

Tongass National Forest Plan Monitoring Program

Introduction

Monitoring is a quality control process for implementation of the Tongass National Forest Land and Resource Management Plan (Forest Plan). It provides the public, the Forest Service, and other resource agencies with information on the progress and results of plan implementation. As such, monitoring, along with the evaluation of that monitoring, comprise an essential feedback mechanism within an adaptive management framework. The evaluation process also provides feedback that can trigger corrective action, adjustment of plans and budgets, or both, to facilitate feasible and meaningful action on the ground.

The Forest Plan identifies management direction for the Tongass in terms of goals, objectives, standards and guidelines – based on the underlying assumptions of statute, policy, theory, data, technology, and public needs and desires. Monitoring is gathering data and information, and observing the results of management activities as a basis for the periodic evaluation of the Forest Plan. Evaluation is a process for interpreting monitoring data and information to determine whether changes in management direction are needed. The Tongass incorporates three types of monitoring and evaluation approaches: implementation, effectiveness, and validation. Implementation monitoring and evaluation is used to determine whether standards and guidelines are implemented. Effectiveness monitoring and evaluation is used to determine whether standards and guidelines are achieving goals, objectives, and desired conditions. Validation monitoring and evaluation is used to examine whether the assumptions and predicted effects used to formulate the Forest Plan are accurate. Actual monitoring design and sampling methods are periodically updated to reflect the most current established survey and analysis procedures and facilitate improvements to the plan monitoring program; the methods used are described in the monitoring and evaluation reports.

The Tongass National Forest has had an active monitoring program for many years and met many of the eight monitoring requirements of the 2012 Planning Rule ([36 CFR 219](#)). The responsible official has adopted administrative changes to the previous (2008) monitoring program to better align with those requirements and incorporated information from previous monitoring efforts and reviews; see also the “Deferred and Future Actions” discussion on page 7 of this document. This document explains the role of monitoring, what the requirements are and how those requirements are met, documents changes from the previous monitoring plan, and outlines monitoring questions the Tongass will use in its plan monitoring program.

Roles and Responsibilities

State and federal natural resource agencies, Alaska Native Corporations and tribal officials, the academic community, and members of the public and organizations are interested in knowing about social, economic, and ecological uses and values of National Forest System (NFS) lands. While concepts such as ecosystem services and carbon cycling and sequestration are values provided by the Tongass National Forest and influenced by its management, it is important to continue collaboration with the Pacific Northwest Research Station, the State of Alaska, other government agencies, and non-governmental groups to learn and develop these concepts.

These groups have opportunities to better align their interests, resources, and efforts in monitoring and evaluation of the Forest Plan. Use of relevant data from a collaborative group or from individual agencies, partners, and volunteers would benefit Tongass National Forest monitoring as well as other land owners in Southeast Alaska. The Tongass Plan Monitoring Program is designed to be flexible enough to respond to emerging issues and areas of high uncertainty such as climate change. Assessment of the effects of climate change has been incorporated, where possible, into the questions considered in Table 1.

For the purposes of this Plan Monitoring Program, the roles and responsibilities within the Forest Service are defined below.

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Regional Office. The Regional Office (<http://www.fs.usda.gov/r10>) develops regional policies and directives (<http://www.fs.fed.us/im/directives/>) on monitoring and evaluation. In addition, the Regional Office works with the Forests to develop a broader scale monitoring program.

Forest. The Forest (<http://www.fs.usda.gov/tongass/>) implements the Forest Plan and conducts implementation monitoring and evaluation. The responsibilities of the Forest include the following:

- Preparing a plan monitoring program (<http://www.fs.usda.gov/goto/R10/Tongass/Monitoring>);
- Collecting data and information for implementation, effectiveness, and validation monitoring; and
- Analyzing and interpreting implementation monitoring data and information and reporting implementation monitoring results, conclusions and evaluation recommendations to the Regional Office, and making these reports available to the public and other agencies.

Pacific Northwest Research Station. The Pacific Northwest Research Station (<http://www.fs.fed.us/pnw/>) provides scientific and technical expertise to conduct effectiveness and validation monitoring and evaluation relative to specific agreements. The responsibilities of the Pacific Northwest Research Station include advising and assisting the Forest with the following:

- Developing monitoring study plans, including study objectives, sampling designs, methods, quality assurance plans, and budgets in cooperation with the Forest;
- Collecting data and information for effectiveness and validation monitoring (in specific cases relative to agreements with the assistance of the Forest);
- Analyzing and interpreting the data and information relative to specific studies and agreements with the Forest;
- Reporting study results, conclusions, and recommendations to the Forest, and making these reports available to the public and other agencies; and
- Publishing, when appropriate, study results in Regional publications, Pacific Northwest Research Station publications, or professional journals.

Relationship to Other Information Needs and Monitoring Activities

The Plan Monitoring Program is not intended to describe all monitoring, inventorying, and data gathering activities undertaken on the Tongass, nor is it intended to limit monitoring. Many similar activities are routinely conducted as part of site-specific project plans developed under the programmatic guidance of the Forest Plan. Other routine monitoring activities include the timber sale administrator and engineering reports, special uses administration inspections, and in the case of large-scale mining activities, for example, monitoring is typically included in the site-specific Plan of Operations for each mine.

Broader scale monitoring is also done through “management reviews” and “activity and program reviews” by Forest Service officials at various levels of the organization. These periodic reviews are typically done as a function of identified issues, challenges, and opportunities, or as a function of general interest in what the national forest management activities are revealing. These reviews, which are normally documented and discussed often, provide insight into information needs and different monitoring and evaluation approaches that can influence the need to adjust the Forest Plan.

