United States Department of Agriculture

Mt. Baker-Snoqualmie N.F.

Draft Monitoring Plan

Forest Service Mt. Baker-Snoqualmie National Forest June 2016

This updated version of the forest monitoring plan was prepared by an interdisciplinary team from the:

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Introduction

This update of the forest plan monitoring program is in response to the 2012 National Forest System Land Management Planning Rule (Planning Rule). The Planning Rule stated, "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 (May 9, 2012), or as soon as practicable, to meet the requirements of this section." 36 CFR 219(C)(1).

What is a Forest Plan Monitoring Program?

The forest plan monitoring program sets out the plan monitoring questions and associated indicators. Monitoring questions and associated indicators must be designed to inform management of resources in 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. Questions and indicators should be based on one or more desired conditions, objectives, or other plan components in the plan, but not every plan component needs to have a corresponding monitoring question. The Mt. Baker-Snoqualmie National Forest's monitoring program is detailed in Chapter 5 of the 1990 Mt. Baker Snoqualmie Land and resource Management Plan as amended by the 1994 Northwest Forest Plan Record of Decision (ROD) ("forest plan"). The original monitoring program in the forest plan does not ask monitoring questions, but instead focuses on "actions/efforts to be monitored" and the associated monitoring objective categorized by resource area.

Transition to 2012 Planning Rule

Under the Planning Rule, each plan monitoring program must contain one or more monitoring questions and associated indicators addressing each of the following categories:

> *(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)).*

The Mt. Baker-Snoqualmie National Forest forest plan monitoring team reviewed the monitoring objectives from the 1990 Forest Plan to determine if they were still relevant and how they might fit under the eight Planning Rule indicators. Many of the 1990 forest plan monitoring components are integrated into this revised monitoring plan. The 2012 National Best Management Practices monitoring has been incorporated. Several National and Regional monitoring efforts to address questions that are more appropriately answered at scales beyond the Forest boundary are also incorporated, including Northern Spotted Owl demographic monitoring by the Pacific Northwest Laboratory and marbled murrelet ocean surveys by the US Fish and Wildlife Service. Other Regional monitoring efforts can be scaled to the Forest, such as the Late-Successional Old Growth monitoring.

Two monitoring categories from the Planning Rule are difficult to tie to the 1990 Forest Plan:

- *(iii) The status of focal species to assess the ecological conditions required under § 219.9*: The Mt. Baker-Snoqualmie forest plan used Management Indicator Species (MIS) for monitoring of habitat status rather than focal species. The forest plan monitoring team reviewed the Management Indicator Species to determine if any would serve as Focal Species under the Planning Rule and concluded that some MIS (woodpeckers) would meet the intention of Focal Species monitoring. Focal species are discussed under monitoring category (iii).

- *(vi) Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area*: The forest plan monitoring team determined that the forest plan monitoring objectives that best represent climate change are those addressing sensitive vegetation types and insects and disease organisms. Therefore this monitoring program proposes to address this category through monitoring of two issues, invasive plants in wilderness areas and forest health, both of which are discussed further under category (vi).

2016 Monitoring Plan Organization

This Transitional Monitoring Plan is organized by monitoring questions and associated indicators for each of the Planning Rule categories. These monitoring questions and indicators are tied to components from the 1990 forest plan. Plan components include desired conditions, objectives, and standards and guidelines.

Monitoring Questions

Monitoring questions focus on providing the information necessary to evaluate whether plan components are effective and appropriate and whether management is being effective in maintaining or achieving progress toward the desired conditions and objectives for the plan area. A monitoring question is not necessary for every desired condition, objective, or other plan component.

Monitoring Indicators

Indicators are performance measures used in answering the selected monitoring questions (see Forest Service Manual 1905 for the definition for “indicator”). The plan monitoring program must include at least one indicator for each monitoring question. The indicators should be practical, measurable, and relevant to answering the monitoring questions for the plan area. They should also be responsive to management activities, or should be chosen to help test relevant assumptions or track relevant changes.

