United States
Department of
Agriculture

Forest Service
Alaska Region

R10-MB-725
May 2010

Economic Analysis of Southeast Alaska:

Envisioning a Sustainable Economy with Thriving Communities

Forest Service, Alaska Region

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CITATION:
Alexander, S. J., Henderson, E.B., Coleman, R., 2010. Economic Analysis of Southeast Alaska: Envisioning a Sustainable Economy with Thriving Communities. Forest Service, Alaska Region Publication R10-MB-725, Juneau, AK, 93 p.

United States Department of Agriculture | Forest Service | Alaska Region | P.O. Box 21628
Juneau, AK 99802-1628

File Code: 2400
Date: May 24, 2010

Dear Members of the Tongass Futures Roundtable:

The Tongass Futures Roundtable (TFR), the Forest Service and many in Southeast Alaska have been working to chart a path forward in the region that provides economic opportunities to communities while conserving the Tongass National Forest. The Forest Service believes that it is possible to provide economic opportunity and jobs to local residents and to sustain a viable timber industry while at the same time transitioning from timber harvesting in roadless areas and old-growth forests to long-term stewardship contracts and young growth management. Our overarching goal is to work with members of the communities to create jobs in Southeast Alaska.

This letter outlines steps that the agency believes can accomplish this goal. Most of the ideas in this letter are drawn from people and organizations in Southeast Alaska and will require continued input and support from TFR and local communities to be successful. This letter first outlines the results of our efforts to collect ideas from local residents through listening sessions, outlines the steps to develop an economic transition framework for Southeast Alaska, and then focuses on a new vision for forest management in the Tongass that builds from the existing Tongass Land Management Plan.

<u>Regional Economic Development Opportunities</u>

Last fall, USDA Forest Service and Rural Development representatives held a series of listening sessions throughout Southeast Alaska to hear from communities on how we could help improve the economic situation in the region.

As a result of those sessions, USDA is working to develop a "Transition Framework" program. The program will help communities transition to a more diversified economy by providing jobs around renewable energy, forest restoration, timber, tourism, subsistence, and fisheries and mariculture. USDA is initiating steps to work with the Department of Commerce's Economic Development Administration to create the Transition Framework and a project implementation team. The team will work closely with communities and community members, as well as other federal agencies, state and local governments, tribes and tribal corporations, and the for-profit and non-profit sectors.

Our goal is to develop a region-wide job creation platform, with an emphasis on building upon current assets (e.g. workforce and natural resources) and current key economic sectors. We will also look realistically at emerging assets (e.g. through workforce training) and emerging economic clusters (e.g. mariculture). We will take a detailed account of the region's assets and resources and identify ways to promote economic development.

During the listening sessions, we compiled a list of project ideas brought forward by Southeast Alaska communities. The enclosed project idea list is an unfiltered record of those ideas. The

Transition Framework project implementation team will use this list as a starting point; the team will evaluate these and other projects for potential implementation based on an assessment of feasibility, agency authority, community and partner support, and potential funding availability. The agencies expect to work with community members to identify and begin some "low-hanging fruit" projects this year.

Within the Transition Framework, we hope to:

- promote small business creation, expansion and retention;
- improve access to capital;
- create quality jobs and sustainable economic growth;
- promote job training and educational opportunities; and
- maximize a forest restoration economy and by-product use.

Forest Management on the Tongass

We believe we can use the forest restoration vision espoused by Secretary of Agriculture Tom Vilsack and USFS Chief Tom Tidwell on the Tongass National Forest to help put people to work. We hope to work with communities to build jobs around a fuller suite of goods and services to provide diversified jobs and community stability.

As part of the broader transition framework, the USFS will work with its USDA counterpart, Rural Development, to facilitate a transition of the forest sector to young growth management. Moving towards a forest industry that relies on young growth timber will require retooling of current infrastructure and a steady supply of timber as the industry makes the transition. This can be accomplished by bridging the transition with long-term stewardship contracts in young growth areas to create investment certainty for forest operator business owners. We believe this transition can be made without entering into roadless areas. To demonstrate this in the near-term, the agency is currently working on a package of stewardship contracts. We expect the first such contract to be offered in early 2011. In the long-term, as young growth stands mature, the expectation is that all timber harvests will be sustained in young growth stands.

The Alaska Region has implemented a host of changes to facilitate the transition to young growth, including:

- Hiring a young growth coordinator and initiating a young growth survey on the Tongass to expedite the Forest Service's ability to offer economic projects in young growth areas;
- Assigning stewardship contract coordinator duties at the regional level to spearhead bringing training and new expertise to the region and increase the ability of the Forest Service to use long-term stewardship contracts to achieve restoration objectives; and
- Initiating plans for three stewardship contracts to be developed and offered over the next three years.

Building from the existing Tongass Land Management Plan, the Forest Service will continue to offer a limited number of old-growth sales in the near-term in roaded forest areas, in order to ensure that a bridge exists for the remaining forest industry infrastructure to make the transition. Ensuring that these sales and the proposed stewardship contracts move forward expeditiously is critically important to maintaining a robust forest industry while we transition to young growth management.

Additionally, the Forest Service will focus on a broader suite of opportunities the Tongass can provide to support a diversified economy in Southeast Alaska, as described in the transition framework program above. Efforts will focus on creating restoration based jobs, restoring fish and deer habitat to support the fishing industry and subsistence users, and examining energy projects, including small hydroelectric projects and bioenergy, to provide lower cost energy and bring down the costs of doing business in Southeast Alaska. We will also invest in facilities, trails, and other activities to attract increased recreation and tourism use and jobs.

The Forest Service, Rural Development, and the Economic Development Administration look forward to working with the people and businesses of Southeast Alaska, and the local, State, Federal and Tribal governments and corporations that have a stake in the region's economy. We believe we can create a vital, sustainable economy that will provide jobs into the future.

Please take a look at these projects and consider the opportunities they provide. If you have ideas you would like to share concerning the Transition Framework, please don't hesitate to speak to your Forest Service District Ranger, or Acting Deputy Regional Forester, Becky Nourse, at 907-228-6326.

Sincerely,

/s/ Beth G. Pendleton
BETH G. PENDLETON
Regional Forester

Enclosure

cc: Rebecca Nourse

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Executive Summary

In Southeast Alaska, most communities are island based, with few road connections. They depend almost entirely on natural resources associated with fishing, timber, mining, and tourism. The loss of even a few jobs can force families to leave, undermining entire communities.

Since the mid-1990s, timber-related jobs in the region have declined from 3,543 in 1990 to 265 in 2008. At the same time, the fisheries industry has struggled with fluctuating markets and prices. The cruise ship industry, the mainstay of Alaska's tourism, has suffered from the recession of 2008–09. Direct job losses and declining sales tax revenues have cost additional indirect jobs.

With the future of Southeast Alaska's communities at risk, the U.S. Department of Agriculture has been exploring ways of diversifying the region's economy. How can Southeast Alaska transition to a sustainable economy with prosperous families and thriving communities?

Low-cost energy is critical. The high cost of electric power impedes economic development in the region, yet the region is rich in hydropower potential. The most promising opportunities lie in developing hydroelectric power and building transmission lines to connect Southeast Alaska's communities to each other and to Canada's grid, generating electric power for potential export. Such projects would create new jobs through constructing, operating, and maintaining hydroelectric and transmission facilities. Previous work by the Forest Service has estimated job creation by this type of work at 10 jobs for every million dollars invested.

New development associated with lower energy costs would create additional jobs. Opportunities for new development might include transitioning Southeast Alaska away from its traditional reliance on harvesting old-growth timber. The current level of timber harvest (30-40 MMBF/year) will not maintain the traditional timber industry in Southeast Alaska. Under any scenario, the traditional reliance on old-growth timber is problematic. Politically, it engenders controversy and conflict.

The hope for sustaining the timber industry in Southeast Alaska is to shift its focus to harvesting younger trees, which is needed for restoration and can eventually be done on an economically sustainable basis, and to foster an integrated wood products industry that produces Alaskan wood for Alaskan use as well as for export. About 8 percent of the forest land on the Tongass National Forest—400,000 acres—is in young growth, half of which is available for harvest under the Tongass Forest Plan. Economically sustainable young growth forest management could be possible as early as the 2030s. With investment in commercial thinning, young growth volume could be available in the 2010's.

Shifting focus to harvesting younger trees will require a period of transition. The rate of the transition will depend on the level of investment and, under any scenario, will require a bridge strategy of old growth harvest and some roadless entry to sustain communities through transition. A major step, following the example of successful mills in the Lower 48, will be for industry in Southeast Alaska to retool its equipment to process smaller logs from younger trees. Substantial investments will be needed; one source estimated that a single sawmill in the region would need to spend $12 million to make the transition. Supplies will need to be reliable; investors will require steady sources of wood over long periods of time to realize returns on such high levels of investment.

Low-cost energy will be another key. Energy is a significant part of the cost of milling timber and getting wood products to market, and the high cost of energy in Southeast Alaska inhibits local production of finished wood products. The region exports timber and imports wood products at relatively high prices. A successful transition to harvesting younger trees will depend on a number of significant factors: old growth harvest continuing to maintain infrastructure, developing better markets for Alaskan wood and wood products both within and outside Alaska, lowering the cost of energy, and developing Alaskan facilities for secondary wood processing.

A potential young growth market is biomass energy, although the potential remains unclear. Current demand for biomass in Southeast Alaska is relatively small; wood chips and other mill wastes are sufficient to meet local heating needs. But diesel is widely used for power and heat in Southeast Alaska, and biomass might be developed into a more cost-effective energy source. Wood fiber produced from thinning young forests might be processed into wood pellets and other energy sources if demand comes to exceed supply from mill wastes.

The transition to harvesting younger trees will depend on getting to the point where markets for Alaskan wood and wood products are cost effective for Alaskans themselves and valuable as exports. Before they consider developing a transition plan, however, policymakers will need to address two difficult tradeoffs:

1. Lowering energy costs will be important to transitional success, and most proposals for generating hydropower and locating transmission lines are in inventoried roadless areas. Although the area affected would be small, any development of inventoried roadless areas is likely to raise controversy.
2. A successful transition will be gradual, requiring modest levels of old-growth timber harvest during transition.

Transitioning from harvesting old-growth trees in Southeast Alaska can help diversify the region's economy and stabilize local communities. Ending old-growth timber harvest after 5–10 years, even with considerable public investment in managing younger forests, will not maintain the traditional timber industry at current levels. Developing a new infrastructure for processing younger trees will require heavy investments, a large and stable supply of low-cost wood, a low-cost energy supply, and carefully developed end markets. Success will depend on meeting each of these requirements.

Access to more affordable and reliable energy is a significant requirement for community stability and economic diversification in Southeast Alaska. It will support the successful transition to harvesting younger trees in the region. More study is needed to better understand the associated risks and opportunities.

This paper includes two parts. Part I describes efforts taken to identify actions Federal agencies could take to promote economic diversification and job creation in Southeast Alaska, to mitigate any job losses that may occur in the timber sector as a result of the transition to a timber program on the Tongass that is based entirely on young growth management.

Part II presents the results of an extensive broad-scale modeling study of the Tongass National Forest that examines whether the transition from old growth management to young growth management could be accelerated; how that could be done; and the consequences of various ways the transition could be accomplished.

Introduction

The USDA Under Secretary for Natural Resources and Environment (USDA NRE) through the Washington Office of the Forest Service asked the Alaska Region to explore ways to accelerate the transition of the timber management program on the Tongass National Forest—and the timber industry in Southeast Alaska that is dependent on that program—away from its historical reliance on harvesting old growth forest stands, and towards a program and industry based on the harvest of young growth stands. In case the transition results in the loss of jobs in the timber sector, the USDA NRE also asked for ideas on how such losses could be mitigated by Federal action to stimulate job creation in other sectors of the economy of Southeast Alaska. This report presents the results of the initial efforts to explore those two arenas.

Background

Humans have been cutting trees in Southeast Alaska since the Tlingit, Haida, and Tsimshian peoples first arrived many thousands of years ago. Timber harvest activities began to increase late in the 19th century as the mining, fishing, and other industries were established. Timber harvest increased further early in the 20th century with the use of Sitka spruce for early aircraft. Throughout this period, the rate of harvest was very small in comparison to the size of the timber resource in the region. The forest products industry did not really become established in Southeast Alaska until 1954, when the Forest Service signed the first of two 50-year contracts to sell timber from the Tongass National Forest. Eventually, two pulp mills were constructed to process low-quality logs, and industrial-scale logging began in the late 1950s. Both pulp mills were closed in the 1990s; since then timber harvest levels have fallen dramatically. Timber harvests on the Tongass peaked in 1990 at 471 MMBF. Over the last six years, Tongass timber harvest levels have ranged from 18.7 million board (MMBF) feet in Fiscal Year 2007 to 49.6 MMBF in FY 2005, for an annual average of 35.7 MMBF.

The forest products industry in Southeast Alaska is based on harvesting old growth timber. Young growth stands — those that grow after the trees in an area have been removed by timber harvest activities or a natural disturbance event such as a landslide or windstorm — are only now approaching the age where they might yield marketable forest products. About 8 percent of the productive old growth forest on the Tongass has been harvested, and 90 percent of the remaining old growth is protected under the Tongass Land and Resource Management Plan (Tongass Forest Plan). The harvest of old growth trees has become increasingly controversial, especially as old growth forests have become rare in the National Forest System outside of Alaska. Consequently, as noted by Regional Forester Denny Bschor in his Record of Decision (ROD) for the 2008 Tongass Forest Plan Amendment, interest in the management of young growth forest stands on the Tongass has increased dramatically in recent years, though challenges remain:

> The management of young growth forest stands is becoming more important as young trees located in previously harvested areas mature, and as interest grows in transitioning the timber industry in Southeast Alaska from one based on the harvest of old growth forest stands to one based on the harvest of young growth … Management practices of young growth forest stands, such as thinning, can substantially improve the forage for deer, and also promote better growth of the remaining trees for future timber harvest. Pre-commercial thinning involves cutting most of the small trees that naturally grow back in areas where the old growth trees have been removed, usually about 15 to 25 years after the initial removal. When thinning is done at this stage, the young growth trees removed are so small that they usually have no commercial value, so it must be paid for by appropriated funds. Similarly, thinning of young growth stands that are 50 to 70 years old can yield commercially marketable trees — hence the name "commercial thinning" — while also improving forage for wildlife and higher timber yields in the future. Many organizations have encouraged the Forest Service to transition the timber program on the Tongass from one based on the harvest of old growth forest to one that harvests young growth stands. Such a transition would enhance the protection of old growth forest habitat.
>
> For all of these reasons, I support the transition of the Tongass timber program to one based more on the harvest of young growth stands. The amended Forest Plan has been carefully reviewed to ensure that it contains no provisions that might impede such a transition. Young growth could potentially comprise a substantial portion of the Tongass timber program in as little as three decades, with initial young growth operations beginning in earnest by the end of the current planning cycle. The ultimate success of this effort, however, will depend on several factors, including investments by the timber industry in milling equipment designed for smaller young growth trees, integration of the industry to effectively process all products harvested from the Forest, and funding decisions made by Congress.

Since the Tongass Forest Plan was completed, the interest in transitioning to a young growth timber program on the Tongass has continued to increase. Several organizations have encouraged the Forest Service to do everything possible to accelerate this transition, and are analyzing how that could be done. For example, in 2009, The Beck Group published a report for The Nature Conservancy that examines what a transition to young growth would look like on Prince of Wales Island. In addition, the Sitka Conservation Society has requested proposals for a study relating to young growth habitat restoration opportunities. The Southeast Conference, a consortium of local governments, is raising funds for a more detailed inventory of young growth forest stands than is currently available. Other parties also have shown interest in expediting young growth management on both the Tongass and private lands.

The Forest Service is not a newcomer to these issues. The agency has conducted or participated in numerous studies related to young growth management in Southeast Alaska. Appendix A of this report summarizes such research conducted over the last several years, and administrative studies and other projects currently underway on the Tongass to better understand how to manage young growth.

Part I of this report presents ideas on how Federal actions could stimulate job creation in other economic sectors of the region. Part II of this report explores the financial and economic implications of alternate transition periods to a young growth timber industry. Part II also includes old growth and young growth management levels during the transition.

It is also important to note what this report does *not* include. It does not include a proposed action to change the Tongass Forest Plan or authorize or restrict project-level activities. Nor does it include an analysis of the demand for forest products from the Tongass National Forest. It is simply an analysis of potential future courses of action regarding management of the Forest, and ideas for how the economy of Southeast Alaska could be stimulated. Should any of these scenarios be selected as policy, all applicable procedural requirements, such as those in the National Environmental Policy Act, the National Forest Management Act, and the Tongass Timber Reform Act would have to be met.

This report was prepared by Susan J. Alexander, PhD, the Alaska Region regional economist and team leader for this project, Eric B. Henderson, the land management planner for the Hiawatha National Forest and a specialist in SPECTRUM modeling, and Randy Coleman, the Alaska Region regional policy analyst. Several Alaska Region Regional Office and Tongass National Forest staff provided information, and assisted with editing. The report was reviewed by Chris J. Miller, PhD, Economist, with the USFS Washington Office Ecosystem Management Coordination Content Analysis Team, and by Guy Robertson, PhD, USFS Washington Office Program Lead, Research and Development Quantitative Science group.

Part I – Opportunities for Job Creation in Southeast Alaska

Introduction

The first part of the assignment by USDA is to identify actions Federal agencies could undertake to assist communities in Southeast Alaska in creating jobs, to mitigate potential job losses that might result from the transition of the timber sector from old growth to young growth management. In this regard, the Deputy Undersecretary for Rural Development and the Deputy Undersecretary for Natural Resources and Environment visited Southeast Alaska last summer, and met with community leaders in Ketchikan and Sitka. Following that visit, USDA representatives met with representatives of communities throughout Southeast Alaska to elicit their proposals for Federal job-creating assistance. Officials from the Tongass National Forest, the Southeast Alaska Area Office of USDA Rural Development, and US Department of Commerce Economic Development Administration (EDA) reviewed these proposals and consolidated them into the "Tongass Initiative," a partnership among the three agencies to promote economic development opportunities in Southeast Alaska.

The three agencies forwarded the Tongass Initiative proposals to the USDA for consideration on December 1, 2009. It is included in this report as Appendix G.

The following constitutes a list of potential projects or activities that aim to boost local employment while providing benefits to SE AK residents at US citizens at large. We have not identified all of the opportunities that have been discussed over the years but have included major possibilities currently under consideration in the region. Each of these needs a thorough analysis comparable to the timber analysis provided in Part 2, but such an analysis was beyond the scope of this report.

In a related effort, the Southeast Conference (a regional organization that has been Federally designated as the Economic Development District and the Resource Conservation and Development Council for Southeast Alaska) and the Central Council Tlingit and Haida Indian Tribes of Alaska (a Federally Recognized Tribal Government representing nearly 27,000 Tlingit and Haida Indians worldwide) completed last June the 2009 Update to the Southeast Alaska Comprehensive Economic Development Strategy (CEDS). This update to the 2006-2011 CEDS Plan was prepared for EDA as "the primary evaluation and planning document for Southeast Alaska's economy, offering a regional approach to economic evaluation, coordination and implementation for these unique and diverse communities." This 129-page document is available at http://www.seconference.org/pdf/2009_CEDS_addendum.pdf.

Electric Power

Both reports identify several opportunities to address the high cost of electric power in many communities in Southeast Alaska. These costs are one of the most significant factors impeding economic growth in the region. There are several hydropower projects proposed for development in inventoried roadless areas within the Tongass National Forest. In addition, the proposed transmission lines that would serve as interties among communities also cross inventoried roadless areas. This poses a significant question for policymakers as they consider how to promote economic development in Southeast Alaska.

Hydroelectric power is Southeast Alaska's largest source of renewable energy. Many communities, however, are served solely by diesel generation, which is far more expensive. Juneau, Ketchikan, Sitka, Petersburg, and Wrangell all use hydropower-generated electricity, and have electrical rates in the range of 9¢ to 12¢ per kWh. Angoon, Elfin Cove, Gustavus, Kake, Hoonah, Naukiti, Port Alexander, Tenakee Springs, Yakutat, and Whale Pass depend on diesel-generated power, and have electrical rates in the range of 48¢ to 54¢ per kWh. The high cost of energy in the communities that rely on diesel generation impedes economic development, as decisions to locate new commercial and industrial developments are influenced by the availability of reliable low-cost power.

Along with the high cost of buying diesel fuel comes the environmental risk of shipping, handling and storing the petroleum product, especially spills in the harsh Alaskan climate and ocean conditions. The higher operation and maintenance costs of diesel generators along with potential interruptions in fuel delivery, the susceptibility of fuel prices to wide variation, plus noise and air pollution are other undesirable aspects of diesel generation. Hydroelectric generation would reduce or eliminate most of these adverse effects.

Development of proposed transmission lines to interconnect these sub-markets and provide an interconnection with British Columbia will enable new economic development in many of the isolated communities and improve the quality of life for residents encumbered with high-cost energy service from diesel generation.

The Inside Passage Electric Co-op (IPEC) is a non-profit, consumer-owned and governed electric utility serving approximately 1,316 members in the Southeast Alaska communities of Angoon, Hoonah, Kake, Klukwan, and the Chilkat Valley. Their 2007 total utility plant cost per customer was $14,873. These high plant costs and low economies of scale create high electrical rates. From 2004 to 2008 the price of diesel for communities in Southeast Alaska that depend on it for their power has more than doubled, from $1.50 per gallon to over $3.50 per gallon. As fuel prices rise, rates rise, from an average of 35¢ per kWh in 2004 to over 50¢ per kWh in 2008. From 2007 to 2008 IPEC's average kWh sold increased from 48¢ to 54¢. Further exacerbating this problem is that as rates rise, the number of customers and consumption declines, reducing further the economies of scale for producing the power with diesel.

The Port Frederick Tidal Project has been proposed to provide power to the community of Hoonah, a community with a predominantly Alaska Native population of approximately 900. The project is within an inventoried roadless area, making its development questionable.

Interties

Juneau, Petersburg, and Wrangell have surplus power produced by hydropower that can be shared with these communities through transmission line interties. Kake and Hoonah are the furthest along with the development of these proposals for sharing power. Hoonah and Kwaan Electrical Transmission Cooperative is comprised of IPEC and Alaska Electric Light and Power (AEL&P), Juneau's electrical utility. IPEC and AEL&P are working to secure funding for completion of the Juneau – Hoonah Intertie, which is presently estimated at $37.1 million. This intertie also crosses inventoried roadless areas, which makes its development more uncertain.

Plans for the Petersburg – Kake Intertie are further along. The Alaska Energy Authority, the Tribal Energy Department of the Central Council of the Tlingit and Haida Indian Tribes of Alaska and the Southeast Conference are nearing the planning and design phase and subsequent construction of the proposed link from Petersburg's and Wrangell's Tyee Hydroelectric Project to Kake, a community with a predominantly Alaska Native population of approximately 700. Cost estimates project $23.1 million for the line. Proposed route reviews have been taking place with selection of the most beneficial route being the next step. This intertie, as with most proposed hydropower and intertie projects in Southeast Alaska, is in inventoried roadless areas.

In addition to the support of the Southeast Conference and IPEC, the Central Council of the Tlingit and Haida Indian Tribes of Alaska and the Grand Camp of the Alaska Native Brotherhood have passed resolutions supporting both of these interties.

These long-range projects could create many jobs through direct construction, operation, and maintenance -- plus indirect jobs through development allowed by lower cost energy – and could be precluded due to the location of the projects in inventoried roadless areas.

Alaska – British Columbia Intertie

While huge hydroelectric potential exists in Southeast Alaska, local demand is often limited, which is a major impediment to development. British Columbia recently decided to build a high-voltage transmission line into northwestern portion of the Province, providing an opportunity to market Alaskan hydropower production to the markets in Canada and the lower 48.

In 2007 a detailed feasibility study of a transmission interconnection between Southeast Alaska and British Columbia was conducted by Hatch Energy for the Alaska Energy Authority. The AK-BC transmission line is proposed for the Bradfield Canal area and would connect the Southeast Alaska system at the Tyee Lake hydroelectric project to the British Columbia transmission system. A transmission interconnection with British Columbia would provide access to power markets outside Southeast Alaska for the output of regional hydroelectric generation.

The primary purpose of the AK-BC Intertie would be to provide an opportunity for the export of Southeast Alaska's surplus hydropower to outside power markets. In the Pacific Northwest and elsewhere on the West Coast there is a significant need for additional electrical power and these needs are expected to grow substantially in the future. Electricity policy changes related to reduction in greenhouse gas emissions represent an export opportunity for competitively priced power from Southeast Alaska projects.

Construction of the AK-BC Intertie could help stimulate development of new and existing hydroelectric facilities in Southeast Alaska by providing a market for the power before it is needed by local communities. This project would also cross inventoried roadless areas.

Hydropower Projects

There are several proposed hydropower projects on the Tongass National Forest located within inventoried roadless areas, raising questions about their development prospects. Most of these are at the preliminary permit stage of the Federal Energy Regulatory Commission's review, permitting, and licensing process. These projects would have a combined output of approximately 275 MW's of power. If the amount of electricity generated by these projects were produced using diesel fuel it would produce approximately 600,000 tons of carbon emissions per year. Converting to hydropower would eliminate these emissions. A few of these projects are described below.

Several entities have proposed to construct new, relatively large, hydroelectric facilities in the Thomas Bay area near Petersburg. These proposed projects include the Cascade Creek project, the Ruth Lake project and the Scenery Lake project. With a combined capacity of 100 MW, these projects would produce ample power for export to markets in the lower 48.

Alaska Power & Telephone Company (AP&T) is pursuing development of the 75 MW Soule River Project located on the Soule River near Hyder, Alaska, adjacent to British Columbia. The proposed project would be connected by a 9.72 mile-long 35.kV submarine cable transmission segment from the powerhouse, located at the mouth of the Soule River extending along the Portland Canal, a 70-mile-long fjord which forms a portion of the AK/BC border, to a connection with the existing British Columbia transmission system near Hyder. AP&T plans to export their power through British Columbia to the lower 48.