The requirements of this Plan Monitoring Program are also not intended to replace monitoring requirements that may be developed in the project planning process. Specific project monitoring requirements are determined during the stage of planning that addresses the National Environmental Policy Act and is based on interagency and public involvement during the project planning process. Project-level monitoring may contribute data toward Forest-level monitoring or it may be completely independent and site-specific to that project.

The activities described in this document refer to monitoring and evaluation of National Forest System lands and do not include any such activities on adjacent non-NFS lands; similar actions may be undertaken by individuals or agencies with the proper authority and jurisdiction for those lands. The opportunity to promote the alignment and coordination of management and prioritize information needs with the State of Alaska, other federal agencies, and other partners is high. Alignment for the Forest Service can include promoting consistent collection and reporting of project implementation monitoring so

that such information can be used or sampled at the Forest-wide scale. Such alignment could also provide more consistent data and information for researchers to use in effectiveness and validation monitoring of the Forest Plan. Similarly, other entities could use Forest Service data to help address their own information needs as well as facilitate the ability to share information and data between entities.

Monitoring and Evaluation Programs

In the past, the Forest Supervisor was responsible for coordinating the preparation of an annual monitoring and evaluation report as well as conducting a more in depth five year review. The 2012 Planning Rule requires a biennial evaluation of information gathered through this plan monitoring program and the relevant information from the broader scale strategy. The biennial report will summarize the monitoring activities conducted during the prior two years and the results obtained. It will address and evaluate the questions listed in this plan monitoring program at the reporting period identified. Generally the evaluation report will focus on the information gathered during the previous two years and identification of changes needed to the Forest Plan or the plan monitoring program. The first biennial report is expected to be released in the summer of 2018, approximately two years from adoption of this monitoring program; this program incorporates the 2012 requirements as described in the "Modification of the Plan Monitoring Program" section, beginning on page 5.

The monitoring questions and associated indicators must be designed to inform management of resources on the plan area, including by testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives. The monitoring evaluation report must indicate whether or not a change to the Forest Plan, management activities, or the monitoring program, or a new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management on the plan area. Specific recommendations for corrective action will depend on the risk to the resource and type of disparity discovered. The types of action that could be recommended include, but are not limited to, the following:

- No action, if monitoring and evaluation indicate that the standards and guidelines are being followed and the results are meeting Forest Plan objectives.
- Additional monitoring, if initial results are inconclusive or indicate a pattern of minor discrepancies between the standards and guidelines and their implementation, or between expected and actual results.
- Referral to the appropriate line officer for action to ensure proper application of the standards and guidelines, if compliance is inconsistent.
- Adjustments to monitoring protocols to use best available science, increase efficiency, or stay within financial and technical capabilities of the agency.
- Amending the Forest Plan to change, for example, one or more of the standards and guidelines.
- Revising the Forest Plan, if major changes are warranted.

As a result of the 2012 Planning Rule, there is also the opportunity to make modifications to the plan monitoring program utilizing administrative changes as described in 36 CFR 219.13(c)(1).

User Notes

Monitoring and evaluation provides for a periodic determination and evaluation of the effects of management practices. Monitoring can be used to evaluate how well the objectives of the Forest Plan are met and how closely the management standards and guidelines have been applied. Monitoring provides feedback for adaptive management.

Adaptive management is a term that generally describes a dynamic management approach where management guidelines can be modified in response to evaluated conditions, based upon established criteria. This approach promotes the idea of making changes to our management actions as a result of what we learn from actual activities and doing so efficiently. The Tongass plan monitoring program facilitates adaptive management through the components of the plan monitoring program illustrated in Table 1.

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Following is a description of how the monitoring and evaluation items in this Plan Monitoring Program are organized in Table 1. Data collected for each monitoring item will be aggregated and evaluated on an annual basis unless otherwise noted. Monitoring items include the following five components:

1. **Monitoring Question**—Questions that can be answered to evaluate if the standards and guidelines are applied, if the standards and guidelines are effective, and if the resource objectives of the Forest Plan are met. Questions are organized by resource group. Listed above the question is a brief description of desired conditions, goals and objectives applicable to the resource.
2. **Sampling/Reporting Period**—Sampling period is the frequency of data and information collection. Reporting period is the frequency of data evaluation and reporting. Data are generally collected annually and reported and evaluated at 2-year intervals. The reason for this is that annual evaluation is too frequent and may not show significant changes from the previous year. A longer period of time, such as 5 years, does not accommodate the responsiveness needed for adaptive management.
3. **Indicators**—Management objectives, standards, guidelines, or other bases for monitoring. Where appropriate, the alpha-numeric code for standards and guidelines are listed (refer to Forest Plan Chapter 4, Forest-wide Standards and Guidelines). In some cases, indicators are specific to a single monitoring question and in other cases, they are applicable to multiple questions.
4. **Data and Information Sources**—Ongoing work projects that are associated with collection of information, data, and evaluation specific to monitoring questions. In some cases, data and information sources are specific to a single monitoring question and in other cases, they are applicable to multiple questions. Although not specified in Table 1, use of information and data collected by volunteers, partners, state and federal agencies, tribal organizations, universities, and other sources is encouraged and may be included in the results of monitoring efforts.
5. **Feedback Mechanisms**—Forest management practices and Standard and Guidelines that should be evaluated to identify if the practices and guidelines provide the resource protection and outcomes identified in the objectives, goals, and management prescriptions. In some cases, feedback mechanisms are specific to a single monitoring question and in other cases, they are applicable to multiple questions.

