Coconino Forest Plan
Administrative Change per Monitoring Transition to Focal Species

Administrative Change #1

June 26, 2019

Introduction

This Administrative Change to the 2018 Land and Resource Management Plan (Forest Plan) for the Coconino National Forest (NF) brings the Forest Plan's Monitoring Strategy into conformance with the monitoring requirements of the 2012 Planning Rule (36 CFR 219). The 2012 Planning Rule allows for corrections in or adjustments to the Forest Plan using a process called "administrative change." "An administrative change is any change to a plan that is not a plan amendment or revision. Administrative changes include corrections of clerical errors to any part of the plan, conformance of the plan to new statutory or regulatory requirements, or other content in the plan (219.7(f))" (36 CFR 219.13(c). In the 2012 Planning Rule, monitoring is considered to be other plan content (36 CFR 219.7(f)(1)(iii)).

The 2012 Rule provides directions for a set of monitoring questions and associated indicators that must be part of every plan monitoring program (USDA Forest Service 2012). The Coconino Forest Plan approved in 2018 incorporated all but the focal species required monitoring plan element: the status of focal species to assess the ecological conditions required under § 219.9.

In the 2012 Planning Rule, Management Indicator Species (MIS) monitoring has been replaced with monitoring of focal species. The concept of MIS as a surrogate for the status of other species is not supported by current science, and population trends are difficult and sometimes impossible to determine within the lifespan of a plan. The concept of focal species, however, is well supported in the scientific literature and community. Focal species monitoring provides information regarding the effectiveness of the plan in providing the ecological conditions necessary to maintain the diversity of plant and animal communities and the persistence of native species in the plan area.

Focal species are selected to monitor when doing so is feasible and they are the best way to track whether ecological integrity and ecosystem diversity is being maintained or improved. Monitoring focal species is intended to address situations where they provide more useful information or are more efficiently monitored than monitoring other potential indicators. There may be situations where key ecological indicators could be monitored directly, but monitoring focal species as an overall measure of composition, structure, function, and connectivity may be a more appropriate indicator of integrity.

Identification of Focal Species

When the Coconino NF revised its plan in 2018, it identified three MIS: Mexican spotted owl, pygmy nuthatch, and pronghorn. In reviewing the purposes for monitoring focal species and the key considerations, the Coconino NF determined that the Mexican spotted owl be carried

forward as a focal species, as a good representative for specific ecological conditions within ponderosa pine and mixed conifer habitats, but that the pygmy nuthatch and the pronghorn would not. Instead, three additional species are selected as focal species to represent the other key habitats in the Coconino NF.

Pronghorn were not carried forward as focal species for grasslands since they are difficult to effectively monitor, and they are managed as a game species by the Arizona Game and Fish Department. As such, detectable population changes in response to forest management activities would be more difficult to discern. The pygmy nuthatch is an indicator for mature ponderosa pine habitat, especially the large snag component. The revised Forest Plan has a monitoring plan element to evaluate if snags are being maintained within desired conditions. Directly monitoring the ecological condition for maintenance of snags greater than 18 inches in diameter within ponderosa pine negates the need for monitoring the species directly.

As expressed in desired conditions, standards, guidelines, and objectives in the 2018 revised Forest Plan, fuels reduction (prescribed cutting and prescribed burning) and restoration activities are the predominant management activities anticipated, particularly in the Ponderosa Pine and Mixed Conifer with Frequent Fire Ecological Restoration Units (ERUs) (see the revised Forest Plan for more detail). The emphasis on fuels reduction and restoration activities in these ERUs were a key consideration in identifying focal species for those habitats. Some other considerations the Coconino NF used in determining how many and which ecological conditions to select focal species for included: the existing departure and trend of ERUs, whether active management activities are anticipated in those types as identified in objectives, the existence of standardized monitoring protocols, existing information on potential species, monitoring efficiencies (ability to monitor multiple species with one method or protocol), and the ability to partner with others to conduct the monitoring (e.g., other agencies and non-governmental organizations).

Considering all of these factors, the 2012 Rule definition of focal species, and specified goals and requirements for identifying focal species, the Coconino NF has selected the following four species as focal species.

Mexican Spotted Owl
The Mexican spotted owl (MSO) serves as an indicator of mature late-seral mixed conifer and late-seral ponderosa pine-Gambel oak forests within the ponderosa pine ERU. The MSO prefers areas of well-structured forests with high canopy cover, large trees, and other late-seral characteristics for nesting and roosting habitat (U.S. Fish and Wildlife Service 2012). Throughout the species' range, it is often, but not always, associated with steep topography, although the MSO also occurs in areas of gentle terrain, as long as suitable forest structure exists (U.S. Fish and Wildlife Service). As the Coconino NF moves forward with fuels reduction and forest restoration efforts, monitoring the MSO will help evaluate the persistence of the mature mixed conifer and pine-oak ecological conditions that support nesting owls.

