United States Department of Agriculture

Biennial Monitoring Evaluation Report

for the Mt. Hood National Forest

Forest Service Mt. Hood National Forest June 2018

For More Information Contact:

Amber Sprinkle, NEPA Planner
Mt. Hood National Forest
16400 Champion Way
Sandy, OR 97055

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

Contents

List of Tables

List of Figures

Summary of Findings and Results

The information presented in this monitoring report is summarized in Table 1 below. Monitoring suggests that forest management activities are being conducted in a manner that meets the Forest Plan desired conditions, goals, objectives and standards and guidelines for most areas. There are two resources for which monitoring was conducted that may suggest a recommendation for changes to forest management activities because data shows a decreasing trend as in the case of early seral habitat for deer and elk, or data is not yet conclusive to suggest a recommendation in changes as in the case of the Oregon Spotted Frog. Monitoring indicates that early seral habitat for deer and elk has decreased over the years, while in contrast, habitat that supports the Northern Spotted Owl has continued to improve, or be maintained. Generally, the Forest is in a declining trend for early seral habitat type even though most vegetation management projects include the creation and enhancement of forage at a small scale. A change in management strategy at the project and landscape level is recommended. In an effort to see a positive trend for deer and elk habitat, it is recommended that future projects should incorporate big game forage enhancement opportunities to a much greater extent. Additional monitoring is needed before recommendations can be made regarding the populations of the Oregon Spotted Frog at Camas Prairie.

Table 1. Summary of monitoring findings.

Monitoring Item	Do monitoring results demonstrate intended progress or trend toward Plan targets?[1]	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed?[2]
Have Best Management Practices (BMPs) been implemented and are they effective at managing water quality consistent with the Clean Water Act?	Yes	No	N/A
Are Standards and Guidelines effective in maintaining or enhancing fish habitat capability?	Yes	No	N/A
Are habitat improvement projects contributing to the persistence of Survey and Manage species?	Yes	No	N/A
Are known populations of invasive species continuing to spread? Are new infestations occurring?	Yes	No	N/A
Are projects designed to prevent reactivation or acceleration of landslides, debris slides, debris flows, and earthflow areas?	Yes	No	N/A

[1] Interval of data collection is beyond this reporting cycle (A); or more time/data are needed to understand status or progress the plan component (B); or methods/results are inadequate to answer monitoring question (C).

[2] See the body of the report for more details regarding any specific recommendations/opportunities for change.

Monitoring Item	Do monitoring results demonstrate intended progress or trend toward Plan targets?[1]	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed?[2]
What is the trend for mature and late- successional habitat needed for pileated woodpecker persistence?	Yes	No	N/A
What is the trend for mature and late- successional habitat above 3500 feet needed for American marten persistence?	Yes	No	N/A
What is the trend for oak pine habitat needed for gray squirrel persistence?	Yes	No	N/A
What is the trend for early-seral habitat needed for deer and elk persistence?	No	Yes	Forest management activities
Are Standards and Guidelines effective in maintaining or enhancing aquatic habitat complexity?	Yes	No	N/A
What is the trend for mature and late- successional habitat needed for northern spotted owl recovery?	Yes	No	N/A
What is the trend for Oregon Spotted Frog populations at Camas Prairie?	Uncertain, B	No	N/A
Are significant (National Register eligible) historic properties being maintained, stabilized, and repaired according to historic preservation standards?	Yes	No	N/A
Are the physical/biological, managerial, and social settings of each Wilderness Resource Spectrum (WRS) maintained consistent with the standards for wilderness management?	Yes	No	N/A
Has the Off-Highway Vehicle Record of Decision 2010 been implemented?	Yes	No	N/A
Are people having a high level of satisfaction during their visit to Mt. Hood National Forest?	Yes	No	N/A
Is the production of pure, clear, raw, potable water being sustained for municipal use?	Yes	No	N/A
What are the current tree mortality rates and patterns across the forest?	Yes	No	N/A
Is total growth and productivity exceeding mortality over all forest	Yes	No	N/A

Monitoring Item	Do monitoring results demonstrate intended progress or trend toward Plan targets?[1]	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed?[2]
disturbances? Every five to ten years?			
What is the rate of harvest of stands available for timber management?	Yes	No	N/A
How much timber is being awarded?	Yes	No	N/A
Are there any changes in the land base available for producing timber?	Yes	No	N/A
Are we meeting the 5-year regeneration period required by the National Forest Management Act?	Yes	No	N/A
How many miles are suitable for passenger cars and high clearance vehicles?	Yes	No	N/A
Are road management activities being implemented in accordance with the latest access and travel management direction?	Yes	No	N/A
Are management activities being implemented so that they do not substantially and permanently impair the productive capacity of the land?	Yes	No	N/A

Introduction

Purpose

The purpose of the biennial monitoring evaluation report is to help the responsible official determine whether a change is needed in the Mt. Hood National Forest Land and Resource Management Plan (Forest Plan) direction, such as components or other content that guide management of resources in the Forest Plan area. The biennial monitoring evaluation report represents one part of the Forest Service's overall monitoring program for this national forest unit, the Mt. Hood National Forest (the Forest). The biennial monitoring evaluation report is not a decision document—it evaluates monitoring questions and indicators presented in the Plan Monitoring Program chapter of the Forest Plan, in relation to management actions carried out in the plan area. The Forest Monitoring Program was recently updated 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 requirement of this section." The Forest completed the updates to the monitoring program in May of 2016. This new approach encourages the use of existing and relevant monitoring questions and indicators that are

consistent with the new rule requirements. It also encourages that any required changes to unit monitoring plans will tie to on-going broad-scale monitoring to the extent practical.

Monitoring and evaluation are continuous learning tools that form the backbone of adaptive management. For this reason, the Forest will produce an evaluation report every two years. This is our first written report of this evaluation since the Forest's change to the monitoring program that was finalize din May 2016. This report indicates whether a change to the Forest Plan, management activities, monitoring program or forest assessment may be needed based on the new information. The full 2015 through 2016 biennial monitoring report for the Forest is available on our website at https://www.fs.usda.gov/main/mthood/landmanagement/planning.

How to Use this Report

This report is a tool and a resource for the Forest Service to assess the condition of forest resources in relation to Forest Plan direction and management actions. It is also a tool and a resource for the public to learn more about how the Forest Service is managing forest resources.

A part of implementing the Forest Plan involves a commitment to monitor and evaluate how well the Forest is doing. Based on review of information collected, adjustments in management actions or anticipated results can be identified. This adaptive management process allows the Forest Plan to remain an active, relevant, usable document. Monitoring provides the decision-makers and the public information on the progress and results of implementing the Forest Plan. As the Forest continued into the third decade under the Forest Plan, the Forest has begun to switch the focus from short-term implementation monitoring to monitoring long-term outcomes of management with respect to key social, economic and ecological systems.

The biennial monitoring evaluation report is designed to help the public, as well as Federal, State, local government, and Tribal entities anticipate key steps in the overall monitoring program. These steps include opportunities for public participation and how the public will be informed of those opportunities, and how public input will be used as the monitoring program progresses. The biennial monitoring evaluation report is also intended to help people better understand reported results in relation to past monitoring reports, future monitoring reports and the broader-scale monitoring strategy that is issued at the Forest Service Regional level.

Roles and Responsibilities

The Forest Plan Monitoring Program requires a coordinated effort of many people, from the people who collect the data, to the people outside the Forest Service who provide feedback and assistance, to the decision maker.

Richard Periman, Mt. Hood National Forest, Forest Supervisor, is the responsible official to whom the recommendations from the report will be provided.

This biennial monitoring report was respectfully prepared by an interdisciplinary team of the following Forest Program Managers and resource specialists: Chad Atwood, Forest Silviculturist & Terrestrial Program Manager; Ryan Cole, Forest Geologist; Chuti Fiedler, Fish Consultation Biologist, & Wildlife Program Support; Brad Goehring, Forest Fisheries Program Manager; Mathew Hackett, Zone Engineer; Casey Hawes, Acting Forest Timber Program Manager; Jill Masters, Geospatial Systems Specialist; Todd Reinwald, Forest Watershed Program Manager; Amber Sprinkle, Forest Planner; Anne Trapanese, Acting Forest Planner; Alexandra Wenzl, Forest Historian; Jennifer Wade, Forest Recreation & Lands Program Manager.

The Importance of Public Participation

We informed the public of the availability of the 2015-2016 biennial monitoring report for the Forest on in June of 2018.

A draft Forest Plan monitoring program was shared with the public in July 2015 for a 30-day comment period. In response, we received two letters, which prompted changes to be made to the draft monitoring program. The final Forest Plan monitoring program and responses to the comments received on the draft are available on our Forest website https://www.fs.usda.gov/main/mthood/landmanagement/planning. The Forest informed the public that we would begin to prepare our first monitoring report under the new program during fiscal year 2016.

This monitoring report is available to the public through our Forest website https://www.fs.usda.gov/main/mthood/landmanagement/planning. The Forest welcomes feedback from the public in regards to this new monitoring report that will help ensure the public participation process in the effectiveness of the new monitoring program and what the resulting information suggests from a land management perspective.

How the Plan Monitoring Program Works

Providing timely, accurate monitoring information to the responsible official and the public is a key requirement of the plan monitoring program. The Forest's biennial monitoring evaluation report is the vehicle for disseminating this information.

In the context of forest planning there are three main monitoring goals:

- Are we implementing the Forest Plan implemented properly? Are we meeting our management targets and project guidelines? (implementation monitoring)
- Are we achieving our Forest Plan management goals and desired outcomes? (effectiveness monitoring)
- Does our hypothesis testing indicate we may need to change the Forest Plan? (validation monitoring)

Implementation monitoring is important for tracking progress and accomplishments. However, it is effectiveness and validation monitoring that drive and support the adaptive management process. Effectiveness monitoring evaluates condition and trend relative to desired conditions. Validation monitoring tests hypotheses and provides information that might necessitate changes to desired conditions in the plan.

Monitoring Activities

Monitoring questions focus on providing necessary information to evaluate effectiveness of plan components and land management in maintaining or achieving progress towards desired conditions and objectives of the plan area. Indicators are like performance measures used in answering the respective monitoring question. Indicators should be practical, measureable, and relevant to answering monitoring questions for the plan area. They should also help to test relevant assumptions or track relevant changes. The Forest's monitoring program contains monitoring questions and identifies associated indicators that address each of the following:

1) The status of select watershed conditions.

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

3) The status of focal species to assess the ecological conditions required under 219.9.

4) 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.

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

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

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

8) 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)).

See Appendix A: Monitoring Program Matrix to review the monitoring program questions and indicators based on the 2012 Planning Rule.

This 2015 through 2016 biennial monitoring report will address all of the new monitoring program questions and considerations and serve as a baseline for subsequent biennial monitoring reports. Subsequent biennial monitoring reports, would focus only on just those monitoring items for which data has changed, or conditions have changed from this reporting period.

The following sections present the most current information (data and evaluations) for all monitoring questions contained within the Forest Plan. All monitoring questions were addressed during the current evaluation period (2015 through 2016), and have had their associated discussions updated in the next section of this report.

Each section describes the details of that would support the recommendation options if applicable. This report displays the results compiled for each monitoring item.

Each monitoring item includes 1) the monitoring question and its indicator(s); 2) an evaluation of the monitoring results; and 3) an adaptive management finding on whether recommendation options could be considered for future changes or not; the forest plan monitoring program is meant to "enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed" (36 CFR 219.12).

Status of Select Watershed Conditions

Best Management Practices

Have best management practices (BMPs) been implemented and are they effective at managing water quality consistent with the Clean Water Act?

- This monitoring question refers to Forest Plan Standards and Guidelines: FW-054, FW-056, FW-060, FW-068 to FW-070, and FW-072.
- Monitoring Indicator(s): United States Forest Service National BMP annual monitoring protocols.

Data

Fifteen activity sites, and eleven different activity categories were monitored in 2015 and 2016 that inform this report. Activities that were monitored include aquatic restoration at Lake Branch, developed recreation use at Pine Point campground, grazing management at the Jordan allotment, off-highway vehicle (OHV) use at McCubbins' Gulch, recreational residence use along Still Creek, temporary road decommissioning in the Bow and Faller timber sale areas, road maintenance along Forest Service Road 2612 (Still Creek Road), vegetation management in the Mint, Bass, Faller and Beluga-Orca timber sale areas, watercraft launch use at the Moore Creek site, well water use at the Camp Creek campground, and finally wildfire management at the 36 Pit Fire area. The National BMP protocols were used for this monitoring effort, and monitoring occurs annually.

Table 2. BMP monitoring results for 2015 and 2016

Monitoring Item	Year Monitored	Implementation Rating	Effectiveness Rating[3]
Aquatic Restoration – Lake Branch	2015	Fully	Effective
Developed Recreation – Pine Point Campground	2016	Mostly	Not Effective
Grazing Management – Jordan Allotment	2015	Marginal	Not Effective
OHV Trail Use – McCubbins Gulch	2016	Fully	Effective
Recreational Residence Use – Still Creek	2016	Fully	Effective
Temporary Road Decommissioning – Bow Thin Sale	2015	Fully	Effective
Temporary Road Decommissioning – Faller Thin Sale	2016	Fully	Effective
Road Maintenance –(2612 Road) Still Creek Road	2015	Fully	Marginal
Vegetation Management – Mint Thin Sale	2015	Fully	Marginal

[3] The target range is described as the level of effectiveness of the implementation of BMPs at the project site. Level of implementation is rated either as fully implemented, mostly implemented, marginally implemented, or not implemented; and the effectiveness rating is either effective, not effective, or marginal

Monitoring Item	Year Monitored	Implementation Rating	Effectiveness Rating[3]
Vegetation Management – Bass Thin Sale	2015	Fully	Effective
Vegetation Management – Faller Thin Sale	2016	Fully	Effective
Vegetation Management – Beluga-Orca Thin Sale	2016	Mostly	Effective
Watercraft Launch Use – Moore Creek	2016	Marginal	Not Effective
Well Water Use – Camp Creek Campground	2016	Fully	Effective
Wildfire Management – 36 Pit Fire	2015	Not	Not Effective

Monitoring Discussion, Findings, and Adaptive Management Considerations

The following results reflect the data collected as shown in Table 2**Error! Reference source not found.**. At five of the fifteen sites, monitoring revealed that BMPs has not been fully implemented, or were not effective at protecting water quality. The 36 Pit Fire rating of "Not" is due to the initial attack activities that occurred on a rapidly moving fire with extreme fire behavior. Corrective actions have been taken at three of those five sites and are currently in progress for the other two. The Forest's annual water quality BMP monitoring information for 2015 and for 2016 provide more detailed information on the process and actions related to BMP monitoring and are available on the Forest's resource management page https://www.fs.usda.gov/resources/mthood/landmanagement/resourcemanagement. 2016 marks the fourth year the Forest has performed BMP monitoring using the protocols set forth by the National BMP Monitoring Program. The Forest continues to use BMP monitoring to serve as a principle means for applying adaptive management measures aimed at protecting water quality from ground disturbing activities. These monitoring results do not warrant a recommendation for changes, because areas that were identified as less than "effective" have or are currently going through site specific corrective actions.

Status of Select Ecological Conditions

Fish Habitat Capability

Are Standards and Guidelines effective in maintaining or enhancing fish habitat capability?

- This monitoring question refers to Forest Plan Standard and Guideline FW-137, and the Northwest Forest Plan (NWFP) Standards and Guidelines for Riparian Reserves and the Aquatic Conservation Strategy (ACS).

- Monitoring Indicator(s): The number of stream miles currently occupied by representative fish species (i.e., steelhead, Chinook, coho, and bull trout).

Monitoring Results

Although collecting data and documenting physical and biological watershed conditions is critical for understanding habitat conditions and trends over time, the biological outcome/result of the habitat capability is equally important. Over the past 2 years, the Forest has been using data from the inventory programs to map fish distribution across the Forest. The distribution of aquatic species is indicative of whether the habitat is functioning to an extent to support various species of fish, in other words, the biological outcome of the physical habitat conditions. Over time, the contraction, expansion, or redistribution of aquatic species on the Forest can be used as a surrogate for the overall function of aquatic habitat and fish habitat capability.

