United States Department of Agriculture

Biennial Monitoring Evaluation Report

for the Apache-Sitgreaves National Forests

Forest Service | Apache-Sitgreaves National Forests | August 2018

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Summary of Findings and Results

We present findings from 20 monitoring items scheduled for reporting during the 2016-2017 biennium in Table 1. Results from half of the items (10) give at least preliminary evidence that indicators are within acceptable ranges or are trending toward desired conditions. In several of these cases, only baseline data have been collected, so trends are not yet apparent. Seven of the items were inconclusive, either because data collected were not adequate to answer the question or because future years' data will be required to adequately address the question. No data were available for the other 3 items, mostly because of capacity shortfalls.

Several changes to the monitoring program, either in the form of administrative changes to the Land Management Plan (USDA-Forest Service, 2015) or edits to the Monitoring Implementation Guide (USDA-Forest Service, 2017c), are recommended based on the results of this first biennium of monitoring. These changes would be focused on improving the linkage between monitoring results and selected Plan direction so that the Responsible Official can make informed decisions about potential changes to Plan direction. Changes to management activities were recommended in 4 cases, ranging from how occupancy surveys are done for Northern Goshawk to how the Forests track plan consistency in NEPA planning. We do not recommend any changes to Plan direction based on these findings. Much of the information is considered baseline, and clear trends are, for the most part, not yet apparent.

Table 1. Summary of findings for 20 monitoring items scheduled for reporting for the 2016-2017 biennium.

Monitoring Item	Notes	Do monitoring results demonstrate intended progress or trend toward Plan targets?*	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed? ‡
Question 1--Soil Health		Yes	Yes	Monitoring Program
Question 4—Air Quality		Yes	No	
Question 5—TES Habitats		Yes	Yes	Management Activities
Question 7a—Riparian Ecological Indicator	No data; capacity shortfall. Plot installation and data collection planned for FY 2019			

Monitoring Item	Notes	Do monitoring results demonstrate intended progress or trend toward Plan targets?*	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed? ‡
Question 7b—Aspen Ecological Indicator		Uncertain (B)	Yes	Monitoring Program
Question 9—Focal Species: Mexican Spotted Owl		Yes	No	
Question 10—Focal Species: Northern Goshawk		Uncertain (C)	Yes	Monitoring Program
Question 11—Focal Species: American Pronghorn		Uncertain (B)	No	
Question 12—Grassland Habitats		Yes	No	
Question 15a—Insects and Diseases		Yes	Yes	Management Activities
Question 15b—Invasive Plants		Uncertain (C)	Yes	Monitoring Program
Question 16—Climate Change Vulnerability		Uncertain (B)	Yes	Monitoring Program
Question 21—Recreation Effects on Resources	No data—capacity shortfall			
Question 22—Scenic Integrity	No data—capacity shortfall			

Monitoring Item	Notes	Do monitoring results demonstrate intended progress or trend toward Plan targets?*	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed? ‡
Question 24—Eligible and Suitable Wild and Scenic Rivers		Yes	No	
Question 25—Wilderness Management		Yes	Yes	Monitoring Program
Question 26—Recommended Wilderness Management		Yes	No	
Question 31—Plan Objectives		Yes	Yes	Monitoring Program
Question 32—Adoption of Standards and Guidelines		Uncertain (C)	Yes	Management Activities
Question 33—Cultural Resources		Uncertain (B)	Yes	Monitoring Program, Management Activities

*If uncertain, interval of data collection is beyond this reporting cycle (A); or more time/data are needed to understand status or progress of the plan component (B); or methods/results are inadequate to answer monitoring question (C).

‡ see body of the report for more details regarding any specific recommendations/opportunities for change.

Introduction

Purpose

The purpose of the biennial monitoring evaluation report is to help the responsible official determine whether a change is needed in forest plan direction, monitoring strategy, or management actions. The biennial monitoring evaluation report represents one part of the Forest Service's overall monitoring program for the Apache-Sitgreaves National Forests. The biennial monitoring evaluation report is not a decision document—it evaluates the answers to monitoring questions and the values of indicators

presented in the Monitoring Strategy chapter of the Plan to determine the effectiveness of management actions carried out in the plan area.

Monitoring and evaluation are continuous learning tools that form the backbone of adaptive management. For this reason, we will produce an evaluation report every two years. This document fulfills the requirements of 36 CFR 219.12 and serves as the Monitoring Evaluation Report for the Apache-Sitgreaves National Forests (Forests) for Fiscal Years (FY) 2016 and 2017. This report indicates whether a change to the Plan, management activities, or monitoring strategy may be needed based on the new information. This 2018 biennial monitoring report for the Apache-Sitgreaves National Forests is available on the Forests' monitoring web page: https://www.fs.usda.gov/detailfull/asnf/landmanagement/planning/?cid=stelprdb5227658&width=full.

Objectives

This report has the following objectives:

- Assess the current conditions and trends of selected forest resources.
- Document implementation of the Plan Monitoring Strategy to assess accomplishments and progress toward achievement of the selected Land Management Plan components.
- Evaluate relevant assumptions, changed conditions, management effectiveness, and progress towards achieving objectives and selected desired conditions described in the Forest Plan.
- Document scheduled monitoring actions that have not been completed and the reasons and rationale for why they have not.
- Present any new information not outlined in the current plan monitoring program that is relevant to the evaluation of the selected monitoring questions.
- Present recommended changes to Plan direction or the Plan Monitoring Strategy to the responsible official.

How to Use this Report

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

The Forests will use the results of this report to identify potential changes to Plan direction that will improve the Forests' management toward desired conditions. Further, the report will help identify potential changes to the monitoring strategy that will improve the adaptive management process by tying questions closer to plan direction and ensuring the continued feasibility of the monitoring program over the planning period.

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

Public and Tribal Participation

The Forests notified interested Tribes of the publication of the 2018 biennial monitoring report for the Apache-Sitgreaves National Forests on August 31, 2018 via letter, which requested comment and input. We informed the public of the availability of the 2018 biennial monitoring report for the Apache-Sitgreaves National Forests on August 31, 2018, through email notices, post card notices, newspaper notice, and by posting on the Forests' website.

The Forests solicit public comments on the monitoring report. Comments should be provided between August 31, 2018 and September 30, 2018.

Public comments may be provided as follows:

Hand-delivered during regular business hours to:

Apache-Sitgreaves National Forests

30 South Chiricahua Drive

Springerville, AZ 85938

Sent via email to:

thomasgreene@fs.fed.us

Or sent by USPS mail to:

Thomas Greene, Forest Planner

Apache-Sitgreaves National Forests

30 South Chiricahua Drive

Springerville, AZ 85938

The Forests will consider all substantive comments received and provide a written response on the website.

About Our Forest Plan Monitoring Program

Roles and Responsibilities

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

Responsible Official

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Monitoring and Evaluation Team

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Partners

The Forests gratefully acknowledge the partnership and assistance of the Arizona Game and Fish Department, Arizona State Parks Arizona Site Stewards Program, and USDA-Forest Service Forest Health Protection, Arizona Zone Office.

How Our Plan Monitoring Program Works

Monitoring and evaluation requirements have been established through the National Forest Management Act (NFMA) at 36 CFR 219. Additional direction is provided by the Forest Service in Chapter 30 – Monitoring – of the Land Management Handbook (FSH 1909.12).

The forests implemented their revised Land Management Plan (Plan) (USDA-Forest Service, 2015) on October 25, 2015. Administrative Change #1 to the plan brought the Monitoring Strategy (Plan, chapter 5) into compliance with 36 CFR 219.12(c)(1) on June 21, 2016. Monitoring questions and indicators were selected to inform the management of resources on the plan area; not every plan component was determined necessary to track [36 CFR 219.12(a)(2)]. See the Administrative Change White Paper for discussion on how the monitoring questions were selected to be consistent with the 2012 planning regulations 36 CFR 219.12. More documents related to Administrative Change #1 can be found on the Forests' planning web page:
https://www.fs.usda.gov/main/asnf/landmanagement/planning

The forests published a Monitoring Implementation Guide (Guide) (USDA-Forest Service, 2017c) in May, 2017, that provides detailed information about each question and protocols for conducting monitoring. The Guide is part of the overall plan monitoring program and provides more specific direction for implementing the plan monitoring strategy. It details monitoring methods, protocols, and roles and responsibilities. The Guide is not part of the plan decision and is subject to change as new science and methods emerge. The Guide is available on the Forests' Monitoring web page.

Monitoring Evaluation

Monitoring Activities

The Forests' monitoring strategy (chapter 5 of the Plan) consists of a set of 33 questions that address how well the Forests are progressing toward desired conditions, achieving Plan objectives, and adhering to Plan standards and guidelines. Most questions are assigned to one of three categories that reflect the three primary revision topics identified in the December 2008 Comprehensive Evaluation Report prepared during the planning process. These categories are Maintenance and Improvement of Ecosystem Health, Managed Recreation, and Community-Forest Interaction. In addition, there is a fourth category called "Other" that contains questions related to planning and archaeological site management.

Questions in the Plan Monitoring Strategy have reporting intervals ranging from 1 to 10 years. This Monitoring Evaluation Report includes questions scheduled for reporting in 2016 or 2017 (i.e. those scheduled for annual or biennial reporting). Results for questions that have reporting intervals longer than 2 years are not included in this report, except for those that depend on periodic reports (e.g. Climate Change Vulnerability Assessment) (USDA-Forest Service, 2017a) that were published during 2016-2017. Scheduled questions that were not addressed due to lack of resources or other reasons are included and so noted. As described in the Monitoring Guide, questions 7 and 15 were split into sections based on resource type. This process resulted in 20 sections. Note that although the Guide indicates that we will combine questions 3 and 7, question 3 was omitted from this report because it has a 5-year reporting interval, while question 7 has a 1-year reporting interval.

Each section contains: the monitoring question, the reporting interval, the indicator(s) listed in the Monitoring Guide, Plan direction addressed by the question, any new science or other information considered, a short summary of methods, monitoring results, a section on discussion and findings, and adaptive management considerations.

Question 1—Soil Health

Question and Summary

1. Are long-term soil health and productivity desired conditions being maintained or met?

Reporting Interval

1 year

Indicator and Unit of Measure

- Soil disturbance class
- Soil condition class

Plan Components Addressed

Landscape Scale Desired Conditions for Soil

- Ecological and hydrologic functions are not impaired by soil compaction. (Plan, p. 20)

Mid-Scale Desired Conditions for Soil

- Soil condition rating is satisfactory. (Plan, p. 20)
- Soils are stable within their natural capability. Vegetation and litter limit accelerated erosion (e.g., rills, gullies, root exposure, topsoil loss) and contribute to soil deposition and development. (Plan, p. 20)
- Soils provide for diverse native plant species. Vegetative ground cover (herbaceous vegetation and litter) is distributed evenly across the soil surface to promote nutrient cycling, water infiltration, and maintain natural fire regimes. (Plan, p. 20)
- Biological soil crusts (e.g., mosses, lichens, algae, liverworts) are present and reestablished if potential exists. (Plan, p. 21)

Fine Scale Desired Conditions for Soil

- Soil loss rates do not exceed tolerance soil loss rates. (Plan, p. 21)
- Logs and other woody material are distributed across the surface to maintain soil productivity. (Plan, p. 21)
- Vegetation and litter are sufficient to maintain and improve water infiltration, nutrient cycling, and soil stability. (Plan, p. 21)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Soil Disturbance Monitoring

The Forests' application of the National Forest Soil Disturbance Monitoring Protocol (Page-Dumroese, et al., 2009) was used to measure the effectiveness of BMP implementation in maintaining soil health and productivity. The forests currently complete soil disturbance monitoring in activity areas using a stratified random sampling scheme. Soil disturbance data are collected on a project-by-project basis. All the monitoring data collected during the 2016 and 2017 were analyzed for this report.

Soil Condition Assessments

The Forests' application of the Technical Guidance of Soil Quality in the Southwestern Region document (USDA-Forest Service, 1999; USDA-Forest Service, 2013) was used to measure effects of management activities, including the effectiveness of BMP application in maintaining soil health and productivity. Soil condition data are collected on a project by project basis, with all the monitoring data collected during the 2016 and 2017 analyzed for this report. All soil condition assessments reported here for 2016 and 2017 were conducted in project areas during planning (i.e. before project treatments commenced), and serve to document soil conditions before project implementation.

Monitoring Results

Soil Disturbance Monitoring

Twenty-five of the twenty-six soil disturbance monitoring transects completed in 2016, or 96 percent, fell below levels of management concern. More than ¾ of the transects also exhibited predominantly satisfactory soil conditions.

Twenty of the 22 soil disturbance monitoring transects completed in 2017, or 91 percent, fell below levels of management concern. Seventeen of 22 transects, or 77 percent, exhibited predominantly satisfactory soil conditions.

Pre- and post-treatment data were available for 30 of the soil disturbance monitoring transects performed in FY 2016 and 2017. Of these, 25, or 83%, maintained or improved in condition, while 5 decreased in condition from satisfactory to impaired (Table 2). Table color code: Satisfactory=green; Satisfactory-Impaired=blue; Impaired=pink.

Table 2. Pre- and post-treatment soil condition assessment ratings for 30 project actions monitored during FY 2016 and 2017.

Monitoring Year	Project Action	Pretreatment	Post-treatment
2016	Nutrioso WUI Timber Sale	Satisfactory	Satisfactory
2016	Mastication Treatment Block 2014	Satisfactory	Satisfactory
2016	Nagel Rx Burn Unit 2013	Satisfactory	Satisfactory
2016	Sinkhole Timber Sale	Satisfactory	Satisfactory
2016	Butler Timber Sale	Satisfactory	Satisfactory
2016	Dipping Vat Timber Sale	Satisfactory	Impaired
2016	Lake Bear Timber Sale	Satisfactory	Satisfactory
2016	Lake Mountain Timber Sale	Satisfactory	Impaired
2016	Pierce No. 2 Timber Sale	Satisfactory	Satisfactory
2016	Quakie Timber Sale	Satisfactory	Satisfactory
2016	Zrama Timber Sale (unit 6)	Satisfactory	Impaired
2016	Loco Coon Mastication Block 2013	Satisfactory	Satisfactory
2016	Mineral EMA Timber Sale	Satisfactory	Satisfactory
2016	Fulton Timber Sale	Satisfactory	Impaired
2016	McCleave Rx Burn Unit 2016	Satisfactory	Satisfactory
2016	Hideaway Meadows Rx Burn Unit 2016	Satisfactory	Satisfactory

Monitoring Year	Project Action	Pretreatment	Post-treatment
2017	Hulsey Bench Salvage Unit 2013	Satisfactory	Satisfactory
2017	Alder Timber Sale	Satisfactory	Satisfactory
2017	Mesa Re-entry Burn Block 2017	Satisfactory	Satisfactory
2017	Porter Timber Sale	Satisfactory	Satisfactory
2017	Mallory Spring Pinyon/Juniper Treatment 2011	Satisfactory	Satisfactory
2017	Hulsey Bench Timber Sale, Highway Units	Satisfactory	Impaired
2017	Crook Timber Sale	Satisfactory	Satisfactory
2017	Nagel Pile Burning 2017	Satisfactory	Satisfactory
2017	Phoenix Park Pinyon/Juniper Sale	Impaired	Satisfactory-Impaired*
2017	Sinkhole Timber Sale	Satisfactory	Satisfactory
2017	Bourdon Ranch Pinyon/Juniper Sale	Satisfactory	Satisfactory
2017	Zrama Timber Sale (unit 1)	Satisfactory	Satisfactory
2017	Whitcom Rx Burn Unit 2017	Satisfactory	Satisfactory
2017	Aspen Meadows Rx Burn Unit 2017	Satisfactory	Satisfactory

*A Satisfactory-Impaired rating signifies that site conditions best resemble a mosaic of satisfactory and impaired states.

Soil Condition Assessments

Of 39 soil condition assessments completed for project-level work in 2016 (all pretreatment assessments conducted on the Black River Restoration Project), 29, or 74%, exhibited satisfactory soil conditions. The remaining 10 (26%), were rated as impaired. In 2017, 14 of the 25 soil condition assessments completed (mostly pretreatment assessments on the Stateline Range NEPA Project), or 56%, indicated satisfactory soil conditions. Four of the 25 soil condition assessments (16%), were rated as impaired. The remaining 7 soil condition assessments completed in 2017, or 28%, indicated inherently unstable soil conditions. Excluding the soil condition assessments rated as inherently unstable as they are generally unsuited for management activities, 14 of 18 soil condition assessments in 2017, or 78%, were rated as being in satisfactory condition.

Monitoring Discussion and Findings

Soil Disturbance Monitoring

Soil disturbance monitoring results showed that soil and water conservation measures on most locations were implemented effectively. Post-disturbance effectiveness monitoring results showed that the majority of treatments are maintaining or improving soil conditions within a 3 to 10 year period

post treatment. Overall, the majority of monitoring results from this biennium showed that forest plan soil quality desired conditions and standards/guidelines are being met.

Soil Condition Assessments

Soil condition monitoring results show that management actions including implementation of soil and water conservation measures are effective in protecting soil condition. Across the entire Apache-Sitgreaves National Forests, legacy (1982) Terrestrial Ecosystem Survey information indicated soil conditions were rated as 63% satisfactory, 21% impaired, and 4% unsatisfactory. Combining 2016 and 2017 data, 67% of the monitoring sites were rated satisfactory, while 22% of the sites were rated as impaired. The recent pretreatment data from 2 projects are generally in line with forest-wide legacy data, suggesting that soil conditions have been stable over the past 35 years. Future monitoring data will identify any trends occurring since the implementation of the revised Plan.

Adaptive Management Considerations

Consider changing the wording of the monitoring question to tie it specifically to project activity areas. There does not appear to be a need to amend the Plan or change management activities at this time, as soil disturbance and condition monitoring have revealed acceptable results (Table 3).

Table 3. Suggested changes based on monitoring results for Question 1.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B1, for more information on suggested changes.

Question 4—Air Quality

Question and Summary

4. Are management activities contributing to desired conditions or improving air quality across the forests in Class 1 (Mount Baldy Wilderness) and Class II airsheds?

Reporting Interval

1 year

Indicator and Unit of Measure

- Visual quality as measured with IMPROVE Air Quality Station protocol (Mount Baldy Wilderness)
- Lichen community composition and elemental concentration (all wilderness areas)

Plan Components Addressed

Landscape Scale Desired Conditions for Air

- Air quality related values, including high quality visual conditions, are maintained within the Class I airshed over Mount Baldy Wilderness. (Plan, p. 19)
- Class II airsheds meet State of Arizona air quality standards including those for visibility and public health. (Plan, p. 19)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Visual Quality

The IMPROVE air quality station that monitors the Class I airshed associated with the Mount Baldy Wilderness (BALD1) is maintained by the Forests. Data and samples are collected on a weekly basis throughout the year. IMPROVE monitors concentrations of atmospheric aerosols (sulfates, nitrates, etc.) and uses these data to assess light "extinction," or the degree to which light is absorbed and/or scattered by air pollution. Visibility is normally expressed in terms of extinction or by using the "deciview" index, which is calculated from the measured extinction value. The deciview index represents a measure of change in visibility conditions which is typically perceptible to the human eye; a deciview change in the range of 0.5 to 1.0 dv is generally accepted as being the limit of human perception. A low deciview (dv) number reflects clearer visibility; while a high deciview number reflects increased haziness.

Data from 2016 were obtained from the Federal Land Manager Environmental Database data warehouse: (http://views.cira.colostate.edu/fed/SiteBrowser/Default.aspx?appkey=SBCF_PmHazeComp). Data from 2017 were not available in time to be included in this report.

Lichens

The Forests will review any new information or reports regarding lichen community composition and elemental concentration in all wilderness areas. No information regarding lichens was collected in 2016 or 2017; however, baseline data were collected from 2 lichen air quality biomonitoring stations in the Mount Baldy Wilderness in 2015 (St. Clair & Leavitt, 2017). The Forests expect to contract a 5-year assessment in 2020.

Monitoring Results

Visual Quality

Figure 1 shows the results of haze index monitoring at the BALD1 Improve site. The haziest days index shows a slight increase (hazier) from 2015 to 2016; however, there is a trend toward improvement in air clarity since 2000. For the clearest days metric, the 2016 deciview (dv) results are the lowest on record since 2000 and similarly show an improving trend. Note that the clearest and haziest days indices are the average of the 20% clearest and haziest days of a given year.

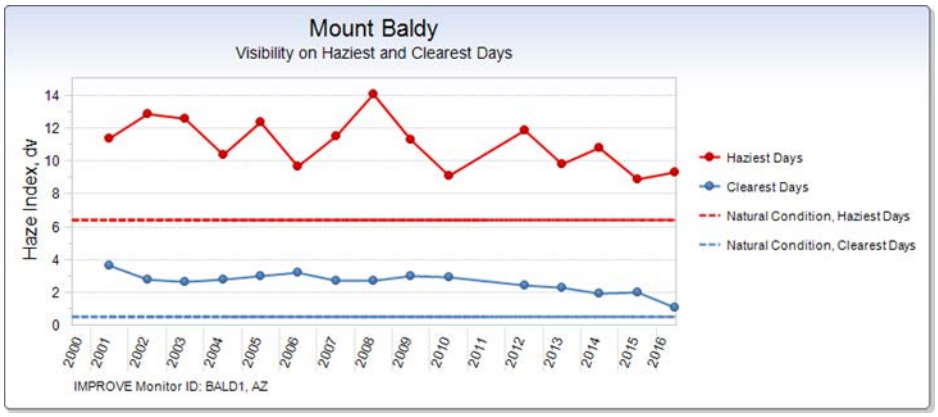

Figure 1. Haze index measured at the BALD1 Improve site for 2000-2016. Figure taken from (Federal Land Manager Environmental Database, 2016)

Lichens

Baseline data for 2 lichen stations in the Mt. Baldy Wilderness Area are reported in (St. Clair & Leavitt, 2017). The following general observations were recorded:

General condition of the lichen community (species diversity and structure): The lichen communities at the 2 Mount Baldy Wilderness Area reference sites are diverse and well developed across all rock, bark, and soil substrates.