Grace's Warbler
Grace's warbler is proposed as an indicator for open, park-like, mature stands of pure ponderosa pine, and in pine-oak habitats. It is strongly associated with this forest structure found historically in northern Arizona (Szaro and Balda 1986, Stacier and Guzy 2002). Monitoring for this species would allow the forest to assess overstory response to prescribed cutting and burning

that aims to restore ponderosa pine forests and reduce fuel loads. Restoration of the pine types would be expected to have a positive influence on populations of Grace's warblers, so they would be expected to be stable or increasing.

Black-throated Gray Warbler

The black-throated gray warbler is recommended as the focal species for the mature pinyon component of pinyon-juniper habitats. In Arizona, it occurs more frequently in taller pinyon-juniper stands that contain higher densities of mature pinyon pine, and may avoid drier stands comprised primarily of juniper (Corman and Wise-Gervais 2005). Forest Plan objectives call for between 1,000 and 10,000 acres of mechanical treatment over 10 years in Pinyon-Juniper with Grass, and a minimum of 3,750 acres treated using naturally-ignited wildfire in both Pinyon Juniper with Grass and Pinyon Juniper Evergreen Shrub. Pinyon trees are not usually targeted for removal using thinning or burning, but can be removed under fuelwood and Christmas tree permits. Monitoring for this species would determine if higher-density mature pinyon pine are being maintained in the Coconino NF, particularly in response to management of naturally-ignited wildfires. With implementation of the Forest Plan, the status of the black-throated gray warbler would be expected to be stable, since plan components strive to maintain old-growth structure within the pinyon-juniper types.

Juniper Titmouse

Juniper titmice are indicators for late seral pinyon-juniper habitats, particularly the snag component. In Arizona, they are strongly associated with dry woodlands that contain Utah and one-seed junipers (Corman and Wise-Gervais 2005). The titmouse is a cavity-nester that nests primarily in juniper trees ranging in height from 10 to 59 feet (Corman and Wise-Gervais 2005). Forest plan objectives for mechanical treatment and fire focus on Pinyon Juniper with Grass and Pinyon Juniper Evergreen Shrub, rather than Pinyon Juniper Woodland. Monitoring this species would determine if pinyon-juniper stands with cavity-producing junipers are being maintained in the forest. With implementation of the Forest Plan components, the status of the juniper titmouse would be expected to be stable.

Administrative Change for Monitoring Transition

Interested parties were notified and received copies of this proposed monitoring transition to focal species, and comments requested, in December 2018 and January 2019. Four comment letters were received: requesting that pronghorn antelope be included as a focal species, asking about focal species for riparian areas, and examining the methods and information to be gathered in monitoring for the proposed focal species. We considered the comments and made some important changes to our proposal as a result of the insights provided. The changes we have made are described and listed below by species and habitat type.

To make this transition from MIS to focal species monitoring, changes have been made to Chapter 5, Monitoring Strategy, in the Coconino Forest Plan. Table 17 (Monitoring Questions) has been updated for this monitoring transition, and is presented after the descriptions of the changes. An updated version of the Coconino Forest Plan will be posted to the forest planning website https://www.fs.usda.gov/land/coconino/landmanagement. Pages which have been changed will be identified in the page footers, along with the date of the change.

Pronghorn Antelope/Grassland Habitat

Comments recommended that the pronghorn be selected as the focal species for grassland habitats. However, focal species are defined as those that provide "meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area." Pronghorn populations are influenced by many factors, such as predation of fawns, availability of water, and competition with elk for forage. As a managed game species, pronghorn numbers may not accurately reflect the species' response to Forest Service management activities. Detectable population changes in response to forest management activities would be more difficult to discern and distinguish from other factors affecting the species' status, such as hunting pressure. Pronghorn are still considered an important native game species and populations continue to be monitored and reported by the AZGFD. The Coconino NF appreciates that the AZGFD continues to share information on population distribution, partner with the forest on grassland enhancement projects, and document use by pronghorn after restoration activities.

There are many existing forest plan components that give management direction for pronghorn and their habitat:

Desired Conditions for Constructed Waters
FW-ConstWat-DC

2 Earthen stock ponds and wildlife waters are accessible to wildlife, especially during key periods such as pronghorn fawning or during times of stress such as drought.

