



## 2012 Annual & Five Year Monitoring and Evaluation Report

RTU-MB-737

July 2013

### Monitoring Overview

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The 2012 Annual Monitoring and Evaluation Report summarizes specific monitoring completed during fiscal year 2012 in accordance with the Tongass Land and Resource Management Plan (Forest Plan). Chapter 6 of the Forest Plan specifies an annual written summary of forest wide monitoring programs.

As a result of the 2008 Forest Plan Amendment, some monitoring protocols and questions were updated to better define and focus the monitoring work. This report serves as both the annual written summary of forest wide monitoring programs, and also the five year review of all monitoring done since the Forest Plan Amendment.

The five year review is a comprehensive description of results for each monitoring question, and an evaluation of the last five years of data.

Monitoring efforts are currently underway for most of the questions in this report. In some cases, monitoring protocols are still being developed or under review.

The monitoring report can be found on the Tongass web site under Projects and Plans. A full reference report for each question is available by hyperlink.

If you have questions or comments about this report, please contact Carol Seitz-Warmuth at the Ketchikan Forest Supervisor's Office, 907-228-6341.



### Monitoring and Evaluation Program

Monitoring and evaluation is a quality control process for implementation of the Tongass Forest Plan. It provides the public, the Forest Service, and other concerned resource agencies with information on the progress and results of plan implementation. As such, monitoring and evaluation comprise an essential feedback mechanism within an adaptive management framework to keep the Plan dynamic and responsive to changing conditions. The evaluation process also provides feedback that can trigger corrective action, adjust-

ment of plans and budgets, or both, to facilitate feasible and meaningful action on the ground.

The Forest Supervisor is responsible for coordinating the preparation of the annual monitoring and evaluation report. This report summarizes the monitoring activities conducted during the year and the results obtained. It addresses and evaluates each of the questions listed in the monitoring plan at the reporting period identified. Generally, the annual report focuses on the information

gathered during the year and identification of issues requiring immediate attention, while a more comprehensive evaluation process takes place every fifth year. The evaluation includes recommendations for remedial action, if necessary, to make management activities and their effects consistent with the Forest Plan. Specific recommendations for corrective action depend on the risk to the resource and type of disparity discovered.

#### POINTS OF INTEREST

**Streams; Fish Habitat; Aquatic Condition p. 13**

**Soil & Water-**

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## Physical and Biological Environment

### 1. Air Quality

#### Is air quality being maintained?

To protect resources from the deleterious effects from air contaminants from on and off-Forest emission sources, changes in air quality were monitored for human health, and lichen contaminant thresholds were calculated for ecosystem health.

The City of Juneau was designated non-attainment for National Ambient Air Quality Standard (NAAQS) particulate matter PM 10 in 1990. Efforts have been made over the years to minimize road dust through paving as well as educating the public to limit woodstove use and open burning during certain periods. Juneau was re-designated as a maintenance area with the US Environmental Protection Agency (EPA) in 2009.

Data from 2006-2008 indicate that Juneau has met federal air quality standards for PM 2.5 (ADEC 2010). In 2012, Juneau was very close to exceeding the PM 2.5 health based standard of 24-hour 35 micrograms per cubic meter. However, Juneau is not on the national list of "non-attainment areas" for PM 2.5.

In 2012, seven lichen biomonitoring plots were revisited within two wilderness areas:

Tracy Arm and Stikine-LeConte. Twenty lichen tissue samples were collected, processed and sent to the University of Minnesota Soil Analytical Lab for analysis of contaminants including N, S, Hg and other heavy metals.

In 2011, wilderness areas were revisited for lichen biomonitoring work that supported the Chief's 10-Year Wilderness Stewardship Challenge. Wilderness areas with new data are: Chuck River, South Prince of Wales, South Etolin, Russell Fiords, Endicott River, Karta River and Kuiu. An additional plot in non-wilderness was established in Paradise Valley on the Juneau Icefield. No contaminants were above threshold from the first visit to Chuck River Wilderness in 2005, but are now exceeding thresholds for some contaminants (N, P, and K).

The plots with lichens elevated above threshold with heavy metals and others from the first monitoring cycle in 2005 continue to be elevated to some degree. This time. More sampling is needed to detect a trend in nitrogen, as it could be from other natural sources or drifting from Lynn Canal boat traffic.

Lichens accumulate contaminants so they are not used to detect pollution for short

time periods. However, with the development of critical loads and the calibration of the nutrient N in lichens, in the future we can use the lichens bio-monitoring program to detect exceedances of nutrient and acidity CLs by collecting lichen samples for elemental analysis. The data can be used to track trends or map the spatial extent of the impacted areas.



## 2. Climate Change

### What are the long-term changes to the permanent snowpack and how does it affect the physical and biological environment?

This question was added to the Forest Plan monitoring plan in 2008. The resource specialists assigned to develop a protocol for this question recommended deferring specific efforts until information from regional and state climate change assessments was available. Glacier and snowpack changes can indicate climate trends that are relevant to national forest management. Changes in glaciers and snowpack alter stream flow, water quality, and habitats important to fish, wildlife, and people.

This report summarizes new information and ongoing efforts related to climate change, snowpack changes (glaciers, permanent and

seasonal snowpack), and streamflow.

Climate change vulnerability assessments are in progress and can inform meaningful operational guidelines and adaptive actions focused on resources at risk that are managed by the Forest Service.

Additional recommendations include maintain current investments in snow courses and stream gauges and establishing additional snowpack monitoring sites in salmon producing watersheds in the

southern and outer coastal areas of the Tongass NF.



## 3. Biodiversity—Restocked Harvested Forest

### Are harvested forest lands restocked within 5 years after harvest?

The 2008 Forest Plan requires that all harvested stands be restocked within 5 years of timber harvest. All harvested lands were examined following treatment. Typically, natural regeneration occurs on 100% of harvested stands. If natural restocking does not occur, artificial regeneration is required, but this has not occurred in the past several decades on the Forest. All stands harvested in 2007 were certified as restocked in FY2012 or an earlier fiscal year. All lands harvested prior to FY2007 have also been certified as restocked. The results show that 100 percent of forestland that was harvested in FY2007 have been surveyed for natural regeneration and were adequately restocked within five years.



#### 4. Biodiversity—Habitat for Old-Growth Associated Species

##### **Following young-growth treatments, is the change in understory vegetation providing improved habitat for key old-growth associated species?**

There are an estimated 461,652 acres of young growth due to timber harvest on the Tongass as of the close of fiscal year (FY) 2012 and we estimate one third is less than 25 years old and two-thirds are 25 to 150 years old. These age classes roughly correspond to the stand initiation and stem exclusion stages of forest succession, respectively.

The Tongass has been working to improve the value of young growth stands for wildlife and to improve their value for future harvest. This is accomplished using a wide variety of pre-commercial thinning and pruning treatments and under the guidance of the Tongass Young Growth Management Strategy (TWYGS). As of the close of FY 2012 a total of 208,050 of young growth forest on the Tongass have been pre-

commercial thinned since 1965. From FY 2007 through FY 2012 35,016 acres were pre-commercial thinned. On average, approximately 6,000 acres have been treated per year since FY 2007. Of the acres treated 1,654 acres were for specifically for improvement of wildlife habitat and 141 acres were riparian thinning to improve anadromous fish habitat.

TWYGS experiments 1, 2, 3, and 4 were measured four to eight years after treatment in 2011, 2007, 2008, and 2010 respectively. This completes the first measurement cycle for TWYGS. The Juneau Forestry Sciences Lab and the Tongass have completed a manuscript of the first post treatment measurement and it has been accepted for publication (Hanley et al. 2013). Plant species biomass and percent cover and overstory canopy cover were analyzed using the Forage Resources Evaluation System for Habitat-Deer (FRESH-Deer) to determine the deer habitat capability of each treatment based on food availability

and its nutritional quality, the season and snow depth, and the reproductive status of deer. Results indicate the thinning treatments improved the value of the habitat for deer in winter and summer conditions (the exception was experiment I (red alder planting in one to five year old stands), treating the stands earlier (15 to 25 year old) yielded greater benefits than did later treatments (25 to 35, and 35+ year-old stands), and compared to a wide range of old-growth stands from throughout the region, summer and winter with low snow depths and treated earlier yielded better food resources for deer than did old-growth forest, whereas later treatments yielded poorer habitat than old growth. The next re-measurement of TWYGS responses is scheduled to occur at nine to thirteen years post-treatment. In FY 2012, this round of re-measurement started with TWYGS experiment 2.



## 5. Biodiversity--Young-Growth Treatments

### Are young-growth treatments improving other key habitat components for old-growth associated species?

Development of this protocol is underway.

#### Small Mammal Response to Young-Growth Treatments

The Tongass-Wide Young-Growth Studies continued in 2012 to evaluate the response of small mammals to thinning treatments and the subsequent response in marten populations. The availability of small mammals as prey can influence the abundance and distribution of northern goshawk and marten. Small mammals have been shown to respond to forest succession following timber harvest in other parts of the Pacific Northwest with a short-term increase in abundance during the early stages of succession, but declines as the canopy closes. However, with the paucity of information about small mammal dynamics on the Tongass and the response of small mammals to successional forest development in harvested stands, the small mammal response to young-growth study should inform us of the features of the understory in young-

growth that small mammal prey respond to. This information may inform future habitat monitoring in young-growth.

The project was initiated in 2010 and is expected to be complete in 2014, after which an assessment of how young-growth treatments are affecting other key habitat components for old growth related species will be conducted. The project is being lead by the University of Wyoming, in cooperation with the Tongass.

#### Terrestrial Fungi in Young-Growth Stands

In 2012, a contract was prepared to initiate fungal surveys on Prince of Wales (POW) Island in selected young growth and old growth forests. The selected sites contain similar soil type so that comparisons can be made on a broad scale as to the functional groups found in the young-growth and old growth stands. This will identify the possibility of fungi being used to determine if old-growth forest associated species are present in young growth stands.

The goals of this project are to 1) obtain baseline information about the presence and abundance of terrestrial fungi critical to soil productivity and other ecosystem functions (i.e. wildlife habitat and nutrient availability for vegetation) on selected areas of similar soil types, and 2) determine the utility of applying acquired information about the fungi to augment young-growth management plans and other restoration efforts focusing on improvements to soil productivity and other ecosystem functions within certain areas on POW (and possibly to other locations on the Tongass National Forest that are relevant).

