total road miles)	13.7	13.1	13.1
Includes streams (Class I stream miles)	9.3	8.9	8.9
Minimizes early seral habitat (acres)	716	716	745
Includes largest remaining block of POG in VCU?	No	No	No
Rare/Underrepresented features (large tree POG acres) [3/]	963	912	991
Deep snow deer/marten habitat (acres) [4/]	836	796	796
Goshawk and murrelet nesting habitat (acres) [5/]	1,357	1,306	1,387
Other Considerations			
Maintains Connectivity	Yes	Yes	Yes
Low elevation POG (acres)[6/]	1,217	1,156	1,156

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

VCU 6200

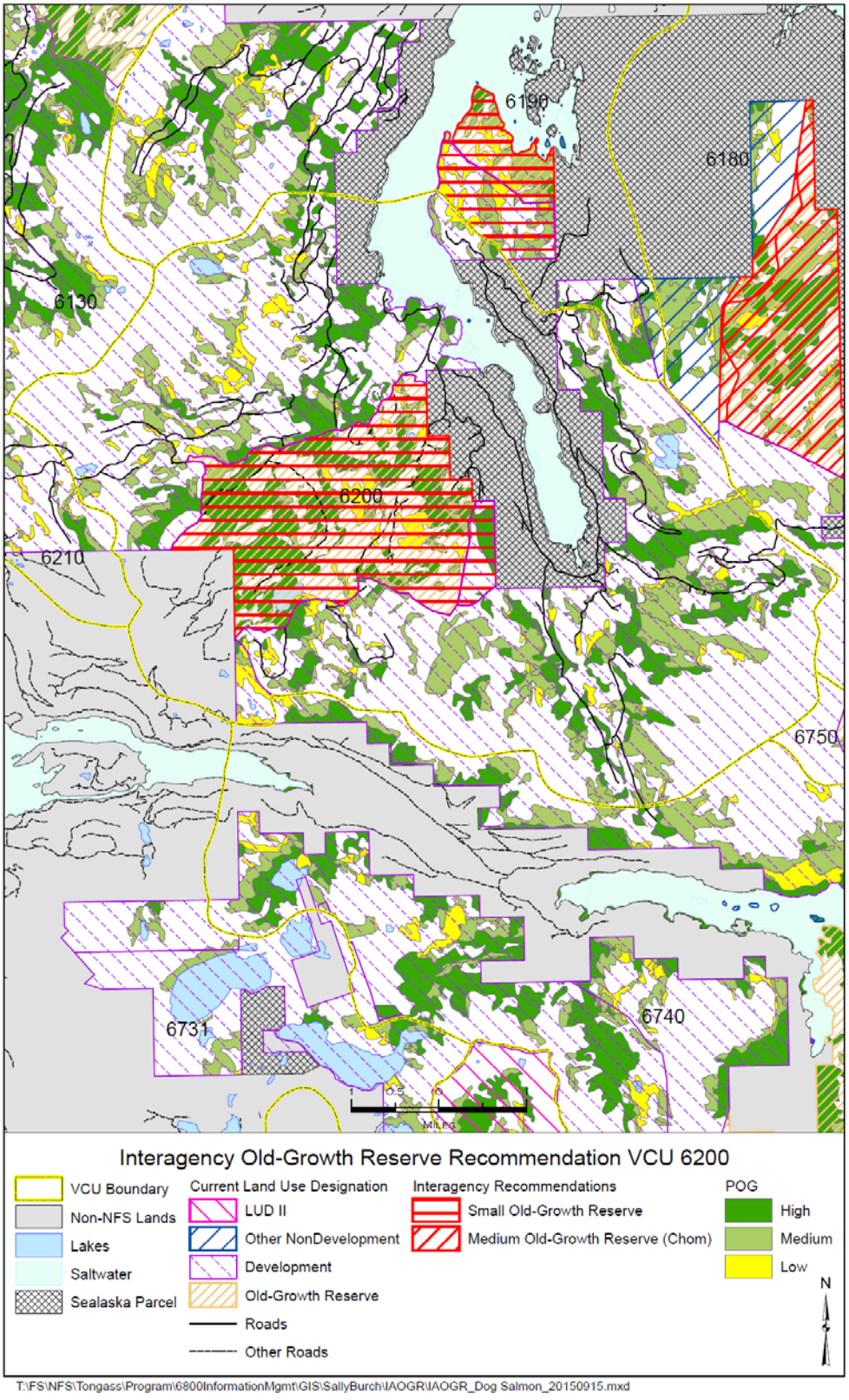


Figure 5

Old Thom's Medium

Pre-Conveyance: The medium OGR in this area consisted of acres designated as OGR in VCUs 6180 and 6190 and the Old Thom's Natural Research Area (RNA) in VCU 6180. Included in the RNA was a USGS Gauging Station. Medium OGRs are supposed to be approximately 10,000 acres in size with a minimum of 5,000 acres of POG and a minimum of 2,500 acres of HPOG, and no farther than 8 miles from other medium or large OGRs, in the four cardinal directions (1997 Forest Plan Appendix K).

Post Conveyance: The Sealaska land conveyance affected the medium OGR in VCUs 6180 and 6190. The resulting acres do not meet the criteria in the 1997 TLMP Appendix K for a medium OGR. The loss of the medium OGR violates the 8 mile proximity requirement for the medium OGRs.

2015 IOGR Rationale/Notes: Options for remedying the loss of the medium in this area include establishing new medium OGR, and/or adjusting/expanding current existing ones to decrease distance between OGRs. The 2015 interagency group considered the intent of the Conservation Strategy at the larger landscape scale for this land area. Lands near Sunny Cove are particularly valuable for wildlife, and could be a small OGR; however, Sunny Cove by itself can't replace or replicate the medium OGR that was lost. Sunny Cove is an intact watershed that may serve as a good replacement for the Old Thom's RNA. The Sunny Cove small OGR in VCU 6750 is near the Cholmondeley medium OGR (VCUs 6170 and 6760) (see Figure 6).

There was discussion as to whether to add the entire Cholmondeley medium to the remaining Old Thom's medium, drop part of the existing Cholmondeley medium, or trade it out entirely (but that option doesn't account for the loss of the Old Thom's medium OGR).

The replacement of the medium in the Old Thom's area needs to be considered at a landscape scale across many VCUs. The proposed replacement of the medium in this area impacts VCUs 6160 (Monie Lake), 6170 (Clover Bay), 6180 (Old Thom's), 6190 (Goose Bay), 6750 (Sunny Creek) and 6760 (Cholmondeley) (see Figure 6).

The discussion involved trying to connect what is left of the Old Thom's medium OGR in VCU 6190 to what was the proposed 2006 interagency medium OGR in VCUs 6160, 6170, 6750 and 6760. The 2006 proposed medium OGR boundary would be modified in VCU 6750. The 2015 IRT proposed enlarging the 2006 OGR in VCU 6750 to include acres to the north to connect to the southern boundary of VCU 6180. The 2015 IRT proposal is to build off the remaining medium OGR acres in VCU 6180 and increase the OGR to the south to connect to the proposed OGR in VCU 6750. A disconnected piece of remaining OGR in VCU 6190 south of Goose Bay would be expanded to include all reaming Forest Service acres in this area. VCU 6190 also includes acres across Polk Inlet. The piece south of Goose Bay was included to help minimize the distance between medium OGRs. It is a small isolated piece of OGR that does include low elevation POG habitat (see Figure 6).

The proposed new medium OGR has a total of 19,060 acres with 8,387 of POG and 4,121 acres of high volume POG. This new OGR is circular and includes only 0.7 miles of road, has 34 miles of Class I streams, only 229 acres of young growth, includes the largest block of POG, 1,184 of large tree POG (SD67), 2,697 acres of deep snow deer and marten habitat and 3,971 acres of

potential goshawk and murrelet nesting habitat. This OGR maintains connectivity and includes 5, 745 acres of low elevation POG.

VCU 6160 -Monie Lake

Pre Conveyance: Prior to the 2008 Forest Plan this VCU included both a medium and a small OGR. The location of the OGR was very controversial. It was recommended to consider this OGR for future review. The 1997 TLMP small OGR is linear along the beach fringe, contains few south facing slopes with POG, little habitat for goshawks or marbled murrelet and does not contain the largest contiguous blocks of POG in the watershed.

The 2002 POW review proposed changing the TLMP small OGR to a medium OGR and relocating the OGR to increase acres of POG and high volume POG and make the OGR more circular. The 2002 proposal includes most of the largest blocks of contiguous POG, potential goshawk and murrelet nesting habitat and important deer winter range. The proposed medium OGR would occur along the shore of VCUs 6160, 6170, 6750 and 6760. The 2002 POW review added entire Monie Lake watershed from Lake to shoreline and includes large blocks of POG in this area. The proposed medium would eliminate the need for a small OGR in VCUs 6160 and 6750.

The 2006 IRT biologically preferred OGR in this VCU changed the designation from a small OGR to a medium OGR. The OGR in this VCU would be combined with the OGRs in VCUs 6170, 6750 and 6760 to form a medium OGR.

Post Conveyance: The OGR in this VCU was not directly impacted by the land conveyance.

2015 IRT: The 2015 IRT proposes that the medium OGR in this VCU be the same as the biologically preferred IOGR proposed for the 2008 Forest Plan (2006 IRT IOGR). The existing small OGR in VCU 6160 is expanded; as a result the small amount of existing medium OGR acreage goes away (see Figure 6).

VCU 6170 -Clover Bay

Pre Conveyance: The 2002 POW IRT relocated the TLMP OGR to increase acres of POG and high volume POG and to make more circular. The proposal included most of the largest blocks of contiguous POG, potential goshawk and murrelet nesting habitat and important deer winter range. The OGR in this VCU would be part of the medium OGR that also includes acres in VCUs 6160, 6170, 6750 and 6760.

The 2006 IRT biologically preferred OGR in this VCU changed the designation from a small OGR to a medium OGR. The OGR in this VCU would be combined with the OGRs in VCUs 6750 and 6760 to form a medium OGR.

Post Conveyance: The OGR in this VCU was not directly impacted by the land conveyance.

2015 IRT: The 2015 IRT proposes that the medium OGR in this VCU be the same as the IOGR as proposed for the 2008 Forest Plan (2006 IRT IOGR) (see Figure 6).

VCU 6180 -Old Thom's Research Natural Area

Pre Conveyance: The 2006 IRT modified the 1997 TLMP medium Old Thom Medium OGR by adding acres to south to increase both POG and high volume POG. The medium OGR maintains connectivity in area heavily fragmented by harvest and private lands.

Post Conveyance: Most of what was medium OGR/RNA in this VCU was lost due to the land conveyance.

2015 Review: The 2015 IRT recommends including both the remaining OGR acres and the remaining RNA acres in the proposed medium. The southern boundary of this proposed modified medium OGR will be a Sealaska ROW. This ROW interrupts the connectivity of the medium OGR with other proposed OGR acres in this VCU. The interagency group felt that this ROW was narrow enough as to not pose a significant problem for most species. The 2015 IRT proposed additional acres south of the ROW provide connectivity to OGR acres in VCU 6750 (Sunny Cove). These acres also include low elevation habitat around the south end of McKenzie Inlet (see Figure 6).