Desired Conditions for Grassland ERUs
FW-TerrERU-Grass-DC

Fine Scale (less than 10 acres)

8 A mosaic of vegetation patches with varying vegetation densities is present, depending on site potential (as determined by TEUI or other appropriate ecological classification system). Densely vegetated areas provide cover for ground-nesting birds and pronghorn fawns. Bare areas are the result of natural processes such as freeze-thaw action, erosion, drought, or prairie dog burrowing.

Objectives for Grassland ERUs[1]
FW-TerrERU-Grass-O

1 Restore or improve at least 3,500 acres of Semi-desert Grasslands during each 10-year period over the life of the plan.

2 Restore or improve 10,800 to 12,400 acres of Great Basin Grasslands during each 10-year period over the life of the plan.

3 Restore or improve 7,600 to 11,400 acres of Montane/Subalpine Grasslands during each 10-year period over the life of the plan.

Guidelines for Grassland ERUs
FW-TerrERU-Grass-G

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[1] Objectives for Semi-desert Grasslands and Great Basin Grasslands maintain and improve habitat for pronghorn.

1 On soils classified with clayey (Vertic) subgroups in Great Basin Grasslands, prescribed fire and resource objective fires should not be used until natural vegetative ground cover is near potential to promote satisfactory and functional soils.

2 Grassland composition, structure, and productivity and soil function should be protected and enhanced using methods such as fencing, aerating soil (decompacting soils), improved grazing strategies, or strategic location of constructed waters or of roads.

Management Approaches Grassland ERUs
Collaborate with partners and stakeholders on grassland restoration, grassland connectivity, and education.

Coordinate with Arizona Game and Fish Department (AZGFD) and U.S. Fish and Wildlife Service on objectives for wildlife conservation, education, habitat restoration, and improvements, particularly regarding pronghorn, prairie dogs, and black-footed ferrets.

Species-specific wildlife needs are addressed on a site-specific basis and considered during project-level planning and implementation. For example, where they occur, pronghorn typically benefit from grasses and shrubs greater than 11 inches in height to provide fawns protection from predators during the fawning season (AZGFD 2011). This habitat consideration is, however, dependent in large part on weather and site capability. Optimal fawning habitat conditions may not always be achievable due to variable environmental conditions (such as winter snowfall and spring precipitation). Project specialists work together to determine achievable conditions that would optimize wildlife habitat at the site level, and give consideration to follow-up monitoring that could assess how well such conditions have been met.

Guidelines for Wildlife, Fish, and Plants
FW-WFP-G
5 Structural improvements should be planned and managed to provide wildlife with safe use of water, and to allow safe passage for wildlife prone to movement restrictions, such as pronghorn. For example, the bottom wire of fences should be smooth and at least 18 inches high to allow pronghorn passage.

6 Important wildlife movement corridors and pronghorn habitat should be generally free of impediments to movement caused by fences, so species can meet basic life history needs and access suitable habitat. For example, in these areas, construction of additional fences should be minimal, fence maintenance should be a priority, and fences that are no longer needed should be removed.

8 Timing restrictions should be applied to projects and activities that potentially negatively affect Southwestern Region sensitive species and pronghorn. The intent is to minimize or avoid impacts to survival or successful reproduction.

13 New road and new trail locations should be designed to maintain species access to adjoining habitat, to maintain habitat for dispersal and migration, and to meet species' life history requirements, including fawning habitat for pronghorn.

Desired Conditions for Anderson Mesa Management Area

MA-AMesa-DC
>   **3** The Anderson Mesa pronghorn herd has a sustainable population, is able to move freely across the grasslands and open areas of the forest and woodlands, and can easily access winter range.

On the Coconino NF, existing conditions for semi-desert grasslands show high departure and trending away from reference conditions. Objectives for improvement and restoration treatments have been identified, but only for about four percent (3,500 acres) or more of the habitat, and there is not a single focal species that would serve as a good indicator of semi-desert grassland conditions. Woody species encroachment and non-native plants are the biggest threats to these grasslands. The Forest Plan Monitoring Strategy has a component to determine how much management activities are contributing towards reducing the incidence or abundance of invasive plants, by tracking acres treated. Combined with existing range monitoring protocols, this will track the condition of semi-desert grasslands over time. The Vesper sparrow was originally proposed as the focal species for the Great Basin and Montane/Subalpine Grassland ERUs. However, with the changes to Monitoring Question 3 to include all grassland ERUs in the Coconino NF, it was determined that the results of this monitoring would serve as a better indicator of ecological conditions in this habitat than the Vesper sparrow which is a generalist species.

