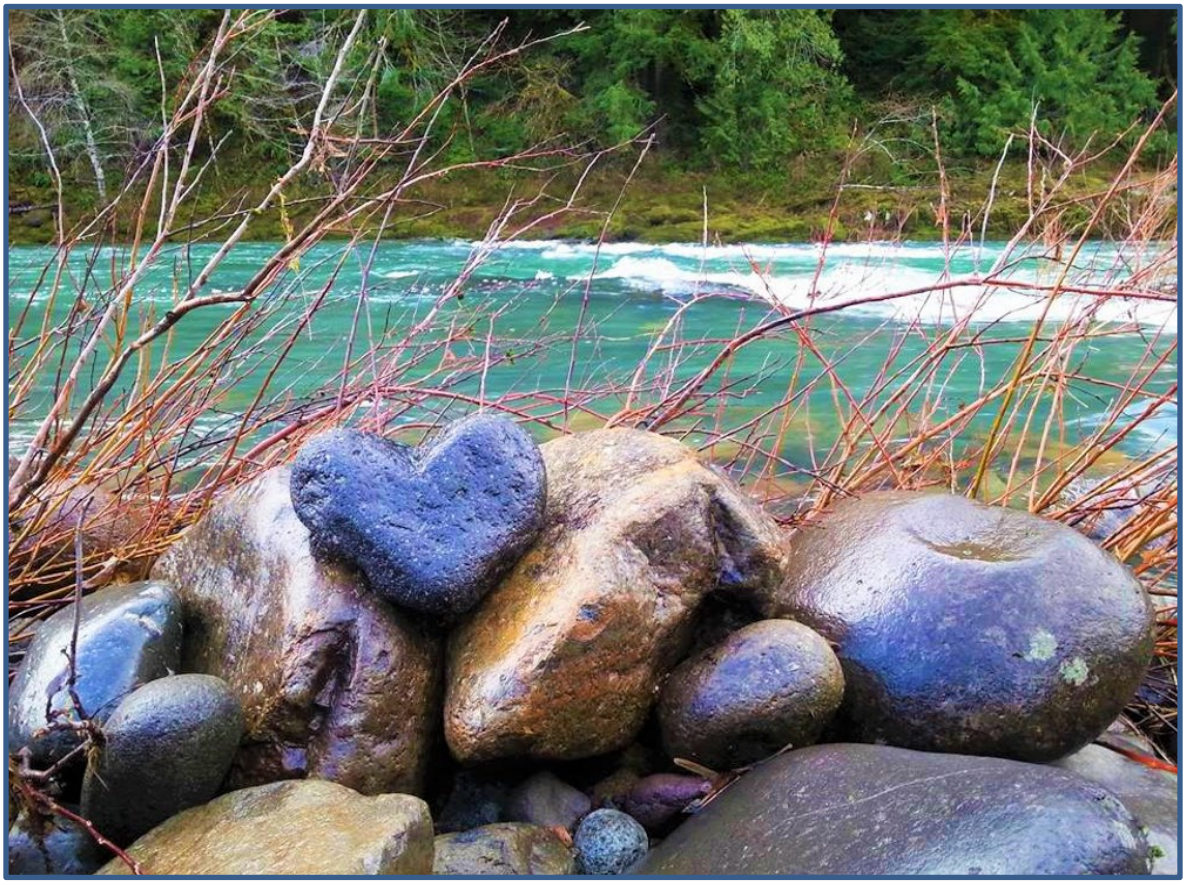
USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Umpqua National Forest March 2024

Biennial Monitoring Evaluation Report for the Umpqua National Forest

Fiscal years 2021-2022



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Why Monitoring Matters

There is no single correct approach to managing a forest or grassland. Each decision maker must weigh the ecological complexity of these ecosystems, the changing environmental conditions, the many different viewpoints of the public, and uncertainty about long-term consequences.

Data from monitoring can therefore be extremely useful. A robust, transparent, and meaningful monitoring program can provide information on specific resources, management impacts, and overall trends in condition – in other words, feedback on whether we are meeting our management objectives or not.

Each National Forest or Grassland has a land management plan or "forest or grassland plan" that balances tradeoffs among recreation, timber, water, wilderness, wildlife habitat, and other uses. The plan describes a set of desired conditions – a science-based vision for what forest or grassland conditions should be once the goals of the plan are met. The forest or grassland plan also includes a monitoring program, organized around a set of monitoring questions and indicators that are designed to track progress toward achieving the desired conditions in the plan.

Purpose

The purpose of this Biennial Monitoring Evaluation Report (BMER) is to inform the public, partners, stakeholders, other government agencies, and tribes of the completed and ongoing monitoring of Forest Plan implementation activities in the Umpqua National Forest. The monitoring results presented in this report help the Forest Supervisor determine whether changes in management are needed, including changes to the monitoring program, management practices, or the Forest Plan itself. The Biennial Monitoring Evaluation Report represents one part of the Forest Service's overall monitoring program for this national forest. It is not a decision document. It evaluates monitoring questions and indicators presented in 1990 Umpqua National Forest Monitoring Plan as amended, as revised in 2016 to comply with the 2012 Planning Rule, and reports on the results of this monitoring.

Monitoring of certain resources is required by law, regulation, or directive (see box below for the required eight monitoring topics). Other monitoring occurs depending on specific needs of the national forest or grassland. Each forest or grassland compiles and evaluates the monitoring results and drafts a report like this one. Decision makers, such as forest and grassland supervisors, use these biennial monitoring evaluation reports (BMERs) to update their knowledge and assess progress toward the desired conditions in the forest or grassland plan. The public use these BMERs to understand what's happening on the land that they depend upon and enjoy.