Answering the biodiversity question with information on macro-fungi proposes to improve soil productivity interpretations through a better understanding of fungal occurrence in different soil types, vegetation, and successional stages across the Forest. Understanding the factors influencing fungal occurrence will inform soil restoration efforts and young-growth productivity dynamics.



TWYGS thinned young-growth stand (16 x 16 ft.



Line-transect surveys in a thinned young-growth stand (16 x 16 ft spacing with 1:4 pruning) at Stoney Creek



Mycena



## 6. Insects & Disease

### Are destructive insects and disease organisms increasing to potentially damaging levels following management activities?

Unlike much of North America, serious non-native insects and pathogens have not yet become established in southeast Alaska. Most insect and disease impacts are considered a natural part of our forest ecosystems, contributing to compositional and structural diversity. Specific management intervention to prevent or control insects and pathogens are not usually implemented in southeast. However, silvicultural practices can be used to fine-tune their impacts. Non-native species are monitored because they have the potential to cause significant tree mortality. Although insects have been the main focus of reporting, plants and plant pathogens will become part of this monitoring effort.

The Forest Service's State and Private Forestry, Forest Health Protection staff conducts annual aerial detection surveys of southeast Alaska. The location of insect and disease activity is mapped and entered in a geographic information system (GIS) database. In addition to the aerial survey work, on-the-ground site visits and observations were also conducted. Forest Inventory

Analysis (FIA) plots were used to develop information on the extent and impact of some diseases, such as dwarf mistletoe. Ground observations and FIA plots were used because some agents cannot be detected from the air or by remote sensing. In general, current management reduces damage from insects and diseases by removing older trees, which were more susceptible to some insect and diseases through timber harvest, or by altering tree species composition to manage the concentration of susceptible hosts. Currently, there are no serious insect threats to old-growth stands and no serious insect or disease organisms were detected in young-growth stands. The most important diseases and forest



declines that are monitored on the Tongass National Forest are wood decay of live trees, hemlock dwarf mistletoe, and yellow cedar decline. Management activities do not appear to be exacerbating insect and disease problems in the Tongass National Forest. Although insect and diseases are not currently causing significant problems in managed stands, we must remain vigilant in our monitoring efforts, as this may change with time under altered climate scenarios, or with the accidental introduction of exotic pathogens or insects.

Hemlock mistletoe young growth forest

## 7. Invasive Species—Status and Trends

### What are the status and trends of areas infested by aquatic and terrestrial invasive species relative to the desired condition?

In FY2012, no additional occurrences of invasive amphibians were recorded on the Tongass, and no occurrences of Atlantic salmon were documented by the Forest Service. During FY2012, the Forest conducted 51 invasive plant surveys for a total of 642.5 acres. Surveys were conducted along existing and proposed road corridors, rock quarries, timber sale units, shorelines, lake margins, estuaries, riparian areas, and recreation sites. Seventeen invasive plant species were recorded. A total of 32 invasive plant species were recorded. Survey results suggest that invasive species are abundant along existing road systems and may have the potential to spread into non-roaded areas. We continue to find invasive plants in areas of high disturbance where human access is frequent (e.g. trails, campgrounds, cabins, log transfer facilities, mine sites) or historic disturbance has oc-

curred (e.g. abandoned canneries and hatcheries). In addition, invasive plants are sometimes found in sensitive areas, such as estuaries, shorelines, and riparian areas.

In FY2010, a Forest Plan invasive plant monitoring protocol was developed to answer the monitoring question concerning the status and trends of invasive plant species on the Tongass but has not yet been implemented. In FY2012, a forest-wide wilderness invasive plant working group was created for the purpose of sharing information and resources among the nineteen wilderness areas on the Tongass. The working group assisted the Tongass wilderness program in developing the invasive plant component of the Forest Plan wilderness character monitoring protocol. This component is related to monitoring the status and trends of invasive plant infestations in wilderness areas. The wilderness character monitoring is scheduled for implementation in FY2013.

A primary action we are continuing is the completion of an environmental analysis (EA) for the control and management of weeds within the Petersburg and Wrangell

Ranger districts. As these two districts move forward in this program of treatments over the next ten years, we anticipate an overall decrease in area and/or frequency of invasive plant infestations within this portion of the Tongass. In FY2013, we plan to revise the Forest Service Manual direction for noxious weed management on the Tongass, whereby we will be adding many more weed prevention measures into our daily activities for all resources. A total of 38 Weed Best Management Practices are being drafted for implementation in FY2013. This year, the Tongass National Forest is conducting a five-year forest plan review, including a review of the current monitoring questions and monitoring protocols. Results from this review will be incorporated into future monitoring efforts for invasive plants on the Forest.



Thistle before treatment (right); after treatment (left)

## 8. Invasive Species—Prevention and Control

### How effective were our management activities, including those done through partnerships, in preventing or controlling targeted invasive species?

In FY2012, a range of prevention measures were implemented based on project and site specific circumstances. In FY2012, vehicle and equipment washing practices to prevent the introduction or spread of invasive plants were implemented in fifteen projects on the Tongass National Forest. Education activities conducted to increase staff and general public awareness of invasive plant identification, prevention, and treatment include invasive plant training for Juneau Ranger District and Admiralty National Monument wilderness rangers, and three public meetings on weed awareness held in the cities of Petersburg, Wrangell and Kake, as part of the scoping of the proposed Invasive Plant Weed Environmental Assessment. Thirty-one invasive plant risk assessments were completed in FY2012.

A total of 126.8 acres of invasive plant treatments were completed to control infestations of twenty-six invasive plant species. This compares to 144.7 acres in FY2011, and 222.5 acres in FY2010. Manual control (hand-pulling, tarping) was used on 122.8 treatment acres, and herbicide was used to treat four acres at the Thorne Bay Ranger District administrative compound.

The Wrangell Ranger District, Southeast Alaska Conservation Council, and Sitka Con-

servation Society joined with the Boy Scouts of America to hand-pull dandelion and creeping buttercup at Twin Lakes on the Wrangell Ranger District. The district also completed two agreements with the Alaska Association of Conservation Districts, including invasive plant management plans for non-federal lands and Stikine-Leconte Wilderness reed canary grass and invasive weed control. On the Thorne Bay Ranger District, Community Connections helped pull weeds on sites throughout Prince of Wales Island. The Hoonah Ranger District entered a partnership with the Hoonah Indian Association to control highly invasive species in their community.

A pilot project to begin monitoring high-priority invasive plant sites is scheduled to be implemented in FY2013. The Petersburg and Wrangell Ranger Districts initiated the first invasive plant treatment Environmental Assessment on the Tongass in 2012. This analysis will cover all treatment options (manual, chemical, and mechanical) for high priority areas within both ranger districts, including wilderness areas and is expected to be completed in FY2013. In 2012, a forest-wide wilderness invasive plant working group was created for the purpose of sharing information and resources among the nineteen wilderness areas on the Tongass. Eight new or updated wilderness invasive plant management plans were completed and two additional invasive plans were initiated but not completed. The invasive plans will be used in

FY2013 to prioritize surveys, treatments, and monitoring in areas of wilderness that are under greatest threat by invasive plant species. In FY2013, we anticipate entering into a formal partnership with the State of Alaska, Alaska Department of Conservation Districts, in developing weed management areas across Southeast Alaska.

## 9. Biodiversity Ecosystem— Old-Growth Associated Species and Subspecies

### Is the old-growth habitat protected under the Forest Plan being maintained to support viable and well distributed populations of old-growth associated species and subspecies?

The old-growth habitat protected under the Forest Plan has been maintained in the system of small, medium, and large old growth reserves (OGR). An errata to the 2008 Forest Plan was published in 2012 (Forest Plan Errata, February 6, 2012) to correct a mapping error for a small OGR in Value Comparison Unit 7470 on the Ketchikan Misty Fiords Ranger District. Although the Errata fixed the mapping error, the acres reported for OGR size and POG were not updated in the Errata. This will be corrected with a new errata. With the exception of this one correction to the

mapped small OGR, there were no other changes made to the spatial distribution, size, and composition of the old-growth habitat land use designation (LUD) or other non-development LUDs since implementation of the 2008 Forest Plan Amendment.

The system of OGRs, along with implementation of the standards and guidelines for protecting old-growth in the matrix should continue to support viable and well distributed populations of old-growth associated species and subspecies. The conservation strategy as implemented in the 2008 Forest Plan provides a sufficient amount and distribution of habitat to maintain viable populations of old-growth associated species after 100 years of plan implementation. Although this does not represent a “no risk” conservation strategy, it represents a bal-

ance of wildlife conservation measure that considers the best available scientific information and reflects an acceptable level of risk for continued species viability.

## 10. Biodiversity Ecosystem—Change in Old-Growth by Biogeographic Province

### Are the effects of biodiversity shown through the cumulative change in old-growth by biogeographic province consistent with the estimates of the Forest Plan (change could include effects of timber harvest, land exchanges or conveyance, windthrow, insect and disease, climatic change, etc.)?

Since implementation of the 2008 Forest Plan, there have been no substantial changes that resulted in a significant change in biodiversity from timber harvest, land exchanges or conveyance, wind-throw, insect and disease, or climate. An estimated 6,996 acres of productive old growth forest (POG) were harvested in fiscal years (FY) 2007 through 2012 in seven biogeographic provinces. Over 50 percent of the harvest over the past six years has occurred in the north central Prince of Wales biogeographic province. The next largest harvest occurred in the Etolin Island and vicinity biogeographic province at roughly twenty-four percent. A similar distribution is seen with the harvest of high volume POG (HPOG). However, the distribution of harvest of big tree POG (SD67) was different in that 87 percent was harvested from the north central Prince of Wales Island biogeographic province.

The percent of original POG, HPOG, and SD67 remaining in FY 2012 in all biogeographic provinces, and Forest-wide, is above that predicted for after 100+ years and full implementation of the Forest Plan. Since reported in the 2008 Forest Plan Final Environmental Impact Statement (FEIS), the 1954 POG and SD67 have been reduced by an estimated one percent in the north central Prince of Wales biogeographic province. In addition, the 1954 HPOG was reduced by one percent in the southern outer islands biogeographic province. All other changes were less than one percent.





## 11. Biodiversity Ecosystem—Old-Growth Matrix

### Is old-growth structure retained in the matrix adequate and is it representative of old-growth types across VCUs and across the Forest?