- Status of sensitive indicator species: Sensitive indicator species at the 2 Mount Baldy Wilderness Area are abundant and intact.

- Upper thallus condition of sensitive indicator species: Some upper thallus bleaching and erosion were noted for several air pollution sensitive, foliose species – e.g., *Pseudevernia intensa* and *Punctelia subrudecta*. Note: This condition was particularly well-developed at the East Fork of the Little Colorado River (USFS Trail No. 95) site. This kind of upper cortical damage can be a visual indication of air pollution-related damage to sensitive indicator lichen species and should be specifically monitored in future reviews.

- Growth form and substrate distribution patterns: Growth form and substrate distribution patterns at the two Mount Baldy Wilderness Area biomonitoring reference sites are generally typical of other subalpine forest communities in Arizona. The diversity of large foliose and fruticose species on bark is particularly impressive.

- Analysis and interpretation of element data: Three out of 5 % Nitrogen levels from the 2 Mount Baldy reference sites were somewhat elevated (> 1.0% but ≤ 1.50%) at 0.96%. 1.03%. and 1/17%. In addition, both *Usnea* samples from the East Fork of the Little Colorado River site showed somewhat elevated and elevated (≥ 90 ppm) levels of Manganese at 86.3 ppm and 191.9 ppm respectively. Finally, Barium levels for 1 of the *Usnea* samples from the East Fork of the Little Colorado River site was elevated (≥ 25 ppm) at 40.30 ppm along with 1 sample at the West Fork of the Little Colorado River site which had elevated (≥ 6.0 ppm) Nickel levels. Note: See the following Table 1 for element details. Comments: Elevated % Nitrogen levels are most likely related to regional and in some cases even long range transport of emissions from fossil fuel combustion. These same elevated % Nitrogen levels are being reported for much of the Intermountain Western United States. Elevated Manganese is most likely caused by windblown dust and ash from wildfires. The elevated Barium and Nickel levels detected at this site are most likely related to emissions from regional coal-fired power plants.

- Herbarium collections: 2015 voucher collections: Herbarium numbers – BRYC-57560-57586 and Collection numbers – St. Clair-21871-21897.

Monitoring Discussion and Findings

Visual Quality

Under the Clean Air Act, the Forest Service has the responsibility to protect visibility in Class I airsheds and make progress toward the National Visibility Goal, which is to "permanently mitigate haze in Class I areas [. . .] to natural conditions by 2064" (USDA-Forest Service, 2006). Part of this responsibility is discharged by operating monitoring stations like BALD1. For this airshed, both clearest and haziest days indices are showing an improving trend, with the clearest days metric being closest to reaching the goal.

Lichens

- Review recommendations: Since the original visit to this reference site (1990) there have not been any visually detectable changes in the diversity and structure of the lichen community; it remains diverse and intact – except for some bleaching and erosion of the upper surfaces of 2 sensitive indicator species at the East Fork of the Little Colorado River reference site. Elevated/somewhat elevated %Nitrogen, Manganese, and Barium levels, based on the 2015 data for this wilderness area, bear watching. A follow up field survey of the lichen communities at these 2 sites should be undertaken in 5-7 years. (St. Clair & Leavitt, 2017)

Adaptive Management Considerations

Continue IMPROVE monitoring annually; compile available lichen reports for wilderness areas and summarize every five years. No changes to monitoring protocol or plan direction are indicated by data presented in this section (Table 4). Although monitoring of class II airsheds would provide more complete coverage for this question, no funding is available for such an undertaking. Additionally, it is likely that long-term trends exhibited at the class I monitoring site reflect broader scale regional improvements in air quality.

Table 4. Suggested changes based on monitoring results for Question 4.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B2, for more information.

Question 5—TES Habitats

Question and Summary

5. Are habitats for threatened, endangered, sensitive, and other species for the forests being maintained or enhanced; meeting recovery objectives; moving toward desired conditions; and contributing to species viability?

Reporting Interval

1 year

Indicator and Unit of Measure

Indicator: compliance with LMP biological opinion terms and conditions, recovery actions and project level implementation/effectiveness monitoring.

Units of measure:

- compliance with the LMP Biological Opinion (BO), and
- whether or not project mitigations are effective.

Plan Components Addressed

Landscape Scale Desired Conditions for Wildlife and Rare Plants

- Habitat conditions contribute to the recovery of federally listed species. (Plan, p. 62)
- Habitat is well distributed and connected. (Plan, p. 62)

Mid-Scale Desired Conditions for Wildlife and Rare Plants

- Wildlife are free from harassment and disturbance at a scale that impacts vital functions (e.g., breeding, rearing young) that could affect persistence of the species. (Plan, p. 62)

Fine Scale Desired Conditions for Wildlife and Rare Plants

- Collection of animals and plants does not negatively impact species abundance. (Plan, p. 62)
- Localized rare plant and animal communities are intact and functioning. (Plan, p. 62)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Summarize LMP Biological Opinion reports/information for compliance. Summarize any project level implementation/effectiveness monitoring.

Monitoring Results

Compliance with reasonable and prudent measures and terms and conditions, implementation of conservation recommendations in the Biological Opinion for the Plan, and incidental take reported for FY 2016 and 2017 are presented in Table 5.

Table 5. Habitat management compliance with reasonable and prudent measures and terms and conditions in the Biological Opinion for the Plan.

Species Common Name	Compliant in 2016 with Reasonable and Prudent Measures/ Terms and Conditions	Compliant in 2017 with Reasonable and Prudent Measures/ Terms and Conditions	Conservation Recommendations Implemented	Incidental Take Reported
Narrow-headed gartersnake	Yes	Yes	Yes	None
Northern Mexican gartersnake	Yes	Yes	Yes	None
Chiricahua leopard frog	Yes	Yes	Yes	None
Three Forks springsnail	Yes	Yes	Yes	None
Apache Trout	Yes	Yes	No	None
Gila chub	Yes	Yes	Yes	None
Gila trout	Yes	Yes	No	None
Little Colorado spinedace	Yes	Yes	No	None
Loach minnow	Yes	Yes	Some	None
Spikedace	Yes	Yes	Some	None
Mexican wolf*	N/A	N/A	N/A	N/A
Lesser long-nosed bat*‡	N/A	N/A	N/A	N/A
New Mexico meadow jumping mouse*	N/A	N/A	Yes	N/A
Yellow-billed cuckoo*	N/A	N/A	No	N/A
Southwestern willow flycatcher*	N/A	N/A	No	N/A

Species Common Name	Compliant in 2016 with Reasonable and Prudent Measures/ Terms and Conditions	Compliant in 2017 with Reasonable and Prudent Measures/ Terms and Conditions	Conservation Recommendations Implemented	Incidental Take Reported
Mexican spotted owl	Yes	Yes	Some	None

*The USFWS did not expect or provide incidental take for these species. Therefore, LMP Biological Opinion includes no Reasonable and Prudent Measures/ Terms and Conditions for these species.

‡The lesser long-nosed bat was delisted in April, 2018.

The ASNFs work closely with U.S. Fish and Wildlife Service (USFWS) staff during project-specific consultations to develop design criteria and conservation measures that maintain primary constituent elements (PCEs) for proposed and designated critical habitat and minimize impacts to listed species. Annual reports have been provided to the USFWS outlining survey efforts, findings, and compliance with Reasonable and Prudent Measures and associated Terms and Conditions for each species. No incidental take was reported in 2016 or 2017.

Conservation recommendations for Apache trout and Gila trout were not implemented as there were no stream renovations and no new replicated populations of the species conducted by Arizona Game and Fish Department.

Some conservation measures for Little Colorado spinedace, loach minnow, and spikedace were not implemented as they included implementing the East Clear Creek watershed strategy and aggressive control of non-native aquatic organisms on the Forest. There has not been funding to implement the watershed strategy, and while some non-natives are being actively removed by the State, the Forests do not manage species.

Recovery actions occurred for Chiricahua leopard frog and Gila chub. Chiricahua leopard frogs were repatriated onto Hickey Allotment after tanks were cleaned and a partial exclosure fence constructed in 2016. In 2017, frog egg masses were raised and metamorphs released into historic habitat at Three Forks. The length of stream miles occupied by Gila chub was increased with the stock of the species further upstream in Harden Cienega.

Implementation monitoring occurred on Sale Areas 1 and 4 on Hulsey Bench and cutting areas 2 and 2a on Nutrioso WUI in 2017. Hulsey Bench Sale Area 1 was in overall good condition. Minimal rutting was observed, and slash distributed over the area seemed adequate. Logs across a road intended as water bars would not function well as there was no soil behind them and water would run underneath instead of off the road. One potential ephemeral drainage was not marked on the sale area map and therefore had mechanical activity and piling in it. Hulsey Bench Sale Area 4 had an area that was accidentally bladed and reported to the aquatic biologist. The area was small and was to be remediated.

Nutrioso WUI cutting areas 2 and 2a had minimal rutting, slash piles seemed to have some dirt/soil, and water bars and logs in the road seemed adequate. In general, cutting stayed within the marked areas. However, cutting occurred in one excluded ravine and 2 ephemeral drainages and slash piles were in the drainages.

To implement conservation measures for the New Mexico meadow jumping mouse, the ASNFs entered into an agreement with Carol Chambers (NAU) to conduct surveys during 2016 and 2017. Survey work includes collection of vegetation information.

We have not implemented conservation measures for the yellow-billed cuckoo and southwestern willow flycatcher (conducting surveys) due to lack of funding and because projects typically only result in, at most, insignificant effects to these species and their critical habitat (or proposed critical habitat for the cuckoo).

Forest plan standards and guidelines for Mexican spotted owl are adhered to on all vegetation management projects. These include, but are not limited to, large tree retention and development, large snag retention and development, and retention and development of large logs. The ASNFs work closely with USFWS staff to identify and implement additional reasonable and prudent measures and terms and conditions during project planning to minimize effects on this species. We have not implemented the following conservation measure: "work with the USFWS to conduct spotted owl surveys over the next several years to attempt to determine how owls modify their territories in response to fuels treatments, forest restoration, and wildland fire." However, through project-specific consultation, we do implement the following conservation recommendation: "design forest restoration treatments across the forest that protect existing nest/roost replacement habitat from high-severity, stand-replacing fire and enhance existing or potential habitat to aid in sustaining spotted owl habitat across the landscape."

Monitoring Discussion and Findings

The Forest has been compliant with the LMP Biological Opinion during FY 2016 and 2017 for aquatic species, and no incidental take was reported. Implementation of Conservation Recommendations is not required, but the Forests try to implement as many as are feasible. Some recommendations are for actions falling with the purview of the State; therefore the Forest cannot directly implement the actions themselves.

Given the number of federally listed aquatic species on the Forests, recovery actions for species are limited by the Forests' and State's work load and capacity to plan and implement projects. The Forests continue to coordinate and collaborate with the State and USFWS to promote actions that will successfully contribute towards recovery.

Implementation monitoring indicated that overall mitigations and design features are being followed. Incidents of mechanical activity and piling where it should not occur were minimal and indicate that aquatics biologists should be involved in reviewing timber sale maps and packages as part of the plan-in-hand meetings prior to contracting.

Adaptive Management Considerations

The plan components are valid and meet requirements for the Plan as well as law, regulation, and policy. No changes are recommended. Adherence to requirements of the Biological Opinion and assessment of effectiveness of those requirements via incidental take is a valid and achievable approach to documenting the Forests' progress toward desired conditions for TES habitats. Consideration should be given to emphasizing comprehensive restoration management activities that include riparian and aquatic habitats (Table 6).

Table 6. Suggested changes based on monitoring results for Question 5.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒

Changes may be warranted for the:	Yes	Unsure	No
Forest plan	☐	☐	☒
Management activities	☒	☐	☐

*Refer to Appendix B, Table B3, for more information on suggested changes.

Question 7a—Riparian Ecological Indicator

Questions and Summary

7a. (boldface) **What is the effect of management upon habitat trends of ecological indicators** (aspen, **riparian**) **across the forests?**

No data are reported in this section. See Monitoring Results heading below for details.

Reporting interval

1 year, with 5-year review

Indicator and Unit of Measure

- Long-term trend of ecological indicators of the following components for cottonwood-willow and montane willow riparian forested PNVTs include:
    - Understory vegetation composition
    - Riparian woody species present in multiple size classes
    - Stream bank and floodplain functioning

Plan components addressed

Mid-Scale Desired Conditions for Riparian Areas

- Willows (e.g., Bebb, Geyer, Arizona, Goodding's) are reproducing with all age classes present, where the potential exists. (Plan, p. 34)
- Riparian obligate species within wet meadows, around springs and seeps, along streambanks, and active floodplains provide sufficient [14] vegetative ground cover (herbaceous vegetation, litter, and woody riparian species) to protect and enrich soils, trap sediment, mitigate flood energy, stabilize streambanks, and provide for wildlife and plant needs. (Plan, p. 34)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Methods are described in the Guide.

Monitoring Results

Due to lack of resources in fiscal years 2016 and 2017, riparian plots have not been established, and no data collection has been accomplished. Plot establishment and data collection are tentatively funded for FY 2019. Reporting has therefore been deferred until the 2018-2019 Monitoring Evaluation Report.

Monitoring Discussion and Findings

Adaptive Management Considerations

Question 7b—Aspen Ecological Indicator

Question and Summary

7b. (boldface) **What is the effect of management upon habitat trends of ecological indicators (aspen**, riparian) **across the forests?**

Reporting Interval

1 year, with 5-year review

Indicator and Unit of Measure

- Number, diameter class, and health of aspen stems on each permanent monitoring plot.
- Changes seen over time due to tree growth, mortality, and damage agents recorded at each exam plot revisit.
- Total acres of aerially mapped new aspen mortality.

Plan Components Addressed

Landscape Scale Desired Conditions for Forests: Aspen

- Areas of aspen occur and shift across the forested landscape. They are successfully regenerating and being recruited into older and larger size classes. Size classes have a natural distribution, with the greatest number of stems in the smaller size classes. (Plan, p. 51)

Objectives for Forests: Aspen

- Aspen dominated and codominated acres within forested PNVTs, representing a range of age classes, are maintained on at least 50,000 acres during the planning period. (Plan, p. 51)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Methodology is described in the Monitoring Guide. During 2016 and 2017, plots were set up and baseline data acquired. Specific methodological notes follow:

- As discussed below, aspen mortality was not reported by FHP in 2017. Therefore, only 2016 aspen mortality data are reported here.
- No remote sensing data were acquired in FY 2016 or 2017 that could be used to estimate total acres in aspen-dominant and co-dominant canopy. The last Forest aerial resource photo missions were flown in FY 2008. Although National Agriculture Imagery Program (NAIP) imagery is available, it is not digitized by cover type. Significant resources would be required to digitize and ground-truth these data for the Forests. Landfire satellite imagery (CONUS LF 1.4.0 for Existing Vegetation Type), was last updated in FY 2014 and published in FY 2016. This dataset provides the most current landscape-level estimates of Aspen acreage on the ASNFs. Therefore, reported acreage for 2016 is from Landfire data acquired in FY 2014 and published in 2016. Landfire data are updated approximately every 2 years.
- Apache NF personnel updated their tracking spreadsheet with final permanent aspen monitoring plots installed in 2015-2017, and updated a map of the plot locations. A total of 132 plots have been installed on the Apache NF.
- Black Mesa RD installed 18 permanent aspen monitoring plots and collected CSE stand exam data at each one. These are the first plots installed on the Sitgreaves NF.
- Baseline plot data collected at plot establishment were entered into the Forest Service database FSVeg Spatial. It is currently not possible to extract individual plot data (or a subset of plots such as those identified in this monitoring program for aspen tracking). The forests have requested the development of a tool that will extract data in this way, but in 2018 the Region 3 FSVeg specialist reported that the plans to enable this database to extract stand-alone plots from stand-level surveys have been delayed by higher priorities for the FS programmers' time. Therefore, no baseline plot data were available to include in this report.

Monitoring Results

Aspen is well represented on the Apache NF following the 2011 Wallow Fire, while on the Sitgreaves NF, most aspen is present in late successional stages and is actively being supplanted by conifers.

Aspen decline was noted on 5 acres during the FY16 Aerial Detection Survey from Forest Health and Protection. No data were available for 2017.

The Landfire LF 1.4.0 dataset shows approximately 49,200 acres of Aspen-dominated habitat and 7,340 acres of aspen co-dominant with spruce-fir (Table 7), for a total of 56,540 acres. This total exceeds the Plan objective (50,000 acres in aspen-dominated or co-dominated types). In addition, there are a potential 131,223 acres of incidental aspen associated with mixed conifer.

Table 7. Acreage of aspen occurrence on the Apache-Sitgreaves National Forests in 2014.

Aspen dominance category	Acres
Aspen-Dominant	49,200
Spruce-Fir-Associated Aspen (Codominant)	7,340
Mixed Conifer-Associated (Incidental)	131,223

Aspen dominance category	Acres
Total	**187,763**

Monitoring Discussion and Findings

All plot data collected so far for aspen monitoring are at plot establishment and therefore considered baseline data. Current inability to retrieve individual plot data from FSVeg Spatial is expected to be addressed before plots are revisited for subsequent data collection.

Active management for timber and fuels on ASNFs emphasizes retention and enhancement of aspen. Silviculture prescriptions for stands where aspen is present prescribe removal of competing conifers within aspen stands and up to 1 chain (66 ft.) around aspen stands to retain and encourage sprouting.

Current acreage of aspen-dominated, and spruce-fir-co-dominated aspen (56,540 acres) exceeds the minimum (50,000 acres) set by plan direction. Much of this acreage on the Apache NF is within the boundary of the 2011 Wallow Fire and consists of stands that regenerated after that event. These stands are, of course, uniform in age over large areas. Long-term progress toward the desired condition will depend on the nature and scale of future management actions and natural disturbance events. The effects of management actions on aspen habitat trends will be difficult to characterize over time, since multiple factors other than management actions are confounded. Coarse measures like total acreage of aspen-dominated and co-dominated forest types tell us little about habitat quality, while plot-level data may not distinguish between the effects of management and those related to natural events and the passage of time. Future analysis of plot data will therefore need to incorporate management actions implemented prior to and subsequent to plot establishment.

Adaptive Management Considerations

Question 7b, as written, is about impacts of management on aspen and using plot data to measure the effects. Fixed plots are not the most efficient way to measure these effects. The most effective way is pre- and post-treatment inventory in areas of active management, followed up with periodic post-management inventories. The indicators as described in the Guide reflect ongoing changes to aspen but are not specifically tied to management activities. Plot data collection protocol may need to be changed to be more directly tied to management activities (Table 8).

No changes are recommended for the Plan nor for management activities.

Table 8. Suggested changes based on monitoring results for Question 7b.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B5 for more information on suggested changes.

Question 9—Focal Species: Mexican Spotted Owl

Question and Summary

9. What is the status of Mexican spotted owls as a focal species?

Reporting Interval

1 year

Indicator and Unit of Measure

The indicator and unit of measure are occupancy (by a male, female, or offspring) of selected protected activity centers.

Plan Components Addressed

Landscape Scale Desired Conditions for Wildlife and Rare Plants

- Habitat conditions contribute to the recovery of federally listed species. (Plan, p. 62)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

The Mexican spotted owl is a focal species for the wet and dry mixed conifer forest potential natural vegetation types (PNVTs). Focal species are selected to be indicators of ecological integrity for one or more vegetation types (FSH 1909.12, 32.13c). For more information about how the focal species were selected for the Apache-Sitgreaves National Forests, see the Administrative Change White Paper associated with Administrative Change 1 to the Plan. The indicator and unit of measure are occupancy (by a male, female, or offspring) of protected activity centers (PACs), which are areas generally encompassing a pair's territory. We gathered survey data using the most recent recovery plan survey protocol (US Fish and Wildlife Service, 2012), and examined occupancy of PACs that have a survey history (at least two surveys in the most recent five-year period) in mixed conifer PNVTs. We define a PAC in mixed conifer forest PNVTs when these PNVTs compose at least 70% of the total PAC area (percent cover by PNVT determined using ASNFs layerfiles in ArcGIS).

Monitoring Results

Our database of record contains 71 PACs in mixed conifer forest PNVTs. Of these PACs, we surveyed 43 and 45 PACs in 2016 and 2017, respectively, using the recovery plan protocol (Table 9). Of the 71 PACs, we have surveyed 46 using the protocol at least twice in the last five years. Of these 46 PACs, 40 had occupancy at least twice.