Changes to Monitoring Strategy

1. Monitoring Question 3 addresses how management activities have contributed to maintaining or making progress toward Desired Conditions for Semi-desert Grassland and Pinyon Juniper with Grass ERUs. Great Basin and Montane/Subalpine Grassland ERUs, also used by pronghorn, will be added to this monitoring question.
   > **Question:** How much have management activities contributed to maintaining or making progress toward DCs related to vegetation structure for the Semi-desert Grassland, Pinyon Juniper with Grass, Great Basin Grassland, and Montane/Subalpine Grassland ERUs?
   > **Metric:** Acres of vegetation treated in each ERU.
   > **Source:** Database of record such as FACTS database (Forest Activity Tracking System).
2. Monitoring Question 20 for pronghorn as a management indicator species (MIS) will be deleted from the Coconino Monitoring Strategy.

Changes to Management Approach

Management Approaches Grassland ERUs
>   Collaborate with partners and stakeholders on grassland identification and restoration (including historical grasslands), grassland connectivity, and education.

Riparian Habitat

Focal species are defined as a small subset of species whose status provides meaningful information on the effectiveness of plan direction. They have been identified for those habitats where forest management activities, primarily thinning and burning, would produce the greatest effects on and changes to those habitats. Since there is considerable plan direction for riparian areas that protects them and limits the effects of management activities in them, a focal species

was not selected for riparian habitat.

The forest plan components that give management direction for riparian habitat include:

Desired Conditions for All Riparian Areas
FW-Rip-All-DC

> **3** Riparian areas exhibit connectivity between and within aquatic, riparian and upland components that reflects their natural range of variability and linkages. Naturally isolated springs remain isolated. Riparian areas are connected vertically between surface and subsurface flows. Streamcourses and other links between aquatic and upland components support ecological functions, and provide habitat and movement corridors for aquatic and upland species.

Guidelines for All Riparian Areas
FW-Rip-All-G9999

> **2** Riparian areas should be managed to promote natural movement of water and sediment, to maintain ecological functions, and to maintain habitat and corridors for species.

Snag Habitat

Monitoring Question 4 in the Coconino Monitoring Strategy evaluates whether snags are being maintained within desired conditions. Directly monitoring the ecological condition for maintenance of snags greater than 18 inches in diameter within ponderosa pine negates the need for monitoring snag-dependent species directly, such as the pygmy nuthatch (previously a management indicator species). The FS looks forward to continuing coordination with the Rocky Mountain Research Station. The long-term snag monitoring Dr. Ganey is conducting will be an asset and inform this monitoring.

Changes to Monitoring Strategy

3. Monitoring Question 21 for the pygmy nuthatch as an MIS will be deleted.

Songbird Focal Species

The songbird focal species selected for the key ecological conditions and ecological response units (ERUs) on the Coconino National Forest are Grace's warbler, black-throated gray warbler, and juniper titmouse.

Grace's warbler was chosen as the focal species for open, park-like, mature stands of pure ponderosa pine, and for pine-oak habitats. Though the songbird has been located in a variety of forest and stand conditions, monitoring this species would help indicate overstory response to vegetation treatments, as well as contribute to information on the species.

The black-throated gray warbler was chosen as the focal species for the mature pinyon component of pinyon-juniper habitats. Although the warbler also uses other habitats and there is a lack of population dynamics information for the species, monitoring this species would help indicate the response of higher-density mature pinyon pine to the management of naturally-ignited wildfires, as well as provide new information on the species.

The juniper titmouse was chosen as the focal species for late-seral pinyon-juniper habitats, particularly the snag component. Monitoring for this species would help determine if pinyon-juniper stands with cavity-producing junipers are being maintained in the forest.

It was determined that Bird Conservatory of the Rockies (BCOR) surveys provide a feasible and efficient way to monitor these songbirds, and incorporates fine-scale vegetation variables. The FS looks forward to continuing coordination with the Rocky Mountain Research Station and Dr. Sanderlin on the best use of these data.

4. A monitoring question will be added for the songbird focal species. The metrics to be used have been updated in response to comment on the proposal:

> **Question:** What is the status of the three songbirds identified as focal species (Grace's warbler, black-throated gray warbler, and juniper titmouse)?
>
> **Metric:** Trends in occupancy (proportion of grid cells occupied across the forest) and density (birds per square kilometer) for each species. To monitor local populations and infer changes from restoration treatments, changes in cells/routes that had restoration treatments could be compared to untreated cells.
>
> **Source:** Bird Conservatory of the Rockies (BCOR) Integrated Monitoring in Bird Conservation Regions (IMBCR) data; state bird monitoring and long-standing bird monitoring data sets such as the Christmas Bird Count and Breeding Bird Surveys.

In the Coconino Revised Forest Plan, the monitoring strategy consists of monitoring questions to be answered at the geographic scale of the entire Coconino National Forest. That is the scale used for the added monitoring questions for focal species. The monitoring after project implementation to answer these questions will use the metrics and data sources given until existing or emerging approaches for monitoring the status of focal species that are supported by current science can be used efficiently. The FS will continue to work with the Rocky Mountain Research Station (RMRS), Northern Arizona University (NAU), and others on vegetation monitoring protocol, with the intent of using the best available remote sensing data as they are available.