This monitoring focused on the application of the 2008 Forest Plan Legacy Standards and Guidelines, which were designed to ensure that value comparison units (VCUs) with a high level of original (year 1954, before large-scale logging began on the Tongass) productive old growth already harvested (33 percent or more) or planned for harvest (67 percent or more) continue to provide the full range of functions within the matrix. As of the end of fiscal year 2012, an estimated 5,800 acres of timber were harvested since implementation of the 2008 Forest Plan. Much of this has occurred outside of VCUs at high risk of losing their full function in the matrix. Where harvest did occur in these VCUs, much of it was exempted from application of the Legacy Standards and Guidelines as category 1 timber sales (those under contract before the effective date of the 2008 Forest Plan) as listed in the 2008 Forest Plan Record of Decision. Most of the harvest of these category 1 timber sales has been completed. It is likely there will be at least some timber harvested by category 2 exempt timber sales in high risk VCUs in the future. The Legacy Standards and Guidelines can be applied to projects previously analyzed us-

ing the Marten Standards and Guidelines if a change analysis is completed that looks at differences in effects and these effects were found to not be significant. Also, the 1997 Forest Plan American Marten Standards and Guidelines are applied to these category 1 and 2 projects when the Legacy Standards and Guidelines are not applied and the project is located in a higher risk biogeographic province as identified by the 1997 Forest Plan. The effects associated with implementing the category 1 and 2 timber projects were considered as part of the baseline and assumed to continue in the environmental analysis of alternatives in the Final EIS for the 2008 Forest Plan. Because these earlier decisions were considered in the effects analysis, implementation is not in conflict with the amended Plan.

For all VCUs within which POG was harvested from FY 2007 through 2012, the percent of the original POG harvested remained below that projected for after 100+ years and full implementation of the 2008 Forest Plan. The exception is VCU 3200, in which the percent of original POG harvested at the end of FY 2012 (1.7 percent) was 0.10 percent above that projected for at the end of the planning period.

Information presented in this report supports the application of the Legacy Standards and Guidelines to 2 additional VCUs

because the percent of original POG harvested there has risen to 33 percent or greater since implementation of the 2008 Forest Plan. The full suite of Forest Plan standards and guidelines continue to protect approximately 19 percent of the existing POG habitat in the matrix. Between the reserve system and the standards and guidelines that apply to the development land use designations, the 2008 Forest Plan protects 91 percent of the POG habitat on the Tongass.

## 12. Biodiversity Ecosystem—Rare Plants

### What are the cumulative effects of changes to habitats that sustain rare plants?

A pilot monitoring project was established on the Craig and Thorne Bay Ranger Districts on Prince of Wales Island. Monitoring is currently focused on four sensitive and rare species: lesser roundleaved orchid, yellow lady's slipper orchid, whiteflower rein orchid, and a rare lung lichen. Monitoring results indicate that the density of lesser roundleaved orchid populations significantly decreased from 2011 to 2012. A possible explanation is that some individual plants become dormant in response to climate variation. Frequency of occurrence, area occupied, and percent cover showed no significant decrease. Whiteflower rein orchid populations showed no significant decrease in frequency, density, area occupied, or percent cover. However, the results are likely to be unreliable since the sample size is very small. Because the majority of data collection for lung lichen and yellow lady's slipper orchid did not begin until 2012, additional data must be collected before determining trends in the populations. The monitoring will be continued in 2013, as the

project transitions from the pilot phase to full implementation.

The only population of mountain lady's slipper orchid on the Tongass National Forest grows on the Wrangell Ranger District on Etolin Island. Signs of animal herbivory and trampling of plants have been observed at the site during past visits. Due to concerns that animal damage is affecting the population's long-term viability, the number of stems exhibiting signs of trampling or herbivory was recorded during the 2012 site visit. Eight percent of the individuals showed some type of animal damage. This amount of damage to the population is not likely to be a cause of immediate concern for population viability. Several well-traveled wildlife trails were found on the site, and scattered old deer tracks, scat, and daybeds were also noted. The Forest Service plans to continue monitoring the mountain lady's slipper population in order to monitor herbivory and animal activity, and to provide additional data on population trends.

The only known population of dune tansy on the Tongass National Forest occurs on the Sitka Ranger District in a beach meadow on Kruzof Island. This population was discovered in 2003 and occupies an area of about 40 feet by 60 feet. In 2006, a stream near the dune

tansy population abruptly changed course and began undercutting the beach meadow habitat, and winter storms have contributed to more severe erosion of this habitat. About half of the meadow has been lost over the last five years. The beach erosion also caused a change in the OHV access and traffic patterns on the beach. A new off-highway vehicle trail now runs right through the dune tansy population. In 2012, signs were posted to help keep vehicle traffic off the population. Continued monitoring of the dune tansy population is planned for 2013.



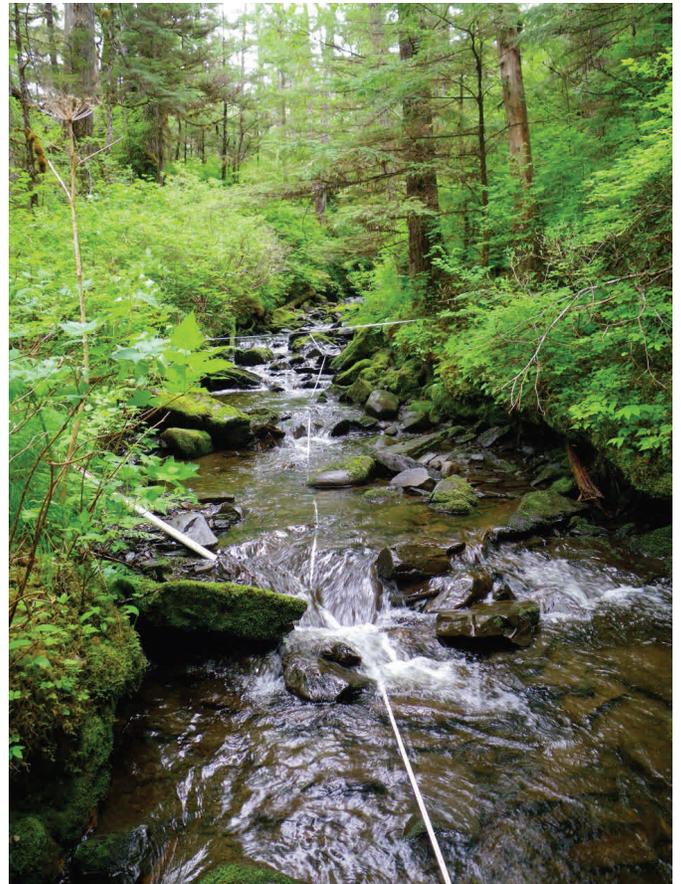
### 13. Stream-Fish Habitat—Management Indicator Species

**Are the trends in abundance of the fish management indicator species (Dolly Varden char, cutthroat trout, coho salmon, and pink salmon) related to changes in habitat associated with forest management, climate change or other factors?**

Through the use of baseline fish habitat objectives, as identified in the Forest Plan Standards and Guidelines, the relative condition of riparian and aquatic habitat can be evaluated. Monitoring representative fish populations, as management indicator species can determine whether trends attributable to current forest management are evident.

In FY2012, statistical analyses of existing resident fish (Dolly Varden char and cutthroat trout) of an eleven year dataset (2000-2010) progressed and an alternate monitoring strategy for Dolly Varden, cutthroat trout and coho salmon designed to provide effective feedback to inform current Forest management was underway with five watersheds across the Tongass monitored. Statistical analysis of the eleven year resident fish dataset is ongoing and expected to be completed by the end of 2013 through the Pacific Northwest Research Station-Corvallis office.

According to ADF&G data, coho salmon appear to be affected primarily by the cyclical productivity of the marine environment including coastal processes. Annual review of ADF&G coho and pink salmon harvest and escapement index data are planned to continue.



## 14. Streams—Fish Habitat—Aquatic Habitat Condition

### Is the natural range and frequency of aquatic habitat conditions maintained?

This question is answered by quantifying the natural range of variability of stream habitat parameters in southeast Alaska. It is assumed that streams in unmanaged watershed best typify the natural aquatic habitat conditions that the Forest Service directs staff to maintain.

#### Stream Surveys

Over 400 stream reaches in southeast Alaska have been measured using standard protocols. In FY2012, six additional reference reaches were measured. Statistical analysis of data from 279 of these stream reaches distributed across the revealed three parameters that show consistent difference between managed and unmanaged watersheds. These parameters are channel width/depth ratio, key wood, and pool frequency, and appear strongest in two Process Groups: flood plain (FP) and moderate gradient mixed control (MM). When combined with two additional measures, pool size and normalized measure of residual pool depth, these parameters are interpreted as baseline fish habitat objectives. Other channel metrics, in common use nationally, assist to create a snapshot of reach habitat. The reference reach project will culminate with the production of an updated statistical

analysis of stream reach metrics.

When combined with other information (e.g., watershed geology, riparian harvest, landslides, etc.) in a watershed-specific context, these metrics provide a diagnostic tool to assess aquatic habitat condition and help identify restoration objectives. Several recent Tongass NF Watershed Restoration Plans (WRPs) provide examples of the use of these metrics.

#### Fish Passage at Road Crossings

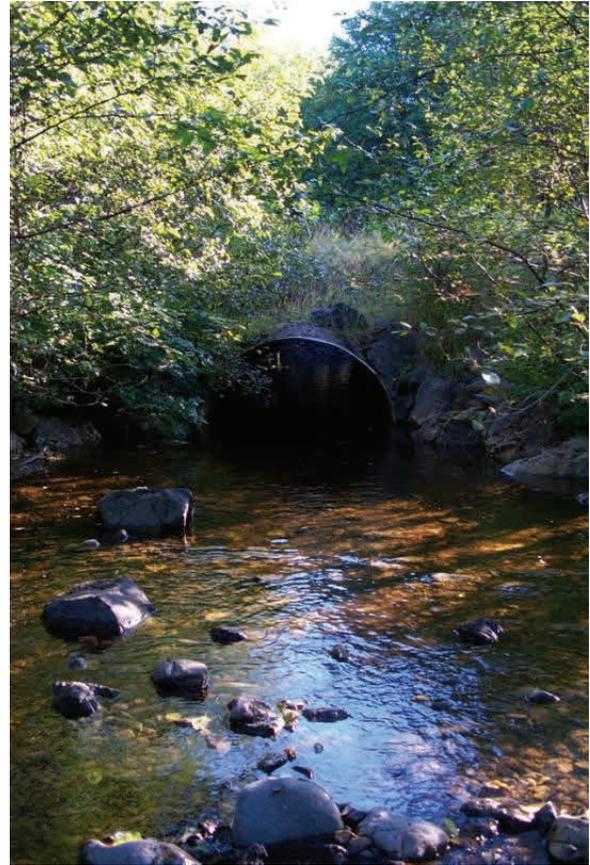
Providing for fish passage at stream and road intersections to ensure fish migration is an important consideration when constructing or reconstructing forest roads. The Tongass National Forest strives to incorporate an adaptive management process to achieve the desired management goals and objectives for the fish passage at road crossings program. The adaptive management approach includes a continuous process of using, or developing, state-of-the-art assessment and restoration techniques followed by monitoring and adjustment of the techniques accordingly.