Table 9. Survey and occupancy history of Mexican spotted owl protected activity centers (PACs) from 2013-2017.*

PAC Name	2013	2014	2015	2016	2017
Hoodoo Knoll PAC	Informal monitoring		Informal monitoring		Occupied
Fish Creek PAC		Occupied	Occupied	Occupied	Occupied

PAC Name	2013	2014	2015	2016	2017
Conklin Creek PAC	Informal monitoring	Informal monitoring	Occupied		Informal monitoring
Upper Conklin Creek PAC	Occupied	Informal monitoring	Occupied	Occupied	Occupied
Slaughter Draw PAC	Occupied	Occupied	Informal monitoring	Occupied	Occupied
Redondo PAC	Occupied	Occupied	Occupied	Occupied	Occupied
Deer Creek PAC	Occupied	Occupied	Informal monitoring	Occupied	
Oscar PAC	Occupied		Occupied		Occupied
Bull Canyon PAC	Occupied	Occupied	Occupied	Occupied	Informal monitoring
Rogers Reservoir PAC	Informal monitoring	Occupied	Occupied		
Thomas Creek PAC	Informal monitoring		Occupied		
Willow Creek PAC			Occupied	Informal monitoring	Occupied
Hannagan Creek PAC	Occupied	Occupied	Occupied	Occupied	Occupied
Horton Creek PAC				Informal monitoring	Absent
Lost Bear PAC				Informal monitoring	Absent
Middle Turkey Spring PAC	Informal monitoring	Occupied	Occupied	Informal monitoring	Absent
Bear Creek PAC			Informal monitoring		Absent
Side Canyon PAC			Informal monitoring		Occupied
Bear Wallow Schell PAC			Occupied	Occupied	Occupied
Fish Barrier PAC				Occupied	Occupied
Campbell Blue PAC	Occupied	Occupied	Occupied	Occupied	Occupied
East Castle PAC	Informal monitoring		Informal monitoring		
Tenney PAC	Occupied	Occupied		Informal monitoring	
Bear Wallow Trail 62 PAC			Informal monitoring		Informal monitoring
Hagen Creek PAC	Occupied	Occupied	Occupied	Occupied	Occupied
Double Cienega PAC		Informal monitoring	Informal monitoring		Informal monitoring
JC Tank PAC	Informal monitoring	Informal monitoring		Occupied	Occupied
Lanphier Creek PAC					Occupied
Jackson Springs PAC	Informal monitoring	Informal monitoring	Occupied	Occupied	Informal monitoring
Mollys PAC		Occupied	Occupied	Occupied	Occupied

PAC Name	2013	2014	2015	2016	2017
Auger PAC	Informal monitoring	Informal monitoring			Occupied
Foote Creek PAC	Informal monitoring				Informal monitoring
Turkey Hunt PAC		Occupied	Occupied	Occupied	Occupied
Alpine West PAC		Occupied	Occupied	Occupied	
Colby PAC	Occupied	Informal monitoring	Informal monitoring	Occupied	Occupied
Firebox PAC	Informal monitoring	Occupied	Occupied	Occupied	Occupied
Franks Tank PAC	not established	not established	Occupied	Informal monitoring	Informal monitoring
Little Creek PAC	not established	not established	Occupied	Occupied	Occupied
Open Draw PAC	not established	not established	Occupied	Occupied	Occupied
Balke PAC	not established	not established	not established	Occupied	Occupied
Blue Vista 2 PAC					
Knoll Lake PAC				Occupied	Occupied
Ridge PAC	Occupied	Occupied	Occupied	Occupied	Occupied
Palomino PAC	Informal monitoring	Occupied	Occupied	Occupied	Occupied
Horse Trap PAC		Occupied	Occupied	Occupied	Occupied
North Chevelon PAC	Occupied	Occupied	Occupied	Occupied	Absent
Powerline PAC	Informal monitoring		Informal monitoring	Absent	Absent
Gentry PAC	Occupied	Informal monitoring	Occupied	Occupied	Occupied
South Wilkins PAC				Occupied	Occupied
North Wiggins PAC				Occupied	Occupied
Bear Willow PAC	Occupied		Occupied	Occupied	Occupied
Twin Lakes PAC		Absent	Occupied	Absent	
Bull Flat PAC		Absent	Absent	Absent	
Long Tom PAC		Occupied	Occupied	Occupied	Informal monitoring
Hangman's PAC		Absent	Occupied	Absent	
Potato PAC			Occupied	Occupied	Occupied
Bosque PAC		Occupied		Occupied	Occupied
OD Ridge PAC	Absent	Informal monitoring		Informal monitoring	Informal monitoring
South Fork PAC	Informal monitoring	Informal monitoring		Informal monitoring	Informal monitoring
Greer PAC	Informal monitoring	Occupied		Informal monitoring	Informal monitoring
Hall Creek PAC		Informal monitoring		Informal monitoring	Informal monitoring

PAC Name	2013	2014	2015	2016	2017
Carnero PAC		Informal monitoring		Occupied	Occupied
Hay PAC	Informal monitoring	Informal monitoring		Informal monitoring	Informal monitoring
Burro PAC	Informal monitoring	Informal monitoring		Informal monitoring	Informal monitoring
Badger Knoll PAC		Informal monitoring		Informal monitoring	Occupied
Rudd Creek PAC		Informal monitoring		Informal monitoring	
Benton Creek PAC		Informal monitoring		Occupied	Informal monitoring
Whiting Knoll PAC		Informal monitoring		Occupied	Occupied
Gillespie PAC		Informal monitoring		Occupied	Occupied
Juan Garcia PAC		Occupied	Occupied	Occupied	Occupied
Home Creek PAC	Occupied	Occupied	Occupied	Occupied	Occupied

*"Occupied" indicates the presence of at least one owl, and "absent" indicates formal surveys did not detect an owl. Results from "Informal monitoring" (monitoring conducted without required number of visits or coverage when no owl were detected) are not used in this analysis. Blank cells indicate no visits that year.

Monitoring Discussion and Findings

Survey data suggest that occupancy across the mixed conifer PNVTs by Mexican spotted owls has remained consistent for the last five years across the ASNFs, indicating that the ecological condition of the mixed conifer PNVTs has been maintained over this time. Early results from management under the revised Plan (2016 and 2017) suggest continuity with previous management results under the Forests' 1987 plan. However, these results should be considered a baseline; future monitoring results will reflect management trends under the 2015 Plan.

Adaptive Management Considerations

In future years, we will assess habitat suitability in the PACs in Table 9 and remove those that do not have suitable habitat for owls, i.e., those PACs with high burn severity from the 2011 Wallow and 2002 Rodeo-Chediski fires. We may also change boundaries of PACs to include more suitable habitat. Thus, the list of PACs in Table 9 may change. Based on data presented in this section, we do not recommend changes to Plan direction, the monitoring strategy, or management activities (Table 10).

Table 10. Suggested changes based on monitoring results for Question 9.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B6, for more information.

Question 10—Focal Species: Northern Goshawk

Question and Summary

10. What is the status of northern goshawks as a focal species?

Reporting Interval

1 year

Indicator and Unit of Measure

The indicator and unit of measure are occupancy (by a male, female, or offspring) of post-fledging family areas (PFAs), management areas generally encompassing a pair's territory. Occupancy is the fraction of the total number of PFAs surveyed which have birds present. A decline in occupancy of post fledgling areas would trigger a review of management actions and/or Plan direction.

Plan Components Addressed

Landscape Scale Desired Conditions for Forests: Ponderosa Pine

- The ponderosa pine forest is a mosaic of structural states ranging from young to old trees. Forest structure is variable but uneven-aged and open in appearance. Sporadic areas of even-aged structure may be present on 10 percent or less of the landscape to provide structural diversity.
- The forest arrangement consists of individual trees, small clumps, and groups of trees with variably-sized interspaces of grasses, forbs, and shrubs. Vegetation associations are similar to reference conditions. The size, shape, and number of trees per group and the number of groups per area vary across the landscape. Tree density may be greater in some locations, such as north-facing slopes and canyon bottoms.

Mid-Scale Desired Conditions for Forests: Ponderosa Pine

- Ponderosa pine forest is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area, resulting in less space between groups. Interspaces typically range from 10 percent in more biologically productive sites to 70 percent in the less productive sites. Tree density within forested areas ranges from 20 to 80 square feet basal area per acre.
- Northern goshawk post-fledging family areas (PFAs) may contain 10 to 20 percent higher basal area in mid-aged to old tree groups than northern goshawk foraging areas and the surrounding forest. (Plan, p. 42)
- Northern goshawk nest areas have forest conditions that are multi-aged and dominated by large trees with relatively denser canopies than the surrounding forest. (Plan, p. 42)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

The northern goshawk is a focal species for the ponderosa pine forest PNVT. Focal species are selected to be indicators of ecological integrity for one or more vegetation types (FSH 1909.12, 32.13c). For more information about how the focal species were selected for the Apache-Sitgreaves National Forests, see the Administrative Change White Paper associated with Administrative Change 1 to the Plan. We determined a survey was consistent with protocol if initial survey efforts resulted in a goshawk detection and/or we conducted audio grid transects. We then examined occupancy of PFAs that have a survey history (at least two surveys in the most recent five-year period) in the ponderosa pine forest PNVT. We define a PFA as in ponderosa pine forest PNVT when this PNVT composed at least 70% of the total PFA area (percent cover by PNVT determined using ASNFs geographic database (layerfiles) in ArcGIS).

Monitoring Results

Our database of record contains 50 PFAs in ponderosa pine forest PNVTs. One of these we "retired" due to lack of habitat from the Rodeo-Chediski Fire (RC). Of these PFAs, we surveyed 9 and 13 PFAs in 2016 and 2017, respectively, to protocol (Table 11). We surveyed 15 using transect audio surveys at least twice in the last five years. Nine of these 15 PFAs have been occupied at least twice in the five years (2013-2017). Thus, we have surveyed using transect audio surveys a small proportion (30%) of the PFAs in the ponderosa pine PNVT.

Table 11. Survey and occupancy history of northern goshawk post-fledging activity centers (PFAs) from 2013-2017.*

PFA name	2013	2014	2015	2016	2017
Fish Bench Tank PFA					Informal monitoring
Heifer PFA				Informal monitoring	
Alder Canyon PFA	Informal monitoring		Informal monitoring	Informal monitoring	Absent
East Fork Willow PFA				Informal monitoring	
Mule Crossing PFA		Informal monitoring	Informal monitoring	Informal monitoring	Informal monitoring
Grama Draw PFA				Informal monitoring	
Rock Trick Tank PFA				Informal monitoring	
Cliff Springs PFA	Informal monitoring		Informal monitoring	Informal monitoring	Occupied
Hart PFA		Informal monitoring		Informal monitoring	
Dye Ridge PFA	Informal monitoring			Informal monitoring	
Upper Canyon Creek PFA		Informal monitoring	Retired RC	Retired RC	Retired RC
Little Springs PFA		Occupied	Occupied	Occupied	Informal monitoring

PFA name	2013	2014	2015	2016	2017
Heber Hollow PFA	Informal monitoring			Informal monitoring	Absent
Dead Horse PFA	Informal monitoring	Occupied			
Outlaw PFA	Informal monitoring			Informal monitoring	
Bear Springs PFA	Informal monitoring	Informal monitoring		Informal monitoring	
Wildcat Canyon PFA		Informal monitoring	Absent	Informal monitoring	Informal monitoring
Hanks Trick Tank PFA				Informal monitoring	
Gourd Flat PFA	Occupied			Informal monitoring	
Upper Sharp Hollow PFA	Informal monitoring			Informal monitoring	Absent
Durfee Draw PFA				Informal monitoring	
Wyrick PFA			Informal monitoring	Occupied	
Shipping PFA	Informal monitoring			Informal monitoring	
Pierce PFA	Informal monitoring			Informal monitoring	Occupied
Brookbank Canyon PFA	Occupied		Occupied	Occupied	Occupied
Smith Canyon PFA			Occupied	Occupied	Occupied
Mineral Creek PFA					
Hidden Lake PFA	Occupied	Occupied	Informal monitoring		
Coon Mountain PFA					
Country Club PFA		Absent	Occupied		
Chipmunk PFA		Absent	Absent		Absent
Colbath PFA					
Left Hand PFA					
Billy Creek PFA			Occupied	Occupied	
Morgan PFA			Absent	Absent	
Turkey Mountain PFA			Absent	Absent	
Timber Mesa PFA			Occupied	Occupied	Occupied
Danish Hollow PFA	Absent				
Hidden Lake PFA	Occupied	Occupied	Informal monitoring		Occupied
Lons Canyon 1 PFA					
Bear Canyon PFA					
South Cottonwood PFA					
Little Brushy PFA		Absent	Absent		Absent

PFA name	2013	2014	2015	2016	2017
Los Burros PFA	Occupied	Informal monitoring	Informal monitoring		
Brown Creek PFA			Absent	Absent	
Aniceto PFA					
Lons Canyon 2 PFA					
Elk Springs PFA		Occupied	Occupied		Absent
Show Low South PFA					
Buck Springs PFA		Occupied	Absent		Occupied

*"Occupied" indicates the presence of at least one goshawk, and "Absent" indicates audio grid transect surveys did not detect a goshawk. Results from "Informal monitoring" (monitoring not conducted using audio grid transect surveys with no goshawk detections) are not used in this analysis. Blank cells note no surveys that year. "RC retired" indicates the PFA was retired due to lack of habitat from the Rodeo-Chediski Fire.

Monitoring Discussion and Findings

PFAs tend to retain goshawk occupancy, meaning we rarely document an absence followed by an occupancy when we complete formal surveys. However, survey data are inconclusive regarding occupancy across the ponderosa pine forest PNVT by northern goshawks because few surveys using audio grid transects were completed. Thus, we can make no inference regarding maintenance of the ecological condition of the ponderosa pine forest PNVT at this time.

Adaptive Management Considerations

In future years, we will assess habitat suitability in the PFAs above and remove those that do not have suitable habitat for goshawks, i.e., those PFAs with high burn severity from the 2011 Wallow and 2002 Rodeo-Chediski fires. We may also change boundaries of PFAs to include more suitable habitat. Thus, the list of PFAs in Table 11 may change.

To address shortfalls in data quality resulting from over-reliance on informal monitoring, we recommend increased use of audio grid transects in future years so that reliable data can be obtained. The Guide should be revised to reflect this emphasis on systematic data collection (Table 12). No changes are recommended to Plan components or management activities.

Table 12. Suggested changes based on monitoring results for Question 10.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B7, for more information on suggested change.

Question 11—Focal Species: American Pronghorn

Question and Summary

11. What is the status of American pronghorn as a focal species?

Reporting Interval

1 year

Indicator and Unit of Measure

The indicator and unit of measure is the geographic distribution of pronghorn across game management units (GMUs) surveyed by Arizona Game and Fish Department (AZGFD).

Plan Components Addressed

Landscape Scale Desired Conditions for Overall Ecosystem Health

- Large blocks of habitat are interconnected, allowing for behavioral and predator-prey interactions, and the persistence of metapopulations and highly interactive wildlife species across the landscape. Ecological connectivity extends through all plant communities. (Plan, p. 17)

Landscape Scale Desired Conditions for All PNVTs

- Vegetative connectivity provides for species dispersal, genetic exchange, and daily and seasonal movements across multiple spatial scales. (Plan, p. 28)

Landscape Scale Desired Conditions for Grasslands

- Perennial herbaceous species dominate and include native grasses, grass-like plants (sedges and rushes), and forbs, and in some locations, a diversity of shrubs. (Plan, p. 58)

Mid-Scale Desired Conditions for Grasslands

- Woody (tree and shrub) canopy cover is less than 10 percent. (Plan, p. 58)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

The American pronghorn is a focal species for grassland PNVT habitat connectivity. Focal species are selected to be indicators of ecological integrity for one or more vegetation types (FSH 1909.12, 32.13c). For more information about how the focal species were selected for the Apache-Sitgreaves National Forests, see the Administrative Change White Paper associated with Administrative Change 1 to the Plan.

Arizona Game and Fish Department, Region 1, conducts fixed-wing flights during August and September to gather geographic data on habitat use by American pronghorns on and near the Apache-Sitgreaves NFs. We obtained and mapped flight data (Table 13, Table 14, Figure 2, and Figure 3) collected by AZGFD in August and September 2016 and 2017. We also obtained a Region 1 AZGFD

annual pronghorn program management report that includes an analysis of survey data. AZGFD did not conduct surveys on the ASNFs in GMUs 4A or 4B in 2016 and 2017.

Monitoring Results

Results from 2016 and 2017 indicate that early population trends for pronghorns on GMUs that intersect the Apache-Sitgreaves NFs are generally stable with some decreasing trends. These short-term trends may not reflect recent changes in habitat quality that have occurred as a result of management actions. The AZGFD report indicates that the 2,500-acre juniper clearing project (in 2BS or "south") in the Woolhouse Habitat Area on the Lakeside Ranger District may be improving habitat. The report stated that "during the August 2014 surveys, pronghorn were already observed using some of the newly treated areas. With the good precipitation in 2015 and 2016, these treated areas are quickly revegetating and it will be interesting to track pronghorn use of these areas." Thus, for this unit the pronghorn survey may be indicating an improvement in grassland connectivity. Because this is the first reporting period and AZGFD did not survey pronghorn in all GMUs occurring on the ASNFs, these interpretations of pronghorn spatial data provide limited insight into how management may be affecting grassland connectivity. Data in future years should more reliably indicate trends in habitat connectivity for grasslands.

Table 13. Numbers of pronghorns observed during surveys, by Game Management Unit (GMU), 2016 and 2017.

GMU	2106 Males	2016 Females	2016 Fawns	2016 Total	2017 Males	2017 Females	2017 Fawns	2017 Total
1	59	123	29	211	29	180	35	244
4A*	56	128	51	235	42	129	39	210
4B*	43	156	21	220	61	151	31	248
3C	26	95	17	138	19	103	23	145
3BN	13	36	12	61	11	15	5	31
3BS	8	19	3	30	7	38	5	50
27	0	1	0	1	2	9	2	13

*Survey flights were conducted in non-ASNFs portions of GMUs 4A and 4B only. Data collection occurs from late July through mid September. From: AZGFD data for Region 1.

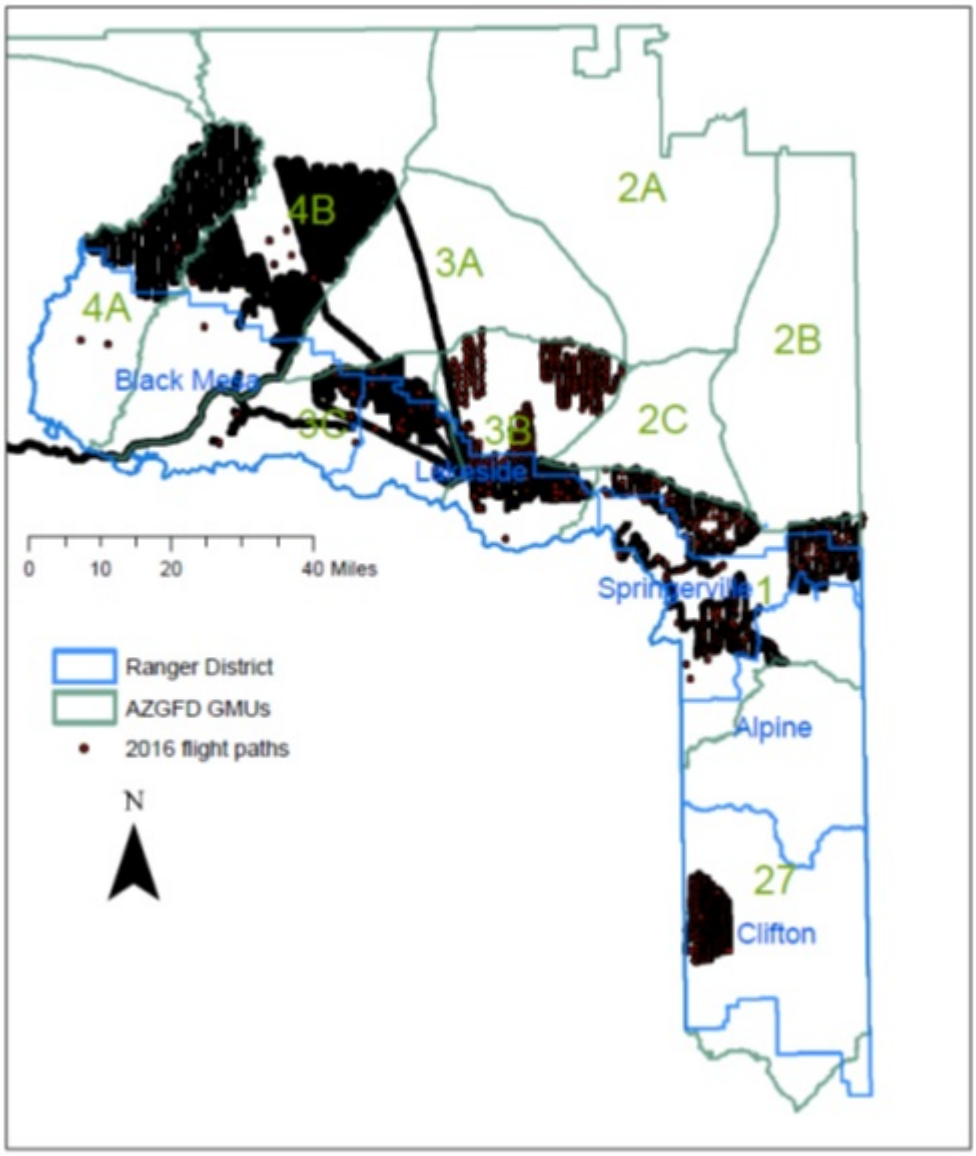

Figure 2. Pronghorn survey fixed-wing flight paths for 2016 in Arizona Game and Fish GMUs, with Apache-Sitgreaves NFs ranger district boundaries.