The Forest will develop a monitoring action plan that utilizes the direction found here, the current protocols, and information on annual budgets. The action plan for the Tongass is primarily documented using the WorkPlan budget system after monitoring project proposals are evaluated by a review team. Items specifically included in the action plan include the following:

- **Sampling Methods**—General methods for collecting information needed to address the monitoring question, including a descriptions of the expected precision and reliability of the monitoring process. For the purposes of this plan monitoring program, precision refers to the closeness of repeated measurements, while reliability refers to the nearness of a measurement to the actual variable being measured.
- **Indicators**—Management objectives, standards, guidelines, or other bases for monitoring. Where appropriate, the alpha-numeric code for standards and guidelines are listed (refer to Forest-wide Standards and Guidelines).
- **References**—Statutory or regulatory foundations of the monitoring question.
- **Annual Cost**—Estimated cost of collecting and analyzing information and reporting results to address each question. Although actual annual funding may not correspond to the level projected, the Forest will, subject to appropriations and higher level funding direction, ensure monitoring and evaluation is funded at a level commensurate with the level of funding provided for program implementation.

Modification of the Plan Monitoring Program

The Requirements of the 2012 Planning Rule

The 2012 Planning Rule requires that an existing plan's monitoring program must be made to conform to the monitoring requirements of the Rule within 4 years of the Rule's May 9, 2012 effective date (May 9, 2016), or as soon as practicable:

Where a plan's monitoring program has been developed under the provisions of a prior planning regulation and the unit has not initiated plan revision under this part, the responsible official shall modify the plan monitoring program within 4 years of the effective date of this part, or as soon as practicable, to meet the requirements of this section. (36 CFR 219.12 (c)(1)).

The 2012 Planning Rule, in 36 CFR 219.12 (a)(5), included the following eight requirements:

Each plan monitoring program must contain one or more monitoring questions and associated indicators addressing each of the following:

- (i) The status of select watershed conditions.*
- (ii) The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.*
- (iii) The status of focal species to assess the ecological conditions required under § 219.9.*
- (iv) The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.*
- (v) The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.*
- (vi) Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.*
- (vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.*
- (viii) The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).*

Subject to the above requirements, the responsible official has the discretion to set the scope and scale of the plan monitoring program after considering information needs and the financial and technical capabilities of the Agency (36 CFR 219.12 (a)(4)).

How the Tongass National Forest Meets the Requirements of the Rule

The Tongass National Forest has a robust plan monitoring program that already addresses many of the eight requirements listed in the 2012 Planning Rule. The Tongass National Forest analyzed each of the eight monitoring requirements of the 2012 Planning Rule, and identified how the Forest meets that requirement. This is summarized below.

In the case, where modifications to the 2008 plan monitoring program were necessary in order to meet the requirement, that modification is explained.

(i) The status of select watershed conditions.

Plan monitoring Question 21 Soil and Water – Watershed Health currently meets this requirement.

(ii) The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.

Question 3 Biodiversity - Habitat for Old-Growth Associated Species, Question 6 Biodiversity Ecosystem - Change in Old-Growth by Biogeographic Province, and Question 7 Biodiversity Ecosystem – Old-Growth in the Matrix currently meet this requirement for terrestrial ecosystems. In addition, Question 12 Streams-Fish Habitat - Aquatic Habitat Condition meets this requirement for aquatic ecosystems.

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(iii) The status of focal species to assess the ecological conditions required under § 219.9.

The Tongass NF is currently engaged in a Forest Plan amendment. Once a selected alternative is approved and a signed Record of Decision is available, the Tongass National Forest will identify one or more focal species. It is also expected that within one year of the selection of focal species for the Tongass NF, or as soon as practicable, the responsible official shall modify as necessary the plan monitoring program (this document) to meet the requirements of this section.

(iv) The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.

Question 17 - Threatened and Endangered Species and Alaska Region Sensitive Species was adjusted to meet this requirement. This question formerly applied to wildlife species only. This revision includes all species and now meets the requirement.

No Species of Conservation Concern have yet been identified by the Regional Forester. After such species are identified, the plan monitoring program will be modified to add these species to the monitoring program. At this time, sensitive species are used, as established in the current Forest Plan, to meet the conservation goals, and intent of this requirement, for managing at-risk species.

(v) The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.

Question 33 Recreation (formerly 37) meets the requirement regarding progress toward meeting recreation objectives. Information regarding visitor use and satisfaction is already being gathered as a component of the National Visitor Use Monitoring program. Question 34 was added to better meet this requirement regarding visitor use and satisfaction.

(vi) Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.

To better meet this requirement, monitoring Question 2 Climate Change was modified to utilize the tree species composition analysis that is performed and provided by Pacific Northwest Research station. In the future, it is expected that the forest will further modify the monitoring question and supplement the tree species composition analysis with additional monitoring protocols.

(vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.

Most of the Forest Plan monitoring program questions meet specific Forest Plan Objectives to some extent. For the purpose of meeting this specific requirement of the 2012 Planning Rule, two plan monitoring questions, Question 19 Soil and Water – Soil Productivity and Question 20 Soil and Water – State Water Quality Standards, clearly meet this requirement of the 2012 Planning Rule.

(viii) The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).

Question 19 Soil and Water - Soil Productivity meets this requirement to maintain productivity of the land.

