



Forest Plan Monitoring Program

Frequently Asked Questions

What is the forest plan monitoring program?

The monitoring program is one of three phases in the forest planning cycle, which includes assessment, plan development or revision, and monitoring. The plan monitoring program is proposed in the forest plan, implemented during the life of the forest plan, and informs the need to amend or revise the forest plan to improve forest management. The monitoring program includes a set of monitoring questions and associated indicators.

Monitoring is a systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships. The monitoring program found in a forest plan includes only some of the monitoring conducted by a forest or region.

Is the forest plan monitoring program a new requirement under the 2012 Planning Rule?

No, monitoring was required by the 1982 Planning Rule, and monitoring was included in forest plans created under that rule. In fact, monitoring productivity of the land is required by the 1976 National Forest Management Act. What is new is that the 2012 Planning Rule includes more specific instructions for monitoring, including eight topics that must be addressed by a monitoring program.

How do monitoring programs influence forest plan revisions?

The forest plan monitoring programs help us determine whether the current forest plan is effective in achieving the desired conditions and objectives laid out in the plan. Every two years after completion of the forest plan, the forest produces a monitoring evaluation report. During evaluation, we determine whether or not a change to forest plan components, requiring a plan amendment, is needed. Monitoring may show that a new assessment is needed, potentially leading to a forest plan revision. The monitoring evaluation report may also indicate a need to change the monitoring program as new information becomes available.

What are monitoring questions and indicators?

Monitoring questions and indicators measure forest plan effectiveness and assess things such as whether we are meeting the desired conditions and objectives for the plan area. Thus, monitoring

questions are linked to desired conditions and objectives outlined in a forest plan; however, a monitoring question is not needed for every desired condition, objective, or other plan component. Monitoring questions are stated in a way that allows us to observe whether we are maintaining or making progress toward the desired condition or objective. Questions may only be posed if there is a measurable or observable indicator for the question. Indicators are quantitative or qualitative variables that can be measured, observed, or described. When observed periodically, indicators may show trends that are relevant to the monitoring questions.

An example of a monitoring question is: *Are black oaks stable or increasing?*

The associated indicator for this example question would be: *Oak spatial extent; canopy cover; density; regeneration; and tree health (e.g., mortality rates, insects, etc.)*

How can monitoring address forest-wide conditions?

Monitoring forms the basis for continuous improvement of the forest plan and provides information for adaptive management within the plan area. The plan monitoring program enables the responsible official to determine where changes are needed in forest plan components (i.e., desired conditions, goals, objectives, standards, guidelines, and suitability of lands), other plan content, and plan implementation strategies that guide resource management.

The plan monitoring program is designed to inform the management of resources in the plan area, including testing relevant assumptions, tracking relevant changes, and measuring management effectiveness. By using appropriate indicators that can be measured, observed, or described over time, management actions can be evaluated to determine if they are moving conditions toward anticipated results. Plan monitoring needs to be achievable within the capability of the national forest while staying focused on answering priority management questions and gathering related core information.

A monitoring guide that describes the protocols for collecting and analyzing monitoring data will be developed for each plan monitoring program. Monitoring guides are optional and not part of a forest plan – this makes them flexible and adaptable to respond to new information and emerging science. The Forest Service will make the monitoring guides for the plan monitoring programs publicly available once they are complete.

Are all desired conditions monitored?

No. It is not feasible for monitoring to occur for every plan component. However, through the strategic selection of monitoring questions and indicators, we can assess progress toward achieving or maintaining a forest plan's desired conditions. The monitoring program contains one or more monitoring questions and associated indicators that address each of the following required topics:

- The status of select watershed conditions.
- The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.

- The status of focal species to assess the ecological conditions required under the Code of Federal Regulations, specifically 36 CFR 219.9.
- The status of a select set of the ecological conditions required under 36 CFR 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.
- The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
- Measurable changes on the plan area related to climate change and other stressors that may affect the plan area.
- Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
- The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).

The entire monitoring program must be within the financial and technical capability of the forest, augmented by broader-scale monitoring by the region and other monitoring with partners.

Does monitoring occur separate from the forest plan monitoring programs?

Yes. Project and activity monitoring, as well as resource or species monitoring conducted by other agencies and organizations, also occurs and may inform the plan monitoring program and adaptive management of the plan. There are also ongoing national monitoring programs such as the Forest Inventory and Analysis program, National Visitor Use Monitoring Program, and Watershed Condition Framework. The Regional Forester will also develop a broader-scale monitoring strategy for plan monitoring questions that can best be answered at a geographic scale larger than one plan area.