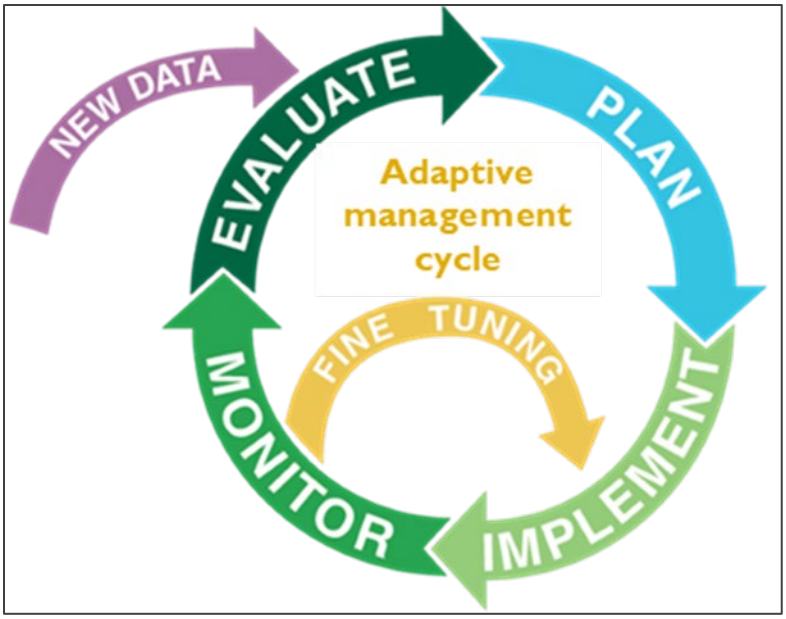

Figure 1. Adaptive Management Cycle

Forest Service monitoring programs include questions and indicators that address eight topics (36 CFR 219.12):

1. Status of select watershed conditions.
2. Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
3. Status of focal species to assess the ecological conditions.
4. Status of a select set of the ecological conditions 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. 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 might be affecting the plan area.
7. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
8. Effects of each management system to determine that they do not substantially and permanently impair the productivity of the land.

If monitoring reveals that we are not quite meeting the mark, there's a need to change management in some way; this is adaptively managing. Monitoring allows us to learn through management and adjust our strategies

based on what we learned. Monitoring also helps us be accountable and transparent to interested and affected parties.

Because monitoring can be expensive, time-consuming, and labor-intensive, we rely on the help of our partners and work collaboratively with them to accomplish monitoring objectives. We also rely on existing data sources such as national and regional inventory, monitoring, and research programs; federal, state, or local government agencies; scientists, partners, and members of the public; and information from Tribal communities and Alaska Native Corporations.

BMERs, like this one, are critical to adaptive management because they tell us and the public whether the land management plan is working. We don't make any decisions in BMERs; instead, we simply document and share monitoring results.

Objectives

• Monitor how the 1990 Umpqua National Forest Land and Resource Management Plan as amended by the 1994 Northwest Forest Plan (henceforth collectively referred to as the Forest Plan) is applied with project activities.

• Evaluate monitoring data for indicators of trends of or effects on forest resources, and how well plan implementation is moving forest resources toward desired conditions.

• Document and report the results of completed Forest Plan implementation, monitoring, and evaluation (this monitoring evaluation report).

• Document scheduled monitoring that has not been completed and the reasons and rationale why.

• Based on how well implementation is moving forest resources toward desired conditions, present recommended change opportunities to the responsible official.

• Through a management review of the monitoring evaluation report by the Forest Supervisor, determine if any changes are needed in monitoring indicators or methods, management actions, or Forest Plan management direction.

Summary of this Report

In the last few years, the Umpqua National Forest has faced challenges from longer, more severe wildfires, including back-to-back intense fire seasons in 2020 and 2021. Wildfire is part of healthy Umpqua watersheds, but has also damaged habitats and human experiences of this unique volcanic landscape that includes the Wild and Scenic North Umpqua River, late-successional reserves set aside by the Northwest Forest Plan, and beautiful forests with abundant natural and cultural resources. Monitoring data helps us learn about the impacts of wildfire, as well as whether we are succeeding at ongoing work to restore stream and riparian ecosystems, protect wildlife habitat, promote sustainable recreation, and produce wood.

This 2024 biennial monitoring evaluation report for the Umpqua National Forest documents monitoring results from fiscal years 2021 through 2022, allowing time to compile and analyze the data.

Using data collected in 2021 and 2022, specialists identified where more data are needed and made recommendations as to any necessary changes to the Forest Plan, monitoring plan, or management activities, or whether a new assessment is needed.

Administrative changes were made to the BMER since the 2016 Monitoring Report and Program Transition Letter.
Two questions were added to the BMER since the 2016 transition BMER plan to address known stressors. In four instances, very similar questions were coupled to consolidate eight original questions into four questions. Of the questions posed in the 2016 transition BMER plan, specialists determined that three questions should be dropped from the monitoring plan, as they cannot be answered with current or future monitoring, or are poor indicators of whether our management is working as intended.

The review of the 2016 transition BMER plan resulted in 20 questions, of which 15 were evaluated under this 2021-2022 BMER. Specialists determined that five of the 20 questions would not be answered in the current report, as we lack either the data or the capacity to analyze them.

We are meeting plan objectives and progress toward our desired conditions for all 15 of the monitoring questions we addressed. To move the Umpqua National Forest closer to the desired condition for wildlife habitat, we recommend additional management activities to maintain early seral habitat for big game, as well as plantation thinning to help prevent future loss of northern spotted owl nesting and roosting habitat. Increasing active management will also directly and indirectly increase economic contributions to the local community. Changes to best management practices (BMPs) for rehabilitating temporary roads and landings could also extend the effectiveness of our generally well-implemented BMPs.

With accelerating wildfire and climate change effects, we also need to continue to follow science about fire regimes to learn how we can maintain a shifting patchwork of forest structures and help old forest structures to develop, while leveraging the appropriate ecological functions of fire. The compounding effects of drought, introduced insects, and increased tree density as a result of fire exclusion could make it more difficult for forests to recover from insect outbreaks.

Finally, we recommend some improvements to our monitoring program, namely by including additional data sets monitoring effectiveness of post-fire-suppression repair, or increasing capacity to analyze monitoring data.

The detailed resource reports that were used to build this monitoring report, including indicator(s) and data sources, are available in the project record upon request. Previous monitoring reports are available at Umpqua National Forest - Planning (usda.gov)

The table below summarizes the results of evaluating the monitoring indicators covered in this report. The table shows whether monitoring results show that management is meeting the Forest Plan direction and whether changes to the Forest Plan, management activities, or plan monitoring program should be considered.

Recommendation Factors	Yes	Uncertain	No
Forest Plan direction met	15	0	0
Change to Forest Plan recommended	2	0	13
Change to management activities recommended	8	0	7
Change to plan monitoring program recommended	2	0	13
Assessment recommended	0	0	15

Forest Supervisor's Certification

This report documents the results of monitoring activities that occurred through fiscal years 2021 through 2022 on the Umpqua National Forest. Monitoring on some topics is long-term and evaluation of those data will occur later.

I have evaluated the monitoring and evaluation results presented in this report. I have examined the recommended changes to the monitoring plan, forest management, and the 1990 Land Management Plan, as amended, at this time. I approve the administrative changes to the monitoring plan presented in this report, to better track the state of our Forest and management effects in future reports. Comments on the changes to the monitoring plan can be submitted at comments-pacificnorthwest-umpqua@usda.gov for 30 days following the release of the correspondence for this report for consideration to inform future reports. I will engage with resource specialists and the public, as appropriate, to incorporate recommended changes to management under the existing 1990 Land Management Plan as amended.

