

## Coronado National Forest Monitoring Transition to Focal Species

### Introduction

The 2012 Planning Rule (U.S. Department of Agriculture [USDA] Forest Service 2012), hereafter referred to as the 2012 Rule, laid out an adaptive management framework for monitoring, assessing, revising, and amending forest plans. It emphasizes collaboration, requires improved transparency, and strengthens the role of public involvement and dialogue throughout the planning process to better support ecological, social, and economic sustainability. The 2012 Rule provides a scientifically supported foundation for addressing uncertainty and understanding changes in conditions that are the result of management actions or other factors. The monitoring requirements of the 2012 Rule are intended to help the Forest Service take into account new information, adapt to changing conditions, and keep plans current and responsive to meet current and future needs.

Unlike previous planning rules, the 2012 Rule requires that all forest plans follow the monitoring requirements of the 2012 Rule, regardless of which rule they were developed under. The 2012 Rule provides directions for a set of monitoring questions and associated indicators that must be part of every plan monitoring program (USDA Forest Service 2012). The unit's plan monitoring program must contain one or more monitoring questions and associated indicators addressing each of the following:

1. The status of select watershed conditions.
2. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
3. The status of focal species to assess the ecological conditions required under § 219.9.
4. The status of a select set of ecological conditions required under § 219.9 that contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
5. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
6. Measureable changes on the plan area related to climate change and other stressors that may be affecting the plan area.
7. Progress toward meeting desired conditions and objectives, including for providing multiple use opportunities.
8. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).

Additionally, Forest Service management directives require a 9<sup>th</sup> element that addresses social, economic, and cultural sustainability (USDA Forest Service 2015).

The Coronado National Forest Revised Lands and Resource Management Plan (Forest Plan) was approved in 2018 under the 1982 Rule provisions. It incorporated all but the focal species required monitoring plan element (#3 above).

### Focal Species Transition

Focal species are defined by the 2012 Rule as “A small subset of species whose status permits inference to the integrity of the larger ecological system to which it belongs and provides meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area. Focal species would be commonly selected on the basis of their functional role in ecosystems.” (36CFR §219.19).

In the 2012 Rule, Management Indicator Species (MIS) monitoring has been replaced with monitoring of focal species. When making the shift to focal species, the final rule considered the challenges the Forest Service faced in monitoring MIS under the 1982 rule. MIS monitoring has been the subject of much of the legal debate around the species provisions of the 1982 rule. The 2012 Rule does not include requirements to designate MIS or monitor their population trends. The concept of MIS as a surrogate for the status of other species is not supported by current science, and population trends are difficult and sometimes impossible to determine within the lifespan of a plan.

The concept of focal species, however, is well supported in the scientific literature and community. Focal species are not surrogates for the status of other species. Focal species monitoring provides information regarding the effectiveness of the plan in providing the ecological conditions necessary to maintain the diversity of plant and animal communities and the persistence of native species in the plan area. The Committee of Scientists Report (USDA 1999) said focal species may be indicator species, keystone species, ecological engineers, umbrella species, link species, or species of concern.

Agency directives provide guidance for considering the selection of a focal species from these or other categories (USDA Forest Service 2015, § 32.13c). Criteria for selection may include: the number and extent of relevant ecosystems in the plan area; the primary threats or stressors to those ecosystems, especially those related to predominant management activities on the plan area; the sensitivity of the species to changing conditions or their utility in confirming the existence of desired ecological conditions; the broad monitoring questions to be answered; and factors that may limit viability of species. This does not preclude the use of an invasive species as a focal species, whose presence is a major stressor to an ecosystem.

The 2012 Rule does not require managing habitat conditions for focal species, nor does it confer a separate conservation requirement for these species simply based on them being selected as focal species. The 2012 Rule does not require or prohibit monitoring of population trends of focal species. Instead, it allows the use of any existing or emerging approaches for monitoring the status of focal species that are supported by current science. This allows managers greater flexibility for monitoring focal species than was afforded MIS under the 1982 Rule requirements. Further, it facilitates better and more meaningful data that will allow for improved efficiencies and more responsive management within plan time frames (approximately 15 years). Monitoring methods for evaluating the status of focal species may include measures of abundance, distribution, reproduction, presence/absence, area occupied, and/or survival rates. The objective is not to choose the monitoring technique(s) that will provide the most information about the focal species, but to choose a monitoring technique(s) for the focal species that will provide useful information with regard to the purpose for which the species is being monitored. The expectation is that monitoring key ecosystem and watershed conditions, along with monitoring the status of a set of well-chosen focal species, will provide timely information regarding the effectiveness of plan components related to plant and animal diversity.

Focal species are not selected to make inferences about other species. Focal species are selected because they are believed to be responsive to ecological conditions in a way that can inform future plan decisions. Forest Service handbook direction for focal species (USDA Forest Service 2015, § 32.13c) further specifies that every plan monitoring program must identify one or more focal species and one or more monitoring questions and associated indicators addressing the status of the focal species. The purpose for monitoring the status of focal species over time is to provide insight into the following:

1. Integrity of and risks to ecological systems on which focal species depend or that they influence, in the case of keystone species or ecological engineers
2. Effects of management on those ecological conditions, their conditions, and risk factors

3. Effectiveness of the plan components to provide for ecological integrity and maintain or restore ecological condition
4. Progress towards achieving desired conditions and objectives for the plan area

Focal species represent a part of the monitoring requirements for ecological sustainability and diversity of plant and animal communities. “It is not expected that a focal species be selected for every element of ecological conditions” (USDA Forest Service 2012; pg. 21233). Focal species should be selected to monitor when doing so is feasible and they are the best way to track whether ecological integrity and ecosystem diversity is being maintained or improved. Monitoring focal species is intended to address situations where they provide more useful information or are more efficiently monitored than other potential indicators. Focal species are to be carefully selected and monitored when the key ecological indicators of composition, structure, function, and connectivity are either unavailable or difficult to monitor. There may be situations where key ecological indicators could be monitored directly, but monitoring focal species as an overall measure of composition, structure, function, and connectivity may be a more appropriate indicator of integrity.