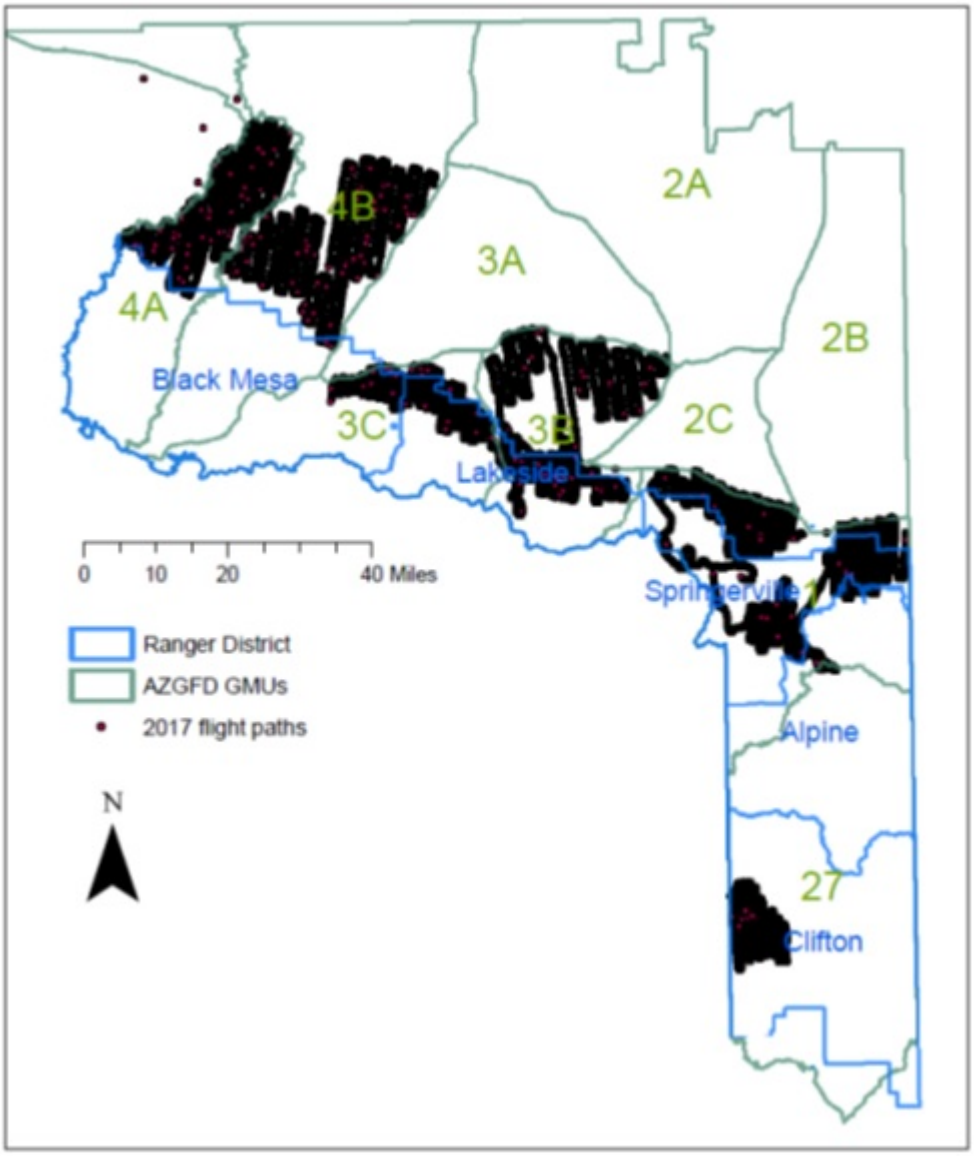

Figure 3. Pronghorn survey fixed-wing flight paths for 2017 in Arizona Game and Fish GMUs, with Apache-Sitgreaves NFs ranger district boundaries.

Table 14. American pronghorn population trends and ratios in AZGFD Region 1, FY 2016 and 2017.

GMU	2016 Population Trend	2016 Bucks:100 does	2016 Fawns:100 does	2017 Population Trend	2017 Bucks:100 does	2017 Fawns:100 does
1*	Stable	44	24	Decreasing	19	19
2A	Increasing	40	25	Increasing	27	26
2B	Decreasing	22	25	Increasing	33	41
2C	Decreasing	14	10	Decreasing	25	8
3A	Stable	11	30	Decreasing	37	17
3BN*	Stable	37	33	Stable	73	33
3BS*	Stable	63	16	Decreasing	18	13

GMU	2016 Population Trend	2016 Bucks:100 does	2016 Fawns:100 does	2017 Population Trend	2017 Bucks:100 does	2017 Fawns:100 does
3C*	Stable	28	18	Decreasing	19	22
4A*‡	Increasing	53	40	Stable	40	30
4B*‡	Stable	32	13	Stable	44	21
27*	Stable	0	0	Stable	22	22

* Game Management Units (GMUs) occurring on the ASNFs.
‡Survey flights conducted in non-ASNFs portions of these GMUs only. Data from: AZGFD data for Region 1.

Monitoring Discussion and Findings

These baseline data are incomplete and may not reflect management on the ASNFs. Data for the ASNFs portions of GMUs 4A and 4B are missing for 2016 and 2017. AZGFD management units cross jurisdictional boundaries, which means management by other entities also influences the overall trend in pronghorn distribution. Based on tentative interpretation of survey data, management activities are either not changing grassland connectivity or are making small improvements towards grassland habitat connectivity desired conditions. We anticipate that trends will become more apparent in future years' data.

Adaptive Management Considerations

Based on interagency discussions while compiling data for this report, AZGFD may revise how it surveys to include portions of GMUs 4a and 4b that overlap the Forest to gain a more complete picture of pronghorn distribution in future years. No changes to the monitoring program, Plan, or management activities are recommended at this time (Table 15).

Table 15. Suggested changes based on monitoring results for Question 11.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B8, for more information.

Question 12—Grassland Habitat

Question and Summary

12. Are management activities contributing to progress towards desired conditions for grassland habitat during the fawning period for American pronghorns?

Reporting Interval

1 year

Indicator and Unit of Measure

The indicator is pronghorn fawn:doe ratio as measured in August.

Plan Components Addressed

Fine Scale Desired Conditions for Grasslands

- Average herbaceous vegetation heights [21] vary by grassland PNVT and yearly weather conditions. Ungrazed herbaceous vegetation heights [20] range from 7 to 29 inches in Great Basin grasslands, 7 to 26 inches in montane/subalpine grasslands, and 10 to 32 inches in semi-desert grasslands. (Plan, p. 58)
- During the critical pronghorn fawning period (May through June [22]), cool season grasses and forbs provide nutritional forage; while shrubs and standing grass growth from the previous year provide adequate hiding cover (10 to 18 inches) to protect fawns from predation. (Plan, p. 58)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

AZGFD annually collects pronghorn population data from late July through early September using fixed-wing aerial surveys. We examined fawn:doe ratios for GMUs with at least some portion within the ASNFs' boundary (Figure 4, Tables 13 and 14). AZGFD did not survey on the ASNFs in GMUs 4A or 4B in 2016 or 2017. AZGFD may revise how it surveys to include more ASNFs lands.

Monitoring Results

Fawn:doe ratios in most units (Table 14) appear to be stable, and the overall trend for fawn:doe ratio in surveyed areas of Region 1 appears stable (Figure 4). Annual fluctuations may reflect year-to-year variability in habitat conditions or other factors.

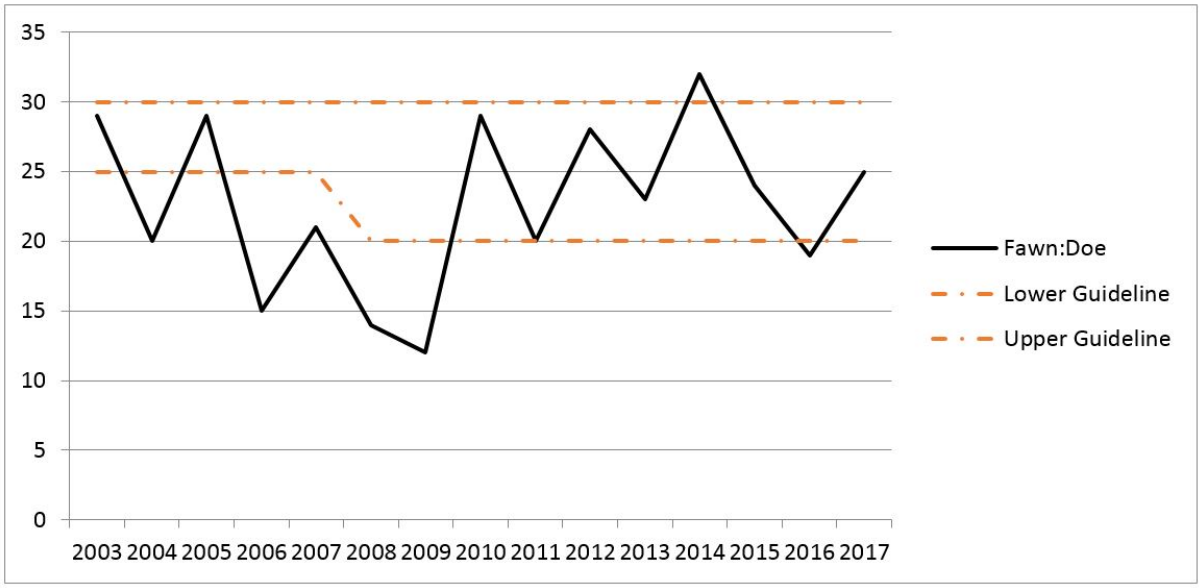

Figure 4. Pronghorn fawn:doe ratios for AZGFD Region 1 for 2003-2017. Orange (dashed line) guidelines roughly reflect maintenance levels for fawn production. Figure from: AZGFD data for Region 1.

Monitoring Discussion and Findings

Fawn:doe ratios in AZGFD region 1 have fluctuated for the past 15 years, possibly because of year-to-year variations in conditions, but no clear multi-year trend is discernible in the data. Since 2008, when guidelines for desired values of fawn:doe ratio were set at 20-30, measured ratios have fallen within guidelines 6 out of 10 years (Figure 4). AZGFD management units cross jurisdictional boundaries, which means management by other entities also influences the overall trend in pronghorn population indices such as fawn:doe ratios. However, the lack of a negative trend line and general concurrence with desired levels of fawn:doe ratio suggests that the Forests' grassland management has been maintaining acceptable habitat conditions during the fawning period. Management actions taken under the revised Plan may not be reflected in recent data. Data from future years may more reliably reflect project actions taken under the revised Plan.

Adaptive Management Considerations

Based on discussions while compiling data for this report, AZGFD may revise how it surveys to include ASNFs land to improve data collection. Based on the results reported in this section, no changes are recommended for the monitoring program, Plan, or management activities (Table 16).

Table 16. Suggested changes based on monitoring results for Question 12.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B9, for more information.

Question 15a—Insects and Diseases

Question and Summary

15a. (boldface) **Are insect and disease populations within reference conditions?** Are invasive plant species' populations changing substantially? **Are their population levels compatible with achieving vegetation desired conditions and management approaches? Are changes and levels consistent with regional changes and levels?** What is the relationship between these stressors and climate vulnerability predictions?

Reporting Interval

1 year

Indicator and Unit of Measure

- Mapped acres of native bark beetle and defoliator activity and severity of attack/tree mortality.
- Percent of inventoried forest/woodland acres infected with moderate to severe dwarf mistletoe levels.
- Detection (presence or increase/absence) of new arrivals present (non-native species or natives never before documented on the ASNFs or in a particular PNVT).
- Increases in outbreak frequency or infection levels of native and non-native insects and disease.

Plan Components Addressed

Landscape Scale Desired Conditions for Overall Ecosystem Health

- Ecological components (e.g., soil, vegetation, water) are resilient to disturbances including human activities and natural ecological disturbances (e.g., fire, drought, wind, insects, disease, pathogens). (Plan, p. 16)

Landscape Scale Desired Conditions for All PNVTs

- Insect and disease populations are at endemic levels with occasional outbreaks. A variety of seral states usually restricts the scale of localized insect and disease outbreaks. (Plan, p. 29)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Methods are described in the Guide. We reviewed Forest Health Protection Aerial Detection Survey reports for 2016 and 2017.

Monitoring Results

Bark Beetles

Douglas-fir Mortality

Douglas-fir mortality attributable to bark beetles has declined across the Forests each year since a peak in 2013 (Figure 5), when approximately 40,000 acres were affected. In 2016, approximately 1,000 acres had some amount of mortality, while in 2017 affected acreage dropped further to 221 acres. These are levels comparable to those observed before the 2011 Wallow Fire (USDA-Forest Service, 2018).

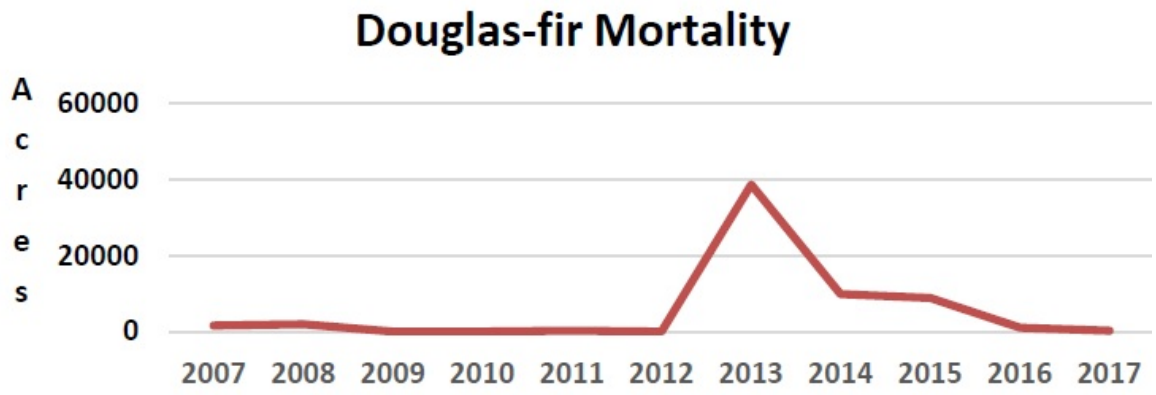

Figure 5. Acres with Douglas-fir mortality attributable to bark beetles detected over 11 years on the Apache-Sitgreaves NFs by aerial detection surveys. Figure taken from (USDA-Forest Service, 2018).

Ponderosa Pine Mortality

Acreage with some level of ponderosa pine mortality increased to 42,580 in 2016, then decreased to 17,389 acres in 2017. Overall, there appears to be a decreasing trend since the peak in 2013 (Figure 6). In 2017, most of the acreage (93%) had very light levels of damage (1-3% of trees affected), 6% had light damage (4-10%), and 1% of the acreage was moderately damaged with 11-30% of the trees affected. In 2016, severity levels were similar, except that 1% of the acreage was severely damaged, with 30-50% of the trees affected.

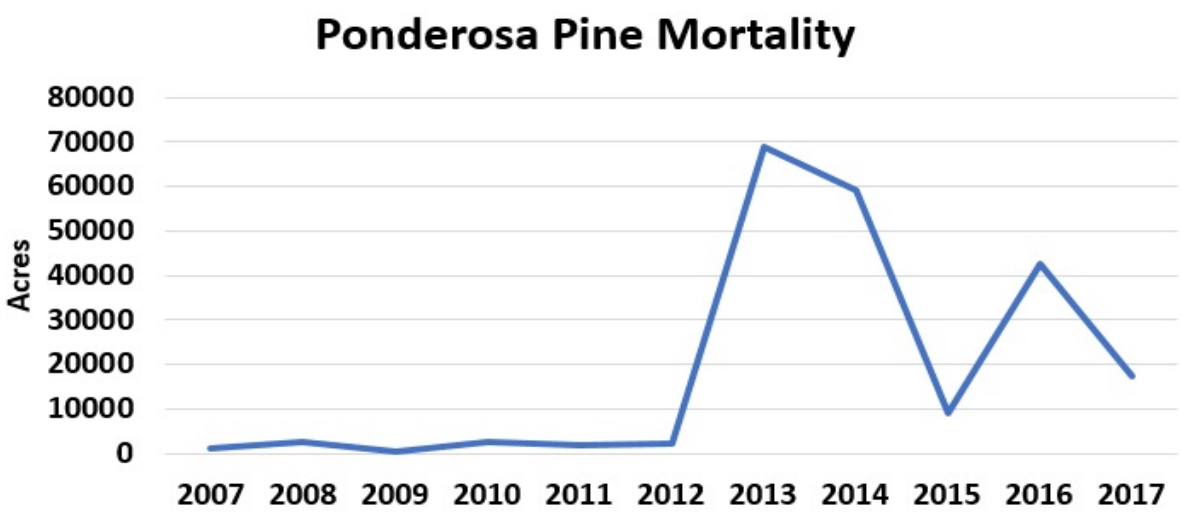

Figure 6. Acres with ponderosa pine mortality attributable to bark beetles detected over 11 years on the Apache-Sitgreaves NFs by aerial detection surveys. Data taken from (USDA-Forest Service, 2018).

Other Beetle-related Mortality

White fir mortality from fir engraver beetles was mapped on 1,348 acres in 2016 and 162 acres in 2017. This result constituted a decreasing trend from 2015, when 5,526 acres were mapped. Corkbark fir mortality, caused by a combination of western balsam bark beetle and root diseases, was mapped on 118 acres in both 2016 and 2017. As with white fir, this represented a steep decrease from 2015, when 5,582 acres were mapped. Spruce mortality from spruce beetle was mapped at 1 acre in 2016 and 14 acres in 2017.

Defoliators

Spruce aphid

The spruce aphid is an exotic pest introduced from Europe that feeds on and defoliates Engelmann spruce and Colorado blue spruce. Repeated cycles of defoliation weaken and kill trees. During the winter of 2016 spruce aphid activity showed a continued increase that started in 2014. Aerial detection surveys over the forests in 2016 detected 3,660 acres with spruce aphid damage, mostly on the Springerville RD of the Apache NFs (Figure 7); an additional 28,690 acres were detected on adjacent White Mountain Apache Tribal lands (USDA-Forest Service, 2017b). Most of the activity was on or near Mt. Baldy; half of the acreage on the Forest was very severely damaged (more than 50% of the canopy defoliated). Approximately 50 acres with spruce aphid damage were also reported on Greens Peak on the Springerville Ranger District. By 2017, the outbreak was diminishing; that year, 730 acres with damage were detected on the Forest, with an additional 4,770 acres on tribal lands (Figure 8). High levels of tree mortality were noted in the 2017 report (USDA-Forest Service, 2018). Acres of damage by this pest over the past decade are depicted in Figure 8. The ASNFs is experiencing deep and prolonged droughts that are expected to intensify under continued anthropogenic climate change. This insect continues to expand its range from the high altitude pure spruce-fir stands downward in elevation to infest Engelmann spruce and blue spruce within the ASNFs wet mixed conifer with infrequent fire PNVTs. With erratic continued shorter and drier winters, outbreaks of this non-native pest are expected to continue.

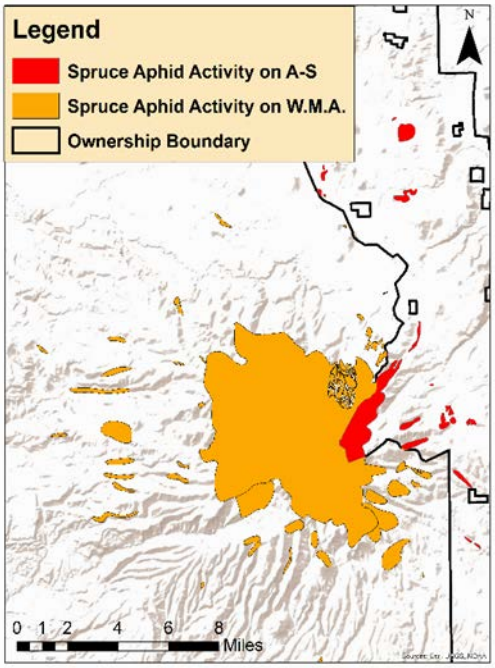

Figure 7. Spruce aphid activity on the Apache-Sitgreaves NFs and White Mountain Apache Tribal lands in 2016. Figure taken from (USDA-Forest Service, 2017b)

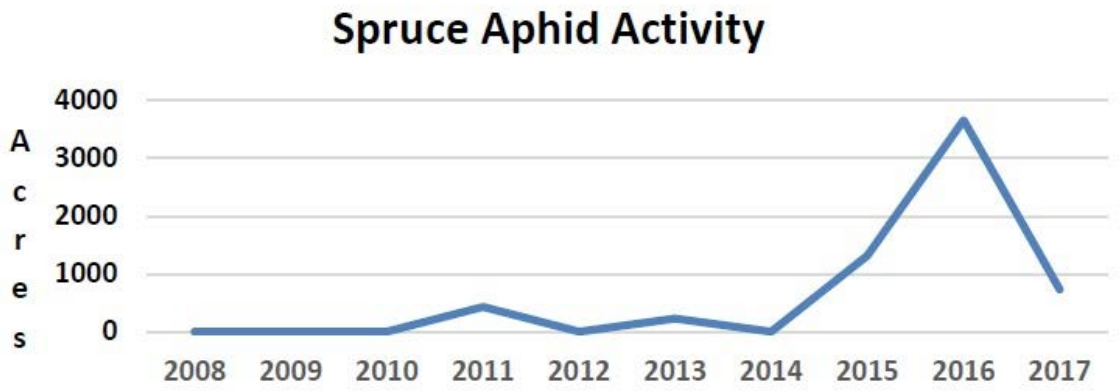

Figure 8. Spruce aphid damage on the Apache-Sitgreaves NFs from 2008 through 2017 as detected by aerial detection surveys. Figure taken from (USDA-Forest Service, 2018)

Aspen Defoliation

Aspen defoliation was detected on 920 acres across the Apache-Sitgreaves NFs in 2016, and on only 70 acres in 2017. Aspen defoliation can be caused by a number of insects and diseases.

Other Defoliators

Minor defoliators detected on the forests were as follows:

Piñon needle scale was detected on 28 acres in 2016.

In 2017, Douglas-fir tussock moth damage was detected on 17 acres, and western spruce budworm damage was found on 88 acres.

Needlecast in ponderosa pine was detected on 60 acres in 2016 and 73 acres in 2017. Needlecast is a fungal disease that may, in repeated cycles, cause reduced tree growth and mortality.