The Tongass National Forest has identified and surveyed approximately 3,500 fish stream road crossings along approximately 5,000 miles of forest roads.

Since 1998 the Tongass has installed, re-installed or retrofitted approximately 256 culverts in fish streams. These culverts are being monitored to evaluate their ability to provide fish passage. The culverts were primarily assessed using criteria established in the USFS Alaska Region Juvenile Fish Passage Criteria Matrix.

As part of a multi-year monitoring project, seventeen stream crossings were monitored in FY2012 to assess their ability to provide fish passage. These culverts were installed, reinstalled or retrofitted in fish streams within the last fourteen years and are located on Zarembo Island and Prince of Wales Island. From 2009 thru 2011, 97 similar culverts were monitored on Kupreanof, Kuiu, Wrangell, Mitkof and Prince of Wales Island. The 114 crossings monitored to date as part of this assessment constitutes approximately 44% of the culverts recently installed, reinstalled or retrofitted in fish streams on the Tongass National Forest. Ninety-four percent of the stream crossings monitored met the acceptable passage criteria established in the Region 10 Passage Matrix. They are consistent with State of Alaska juvenile fish passage standards and are assumed to provide unimpeded juvenile and adult fish passage.





## 15. Streams—Fish Habitat—Riparian Vegetation

### Is riparian vegetation maintained or restored to a condition that supports key riparian functions?

FY2012 was the thirteenth consecutive year that windthrow within stream buffers was monitored. There are currently 262 stream buffers monitored. They are located on five ranger districts and are associated with 37 timber sales and 135 harvest units that were harvested from FY2000 thru FY2007. The sample population contains the majority of riparian management areas (RMAs) associated with harvest activity on the Tongass National Forest during this period.

Monitoring results have shown that post harvest windthrow is present in 144 (55 percent) of the 262 buffers monitored and associated with harvest units harvested from FY2000 through FY2007. The mean cumulative amount of windthrow in the buffers is 6.7 percent and the median amount is 0.8%. Windthrow has extended as far as the stream in 29% of the buffers. The cumulative

windthrow mortality in the buffers is highly variable and ranges from zero to 85 percent. To date, 74 percent of the buffers in which windthrow has been measured have less than 5 percent windthrow mortality, 83 percent have less than ten percent windthrow and 97 percent of the buffers have less than 50 percent windthrow within them.

By retaining riparian vegetation in a condition found within the range of natural variability, it is anticipated that Forest Plan riparian objectives can be achieved. If windthrow is exacerbated beyond the range of natural variability, its effect will need to be understood to assess if natural channel processes are maintained in a natural condition as desired in the Forest Plan Riparian Standards and Guidelines.

The challenge is to better define where the windthrow risks are high. A greater susceptibility to windthrow was observed in buffers located on hillslopes with south and west hillslope aspects, versus north and east aspects. Also greater susceptibility to wind-

throw was detected in buffers that have their face generally orientated to the south versus the north. Most of the windthrow occurs within the first few years after harvest and diminishes the longer the buffer is standing. A better understanding of the complex relationship between temporal, spatial and structural variables and riparian windthrow is expected through the continuation of this monitoring effort. This better understanding will provide more effective windthrow abatement prescriptions and management will move closer toward assuring desired riparian conditions.

## 16. Wildlife Terrestrial Habitat—Management Indicator Species

**Are population and habitat trends for Management Indicator Species (MIS) consistent with expectations? Are these trends due to changes in habitat conditions or other factors? If they are tied to habitat conditions, is there a direct relationship with forest management, climate change or other factors? Terrestrial MIS include red squirrel, black bear, brown bear, marten, river otter, Sitka black-tailed deer, mountain goat, gray wolf, Vancouver Canada goose, bald eagle, red-breasted sapsucker, hairy woodpecker, & brown creeper.**

We report the changes in the Tongass Management Indicator Species habitat and populations since implementation of the 2008 Forest Plan. Using a geographic information system and records of timber harvest stored in the Forest Service Activities Tracking System, we measured changes in the percent of productive old growth (POG), high-volume POG (HPOG), and big-tree POG (SD67) that was available prior to large-scale logging on the Tongass (estimated to be the year 1954). Road densities are also measured as an indicator of changes in access that may contribute to greater mortality of wolves, black bears, and brown bears.

There has been little change in MIS habitats since implementation of the 2008 Forest Plan. The Tongass encompasses just over 16.8 million acres, of which roughly 5.4 million acres were POG, 2.3 million acres were HPOG, and 700,000 were SD67 in 1954. By 2006, approximately 92, 87, and 80 percent remained, respectively. Since implementation of the 2008 Forest Plan there has been very little harvest (one percent or less) at the Forest-wide and biogeographic province scale and this change in forest cover is within projections for after 100+ years and full implementation of the 2008 Forest Plan.

Analysis of road densities across the Forest, measured as miles of road per square mile of land and at the scale of wildlife analysis area (WAAs), indicates road densities have largely remained stable since 2006 with some local, but slight, increases and decreases. Using a road density of 1.0 mi/mi<sup>2</sup> as a benchmark, the number of WAAs exceeding 1.0 mi/mi<sup>2</sup> has remained at 26 since implementation of the 2008 Forest Plan and is well below that predicted for

after 100+ years and full implementation of the Plan (48 WAAs).

For species population status and trend we largely rely on the assessments by the agencies responsible for their regulation such as the Alaska Department of Fish and Game for hunted and trapped mammal species and the U.S. Fish and Wildlife Service (USFWS) for bald eagle and Vancouver Canada geese. Long-standing bird survey datasets such as the Breeding Bird Survey (BBS) and the Alaska Land-bird Monitoring Survey (ALMS) were analyzed by the U.S. Geological Survey for trends in passerine bird and woodpecker MIS.

These agencies rely on varying types of data for determining population status and trends. The USFWS surveys of waterfowl, including Vancouver Canada geese, and the bald eagle result in fairly robust quantitative estimates. However, the expense of these surveys necessarily means that they are done infrequently. Some populations are virtually impossible to estimate and so indicators are used to inform their management. This is the case for marten and river otter for which the ADFG uses a suite of indicators thought to indicate abundance and changes in populations over time. Indicator data are relatively inexpensive to gather and so are measured much more frequently, but by their nature are not reliable for indicating short-term trends.

Based on these data, MIS populations region-wide appear to have fluctuated within the historic range of variability over the past ten years. However some local populations of game species, such as the Nunatak Bench population of mountain goat (Yakutat area), continue to be suppressed after illegal-harvest and severe winters.

Estimated trends using the ALMS (10 years of data) and BBS (seventeen years of data) for brown creeper, hairy woodpecker, and red-breasted sapsucker are imprecise, statistically non-significant, and inconsistent. The exception is for hairy woodpecker for

which both surveys indicate a weak, imprecise, and non-statistically significant negative trend. Further investigation of these data is warranted to determine if the trend detection can be improved with the addition of survey sites.



## 17. Wildlife Terrestrial Habitat—Federally Listed Threatened or Endangered & Region Sensitive Species

### Is current management providing for sufficient habitat of federally listed threatened or endangered species (TES) and Alaska region sensitive species?

In February 2009, the sensitive species list for the Alaska Region of the Forest Service was revised in response to extensive coordination and consultation with other agencies and organizations, review and synthesis of the latest scientific information, and participation by staff of the Chugach and Tongass National Forests and the Regional Office. Forest Service sensitive species are defined as: "Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: 1) significant current or predicted downward trends in population numbers or density and 2) significant current or predicted downward trends in habitat capability that would reduce a species existing distribution." The following animal species were identified as Alaska Region of the Forest Service sensitive species: Kittlitz's murrelet

(*Brachyramphus brevirostris*), Queen Charlotte goshawk (*Accipiter gentilis laingi*), black oystercatcher (*Haematopus bachmani*), Aleutian tern (*Sterna aleutica*), dusky Canada goose (*Branta canadensis occidentalis*). All species occur on the Tongass except the dusky Canada goose. The humpback whale (*Megaptera novaeangliae*) and the Steller sea lion (*Eumetopias jubatus*) are the only federally listed wildlife species under the Endangered Species Act (ESA) that are likely to occur within the boundary of the Tongass National Forest.

In this report, we review and assess new information on the changes to important habitat for each TES species, including the effects determinations made to fulfill the Section 7 (a)(c) of the Endangered Species Act mandate. In the case of the Queen Charlotte goshawk, we also review the implementation of relevant Forest Plan standards and guidelines. Based on this review we recommend that the Legacy Standards and Guidelines be applied to two

additional VCUs because the percent of original POG harvested there has risen to 33 percent or greater since implementation of the 2008 Forest Plan.



## 18. Wildlife Terrestrial Habitat—Geographic Distribution

### What is the geographic distribution and habitat relationships of mammalian endemic species on the Tongass?

The University of New Mexico (UNM) and the Tongass continue to collaborate to inventory mammals and their distribution on the Tongass through the ISLES (Island Surveys to Locate Endemic Species) project. Recent surveys for endemics by UNM in southeast Alaska were initiated in 2009 and have continued annually since. UNM typically collects small mammals using trap-lines of snap and pitfall traps. In some cases, live-traps are used (for animals to be karyotyped) and rat traps may be employed when targeting larger species (like ermine and flying squirrels). UNM also salvages mammal carcasses from cooperating trappers and hunters. All specimens collected are identified using DNA techniques, vouchered, and the information is entered into Arctos (an online database of museum specimen data). The specimens and associated information are geo-referenced for use in a geographic information system (GIS).