Mexican Spotted Owl (MSO)

The MSO was chosen as the focal species for mature late-seral mixed conifer and late-seral ponderosa pine-Gambel oak forests within the ponderosa pine ERU. Monitoring the MSO will help evaluate the persistence of the mature mixed conifer and pine-oak ecological conditions that support nesting owls.

Changes to Monitoring Strategy

5. Monitoring Question 22 for the Mexican spotted owl (MSO) as an MIS will be deleted, and replaced with the monitoring question for MSO as a focal species.
6. The monitoring question for the Mexican spotted owl (MSO) as a focal species will be added:

> **Question:** Are plan components guiding fuels reduction and forest restoration activities maintaining the suite of late-seral ecological conditions within mixed conifer and pine-oak ERUs that contribute to stable or increasing MSO habitat?
>
> **Metric:** Acres of change in late seral mixed conifer and pine-oak habitats.
>
> **Source:** Best available remote sensing data (satellite, land cover databases) to measure change in acres. Results from Monitoring Questions 4, 5, and 6.

Changes to the Coconino Forest Plan Monitoring Strategy

Use of the adaptive management framework and the best available scientific information are key; the monitoring program will continue to be developed as protocols and specific methods for the collection and evaluation of monitoring information are identified.

Evaluation of monitoring results may lead to recommendations to change management direction, or revise or amend the Coconino Forest Plan. The Biennial Monitoring Evaluation Report will inform adaptive management of the plan area and may identify changes to the plan monitoring strategy that may be needed.

The changes to the Coconino Forest Plan Monitoring Strategy are shown in the following table from Chapter 5 of the Forest Plan. Additions are indicated by **bold text**. Deletions are indicated by strike-through text. These pages of Chapter 5 that have been changed will be published and mailed to interested parties to replace the original pages in the printed documents. An updated version of the Coconino Forest Plan will be posted to the forest planning website https://www.fs.usda.gov/land/coconino/landmanagement.

The monitoring plan includes the following: monitoring questions that describe the actions, effects, or resources to be evaluated; scale of the question; what is being measured; the source of the information; the frequency of monitoring and reporting, and the expected precision/reliability of the monitoring process (table 15).

- **Monitoring Question**: The question(s) that will be answered. All questions are at the geographic scale of the Forest unless indicated otherwise.
- **Metrics and Data Sources**: The evaluation criteria and data sources available to evaluate the monitoring questions at the time of plan approval. These are not the required methods of measurement. As new tools become available, other methods may be used to answer the monitoring questions.
- **Frequency of Monitoring**: How often information is gathered or measured.
- **Frequency of Evaluation**: How often the information is analyzed and reported. Available monitoring information will be evaluated and reported every two years.
- **Data Precision and Reliability**: An indication of how rigorous the information used to evaluate the monitoring question is with respect to repeatability, reliability, accuracy, and precision. Two categories of precision and reliability are appropriate at the plan scale, and because of varying methods and data sources used to evaluate the monitoring question, both classes may be indicated. Classes of precision and reliability, however, are not meant to identify which methods and data sources may be most appropriate to answer the monitoring question.
  - **Class A**: Methods that are generally well-accepted for modeling or quantitative measurement. Results have a high degree of repeatability, reliability, accuracy, and precision.
  - **Class B**: Methods or measurements that are based on project records, personal communications, ocular estimates, pace transects, informal visitor surveys, and similar types of assessments. The degree of repeatability, reliability, accuracy, and precision are not as high as Class A methods, but they still provide valuable information.