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ALICE CARLTON Date
Forest Supervisor

Watershed and soil resources

The Wild and Scenic North Umpqua River is one of the highest-quality waters in Oregon, supporting runs of wild salmon, steelhead, and trout. Its emerald-green water runs through a stunning forest corridor and attracts anglers and hikers from around the world. The South Umpqua is also a fishing and recreation destination, flowing through unique geology near the boundary of the Cascades and Klamath mountains.

To track the health of these watersheds, we use a protocol called the Watershed Condition Framework, which provides a consistent and credible process for assessing conditions, implementing projects to restore conditions in priority watersheds, and monitoring the results of these projects.

The profound nature of historic damage done to stream channels on the Umpqua National Forest through removal of instream wood, riparian tree harvest, and riparian road construction has damaged aquatic habitat in many stream reaches. Recovery of affected streams, even with active restoration, will take decades.

Our restoration actions include planting and protecting riparian vegetation for shading, improving aquatic habitat through large wood placement, and decreasing risk of high severity wildfire through fuels reduction. As of 2022, the Umpqua National Forest has seven 6th field watersheds (equivalent to river basins) listed as priorities for restoration. These include Upper Steamboat, Middle Steamboat, Calf Creek, and Deception Creeks on the North Umpqua Ranger District, Copeland Creek on the Diamond Lake Ranger District, and Skillet-South Umpqua and Black Rock Fork on the Tiller District.

We also follow the national best management practices program, which was developed to improve management of water quality consistent with the Federal Clean Water Act. Best management practices are specific actions used to reduce or control impacts to water bodies from nonpoint sources of pollution, most commonly by reducing the discharge of pollutants, including excessive sediment, into waterways. We monitor a sample of projects, such as timber harvest units, to determine whether best management practices were implemented and whether they were effective in protecting waterways.

Thanks to our monitoring efforts, we can take corrective actions to protect water quality as soon as practicable whenever problems are found. We also take adaptive management actions to avoid similar problems in the future.


A landing pile appropriately placed outside a stream buffer, observed during best practices monitoring.

Monitoring Questions, Indicators, and Key Results

i.1. Are watershed conditions improving across the Umpqua National Forest?
Indicator – Number of watersheds functioning properly, at risk, or impaired according to the Watershed Condition Framework.

- All 6th field watersheds on the Umpqua National Forest were assessed in 2012. In 2021, the assessment was updated, and found 41 percent of watersheds functioning properly and 59 percent functioning at risk. No watersheds were rated as impaired. The major drivers for watersheds functioning at risk were poor road and trail conditions, water quality impairment for temperature, poor aquatic habitat conditions, and impacts from wildfire or fuel condition class.

i.2. Have best management practices been implemented and are they effective at managing water quality consistent with the Clean Water Act?
Indicator – Best management practices compliance and effectiveness.

- In 2021-2022, best management practice evaluations were fully or mostly implemented and effective at 77 percent of monitored sites. The level of implementation and effectiveness has remained relatively steady over the past 6 years.

- Corrective actions to address potential water quality issues included installing signage to discourage the public from accessing a user-created trail in a riparian area, conducting additional repair work where a bulldozer crossed a stream during wildfire response, and surveying for at-risk culverts on closed roads.

- Adaptive management actions included pre-planning fire lines to avoid unnecessary stream crossings, and increasing groundcover on subsoiled skid trails and landings.

Summary of 2021-2022 results showing percentage of sites where best management practices were implemented and their effectiveness.

Implementation	
Full	69%
Mostly	8%
Marginal	23%
No BMPs	0%

Implemented BMP Effectiveness	
Effective	62%
Mostly	15%
Marginal	0%
Not Effective	23%

ii.1 Are National Forest management practices maintaining or decreasing the spread of aquatic invasive species? This question is not addressed in this report. We lack the capacity to compile and analyze relevant data.

viii.1 Are management activities being implemented so that they do not substantially and permanently impair the productive capacity of the land while meeting Forest goals for soil conditions, erosion, and nutrient cycling?

Indicator: Percent detrimental soil disturbance in timber harvest units.

- All timber units surveyed in 2021 and 2022 met soil quality standards for keeping detrimental soil disturbance under 20 percent. In addition, all units met the specific standards for maintaining ground cover and organic matter for erosion protection and nutrient replenishment.

ii.3 Are National Forest management activities contributing to the maintenance or improvement of aquatic habitat and habitat complexity in streams, rivers, and lakes?

Indicators: Number of streams with 7-day average high temperatures within healthy range for aquatic life; Diamond Lake Health Monitoring Index values; trends in instream and riparian habitat conditions; Trends in aquatic macroinvertebrate abundance, diversity and distribution.

- Forest-wide stream survey data show a slight and gradual improvement in stream habitat complexity reflected in substrate and presence of wood. Monitoring shows that our actions have been effective at protecting stream shade and other important aquatic components of fish habitat and habitat complexity, such as large woody debris.

- Recent assessments identified both the South Umpqua and North Umpqua sub-basins as areas of concern due to habitat degradation associated with large wildfires (salvage logging outside of riparian areas, increased water temperatures, debris flows, reduction in stream complexity). North Umpqua riverine habitat has insufficient stream habitat complexity, and a lack of large woody debris and off-channel overwintering habitat for fish.

- Feasible forest management actions limit degradation, but may not be sufficient to improve aquatic habitat given climate change.

Recommended Changes

Based on these results, the following are recommendations as to changes to the Forest Plan, monitoring plan, or management:

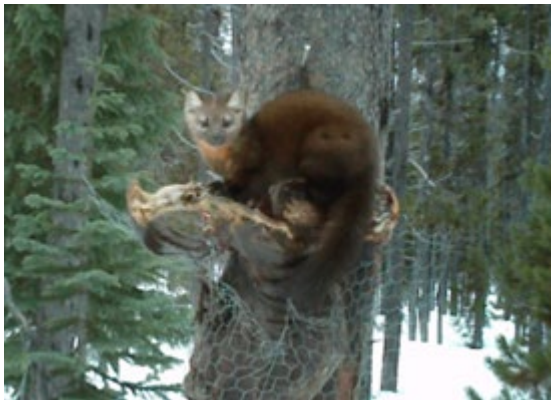
- The trend of watersheds functioning at risk compared to those functioning properly cannot be fully understood with the existing limited dataset. Additional updates to watershed condition will be needed to determine trends.
- Management activities should use signage and natural barriers to discourage users near sensitive features. Contingency actions such as fencing or trail re-routes may be needed based on site-specific monitoring.
- During fire incidents, suppression activities such as dozer line construction should be guided by reviewed Potential Control Lines to reduce effects to sensitive areas.
- Post-fire repair plans should include implementation and effectiveness monitoring to assure repair sufficiency at sensitive sites such as stream and wetland crossings. Monitoring results should inform the development of instructional materials to improve implementation of repair plans.
- Improve subsoiling techniques or equipment to achieve better soil decompaction results, especially in clay loams. Consider seeding skid trails and temporary roads more, especially in nutrient poor, shallow soils.
- Future monitoring assessments of stream function, complexity and ecological integrity could incorporate the extensive macroinvertebrate data sets collected on the Umpqua NF as a way to focus in on the freshwater habitat conditions and eliminate the confounding effects of ocean conditions on adult salmon and steelhead survival.