Data

Provincial-level stream inventories are completed on an annual basis to collect information on stream conditions, including habitat typing (e.g., pools, riffles, glides, etc.), riparian and upland vegetation, and management activities near the stream, streambed composition, and fish species presence. Inventory data is entered into corporate data systems and compiled into a report for each stream to give fisheries biologists a snapshot of aquatic habitat conditions and, over time, a tool to evaluate trends and determine if the Forest is meeting aquatic habitat standards and guidelines. In 2015, the stream inventory program surveyed 5.8 miles of Lowe Creek, 3.7 miles of the Upper Clackamas River, and 1.3 miles of Poop Creek. In 2016, the stream inventory program surveyed 6.4 miles of the North Fork Clackamas River, 3.2 miles of Cheeney Creek, 1.1 miles of Brooks Meadow Creek, and 8.7 miles of Frog Creek. The Aquatic and Riparian Effectiveness Monitoring Program (AREMP) is a multi-federal agency program developed to assess the effectiveness of the ACS of the NWFP. The objective of the ACS is to maintain or restore the condition of watersheds in the NWFP area. This monitoring effort determines watershed condition every five years for every 6th-field watershed based on upslope and riparian data derived from geographic information system (GIS) layers and satellite imagery. In-channel attributes are measured each year in a subset of watersheds to supplement the watershed condition assessments and validate the models used to assess stream condition. AREMP tracks changes in watershed condition over time; and reports on the NWFP's effectiveness across the region. Results of this monitoring are incorporated here by reference and can be found on the Regional Ecosystems Office (REO) Watershed Overview page. Additionally, the Watershed Condition Framework (WCF) establishes a consistent, comparable, and credible process for improving the health of watersheds on National Forests. This framework helps to focus efforts in a consistent and accountable manner and facilitate new investments in watershed restoration that will provide economic and environmental benefits. Watershed condition classification was completed on all National Forest System lands in 2011 and in 2015. Priority watersheds were identified and work began on our programmatic Watershed Restoration Action Plans that help to identify possible management actions that could be taken to move the habitat towards a desired future condition. The results of the WCF are available through an Interactive Map Viewer where users can view designated priority watersheds, why the watershed was selected, and learn about other important planning items, including estimated costs and restoration partners. The Forest Plan Standard and Guideline FW-137 states that fish habitat capability shall be maintained at existing levels or greater. Data collected from the stream inventory program are synthesized into ratings for discrete watershed condition indicators. These indicators include aquatic specific attributes such as ratings for: impaired waters, water quality problems, water quality, flow, habitat fragmentation, large woody debris, channel, life form, native species, exotic /invasive species, open road density, road maintenance, road proximity to water, mass wasting, soil productivity, soil erosion, soil contamination, and several other indicators. The routines

and processes used to calculate the ratings can be found in the WCF technical guide located on the WCF website (where you can find the Interactive Map Viewer) and in a forest process document that details how stream inventory data is synthesized into habitat ratings.

Species distribution mapping allow convenient visualization of overall aquatic habitat conditions. Fish distribution maps (Appendix B: Fish Distribution Maps) were generated from Level II stream inventory data and documented professional fish biologist observations. Sufficient data existed to map six species of fish, including four Endangered Species Act (ESA) listed fish (Chinook, coho, steelhead, and bull trout) and two Regional Forester Sensitive species (coastal cutthroat trout, redband trout). Through GIS analysis, the stream mileage of species occupancy/distribution was calculated as seen in Table 3 and Table 4 below.

Table 3. Miles of stream distribution by species.

Fish Common Name	Approximate Miles
Bull Trout	81
Chinook salmon	174
Coastal Cutthroat Trout	561
Coho salmon	202
Redband trout	226
Steelhead	270
Total Miles	**1514**

Table 4. Miles of stream distribution by Ranger District.

Ranger District	Approximate Miles
Barlow	178
Clackamas River	567
Hood River	289
Zigzag	480
Total Miles	**1514**

Monitoring Discussion, Findings, and Adaptive Management Considerations

As additional data is collected, the usefulness of the map products will increase. Changes in fish distribution may be observed prompting biologists to investigate the change in more depth. As an example, it is possible that disturbances such as landslides or debris flows may create new partial or full barriers to fish passage, or dry years/low flow years may limit distribution. Conversely, as aquatic restoration work continues with the replacement of impassable culverts, habitat availability may increase. There are numerous factors that may affect the number of individuals within a population and their distribution, but a well distributed group of individuals, generally in the areas historically occupied, implies the habitat is capable of supporting the various life stages of the species. Factors such as density dependence, run strength, ocean conditions, etc. (especially for anadromous species) can significantly alter distribution, but the intent of distribution tracking is not to monitor short time

frame census data, but rather to monitor trends over longer periods of time. By tracking distribution, the Forest will be positioned to track changes in fish habitat capability.

By reviewing data and results (from the sources above) of the Forest Stream Inventory Program, the AREMP, and the national WCF, it is clear the aquatic habitat conditions are improving across the Forest since NWFP implementation. In addition, forest-wide fish distribution mapping indicates that fish habitat capability across the Forest is well distributed and this mapping effort will serve as a baseline for future distribution monitoring comparisons. Changes are not recommended because trends continue to show improvement.

Survey and Manage Species

Are habitat improvement projects contributing to the persistence of Survey and Manage species?

- This monitoring question refers to NWFP Standards and Guidelines for Survey and Manage species.
- Monitoring Indicator(s): Acres of habitat enhanced for Survey and Manage species.

Monitoring Results

In 2016, approximately 5,185 project acres were surveyed to locate and buffer all potential survey and manage known sites. Obligate aquatic species (Basalt Juga and Columbia duskskysnail) were surveyed, and known sites analyzed for potential project impacts, but in almost all cases, their stream/spring habitat are already protected by NWFP riparian buffers. With these conservation measures in place, the forest is contributing to the persistence of survey and manage species as described in the NWFP.

Data

Since the NWFP, projects on the forest have generally been planned to avoid potential habitat (stands >80 years old and spring-fed systems), if possible. In cases where treatment was desired in mature stands, required surveys were completed, and known sites were protected from ground disturbing activities. The Mt. Hood National Forest provides potential habitat for 11 species of NWFP fauna survey and manage species, including:

1. Larch Mountain salamander *(Plethodon larselli)*
2. Great gray owl *(Strix nebulosa)*
3. Red tree vole *(Arborimus longicaudis)*
4. Columbia Oregonian *(Cryptomastix hendersoni)*
5. Crater Lake tightcoil *(Pristiloma arcticum crateris)*
6. Dalles sideband *(Monadenia fidelis minor)*
7. Evening fieldslug *(Deroceras hesperium)*
8. Panther jumping slug *(Hemphillia pantherina)*
9. Puget Oregonian *(Cryptomastix devia)*
10. Basalt Juga (*Juga O.* sp. 2)
11. Columbia Duskysnail *(Colligyrus greggi)*

Monitoring Discussion, Findings, and Adaptive Management Considerations

Successful conservation measures developed during project analysis, and put in place during implementation, indicate that there are no recommended changes. The Forest continues to contribute in a positive way to the persistence of survey and manage species.

Invasive Species

Are known populations of invasive species continuing to spread? Are new infestations occurring?

- This monitoring question refers to Forest Plan Standards and Guidelines FW-375 to FW-377, FW-384, and Forest Plan amendments 13 and 15.
- Monitoring Indicator(s): Acres of surveyed lands with new and active invasive species infestations, and acres treated.

Monitoring Results

Treatment of an infestation does not necessarily result in the immediate elimination of the infestation, particularly when multiple treatments are required to affect a change in the survival of the target species infestation. Treatments can include actions within any of the four general categories of integrated pest management techniques: Biological treatments, Cultural treatments, Physical/Mechanical treatments, or Chemical treatments. The increase in areas treated does not necessarily indicate that all infestation levels are increasing on the Forest, however some are. Awareness, treatment capacity, and funding have increased which contributes to the rise in the number of acres identified.

Data

Our data records indicate that new infestations are occurring and some invasive species are continuing to spread on the Forest. The term "invasive species" refers to any species of exotic plant, vertebrate, invertebrate or pathogen meeting the Executive Order 13112 definition of "invasive species", including plant species defined by the State or Federal status as "noxious weeds". This is reflected as an increase in acreage over the past several years. Table 5 shows inventoried acres over the past three decades. Generally the increase in acreage is a result of revisits to treat known populations. The number of mapped acres of invasive plant treatment areas has also increased. The term "treatment" refers to any activity or action taken where the goal is to eradicate, control, prevent or otherwise manage the spread of invasive species infestation.

Table 5. Inventoried acres over time.

Timeframe	Acres Inventoried[4]
1990's	1,667
2000's	9.686
2010-2017	1,974

[4] An inventory record would only be created for a verified weed site with a Forest species of concern. Some inventoried sites have not yet been treated.

Monitoring Discussion, Findings, and Adaptive Management Considerations

Reports from site visits and treatments (both partners and internal) suggest that most recorded sites remain at moderate levels and are not spreading. New populations do continue to appear on the edges of the Forest or on and along vector sources, such as road shoulders, powerline and other right-of-ways, and campgrounds. Generally treatments do not initially eradicate these sites. Treatments require monitoring and treatment repetition for several years, which results in an increase in acres infested across the Forest over time. The increase in areas treated does not necessarily indicate that all infestation levels are increasing on the Forest, however some are. Awareness, treatment capacity, and funding have increased which contributes to the rise in the number of acres identified. Increased awareness, capacity, and funding has allowed for the treatment of more sites each year and an increased capacity to report new sites. In addition, the Forest continues to report on pre-existing known sites that had not yet been captured in our databases. There a no changes recommended at this time as the forest continues to inventory and treat acres.

Landslides, Debris Slides, Debris Flows and Earthflow

Are projects designed to prevent reactivation or acceleration of landslides, debris slides, debris flows, and earthflows?

- This monitoring question refers to Forest Plan Standards and Guidelines FW-001 to FW-021, B8-001 to B8-055.
- Monitoring Indicator(s): Description of projects that are near landslides, debris slides, debris flows, and earthflow areas, and how the projects affect stability.

New and ongoing planning efforts that encompassed locations where slope stability was a large component for consideration included the Eliot Crossing Reroute, the Goat Mountain Environmental Assessment (EA) and the North Clack EA for forest thinning. For the recent Goat EA, the boundaries of six proposed thinning units were modified to exclude acreage from thinning where the ground was judged to be unstable or potentially unstable. An additional 40 acres of proposed thinning was located within the Forest Plan B8 Earthflow land allocation (B8). Evaluation by a geologist determined that it was a low risk inactive feature, and that thinning upon it would not pose a threat of activation. Analysis also determined that the construction and reconstruction of temporary roads would occur on stable ground, and not affect slope stability. Decommissioning and storm proofing more than 13 miles of road in the project would mitigate any influence they may have had on unstable slopes, as would drainage improvements on existing haul routes. The first year of initial planning and field work for the North Clack EA project area was completed in 2016. Sampling data in units proposed for thinning is currently underway to identify and determine if any unstable or potentially unstable terrain is present and needs to be safe-guarded from proposed activities. There are no lands designated as B8 in the project area. Any temporary roads that may be needed for access would be evaluated to determine their potential effect on slope stability, and measures would be prescribed to avoid activation of any unstable or potentially unstable slope. Whenever activities are proposed in terrain where slope-stability may be an issue, specialists in geology, soils, and/or engineering are consulted.

Monitoring Discussion, Findings and Adaptive Management Considerations

The protocols used to collect and analyze data to review potential project impacts, and project design criteria that are implemented where activities may be proposed in unstable areas continues to meet the

forest plan standards and guidelines and objectives to ensure project activities are not negatively contributing to slope stability concerns.

Status of Focal Species[5]

Pileated Woodpecker

What is the trend of mature and late successional habitat needed for pileated woodpecker persistence?

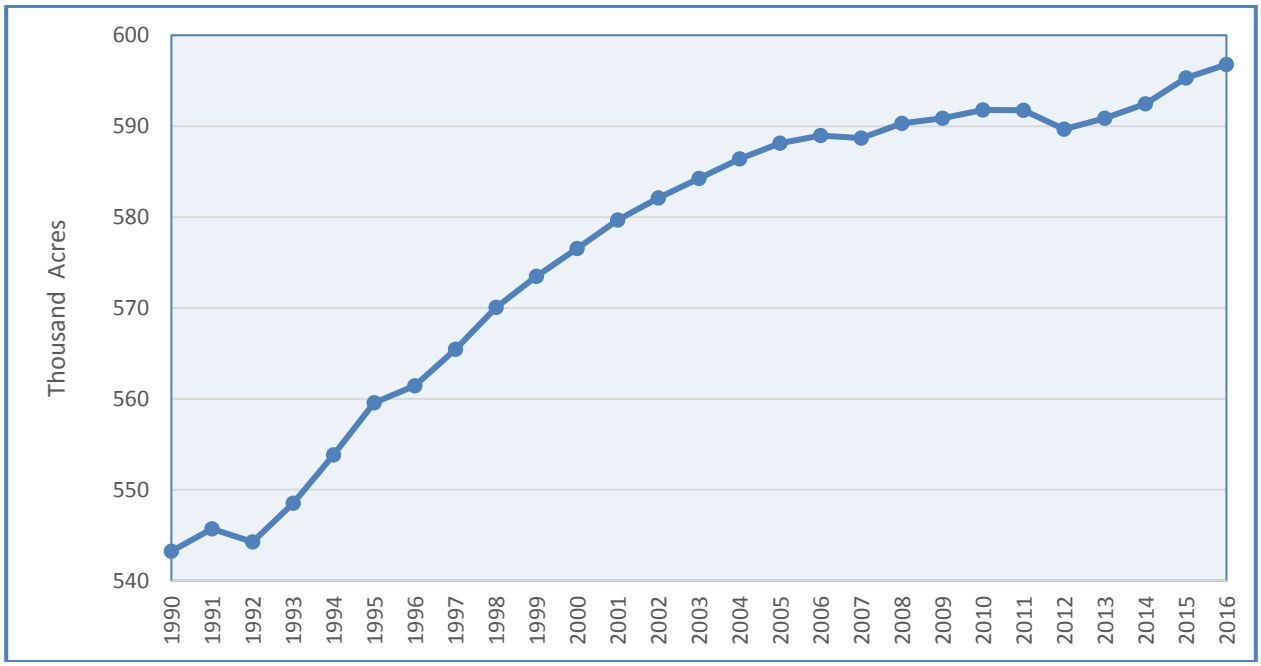
- This monitoring question refers to the Forest Plan desired condition that habitat is managed for the pileated woodpecker.
- Monitoring Indicator(s): Acres of late successional and old growth habitat on the Forest tracked over time. The Forest used acres of the Forest that contain 10 or more trees per acre that are greater than 20 inches in diameter at breast height (DBH).

Data

The pileated woodpecker is one of the Forest's management indicator species and is associated with mature and old growth forests (coniferous and mixed deciduous-coniferous forest types) that typically contain large snags and down wood. They also utilize younger forests if there are scattered large trees and down wood present. Figure 1 illustrates the monitoring results on the Forest since 1990 for pileated woodpecker habitat.

[5] Data for the pileated woodpecker, American marten, Western gray squirrel, and Deer and Elk was provided by Oregon State University's Landscape Ecology, Modeling, Mapping, and Analysis (LEMMA) vegetation structure (Gradient Nearest Neighbor – GNN) dataset (https://lemma.forestry.oregonstate.edu/about).

Figure 1. Acres of late successional and old growth pileated woodpecker habitat over time.



Monitoring Discussion, Findings, and Adaptive Management Considerations

From 2014 to 2016, forest stands that met this metric have increased steadily from 592,470 acres to 596,780acres. Overall, this metric has been steadily increasing since the Forest Plan was written (543,240 acres in 1990).Range-wide within Canada and the United States, the pileated woodpecker population has steadily increased from 1966 to 2015, according to the North American Breeding Bird Survey (Sauer et al., 2017). As shown in Figure 1above, the trend for the pileated woodpecker is increasing at the forest and range-wide scale. The increasing trend does not compel a recommendation for changes in the Forest's management strategy for this focal species.

American Marten

What is the trend for mature and late successional habitat above 3500 feet needed for American marten persistence?

- Plan Component(s) the monitoring questions is tracking: the Forest Plan desired condition that habitat is managed for the American pine marten.
- Monitoring Indicator(s): Acres of late successional and old growth habitat above 3500 feet elevation on the Forest tracked over time. Acres of Forest land at greater than 3,500 feet elevation currently in mature or late-successional stage, with greater than 50 percent canopy cover were used in this evaluation.
- Background: The American marten is one of the Forest's management indicator species and is associated with mature and old growth coniferous forest, generally above 3,500 feet in elevation. Optimal habitat would contain greater than 50 percent canopy cover, with complex cover components (i.e., down trees, rock piles, shrubs/brush).