Dwarf Mistletoes

Dwarf mistletoes are at historically elevated levels in the Ponderosa Pine and Spruce-Fir PNVTs. Inventoried ponderosa pine stands show that 63% are infected to some degree by dwarf mistletoes. Of the estimated 269,350 acres of dwarf mistletoe infected stands, 28.2% (75,957 acres) have low infection levels (<20% of trees infected); 58.0% of the stands (156,223 acres) have moderate infection levels (between 20% and 80% of the trees infected); and 13.8% of the stands (37,170 acres) have high infection levels (in excess of 80% of the trees infected). See ASNFs Plan for management implications of the various levels of dwarf mistletoe infections.

While the historical natural range of variability for dwarf mistletoe has not been quantified, we can make reasonable inferences based on historical photos and personal accounts (Conklin & Fairweather, 2010). Historical dwarf mistletoe distributions are understood to be increasing in acres and intensifying within stands (Table 17) (Lynch, et al., 2010).

Table 17. Historical Percentages of Dwarf Mistletoe-infected stands

National Forest	1950s	1980s	2016
Apache-Sitgreaves	41%	52%	63%

New Arrivals

No previously unreported forest pests or diseases were reported on the Apache-Sitgreaves NFs during 2016 or 2017.

Outbreaks and Changes in Infection Levels

The Forests continue to recover from post-fire effects on bark beetles. Both ponderosa pine and Douglas-fir mortality attributable to bark beetles peaked in 2013 after the 2011 Wallow Fire. Acres with Douglas-fir beetle damage have now declined to near baseline levels (Figure 5) while acreage with ponderosa pine beetle damage, while reduced, is still elevated relative to pre-fire conditions (Figure 6). A short-lived outbreak of spruce aphid centered on Mt. Baldy peaked in 2016 and appeared to be diminishing by 2017.

White Pine Blister Rust

White pine blister rust is caused by the introduced fungal pathogen *Cronartium ribicola*. This disease was discovered in southwestern white pine in the southwestern US in 1990, and on the Apache-Sitgreaves NFs in 2009 (Fairweather & Geils, 2011). No data were reported for this disease on the Forests in 2016 or 2017.

Monitoring Discussion and Findings

The likelihood of current or increasing levels of insect damage into the future is increased under continued drying and warming trends. Mild winters and hot and dry summers contribute significantly to stress on all vegetation on the forest. Restoration activities are being planned and implemented across the Forests that will mitigate, but not eliminate, stresses on the Forest vegetation and lead to greater resilience to disturbances. Results presented in this section reflect recent landscape-scale

disturbance (Wallow Fire) and do not yet appear to indicate identifiable long-term trends attributable to climate change.

Adaptive Management Considerations

Based on data reported in this section, we recommend continued and increased emphasis on forest restoration activities, consistent with Plan direction, that increase the resilience of stands to insect and disease outbreaks. No changes to the Plan or monitoring program are recommended (Table 18).

Table 18. Suggested changes based on monitoring results for Question 15a.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☒	☐	☐

*Refer to Appendix B, Table B10, for more information on suggested change.

Question 15b—Invasive Plants

Question and Summary

15b. (boldface) Are insect and disease populations within reference conditions? **Are invasive plant species' populations changing substantially? Are their population levels compatible with achieving vegetation desired conditions and management approaches? Are changes and levels consistent with regional changes and levels?** What is the relationship between these stressors and climate vulnerability predictions?

Reporting Interval

1 year

Indicator and Unit of Measure

Noxious or invasive species Pesticide Use Permits (PUPs) indicating specific target pest, pesticide name, and number of acres to be treated.

Plan Components Addressed

Landscape Scale Desired Conditions for Invasive Species

- Invasive species (both plant and animal) are nonexistent or in low occurrence to avoid negative impacts to ecosystems. (Plan, p. 66)

Mid-Scale Desired Conditions for Invasive Species

- Undesirable nonnative species are absent or present only to the extent that they do not adversely affect ecosystem composition, structure, or function, including native species populations or the natural fire regime. (Plan, p. 66)

- Introduction of additional invasive species rarely occurs and is detected at an early stage. (Plan, p. 66)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

We reviewed Pesticide Use Permits for Fiscal Years 2016 and 2017 from the Alpine, Springerville, Black Mesa, and Lakeside Ranger Districts on the Apache-Sitgreaves National Forests.

Monitoring Results

Pesticide Use Permits were submitted in 2016 on the Alpine, Springerville, Black Mesa, and Lakeside Ranger Districts for musk thistle, Siberian elm, Dalmatian toadflax, and saltcedar. The Sitgreaves Zone (Black Mesa and Lakeside RDs) surveyed and treated 303 acres of noxious or invasive species, and the Apache Zone (Springerville and Alpine RDs) surveyed and treated 309 acres. Additional species identified in 2017 include 25 acres of camelthorn on the Apache NF and 20 acres of Russian knapweed on the Lakeside RD. The Sitgreaves Zone surveyed and treated 334 acres, and the Apache Zone surveyed and treated 320 acres in 2017.

Monitoring Discussion and Findings

Invasive plant populations changed substantially following the 2011 Wallow Fire on the Apache National Forest. The opening of the closed forest canopy as well as suppression activities and introduction of contaminated straw as part of post-fire erosion control efforts all are believed to have contributed to the large increase in infested acreage immediately following the fire. The primary species that has increased throughout the footprint of the fire is musk thistle. Since 2012, populations appear not to have changed substantially, and treatment efforts seem to be decreasing the density of the populations for the areas being treated. As far as is known, population levels are currently compatible with achieving vegetation desired conditions. Population varies annually for the biennial musk thistle depending on winter/spring moisture. In dry years there may be a third of the infestations observed during wet years. Overall, the other species including camelthorn and Russian knapweed, are not known to be increasing in acreage, and management activities are decreasing the density of plants, albeit slowly, within the infested acreage. A high degree of uncertainty attaches to these results because of the lack of reliable surveys.

Adaptive Management Considerations

When the unit of measure which included the pesticide use permit was identified as an instrument that could be used for responding to this question, the understanding was that the permits were approved annually so one could observe the changes in species and acreage across time. In 2015, the Regional Office provided direction that pesticide use permits do not need to be reviewed annually unless substantive changes have occurred. We recommend the following changes to the monitoring program (Table 19):

- Continue to have the zones submit the pesticide use permits with the planned species to be treated and the estimate of the acres of infestation so the Forests can continue to track change over time.

- Gather accomplishment reporting of acres treated by Ranger District. This measure is also problematic because the acres being treated may not be representative of the true population levels.
- Conduct more intensive noxious or invasive plant surveys in an effort to get more accurate estimates of the true population levels.

Better information on populations of noxious weeds will guide changes in management activities.

Table 19. Suggested changes based on monitoring results for Question 15b.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐
Forest plan	☐	☐	☒
Management activities	☐	☒	☐

*Refer to Appendix B, Table B11, for more information on suggdested changes.

Question 16—Climate Change Vulnerability

Question and Summary

16. Has ASNFs' Climate Change Vulnerability Assessment (CCVA) by ERU changed over the life of the forest plan? How do current climate patterns, over the life of the forest plan, compare to vulnerability predictions for the ASNFs?

Reporting Interval

5 years

Indicator and Unit of Measure

A draft ASNFs CCVA was provided to the forests in January, 2016, and the final version was produced on January 17, 2017 (USDA Forest Service, 2017). Vulnerability is presented for ecological response units (ERUs), at the "local scale" (groups of 6th Level HUCs), and at the 6th Level HUC sub-watershed scale in tabular form. Vulnerability levels are: Low, Moderate, High, and Very High. Changes to these levels in subsequent iterations of the CCVA, if they are forthcoming, are the indicator. Alternatively, changes to vegetation type as indicated in periodic Midscale Vegetation Modeling, correlated with predictions in the 2017 CCVA, will be used to infer climate-related vegetation changes.

Plan Components Addressed

Landscape Scale Desired Conditions for All PNVTs

- The vegetative conditions and functions are resilient to the frequency, extent, and severity of ecological disturbances (e.g., fire, insects and disease, flood, climate change, management activities). The landscape is a functioning ecosystem that contains all its components and processes. (Plan, p. 28)

Mid-Scale Desired Conditions for All PNVTs

- Stand densities and species compositions are such that vegetation conditions are resilient under a variety of potential future climates. (Plan, p. 29)

New Science or Other Information

Climate change vulnerability was assessed for Forest Service lands in Region 3 (Arizona and New Mexico), and reports were provided to each National Forest in the region (Triepke, et al., 2014).

Methods

The ASNFs were provided with a final CCVA in January, 2017 (USDA-Forest Service, 2017a). For information about how the CCVA was derived, see (Triepke, et al., 2014; USDA-Forest Service, 2014). Data for ERUs, 6th-level HUC watersheds, and "local scale" units composed of clusters of 6th level watersheds, are included in tabular form. Data for individual Terrestrial Ecosystem Unit Inventory (TEUI)-scale polygons were not provided. Currently, no updates to the CCVA are planned. Information from the 2017 CCVA will be treated as baseline data. Should another CCVA be produced in the future, the forests will assess and report changes to vulnerability statistics for ERUs and 6th-level HUCs. Midscale Vegetation Modeling, which is planned to be repeated on a 5-year cycle by the Regional Office, will indicate whether vegetation changes have occurred within TEUI units. These changes can be correlated with predictions from the CCVA. The 2017 CCVA will also be used in this monitoring program to inform the interpretation of monitoring data from questions 14, 15, and 18 in future Monitoring and Evaluation Reports.

The CCVA report describes vulnerability as the risk or probability of stress arising from future climate. It depends on three factors: the breadth of the "envelope" for a given ERU (i.e. the range of climatic conditions under which the ERU can persist), the status of a given location relative to the ERU envelope, and the magnitude of climate change predicted for that location. The base units for calculating vulnerability were polygons with similar plant communities and site potential, derived from the TEUI. Highly vulnerable units can be thought of as having a higher risk of type conversion as the climate changes. The report also assigns an uncertainty value to the vulnerability score, depending on the degree of agreement among three climate models used to predict the extent of climate change.

Monitoring Results

What follows is a summary of the CCVA report (USDA-Forest Service, 2017a). For details, please refer to the report.

Overall, 17% of the Forests' area falls into the low vulnerability category, with a relatively small probability of type conversion through 2090, while 46% and 25% of the area, respectively, had moderate or high vulnerability scores. The remaining 12% of the forests' area was classified as having very high vulnerability to climate change (Figure 9).

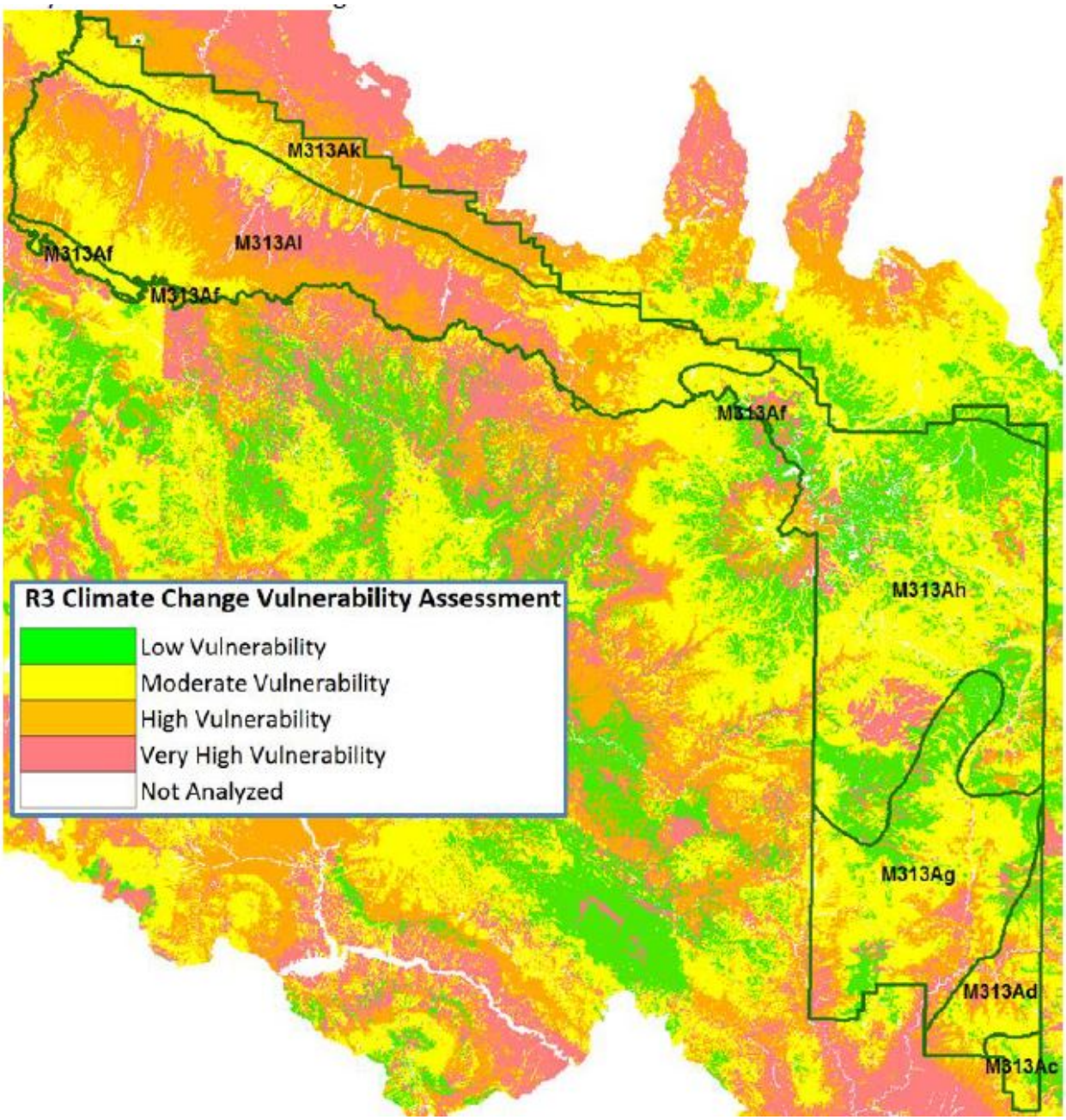

Figure 9. Patterns of vulnerability to climate change on the Apache-Sitgreaves NFs and surrounding lands of southwestern New Mexico and southeastern Arizona. The Apache-Sitgreaves NFs and its local-scale units are represented by extents within the dark green borders. Figure and caption taken from (USDA-Forest Service, 2017a).

The most highly vulnerable ERU on the forests is the spruce-fir forest, which occupies 3% of the forests' area at the highest elevations. Sixty-nine percent of this ERU is classified as having very high vulnerability, with 90% of the predictions having a low uncertainty. Ponderosa pine forest, which is the largest ERU by acreage on the forests, has the second highest vulnerability classification of any ERU, with 30% of the acreage at high and 22% at very high vulnerability. Colorado Plateau/Great Basin Grassland is also highly vulnerable, with 54% of the acreage in High or Very High vulnerability categories, though with only 2%

in the very high category. Low vulnerability ERUs on the forests include Interior Chaparral, Mixed Conifer with Aspen, Ponderosa Pine Evergreen Oak, and Montane/Subalpine Grassland.

Subwatersheds on the forests (HUC_12) were assigned composite vulnerability scores in the CCVA (Figure 10). Most of the watersheds on the Apache-Sitgreaves National Forests are classified as moderately to highly vulnerable, with a handful of very highly vulnerable watersheds on the Sitgreaves NF. The Sitgreaves NF has a much higher concentration of high-vulnerability watersheds than does the Apache NF, reflecting the large acreage of highly and very highly vulnerable Ponderosa Pine ERU polygons on that forest.

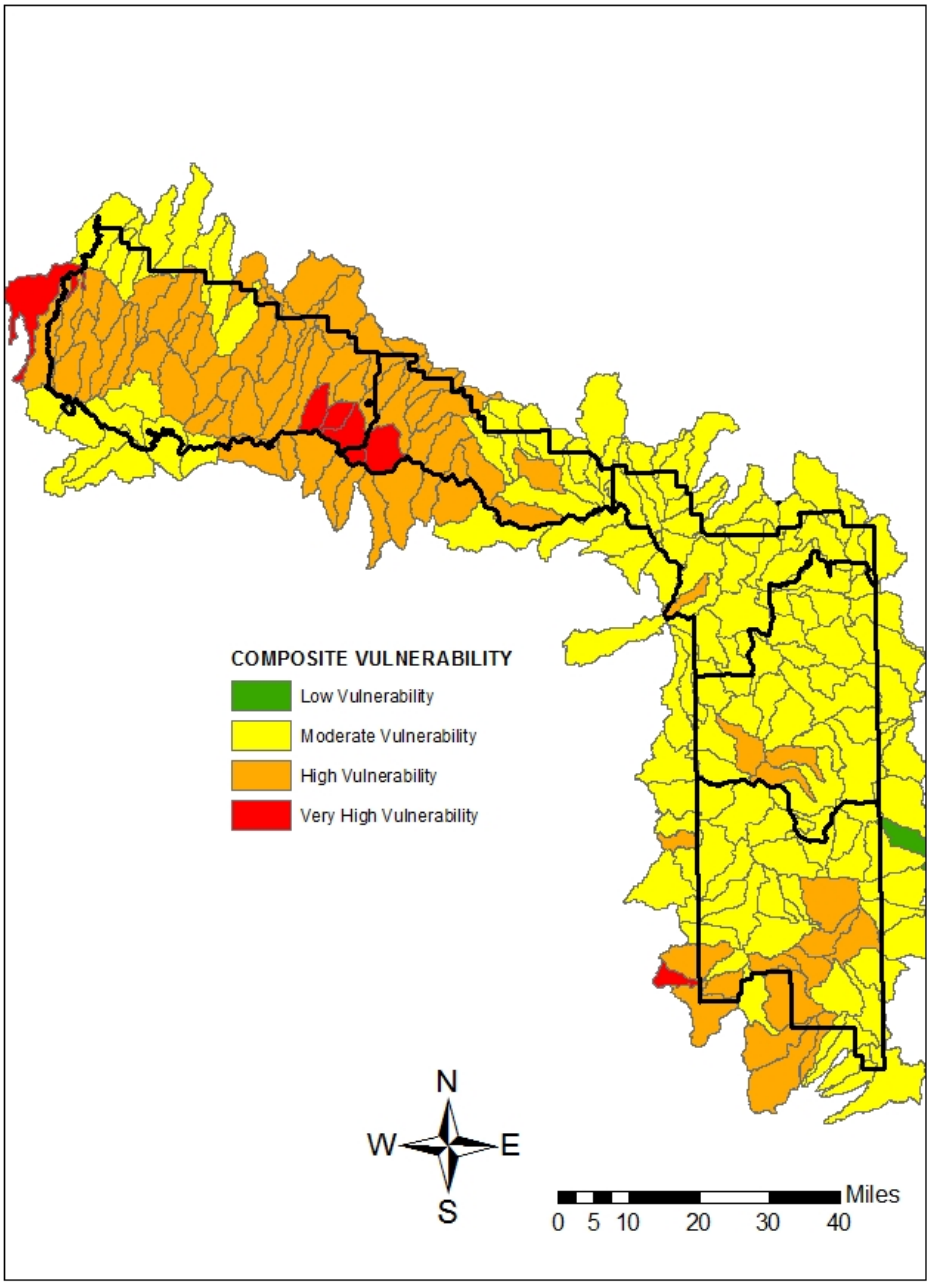

Figure 10. Composite climate change vulnerability score for 194 HUC_12 watersheds that intersect the boundary of the Apache-Sitgreaves National Forests. Data taken from (USDA-Forest Service, 2017a)

Monitoring Discussion and Findings

In general, high and very high vulnerability areas of the forests are concentrated on ERUs that are near the warmer, drier ends of their climate envelopes. Most prevalent are the Ponderosa Pine Forest on the Sitgreaves NF and the Spruce-Fir Forest in the Mt. Baldy and Escudilla wilderness areas, Desert Grassland along the Blue River on the Clifton RD, and Mixed Conifer with Aspen ("wet mixed conifer") on the southwestern portion of the Alpine RD, Apache NF. As the climate warms and dries through the 21st Century, these areas have the highest probability of undergoing type conversion.

Adaptive Management Considerations

The 2017 CCVA is considered baseline data for future assessments and will be used to inform the answers to monitoring questions in future Monitoring and Evaluation Reports. We recommend changing the question in the first paragraph of Methods to reflect the fact that Midscale Vegetation modeling, which is expected to be repeated on a 5-year cycle, will reflect changes in ERU over time. These changes can be correlated to predicted risk of type conversion in the CCVA. No changes to plan components or management activities are recommended based on this report at this time (Table 20).

Table 20. Suggested changes based on monitoring results for Question 16.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B12, for more information on suggested change.

Question 21—Recreation Effects on Resources

Question and Summary

21. How are recreational activities (including off-highway vehicle use) affecting the physical and biological resources of the forests?

No data are reported in this section. See Monitoring Results heading below for details.

Reporting Interval

1 year

Indicator and Unit of Measure

This question will focus on law-enforcement activity and incident reports: number/type/location of violation notices/citations/warnings/incident reports for resource damage, campfires, dumping, littering, and unauthorized construction. Some noxious weed information can be obtained from Pesticide Use Proposals. Available information, such as total acres treated, will be extracted from target reporting in the database of record.

Plan Components Addressed

Desired Conditions for Overall Recreation Opportunities

- Recreation activities occur within the ability of the land to support them and with minimal user conflicts. (Plan, p. 70)
- Recreation use does not negatively affect wildlife habitat and populations. Negative interactions between people and wildlife are minimized. (Plan, p. 70)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Methods are described in the Guide.

Monitoring Results

No data were provided to the monitoring team by Law Enforcement upon request, and supplemental data were not collected due to capacity shortfalls. Reporting has therefore been deferred until the 2018-2019 Monitoring Evaluation Report.

Monitoring Discussion and Findings

Adaptive Management Considerations

See Appendix B, Table B13.

Question 22—Scenic Integrity

Question and Summary

22. How are projects and programs affecting scenic integrity?

No data are reported in this section. See Monitoring Results heading below for details.