Conclusion

Numerous opportunities exist to promote economic development in Southeast Alaska by construction of hydropower projects and related electrical interties between communities. It is beyond the scope of this paper to analyze the numerous project proposals to determine which ones are the most promising. Such expertise is available, however, through the Southeast Conference and other parties. USDA may wish to issue a contract for an evaluation of the potential of the various proposed projects to determine which ones would provide the most benefit from a regional perspective. Policymakers must also address the issue of whether such projects in roadless areas will be allowed.

Biomass Energy

Many studies have examined the use of Southeast Alaska biomass, such as chips or hog fuel, for manufacture of products such as medium density fiberboard, and for generating heat and electricity. The McDowell Group and others (2004) examined options for using utility wood and mill byproducts as part of an integrated industry consisting of sawmills and other wood product manufacturing facilities. Leonard Guss Associates (2005) examined the feasibility of building a medium density fiberboard plant in Southeast Alaska. Generally, these studies find that building this kind of infrastructure in Southeast Alaska would require substantial investment, a large, low cost, stable wood supply, a low cost power supply, and careful development of end markets. Nichols and Crimp (2002) studied the feasibility of using wood for local heating needs on the Kenai Peninsula. Wood can help Alaska communities meet energy needs in places where there are abundant biomass resources. Nichols and Crimp found that the most significant potential barrier on the Kenai Peninsula is future wood supply, as beetle infestations and resulting widespread mortality of trees has reduced the availability of long-term supplies of woody biomass. In Southeast Alaska, wood supply is not such an issue, but harvest and transportation barriers can be significant. However, the use of sawmill byproducts can create opportunities; the town of Craig on Prince of Wales Island has a biomass heat generation plant that uses sawmill waste. Nicholls et al. (2008) took a broad look at using biomass to produce energy in the western US. They found that “the costs of harvesting, chipping, and transporting biomass are often several times the final value of the products obtained from the biomass. A key challenge for natural resource managers is to find markets and products that will recover at least a portion of these costs while providing other benefits such as reducing fire risk.” (Nicholls et al. 2008 pages 1-2). The average thinning project on Forest Service land in the western US costs about$70 per oven-dry ton (ODT) of recovered biomass. This is roughly twice the market value of biomass in energy and chip markets, which typically ranges from $25 to $35 per ODT. Nationwide, biomass is second only to hydropower as a source of renewable electrical energy. However, higher costs of electric generation from wood versus other renewable sources, generally declining energy costs, and a loss of state incentives have made wood less competitive, resulting in some plant closures. Bioenergy plants often require stable, long-term fuel supplies (20 years or longer). An important part of successful biomass hazardous fuels removals from Forest Service and Bureau of Land Management (BLM) lands has been the use of stewardship contracts. Uses of biomass for heating, usually in the 2006 Fuels for Schools program in western states, are often relatively small facilities that use from a few hundred to a few thousand tons per year.

The Beck Report (2009) assessed the costs of developing a biomass collection business, and assessed whether the logging residues could be utilized. In general, they found that the high cost of delivering logging residue makes it more likely that a manufacturer of wood pellets or briquettes, electrical cogeneration facilities, or central heating plants on Prince of Wales Island will most likely use mill residues. They found that mill residues are available at a much lower cost than logging residues. Prince of Wales Island has the most extensive road system of any area in southeast Alaska, in addition to a well developed shipping infrastructure.

Interest in wood energy as one component of the potential market for thinning slash in the future has increased significantly in the past year. At least three large facilities in Southeast, Sealaska's office building in Juneau and the Coast Guard facilities in Sitka and Ketchikan are either in the process of being converted to wood heat or being strongly considered for wood heat. The fuel most likely to be used in such facilities is pellets, manufactured in Canada. Current demand for biomass in Southeast Alaska is relatively small and there is sufficient mill waste available to supply wood heat needs in Southeast Alaska for the immediate future. However, by-products from thinning treatments may provide a secondary source if demand increases and exceeds the mill waste supply. If fuel prices increase, the cost of removal and transport of thinning by-products from the woods to the producer could become more realistic. It is not known how biomass production and utilization compares -- in terms such as delivered Kwh or Btu cost -- to heat and energy production from hydropower or diesel, both commonly used sources of power and heat in Southeast Alaska.

If demand for chips from sawmills increases markedly, the supply of mill residues in Southeast Alaska may become limiting, unless young growth commercial thinning is supported with extensive public investments, or old growth harvest is allowed to continue for several more decades. Based on current information, such as the 2009 Beck Report, it appears unlikely that biomass utilization ideas based on forest thinning residues will be profitable. Not only is removing and transporting thinning residues from the forest to a processing facility expensive, the number of acres in age classes suitable for pre-commercial thinning is limited. The USFS State and Private Forestry and USDA Rural Development offer programs, including grants and loans, that could be used to assess the feasibility of a pellet plant, or contract for feasibility studies of this and other options.

Retooling Existing Mills to Handle Young Growth

The existing sawmills in Southeast Alaska were built to process old growth trees. With the exception of a relatively limited small diameter processing facility within the Viking sawmill on Prince of Wales Island, regional sawmills have equipment designed for relatively large-diameter material and cannot efficiently process the smaller material produced by thinning young growth. Retooling the existing mills to handle young growth material is an expensive proposition for these small operators. The Beck report, which focused just on Prince of Wales Island, estimated that upgrading and modernizing the Viking sawmill to efficiently process young growth material would cost $12 million. USDA Rural Development and USFS State and Private Forestry may wish to consider offering loans or loan guarantees to mill operators for this purpose.

Potential Forest Service Projects

Finally, the Alaska Regional Office of the Forest Service has identified numerous actions that could be taken to expand job creation in Southeast Alaska while improving natural resource conditions. All of these activities would be within the authority of the Forest Service to conduct, should funding become available to implement them. None of them, however, would create permanent, year-around jobs; all the jobs would be seasonal, temporary, or both.

Recreation Contracts

Many recreation facilities on the Tongass National Forest are in need of maintenance or replacement. Responding to these needs via contracts would create private-sector jobs while improving service to the public. Due to the remote location of most of these facilities on the Tongass (many of which are accessible only by aircraft), the cost of these efforts is higher than normal for other locations in the National Forest System. The following contracts could be pursued:

- Recreation Cabin Replacement. This contract would cost about $1,000,000 annually for 8 years, and would replace 40 cabins over that period.
- Deferred Maintenance of Cabins and Shelters. This contract would cost about $900,000 to repair roofs, windows, doors, and decking at 20 cabins and roofs and supporting structures at 20 shelters.
- Trail Maintenance. This contract would cost about $1.5 million annually for 5 years to bring up to standard all 450 miles of trails on the Tongass that need repair.
- Cabin Firewood. This contract would cost about $720,000 annually to provide firewood at 120 cabins on the Tongass.
- Campground Firewood. These contracts would total about $110,000 annually to supply 194 fee campsites on five Ranger Districts with firewood for the public.
- Recreation and Trail Signs. This contract would cost about $2 million to build and install 1,000 signs across the 17 million-acre Tongass National Forest.

Together, these contracts would support approximately 12 annualized jobs, most of which would last for no more than 8 years.

Stream Restoration Contracts

Timber harvest activities conducted many years ago when standards were not as high as they are today have degraded salmon habitat conditions on numerous streams across the Tongass. These contracts would cost about $1 million annually for 10 years, would restore about 2 miles of degraded habitat each year, and would support approximately 5 annualized jobs for 10 years.

Road Storage/Fish Passage Contracts

Some roads on the Tongass do not meet current standards, including requirements for fish passage that have become considerably more stringent in recent years. These contracts would cost about $5 million annually for 10 years, to remove culverts on approximately 100 miles or road per year and acquire movable bridges for use with crossings needed for access. These contracts would support approximately 50 annualized jobs for 10 years.

North Prince of Wales Highway Upgrades

This project would improve and pave the section of this road from Coffman Junction to Neck Lake, which would improve tourism opportunities on Prince of Wales Island, and reduce road maintenance costs. The project would cost about $58 million, and would support about 70 annualized jobs for 5 years. Upon completion, the road would become part of the State of Alaska Highway System, and the State would assume maintenance responsibility.

Sandy Beach Road

Sandy Beach road from Thorne Bay north to Sandy Beach has been prepared for construction contract with FHWA Funds. The project is construction ready, and the City of Thorne Bay has agreed to take the operations and maintenance responsibility for the Non- NFS section of the road. This is a highly scenic route along the beach to Coffman Cove. Enhanced tourism, opportunities for a motorized trail to get ATVs off the highway and provide tourism opportunity. This project would cost about $20 million, and would support about 25-30 annualized jobs for 5 years. Road construction would be a lighter standard similar to what is proposed for the Kake-to-Seal-Point route. This is not a likely State of Alaska Route in the foreseeable future.

Part II – Transitioning to Young Growth Management

Introduction

Commercial timber harvest in the Tongass National Forest began in areas that were easily accessible at a relatively low cost and were compatible with the logging technology of the time. In the late pre-industrial and early industrial period (ca. 1900 -1960) the logging activities consisted of A-Frame logging where logs were yarded from the uplands directly to the water and tractor logging where easily accessible flat ground was logged to the water. Evidence of both of these logging systems is found along the beaches in what are now the oldest young growth stands. From the early 1960s to the post pulp mill era (1994), timber harvest occurred farther inland. During the forest planning process, some young growth stands have been included in Land Use Designations (LUDs) that do not allow timber harvest or to areas where Forest Plan Standard and Guidelines (S&G) restrict timber harvest activities, such as the Beach Fringe S&G.

There is a total of over 400,000 acres of harvested stands on the Tongass (about 8 percent of forested land). About half of these acres are in the suitable base where commercial timber harvest is allowed under the Tongass Forest Plan. The age distribution of the suitable[1] young growth is shown in Figure I-1. The majority of the acres originated between 1959 and 1998, which makes them 10 to 50 years old. However, there are approximately 8500 acres aged 50-70 that may be candidates for commercial thinning treatments within the next decade.

Other landowners in Southeast Alaska that produce timber are Alaska Native corporations and the State of Alaska. Since the early 1980s, the Native corporations have harvested over half the total log volume produced in the region. In 2000, owing primarily to sales on lands owned by the Alaska Mental Health Trust and the University of Alaska, the State emerged as a major producer, outstripping Forest Service production in 2001, 2002, 2006 and 2007. However, in 2008, timber harvest from State lands (including lands administered by the Department of Natural Resources (DNR), the Mental Health Trust, and the University) was about 12 MMBF, down from almost 45 MMBF in 2007. Future old growth harvests from State lands will probably remain low, as the land base is limited. Timber harvests from Native corporation, Mental Health Trust, and University lands can be and frequently are exported. The upswing in State harvests available to regional sawmills was a temporary effort to “fill in” for low Forest Service sales.

[1] Suitable acres are defined by the Suitability analysis described in the Forest Plan. Timber sales on suitable land generally are counted as part of the Allowable Sale Quantity.

Foreign imports of logs from other countries, such as Canada, are generally not utilized by Southeast Alaska sawmills.

Sawmills in Southeast Alaska will need to re-tool to effectively process young growth logs. The Beck Report (2009) estimated the cost for one sawmill on Prince of Wales Island to upgrade at about $12 million. It is not known how likely this is, due in part to a lack of understanding of markets for products that can be sawn from Southeast Alaska young growth. The Beck Report (2009) mentions concerns, also expressed by other experts, that it is uncertain who would invest in such a retooling, and that investors will probably want guarantees of supply. Native corporation landowners in Southeast Alaska, in addition to State land managers, face the same kinds of questions about markets, wood quality, and types of products that can be produced. Native corporation landholders in particular have a great deal of young growth that will be maturing in the next few decades.

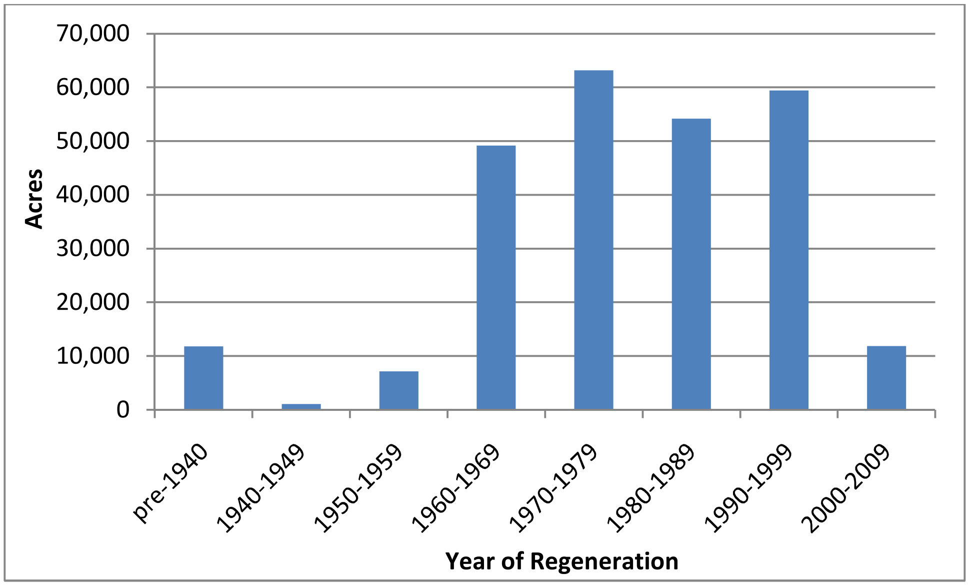

Figure I-1: Age Distribution of Suitable Young Growth Acres on the Tongass National Forest.

Objectives

One overall objective of this report is to assess alternate pathways to establishing young growth management on the Tongass National Forest. We accomplish this through the comparison and analysis of seven timber management scenarios. Part II of this study describes these scenarios for transitioning the timber products industry in Southeast Alaska from old growth to young growth. The scenarios vary the harvest level, the time period over which old growth management may occur, and the presence or absence of governmental financial investment in the transition.

There are five main objectives of Part II of this study:

1. Describe the time periods and harvest levels at which transition to young growth could occur.
2. Analyze old growth management that occurs during the transition.
3. Describe a young growth management strategy for the transition.
4. Identify the financial trade-offs from accelerating vs. delaying the transition.
5. Determine the economic impacts of the transition, including job sustainability.

Analysis Process

This section describes the key assumptions and the solution process used in this analysis. It also describes how the results are analyzed. The Spectrum model was used to assess various timber management alternatives. Spectrum is a modeling system developed by the USFS Ecosystem Management Analysis Center in Fort Collins, CO and the Rocky Mountain Research Station. Spectrum is designed to assist decision makers explore and evaluate resource management choices. Models constructed with Spectrum apply management actions to landscapes through time and display resulting outcomes. The analysis in this study followed the process outlined in the 2008 Tongass Forest Plan Revision Final Environmental Impact Statement (FEIS) Appendix B.

Land Base

The first step in the analysis is to define a land base from which timber can actually be harvested over the coming decades. To do this, we started with the 2008 Tongass Plan Amendment plan suitable land base (see fig 1). The land base was modified to include only developed areas south of Frederick Sound. This was done by excluding inventoried roadless areas, unroaded areas 1000-5000 acres in size, and developed areas north of Frederick Sound. Figure A-1 shows the acres of young growth (YG) and old growth (OG) as they occur in developed (Dev) and undeveloped areas (Undev) north or south of Frederick Sound. Undeveloped areas include both inventoried roadless and unroaded areas 1000-5000 acres in size. Unroaded areas 1000 to 5000 acres in size are available for timber harvest activities, but we were unable to separate them from the inventoried roadless acres due to the structure of the database used. Developed areas have been roaded or harvested in the past. The inventoried roadless land base is from 2006, as incorporated in the 2008 Tongass Plan Amendment. This inventory reflects adjustments made since the 2001 Roadless Rule was issued. Although specific acres will not correspond exactly in every case to the 2001 inventory of roadless areas, it was assumed for the sake of this analysis that the difference in types of timber volume available for harvest across the forest through time would be negligible.

There are developed areas available for timber harvest north of Frederick Sound, but we chose to be conservative and make sure that projected volumes in the various scenarios would be available from areas that are more accessible and generally more economic than much of the north end of the Tongass. If markets shift and improve to the point that timber harvests from developed land use designations north of Frederick Sound become more economic, harvest could occur in those areas. Timber is currently being harvested north of Frederick Sound, but often the profitability of the area is marginal. Figure A-1 shows that south of Frederick Sound, there are 179,000 acres of old growth and 220,000 acres of young growth included in the developed land base used for this analysis. There are 11,000 acres of young growth and 354,000 of old growth in the suitable land base in undeveloped areas south of Frederick Sound that are not included in this analysis. The figure also shows that there are 82,000 acres in developed areas north of Frederick Sound, 38,000 of which are young growth and 44,000 are old growth.

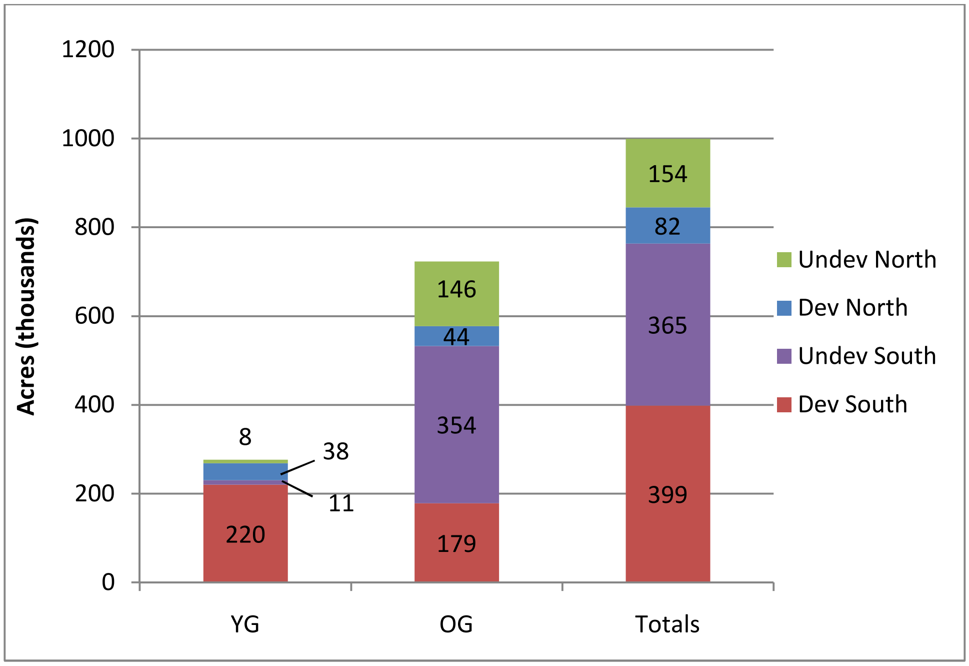

Figure A-1: Suitable land acres by Development classification and geographic location.

Age Classification

Young growth was categorized into 10-year age classes, assuming the base year for analysis was 2010 (i.e., young growth with a year of origin of 2000 or greater was in the 0-10 year-old age class, etc.). The specific age classes used were: 0-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, and older than 70. Stands that had been pre-commercially thinned were distinguished from those that had no pre-commercial thin activity. Stands of natural origin (about 10,000 acres of the 220,000 young growth acres in the analysis) were classified as either 10-20, 30-40 or older than 70, depending on their approximate size. Young growth was also classified by productivity class, which reflects the quality of the site and how quickly it grows. Old growth was classified into three volume strata, High, Mid and Low, which are described in detail in Appendix B of the 2008 Tongass Plan Amendment FEIS.

Constraints

Constraints set limits on what the model can choose in regards to management strategy. They are used so that the model chooses a management scenario that is realistic and consistent with management direction outlined in the forest plan. The full suite of constraints is discussed in Appendix B of this document, and there is additional information in Appendix B of the Tongass Forest Plan FEIS.

Costs and Prices

Costs and prices were updated from those used in the forest plan. "Transitioning to Young Growth: Prince of Wales Island, Southeast Alaska" written by The Beck Group for The Nature Conservancy in 2009 (referred to as The Beck Report) was used to update young growth selling values. The current version of the Historic Cruise Database, maintained by Region 10, was used as the basis for updating old growth selling values and logging costs. Other cost and price values were updated as well (see Appendices C, D, and E for more information on cost updates). It is generally assumed that pre-commercial and commercial thinning will affect the future stem size, wood quality and overall value of treated young growth stands. This analysis incorporated increased growth rates after pre-commercial thinning (see Appendix F), but did not quantify increased value and quality since there is limited information about these metrics. Preliminary results of studies described in Appendix A indicate that pre-commercial thinning enhances volume growth in all productivity classes. There has been little young growth management in Southeast Alaska and therefore there is very little data on how young growth values vary as stem size increases, how wood quality changes as piece size increases, or what kinds of products might be sawn from young growth at different stand ages. PNW scientists indicate that the value of sawn products will increase beginning at about age 70 years in the southern Tongass, but there is no specific data available.

This analysis is based on costs and values associated with the production of sawtimber. Specific information on costs and values of other potential products, such as biofuels, is not available for Southeast Alaska, so the scenarios included in this analysis do not include such products. Preliminary information available from existing studies indicates that regional markets for such products manufactured in Southeast Alaska are probably not large enough to allow the economies of scale required for the operations to be competitively successful. Local small-scale operations may be feasible, such as the heating plant in Craig. These markets may develop over the next several years, but there is insufficient information to include them in the model at this time.

Solution Process

Generally, each scenario was constrained to meet a specific harvest volume target (30 or 50 MMBF per year). Old growth harvests were limited to the first 5 or 10 years, or left unconstrained regarding how long they could continue on the developed land base. The model was then solved with an objective function that maximized present net value, which found the management strategy with the highest financial return, given all the constraints.

Analysis of Results:

Results are presented for each scenario below. Several key metrics are used to describe the implications of the management scheme under each scenario. These metrics are described as follows:

Old Growth Management

The overall (cumulative) acres of old growth timber harvest and the decades in which it occurs is presented and compared among the scenarios. The timing of transition to young growth management is defined by both the number of decades and the acres of old growth that are harvested during the transition. Scenarios with fewer acres of old growth management are recognized as having shorter transition times. Timber volume resulting from old growth management is shown as a point of comparison among the scenarios.

Young Growth Management

Each scenario is discussed relative to its associated young growth management scheme. The results section discusses the timing, acres harvested, and silvicultural treatments (e.g., thin vs. clearcut). Timber volume from young growth management is presented as a point of comparison among the scenarios and used as a basis for analysis of the implications to the Southeast Alaska economy.

Financial Analysis

The scenarios in this study are used to analyze the implications of different possible futures (such as decreased harvest levels, investment in silvicultural treatments, or changes in policy). Each scenario is evaluated according to its financial value, expressed as present net value (PNV). Present net value expresses the worth of all future cash flows received by the Forest Service, both revenues and expenses, discounted to today's dollars. Following common convention for Forest Service projects, we used a discount rate of 4 percent in this analysis. PNV analysis is useful for comparing projects with different cash flows and costs over different periods. See appendices C, D and E for logging costs and values associated with both young growth and old growth. PNV represents the financial value of the overall management strategy to the Forest Service. Positive PNV values mean that the Forest Service realizes net returns, while negative PNVs mean the Forest Service needs to invest in the timber program to implement the management strategy. The PNV calculation reflects only the costs and values associated with timber management; it does not include other values such as clean water, fish and wildlife habitat, or other non-market values.

Each scenario quantifies costs of planning and administering pre-commercial and commercial thinning activities. In instances where costs to harvest commercial thins are greater than revenues received, the necessary investment to make the program financially viable is shown.

Employment Analysis

Estimates of employment in logging and wood manufacturing are based on projected Tongass harvests in the various scenarios. Although these employment numbers are not total regional employment in logging and sawmilling, local wood manufacturers will depend in large part on Tongass timber for the foreseeable future. As mentioned previously, harvests from State lands will probably remain at about 10 to 15 MMBF per year for the foreseeable future. If this harvest is from DNR lands it can contribute to local sawmills, but Mental Health and University timber, in addition to Native corporation timber, can be and often is exported. Logging employment would be supported by such timber sales, but not manufacturing employment.

Based on eight years of Tongass timber harvest since the last of the long-term contract sales were harvested, and regional employment in logging and wood manufacturing, the relationship between harvest from the Tongass and estimated employment generated from that harvest was calculated and expressed as employment coefficients. These employment coefficients are used to estimate the number of jobs created when timber is harvested from the Tongass. These estimates are for "direct" jobs, or jobs specific to the timber industry in Southeast Alaska. Although these employment coefficients might change as mills restructure or stop operations, it is not known how they might change, so this analysis assumes current behavior will continue in the future.

Economic activity in one sector (such as logging) generates activity in others as firms purchase services and materials as inputs (called "indirect" effects) and employees spend their earnings within the local economy ("induced" effects). In what is known as the multiplier effect, each industry affects the local economy through its particular pattern of local purchases and payments. These impacts can be estimated with multipliers for total employment and total income, to assess the total economic effects generated by a particular type of industry. Total employment (direct, indirect and induced) generated by an industry is calculated by multiplying employment in that industry ("direct" effects) by the appropriate multiplier. The 2008 Forest Plan FEIS (Table 3.22-4, page 3-496) included employment and income multipliers for total (direct, indirect and induced) employment estimated using the 1998 IMPLAN model. IMPLAN is an input-output model commonly used in forest planning and regional assessments.

The employment numbers reported in this document are all estimates of only direct employment resulting from timber harvest and thinning activities on the Tongass. The estimates are used to compare one scenario to another and compare employment projections to current industry conditions. It should be kept in mind that the total economic impacts of these scenarios (direct, indirect and induced) will be even larger.