The 2016 Modifications

The Tongass National Forest plan monitoring program developed in 2008 already addressed many of the requirements of the 2012 Planning Rule. The following modifications of the plan monitoring program were primarily adopted to address the gaps between the 2008 program and the 2012 requirements:

- The monitoring question that addresses Climate Change (Question 2) has been modified to more clearly address the requirement of the 2012 Planning Rule for monitoring measurable changes related to climate change and other stressors that may be affecting the Forest. It is anticipated that ongoing climate change vulnerability assessments and multi-stakeholder collaborations will result in a suite of monitoring questions related to climate change. Until that work is completed, the monitoring question has been modified to focus on tree species composition and related factors by utilizing estimates based on data that is currently being gathered by the Pacific Northwest Research Station through the Forest Inventory and Analysis (FIA) program.

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- The monitoring question that addresses Federally Listed Threatened or Endangered and Alaska Region Sensitive Species (Question 17) has been slightly modified so as to clearly indicate that it includes all species, not just wildlife. Species of Conservation Concern for the Tongass National Forest have not yet been identified by the Alaska Region, and this Monitoring Question will be modified to include those species once they have been identified.
- The monitoring question that addresses Recreation (Question 33) meets the requirement regarding progress toward meeting recreation objectives. Furthermore, information regarding visitor use and satisfaction is already being gathered as a component of the National Visitor Use Monitoring (NVUM) program. An additional monitoring question (Question 34) has been added to specifically address visitor use and satisfaction as currently measured by the NVUM program.
- Questions that previously included Management Indicator Species (MIS) have been updated (Question 11 and Question 14). The 1982 planning regulations to implement the National Forest Management Act (NFMA) directed the use of MIS in forest planning to help display the effects of forest management; the 2008 Forest Plan includes identification and analysis of 13 wildlife and 4 fish MIS. The 2012 regulations do not include the requirement for MIS and references to MIS have been removed in this monitoring program revision. Until focal species are identified (after completion of the ongoing Forest Plan Amendment), some species that were formerly identified as MIS are still included in this monitoring program.

The species included for monitoring were based on a series of workshops held in 2011 with representatives from Alaska Department of Fish and Game, National Marine Fisheries Service, US Fish and Wildlife Service, and the US Forest Service. The workshops were convened to evaluate the Tongass National Forest MIS and develop a set of proposed MIS that would more effectively serve the Tongass. After following a structured process used to revise MIS elsewhere on National Forest Service lands (Hayward et al 2001), the group recommended retaining deer, marten, brown bear, black bear, mountain goat, and bald eagle for wildlife and coho salmon, Dolly Varden char, and cutthroat trout for fish (Hayward and Jacobsen 2011). These species have been retained in this monitoring program revision. In addition, wolf has been retained for wildlife in compliance with Forest Plan Standard and Guideline WILD1.XIV.A.1(a).

- Editorial Changes: The goals and objectives above some monitoring questions were minimally adjusted to better reflect the wording in the 2008 Forest Plan. Language throughout the document was modified slightly to conform to the new language in the 2012 Planning Rule. Some Indicators and Data Sources were updated to reflect current monitoring efforts, new sources, or comment suggestions. For example, an indicator was added to Question 16 (Subsistence) to review if any projects were determined to have a significant possibility of a significant restriction on subsistence resources and a cross-reference was added to Question 2 (Climate Change) to refer to other questions that may contain associated information.

Questions have been renumbered to accommodate grouping similar resources together. For example, the resource headings "Biodiversity" and "Biodiversity Ecosystem" have been combined into one section. Other questions that addressed the same topic have been combined to improve efficiency during data gathering and better display the information in the evaluation report. For example, two questions on non-interchangeable components (under "Timber Resource") are now in one question. Numbering changes are noted for each question if applicable.

- The monitoring question that addresses cultural resources (Question 35 Heritage Program) was updated at the request of the Forest Heritage Program Manager to better reflect monitoring of the Forest Plan Standards and Guidelines for that resource.
- The stated goals / objectives associated with Questions 28 and 29 Transportation Systems were updated to reflect the current State of Alaska regulatory agency for log transfer facility and storm water discharge permits.

Deferred and Future Actions

The requirement that the Forest monitor the status of focal species to assess the ecological conditions required under 36 CFR 219.9 will be deferred until focal species are identified after completion of the ongoing Forest Plan Amendment. A Record of Decision for the Forest Plan Amendment is expected late in 2016. As discussed in the previous section, the current climate change vulnerability assessments may

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potentially identify a suite of monitoring questions related to climate change that could be added or modified at a later date, and Species of Conservation Concern are not yet identified by the Alaska Region and will be added to the monitoring program after they have been selected.

In addition, the Forest Plan Amendment, currently under way, may identify other modifications to the plan monitoring program that should be made. Future modifications to the monitoring program, including those that may be necessary as a result of the upcoming Forest Plan Amendment, the identification of focal species, and/or the identification of Species of Conservation Concern, are administrative in nature but substantial changes can only be made after notice to the public and consideration of public comment [36 CFR 219.13 (c)(1) and 36 CFR 219.16 (c)(6)].

Reference to Requirements of the 2012 Planning Rule

For each question in Table 1, a reference to the specific requirement of the rule is given. For those questions that specifically address a requirement of the rule and are described in the section, *How the Tongass National Forest Meets the Requirements of the Rule*, above, the reference is appended with the word "Requirement." This includes questions 2, 3, 6, 7, 12, 17, 19, 20, 21, 33, and 34. For those questions that are intended to monitor specific Forest Plan components, the reference is appended with the phrase "Forest Plan."