Data

Figure 2. Acres of American marten habitat over time

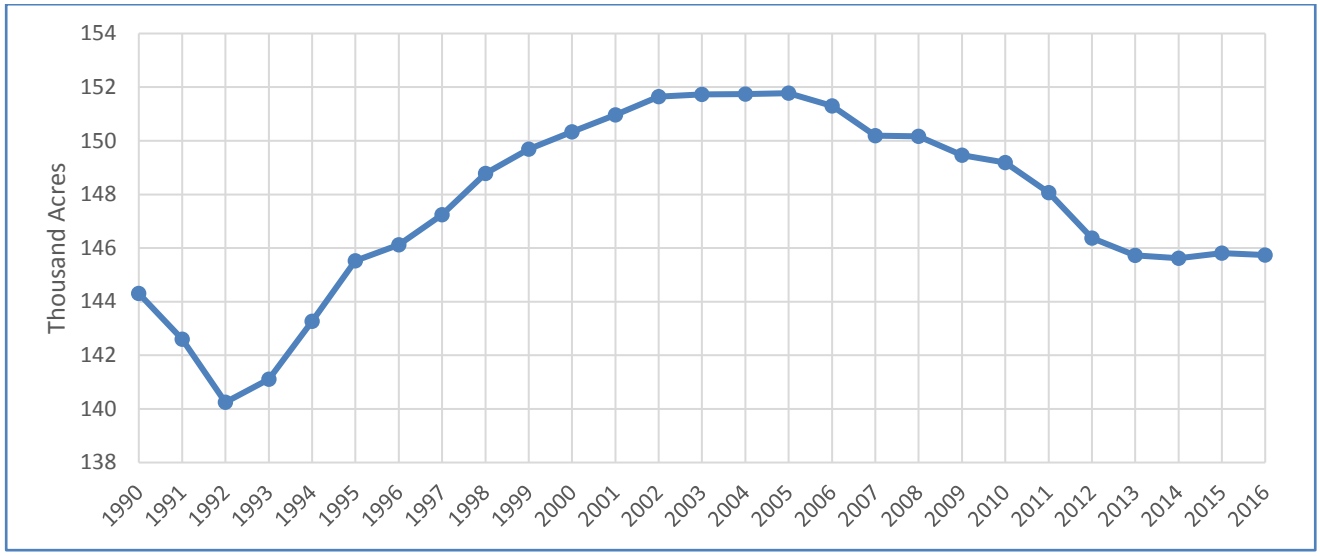
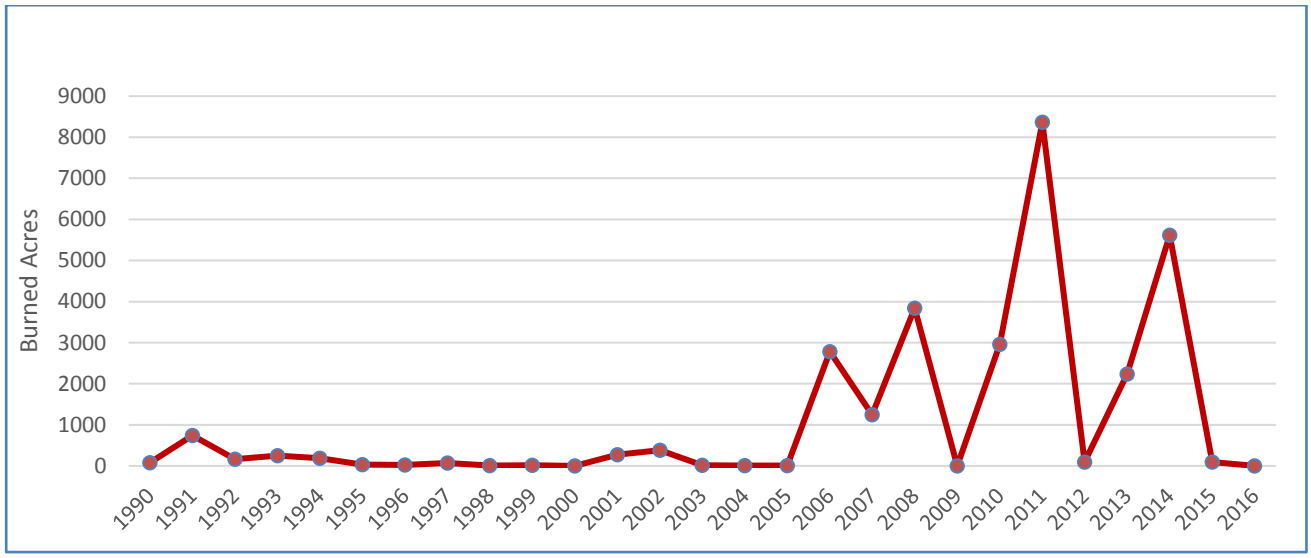


Figure 3. Burned acres on the Forest between 1990 and 2016.



Monitoring Discussion, Findings and Adaptive Management Considerations

Overall, American marten habitat has been increasing since the development of the1990 Forest Plan, but these acres plateaued between 2002 and 2005 as shown in Figure 2 above. From 2006 to 2011, mature and late-successional forests (greater than 3,500 feet elevation) acreage declined largely due to multiple large fires (Figure 3) in or adjacent to the Mt. Hood Wilderness and Bull of the Woods Wilderness. Since 2011, marten habitat acreage leveled out as almost all fires were at lower elevations, coupled with several years of low fire activity on-forest. From 2014 to 2016, the trend for forest stands that meet this metric stayed relatively constant (252,270 to 252,320 acres). You can view

the correlation between habitat availability and large fire events using the data illustrated in Figure 2 and Figure 3 above.

Large fires are a natural part of ecological systems. The fires that caused this temporary decrease in habitat resulted from naturally occurring lightning strikes. There are no recommendations for changes because the forest has been maintaining and continues to maintain habitat for this species. Acknowledging that there will be natural fluctuations in available habitat due to wildfire activity, the American marten's habitat on the Forest is on a trend that is consistent with the Forest Plan.

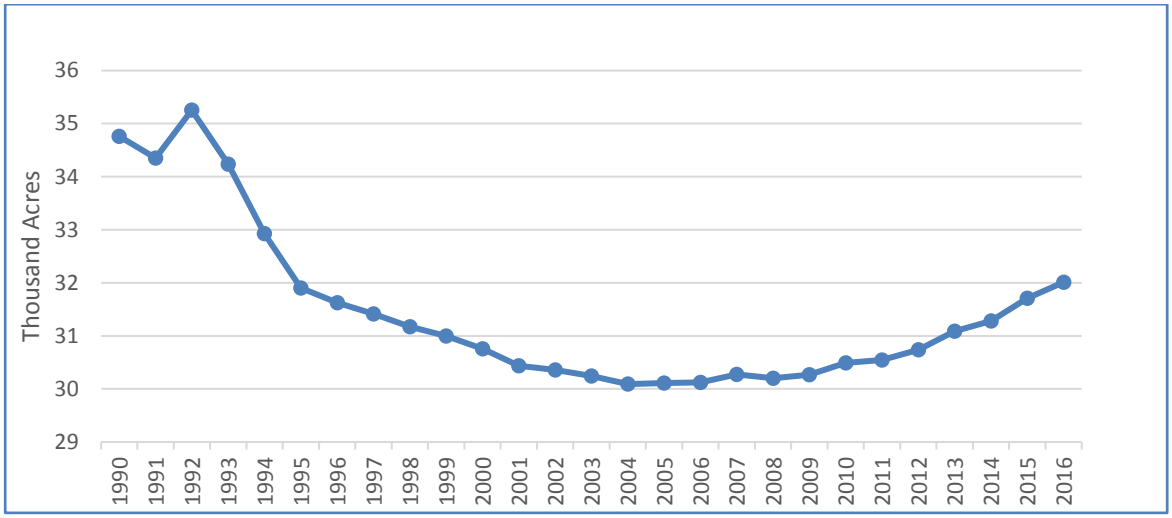
Western Gray Squirrel

What is the trend for oak pine habitat needed for gray squirrel persistence?

- Plan Component(s) the monitoring questions is tracking: the Forest Plan desired condition that habitat is managed for other wildlife species represented by the named management indicator species (MIS).
- Monitoring Indicator(s): acres of oak pine habitat tracked over time. Acres of the Forest that contain greater than or equal to 80 percent Ponderosa pine and/or Oregon White Oak basal area were used to measure habitat trends for the Western gray squirrel.
- Background: The Western gray squirrel is one of the Forest's management indicator species that is strongly associated with forested stands with high ponderosa pine and Oregon white oak components. Studies in south central Washington and north central Oregon, and in areas within the Forest or immediately adjacent, show that the nest and core areas are in coniferous stands that contain approximately 80 to 95 percent ponderosa pine and/or Oregon white oak, mixed with Douglas-fir (Foster, 1992; Linders and Stinson, 2007).

Data

Figure 4. Acres of Western gray squirrel oak pine habitat over time.



Monitoring Discussion, Findings, and Adaptive Management Considerations

The data in Figure 4 shows a steady decline from 1990 (34,760 acres) to a low in 2004 (30,090 acres), but has then steadily increased annually since 2008 to approximately 32,000 in 2016. This timing is coincident with the Forest's priority to restore fire-adapted stands to a more natural range of vegetative conditions. The goal of these fuel reduction projects included silvicultural prescriptions to favor ponderosa pine, oak and other fire-resistant species, while removing much of the thick understory that resulted from decades of active wildfire suppression. These fuel reduction projects are currently being planned and implemented, and thus will continue to improve pine/oak habitat required by the western gray squirrel, therefore changes to management strategies for the Western gray squirrel are not recommended at this time.

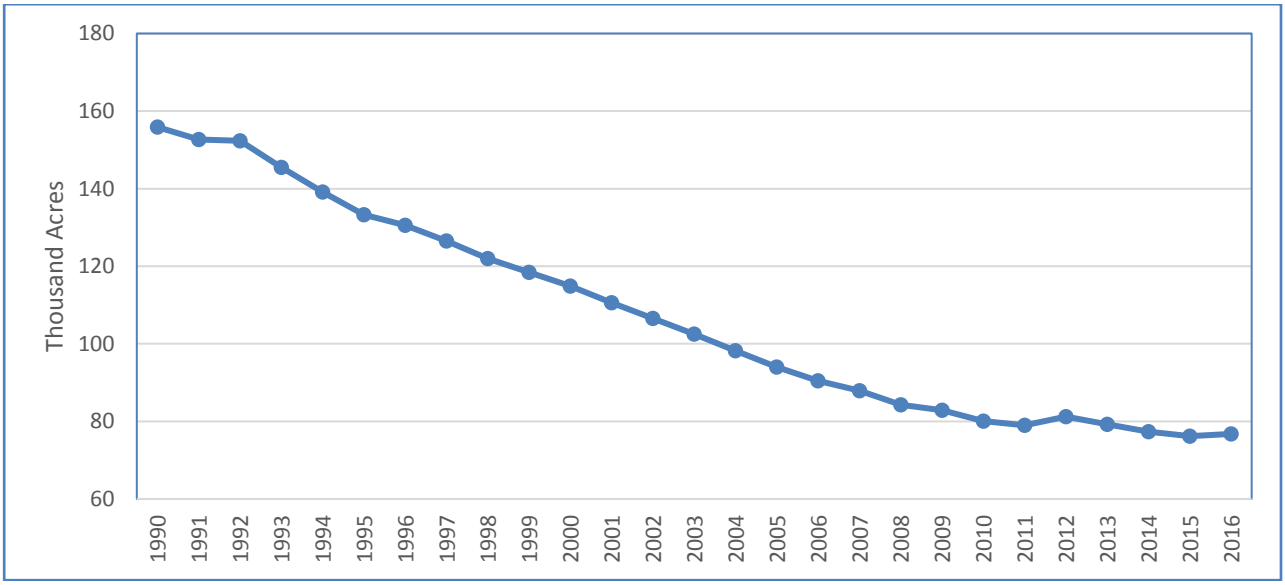
Deer and Elk

What is the trend for early seral habitat needed for deer and elk persistence?

- Plan Component(s) the monitoring questions is tracking: the Forest Plan desired condition that habitat is managed for other wildlife species represented by the named management indicator species (MIS)
- Monitoring Indicator(s): acres of early seral habitat tracked over time. The Forest used acres of habitat with less than 40 percent canopy cover to measure deer and elk habitat.

Data

Figure 5. Acres of early seral habitat for deer and elk forage.



Monitoring Discussion and Findings & Adaptive Management Considerations

From 2014 to 2016, early seral habitat slightly decreased from 77,370 to 76,777 acres. Overall, this habitat has steadily decreased since 1990 (high of 155,880 acres) to present day, with 2015 at the lowest level (76,197 acres). This trend is shown in Figure 5 is consistent with the sharp decline in federal timber harvest, and especially the reduction of clearcut methods in the early 1990's that would have maintained early seral forb and shrub forage preferred by deer and elk (ODFW, 2008). The slight increase in 2012 is likely due to large fires that reset some of the high-severity burn areas back to early seral habitat.

Overall, the forest is in a declining trend for this habitat type even though most vegetation management projects include the creation and enhancement of forage at a small scale. A change in management strategy at the project and landscape level is recommended. In an effort to see a positive trend for deer and elk habitat, future projects should incorporate big game forage enhancement opportunities to a much greater extent.

Status of Ecological Conditions for Threatened and Endangered Species and Proposed Candidate Species

Aquatic Habitat Complexity

Are standards and guidelines effective in maintaining or enhancing aquatic habitat complexity?

- Plan Component(s) the monitoring questions is tracking: FW-139 to FW-147 and NWFP Standards and Guidelines for Riparian Reserves and the Aquatic Conservation Strategy

- Monitoring Indicator(s): Number of stream miles currently occupied by ESA listed fish species (i.e., steelhead, Chinook, coho, and bull trout).
- Background: The Forest Plan goals for the fisheries program are to maintain aquatic habitat quality, as well as diverse and sustainable fish populations. Aquatic resource monitoring is the starting point to track the status of populations of concern, such as ESA listed fish; develop long term data sets on population trends; and conduct effectiveness monitoring for restoration projects designed for habitat recovery and long term sustainability of fish populations. Federally-listed fish species on the Forest include steelhead, coho, Chinook, and bull trout.
- What protocols were used to collect and analyze these data? Similar to the monitoring question addressing general ecological conditions that pertain to fish habitat capability (earlier in this report), maintaining or enhancing aquatic habitat complexity as it relates to viable populations of ESA listed or species of concern is addressed using the same programs; Stream Inventory, AREMP, the WCF, and fish distribution mapping. The inventory program collects stream habitat data, which is then used in both watershed attribute ratings in WCF and also in distribution mapping. The Appendix B: Fish Distribution Maps are a visual representation of fish distribution, which is a surrogate for habitat that is functioning properly or sufficiently complex for listed, sensitive, or species of concern. Although the habitat may be capable of supporting fish, the Forest continues to implement a robust aquatic restoration program that has direct effects to species of concern. By using the stream inventory data, projects are designed to restore processes and habitat attributes that are limiting factors for full functionality, such as the lack of large wood or off/side channel habitat.

Monitoring Results

As seen in the ratings of the WCF map viewer, and by comparing 2010 and 2015 WCF aquatic habitat ratings, aquatic habitat complexity varies across watersheds and individual streams, but all watershed habitat complexity and stream complexity has been maintained or improved over the reporting period.

Monitoring Discussion, Findings and Adaptive Management Considerations

The two priority watersheds that have been selected under WCF and have received the greatest level of effort for restoration purposes over the last 5 years are Still Creek and upper west fork Hood River. The restoration projects and action plans for these 6th field watersheds can also be found by using the Interactive Map Viewer[6] on the WCF program website[7]. The map viewer also displays physical habitat ratings that are derived from the stream inventory program and synthesized using standardized protocols. Documenting the effects of these
restoration projects by surveying physical habitat attributes (stream inventory) and fish usage of restored habitat (distribution maps), allows the Forest to meet standards and guides addressing the maintenance or enhancement of habitat complexity that are necessary to support the various life stages of species of concern and maintain viable populations of ESA listed fish species. In addition to monitoring habitat complexity through stream surveys and the resultant biological response (distribution mapping), direct fish population monitoring is used to better understand life history stages of different populations as well as to focus recovery efforts for ESA-listed or sensitive fish species. The Oregon Department of Fish and Wildlife (ODFW) is primarily responsible for monitoring population status and abundance of fish species (census data), but Forest Service personnel, in collaboration with government, non-government, and Tribal partners, help monitor fish production in

[6] https://www.fs.fed.us/biology/watershed/condition_framework.html

[7] https://reo.gov/monitoring/watershed-overview.shtml

each basin on the Forest. In 2015-16, salmon, steelhead, and bull trout populations were monitored in the Fifteenmile, Hood River, Clackamas, and Sandy River basins. Several projects are ongoing: 1) Steelhead spawning surveys in Fifteenmile Creek, 2) Smolt production monitoring in the Sandy River Basin for long-term population estimates, 3) Clackamas River bull trout re-introduction population/redd survey monitoring, and 4) Hood River bull trout population spawning monitoring. The results of these monitoring efforts are documented in various reports produced by the Forest Service, Sandy River Basin Partners, and ODFW. ODFW reports can be obtained on the ODFW website[8].

Northern Spotted Owl

What is the trend for mature and late successional habitat needed for northern spotted owl recovery?

- Plan Component(s) the monitoring questions is tracking: NWFP Standards and Guidelines' Late Successional Reserves.
- Monitoring Indicator(s): Acres of late successional and old growth habitat on the Forest tracked over time. The Forest used acres of nesting and roosting habitat that are rated as suitable or highly suitable (Davis et al, 2016) as the metric to measure mature and late-successional habitat for NSO.
- Background: Northern spotted owl (NSO) is a federally listed threatened species, as well as a forest management indicator species for mature and late-successional habitat.

Monitoring Results

From 2014 to 2016 NSO suitable habitat increased slightly from 528,290 to 532,160 acres. This habitat type has increased steadily from 1990 to present. There were several years where this increasing trend slowed somewhat due to large forest fires (2006-2007 and 2011-2013), but overall, it seems that processes of forest succession have compensated for most of the losses due to fires.