Monitoring Reports

The Planning Rule requires a biennial evaluation of new information gathered through the plan monitoring program and relevant information from the broader-scale strategy, and a written report of the evaluation made available to the public. The first monitoring report with the updated indicators must be completed no later than 2 years from the date of the new monitoring plan. The monitoring report should indicate whether or not a change to the 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 of the plan area.

Monitoring Categories

(i) – The status of select watershed conditions

Monitoring Issue (i.1): Aquatic BMPs

Forest Plan Components

Goal

Maintain aquatic and riparian resource protection during and after implementation of construction or reconstruction of aquatic ecosystem improvements, including those that involved streams, rivers, ponds, wetlands, and their banks or shorelines, floodplains, or both aquatic ecosystems and floodplains. This goal is derived from the Watershed component of the of the Forest Management Objectives outlined in the 1990 forest plan, as amended by the Aquatic Conservation Strategy Objectives in the 1994 Northwest Forest Plan ROD Basis for Standards and Guidelines.

Desired Condition

Best Management Practices (BMPs) are employed to protect water, aquatic, and riparian resources during implementation of construction or reconstruction of aquatic ecosystems improvements. BMPs are effective in completed aquatic ecosystem projects in protecting water, aquatic, and riparian resources.

Evaluation Questions

1. Are BMPs effective in protecting and improving waterbodies, bank/shorelines, or floodplains?
2. Are BMPs effective for longer-term sustainability of project objectives?

Type of Monitoring

Effectiveness/Implementation

Monitoring Indicators

- BMP monitoring protocols

Sampling Methods

- BMP National survey forms.
- Random selection of projects.
- Data will be collected and compiled by an interdisciplinary team.

- Summary reports will be prepared.

Threshold of Variability

BMPs are met 90% of the time.

Responsibility

- Hydrology staff
- Interdisciplinary Team

Reporting Period

Annually

Monitoring Issue (i.2): Watersheds

Forest Plan Components

Goal

Maintain and restore the resilience of forest ecosystems through water, aquatic, and riparian resources protection and improvements. The Watershed Condition Framework (WCF) is a means to identify and strategically plan for identification and implementation of essential projects to improve condition classes of identified watersheds. This goal is derived from the Watershed component of the of the Forest Management Objectives outlined in the 1990 forest plan, as amended by the Aquatic Conservation Strategy Objectives in the 1994 Northwest Forest Plan ROD Basis for Standards and Guidelines.

Desired Condition

Projects are implemented and planning leads to the improvement and protection of water, aquatic, and riparian resources in WCF priority sub-watersheds.

Evaluation Questions

1. Are ongoing projects effective in the transition of priority watersheds' condition classes toward desired conditions?
2. Will out year projects support the transition of priority watersheds' condition classes toward desired conditions?

Type of Monitoring

Planning Effectiveness/Implementation

Monitoring Indicators

- WCF priority watershed condition classes

Sampling Methods

- Watershed restoration action plans are developed to focus work and identify essential projects necessary to achieve recovery conditions in priority sub-watersheds.
- Monitor the implementation of essential projects for improvements of watershed condition classes.

Threshold of Variability

Transition of priority watersheds to a desired functioning condition class – 90% of time.

Responsibility

- Hydrology staff
- Interdisciplinary Team

Reporting Period

Annually

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

Monitoring Issue (ii.1): Forest Ecosystem Structure and Function

Forest Plan Components

Goal

Maintain forest plant species, structure, and landscape patterns moving toward desired conditions. This goal is derived from the Diversity and Long-term Productivity component of the of the Forest Management Objectives outlined in the 1990 forest plan, as amended by the Ecological Principles for Management of Late-Successional Forests in the 1994 Northwest Forest Plan ROD Basis for Standards and Guidelines.

Desired Condition

The desired landscape within the Mt. Baker-Snoqualmie National Forest is an interconnected mosaic of large blocks of older forest with a mix of younger forests of various age classes that fit a natural disturbance regime for this area and time period. The forest contains approximately 50 percent congressionally designated wilderness and under the current forest plan, much of the rest of the forest is within Late-Successional Reserve allocations.