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Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (more detailed description of column headings is found on previous pages)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
Air Quality Maintain the current air resource condition to protect the Forest's ecosystems from on and off Forest air emissions sources. Attain national and state ambient air quality standards Forest-wide. 1. Is air quality being maintained? <i>Forest Plan</i>	Annual / 2 year	Changes in air quality relative to state and federal ambient air quality standards (AIR2 II.A.)	Air inventory and monitoring	Evaluate and change management practices; Air Standards and Guidelines
Climate Change and Other Stressors Ecosystem services benefit communities from the local to the global scale. This includes "regulating services" such as those processes that affect climate, water, disease regulation, and pollination. 2. What are the measurable changes related to climate change and other stressors that may be affecting the Forest? <i>36 CFR 219.12 (a)(5)vi - Requirement</i>	5 year / 5 year	Changes in tree species composition as measured by basal area cover, and other changes including growth, sapling recruitment, harvest, snags, decay, and other relevant measures (TIM2) See also the "Invasive Species" and "Insects and Disease" sections as possible "other stressors"	Inventory data from FIA permanent plots established in 1995–2003 and remeasured periodically are used to provide estimates of tree species composition and other factors.	Evaluate key changes and effects on selected resources and assess potential changes to the Forest Plan

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Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
Biodiversity Maintain ecosystems capable of supporting the full range of native and desired non-native species and ecological processes. Maintain a mix of representative habitat types at different spatial and temporal scales. Maintain a system of old-growth and other forest habitats (includes reserves, non-development LUDs, and beach, estuary, and riparian corridors) to sustain old-growth associated species and resources. Include a young-growth management program to maintain, prolong, and/or improve understory forage production and to improve habitat conditions, including future old-growth characteristics on both suitable and unsuitable lands.				
3. (Formerly 4) Following young-growth treatments, is the change in understory vegetation providing improved habitat for key old-growth associated species? 36 CFR 219.12 (a)(5)ii – Requirement	Annual / 2 year	Assessment of understory species composition (WILD2)		
4. (Formerly 5) Are young-growth treatments improving other key habitat components for old-growth associated species? Forest Plan	Annual / 2 year	Assessment of understory species composition (WILD2), restocking of yellow cedar (TIM9), fungi composition in the stand		
5. (Formerly 9) Is the old-growth habitat on the Tongass being maintained to support populations of old-growth associated species and recognized subspecies, as described in the Conservation Strategy? Forest Plan	Annual / 2 year	Changes in the system of large, medium and small habitat reserves and non-development LUDs (WILD1 II.B).	Silviculture inventory (FACTS), wildlife inventory, Tongass-wide young-growth study (TWYGS), research studies, GIS, NEPA decisions	Evaluate and change, if needed, management actions and silvicultural prescriptions; KV Plans; Timber Standards and Guidelines; Wildlife Standards and Guidelines
6. (Formerly 10) Are any effects on biodiversity resulting from the cumulative change in the extent of old-growth by biogeographic province, and are those effects consistent with the estimates and intent of the Forest Plan? 36 CFR 219.12 (a)(5)ii – Requirement	Annual / 2 year	Changes in the amount of old growth in relations to finer scale classification (such as plant associations or high volume strata) (WILD1 II.B) Change could include effects of timber harvest, land exchanges or conveyance, windthrow, insect and disease, climate change, etc.		
7. (Formerly 11) Are old growth features retained in the matrix consistent with expectations and is it representative of old growth types across VCUs and across the Forest? 36 CFR 219.12 (a)(5)ii – Requirement	Annual / 2 year	Amount of retained old-growth structure within managed landscapes (examples include legacy structure, reserve trees, windfirm buffers)		

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Insects and Disease</p> <p>The Forest's management activities do no contribute to increasing levels of destructive insect and disease organisms. Endemic levels of insects and disease perform their natural role in the ecosystem.</p> <p>8. (Formerly 6) Are destructive insects and disease organisms increasing to potentially damaging levels following management activities? <i>Forest Plan</i></p>	Annual / 2 year	Identify and quantify areas where insects and disease are occurring (HEALTH1)	Silviculture inventory, State and Private Forestry aerial surveys, Pacific Northwest Research station studies	Evaluate and change, if needed, management practices; Timber Standards and Guidelines; Invasive Species Standards and Guidelines
<p>Invasive Species</p> <p>Manage the Forest to reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of invasive species. Native and desired non-native species are not threatened by invasive species.</p> <p>9. (Formerly 7) What are the status and trends of areas infested by aquatic and terrestrial invasive species relative to the desired condition? <i>Forest Plan</i></p> <p>10. (Formerly 8) How effective were our management activities, including those done through partnerships, in preventing or controlling targeted invasive species? <i>Forest Plan</i></p>	Annual / 2 year	An assessment of changes noted in inventory of aquatic and terrestrial invasive species (INV1).	Silviculture inventory, state and private forestry insect and disease surveys; Pacific Northwest Research Station studies	Evaluate and change, if needed, management practices; Timber Standards and Guidelines; Invasive Species Standards and Guidelines

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Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
Streams-Fish Habitat Maintain or restore the natural range and frequency of aquatic habitat conditions on the Tongass National Forest to sustain the diversity and production of fish and other freshwater organisms.	Annual / 2 year	Habitat changes and population trends for fish species.	Field collected data; Forest-wide databases	Evaluate site characteristics; stream protection measures and change, if needed,; Fish and Riparian Standards and Guidelines
11. (Formerly 13) Are the trends in abundance of Dolly Varden char, cutthroat trout, and coho salmon related to changes in habitat associated with forest management, climate change or other factors? <i>Forest Plan</i>				
12. (Formerly 14) Is the natural range and frequency of aquatic habitat conditions maintained? <i>36 CFR 219.12 (a)(5)ii – Requirement</i>	Annual / 2 year	Compliance with Fish Standards and Guidelines (FISH2. IV, FISH3. I.A)		
13. (Formerly 15) Is riparian vegetation maintained or restored to a condition that supports key riparian functions? <i>Forest Plan</i>	Annual / 2 year	Effects of management activities on riparian areas. Riparian Standards and Guidelines (RIP1 II.A)		