Data

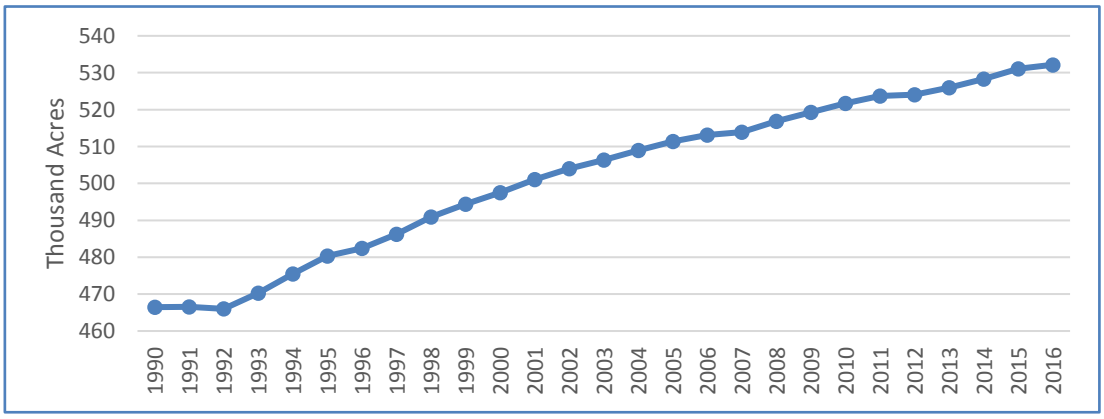


Figure 6. Acres of suitable Northern Spotted owl habitat over time.

Monitoring Discussion, Findings and Adaptive Management Considerations

It is likely this increasing trend will continue due to reduction of clearcut methods and increased focus on thinning methods. It is apparent that the NSO habitat trend is the direct inverse of the early-seral

[8] http://odfw.forestry.oregonstate.edu/

habitat trend that provides for forage habitat for deer and elk. You can compare those trends by viewing the NSO habitat trend in Figure 6 above, and the habitat trend for deer and elk shown in Figure 5.

A twenty year report[9] (1994-2013) describing the trend of federal late-successional habitat managed under the 1994 NWFP shows a small decrease (2.8-2.9% decrease) in older forests (Davis et al, 2015). Wildfire-related losses, including the large areas of the NWFP lands burned annually, has increased in frequency compared to recent decades preceding the NWFP. This increase in fire frequency and size is also reflected on the Forest, but the increase in older, suitable habitat is still on an upward trend for the forest due to on-going forest succession.

Oregon Spotted Frog

What is the trend for Oregon Spotted Frog populations at Camas Prairie?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Standards and Guidelines FW-175
- Monitoring Indicator(s): Tracking visual encounter surveys over time.
- Background & Driver(s): Due to range-wide population declines, the Oregon spotted frog was listed as a threatened species under the ESA in 2014. This is the only extant population on the Forest, and is completely isolated from other Oregon spotted frog populations.

Monitoring Results

Annual egg mass counts from 2005 to 2017 fluctuated from year to year, with a low of 16 (2008) to a high of 82 (2011).

Data

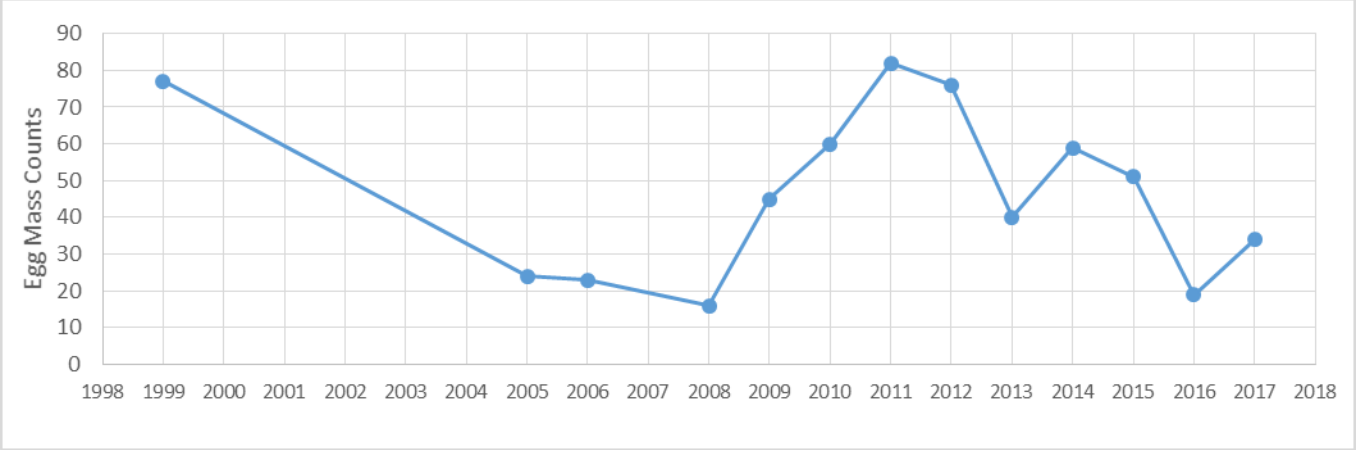


Figure 7. Camas Prairie Oregon Spotted Frog egg mass counts over time. (Data retrieved from Wetland Wildlife Watch)

[9] The NSO twenty year reports can be viewed at the NWFP Interagency Regional Monitoring Program website.

Monitoring Discussion, Findings and Adaptive Management Considerations

It is suspected that the egg mass counts are highly correlated to cyclical water year fluctuations. More investigation is needed to ensure accuracy of the suspected correlation. The population at Camas Prairie seems to be at a low but persisting (level) trend as shown above in Figure 7.

Status of Visitor Use and Satisfaction

Historic Properties

Are significant (National Register eligible) historic properties being maintained, stabilized, and repaired according to historic preservation standards?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Standards and Guidelines FW-622 and FW-624
- Monitoring Indicator(s): Monitoring data/site condition assessments.
- Background & Driver(s): Heritage resources significance is based on the National Register of Historic Places (NRHP) criteria, as per direction in Section 106 of the National Historic Preservation Act (NHPA) as per 36CFR §800. The NHPA guides the majority of the decisions in project related effects to cultural resources. The Forest Plan standards and guidelines are outlined to follow the direction cited in the NHPA in terms of the identification, evaluation, protection and enhancement of historic properties

Monitoring Results

Monitoring results are displayed in the table below. The table identifies the location of the significant heritage site by ranger district. Generally, a condition rating of "Fair" means that approximately fifty percent or more of the building is considered to have high integrity and is structurally sound. A rating of "Poor" generally indicates that the building is not considered structurally sound and that there is a high percentage of loss of the buildings historic fabric. A rating of "Good" indicates that the building is sound and has high structural integrity.

Data

Table 6. Heritage resource sites and condition ratings.

Site	Note	Condition
Clackamas River Ranger District		
Bagby Guard Station, 1913 (Listed NRHP)		Fair
Bull of the Woods Lookout		Poor
Olallie Meadows Cabin (Listed NRHP)		Poor
Olallie Guard Station (Listed NRHP)	SUP	Fair
Oak Grove Ranger Station, (NRHP Listed)		Poor
Hawk Mountain Cabin		Poor
Zigzag Ranger District		
Devil's Peak Lookout		Poor
Zigzag Ranger Station (Listed NRHP)		Poor
Warming Hut at Ski Bowl (Listed NRHP)	SUP	Good

Site	Note	Condition
Timberline Lodge (National Historic Landmark)	SUP	Good
Silcox Hut (Listed NRHP)	SUP	Good
Summit Guard Station	SUP	Good
Clackamas Lake Guard Station	Partial SUP	Fair-Poor
Upper Sandy Guard Station (NRHP Listed)		Poor
Timberline Trail		Fair
McNeil Shelter		Poor
Barlow Road (National Historic Trail-Oregon Trail)		Fair
Old Oregon Trail Tavern/Paradise Christian Camp	SUP	Fair
Cloud Cap Inn (Listed NRHP)	SUP	Fair
Hood River Ranger District		
Tilly Jane A-Frame (Listed – contributing NRHP)	SUP	Fair
Tilly Jane Guard Station and Garage (Listed contributing NRHP)	SUP	Fair
American Legion Cookhouse (Listed contributing NRHP)		Poor
American Legion Amphitheater (Listed NRHP)		Poor
Cooper Spur Shelter (Listed NRHP)		Fair
Barlow Road (Listed NRHP)		Fair
Parkdale WC Ranger's House and Garage (Listed NRHP)		Fair
Parkdale WC Office (Listed NRHP)		Fair
Parkdale WC Shop – Rec (Listed NRHP)		Fair
Parkdale WC Bunkhouse (Listed NRHP)		Fair
Parkdale WC Shop (Listed NRHP)		Fair
Parkdale WC Fire Warehouse (not evaluated)		Fair
Lost Lake Adirondacks (evaluated as eligible)		One poor; one demolished
Elk Meadows Shelter		Poor
Cairn Basin Shelter		Poor
Clear Lake Butte Lookout		Good
Gnarl Ridge Shelter		Poor
McNeil Point Shelter		Poor
Barlow Ranger District		
Barlow Ranger's Residence and garage (not evaluated)		Fair
Barlow Fire Warehouse (not evaluated)		Fair
Barlow Road (Listed NRHP)		Fair
Flag point Lookout	Fire Lookout	Fair
Bear Springs Campground Shelter	SUP	Fair
Five mile Lookout and Garage		Fair
Indian Creek DU Shelter		Fair
Bear Springs Conference Room		Fair
Bear Springs Engineer Office		Fair
Bear Springs Saw Shop		Fair
Bear Springs WC Residence (1005)		Fair

Monitoring Discussion, Findings and Adaptive Management Considerations

It is likely that buildings with condition rating of "Good" or "Fair" may be operated or maintained as part of a Special Use Permit. A portion of the money generated from special use permits (SUP), where

historical structures are included as part of the permit, goes towards the repair and maintenance of those structures. Other structures on the Forest that are not covered under a SUP depend heavily on appropriated dollars, grants, or funding from partners for maintenance and repair.

Physical/Biological, Managerial, and Social Settings

Are the physical/biological, managerial, and social settings of each Wilderness Resource Spectrum (WRS) maintained consistent with the standards for wilderness management?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Desired Condition: there are nine Wilderness areas on the Forest that will provide primitive recreation opportunities along with scenic, historical and ecological experiences; and Forest Plan Standards and Guidelines A2-005 through A2-035, and A2-048 through A2-050.
- Monitoring Indicator(s): Wilderness Performance Program score card's 10 elements associated with wilderness stewardship.
- Background & Driver(s): From 2015-2014 the national standards for monitoring Wilderness character were measured using the "10-Year Wilderness Stewardship Challenge" (10-YWSC). The performance measure "wilderness managed to a minimum stewardship level" is commonly referred to as the 10-YWSC. The use of the 10-YWSC changed in 2015 at the 50th anniversary of the Wilderness Act, marking the end of the 10-YWSC. . The goal of the 10-YWSC was to bring every one of the more than 400 wildernesses under the Forest Service's care to a minimum stewardship level by 2014.

Monitoring Results

The table below displays the stewardship score results for the wilderness areas on the Forest that were included in the Challenge. Table 7 shows that in 2014, all five of the wilderness areas on the Forest which were part of this challenge were scored over 60, and considered as managed to a minimum stewardship level under all criteria of the 10-YWSC, which is a passing score.

Data

Under the Omnibus Public Land Management Act of 2009 (the 2009 Omnibus) five existing wilderness areas expanded (Badger Creek, Bull of the Woods, Mark O. Hatfield, Mt. Hood and Salmon-Huckleberry), and three new wilderness areas were created (Clackamas, Roaring River and Lower White River). The new wilderness areas were not part of the 10-YWSC, although baseline information was gathered.

Table 7. 10-year Wilderness Stewardship Challenge Data (2014).

Wilderness Name	Wilderness Designation Year	Challenge FY	10-YWSC	Stewardship Score
Mark O. Hatfield Wilderness	1984	2014	Yes	66
Mount Hood Wilderness	1964	2014	Yes	69
Salmon-Huckleberry Wilderness	1984	2014	Yes	68
Badger Creek Wilderness	1984	2014	Yes	60
Bull Of The Woods Wilderness	1984	2014	Yes	62
Clackamas Wilderness	2009	2014	No	32
Lower White River Wilderness	2009	2014	No	32
Roaring River Wilderness	2009	2014	No	40

Monitoring Discussion, Findings, and Adaptive Management Considerations

The direction for 2015 wilderness stewardship was to follow the new Wilderness Stewardship Performance (WSP) plan to develop new performance measures for each wilderness area (see Appendix C: Wilderness Monitoring Table). There was no target for meeting a standard, but the target was to set the new standards for each wilderness area. In 2016, the only standard met for all wilderness areas was the air quality monitoring. The agency expected scores to drop initially in the first few years as many of the elements are new or revised. The Forest is developing a strategy on how to implement the new WSP plan, hopefully with help from partners and volunteers. More information on the WSP can be found at Wilderness.net, or here in the WSP brochure[10].

Off Highway Vehicles (OHVs)

Has the OHV Record of Decision of 2010 been implemented?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Desired Condition: activities such as hunting, sightseeing, off-road vehicle use, dispersed camping, cross-country skiing, and fishing are typical.
- Monitoring Indicator(s): Development and designation of designated trails in the Forest Service Infrastructure application (INFRA) database for roads and trails.
- Background & Driver(s): The Forest manages three areas specifically designated for OHV recreation use. La Dee Flats is one of those areas and is located on the Clackamas River Ranger District. For the past two years this OHV area has been the main focus for the beginning phases of implementation of the Forests' 2010 OHV decision. The other two designated OHV areas are Mc Cubbins Gulch, and Rock Creek and are both located on the Barlow Ranger District. Over the past two years, no work has been completed in either of these areas under the 2010 OHV decision.

Monitoring Results

Progress or has already been completed towards implementation of the 2010 OHV decision. The table does not capture data on trails that were existing and already in use, and did not have any changes in the 2010 OHV decision. Other trail monitoring is captured through the Trail Assessment and Condition Surveys (TRACS) program. TRACS is the required methodology for conducting trail inventory, condition assessment, and prescriptions for National Forest System trails. Currently, there are approximately 10 miles of roads that have been converted to trails in the LaDee area under the 2010 OHV decision, and there are approximately 8 miles of mixed-use (MU) routes in the LaDee Area.

[10] http://www.wilderness.net/NWPS/documents/FS/WSP%20Brochure.pdf

Data

Table 8. OHV Record of Decision implementation status[11].

National Forest System Road Number	OHV Route Designation	OHV Class	Route Status	OHV Trail Number	Approx. Miles
4611	Closed to All Traffic	CL	Closed	-	1.0
4610000	Mixed-Use Route (MU)	MU-I, II, III	MU	-	4.4
4610011	Closed to All Traffic	CL	Decommissioned	-	0.7
4610011	Convert to Trail	I, II, III	Converted	802	0.17
4610011	Convert to Trail	I, II, III	Converted	800	0.1
4610012	Closed to All Traffic	CL	Decommissioned	-	0.3
4610013	Convert to Trail	I, II, III	Converted	802	0.2
4610014	Convert to Trail	I, II, III	Converted	803	0.7
4610015	Convert to Trail	I, II, III	Converted	802	0.3
4610016	Convert to Trail	I, III	Converted	801	1.2
4610017	Closed to All Traffic	CL	Decommissioned	-	0.3
4610018	Closed to All Traffic	CL	Decommissioned	-	0.1
4610018	Convert to Trail		Decommissioned	-	
4610018		I,III	Decommissioned	-	0.1
4610019	Closed to All Traffic	CL	Decommissioned	-	0.3
4610020	Closed to All Traffic	CL	Closed	-	0.1
4610024	MU	MU-I, II, III	MU	-	0.2
4610112	Convert to Trail	I, II, III	Converted	800	0.9
4610113	Convert to Trail	I, II, III	In the process of being converted	802	1.7
4610115	Closed to All Traffic	CL	Decommissioned	-	1.2
4610115	Convert to Trail	I, III	Converted	804	1.2
4610120	MU	MU-I, III	MU	804	0.1

[11] Miles shown are approximate. Where routes are closed, OHV Class is listed as CL, for Closed. For designation there are three types of OHV class vehicles. *Class I* (quads, 3-wheelers) are vehicles that are 50-inches wide or less, and have a dry weight of 800 pounds or less with a saddle or seat and travels on 3 or more tires. *Class II* (jeeps, sand rails, SUVs, etc.) are *v*ehicles wider than 50 inches and have a dry weight more than 800 pounds. *Class III* (motorcycles) are vehicles on two tires that have a dry weight less than 600 pounds.