VCU 6190 -Goose Bay

Pre Conveyance: According to 2002 POW IRT the medium IOGR exceeded the minimum acre criteria for POG and high POG and it was mentioned to consider reducing OGR size to allow for future management activities.

The 2006 review team recommended modifying the 1997 TLMP medium Old Thom's OGR by adding acres to the south. This modification increased both POG and high POG acres. The added area includes both roads and second growth stands.

The consensus of the 2006 review team was to not adopt the IOGR so as to maintain future harvest opportunities because while the IOGR is preferred biologically reverting to the 1997 TLMP OGR still maintains the integrity of the OGR.

Post Conveyance: Most of what was medium OGR/RNA in this VCU was lost due to the land conveyance.

2015 Review: The 2015 IRT recommends the creation of a new small OGR in this VCU. Alternatives for a small include the Goose Bay area which is currently mapped as part of the medium that was lost. The Goose Bay area is relatively intact, with the last portion of low-elevation POG in this VCU remaining on Forest Service land.

VCU 6750 -Sunny Cove

Pre Conveyance: Prior to the 1997 TLMP, the entire Sunny Cove areas was proposed as a Habitat Conservation Area (HCA). The 1997 TLMP excluded most of the south facing slopes on the north side of Sunny Creek. The 1997 TLMP OGR includes high elevation, low volume isolated patches of narrow strips of timber.

In the 1997 TLMP this VCU contained a small OGR. The 2006 IRT changed the 1997 TLMP small OGR to a medium OGR and added acres to increase POG. The 2006 IRT proposal included most of the largest blocks of contiguous POG, potential goshawk and murrelet nesting habitat, important deer winter range and added a corridor that connects this OGR to the OGR in VCU 6170. The medium OGR would occur along the shore of VCUs 6160, 6170, 6750 and 6760. This proposal dropped the 1997 TLMP small OGR in VCU 6750 and added an area north of Sunny Cove and along Sunny Creek to connect to OGR in VCU 6760. This medium OGR would include acres in VCUs 6160, 6170, 6750 and 6760. This proposal did not include changes to the OGR in VCU 6760 but did included changes to the OGR in VCU 6160 and VCU 6170.

The proposed OGR includes HPOG and low elevation on both sides of Sunny Creek and higher elevation on south side of Sunny Creek. It also includes the large blocks of POG in this area. This option would eliminate the need for a small OGR in VCU 6750. The Polk Timber Sale EIS confirmed the value of wildlife habitat in this only unharvested drainage and avoided harvest in this area. This proposal does not include high value deer winter range north of Sunny Creek or goshawk use areas identified during field work for the timber sale (prey remains).

The 2006 IRT recommended a review of this OGR especially if the Cholmondeley Timber Sale is not completed.

The 2006 IRT changed the small OGR in this VCU (6750) to a medium OGR. Past review document assumed OGR acres in VCU 6160 (Monie Lake) was part of the medium OGR. The location of the medium was very controversial.

The 2006 Interagency Team preferred location was not implemented because there is a proposal for a timber sale with a supplemental ROD in this area. If the timber sale does not occur, then consider implementing the interagency OGR. Management recommended adoption of the Cholmondeley Timber Sale NEPA decision and Forest Plan Amendment OGR.

In the 2006 review the Forest Supervisor decided on the 1997 TLMP OGR. It was also recommended that potential future LTF/MAF sites be maintained in VCUs 6150 or 6160.

Post Conveyance: The OGR in this VCU was not directly impacted by the land conveyance.

2015 Review: The 2015 IRT proposes that the medium OGR in this VCU be reverted back to the IOGR for the 2008 Forest Plan (2006 IRT IOGR). The 2015 IRT proposed moving the current small OGR from the west side of Sunny Creek to the east side and changing the designation from a small OGR to being included as part of the proposed medium (see Figure 6). This proposal includes most of the largest blocks of contiguous POG, potential goshawk and murrelet nesting habitat, important deer winter range and adds a corridor that connects this OGR to the OGR in VCU 6170. The value of this area as an unharvest watershed has been recognized since the Polk Timber Sale EIS (1995).

VCU 6760 -Cholmondeley

Pre Conveyance: The 2006 IRT proposed modifying the 1997 TLMP medium OGR by adding acres to the west to connect to Sunny Point and proposed OGR in VCU 6750. This proposal includes most of the largest blocks of contiguous POG, potential goshawk (prey remains were found) and murrelet nesting habitat and important deer winter range.

Post Conveyance: The OGR in this VCU was not directly impacted by the land conveyance.

2015 IRT: The 2015 IRT proposes that the medium OGR in this VCU be reverted back to the IOGR for the 2008 Forest Plan (2006 IRT IOGR) (Figure 6).

Medium OGR VCUS 6160, 6170, 6180, 6190, 6200, 6750 and 6760

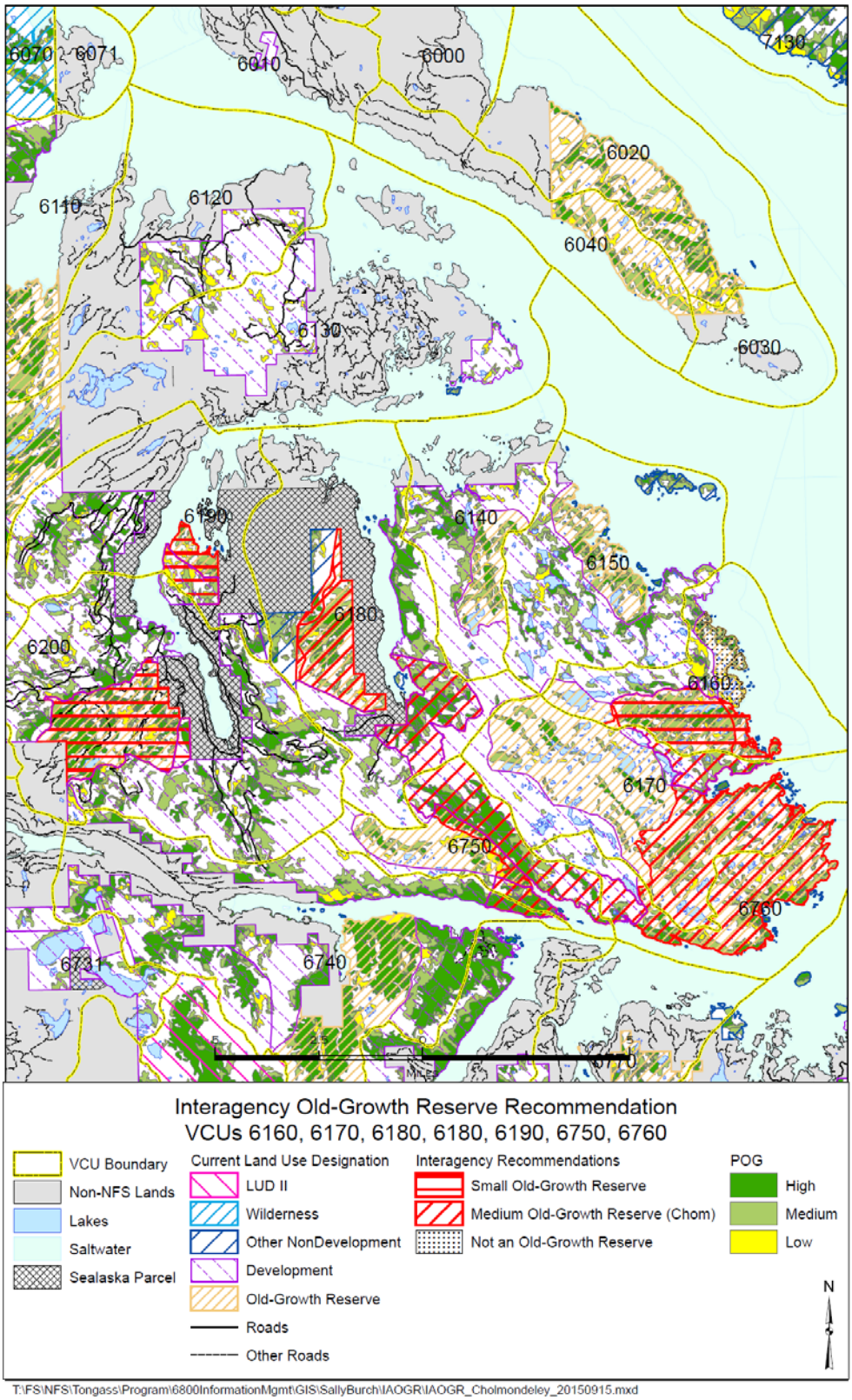


Figure 6

Comparison of Medium OGRs in VCUs 6160, 6170, 6180, 6190, 6750, and 6760 (Monie Lake and Old Thom Medium OGRs)

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land ownership All VCUs (acres)	63,348		
Non-NFS land (acres)	4,651	12,842	12,842
NFS land Total (acres)	58,697	50,801	50,801
Min. Req. OGR acres	10,000		
Min. Req. POG acres	5,000		
Min. Req. High-Volume POG acres	2,500		
Old Thom Medium OGR (VCUs 6180/6190)			
Total Medium OGR Acres	10,238	4,159	See Below
Total Medium OGR POG Acres	7,184	2,030	
Total Medium OGR High-Volume POG Acres	4,293	652	
Acreage requirements met? (Total/POG/HPOG)	Yes/Yes/Yes	No/No/No	
Monie Lake Medium OGR (VCUs 6160, 6170, 6760)			
Total Medium OGR Acres	15,527	15,527	See below
Total Medium OGR POG Acres	4,223	4,223	
Total Medium OGR High-Volume POG Acres	1,429	1,429	
Acreage requirements met? (Total/POG/HPOG)	Yes/No/No	Yes/No/No	
New Cholmondeley Medium OGR (VCUs 6170, 6180, 6750, and 6760)			
Total Medium OGR Acres	See Above	See Above	19,060
Total Medium OGR POG Acres			8,387
Total Medium OGR High-Volume POG Acres			4,121
Acreage requirements met? (Total/POG/HPOG)			Yes/Yes/Yes
Contributing VCUS			
VCU 6160			
Total land ownership (acres)	6,207		
Non-NFS land (acres)	0	0	0
NFS Land (acres)	6,207	6,207	6,207
Total Medium OGR (acres)	691	691	0
All Non-development LUD in VCU (acres)	1,954	1,954	4,091
Medium OGR POG (acres)[2/]	16	16	0
Medium OGR High-volume POG (acres)	0	0	0
All Non-development LUD POG in VCU (acres)	620	620	1,822
All Non-development LUD High-volume POG in VCU (ac)	132	132	473
VCU 6170			
Total land ownership (acres)	14,370		
Non-NFS land (acres)	0	0	0
NFS Land (acres)	14,370	14,370	14,370
Total Medium OGR (acres)	10,786	10,786	5,721
All Non-development LUD in VCU (acres)	10,927	10,927	11,876
Medium OGR POG (acres)[2/]	2,321	2,321	1,809
Medium OGR High-volume POG (acres)	827	827	591
All Non-development LUD POG in VCU (acres)	2,443	2,443	2,802
All Non-development LUD High-volume POG in VCU (ac)	942	942	1,016
VCU 6180			
Total land ownership (acres)	18,234		
Non-NFS land (acres)	1,075	6,573	6,573
NFS Land (acres)	17,159	11,661	11,661
Total Medium OGR (acres)	8,730	3,703	4,820
All Non-development LUD in VCU (acres)	8,854	3,755	6,068
Medium OGR POG (acres)[2/]	6,009	1,715	2,408