Effects of management to maintain or restore certain populations or species of concern

Several distinct geologic provinces come together in the Umpqua National Forest to create a spectrum of habitat for a wide diversity of plants and wildlife, including populations and species with Threatened, Endangered, or Sensitive status and species of local concern.

One species of concern is the northern spotted owl. The mission of the 1994 Northwest Forest Plan was to guide land management in the range of the northern spotted owl toward the dual needs for forest habitat and forest products. Our goal is to maintain and develop northern spotted owl nesting, roosting, and foraging habitat in late successional reserves (forest land designated by the Northwest Forest Plan to protect and enhance conditions of mature and old-growth forest ecosystems) and facilitate connectivity between these reserves and the rest of the forest landscape. The Forest Service maintains a monitoring program specifically for the northern spotted owl that has tracked the status and trends of the owl population in the Pacific Northwest since the early 1990s.

Although the Forest Service does not manage elk populations directly–this falls to the Oregon Department of Fish and Wildlife –our Forest Plan directs us to manage elk habitat to provide for hunting opportunities. We maintain winter range via road closures, and when possible we maintain early seral habitats: open areas that typically follow fire, storms, or timber harvest, where high-protein and mineral-rich grasses, forbs, and shrubs provide quality forage for deer and elk. We also manage for the Cascade pine marten, a forest-dependent member of the weasel family that lives in mature and old-growth forest at high elevations. This marten is recognized as distinct from the Coastal pine marten, which is listed as Threatened.



Pine marten is a high-elevation indicator species monitored on the Umpqua National Forest.

Monitoring Questions, Indicators, and Key Results

iii.1 What is the trend for mature and late successional habitat (mountain hemlock, lodgepole pine) needed for marten persistence on the Umpqua?

Indicators: Acres of montane mixed conifer forest by late successional forest index categories tracked over time. Changes in snag and dead log levels in montane mixed conifer relative to historic condition by 5th field watershed tracked over time.

- Modeling shows there is more mature and late successional mountain hemlock and lodgepole pine habitat for marten than was predicted in our 1990 Forest Plan. Although a large fire in 2020 reduced lodgepole pine habitat and we expect further reductions from insects and disease, the trend in available habitat is overall stable.

- USFWS and Forest Service camera monitoring shows pine marten are present in habitat above and below 4,000 feet elevation.

iii.2 What is the trend for mature and late successional habitat needed for pileated woodpecker and northern spotted owl persistence?

Indicators: Acres of lowland conifer/hardwood forest by late successional forest index categories tracked over time. Changes in snag and dead log levels relative to historical condition by 5th field watershed tracked over time. Acres of dispersal habitat, suitable habitat, and by old growth site index categories tracked over time.

- Pileated woodpecker populations are stable to increasing, according to USGS breeding bird survey. Although declines in mature and old-growth forest have occurred mostly due to wildfire, snag patches due to the fires as well as snag patches created by insect and disease have created habitat that pileated woodpeckers are able to use.

- There has been a substantial loss of northern spotted owl nesting, roosting, and foraging habitat and subsequent loss of historical owl nest sites due to large, severe wildfires across the Umpqua National Forest. From 2017 -2023, 186,304 acres of reserves (including Northwest Forest Plan riparian reserves and late successional reserves) have been lost to wildfire (USFWS, 2023).

- Across the entire Northwest Forest Plan area (western Washington and Oregon down through northern California), there was a 3 percent increase in northern spotted owl nesting and roosting habitat in the 25 years since the plan was signed. Despite this net increase in habitat the northern spotted owl population has decreased by an estimated 61.8 percent in the last 25 years (Davis et al., 2022).

iii.3 What is the trend in elk habitat condition and elk hunting levels and success?

Indicators: Changes in elk harvest, success rates, and Oregon Department of Fish and Wildlife elk population estimates by State Game Management Unit. Acres of early seral habitat relative to historical condition by 5th field watershed tracked over time.

- Population trends for elk are declining steadily. The management objective for most Oregon Department of Fish and Wildlife game units is to maintain a ratio of 10 bulls for every 100 cow elk. This was met for most, but not all, units during 2015-2019.

- Early seral habitat (used by elk for foraging) from timber harvest has been declining while winter range closures have remained the same. However, extensive wildfire on the Umpqua National Forest since 2002 has created a patchwork of early seral habitat and improved forage production within the fire perimeters.

- The number of big game hunters has been generally consistent across the 2018-2022 period with an increase in the number of days hunted. Until recently, big game harvest success has

been steadily declining. Average elk hunting success in 2018-2022 varied from 8 to 38 percent in the Dixon unit and from 26 to 45 percent in the Indigo unit.

iv.4 What is the trend for the Northern spotted owl population?
Indicator: Estimated number of territorial owls and annual rate of population change

- The northern spotted owl is currently listed as "threatened." However, in 2020 a reclassification to "endangered" was found to be "warranted but precluded by higher priority actions to amend the lists of endangered and threatened wildlife and plants."

- The dominant reason for the owls' decline is the invasion and competition from the barred owl, native to the eastern U.S., into the spotted owl's habitat across its range in the PNW (Davis et al. 2022). Northern spotted owl populations potentially face extirpation if the negative effects of barred owls are not ameliorated while maintaining northern spotted owl habitat.

The following questions will be answered in a future monitoring report, as we currently lack either the data or the capacity to analyze the data:

iv.1 Are National Forest management actions maintaining or improving focal fish species populations and Threatened and Endangered subpopulations?

iv.5 What are the trends for botanical Sensitive Species? Are any species we are monitoring in decline? If so, have management actions been taken to restore their habitats?