Table 15. Coconino NF plan monitoring questions

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
1	What is the contribution of forest management to air quality in the three smoke management units that overlap the Coconino NF (Colorado River airshed, Little Colorado River airshed, Verde River airshed) when there are exceedances of State of Arizona's air quality standards? Scale: Greater than forestwide	**Metric:** Various, depending on pollutant. **Source:** Data from any Arizona Department of Environmental Quality (ADEQ) air quality monitoring station in the three smoke management units that overlap the forest. **Evaluation:** Forest activities that relate to air quality on day of exceedance.	Information is collected by ADEQ daily.	A
2	What is the contribution of forest management to visibility within the Sycamore Wilderness and Mazatzal Wilderness Class I Areas when there are exceedances of the Regional Haze Implementation Plan? Scale: Greater than forestwide	**Metric:** Various, depending on pollutant. **Source:** Data from IMPROVE[1] program (Environmental Protection Agency air quality monitoring stations at Ike's Backbone and Sycamore Canyon). **Evaluation:** forest activities that relate to visibility on day of exceedance.	Weekly	A
3	How much have management activities contributed to maintaining or making progress toward DCs related to vegetation structure for the Semi-desert Grassland, and Pinyon Juniper with Grass, **Great Basin Grassland, and Montane/Subalpine Grassland** ERUs?	**Metric:** Acres of vegetation treated in each ERU. **Source:** Database of record such as FACTS[2] database (Forest Activity Tracking System).	Annually	A
4	Are downed logs and snags falling within the ranges established in desired conditions for Ponderosa Pine and Mixed Conifer with Frequent Fire ERUs?	**Metric:** Frequency of snags and downed logs. **Source:** Field data and database of record such as FACTS.	3 to 5 years	A
5	Are tree densities within forested areas falling within the basal area ranges established in the desired conditions for Ponderosa Pine and Mixed Conifer with Frequent Fire ERUs?	**Metric:** Basal area. **Source:** Field data and database of record such as FACTS.	3 to 5 years	A

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
6	How much have management activities contributed to reducing the risk of uncharacteristic fire?	**Metric:** acres mechanically treated, acres of prescribed fire, acres of wildfire for resource objectives. **Source:** Database of record such as FACTS.	Annually	A
7	How much have management activities contributed to returning fire to fire-adapted ecosystems?	**Metric:** acres of prescribed fire and acres of wildfire managed for resource objectives that maintain or move towards desired conditions in the forest plan. **Source:** Database of record such as FACTS.	Annually	A
8	How much have management activities improved functional-at-risk or nonfunctional stream riparian areas and wetlands?	**Metric:** acres/miles of functional-at-risk or nonfunctional stream riparian areas improved and number and acres of functional-at-risk or nonfunctional wetlands improved. **Source:** Database of record such as WIT[3] database (Watershed Improvement Tracking).	Annually	A, B
9	How much have management activities contributed to the restoration of riparian function to springs not in proper functioning condition?	**Metric:** number of springs improved or restored. **Source:** Database of record such as WIT.	Annually	A
10	How many water rights have been procured or how many water rights filings have been done?	**Metric:** Number of water rights procured or filings completed **Source:** USDA Forest Service Water Rights and Uses (WRU) database and Arizona Department of Water Resources	Annually	A
11	What are surface water trends for Oak Creek, Wet Beaver Creek, and Fossil Creek?	**Metric:** Annual mean discharge and peak streamflow **Source:** U.S. Geological Survey Gaging Stations	Annually	A

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
12	How much have management activities contributed to reducing the incidence or abundance of aquatic invasive species?	**Metric:** miles of streams and acres of lakes, ponds, or wetlands with non-native species removal or are affected by a fish barrier or other structure. Number of new populations of aquatic invasive species. **Source:** surveys and reports, including from partner agencies and organizations (such as Fossil Creek native fish annual monitoring report); information from State and Federal agencies on new populations of aquatic invasive species.	Annually	A, B
13	How much have management activities contributed toward reducing the incidence or abundance of invasive plants?	**Metric:** Acres of invasive plants treated. **Source:** Database of record such as FACTS.	Annually	A
14	To what extent are undesirable outbreaks of insects and pathogens occurring on the forest? (1982 Planning Rule (sec. 219.12(k)(5)(iv))	**Metric:** acres of damage or mortality. **Source:** Forest Health and Condition Report, Southwestern Region.	Annually	A, B
15	How much have implemented projects and soil best management practices contributed to protecting soil, reducing accelerated erosion, reducing soil compaction, and maintaining soil and nutrient cycling thus maintaining long term soil productivity?	**Metric:** Acres of implemented projects that maintain or trend toward satisfactory soil condition. Acres and number of projects where BMP implementation was effective at protecting soil productivity. **Source:** Field data from a sample of implemented projects on the forest (soil condition and soil productivity), including implemented BMPs.	Every 3 to 5 yrs for soil condition assessments. Annually for BMP implementation.	B
16	Have management activities contributed to impairment of warm water or cold water streams based on aquatic macroinvertebrate metrics? Aquatic macroinvertebrates are an ecological indicator of water quality.	**Metric:** Streams added to or removed from ADEQ's impaired or non-attaining list. **Source:** ADEQ 305(b) reports.	Every 3 years.	A