How much data from other agencies is incorporated into forest monitoring programs?

We frequently incorporate data from other agencies to assess the status of natural resources. For example, the Forest Service participates in the [California Surface Water Ambient Monitoring Program \(SWAMP\)](#). This program coordinates all water quality monitoring conducted across the state and provides resource managers, decision makers, and the public with timely, high-quality information to evaluate the condition of all waters throughout California. SWAMP works closely with the California Department of Fish and Wildlife, Southern California Coastal Water Research Project, and California State University experts at Chico, San Jose and San Marcos.

We also use volunteer-driven data from programs such as [eBird](#) and information provided to us by the public and partners. See the *Collaboration* section of the [Sierra Nevada Bioregional Assessment](#) for examples of how public information has been included through the use of *The Living Assessment*, how we are working with state agencies on statewide resource planning

efforts, such as the State Wildlife Action Plan, and how we are collaborating with partners through Landscape Conservation Cooperatives.

What is a broader-scale monitoring strategy?

The plan monitoring program and the broader-scale monitoring strategy are elements of a two-level approach to monitoring in the 2012 Planning Rule. Each Region of the US Forest Service will develop a broader-scale monitoring strategy to answer plan monitoring questions common to two or more forests that can best be answered at a geographic scale larger than one plan area. The Rule indicates that the strategy should be coordinated and integrated with each forest plan's plan monitoring program to ensure that monitoring is complimentary and efficient and that information is gathered at a scale appropriate to the monitoring questions. Ultimately, the intent of the strategy is to realize efficiencies by coordinating similar monitoring across units, integrating agency protocols, and leveraging partner and adjacent landowner monitoring work.

There are no specific requirements for the broader-scale monitoring strategy, so each region will complete these based on the needs of the forests in the region. Not every forest unit needs to be included in a broader-scale monitoring strategy. The Forest Service Handbook directives indicate that a strategy may be made up of several *substrategies* depending on how it is developed and the scope and scale it covers.

Where can I find Region 5's broader-scale monitoring strategy?

Region 5 has not developed a broader-scale monitoring strategy, but will begin soon. We will coordinate with other government agencies, local Tribes, and the public to develop monitoring questions, indicators, and methodologies for data collection. We intend to develop a strategy that is adaptable to changing needs at the broader-scale and as defined by the Forest Service and partners.

Potential components of the broader-scale monitoring strategy could include:

- Water: quality, quantity and timing;
- Recreation: recreation opportunities and experiences, access, and ecological sustainability of recreation activities;
- Social, cultural and economic conditions: contributions related to tourism, cultural and historic resources, and renewable resources including wood, biomass and special forest products (e.g. mushrooms);
- Fish and wildlife habitat: ecological conditions that provide for species persistence, and ongoing species monitoring;
- Special uses: sustainable management of utility corridors, power generating facilities, communication facilities;

- Fire: vegetation trends that contribute to maintaining fire as a necessary ecological process while also controlling fire severity, intensity and frequency, and protecting life and property;
- Air quality: features of national wilderness areas which are sensitive to air pollution;
- Transportation: access, maintenance, and impacts to watersheds;
- Climate change: effects on watersheds and aquatic resources, drought, insect and disease, phenology of plant and animal species; and
- Sustainable carbon management: carbon sequestration in ecosystems and harvested wood products.

The Forest Service will be thoughtful about broader-scale monitoring feasibility. Ongoing monitoring by the Forest Service or other entities will be prioritized to continue to leverage partnerships and trend information from long-term monitoring efforts.

A partial list of ongoing national and regional monitoring that can further inform forest plan monitoring can be found in the Monitoring Supplemental Report on the project website.

What are focal species?

Focal species are a plant or animal whose well-being can be used as an indicator to the effectiveness of the forest plan in providing the ecological conditions necessary to maintain the diversity and persistence of native species in the plan area. A few qualities of well-selected focal species include: the species is taxonomically well-known and stable; the species is specialized within a narrow habitat; and the species is a permanent resident. Monitoring questions should relate the species to the ecological condition and reason for its selection, and indicators may include affected attributes of the species, such as presence or occupancy, habitat use, reproductive rate, and population trends.

Focal species, as used by the Forest Service, are not meant to act as surrogates for other species. Focal species monitoring is also not the same as monitoring those species in which we have a particular interest, such as threatened or endangered species, invasive species, or other species for which we deliberately manage the landscape.