Since 2009, Surveys have been conducted on at least twenty-seven different islands throughout southeast Alaska as well as the Haines area and documented eleven spe-

cies of small mammals and four mesocarnivore species. Findings included a six-fold decrease in small mammals captured per unit effort between 2011 and 2012. This decrease is not entirely unexpected as northern latitude small mammal populations are known to fluctuate dramatically on an annual basis. Reports included first records of rough skin newts (*Taricha granulose*) on Heceta and Tuxekan Islands, first records of western toad (*Bufo boreas*) for four islands, no small mammal captures on White Cliff Island and the western most San Lorenzo Island, documentation of the occurrence of *Martes caurina* on Dall Island and its co-occurrence with *Martes americana*. (Prior to this finding, *M. caurina* was known only from Admiralty and Kuiu islands in the Alexander Archipelago, and considered an endemic taxa on neighboring Haida Gwaii in British Columbia). Reports also included the first records of the endemic Prince of Wales flying squirrel (*Glaucomys sabrinus griseifrons*) for Shelikof and Sukkwan islands, and failure to document northern flying squirrels on the majority of other islands.



Keen's mouse

## 19. Soil and Water–Soil Productivity

### Are the soil conservation practices implemented and effective in meeting Alaska Regional and Soil Quality Standards and maintaining soil productivity?

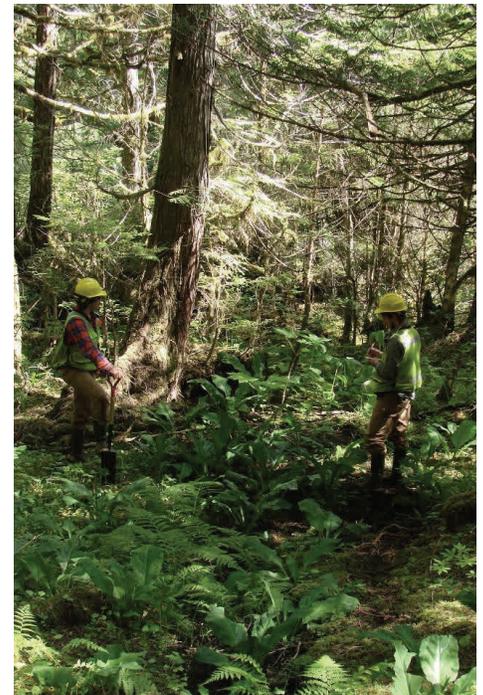
The FY 2012 monitoring report (Landwehr et al. 2012) summarizes data collected in 34 young-growth stands ranging in age from ten to 63 years. The 2012 report summarizes four years of data collection. Fifteen of the stands were more than 50 years old and represent some of the oldest young-growth on the forest. The group of stands was spread across the forest with representation from Yakutat, Petersburg, Wrangell, Ketchikan, Craig, and Thorne Bay Ranger Districts. Methods included re-monitoring soil disturbance in stands where soil disturbance was measured fifteen years ago, measuring soil disturbance and duff thickness in young-growth stands more than 50 years old and adjacent un-harvested areas, and revisiting stands more than one year old with photo documentation of severe soil disturbance during yarding operations. Soil disturbance

and woody debris measurements were collected in stands with heavy woody debris accumulations.

In 2012, Tongass soil scientists also collected soil quality monitoring data on two timber harvest units that were shovel logged on Wrangell Island and four 40 year-old young-growth units proposed for treatment in the Big Thorne Timber Sale. The data collected from the four Big Thorne young-growth units will be used for cumulative effects analysis in that FEIS.

The shovel yarded portions of units four and eleven of the Backline Timber Sale were monitored in July 2012. Shovel yarding in both units included slopes ranging up to 45 percent gradient. Typically shovel yarding is conducted on slopes less than 35 percent gradient. Sixty soil disturbance transects were completed in the two units. Since this is one of the first opportunities we have had to monitor shovel yarding on steeper slopes, the transect data was stratified by slope. On slopes less than 25 percent gradient soil disturbance averaged less than three

per cent. On slopes over 35 percent gradient, soil disturbance averaged ten percent. Increasing soil disturbance with increasing slope was also reported by Landwehr and Silkworth in 2011 on the Staney Wildlife Gaps Project. On steeper slopes, many of the soil disturbances consisted of ruts to dense till or bedrock or soil displacements caused by the shovel operator using soil to create a more level surface to operate on. Soil disturbance caused by shovel operation is very operator dependent. Shovel operators on the Backline Timber Sale on Wrangell Island are relatively inexperienced, especially on steeper slopes. Observations on the Logjam Timber Sale indicate that some operators can successfully negotiate slopes of 35 percent with minimal soil disturbance.



A-frame yarding corridor in the Flicker Creek stand (left) and Deweyvill stand (right)

## 20. Soil and Water—State Water Quality Standards

### Are the soil and water conservation practices as described through the Best Management Practices and site specific prescriptions implemented and effective in minimizing soil erosion and maintaining the State Water Quality Standards?

The Best Management Practices (BMPs) described in the Soil and Water Conservation Handbook define practices that protect soil and water resources. The Soil and Water standards and guidelines define site-specific measures to protect those resources. These standards and guidelines were monitored following a methodology described in the National BMP Monitoring pilot guidelines.

The FY2012 BMP implementation and effectiveness monitoring was completed through interdisciplinary team (IDT) monitoring of a sample of 10-15 percent of the roads constructed, stored and decommissioned over the past four years, a few roads closed over eight years ago, units harvested in 2012, recreation sites and trails maintained, reconstructed in 2012, and a mine site operated in 2012. BMP Monitoring was also conducted on a couple of recreation sites and trails constructed over the past four years. Routine BMP implementation monitoring on 100% of the roads, units, mines recreation sites and trails is completed during the contract inspection and construction process and documented through

successful final inspection of the contracts and projects. The IDT monitoring was conducted by representatives from the Forest Service, other Federal Agencies and State agencies, and was conducted on a stratified sample of units, roads, trails and developed recreation facilities. Due to a low level of timber harvest and associated road construction, the number of units harvested and roads constructed or reconstructed in fiscal year 2012 were limited. Sites monitored in FY 2012 by the IDT occurred on the Ketchikan Misty Fjords, Sitka, Admiralty, Petersburg, Wrangell, and Thorne Bay Ranger Districts, are specifically listed in the reference report.

Reviewing the monitoring that has been completed over the past five years, Tongass IDT monitoring shows that the sale administrators, engineering representatives, project managers, and contracting officer's representatives are working to support successful implementation of the BMPs. Focus items, corrective actions and departures identified in the past reports indicate some consistent BMPs that require diligent efforts to implement. Evaluation of the data shows that completion of the monitoring forms and field monitoring activities is important and highlights some significant issues and has contributed to improve consistency.

The Tongass wide landslide inventory was completed in FY2012. Approximately three million acres were mapped to the standards outlined in the Tongass landslide inventory protocol. Completion of the inventory is planned for 2013. A frequency analysis of landslides and soil map units and ecological subsections was initiated; however, more information is needed on the initiation zones and there is not enough detail in the soil map unit layer. The timber harvest activities associated with slopes over 72 percent gradient and unstable soils are adhering to applicable standards and guidelines. The soil scientists on the forest need to define training needs and documentation criteria for slopes over 72 percent gradient harvested or land where harvest is deferred.



Slake timber sale unit 69



Slake timber sale Unit 73D



Boundary timber sale unit 5

## 21. Soil and Water—Watershed Health

**What is the ecological condition and trend of watersheds in terms of key characteristics (such as soil productivity, water quality and quantity, invasive species, etc.) of watershed health identified in the desired condition (aquatic ecosystem potential) of the plan area? How effective are management actions in improving watershed health (maintaining or moving watersheds toward Condition Class I)?**

Tongass Watershed, Soils and Fish staff—supported by Regional Office and other Forest staff groups—completed comprehensive condition assessments for over 900 Tongass Watersheds. Overall condition ratings, along with use and aquatic value criteria were used to define candidate “Priority Watersheds” for restoration. Seven priority watersheds identified includes Harris River, Twelvemile Creek, Staney Creek, Luck/Eagle Creek, Saginaw Creek, Sitkoh River and Sitkoh Creek watersheds. Work on the Harris River watershed was completed in FY2011, and was removed from the watershed priority list. The Watershed Condition Framework will provide a road map for collaborative watershed restoration activities on the Tongass NF over the next three to five years. Future efforts in this monitoring program for stream flow response to vegetation management will focus on the development of a watershed scale, canopy density model that

may better connect temporal changes in rainfall interception potential after timber harvest with observed changes in water yield in monitored areas.

In 2009, the Tongass NF and the Pacific Northwest Research Station began collaborating on a protocol for watershed restoration effectiveness monitoring. Objectives included developing and testing an integrated suite of monitoring tools to evaluate the effectiveness of management actions at improving watershed health. In FY2011 and 2012, the focus was restoration of small streams that exhibit simplified habitat due to loss of in-stream wood from past riparian harvest. Work was completed on streams in both Twelvemile Creek and Staney Creek watersheds on Prince of Wales Island. The attainment of these objectives will be reflected in measurable responses in stream channel metrics in the short and long term. Some immediate responses were observed after post-treatment channel-forming floods in August and September 2011 and continued in 2012.

Work also focused on extending baseline data for the six small study streams and improving the power of ecological metrics to detect differences among streams both before and after treatment. A detailed evaluation of litterfall content, nitrogen content, and terrestrial invertebrate content combined with fish diet information observed within young-growth riparian forests and

adjacent streams with a range of alder/conifer mixtures. A decision support tool for applying riparian thinning was developed in 2011 and field tested in 2012 after initial application in the six study streams within Twelvemile and Staney Creek watersheds. This soil-geomorphic model combines soils, landforms, and channel type with predicted response trajectories in un-thinned young-growth riparian stands. During FY 2011, the six study reaches were re-measured to evaluate amount of tree volume basal area and species removed as part of the large wood collection for instream structure utilization. Fish monitoring continued in 2012 at the six study stream reaches using an experimental fish monitoring protocol designed to assess the effects of restoration on fish density and growth rates of the species in the fish community at the reach scale.

Preliminary study plan monitoring findings suggest that the effort to date is informative with respect to protocol refinement and overall progress. Additional consideration is necessary to evaluate applicability at a forest-wide scale. The original study plan is in the process of being adapted to an approach with broader Tongass-wide scope, more focused metrics, and less intense sampling.