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
17	Have management activities contributed to the delisting and improvement of impaired waters, or waters non-attaining Arizona water quality standards?	**Metric:** number of streams or lakes removed or added to ADEQ's impaired or non- attaining list. **Source:** ADEQ 305(b) reports.	Every 3 years	A
18	How much have management activities contributed to maintaining or moving towards desired conditions of functioning properly for priority 6th code watersheds identified in the watershed condition assessment?	**Metric:** Acres of watershed maintenance or restoration activities and acres of vegetation treatments within priority 6th code watersheds. Name and number of 6th code watersheds that have moved to an improved class. **Source:** In forestwide WCATT (Watershed Condition Assessment Tracking Tool) and database of record such as FACTS.	Every 3 to 5 years	A
19	A. How much have management activities improved habitat for aquatic and riparian-dependent threatened, endangered, or proposed species? (Related to question 8) B: How much have management activities contributed to reducing the incidence or abundance of aquatic invasive species in habitat for threatened, endangered or proposed species? Related to question 10.	**A. Metric:** acres/miles of functional-at-risk or nonfunctional stream riparian areas improved and number and acres of functional-at-risk or nonfunctional wetlands improved as related to threatened, endangered, and proposed species habitat. **A. Source:** Database of record such as WIT database. **B. Metric:** miles of streams and acres of lakes, ponds, or wetlands with non-native species removal or are affected by a fish barrier or other structure. **B. Source:** project files for structures completed. **B. Metric:** Number of new populations of aquatic invasive species. **B. Source:** surveys and reports, including from partner agencies and organizations (such as Fossil Creek native fish annual monitoring report); information from State and Federal agencies on new populations of aquatic invasive species.	Annually	B

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
20	A. What are the status and trends of pronghorn (a management indicator species) populations on the Forest? **What is the status of the three songbirds identified as focal species (Grace's warbler, black-throated gray warbler, and juniper titmouse)?**	A. **Metric** for pronghorn population trend: Increasing, Decreasing or Stable - Qualitative. B. **Metrics** for pronghorn habitat: Acres of vegetative treatments (prescribed cutting, prescribed burning, wildfire managed for resource objectives), acres of invasive plant treatment, and miles of road decommissioned or naturalized in grassland habitats. **Metric: Trends in occupancy (proportion of grid cells occupied across the forest) and density (birds per square kilometer) for each species. To monitor local populations and infer changes from restoration treatments, changes in cells/routes that had restoration treatments could be compared to untreated cells.** **Source: Bird Conservatory of the Rockies (BCOR) Integrated Monitoring in Bird Conservation Regions (IMBCR) data; state bird monitoring and long-standing bird monitoring data sets such as the Christmas Bird Count and Breeding Bird Surveys.**	Annually 3 to 5 years	A, B A
21	A. What are the status and trends of pygmy nuthatch (a management indicator species) populations on the Forest? B. Are snags falling within the range established in desired conditions for Ponderosa Pine ERU, habitat for pygmy nuthatches, an MIS species? C. Are tree densities within forested areas falling within the basal area ranges established in the desired conditions for Ponderosa Pine ERU? D. How much have management activities contributed to reducing the risk of uncharacteristic fire in Ponderosa Pine ERU?	A. **Metric** for pygmy nuthatch population trend: Increasing, Decreasing, or Stable (Qualitative). B, C, D, and E. **Metrics** for pygmy nuthatch habitat: Frequency of snags. Basal area. Acres mechanically treated; acres of prescribed fire, acres of wildfire for resource objectives.	Annually	A

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
2~~2~~1	~~A. What are the status and trends of Mexican spotted owls (a threatened species and a management indicator species) populations?~~ ~~B. Are downed logs and snags falling within the range established in desired conditions for Ponderosa Pine, Mixed Conifer with Frequent Fire, and Mixed Conifer with Infrequent Fire ERUs?~~ ~~C. Are tree densities within forested areas falling within the basal area ranges established in the desired conditions for Ponderosa Pine, Mixed Conifer with Frequent Fire, and Mixed Conifer with Infrequent Fire ERUs?~~ ~~D. How much have management activities contributed to reducing the risk of uncharacteristic fire in Ponderosa Pine, Mixed Conifer with Frequent Fire, and Mixed Conifer with Infrequent Fire ERUs?~~ ~~E.~~ **A.** How much have management activities contributed to returning fire to Ponderosa Pine, Mixed Conifer with Frequent Fire, and Mixed Conifer with Infrequent Fire ERUs? **B. Are plan components guiding fuels reduction and forest restoration activities maintaining the suite of late-seral ecological conditions within mixed conifer and pine-oak ERUs that contribute to stable or increasing MSO habitat?**	**A. Metric** ~~for Mexican spotted owl population trend: Increasing, Decreasing, or Stable (Qualitative).~~ **B, C, D, and E. Metrics** ~~for Mexican spotted owl habitat: Frequency of snags. Basal area. Acres mechanically treated; acres of prescribed fire, acres of wildfire for resource objectives.~~ **A. Source:** ~~Broadscale monitoring results from Southwestern Regional Office.~~ **B, C, D, and E. Sources:** ~~Field data and database of record such as FACTS.~~ **A. Metric:** ~~Site occupancy (proportion of grid cells occupied across the Southwestern Region).~~ **Acres mechanically treated, acres of prescribed fire, acres of wildfire for resource objectives.** **B. Metric: Acres of change in late seral mixed conifer and pine-oak habitats.** **A. Source: Field data and database of record such as FACTS.** ~~Regional BCOR MSO site occupancy data; forest data on Protected Activity Center occupancy.~~ **B. Source: Best available remote sensing data (satellite, land cover databases) to measure change in acres. Results from Monitoring Questions 4, 5, and 6.**	~~Annually~~ **5 to 10 years**	A, B
22	How much have management activities contributed to maintaining or moving toward desired conditions for aspen? Aspen is an ecological indicator of habitat diversity, and early seral stages in the following ERUs: Mixed Conifer with Infrequent Fire, Mixed Conifer with Frequent Fire, Spruce-Fir, and in localized areas in Ponderosa Pine.	**Metric:** Acres of aspen protected or maintained. **Source:** Database of record such as FACTS database.	Annually	A