National Forest System Road Number	OHV Route Designation	OHV Class	Route Status	OHV Trail Number	Approx. Miles
4610120	Closed	CL	Closed	-	0.7
4611000	MU	MU-I, II, III	MU	-	1.5
4611012	Closed to All Traffic	CL	Decommissioned	-	0.2
4611014	Closed to All Traffic	CL	Decommissioned	-	0.2
4611120	Close to All Traffic	CL	Decommissioned	-	0.4
4611120	Convert to Trail	I, III	Converted	804	0.5
4611121	Convert to Trail	I, III	Converted	806	1.6
4611125	Convert to Trail	I, III,	Converted	805	0.2
4611130	Convert to Trail	I, III	Converted	805	3
4611135	Closed to All Traffic	CL	Decommissioned	-	0.5

Monitoring Discussion, Findings, and Adaptive Management Considerations

The Forest has been working with volunteers to maintain the all three of the OHV areas. The Forest also utilized OHV rangers who perform trail maintenance work as well as compliance patrols, and ongoing monitoring. Approximately 4 miles of road have been decommissioned the La Dee Flat OHV area, and approximately 12.3 miles of road have been converted to trails. In 2017 the Forest plans to implement improvements to the La Dee Flat staging area. This is a key component to La Dee Flat OHV area as it will continue to improve not only user experience by having an adequate staging area, but also increase safety by ensuring users have an area where they can pull safely off of the road out of the way of traffic.

Level of Satisfaction

Are people having a high level of satisfaction during their visit to Mt. Hood National Forest?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Desired Condition: Outdoor recreation opportunities on the Forest are available in a variety of settings. Opportunities for dispersed recreation in a roaded setting are plentiful. Activities such as hunting, sightseeing, off-road vehicle use, dispersed camping, cross-country skiing, and fishing are typical. Opportunities for dispersed recreation in unroaded areas are less plentiful.
- Monitoring Indicator(s): The percent visitor satisfaction for (1) developed sites, (2) general forest areas, and (3) designated wilderness.
- Background & Driver(s): The NVUM program provides science-based estimates of the volume and characteristics of recreation visitation to the National Forest System, as well as the benefits recreation brings to the American public. Information about the quantity and quality of recreation

visits is required for the National Forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda. The NVUM program ensures that all visitor statistics for National Forests and grasslands produced by the Forest Service use a standardized measure. These standards were established by the Forest Service in the 1970s; however, their application is now stricter than in the past. For example, visitors must be physically recreating on Forest Service managed lands for a visit to count. They cannot be passing through, viewing from a non-Forest Service managed road, or just using restroom facilities.

Monitoring Results

The report and final results for the FY2016 National Visitor Use Monitoring (NVUM) were not issued as of January 2017[12]. The NVUM data is collected through visitor surveys every five years, as such, the most current data (as provided in this monitoring report) available on visitor satisfaction is from the FY2011 NVUM report. About 78 percent of the visitors to the Forest are very satisfied with their recreation experience, as shown in Figure 8. Another 18 percent are somewhat satisfied. Satisfaction index scores for perception of safety were over 90 percent across all types of sites. In dispersed settings, the facility condition and access items were above the national 85% satisfied target. The full 2011 National Visitor Use Monitoring report[13] is also available online

Data

Figure 8. Percent of National Forest visitors by overall satisfaction rating

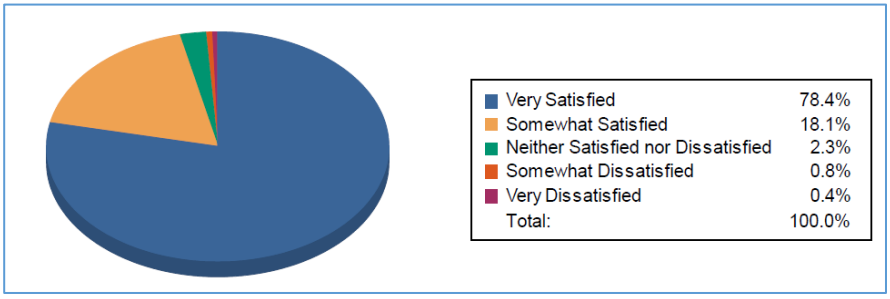


Table 9. Percent satisfied index scores for aggregate categories[14].

Satisfaction Element	Developed Sites[15]	Undeveloped Areas	Designated Wilderness
Developed Facilities	87.1 %	94.8 %	87.6 %
Access	88.6 %	94.9 %	95.5 %
Services	96.9 %	76.7 %	92.4 %
Feeling of Safety	93.3 %	93.6 %	96.8 %

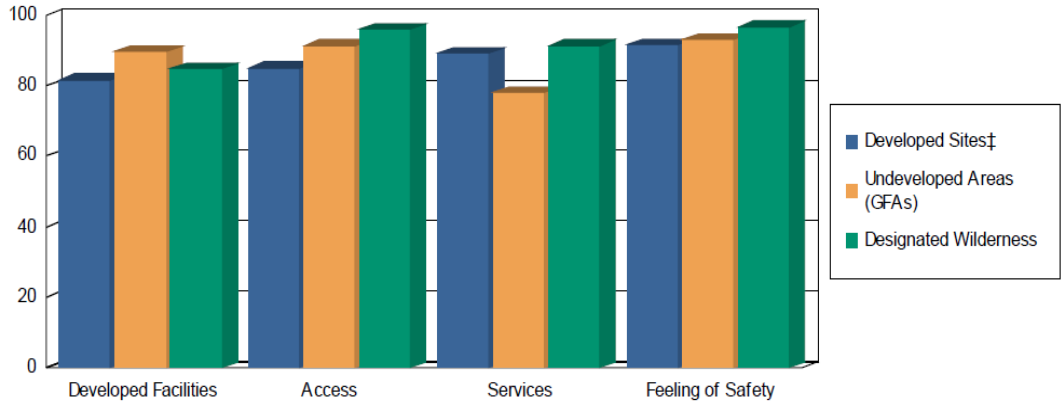
[12] This portion of the monitoring report was compiled in January 2017.

[13] https://apps.fs.usda.gov/nvum/results/ReportCache/2011_A06006_Master_Report.pdf

[14] This index is a composite rating. It is the proportion of satisfaction ratings scored by visitors as good (4) or very good (5). Computed as the percentage of all ratings for the elements within the sub grouping that are at or above the target level, and indicates the percent of all visitors that are reasonably well satisfied with agency performance.

[15] This category includes both day use and overnight use developed sites.

Figure 9. Percent meets expectations (PME) score[16].



Monitoring Discussion, Findings and Adaptive Management Considerations

An important element of outdoor recreation program delivery is evaluating customer satisfaction with the recreation setting, facilities, and services provided. Satisfaction information helps managers decide where to invest in resources and to allocate resources more efficiently toward improving customer satisfaction. Satisfaction is a core piece of data for national- and forest-level performance measures. To describe customer satisfaction, several different measures are used. Recreation visitors were asked to provide an overall rating of their visit to the national forest, on a 5-point Likert scale. About one-third of visitors interviewed on the Forest rated their satisfaction with fourteen elements related to recreation facilities and services, and the importance of those elements to their recreation experience. Visitors were asked to rate the specific site or area at which they were interviewed. Visitors rated both the importance and performance of these elements using a 5-point scale. The Likert scale for importance ranged from not important to very important. The Likert scale for performance ranged from "very dissatisfied" to "very satisfied". Although the satisfaction ratings specifically referenced the area where the visitor was interviewed, the survey design does not usually have enough responses for any individual site or area on the Forest to present information at a site level. Rather, the information is generalized to overall satisfaction within the three site types: Day Use Developed (DUDS), Overnight Use Developed (OUDS), General Forest Areas, and on the Forest as a whole (including designated wilderness). The results of the National Visitor Use Monitoring report indicate general acceptable levels of visitor satisfaction, and do not warrant a recommendations for changes.

[16] Percent Meet Expectations (PME) is the proportion of satisfaction rating in which the numerical satisfaction rating for a particular element is equal to or greater than the importance rating for that element. This indicator tracks the congruence between the agency's performance and customer evaluations of importance. The idea behind this measure is that those elements with higher importance levels must have higher performance levels. Lower scores indicate a gap between desires and performance.

Measureable Changes Related to Climate and Other Stressors

Water for municipal use

Is the production of pure, clean, raw potable water being sustained for municipal use?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Desired Condition: The Bull Run continues to be managed for high quality water; and Forest Plan Standards and Guidelines: FW-084, FW-130, D-001 to D-021
- Monitoring Indicator(s): Changes on the quality and quantity of sustainable municipal waters supply.
- Background & Driver(s): For decades, more than a dozen communities have relied upon surface waters originating from the Forest for municipal use, including large sectors of the Portland metro area. Six watersheds on the Forest have been designated special status by the Forest Plan as amended by the NWFP of 1994 and the 2009 Omnibus (see Table 10 for a listing of these watersheds). A primary management goal for these watersheds is to serve as a municipal water source. Activities that are planned and implemented within them are to be consistent with specific Standards and Guidelines intended to protect the quantity and quality of water.

Table 10. Special status watersheds and associated municipalities.

Special Status Watersheds	Municipality
Bull Run Watershed	City of Portland
The Dalles Watershed (Includes Dog River and Mill Creek)	City of The Dalles
Alder Creek	City of Sandy
Fifteenmile Creek	City of Dufur
Gordon Creek	City of Corbett
Crystal Springs	Unincorporated – Rural communities on Cooper Spur Road

Monitoring Results

Average annual temperatures for the area in 2015 were the highest ever recorded at the time. Snowpack in the basins around Mt Hood were at record low levels, and were about 70 to 90 percent below average. Peak snowpack accumulation occurred 6-12 weeks earlier than normal, and melt-out dates were the earliest on record. Total precipitation was a little low too, being about 84 percent of annual average. This affected streamflow, which by early summer was accurately forecasted to be roughly 50 percent of normal through September. By early fall, reservoir drawdown was at the maximum, and groundwater reserves were being tapped by some of the municipalities including the City of Portland.

Monitoring Discussion, Findings, and Adaptive Management Considerations

During the 2015 and 2016 biennium, the quantity and quality of waters originating from the Mt Hood NF and used by providers for municipal purposes was mostly maintained. Variations in the quantity and quality of waters originating from the Forest over that timeframe were not aberrant to a point of

deficiency or scarcity that could be attributed to management activities. During the drought year of 2015 however, there were climatic variables that affected the quantity and quality of available water. Higher than average spring and summer temperatures, the diminished recharge from low snowpack and its early melt off, and the lower summer streamflow affected the quality of some water bodies. Timothy Lake in the Clackamas basin for example, developed a rather large bloom of blue-green algae. Testing of the bloom concluded that it was not toxic, but its formation indicated changes in water quality that year. Water quality in spring fed sources, such as Dog River in the City of the Dalles watershed, remained high. Despite the climatic anomalies, there were no extraordinary departures in treatment operations reported by providers to ensure that the supply of water originating from the Forest was safe to drink

Tree Mortality

What are the current tree mortality rates and patters across the Forest?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Standards and Guidelines: FW-381 through FW-383.
- Monitoring Indicator(s): Detectable acres of high tree mortality (insect/drought stress).

Monitoring Results

Tree mortality forest wide is measured in a number of ways, as there are a number of causes of tree mortality it can differ depending on the type of insect or disease, geographic distribution of the affected area(s), and the types of plant species affected. Information on tree mortality across the forest is derived from the following sources: Annual Forest Insect and Disease Aerial Detection Survey; 1947-2014; Forest Health Protection, State and Private Forestry, Pacific Northwest Region, Forest Service, U.S. Department of Agriculture; Washington Department of Natural Resources, Resource Protection Division, Forest Health; Oregon Department of Forestry, Forest Health Management. One methodology the Forest uses to capture tree mortality information is through aerial detection survey. This kind of survey is conducted from an aircraft flying over the forest using remote sensing technology to capture forest health information. More information on Aerial Detection Survey[17] is available at the Forest Service website. Survey results of the Forest's aerial detection survey from the past 5 years are summarized in the data section below.

Data

Table 11. Approximate mortality by infestation.

Infestation	General Location on Forest	Approximate Mortality
Bark beetles after fires	Dispersed across the forest	14,000 trees across 2,300 acres
Ips Bark beetles[18]	Northeast/eastern periphery	14,000 trees across 2,000 acres
Mountain Pine beetle	South of Timothy Lake	7,000 trees across 2,000 acres
Silver fir beetle	Northwest flank of Mt. Hood	1,200 trees across 100 acres

[17] https://www.fs.usda.gov/detail/r6/forest-grasslandhealth/insects-diseases/?cid=stelprdb5286951

[18] The majority of the Ips infestation was mapped in 2016. The area south of Timothy Lake has been occurring for over a decade and it appears the mortality event has returned to average levels.

Table 12. Fires and acres burned as a contributing factor toward tree mortality across the Forest.

Year	Number of fires	Total acres of Forest land burned
2007	46	1,251
2008	88	3,858
2009	60	9
2010	67	4,646
2011	56	8,373
2012	86	103
2013	76	2,246
2014	127	5,641
2015	96	108
2016	60	9
Average	76	2,624

Monitoring Discussion, Findings and Adaptive Management Considerations

Forest pests caused over-story mortality events on the Forest during the last 5 years which may have caused localized patches above the average observed pattern of growth and loss. The data above are cited from the Annual Forest Insect and Disease Aerial Detection Survey (2014). The random placement of data plots across the forest should capture some of those site specific differences. The rest of the Forest has incurred about 1-2 dead trees per acre, if that, over the last five years. Overall, 55,000 trees were killed on about 19,000 acres between 2012 and 2016. Fires are another large contributor to tree mortality across the Forest. Within fire burned areas tree mortality varies as well as the rate of mortality among different burned areas. Table 12 displays the number of fires reported in the Individual Wildland Fire Reports and that are stored in Fire Stats[19] database. Overall, the forest has had an average of 2,624 acres burned annually from 2007-2016. Based on this information, there are no recommendations for changes.

Meeting the Desired Conditions and Objectives in the Plan

Growth and Productivity over Mortality

Is total growth and productivity exceeding mortality over all Forest disturbances? Every five to ten years?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Objective of long term sustained yield capability and timber growth since previous decade.
- Monitoring Indicator(s): Track growth, harvest, stocking, and mortality by land use allocation over time.

[19] http://firestats.cc/

Monitoring Results

The following growth and mortality averages were calculated from Forest Inventory and Analysis[20] (FIA) data collected in non-wilderness areas on the Forest. These data are for the years 2011-2015. Plot data were used to estimate growth and mortality for trees greater than 4 inches in diameter at breast height (DBH). There were 199 forested plots with data and 10 plots which were missing data. Data were simulated for the 10 plots which were missing data from those which had data. On average, in forested non-wilderness areas on the Forest:

- growth is measured at approximately 117 cubic feet per acre per year, and
- mortality is measured at approximately 28 cubic feet per acre per year.

Monitoring Discussion, Findings, and Adaptive Management Considerations

Forest growth is exceeding mortality in the period between 2011 and 2015. This trend is similar for growth over mortality rates as measured over a ten year span. All growth is estimated using the FIA volume equations. There is insufficient data in Wilderness Areas, as the region does not collect FIA data in those areas. Based on the average growth and mortality measures, there are no recommendations for changes at this time.

Rate of Harvest

What is the rate of harvest of stands available for timber management?

- Plan Component(s) the monitoring question is tracking: Forest Plan Objective to produce a continuing supply of wood products, maintain an even flow of harvest, and provide a positive economic return to the government.
- Monitoring Indicator(s): Timber harvested by land allocation

Monitoring Results

The total reported average per year volume harvested from the forest between fiscal year 2012-2016 was 37,904 CCF/year (hundred cubic feet per year). From that total, approximately 34,162 CCF/year was from timber sales and stewardship projects, and the rest (3,742 CCF) was from firewood sales. See Table 13 below for more information regarding the annual harvest volume shown in CCF and MBF (thousand board feet).

Data

The data in this table is derived from Forest Service Timber Information Manager and Timber Sale Accounting databases.

Table 13. Annual harvest volume.

Fiscal Year		MBF Volume	CCF Volume
2012	Timber	20849.66	39625.54
	Firewood	2712.55	5216.45
	Fiscal Year Total	23562.21	44841.99
2013	Timber	12100.11	22820.67

[20] https://www.fia.fs.fed.us/

Fiscal Year		MBF Volume	CCF Volume
	Firewood	2299.28	4421.70
	Fiscal Year Total	14399.39	27242.37
2014	Timber	18234.86	34489.57
	Firewood	1875.41	3606.55
	Fiscal Year Total	20110.27	38096.12
2015	Timber	14627.36	27598.29
	Firewood	1409.98	2711.50
	Fiscal Year Total	16037.34	30309.79
2016	Timber	24678.85	46279.83
	Firewood	1428.99	2748.05
	Fiscal Year Total	26107.84	49027.88

Monitoring Discussion, Findings, and Adaptive Management Considerations

Some of the overall volume was from salvage sales and included salvage material, so not all of the volume sold was from green trees. However, the exact amount of that which was green versus salvage volume cannot be determined from these data. The data also does not include which land allocation the volume was harvest, but the majority of the volume harvested has been from C1/Matrix lands. Timber sales continue to occur at a regular rate, therefore changes to forest management practices are not recommended at this time.

Awarded Timber

How much timber is being awarded?

- Plan Component(s) the monitoring questions is tracking: Forest Plan objective of producing a continuing supply of wood products, maintain an even flow of harvest and provide a positive economic return to the government
- Monitoring Indicator(s): Awarded timber each fiscal year.