Comparison of Medium OGRs in VCUs 6160, 6170, 6180, 6190, 6750, and 6760 (Monie Lake and Old Thom Medium OGRs)

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
Medium OGR High-volume POG (acres)	3,655	610	1,186
All Non-development LUD POG in VCU (acres)	6,033	1,739	2,924
All Non-development LUD High-volume POG in VCU (ac)	3,657	612	1,273
VCU 6190			
Total land ownership (acres)		12,071	
Non-NFS land (acres)	3,563	5,962	5,962
NFS Land (acres)	8,508	6,109	6,109
Total Medium OGR (acres)	1,543	492	0
All Non-development LUD in VCU (acres)	1,649	497	1,101
Medium OGR POG (acres)[2/]	1,176	315	0
Medium OGR High-volume POG (acres)	638	41	0
All Non-development LUD POG in VCU (acres)	1,210	320	647
All Non-development LUD High-volume POG in VCU (ac)	655	44	69
VCU 6750			
Total land ownership (acres)		6,887	
Non-NFS land (acres)	11	11	11
NFS Land (acres)	6,876	6,876	6,876
Total Medium OGR (acres)	0	0	3,984
All Non-development LUD in VCU (acres)	2,522	2,522	6,024
Medium OGR POG (acres)[2/]	0	0	2,187
Medium OGR High-volume POG (acres)	0	0	1,673
All Non-development LUD POG in VCU (acres)	968	968	2,774
All Non-development LUD High-volume POG in VCU (ac)	409	409	1,797
VCU 6760			
Total land ownership (acres)		5,579	
Non-NFS land (acres)	0	0	0
NFS Land (acres)	5,579	5,579	5,579
Total Medium OGR (acres)	4,014	4,014	4,534
All Non-development LUD in VCU (acres)	4,067	4,067	4,615
Medium OGR POG (acres)[2/]	1,886	1,886	1,983
Medium OGR High-volume POG (acres)	601	601	671
All Non-development LUD POG in VCU (acres)	1,925	1,925	2,022
All Non-development LUD High-volume POG in VCU (ac)	614	614	682
Appendix D General Design Criteria and Other Considerations			
Old Thom Medium OGR			
Appendix D Design Criteria			See Below
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	Yes	No	
Minimizes roads (total road miles)	0.0	0.0	
Includes streams (Class I stream miles)	10.7	2.9	
Minimizes early seral habitat (acres)	9	9	
Includes largest remaining block of POG in VCU?	Yes	No	
Rare/Underrepresented features (large tree POG acres) [3/]	3,229	456	
Deep snow deer/marten habitat (acres) [4/]	2,982	123	
Goshawk and murrelet nesting habitat (acres) [5/]	4,293	652	
Other Considerations			
Maintains Connectivity	Yes	No	
Low elevation POG (acres)[6/]	4,218	473	
Monie Lake Medium OGR			
Appendix D Design Criteria			See Below

Comparison of Medium OGRs in VCUs 6160, 6170, 6180, 6190, 6750, and 6760 (Monie Lake and Old Thom Medium OGRs)

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	No	No	
Minimizes roads (total road miles)	0.0	0.0	
Includes streams (Class I stream miles)	24.6	24.6	
Minimizes early seral habitat (acres)	0	0	
Includes largest remaining block of POG in VCU?	No	No	
Rare/Underrepresented features (large tree POG acres) [3/]	378	378	
Deep snow deer/marten habitat (acres) [4/]	1,196	1,196	
Goshawk and murrelet nesting habitat (acres) [5/]	1,429	1,429	
Other Considerations			
Maintains Connectivity	Yes	Yes	
Low elevation POG (acres)[6/]	3,417	3,417	
Proposed New Cholmondeley Medium OGR			
Appendix D Design Criteria	See Above	See Above	
Circular rather than linear to maximize interior habitat/minimize fragmentation effects			Yes
Minimizes roads (total road miles)			0.7
Includes streams (Class I stream miles)			34.0
Minimizes early seral habitat (acres)			229
Includes largest remaining block of POG in VCU?			Yes
Rare/Underrepresented features (large tree POG acres) [3/]			1,884
Deep snow deer/marten habitat (acres) [4/]			2,697
Goshawk and murrelet nesting habitat (acres) [5/]			3,971
Other Considerations			
Maintains Connectivity			Yes
Low elevation POG (acres)[6/]			5,745

1/Medium OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should also include 2,500 acres of high-elevation POG
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

Comparison of Small OGR in VCU 6160

	Pre-conveyance	Post-conveyance	2015 Biologically Preferred
General VCU Info./Forest Plan Appendix K Criteria			
Total land all ownership (acres)	6,207		
Non-NFS land (acres)	0		0
NFS land Total (acres)	6,207		6,207
16% of NFS land (Min. Req. OGR acres)	992		992
All Non-development LUD in VCU (acres)	1,954		4,091
Small OGR (acres)[1/]	1,247		2,558
8% of NFS land (Min. POG Req. acres)	496		496
OGR POG (acres)[2/]	597		1,441
All Non-development LUD POG in VCU (acres)	620		2,460
Acreage requirements met? (Total/POG)	Yes/Yes		Yes/Yes
Small OG LUD Overlap into Adjacent VCU			
VCU #	NA	NA	NA
Total OGR Acres			
OGR POG Acres			
Small OG LUD Overlap from Adjacent VCU			
VCU #	NA	NA	NA
Total Acres			
POG Acres			
Appendix D General Design Criteria			
Circular rather than linear to maximize interior habitat/minimize fragmentation effects	No		Yes
Minimizes roads (total road miles)	0.0		0.0
Includes streams (Class I stream miles)	5.2		8.0
Minimizes early seral habitat (acres)	0		0
Includes largest remaining block of POG in VCU?	No		Yes
Rare/Underrepresented features (large tree POG acres) [3/]	38		270
Deep snow deer/marten habitat (acres) [4/]	132		325
Goshawk and murrelet nesting habitat (acres) [5/]	132		379
Other Considerations			
Maintains Connectivity	Yes		Yes
Low elevation POG (acres)[6/]	597		1,255

1/Small OGR includes all OG and other Non-Dev LUDs that apply to the VCU to meet Forest Plan Standard and Guidelines for this reserve. This includes overlap into adjacent VCUs and excludes Non-Dev LUD in the VCU not associated with this reserve.
2/ Should be approximately 50% of OGR acres
3/ SD67 type
4/ High-volume POG ≤ 800 feet in elevation
5/ High-volume POG all elevations (indicative of optimal goshawk and marbled murrelet nesting habitat due to presence of large trees and snags, though both species may use all POG types)
6/ All POG ≤ 800 feet in elevation (representative of low-elevation travel corridors important for many species)

Interagency Old Growth Reserve Review
Sealaska Land Conveyance

September 2015

9/11/15

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APPENDIX F
COMPARISON OF DIRECTION BY ALTERNATIVE

Appendix F

Comparison of Direction by Alternative

CONTENTS

TABLES

Appendix F
Comparison of Direction by Alternative

Introduction

Chapter 5 of the proposed Forest Plan contains the proposed direction for Alternative 5 (the Preferred Alternative). Direction in Chapter 5 applies to the entire plan area (forest-wide) or to specific LUDs as explained in Chapter 3. Management direction includes plan components and management approaches. This appendix shows how direction for the other alternatives compares to Alternative 5, whether direction is identical, or how it differs. This appendix follows the organization of Chapter 5 and presents the comparison in this order: Young Growth, Renewable Energy, Transportation System Corridors, and Forest-wide direction.

Young-Growth Direction

Table F-1, located at the end of this appendix, displays the proposed Young-growth direction for Alternative 5 (the Preferred Alternative), which is the basis for the proposed Forest Plan (see proposed Plan Chapter 5). The table also shows how direction for the other alternatives compares to Alternative 5, whether direction is identical, or how it differs.

Management approaches for young growth for Alternative 5 are presented in proposed Forest Plan Chapter 5 and are not repeated here. The following sections present how Alternatives 2 through 5 Management Approaches compare to those of Alternative 5. No management approaches would apply to Alternative 1, the No Action Alternative.

Management Approaches for Young Growth

Alternative 5:

See proposed Forest Plan Chapter 5.

Alternative 2-4:

The intent is that responsible officials engage stakeholders (for example, conservation interests, timber operators, permitted user groups, and other interested parties) early and often to best design projects that meet ecological, social, and economic interests. Such inclusion would surface and resolve differences, and minimize and avoid social, environmental, and natural resource conflicts. At the earliest possible time, Interdisciplinary Teams (IDTs) would engage scientific and technical expertise, and knowledge of local resources to encourage creative thinking and enhance integration and coordination among jurisdictions.

The intent is that during project planning, IDTs identify other resource opportunities in the project area, and integrate these opportunities into the project design. (See definition for Integrated Resource Management in Chapter 7.) When designing young-growth projects that would advance old-growth characteristics in the beach fringe, riparian management area (RMA), or old-growth reserve (OGR), IDTs seek out stakeholders to encourage creative and innovative approaches for developing silvicultural treatments that imitate the natural scale and distribution of disturbance patterns on the Tongass (e.g., wind-thrown timber that creates gaps and patches; landslides that create corridors and gaps; mortality that naturally thins stand). The intent is that treatments in RMAs would address stream process group objectives. (Consult Appendix D, and Exhibit 2 in the Tongass Young Growth Management Strategy [USDA Forest Service 2014d].)

Where appropriate, line officers would use Stewardship Authority (FSH 2409.19, Chapter 60) and other authorities to help achieve land management goals while meeting regional and local community needs.

Management Approaches for Beach and Estuary Fringe

Alternative 5:

See Forest Plan Chapter 5.

Alternative 2:

The intent is that the IDT assesses the highly productive, sensitive, and valuable fish and wildlife habitat found in estuaries to determine how to protect these important resources. Forest Plan Appendix D provides guidance for delineating RMAs associated with estuarine stream process group.

The intent is that the IDT consult and integrate permit holders, local users, and user groups in planning in the development of any management activity.

When even-aged management of young growth occurs in the beach and estuary fringe, the intent is to maintain an approximate 1,000-foot wide protected corridor adjacent and inland of the harvest unit to function as an alternate, low elevation, natural habitat and corridor.