Desired conditions include:

- Late successional habitat is retained in interconnected, large blocks.
- Maintain and enhance biological diversity.

Evaluation Question

What are the spatial trends in forest stand seral conditions including age and structural distribution?

Type of Monitoring

Effectiveness/Implementation

Monitoring Indicators

Percentage of Forest in a continuum of age-class and structure. Metrics to evaluate seral stage distribution include:

- Forest type distribution

- Forest age-class distribution
- Forest Structure distribution
- Old Forest measurements of total area, patch size, interior core area and connectivity

Sampling Methods

Information used to monitor sampling would include:

- NWFP Interagency Monitoring program trends – 5 year monitoring
- Modeled GIS data (Ecoshare)
- Forest GIS data (MBS)
- Ecological Plot Data (Ecoshare)
- GNN Structure Maps and Plot Database (LEMMA)

Threshold of variability

Trend toward increasing high functioning Late-Successional Reserves

Responsibility

Interdisciplinary Team

Reporting Period

Every 5 years

Monitoring Issue (ii.2): Fish Habitat

Forest Plan Components

Goal

Maintain aquatic habitat quality for native fish species. This goal is derived from the Fish Habitat Management component outlined in the 1990 forest plan, as amended by the Aquatic Conservation Strategy Objectives in the 1994 Northwest Forest Plan ROD Basis for Standards and Guidelines.

Desired Condition

Maintain stream and river conditions for high quality habitat for salmon and trout.

Evaluation Question

Is aquatic habitat quality being maintained to support viable populations of desired fishes?

Type of Monitoring

Effectiveness

Monitoring Indicators

- Aquatic and Riparian Effectiveness Monitoring Program (AREMP) uses two data sets to evaluate stream and watershed condition for each aquatic province within the NWFP: stream data and upslope data.

- The stream evaluation is based on inchannel data (e.g., substrate, pieces of large wood, water temperature, pool frequency, and macroinvertebrates)
- Upslope evaluation is based on mapped data, including road metrics from FS and BLM geographic information system road layers and vegetation metrics derived from satellite imagery.

Sampling methods

AREMP random sampling of watersheds

Threshold of Variability

Condition scores show positive trends.

Responsibility

Forest fish biologists

Reporting Period

Annually

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

Monitoring Issue (iii.1): Woodpecker Habitat

Forest Plan Components

Goal

Maintain habitat for woodpecker species associated with snags. This goal is derived from the Wildlife Habitat Management indicators component outlined in the 1990 forest plan, as amended by the coarse woody debris and snag components in the 1994 Northwest Forest Plan ROD Basis for Standards and Guidelines.

Desired Condition

The desired condition is a landscape with snags numbers that support viable populations of cavity excavating birds/woodpeckers across the Forest.

Evaluation Question

Are forest landscapes contributing desired snag numbers?

Type of Monitoring

Forest stand conditions

Monitoring Indicators

- Percentage of the landscape within the DecAID thresholds

Sampling Methods

- DecAID assessment

- GNN Structure Maps and Plot Database (LEMMA)

Threshold of Variability

Increasing trend in percentage of landscape within the 50% and 80% DecAID thresholds

Responsibility

Wildlife Staff

Reporting Period

Every 5 years

(iv) –The status of a select set of 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.

Monitoring Issue (iv.1): Northern Spotted Owl Habitat

Forest Plan Components

Goal

Maintain suitable habitat on the Forest to contribute to northern spotted owl population recovery within the range of this species. This goal is derived from the Threatened, Endangered, and Sensitive Species component outlined in the 1990 forest plan, as amended by the Late-Successional Reserve objectives in the 1994 Northwest Forest Plan ROD Standards and Guidelines.

Desired Condition

The desired condition is a well-distributed, genetically interacting, demographically diverse population of northern spotted owls inhabiting a high percentage of their native range within the Mt. Baker-Snoqualmie National Forest.