## 22. Wetlands

### **Were the wetland conservation practices implemented and effective to avoid and/or minimize impacts to wetlands to the extent practicable?**

A wetland/road monitoring report (Landwehr 2011) based on the 2011 field work was completed in FY2012. Wetland-road monitoring has been on a two-year cycle, one year for field work and the second year for report writing. As 2012 was a report writing year, no monitoring took place in the 2012 field season. The following information summarizes the data from the 2011 field season.

Six road segments constructed through wetlands were monitored in fiscal year (FY) 2011. Three of the road segments were constructed as part of the Logjam Timber Sale (TS) Project. Three of the road segments monitored were constructed through

wetlands more than 30 years ago. The FY 2008 wetland monitoring report identified the need to monitor older road segments. The literature cited in the 2006 and 2008 reports indicates that changes to wetland vegetation and soil hydrology may not manifest themselves until several decades after the construction activity.

The field work found that the new road segments were constructed to specifications with minor opportunities for improvements to lessen impacts to wetlands. Two of the old road segments did not meet specifications for road width.

The Logjam TS Environmental Impact Statement (EIS) successfully documented wetlands avoidance with project activities. In addition to site specific wetland avoidance documented on road cards, the EIS included a discussion of wetland avoidance at the project scale.

Due to the limited number of miles of road constructed through wetlands in 2011, and recent years in general, there is minimal impact to wetlands across the Tongass National Forest from construction of forest roads.

## 23. Karst and Cave Ecosystems

### Are the biological, mineralogical, cultural, paleontological components, and recreational values of the karst and caves maintained?

Monitoring for karst and cave ecosystems in FY 2012 was completed on projects implemented under the direction of the Standards and Guidelines in the Forest Plan. Work completed included preliminary inventory, cave inventory and mapping, timber harvest unit and road reconnaissance, timber harvest unit layout, and road layout.

The Karst Resources Standards and Guidelines require that areas of high vulnerability karst within the project area be deleted from land considered for harvest. Karst lands included in project areas are typically low or moderately low vulnerability karst. The Karst Resources Standards and Guidelines are fully implemented in proposed and ongoing projects such as the Big-Thorne Timber Sale, Kosciusko Island Timber Sale, Dargon Point CE, Twelve Mile Restoration EA, and in several other proposed and ongoing projects throughout the Forest. Karst resource inventory is planned in 2013 for completion of the Kosciusko Timber Sale. Karst resource input was provided for a number of sales associated with the Small

Sales Program on Thorne Bay and Craig Ranger Districts on Prince of Wales Island. Particular emphasis was placed on the inventory and design of the prescriptions and mitigation proposed for commercial thinning opportunities. Efforts on the above projects included on the ground inventories by the forest geologist and geology staff, soil scientists, hydrologists, fisheries, and timber specialists.

Effectiveness monitoring has been historically tied to post harvest monitoring and preliminary cave resource inventories. In FY 2012, a minor amount of logging occurred on karst lands where mitigation had been prescribed. Monitoring of some of the small sales on the Thorne Bay Ranger District was conducted to evaluate the effectiveness of proposed mitigation. Monitoring of these sites found that prescriptions such as partial suspension and windfirm buffers were implemented and effective. Limited subsurface monitoring was accom-

plished. These included subsequent trips into known cave systems to document changes and pre-harvest inventory of karst features to establish baseline inventories. No substantial changes as a result of management activities were documented within the known cave systems.



## Human Uses and Land Management

### 24. Timber Resources—Economic Timber Sales, Shelf Volume, and Contract Volume

#### Is the timber management program meeting the objectives of achieving economic timber sales and rebuilding the volume under contract and shelf volume components of the sale program?

In FY 2012 the Tongass offered 52,508 MMBF, sold 52,508 MMBF and had less than 0.1 MMBF in one no-bid timber sale that remained unsold at the year of the fiscal year.

The purchasers harvested 20,827 MMBF and had an ending inventory of 130,458 MMBF. The average annual harvest for the past five years was 30.8 MMBF.

The average bid rate for the timber under contract is \$26.22/MBF. At the end of FY 2012 the average bid rate was \$28.02/MBF. Currently, the Tongass is providing three to four years supply of volume under contract to local mills. However, the Ton-

gass has not been able to establish shelf volume to maintain flexibility and stability in the sale program.

Congress mandated that all timber sales offered for sale by the Tongass National Forest, using the residual value appraisal approach and with western red cedar appraised for domestic processing be above base rates before they can be offered for sale.



## 25. Timber Resources—Standards and Guidelines

### Are timber harvest activities adhering to applicable timber management standards and guidelines relative to: created openings exceeding the maximum size limit for unit harvest, harvest on slopes greater than 72 percent slope gradient, or within the 1,000 feet beach and estuary buffer?

There were 1,063 acres fully or partially harvested during FY2012. Of these acres, 280 resulted in the creation of an opening through the use of even-aged silvicultural systems.

The 100-acre size limitation applies to all

harvest units that create an opening using even-aged management. Of the total harvest acres that created openings in the fiscal year 1999-2012 period, four units exceeded the 100-acre limit, but none went over 113 acres. All four units were analyzed and approved in project-level Records of Decision. There were no openings greater than 100 acres created in FY2012.

Forest Plan standards and guidelines for scenery and sensitive species such as Northern goshawk and American marten, and soil and water BMPs emphasize smaller sizes. Also, emphasis on leaving old-growth (legacy) structure in harvest areas is resulting in smaller harvest openings. Of the 280

acres managed via the even-aged system, 25 percent retained a portion of the original stand structure through the retention of leave trees.

In 2012, approximately 133.5 acres of timber harvest occurred on slopes over 72 percent gradient. The harvest occurred in six harvest units analyzed in the Logjam Timber Sale Environmental Impact Statement and one unit analyzed in the Boundary Timber Sale environmental assessment. The areas were harvested according to mitigation defined in the National Environmental Policy Act documents.

## 26. Timber Resources - Allowable Sale Quantity

### Is the ASQ landbase consistent with resource information and programmed harvest?

The ASQ for the Tongass National Forest as specified in the 2008 Forest Plan is 2.67 billion board feet for the first decade following implementation of the plan. The ASQ consists of two separate non-interchangeable components (NIC), also referred to as an operability inventory. Under the 2008 Forest Plan, the ASQ is divided into two NIC classifications based on land type and difficulty of harvest. NIC I (set at 2.38 billion board feet of timber per dec-

ade) and NIC II (set at 0.29 billion board feet per decade) and a proportional mix, set at approximately 89 percent NIC I and 11 percent NIC II (Forest Plan ROD, pg. 7).

During FY2012, 52.5 million board feet (MMBF) were sold on the Tongass National Forest. The average volume sold between FY2003 and FY2012 was 45.8 MMBF, or 17% of the ASQ. The decline in timber sale volume is based on a variety of factors including demand, economic conditions, harvest costs and litigation.



## 27. Timber Resources - Tongass Timber Reform Act

### Is the timber demand being met within limits of the adaptive management strategy and Tongass Timber Reform Act (TTRA)?

The annual demand calculation is an analysis of the timber industry in southeast Alaska. The variables for this analysis include installed mill capacity, projected harvest level, and timber volume under contract. The adaptive management strategy is implemented in three phases. Phase 1 restricts the timber program to a portion of the suitable land base that excludes moderate and high value roadless areas. Should the level of harvest reach 100 MMBF for two consecutive fiscal years, the Tongass National Forest can then plan for timber projects in the Phase 2 portion of the approved suitable land base. Should the harvest reach 150 MMBF for two consecutive fiscal years, the Tongass could then plan for timber projects in Phase 3 areas, which includes the entire

suitable land base. The demand calculation is based upon an estimate of timber harvest, not on actual timber harvest. Actual timber harvest is recorded and reported in the Timber Sale Accounting System.

The Annual Demand Calculation estimates that the timber industry needs to purchase a range of timber between 53 to 117 MMBF and a harvest level of 53MMBF of timber. In FY2012 the Annual Demand Calculation ranged from a low of 110 MMBF to a high of 259 MMBF.

In FY2012, the Tongass offered 52,508 MMBF, sold 52,508 MMBF and had 0 MMBF in no-bid timber sales. Timber harvest for FY2012 was 20,827 MMBF.

The result of the low harvest indicates that the Tongass timber sale planning efforts should continue in Phase 1 areas on the forest.

## 28. Timber Resources - Adaptive Management Strategy Threshold

### Has a Timber Sale Adaptive Management Strategy threshold been reached, so that it is appropriate to move to the next phase?

The initial threshold outlined by the Timber Sale Adaptive Strategy is 100 million board feet (MMBF) harvest per year for two consecutive years. The volume harvested in

FY2012 was 20,827 MMBF. The harvest volume last exceeded 100 MMBF in FY2000. Due to a variety of factors, it is unlikely that harvest will approach or exceed 100 MMBF on the Tongass National Forest in the near future.



In FY2012 there was approximately 20,827 MMBF harvested from the Tongass, all of the harvest was in NIC I areas. Timber harvest consisted of 85 percent conventional logging systems and 15 percent helicopter logging systems.

## 29. Timber Management – Non-Interchangeable Components

### Are the non-interchangeable components (NICs) of the allowable sale quantity consistent with actual harvest?

The ASQ consists of two separate components (NICs), defined as increments of the suitable land base and their contribution to the ASQ that are established to meet Forest Plan objectives. NICs are identified as parcels of land and the type of timber thereon, which are differentiated for the purpose of Forest Plan implementation. The total ASQ is derived from the sum of the timber volumes from all NICs, which cannot be interchanged during the timber sale program.

**NIC I. Normal Operability:** This is volume scheduled from suitable lands using existing logging systems. Most of these lands are expected to be economic under projected market conditions. On average, sales from these lands have the highest probability of offering a reasonable opportunity for a purchaser to gain a profit from their investment and labor. This is the best operable

ground. Normal operability includes those systems most frequently used on the Tongass. These systems are tractor, shovel, standard cable, and some helicopter.

**NIC II. Difficult and Isolated Operability:** This is volume scheduled from suitable lands that are available for harvest using logging systems not in common use in Southeast Alaska. Most of these lands are presently considered economically and technologically marginal.

The evaluation criteria include: 1) Volume harvested by logging system from suitable lands from commercial forest timber stands that are healthy. 2) Volume harvested by logging system from suitable lands from commercial forest timber stands that are unhealthy and currently in a non-productive status, for example yellow-cedar decline and blow down with heavy sap rot or breakage. 3) Distance from the setting to landing. For helicopter settings, settings over  $\frac{3}{4}$  of a mile flight distance from landings, either on the land or in the water, is considered NIC II.

