

Chapter 6

Monitoring and Evaluation Plan

Introduction

Monitoring and **evaluation** is a quality control process for implementation of the Tongass Land and Resource Management Plan (TLMP). It provides the public, the Forest Service, and other concerned resource agencies with information on the progress and results of TLMP. 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 the feedback that triggers corrective action and the adjustment of plans and budgets, or both, so that they are realistic and being adhered to.

TLMP identifies **management direction** for the Tongass in terms of goals, objectives, and standards and guidelines--all of which are based on underlying assumptions (policy, theory, data, and technology). **Monitoring** is gathering data and information and observing the results of management activities to provide a basis for the periodic evaluation of the Plan. **Evaluation** is a process for interpreting monitoring data and determining whether changes in management direction are needed. This plan recognizes three types of monitoring and evaluation: **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 objectives, whether objectives are achieving goals, and includes an evaluation on whether there are significant changes in productivity of the land. Validation monitoring and evaluation is used to examine whether the assumptions and predicted effects used to formulate the plan are accurate. The precise methods used for the sampling methods are contained in the Tongass Forest Monitoring Methods Handbook (in development at the time this Plan was printed). These methods are periodically updated to reflect the most recent survey and analysis procedures.

Roles and Responsibilities

The Forest Service will continue to strengthen the collaborative working relationships between the Alaska Regional Office, each Administrative Area, and the Pacific Northwest Station. For the purposes of this monitoring and evaluation plan, the roles and responsibilities of forest management and forest research are defined below:

Regional Office. The Regional Office will develop regional policies and directives on monitoring and evaluation.

Administrative Areas. Each Administrative Area (Chatham, Ketchikan, Stikine) will implement the Plan and conduct implementation monitoring and evaluation. The responsibilities of the Administrative Areas include:

Preparing an annual **monitoring** program.

Collecting data for **implementation**, effectiveness, and validation monitoring.

Assisting the Pacific Northwest Station in collecting data for effectiveness and validation monitoring.

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Analyzing and interpreting implementation monitoring data 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 Station will provide scientific and technical expertise to conduct effectiveness and validation monitoring and evaluation. The responsibilities of the Station include advising and assisting the Region with:

Publishing, when appropriate, study results in Regional publications, Pacific Northwest Research Station publications or professional journals.

Development of monitoring study plans, including study objectives, sampling designs, methods, quality assurance plans, and budgets in cooperation with the Administrative Areas.

Collection of data for effectiveness and validation monitoring (with the assistance of the Administrative Areas).

Analysis and interpretation of the data.

Reporting study results, conclusions and recommendations to the Administrative Areas and the Regional Office, and making these reports available to the public and other agencies.

Relationship to Other Monitoring Activities

This monitoring and evaluation plan is not intended to depict all monitoring, inventorying, and data gathering activities undertaken on the Tongass, nor is it intended to limit monitoring. Many such activities are conducted under direction contained in site-specific project plans developed under the programmatic guidance of TLMP. Other routine [monitoring](#) activities include the preparation of [timber](#) sale administrator and engineer reports. In addition, monitoring for large-scale mining activities are included in the site-specific [Plans of Operation](#) for each mine.

Management of the Forest, including implementation of project plans and TLMP, is reviewed and documented periodically by various Forest Service officials during what are known as “management reviews,” “activity and program reviews,” and “general management reviews,” depending on the geographic or programmatic scope of the review, or both. Administrative studies can be yet another form of monitoring. Some of the studies on-going at the time of this TLMP revision include growth and yield of [forested wetlands](#), buffer strip stability, [V-notch](#) soil stability based on [timber](#) cutting prescriptions, stream temperature monitoring, and effectiveness of fish passes. The Monitoring Avian Productivity and Survivorship (MAPS) program is conducted on all Administrative Areas, as are counts of marbled murrelets and other species of interest.