Recommended Changes

- Barred owl management is recommended as part of Recovery Action 30 – "Manage to reduce the negative effects of barred owls on spotted owls."

- While timber harvest may cause loss of owl nesting and roosting habitat and connectivity between habitat reserves, design projects such as fuel reduction, fuel breaks, and plantation thinning to limit the future loss of nesting and roosting habitat in late successional reserve lands.

- Implement additional prescribed fire or activities in the summer range and winter range to maintain early seral habitat for big game.

References cited:

Davis, Raymond J.; Lesmeister, Damon B.; Yang, Zhiqiang; Hollen, Bruce; Tuerler, Bridgette; Hobson, Jeremy; Guetterman, John; Stratton, Andrew. 2022. Northwest Forest Plan—the first 25 years (1994–2018): status and trends of northern spotted owl habitats. Gen. Tech. Rep. PNW-GTR-1003. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 38 p. https://doi.org/10.2737/PNW-GTR-1003.

USFWS. 2023. Biological Opinion for Umpqua National Forest's Post Catastrophic Disturbance Activities Programmatic Reinitiation (Reference Number: 01EOFW00-2021-F-0461). Fish and Wildlife Service, Roseburg Field Office. Roseburg, OR. 262 pp.

Social and economic benefits to communities, including recreation

The distinctive landscape on the Umpqua National Forest provides spectacular scenery, from the famously beautiful Wild and Scenic North Umpqua River to high mountain lakes and forested wilderness. Recreationists, outfitters, guides, and local businesses benefit directly from spending by forest visitors.

Logging and mining were historically important local industries, but after the Northwest Forest Plan was adopted in 1994, the focus of the Forest Service and its partners shifted to protecting key species, improving forest health, and restoring the watershed. Even so, the forest products industry continues to be a key part of the Douglas County economy. The 2008-2009 recession impacted the timber industry in the region especially hard. Unemployment in Douglas County rose to its highest point in May 2009 at 16.5 percent. As of June 2023, unemployment stands at 4.8 percent in Douglas County.

Most timber sales from the Umpqua National Forest are purchased and processed locally. Merchantable saw timber is also generally marketed to and processed by facilities in Douglas County, Oregon; therefore, the economic consequences of deviating from estimated timber outputs would be felt locally and contribute to a decline in the local timber industry.

In general, the sale of timber from national forest land potentially results in sustained or increased employment in the logging and wood products manufacturing sectors, in the forestry services (slash treatment, planting, etc.), and in indirect employment in many other sectors. Other benefits are derived from road reconstruction and other restoration activities that may be funded by revenue from the timber sales or other funding sources.

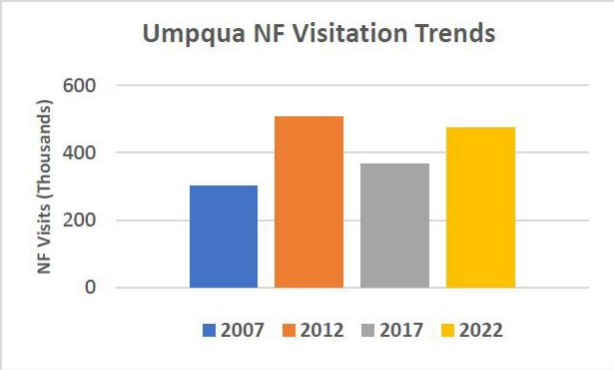
Monitoring Questions, Indicators, and Key Results

i.3. Are National Forest management actions maintaining the outstanding remarkable values of designated, study, and potential Wild and Scenic Rivers and designated State scenic waterways? This question is not addressed in this report, as we lack the capacity to analyze data for all the outstanding remarkable values. However, some of the values overlap with metrics reported in the Watersheds section.

v.1 Are people having a high level of satisfaction during their visit to Umpqua National Forest?
Indicator: Percent visitor satisfaction for (1) developed sites, (2) general forest areas, and (3) designated wilderness.

- Of visitors surveyed on the Umpqua National Forest in 2022, 96 percent stated that they were either “very satisfied” or “somewhat satisfied” with their trip to the national forest.

- The total number of visits to Umpqua National Forest in fiscal year 2022 was slightly more than 475,000, an increase of roughly 29.6 percent since fiscal year 2017.



Visitation trends for Umpqua National Forest, 2007-2022.

vii.1 How do the timber output estimates in the Forest Plan compare with actual production?

Indicator: How does the volume of sold timber compare to the probable sale quantity?

- Since 2005, Umpqua National Forest timber volume has been offered at a somewhat consistent level of about 30 million board-feet per year (2.5 million cubic feet).

- In fiscal year 2021 the timber target defined by the Region 6 regional office for the Umpqua National Forest was 5,560,000 cubic feet. The Umpqua attained 5,653,800 cubic feet, exceeding the Region's target. In fiscal year 2022 timber targets were not specified and Region 6 directed all R6 national forests to attain what they were able to, as the fire recovery efforts from 2021 fires greatly interrupted scheduled workplans. The Umpqua National Forest attained 5,363,600 cubic feet of timber in fiscal year 2022.

vii.2 What are the economic consequences of deviating from the estimated Forest Plan timber outputs?

Indicator: What is the economic impact if the probable sale quantity is not met or exceeded in terms of revenue to the Forest Service and private sector jobs?

- Douglas County lost 2,086 forestry, logging, and wood products manufacturing jobs from a recent high in June 2005 to the low in December 2011. Since then, 204 jobs have been added back as log and lumber markets have improved.

- In 2022, the logging, forestry, and wood products manufacturing sectors provided about 7.9% of Douglas County's non-governmental employment. For private industry the average annual wage paid in the Douglas County area in 2022 was $48,032, compared to the forestry, logging, and wood products manufacturing average wage of $62,003. Higher timber outputs would add jobs to the economy in the forestry, restoration, logging, and milling sectors, as would increased local contracting for fuels and restoration projects. These higher wage jobs contribute to a higher standard of living within Douglas County.

Recommended Changes

- It is no longer relevant to compare actual timber outputs on the Umpqua National Forest with metrics from the Umpqua National Land and Resource Management Plan or the original 1994 Northwest Forest Plan, due to significant changes in Forest Service policies, guidance, and legal decisions, so we have changed the monitoring question.

Measurable changes related to climate change or other stressors

The linked stressors of climate change and fire are affecting all aspects of ecosystems and management on the Umpqua National Forest, including vegetation structure, incidence of insects and disease, and fisheries. Outbreaks of forest pest insects and diseases are particularly linked to drought stress, while warming air increases stream temperatures and reduces snowpack and soil water availability for vegetation.