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
23	Have areas classified as unsuited for timber production become suitable? (sec. 219.12(k)(5)(ii))	**Metric:** Acres of suitable timber. Method: Reapply timber suitability criteria and process. **Source:** TimCo (Timber code) Forest Service database	Every 10 years	A
24	Are forests and woodlands adequately restocked within 5 years of final harvest treatment when openings are created for the purpose of regeneration? (sec. 219.12(k)(5)(i)	**Metric:** Percentage of area adequately restocked. **Source:** Review annual reforestation needs report, stocking certifications, silvicultural prescriptions, and FACTS database.	1 to 5 years	A, B
25	Should maximum size limits of 40 acres for even-aged management harvest areas be continued? (sec. 219.12(k)(5)(iii)), 219.27 (d)(2)	**Metric:** Percentage of harvest units that exceed 40 acres for even-aged management. **Source:** FACTS database.	1 to 5 years	A, B
26	How many new recreation opportunities have been added to the system?	**Metric:** Number of new facilities. Number of miles and type of new trails provided. **Source:** INFRA[4] database	Every 5 years	A
27	How many recreation sites or locations have been improved, relocated, or decommissioned in response to known resource damage?	**Metric:** Number of facilities or dispersed sites. **Source**: INFRA database, PALS (Planning, Appeals, Litigation System) Forest Service database	Every 5 years	A
28	How much have management activities contributed to progress toward scenic integrity desired conditions in areas identified as needing rehabilitation?	**Metric**: Percentage of acres that have been thinned <u>and</u> burned and that improved (by at least one level) areas identified as needing rehabilitation. **Source:** FACTS database, Scenery Management – Scenic Integrity Objectives Rehabilitation Map (map14) included with the plan, and other areas identified by scenery resource specialists as needing rehabilitation.	Annually	A, B

Question Number	Questions	Metric and Data Source	Monitoring Frequency	Data Precision and Reliability
29	Have there been changes that have resulted in unforeseen issues requiring plan amendments? (sec. 219.12(k))	**Metric:** Number, type, and content of plan amendments. **Source:** database of record for number, type, and content of plan amendments.	Annually	B
30	How do actual accomplishments compare with plan objectives? (sec. 219.12(k)(1))	**Metric:** Various, as described in plan objectives. **Source:** database of record for the various accomplishments, such as: FACTS, INFRA, PALS, and WIT databases.	Annually	B

[1] The Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring program was established in 1985 to aid the creation of Federal and State implementation plans for the protection of visibility in Class I areas (156 national parks and wilderness areas) as stipulated in the 1977 amendments to the Clean Air Act.

[2] FACTS refers to the Forest Activity Tracking System database that is part of the Natural Resource Manager's (NRM) system of database tools for managing agency data across the Forest Service. It is an activity tracking application for all levels of the Forest Service. The application allows tracking and monitoring of National Environmental Policy Act (NEPA) decisions as well as the ability to create and manage Knutson-Vandenberg (KV) trust fund plans at the timber sale level.

[3] WIT refers to the Watershed Improvement Tracking database that is part of the NRM system of database tools for managing agency data across the Forest Service. WIT manages data, observations and planning details about sites that need to be (or have been) restored or improved with the intent of benefiting watershed and aquatic ecosystem health and function. The application is a watershed restoration activity tracker that addresses site conditions, administrative plans and actions, and outcomes.

[4] INFRA refers to the Infrastructure database that is part of the NRM system of database tools for managing agency data across the Forest Service.