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
Wildlife Terrestrial Habitat Maintain the abundance and distribution of habitats, especially old-growth forests, to sustain viable populations in the planning area. Maintain habitat capability sufficient to produce wildlife populations that support the use of wildlife resources for sport, subsistence, and recreational activities.	Annual / 2 year (all species may not be monitored every year)	Habitat changes and population trends (WILD 1. I.B and D, and WILD 1. II.B). Participate in interagency monitoring of wolf and marten populations (WILD 1.XIV.A.1 and WILD 1.XVIII.A.1).	Wildlife inventory and monitoring; population trend data from various sources (ADFG, Breeding Bird Survey, Alaska Landbird Monitoring); subsistence management actions	Evaluate management practices and change if needed; Wildlife Standards and Guidelines; in-season subsistence manager actions
14. (Formerly 16) What are the population and habitat trends for the following species and do the trends appear to be related to forest management, climate change, or other factors? Sitka Black-tailed Deer, Marten, Alexander Archipelago Wolf, Brown Bear, Black Bear, Mountain Goat, Bald Eagle Forest Plan				
15. (Formerly 18) What is the geographic distribution and habitat relationships of mammalian endemic species on the Tongass? Forest Plan		Documentation for mammalian taxa with limited historical ranges including geographic extent and habitat distribution across islands and mainland Forest (WILD1.I.B, WILD 1. XIX).		
Subsistence Management Provide for the continuation of subsistence uses and resources by all rural Alaskan residents.	Annual / 2 year	Changes in traditional resource use patterns, traditional environmental knowledge, and subsistence needs and uses; Trends in changes to both State and Federal harvest regulations (SUB I.D); number of projects determined to have a significant possibility of a significant restriction on subsistence.	Subsistence records, ADFG and Federal hunt reports and regulations, tribal consultation database, NEPA decisions (subsistence findings)	Evaluate management practices and change if needed; Subsistence Standards and Guidelines
16. (Formerly 34) Are the effects of management activities on subsistence users in rural Southeast Alaska communities consistent with those estimated in the Forest Plan? Forest Plan				

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Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Threatened and Endangered Species, Region 10 Sensitive Species, and Rare Plant Species</p> <p>Populations of sensitive and rare species and their habitats are considered and maintained as to preclude the need for listing species as threatened or endangered. There are no threatened or endangered species on the Forest.</p> <p>Provide sufficient habitat to preclude the need for listing species under the Endangered Species Act, or from becoming listed as Sensitive due to National Forest habitat conditions.</p> <p>17. Is current management providing for ecological conditions to support federally listed threatened or endangered species, and Alaska Region sensitive species? 36 CFR 219.12 (a)(5)iv – Requirement</p> <p>18. (Formerly 12) What are the cumulative effects of changes to habitats that sustain rare plants? Forest Plan</p>	Annual / 2 year	Changes in habitats for the listed threatened or endangered species, and Alaska Region sensitive species (PLA1, WILD4); changes to listed species or critical habitat; biological evaluation findings / number of consultations; mitigation measures implemented / number of populations located	Wildlife inventory and monitoring; population trend data from various sources (ADFG, Breeding Bird Survey, Alaska Landbird Monitoring); TNF Rare Plant surveys; project BE/BA analyses; NEPA documents – review mitigation measures and S&G implementation; GIS	Evaluate management practices and change if needed

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Soil and Water</p> <p>Maintain soil productivity and minimize soil erosion resulting from land-disturbing activities (meet Alaska Region Soil Quality Standards). Minimized sediment transported to streams from land disturbing activities. Maintain and restore the biological, physical, and chemical integrity of Tongass National Forest waters. Ecological function is maintained within watersheds of the plan area while resource management activities sustain human needs and uses.</p> <p>19. Are the soil conservation practices implemented and effective in meeting Alaska Regional Soil Quality Standards and maintaining soil productivity? 36 CFR 219.12 (a)(5)vii and viii – Requirement</p> <p>20. 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? 36 CFR 219.12 (a)(5)vii – Requirement</p> <p>21. 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)? 36 CFR 219.12 (a)(5)i – Requirement</p>	<p>Annual / 2 year for questions 19 and 20; annual and 5 year for question 21</p>	<p>Compliance and implementation of the Region 10 Soil Quality Standards (SW3 I.A.4)</p> <p>Compliance and implementation of BMPs and the State Water Quality Standards (SW3 I.A.2 and 3).</p> <p>Effects of management activities on Watershed Condition Class (SW4 I.A.1)</p>	<p>Field-collected data; Forest wide data bases; BMP Soil and Water Monitoring; watershed analysis</p>	<p>Evaluate site characteristics and change if needed; logging systems implementation; road design and construction; recreation design and development; Soil and Water Standards and Guidelines</p> <p>Evaluate site characteristics and restoration practices</p>