The employment coefficients used in this study for direct employment for sawmilling and logging are based on 2001 to 2008 average levels of employment per million board feet (MMBF) of net sawtimber harvested. For every MMBF of sawtimber harvested from the Tongass, about 2.3 annualized logging jobs and 3.4 annualized sawmilling jobs are created. An annualized job is one job for one year. These employment coefficients are based on current industry structure (e.g., the sawmills as currently configured) and current behavior (e.g., how much harvested log volume goes to local sawmills as opposed to being shipped elsewhere). The direct employment coefficient for pre-commercial thinning is based on how many acres of thinning is accomplished; data from thinning contracts from 2005 through 2009 tells us that one annualized job is associated with about 288 acres of thinning. Actual direct employment associated with Tongass timber harvests averaged 151 annualized jobs from 2004 through 2008, and the average annual harvest in the same period was 37.2 MMBF. This represents about ten percent of mill capacity in the region.

Scenarios

The scenarios used in this analysis are formed around variations on three main parameters:

1. How long old growth harvest is allowed to continue.
2. Whether young growth is harvested only when it is economically viable to do so, or receives sufficient public investments necessary to harvest young growth.
3. How much timber is harvested annually.

How Long Old Growth Harvest is Allowed

This variable is included because of the public controversy surrounding the harvest of old growth. We examined four different possibilities: ending old growth harvest immediately; after five years; after ten years; and allowing the timber program on the Tongass to transition naturally to young growth harvest as these stands mature.

Level of Public Investments in Young Growth Harvest Management

Based on the best available information regarding the costs of conducting commercial thinning of young growth, the products that can be made from it, and the values of such products, young growth management is not currently economically viable without substantial public investments to pay for thinning. This is because the vast majority of young growth currently available on the developed land base is too young and small to generate profits in excess of the logging and transportation costs used in this analysis (see appendices C, D and E for cost and price details). Pre-commercial and commercial thinning activities in young growth stands in Southeast Alaska generally require investment. Final clearcut harvest of young growth under the assumptions and data used in this analysis are generally profitable. One purpose of this study is to determine what it would take to accelerate the transition to young growth management on the Tongass. For this analysis, we tested four possibilities. Some scenarios include no public investments in young growth management, to see when the young growth stands would be mature enough—and the products available from thinning them valuable enough—to be economically viable. We also examined a scenario under which sufficient public investments are made to start commercially thinning immediately at a relatively low level (2 MMBF annually); another that attempts to achieve 30 MMBF annually beginning in five years; and another that tests how much young growth could be sustainably harvested beginning immediately, to determine what that sustainable level is and the cost of achieving it.

Timber Harvest Level

Another objective of the study is to examine whether existing employment levels can be maintained while avoiding timber harvest in inventoried roadless areas and while accelerating the transition to young growth management on the Tongass. Employment levels in the timber industry are closely related to timber harvest levels. For this analysis, we studied three possible future harvest levels. Five of the seven scenarios attempt to maintain either 30 MMBF or 50

MMBF annually. We included the 50 MMBF level to approximate the level of harvest that has occurred over the last nine years, since the closure of the last pulp mill. We included scenarios that attempt to harvest 30 MMBF annually to approximate the level of harvest over the last five years (the average annual harvest from the Tongass for Fiscal Years 2005-2009 is 33.6 MMBF). It is important to note that 30 MMBF per year is not enough supply to maintain the remaining mills in Southeast Alaska in operation; and 50 MMBF is not enough to allow the industry to expand sufficiently to become more efficient, integrated, and competitive in global markets. As of 2008, operable mill capacity in Southeast Alaska, not including a mill that has not operated in two years or bought a Forest Service timber sale in several years, is about 183 MMBF. In 2008, production was about 24 MMBF, or 13 percent of total capacity. A harvest level of 50 MMBF would allow the region's sawmills to operate at 27 percent of capacity. Sawmills can also buy sawtimber from State timber sales, but the amount available is limited. These issues are discussed extensively in the 2008 Tongass Forest Plan Amendment ROD (see especially pages 17 and 35-37).

In addition to these two harvest levels, one scenario identifies the maximum amount of sustainable harvest of young growth, as described in the preceding paragraph.

With this number of parameters and possible values for each, there were 48 possible permutations, an unreasonable and unnecessary number of scenarios to accomplish the objectives of the study. After examining many of these permutations, we selected the seven scenarios described below for analysis and presentation. These scenarios are also summarized in Table SS-1.

Scenario 1: 30 MMBF Old Growth Harvest for 5 Years

The intent of this scenario is to harvest 30 MMBF per year from both old growth and young growth stands in the developed land base in the next five years (2010 – 2014), and then transition immediately to young growth if economically viable. In this scenario, no more old growth is harvested after the first 5 years. The constraint on non-declining even flow[2] is removed to allow harvest to decline if suitable economic young growth volume was unavailable. After 2014 the only volume that is harvested is sustainable, economically viable young growth.

Scenario 2: 30 MMBF Old Growth Harvest for 5 Years – Accelerated Young Growth Harvest

[2] Non-declining even flow is defined in 36 CFR 219.16(a)(1), as published in 1982:
"… the planned sale for any future decade shall be equal to, or greater than, the planned sale for the preceding decade...

The intent of this scenario is also to harvest 30 MMBF per year, and allow no old growth harvest after the first five years. In this scenario, the non-declining even flow constraint is imposed, and the minimum goal for young growth is set at 30 MMBF per year after the first 5 years. This scenario forces the model to harvest young growth once old growth is no longer available, despite the costs involved. This scenario is used to assess the estimated investment necessary to bring young growth volume into a timber sale program in the near future, through both commercial thinning and final harvest (clearcut) activities.

Scenario 3: 50 MMBF Old Growth Harvest for 10 Years

This scenario is similar to Scenario 1, but it allows for both a higher harvest level and old growth harvest for a longer period of time. The objective of this scenario is to harvest 50 MMBF per year from both old growth and young growth in the first decade. After ten years, no more old growth is harvested. As in Scenario 1, the constraint on non-declining even flow is removed to show whether harvest could be maintained at the 50 MMBF annual harvest level while harvesting only economic young growth through both commercial thinning and final clearcut harvest.

Scenario 4: Immediate End of Old Growth Harvest; Maximum Young Growth Harvest

This scenario ends the harvest of old growth immediately. It constrains all harvest to young growth acres and determines the maximum sustainable harvest level that can be achieved in each decade. This scenario shows what could happen if investments in young growth management are made at levels required to allow harvest at the maximum feasible level. Present Net Value is maximized after the maximum young growth volume is determined and used as a constraint. Harvest activities with negative values are allowed so young growth volume can be harvested. This scenario has a non-declining even flow constraint to ensure the resulting management strategy is sustainable.

Scenario 5: 30 MMBF Harvest with Natural Transition

This scenario harvests 30 MMBF per year from both old growth and young growth acres, showing how timber harvests transition from old growth to young growth as the young growth becomes available and economically feasible. There is a non-declining even flow constraint, but no time constraints on old growth harvest in developed areas (old growth harvests may occur after Decade 1).

Scenario 6: 30 MMBF Modified Natural Transition

The intent of this scenario is to harvest 30 MMBF per year from a combination of old growth and young growth acres, with a minimum goal for young growth volume of 2 MMBF per year, through a combination of commercial thinning and final clearcut harvests. This scenario illustrates tradeoffs in supplying a small amount of young growth to local sawmills in early decades, providing opportunities for them to explore retooling options and discover markets for the young growth material while they continue to harvest mostly old growth until more young growth becomes available and economically feasible.

Scenario 7: 50 MMBF Harvest with Natural Transition

This scenario is the same as scenario 5, but with a higher harvest level. This scenario harvests 50 MMBF per year from both old growth and young growth acres, showing how timber harvests transition from old growth to young growth as the young growth becomes available and economically feasible. There is a non-declining even flow constraint, but no time constraints on old growth harvest in the developed area (old growth harvests may occur after Decade 1).

Scenario	Old growth management	Young growth management	Total harvest
1	First 5 years only	Upper limit of 30 MMBF per year	30 MMBF first 5 years; max. economical thereafter from young growth
2	First 5 years only	Upper limit of 30 MMBF per year	30 MMBF first 5 years; max. physical capacity thereafter from young growth
3	First 10 years only	Upper limit of 50 MMBF per year	30 MMBF first 5 years; max. economical thereafter from young growth
4	None	Maximum physical capacity	Maximum physical capacity from young growth
5	Upper limit of 30 MMBF per year in combination with young growth	Upper limit of 30 MMBF per year in combination with old growth	30 MMBF per year economical harvests
6	28 MMBF per year max.	Minimum 2 MMBF per year	30 MMBF per year
7	Upper limit of 50 MMBF per year in combination with young growth	Upper limit of 50 MMBF per year in combination with old growth	50 MMBF per year economical harvests

Table SS-1: Summary of Timber Management Scenarios.

Results

Results from each of the seven scenarios are discussed below. Both old growth and young growth management are evaluated based on acres harvested and associated timber volume. A financial analysis is presented to show investments necessary for thinning activities, as well as the present net value of each scenario. In addition, each scenario discussion includes an analysis of the impacts on employment in the timber industry of Southeast Alaska. At the end of this section, Table SR-1 summarizes the results of the scenarios.

Scenario 1: 30 MMBF Old Growth Harvest for 5 Years

Acres and volumes

This scenario harvests 6400 acres of old growth in years 1-5 (1280 acres per year) to yield an annual harvest level of 30 MMBF (26 MMBF of sawtimber). There is no young growth harvest in years 6-20. Young growth management begins again in year 21, with an annual harvest of 45 acres for a yield of 1.6 MMBF per year. Annual volume by five-year period is shown in Figure S1-1.

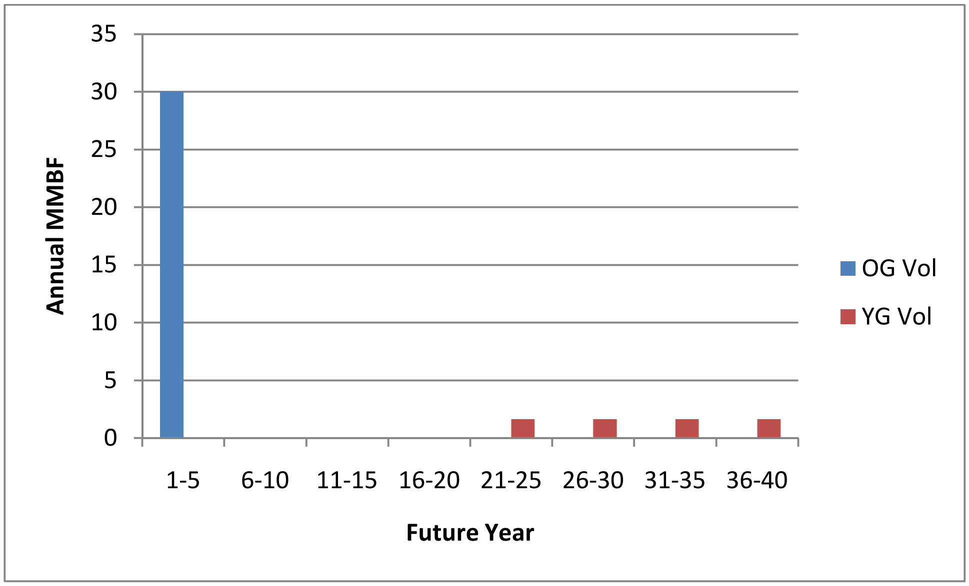

Figure S1-1: Annual gross harvest volume by 5-year period.

Economic Analysis

This scenario has a PNV of $11.6 million. The PNV of all the scenarios is illustrated in Figure D-1. Most of the PNV of this scenario accrues from old growth harvest in the first five years.

Under this scenario, approximately 150 timber-related jobs will be maintained during the first five years. After that time, when timber harvest declines to 0, there will be no timber related jobs until harvest begins again in year 21. Beginning in year 21, the model indicates an estimated 10 timber jobs will be supported with timber harvests. This assumes the timber industry would return to Southeast Alaska following a 15-year hiatus with no harvest from the Tongass, a very unlikely outcome. Contributing to this unlikely return is the low volume of economically viable timber that is available by year 21, all of which is final clearcut harvest of young growth. An annual harvest volume of 1.6 MMBF will not sustain a sawmill operation. This Scenario does not recognize commercial thinning as an economically viable option until far into the future (120+ years). In part, this is because the cost of commercial thinning is greater than the additional growth and value it creates in the remaining stand. Commercial thinning requires public investments if the activity is desired. Pre-commercial thinning does not begin until Decade 8, with about 25 acres per year (Figure D-2). Again, this means that the cost of the pre-commercial thin is greater than the net value gain over the remaining portion of the stand's life.

Scenario 2: 30 MMBF Old Growth Harvest for 5 Years – Accelerated Young Growth Harvest

Acres and volumes

Similar to scenario 1, this scenario yields an average harvest level of 30 MMBF per year (26 MMBF sawtimber) in years 1 through 5. Although the intent of this scenario is to maintain harvest volume, the age class distribution and available young growth treatment options do not allow a harvest level of 30 MMBF to be maintained in years 6-10. Figure S2-1 shows that the volume for years 6-10 drops to 14 MMBF per year, but recovers to 24 MMBF per year (close to the total volume of 30 MMBF) starting in year 16, and reaches 30 MMBF per year by year 31.

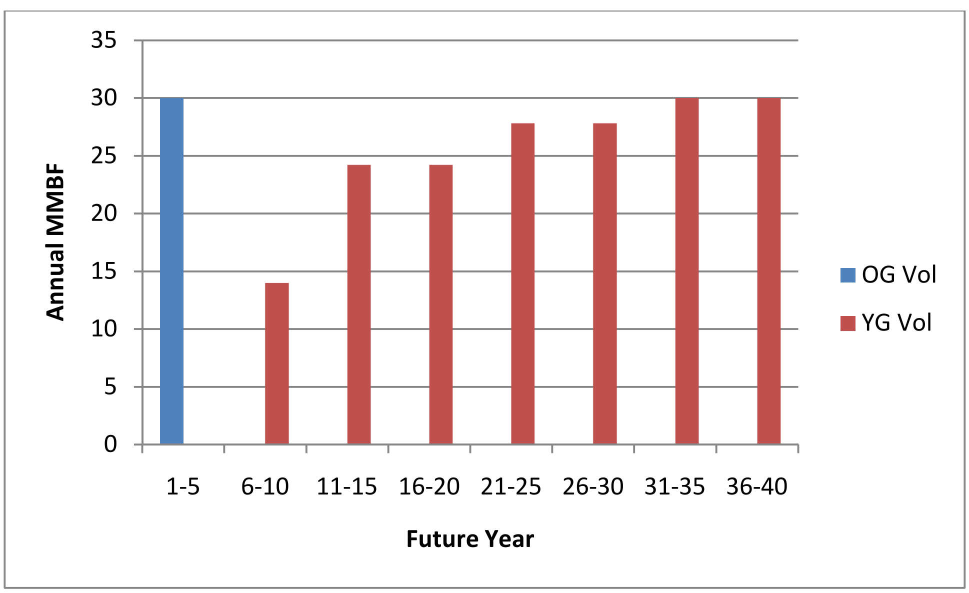

Figure S2-1: Annual gross harvest volume by 5-year period.

This scenario harvests a total of 6400 acres (1280 acres per year) over in the first five years, the same as scenario 1. However, this scenario begins young growth harvest at a much higher level than scenario 1 beginning in year 6 (see Figure S2-2). In years 6-10, there are 200 acres of final clearcut harvest of young growth and 1000 acres of commercial thins every year. In year 11, commercial thinning is increased to nearly 4000 acres annually, and final clearcut harvest increases to 500 acres per year. This corresponds to the higher annual volume output shown in Figure S2-1.

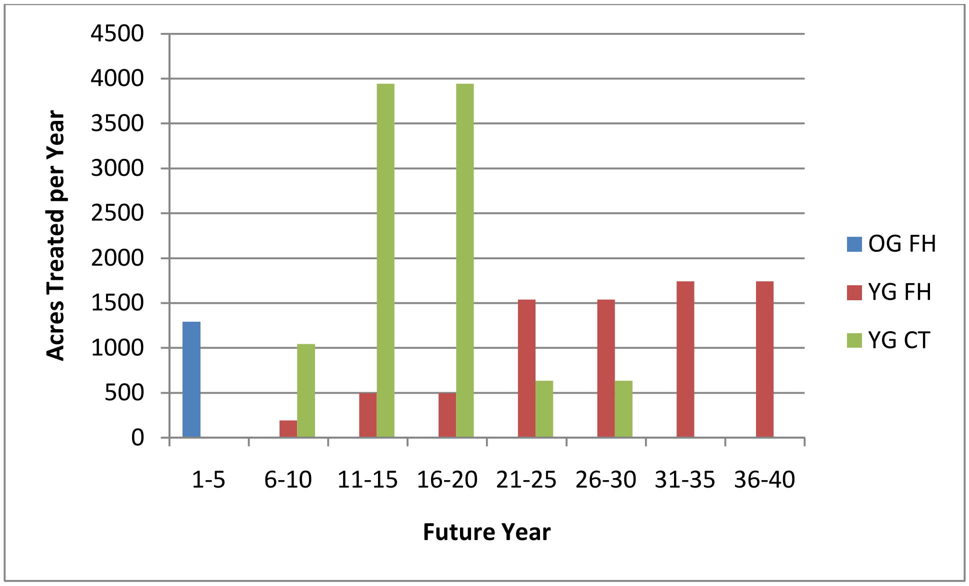

Figure S2-2: Annual acres harvested by treatment type.

Economic Analysis

This scenario has a PNV of minus $39.1 million. This means that there is an overall net loss to the Federal Treasury and that harvest activities generally require public investments. The PNV of this scenario is compared with other scenarios in Figure D-1. Much of the expense is incurred in the first three decades when commercial thinning activities are used to generate volume at a financial loss. Figure S2-3 shows that during the first decade (years 1-10), commercial thinning will cost approximately $1 million per year (which translates to $2 million per year for years 6-10 when the commercial thin activities occur). The required investment for commercial thinning increases to $3.8 million per year during decade 2, and drops to $500,000 per year in decade 3, before dropping to $0 in decade 4. The annual investment requirement for commercial thinning is directly proportional to the level of commercial thinning activities shown in Figure S2-2.

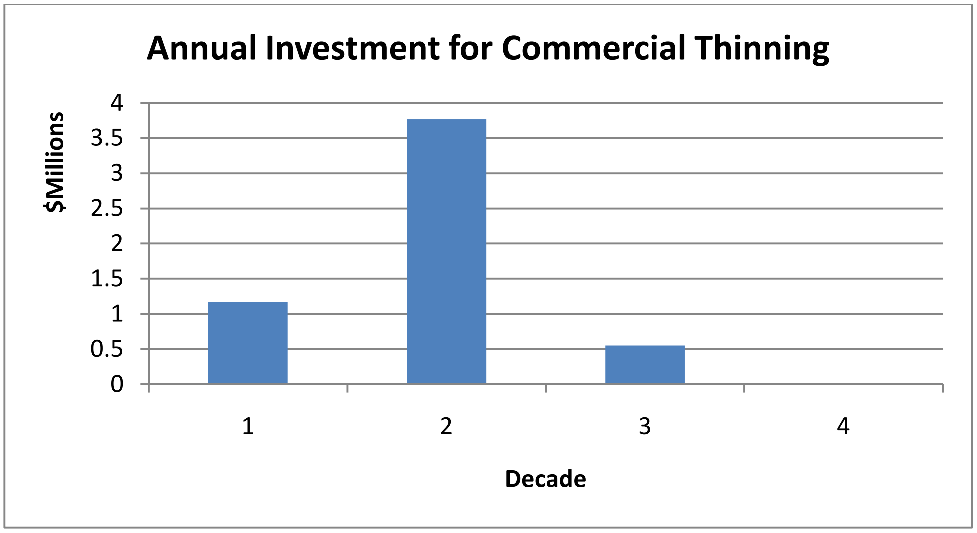

Figure S2- 3: Annual commercial thinning investment necessary to implement Scenario 2.

Similar to scenario 1, approximately 150 timber-related jobs will be maintained during the first five years (Figure S2-4). When timber harvest declines during years 6-10, the number of annualized jobs correspondingly drops to 80. The model indicates this will recover to 140 jobs by year 11 and surpass the initial 150 jobs when 160 jobs are maintained beginning in year 21. Similar to scenario 1, these job estimates are based on implicit assumptions that are very unlikely; in this case, that existing timber operators in Southeast Alaska would survive 5 years of an annual Tongass supply of 30 MMBF of old growth, re-tool for young growth during that time, and remain viable through the following 5 years at an annual level of 14 MMBF of young growth plus an additional 20 years before annual harvest levels return to 30 MMBF.

These concerns aside, the model predicts that pre-commercial thinning begins in Decade 3, with treatment of 20 acres per year (Figure D-2). The number of acres subject to pre-commercial thinning is small because the cost incurred from pre-commercial thinning activities is not recovered with increased revenues when the stand is clearcut several decades later.

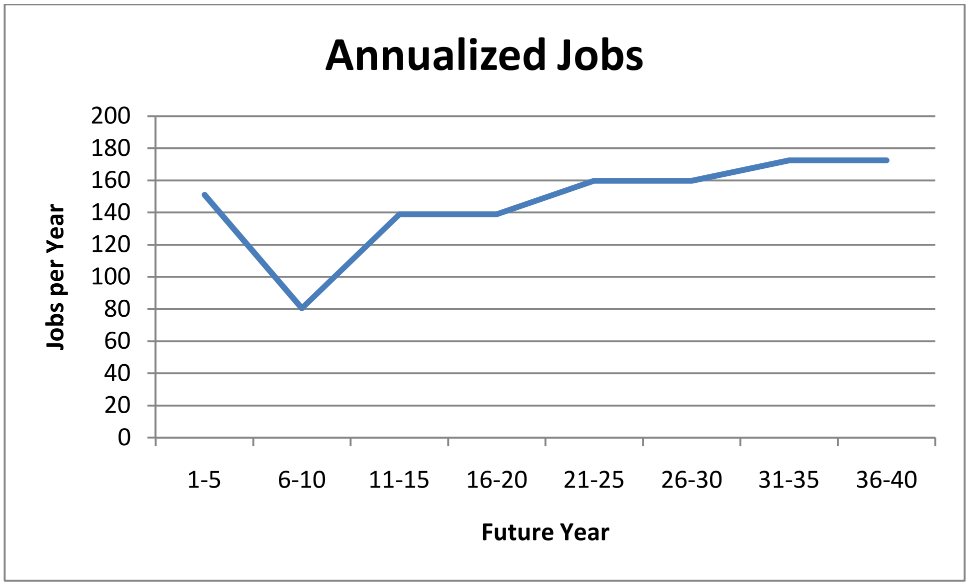

Figure S2- 4: Annualized jobs maintained in Scenario 2.

Scenario 3: 50 MMBF Old Growth Harvest for 10 Years

Acres and volumes

This scenario harvests 20,800 acres of old growth in years 1 -10 (2080 acres per year) to yield an annual volume of 50 MMBF (44 MMBF sawtimber). There is no economical young growth harvest in the first two decades because, under the cost and price assumptions described above, the trees are still too small to yield products with sufficient market value to recover the cost of harvesting young growth. Young growth management begins in year 21, and is managed the same way as that which is described in Scenario 1(Figure S3-1).

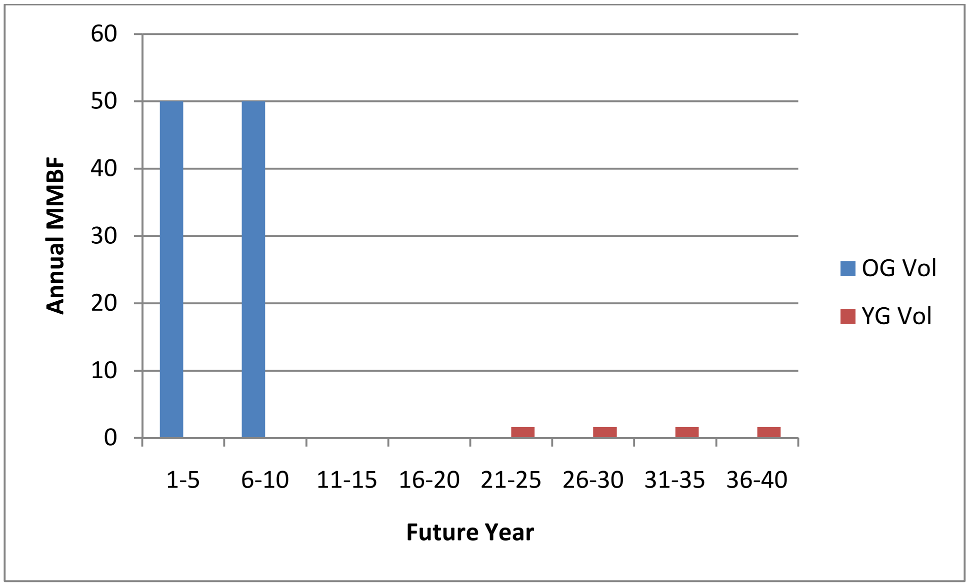

Figure S3-1: Annual gross harvest volume by 5-year period.

Economic Analysis

Scenario 3 has a PNV of $26 million. This is compared with the other scenarios in Figure D-1. The PNV is the highest of those scenarios that fully transition out of old growth harvest after the first decade. The positive PNV value is largely due to the old growth timber harvest in the first 10 years, after which timber harvest will likely be break-even.

Under this scenario, approximately 250 timber-related jobs will be maintained during the next ten years. After that time, harvest and resulting jobs drops to 0 until year 21, at which time young growth management (and resulting jobs) resumes as described in Scenario 1. As also described in Scenario 1, it is unlikely that the timber industry would return to Alaska after a significant period of time—in this case 10 years—with no harvest from the Tongass.

Scenario 4: Immediate End to Old Growth Harvest; Maximum Young Growth Harvest

Acres and volumes

Scenario 4 shows that the maximum sustainable young growth harvest for the next ten years is 9 MMBF total volume annually (Figure S4-1). This doubles for the second ten years (11-20) to 20 MMBF per year, but has the potential to increase to 85 MMBF per year or more in the long-run (30 or more years in the future).