Alternative 3:

Same as Alternative 5.

Alternative 4:

Same as Alternative 5 with the addition of:

To maintain or improve habitat conditions and long-term ecological function, it is expected that the IDT would minimize the size of created openings in stands previously treated for wildlife and fish habitat purposes.

Management Approach for Karst and Cave Resources

Alternative 2-4:

Same as Alternative 5.

Management Approaches for Recreation and Tourism

Alternative 2-4:

Same as Alternative 5.

Management Approaches for Riparian

Alternative 2:

Same as Alternative 5.

Alternative 3:

No management approaches.

Alternative 4:

To maintain or improve habitat conditions and long-term ecological function, it is expected that the IDT would minimize the size of created openings in stands previously treated for wildlife and fish habitat purposes.

Management Approaches for Scenery

Alternatives 2-4:

No management approaches.

Management Approaches for Soil and Water

Alternative 2-4:

Same as Alternative 5.

Management Approaches for Timber

Alternatives 2-4:

Same as Alternative 5.

Management Approaches for Wildlife

Alternative 2:

It is expected that project IDT and the interagency review team of USDA Forest Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game biologists would jointly work to identify young growth for harvest within the Old-Growth Habitat LUD that can be exchanged for old growth from adjacent landscapes, where a net gain of productive old growth habitat in the Old-Growth Habitat LUD is possible while maintaining and enhancing landscape connectivity. (See Appendix K.)

Alternative 3:

It is expected that project IDT and the interagency review team of USDA Forest Service, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game biologists would jointly work to identify young growth for harvest within the Old-growth Habitat LUD that can be exchanged for old growth from adjacent landscapes, where a net gain of productive old growth habitat in the Old-growth Habitat LUD is possible while maintaining and enhancing landscape connectivity. (See Appendix K.)

When implementing young-growth timber harvest projects larger than 20 acres in VCUs that have had concentrated past timber harvest, it is intended that 30 percent of the young growth stand acres should be left. The purpose is to retain sufficient residual trees to diversify the structural characteristics of the stand and provide for future recruitment of snags. The VCUs where this is intended to apply are ones in which 33 percent or more of the productive old growth has been harvested since 1954. (Consult Forest Plan Chapter 4 under Wildlife section (WILD1), IV. Legacy Forest Structure.)

Alternative 4:

When implementing young-growth timber harvest projects larger than 20 acres in VCUs that have had concentrated past timber harvest, it is intended that 30 percent of the young growth stand acres should be left. The purpose is to retain sufficient residual trees to diversify the structural characteristics of the stand and provide for future recruitment of snags. The VCUs where this is intended to apply are ones in which 33 percent or more of the productive old growth has been harvested since 1954. (Consult Forest Plan Chapter 4 under Wildlife section (WILD1), IV. Legacy Forest Structure.)

To maintain or improve habitat conditions and long-term ecological function, it is expected that the IDT would minimize the size of created openings in stands previously treated for wildlife and fish habitat purposes.

Renewable Energy Direction

All plan content for Renewable Energy presented in proposed Plan Chapter 5 apply to Alternatives 3 and 4. They do not apply to Alternative 1, No Action. For Alternative 2, the plan components are identical to the preferred alternative except S-RE-SCENE-01. Under Alternative 2, the following standard would be applied:

> S-RE-SCENE-01: Apply the forest-wide standards and guidelines of the Very Low Scenic Integrity Objective (SIO) to renewable energy sites.

Management Approach for Renewable Energy

The management approaches for Renewable Energy presented in Chapter 5 apply to all action alternatives. (They do not apply to Alternative 1, No Action.)

Transportation System Corridors Direction

All plan components for Transportation System Corridors presented in Chapter 5 apply to all action alternatives. (They do not apply to Alternative 1, No Action.)

Management Approach for Transportation System Corridors

The management approaches for Transportation System Corridors presented in Chapter 5 apply to all action alternatives. (They do not apply to Alternative 1, No Action.)

Forest-Wide Direction

Chapter 5 of the proposed Forest Plan includes Forest-wide plan Desired Conditions (Chapter 2), Multiple-use Goals and Objectives (Chapter 2), Standards and Guidelines (Chapter 4). The proposed direction presented for Alternative 5 (the Preferred Alternative) applies to all action alternatives.

Table F-1 displays the proposed Young-Growth direction for Alternative 5 (the Preferred Alternative), for which the proposed Forest Plan has been prepared (see Chapter 5). This table also shows how direction for the other alternatives compares to Alternative 5, whether direction is identical, or how it differs. The LUDs that a particular plan component would apply to are indicated using the following abbreviations: Old-growth habitat (OGH); Remote Recreation (RM); Recreation River (RR); Special Interest Area (SA); Semi-Remote Recreation (SM); Scenic River (SR); Scenic Viewshed (SV); Modified Landscape (ML); Timber Production (TM)

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Young Growth (YG)				
Desired Condition (DC)				
DC-YG-01: Young-growth forests produce desired resource values, products, services and conditions in ways that sustain the diversity and productivity of ecosystems. Lands suitable for timber production produce sawtimber and other wood products on an even-flow, long-term sustained yield basis; the timber yield contributes to the projected timber sale quantity (PTSQ).Timber and other ecosystem services from young-growth forest resources provide economical and sustainable opportunities that support Southeast Alaska communities. [OGH, SV, ML, TIM]	Desired Conditions for young-growth timber are found in Chapter 4 of the approved 2008 Forest Plan under Timber and in the Tongass Young Growth Management Strategy Exhibit 1-Timber Approach (2014).	DC-YG-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-01 is identical to Alternative 5. [SV, ML and TM LUDs only]
DC-YG-02: Pre-commercial thinning treatment of young-growth timber stands approaching, or at, the stem-exclusion stage, increase stand growth and vigor (e.g., larger trees, small canopy gaps, diverse understory).Treatments occur where highest productivity, harvest operability and access is favorable. [OGH, SV, ML, TM]		DC-YG-02 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-02 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-02 is identical to Alternative 5. [SV, ML and TM LUDs only]
DC-YG-03: Harvesting of young-growth stands provides opportunities to improve or maintain fish and wildlife habitat by accelerating old-growth characteristics. [OGH]		DC-YG-03 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-03 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-03 is identical to Alternative 5. [SV, ML and TM LUDs only]

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
DC-YG-04: Harvesting of young-growth stands in Riparian Management Areas (RMAs and Beach Fringe provides opportunities to improve or maintain fish and wildlife habitat by accelerating old-growth characteristics. [OGH, SV, ML, TM]		DC-YG-04 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	**DC-YG-04:** Harvesting of young-growth stands in the Beach Fringe provides opportunities to improve or maintain fish and wildlife habitat by accelerating old-growth characteristics. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-04 is identical to Alternative 3. [SV, ML and TM LUDs only]
DC-YG-05: At the end of the planned rotation for young growth, stands are in a condition whereby regeneration harvests using even-aged, two-aged or uneven-aged silvicultural systems are feasible and appropriate. [SV, ML, TM]		DC-YG-05 is identical to Alternative 5. [RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-05 is identical to Alternative 5. [RM, RR, SA, SM, SR, SV, ML and TM LUDs only	DC-YG-05 is identical to Alternative 5. [SV, ML and TM LUDs only]
Suitability of Lands (SUIT)				
SUIT-YG-01: Lands within Old-growth Habitat, Scenic Viewshed, Modified Landscape, and Timber Production LUDs are suitable for young-growth timber production if they meet the other suitability requirements such as Tongass Timber Reform Act (TTRA), high vulnerability karst, and Inventoried Roadless Areas. Timber management within these LUDs is compatible with desired conditions for young-growth management. [OGH, SV, ML, TM]	Suitability of lands for timber production are found in Appendix A of the current 2008 Forest Plan.	**SUIT-YG-01:** Lands within Old-growth Habitat, Remote Recreation, Recreational River, Special Interest Area, Semi-remote Recreation, Scenic River, Scenic Viewshed, Modified Landscape, and Timber Production LUDs are suitable for young-growth timber production if they meet the other suitability requirements in 36 CFR 219.11. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	SUIT-YG-01 is identical to Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	**SUIT-YG-01:** Lands within Scenic Viewshed, Modified Landscape, and Timber Production LUDs are suitable for young-growth timber production if they meet the other suitability requirements in 36 CFR 219.11. [SV, ML and TM LUDs only]
Objectives (O)				
O-YG-01: During the 15 years after plan approval, the amount of young-growth offered would gradually increase to exceed 50 percent of the timber offered annually. [OGH, SV, ML, TM]	Objectives for young-growth timber are found in Chapter 4 of the approved 2008 Forest Plan under Timber and in the Tongass Young	O-YG-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	O-YG-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	O-YG-01 is identical to Alternative 5. [SV, ML and TM LUDs only]

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
O-YG-02: During the 15 years after plan approval, offer increasing annual volumes of economically viable young-growth timber. Old-growth timber harvest would gradually be reduced to an average of 5 MMBF annually, to support local mills and investments in re-tooling, depending on markets and demand. [OGH, SV, ML, TM]	Growth Management Strategy Exhibit 1-Timber Approach (2014).	O-YG-02 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	O-YG-02 is identical to Altern 5. [OGH, RM, RR, SA, SM, S ML and TM LUDs only]	O-YG-02 is identical to Alternative 5. [SV, ML and TM LUDs only]
O-YG-03: Annually, pre-commercially thin 4,000 to 7,000 acres of young-growth stands. [OGH, SV, ML, TM]		O-YG-03 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	O-YG-03 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	O-YG-03 is identical to Alternative 5. [SV, ML and TM LUDs only]
Goals (G)				
GL-YG-01: Provide a stable young-growth timber supply that sustains long-term timber yields while maintaining or improving habitat conditions for wildlife and fish at the landscape level (see Proposed Forest Plan Appendix B). [OGH, SV, ML, TM]	Goals for young-growth timber are found in Chapter 4 of the approved Forest Plan under Timber and the Tongass Young Growth Management Strategy Exhibit 1-Timber Approach (2014).	**GL-YG-01:** Provide a stable young-growth timber supply that sustains long-term timber yields without impairment of the productivity of the land, with consideration being given to ecological, social, and economic factors. See Tongass Young Growth Management Strategy (2014). [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-01 is identical to Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-01 is identical to Alternative 2. [SV, ML and TM LUDs only]
GL-YG-02: Pre-commercially treat stands to reduce or eliminate stem exclusion, to decrease stand rotation time, and provide future silvicultural opportunities. [OGH, SV, ML, TM]		GL-YG-02 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-02 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-02 is identical to Alternative 5. [SV, ML and TM LUDs only]
GL-YG-03: Create opportunities in young-growth management and the use of forest products in a manner that enhances the economic vitality of the region and the resilience of local communities. [OGH, SV, ML, TM]		GL-YG-03 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-03 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-03 is identical to Alternative 5. [SV, ML and TM LUDs only]