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Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Wetlands</p> <p>Avoid or minimize the destruction, loss, or degradation of wetlands, and preserve and enhance wetland functions and values.</p> <p>22. Were the wetland conservation practices implemented and effective to avoid and/or minimize impacts to wetlands to the extent practicable? <i>Forest Plan</i></p>	2 year / 2 year	Compliance and implementation of the Wetlands Standards and Guidelines (WET I.A and B)	Field-collected data, forest wide database; BMP Soil and Water Monitoring	Evaluate site characteristics and change if needed; logging systems implementation; road design and construction; recreation design and development; Wetland Standards and Guidelines
<p>Karst and Cave Ecosystems</p> <p>Maintain the natural karst processes and productivity of the karst landscape while providing for other land uses where appropriate. Protect significant caves and their associated resources.</p> <p>23. Are the biological, mineralogical, cultural, paleontological components, and recreational values of the karst and caves maintained? <i>Forest Plan</i></p>	Annual / 2 year	Effects of management activities on caves and karst landscape: KC1.II. A, C, and F; KC2 I.A.	Karst inventory and monitoring	Evaluate management practices and change if needed; Karst and Cave Standards and Guidelines

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Timber Resources</p> <p>Manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest on an even-flow, long-term sustained yield basis and in an economically efficient manner.</p> <p>The annual allowable sale quantity (ASQ) was partitioned into two non-interchangeable components (NIC) based on operability to promote economic sustainability of the timber resource; Land of normal operability is designated NIC I; all other land is designated NIC II.</p> <p>Manage young-growth to improve habitat for wildlife and for commercial timber production.</p>				
<p>24. (Formerly 3) Are forest lands restocked within 5 years after harvest? <i>Forest Plan</i></p>	Annual / 2 year	Restocking of all acres of harvested forest land following a regeneration harvest (TIM9)	Silviculture inventory (FACTS)	Evaluate and change, if needed, silvicultural prescriptions; KV Plans
<p>25. (Formerly 24, 27, and 28) Is the Forest meeting demand for economic timber sales within the limits of the timber sale adaptive management strategy? Is there sufficient volume under contract or awaiting sale? <i>Forest Plan</i></p>	Annual / 2 year	CH 2 Timber Goals and Objectives; Number and volume of sales offered, sold, or under contract; acres and volume NEPA cleared; adaptive management threshold for phase 2 and 3 lands; annual demand calculation	Silviculture Inventory, Timber Monitoring	Evaluate management practices and change if needed; Standards and Guidelines
<p>26. (Formerly 25) Are timber harvest activities adhering to applicable timber management standards and guidelines relative to: a) created openings exceeding the maximum size limit for unit harvest, b) harvest on slopes greater than 72 percent slope gradient, or c) within the 1,000 feet beach and estuary buffer? <i>Forest Plan</i></p>	Annual / 2 year	Compliance with Standards and Guidelines: TIM5 II.C, III.A, B and C; SW3 I.A.5.; BEACH2 II.A.6.	Cut and sold monthly report and 6/12-month sale reports	
<p>27. (Formerly 26, 29, and 30) Is the amount of harvest within the ASQ? What proportion of the harvest is in each non-interchangeable component (NIC) and is the mix accurate compared to the Forest Plan? <i>Forest Plan</i></p>	Annual / 2 year	Harvested volume compared to ASQ (TIM1.I.A)	GIS	
		Amount of volume harvested by NIC (TIM1.I.B)		
		Amount of volume within NIC I and NIC II areas across the Forest.		

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Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Transportation System</p> <p>Develop and manage roads and utility systems to support resource management activities; recognize the potential for future development of major transportation and utility systems.</p> <p>Maintain trails to a standard that provides for the health and safety of all users.</p> <p>Each log transfer facility (LTF) is operated under terms of the LTF permits, in accordance with Alaska Water Quality Standards, and requirements from the Alaska Department of Environmental Conservation for Storm Water Discharge (ADEC Alaska Pollutant Discharge Elimination System permits).</p> <p>28. (Formerly 31) Are the standards and guidelines used for forest development roads and log transfer facilities effective in limiting the environmental effects to anticipated levels? <i>Forest Plan</i></p> <p>29. (Formerly 32) Are roads and trails maintained in accordance with management objectives? <i>Forest Plan</i></p>	Annual / 2 year	<p>Environmental effects of forest development roads and Log transfer Facilities. Focal areas include: drainage of rock pits (TRAN4 IV., BMP 14.9, TRAN4 II.A.6; BMP 14.17), and effectiveness of access management prescriptions in restricting access and preventing sediment transport (TRAN6 1.A); amount of deferred maintenance remaining and corrected</p> <p>Construct, operate, and maintain trails and waterway facilities as part of the transportation system (TRA12. B.)</p>	Roads and LTF inventory and monitoring; INFRA; BMP monitoring; Access Management Plans; contracts	Evaluate management practices and change if needed; Standards and Guidelines

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Mining and Minerals Exploration</p> <p>Provide for environmentally sound mineral exploration, development, and reclamation in areas open to mineral entry and in areas with valid existing rights that are otherwise closed to mineral entry. Seek withdrawal of specific locations where mineral development may not meet Land Use Designation objectives.</p> <p>30. (Formerly 33) 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? <i>Forest Plan</i></p>	Annual / 2 year	Changes in effects relative to anticipated effects on soil and water resources relative to observations (MG2 III. B).	Minerals inventory and monitoring, BMP monitoring	Evaluate management practices and change if needed; Minerals and Geology Standards and Guidelines