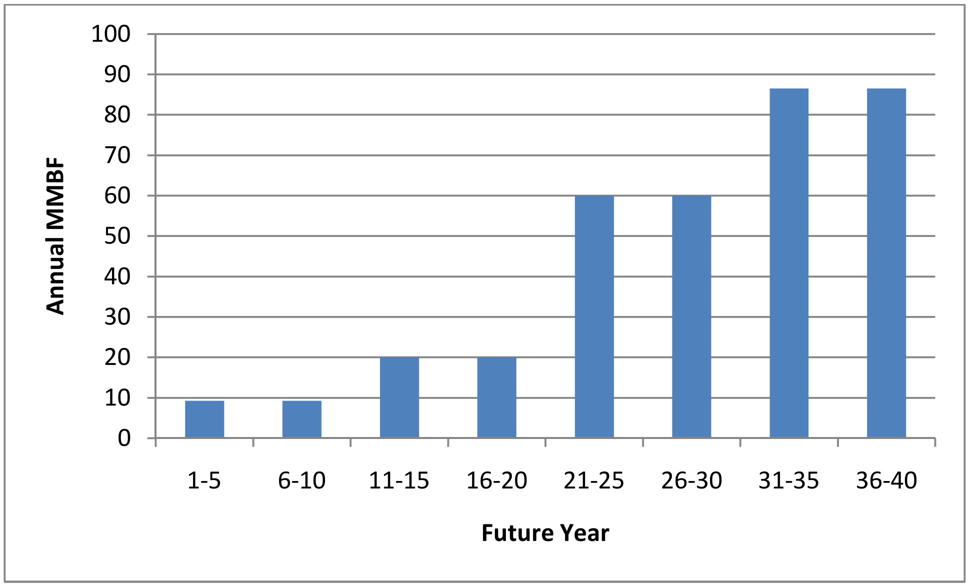

Figure S4-1: Annual gross harvest volume by 5-year period.

This scenario does not harvest old growth; all timber volume is realized from young growth commercial thin and final clearcut harvest activity. Figure S4-2 shows that in the next ten years, there are about 270 acres per year available for final clearcut harvest and an additional 1300 acres per year available for commercial thinning. By Decade 2, commercial thinning activity increases substantially to 4500 acres per year, and in Decade 3 it occurs at its maximum level of

7300 acres per year. By Decade 5, the young growth volume is sustained with only final clearcut harvest activities.

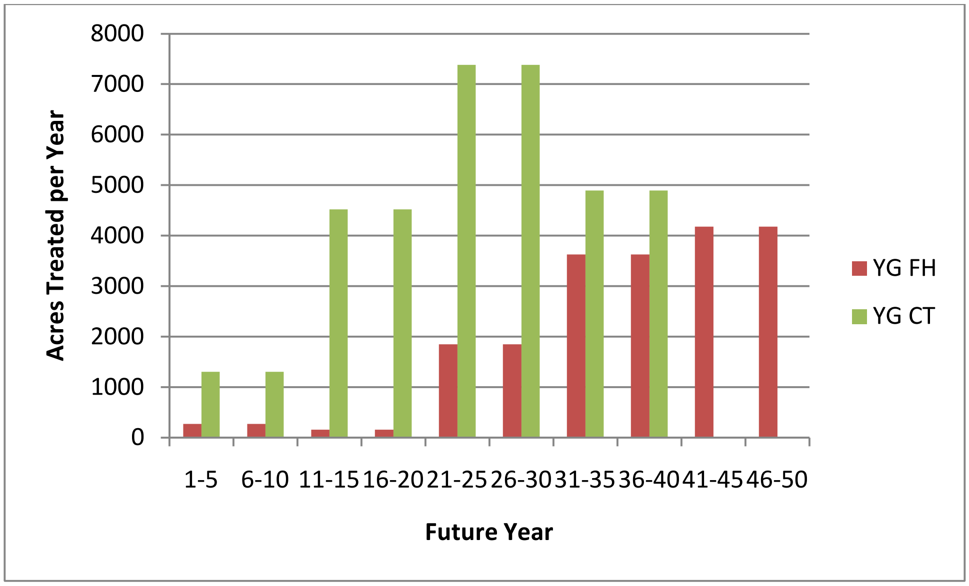

Figure S4-2: Scenario 4 annual acres harvested by treatment type.

Economic Analysis

This is the most costly scenario, with a PNV of minus $127.6 million. This means that there is a net loss to the Federal Treasury and that generally harvest activities require investment. The PNV of this scenario is compared with the other scenarios in Figure D-1. Much of the expense is incurred in the first four decades, when commercial thinning activities are used to generate volume at a financial loss. The necessary annual investment is directly proportional to the level of commercial thinning activities shown in Figure S4-2. Figure S4-3 shows that during the first decade (years 1-10), public investments in commercial thinning will be approximately $1.4 million per year. The annual investment increases to $4.7 million per year during decade 2, and $8.8 million per year in decade 3 at its maximum. In decade 4, more volume is available from final clearcut harvest, so the commercial thin investment requirement drops to $5 million per year in decade 4 and ceases entirely by Decade 5.

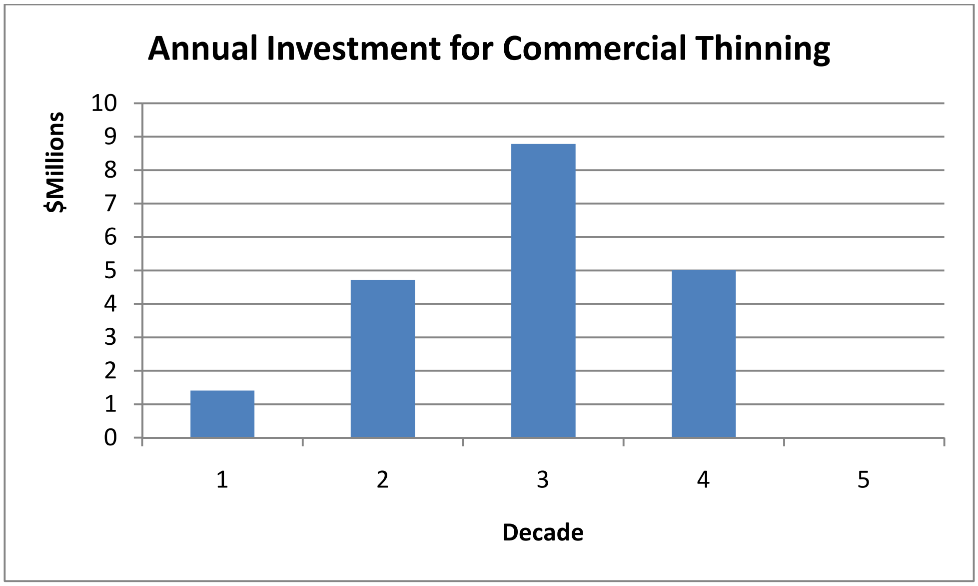

Figure S4- 3: Annual commercial thinning public investment necessary to implement Scenario 4.

This scenario maintains the fewest timber related jobs in the first decade of any scenario (Figure S4-4). The 9 MMBF gross harvest volume per year, combined with pre-commercial thinning activity, maintains about 53 jobs for the first ten years. As a practical matter, this scenario most likely results in the closure of the major existing timber operations in Southeast Alaska over the next 10 years. Assuming some industry survives or is re-established after the first decade, the higher harvest volumes in later decades increase the number of annualized jobs to 115 in decade 2, 344 in decade 3 and 500 in decade 4. Pre-commercial thinning is not a significant activity in this Scenario (Figure D-2). During the first five decades, the maximum pre-commercial thinning level is 52 acres per year, during Decade 3.

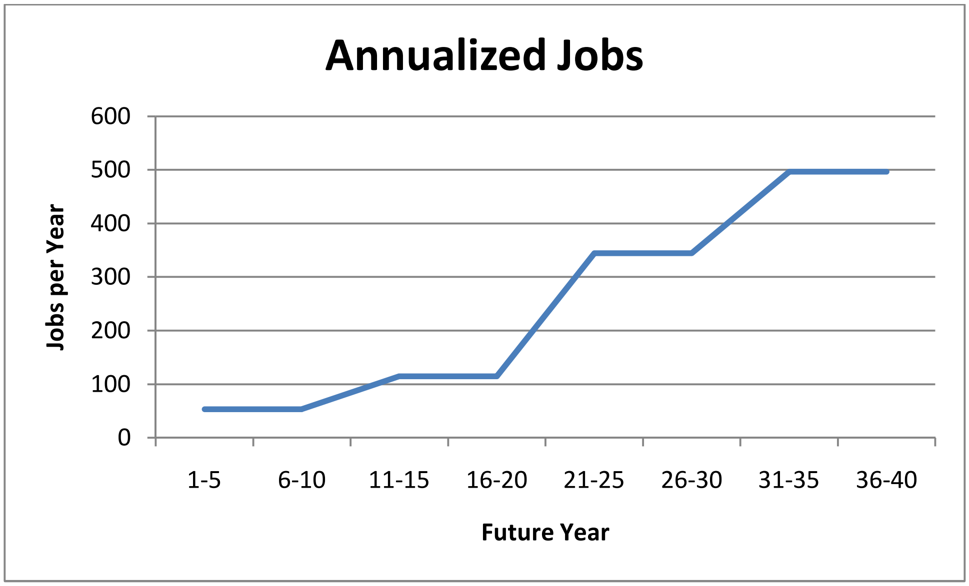

Figure S4- 4: Annualized jobs maintained in Scenario 4.

Scenario 5: 30 MMBF Harvest with Natural Transition

Acres and volumes

In scenario 5, old growth harvest is not ended at any prescribed date; rather, it is allowed to continue at substantial levels for the next 60 years (Figure S5-1). For the first three decades, there is no volume from young growth; there is no young growth commercial thin activity or any young growth final clearcut harvest activity. Young growth harvest activity begins in decade 4, and management essentially converts to young growth by decade 7.

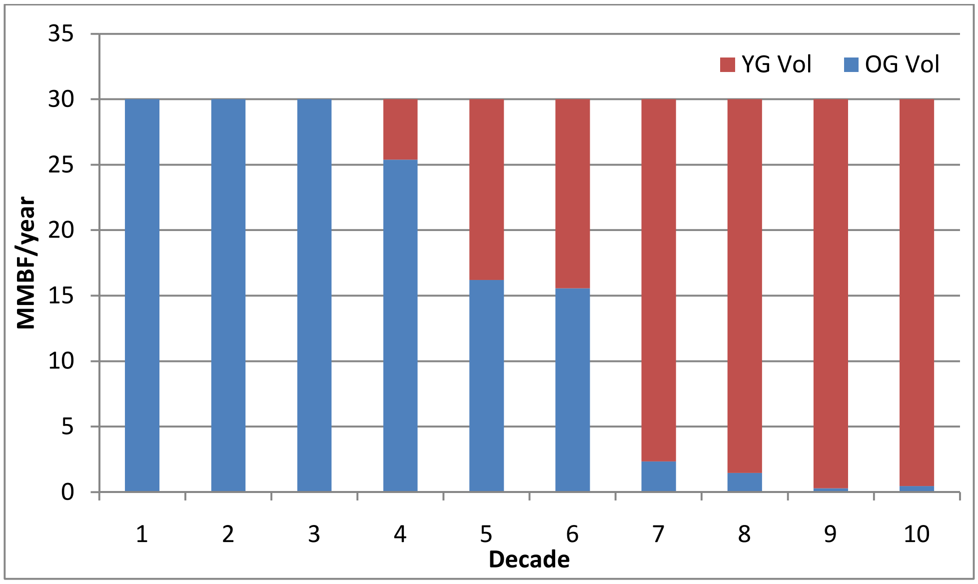

Figure S5-1: Scenario 5 annual gross harvest volume by decade.

Figure S5-2 shows treatment types and acres harvested corresponding to the volumes shown in Figure S5-1. Young growth final clearcut harvesting activity begins in decade 4, and a full transition to young growth harvest occurs about in decade 7. The transition occurs mostly across decades 5 and 6. This Scenario harvests about 57,000 acres of old growth over the next 100 years, about 33 percent of the 179,000 acres of old growth that currently exist on the developed land base south of Frederick Sound (see Figure A-1).

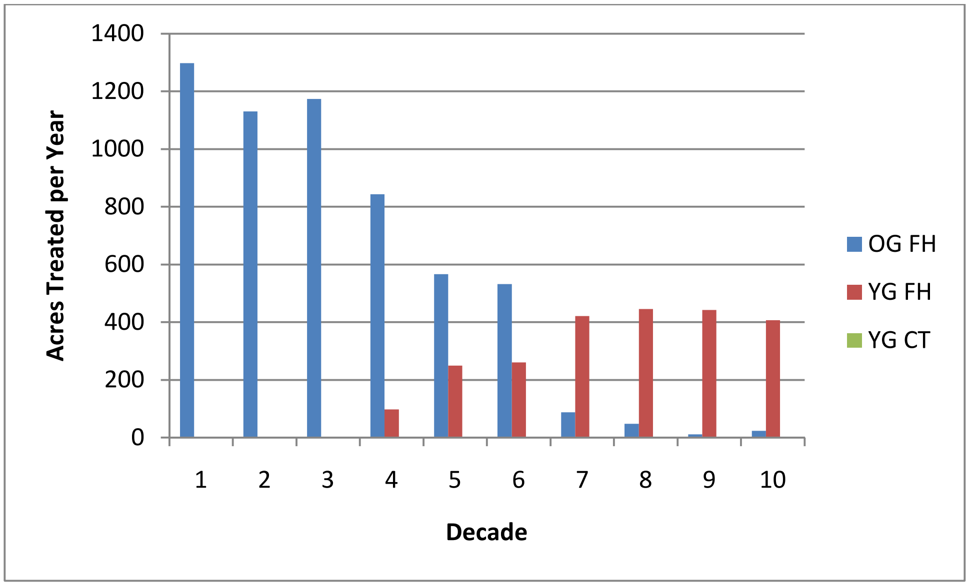

Figure S5-2: Scenario 5 annual acres harvested by treatment type.

Economic Analysis

Scenario 5 has a PNV of $27.6 million. The PNV of this scenario is compared with the other Scenarios in Figure D-1. Old growth harvest that is not constrained to a particular time period allows positive timber sales for the foreseeable future. Commercial thinning does not occur until after year 100, because the cost of commercial thinning is greater than the additional growth and value it creates in the remaining stand. This scenario maintains 150 jobs for the foreseeable future (5 decades). Pre-commercial thinning is not a major factor; it begins in year 80 at the modest level of 60 acres per year (Figure D-2).

Scenario 6: 30 MMBF Modified Natural Transition

Acres and volumes

Scenario 6 requires at least 2 MMBF young growth harvest per year until the full transition to young growth occurs. Figure S6-1 shows that old growth volume remains at about 28 MMBF per year for the next 40 years, after which time there is a significant shift to young growth harvest volume, with full transition by about decade 7. Gross volume in decade 7 is similar to Scenario 5 at about 30 MMBF annually.

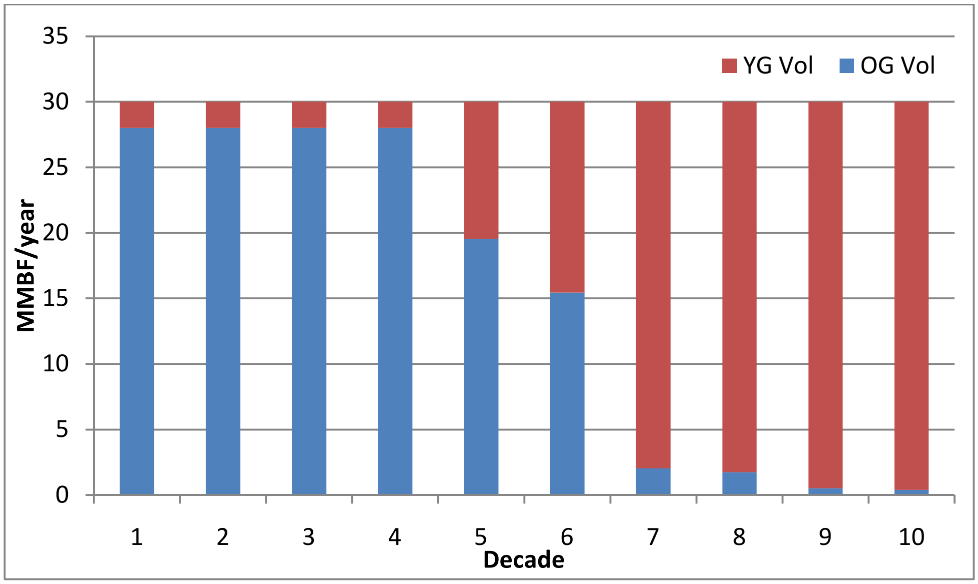

Figure S6-1: Scenario 6 annual gross harvest volume by decade.

Figure S6-2 shows treatment types and acres harvested corresponding to the volumes shown in Figure S6-1. Young growth harvest during the first 100 years mainly consists of final clearcut harvest activities. This is, not surprisingly, almost identical to Scenario 5. The period of most intense transition lasts for about 20 years, in decades 5 and 6. Young growth harvest activity in period 4 is less than in Scenario 5 likely due to these acres being spread over decades 1-4 in Scenario 6. This Scenario harvests about 57,000 acres of old growth over the next 100 years, similar to Scenario 5.

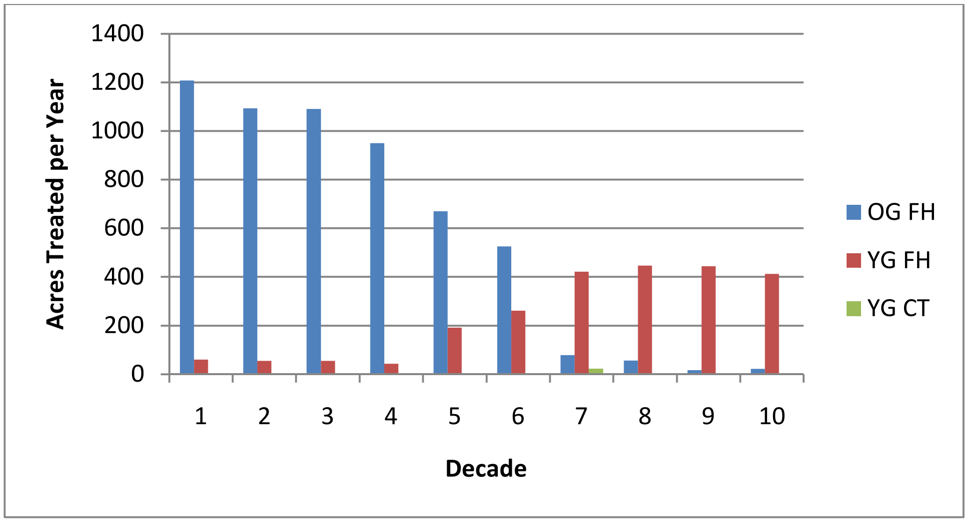

Figure S6-2: Scenario 6 annual acres harvested by treatment type.

Economic Analysis

Scenario 6 has a PNV of $25.7 million. This is lower than Scenario 5 due to the financial trade-offs that occur in early decades when young growth management occurs before its economically optimal time. The PNV of this scenario is compared with the other scenarios in Figure D-1. Old growth harvest that is not constrained to a particular time period allows positive timber sales for the foreseeable future. Commercial thinning does not occur until year 110. For modeling purposes, it was assumed commercial thinning activities would require an investment, but the present value of those costs is negligible when discounted more than 100 years.

Job creation and pre-commercial thinning activities are nearly identical to scenario 5. Scenario 6 maintains about 150 jobs for the first five decades. Pre-commercial thinning activity is insignificant.

Scenario 7: 50 MMBF Harvest with Natural Transition

Acres and volumes

Scenario 7 shows that old growth gross harvest volume remains at 50 MMBF per year for the next 20 years (Figure S7-1). For the first 2 decades, there is no volume from young growth; there is no young growth commercial thin activity nor is there young growth final clearcut harvest activity. Young growth harvest activity begins a decade earlier than Scenario 5 (in decade 3), and management mostly converts to young growth by decade 6, again a decade earlier than Scenarios 5 and 6. Conversion begins earlier in this Scenario because the economically viable old growth is harvested at an increased rate. Therefore, the supply runs out earlier, and young growth harvest becomes the more economical of the two choices.

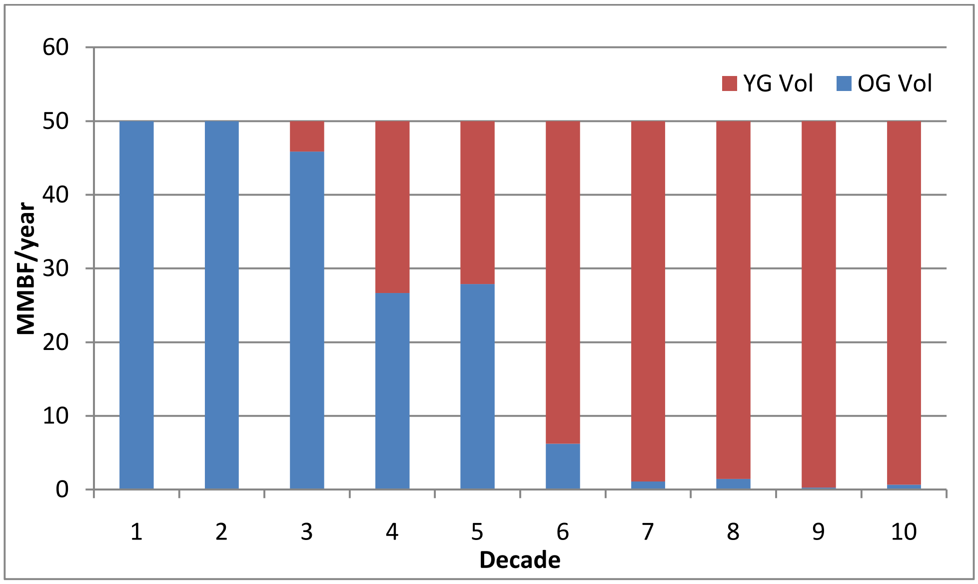

Figure S7-1: Scenario 7 annual gross harvest volume by decade.

Figure S7-2 shows treatment types and acres harvested corresponding to the volumes shown in Figure S7-1. Young growth final clearcut harvest activity begins in decade 3, and represents most of the harvest activity by Decade 6, with about 800 acres of young growth clearcut harvest activity each year. The most intense transition period is the 30 years between decades four and six. This Scenario harvests about 77,000 acres of old growth over the next 100 years, about 43 percent of the 179,000 acres of existing old growth available in the developed land base south of Frederick Sound. Scenario 7 harvests only a handful of old growth acres after the 10th decade of the projection. Not only does the scenario harvest less than half of the old growth acres in the developed land base in this analysis, it also spreads the harvest among the three volume density strata. About half of the old growth harvested is from the high volume strata. About 40 percent of the harvested old growth acres are from the mid-volume strata, and about 10 percent from the low-volume strata. About 40 percent of the initial old growth acres in the high-volume strata are harvested in this scenario. Two-thirds of the acres in the mid-volume strata are harvested, and about 20 percent of the acres in the low-volume strata are harvested.

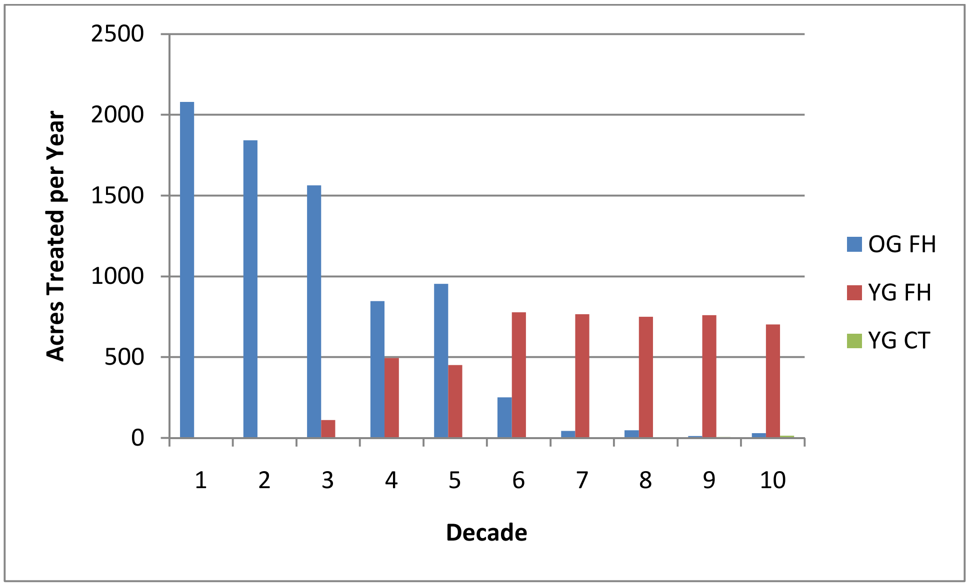

Figure S7-2: Scenario 7 annual acres harvested by treatment type.

Economic Analysis

The PNV of this scenario is compared with the other Scenarios in Figure D-1. Scenario 7 has a PNV of $23.9million, which is lower than scenario 5. This suggests that some negatively valued old growth is harvested in order to maintain the desired harvest levels and that increasing the harvest level above 50 MMBF per year will further reduce the PNV. Yet the PNV is still positive, which suggests that as a whole, old growth harvest that is not constrained to a particular time period allows positive timber sales for the foreseeable future. Like scenario 5, commercial thinning activities do not occur until after year 100 (see Figure S5-2). For modeling purposes, it was assumed commercial thinning requires an investment, but the present value of the cost is negligible when discounted more than 100 years.

This scenario maintains about 250 jobs for the first six decades until the young growth transition occurs. Employment increases to about 280 annualized jobs in decade 6, corresponding to the increased harvest volume in those later decades. Similar to the other scenarios, not much pre-commercial thinning occurs in any decade.