Monitoring Results

The Forest Plan identified an allowable sale quantity (ASQ) of 189 million board feet (MMBF) per year. The NWFP, which amended the Forest Plan, predicted a Probable Sale Quantity (PSQ) of 67 MMBF (million board feet). In 1995, the PSQ level was adjusted downward to 64 MMBF to reflect the need to protect areas around spotted owl activity centers. The current PSQ for the Forest is 64 MMBF. In fiscal year (FY) 2015 the budget allocation scheduled the Forest to offer for sale approximately 29.6 MMBF (46.3% of PSQ). The Forest awarded a total of 28.8 MMBF. In FY 2016 the budget allocation scheduled the Forest to offer for sale approximately 34.8 MMBF (54.4% of PSQ). The Forest awarded a total of 38.1 MMBF. This is also illustrated in Table 14 below.

Data

Table 14. Awarded timber each fiscal year.

Fiscal Year	Amount of Timber Awarded (MMBF)	% of Plan PSQ
2016	38.1	59.5 %
2015	28.8	45.0 %
2014	33.2	51.9 %
2013	35.0	54.7 %

Monitoring Discussion, Findings, and Adaptive Management Considerations

The timber volume was awarded under one of three different types of contracts: timber sale, small business administration (SBA) or stewardship contracts. About 75% of the volume sold in FY 2015 was in stewardship contracts and the remaining in timber sales. In FY 2016, about 20% of the volume was awarded in SBA sales and the remaining 80% in timber sales. The total value of all saw log and firewood sales on the Forest was $2.77 million in FY 2015 and $1.85 million in FY 2016.
Much of the revenue generated from the stewardship contracting projects remains on the Forest and will be used to accomplish restoration projects such as fuel reduction projects, road maintenance, road decommissioning, fish passage projects, and wildlife habitat enhancement. In FY 2016, a total of about $800,000 in retained receipts from stewardship contract projects were used to implement or awarded in contracts to accomplish restoration projects across the Forest. The Forest also made progress on planning projects that accomplish wildfire risk reduction objectives and commercial thinning in overstocked plantations. The completed planning efforts resulted in approximately 40 MMBF of saw timber and will be included in timber sales and stewardship contracts in FY 2017 and 2018. The Forest also started new vegetation management planning projects that will continue to be developed in FY 2017.

Timber Land Base

Are there any changes in the land base available for producing timber?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Desired Condition: Timber harvest comes from lands suitable for growing timber.
- Monitoring Indicator(s): Change in acres of land use allocations permitting timber harvest.

Monitoring Results

In 2015 and 2016 there were no changes to the land base available for producing timber. The land base available for producing timber is defined within management area direction for each of the land use allocations (LUAs) that are described in the Forest Plan. Many of the LUAs overlap one another. The information in this section is denoted by what would be defined as the predominating LUA for the area, even though other LUA objectives may also be nested within the area. In some cases the LUA may cover a higher percentage than what the table shows, but in those areas the LUA would not be the predominate allocation, therefore those acreages are not displayed in this section.

Data

Table 15 displays the approximate land base percentages for each of the Forest's LUAs based on its predominate allocation status as described in the Forest Plan and as estimated from geographic information systems spatial analysis. The table denotes which of those LUAs have allowances for timber harvest activities. Percentages displayed in the table are approximates and were derived using geographic information spatial data systems.

Table 15. Land base percentages[21].

Land Use Allocation (LUA)	Emphasis	Timber Harvest/ Management/ Forest Products Should Occur? (Yes/No)	% LUA Acres of Forest	Timber harvest only when harvest supports LUA goals/objectives/ desired future condition (Yes/No)
A1	Wild Rivers (Outside of Wilderness)	No	1%	No
A2	Wilderness	No	31%	No
A3	Research Natural Area	No	0%	No
A4	Special Interest Area	No	2%	Yes
A5	Unroaded Recreation	No	1%	Yes
A6	Semi-Primitive Roaded Recreation	No	0%	Yes
A7	Special Old Growth	No	0%	Yes
A8	Northern Spotted Owl Habitat Area	No	Not Mapped	No
A9	Key Site Riparian	No	1%	Yes
A10	Developed Recreation	No	0%	Yes
A11	Winter Recreation Areas	No	1%	Yes
A12	Outdoor Education Area	No	0%	Yes
A13	Bald Eagle Habitat Area	No	0%	Yes
B1	Scenic & Recreational Rivers	Yes	4%	Yes
B2	Scenic Viewshed	Yes	16%	Yes
B3	Roaded Recreation	Yes	1%	Yes
B4	Pine-Oak Habitat	Yes	2%	Yes
B5	Pileated Woodpecker/Pine Marten Habitat Area	Yes	0%	Yes
B6	Special Emphasis Watershed	Yes	10%	Yes
B7	General Riparian Area	Yes	Not Mapped	Yes

[21] Table 15 shows land base percentages for each of the Forest's LUAs and associated timber harvest ability. The data displayed in this table are considered approximates and are generated using spatial data systems (i.e., Geographic Information Systems). Where the LUA totals less than one percent, "0%" acres are show in the table.

Land Use Allocation (LUA)	Emphasis	Timber Harvest/ Management/ Forest Products Should Occur? (Yes/No)	% LUA Acres of Forest	Timber harvest only when harvest supports LUA goals/objectives/ desired future condition (Yes/No)
B8	Earthflow	Yes	3%	Yes
B9	Wildlife/Visual Area	Yes	0%	Yes
B10	Deer and Elk Winter Range	Yes	1%	Yes
B11	Deer and Elk Summer Range	Yes	1%	Yes
B12	Backcountry Lakes	Yes	0%	Yes
C1	Timber Emphasis	Yes	24%	Yes
			100%	Forest land base.
			63%	Percent of total Forest acres where timber harvest could occur.
			35%	NWFP (matrix) timber emphasis approximate percentage.
			14%	Approximate percentage where matrix overlaps C1 LUA

Monitoring Discussion, Findings, and Adaptive Management Considerations

The most recent changes to the Forest's LUAs occurred in 2009 under the congressional action of the 2009 Omnibus which designated three new wilderness areas, expanded existing wilderness areas, and designated nine new Wild, Scenic, and Recreational River corridors. Approximately 31% of the Forest is designated wilderness. According to the Forest Plan, river corridors designated as "Wild" under the 2009 Omnibus would not allow for regulated timber harvest, however, unregulated timber harvest may occur only for salvage, health and safety, insect and disease control, fire, natural catastrophe or disaster. In Scenic and Recreational corridors regulated timber harvest should occur in an effort to achieve specific management objectives defined within that management area direction in the Forest Plan.

The NWFP amended the Forest Plan and identified approximately 40 percent of the Forest as "Matrix" lands. Within the total matrix allocation, approximately 14 percent of the Forest land base is "timber emphasis", wherein the primary objective is timber production. For the remainder of matrix land outside of timber emphasis designation, vegetation management is still a major activity, however timber management is undertaken in these areas as a means to meet other (primary) resource objectives (e.g., scenic viewshed, deer and elk winder range, special emphasis watershed etc.). The Forest currently has two land exchange projects under analysis; the Government Camp Cooper Spur Land Exchange, and the Bull Run Land Exchange.

The Draft Environmental Impact Statement (DEIS) for the Government Camp Cooper Spur Land Exchange was released in October, 2016. In summary, the DEIS describes the proposed exchange consisting of approximately 109 acres of NFS lands to be conveyed to Mt. Hood Meadows, and approximately 769 acres of lands in Hood River County currently owned by Mt. Hood Meadows to be conveyed to the Forest. All lands to be conveyed are classified as not suitable for timber production. In addition to the land exchanges, the proposed action includes a Forest Plan LUA amendment to reflect the following; approximately 1,709 acres of NFS lands becoming part of the Mt. Hood

Wilderness, and approximately 2,090 acres of existing NFS lands and the 769 acres of acquired lands becoming designated as part of the Crystal Springs Watershed Special Resources Management Unit. The Silviculture section in chapter 3 of the DEIS describes that the number of acres considered as suitable for timber production would decrease by approximately 249 acres. This is due to 249 acres of suitable lands in both the B2 and the C1 LUAs being re-classified as either A2 or proposed A14 (Crystal Springs Watershed Special Resources Management Unit) after the land exchange. A2 and A14 would be unsuitable for timber production by management direction. It is important to note, that the information described here was based from a Draft Environmental Impact Statement, and a final decision on the Government Camp Cooper Spur Land Exchange is anticipated soon.
The Bull Run Land Exchange proposed action is described as the conveyance of 2,830 acres of NFS lands near the Bull Run River and Bull Run Reservoirs 1 and 2 to the City of Portland Water Bureau in exchange for the acquisition of 2,528 acres of City owned land in the western and southern portions of the management unit. All of the lands proposed as part of this land exchange are within the Bull Run Management Unit, and are not part of the land base available for timber production. It is important to note that the information presented here is based on what has been proposed, and a final decision on the Bull Run Land Exchange is anticipated in 2018 or soon after.

Regeneration Requirements

Are we meeting the 5-year regeneration period required by the National Forest Management Act (NFMA)?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Desired Condition: Areas harvested are adequately restocked within five years of final harvest (36 CFR § 219.27), and Standards and Guidelines: FW-358, C1-019 through C1-021.
- Monitoring Indicator(s): Meeting stocking guidelines in the Forest Plan as tiered to the Forest Service Handbook.

Monitoring Discussion, Findings, and Adaptive Management Considerations

The NFMA regeneration period only applies to regeneration harvesting, which the Forest maintains a record of in the FACTS database. We have met all regeneration timelines as the Forest rarely does regeneration harvesting. The Forest's planting program is for fire restoration and species diversity planting.

Suitable Miles

How many miles are suitable for passenger cars and high clearance vehicles?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Goal to provide safe, efficient access for the movement of people and materials involved in the use and management of the Forest, and Standards and Guidelines: FW-419, and FW-420.
- Monitoring Indicator(s): Miles of road being maintained each year for all vehicles. Miles of roads providing safe access for use and management of the Forest.

Data

The Forest Service classifies roads in 5 levels based on the amount of maintenance attention they needed due to the road's importance based on usage, both quantity of cars and access to locations on the forest. Table 16 **Error! Reference source not found.**shows a summary of the accessible miles based on road suitability, and respective maintenance level (ML). The Forest uses a maintenance level (ML) system to classify road maintenance objectives, and road use, and that is broken into five levels. The lowest level is a ML 1, which means the road is closed to use, but is still needed for use at a later date, such as for access to an area for harvest during a timber sale. ML 1 roads have infrequent reoccurring use, and only receive maintenance when they are to be used for a project. Roads that provide access to the forest but not to a well-used site or other destination feature are designated as an ML 2 road. ML 2 roads are maintained to a level that does not consider usage by passenger cars, but for those vehicles that are built to provide higher clearances and deal with rougher surfaces. In Table 16 below vehicle suitability is shown along with maintenance level, and associated accessible miles by passenger cars and high clearance vehicles.

Table 16. Description of Forest roads.

Forest Maintenance Level	Suitability	Accessible Miles
Maintenance level 1	Maintained for project use	0
Maintenance level 2	Suitable for high clearance vehicles	1,338
Maintenance levels 3, 4, and 5	Suitable for passenger cars	311
Approximate total accessible miles		1649

Monitoring Results, Discussion, Findings, and Adaptive Management Considerations

As of March 2017 the Forest has approximately 1,338 miles of road suitable only for high clearance vehicles. MLs 3, 4, and 5 are all designated based on how much focus needs to be applied to each type of road as increases in the use levels and importance of access to an area are identified. Levels 3, 4, and 5 are suitable for use by passenger cars. As of March, 2017 the Forest has approximately 311 miles of road meeting these Maintenance Levels. As the Forest continues to implement travel management objectives, the number of miles in each maintenance level will change. As implementation of travel management objectives occurs, accessible miles at different suitability levels are anticipated and are expected to change over time.

Travel Management

Are road management activities being implemented in accordance with the latest access and travel management direction?

- Plan Component(s) the monitoring questions is tracking: Forest Plan Standards and Guidelines: FW-419 through FW-424.
- Monitoring Indicator(s): Miles of road converted into desired maintenance level and/or that have achieved the road management objectives.

Monitoring Results

Yes. The latest Forest-scale transportation analysis produced a report known as the 2015 Travel Analysis Report (TAR) which categorized all system roads on the Forest as either "Likely Needed" or "Likely Not Needed" as part of the desired future transportation system. This report makes recommendations for project-level decisions about whether to retain roads and maintain for public

access use, close roads to public access but maintain for administrative use, place roads into storage for later use, or to decommission roads.

Monitoring Discussion, Findings, and Adaptive Management Considerations

A project-scale transportation analysis is completed concurrently with the planning of each new land management project on the Forest and is guided by the TAR. Project level decisions are made based on effects analysis for resource areas. These project by project decisions would approve actions and expenditures by the government to move the Forest's transportation system toward a minimum road system. As the TAR provides recommendations, final decisions on road status are made based on defined project objectives and a thorough review of roads within that project area. Since October of 2014. The Forest has converted approximately 4 miles of roads to ML 1, and approximately 11 miles of roads have been decommissioned. A decommissioned road is a road that has been obliterated and removed from the Forest's system of roads. The Forest continues to analyze the road system through ongoing project planning. Currently, the forest is conducting analysis for restoration and vegetation treatment projects that would continue to change the overall roads system landscape.

Management Systems and Productive Capacity of the Land

Productive Capacity of the Land

Are management activities being implemented so that they do not substantially and permanently impair the productive capacity of the land?

- Plan Component(s) the monitoring questions is tracking: Forest Standards and Guidelines: FW-022 through FW-038
- Monitoring Indicator(s): Extent of detrimental soil disturbance in an activity unit.

Monitoring Results

In 2015 and 2016 BMP monitoring was conducted on a total of four timber sale units where ground-based logging methods were employed to determine if BMPs were implemented, and if they were effective at minimizing impacts to water quality from ground disturbing activities. Although the BMP monitoring is intended to evaluate the effects to water resources, the extent of ground impacts on soil resources can be assessed simultaneously. Two of the monitoring sites were located on the west side of the Forest (Beluga-Orca and Bass stewardship contracts), and two were on the east side (Faller Thin and Mint timber sale areas). Monitoring concluded that the extent of detrimental soil conditions had been limited at all four sites. Timber sale administrators had used contractual stipulations to keep the skid trail system and landings limited in size, and ensured that a portion of their surfaces were water-barred and covered with a protective layer of slash afterward.

In 2015 soil conditions were monitored within the same areas (two sites were on the west side and two were on the east side of the Forest). This monitoring effort was conducted to validate estimates made by soil scientists of the extent of detrimental soil conditions in units being proposed for thinning. Data helped to confirm for them that the visual indicators they were seeing were indeed detrimental soil impacts that remained from the initial harvest decades ago. Results of the monitoring provided

rationale for prescribing site-specific BMPs or PDCs, established a basis for comparing soil conditions before and after the proposed thinning, and helped to identify the potential for future restoration opportunities.

Monitoring Discussion, Findings, and Adaptive Management Considerations

The Forest conducts BMP monitoring and soil condition monitoring annually to determine if ground disturbing activities are impairing the productive capacity of the land. The Forest Plan outlines Standards and Guidelines that direct that detrimental effects to soils from ground disturbing activities be minimized, and that soil productivity be protected, maintained, or restored. To achieve those objectives, BMPs and PDCs are defined and prescribed during planning phases of a project to limit the extent of detrimental soil impacts. These are then translated and incorporated into contractual clauses so that they are legally binding and enforceable through the administration of third party work, or used to develop implementation plans that guide operations being conducted internally.

Restorative actions aimed at enhancing or restoring the productive capacity of the land occur on an annual basis as do measures to protect it. The Mt Hood National Forest has an annual target of 1,200 acres assigned it by the Regional office to restore degraded areas or to enhance and maintain the existing productivity on select sites. The Forest exceeded their assigned target in years 2015 and 2016 by 186 and 155 percent respectively. Exceeding the assigned target over the last two years can be attributed primarily to successes in securing partnership funds and retained receipts to conduct noxious weed control, pre-commercial thinning, reforestation, road closures and decommissioning, riparian plantings, and repair of user-created OHV trails

Conclusion

As the Forest maintains a focus on long-term outcomes of management with respect to key social, economic and ecological systems, the following recommendations are a result of this monitoring report. Monitoring suggests that forest management activities are being conducted in a manner that meets the Forest Plan desired conditions, goals, objectives and standards and guidelines for most areas. However, monitoring data suggests that the Forest is in a declining trend for early seral habitat type for deer and elk even though some vegetation management projects include the creation and enhancement of forage at a small scale. A change in management strategy at the project and landscape level is recommended for these species. In an effort to see a positive trend for deer and elk habitat, it is recommended that future projects should incorporate big game forage enhancement opportunities to a greater extent.

Monitoring results are not yet conclusive to suggest a recommendation in changes as in the case of the Oregon Spotted Frog. Additional monitoring is needed before recommendations can be made regarding the populations of the Oregon Spotted Frog at Camas Prairie.

The Forest will continue its commitment to monitor and evaluate the effectiveness of our management actions. This process will continue to allow the Forest Plan to remain an active, relevant, usable document.