Plan Monitoring Program

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Wilderness Manage designated Wilderness to maintain the enduring wilderness resource while providing for the public purposes of recreational, scenic, scientific, educational, conservation, and historical uses, subject to special provisions of ANILCA and TTRA. Ensure Wilderness ecosystems are substantially free from the effects of civilization (natural). Provide a high degree of remoteness from the sights and sounds of humans (opportunities for solitude or primitive recreation). Keep Wilderness free from human control or manipulation (untrammeled). Minimize improvements or human occupation, including mechanized transport and motorized equipment, in accordance with legislative guidelines (undeveloped).</p> <p>31. (Formerly 35) Is the wilderness character being maintained? <i>Forest Plan</i></p>	Annual / 2 year	Compliance with guidelines establishing levels of social encounters, development, and visitor impacts (REC3).	Wilderness inventory and monitoring, wilderness stewardship performance reports, MRDG	Evaluate management practices and change if needed; Wilderness Standards and Guidelines, wilderness stewardship performance trend
<p>Wild and Scenic Rivers Maintain the outstandingly remarkable values and the free-flowing conditions of river segments designated or recommended for designation to the National Wild and Scenic River System.</p> <p>32. (Formerly 38) Are Wild, Scenic, and Recreational River Standards and Guidelines effective in maintaining or enhancing the free flowing conditions and outstandingly remarkable values at the classification level for which the river was found suitable for designation as part of the National Wild and Scenic River System? <i>Forest Plan</i></p>	Annual / 2 year	Compliance of activities with standards and guidelines. The degree to which human activities maintain or enhance the resource values of the river (REC3).	Recreation inventory and monitoring	Evaluate management practices and change if needed; Recreation and Tourism Standards and Guidelines

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Recreation and Tourism</p> <p>Provide a range of recreational opportunities consistent with public demand, emphasizing locally popular recreation places and those important to the tourism industry. Manage the Forest's recreation settings in accordance with the Recreation Opportunity Spectrum standards and guidelines for each LUD.</p> <p>33. (Formerly 37) Are areas of the Forest being managed in accordance with the Recreation Opportunity Spectrum (ROS) class in Forest-wide Standards and Guidelines? 36 CFR 219.12 (a)(5)v – Requirement</p> <p>34. (NEW) What is the status and trend of visitor use and visitor satisfaction? 36 CFR 219.12 (a)(5)v – Requirement</p>	<p>Annual / 2 year for question 33; 5 year / 5 year for question 34</p>	<p>Compliance with guidelines: REC3 I, II,III, Appendix I (and other standards and guidelines specific to numbers of encounters allowed in each LUD / ROS class).</p> <p>Annual Visitation Estimates, Percent Satisfied, Site Types visited, Distance Travelled.</p>	<p>Recreation inventory and monitoring; ROS updates in GIS</p> <p>National Visitor Use Monitoring (NVUM) Program</p>	<p>Evaluate management practices and change if needed; Recreation and Tourism Standards and Guidelines</p>
<p>Heritage Program</p> <p>Identify, evaluate, preserve, and protect cultural resources in compliance with laws and regulations, including their amendments and associated implementation direction. Consult with tribes to protect and maintain sacred sites. Manage and protect sacred sites as an integral part of the landscape and land management planning.</p> <p>35. (Formerly 36) a) Are cultural resources being protected through regularly scheduled monitoring efforts for Priority Heritage Assets? b) Are cultural resources being managed at a project-specific level in accordance with Forest Service policy of avoidance and protection or through achieving a “no adverse effect” to historic properties with a signed Memorandum of Agreement with the State Historic Preservation Officer? c) Are sacred sites identified and protected through regularly scheduled monitoring efforts and/or consultation with affected tribes or Indian Religious Practitioners? Forest Plan</p>	<p>Annual / 2 year</p>	<p>Compliance of activities with Heritage Resource and Sacred Sites Standards and Guidelines (HSS I, II, III, VI) and relevant laws.</p>	<p>Cultural resources inventory and monitoring; tribal consultation database; SHPO determinations</p>	<p>Evaluate management practices and change if needed; Heritage and Sacred Sites Standards and Guidelines</p>

Plan Monitoring Program

Table 1. Forest Plan Monitoring Questions, Evaluation Criteria and Adaptive Management Feedback Mechanism (continued)

Forest Plan Objectives and Monitoring Questions	Sampling/ Reporting Period	Indicators	Data Sources	Feed Back Mechanism
<p>Scenery</p> <p>Provide Forest visitors with visually appealing scenery with emphasis on areas seen along the Alaska Marine highway, tour ship and small boat routes, State highways, major forest roads, and from popular recreation places; recognize that in other areas where landscapes are altered by management activities, the activity may visually dominate the characteristic landscape.</p> <p>36. (Formerly 39) Are the adopted scenic integrity objectives established in the Forest Plan met? <i>Forest Plan</i></p>	Annual / 2 year	Whether the standards and guidelines associated with unit harvest and view shed disturbed are adequate to meet the scenic integrity objectives (SCENE2 II.A, B, C, D)	Scenery inventory and monitoring	Evaluate management practices and change if needed; Scenery Standards and Guidelines
<p>Economics</p> <p>Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska. Support a wide range of natural-resource employment opportunities within Southeast Alaska's communities.</p> <p>37. (Formerly 40) What are the numbers and trends of employment in the a) wood products, b) recreation and tourism, c) mining, and d) fishing industries in Southeast Alaska? <i>Forest Plan</i></p>	Annual / 2 year	Effects of Forest Plan implementation of employment by resource sector.	Socio-Economic inventory;	Evaluate management practices and change if needed
<p>Cost and Outputs</p> <p>The Forest is allocated funds annually to be used to accomplish Forest Plan Objectives; these funds and associated output targets vary annually and are not contained within the Forest Plan.</p> <p>38. (Formerly 41) What is the trend in outputs and their associated costs? <i>Forest Plan</i></p>	Annual / 2 year	Outputs and costs of desired goods and services from annual Tongass report	Forest budget and accounting	Evaluate management practices and change if needed