Evaluation Question

1. What is the health of the northern spotted owl population in the north cascades?
2. What are the trends in northern spotted owl population (decreasing, stabilizing, or increasing) across the Mt. Baker-Snoqualmie National Forest?

Type of Monitoring

Effectiveness

Monitoring Indicators

- Results and conclusions from the Northern Spotted Owl Effectiveness Monitoring Plan

Sampling Methods

- Data will be utilized from the Pacific Northwest Research Station and Regional Office reporting on owl population trends within the region. Monitoring of the northern spotted owl population and reproduction relies on regional efforts and current PNW demographic study area.

Threshold of Variability

- Decline in numbers or reproductive performance that exceeds levels as determined by the Pacific Northwest Research Station.
- Loss of owl pairs in excess of anticipated levels as determined by the Regional Northern Spotted Owl Effectiveness Monitoring Team.

Responsibility

Wildlife Staff

Reporting Period

Every 5 years

Monitoring Issue (iv.2): Marbled Murrelet Habitat

Forest Plan Components

Goal

Maintain suitable nesting habitat in the Mt. Baker-Snoqualmie National Forest to contribute to marbled murrelet population recovery within the range of this species. This goal is derived from the Threatened, Endangered, and Sensitive Species component of the outlined in the 1990 forest plan, as amended by the as amended by the Late-Successional Reserve objectives in the 1994 Northwest Forest Plan ROD Standards and Guidelines.

Desired Condition

Marbled murrelet population recovery is a primary goal for lands within the range of the species. The desired future condition is a well distributed, genetically interacting, demographically diverse population of marbled murrelet that inhabits a high percent of their native range.

Evaluation Question

What is the health of the marbled murrelet population that inhabits murrelet Conservation Zone 1 (Puget Sound)? Is the marbled murrelet population decreasing, stabilized or increasing?

Type of Monitoring

Effectiveness Monitoring Indicators

- Trend in acres of suitable nesting habitat within Mt. Baker-Snoqualmie National Forest
- Trend in marbled murrelet densities within murrelet Conservation Zone 1 within Mt. Baker-Snoqualmie National Forest
- Trend in juvenile ratios (ratio of juveniles to after-hatch-year birds) within marbled murrelet Conservation Zone 1.

- Results and conclusions from the Marbled Murrelet Effectiveness Monitoring Plan for the Northwest Forest Plan that relate to marbled murrelet population health and distribution.

Sampling Methods

The PNW Research Station conducts effectiveness monitoring for marbled murrelet. Effectiveness monitoring for the marbled murrelet has two facets:

- Assess population trends at sea by using a unified sampling design and standardized survey methods, and
- Establish a credible estimate of baseline nesting-habitat data by modeling habitat relations, and use the baseline to track habitat changes over time.

Threshold of Variability

- Increasing trend in acres of suitable nesting habitat
- No threshold of variability has been determined for marbled murrelet density, trend in juvenile ratios or population health and distribution.

Responsibility

Wildlife Staff

Reporting

5 years

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

Monitoring Issue (v.1): Recreation Opportunities

Forest Plan Components

Goal

Recreation settings and opportunities provide high visitor satisfaction and meet current and future visitor demands in a sustainable way.

Evaluation Questions:

1. What is the Current Use and demand for recreation activities and settings in the Mt. Baker-Snoqualmie National Forest?
2. Are visitors satisfied with the settings, opportunities and activities offered in the Mt. Baker-Snoqualmie National Forest?

Type of Monitoring

Statistical sampling and crowd based data mining.

Monitoring Indicators

- Number of visitors by setting and activity and percent of satisfaction with the opportunities, settings, and activities offered by the Forest.

Sampling Methods

- Further discussion and analysis of National Visitor Use Monitoring (NVUM) reports every four years will indicate satisfaction levels. Crowd based data mining will be used to augment NVUM to produce more site specific use data and the site scale.

Threshold of Variability

Less the 85% of respondents are satisfied with conditions, settings and opportunities.

Responsibility

Multi-district Team

Reporting Period

Every four years on NVUM cycle.