The requirements of this [monitoring](#) and [evaluation](#) plan are not intended to replace monitoring requirements developed in the project planning process, or other ongoing monitoring activities such as management reviews. Specific project monitoring requirements are determined during the [National Environmental Policy Act](#) project planning process, based on interagency and public involvement early in the planning process. Although there will be overlap between monitoring requirements of project plans and TLMP, no single project monitoring plan is expected to address all of the questions listed in this monitoring and evaluation plan. Some project plans may impose monitoring requirements not included in this monitoring and evaluation plan, in response to site-specific concerns. Taken as a

whole, however, each Administrative Area's project monitoring should be designed to answer the questions posed in this monitoring and evaluation plan, so that wherever possible monitoring requirements in TLMP can be met by compiling the results of project monitoring.

Finally, other data gathering activities are listed in Appendix B as "information needs." These are inventory or research items that are useful or necessary, and can be thought of as "monitoring" in a broad use of the term. Many of these items are often called "baseline" or "trend" monitoring. However, these items are not included in the monitoring and evaluation plan.

Annual Monitoring and Evaluation Programs

The Forest Supervisors are responsible for coordinating the preparation of an annual monitoring and evaluation report. Such reports will summarize the monitoring activities conducted during the year covered and the results obtained, address each of the monitoring questions listed in this monitoring plan and evaluate the implementation of TLMP. Finally, the annual monitoring and evaluation report should include recommendations for remedial action, if necessary, to make management activities and their effects consistent with TLMP. Specific recommendations for corrective action will depend on the risk to the resource and the type of disparity discovered. The types of action that could be recommended include:

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.

Changing the projected output schedule, if it turns out to be unachievable given funding and other constraints.

Revising the budget, if the anticipated costs of implementation of TLMP turn out to be incorrect.

Amending TLMP to change, for example, the allocation of particular areas from one [Land Use Designation](#) to another, or changing one or more of the standards and guidelines. (Refer to the description of revising the Forest Plan in Chapter 5.)

Revising TLMP if major changes are warranted.

Monitoring and Evaluation Items

Following is a description of how the monitoring and evaluation items in this plan are organized in Table 6-1. Data collected for each monitoring item will be aggregated and evaluated on an annual basis unless otherwise noted. Monitoring items are sorted alphabetically by resource area and include the following five components:

Monitoring Question and Type of Monitoring and Evaluation.
Implementation [I], effectiveness [E], and validation [V].

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Annual Cost. Estimated annual cost (1997 dollars in thousands) of collecting information and analyzing and reporting results to address each question. Although actual annual funding may not correspond to the level projected in TLMP, each Administrative Area will, subject to appropriations and higher level funding direction, ensure that monitoring and evaluation is funded at a level commensurate with the level of funding provided for program implementation. The total annual estimated costs for monitoring and evaluation is approximately \$1.4 Million.

Evaluation Criteria. 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 & Guidelines](#), Chapter 4).

Sampling Methods. General methods for collecting information needed to address the monitoring question. More detailed sampling methodologies are contained in the Tongass Forest Monitoring Methods Handbook (in development when this Plan was printed). These methods will be periodically updated. Descriptions of the expected precision and reliability of the monitoring process will be addressed in the Methods Handbook. For the purposes of this monitoring and evaluation plan, precision refers to the closeness of repeated measurements and reliability refers to the nearness of a measurement to the actual variable being measured. In general, we expect that the monitoring process described in this chapter has a moderately high precision and reliability.

References. Statutory or regulatory foundations of the monitoring question.

Table 6-1.
Monitoring and evaluation items for the Tongass Land Management Plan.

Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
Air Quality				
Is air quality meeting State and Federal ambient air quality standards? (V)	1	Changes in meeting state and federal ambient air quality standards.	Annually summarize and evaluate available information from the State of Alaska Department of Environmental Conservation and the U.S. Environmental Protection Agency.	Clean Air Act
Biodiversity				
Are contiguous blocks of old growth habitat being maintained in a forest-wide system of old growth reserves to support viable and well distributed populations of old growth associated species and subspecies? (I)	3	Changes in the system of large, medium, and small habitat reserves identified and mapped in the Forest Plan as part of a forest-wide old-growth habitat reserve strategy: WILD112 II.B. Appendix K.	Annually measure and review the cumulative changes to the old-growth reserve system, including boundary changes done through project implementation and due to natural changes in condition such as insect and disease epidemics or fire. Evaluate if the remaining old-growth blocks, including both those in development and non-development LUD's, meet or exceed the minimum criteria for size, spacing, and composition.	36 CFR § 219.12 (k)
Are the effects on biodiversity consistent with those estimated in the Forest Plan? (E, V)	3	Changes in habitat types at the appropriate scales.	Annually calculate the changes in the amount of acres for each habitat type, as displayed in the FEIS, at the appropriate scales. Compare this to the effects estimated for these changes in the Forest Plan .	36 CFR § 219.12 (k)
Are management practices consistent with current knowledge regarding sensitive species conservation (federally listed threatened or endangered species , Alaska Region sensitive species, and State species of special concern)? (E, V)	30	Habitat changes and population trends for threatened, endangered, and sensitive taxa: TE&S I.A.1, 2, 3, and 4.	Annually review files and recent information regarding sensitive taxa on the Tongass National Forest. Consult with other agencies regarding these species and whether additional species should be considered for addition to the Region 10 sensitive species list. These species include all other species in Southeast Alaska with threatened or endangered status (U.S. Fish and Wildlife Service designation), sensitive species status (U.S. Forest Service designation), and Species of Special Concern status (Alaska Department of Fish and Game designation). Evaluate data collected in studies to determine the need for changes in the standards and guidelines of the Tongass land management plan. Summarize results of Biological Evaluations and associated effectiveness monitoring conducted at the project-level level, and results of any consultations with ADF&G and U.S. FWS under the MOU with those agencies.	36 CFR § 219.12 (k)

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Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
Are destructive insect and disease organisms increasing to potentially damaging levels following management activities? (E)	4	Identify and quantify areas where insects or disease are occurring: HEALTH1 I.	Annually summarize by Administrative Area information from the annual Alaska Region report: <i>Forest Insect and Disease Conditions in Alaska</i> .	36 CFR § 219.12 (k)(5)(iv)
<i>Fish Habitat</i> Are population trends for Management Indicator Species (MIS) and their relationship to habitat changes consistent with expectations? (V)	5	Habitat changes and population trends for management indicator species.	Pink and coho salmon —Annually evaluate harvest and spawning-survey statistics, as reported by the Alaska Department of Fish and Game, to determine long-term population trends. Compare with predictions (of no measurable effect to fish habitat). (Also see fish and riparian effectiveness monitoring, below.) Dolly Varden char —Annually evaluate harvest statistics, as reported by the Alaska Department of Fish and Game, to help determine long-term population trends. If data are unavailable, conduct population surveys on a sample basis. Compare with predictions (of no measurable effect to fish habitat). (Also see fish and riparian effectiveness monitoring, below.)	36 CFR § 219.19(a)(6)
Are fish & riparian standards and guidelines being implemented? (I)	60	Compliance of land-disturbing projects with Fish and Riparian Forest-wide Standards & Guidelines: RIP2; FISH112 IV. G. (fish passage); FISH112. IV. C. (streambanks & channel protection).	Annually conduct field inspections on a representative sample of newer and older harvest units and their associated roads to determine if standards and guidelines have been implemented. This monitoring may overlap with timber, karst, wetlands, transportation, and soil & water monitoring.	36 CFR § 219.12 (k); Tongass Timber Reform Act
Are fish & riparian standards and guidelines effective in maintaining or improving fish habitat? (E)	60	Effects of management activities in riparian areas on fish habitat	Annually survey a representative sample of class I streams in or adjacent to timber harvest units approved for harvest in the past year. The stream segments will be surveyed before timber harvest, and again 5, 10, and 15 years following harvest. Upon completion of surveys in year 5, results will be reported. Estimate habitat components important for fish, including the fish habitat management objectives such as Large Woody Debris , pool depth, frequency, and percent of pool area, stream width to depth ratios, accumulation of fine sediments, and upstream fish passage at road crossings. This monitoring may overlap with soil & water monitoring.	36 CFR § 219.12 (k)

Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
Heritage Resources				
Are heritage resources standards and guidelines being implemented? (I)	10	Compliance of activities with Heritage Resources Standards & Guidelines: HER.	Assess (on a representative sample of Districts and/or projects) whether procedural requirements of the Heritage Resources Standards & Guidelines are being followed.	36 CFR § 296
Are heritage resources standards and guidelines effective in protecting heritage/cultural resources as expected in the Forest Plan? (E)	40	Evidence of damage to sites.	Conduct field inspections on selected sites at least once a year, and document the conditions of the site, any changes from the previous inspection and, if possible, the cause of the change. Sites should be selected based on an assessment of several factors, including their resource values and their susceptibility to disturbance from natural forces, vandalism or management activity. This monitoring may be conducted in conjunction with heritage resources implementation monitoring.	36 CFR § 296
Karst and Caves				
Are karst and cave standards and guidelines being implemented? (I)	30	Compliance of land-disturbing projects with Karst and Cave Forest-wide Standards & Guidelines: KARST I.	Annually conduct field inspections on a representative sample of newer and older harvest units and their associated roads to determine if standards and guidelines have been implemented. This monitoring may overlap with fish, timber , wetlands , transportation, and soil & water monitoring.	36 CFR § 219.12 (k); Tongass Timber Reform Act
Are karst and cave standards and guidelines effective in protecting the integrity of significant caves and the karst landscape? (E)	50	Effects of management activities on	Annually conduct field inspections on a representative sample of older and newer harvest units and their associated roads to determine if karst and cave standards and guidelines were effective in maintaining the integrity of significant caves and high vulnerability karst landscapes including, karst hydrology, soils loss, forest regeneration sedimentation and debris transport. This monitoring may be conducted in conjunction with karst and caves implementation monitoring.	36 CFR § 219.12 (k)
Land Management Planning				
Is the management of National Forest System lands consistent with management objectives of adjacent lands and their management plans? (I)	3	Implementation of projects under TLMP compared with land management objectives of adjacent publicly owned lands.	Annually note any inconsistencies between National Forest management projects and management objectives of adjacent publicly owned lands. A determination should be made based on information from a number of sources, including project level environmental documents, input from state, local, and other federal agencies, as well as professional judgment.	36 CFR § 219.7 (f); FSH 1909.12-92-1 Chapter 6.21 6

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Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
Local and Regional Economies				
Are the effects on employment and income similar to those estimated in the Forest Plan? (V)	3	Effects of Forest Plan implementation on employment and income by resource sector.	Annually summarize and compare to Plan estimates the natural-resource employment and income estimates from the Alaska Dept. of Labor employment and earnings publications and U.S. Bureau of Economic Analysis income and employment data.	
Has the Forest Service worked with local communities to identify and pursue Rural Community Assistance opportunities? (I)	5	Evidence of a Rural Community Assistance program: RUR I.A.	Annually document, summarize, and evaluate rural community assistance activities; coordinate with community leaders and others in preparing the report.	
Minerals and Geology				
Are the effects of mining activities on surface resources consistent with Forest Plan expectations, as allowed in approved Plans of Operations? (E)	2	Mining operations with effects not anticipated in the Plan of Operations : MG12 III.B.	Annually summarize monitoring efforts, results, and findings conducted under project-specific Plans of Operations.	36 CFR § 219.12 (k)
Recreation and Tourism				
Are areas of the Forest being managed in accordance with the prescribed Recreation Opportunity Spectrum (ROS) class in Forest-wide Standards & Guidelines? (I)	20	Compliance with guidelines: REC122 III. (and other standards and guidelines specific to numbers of encounters allowed in each ROS class).	Annually monitor a representative sample of areas on each Administrative Area. Report cumulative changes in ROS every 5 years.	36 CFR § 219.12 (k)
Is Off Road Vehicle (ORV) use causing, or will it cause, considerable adverse effects on soil, water, vegetation, fish and wildlife, visitors or cultural and historic resources of the Forest? (I, E)	10	The degree to which ORV's are causing impacts: REC112 II.D.	Annually examine a representative sample of areas used by ORV's.	36 CFR § 295; Executive Orders 11644, 11989

Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
Research				
Have identified high-priority information needs been fulfilled?	1	Completion of existing high-priority information needs and identification of any new high-priority information needs.	Annually summarize progress of and significant results from studies addressing high priority information needs.	36 CFR § 219.28
Scenery				
Are the standards and guidelines effective in attaining the adopted Visual Quality Objectives established in the Plan? (E)	20	Whether the standards and guidelines associated with harvest unit size, type of silvicultural system used, amount of dispersal between units, and overall percent of viewshed disturbed are generally adequate to meet the different visual objectives in different types of landscapes: VIS11 II. A, B, C, D.	Select a representative set of viewsheds across the Forest (a minimum of 5 per Administrative Area) that have been harvested during implementation of TLMP standards and guidelines. These viewsheds should be associated with the use areas or travel routes on the visual priority list in Appendix F. This set should include areas representing all four Visual Quality Objectives and landscapes representing the different characteristic landscapes and different Visual Absorption Capability settings. This monitoring should also include assessing the effectiveness of alternatives to clearcutting management. Documentation should include photographic records from established photo points that are updated and assessed periodically and kept in a permanent file. Report 3-5 years following adoption of TLMP and at approximately 5 year intervals thereafter.	
Soil and Water				
Are the standards and guidelines for soil disturbance being implemented? (I)	60	Compliance of land-disturbing activities with Alaska Regional Soil Quality standards: S&W112 I.A.5, 6, 7, 8.	Annually conduct field inspections on a representative sample of older and newer harvest units and their associated roads to determine if soil quality standards were implemented. This monitoring may overlap with timber and soil & water monitoring.	36 CFR § 219.12(k); Alaska Region Supplement to Forest Service Manual (FSM) 2554 #2500-92-1, effective 1/15/92, as amended.
Are the standards and guidelines effective in meeting Alaska Regional Soil Quality Standards? (E)	20	Effects of project management S&W112 I.A.5, 6, 7, 8.	Annually conduct surveys on a representative sample of areas with timber harvest. Repeat this survey in years 3 and 5. Estimate size of mass wasting events (acres and cubic yards), map location, and determine whether associated with management activity or not. Results are reported in year five. If inconclusive, determine whether or not to continue surveys in that VCU. This monitoring may be conducted in conjunction with soil implementation monitoring.	36 CFR § 219.12(k); R10 Supplement to Forest Service Manual (FSM)2554 #2500-92-1, effective 1/15/92, as amended.

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Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
Are Best Management Practices being implemented? (I)	60	Determine if Best Management Practices are being properly implemented on projects. The memorandum of agreement with Alaska Department of Environmental Conservation defines the Best Management Practices monitoring responsibilities of the Tongass National Forest: BMP's: Roads: 12.8, 12.9, 12.16, 14.5, 14.6, 14.7, 14.8, 14.9, 14.10, 14.11, 14.14, 14.15, 14.16, 14.17, 14.19; Timber Harvest: 12.5, 12.6, 12.6a, 12.17, 13.3, 13.10, 13.16, 13.11, 13.14.	Annually conduct field inspections on a representative sample of older and newer harvest units and their associated roads to This monitoring may overlap with timber , karst , wetlands , transportation, and fish monitoring.	36 CFR § 219.12 (k); Clean Water Act
Are Best Management Practices effective in meeting water quality standards? (E)	260	Water quality effects of forest management activities. The memorandum of agreement with Alaska Department of Environmental Conservation defines the Best Management Practices monitoring responsibilities of the Tongass National Forest.	Annually conduct long term best management practice effectiveness studies according to study plans for specific Best Management Practices coordinated across the three Administrative Areas. Current effectiveness monitoring projects include: stability and effectiveness of stream buffers; road drainage structure operations and maintenance; soil disturbance, and downstream aquatic habitat effects in harvested versus non-harvested v-notches ; stream buffer strip stability and consequences of blowdown; effectiveness of class III stream prescriptions in minimizing sediment delivery to fish streams; cumulative watershed effects using macro-invertebrates as indicators of stream health; effectiveness of yarding methods in minimizing soil disturbance and achieving soil quality standards; frequency and effects of landslides in old growth, young growth and clearcut sites on Prince of Wales Island; and macroinvertebrate sampling prior to road construction to measure application of stream crossing installation, road use, and road maintenance. Annual status reports, with comprehensive reports of findings every three years, to correspond with the triennial State water quality standards review.	36 CFR § 219.12 (k)