Wildfire is an important component of the Umpqua's ecosystems, but can also stress local populations, or entire ecosystems when climate change and legacies of fire exclusion increase fire severity. Recent research on cross-dated fire scars from hundreds of stump and log cross-sections across the Umpqua National indicated that the time between fires was typically shorter than previously estimated—under 25 years even in some wetter and cooler sites—and that the time between fires was highly variable within ecosystems, with some current old-growth stands established during and after frequent reburns (Merschel 2021). However, the frequency and extent of high-severity fire have increased markedly on the Umpqua National Forest and throughout the western United States since the end of the 20th century (Parks et al. 2020). The east wind-driven fires of 2020, including the Archie Creek fire on the Umpqua NF, were extreme in their size, severity, and rapid spread, but consistent with historical east wind events (Reilly et al. 2022).

The role of fire was acknowledged in the original Northwest Forest Plan, which was designed to protect species like the northern spotted owl that depend on old-growth forests. But in the last two decades, severe fire has reduced the amount of habitat for the northern spotted owl throughout its range. This trend is different from the expectations in the Northwest Forest Plan, which anticipated that the reserve system would be sufficient to maintain and increase late-seral habitat while timber harvest would deplete habitat outside the reserves.

Patchy tree mortality following the Jack Fire of 2021.

Monitoring Questions, Indicators, and Key Results

ii.5 Are priority invasive plants being managed in accordance with the Umpqua Integrated Weed Management Plan? Are prevention measures being implemented? This question is not addressed in this report. We lack the capacity to analyze existing data due to staffing transitions.

vi.1 Are areas managed for old growth or late seral maintaining late seral characteristics?
Indicator: What proportion of designated late successional reserve is in a late-seral condition? \Have fires, insects and disease, or other stressors reduced the proportion of late-seral during the reporting period?

- Between 1993 and 2022, the proportion of forest exhibiting old-growth characteristics has declined in all Northwest Forest Plan land use allocations on the Umpqua National Forest. The proportional and absolute decreases in acres of old-growth have been steeper in late-successional reserves than in unreserved land allocations (open to timber harvest). Late-successional reserves still exhibit a higher proportion of area in an old-growth condition than unreserved lands.

- In 2021, the majority of high-severity fire (tree basal area mortality greater than 75 percent) on the Umpqua NF occurred in late-successional reserves: more than 19,000 acres compared with about 3,300 acres of high-severity fire in unreserved lands. In 2022, the area severely burned on the Umpqua was very small and outside late-successional reserves. Other fires have also severely impacted late-successional reserves since 1993, with the frequency and extent of severe fire increasing substantially in the 2010s and 2020s relative to the 1990s.

vi.2 Are patterns of wildfire consistent with historical patterns to which ecosystems are likely adapted?
Indicators: a) How much area burned with different fire severities, with respect to basal area? b) Was high-severity fire concentrated into patches larger than typical tree seed dispersal distances?

- In 2021, the Umpqua National Forest experienced extensive fire with mixed severity, mainly driven by topography and fine-scale weather, unlike the wind-driven 2020 fires. These fire patterns are at least qualitatively consistent with the mixed-severity historical conditions under which many forest types may have developed, and in some places, the fires contributed to realigning vegetation patterns with topography. The fire season in 2022 was much quieter than in 2021, with the sole major fire on the Umpqua (the Windigo fire) barely over 1,000 acres. This fire had a relatively high proportion of high-severity area, which is expected for the high-elevation vegetation in which it burned.

- It is unclear how the total area burned compares to historical distributions of area burned per year. Fire affected about 145,000 acres in 2021, or about 15 percent of the Umpqua National Forest. This would correspond to a fire rotation interval of about 7 years, shorter than the median time between historical fires estimated from tree cores, but feasibly within the historical range of variation of area burned annually.

- Currently, the size of high-severity patches may exceed the distance that conifer seeds typically travel from their parent trees, limiting regeneration away from the edges of the patch. As ongoing research illustrates historical spatial patterns of fire severity, future monitoring may be able to better compare

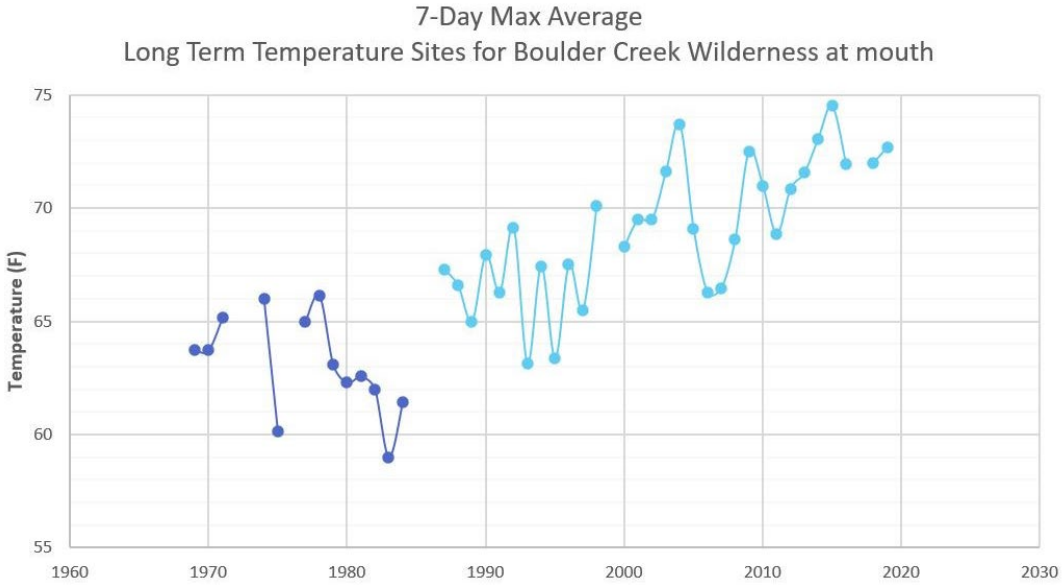
them to contemporary patterns.

- Patches of high-severity fire occurred primarily in areas that had previously burned and regrown with young conifers in the past 20 years. Around 1,800 acres were within high-severity patches large enough to potentially limit regeneration (more than 500 feet from a lower-severity area, a conservative estimate of how far a conifer seed could travel from a surviving tree).