What is the difference between focal species and management indicator species?

Management indicator species were used prior to the 2012 Planning Rule as surrogates for other species. The premise was that the well-being of one species could act as a surrogate for another species or species group. The assumption that focusing land management activities on a single species will sufficiently allow for the persistence of other species has been mostly unproven because of the difficulty of tying the indicator species' sensitivity to environmental change to the actual response of another species.

In order to avoid the mistaken assumptions behind substitute species indicators, the Forest Service's definition of focal species does not connect one species to another species, but instead ties a species to specific attributes of the ecosystem. This approach is simpler to validate because direct cause and effect relationships can be more easily identified. A focal species should represent specific components of the ecosystem on which it relies, so that changes to the condition of the ecosystem component, either positive or negative, will be reflected in the status of the focal species. Changes in the status of a focal species are meant to provide insight into the health and integrity of the habitats within our management influence, and extrapolations should not be made to the status of other species that rely on those habitats.

Are former management indicator species used as focal species in the draft forest plans?

In some instances, management indicator species have been chosen as focal species, but not in all cases. The key requirement is that the chosen species should represent specific components of the ecosystem on which it relies, so that changes to the condition of the ecosystem component, either positive or negative, will be reflected in the status of the focal species. Changes in the status of a focal species are meant to provide insight into the health and integrity of the habitats within our management influence, and extrapolations should not be made to the status of other species that rely on those habitats.

An example of a management indicator species that fits the Forest Service's definition of focal species in the 2012 Planning Rule is the benthic macroinvertebrate communities. Benthic macroinvertebrate communities are identified in the scientific literature as good indicators for stream ecosystem integrity. All three draft forest plans include benthic macroinvertebrate communities as focal species. Benthic macroinvertebrate monitoring is accomplished regionally in collaboration with the [California Surface Water Ambient Monitoring Program](#) (SWAMP) (State Water Resources Control Board).

Are at-risk species also focal species?

It is possible that an at-risk species may qualify as a focal species if that species also happens to be an excellent indicator of habitat conditions or changes in the ecosystem. However, these species are often rare, narrowly distributed, and difficult to sample and, therefore, problematic for analysis. This is the case for some threatened and endangered fish and amphibians and some birds.

Invasive species like cheat grass represent undesired conditions of an ecosystem – doesn't this make them poor focal species?

Cheat grass (*Bromus*) was selected as a focal species because it has a key functional role in sagebrush and desert shrubland ecosystems through its effects on fire regimes (fire frequency and size) and on ecosystem diversity. For many shrubland and forested ecosystems, the presence of cheat grass is one of the best overall indicators of ecosystem health, reflecting health in ecosystem structure, function, and composition. Cheat grass is an indicator that can be rapidly and efficiently measured, lending itself to experimental design that provides rigorous basis to differentiate causes of trends. Ground-based and remote-sensing detection techniques can

efficiently inform trends in relationships between land management activities and ecosystem integrity.

To date, scientific evidence demonstrates that both climate change and management activities affect this indicator. Objectives and other plan components, such as invasive species guidelines, are written with the assumption that management activities will result in little or no change in cheat grass abundance. However, if monitoring indicates that it is spreading in distribution and/or increasing in cover, new considerations may be needed to ensure the integrity of desert shrubland, pinyon-juniper, and sagebrush systems, including sage-grouse habitat, is protected.

There are focal species I would like the Forest Service to consider – how can I share my input?

The monitoring programs in the draft forest plans are not final and public input on these programs will be considered. If you believe you know of species or species assemblages that will aid in the monitoring of resource conditions, please share those with us during the 90-day public comment period. Please describe which desired conditions they are effective indicators for and your rationale along with any scientific literature that supports your conclusions. If these are species that are monitored by another agency or entity, please share that information with us.

When determining good focal species, consider these questions:

- Is the monitoring of the species or assemblage of species more cost-effective than the direct measure of the environmental and habitat attributes of interest?
- Is the species taxonomically well-known and stable?
- Is there a thorough understanding of the biology of the species including habitat requirements and life history traits?
- Are we able to differentiate between the effects of natural and anthropogenic stress on the species?
- Are there known relationships between environmental stressors and population status of the species?
- Is the species specialized within a narrow habitat, demonstrating a relationship to habitat attributes of interest?
- Is the species a permanent resident? Migrants are subject to a variety of sources of mortality and stress in their wintering grounds and during migration.
- Are changes in the species population relevant to ecologically significant change in its habitat?
- Is the species sufficiently sensitive to provide an early warning of natural responses to environmental impacts?