## 30. Timber Management - Proportional Mix of NIC I and NIC II

### Is the proportional mix of volume in NIC I and NIC II as estimated in the Forest Plan accurate?

Under the 2008 Forest Plan Amendment, the ASQ is divided into NIC I and NIC II. The proportional mix in the Forest Plan is set at approximately 89 percent NIC I (238 MMBF) and 11 percent NIC II (29 MMBF) harvested annually.

NIC components are estimates designed to prevent the disproportionate harvest of the most economical portions of the Forest over the long term. Limits on each component are binding on a decadal basis. The components are non-interchangeable because lower sale level in one component may not be compensated by higher sale levels in the other. The NIC I component includes land that can be harvested using “normal opera-

bility” logging systems such as shovel and short span cable. The NIC II component includes difficult and isolated operable timber stands requiring special logging equipment requirements due to yarding distances or topography.

Since implementation of the 2008 Forest Plan, actual harvest was 95 percent and 93 percent NIC I and five percent and seven percent NIC II in FY2008 and FY2009 respectively. In FY2010, all harvest occurred in NIC I areas, while in FY2012, 99 percent of harvest occurred in NIC I areas with 1 percent occurring in NIC II areas. Unless the annual offer volume approaches the NIC I allowable volume of 238 MMBF, NIC II over-harvest is not likely to occur.



### 31. Transportation System

#### Are the standards and guidelines used for forest development roads and log transfer facilities effective in limiting the environmental effects to anticipated levels?

##### Road Storage

Monitoring observations of recently closed, or stored, NFS roads will focus on high use areas on a selected road system. Since most motorized traffic occurs on road systems connected to communities, the monitoring effort will likewise focus on those systems. Once a road system has been selected for monitoring, at least ten percent of roads that have been closed during the past one to three years will be selected for monitoring. The process of selecting roads is based upon certain site characteristics, which include road grade, side slopes, number of fish crossings, and level of closure treatment.

In FY2012, monitoring observations were collected from three different road systems: Ketchikan – Shoal Cove, Petersburg – Mitkof Island, and Petersburg – Kuiu Island. The self-maintaining aspects of stored roads are evaluated by the following criteria: 1) Effectiveness of water bars on steep grades for erosion control. 2) Effectiveness of water bars and culverts. 3) Efficiency of water bar placement. 4) Erosion control at streams where structures have been removed.

### 32. Transportation System

#### Are the roads and trails maintained in accordance with management objectives?

Road systems are evaluated to determine if significant motor vehicle traffic exists on roads that have been recently closed. Once a road system has been selected for monitoring, at least ten percent of roads that have been closed during the past one to three years will be randomly selected from the INFRA database.

In FY2012, monitoring observations were collected from three different road systems: Ketchikan – Shoal Cove, Petersburg – Mitkof Island, and Petersburg – Kuiu Island.

##### Closed Roads Maintenance Level 1

Data was collected from these road systems in response to the following questions: 1) Have the ML1 roads been removed from the Motor Vehicle Use Map? 2)

Specific analysis of road closures in FY2012 for each road system, as well as for the five year monitoring review period, can be found in the reference report. Generally consideration of the road maintenance level, road use, and future, needs to be evaluated against the surface flow patterns of the area and fish resource requirements to determine the optimum design for water bars, cross drains, culverts, and bridges. Continued work with the hydrologists, fish biologists, as well as experienced engineers on site specific prescriptions for water bars and cross drains is essential.

##### Log Transfer Facilities

Monitoring will continue to be conducted for each log transfer facility (LTF) under the terms of the LTF permits in accordance with the Alaska water quality standards and requirements from the Environmental Protection Agency (EPA) for non-point source discharge. LTF monitoring is accomplished through field assessments and documented to assess the success of the Best Management Practices (BMPs) stipulated as terms of the LTF permits. The assessment elements of LTF monitoring include site identification, transfer activity, runoff control, bark and debris disposal, and fuel control. In FY2012, all active log transfer facilities were operated in accordance with their permits.



Shoal Cove road 8435000

Has public motor vehicle access been eliminated on stored roads? 3) Are stored roads be used by motor vehicles as evidenced by tracks?

##### Open Roads Maintenance Level 2-5

Data was collected from these road systems in response to the following questions: 1) Is the surface condition of the road appropriate for the maintenance level? 2) Is the general roadway condition appropriate for the maintenance level?

Analysis of the questions posed for open and closed roads for FY2012 determined that stored roads have been effectively closed to unauthorized use through the combination of prohibition and elimination. Most of the closed roads and bridges pulled and are impassable to most OHV traffic. Roads are being maintained at the level stated in their Road Management Objectives. The management practices

associated with road closures and the need to access firewood is under evaluation. The District Rangers are exploring, through the assistance with the engineering department, the options associated with seasonal closures on future projects.



### 33. Mining and Minerals Exploration

**Are Federal regulations (36 CFR 228) to ensure surface resource protection implemented and is the administration of this regulation through the Forest Plan effective in limiting soil and water resource impacts?**

A wide range of mineral resources and deposit types occur within the boundaries of the Tongass National Forest. Examples include, but are not limited to, gold, silver, molybdenum, and uranium, as well as nationally designated "strategic" and "critical" minerals such as lead, zinc, copper, tungsten, and rare earth elements. The Forest Service recognizes that minerals are fundamental to the Nation's wellbeing and, as

policy, encourages the orderly exploration and development of the mineral resources on National Forest System lands. The Secretary of Agriculture has provided regulations to ensure surface resource protection during the exploration and development of the mineral resources.

Two large locatable mine plans were administered, and six exploration drilling programs and mineral material operations were processed on the Tongass National Forest for FY2012. All active operations were found to be in compliance with Forest Plan Standards and Guidelines.

The Forest Service is engaged in an ongoing effort to mitigate the dangers posed by Abandoned Mine Land (AML) features on

the National Forests. These features include tunnels, adits, shafts, tailings ponds, rock dumps, mill sites and other associated mining features. Six AML features in the Ketchikan-Misty Fiords and Thorne Bay Ranger Districts were mitigated in FY2012.

Fiscal Year 2012 inspections of mineral sites indicate that the effects of mining activities on surface resources are consistent with Forest Plan expectations. The necessity of the operator to obtain approval for their Plan of Operations provides the Forest Service the opportunity and authority to control the effects of the development on the Forest surface resources.



Green's Creek Mine



### 34. Subsistence Management

**Are the effects of management activities on subsistence users in rural Southeast Alaska communities consistent with those estimated in the Forest Plan?**

Monitoring in FY2012 consisted of subsistence fisheries monitoring and subsistence wildlife monitoring.

***Subsistence Fisheries Monitoring***

Ten fisheries assessment projects were conducted in Southeast Alaska in 2012. Nine projects were assessments of sockeye salmon harvests, escapements, and for stocks that sustain subsistence fisheries. One monitoring project was for understanding the distribution of eulachon on the Yakutat Forelands.

***Subsistence Wildlife Monitoring***

Aerial goat and moose surveys were conducted near Yakutat in FY2012. Eulachon surveys were conducted in District 1 with concentrated effort in Carroll Inlet and the Unuk River.

Sitkoh Seining Sockeye





### 35. Wilderness

#### Is the wilderness character being maintained?

In September 2012, the Tongass Forest Supervisor signed the Wilderness Character Monitoring Plan for the Tongass National Forest. This plan provides direction for monitoring and evaluating changes in wilderness character for the 19 wilderness areas on the Tongass National Forest. The plan also identifies a pathway for action to prevent or halt degradation of wilderness resources and qualities. To monitor wilderness character, managers will identify trends in the four qualities of wilderness character: untrammeled, natural, undeveloped, and solitude or primitive/unconfined recreation.

Understanding the maintenance of the wilderness character will require measurements, both annually and every five years, to identify changes or trends. This work will also require interdisciplinary participation for the inventory and monitoring specific the specific components that collectively make up the wilderness character for the separate wildernesses. Since the standards

were just established in 2012, the answer to whether or not the wilderness character is being maintained for each of the 19 wilderness areas may not be known until after 2017.

Progress in FY 2012 on elements of the Chief's 10 Year Wilderness Stewardship Challenge (WSC) was facilitated by a grant of \$251,000 from the Washington Office and by increased participation of regional non-profit organizations interested in wilderness stewardship. Wilderness character monitoring work in 2012 included invasive plant treatment in the Stikine-LeConte Wilderness, updating of wilderness education plans, monitoring outfitter/guides use, completion of wilderness information needs assessments, completion of wilderness information needs assessment inventories for Sitka RD, and completion of Invasive plant inventories. This work improved wilderness stewardship across the Tongass.

Stewardship partners Sitka Conservation Society (SCS) and Southeast Alaska Conservation Society (SEACC) provided assistance with stewardship work within several wilder-

ness areas. Work completed by SCS included help in developing data collection tools for wilderness monitoring. Examples include a visitor use observation and encounter documentation booklet that was provided to all district employees for the 2012 season, and revision of a wilderness encounter monitoring form.

The Wrangell Ranger District worked jointly with SCS and SEACC to organize the Wrangell Boy Scouts to work in the Stikine-LeConte Wilderness to eradicate an area of invasive plants. Another cooperative effort culminated in a multi-day backpack hike in the South Etolin Wilderness to Mt. Shakes to monitor solitude, sensitive plants, invasive plants, amphibians, heritage resources, impacts from elk (introduced species), and campsites used by permitted commercial operators.

## 36. Heritage Resources

**Are (1) project clearance/inventory, (2) project implementation, (3) mitigation, and (4) enhancement completed in accordance with the requirements and regulations for heritage resources?**

Heritage specialists evaluated 129 projects in FY2012 for the potential to affect heritage resources eligible to the National Register of Historic Places (National Register). It was determined that none of those projects would have an adverse effect to sites eligible to or listed in the National Register. Despite declining budgets, Tongass archeologists continued a fairly active program to monitor the conditions of the Forest's cultural resources, monitoring the condition of 214 sites in FY2012. Some notable projects in FY2012 include:

### *Etolin Canoe*

Forest Service archeologists Jane Smith and Gina Esposito monitored the Etolin Canoe site (Site PET-089) and noted natural decay and impact from a tree fall. Vegetation is

growing on top of the canoe and a small diameter tree has fallen across it. A portion of the side of the canoe has broken from the main body and lies next to the canoe. After removing the tree and a large branch from the canoe, archeologists noted soft rot underneath the vegetation, but recognized that some firm wood remained beneath the rot zone. According to conservator Alice Hoveman, who made recommendations regarding the preservation of the canoe in 1983, shearing vegetation and new growth away from the canoe so that moisture is not readily retained will help reduce rot by providing ventilation. Archeologists removed the moss and vegetation from the canoe, carefully pulling away roots that had begun to penetrate the wood. Although the canoe will eventually deteriorate, periodic monitoring may tell us if removing the vegetation from the canoe has helped slow soft rot and deterioration.