Measure & Scenario	Yrs. 1-5	6-10	11-15	16-20	21-25	26-30
Annual MMBF						
Scenario 1	30	0	0	0	1.6	1.6
Scenario 2	30	14	24	24	28	28
Scenario 3	50	50	0	0	1.6	1.6
Scenario 4	9	9	20	20	60	60
Scenario 5	30	30	30	30	30	30
Scenario 6	30	30	30	30	30	30
Scenario 7	50	50	50	50	50	50
Annual Jobs						
Scenario 1	150	0	0	0	10	10
Scenario 2	150	80	140	140	160	160
Scenario 3	250	250	0	0	10	10
Scenario 4	53	53	115	115	350	350
Scenario 5	150	150	150	150	150	150
Scenario 6	150	150	150	150	150	150
Scenario 7	250	250	250	250	250	250
Annual commercial thinning investment (million $)						
Scenario 1	0	0	0	0	0	0
Scenario 2	0	2	3.8	3.8	0.5	0.5
Scenario 3	0	0	0	0	0	0
Scenario 4	1.4	1.4	4.7	4.7	8.8	8.8
Scenario 5	0	0	0	0	0	0
Scenario 6	0	0	0	0	0	0
Scenario 7	0	0	0	0	0	0
PNV (million $)						
Scenario 1	11.6					
Scenario 2	-39.1					
Scenario 3	26.0					
Scenario 4	-127.6					
Scenario 5	27.6					
Scenario 6	25.7					
Scenario 7	23.9					

Table SR-1: Scenario results summary.

Conclusions

When considered together, these Scenarios can be used to gain insight into the nature of the physically available timber and economic situation faced by the Southeast Alaska timber industry, as well as the implications of different transition strategies. This section discusses some of the major findings of this study.

1. Ending old growth timber harvest after 5 or 10 years, even with considerable public investments in young growth management, will not maintain a timber industry in Southeast Alaska.

Scenarios 1 and 3 each show that forcing a complete transition to young growth in the short-term by ending old growth harvest in 5 or 10 years will result in a low economically feasible timber harvest and substantial job losses. These scenarios estimate that a harvest level of 30 MMBF can sustain about 150 jobs, at least in the short run, and 50 MMBF can sustain about 250 jobs (Figure D-3). In both of these scenarios, the number of jobs drops to 0 immediately after the transition occurs. This would probably result in the elimination of the timber industry from Southeast Alaska, because the cost of re-establishing the industry once economical young growth harvest becomes available again would probably be insurmountable. Adding to the difficulty of re-establishment is the very low volume of economic timber available at that time (1.6 MMBF per year). This low volume would not support a timber industry.

Scenario 2 indicates that, if old growth harvest is ended after 5 years, even considerable public investment in young growth harvests after that will be insufficient to supply the existing industry for the remainder of the first decade. Figure S2-1 shows that the maximum available volume in years 6-10 is 14 MMBF per year, less than half of the current harvest level. Scenario 4 shows that even with the highest level of public investments in young growth harvests cannot generate an immediate supply sufficient to maintain current industry and employment. While such investments can lead to significant sustainable volume yields (85 MMBF or more) and the highest level of corresponding timber jobs (500+)in 30 years, this assumes the industry will re-establish itself in Southeast Alaska after being driven out by a decade of harvests under 10 MMBF.

2. Continued old growth harvest outside of inventoried roadless areas can maintain the current level of timber harvest and jobs at a net profit.

Scenarios 5 and 7 explore the implications of transition to young growth in an economically viable manner without forcing an end to old growth harvest within a prescribed time period. Scenario 5 shows that maintaining an old growth harvest level of 30 MMBF per year is physically and economically sustainable over the next 40 years, after which time young growth harvest becomes viable and completely replaces old growth harvest by year 60. Scenario 7 shows that harvesting old growth is physically and economically sustainable for 30 years at an annual level of 50 MMBF, and can continue for another 30 years beyond that at lower levels as economic young growth harvest increases. Compared to Scenario 5, the transition period in Scenario 7 is shortened essentially to 60 years because harvest at a higher level exhausts the supply earlier.

Scenarios 5, 6 and 7 suggest that the old growth available in the developed areas of the forest is sufficient to economically transition to young growth management at a harvest level of 30-50 MMBF. Figure A-1 shows that the 57,000 to 77,000 acres of old growth harvested in these scenarios is only33-43% of the old growth available in the land base used in this study (i.e., the 179,000 acres in developed areas south of Frederick Sound).

Figure D-1 shows that along with Scenario 3, Scenarios 5, 6 and 7 have the three highest PNV values. This confirms the increased economic returns that occur with old growth harvest. Not surprisingly, harvesting young growth in the first several decades, before the optimal economic transition (as in Scenario 6), causes a decrease in PNV (compared to Scenario 5, where there is no pre-economic young growth treatment). However, Scenario 7’s lower PNV implies that the maximum PNV (i.e., harvest of all positively valued old growth acres) probably occurs at an annual harvest level somewhere between 30 and 50 MMBF.

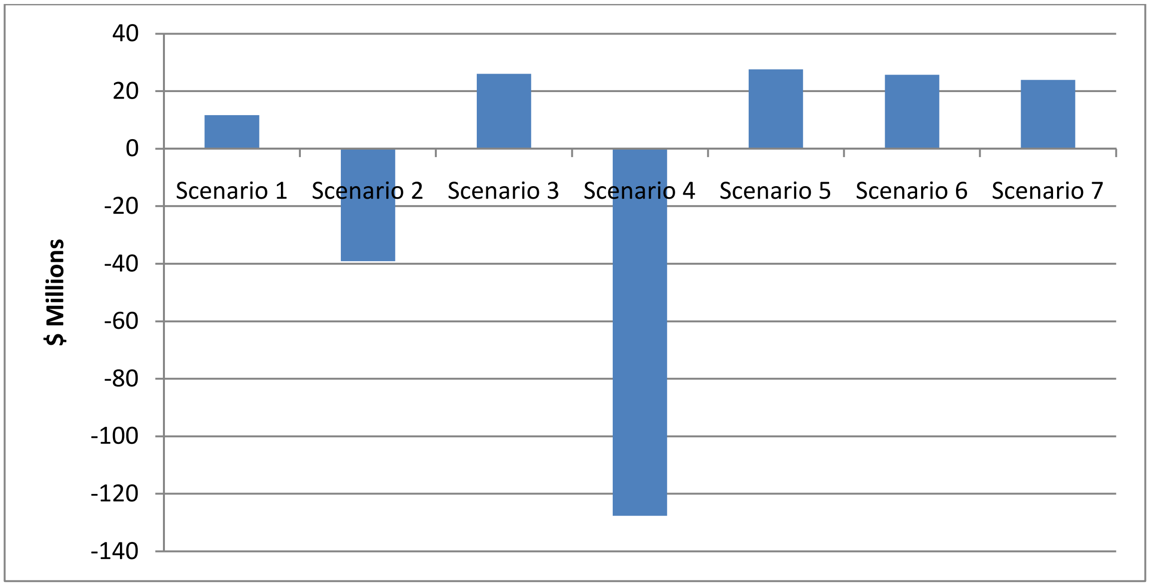

Figure D-1: Present Net Value of each Scenario.

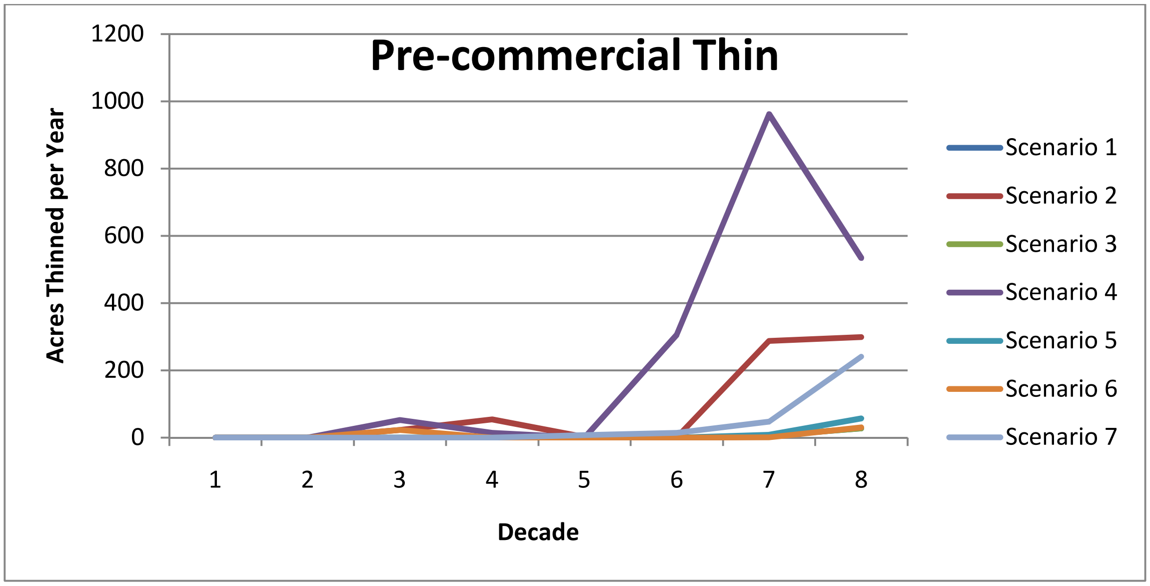

Figure D-2: Annual pre-commercial thin acres by Decade.

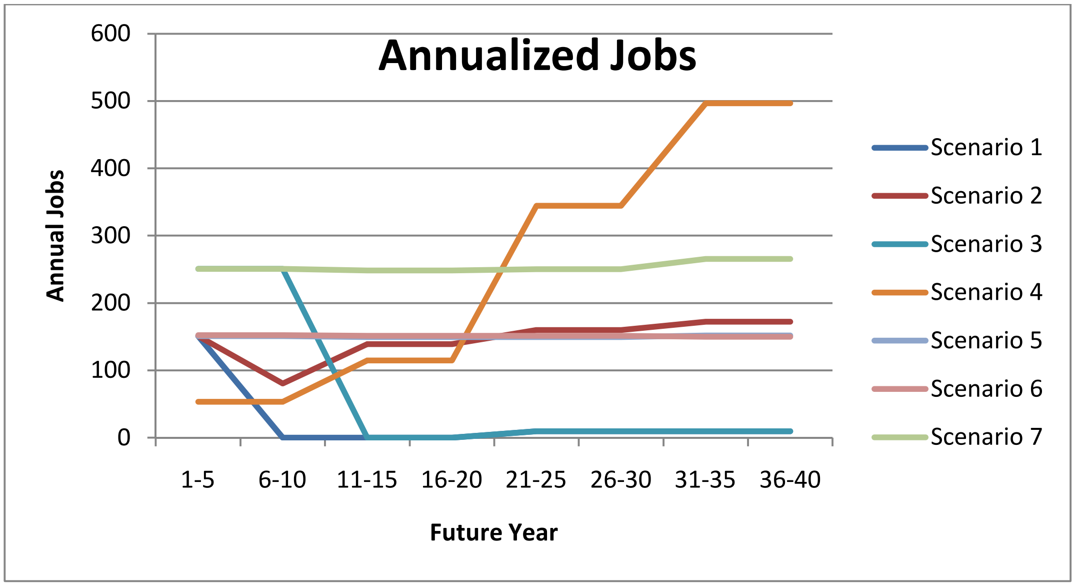

Figure D-3: Annualized jobs maintained by 5-year increments.

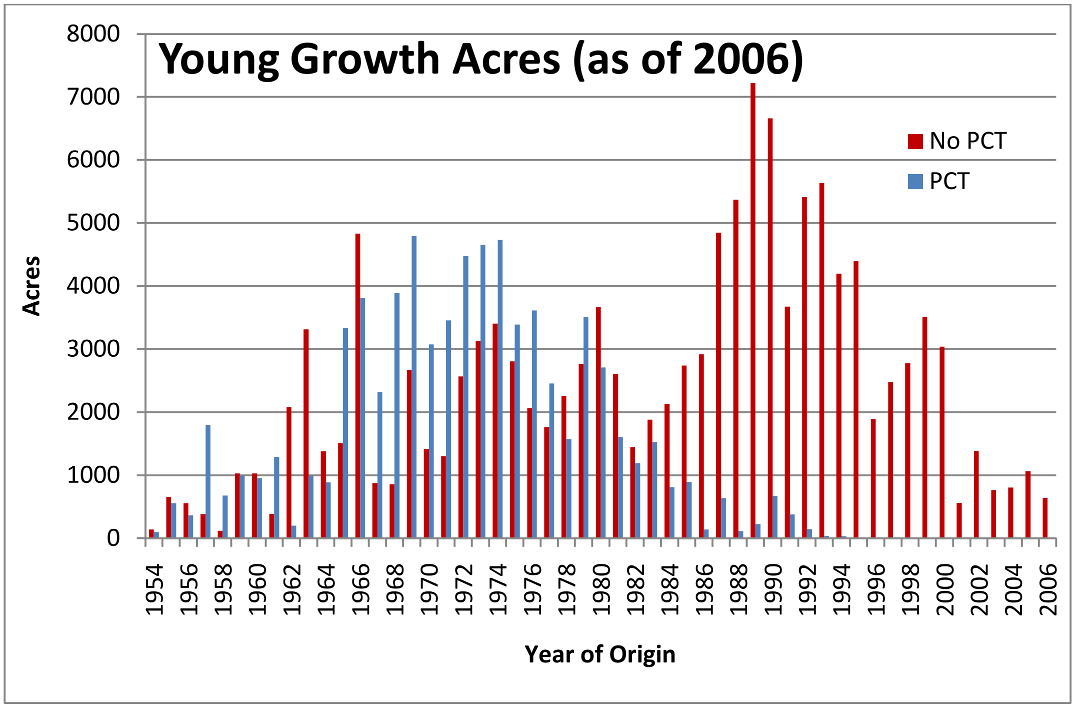

Figure D-4: Young growth age distribution with pre-commercial thins (as of 2006).

Discussion

The scenarios in this analysis provide some sideboards for a transition strategy to young growth. At one extreme, Scenario 4 shows the likely implications of immediately ending old growth harvest and transitioning to young growth without considering costs. Scenarios 1 and 5 show another extreme of completing a transition in a short time period without additional investment for young growth harvest. Yet another extreme is shown in Scenarios 5 and 7, where there is no prescribed time limit to stop harvesting old growth; such harvest continues at significant levels for up to 60 years, and young growth harvest does not occur with significance until at least 30 years into the future.

Depending on the policy objectives being pursued, the most appropriate transition strategy probably lies somewhere between the scenarios discussed in this paper. Perhaps allowing old growth harvest to continue for 20 years while requiring a minimum level of young growth harvest during that period could result in a young growth based industry that does not result in unacceptably large losses to the government. More work needs to be done to more clearly define the objectives and what might be some acceptable trade-offs.

We also need to acknowledge three limitations of the study. First, this study does not explicitly recognize the variation in young growth value by piece size. The best available information (i.e., the Beck report) only recognized a single value for young growth ($220/MBF pond log value) regardless of size. In reality, one should expect larger diameter sawtimber to command a higher price per MBF and inversely, smaller diameter logs should have lower values. Recognizing these variations in prices has the potential to substantially influence the financial viability of the analyzed scenarios. This study is also conducted at a time when timber markets have been depressed to multi-year lows. While markets and prices are expected to improve in the future, the model is not formulated to conjecture when and to what degree this recovery will occur. Obviously, higher young growth values that might occur with a recovery will influence the financial viability of each Scenario.

This study also does not address the possibility of harvesting young growth in areas such as beach fringe, which allow timber harvest only for non-timber purposes such as habitat improvement and restoration. Such harvest may produce young growth timber and reduce the trade-offs of young growth management on the suitable land base.

Finally, while the model used in this analysis allows for pre-commercial thinning, none of the Scenarios analyzed in this study include pre-commercial thinning until far into the future (Figure D-2). Pre-commercial thinning is done 15-30 years after old growth stands have been harvested, in order to improve wildlife habitat conditions, accelerate tree growth and future timber values, or both. While there is good data from studies conducted elsewhere to believe that pre-commercial thinning produces such benefits, there is insufficient data from such activities in Alaska to quantify them. Consequently, the model does not recognize the benefits as being valuable enough to outweigh the costs. The Tongass conducts about 5,000 acres of pre-commercial thinning annually, and expects to continue doing so, which supports about 17 jobs in the timber industry. Figure D-4 shows the age class distribution of the 209,000 young growth acres included in this analysis, and how many of those have been pre-commercially thinned.

Appendix A: Literature and Study Summary

There are numerous studies that examine southeast Alaska forest silviculture and management, wood characteristics, and wood product development, markets, and manufacturing. The Forest Service Pacific Northwest Research Station has studied product and market development, primarily focusing on products from old growth stands, but also examining alternative species, such as red alder, and niche markets. For example, Cantrell (2005) examined the use of wood in Tongass infrastructure and maintenance, and found that most of the wood used to build and maintain buildings, cabins and bridges was imported. Many structures are in need of repair or replacement. He estimated the annual demand for wood products used to build and maintain all structures on the Tongass, including buildings, trails, and bridges, at about 1.3 MMBF per year. About 23 percent of this volume is currently supplied from local sources, mostly in trail construction. Three-quarters of wood products used in trails are from local sources. Bridge construction constitutes 48 percent of the total demand for wood products on the Tongass. Many of the bridges that are due for repair and maintenance are in the Craig, Thorne Bay, Petersburg and Wrangell districts, near current functioning sawmills with well developed transportation systems. Cantrell stated that if Tongass structures could be maintained with an Alaskan wood supply, demand for local building lumber would increase substantially. Another example of studies that look at Alaska forest product development is Roos et al. (2009); they examined the US glulam beam and lamstock market to explore the implications for Alaska lumber. Glulam beams are constructed by gluing layers of lumber ("lamstock") together under pressure. They can be constructed for specific strengths, lengths, and shapes, and are used in residential, commercial and industrial construction, from homes to schools to bridges. Although manufacturing glulam beams in Alaska would be expensive, there is potential for the lamstock to be made in Alaska and shipped to glulam producers on the west coast. Alaska yellow-cedar is already being used to make glulam beams for exterior weather-exposed applications. Roos and Nicholls (2006) surveyed manufacturers of secondary wood products, mostly furniture and cabinet makers, as to their use of Alaska tree species. Alaska yellow-cedar was the most popular species, followed by Sitka spruce and western redcedar.

Many studies have examined the use of southeast Alaska biomass, such as chips or hog fuel, for manufacture of products such as medium density fiberboard, and for generating heat and electricity. The McDowell Group and others (2004) examined options for using utility wood and mill byproducts as part of an integrated industry consisting of sawmills and other wood product manufacturing facilities. Leonard Guss Associates (2005) examined the feasibility of building a medium density fiberboard plant in southeast Alaska. Generally, these studies find that building this kind of infrastructure in southeast Alaska would require substantial investment, a large, low cost, stable wood supply, a low cost power supply, and careful development of end markets. Nichols and Crimp (2002) studied the feasibility of using wood for local heating needs on the

Kenai Peninsula. Wood can help Alaska communities meet energy needs in places where there are abundant biomass resources. Nichols and Crimp found that the most significant potential barrier on the Kenai Peninsula is future wood supply, as beetle infestations and resulting widespread mortality of trees has reduced the availability of long-term supplies of woody biomass. In southeast Alaska, wood supply is not such an issue, but harvest and transportation barriers can be significant. However, the use of sawmill byproducts can create opportunities; the town of Craig on Prince of Wales Island has a biomass heat generation plant that uses sawmill waste. Nicholls et al. (2008) took a broad look at using biomass to produce energy in the western US. They found that "the costs of harvesting, chipping, and transporting biomass are often several times the final value of the products obtained from the biomass. A key challenge for natural resource managers is to find markets and products that will recover at least a portion of these costs while providing other benefits such as reducing fire risk." (Nicholls et al. 2008 pages 1-2). The average thinning project on Forest Service land in the western US costs about$70 per oven-dry ton (ODT) of recovered biomass. This is roughly twice the market value of biomass in energy and chip markets, which typically ranges from $25 to $35 per ODT. Nationwide, biomass is second only to hydropower as a source of renewable electrical energy. However, higher costs of electric generation from wood versus other renewable sources, generally declining energy costs, and a loss of state incentives have made wood less competitive, resulting in some plant closures. Bioenergy plants often require stable, long-term fuel supplies (20 years or longer). An important part of successful biomass hazardous fuels removals from Forest Service and BLM lands has been the use of stewardship contracts. Uses of biomass for heating, usually in the 2006 Fuels for Schools program in western states, are often relatively small facilities that use from a few hundred to a few thousand tons per year.

Forests that grow back after the removal of old growth are referred to as second growth or young growth. In the Pacific west, many forests are in their third or fourth cycle of regeneration. In Alaska, most of the forested areas are still original natural stands of old growth. There are also thousands of acres of young growth in many places. Little is known about how these young growth Sitka spruce/hemlock stands respond to silvicultural treatments, including pre-commercial and commercial thinning, in terms of stem growth and wood quality. Christensen et al. (2002) examined 90 year old trees from two stands on Prince of Wales Island containing both thinned and unthinned trees. The trees were part of an earlier study that examined three thinning densities. Thinning had occurred at age 70, twenty years before this study. Thinning can profoundly affect species composition, stand structure, growth rates, and wood characteristics, affecting recoverable volume and lumber qualities. Although the thinning had no effect on Sitka spruce grade yield, it did positively affect grade yield in western hemlock. Overall, differences in volume recovery, grade yield, and strength characteristics were either lacking or small between the thinned and unthinned trees in this study. This study indicates that lumber sawn from young-growth Sitka spruce and western hemlock in southeast Alaska appears to be best suited for structural light framing or moulding and millwork. Barbour et al. (2005) examined young growth management options and their implications for wood quality. They used the Forest Vegetation Simulator (FVS), wood product recovery information, and expert judgment to examine volume production and potential revenue for three different silvicultural treatments with various thinning intensities and timings, and a no-treatment alternative, in stands harvested from two different site classes at 70, 110, and 150 years. They state that:

"Some combination of the existing young-growth stands plus the stands that develop on lands harvested in the future will eventually become the base of the commercial timberland in southeast Alaska. This creates something of a scheduling problem because the bulk of the harvest occurred over four decades, and even the most optimistic estimates suggest that rotations of at least 60 years are necessary to grow commercial timber in southeast Alaska. In addition, not all young stands are available for future timber management." (P. 82)

Commercial thinning appeared to be more appropriate in terms of volume gains on higher productivity sites, whereas low-intensity pre-commercial thinning performed well in all productivity classes. In general, they found that harvesting stands at age 70 will limit wood product options to construction lumber or structural veneer, composite or fiber products, or the export of logs for manufacture elsewhere. Alaska manufacturers will be high-cost producers of these types of products compared to other producers globally. These kinds of products can be produced in one-third to one-half the time in other regions.

The Beck Group produced a report for The Nature Conservancy in 2009 examining the costs and revenues of harvesting and processing young growth on Prince of Wales Island. Numerous Forest Service specialists collaborated with the Beck group in this assessment. The Beck Group examined the costs of equipment changes necessary for processing this younger material, and evaluated prospects for developing markets for young growth byproducts. Young growth cost and price information derived by the Beck group were used in the SPECTRUM modeling used to develop the management strategies explored in this study. The Beck Group found that specific information needed for an appraisal of the young growth resource is lacking. It is known where the young growth stands are, the number of acres and the age classes, but specific data on tree size and exact volume per acre is unknown. Yield functions give general information useful for large scale planning, but a study at the scale of the Beck Report needs more specific data that is generally not available. The Beck Group report states that Viking Sawmill on Prince of Wales Island could process young growth sawlogs with some equipment upgrades to increase lumber recovery and productivity, but notes that the value of this lumber will be relatively low. Sawlogs from thinning operations will generally be worth less than the cost of logging and hauling, so thinning operations to produce sawtimber will need government investment to be viable. The Beck Group assessed the costs of developing a biomass collection business, and assessed whether the logging residues could be utilized. In general, they found that the high cost of delivering logging residue makes it more likely that a manufacturer of wood pellets or briquettes, electrical cogeneration facilities, or central heating plants on Prince of Wales Island will most likely use mill residues. They found that mill residues are available at a much lower cost than logging residues. Prince of Wales Island has the most extensive road system of any area in southeast Alaska, in addition to a well developed shipping infrastructure.

Several studies of young growth management are underway in southeast Alaska by scientists in the Forest Service Pacific Northwest Research Station. Lowell et al. (2008) summarized a study that looked at the volume and quality of lumber products manufactured from thinned and unthinned stands of western hemlock and Sitka spruce in southern southeast Alaska. The information from this study was gathered to develop a baseline for more studies as the stands age further. They found that the trees responded positively to the pre-commercial thinning treatments. Twenty years after pre-commercial thinning, there were no negative effects on volume or wood quality. McClellan (2008) outlines the history of thinning activities and experiments on the Tongass. He states that since 1950, about 204,000 acres of young growth stands have been pre-commercially thinned, about one-third of the available acres. Benefits of thinning beyond improving merchantable wood include increasing understory plant diversity and improving wildlife habitat. Thinning may not always increase understory herbs and shrubs. Deal and Farr (1994) found that thinning young stands can promote tree growth but not the understory, and that wide spacing resulted in western hemlock regeneration.

In 2001, the Pacific Northwest Research Station and the Tongass National Forest began establishing the Tongass-Wide Young-Growth Studies (TWYGS), an operational-scale, adaptive management series of studies of management options for pre-commercial-aged stands. Research scientists (forest ecology and wildlife) guided the design of the studies and managers established the studies as part of their operational timber-stand improvement program. The studies are designed to evaluate the potential benefits of treating pre-commercial stands to increase wildlife habitat value and wood production. At present, TWYGS includes four experiments that test the effectiveness of alder interplanting, pre-commercial thinning, and pruning. Each experiment includes appropriate controls, random assignment of treatments, and replication at 15-20 sites distributed widely across the Tongass National Forest. Five years after thinning 20-25 year-old stands, deer forage increased three to four times (depending on spacing) over that found in unthinned stands. Thinning combined with pruning in 30-40 year-old stands increased deer forage four to seven times over that found in untreated stands (McClellan, pers, comm., email dated 10/30/2009).