- Are populations readily sampled, allowing for estimates of population status (presence-absence or abundance), and cost-effective to measure? For a species with a low population density, sampling problems are particularly severe and may preclude accurate assessment, despite the species being considered a good indicator for other reasons.
- Is there low sampling variability (consistent and high detectability across time and space) of population status?

What monitoring questions and indicators has the public suggested to date?

The following are monitoring questions and indicators that were submitted by the public. We have grouped them by the eight monitoring requirement categories. The Forest Service is taking these into consideration for both the forest plan monitoring programs and the broader-scale monitoring strategy.

Watershed conditions

Specify quantitative indicators for watershed condition monitoring and focus on indicators making the greatest contribution to risk that can be affected by management.

Monitor effects of climate disturbance on the hydrologic regime and unraveling of drainage networks.

Monitor effects of warming with more intensive arrays of temperature probes in stream.

Monitor effects of climate change with benthic macroinvertebrates in streams.

Include additional measures of habitat complexity and hydrologic functions for meadow monitoring.

Monitor additional climate change impacts like late-summer streamflow.

Monitor dams and diversions.

Ecological conditions including key characteristics of terrestrial and aquatic ecosystems

Monitor non-pine tree species like white fir, red fir, incense cedar.

Focal species to assess ecological conditions

Generally include select at-risk species and all former management indicator species as focal species.

Response: See Focal Species discussion above.

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

Generally more monitoring of at-risk species such as California spotted owl, fisher, marten, sage grouse, Mt. Lyell salamander, and Sierra Nevada big horn sheep.

Include monitoring of fisher target habitat connectivity.

Include more monitoring of California Spotted Owl home ranges and territories.

Monitor ecological conditions for at-risk species: Mt. Pinos sooty grouse, California condor, northern goshawk [not at-risk], both mountain and foothill yellow-legged frogs, and slender salamanders.

Visitor use, visitor satisfaction, and progress toward meeting recreation objectives

Monitor social and ecological sustainability for recreation and whether recreation settings are capable of adapting to changing conditions.

Climate change and other stressors

We suggest you add the following monitoring questions: what proportion of the landscape, stratified by forest type, contains old forest areas? What is the spatial distribution of old forest areas in the plan area?

Expand indicators for fire managed for resource benefit to include the proportion of all severity classes.

Monitoring how prescribed fire and managed fire are being utilized.

Monitor impacts of livestock grazing and roads.

Monitor other stressors like high-impact recreation (example: Percentage of visitors participating in OHV use).

Local use of forests for rock collecting and mining.

Desired conditions and objectives in the plan, including for providing multiple use opportunities

Monitor desired condition for wilderness character using RMRS-GTR-340 as a starting point.

Response: This was added to the Appendix Proposed and Possible Actions. The baseline conditions for wilderness character monitoring have not been established yet. Once the baseline has been established, we will implement monitoring of these conditions.

Productivity of the land

None.

Will the Forest Service share the results of the forest monitoring programs and broader-scale monitoring strategy and can the public participate in making future changes to these programs?

Monitoring information will be evaluated every two years, starting no later than two years after the effective date of the forest plan decision. This biennial evaluation includes information gathered through the plan monitoring program and relevant information from the Region 5 broader-scale monitoring strategy and other monitoring efforts. A written report of the evaluation will be made available to the public. Some monitoring occurs at intervals other than two years, and the results of that monitoring will be included in the next biennial evaluation. Documented results from the broader-scale monitoring strategy will be made publicly available on at least a 5-year cycle and may be documented in a variety of forms, including sharing data, summaries, reports and papers.

If monitoring indicates that substantive changes to the monitoring program need to be made, this will be described in the biennial monitoring report. Changes can be made through an administrative change with public notice. A substantive change to the monitoring program made outside of the plan revision or amendment process will be made only after notice to the public of the intended change and consideration of public comment. The Responsible Official will decide how to notify the public, which may include posting on a webpage, use of emails, or in the biennial monitoring evaluation report. A change to a monitoring guide or annual monitoring work plan is not a change to the plan monitoring program and does not require public notification.

Previous monitoring reports: Inyo National Forest [Monitoring Reports](#), Sierra Nevada Forest Plan [Monitoring Reports](#), National Forest Visitor Use [Monitoring Reports](#). Future biennial monitoring reports will be located on each national forest website.

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