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
GL-YG-04: Harvest of young-growth timber supports a variety of mill sizes and operators across the forest, including small and micro sales that support economic opportunities. [OGH, SV, ML, TM]		GL-YG-04 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-04 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-04 is identical to Alternative 5. [SV, ML and TM LUDs only]
GL-YG-05: Make available a variety of potential forest products that support the development of an integrated industry based primarily upon young-growth timber harvest. [OGH, SV, ML, TM]		GL-YG-05 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-05 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	GL-YG-05 is identical to Alternative 5. [SV, ML and TM LUDs only]
Standard (S)				
S-YG-01: When harvesting trees prior to the culmination of mean annual increment (CMAI) of growth under the authority granted by Public Law 113–291, Sec. 3002, subsection (e)(4)(A), the limitation of subsection (e)(4)(B) shall be applied. [OGH, SV, ML, TM]	Standards for young-growth timber are found in Chapter 4 of the approved Forest Plan under Timber and the Tongass Young Growth Management Strategy Exhibit 1-Timber Approach (2014).	S-YG-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-01 is identical to Alternative 5. [SV, ML and TM LUDs only]
Beach and Estuary Fringe (BEACH)				
Desired Condition (DC)				
DC-YG-BEACH-01: Active management of young-growth stands within the beach and estuary fringe supports a range of social, economic and ecological needs. These areas provide habitat and connectivity for wildlife and opportunities for accelerating old-growth characteristics while also providing commercial timber byproducts. [OGH, SV, ML, TM]	Desired Condition of the beach and estuary fringe are found in Chapter 4 of the approved 2008 Forest Plan under Beach and Estuary Fringe.	DC-YG-BEACH-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-BEACH-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-BEACH-01 is identical to Alternative 5. [SV, ML and TM LUDs only]

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Objectives (O)				
O-YG-BEACH-01: Offer about 3,500 acres of young-growth in the beach and estuary fringe to provide commercial timber during the 15 years after Plan approval. [OGH, SV, ML, TM]	Objectives of the beach and estuary fringe are found in Chapter 4 of the approved 2008 Forest Plan under the Beach and Estuary Fringe section.	**O-YG-BEACH-01:** Offer about 11,300 acres of young-growth in the beach and estuary fringe to provide commercial timber during the 15 years after Plan approval. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	**O-YG-BEACH-01:** Offer about 8,000 acres of young-growth in the beach and estuary fringe to provide commercial timber during the 15 years after Plan approval. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	**O-YG-BEACH-01:** Offer about 5,500 acres of young-growth in the beach and estuary fringe to provide commercial timber during the 15 years after Plan approval. [SV, ML and TM LUDs only]
Suitability of Lands (SUIT)				
SUIT-YG-BEACH-01: Young growth stands within the beach and estuary fringe are suitable for timber production; timber management within these stands is compatible with desired condition DC-YG-BEACH-01. See SUIT-YG- 01 and Appendix A. [OGH, SV, ML, TM]	Lands within the beach and estuary fringe are not suitable for timber production. See DEIS Chapter 2 for Alternative 1 Suitability.	SUIT-YG-BEACH-01 is identical to Alternative 5. See SUIT-YG -01 and DEIS Chapter 2 for Alternative 2 Suitability. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	SUIT-YG-BEACH-01 is identical to Alternative 5. See SUIT-YG- 01 and DEIS Chapter 2 for Alternative 3 Suitability. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	SUIT-YG-BEACH-01 is identical to Alternative 5. See SUIT-YG- 01 and DEIS Chapter 2 for Alternative 4 Suitability. [SV, ML and TM LUDs only]
Standards (S)				
S-YG-BEACH-01: The maximum size of any created opening for commercial timber harvest in the beach fringe must not exceed 10 acres and a maximum removal of up to 35 percent of the acres of the original harvested stand is allowed. Commercial thinning is limited to 35 percent of the stand's original basal area. A combination of the two treatments may be used, with no more than 35 percent of the total stand removed in either basal area and/or acres. TTRA and other administratively withdrawn areas do not count towards the stand's total acreage. [OGH, SV, ML, TM]	Standards and Guidelines for the beach and estuary fringe are found in Chapter 4 of the approved 2008 Forest Plan under the Beach and Estuary Fringe section.	**S-YG-BEACH-01:** Even aged management is not allowed in young-growth stands within the beach and estuary fringe after 15 years from plan approval. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-BEACH-01: Even-aged management of young-growth timber is not allowed for commercial timber harvest purposes. Commercial Thinning is allowed. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-BEACH-01 is identical to Alternative 3. [SV, ML and TM LUDs only]

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
S-YG-BEACH-02: Harvest of commercial timber within young-growth stands is limited to a one-time only entry and to the first 15 years unless best available scientific information shows that additional entries are: a) warranted, and b) meet the LUD objectives. [OGH, SV, ML, TM]		S-YG-BEACH-02 does not apply. See S-YG-BEACH-01 above.	S-YG-BEACH-02 does not apply.	S-YG-BEACH-02 does not apply.
S-YG-BEACH-03: Commercial harvest within beach fringe is not allowed within a minimum 200-foot forested buffer beginning at mean high tide (that is, a no commercial harvest buffer). This does not preclude wildlife enhancement projects and providing access to timber harvest units. [OGH, SV, ML, TM]		S-YG-BEACH-03 does not apply.	S-YG-BEACH-03 does not apply.	S-YG-BEACH-03 does not apply.
Facilities (FAC)				
Standard (S)				
S-YG-FAC-01: Authorize only those facilities (recreation and administrative) that are compatible with young-growth objectives O-YG-01 and O-YG-02.. [OGH, SV, ML, TM]	Standards and Guidelines for facilities are found in Chapter 4 of approved 2008 Forest Plan.	S-YG-FAC-01 is identical to Alternative 5	S-YG-FAC-01 is identical to Alternative 5	S-YG-FAC-01 is identical to Alternative 5
Karst and Cave Resources (KC)				
Desired Condition (DC)				
DC-YG-KC-01: The karst and cave ecosystems (or landscapes) maintain natural processes and the productivity, while providing for other land uses. [OGH, SV, ML, TM]	Desired Conditions for Karst and Cave Resources are found in Chapter 4, Karst and Cave Resources, and Appendix H of the approved 2008 Forest Plan.	DC-YG-KC-01 is identical to Alternative 5	DC-YG-KC-01 is identical to Alternative 5	DC-YG-KC-01 is identical to Alternative 5

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Standard (S)				
S-YG-KC-01: Commercial timber harvest is not allowed on lands identified as high vulnerability karst lands. (Consult Appendix H.) [OGH, SV, ML, TM]	Standards and Guidelines for Karst and Cave Resources are found in Chapter 4, Karst and Cave Resources, and Appendix H of the approved 2008 Forest Plan.	S-YG-KC-01: Commercial thinning on high vulnerability karst is allowed on a case-by-case basis. (See young-growth management on karst in Appendix H) [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-KC-01 is identical to Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-KC-01 is identical to Alternative 2. [SV, ML and TM LUDs only]
S-YG-KC-02: On lands identified as medium vulnerability karst (see Appendix H), patch clearcuts are allowed but may not exceed 10 acres with a maximum removal of 35 percent of the acres of the original harvested stand. [OGH, SV, ML, TM]		S-YG-KC-02: Even-age management is allowed on moderate vulnerability karst when karst management objectives (Appendix H) can be met. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-KC-021 is identical to Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-KC-02 is identical to Alternative 2. [SV, ML and TM LUDs only]
S-YG-KC-03: Even-aged management is allowed on lands identified as low vulnerability karst lands. (Consult Appendix H.) [OGH, SV, ML, TM]		S-YG-KC-03: Even-age management is allowed on low vulnerability karst when karst management objectives (Appendix H) can be met. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-KC-03 is identical to Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-KC-03 is identical to Alternative 2. [SV, ML and TM LUDs only]
Lands (LAND)				
Standard (S)				
S-YG-LAND-01: Authorize only those uses that are compatible with young-growth objectives O-YG- 01 and O-YG-02. [OGH, SV, ML, TM]	Standards and Guidelines for Lands are found in Chapter 4 of the approved 2008 Forest Plan.	S-YG-LAND-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-LAND-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-LAND-01 is identical to Alternative 5. [SV, ML and TM LUDs only]
Recreation and Tourism (REC)				
Standard (S)				
S-YG-REC-01: Authorize only those uses that are compatible with young-growth objectives O-YG- 01 and O-YG- 02. [OGH, SV, ML, TM]	Standards and Guidelines for Recreation and Tourism are found in Chapter 4 of the approved 2008 Forest Plan.	S-YG-REC-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-REC-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-REC-01 is identical to Alternative 5. [SV, ML and TM LUDs only]

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Riparian (RIP)				
Desired Condition				
DC-YG-RIP-01: Active management of young-growth stands that are suitable for timber production within riparian management areas (RMAs) supports a range of social, economic and ecological needs. These areas are managed to accelerate old-growth characteristics in order to improve riparian functions for soil, water, fish, wildlife and other resources (see Appendix D), while also providing a commercial timber byproduct. [OGH, SV, ML, TM]	Desired Conditions for riparian management areas are found in Chapter 4, Riparian, and Appendix D of the approved 2008 Forest Plan	DC-YG-RIP-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-RIP-01 is identical to Alternative 1.	DC-YG-RIP-01 is identical to Alternative 1.
Suitability of Lands (SUIT)				
SUIT-YG-RIP-01: Young-growth stands within RMAs (excluding Tongass Timber Reform Act buffers) are suitable for timber production; timber management within these stands is compatible with desired condition DC-YG-RIP-01. See SUIT-YG-TIM-01 and Appendix A for Alternative 5. [OGH, SV, ML, TM]	Lands within Riparian Management Areas are not suitable for timber production. See DEIS Chapter 2 for Alternative 1.	SUIT-YG-RIP-01 is identical to Alternative 5. See SUIT-YG-TIM-01 and DEIS Chapter 2 for Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	Lands within Riparian Management Areas are not suitable for timber production. See DEIS Chapter 2 for Alternative 3.	Lands within Riparian Management Areas are not suitable for timber production. See DEIS Chapter 2 for Alternative 4.
Objectives (O)				
O-YG-RIP-01: During the 15 years after plan approval, treat about 900 acres of young-growth in RMAs to provide a commercial timber byproduct. [OGH, SV, ML, TM]	Objectives for riparian management areas are found in Chapter 4 of the approved Forest Plan under Riparian (RIP2).	**O-YG-RIP-01:** During the 15 years after plan approval, treat about 1,600 acres of young-growth in RMAs to provide a commercial timber byproduct. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	Identical to Alternative 1.	Identical to Alternative 1.