In 2007, the Station and the Tongass established the Prince of Wales Island Commercial Thinning Study to evaluate the feasibility and effects of commercial thinning in 50-70 year-old even-aged western hemlock-Sitka spruce stands. The study will evaluate harvesting costs and product yields, effects on understory plant diversity and abundance, deer forage availability, light availability, forest structure, stand growth and yield, tree damage agents, and soil disturbance. Four different thinning treatments and an unthinned control are replicated at three sites on Prince of Wales Island. The study was implemented through a stewardship contract and harvesting began in May 2009. Harvesting is expected to be completed in 2010 and early results will be available soon after (McClellan, pers, comm., email dated 10/30/2009).

The lack of growth and yield information for young even-aged western hemlock-Sitka spruce stands in southeast Alaska motivated the PNW Research Station and the Alaska Region to begin a long-term stand-density study in 1974. The Cooperative Stand-Density Study (CSDS) was so named because PNW and the Region shared responsibility for its establishment. The study has followed permanent growth plots that were treated with light, medium, or heavy thinning, plus unthinned controls for comparison. Between 1974 and 1987, plots were established at 59 locations throughout southeast Alaska and were periodically re-measured through 2002. CSDS data have been used to calibrate the regional stand-growth simulator, FVS-SEAPROG and a regional version of the Forest Projection and Planning System. Although CSDS was designed as purely a growth and yield study, the plots have been used by researchers to examine the effects of thinning on understory abundance and diversity, wood quality, and tree-damaging agents (McClellan, pers, comm., email dated 10/30/2009).

In 1990, PNW and the University of Washington established a study of pruning in 22-29 year-old western hemlock-Sitka spruce stands. The study included three levels of pruning and unpruned plots for comparison, all replicated at five sites across southeast Alaska. The study has produced information on the effects of pruning on growth and yield, development of epicormic sprouts, and evidence that pruning can increase the abundance of certain understory plants important for deer forage (McClellan, pers, comm., email dated 10/30/2009).

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Appendix B: Constraints

Constraints used in the Scenarios described in this paper are described below. Constraints set limits on what the model can choose in regards to management strategy. They are used so that the model chooses a management scenario that is realistic and consistent with the management direction outlined in the forest plan.

Standard Constraints

The model retained the following constraints found in the Forest Plan FEIS Appendix B:

a. **Non-declining yield**
b. **Sustained yield**
c. **Culmination of Mean Annual Increment**
d. **Watershed Entry**
e. **Pre-commercial Thinning**
f. **Minimum timber constraint** (modified to the appropriate level – see below)
g. **Regulation Class 3 harvest**
h. **Legacy Constraints**
i. **Regulation Class management intensity**
j. **Model Implementation Reduction Factors (MIRF)**
k. **Dispersion and Adjacency**

Modified Constraints

The model modified or added the following constraints:

1. **Logging operability** – the model eliminated the NIC I/NIC II[3] harvest constraint which made it feasible for all harvest to come from NIC I lands. This may not be a significant modification, as the Phase 1 land base consists largely of NIC I lands. The original constraints were *no more than* 91% NIC I harvest in the Chatham area, 96% in the Ketchikan and 95% in the Stikine.

2. **Strata harvest control** – This constraint controls the acres of old growth harvest and was intended to prevent disproportionate High volume strata harvest early in the Plan's life. For this study, the High Volume Strata constraint was greatly relaxed; from about 40-50% (depending on Administration Area) to 80% of harvested acres could be the High Volume Strata per decade. This constraint was modified because the land base used for this analysis was very limited compared to the Tongass Forest Plan suitable land base.

[3] NIC is the abbreviation for "Non-Interchangeable Component" which requires that harvest occurs with harvest systems proportional to their occurrence. NIC I is comprised of "Normal" operability, or the sum of ground-based harvest, short-span cable harvest, and helicopter harvest of ½ mile or less. NIC II is comprised of "Difficult" and "Isolated" harvest, or long-span cable and helicopter harvest of more than ½ mile.

The amount of high volume strata harvested in this exercise would not be disproportionate to the amount available in the suitable land base overall.

3. **Timber Constraint** – This constraint varied by scenario. The constraint is set as a limit on volume harvested in any given decade. This had to be modified for those Scenarios that assumed a 5-year transition. For example, the Scenario that harvested 30 MMBF per year for 5 years set the decadal constraint at 150 MMBF. We then assumed that 30 MMBF would be harvested each year for the first 5 years.

4. **Maximum decadal increase** - The maximum decadal increase constraint is used to limit Decadal harvest level increases to a certain percentage per decade. This constraint was generally not necessary and was therefore not used in this analysis.

5. **Non-declining Even Flow** – In Scenarios that assumed no young growth subsidization, the constraint that required harvest levels to be maintained was removed for the decade immediately following old growth harvest cessation. After that point, it was reinstated for the remainder of the planning horizon. This allowed the model to show the feasible level of economically viable timber harvest beyond the first decade. For example, if old growth harvest was not allowed after 10 years, the constraint was removed between decades 1 and 2 (allowing harvest level in decade 2 to drop to 0 at the extreme). However, it was reinstated such that decade 3 harvest level had to be at least that of decade 2, and so forth. For Scenarios 4 through 7, this constraint was used for all decades.

Appendix C: Young Growth Costs

Harvest system costs and young growth pond log values were updated for this study based on the findings of the 2009 Beck Group report to the Nature Conservancy.

Commercial Thin Costs

There are two types of commercial thin management options used in this study. These are described in more detail below.

Commercial Thin Following Pre-commercial Thin (PCT-CT) – The first intermediate silvicultural treatment occur in these stands is a pre-commercial thin at age 20 or age 30. After the pre-commercial thin, the stand is commercially thinned at age 60, 70, or 80.

Commercial Thin (CT Only) – The first intermediate silvicultural treatment to occur in these stands is a commercial thin (there is no prior pre-commercial thin). The timing options of the thin are at age 70, 80, or 90.

Commercial thin costs were calculated from the "thinning from below" costs published in the Beck Report Table on page 12 (reprinted below as Table AC-1). Specifically, Table AC-1 shows the Felling, Cable yarding and Skidder yarding costs associated with young growth management in different diameter classes. These costs were applied to commercial thin timing choices by using information in the yield tables developed for the Forest Plan. In Table AC-2, the column "DBH From Yield Table" shows the average diameter of the timber removed from the stand, as determined by the Forest Vegetation Simulator. The "Crosswalk DBH" column shows which corresponding costs were used from Table AC-1. Logging costs used in this study are shown in Table AC-2.

Table AC-1: Young Growth Thin From Below Costs ($/MBF) Published in the Beck Report (p. 12).

Activity	10.5" DBH	11.5" DBH	12.5" DBH
Felling	87.03	63.83	53.19
Cable	170.28	124.87	104.06
Skidder	117.43	86.12	71.76

Table AC-2: Logging Costs for Commercial Thin Timing Choices.

Mgmt. Option	CT Thin Age	DBH from Yield Table	Crosswalk DBH	Felling $/MBF	Shovel $/MBF	Short Span Cable $/MBF
CT Only	70	8.99	9.5	101.86	209.07	270.92
CT Only	80	9.89	10.5	87.03	182.30	235.15
CT Only	90	10.97	11.5	63.83	140.28	179.03
PCT - CT	60	9.71	10.5	87.03	182.30	235.15
PCT - CT	70	11.08	11.5	63.83	140.28	179.03
PCT - CT	80	12.86	12.5	53.19	121.13	153.43

Clearcut Costs

Clearcut costs were not explicitly calculated and reported in the Beck Report. However, the report analyzed strip thinning, which may be an acceptable surrogate. According to the Beck Report,

> This silvicultural prescription [strip thinning] calls for long strips, or patches, of timber to be harvested completely, with the adjacent standing timber left as growing stock. This approach has the advantage of being the most cost-effective in terms of logging and hauling expenses, and also yields larger average DBH trees in comparison with the "thin from below" approach because larger, more vigorous trees are harvested along with the smaller trees.

Strip thinning logging costs were reported as the average of cable and skidder costs (weighted 50/50). For this young growth study, each of these systems was analyzed separately, and therefore, the average was disaggregated into unique cable and skidder costs. This was accomplished by using the thin from below ratio of Cable:Skidder harvest (1.45) , found on page 12 of the Beck Report. The following set of equations illustrates how clearcut costs were determined from the data supplied for Kosciusco Island (Table AC-3).

Solve for C, S:

$(C+S)/2 = 101.44$
$1.45S = C$

$\therefore C = 82.8$
$\therefore S = 120.07$

Where:
C = cost of Cable yarding
S = cost of Skidder yarding

Strip thin costs found in the Beck report are shown below. Table AC-3 shows cost of thinning the 14" size class on Kosciusco Island (Beck Report p. 13). There was no estimated volume yield from disclosed in the report, so the proceeding analysis assumed 20 MBF per acre. Table AC-3 shows strip thin costs determined for Prince of Wales Island, broken into size class and volume per acre (Beck Report p. 15). Note that the "Yarding Average" figures include both Cable and Skidder logging costs.

Table AC-3: Strip thin logging costs on Kosciusco Island (Beck Report p. 13).

20 MBF per Acre		
	Cost for Size Class ($/MBF)	
Activity	14"	16"
Felling	24.27	**
Yarding Average	101.44	**
Processing	25.51	**
Loading	21.58	**

Table AC-4: Strip thin logging costs on Prince of Wales Island by Volume removed and size class.

20 MBF per Acre				
	Cost for each size Class ($/MBF)			
Activity	14"	16"	18"	20"
Felling	34.16	30.04	26.07	23.57
Yarding Average	36.98	36.25	35.56	34.88
Processing	30.61	28.34	26.33	24.92
Loading	17.26	16.92	16.6	16.28

30 MBF per Acre				
	Cost for each size Class ($/MBF)			
Activity	14"	16"	18"	20"
Felling	30.76	26.64	22.67	**
Yarding Average	36.25	35.56	34.88	**
Processing	27.83	25.77	23.94	**
Loading	16.92	16.6	16.28	**

Information from Table AC-3 and Table AC-4 was used to calculate the costs in Table AC-5, which represents logging costs used in the final analysis of this report. First, the 14" size class yarding costs were disaggregated to Cable and Skidder costs using the process described above. Next, costs were averaged between the two tables for the 20 MBF per acre 14" size class. For example, the $29.22 Felling cost in Table AC-5 is the average of $24.27 (from Table AC-3) and $34.14 (from Table AC-4). This process resulted in the 14" size class column for the 20 MBF per acre yield in Table AC-5 (highlighted).

The remainder of Table AC-5 was completed by using the ratios between size classes and between harvest levels in Table AC-4. For example, at a harvest level of 20 MBF per acre, moving from the 14" class to the 16" class reduces felling costs by 12% (1- (30.04/34.16)). Similarly, increasing the removed volume had a corresponding cost reduction. Consider again the felling costs for the 14” class. Table AC-4 shows a 10% reduction in cost by removing 30 MBF rather than 20 MBF (1-(30.76/34.16)). Together, these two calculations were used to complete Table AC-5.

Table AC-5: Logging costs used in the final analysis.

20 MBF per Acre				
	Cost for each size Class ($/MBF)			
Activity	**14''**	**16''**	**18''**	**20''**
Felling	29.22	25.69	22.30	20.16
Skidder Yarding	56.50	55.38	54.33	53.29
Cable Yarding	81.92	80.30	78.77	77.27
Processing	28.06	25.98	24.14	22.84
Loading	19.42	19.04	18.68	18.32

30 MBF per Acre				
	Cost for each size Class ($/MBF)			
Activity	**14''**	**16''**	**18''**	**20''**
Felling	26.31	22.78	19.39	**
Skidder Yarding	55.38	54.33	53.29	**
Cable Yarding	80.30	78.77	77.27	**
Processing	25.51	23.62	21.95	**
Loading	19.04	18.68	18.32	**

The next stage of the cost calculation process was to expand the figures in Table AC-5 laterally to a 30” size class and also vertically up to a yield of 100 MBF per acre. This covers both the diameter and volume ranges in which young growth harvest is likely to occur. Lateral projection of the 20 MBF removal costs was accomplished first. A curve was fit to each activity cost of the 20 MBF per acre figures and projected to the 30” size class. Extrapolation in this manner is somewhat risky due to the unknown nature of data beyond the researched range. Second-order polynomial curves were chosen for the projection due to their apparent good fit of the known data (R^2 were generally between 0.98 and 1, which indicates near-perfect fits), and their tendency to flatten out in the unknown region (i.e., there is a lower risk that they are too optimistic in their projections). Figure AC-4 shows the curves fit to the costs associated with 20 MBf per acre removal. The thick, colored portions of each curve indicate the known range of values (i.e., the 14”, 16”, 18” and 20” size classes). The thin black lines are these curves projected out to the 28” size class.

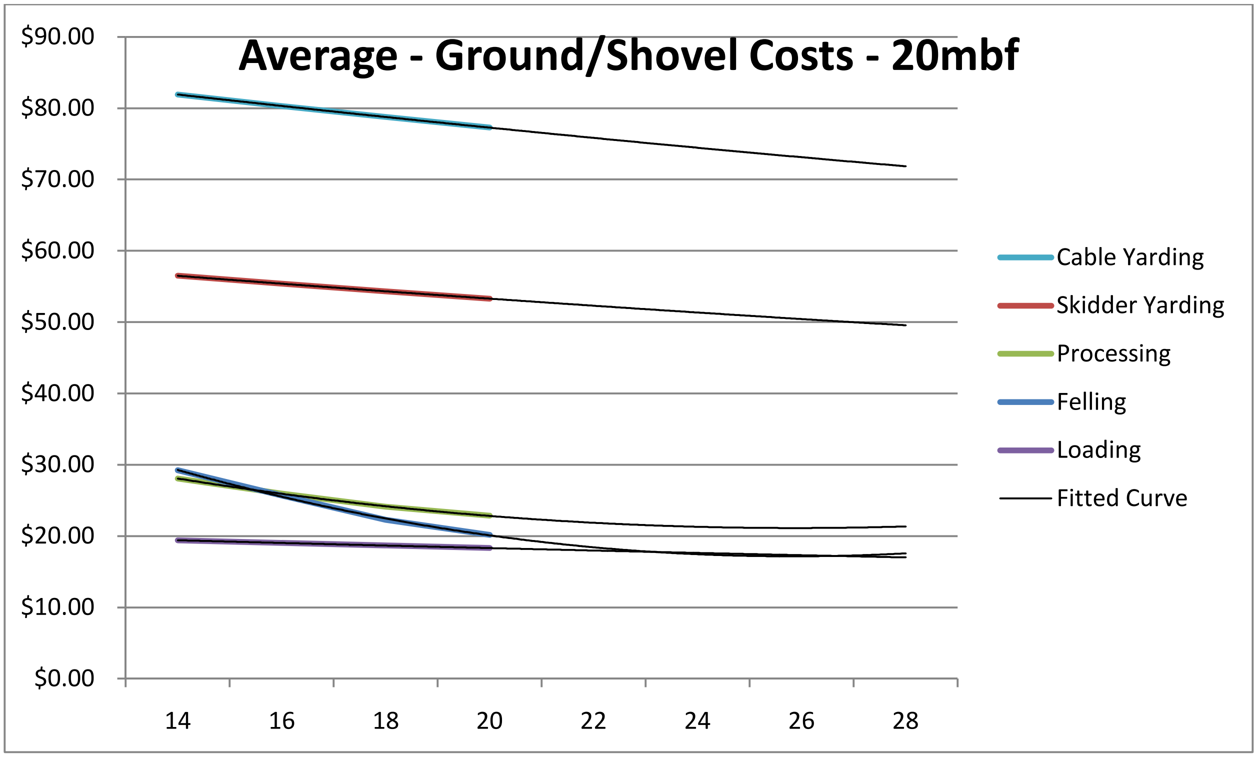

Figure AC-4: Projected activity costs at 20 MBF per acre yields.

The final step of the cost calculation was to fit curves vertically, or across, the different MBF removal amounts up to 100 MMBF. Each curve fit to the 20 MBF removal costs had a y-intercept, (referred to as "c") that defined the curve's location in y-space (how high or low on the chart it appears). The assumption used in this exercise was that volume removed would vary costs in y-space, but not in x-space. In other words, the shape of each cost curve is identical across the different volumes, but its location on the chart is lower as more volume is removed. Figure AC-5 shows an example of this phenomenon applied to skidder costs. The shape of each curve is identical, but the location is shifted in the y-direction depending on the volume removed.

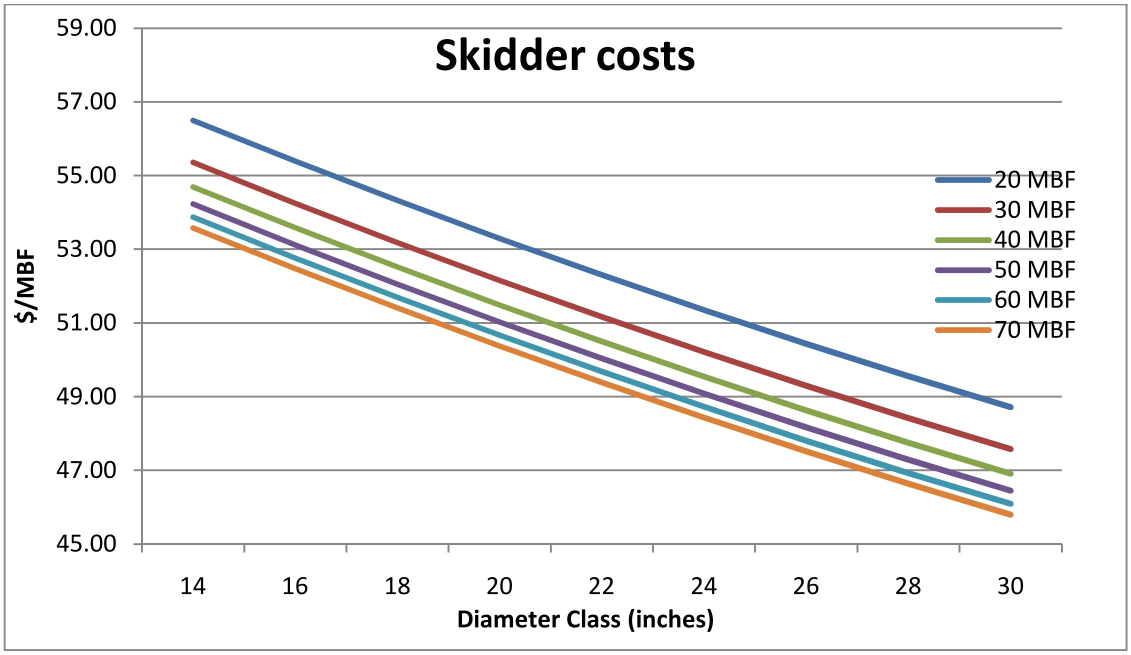

Figure AC-5: Skidder logging costs by diameter at different harvest levels.

The two known "c" coefficients (from 20 MBF removal and 30 MBF removal) were fit with another curve to project the appropriate coefficients at higher harvest levels. A perfect fit would be a straight line, but in order that the extrapolation was not too severe far outside the known range, a power function was used, with the form $f(x) = x^a$, where a is a real number. Figure AC-6 shows the function used to determine y-intercept ("c") coefficients associated with skidder costs at different volume per acre harvest levels. Similar curves were determined for the other costs in Table AC-5. This information was used to expand Table AC-5 and calculate costs associated with harvest volumes of 20-100 MBF per acre and average diameter classes of 14-30 inches.

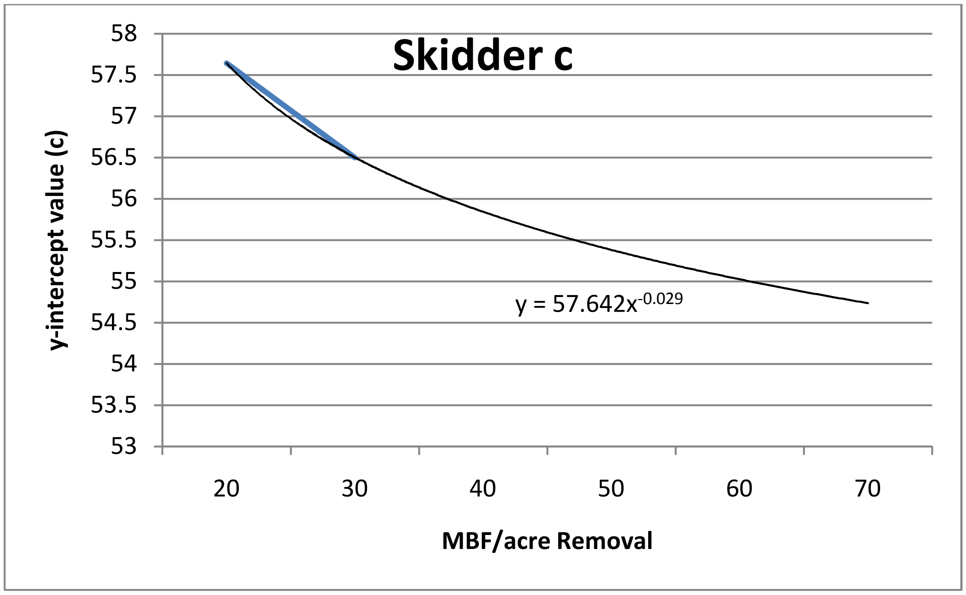

Figure AC-6: Project “c” coefficient for Skidder costs across per-acre harvest levels.

The results of the curve fitting analysis to calculate harvest costs by volume class and size class are shown in Tables AC-6, AC-7 and AC-8. Tables AC-6 and AC-7 include Yarding, Processing, Loading, and Mobility (see AppendixE) costs. Felling was recognized independently in the model and is therefore represented in a separate table. These costs were used in the Spectrum model.

Table AC-6: Shovel harvest costs per MBF by size class and per-acre volume.

Harvest Volume (MBF)	14” DBH	16” DBH	18” DBH	20” DBH	22” DBH	24” DBH	26” DBH	28” DBH	30” DBH
20	108.38	105.14	102.35	100.00	98.09	96.63	95.39	94.20	93.06
30	103.90	100.66	97.87	95.52	93.61	92.14	90.91	89.72	88.58
40	101.41	98.17	95.38	93.03	91.12	89.65	88.42	87.23	86.09
50	99.71	96.47	93.68	91.33	89.42	87.96	86.72	85.53	84.39
60	98.43	95.19	92.40	90.05	88.14	86.68	85.44	84.25	83.11
70	97.40	94.17	91.37	89.02	87.11	85.65	84.41	83.23	82.09
80	96.55	93.31	90.52	88.17	86.26	84.80	83.56	82.37	81.23
90	95.82	92.59	89.79	87.44	85.53	84.07	82.83	81.65	80.51
100	95.19	91.95	89.16	86.81	84.90	83.44	82.20	81.01	79.87

Table AC-7: Cable harvest costs per MBF by size class and per-acre volume.

Harvest Volume (MBF)	14" DBH	16" DBH	18" DBH	20" DBH	22" DBH	24" DBH	26" DBH	28" DBH	30" DBH
20	133.80	130.07	126.79	123.98	121.62	119.73	118.08	116.50	114.98
30	128.84	125.11	121.83	119.02	116.67	114.77	113.12	111.54	110.03
40	126.10	122.37	119.09	116.28	113.93	112.03	110.38	108.80	107.29
50	124.22	120.49	117.21	114.40	112.04	110.15	108.50	106.92	105.40
60	122.80	119.06	115.79	112.97	110.62	108.73	107.08	105.49	103.98
70	121.65	117.92	114.64	111.83	109.48	107.58	105.93	104.35	102.84
80	120.70	116.97	113.69	110.88	108.53	106.63	104.98	103.40	101.89
90	119.89	116.15	112.88	110.07	107.71	105.82	104.17	102.59	101.07
100	119.18	115.45	112.17	109.36	107.00	105.11	103.46	101.88	100.37

Table AC-8: Felling costs per MBF by size class and per-acre volume.

Harvest Volume (MBF)	14" DBH	16" DBH	18" DBH	20" DBH	22" DBH	24" DBH	26" DBH	28" DBH	30" DBH
20	29.27	25.52	22.47	20.10	18.43	17.45	17.17	17.17	17.17
30	26.31	22.56	19.50	17.14	15.47	14.49	14.20	14.20	14.20
40	24.69	20.94	17.88	15.52	13.85	12.87	12.58	12.58	12.58
50	23.60	19.85	16.79	14.43	12.75	11.78	11.49	11.49	11.49
60	22.78	19.03	15.97	13.61	11.93	10.96	10.67	10.67	10.67
70	22.12	18.37	15.32	12.95	11.28	10.30	10.02	10.02	10.02
80	21.58	17.83	14.78	12.41	10.74	9.77	9.48	9.48	9.48
90	21.13	17.38	14.32	11.96	10.29	9.31	9.02	9.02	9.02
100	20.73	16.98	13.92	11.56	9.89	8.91	8.62	8.62	8.62

Pond Log Value

Pond log value is the price a mill pays for a log delivered to the mill. The pond log value for this study was $220/MBF, found in the table on page 24 of the Beck Report. This was the average delivered cost of spruce and hemlock logs, and reflects accounting for the mill's assumed 11% profit margin. It is likely that pond log value varies by size of the log (larger logs are more valuable than small logs), but there was insufficient information in the Beck report to determine that variation. Unless otherwise noted, the pond log value for all sizes of young growth in all Scenarios was $220/MBF.