Reporting Interval

1 year

Indicator and Unit of Measure

- Percent and acres that meet Scenic Integrity Objectives (SIOs)
- Percent change in Scenic Integrity Level (SIL)
- Scenic Integrity Objective Map can be found in Forest Plan documents

Plan Components Addressed

Landscape Scale Desired Conditions for Grasslands

- Landscapes associated with montane/subalpine grasslands vary from natural appearing where human activities do not stand out (high scenic integrity) to unaltered where only natural ecological changes occur (very high scenic integrity). (Plan, p. 58)

Guidelines for Landscape Scale Disturbance Events

- Projects and activities should include both short and long term provisions for scenic integrity, especially in sensitive foreground areas (high and very high scenic integrity). (Plan, p. 68)

Desired Conditions for Developed Recreation

- Developed campgrounds are places where structures and human caused vegetation changes may be seen but they do not dominate the view or attract attention (low to moderate scenic integrity). Human activities in the areas visible from campgrounds (foreground to middle ground, 300 feet to 4 miles) should not attract attention or stand out, and the landscapes should appear natural (moderate to high scenic integrity). (Plan, p. 73)

Desired Conditions for Scenic Byways

- Scenic byways exhibit natural appearing landscapes where human activities do not stand out in the foreground, up to one-half mile (high scenic integrity). (Plan, p. 79)

Desired Conditions for National Recreation Trails

- The immediate foreground (0 to 200 feet) views from the NRTs vary from natural appearing landscapes where human activities do not stand out (high scenic integrity) to unaltered landscapes where generally only ecological changes occur (very high scenic integrity). (Plan, p. 81)

Desired Conditions for Eligible and Suitable Wild and Scenic Rivers

- Eligible and suitable wild river segments display unaltered landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive and/or semiprimitive nonmotorized recreation opportunities. (Plan, p. 84)
- Eligible and suitable scenic river segments display landscapes which vary from slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity) and provide semiprimitive nonmotorized, semiprimitive motorized, and/or roaded natural recreation opportunities. (Plan, p. 84)
- Eligible and suitable recreational river segments display landscapes which vary from moderately altered where human activities are evident (low scenic integrity) to slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) and provide primitive, semiprimitive nonmotorized, semiprimitive motorized, and/or roaded natural recreation opportunities. (Plan, p. 84)

Desired Conditions for Scenic Resources

- Lakes (reservoirs) and surrounding lands (¼ mile from the shore) provide landscapes which vary from slightly altered where human activities may be seen but do not attract attention

(moderate scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity). (Plan, p. 85)

- The scenic vistas associated with canyons and other landforms retain their scenic integrity. (Plan, p. 85)
- The vistas—both from and onto—the Mogollon Rim exhibit landscapes which vary from natural appearing where human activities do not stand out (high scenic integrity) to unaltered where generally only ecological changes occur (very high scenic integrity). (Plan, p. 85)

Guidelines for Minerals and Geology

- Mineral material resource sites should be located where economical and the scenic integrity objectives can be met. Adverse visual impacts should be minimized. (Plan, p. 99)

Desired Conditions for Special Uses

- Energy developments and other special uses are not major features on the landscape and should not attract attention (moderate scenic integrity). (Plan, p. 101)
- Communications sites display landscapes which vary from moderately altered where human activities are evident (low scenic integrity) to slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity). (Plan, p. 101)

Guidelines for Special Uses

- The use of underground utilities should be favored to avoid potential conflicts with resources (e.g., scenic integrity, wildlife, wildfire, heritage). (Plan, p. 102)

Desired Conditions for General Forest

- Landscapes in the General Forest Management Area vary from moderately altered where human activities are evident (low scenic integrity) to natural where generally only ecological changes occur (very high scenic integrity). (Plan, p. 112)

Desired Conditions for Community-Forest Intermix

- Landscapes in the Community-Forest Intermix Management Area vary from moderately altered where human activities are evident (low scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity). (Plan, p. 113)

Desired Conditions for Wild Horse Territory

- The Wild Horse Territory Management Area contains landscapes that vary from moderately altered where human activities are evident (low scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity). (Plan, p. 118)

Desired Conditions for Wildlife Quiet Area

- Landscapes in WQAs vary from slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity). (Plan, p. 119)

Desired Conditions for Natural Landscape

- Landscapes vary from natural appearing where human activities do not stand out (high scenic integrity) to natural where generally only ecological changes occur (very high scenic integrity), except as described below. (Plan, p. 121)

- Developed campgrounds, picnic areas, trailheads, and roads passable by passenger cars provide roaded natural recreation opportunities. Landscapes within and immediately adjacent to these features remain scenic. They may be slightly altered where human activities may be seen but do not attract attention (moderate scenic integrity) to natural appearing where human activities do not stand out (high scenic integrity). (Plan, p. 121)

Desired Conditions for Research Natural Area

- The Phelps Cabin RNA, outside of Mount Baldy Wilderness, exhibits landscapes that vary from natural appearing where human activities do not stand out (high scenic integrity) to natural where generally only ecological changes occur (very high scenic integrity). (Plan, p. 123)

Desired Conditions for Recommended Research Natural Area

- The recommended Three Forks, Campbell Blue, Corduroy, and Sandrock RNAs, outside of any eligible or suitable wild and scenic river corridor, exhibit unaltered appearing landscapes where human activities do not stand out (high scenic integrity). (Plan, p. 125)
- The recommended Thomas Creek RNA exhibits slightly altered landscapes where human activities may be seen but do not attract attention (moderate scenic integrity). (Plan, p. 125)
- The recommended Phelps Cabin RNA addition (currently the Phelps Cabin Botanical Area), outside of any eligible or suitable wild and scenic river corridor, exhibits unaltered appearing landscapes where human activities do not stand out (high scenic integrity). (Plan, p. 125)

Desired Conditions for Wilderness

- Wilderness areas maintain natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive and/or semiprimitive nonmotorized recreation opportunities. (Plan, p. 127)

Desired Conditions for Primitive Area

- The Blue Range Primitive Area and presidential recommended additions maintain natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive recreation opportunities, except along the designated road (36 CFR 293.17(a)). (Plan, p. 129)

Desired Conditions for Recommended Wilderness

- Recommended wilderness areas display natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive or semiprimitive nonmotorized recreation opportunities. (Plan, p. 130)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Methods are described in the Guide.

Monitoring Results

No project management reviews were conducted during the biennium for effects of projects on scenic integrity. Therefore, no data are available to address this question. Reporting has therefore been deferred until the 2018-2019 Monitoring Evaluation Report.

Monitoring Discussion and Findings

Adaptive Management Considerations

Question 24—Eligible and Suitable Wild and Scenic Rivers

Question and Summary

24. Are eligible and suitable wild and scenic rivers being managed to protect and enhance the identified outstandingly remarkable values?

Reporting Interval

1 year

Indicator and Unit of Measure

The indicators are the outstandingly remarkable values (ORVs) and the free-flowing condition of the river.

Plan Components Addressed

Standards for Eligible and Suitable Wild and Scenic Rivers

- Each eligible river's free-flowing condition, outstandingly remarkable values, and classification shall be sustained until further study is conducted. (Plan, p. 84)
- Each suitable river's free-flowing condition, outstandingly remarkable values, and classification shall be maintained until congressional action is completed. (Plan, p. 84)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Fifteen project decisions were signed during FY2016 and FY2017 (Table 21). We conducted a review of these projects to evaluate the possibility that the projects would impact ORVs. Project geographic footprints were compared to locations of eligible and suitable wild and scenic river (E/S WSR) segments. Projects where there was no geographic overlap were assumed to have no potential to impact ORVs. If there was overlap, project actions were compared to specific ORVs reported in (USDA-Forest Service, 2009).

Monitoring Results

ORVs

Of 15 projects reviewed, 13 had no geographic overlap with E/S WSR segments or buffers. The Apache-Sitgreaves National Forests Outfitter/Guide Permit Authorization Project (Outfitter/Guide Project) was planned over the entire forest but did not have project actions that would reasonably be expected to impact ORVs. Two small areas of overlap occurred for the Wildlife Habitat Planting Project. The project actions in this project (planting willow trees) would not be expected to negatively impact ORVs (Table 21).

Table 21. NEPA projects signed for the Apache-Sitgreaves NFs during FY 2016 and 2017 and their potential impacts on eligible and suitable wild and scenic river segments on the forests.

FY	QTR	NEPA Type	Project Name	Geographic Overlap With E/S WSR	Project Potential to Impact ORVs	Specific impact
16	2	EA	Upper Rocky Arroyo Restoration Project	No	No	N/A
16	3	CE	Navopache Electric Burton Road Powerline Maintenance & Rebuild	No	No	N/A
16	4	CE	Wildlife Habitat Planting Project	Yes; Campbell Blue Cr. and West Fork of Black R.	Yes; vegetation is an ORV on Campbell Blue Cr.	None; willows are native and present in both riparian areas.
16	4	CE	R-C Site Prep for Reforestation	No	No	N/A
16	4	CE	Heber Substation Expansion	No	No	N/A
16	4	EA	Apache-Sitgreaves National Forests Outfitter/Guide Permit Authorization Project	Yes; analysis area was entire forest.	No	N/A
17	1	CE	Tall Timbers Playground Improvement Project	No	No	N/A

FY	QTR	NEPA Type	Project Name	Geographic Overlap With E/S WSR	Project Potential to Impact ORVs	Specific impact
17	1	EA	Rim Lakes Recreation Improvements Project	No	No	N/A
17	1	CE	Dept. of Public Safety Trailer Replacement	No	No	N/A
17	2	CE	Section 31 Fuels Reduction	No	No	N/A
17	2	CE	Green's Peak Farm Bill CE	No	No	N/A
17	3	CE	Porter Mountain Communication Site Lease Reissuance	No	No	N/A
17	3	EIS	Camp Tatiyee Land Exchange	No	No	N/A
17	4	EA	West Escudilla Restoration Project	No	No	N/A
17	4	CE	Greens Peak Communication Site Permit Reauthorizations	No	No	N/A

Free-flowing Condition

Construction of fish barriers was not planned and did not take place within eligible and suitable wild and scenic river segments during 2016 or 2017. No other project activities that could affect the free-flowing condition of rivers were planned during these years. Therefore, project actions had no effect on free-flowing conditions for eligible and suitable WSRs during FY2016 and FY2017 on the ASNFs.

Monitoring Discussion and Findings

A review of project decisions during FY 2016 and 2017 revealed that impacts to E/S WSR segments on the Forests would not occur as a result of planned actions. Most of the lack of impact is attributable to the fact that 13 of 15 project planning areas do not overlap with any E/S WSR segments. There are several larger-scale projects expected to be signed in the next few years that do overlap E/S WSR segments and whose proposed actions have the potential to impact ORVs. In those cases, project planning teams will need to identify and take into account plan direction and legal requirements for these areas.

Adaptive Management Considerations

No changes to the monitoring strategy or plan direction are recommended based on information in this section (Table 22). Future-year projects may provide a more rigorous test of project planning processes

since there will be more extensive overlap with E/S WSR segments. Full implementation of the procedures in the Guide will provide a more comprehensive answer to this question.

Table 22. Suggested changes based on monitoring results from Question 24.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B15, for more information.

Question 25—Wilderness Management

Question and Summary

25. Are designated wilderness and the primitive area being managed to maintain the wilderness values and character?

Reporting Interval

2 years

Indicator and Unit of Measure

- number of Minimum Requirements Analysis (MRA) documents that allow for trammeling
- number of acres of each wilderness or primitive area affected

Plan Components Addressed

Desired Conditions for Wilderness

- Ecological conditions are affected primarily by natural ecological processes, with the appearance of little or no human intervention. (Plan, p. 127)
- There are unconfined opportunities for exploration, solitude, risk, and challenge. The nonmotorized trail system enhances the wilderness character. Where there is public demand, outfitters and guides provide services to visitors seeking a wilderness experience. (Plan, 127)
- Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. (Plan, p. 127)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

We identified two Minimum Requirements Decision Guides (MRDGs) related to the Mexican Wolf Recovery Program and reviewed them to determine if they allowed for trammeling, and if so, how many acres of wilderness or primitive area would be affected. We also reviewed fire suppression operations within designated wilderness and the primitive area to determine if trammeling occurred.

Monitoring Results

Minimum Requirements Analyses were conducted in 2016 and 2017 by the Mexican Wolf Recovery Interagency Field Team (IFT) to identify the minimum requirements of administrative actions associated with the Mexican Wolf Recovery Program. The specific actions analyzed were a possible helicopter landing to capture an injured wolf, should one be discovered during annual overflight surveys, in order to treat and/or transport the wolf for treatment, and a subsequent helicopter landing to release the recovered wolf. Both MRDG documents for capturing, treating, and returning injured Mexican grey wolves to wilderness by use of a helicopter landing allow for trammeling (i.e. intentional manipulation of the ecosystem). Potential locations for these activities include all wilderness areas on the Forests and the Blue Range Primitive Area, a total of approximately 203,280 acres. Potential land area trammeled by a single helicopter landing would be less than one acre. No landings occurred during 2016 or 2017.

Three wildfires occurred within the boundaries of designated wilderness or the primitive area during FY 2016 and 2017. All 3 occurred in 2017 and were entirely or partly within the boundaries of the Primitive Area Management Area. Two of the fires were small (each was mapped at 36 acres) and were monitored but not actively suppressed. The third, the Strayhorse Creek fire, occurred on the western edge of the primitive area and spread eastward into the area. Suppression operations were restricted to areas outside the primitive area, and the fire was allowed to spread eastward into the primitive area until extinguished by rainfall. No trammeling occurred during the management of any of these wildfires.

Monitoring Discussion and Findings

Although the MRDGs we examined allow for trammeling, the IFT also pointed out that this trammeling, should it take place, would be in service of a program designed to restore an apex predator to wilderness areas where it was previously extirpated, an action that would help enhance the natural quality and scientific and conservation purposes of wilderness.

Adaptive Management Considerations

No change to management activities or plan direction is recommended based on information in this section. Although 2 MRDGs allowed for trammeling during the biennium, this potential trammeling was shown to be in service of the larger goal of consistency with Plan desired conditions for wilderness listed above. The Guide should be changed to prescribe management reviews in order to provide a more comprehensive answer to this question (Table 23).

Table 23. Suggested changes based on monitoring results from Question 25.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐

Changes may be warranted for the:	Yes	Unsure	No
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B25, for more information on suggested change.

Question 26—Recommended Wilderness Management

Question and Summary

26. Are recommended wilderness being managed to protect the wilderness values and character?

Reporting Interval

2 years

Indicator and Unit of Measure

Indicator is human-caused disturbance that does not complement wilderness characteristics. Unit of measure is authorized activity that causes irreparable damage to wilderness characteristics.

Plan Components Addressed

Desired Conditions for Recommended Wilderness

- Recommended wilderness areas display natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive or semiprimitive nonmotorized recreation opportunities. (Plan, p. 130
- Recommended wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. (Plan, p. 130)

Guidelines for Recommended Wilderness

- The wilderness characteristics of each recommended wilderness should remain intact until a congressional decision on wilderness designation is made. Characteristics include naturalness, opportunities for solitude, opportunities for primitive recreation, and identified special features. (Plan, p. 131)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

We conducted a review of projects signed in FY 2016 and 2017. All projects that overlap with recommended wilderness were examined for project activities that may cause irreparable damage to wilderness characteristics.

Monitoring Results

Two projects approved during FY 2016 and 2017 had geographic overlap with recommended wilderness: Apache-Sitgreaves National Forests Outfitter/Guide Permit Authorization Project (Outfitter/Guide Project), and Wildlife Habitat Planting Project. Both projects were approved in 2016.

The analysis area for the Outfitter/Guide Project was the entire Apache-Sitgreaves NFs. This project changes the way the Apache-Sitgreaves NFs issue permits to commercial recreational outfitters and guides on the Forests. Instead of using temporary permits, the Forests will now have the option to issue longer-term permits for a maximum number of service days, thus streamlining the permitting process. No changes in actual use by commercially guided recreationists were proposed in this project. No change in the requirements in the permits regarding plan direction, Forest Service policy, and regulations would be made as a result of this project.

The Wildlife Habitat Planting Project has geographically dispersed treatment locations along streams across the Forests. It overlaps with the Escudilla Recommended Wilderness along the upper reach of Stone Creek on the Alpine Ranger District. Project actions consist of planting native plants of various species in riparian zones to enhance wildlife habitat by restoring and/or augmenting populations of these species.

Monitoring Discussion and Findings

The Outfitter/Guide Project is expected to have no effect on the management of recommended wilderness on the Forests. All plan direction, law, regulation, and policy applies to guided recreational activities as before.

The Wildlife Habitat Planting Project would not be expected to cause irreparable damage to wilderness characteristics. Planting willows and other native plants in riparian areas for the purpose of wildlife habitat improvement would be expected to have a net positive effect on wilderness characteristics and help preserve those characteristics until Congress acts on the recommendation.

Adaptive Management Considerations

No changes to the monitoring program, Plan, or management activities are recommended based on information collected for this question (Table 24).

Table 24. Suggested changes based on monitoring results from Question 26.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B17, for more information.

Question 31—Plan Objectives

Question and Summary

31. Are plan objectives being achieved?

Reporting Interval

1 year

Indicator and Unit of Measure

Report of annual accomplishments towards meeting plan objectives.

Plan Components Addressed

This question addresses the Plan's 37 objectives, listed in Table 25 below.

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Question 31 addresses the progress the forests have made toward achieving the 37 objectives set forth in the Plan. Data were collected from the relevant program managers for each objective.

Monitoring Results

Reported accomplishments for the Plan's 37 objectives for FY 2016 and 2017 are presented in Table 25. Table color code: Objective accomplished for FY=green; objective partially accomplished for FY=blue; no progress toward objective for FY=pink. See footnote at end of table for more detail.

Table 25. Plan objectives taken from the Apache-Sitgreaves NFs' Land Management Plan, with reported accomplishments for fiscal years 2016 and 2017.*

Objective	Fiscal Year 2016 Accomplishments	Fiscal Year 2017 Accomplishments
During the planning period, improve the condition class on at least 10 priority 6th level HUC watersheds by removing or mitigating degrading factors. (Plan, p. 17; Overall Ecosystem Health)	16,801 acres moved from Functioning at Risk to Properly Functioning. No acres moved from Not Functioning to Functioning at Risk.	0
Annually, enhance or restore an average of 350 acres within priority 6th level HUC watersheds, including treating the causes of State and federally designated impaired or threatened waters to improve watershed condition and water quality. (Plan, p. 21; Soil)	2,625 acres	2,858 acres

Objective	Fiscal Year 2016 Accomplishments	Fiscal Year 2017 Accomplishments
Annually, enhance or restore 5 to 15 miles of stream and riparian habitat to restore structure, composition, and function of physical habitat for native fisheries and riparian-dependent species. (Plan, p. 26; Aquatic Habitat and Species)	37.9 miles	9.4 miles
During the planning period, complete at least five projects (e.g., remove barriers, restore dewatered stream segments, or connect fragmented habitat) to provide for aquatic and riparian associated species and migratory species. (Plan, p. 26; Aquatic Habitat and Species)	0	0
Annually, move 200 to 500 acres toward desired composition, structure, and function of streams, floodplains, and riparian vegetation. (Plan, p. 35; Riparian Areas)	108 acres	434 acres
Within the planning period, relocate, repair, improve, or decommission a minimum of 4 miles of National Forest System roads or trails that add sediment to streams, damage riparian vegetation, erode stream banks, cause gullies, and/or compact floodplain soils. (Plan, p. 35; Riparian Areas)	5 miles of surface stabilization with lignin product to reduce sediment.	7 miles of surface stabilization with lignin product to reduce sediment.
Annually, remove an average of 2 miles of unauthorized roads or trails that add sediment to streams, damage riparian vegetation, erode stream banks, cause gullies, and/or compact floodplain soils. (Plan, p. 35; Riparian Areas)	3.5 miles	3.3 miles
Within the planning period, enhance or restore 5 to 25 wet meadows, springs, seeps, or cienegas to proper hydrologic function and native plant and animal species composition. (Plan, p. 35; Riparian Areas)	0	0
Annually, work with partners to reduce animal damage to native willows and other riparian species on an average of 5 miles of riparian habitat. (Plan, p. 35; Riparian Areas)	0.75 miles by repairing or erecting fencing	0 miles

Objective	Fiscal Year 2016 Accomplishments	Fiscal Year 2017 Accomplishments
Annually, treat 5,000 to 35,000 acres to reduce tree densities, restore natural fire regimes, promote species habitat and ecosystem health, reduce fire hazard, maintain desired conditions, initiate recovery from uncharacteristic disturbance, and provide forest products, leaving a desired mix of species with the range of desired densities that are resilient to changing climatic conditions. (Plan, p. 37; Forests: All Forested PNVTs)	7,034 acres	61,019 acres
Aspen dominated and codominated acres within forested PNVTs, representing a range of age classes, are maintained on at least 50,000 acres during the planning period. (Plan, p. 51; Aspen)	56,540 acres (based on 2014 imagery)	56,540 acres (based on 2014 imagery)
Annually, treat or maintain 5,000 to 15,000 acres to promote a highly diverse structure. (Plan, p. 52; All Woodland PNVTs)	21,394 acres	9,945 acres
Decrease or maintain the woody canopy cover at less than 10 percent by treating up to 25,000 acres annually. (Plan, p. 58; Grasslands)	43,121 acres	17,626 acres
Annually, improve wildlife connectivity by removing at least five unneeded structures (e.g., fence). (Plan, p. 62; Wildlife and Rare Plants)	6.4 miles of fencing modified to be wildlife friendly or removed, or 3.2 “structures”	0
Annually, contain, control, or eradicate invasive species (e.g., musk thistle, Dalmatian toadflax) on 500 to 3,500 acres. (Plan, p. 66; Invasive Species)	612 acres	654 acres
Annually, control or eradicate invasive species (e.g., tamarisk, bullfrogs) on at least 2 stream miles. (Plan, p. 66; Invasive Species)	No data provided	No data provided
Annually, rehabilitate, stabilize, revegetate, or relocate an average of five dispersed campsites to improve recreation opportunities and/or protect the environment. (Plan, p. 72; Dispersed Recreation)	12 sites rehabilitated; 11 sites on Black Mesa RD, 1 site on Springerville RD	2 sites rehabilitated on Springerville RD