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Standards (S)				
S-YG-RIP-01: The maximum size of any created opening for commercial timber harvest in the RMA must not exceed 10 acres and a maximum removal of up to 35 percent of the acres of the original harvested stand is allowed. Commercial thinning is limited to 35 percent of the stand's original basal area. A combination of the two treatments may be used, with no more than 35 percent of the total stand removed in either basal area and/or acres. TTRA and other administratively withdrawn areas do not count towards the stand's total acreage. [OGH, SV, ML, TM]	Standards and Guidelines for riparian management areas are found in Chapter 4 of the approved 2008 Forest Plan under the Riparian section.	**S-YG-RIP-01:** Even-aged management is not allowed in RMAs. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	Identical to Alternative 1.	Identical to Alternative 1.
S-YG-RIP-02: Harvest of commercial timber within young-growth stands is limited to a one-time only entry and to the first 15 years unless best available scientific information shows that additional entries are: a) warranted, and b) meet the LUD objectives. [OGH, SV, ML, TM]		**S-YG-RIP-02:** Commercial thinning is allowed in RMAs with a maximum removal of 33 percent of the stand. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]		
Scenery (SCENE)				
Standards (S)				
S-YG-SCENE-01: Apply the Very Low Scenery Integrity Objectives (SIO) for young-growth harvest. (Consult Forest Plan Chapter 4 Scenery section.) For combined young-growth and old-growth projects within the same viewshed, apply this Standard. [OGH, SV, ML, TM]	Standards and Guidelines for Scenery are found in Chapter 4 of the approved 2008 Forest Plan under the Scenery section.	**S-YG-SCENE-01** is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	**S-YG-SCENE-01:** For young-growth harvests outside of Timber Production LUD, adopted Scenery Integrity Objectives for Each Land Use Designation shall be reduced by one level. (Consult Chapter 4 of the approved 2008 Forest Plan under the Scenery section There is no change to the SIOs for the Timber Production LUD. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	Identical to Alternative 1.

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
S-YG-SCENE-02: Young-growth stands adjacent to existing clearcuts may not be harvested until the clearcut stands reach ten years of age. [OGH, SV, ML, TM]		S-YG-SCENE-02 does not apply.	S-YG-SCENE-02 does not apply.	S-YG-SCENE-02 does not apply.
Soil and Water (SW)				
Desired Conditions (DC)				
DC-YG-SW-01: Long-term soil quality and site productivity in the suitable land base is not impaired and is capable of supporting the regeneration, growth and successional pathways of naturally occurring plant communities. (Consult FSM 2554 Supplement No.: R-10 2500-2006-1.) Soil surface erosion and mass wasting from management activities is minimized. [OGH, SV, ML, TM]	Desired Conditions for Soil and Water are found in Chapter 4 of the approved 2008 Forest Plan under the Soil and Water section.	DC-YG-SW-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-SW-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	DC-YG-SW-01 is identical to Alternative 5. [SV, ML and TM LUDs only]
Standards (S)				
S-YG-SW-01: During timber harvest or vegetation treatment operations, dense slash and woody debris accumulations are not allowed. [OGH, SV, ML, TM]	Standards for Soil and Water are found in Chapter 4 of the approved 2008 Forest Plan under the Soil and Water section.	S-YG-SW-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-SW-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-SW-01 is identical to Alternative 5. [SV, ML and TM LUDs only]
Guidelines (G)				
G-YG-SW-01: Ground-based yarding should avoid creating ruts that are more than 12 inches deep. [OGH, SV, ML, TM]	Guidelines for Soil and Water are found in Chapter 4 of the approved 2008 Forest Plan under the Soil and Water section.	G-YG-SW-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	G-YG-SW-01 is identical to Alternative 5. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	G-YG-SW-01 is identical to Alternative 5. [SV, ML and TM LUDs only]

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Wildlife (WILD)				
Desired Conditions (DC)				
DC-YG-WILD-01: Active management of young-growth stands within the Old-growth Habitat LUD supports the integrated consideration of social, economic and ecological needs of regional and local communities. Young-growth stands within the Old-growth Habitat LUD maintain habitat and connectivity for wildlife and opportunities for accelerating development of old-growth characteristics while also providing commercial timber byproducts. [OGH]	Desired Conditions for wildlife management in young-growth timber are found in Chapter 4 of the approved Forest Plan under the Wildlife section.	**DC-YG-WILD-01:** Non-development LUDs, maintain habitat and connectivity for wildlife at the landscape scale while also providing commercial timber byproducts. [OGH LUD only]	DC-YG-WILD-01 is identical to Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	Identical to Alternative 1.
DC-YG-WILD-02: In the Old-Growth Habitat LUD, treated young-growth emulates the natural scale and distribution of disturbance patterns (for example, wind-thrown timber that creates gaps and patches; landslides that create corridors and gaps; and mortality that naturally thins stands). [OGH]		DC-YG-WILD-02 does not apply.	DC-YG-WILD-02 does not apply.	DC-YG-WILD-02 does not apply.
Objective (O)				
O-YG-WILD-01: During the 15 years after plan approval, treat about 1,800 acres of young-growth in the Old-growth Habitat LUD to promote the development of old-growth characteristics while also providing commercial byproducts. [OGH]	Objectives for wildlife management in young-growth timber are found in Chapter 4 of the approved 2008 Forest Plan under the Wildlife section	During the 15 years after plan approval, treat about 3,200 acres of young growth in the Old-growth Habitat LUD to promote the development of old-growth characteristics while also providing commercial byproducts. [OGH LUD only]	During the 15 years after plan approval, treat about 2,200 acres of young growth in the Old-growth Habitat LUD to promote the development of old-growth characteristics while also providing commercial byproducts. [OGH LUD only]	Identical to Alternative 1.

Table F-1.
Comparison of Young-Growth Direction by Alternative

Alternative 5	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Standards (S)				
S-YG-WILD-01: The maximum size of any created opening must not exceed 10 acres and a maximum removal of up to 35 percent of the acres of the original harvested stand is allowed. Commercial thinning is limited to 35 percent of the stand's original basal area. A combination of the two treatments may be used, with no more than 35 percent of the total stand removed in either basal area and/or acres. TTRA and other administratively withdrawn areas do not count towards the stand's total acreage. [OGH]	Standards for wildlife management in young-growth timber are found in Chapter 4 of the approved 2008 Forest Plan under the Wildlife section.	**S-YG-WILD-01:** Allow management of young growth stands to produce commercial wood products in all LUDs suitable for timber production. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	S-YG-WILD-01 is identical to Alternative 2. [OGH, RM, RR, SA, SM, SR, SV, ML and TM LUDs only]	Identical to Alternative 1.
S-YG-WILD-02: Commercial young-growth harvest within the Old-Growth Habitat LUD is limited to a one-time only entry unless best available scientific information shows that additional entries are: a) warranted, and b) meet the LUD objectives. [OGH]		S-YG-WILD-02 does not apply.	S-YG-WILD-02 does not apply.	S-YG-WILD-02 does not apply.
Guideline (G)				
G-YG-WILD-01: Road construction should be kept to the minimum necessary for the removal of young-growth timber within the Old-Growth Habitat LUD. [OGH]	Guidelines for wildlife management in young-growth timber are found in Chapter 4 of the approved 2008 Forest Plan under the Wildlife section.	G-YG-WILD-01 is identical to Alternative 5. [OGH LUD only]	G-YG-WILD-01 is identical to Alternative 5. [OGH LUD only]	G-YG-WILD-01 does not apply.

Land Use Designations: Old-growth habitat (OGH); Remote Recreation (RM); Recreation River (RR); Special Interest Area (SA); Semi-Remote Recreation (SM); Scenic River (SR); Scenic Viewshed (SV); Modified Landscape (ML); Timber Production (TM).

APPENDIX G
TIMBER DEMAND AND SUPPLY

Appendix G

Tongass National Forest

Timber Demand and Supply

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Appendix G

Tongass National Forest Timber Demand and Supply

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Summary

Since 1990, when the Tongass Timber Reform Act (Public Law 101-626) required the Tongass National Forest to take economics into account in planning timber sale programs, multiple demand studies have been published by the US Forest Service Pacific Northwest (PNW) Research Station assessing derived demand for Alaska forest products. Demand assessment information is incorporated into short-term timber sale planning through a supply model and into long-term planning through the Forest Plan process. Appendix G supports Forest Plan amendment environmental impact statement (EIS) text, provides additional information regarding Daniels et al. (in press) demand estimates, and outlines how Daniels et al. (in press) demand projections are incorporated into annual timber sale offer target calculations for the Tongass National Forest.

Introduction

Section 101 of the 1990 Tongass Timber Reform Act (TTRA) states:

> Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act of 1976 (Public Law 94-588), except as provided in subsection (d) of this section, the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle.

The 1997 Record of Decision for the Tongass Land and Resource Management Plan revision committed the US Forest Service to develop procedures to ensure annual timber sale offerings would be consistent with implementing TTRA's "seek to meet" market demand language. Those procedures were completed in 2000 and have become known as the "Morse methodology", in acknowledgement of the author, and are based on the following assumptions:

- Forest products markets are volatile, especially in the short term.
- Southeast Alaska timber purchasers have few alternative suppliers if they cannot obtain timber from the Tongass National Forest. Oversupplying this market has relatively few adverse economic effects; undersupplying it can have much greater negative economic consequences.
- It takes years to prepare national forest timber for sale, including completion of environmental impact statements.
- It is difficult to estimate Tongass National Forest timber demand, even a year or two in advance.
- To remain competitive, Alaska's forest products industry must be able to respond to rapidly changing market conditions.

The Morse methodology establishes a system that strives to build and maintain sufficient volume of timber under contract (i.e., timber purchased but not yet harvested – the primary indicator of timber inventory available to the industry) to allow the industry to react promptly to market fluctuations. Industry actions such as annual harvest levels are monitored and timber program targets are developed by estimating the amount of timber needed to replace volume harvested from year to year. The Morse methodology is self-correcting: if harvest levels drop below expectations, future timber sale offerings will also be reduced to levels needed to maintain the target level of volume under contract. Conversely, if harvest levels unexpectedly rise, future timber sale targets will also increase to ensure inventory of volume under contract is not exhausted. By dealing with uncertainty in a flexible science-based manner, the Morse methodology is an example of adaptive management. The US Forest Service intended for the Morse methodology to be the means by which the agency complies, year-to-year, with the annual demand portion of TTRA's "seek to meet" requirement. Similarly, the agency intended to comply with the requirement to seek to meet demand "for each planning cycle" through a series of annual applications of the Morse methodology.

During the past 25 years, the PNW Research Station has published several studies in support of Tongass National Forest land management planning that estimate derived demand for Southeast Alaska timber including Brooks and Haynes (1990, 1994, 1997), Brackley et al. (2006a), and Daniels et al. (in press). Procedures developed by Morse (2000) to estimate the timber offer target (supply) incorporate demand estimates from PNW studies as a spreadsheet input. PNW derived demand projections are trend projections. The Morse methodology relates these derived demand projections into an annual calculation of timber sale offer levels.