Appendix D: Old Growth Costs

Yarding costs and old growth pond log values were updated from information in the Historic Cruise Database (HCDB). The Region 10 Timber Valuation forester created a Valuation Spreadsheet to process new HCDB information and calculate old growth pond log value and harvest costs by yarding system (cable clearcut, cable partial cut, helicopter, shovel clearcut, and shovel partial cut), volume strata (High, Medium, Low) and Geographic zone (North Island, North Mainland, South Island, South Mainland, and Yakutat). The Valuation Spreadsheet calculations were used for the Forest Plan Amendment, and a copy is located in the project record.

Logging Costs

Logging cost formulas are annually updated and published in the Region 10 Residual Value Update Bulletin 2409.22. The formulas are calibrated to actual costs collected from current Tongass timber sale operations and conditions. This analysis used the Base Year 2007 logging formulas listed in the April 1, 2009 Bulletin. The three input variables in the yarding cost formulas are average scaling defect, average volume per 32 foot log, and average harvest volume per acre. The Historic Cruise Database was updated with new cruise data, selling values, and costs to calculate new yarding costs and Pond Log Values for the Valuation Spreadsheet. Updated old growth logging costs used in this study are displayed in Table AD-1.

Table AD-1: Old Growth Logging Costs by Volume Strata and Geographic Zone.

Volume strata	Geographic Zone	Felling and Bucking	Shovel Clearcut	Shovel Partial Cut	Short Span Cable Clearcut	Short Cable Partial Cut	Long Span Cable
High	North Island	44.15	105.34	141.29	155.80	204.60	207.30
Low	North Island	44.15	223.30	301.62	282.76	341.72	361.92
Mid	North Island	44.15	143.18	192.95	200.36	256.32	262.34
High	N. Mainland	44.15	106.89	143.42	157.73	206.96	209.67
Low	N. Mainland	44.15	362.10	486.50	386.15	435.03	486.31
Mid	N. Mainland	44.15	167.83	222.97	214.36	267.31	287.43
High	South Island	44.15	100.34	134.11	149.09	195.58	199.78
Low	South Island	44.15	242.54	323.31	278.80	335.82	365.78
Mid	South Island	44.15	132.99	178.36	186.93	240.18	247.55
High	S. Mainland	44.15	99.36	132.97	148.19	195.00	198.12
Low	S. Mainland	44.15	173.31	233.15	230.30	288.07	300.58
Mid	S. Mainland	44.15	129.98	174.62	184.43	237.85	243.60
High	Yakutat	44.15	103.81	138.21	152.19	197.72	205.33
Low	Yakutat	44.15	251.40	362.57	391.24	454.47	442.70
Mid	Yakutat	44.15	172.72	227.97	212.33	261.69	288.60

Pond Log Value

Pond log value is the price a mill will pay per MBF of raw log material delivered to the mill. Prices vary by species and quality. Tracking species and log quality is too finely detailed for a modeling exercise that considers the long-term management strategy for the Tongass National Forest. For this study, log quality and piece size information is aggregated, or "lumped" into average yields from the different volume strata in each Geographic zone on the forest. Pond log value coefficients, used to calculate the dollar price, were calculated in an updated Historic Cruise Database. These coefficients were updated in the Valuation Spreadsheet, and the spreadsheet was used to calculate average price (pond log value) that can be expected from harvest in the different volume strata and Geographic zones. Updated values are displayed in Table AD-2.

Table AD-2. Updated Old Growth Pond Log Values By Volume Strata and Geographic Zone.

Volume strata	Geographic Zone	Pond Log Value
High	North Island	268.58
Low	North Island	329.73
Mid	North Island	302.76
High	North Mainland	274.00
Low	North Mainland	414.40
Mid	North Mainland	215.13
High	South Island	331.11
Low	South Island	453.45
Mid	South Island	447.83
High	South Mainland	328.63
Low	South Mainland	486.21
Mid	South Mainland	443.07
High	Yakutat	362.83
Low	Yakutat	381.01
Mid	Yakutat	303.87

Appendix E: Other Cost Updates

Costs other than Logging system costs were also updated for the Spectrum model. These are described below

Log Transfer Facilities

Log Transfer Facilities (LTF) are used when logs are transported to a mill via a waterway. The LTF serves as a landing point along a beach where logs are prepared for transport and transferred from the land into the water or onto a barge. The cost of constructing a new LTF or refurbishing an existing LTF was updated. According to the Tongass Roads Program Manager, since the time of the Forest Plan the cost of LTF maintenance and construction has nearly doubled. This is due to increased fuel costs, new regulations, and fewer companies available to do LTF work. LTF costs were stratified into four categories, and the cost of each was updated:

LTF Category Definitions and Costs

Category 1: Existing LTF constructed/used within last 10 years	$50,000
Category 2: Existing LTF constructed/used more than 10 years ago	$250,000
Category 3: New Construction (large) (>30 MMBF total volume)	$350,000
Category 4: New Construction (small) (<30 MMBF total volume)	$250,000

Road Haul Cost

Road haul cost is the cost associated with trucking the wood over land either to a mill or a Log Transfer Facility. An average road haul cost per MBF was applied to all timber on the forest, based on an average scaling defect and average Round Trip Time (RTT), which is the time to drive a truck out to a logging site and back again. The cost was updated from the Round Trip Time used for the Forest Plan, the most recently calculated average scaling defect (.16), and the formula published in the April, 2009 Region 10 Residual Value bulletin:

Forest Plan assumed average Round Trip Time (RTT) = 1.542 hours
Most recently calculated scaling defect (sd) = .16

R10 RV bulletin published equation: (RTT*73.26/6)/(1-sd) = Road Haul Cost /MBF
Equation with updated values: (1.542 * 73.26/6)/(1-.16) = $22.4

∴ Road Haul Cost = $22/MBF

Logging Camp and Mobilization Costs

Based on collected costs from old growth timber sales logged in 2007, the Regional Timber Valuation Forester provided a Regional average cost of $32/MBF for camp and $4/MBF for mobilization For young growth timber sales, this analysis assumes a camp cost of $24/MBF (based on the findings in the Beck report) and a mobilization cost of $4/MBF where total sale volume is at least 1000 MBF.

Commute Costs

Commute costs are incurred when harvest activities are far enough from the nearest town, but close enough that a logging camp does not need to be established. Since logging companies typically lump commute and crew transport costs in their yarding (and other) costs, most areas on the forest do not recognize a separate commute cost. However, analysis for the Forest Plan identified a few areas that would incur this cost. Commute costs were assumed to be the same as the Forest Plan, $7/MBF.

Road Construction Costs

The Region 10 Engineer's Cost Guide (updated January, 2009) was used to update road construction costs by average side slope.

Linear Grading 0 - 20% Average Side Slope	$134,361
Linear Grading 20 - 40% Average Side Slope	$165,487
Partial Bench Linear Grading 40-55% Average Side Slope	$216,954
Full Bench Linear Grading 60-80% Average Side Slope	$322,378

These costs were applied to each Value Comparison Unit (VCU) on the forest. Each VCU was stratified by into unique Regulation Classes and Roaded classification (see the Forest Plan FEIS Appendix B for discussion of Regulation Class and Roaded classification). Necessary road construction in each of these categories was broken into these four classes. The final road cost for each stratum was calculated using a weighted average road cost based on the necessary road construction in each slope category.

Updated Pre-commercial Thin Costs

Pre-commercial thin costs, to include the cost of the contract and administration, were assumed to be lower than those used in the Forest Plan. The Tongass Staff Officer for Fire, Ecology, and Forest Management compiled a paper for the Tongass Futures Round table that listed the pre-commercial thin cost based on recent data at $500/acre. Pre-commercial thinning has been budgeted at $500/acre on the Tongass for the past three fiscal years.

Appendix F: Yield Tables

Old Growth Yields

Old growth yields for the forest plan were classified by Geographic zone and Volume Strata. Full clearcut yields were determined in the Valuation Spreadsheet (described in Appendix D, above). Partial cut volume was determined by applying a percentage removal to the full clearcut yield, and therefore is not included in this appendix.

Old growth yields calculated for the Forest Plan were used in this analysis. The inventory and defect information used in the Forest Plan was still relevant for use in this study. Average old growth stand structure and inventory does not significantly change through time. Table AF-1 shows the old growth volumes used in this study.

Table AF-1: Old Growth Yields by Volume Strata and Geographic Zone.

Volume strata	Geographic Zone	Sawlog Yield (MBF/acre)	Utility Yield (MBF/acre)
High	North Island	25.59	4.84
Low	North Island	11.07	1.82
Mid	North Island	17.69	3.04
High	North Mainland	24.58	4.58
Low	North Mainland	7.62	0.94
Mid	North Mainland	19.61	4.52
High	South Island	29.28	5.08
Low	South Island	13.72	1.95
Mid	South Island	20.67	2.88
High	South Mainland	30.17	5.37
Low	South Mainland	15.06	1.96
Mid	South Mainland	21.03	3.04
High	Yakutat	32.71	4.06
Low	Yakutat	4.76	0.52
Mid	Yakutat	27.72	5.00

Young Growth Yields

The Forest Vegetation Simulator (FVS) model was used to calculate young growth yields for the Forest Plan. The FVS model provided yield outputs for different management ages and silvicultural treatments in the three recognized young growth productivity classes (1 - high productivity, 2 - medium productivity and 3 - low productivity). Productivity is a classification of site quality and growth potential.

Yields developed for the Forest Plan were used in this exercise. Clearcut yields were generated on all three Productivity Classes, and commercial thin yields were generated for Productivity

Class 1 (High productivity). It was assumed that commercial thinning would not occur on medium and low productivity stands. The specific silvicultural treatments are described below.

Commercial Thin – The first intermediate silvicultural treatment to occur in these stands is a commercial thin (there is no prior pre-commercial thin). The timing options of the thin are at age 70, 80, or 90.

There are two different yields associated with this prescription. The first yield is the volume of the commercial product removed at the time of the commercial thin. The next yield is the volume of a clearcut activity at or after the Culmination of Mean Annual Increment (CMAI). The volume of the clearcut will vary by the timing of the commercial thin.

Commercial Thin Volume

Table AF-2 shows the commercial thin volumes at each of the potential timing choices used in this study.

Table AF-2: Commercial Thin Volume by Age of Treatment.

Treatment	Age of Thin	Yield (MBF)
Commercial Thin at 70 (C7)	70	9.62
Commercial Thin at 80 (C8)	80	14.38
Commercial Thin at 90 (C9)	90	18.37

Clearcut volumes

Figure AF-1 shows the clearcut volume at different ages, assuming that clearcut follows a commercial thin. Each timing choice is represented; "C7" is commercial thin at age 70, "C8" is at age 80 and "C9 is at age 90.

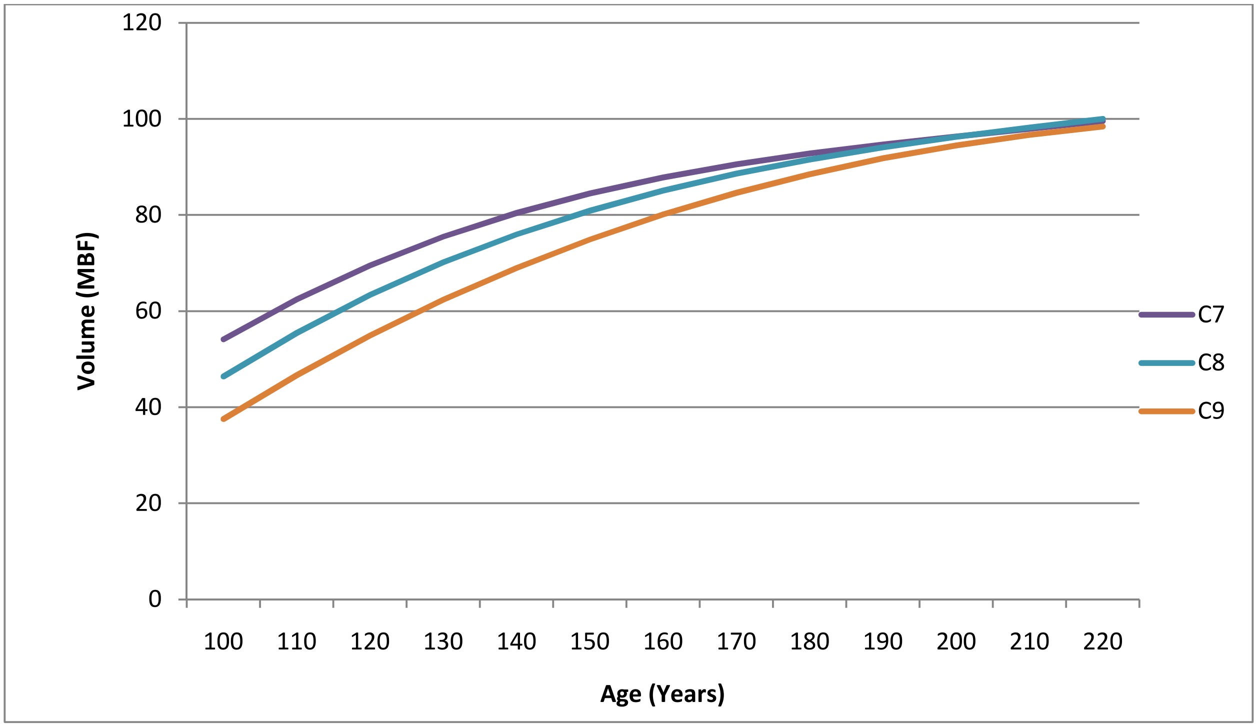

Figure AF-1: Clearcut Volume After Commercial Thin – by Clearcut Age.

Commercial Thin Following Pre-commercial Thin – The first management activity to occur in these stands is a pre-commercial thin at age 20. After the pre-commercial thin, the stand has a commercial thin that occurs at age 60, 70, or 80.

Like the Commercial Thin prescription, there are two different yields associated with this prescription. The first yield is the volume of the commercial product removed at the time of the commercial thin. The next yield is the volume of a clearcut activity at or after the Culmination of Mean Annual Increment (CMAI). The volume of the clearcut varies by the timing of the commercial thin.

Commercial Thin Volume

Commercial thin yields after a pre-commercial thins are higher at a given age because the pre-commercial thin encourages more rapid growth in the stand. Table AE-3 shows the commercial thin volumes at different ages, assuming the stand has been treated with a pre-commercial thin.

Table AF-3: Commercial thin volumes at various thin ages.

Prescription	Age of Thin	Yield (MBF)
Commercial Thin at 60 (P6)	60	8.28
Commercial Thin at 70 (P7)	70	13.28
Commercial Thin at 80 (P8)	80	18.73

Clearcut volumes

Figure AF-2 shows clearcut volumes at different ages for a stand that has had both pre-commercial and commercial thin activities. Each timing choice is represented – "P6" is after a commercial thin at age 60, "P7" is after the commercial thin at 70, and "P8" is after the commercial thin at age 90.

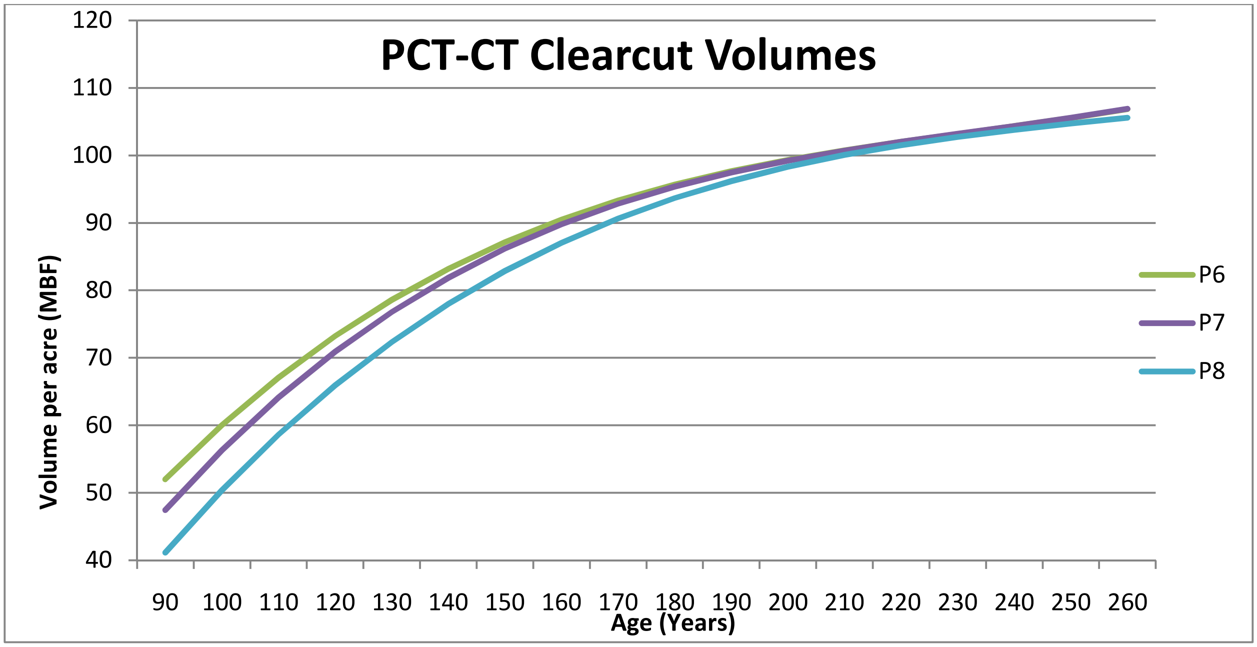

Figure AF-2: Clearcut Volume After Pre-commercial and Commercial Thins – by Clearcut Age.

Appendix G

USDA United States Department of Agriculture | Forest Service | Washington Office | 1400 Independence Avenue, SW Washington, DC 20250

File Code: 1500
Date: APR 22 2010

Community Members of Southeast Alaska:

Last fall the U.S. Department of Agriculture Deputy Under Secretary for Natural Resources and Environment (USDA NRE) toured Southeast Alaska with his counterpart from U.S. Department of Agriculture Rural Development (USDA RD). While there, they co-hosted two economic diversity workshops to better understand how the U.S. Department of Agriculture (USDA) can support a diversified economy and a range of opportunities for Southeast Alaskans. What we discovered is an alignment – a shared vision – across diverse groups, including local communities, the State, some of the timber industry, environmental groups, Alaska Natives and many others, for a focus on ecological restoration, and by that means affording a transition – a 'bridge' – to a sustainable forest products industry based on forest restoration and second growth. I am optimistic the Forest Service, in close partnership with Rural Development, can bring to bear all tools and resources of the Department of Agriculture to provide new economic opportunities for Alaskan communities and Alaska Natives.

Since our tour, USDA regional staffs, led by the Forest Service and Rural Development, held a wider series of forums and, based on that input, have focused on crafting a more diversified and coordinated USDA role in providing long-term, sustainable support for a wide array of economic opportunities for Alaskan communities and Alaskan Natives, not just focused on timber production, but also on ecosystem restoration, biomass, energy and mariculture.

Part of the Forest Service commitment arising from the community forums was to produce a report, in support of economic analysis for Southeast Alaska, to inform ongoing development of strategies to achieve the emerging shared vision. Part I of this report presents ideas, largely gleaned from those community workshops, on how Federal actions could stimulate job creation in other economic sectors of the region; i.e., jobs outside the timber industry. Part II of this report provides a data-rich analysis that explains the financial and economic implications, within the Tongass National Forest suitable timber base, for a transition from the traditional to a young-growth based forest products industry. In many ways this data analysis and companion section detailing job creation ideas point to the need for a more holistic transition framework for job stabilization away from old growth forest management and more toward a plan covering all the opportunities available to Southeast Alaskan communities from the Tongass National Forest: forest restoration, bioenergy, subsistence, recreation and young growth forest management.

The Forest Service is committed to working collaboratively with Rural Development and community partners to find solutions that work and to transition soon. I realize we have a lot of hard work ahead of us and I look forward to working with you to make Southeast Alaska a thriving economic area.

Sincerely,

Thomas L Tidwell

THOMAS L. TIDWELL
Chief

Enclosure

Appendix G: Record of Community Project Ideas

Record of Community Project Ideas from October 2009 USDA Listening Sessions

During the 2009 USDA community listening sessions, we compiled a list of project ideas brought forward by Southeast Alaska community members. This project idea list is an unfiltered record of those ideas. The Transition Framework project implementation team will use this list as a starting point; the team will evaluate these and other projects for potential implementation based on an assessment of feasibility, agency authority, community and partner support, and potential funding availability. We will work closely with communities and community members, as well as other federal agencies, state and local governments, tribes and tribal corporations, and the for-profit and non-profit sectors, to identify and begin some "low-hanging fruit" projects this year.

Community	Project Type	Project
Angoon	Energy	Alaska Tidal Energy Research Institute - Facilities Construction
Chilkat Indian Village of Klukwan	Tourism	Jilkaat Kwaan Cultural Heritage Center and Bald Eagle Observatory
Coast Guard - KTN, Sitka, Kodiak	Energy	Biomass facilities: feasibility study is done. Looking for design/build funding, KTN: 3mil, Sitka 8mil, Kodiak 6mil.
Coffman Cove	Forest Restoration	Wood processing, including small diameter logging and a pellet/brick mill.
Coffman Cove	Mariculture/Fisheries	Barge terminal and log transfer facility: $2mil for design and construction
Coffman Cove	Tourism	Boat repair and storage facility: $1.2 mil for equipment and covered storage
Coffman Cove	Tourism	Bike trails, foot trails, cabins (complete FS recreation plan).
Craig	Energy	Raise level of dam at municipal water source -- $450k
Craig	Energy	Fish hatchery micro-hydro project -- $250k
Craig	Energy	CCA wood boiler tie-in: $445k
Craig	Energy	Municipal building energy conservation -- $240k

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
Craig	Mariculture/Fisheries	Expand cold storage building to enclose equipment and seasonal housing -- $500k
Craig	Mariculture/Fisheries	Purchase community quota entity halibut shares -- $250k
Edna Bay	Other	Boat Harbor Replacement and Expansion
Edna Bay	Forest Restoration	Replace bridges at Thayer and Charlie Creeks (fish habitat protection, safety issues)
Edna Bay	Forest Restoration	Construction of Recreational and Subsistence Access Structures on Trout and Buggy Creeks (water quality and fish habitat)
Edna Bay	Mariculture/Fisheries	Bulk Fuel Tank Construction - provide bulk fuel for fishing fleet
Elfin Cove	Energy	Jim's Lake/Crooked Creek Hydro (final design and buildout)
Elfin Cove	Mariculture/Fisheries	Expand mariculture in local area beyond Port Althorp
Elfin Cove	Tourism	Welcome Center in Elfin Cove (info, 1st aid, emergency response)
Elfin Cove	Other	Develop broadband communication for Elfin Cove; w/ Southeast Conference
Elfin Cove	Tourism	Salt Chuck Trail and Bear viewing area
Gustavus	Other	Gustavus Disposal and Recycling Center
Gustavus	Other	Repair/remodel of existing Gustavus Fire Hall
Gustavus	Other	Gustavus Community Broadband Network
Haines	Mariculture/Fisheries	Portage cove harbor improvements for commercial and private fishing vessel use ($7.04mil)
Haines	Other	Lutak port development for industrial shipping, $25mil
Haines	Energy	Construct central wood heat generating facility for municipal buildings
Haines	Other	Water and wastewater upgrades, apropos the Borough water and sewer master plan ($7.66mil)

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Community	Project Type	Project
Haines	Other	Chilkat Center for the Performing Arts renovation ($5mil)
Hollis	Forest Restoration	Selectively thin forest areas in Maybeso, along road 2024-300.
Hollis	Tourism	Complete Harris river trail loop
Hoonah	Other	Boat Haul Out (final phase - security, wastewater treatment, containment infrastructure, boat related equipment
Hoonah	Other	Barge landing facility
Hoonah	Other	Subdivision development
Hoonah	Other	Raw Water Transmission Line
Hoonah	Other	Health Clinic
Hydaburg	Energy	Reynolds Creek hydro project
Hydaburg	Energy	Reynolds Creek Hydro Project
Hydaburg	Energy	Bulk fuel facility
Hydaburg	Forest Restoration	Watershed protection/watershed council
Hydaburg	Forest Restoration	Local area management/subsistence management plan
Hydaburg	Other	Health Clinic expansion/renovation
Hydaburg	Tourism	Totem project
Hyder	Other	Hyder Barge Ramp (950k)
Hyder	Mariculture/Fisheries	Mulit-purpose marine dock feasibility study ($100k)
Juneau	Energy	Ground source heat pump feasibility study

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
Juneau	Other	Develop cultural center for Douglas Indian Association, in 3 phases: 1) hire NAGPRA specialist ($50k); 2) organization and site visits prior to work ($75k); 3) construction ($150k)
Kake	Energy	Alternative energy study for short-term relief (until intertie is complete)
Kake	Energy	Wind/tidal power energy development
Kake	Energy	Alternative energy research facility
Kake	Mariculture/Fisheries	Ice making facility
Kake	Mariculture/Fisheries	Commercial clam development-- also requires some land for gear storage
Kake	Mariculture/Fisheries	Oyster Farming - On The Job Training Program
Kake	Forest Restoration	Thinning ops for wood biomass, wood fiber byproducts
Kake	Forest Restoration	Stewardship contracting on road closures, fish passage barriers
Ketchikan	Energy	Whitman Lake Hydroelectric Project
Ketchikan	Forest Restoration	Thinning 7k acres of beach fringe forest ($4mil), insfrastructure and equipment cost support
Ketchikan	Mariculture/Fisheries	Shellfish nursery and hatchery construction ($1.27mil)
Ketchikan	Mariculture/Fisheries	Marine Science Center (research, tech development, best practices farm for shellfish industry) capital cost support
Ketchikan	Other	Ketchikan Performing Arts Center
Ketchikan	Other	Business incubation funding to encourage innovative business development ($390k over 3 yrs)
Ketchikan	Other	Ward Cove: restoration of a marine industrial park, including site cleanup, building repair and demo, infrastructure repair ($11.5mil)
Ketchikan	Energy	Bethe Substation Upgrade