Objective	Fiscal Year 2016 Accomplishments	Fiscal Year 2017 Accomplishments
Within the planning period, work with the AZGFD, ADOT, and other partners to provide at least 10 new wildlife viewing opportunities. (Plan, p. 72; Dispersed Recreation)	0	0
Within the planning period, reduce the developed recreation deferred maintenance backlog at plan approval by 10 percent. (Plan, p. 74; Developed Recreation)	$604,150	$692,122
Within the planning period, accessible and wildlife-resistant trash facilities should be provided in all developed sites where trash is collected. (Plan, p. 74; Developed Recreation)	21 wildlife trash facilities installed in 2016.	34 wildlife trash facilities installed in 2017
Annually, maintain at least 20 percent of the passenger vehicle and 10 percent of the high-clearance vehicle NFS roads. (Plan, p. 75; Motorized Opportunities)	88% of ML 3-5 (Passenger Car system) roads receiving Maintenance. (681.7 miles of 771.4) 11 % of ML2 (High Clearance System) Roads (311.2 miles of 2,726.6 miles)	92% of ML 3-5 (Passenger Car system) roads receiving Maintenance. (726.6 miles of 789.8) 21% of ML2 (High Clearance System) Roads (572 miles of 2,726.6 miles)
Annually, maintain at least 20 percent of NFS motorized trails. (Plan, p. 75; Motorized Opportunities)	No data provided	No data provided
Annually, maintain at least 20 percent of nonmotorized trails. (Plan, p. 78; Nonmotorized Opportunities)	No data provided	No data provided
Within 5 years of plan approval, initiate the process for the regional forester to remove the NRT designation from the Escudilla trail in conformance with Forest Service Manual 2353.57 – Management of National Recreation Trails. (Plan, p. 81; National Recreation Trails)	No Action	No Action

Objective	Fiscal Year 2016 Accomplishments	Fiscal Year 2017 Accomplishments
Annually, accomplish an average of five projects to enhance scenic resources (e.g., restore grasslands and aspen, remove unnecessary fences, close and rehabilitate unneeded gravel/cinder pits). (Plan, p. 85; Scenic Resources)	43,121 acres of grassland restored	17,626 acres of grassland restored
Annually, survey and post on average 2 to 5 miles of unposted NFS boundary. (Plan, p. 88; Lands)	8.4 miles	7.2 miles
Annually, maintain on average 2 to 5 miles of property boundary posting and corner monuments. (Plan, p. 88; Lands)	1.6 miles	0 miles
Annually, resolve an average of three existing trespass cases. (Plan, p. 88; Lands)	0	0
Every 2 years or according to Southwestern Region Heritage Program standards, National Register sites and priority cultural resources are inspected. (Plan, p. 90; Cultural Resources)	37 sites inspected (7 National Register sites, 30 National Register-eligible sites).	23 (5 National Register sites, 12 National Register-eligible sites, 6 unevaluated sites)
During the planning period, nominate at least five eligible cultural resources for inclusion in the NRHP. (Plan, p. 90; Cultural Resources)	0	0
Annually, provide a Passport in Time (PIT) or other education project to provide opportunities for the public to learn about the Apache-Sitgreaves NFs' past and cultural resources. (Plan, p. 90; Cultural Resources)	24, one of which was a PIT-like project.	13, one of which was a PIT project and one was a PIT-like project
Annually, complete a minimum of 100 acres of non-project cultural inventory to expand existing knowledge about the nature, location, and management needs of the forests' cultural resources. (Plan, p. 91; Cultural Resources)	672 acres	265 acres
Over the planning period, a minimum of five MOUs are renewed or established with tribes associated with the Apache-Sitgreaves NFs. (Plan, p. 93; American Indian Rights and Interests)	0	One MOU was completed with the White Mountain Apache Tribe and the Tonto National Forest

Objective	Fiscal Year 2016 Accomplishments	Fiscal Year 2017 Accomplishments
Annually, prepare and offer up to an average of 122,000 CCF [29] from suitable timberlands resulting from sustainable harvest to provide wood products to businesses and individuals. (Plan, p. 95; Forest Products)	91,042 CCF	78,254 CCF
Annually, provide up to 94,000 CCF (119,380 cords [30]) of firewood for personal and commercial use. (Plan, p. 95; Forest Products)	12,252 CCF	7,469 CCF
Annually, provide an average of 5,000 permits for Christmas trees. (Plan, p. 95; Forest Products)	4,537	4,341
Annually, prepare at least one instream flow water rights application until water acquisition needs are complete to sustain riparian areas, fish, wildlife, and water-based recreation. (Plan, p. 104; Water Uses)	0	0

*Green highlighted cells indicate that the objective was met; blue highlighted cells indicate that some progress was made. No progress was reported for the FY for results in pink cells. No data were available for un-highlighted cells. For objectives whose accomplishment deadline is the end of the planning period, any progress toward the objective during either FY was considered as having met the objective for that FY.

Monitoring Discussion and Findings

Results for Question 31 generally indicate that the Forests are making progress toward achieving the objectives in the Plan. No progress in either year was reported for 8 objectives, while 19 objectives, or 51%, were reported as achieved for both years of the biennium. An additional 3 objectives were accomplished in one of the two fiscal years, and some progress in at least one fiscal year was made on 4 others. No data were reported on the remaining 3 objectives.

Adaptive Management Considerations

Results from Question 31 provide the forests the opportunity to revisit Plan objectives and determine if they are still relevant, achievable, and/or desirable. While it is probably too early to recommend changing or eliminating Plan objectives, it is worth noting that no progress was made toward several objectives during fiscal years 2016 and 2017. If no progress is made toward these objectives in future years, consideration should be given to changing or eliminating them, or to modifying management activities so that they are addressed if forest leadership continues to consider them important. A change to the Guide is recommended for the objective on p. 72 that references wildlife viewing opportunities. Objectives for which no accomplishments were tallied during 2016 or 2017 are listed in Table 26.

Table 26. Plan objectives for which no accomplishments were reported in 2016 or 2017.

Objective	Comments
During the planning period, complete at least five projects (e.g., remove barriers, restore dewatered stream segments, or connect fragmented habitat) to provide for aquatic and riparian associated species and migratory species. (Plan, p. 26; Aquatic Habitat and Species)	Deadline is end of planning period. At least 1 project to remove a fish barrier is in planning phase.
Within the planning period, enhance or restore 5 to 25 wet meadows, springs, seeps, or cienegas to proper hydrologic function and native plant and animal species composition. (Plan, p. 35; Riparian Areas)	Deadline is end of planning period. No activity due to low priority and lack of funding
Within the planning period, work with the AZGFD, ADOT, and other partners to provide at least 10 new wildlife viewing opportunities. (Plan, p. 72; Dispersed Recreation)	Deadline is end of planning period. Question needs better definition of what constitutes a wildlife viewing opportunity. Could be addressed in the Guide.
Within the planning period, reduce the developed recreation deferred maintenance backlog at plan approval by 10 percent. (Plan, p. 74; Developed Recreation)	Deadline is end of planning period. 14.6% increase from 2016-2017.
Within 5 years of plan approval, initiate the process for the regional forester to remove the NRT designation from the Escudilla trail in conformance with Forest Service Manual 2353.57 – Management of National Recreation Trails. (Plan, p. 81; National Recreation Trails)	Deadline for initiation of this process is October, 2020.
Annually, resolve an average of three existing trespass cases. (Plan, p. 88; Lands)	One case is in process as of June, 2018.
During the planning period, nominate at least five eligible cultural resources for inclusion in the NRHP. (Plan, p. 90; Cultural Resources)	Deadline is end of planning period. See discussion under Question 33, Adaptive Management Considerations.
Annually, prepare at least one instream flow water rights application until water acquisition needs are complete to sustain riparian areas, fish, wildlife, and water-based recreation. (Plan, p. 104; Water Uses)	Not accomplished due to competing priorities.

A change to the Guide to better define “wildlife viewing opportunity” is recommended. No changes to the Plan or management activities are recommended at this time (Table 27).

Table 27. Suggested changes based on monitoring results for Question 31.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐
Forest plan	☐	☐	☒
Management activities	☐	☐	☒

*Refer to Appendix B, Table B18, for more information on suggested changes.

Question 32— Adoption of Standards and Guidelines

Question and Summary

32. Are the standards and guidelines prescribed being incorporated in NEPA documents and implemented in projects and activities?

Reporting Interval

1 year

Indicator and Unit of Measure

Compliance with standards and guidelines.

Plan Components Addressed

This question addresses the regulatory requirement that projects must be consistent with Plan components (36 CFR 219.15). No specific plan direction reflects this requirement since regulatory requirements were generally not repeated in Plan decisions.

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

We reviewed NEPA documents to verify the inclusion of the Plan standards and guidelines into Forest projects. Only projects which had a decision document signed in FY2016 or FY2017 were reviewed. All but one document reviewed for this report can be found at the following website: (https://www.fs.usda.gov/wps/portal/fsinternet/cs/projects/asnf/landmanagement/projects?archive=1&sortby=1)

The Forest Plan Consistency Workbook (Workbook) is a compilation of all Plan direction in the Apache-Sitgreaves NFs Land Management Plan in spreadsheet form. It was made available to project planning teams beginning in FY 2017 and is intended to be used to evaluate proposed actions for consistency with Plan direction. Completed workbooks were not available on the public project website for any of the projects reviewed, although individual project records may include the checklist. Most of the digital project records for these projects were not available as the database of record was undergoing transition at the time of review.

Monitoring Results

Results of this review of NEPA documents for Plan compliance are presented in Table 28. Official project records are kept in paper files at District offices; however, electronic copies are stored on a Forest Service internal database. Five project records were available electronically through the internal database at the time of this writing. Because at the time of the review, most internal electronic records for the projects were not available due to ongoing migration of data to a new system, we reviewed publicly available documents on the Forests' website. We also reviewed projects listed on the Forest Service internal NEPA database to confirm that all projects had been published to the public website. One project that had not been published to the public website was identified in this way and included in Table 28.

There were 15 projects signed within the reporting period; all had some assertion of plan consistency in the decision document. Projects classified as Categorical Exclusion (CE) usually only had a statement asserting the project was consistent with the Plan. Projects classified as Environmental Analysis (EA) and Environmental Impact Statement (EIS) usually had more robust and detailed statements of Plan consistency, often in the accompanying analysis document.

Table 28. Documentation of plan consistency in 15 NEPA projects signed during FY 2016 and 2017 for the Apache-Sitgreaves National Forests.

FY	NEPA Type	Project Name	Plan Consistency Asserted in NEPA Document (Y/N)	Plan Consistency Workbook in Record* (Y/N)
16	EA	Upper Rocky Arroyo Restoration Project	Y	N/A
16	CE	Navopache Electric Co-Op Porter Mountain Telecommunication Facility**	Y	N/A
16	CE	Navopache Electric Burton Road Powerline Maintenance & Rebuild	Y	N/A
16	CE	Wildlife Habitat Planting Project	Y	N/A
16	CE	R-C Site Prep for Reforestation	Y	N/A
16	EA	Apache-Sitgreaves National Forests Outfitter/Guide Permit Authorization Project	Y	N/A
17	CE	Tall Timbers Playground Improvement Project	Y	N
17	EA	Rim Lakes Recreation Improvements Project	Y	
17	CE	Dept. of Public Safety Trailer Replacement	Y	
17	CE	Section 31 Fuels Reduction	Y	N

FY	NEPA Type	Project Name	Plan Consistency Asserted in NEPA Document (Y/N)	Plan Consistency Workbook in Record* (Y/N)
17	CE	Green's Peak Farm Bill CE	Y	
17	CE	Porter Mountain Communication Site Lease Reissuance	Y	
17	EIS	Camp Tatiyee Land Exchange	Y	
17	EA	West Escudilla Restoration Project	Y	N
17	CE	Greens Peak Communication Site Permit Reauthorizations	Y	

* No entry indicates that the electronic project record was unavailable at the time of the review.
** Not listed on public website.

Monitoring Discussion and Findings

This review indicates that project planning teams are giving consideration to consistency with Plan direction; however, documentation of plan consistency remains incomplete in project records.

Adaptive Management Considerations

We noted that adoption of the Workbook has so far been uneven. As its availability becomes more widely known and project planning processes are standardized, we expect that more projects will use the Workbook. Currently there is no Forest-level process for confirming standards and guidelines are being implemented in projects and activities post-decision. While it is important that Plan standards and guidelines be incorporated into project development and NEPA documents, implementation of the standards and guidelines is the key desired result. Confirmation that Plan standards and guidelines are being implemented in projects and activities post-NEPA documentation (for example, verification that project design features and best management practices are implemented) will need to be an ongoing part of Project and Plan monitoring programs. The results of this review do not provide adequate confirmation of this indicator.

We recommend 3 changes to the project planning process, all of which would be classified as changes to management activities (Table 29):

- Document consistency with the Plan by using the Plan Consistency Workbook for all projects;
- Include the completed Workbook in the project record;
- Develop a process for implementation tracking and reporting that indicates whether the planned design criteria, mitigation measures, and/or procedures were implemented and resulted in Plan consistency.

Table 29. Suggested changes based on monitoring results for Question 32.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☐	☐	☒
Forest plan	☐	☐	☒
Management activities	☒	☐	☐

Question 33—Cultural Resources

Question and Summary

33. What is the condition of archaeological sites and traditional cultural properties on ASNFs?

Reporting Interval

2 years

Indicator and Unit of Measure

- Total number of historic properties inspected per year
- Total number of PHAs inspected per year
- Total number of historic properties effectively managed during project implementation per year
- Total number of historic properties not effectively managed during project implementation per year
- Total number of damage assessments per year
- Total number of historic properties restored, rehabilitated, or repaired per year

Plan Components Addressed

Desired Conditions for Cultural Resources

- Significant cultural resources (i.e., archaeological, historic, traditional cultural properties (TCPs), and known American Indian sacred sites) are preserved and protected for their cultural importance and are free from adverse impacts. (Plan, p. 90)

Objectives for Cultural Resources

- Every 2 years or according to Southwestern Region Heritage Program standards, National Register sites and priority cultural resources are inspected. (Plan, p. 90)

New Science or Other Information

No new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Methods

Cultural resources (archaeological, historic, traditional cultural properties, and known American Indian sites of traditional or religious importance) are monitored under the following circumstances: 1) during or after implementation of undertakings (ground-disturbing actions), 2) at the discretion of the Arizona Site Stewards volunteer program, 3) when there is an opportunity, 4) by request, or 5) as required by the Region 3 Programmatic Agreement and the Plan, which requires Priority Heritage Assets (PHA) to be inspected every 2-5 years. Over 8,000 sites have been recorded on the ASNFs; therefore, only a small percentage are inspected each year.

Arizona Site Stewards are volunteers who work through the Arizona Site Stewards Volunteer Program, which is administered by Arizona State Parks. Among other services, site stewards monitor and report damage to archaeological sites in Arizona. The managing agencies are notified when disturbances are observed on a site assigned to the Arizona Site Stewards program. Damaged sites are reported directly to Forest cultural resource staff through email notification. Arizona site stewards assisted with site monitoring on the Apache-Sitgreaves NFs during 2016 and 2017.

Sites that are inspected or monitored are reported by fiscal year through INFRA (2016) and NRM (starting in 2017). Only projects/events reported as completed within the databases are included in this report.

Monitoring Results

Values for indicators are presented in Table 30.

Table 30. Cultural resource indicator values for FY 2016 and 2017 for the Apache-Sitgreaves NFs.

Indicator	2016	2017
Total number of historic properties inspected per year	37	44
Total number of PHAs inspected per year	16	4
Total number of historic properties effectively managed during project implementation per year	1	4
Total number of historic properties not effectively managed during project implementation per year	6	7
Total number of damage assessments per year	8	11
Total number of historic properties restored, rehabilitated, or repaired per year	2	3

Table 31 lists the types of damage incidents observed at sites for both years. Most of the damage reports were from the Sitgreaves NF, and the majority of incidents were from authorized undertakings or unauthorized actions, mostly mechanical thinning and prescribed fire operations. In 2016, one site was looted for artifacts for the purpose of selling the artifacts. Suspects were apprehended, and the case is under investigation. In 2017, one ancestral Puebloan site was looted twice in less than a month. Repeated incidents at this site can be attributed to its accessibility by motor vehicles and the fact that it is far enough off main roads to be hidden from observers.

Table 31. Number of sites reported damaged in 2016 and 2017.

Type of Incident	2016	2017
Looting/ARPA violation	1	4
Vandalism	1	-
Unauthorized removal/ Reconstruction of Historic Features	1	1
Unauthorized fuel wood cutting within a site	1	-
Fire suppression - wildfire	-	1
Prescribed Fire – failure to protect historic property with flammable materials	-	1
Prescribed Fire – damage by heavy equipment	-	1
Foreclosure (unauthorized use of a site for recreational activities, no S106 compliance)	-	2
Unauthorized Event	-	1
Project undertakings – mechanical	4	-
Total Incidents Related to Undertakings (authorized ground-disturbing projects)	**4**	**6**
Total Incidents Related to Unauthorized Activities	**2**	**1**
Total Incidents Related to Looting/Vandalism	**2**	**4**

Twenty Priority Heritage Assets (PHAs) were monitored during the biennium, 16 in 2016 and 4 in 2017. This year-to-year difference is partially due to the limited number of PHAs that needed monitoring per the Region 3 Programmatic Agreement, and partially to an increase in timber and fuels-related project activity in 2017 that precluded opportunistic site visits in areas outside project boundaries.

Site stabilization or restoration efforts include two small historic sites that underwent minor stabilization: one of the Adirondacks (camping shelters) at Stray Horse Campground, and the dance hall at Double Circle Ranch. Additionally, HistoriCorps visited National Register property Bear Mountain Lookout Complex and drafted a stabilization plan for the historic buildings.

Monitoring Discussion and Findings

Protection of cultural resources on the Apache-Sitgreaves NFs had significant challenges during the 2016-2017 biennium. While trends could not be reliably identified in the first 2 years of data, the number of incidents recorded indicates that changes to management actions would be justified.

During the data gathering process for this report, it was discovered that the current Heritage NRM database for 2017 is not complete due to INFRA/NRM data migration issues that occurred towards the end of FY 2017. These ongoing issues may have resulted in monitored sites being underreported in 2017. Underreporting may also have occurred as a result of inadequate reporting requirements, as described below under Adaptive Management Considerations.

The observed high frequency of site damage during undertakings is partially attributable to capacity shortfalls. Trained personnel are not always available for marking sites before treatments and follow-up monitoring after treatments are completed. Inadequately or incorrectly marked sites are more likely to be inadvertently damaged during project actions. Changes to management procedures, discussed below under Adaptive Management Considerations, are recommended.

Adaptive Management Considerations

There is some concern that sites inspected or monitored during project undertakings may be underreported, either because of database migration issues or reporting requirements. In cases where no specific requirement for reporting arises in clearance documents or due to reported damage, current procedures may not be adequate to ensure that inspections are documented in the database of record. A change to management procedures and potentially, to the Guide, to standardize the process for reporting these actions is recommended. The number of damaged sites reported in the biennium indicates that consideration should be given to changing cultural resource management actions to emphasize prevention of such incidents. Additional resources would be required for this effort.

Monitoring results provide the Forests the opportunity to revisit Plan objectives and determine if they are still relevant, achievable, and/or desirable. No progress was made during the biennium on the objective, “During the planning period, nominate at least five eligible cultural resources for inclusion in the NRHP.” (Plan, p. 90; Cultural Resources) (see Table 26). Nomination of resources for inclusion in the NRHP is an expensive and time-consuming process for which budgetary resources are not currently available. Although it would be premature to recommend a plan amendment based on the first two years of monitoring for this objective, if in future years that situation does not change, consideration should be given to modifying this objective by reducing the target number or by replacing it with a desired condition with no specific target.

Table 32. Suggested changes based on monitoring results for Question 33.*

Changes may be warranted for the:	Yes	Unsure	No
Plan monitoring program, including Guide	☒	☐	☐
Forest plan	☐	☐	☒
Management activities	☒	☐	☐

*Refer to Appendix B, Table B20, for more information on suggested changes.

Conclusion

We report results from 20 items scheduled for monitoring in the FY 2016-2017 biennium. Data were available and reported for 17 of the items; 3 items have been deferred because no data were available for either FY in the biennium. A number of changes to the monitoring

program are recommended based on results of 8 of the items. Further changes to the monitoring strategy may be considered based on inability to obtain data or other factors that have become apparent in the monitoring process. Management action changes are recommended for 4 items. No changes to Plan direction are recommended in this report.