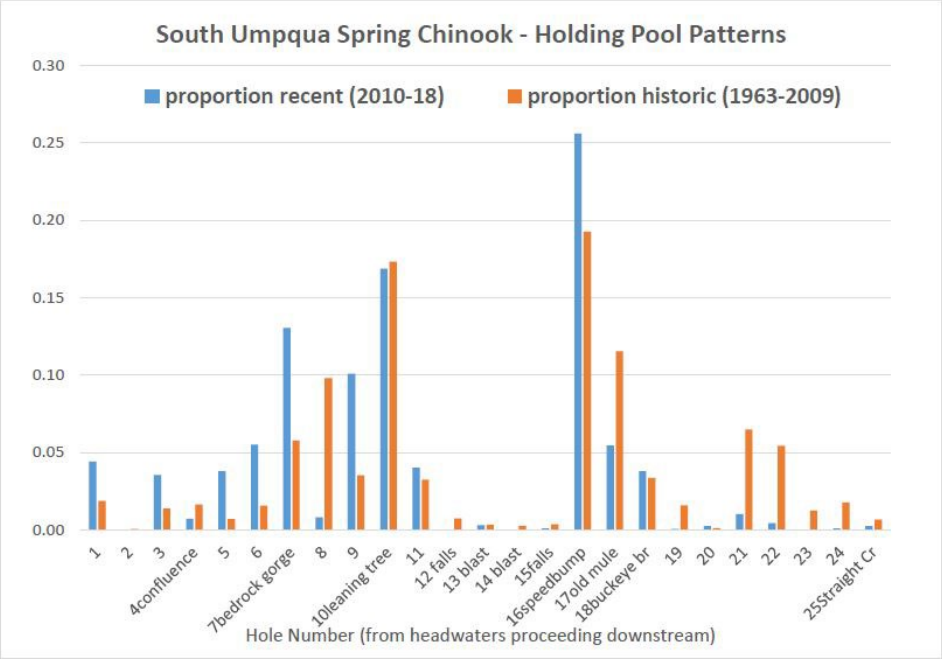
vi.3 How is climate change impacting aquatic habitat conditions and fish distribution?

Indicators: a) Trend, increase or decrease, in the total miles of habitat for fish or changes in the distribution of species. b) Trend of water temperatures in Upper South Umpqua and Jackson Creek Spring Chinook stronghold. c) Trend in water temperatures in Steamboat Creek and Upper North Umpqua Summer Steelhead strongholds.

- Water temperatures have been increasing in a wilderness tributary to the North Umpqua River. The watershed experienced fires in 1986, 2008, and 2017. Because this is a designated wilderness without vegetation management, the trends in water temperature can be attributed to post-wildfire effects (such as loss of shade) and climate change.



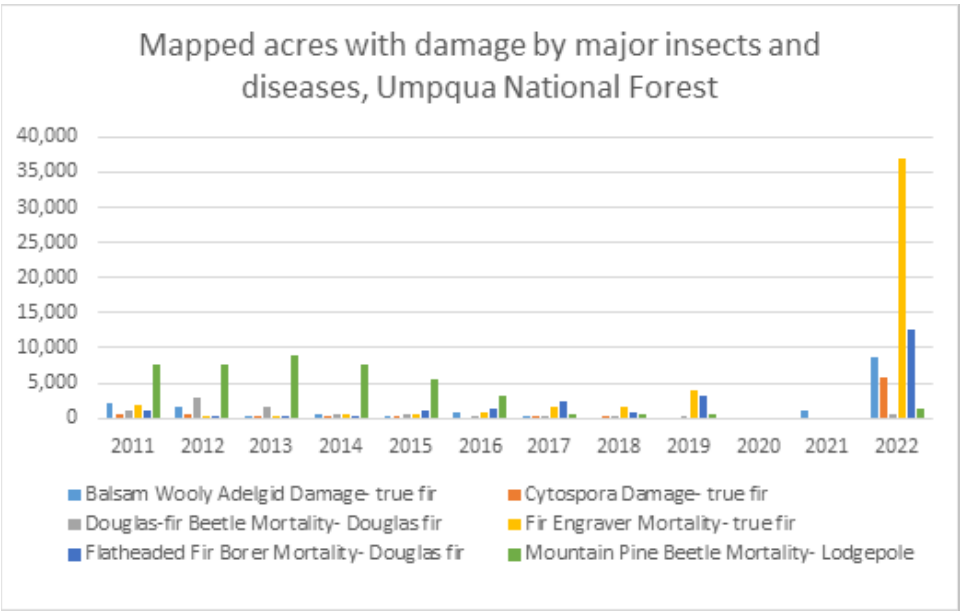
- Management activities are aligned with increasing or maintaining streamflow and fish populations, but may be insufficient to counteract increasing stream temperatures and other stressors related to climate change, which are beyond the control of National Forest management. The figure below, from an interagency monitoring effort in 2019, shows the upstream movement trend for spring chinook salmon in the South Umpqua River, which is most likely a response to warming water temperatures as the over-summering fish seek thermal refuge in the headwaters. In the last decade, the downstream reaches have become too warm for their survival.



vi.4 Are incidence of insect and disease trending upward?

Indicator: Acres affected by type and insect and disease.

- In 2021-2022, trees in the Umpqua National Forest experienced increased damage from several native insects, including flatheaded fir borer on Douglas-fir, fir engraver beetle on true firs, some mountain pine beetle on sugar pine, and from the introduced balsam wooly adelgid on true firs. These insects frequently attack and kill trees that are stressed by drought or other environmental conditions.



- The Aerial Detection Survey offers a rough annual snapshot of trends in insect and disease-mediated tree mortality. No data were collected in 2020 or 2021 due to pandemic and fires, except for incidental ground-based mapping. Surveyors expect that those years would have also shown elevated mortality, similar to 2022 patterns, had those years been surveyed.

- All these mortality agents, as well as cytospora canker damage, have increased dramatically relative to the preceding decade, whereas mountain pine beetle in lodgepole forests has become less prevalent since the early 2010s. The compounding impacts of climate change-related drought, introduced insects and pathogens, and increased tree density as a result of fire exclusion may make it more difficult for forests to recover from contemporary outbreaks.

- Thresholds for action have not been quantified, but the mortality is already affecting recent management such as in the Elk Creek watershed where primarily Douglas-fir trees marked for removal in timber sales are dying and starting to decay before they are cut, or trees that had been selected to retain and form the future forest die before or soon after the harvest. It is also affecting recreation as true firs are dying in popular high-elevation areas such as the Diamond Lake campgrounds.