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
Ketchikan	Energy	Metlakatla to Ketchikan Electrical Intertie
Ketchikan	Mariculture/Fisheries	UAS - Curriculum Development to support Mariculture Apprenticeship Program
Ketchikan	Other	Water Street Trestle No. 2 Replacement
Ketchikan	Other	Berth I and II Replacement
Ketchikan	Other	Ketchikan General Hospital Alteration and Additions
Ketchikan	Other	Marble Creek sustainable commercial greenhouse farm ongoing and capital expense coverage
Ketchikan	Other	Marble Creek renewable energy river hydro plant on marble creek falls: provide energy to Loran Station Shoal Cove
Ketchikan	Other	Southeast Fence Specialists manufacturing division cost support ($502k)
Ketchikan	Tourism	Loggerville Small Boat Harbor start-up cost support
Ketchikan Indian Community	Other	IRR Roads and Trails Program
Klawock	Mariculture/Fisheries	Drive Down Ramp phase II-- need $442k to match the $400k already raised.
Klawock	Other	Public safety building phase II-- $2.5 mil
Klawock	Other	Head start building: $250k.
Klawock	Tourism	Civic/cultural center: museum and office for archaeology studies.
Metlakatla	Energy	Metlakatla to Ketchikan Hydro Intertie (transmission line)
Metlakatla	Mariculture/Fisheries	Tamgas Creek Hatchery - a. new hatchery; b. increase chum rearing costs; c. tagging machines
Metlakatla	Mariculture/Fisheries	Mariculture project
Metlakatla	Energy	Triangle Lake Hydro Electric Project

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
Metlakatla	Other	Raven Loop Cul-de-Sac (future development of single and multi-family low income housing)
Metlakatla	Other	Pave Walden Point Road; extend electric power to new Ferry Terminal
Metlakatla	Other	Bald Ridge Aggregate Project (mine, processing, transportation)
Metlakatla	Other	Annette Island School District projects (gym improvements, walkways, parking, roadwork, teacher housing, playground renovation, track and field construction
Metlakatla	Other	Construct Jail, Court, Fire Station - multipurpose building
Myers Chuck	Other	Wireless high speed internet, $75k
Naukati	Energy	Completion of northern intertie from Coffman Cove to Naukati
Naukati	Mariculture/Fisheries	Waterfront development to support regional shellfish processor and lab.
Pelican	Mariculture/Fisheries	Multi-use cargo dock and barge landing facility
Pelican	Mariculture/Fisheries	Ice Machine for fishing fleet
Pelican	Mariculture/Fisheries	Construct Salmon Hatchery (king, coho, chum)
Pelican	Other	Broadband Internet Service and Cell Phone Service
Pelican	Other	Waterline/Electric Infrastructure
Petersburg	Energy	Facilitate wood chip industry to supply municipal buildings
Petersburg	Mariculture/Fisheries	Proposals for a variety of fisheries related research studies
Petersburg	Mariculture/Fisheries	Bivalve hatchery (feasibility and construction)
Petersburg	Mariculture/Fisheries	Heat exchanger system for Crystal Lake Hatchery
Petersburg	Mariculture/Fisheries	Construct fresh/frozen cold storage for seafood at Petersburg Airport
Petersburg	Energy	Green building funding for facilities (library, conference center, fire hall)

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
Petersburg	Forest Restoration	Culvert replacement on non-Forest Service roads
Petersburg	Mariculture/Fisheries	Construct enviro friendly boat wash facility
Petersburg	Mariculture/Fisheries	Water quality monitoring in harvested watersheds
Petersburg	Other	Revolving loan program
Petersburg	Tourism	new trails near town, improve existing trails
Petersburg	Tourism	Camping opportunities near town
Port Alexander	Energy	Develop affordable energy system for community using Leona Lk hydro, with distribution system (feasibility, conceptual design, NEPA, S&D, Construction)
Port Alexander	Energy	District Heating system for three community-owned buildings (wood energy)
Port Alexander	Mariculture/Fisheries	Community-owned kitchen with ability to process fish
Port Alexander	Tourism	Larch Bay Boardwalk
Port Alexander	Other	Upgrade raw water lines to meet DEC regulations
Port Alexander	other	Construct Helicopter landing pad for safety needs
Port Alexander	other	Construct small Health Clinic (basic 1st aid until help arrives)
Port Alexander	Tourism	Reconstruct one shelter and two trails
Port Protection	Forest Restoration	Habitat Restoration on USFS timber harvest lands
POW	Energy	Regional recycling, transfer, and remanufacturing facility
POW	Forest Restoration	Affordable housing using YG
POW	Tourism	FS facility development (for enhanced visitor experience)
POW	Energy	North POW Road Extension

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
POW	Forest Restoration and Tourism	FS road maintenance
POW	Mariculture/Fisheries	Culvert restoration-- Hollis to Klawock Hwy
POW	Mariculture/Fisheries	Open Hole-in-the-Wall for traditional subsistence
POW	Tourism	Visitor center
Saxman	Other	Outdoor sports court design and construction ($139k)
Sitka	Energy	Blue Lake power tunel and powerhouse. $25mil
Sitka	Energy	Expansion and construction of hydro projects
Sitka	Mariculture/Fisheries	Marine haul-out facility, shipyard, or other marine related industry
Sitka	Mariculture/Fisheries	Sitka Sound Science Center to continue fisheries work (hatchery operation), ocean research, and leverage EDA awarded grant for roe techincian training.
Sitka	Mariculture/Fisheries	Fishmeal plant
Sitka	Other	Sitka Community Hospital expansion
Sitka	Other	Water based bulk water distribution pipe
Sitka	Other	$15 mil for infrastructure to develop affordable housing
Sitka	Tourism	Construction of a deepwater dock
Skagway Traditional Council	Energy	Recycling/Incinerator Project (finish funding project - concrete flooring, electricity, energy efficient heating/boiler system, fund a coordinator position)
Tenakee Springs	Energy	4 pieces to complete hydro project at Indian river: feasibility study, preliminary design, EA ($250k) and survey, design, and construction ($3mil)
Tenakee Springs	Other	Bulkhead/Breakwater Construction
Tenakee Springs	Other	Replace Fire hall

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
Tenakee Springs	Other	Solid Waste management/recycling
Tenakee Springs	Other	Upgrade clinic
Thorne Bay	Forest Restoration	Biomass district heating system
Whale Pass	Energy	Neck Lake Hydro
Wrangell	Energy	Bradfield Corridor - AK/BC Intertie Project
Wrangell	Energy	Sunrise Lake Hydro Development
Wrangell	Energy	Solid waste disposal with electrical generation
Wrangell	Energy	Spur Road Electrical Extension
Wrangell	Mariculture/Fisheries	Geoduck Reconnaissance and Biomass Assessment Surveys
Wrangell	Mariculture/Fisheries	City Dock Improvements (design and construct)
Wrangell	Mariculture/Fisheries	Harbor Improvements (design and construction)
Wrangell	Mariculture/Fisheries	Sea Cucumber Enhancement
Wrangell	Tourism	Chief Shakes Tribal House Renovation
Wrangell	Energy	AK/BC Intertie Preliminary Assessments
Wrangell	Energy	Energy Efficiency Improvements - LED street light replacement
Wrangell	Forest Restoration	Young Growth Forest Plan (timber harvest, habitat restoration)
Wrangell	Forest Restoration	Bradfield Watershed Restoration
Wrangell	Mariculture/Fisheries	Fisheries Enhancement at Virginia Lake - create a silver salmon run
Wrangell	Other	Downtown Revitalization (utility upgrades, safety improvements, landscaping)

Appendix G: Record of Community Project Ideas

Community	Project Type	Project
Wrangell	Other	Replace Hospital and Nursing Home
Wrangell	Other	Water Treatment Plant Upgrade
Yakutat	Mariculture/Fisheries	Study and design funds for scallop and prawn farming
Yakutat	Mariculture/Fisheries	Halibut and Black Cod CQE - purchasing fish quotas
Yakutat	Mariculture/Fisheries	Seafood Production Facility Modification
Yakutat	Mariculture/Fisheries	Remote Fish Processing Facilities
Yakutat	Other	Multi-purpose Building (YTT, Yak-Tat Kwaan, Inc; CBY, museum, visitor and cultural center)
Yakutat	Other	Harbor and Multi-purpose Dock facilities
Yakutat	Other	Borough Science Center Facility - housing and small lab
Yakutat	Other	Landfill (Incinerator, recycle center, utility extension)
Yakutat	Other	Sewer and Water Facilities
Yakutat	Other	Animal Shelter Facility
Yakutat	Other	Youth Center

Southeast Alaska: Economic and Social Context

Economics

The region of SE Alaska is, generally speaking, a resource dependent economy. Historically, its local communities have had very direct ties to commercial and guided sport fishing, timber, mining, and tourism. Communities were built up over the years around these resource-based industries. Yet, SE Alaska is like a small community of 50-60,000 residents, located in small communities, on islands throughout the region. The local economies are captive economies in the sense that there is no ability to "commute," in the traditional sense, with no road system connecting communities.

In recent history, beginning in the mid-1990's, the timber economy of the region took a substantial hit. For a variety of reasons, the major employers of this industry in the region closed due to market, political, and economic conditions. Direct employment in this industry, which had peaked at approximately direct 2,400 jobs in timber harvesting and at the mills, shrank to a recent estimate of less than 400. In island-bound, captive local economies, these were hard losses to absorb as those direct jobs represented a substantial loss in payroll circulating in the local economies of the region. This loss in capital inflow also caused indirect job losses.

At the same time, the fisheries industry struggled with fluctuating markets and prices. While management of fisheries was stable, the advent of Individual Fishery Quotas changed the employment landscape of the region for this industry. Fish prices have since rebounded, yet pricing volatility appears toward a downward trend again, according to a Sitka-based processing plant manager.

The cruise ship industry, which is the vehicle that brings the vast majority of the visitors to Alaska in the tourism industry, also took a blow with the recent national economic downturn. Further political battles over tourism levels in some parts of the region have further destabilized the industry's presence in the region. The net result is a readjustment of portions of the cruise ship fleet to other markets for the near future. This has already resulted in less sales tax revenue in local economies – a substantial portion of which supports local governments and school district funding. Additional job losses followed this general downward trend in sales tax revenue.

Demographics

Key demographic indicators within the region are also trending downward. In more remote, rural communities, unemployed individuals typically must leave the community—maybe even the region—to find employment. Populations are therefore declining. Further, the average age in communities has been climbing as young families leave the region to seek employment.

School Districts are struggling as well. As young families seek employment elsewhere, school-age children decline in numbers. For example, Sitka School District enrollment was at 1886 the year the Sitka-based pulp mill closed (1993). This year, enrollment is at approximately 1200 students, a decrease of one third total enrollment. The district routinely plans for fewer students each year in its budget forecasting. Similar stories can be told about Wrangell, Hoonah, Kake, et.al. Angoon considered closing its school altogether and sending its students to a boarding school located in Sitka. In the more remote school districts, the State of Alaska requires that there be a minimum of 10 students enrolled for a school to remain open. Several schools in these more rural communities on the verge of losing state funding due to being on this edge of the minimum student count.

Cost of living remains a challenge for the region. For example, USDA Rural Development uses 150% of the established HUD estimates for income and cost of construction guidelines in the Single Family Home Loan program. This national office approval is due to the high cost of living in the region using local pricing.

Infrastructure

Most communities in the region are facing less local revenue from sales tax, the financial engine that allows local government to fund its police, fire, public works programs and match state funding for schools. This loss stems from two main sources: tourism-dependent communities saw fewer visitors and less spending this past year; and prices fluctuated downward in the markets for fishers. These are current challenges, while the timber economy of the region has essentially disappeared from its peak economic impact levels of the period from 1970's to the mid-1990's.

Access to reliable and inexpensive power and transportation traditionally drives a local community's stability and its economy. In Southeast Alaska, cost of energy is an enormous challenge. At present, a number of successful hydro-based electric generation plants operate in the region. These plants do not impact salmon habitat and are a renewable resource. However, many smaller communities are currently dependent on diesel for electricity. Kilowatt hour rates in these communities are well above $.50 per hour, up to $1.00 per kilowatt hour in a more remote community!

The plan to connect existing hydro systems to these smaller communities has been supported by Congress. These transmission line projects are at various stages within the region. Not all of these remote communities can be tied to the regional electric power grid, however. Those communities are looking at more localized solutions of hydro generation.

The economic challenges in Southeast Alaska also present opportunities. Local leadership at the community meetings expressed desire and energy to see positive changes and development in the region.

Community Overview

This next section takes a quick look at local indicators in several of the communities of SE Alaska, starting at the northern end of the SE Alaska panhandle and working south.

Yakutat

This community is located at the northern most edge of the Tongass. It is essentially "in the middle of nowhere," with poor telecommunications (dial up internet, no cell services, and regular phone service is poor), extremely limited ferry service, and diesel generated electricity ($.50+ per kilowatt hour). Yakutat's 2000 population was 808. Its 2008 population was 590 (- 27%). School enrollment has a sharp decline from 2000 – 160 to 2008 – 106 students (-34%). Fishing is their core economic engine and it is supplanted, for families, with subsistence taking of fish and game. A unique challenge is that of Hubbard Glacier as it relates to local fishing industry. The glacier advancement, at times, will cut off the fish runs and fish migrate to streams further away from Yakutat to spawn in. This causes a great challenge for the one private economic engine in Yakutat – commercial fishing. It is primarily an Alaska Native population.

Skagway

This community is heavily dependent on tourism (cruise industry) as its main source for business/jobs and for revenue for local government tax revenue. Over half of the business owners are not year round residents of Skagway. Population remains relatively stable, at 862 in 2000 and currently at 846. School enrollment for 2000 was 131 and in 2009 it is currently 89 – a 33% drop. Local leaders attribute this alarming decline to the closure of the year-round railroad operation of the White Pass-Yukon Railroad. Skagway's electric utility is privately owned and is a combination of hydro and diesel generation.

Haines

Located on Upper Lynn Canal north of Juneau, this community relies on tourism, fishing, and limited timber/forest products as well as government jobs for economic stability. It is one of only two communities in the region (Skagway) with road connections out of the region. The electric generation is hydro based. 2000 population 2392; 2008 population – 2310. A very modest decrease. However, school district enrollment has declined dramatically since 1975, when 596 students were enrolled (when 2 sawmills and a fish processor operated). In 2000, 407 students were enrolled, and 304 in 2008 (-25% from 2000, -49% from 1975). The average age of the population in Haines is increasing as young families leave.

Juneau

As the capitol of the state, Juneau is home to a substantial number of state jobs. It is also a central shopping source (retail and grocery) for many of the outlying rural remote villages in the northern panhandle of SE Alaska. Its electricity is hydro-based and affordable. With the cost of living continuing to climb in rural villages as well as the challenge for cost of living wage jobs in those rural villages, many residents do choose to move into Juneau. However, Juneau's population still experienced a decline from 2000

(30,711) to 2008 (30, 427). This may indicate a quiet out-migration of the region's residents through Juneau. Juneau's private sector is driven by tourism (cruise passengers), mining (Green's Creek), and fishing. However, direct government jobs provide for about 45% of the employment in Juneau, especially given the State Legislature is also housed here in the state capitol.

Hoonah

Fishing, tourism and government as well as timber are major employers in the economy of Hoonah, a primarily Alaska Native village. It is located across from Glacier Bay and is also located strategically on the way out to the commercial fishing grounds in the North Pacific Ocean. Diesel generated electric power means $.50+ per kilowatt hour. With the downturn in the timber business, tourism has provided a recent boost to the local economy—however, these are seasonal jobs. The smallest of the three remaining sawmills is located here. There is also a small fish processor located here. With the cost of energy, the community remains unstable. While population has remained stable, school enrollment has declined nearly 50% since 2000, from 236 to present-day 123.

Pelican

The community economy is premised in commercial fishing. The local seafood plant, owned by Kake Tribal, Inc. and leased to another business, has closed for two consecutive summer seasons. This loss is a major blow to the community. They do have a small hydro that helps with the cost of energy. Pelican is located in a remote location across from Glacier Bay, close to the open waters of the Pacific Ocean. Internet and cell service are poor. Year 2000 school enrollment was 33 students. Current year enrollment is at 14 students. Again, a decrease of over 50%, similar to Hoonah, and also geographically located on the northern end of Chichagof Island.

Gustavus

The gateway to Glacier Bay National Park, Gustavus is a seasonal community. Half of the employees work for the NPS and a majority of the rest of the residents work in the visitor industry. There are some commercial fishing permits, though no local fish processing done here. The seasonal population doubles the year round figure in this small town of 448 residents. Gustavus has many seasonal summer homes for residents of the nearby city of Juneau. Gustavus is completing an in-stream hydro system that will power their electric utility. Diesel generated power comes at a cost of over $.50 per kilowatt hour to the businesses and residents.

Elfin Cove

This community is located on northern Chichagof Island, between Hoonah and Pelican. It is a highly seasonal community with 30 year round residents. The local economy is entirely commercial and guided sport fishing with supply businesses open for both sectors of the fishing economy. Because of the lack of students, the school closed in 1999 and any school age kids are homeschooled. They lack telecommunications, specifically internet and cell services. Their desire is for some sort of broadband service.

Angoon
There is little economic activity in this community, leading to high unemployment (estimated at 60%+). Energy costs are $.50+ kilowatt hour with a diesel power source. Population is trending downward: from 1990 – 630; 2000 – 572; to its current 2008 – 430 residents. This is a decrease of -25% from 2000 and a decrease of -32% from 1990. Last year, the governing school district considered closing the Angoon High School and sending its students to a regional boarding school in Sitka. Many residents fish commercially, but there is no local fish processor. There are also two tourist lodges of which one is a guided sport fish lodge. The cost of energy is the highest concern for local leadership in this predominantly Alaska Native village.

Tenakee Springs
This community is located between Juneau and Sitka, and is primarily a retirement/weekend vacation community. A guided sport fishing lodge provides essentially all the tax revenue for the local government and a number of year-round residents commercial fish, though there is no local commercial fish processing. The community-owned electric generation is diesel powered giving residents and businesses a $.64 per kilowatt hour rate. Telecommunication is also relatively poor at the moment (internet, cell service). Residents use four wheelers on the single dirt road, but no vehicles, other than the city-owned fuel truck, are allowed into the community. The harbor is in need of better protection, especially during the winter storms. Unloading barged supplies is challenging. Last year, the community advertised for families with school age kids to move to the community in order to keep the school open. It worked. A family with five school age kids moved there, helping the school stay above the state mandated minimum of ten students. The community's primary stated need is for development of Indian River in-stream hydro, to provide cheaper, reliable hydro-based electricity and move away from diesel.

Sitka
This community was home to a pulp mill that closed in 1993. 400+ jobs and a $20 million payroll were taken out of the local economy. Today's economy heavily reliant on public sector jobs (local, state, federal jobs). Fishing (commercial and guided sport fish) and tourism are the primary private sectors of the economy. This is another community where the population has changed very little but is aging at higher than normal rates. It is also reflected in the school district enrollment. The year the mill closed, enrollment was at 1886 students. Today it is at approximately 1200 students. This reflects a decrease of -36%! Electric generation is hydro-based; however, the utility is at capacity and routinely burns diesel at peak load hours daily. Tourism and fisheries supply the sales tax revenue. This year, revenue dropped precipitously enough for the city to consider it a financial crisis.

Port Alexander
This is a small, remote community of approximately 60 summer residents and 30-40 residents in the offseason. Summer commercial and guided sport fishing drive the local economy in this board walk community. No community electric generation and transmission system exists, though residents recently voted to begin moving toward this

infrastructure. Currently, according to State of Alaska assessments, they rate out at $1.00 per kilowatt hour using diesel to fire the individual generators used in the homes and the businesses. This community struggles to maintain the state minimum 10 student enrollment. Residents are interested in both small hydro and a regulatory-required upgrade for their water line.

Kake

This is a predominantly Alaska Native village that has a current population of 519, down from 2000 when it had 710 residents. (-27% decrease). This is reflected in school enrollment as well (2000 enrollment – 166 and 2009 enrollment – 93, a 44% decrease!). Government (local and school district) are the primary jobs. The ANCSA village corporation, Kake Tribal Corporation, is struggling financially. These financial issues impact not only the corporation's ability to employ the local populace, but also, at times, its ability to pay the city government sales tax revenue owed, as the single largest tax payer. Kake is also completely reliant on fossil fuel generated electric power. The community pays in excess of $.50+ per kilowatt hour. The community is very supportive of the Petersburg to Kake intertie.

Petersburg

Historically, Petersburg has relied on fishing and timber supplying its local economic engine. There is a nominal visitor flow/traffic through Petersburg but nothing in the larger scale of cruise ship visits. With the timber economy rapidly diminishing, Petersburg is now primarily dependent on commercial fishing, and to a small degree guided sport fishing, for its economic health. Population has trended downward from 2000 – 3224 pop. to 2009 – 3009 pop. School enrollment is declining at a faster rate than the population. In 2000, enrollment was listed at 699 students. Today, enrollment is at 518, a decline of 25%. Petersburg has hydro-based electric generation and is involved in the regional push for connecting hydro systems together to sell power and to help smaller communities get off of diesel, where possible.

Wrangell

When the Wrangell Sawmill closed in the mid 1990s, this community lost one of its primary employers. The community has struggled since. Population trends continue downward at a nominal pace, from 2000 - 2308 population to 2008 – 2112. However, school district enrollment is down 39% since 2000 (505 students to 312 this year). With no mill operating and local fish processors struggling, out-migration of families continues. As with many other communities, the population is aging and the younger families with school age children continue to leave in search of stability. Source of electric generation power is hydro.

Coffman Cove

This community is one of several located on Prince of Wales Island. This is a former logging camp turned municipality looking to establish tourism and commercial fishing opportunities. Shellfish farming is a small but growing interest as well. While the population has not declined dramatically, it has diminished from 2000 (199 population) to its current 2009 population of 141. Enrollment at the local school is also challenged as they struggle to maintain the minimum 10 students as required by Alaska state law. Coffman Cove is also a northern terminal for the Prince of Wales Ferry System. That service was suspended for the winter months last fall due to lack of ridership. Local electricity is diesel-generated and therefore expensive.

Klawock

This community is located on Prince of Wales Island, approximately six miles from Craig. It had its history in commercial fishing and fish processing but logging has become its primary economy in the recent decade. One of Southeast Alaska's largest remaining sawmills is located in Klawock – Viking Lumber. Native corporate timber harvesting also is an influence in this local economy. Population saw a modest decline from 2000 (854) to current year (785). School enrollment has declined 40% since 2000 (206 students to 125 today). A private company provides diesel and hydro-generated electricity, and as with other diesel-dependent communities, Klawock pays a much higher per kilowatt hour rate.

Craig

The largest community on Prince of Wales Island, Craig's current population is 1117, down from the 2000 population of 1397 – a 20% decline. Historically, Craig has been a timber supply/support and commercial fishing economy. They have become more commercial fishing dependent, with the downturn in private and public land logging. Unlike other communities who are struggling with school enrollment, Craig had an increase in student population from 2000 (420 students) to present (723 students). Craig has successfully positioned itself as a central resource for the other communities on the island for supplies, retail, transportation, etc. Hydro-based electricity is provided through a private company. There was also a recent investment to open a new fish processing facility here that will help the local economy into the future. Viking Lumber, situated between Klawock and Craig, continues to play a key role in the local economy.

Thorne Bay

In the 1960's and 1970's, Thorne Bay was the largest sort yard/logging camp in North America. In 1982, it incorporated as a city. Today's local economy struggles with the downturn of the timber industry, as it is still timber-based with several small mill operators located in Thorne Bay. Population in 2000 was at 557 and today is listed at 440, a 21% decline. Unemployment is at 16%.

Kasaan

Located south of Thorne Bay on the east side of Prince of Wales Island, Kasaan is a small community of 54 residents, up from 30 residents in 2000. Local timber rights were sold by the village ANCSA corporation. There is no local economy. There are two commercial fishing permits held by local residents who presumably conduct their business elsewhere. There is a desire by the tribe and city to create an economy based on heritage and eco-tourism. Subsistence is a major part of the lifestyle in this community.

Hydaburg

A predominant Alaska Native village, Hydaburg currently has 341 residents, down from 382 residents in 2000. School District enrollment in 2000 was 107 students and that declined to 66 students last year, a decline of 38%. The local employment is built around timber and commercial fishing, though the local ANCSA corporation suspended timber harvesting years ago. Employment is still found for the SE Stevedoring log transfer facility used by SEALASKA on a part time basis. Commercial fishermen conduct their business elsewhere as there is no processor in Hydaburg. Unemployment is at 31%.

Ketchikan

Combining the population of the borough, the city, and Saxman, the overall population is 20,921. This is down 7% from the 2000 population of 22,428. The school district enrollment has decreased 19% over those same years, from 2598 down to 2126. Timber, tourism, commercial and guided sport fishing are the mainstays of the private sector. Ketchikan suffered a substantial economic blow when the pulp mill ceased operation in the mid 1990's. 450+ direct jobs and a payroll well in excess of $20 million were taken out of the local economic circulation, leading to additional indirect job loss. Hydro-based generation provides inexpensive electric rates.

Metlakatla

This is the only federally recognized Indian reservation in Alaska. As the tribe, Metlakatla Indian Community owns and operates all utilities and manages its own natural resources. The economy has been severely depressed for an extended period of time. The loss of the major employer, the Annette Island Sawmill, coupled with the instability of the community-owned fish processing plant, leaves the community with a high unemployment rate of 20%. The tribe is working on small enterprises and also pursuing tourism development. There are approximately 40 commercial fishing permits owned by Metlakatla residents. Population has remained somewhat stable at 1318 current residents, down a bit from 1375 residents in 2000. School population has taken a severe drop, down 28% from 2000 (368 to current levels of 267).

Hyder

This small community sits on the US side of the US/Canada border, with a small population of 72 residents today, down from 97 residents in 2000. It is a small economy based primarily on the visitor industry, with visitors passing through via the periodic Alaska Marine Highway sailings. Residents would like to complete a port project that will allow for a potential increase in commerce, trade, and general tourism development.