### *Windham Bay Rock Art Monitoring*

Juneau Zone archeologists Rachel Myron and Myra Gilliam along with volunteer Robi-

na Moyer monitored the Windham Bay Petroglyph (Site SUM-047) on the Juneau Ranger District on July 24, 2012. This is a very complex petroglyph site with several years of photos, sketches, and maps compiled over the years. In 2012 the team had all of the compiled maps and photographs with them and they attempted to relocate the previously described glyphs. They relocated four of the glyphs noted on a 1989 map, but could not find two glyphs recorded on that map. The glyphs, observed in 2012, appear to be weathering normally. The shapes of the glyphs are much less pronounced and evident now than in the previous photographs and lichen are growing on some of the glyphs obscuring shapes and patterns. Also, some of the rocks recorded as having glyphs were not found. The difficulty in finding these sites is possibly due to actively changing streams or high energy beaches, which are natural causes that can contribute to loss of cultural resources.



## 37. Recreation

**Are areas of the Forest being managed in accordance with the prescribed Recreation Opportunity Spectrum (ROS) class in Forest-wide Standards and Guidelines? Is the ROS classification consistent with public demand?**

### *Misty Fjords National Monument Wilderness:*

In 2012, two environmental documents were completed that will manage commer-

cial recreation use in accordance with Forest Plan direction. The two documents were the Prince of Wales Island Outfitter and Guide Management Plan, and the Ketchikan-Misty Fjords Outfitter and Guide Management Plan.

Most areas for the three districts where an environment analysis was completed found that ongoing commercial recreation activities were consistent with the Forest Plan standards and guidelines. However, an area identified as Misty Core Lakes (an area

where floatplanes land within the Misty Fjords National Monument Wilderness), required a reduction of authorized use to be consistent with standards and guidelines for group encounters that could be expected in this wilderness setting. The reduction for approved landings of airplanes for commercial recreation use within this area will be implemented in the 2013 operating season.

### 38. Wild and Scenic Rivers

#### Are areas of the Forest being managed in accordance with the prescribed Recreation Opportunity Spectrum (ROS) class in Forest-wide Standards and Guidelines? Is the ROS classification consistent with public demand?

There are no Standards and Guidelines written specifically for rivers recommended and / or designated Wild and Scenic (WSR). At this time, rivers on the Tongass that have been recommended for inclusion in the WSR program are managed to maintain their future eligibility in the program. Currently, no effort has been undertaken to have these rivers formally designated by Congress. Management prescriptions are used instead to maintain and enhance the free flowing conditions and outstandingly remarkable values for which the river was found suitable for designation as part of the National Wild and Scenic River System.

Each District on the Tongass NF provides oversight of the recommended Wild and

Scenic Rivers. The districts evaluate activities that could affect the rivers and conduct monitoring and assessments to ensure the free flowing conditions and outstandingly remarkable values are maintained. In 2012, the Thorne Bay district ranger identified timber harvest units within the Thorne River recommended Recreation Wild and Scenic River corridor. Harvest units were proposed

in all action alternatives which were evaluated in the Draft Environmental Impact Statement for the Big Thorne Timber Sale. A final environmental impact statement is scheduled to be completed in 2013.

#### *Petersburg Ranger District*

Work was completed for the reconstruction of a cabin on Kadake Creek, on Kuiu Island.

The reconstructed cabin will have no effect on the recommended eligibility of the river and will likely enhance the recreation experience for visitors.

Naha River



### 39. Scenery

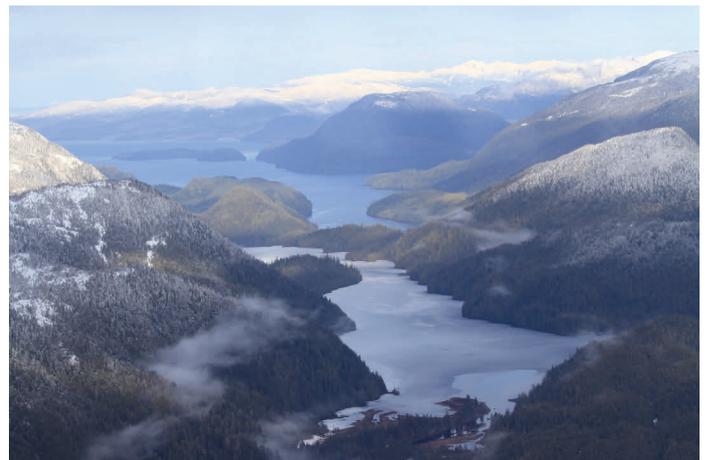
#### Are the adopted scenic integrity objectives established in the Plan met?

Tongass National Forest landscape architects analyzed numerous project sites and scenic viewsheds associated with these project sites in FY2012. A formal scenery resource report was written for some of the projects, while the analyses for other projects is reflected in site planning drawings and decisions made in the design process. In both cases, design and project recommendations are made to be consistent with the scenic integrity objectives in the Forest Plan.

Visual analyses were conducted on all Ranger Districts in 2012 with the exception of Yakutat and Admiralty. Five analyses took place on Craig Ranger District—Sal Creek young-growth cabin site concept plan, young-growth three sided cabin design and site plan, Sunnahae Trail location and design phase 2, Seaside Park at Coffman Cove day use site design, and Honker Portage Trail survey and design. The Bohemia Basin Trail scenery resource evaluation was conducted at the Hoonah Ranger District. In Juneau, the Forest Sciences Laboratory site plan support, the Petersen Lake Trail design support, the West Glacier Trailhead Concept

Plan, the Greens Creek Mine EIS support, and the Sweetheart Lake Hydro project analyses occurred. Ketchikan- Misty Fiords also had five analyses—Saddle Lakes Timber Sale EIS support, Upper Silvis Trail Construction, Ward Lake Accessible Trail survey and design, Carlanna Lake Trail survey and design, and Lunch Creek Trail survey and design. There were six analysis completed in Petersburg—Cascade Creek Trail design support, Raven Trail Phase 2 survey and design, Petersburg Lake Trail design support, Seal Point Recreation Site concept plan, South Mitkof Boat Launch design support, Cascade Creek Hydro resource report review. In Sitka analyses of the Cascade Creek bridge (survey and design, Cross trail), the Takatz Hydro ID Team support, the White Sulphur Springs Bathhouse (survey and design), the Sitka Office design support, and the Redoubt Cabin (survey and design) were completed. In Thorne Bay

two analysis, Big Thorne timber sale NEPA support for scenery, and Seaside Park (Coffman Cove) Site Analysis and Concept Plan were completed. Lastly, there were three analysis completed in Wrangell—Wrangell Island Timber Sale NEPA support, Berg Bay Cabin survey and design, and Garnett Ledge Cabin survey and design.



## Economic and Social Environment

### 40. Economics

#### Are the effects on employment and income similar to those estimated in the Forest Plan?

##### Wood Products

The Forest Plan employment and earnings figures include activities associated with private, state, BIA, Forest Service and Native Corporation timber harvesting. The plan assumes that the entire Non-Interchangeable Component (NIC) 1 would be harvested. This has not happened and employment in the woods products sector currently is much lower than predictions in the 2008 Forest Plan.

##### Recreation and Tourism

Though there was a major economy-related decline in 2010, employment data from the State indicates little decrease in the Recreation and Tourism employment sectors during the last five years. In the 2008 Forest Plan, there is little difference in recreation employment between the various forest management alternatives.

##### Commercial Fishing

The Forest Plan does not estimate employment in salmon harvesting and processing. There is no expectation of significant

change to the commercial fishing or fish processing industries over the next decade resulting from Tongass National Forest activities. State employment figures show a fairly stable workforce in this field in the last six years.

##### Mining and Minerals

The Forest Plan indicates that changes to mining employment are based on whether the potentially effected locatable deposits are economically viable and not Tongass NF management decisions. Trends noted in the five year review indicate the mining industry has experienced steady growth in the past five years. It is unlikely that this growth is related to 2008 Forest Plan direction, but is likely tied to global market demand and prices.

##### Regional Picture (SE Alaska)

Overall, employment in the timber sector in is much lower than that predicted in the 2008 Forest Plan. Employment is stable in the recreation and tourism sector as determined by the proxy industry – the service and retail sector. The commercial fishing sector of employment is fairly stable. Mining employment has shown an increase since 2005.



### 41. Costs and Outputs

#### What is the trend in outputs and costs associated with those outputs?

The Tongass Land and Resource Management Plan (Forest Plan) includes monitoring requirements to track costs and outputs associated with the allocation used to accomplish Forest Plan Objectives.

Allocations and expenditures by budget line item (BLI) and outputs for performance measures in the various resource program areas are provided for FY 2012 in the reference report (link below). Costs associated with outputs will be monitored for a 5-year period and then analyzed to identify trends. This information will show the cost of doing business on the Tongass National Forest.

##### PLANNING, INVENTORY, & MONITORING

FY 2012 TOTAL FOREST ALLOCATIONS

	DESCRIPTION	ALLOCATED	EXPENDED
Subtotal	Appropriated Funds	\$43,444,300	\$43,520,486
Subtotal	Permanent & Trust Funds	\$6,105,983	\$5,438,316
<b>TOTAL</b>		<b>\$49,550,283</b>	<b>\$48,958,802</b>

##### Accomplishments

Annual Monitoring Requirements Completed	33 reports
Acres of Inventoried Data Collected and Acquired	3,101,093 acres
Land Management Plans (LMP) Amendment Underway	1 plan
Land Management Plans (LMP) Assessments Completed	1 plan

The tables show the FY 2012 total allocations and expenditures (combined appropriated funds and permanent and trust funds) for the Tongass National Forest, and outputs for performance measures in the "PLANNING, INVENTORY, & MONITORING" resource program area.

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