Procedures developed by Morse (2000) to estimate annual timber sale offering targets from the Tongass National Forest address the uncertainty associated with forecasting market conditions, considering the continuing transformation of the timber industry and the inability of the US Forest Service to respond quickly to market fluctuations due to the time it takes to prepare timber for sale. The basic approach is to allow the industry to accumulate an adequate volume under contract (i.e., a measure of inventory), then monitor industry behavior and adjust timber program levels to keep pace with harvest activity. Key economic indicators and stumpage market conditions are also monitored. Of noteworthy importance, the Morse methodology underwent rigorous technical and public review before it was implemented. Since the method was initially developed by Morse (2000), inputs to the model have been adjusted to reflect new understandings and information including share of raw material provided by the Tongass National Forest to local processors, amount of time between timber sale purchase and harvest, and sawmill capacity. In this way, the approach has allowed for adaptations to better reflect current conditions.

An update of the timber demand assessment by Brackley et al. (2006a) was requested from the PNW Research Station to inform new efforts to amend the Tongass Land and Resource Management Plan. New timber demand projections were also needed to accommodate changes in forest policy regarding Tongass National Forest timber harvest, land ownership, shipping policy, and profile of foreign log demand. PNW Research Station published new demand projections (Daniels et al. in press), in support of forest plan amendment efforts, with three alternative future scenarios. Scenario 1 incorporates the young growth transition and resulting changing quality of timber from the Tongass over time. Scenario 2 builds upon Scenario 1 by adding markets for wood energy products. Scenario 3 is motivated by uncertainty surrounding the domestic housing market and assumes a rebound in construction activity by only considering the pre-recession rate of growth in domestic lumber. New timber demand projections do not require significant change in the basic methodology for timber offer calculations in the procedure outlined by Morse (2000).

During the 1990s, competition with production in other regions and market conditions led to the closure of Southeast Alaska's two pulp mills and numerous other sawmill closures. From 2002 to 2006, the Tongass National Forest supplied approximately 65 percent of wood sawn by local sawmills (Kilborn et al. 2004; Brackley et al. 2006b; sawmill survey data collected by Dan Parrent of US Forest Service and on file with the US Forest Service Alaska Region). This percentage has increased in recent years with the Tongass National Forest providing an estimated three-quarters (78%) of wood sawn by local sawmills in 2013; nearly one-quarter (21%) of sawn wood originated from State of Alaska lands. State lands comprise a small percentage of Southeast Alaska forest lands and cannot indefinitely supply such a high

proportion of timber needed by remaining sawmills. A very small proportion (< 1%) of sawn timber has come from private lands in recent years. On average, the ten remaining local sawmills in the study operated at approximately 15 percent of their estimated capacity in 2013 (sawmill survey data collected by Dan Parrent of US Forest Service and on file with the US Forest Service Alaska Region).

The primary destination for Southeast Alaska sawn wood is other US states. Brackley and Haynes (2008) concluded many of the lumber and wood product markets Alaska sawmills compete in are higher-end markets in which foreign and domestic prices have become fairly similar, through market arbitrage. Haynes at al. (2007) found that since 1994, the value of US forest product exports has been in gradual decline while the value of imports has steadily increased. Hansen (2006) further states US companies have historically jumped into the export market when the domestic market is down – and shifted back to the US market when the domestic market improves. Haynes et al. (2007) state US demand for forest products is varied and large, averaging 71 cubic feet per person per year. Furthermore, per capita consumption of wood products in the US has been relatively constant for 50 years. Since the national recession (2007 – 2009) and prolonged period of economic recovery, the US market has been slowly rebounding with housing starts and forest product prices again on the rise. Global population growth will also drive increases in wood products demand both domestically and internationally.

In 2007, the US Forest Service in Alaska approved a new policy under which timber purchasers may ship to Lower 48 states unprocessed certain small-diameter and low-quality logs harvested from the Tongass National Forest, up to 50 percent of the volume harvested on each sale. This interstate shipment policy places purchasers of Tongass National Forest timber in a similar position as their counterparts in the Lower 48, where there is no restriction on interstate shipments of timber harvested from National Forest System lands. Implementation of this policy has made Alaska forest products producers more competitive with their counterparts in the Lower 48 states. Of noteworthy importance, the emergence of the Tongass National Forest as an international supplier of softwood logs is a major development since the prior demand study (Brackley et al. 2006a) that Daniels et al. (in press) incorporated into new demand projections.

On the supply side, the cost of preparing stumpage for sale and delivering it to sawmills has increased due to decreased size of sales, increased fuel costs, legal and procedural challenges to federal timber sales, and more constraints on harvest activity in the interest of resource protection. The uncertainty surrounding Tongass National Forest sale quantities has increased the risk faced by potential purchasers and investors in local processing capacity.

Demand Estimation

The method to project Alaska timber harvest and output followed by Daniels et al. (in press) is essentially the same as employed in previous estimates of Alaska timber demand by Brooks and Haynes (1990), Brooks and Haynes (1994), Brooks and Haynes (1997), and Brackley et al. (2006a). Derived demand is estimated by converting the volume of demand for Alaska forest products in all markets, foreign and domestic, to the timber volume required to produce those products. In the model, ratios are used to assign a portion of the total global demand to producing regions. Daniels et al. (in press) then estimate Alaska forest products output, by product, required to meet projected demand and calculate the raw material requirements necessary to support this production, using explicit product recovery and conversion factors. The total raw material requirement (i.e., total derived demand for timber) is a combined projection of timber harvest from private ownership, national forest, and non-national forest public owners. Projected national forest timber demand is the quantity of timber required to satisfy projected derived demand given harvest by other owners, explicit assumptions about markets, and implicit assumptions about prices. The study analyzes past trends over a period of nearly 25 years (1990 to 2013), which forms the basis for a 15-year projection (2015 to 2030) incorporating three key parameters:

1. The level of forest product imports in Canada and Pacific Rim nations. Daniels et al. (in press) define the Pacific Rim as Japan, Korea, and China. Based on other research regarding these markets, Daniels et al. (in press) projects imports of sawn wood products and softwood logs will increase over the next 15 years.

2. The share of Canadian and Pacific Rim markets that will be supplied by US forest products producers will remain relatively constant.
3. The share of US exports to Pacific Rim and Canada that will come from Alaska. Daniels et al. (in press) examines three alternative assumptions regarding future trends of Alaska's share of US exports to the Pacific Rim and Canada.

Daniels et al. (in press) assembled historic data describing relevant components of the Alaska forest products sector and calculated possible future wood needs by analyzing trends that influence harvests. They also used assessments of current markets from other analysts. Data from the historic period of 1990 to 2013 were used as the basis for projecting the future (2015 to 2030) to avoid overemphasizing short-term cycles. Trends in imports and consumption (for example, sawn wood in the Pacific Rim) and production trends represented by shipments (for example, lumber to all destinations) comprise the basic structure of the model. Demand for wood products is global in nature and the US is a net importer of timber. A sawmill in Alaska has the option to ship products to international export destinations, new markets in the Lower 48, or local Alaska purchasers. Price is the primary determinant of where products will be shipped. There are many high-value products (e.g., large timbers for architectural designed buildings and shop grades of lumber) that are shipped to the Lower 48 from Alaska. The vast majority of timber harvested in Alaska, however, is exported as softwood logs to Pacific Rim nations.

The demand model calculates the quantity of national forest timber needed by sawmills and exporters as a residual necessary to balance the model. In other words, Daniels et al. (in press) estimated the roundwood equivalent of all material used to produce products from Alaska and subtracted estimated future volume harvested from other landowners to derive national forest roundwood needs (i.e., the "residual"). Of noteworthy importance, the results in Daniels et al. (in press) reflect standing timber volume necessary to meet product demand from federal, state, and private lands.

Stumpage price projections in PNW Research Station demand studies are linked to price series used and projected in Resource Panning Act assessments (i.e., Haynes et al. 2007). Stumpage prices in Alaska are estimated as a function of Washington and Oregon prices. Alaska markets directly interact with producers and consumers in other US regions through this price relationship. Brackley and Haynes (2008) explain that "market arbitrage is used to understand parity among prices in spatially distinct markets where there is the opportunity for open exchange (trade). Market arbitrage is a powerful force that keeps prices of different species, grades, and locations within some fixed proportion to each other. Abstracting from transportation and transactions costs, for example, prices of one species and grade will not exceed prices for other species of similar grade in the long run because of possibilities of substitution." Tying price in Alaska to price in the Pacific Northwest is how market arbitrage is implicitly included in the demand assessment. The mix of products that enter end markets from Alaska are, on average, higher quality and more valuable than the average lumber markets in Washington, Oregon, and British Columbia (Brackley and Haynes 2008). The type of lumber products in the demand projections reflects this higher value by the type of markets they compete in. Although price is not explicit in the PNW Research Station demand studies, it is reflected through this mix of generally higher-value products that go into various end markets and by the assumption that Alaska price is a function of US price.

Southeast Alaska is one of the last places in western North America that produces products from slow-grown large old trees. Alaska's old-growth trees, and some younger trees, have special high-quality strength and appearance characteristics. Wood products manufactured in Alaska are generally destined for high-end markets, such as window casings and door moldings. These markets are arbitraged throughout the Pacific Rim, meaning prices for these products are similar regardless of what market it enters – domestic or foreign. Brackley and Haynes (2008) illustrate how Alaska producers have shifted in and out of domestic markets. Daniels et al. (in press) accounted for this market arbitrage by assuming export products would be synonymous with products that could be sold in domestic or foreign markets based on price.

Data regarding domestic end markets for sawn wood production from Southeast Alaska have been available since about 2000, however, information on domestic end markets can be difficult to verify. A major unresolved challenge is determining how much of the product shipped to the Pacific Northwest is

ultimately transshipped to another final destination. Transshipments are products that are shipped to foreign markets from a different customs district than the one in which they were manufactured. In the case of Southeast Alaska, lumber manufactured in Alaska is oftentimes shipped to foreign markets from the Seattle customs district, making it difficult to track many of the very recent end markets and subsequent demand for manufactured products from Alaska. Trade statistics for softwood log exports from Alaska are also confounded by transshipments. Other data used in the Daniels et al. (in press) analysis includes harvest of sawlogs and utility logs from all Southeast Alaska ownerships, production of lumber and other products from Southeast Alaska sawmills, log and lumber shipments out of Alaska to various destinations, Alaska market share of US forest products, and US market share in Canada and Pacific Rim nations.

Daniels et al. (in press) developed a baseline demand model, projecting from 2015 to 2030, to construct three scenarios representing alternative futures for timber harvest – all incorporating a transition from predominantly old growth to young growth timber harvest. The baseline demand model assumes projected trends in imports, consumption, and market share will remain constant. Additional assumptions include softwood log exports from all owners will continue at current five-year average, "other" production will remain constant, markets for utility logs and other low grade material will remain elusive, and the large majority of residues are sold. Alternative future scenarios reflect conditions related to changing timber quality, growing wood energy markets, and rebounding housing market demand.