Recommended Changes

- With accelerating fire and climate change, limiting management in static reserves cannot guarantee the persistence of mature or old forest conditions. Updated plan components could include more condition-based management, and emphasize ecosystem processes and fostering environments where old forests can develop in the future more than simply protecting existing old forest from harvest. In the meantime, we recommend using the discretion in the existing Forest Plan to thin in late-successional reserves if the weight of evidence suggests that this would help old forest structures to develop, and to avoid harvest in areas outside late-successional reserves where old-growth structure will persist if left unharvested.
- Future Forest Plans should more explicitly address fire and what constitutes appropriate fire management, emphasizing the ecological functions of fire and also the challenges in achieving those functions in an ecosystem and society where fire has been effectively excluded.

- Assess proximity to dying trees and other insect and disease risk factors when planning forest management, and do not expect trees at high risk to survive. Plan where to remove the dying trees for wood products or to affect future fire behavior, and where to retain them as snags and coarse wood.

- Identify areas of lower risk and promote active management to increase their future resistance to insect outbreaks.

- Ongoing additional monitoring, such as in the sugar pine health aspects of the recent Calf-Copeland project, will help assess the conditions under which removing some trees can increase the remaining trees' resistance to insects and pathogens.

- For all monitoring activities, support staff time to not only collect but manage, analyze, and draw conclusions from the data.

- Fund and include smolt trapping data if needed to determine which life stages are influencing trends in anadromous fish populations, and potentially identify the importance of local vs oceanic climate-related stressors.

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Summary Table

This table shows Umpqua National Forest Plan monitoring questions and evaluation addressed in this report. Possible types of change recommended include changes to the land management plan, changes in management activities or the monitoring program, and recommendations for a new assessment.

Table 1. Summary of monitoring recommendations

Monitoring question	Progress toward Forest Plan desired conditions and objectives	Recommended action
i.1. Are watershed conditions improving across the Umpqua National Forest?	41% of watersheds are functioning properly. None were rated as impaired.	Use additional data to assess specific watershed conditions as needed.
i.2. Have best management practices been implemented and are they effective at managing water quality consistent with the Clean Water Act?	Best management practices were fully or mostly implemented and effective at 77% of monitored sites.	None needed
ii.1 Are National Forest management practices maintaining or decreasing the spread of aquatic invasive species?	Deferred	Deferred
ii.3 Are National Forest management activities contributing to the maintenance or improvement of aquatic habitat and habitat complexity in streams, rivers, and lakes?	Our actions have been effective at protecting stream shade. Forest-wide stream survey data show a slight and gradual improvement in stream habitat complexity reflected in substrate and presence of wood.	Incorporate macroinvertebrate data sets into future monitoring assessments of complexity.
viii.1 Are management activities being implemented so that they do not substantially and permanently impair the productive capacity of the land while meeting Forest goals for soil conditions, erosion, and nutrient cycling?	All units met standards for maintaining ground cover and organic matter for erosion protection and nutrient replenishment, and for keeping detrimental soil disturbance under 20 percent.	Change subsoiling methods and groundcover retention or seeding guidelines.
iii.1 What is the trend for mature and late successional habitat (mountain hemlock, lodgepole pine) needed for marten persistence on the Umpqua?	There is more mature and late successional mountain hemlock and lodgepole pine habitat for marten than was predicted.	None needed
iii.2 What is the trend for mature and late successional habitat for pileated woodpecker and northern spotted owl persistence?	Declines in mature and old-growth forest have occurred mostly owing to wildfire. Snag patches have created habitat that pileated woodpeckers can use, but removed nesting, roosting, and foraging habitat for northern spotted owl.	More plantation thinning could help prevent future loss of nesting and roosting habitat in late successional reserves.

Monitoring question	Progress toward Forest Plan desired conditions and objectives	Recommended action
iii.3 What is the trend in elk habitat condition and elk hunting levels and success?	Early seral habitat from timber harvest has been declining; however, wildfire since 2002 has created a patchwork of early seral habitat and improved forage production within the fire perimeters. The number of big game hunters has been consistent across 2018-2022 with an increase in the number of days hunted.	We recommend additional prescribed fire or other activities in the summer range and winter range to maintain early seral habitat for big game.
iv.4 What is the trend for the Northern spotted owl population?	Northern spotted owl population has decreased by an estimated 61.8% in the last 25 years across its range.	Barred owl management is recommended as part of Recovery Action 30.
iv.1 Are National Forest management actions maintaining or improving focal fish species populations and Threatened and Endangered subpopulations?	Deferred	Deferred
iv.5 What are the trends for botanical Sensitive Species? Are any species we are monitoring in decline? If so, have management actions been taken to restore their habitats?	Deferred	Deferred
i.3. Are National Forest management actions maintaining the outstanding remarkable values of designated, study, and potential Wild and Scenic Rivers and designated State scenic waterways?	Deferred	Deferred
v.1 Are people having a high level of satisfaction during their visit to Umpqua National Forest?	96% of visitors surveyed on the forest stated that they were either “very satisfied” or “somewhat satisfied.”	None needed
vii.1 How do the timber output estimates in the Forest Plan compare with actual production?	In 2021 and 2022 harvest levels topped 5 million cubic feet, exceeding the Region 6 target.	None needed
vii.2 What are the economic consequences of deviating from the estimated Forest Plan timber outputs?	The forest products industry continues to be a key part of the economy of Douglas County.	None needed
ii.5 Are priority invasive plants being managed in accordance with the Umpqua Integrated Weed Management Plan? Are prevention measures being implemented?	Deferred	Deferred

Monitoring question	Progress toward Forest Plan desired conditions and objectives	Recommended action
vi.1 Are areas managed for old growth or late seral maintaining late seral characteristics?	From 1993-2022, the proportion of late-successional reserves exhibiting old-growth characteristics has declined on the Umpqua NF. The decrease in old-growth have been steeper in late-successional reserves than in unreserved allocations.	Updated plan components could include more condition-based management, and emphasize fostering environments where old forests can develop in the future.
vi.2 Are patterns of wildfire consistent with historical patterns to which ecosystems are likely adapted?	It is unclear how the total area burned compares to historical distributions of area burned per year. In 2021, around 1,800 acres were within high-severity patches large enough to potentially limit regeneration.	Future Forest Plans should more explicitly address fire and what constitutes appropriate fire management.
vi.3 How is climate change impacting aquatic habitat conditions and fish distribution?	Management activities are aligned with increasing or maintaining streamflow and fish populations, but may be insufficient to counteract increasing stream temperatures related to climate change.	For all monitoring activities, support staff time to not only collect but manage, analyze, and draw conclusions from the data.
vi.4 Are incidence of insect and disease trending upward?	In 2021-2022, trees in the Umpqua NF experienced increased damage from several native insects.	Identify areas of future risk and promote active management to increase their future resistance to insect outbreaks.