Appendix A: Monitoring Program Matrix

Forest Plan Component	Monitoring Question	Indicator(s)
I) The status of select watershed conditions.		
Standards and Guidelines: FW-055 to FW-058 NWFP Standards and Guidelines: Aquatic Conservation Strategy, General Monitoring Objective (1)	Have Best Management Practices (BMPs) been implemented and are they effective at managing water quality consistent with the Clean Water Act?	U.S. Forest Service National BMP Annual Monitoring Protocols
II) The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.		
Standards and Guidelines: FW-137 NWFP Standards and Guidelines: Riparian Reserves & Aquatic Conservation Strategy	Are Standards and Guidelines effective in maintaining or enhancing fish habitat capability?	Number of stream miles currently occupied by representative fish species (i.e., steelhead, chinook, coho, and bull trout).
NWFP Standards and Guidelines: Survey and Manage Species	Are habitat improvement projects contributing to the persistence of Survey and Manage species?	Acres of habitat enhanced for Survey and Manage species.
Standards and Guidelines: FW-375 to FW-377, FW-384, Forest Plan Amendments #13 and #15	Are known populations of invasive species continuing to spread? Are new infestations occurring?	Acres of surveyed lands with new and active invasive species infestations. Acres treated for invasive species.
Standards and Guidelines: FW-001 to FW-021, B8-001 to B8-055	Are projects designed to prevent reactivation or acceleration of landslides, debris slides, debris flows, and earthflow areas?	Description of projects that are near landslides, debris slides, debris flows, and earthflow areas and how the projects affect stability.
III) The status of focal species to assess the ecological conditions required under §219.9.		
Desired Condition: Habitat is managed for the pileated woodpecker.	What is the trend for mature and late- successional habitat needed for pileated woodpecker persistence?	Acres of late-successional and old growth habitat on the Forest tracked over time.
Desired Condition: Habitat is managed for the American pine marten.	What is the trend for mature and late- successional habitat above 3500 feet needed for American marten persistence?	Acres of late-successional and old growth habitat above 3500 feet elevation on the Forest tracked over time.

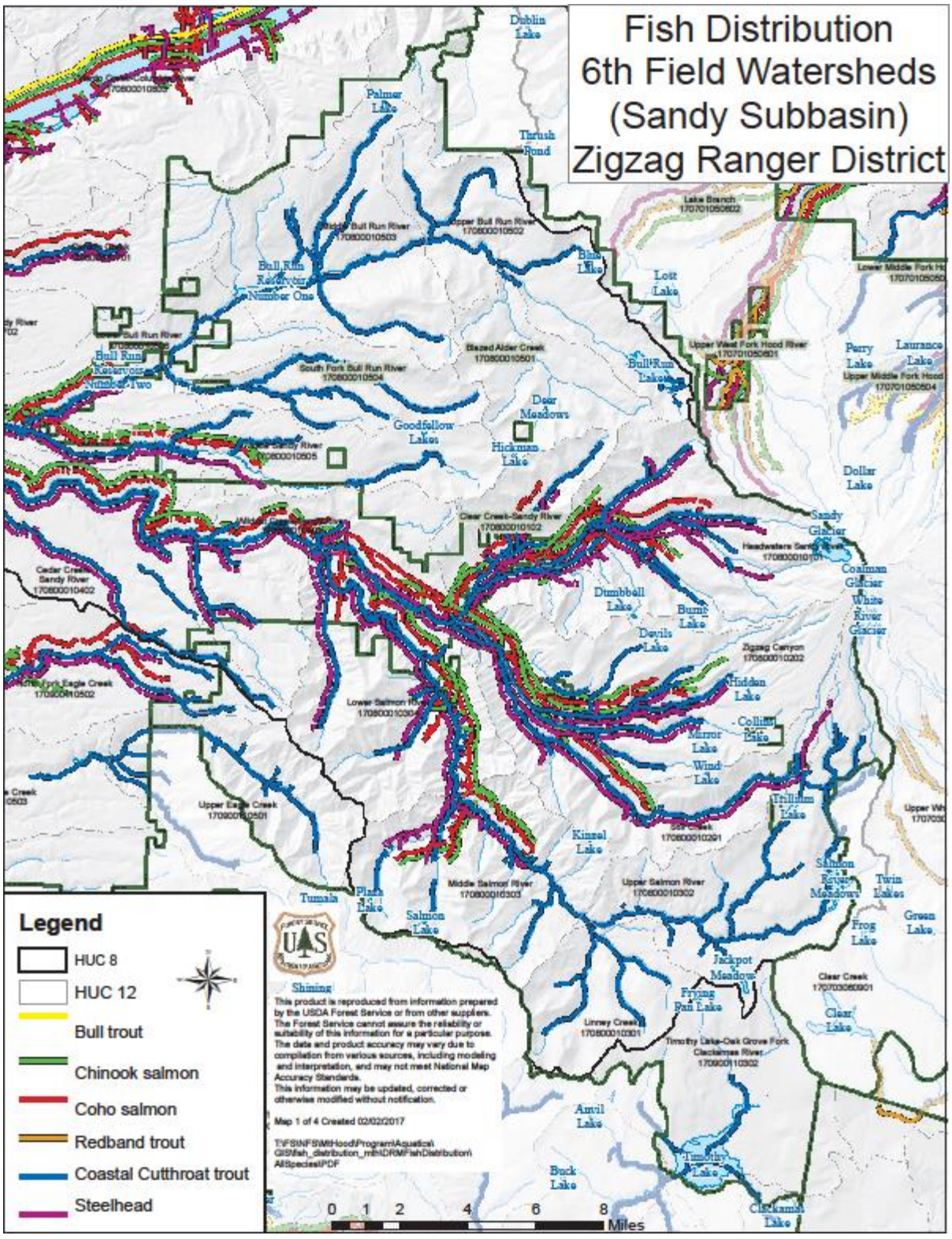
Forest Plan Component	Monitoring Question	Indicator(s)
Desired Condition: Habitat is managed for other wildlife species represented by the named management indicator species.	What is the trend for oak pine habitat needed for gray squirrel persistence?	Acres of oak pine habitat tracked over time.
Desired Condition: Habitat is managed for other wildlife species represented by the named management indicator species.	What is the trend for early-seral habitat needed for deer and elk persistence?	Acres of early-seral habitat tracked over time.
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.		
Standards and Guidelines: FW-139 to FW-147 NWFP Standards and Guidelines: Riparian Reserves & Aquatic Conservation Strategy	Are Standards and Guidelines effective in maintaining or enhancing aquatic habitat complexity?	Number of stream miles currently occupied by Endangered Species Act listed fish species (i.e., steelhead, chinook, coho, and bull trout).
NWFP Standards and Guidelines: Late Successional Reserves	What is the trend for mature and late- successional habitat needed for northern spotted owl recovery?	Acres of late-successional and old growth habitat on the Forest tracked over time.
Standards and Guidelines: FW-175	What is the trend for Oregon Spotted Frog populations at Camas Prairie?	Tracking visual encounter surveys over time.
V) The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.		
Standards and Guidelines: FW-622, FW-624	Are significant (National Register eligible) historic properties being maintained, stabilized, and repaired according to historic preservation standards?	Monitoring data and/or site condition assessments.

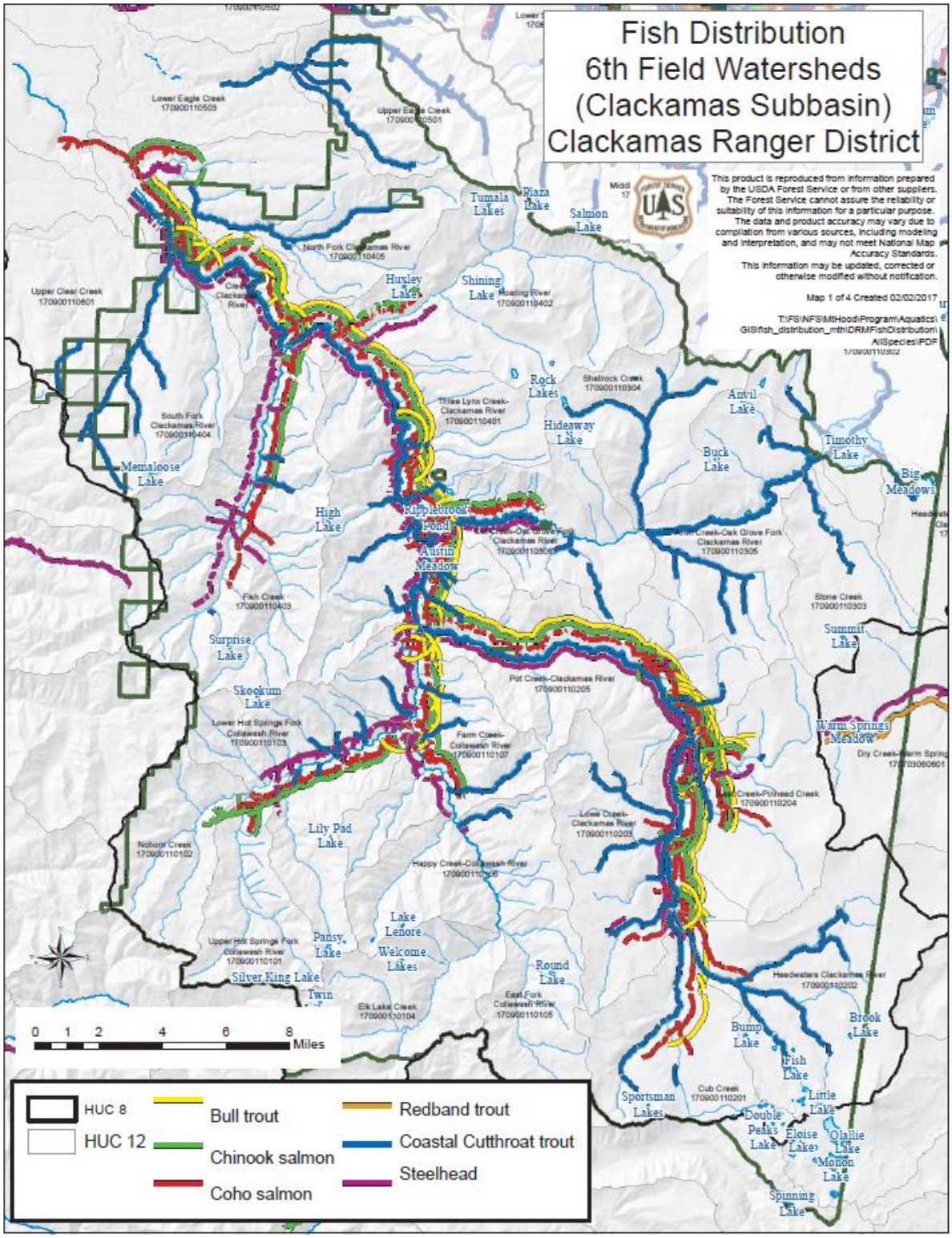
Forest Plan Component	Monitoring Question	Indicator(s)
Desired Condition: There are five Wilderness areas on the Forest that will provide primitive recreation opportunities along with scenic, historical and ecological experiences. Standards and Guidelines: A2-005 to A2-035, A2-048 to A2-050.	Are the physical/biological, managerial, and social settings of each Wilderness Resource Spectrum (WRS) maintained consistent with the standards for wilderness management?	Wilderness Performance Program Score Card – 10 elements associated with wilderness stewardship will be selected.[22]
Desired condition: Activities such as hunting, sightseeing, off-road vehicle use, dispersed camping, cross-country skiing, and fishing are typical.	Has the Off-Highway Vehicle Record of Decision 2010 been implemented?	Development and designation of designated trails in INFRA Roads and Trails databases.
Desired condition: Outdoor recreation opportunities on the Forest are available in a variety of settings. Opportunities for dispersed recreation in a roaded setting are plentiful. Activities such as hunting, sightseeing, ORV use, dispersed camping, cross-country skiing, and fishing are typical. Opportunities for dispersed recreation in unroaded areas are less plentiful.	Are people having a high level of satisfaction during their visit to Mt. Hood National Forest?	Percent visitor satisfaction for (1) developed sites, (2) general forest areas, and (3) designated wilderness.
VI) Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.		
Desired Condition: The Bull Run continues to be managed for high quality water. Standards and Guidelines: FW-054-060, 078-079, 84, 130 FW-071, , D-001 to D-021	Is the production of pure, clear, raw, potable water being sustained for municipal use?	Changes in the quality and quantity of sustainable, municipal water supply.
Standards and Guidelines: FW-381 to FW-383	What are the current tree mortality rates and patterns across the forest?	Detectable acres of high tree mortality.
VII) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.		

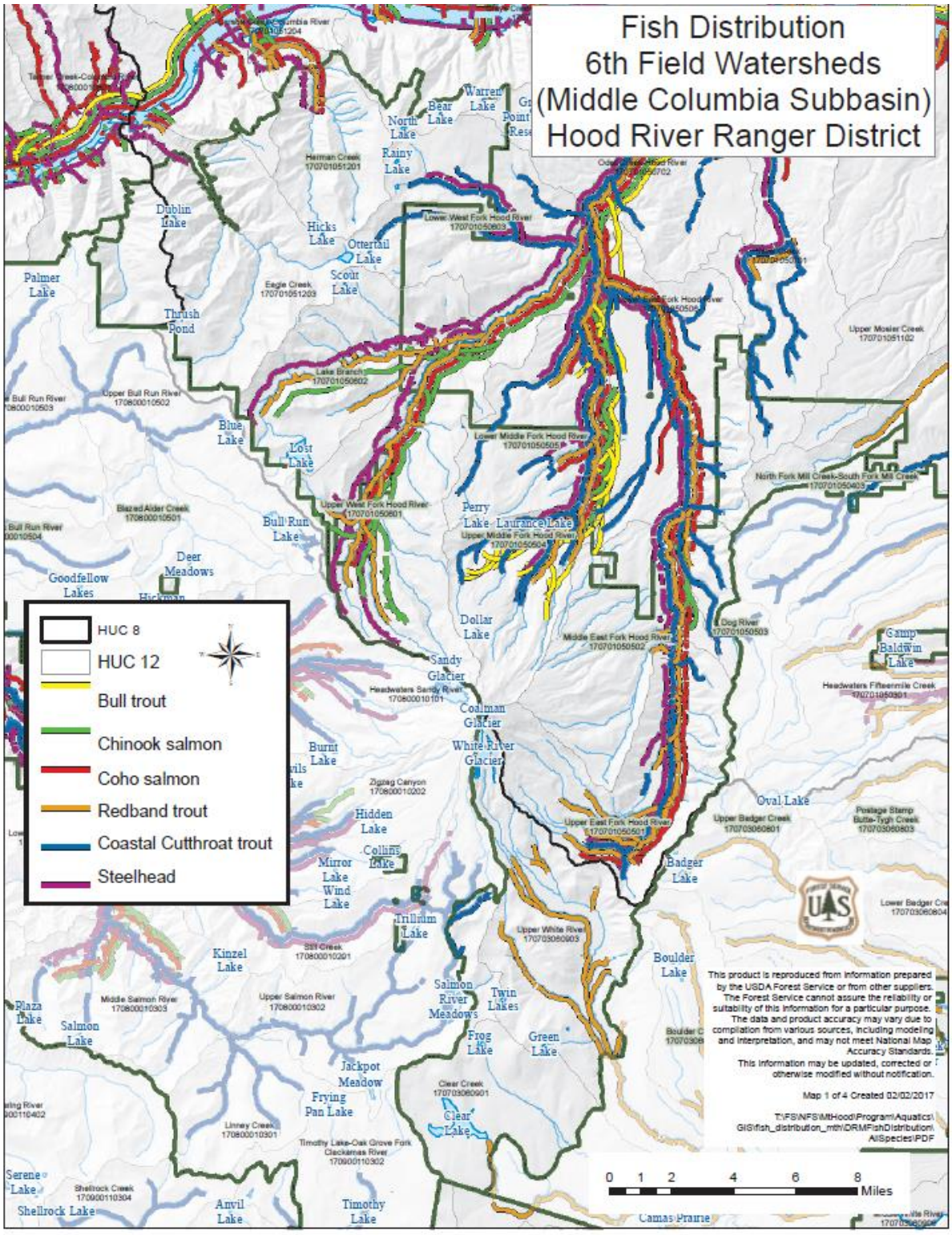
[22] The WSP framework contains four mandatory elements (agency management actions, workforce capacity, education, and wilderness character baseline) and the Forest will select six other elements from a list of 15: Invasive Species; Air Quality Values; Natural Quality of Wilderness Character; Natural Role of Fire; Water; Fish and Wildlife; Recreation Sites; Trails; Non-Compliant Infrastructure; Motorized Equipment / Mechanical Transport Use Authorizations; Agency Management Actions; Opportunities for Solitude; Opportunities for Primitive and Unconfined Recreation; Cultural Resources; Livestock Grazing; Outfitters and Guides; Other Special Provisions (e.g., dams, airstrips, mines); Workforce Capacity; Education; and, Wilderness Character Baseline.