> Scenario 1. The first scenario incorporates the young growth transition and resulting changing quality of timber from the Tongass National Forest over time. It includes a transition period of ten years of tapering levels of old growth harvest as the industry adjusts and more young growth becomes available. By 2025, old growth harvest will be limited to five million board feet annually for small and micro sales designed to provide raw material for small businesses and specialty products. Prior to 2025, scenario one reflects the baseline model.
>
> Scenario 2. The second scenario builds upon the first scenario by adding markets for wood energy products. It is US Forest Service policy to support the conversion from distillate fuel to wood-based energy in Southeast Alaska's residential, commercial, and industrial sectors. Expanding markets for biomass energy will impact Tongass National Forest timber harvest by generating demand for two biomass sources – sawmill residues and low- and utility-grade logs. Scenario two includes derived demand estimates as the conversion is phased in over time.
>
> Scenario 3. The third scenario is motivated by uncertainty in the US housing market – a traditional driver of global lumber demand. Notably, scenario three assumes a higher trajectory for the market by considering only pre-recession (prior to 2007) domestic consumption growth rates. During recent years, US sawnwood consumption levels have grown at levels nearly matching those of the pre-recession housing boom. The third scenario is based on the possibility that domestic sawnwood demand growth will continue at a pre-recession rate throughout the projection period.

Daniels et al. (in press) indicate there are several challenges with developing timber demand projections. Most notable is the lack of published market data for Alaska forest products. Their analysis was based primarily on two data sources – one of which only collects data from a predetermined set of sawmills. The second data source is a full census survey of sawmills, but is only completed every five years. Furthermore, because Southeast Alaska forest products industry is relatively small, issues related to confidentiality and disclosure further hindered data collection and analysis.

Appendix G

Using Derived Demand Estimates to Estimate Supply

Determining what demand estimates mean for timber sale offered from the Tongass National Forest involves taking the results from Daniels et al. (in press) and using them as input to a supply calculation that seeks to meet annual market demand from the forest. Derived demand projections in Daniels et al. (in press) are one of the inputs to the timber offer calculation developed by Morse (2000). In the development of the original model (Morse 2000), the derived demand input was total harvest volume, over time, from PNW Research Station projections developed by Brooks and Haynes (1997). Timber volume in the Daniels et al. (in press) demand projections, including scenarios one, two, and three, include export logs, lumber, residue, and "other" forest products (i.e., bowls, furniture, houselogs, molding, shakes, posts and poles, and siding). Table G-1 summarizes estimated sale volume represented by Daniels et al. (in press) in their projections.

Table G-1
Tongass National Forest Timber Sale Volume to Meet Derived Demand as Reported in Daniels et al. (in press)

	Projected Tongass National Forest Timber Harvest (MMBF; includes logs, lumber, residue, and other)		
Year	Scenario 1 Young Growth Transition	Scenario 2* Wood Energy Growth	Scenario 3* Housing Market Recovery
2015	40.9	40.9	40.8
2016	41.6	41.6	41.6
2017	42.3	43.4	42.5
2018	43.1	46.3	43.3
2019	43.8	49.2	44.1
2020	44.5	52.1	45.0
2021	45.3	55.1	45.8
2022	46.0	58.0	46.7
2023	46.7	60.9	47.5
2024	47.5	63.8	48.4
2025	44.0	63.0	45.0
2026	44.5	65.7	45.6
2027	45.0	68.4	46.2
2028	45.5	71.0	46.8
2029	45.9	73.7	47.4
2030	46.4	76.4	47.9

* Scenario 2 and Scenario 3 include the transition to predominantly young growth timber harvest (Scenario 1).

Demand numbers reported by Daniels et al. (in press) are projections of how much wood will be used to meet derived demand projections. Timber sales take years to process and can be held for several years by the purchaser in anticipation of future needs. Sales must be planned and timber made available in advance of projected needs. The derived demand projections do not include increased timber sale volume in anticipation of increases in wood processing (i.e., increasing use of existing infrastructure, construction of new sawmills). Additional timber to supply existing infrastructure operating at higher capacity or the construction of new sawmills would need to be sold in preceding years to provide sufficient timber supply.

Demand is an estimate, and translating that demand to on-the-ground sale numbers is also an estimate. The derived demand projections developed by Daniels et al. (in press) are used to estimate the market demand for the current Tongass National Forest planning cycle. They are also, as noted above, an important input to the model (Morse 2000) that the US Forest Service uses to compute the offer target or supply of timber from the Tongass National Forest in a given year. That procedure is outlined in the following section.

Development of Timber Sale Requirements to Meet Market Demand

New demand projections in Daniels et al. (in press) required that the spreadsheet model outlined in Morse (2000) for estimating timber sale goals be slightly modified to reflect the three alternative future

scenarios. Modification of the spreadsheet model allows continued implementation of Forest Service Sale Preparation Handbook direction (FSH 2409.18, R-10 Supplement 2409.18-2006-5; Ch. 11.4), which states that the procedure outlined in Morse (2000) will be followed in developing short-term offer targets.

The general approach of the timber sale offer model (Morse 2000) is to consider timber requirements of the region's sawmills at different levels of operation and under different assumptions about market conditions and technical processing capacity. These assumptions provide a basis for estimating the volume of timber likely to be processed by the industry as a whole in any given year. The specific steps in the process are outlined below.

Volume of Timber Processed Locally. The first step in the calculations adjusts sawmill capacity estimates by the utilization rate assumed for each of the three scenarios, and by the percent of volume expected to come from the Tongass National Forest. This provides an estimate of the volume of logs from the Tongass National Forest likely to be processed into lumber by sawmills in Southeast Alaska under the different scenarios. These figures are then adjusted upward to account for species and grades of timber that are not processed into lumber locally. Given this set of assumptions, the timber supply expected to be consumed in a given fiscal year is then computed.

Inventory Requirements. The second stage provides an estimate of the volume of uncut timber inventory to carry under different demand scenarios. As described on pages 19-20 of Morse (2000), target inventory levels depend on the volume expected to be processed each year and the amount of time needed to replenish inventory. The relationship is summarized in Morse (2000; equation 2, page 20) and by the timber inventory requirements in the model itself. Because the volume of timber expected to be processed varies by scenario, timber inventory requirements also vary from one scenario to another.

Harvest Projections. The next step in the process is to incorporate the derived demand estimates developed by Daniels et al. (in press), adjusted as shown in Table G-1.

Range of Expected Timber Purchases. By subtracting the volume under contract at the beginning of the year from the required inventory, the projected inventory shortfall is calculated. The low range of expected timber purchases is replacement for the volume harvested; the high range is the volume harvested plus the inventory shortfall so that the inventory requirement is met at the end of the year.

Between fiscal years 1999 and 2008, annual US Department of the Interior and Related Agencies Appropriations Acts allocated specific funds to the Tongass National Forest for the purpose of preparing a reliable timber supply. These "pipeline" funds were in addition to regular agency funding for forest management and timber sales. While "pipeline" funding varied by fiscal year, ranging from four to five million dollars, the objective remained the same – to establish a three-year timber supply to provide industry enough volume to maintain a viable inventory for financial integrity and to respond to market changes. While US Congress discontinued "pipeline" funding, the Tongass National Forest still strives to maintain a three-year timber supply.

Three-Year Timber Supply. The annual timber supply needs from the Tongass National Forest is considered synonymous with the annual timber consumption (i.e., the amount that is expected to be harvested in a given year). To estimate the three-year timber supply, the annual consumption is multiplied by three years.

Timber Pipeline. The Tongass National Forest timber pipeline was established as a process to "ramp-up" to the three-year supply over a period of years. It takes approximately four years to get a project through the analysis and preparation process – to be ready to offer for sale. The additional average annual volume needed to meet the three-year timber supply in a given fiscal year is the three-year timber supply of timber inventory minus timber inventory requirement, spread evenly over a four-year period.

Total Timber Sale Requirement. By taking the median between the low and high range of the volume expected to be purchased, and combining it with the average annual pipeline volume, the total volume anticipated for purchase is estimated.

The measure of meeting TTRA's "seek to meet" requirement while also developing a three-year timber supply is volume sold from the Tongass National Forest. To meet these objectives, a sufficient amount of

volume must be offered to account for any fall-down between the volume offered and the volume sold. The final step in projecting the amount of volume to be purchased is to evaluate the anticipated volume that needs to be offered.

Timber Sale Fall-Down. Historically, there has been a difference between volume offered and volume sold from national forest timber sales. The reluctance of purchasers to buy timber sales tends to increase as markets decrease and/or logging costs increase. Mason et al. (2004) examined why some offerings in Southeast Alaska go unsold and concluded that the probability of a timber sale being successfully sold is tied to downstream markets that are inherently difficult to predict rather than factors directly controlled by the US Forest Service.

Projected Offer Objectives. To project the amount of volume that needs to be offered for each of the alternative scenarios, the total timber sale projection is increased to account for fall-down and litigation to provide a rough estimate of the volume to be offered for each scenario to meet timber sale objectives.

Conclusion

Many challenges have confronted the Southeast Alaska forest products industry over the past two decades. Southeast Alaska's two pulp mills and numerous sawmill facilities have closed. Remaining active sawmills operate at about 15 percent of their estimated capacity, on average. During 2013, the Tongass National Forest supplied approximately three-quarters of logs for local sawmills followed by one-quarter from state land; less than one percent is from private lands. The destination for material sawn in Southeast Alaska is now primarily other US states (Kilborn et al. 2004; Brackley et al. 2006b; Backley and Crone 2009; Alexander and Parrent 2010, 2012). Demand for Southeast Alaska sawnwood products in export markets continues to be relatively low, while exports of softwood logs have remained strong. Hansen (2006) states US companies have historically jumped into the export market when the domestic market is down, and shifted back to the US market when the domestic market improves. In recent years, the US domestic market has been attractive with rising housing starts and forest product prices.

On the supply side, the cost of preparing stumpage for sale and delivering it to sawmills in Alaska is generally higher than in Oregon and Washington, due to transportation and labor costs, decreased timber sale size, increased fuel costs, legal and procedural challenges to federal timber sales, and more constraints on harvest activity on federal lands in the interest of resource protection. The uncertainty surrounding Tongass National Forest sale quantities has increased the risk faced by potential purchasers and investors in local processing capacity.

In choosing the timber sale offer level, it is important to anticipate the consequences of decisions. In terms of short-term economic consequences, over-supplying the market is less damaging than under-supplying it. If more timber is offered than purchased in a given year, the unsold volume is still available for purchasing off-the-shelf or re-offered at a minimal investment. However, a significant shortfall in timber supply available for harvest can be financially devastating to the industry.

The purpose of this paper is to identify the extent to which economic analysis contributes to this decision-making process. In the final analysis, planning a timber sale program is an exercise in professional judgment and needs to consider more than economic factors. Realistic timeframes account for delays in timber sale preparation, administrative appeals, and/or litigation with sufficient contingent volume included in the annual timber sale program. Budget and organizational constraints also limit the extent to which the US Forest Service can respond to economic cycles and associated fluctuations in timber demand. These are all important considerations in evaluating market demand for timber and setting timber offerings.

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