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Subsistence				
Are the effects of management activities on subsistence users in rural Southeast Alaska communities consistent with those estimated in the Forest Plan? (V)	20	Changes in traditional resource use patterns, traditional environmental knowledge, and subsistence needs	Once every five years summarize and evaluate the effects of the Forest Plan on subsistence users by community. Information used in this evaluation should include testimony from subsistence hearings, project evaluations conducted under ANILCA Section 810, communications with community leaders and elders, the efforts to capture traditional environmental knowledge, and the information obtained from the subsistence study specified in the Information Needs Appendix of the Forest Plan.	36 CFR § 219.12 (k)
Timber Management				
Are timber harvest activities adhering to applicable timber management standards and guidelines? (I)	40	Harvest units in compliance with Forest-wide Standards & Guidelines: TIM114 IV.A., C. (Unit size limits); S&W112 I.A.5. (72% slopes); BEACH2 II.G. (beach and estuary fringe).	Annually conduct field inspections on a representative sample of older and newer harvest units and their associated roads to determine if the following sets of standards and guidelines were implemented as prescribed: maximum clearcut size limits, including compliance with criteria for exceptions to the 100-acre size limit; and timber dispersion , including compliance with (1) guidelines for allowing harvest on slopes in excess of 72 percent and (2) the management of the beach fringe and estuarine areas within timber harvest prescriptions as required by the Beach and Estuary Fringe Forest-wide Standards & Guidelines. This monitoring may overlap with soil & water, karst , wetlands , transportation, and fish monitoring.	36 CFR § 219.12 (k)
Are harvested forest lands restocked within five years following harvest? (I)	40	Restocking of all acres of harvested forest land following a regeneration harvest: TIM24 I.A.	Annually review regeneration certification records in the Silviculture Information System (SIS) to identify the units that have not met the NFMA requirement. Quantify the areas that failed to meet stocking requirements where planting was implemented.	36 CFR § 219.12 (k)(5)(i)
Is the Allowable Sale Quantity (ASQ) consistent with resource information and programmed harvest? (V)	20	New information leading to changes in timber utilization standards, timber inventory results, timber dispersion requirements, tentatively suitable land base (including the suitability of Kaikli, Karheen, Kitkum, and Maybeso forested wetland soils), yield tables, the operability inventory, projections in the average width of the area managed for riparian,	Review and analyze assumptions in TLMP at least every five years, unless major changes in any of the factors listed above are evident earlier. Some of this information can be gathered in conjunction with other monitoring items. Rerun the Report results every 5 years.	36 CFR § 219.27 (b)-(d)

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		beach fringe and estuarine resources, and implementation factors (MIRF's) applied for: streams missing from the channel-type inventories, land not available for timber harvest due to isolation, streams corridors, spatial limitations of FORPLAN, and other factors. Also consider changes in land conditions due to large-scale natural disturbances.		
Are the Non-Interchangeable Components (NIC) of the allowable sale quantity consistent with actual harvest? (I)	3	Amount of harvest by NIC is consistent with amounts specified in the Forest Plan.	Annually evaluate information regarding amount of harvest by NIC I and NIC II categories. Compare the cumulative harvest in these categories to the ceilings specified for the first decade in the Forest Plan for each component.	36 CFR § 219.27 (b)-(d)
Is the proportional mix of volume in NIC I and NIC II as estimated in the Forest Plan accurate? (V)	2	Estimate the amount of volume within NIC I and NIC II areas across the Forest.	Annually report on the progress of the administrative study on NIC's. Upon completion, summarize and evaluate its results to determine if changes to the Forest Plan are required.	36 CFR § 219.27
Should maximum size limits for harvested areas be continued? (V)	3	Maximum size limits of harvest areas and their effects on other resources as well as public acceptance of harvest units at or near the maximum allowable size.	Annually evaluate information, including results of monitoring for other resources, and use professional judgment in determining whether or not to recommend a change to the maximum allowable harvest unit size.	36 CFR § 219.12 (k)(5)(iii); FSH 1909.12-92-1 Chapter 6.21 10
Transportation				
Are the standards and guidelines used for forest development roads and Log Transfer Facilities effective in limiting the environmental effects to anticipated levels? (E, V)	80	Environmental effects of forest development roads and Log Transfer Facilities. Specific areas to be addressed include: drainage of rock pits (TRAN214 IV.; BMP 14.9), fish passage through culverts (TRAN214 II.A.6.; BMP 14.17), and effectiveness of access management prescriptions in restricting access.	Annually conduct field inspections on a representative sample of older and newer harvest units and their associated roads and Log Transfer Facilities to determine whether the standards and guidelines adequately mitigate adverse impacts on other resources, including soil productivity, water quality, and wildlife and fish habitat. This monitoring may overlap with timber, karst, wetlands, soil & water, and fish monitoring.	36 CFR § 219.12 (k)

Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
Wetlands				
Are wetlands standards and guidelines being implemented? (I)	50	Compliance of land disturbing activities with Wetlands Forest-wide Standards & Guidelines: WET III.B. (BMP 12.5).	Annually conduct field inspections on a representative sample of older and newer harvest units and their associated roads to determine if wetlands standards and guidelines are being implemented. Annually, summarize and evaluate: 1) the acres of wetlands lost (or gained), and 2) the number of forested wetland acres harvested on Kaikli, Karheen, Kitkum, and Maybeso soil types. This monitoring may overlap with timber, karst, soil & water, transportation, and fish monitoring.	33 CFR § 323.4, Section 404(f) of the Clean Water Act
Are wetlands standards and guidelines effective in minimizing the impacts to wetlands and their associated functions and values? (E)	50	Loss of wetlands and/or impacts to their natural and beneficial functions and values: WET III.B. (BMP 12.5).	Annually conduct field inspections in conjunction with wetland implementation monitoring to rate the effectiveness of wetlands standards and guidelines.	33 CFR § 323.4, Section 404(f) of the Clean Water Act
Wild and Scenic Rivers				
Are Wild, Scenic, and Recreational River standards and guidelines being implemented? (I)	3	Compliance of activities with standards and guidelines.	Annually summarize activities (e.g., special uses) and conduct a survey of a representative sample of rivers to document the degree of compliance of Forest Service activities and permitted uses with applicable standards and guidelines.	36 CFR § 219.12 (k); 36 CFR § 297
Are Wild, Scenic, and Recreational River standards 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? (E)	3	The degree to which human activities maintain or enhance the resource values of the river.	Annually, in conjunction with Wild and Scenic River implementation monitoring.	36 CFR § 219.12 (k); 36 CFR § 297

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Wilderness Areas				
Are standards and guidelines for the management of wilderness being implemented? (I)	30	Compliance with guidelines establishing levels of social encounters, development, and visitor impacts by Recreation Opportunity Spectrum class: REC122 I.B.1.	Annually conduct field monitoring of a representative sample of Forest Service permitted uses in Wilderness (Special Use Permits and uses authorized by agreements) to document the degree of compliance with applicable standards and guidelines. In addition, perform a field monitoring trip on a representative sample of Wilderness Areas each year to assess compliance with standards and guidelines not related to authorizations and as an overview of the permit compliance within that individual wilderness area.	36 CFR § 219.12 (k)
Are standards and guidelines for the management of wilderness effective in maintaining the wilderness resource? (E)	30	The degree to which human activities maintain the wilderness resource.	Annually, in conjunction with wilderness implementation monitoring.	36 CFR § 219.12 (k)
Wildlife				
Are population trends for Management Indicator Species (MIS) and their relationship to habitat changes consistent with expectations? (Also see the biodiversity monitoring questions.) (V)	260	Habitat changes and population trends for management indicator species.	<p>Measure habitat changes (see Biodiversity Monitoring, item #2). Use the most recent version of the interagency habitat capability models (other sources may be used if they better reflect habitat change) to estimate change in the relative habitat values for each MIS since the start of plan implementation. Compare population trends for MIS (gathered as described below) with habitat changes. Evaluate approximately every five years for consistency with plan expectations.</p> <p>Red squirrel—In conjunction with annual deer pellet surveys conducted by the Forest Service, observers will count the number of squirrels seen and heard along each route. Annual comparisons of total counts will be evaluated to determine population trends.</p> <p>Black bear—Harvest statistics, bear mortality data, and results of population surveys from all sources will be gathered, reviewed, and evaluated annually to determine population trends.</p> <p>Brown bear—Harvest statistics, bear mortality data, and results of population surveys from all sources will be gathered, reviewed, and evaluated annually to determine population trends.</p>	36 CFR § 219.19(a)(6)

Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
			<p>Marten—Harvest statistics, results of population surveys, and results of on-going studies from all sources will be gathered, reviewed, and evaluated annually to determine population trends.</p> <p>River otter—Harvest statistics and results of population surveys from all sources will be gathered, reviewed, and evaluated annually to determine population trends.</p> <p>Sitka black-tailed deer—Harvest statistics, results of population surveys, Forest Service pellet surveys, and ADF&G publications will be gathered, reviewed, and evaluated annually to determine population trends.</p> <p>Mountain goat—Harvest statistics and results of population surveys from all sources including incidental or project-related mountain goat data collected by the Forest Service, will be gathered, reviewed, and evaluated annually to determine population trends.</p> <p>Gray wolf—Harvest statistics, wolf mortality data, and results of population surveys, as well as preliminary or final research results from all sources will be gathered, reviewed, and evaluated annually to determine population trends.</p> <p>Vancouver Canada goose—Compile results of Christmas bird counts, numbers of Vancouver Canada geese in wintering areas obtained in conjunction with other surveys, and incidental observations made in conjunction with other project activities. These results will be evaluated to determine population trends.</p> <p>Bald eagle—Compile results of Christmas bird counts, surveys and published bald eagle status reports by US Fish and Wildlife Service, Forest Service surveys of project areas, and breeding bird surveys. These results will be evaluated to determine population trends.</p> <p>Red-breasted sapsucker—Compile results of Christmas bird counts, annual breeding bird survey routes or point-counts, and any Monitoring Avian Productivity and Survivorship Program data collected each year. These results will be evaluated to</p>	

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Resource Area and Monitoring Question	Annual Cost (\$1,000)	Evaluation Criteria	Sampling Methods	References
			determine population trends.	
			<p>Hairy woodpecker—Compile results of Christmas bird counts, annual breeding bird survey routes or point-counts, and any Monitoring Avian Productivity and Survivorship Program data collected each year. These results will be evaluated to determine population trends.</p> <p>Brown creeper—Compile results of Christmas bird counts, annual breeding bird survey routes or point-counts, and any Monitoring Avian Productivity and Survivorship (M.A.P.S.) Program data collected each year. These results will be evaluated to determine population trends.</p>	
Are the population levels and associated distribution of mammalian endemic species on islands and portions of the mainland consistent with the estimates in the Forest Plan? (V)	1	Documentation for several recognized mammalian taxa with limited historical ranges including geographic extent and habitat distribution within and across islands and the mainland portion of the Forest.	Annually report on the progress of the small mammal study specified in the Information Needs section of the Forest Plan (Appendix B). Summarize and evaluate the final results when complete.	36 CFR § 219.12 (k)
Costs and Outputs What outputs were produced in the previous year? (I)	4	Outputs of desired goods and services as described in TLMP.	Annually summarize and evaluate management attainment report (MAR) items with Forest Plan projections.	36 CFR § 219.12(k)
Are the costs associated with carrying out the planned management prescriptions (including those of producing outputs) consistent with those costs estimated in Plan? (V)	3	Comparison of the estimated and actual costs for carrying out TLMP including the monitoring and evaluation plan. Use annual MAR for outputs and year-end financial report.	Once every five years compare MAR items and cost of producing targets; compare with Forest Plan projections and cost estimates.	36 CFR § 219.12(k)(3)