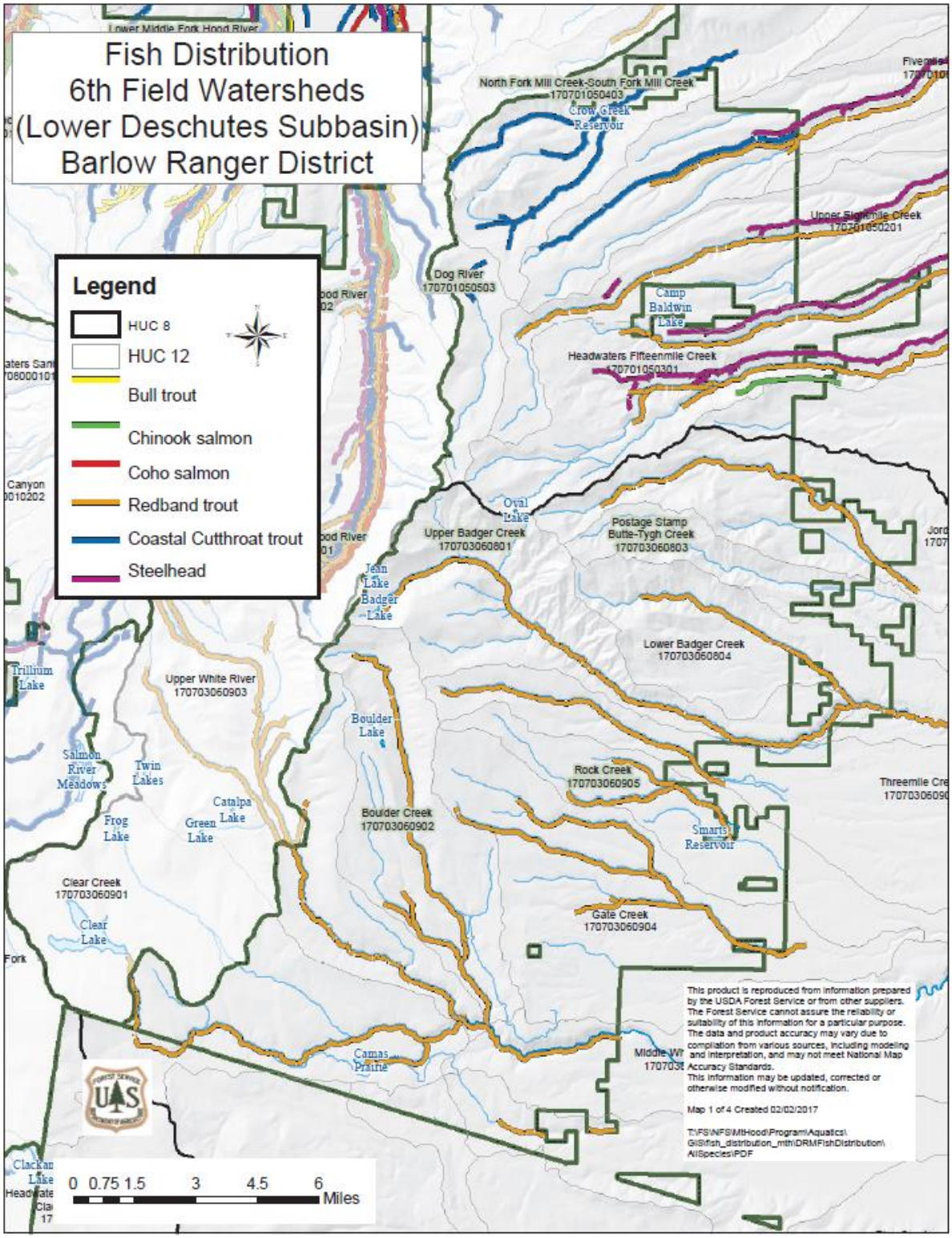
Forest Plan Component	Monitoring Question	Indicator(s)
Objective: Long term sustained yield capacity and timber growth since previous decade.	Is total growth and productivity exceeding mortality over all forest disturbances? Every five to ten years?	Track growth, harvest, stocking, and mortality by land use allocation over time.
Objective: Produce a continuing supply of wood products, maintain an even flow of harvest and provide a positive economic return to the government.	What is the rate of harvest of stands available for timber management?	Acres of timber harvested by land allocation.
	How much timber is being awarded?	Awarded timber each fiscal year.
Desired Condition: Timber harvest comes from lands suitable for growing timber.	Are there any changes in the land base available for producing timber?	Change in acres of land use allocations permitting timber harvest.
Desired Condition: Areas harvested are adequately restocked within five years of final harvest (36 CFR 219.27). Standards and Guidelines: FW-358, C1-019 to C1-021.	Are we meeting the 5-year regeneration period required by the National Forest Management Act?	Meeting stocking guidelines in Forest Plan as tiered to Forest Service Handbook.
Goal: Provide safe, efficient access for the movement of people and materials involved in the use and management of the Forest. Standards and Guidelines: FW-419, FW-420.	How many miles are suitable for passenger cars and high clearance vehicles?	Miles of road being maintained each year for all vehicles. Miles of roads providing safe access for use and management of the Forest.
Standards and Guidelines: FW-419 to FW-424.	Are road management activities being implemented in accordance with the latest access and travel management direction?	Miles of road converted into desired maintenance level and/or that have achieved the road management objectives.
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)).		
Standards and Guidelines: FW-022 to FW-038	Are management activities being implemented so that they do not substantially and permanently impair the productive capacity of the land?	Extent of detrimental soil disturbance in an activity unit.

Appendix B: Fish Distribution Maps


Fish Distribution
6th Field Watersheds
(Sandy Subbasin)
Zigzag Ranger District
Legend
HUC 8
HUC 12
Bull trout
Chinook salmon
Coho salmon
Redband trout
Coastal Cutthroat trout
Steelhead
Dublin Lake
Palmer Lake
Thrush Pond
Bull Run Reservoir Number One
Bull Run Reservoir Number Two
Blue Lake
Lost Lake
Bull Run Lake
Goodfellow Lakes
Dear Meadows
Hickman Lake
Dollar Lake
Sandy Glacier
Coalman Glacier
White River Glacier
Dumbbell Lake
Burnt Lake
Devils Lake
Zigzag Canyon
Hidden Lake
Collins Lake
Mirror Lake
Wind Lake
Trillium Lake
Kinzel Lake
Tumala Lake
Flash Lake
Salmon Lake
Salmon River Meadows
Twin Lakes
Frog Lake
Green Lake
Jackpot Meadows
Frying Pan Lake
Clear Lake
Timothy Lake-Oak Grove Fork Clackamas River
Amil Lake
Buck Lake
Timothy Lake
Clackamas Lake
Shining
This product is reproduced from information prepared by the USDA Forest Service or from other suppliers. The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. The data and product accuracy may vary due to compilation from various sources, including modeling and interpretation, and may not meet National Map Accuracy Standards. This information may be updated, corrected or otherwise modified without notification.
Map 1 of 4 Created 02/02/2017
0 1 2 4 6 8 Miles


Fish Distribution
6th Field Watersheds
(Clackamas Subbasin)
Clackamas Ranger District
This product is reproduced from information prepared by the USDA Forest Service or from other suppliers. The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. The data and product accuracy may vary due to compilation from various sources, including modeling and interpretation, and may not meet National Map Accuracy Standards. This information may be updated, corrected or otherwise modified without notification.
Map 1 of 4 Created 02/02/2017
T:\FS\NFS\MtHood\Program\Aquatics\GIS\fish_distribution_mth\DRM\FishDistribution\AllSpecies\PDF
Tumala Lakes
Plaza Lake
Salmon Lake
Huxley Lake
Shining Lake
Rock Lakes
Hideaway Lake
Antvil Lake
Timothy Lake
Buck Lake
Big Meadows
Memaloose Lake
High Lake
Ripplebrook Pond
Austin Meadow
Surprise Lake
Skookum Lake
Summit Lake
Warm Springs Meadow
Lily Pad Lake
Lake Lenore
Pansy Lake
Welcome Lakes
Silver King Lake
Round Lake
Bump Lake
Brook Lake
Fish Lake
Sportsman Lakes
Little Lake
Double Peaks Lake
Eloise Lake
Olallie Lake
Monon Lake
Spinning Lake
0 1 2 4 6 8 Miles
HUC 8
HUC 12
Bull trout
Chinook salmon
Coho salmon
Redband trout
Coastal Cutthroat trout
Steelhead


Fish Distribution
6th Field Watersheds
(Middle Columbia Subbasin)
Hood River Ranger District
HUC 8
HUC 12
Bull trout
Chinook salmon
Coho salmon
Redband trout
Coastal Cutthroat trout
Steelhead
Warren Lake
Bear Lake
North Lake
Rainy Lake
Herman Creek
Dublin Lake
Hicks Lake
Ottertail Lake
Scout Lake
Palmer Lake
Eagle Creek
Thrush Pond
Lake Branch
Upper Bull Run River
Blue Lake
Lost Lake
Blazed Alder Creek
Bull Run Lake
Deer Meadows
Goodfellow Lakes
Perry Lake
Laurance Lake
Dollar Lake
Sandy Glacier
Headwaters Sandy River
Coalman Glacier
White River Glacier
Burnt Lake
Zigzag Canyon
Hidden Lake
Collins Lake
Mirror Lake
Wind Lake
Trillium Lake
Kinzel Lake
Salmon River Meadows
Twin Lakes
Frog Lake
Green Lake
Jackpot Meadow
Frying Pan Lake
Clear Creek
Clear Lake
Linney Creek
Timothy Lake-Oak Grove Fork Clackamas River
Serene Lake
Shellrock Creek
Shellrock Lake
Anvil Lake
Timothy Lake
Camas Prairie
Plaza Lake
Salmon Lake
Middle Salmon River
Upper Salmon River
Upper West Fork Hood River
Lower West Fork Hood River
Lower Middle Fork Hood River
Upper Middle Fork Hood River
Middle East Fork Hood River
Upper East Fork Hood River
Upper White River
Dog River
Gamp Baldwin Lake
Headwaters Fifteenmile Creek
Oval Lake
Upper Badger Creek
Postage Stamp Butte-Tygh Creek
Badger Lake
Lower Badger Creek
Boulder Lake
Upper Moser Creek
North Fork Mill Creek-South Fork Mill Creek
This product is reproduced from information prepared by the USDA Forest Service or from other suppliers. The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. The data and product accuracy may vary due to compilation from various sources, including modeling and interpretation, and may not meet National Map Accuracy Standards. This information may be updated, corrected or otherwise modified without notification.
Map 1 of 4 Created 02/02/2017
T:\FS\NFS\MtHood\Program\Aquatics\GIS\fish_distribution_mth\DRMFishDistribution\AllSpecies\PDF
0 1 2 4 6 8
Miles


Fish Distribution
6th Field Watersheds
(Lower Deschutes Subbasin)
Barlow Ranger District
Legend
HUC 8
HUC 12
Bull trout
Chinook salmon
Coho salmon
Redband trout
Coastal Cutthroat trout
Steelhead
North Fork Mill Creek-South Fork Mill Creek
170701050403
Crow Creek Reservoir
Dog River
170701050503
Camp Baldwin Lake
Headwaters Fifteenmile Creek
170701050301
Oval Lake
Upper Badger Creek
170703060801
Postage Stamp Butte-Tygh Creek
170703060803
Jean Lake
Badger Lake
Lower Badger Creek
170703060804
Trillium Lake
Upper White River
170703060903
Boulder Lake
Salmon River Meadows
Twin Lakes
Frog Lake
Green Lake
Catalpa Lake
Boulder Creek
170703060902
Rock Creek
170703060905
Smarts Reservoir
Clear Creek
170703060901
Clear Lake
Gate Creek
170703060904
Camas Prairie
0 0.75 1.5 3 4.5 6
Miles
This product is reproduced from information prepared by the USDA Forest Service or from other suppliers. The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. The data and product accuracy may vary due to compilation from various sources, including modeling and interpretation, and may not meet National Map Accuracy Standards.
This information may be updated, corrected or otherwise modified without notification.
Map 1 of 4 Created 02/02/2017
T:\FS\NFS\MtHood\Program\Aquatics\GIS\fish_distribution_mth\DRM\FishDistribution\AllSpecies\PDF

Appendix C: Wilderness Monitoring Table

Wilderness Name	Core Element 1	Core Element 2	Core Element 3	Core Element 4	Core Element 5	Core Element 6	Core Element 7	Core Element 8	Core Element 9	Core Element 10	Elective Element 1
Badger Creek Wilderness	Invasive Species	Air Quality Values	Recreation Sites	Trails	Agency Management Actions	Opportunities for Solitude	Cultural Resources	Workforce Capacity	Education	Wilderness Character Baseline	
Bull Of The Woods Wilderness	Invasive Species	Air Quality Values	Recreation Sites	Trails	Agency Management Actions	Opportunities for Solitude	Cultural Resources	Workforce Capacity	Education	Wilderness Character Baseline	
Clackamas Wilderness	Invasive Species	Air Quality Values	Water	Recreation Sites	Agency Management Actions	Opportunities for Solitude	Cultural Resources	Workforce Capacity	Education	Wilderness Character Baseline	
Lower White River Wilderness	Invasive Species	Air Quality Values	Water	Recreation Sites	Agency Management Actions	Opportunities for Solitude	Cultural Resources	Workforce Capacity	Education	Wilderness Character Baseline	
Mark O. Hatfield Wilderness	Invasive Species	Air Quality Values	Recreation Sites	Trails	Agency Management Actions	Opportunities for Solitude	Outfitters & Guides	Workforce Capacity	Education	Wilderness Character Baseline	
Mount Hood Wilderness	Invasive Species	Air Quality Values	Recreation Sites	Trails	Agency Management Actions	Opportunities for Solitude	Outfitters & Guides	Workforce Capacity	Education	Wilderness Character Baseline	Cultural Resources
Roaring River Wilderness	Invasive Species	Air Quality Values	Recreation Sites	Trails	Agency Management Actions	Opportunities for Solitude	Cultural Resources	Workforce Capacity	Education	Wilderness Character Baseline	
Salmon-Huckleberry Wilderness	Invasive Species	Air Quality Values	Recreation Sites	Trails	Agency Management Actions	Opportunities for Solitude	Cultural Resources	Workforce Capacity	Education	Wilderness Character Baseline	

Appendix D: References

Allen, A.W. 1982. *Habitat suitability index models: Marten*. USDI Fish and Wildlife Service. FWS/OBS-82/10.11. 9 pp.

Davis, Raymond J.; Ohmann, Janet L.; Kennedy, Robert E.; Cohen, Warren B.; Gregory, Matthew J.; Yang, Zhiqiang; Roberts, Heather M.; Gray, Andrew N.; Spies, Thomas A. 2015. *Northwest Forest Plan–the first 20 years (1994-2013): status and trends of late-successional and old-growth forests*. Gen. Tech. Rep. PNW-GTR-911. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 112 p.

Davis, Raymond J.; Hollen, Bruce; Hobson, Jeremy; Gower, Julia E.; Keenum, David. 2016. *Northwest Forest Plan—the first 20 years (1994–2013): status and trends of northern spotted owl habitats*. Gen. Tech. Rep. PNW-GTR-929. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 54 p.

Forest Health Protection, State and Private Forestry, Pacific Northwest Region, Forest Service, U.S. Department of Agriculture; Washington Department of Natural Resources, Resource Protection Division, Forest Health; Oregon Department of Forestry, Forest Health Management. *Annual Forest Insect and Disease Aerial Detection Survey; 1947-2014*. (n.d.). Retrieved from https://www.fs.usda.gov/detail/r6/forest-grasslandhealth/insects-diseases/?cid=stelprdb5286951.

Forest Inventory and Analysis. (n.d.). Retrieved August 11, 2017, from https://www.fia.fs.fed.us/.

Foster, Susan Ann. 1992. *Studies of the ecological factors that affect the population and distribution of the western gray squirrel in northcentral Oregon.* Dissertation and Theses Portland State University. 154pp.

Linders, Mary J., and Derek W. Stinson 2007. *Washington State recovery plan for the western gray squirrel.* Washington Department of Fish and Wildlife, Olympia. 128 pp.

Oregon Department of Fish and Wildlife (ODFW). 2008. *Oregon black-tailed deer management plan.* 61pp.

Oregon State University. *Landscape Ecology, Modeling, Mapping, and Analysis (LEMMA) vegetation structure (Gradient Nearest Neighbor – GNN)* dataset. (n.d.). Retrieved from https://lemma.forestry.oregonstate.edu/about.

NWFP *Interagency Regional Monitoring Program.* (n.d.). Retrieved from https://reo.gov/monitoring/reports/20yr-report/.

Sauer, J. R., D. K. Niven, J. E. Hines, D. J. Ziolkowski, Jr, K. L. Pardieck, J. E. Fallon, and W. A. Link. 2017. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2015. Version 2.07.2017 USGS Patuxent Wildlife Research Center, Laurel, MD* https://www.mbr-pwrc.usgs.gov/bbs/bbs.html.

USDA Forest Service, Mt. Hood National Forest, *National Visitor Use Monitoring Report*. (2016, December 16). Retrieved from http://apps.fs.fed.us/nfs/nrm/nvum/results/ReportCache/2011_A06006_Master_Report.pdf.