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

Monitoring Issue (vi.1): Invasive Plants in Wilderness Areas

Forest Plan Components

Goal

Control existing and treat new infestations of terrestrial invasive plants within designated wilderness areas. The distribution of designated wilderness on the MBS is in areas most susceptible to impacts from climate change.

Desired Condition

Mitigation Measures and Management Requirements in the 2015 MBS Invasive Plant Treatment FEIS and ROD are employed to minimize the impacts of terrestrial invasive plants and protect against the increase of new infestations following initial detection in designated wilderness areas.

Evaluation Questions:

1. Are invasive plants increasing within designated wilderness areas in response to climate change?
2. Are new infestations of invasive plants being detected within designated wilderness areas?

Type of Monitoring

Effectiveness/Implementation

Monitoring Indicators

- Percent of infestation treated within treatment area.

Sampling Methods

- Invasive plant survey form.
- Effectiveness monitoring of known sites.

Threshold of Variability

Known invasive plant sites are being controlled within 10% of initial infestation detection in designated wilderness areas.

Responsibility

Interdisciplinary Team

Reporting Period

Annually

Monitoring Issue (vi.2): Forest Health

Forest Plan Components

Goal

Maintain impacts from stressors such as insects, disease, animal damage, and air pollution on growing stock to the range of natural variability for the Forest.

Desired Condition

Insects and disease are an integral part of the forest ecosystem; however if conditions are changed outside of the range of natural conditions, epidemics can occur. Manage forest stands to provide for resiliency within climate change.

Evaluation Question

1. What is the extent of outbreaks and infestations, are they within range of natural variability?
2. What are the trends in outbreaks and infestations – increasing, stabilizing, or decreasing?
3. What are the impacts of stressors such as insects, disease, animal damage, and air pollution to growing stock levels?

Type of Monitoring

Effectiveness

Monitoring Indicators

- Acres of stands affected by insect and disease
- Trend of detectable acres of high tree mortality (insect/draught-stress)

Sampling Methods

- Aerial surveys, field observation, stand exams.
- Regional Office Forest pest management flights

Threshold of Variability

The trend of impacts from stressors on growing stock remains stable, acres impacted do not increase by more than 50% from 5 year average.

Responsibility
Vegetation Management staff

Reporting Period
Annually

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

Monitoring Issue (vii.1): Timber Production

Forest Plan Components

Goal

The Forest provides commodities at levels projected in the 1990 forest plan, as amended.

Desired Condition

The Forest will produce a predictable and sustainable level of timber and non-timber resources to meet projections under the 1990 forest plan as amended by the Northwest Forest Plan. A sustainable supply of timber and other forest products is needed to help maintain the stability of local and regional economies (Northwest Forest Plan ROD at p. 26).

The Forest will also produce a sustainable, long term supply of desired special forest products (SFPs). Along with personal and Tribal uses of SFPs, this will provide a commercial supply of SFPs that will create income for collectors.

Evaluation Question
Is timber sale quantity similar to level predicted in the 1990 forest plan?

Type of Monitoring
Implementation

Monitoring Indicators
- Cut and sold timber volume
- Special forest products harvested

Sampling Methods
- Timber Information management database

Threshold of Variability
Deviation of 10 percent over a three year period.

Responsibility
Vegetation Management staff

Reporting Period
Annually

(viii) – The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land.

Monitoring Issue (viii.1): Land Suitability for Timber

Forest Plan Components

Goal

Allowable sale quantity is programmed and harvested only on those lands classified as suitable for timber production.

Desired Condition

Forest management activities support a landscape with productive forest stands on those lands classified as suitable for timber production.

Evaluation Question
Is allowable sale quantity programmed and harvested only on those lands classified as suitable for timber production?

Type of Monitoring
Planning and project implementation.

Monitoring Indicators
Percentage of acres programmed and harvested on suitable lands.

Sampling Methods
- Management reviews
- Resource inventory

Threshold of Variability
Allowable sale quantity is programmed and harvested only on those lands classified as suitable for timber production.

Responsibility
Vegetation Management

Reporting Period
Annually