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Appendix A: List of Abbreviations and Acronyms

Abbreviation	Explanation
ADOT	Arizona Department of Transportation
ArcGIS	Geographic Information System [mapping] software
ASNFs	Apache-Sitgreaves National Forests
AZGFD	Arizona Game and Fish Department
BO	Biological Opinion
CCF	Hundred Cubic Feet (wood volume)
CCVA	Climate Change Vulnerability Assessment
CE	Categorical Exclusion
CFR	Code of Federal Regulations
CONUS	Continental United States
E/S WSR	Eligible/Suitable Wild and Scenic River
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERU	Ecological Response Unit (equivalent to PNVT)
FHP	USDA-Forest Service Forest Health Protection
FY	Fiscal Year
GMU	Game Management Unit
HUC	Hydrologic Unit Code
IFT	Interagency Field Team
INFRA	Forest Service database
LMP	Land Management Plan (the 2015 revised Forest Plan)
ML	Maintenance Level
MOU	Memorandum of Understanding
MRA	Minimum Requirements Analysis
MRDG	Minimum Requirements Decision Guide
NAU	Northern Arizona University
NEPA	National Environmental Policy Act
NAIP	National Agriculture Imagery Program
NF	National Forest
NFMA	National Forest Management Act

Abbreviation	Explanation
NRHP	National Register of Historic Places
NRM	Natural Resource Manager (Forest Service database)
NRT	National Recreation Trail
ORV	Outstandingly Remarkable Value
PAC	Protected Activity Center
PCE	Primary Constituent Element
PFA	Post-fledging Family Area
PHA	Priority Heritage Asset
PIT	Passport In Time
PNVT	Potential Natural Vegetation Type
PUP	Pesticide Use Permit
RD	Ranger District
RNA	Research Natural Area
SIL	Scenic Integrity Level
SIO	Scenic Integrity Objectives
TCP	Traditional Cultural Property
TES	Threatened, Endangered, and Sensitive [species]
TEUI	Terrestrial Ecological Unit Inventory
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WQA	Wildlife Quiet Area
WUI	Wildland-Urban Interface

Appendix B: Monitoring Discussion & Findings and Adaptive Management Findings Work Sheet

Monitoring Discussion and Findings

Monitoring is conducted for the purpose of determining whether changes are needed to the management of the planning unit, either by changing plan direction or management actions. The process of monitoring can also reveal whether the monitoring protocols are relevant and adequate for identifying potential changes to the plan, or whether the monitoring strategy itself may need to be changed. Each monitoring question discussed in this report is evaluated below for potential changes to monitoring strategy, plan direction, and management actions that may be warranted by results from monitoring. Results from this evaluation are used to inform the Adaptive Management Considerations section of the corresponding question in the main report.

Table B1. Question 1—Soil Health

Question 1: Are long-term soil health and productivity desired conditions being maintained or met?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes
2. What was missing?	
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	Yes. Since monitoring data are collected in project activity areas, Monitoring Strategy and/or Guide should be changed to specifically refer to these areas.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Based on information collected to date, soil health and productivity are improving or at least being maintained, compared to the 1987 TES as baseline.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Results from 2016 and 2017 show that the forests have maintained soil health over the long term, despite landscape-scale wildfires in 2002 and 2011.

Question 1: Are long-term soil health and productivity desired conditions being maintained or met?	Answer
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	prescribed fire, mechanical vegetation treatments, mastication, wildfire, range allotments
11. Describe how those management activities or other events may have influenced the monitoring results.	All of these activities/events cause soil disturbance and changes in soil cover, both of which influence soil health.
12. May change be warranted for management activities in the plan area?	No

Table B2. Question 4—Air Quality

Question 4: Are management activities contributing to desired conditions or improving air quality across the forests in Class 1 (Mount Baldy Wilderness) and Class II airsheds?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes for class I, no for class II; no monitoring was done in class II airsheds.
2. What was missing?	class II data
3. Why was it missing?	Low priority from State of AZ
4. Change to Monitoring Strategy warranted?	No
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes; at least for the class I airshed.

Question 4: Are management activities contributing to desired conditions or improving air quality across the forests in Class 1 (Mount Baldy Wilderness) and Class II airsheds?	Answer
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Long-term trend in air quality appears to be improving for class I airshed.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Smoke from prescribed and wildfires, dust from roads and other sources.
10. If yes, list the management activities or other events that may have influenced the monitoring results.	interagency coordination for smoke management from prescribed fire, dust abatement on roads
11. Describe how those management activities or other events may have influenced the monitoring results.	Coordination of smoke management among agencies is conducted for the purpose of keeping particulates within regulatory limits; dust abatement is intended to reduce fugitive dust from roads.
12. May change be warranted for management activities in the plan area?	No

Table B3. Question 5—TES Habitats

Question 5: Are habitats for threatened, endangered, sensitive, and other species for the forests being maintained or enhanced; meeting recovery objectives; moving toward desired conditions; and contributing to species viability?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes

Question 5: Are habitats for threatened, endangered, sensitive, and other species for the forests being maintained or enhanced; meeting recovery objectives; moving toward desired conditions; and contributing to species viability?	Answer
2. What was missing?	
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	No
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes, terrestrial habitat is progressing toward desired conditions due to actions related to BO compliance as well as management activities designed to enhance habitat. Aquatic habitats are being maintained, but less progress has been made because most habitat management actions are focused solely on BO compliance.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Restoration of upland habitats through project activity has resulted in habitat enhancement at scale. Compliance with BO requirements in aquatic and riparian areas has maintained habitats in those systems.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	Aquatic habitats made little progress because of limited implementation of projects within aquatic ecosystems during FY 2016 and 2017.
8. May a change be warranted for the Forest Plan?	no
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	vegetation management, prescribed fire
11. Describe how those management activities or other events may have influenced the monitoring results.	Habitats are trending toward historical range of variability on upland forest PNVTs.
12. May change be warranted for management activities in the plan area?	Yes; emphasize comprehensive restoration that includes riparian and aquatic habitats.

Table B4. Question 7a—Riparian Ecological Indicator

Question 7a: 7a. What is the effect of management upon habitat trends of ecological indicators (riparian) across the forests?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No results were available for this section.
2. What was missing?	
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	
10. If yes, list the management activities or other events that may have influenced the monitoring results.	
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	

Table B5. Question 7b—Aspen Ecological Indicator

Question 7b: 7b. What is the effect of management upon habitat trends of ecological indicators (aspen) across the forests?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No
2. What was missing?	Data will need to be specifically tied to project activity locations. Baseline data were also temporarily unavailable due to the lack of database querying software capable of reporting results from selected plots within a project area.
3. Why was it missing?	Fixed plot installations were not specifically tied to project activity locations.
4. Change to Monitoring Strategy warranted?	Yes; change timing of data collection from existing plots specified in Guide to reflect the implementation of project activities to address the effects of management on aspen.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Current data are baseline; no trends can be identified yet. To focus results on management actions, will need to make changes to data collection protocols to reflect the locations of management actions.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes

Question 7b: 7b. What is the effect of management upon habitat trends of ecological indicators (aspen) across the forests?	Answer
10. If yes, list the management activities or other events that may have influenced the monitoring results.	wildfire, prescribed fire, mechanical treatments
11. Describe how those management activities or other events may have influenced the monitoring results.	Mechanical treatments on the Forests are used to remove understory conifers from older aspen stands, delaying replacement of the aspen by coniferous species. Stand-replacing wildfires remove the overstory and result in coppice regeneration of aspen, which creates large even-aged stands of young aspen. It is not clear whether either of these processes is reflected in the baseline data collected in 2016-2017 because of the temporary unavailability of those data.
12. May change be warranted for management activities in the plan area?	No

Table B6. Question 9—Focal Species: Mexican Spotted Owl

Question 9: What is the status of Mexican spotted owls as a focal species?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes
2. What was missing?	Broader scale monitoring of Mexican spotted owls at the regional scale. Monitoring of MSO may be part of the Region 3 Broader Scale Monitoring Program, which is in development.
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	No
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes; at the forest scale, Mexican spotted owl populations are being maintained. Regional scale data would reveal larger-scale trends and put the ASNFs' results in context.

Question 9: What is the status of Mexican spotted owls as a focal species?	Answer
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Maintenance of MSO populations between 2013 and 2017 suggests that management actions taken in Mixed Conifer Forest PNVTs on the forests are successfully maintaining the ecological integrity of those systems.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	vegetation management, prescribed fire, managed wildfire
11. Describe how those management activities or other events may have influenced the monitoring results.	Implementation of mitigation measures and project design features that are consistent with the recovery plan should result in improved habitat, which over time should be reflected in MSO occupancy rates.
12. May change be warranted for management activities in the plan area?	No.

Table B7. Question 10—Focal Species: Northern Goshawk

Question 10: What is the status of northern goshawks as a focal species?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No
2. What was missing?	More use of formal monitoring (transect audio surveys) will provide reliable occupancy data.
3. Why was it missing?	inadequate allocation of resources to monitoring

Question 10: What is the status of northern goshawks as a focal species?	Answer
4. Change to Monitoring Strategy warranted?	Yes
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Inconclusive
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Vegetation management, prescribed fire, managed wildfire
10. If yes, list the management activities or other events that may have influenced the monitoring results.	Restoration activities should result in habitat quality improvement over time.
11. Describe how those management activities or other events may have influenced the monitoring results.	Mitigation measures and design features that are consistent with plan components for northern goshawk and ponderosa pine forest should result in overall benefits to northern goshawk populations.
12. May change be warranted for management activities in the plan area?	No

Table B8. Question 11—Focal Species: American Pronghorn

Question 11: What is the status of American pronghorn as a focal species?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes, for the most part

Question 11: What is the status of American pronghorn as a focal species?	Answer
2. What was missing?	AZGFD indicates that they may expand survey flights over the ASNFs to improve the ability for the Forests to make inferences about management activities.
3. Why was it missing?	AZGFD's monitoring protocols in 2016 and 2017 did not reflect ASNFs' monitoring priorities.
4. Change to Monitoring Strategy warranted?	No; this information is baseline
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Because the data collected in FY 2016 and 2017 are baseline, no trend is calculated.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Preliminary observations indicate that in at least one habitat improvement project area, pronghorn use has increased. Future years' data will document this and other improvements.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	Habitat improvement project on the Lakeside RD in 2014 appears to be successful at restoring ecosystem connectivity and function to the grassland ecosystem based on preliminary observations of pronghorn distribution.
11. Describe how those management activities or other events may have influenced the monitoring results.	Removing overstory vegetation from key grassland habitats increases access to high quality habitat and connects habitat areas that were formerly disconnected.
12. May change be warranted for management activities in the plan area?	No

Table B9. Question 12—Grassland Habitats

Question 12: Are management activities contributing to progress towards desired conditions for grassland habitat during the fawning period for American pronghorns?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes
2. What was missing?	
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	No
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes; fawn:doe ratios in AZGFD region 1 for the past 15 years have fluctuated, presumably because of year-to-year variations in conditions, but no clear multi-year trend is discernible in the data. Since 2008, when guidelines for desired values of fawn:doe ratio were set at 20-30, measured ratios have fallen within guidelines 5 out of 9 years.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	The lack of a trend line and general concurrence with desired levels of fawn:doe ratio suggests that the Forests' grassland management is maintaining acceptable habitat conditions during the fawning period.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	Grazing, grassland restoration

Question 12: Are management activities contributing to progress towards desired conditions for grassland habitat during the fawning period for American pronghorns?	Answer
11. Describe how those management activities or other events may have influenced the monitoring results.	Management of grazing by domestic stock directly influences vegetation height and forage species composition, both critical variables determining habitat quality for pronghorns. Restoration of grassland by removal of excess woody overstory should increase availability of habitat to pronghorns.
12. May change be warranted for management activities in the plan area?	No

Table B10. Question 15a—Insects and Diseases

Question 15a: Are insect and disease populations within reference conditions? [. . .]Are their population levels compatible with achieving vegetation desired conditions and management approaches?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes, with best available science.
2. What was missing?	Historical occurrence is unknown for most insects
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	No
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Restoration strategy is designed to increase resilience, health, and resistance to drought, insects, diseases, and anthropogenic climate changes.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	

Question 15a: Are insect and disease populations within reference conditions? [. . .]Are their population levels compatible with achieving vegetation desired conditions and management approaches?	Answer
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	Restoration activities including vegetation management and prescribed fire
11. Describe how those management activities or other events may have influenced the monitoring results.	Restoration of forest vegetation to desired conditions should increase resilience of stands to insect and disease outbreaks
12. May change be warranted for management activities in the plan area?	Yes; accelerate the pace of restoration consistent with Plan direction and capacity.

Table B11. Question 15b—Invasive Plants

Question 15b: Are invasive plant species' populations changing substantially? Are their population levels compatible with achieving vegetation desired conditions and management approaches?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No
2. What was missing?	The Forests need a comprehensive inventory of invasive weeds.
3. Why was it missing?	Noxious weed surveys will need to be funded in association with vegetation management projects.
4. Change to Monitoring Strategy warranted?	Yes; question is good, but PUPs aren't adequate to answer it. The Forests need periodic spatial surveys by species. Surveys should be tied to projects. This can be accomplished by changing the Guide.

Question 15b: Are invasive plant species' populations changing substantially? Are their population levels compatible with achieving vegetation desired conditions and management approaches?	Answer
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Monitoring results are not detailed or comprehensive enough to answer this question.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	Herbicide treatments of known infestations should decrease populations over time, although whether this is happening is in question.
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	Unknown; with better survey data, pesticide applications could be better targeted and/or increased.

Table B12. Question 16—Climate Change Vulnerability

Question 16: Has ASNFs' Climate Change Vulnerability Assessment (CCVA) by ERU changed over the life of the forest plan? How do current climate patterns, over the life of the forest plan, compare to vulnerability predictions for the ASNFs?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No
2. What was missing?	The Midscale Assessment, version 2 of which is due out in FY 2018 and which is planned to be produced every 5 years, will provide insight into the locations and extent of type conversions since the 2012 assessment. Since the CCVA predicts the probability of type conversion by TES unit, the Midscale Assessment can be used to verify predictions in the CCVA. This use of the Midscale Assessment was not anticipated during the preparation of the Guide.
3. Why was it missing?	Midscale assessment is still in preparation.
4. Change to Monitoring Strategy warranted?	Yes; the Monitoring Strategy and the Guide need to be updated to include the use of the Midscale Assessment as a way of detecting type conversions.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Current data are baseline only; no trends have been identified.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No

Question 16: Has ASNFs' Climate Change Vulnerability Assessment (CCVA) by ERU changed over the life of the forest plan? How do current climate patterns, over the life of the forest plan, compare to vulnerability predictions for the ASNFs?	Answer
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	No
10. If yes, list the management activities or other events that may have influenced the monitoring results.	
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	No; maintain current emphasis on ecosystem restoration.

Table B13. Question 21—Recreation Effects on Resources

Question 21: How are recreational activities (including off-highway vehicle use) affecting the physical and biological resources of the forests?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2.
2. What was missing?	No data were provided for this question.
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	The Forests may wish to consider changes to the monitoring strategy to improve link between monitoring data and plan direction and to facilitate data collection in future years.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	

Question 21: How are recreational activities (including off-highway vehicle use) affecting the physical and biological resources of the forests?	Answer
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	
10. If yes, list the management activities or other events that may have influenced the monitoring results.	
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	

Table B14. Question 22—Scenic Integrity

Question 22: How are projects and programs affecting scenic integrity?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2.
2. What was missing?	No data were provided for this question.
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	

Question 22: How are projects and programs affecting scenic integrity?	Answer
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	
10. If yes, list the management activities or other events that may have influenced the monitoring results.	
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	

Table B15. Question 24—Eligible and Suitable Wild and Scenic Rivers

Question 24: Are eligible and suitable wild and scenic rivers being managed to protect and enhance the identified outstandingly remarkable values?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No

Question 24: Are eligible and suitable wild and scenic rivers being managed to protect and enhance the identified outstandingly remarkable values?	Answer
2. What was missing?	A thorough analysis would have included actions implemented during 2016 and 2017 as well as those planned. Reviews of implemented actions were not conducted during the biennium.
3. Why was it missing?	Funding and personnel resources were lacking for these reviews.
4. Change to Monitoring Strategy warranted?	No; implementation of project reviews (already specified in the monitoring strategy) in addition to a review of planned actions will provide a more complete picture of impacts to E/S WSR.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Tentatively yes, based on assessment of planned actions, the Forests are maintaining ORVs and free-flowing condition on E/S WSR segments.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Based on the 2016 and 2017 assessment of planned actions, project planners are successfully designing proposed actions that are compatible with the sustainment of free-flowing condition, outstandingly remarkable values, and classification of E/S WSR segments.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	No
10. If yes, list the management activities or other events that may have influenced the monitoring results.	
11. Describe how those management activities or other events may have influenced the monitoring results.	

Question 24: Are eligible and suitable wild and scenic rivers being managed to protect and enhance the identified outstandingly remarkable values?	Answer
12. May change be warranted for management activities in the plan area?	No

Table B16. Question 25—Wilderness Management

Question 25: Are designated wilderness and the primitive area being managed to maintain the wilderness values and character?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No
2. What was missing?	Need to conduct project reviews to evaluate signed and implemented actions and/or activities, not just MRAs. MRAs may provide an incomplete picture of impacts to wilderness areas.
3. Why was it missing?	Funding and personnel resources were lacking for these reviews.
4. Change to Monitoring Strategy warranted?	Yes; monitoring Strategy is still valid; however, to determine whether the Forests are managing wilderness and the primitive area in compliance with the law, the Guide should be changed to prescribe management reviews and reflect impacts that occur outside of planned project activity (e.g. recreational impacts, fire suppression impacts).
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes; based on the analysis conducted, the Forests are maintaining wilderness values and character.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Planned actions in 2016 and 2017 that could result in trammeling were minimal and would further the restoration of important wilderness values and character.

Question 25: Are designated wilderness and the primitive area being managed to maintain the wilderness values and character?	Answer
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	No
10. If yes, list the management activities or other events that may have influenced the monitoring results.	
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	No; based on the monitoring results in this section, no change to management activities is warranted.

Table B17. Question 26—Recommended Wilderness Management

Question 26: Are recommended wilderness being managed to protect the wilderness values and character?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No
2. What was missing?	A thorough analysis would have included actions implemented during 2016 and 2017 as well as those planned. Reviews of implemented actions were not conducted during the biennium.
3. Why was it missing?	Funding and personnel resources were lacking for these reviews.

Question 26: Are recommended wilderness being managed to protect the wilderness values and character?	Answer
4. Change to Monitoring Strategy warranted?	No; implementation of project reviews in addition to a review of planned actions will provide a more complete picture of impacts to recommended wilderness.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes; planned actions approved in 2016 and 2017 would have no impact on the wilderness values and character of recommended wilderness. Implemented actions were not evaluated.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Based on information reported in this section, recommended wilderness is being managed to protect wilderness values and character.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	No
10. If yes, list the management activities or other events that may have influenced the monitoring results.	
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	No

Table B18. Question 31—Plan Objectives

Question 31: Are plan objectives being achieved?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes, in general.
2. What was missing?	
3. Why was it missing?	
4. Change to Monitoring Strategy warranted?	Yes; we recommend a change to the Guide to better define "wildlife viewing opportunity" for the second objective on p. 72 of the Plan.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Yes; at least some progress was reported on 26 of the Plan's 37 objectives during the biennium. No action was taken on 8 objectives, and no data were reported in either year for the remaining 3.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	Progress was made on most (70%) of the Plan's 37 objectives.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	Of the 8 objectives for which no progress was reported for either year, 2 had ongoing projects that should result in progress in the next biennium, 6 were objectives with deadlines in the future (5 years, end of planning period), and one was not accomplished due to lack of allocated resources. See Table 26 for details.
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	No
10. If yes, list the management activities or other events that may have influenced the monitoring results.	

Question 31: Are plan objectives being achieved?	Answer
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	No

Table B19. Question 32—Adoption of Standards and Guidelines

Question 32: Are the standards and guidelines prescribed being incorporated in NEPA documents and implemented in projects and activities?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. No
2. What was missing?	Validation of implementation through management reviews.
3. Why was it missing?	May need to provide a more detailed mechanism to capture information during management reviews.
4. Change to Monitoring Strategy warranted?	No; both the Monitoring Strategy and the Guide already call for reviews of NEPA documents and management reviews of selected projects and activities.
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Uncertain; documentation of planned consistency is incomplete, and no information was collected on implementation.
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	No planned project action was found to have deviated from Plan standards or guidelines.
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	

Question 32: Are the standards and guidelines prescribed being incorporated in NEPA documents and implemented in projects and activities?	Answer
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	Documentation of planned action consistency with the Plan and implementation of mitigation measures and design features need to be standardized.
11. Describe how those management activities or other events may have influenced the monitoring results.	Incomplete documentation of Plan consistency evaluation and implementation of mitigation measures and design features not only makes monitoring results inaccurate but may impact the Forest Service's ability to respond successfully to objections.
12. May change be warranted for management activities in the plan area?	Yes

Table B20. Question 33—Cultural Resources

Question 33: What is the condition of archaeological sites and traditional cultural properties on ASNFs?	Answer
1. Did the monitoring results provide all the information necessary to answer the monitoring question?	Yes—go to 5. No—go to 2. Yes, with the caveat that reports of inspections may have been omitted from the totals
2. What was missing?	Possibly inspection reports
3. Why was it missing?	Database migration errors and/or procedural issues in reporting
4. Change to Monitoring Strategy warranted?	Yes
5. Based on the monitoring results, are the Forest Plan components progressing, trending, or maintaining as desired or anticipated?	Unknown; trends could not be identified in first 2 years of data.

Question 33: What is the condition of archaeological sites and traditional cultural properties on ASNFs?	Answer
6. If yes, briefly describe the success and go on to question 9. If no, list the monitoring indicators – or other plan components – from the results section that are not progressing, trending, or maintaining as anticipated.	
7. Describe why these Forest Plan components may not be progressing, trending, or maintaining as anticipated.	
8. May a change be warranted for the Forest Plan?	No
9. Did any USFS management activities or other events in the plan area influence the monitoring results?	Yes
10. If yes, list the management activities or other events that may have influenced the monitoring results.	Procedures designed to minimize incidents related to undertakings may not be robust enough to prevent unacceptable levels of damage.
11. Describe how those management activities or other events may have influenced the monitoring results.	
12. May change be warranted for management activities in the plan area?	Yes