The requirement for the responsible official to monitor focal species allows discretion to determine the most appropriate method and geographic scale for monitoring, within the financial and technical capabilities of the unit. Some focal species may be monitored at scales beyond the plan area boundary, while others may be more appropriately monitored and assessed within the plan area.

Key considerations for selecting focal species:

- Is the species’ relationship to ecological conditions well understood?
- Is the species responsive to ecological conditions in a way that informs management decisions?
- Would monitoring the species reflect progress toward or maintenance of desired ecological conditions?
- Would the species be a more direct and effective measure of ecological characteristics of interest than other potential monitoring indicators?
- Would the species provide data for multiple purposes?
- Could the species be monitored effectively and efficiently within the Forest’s technical and financial capabilities?
- Is the species difficult to detect (e.g., rare or cryptic)?
- Is the species abundant enough to measure change in status?
- Are there any other factors (hunting, off-forest land use, disease, etc.) that could affect the species’ status that would mask the response to management activities?

### **Identification of Focal Species**

When the Coronado National Forest (Coronado NF) revised its plan in 2018, it identified three MIS: Mexican spotted owl (*Strix occidentalis lucida*), acorn woodpecker (*Melanerpes formicivorus*), and Sonora mud turtle (*Kinosternon sonoriense sonoriense*). After reviewing the purposes for monitoring focal species and the key considerations, the Coronado NF is recommending that: Mexican spotted owl be carried forward as focal species as a good representative for specific ecological conditions within mixed-conifer, Ponderosa pine-evergreen shrub (oak), and Madrean pine-oak woodland habitats; acorn woodpecker as a good representative for Madrean pine-oak and Madrean encinal woodland habitats; and Sonora mud turtle as a good representative for natural and constructed water sources in grassland, Madrean encinal woodland, and Madrean pine-oak woodland habitats.

As expressed through desired conditions, standards, guidelines and objectives in the 2018 revised Forest Plan, fuels treatments (i.e., wildland fire, mechanical, thinning, and/or mastication) are predominant management activities anticipated, particularly in the grassland, interior chaparral, Madrean encinal woodland, Madrean pine-oak woodland, ponderosa pine-evergreen shrub (oak), and mixed-conifer (dry and wet) vegetation communities. In general, the objectives of these vegetation treatments are to move from current conditions of more closed structural classes to desired conditions that include more open structural classes. General descriptions of the aforementioned vegetation communities for which focal species are being proposed as good representatives and associated guidelines and treatment objectives are listed below (see the revised Forest Plan for more detail).

Grasslands make up 23.7% the Coronado NF and include semidesert, plains, and savanna grasslands. Elevations range from 3,200 to 4,600 feet in the semidesert grassland communities, although they may extend beyond this range on steep southern exposures. In the semidesert grassland communities, the predominant species are native grasses including common species such as grammas and threeawns. The vegetation composition and structure of the grasslands are highly departed from reference conditions, and much of the departure is due to increased canopy cover from shrubs as a result of the lack of wildfire among other potential factors. The success of recent planned fire ignitions and mechanical treatments to reduce shrub cover in current and former grasslands indicates the potential for grassland restoration. The objective for this vegetation community is: every 10 years, treat at least 72,500 acres of grasslands using wildland fire (planned and unplanned ignitions), thinning, and mastications. Guidelines include:

1. Some patches of shrubby species, such as mesquites and yuccas, should be retained during fuel reduction projects on sites where they are appropriate under the desired conditions.
2. Vegetation treatments in semidesert grasslands should provide for maintaining a sustainable population of paniculate agaves.

Madrean encinal woodland makes up 43.0% of the Coronado NF and is discontinuously distributed in the mountain foothills at elevations ranging from 3,600 to 6,500 feet. These woodlands grade into grasslands at lower elevations and pine-oak woodlands at higher elevations. Emory oak is present throughout the range of Madrean encinal; however, Mexican blue oak and Arizona white oak are the most common oak species. Current conditions of Madrean encinal woodland are dominated by late-seral closed structural classes, and the goal is to move to desired conditions that include more mid-seral closed structural classes. The objective for this vegetation community will be accomplished by treating at least 367,000 acres of Madrean encinal woodlands using wildland fire (planned and unplanned ignitions) and mechanical treatments (thinning, and mastication) every 10 years. Guidelines include:

1. Fuel reduction and habitat restoration projects should leave clusters of live trees, snags, and shrubs to benefit species that require these structures for breeding, feeding, shelter, and other habitat needs.
2. Vegetation treatments in Madrean encinal woodland should provide for maintaining a sustainable population of paniculate agaves.

Madrean pine-oak woodlands make up 8.3% of the foothills and mountains of the Coronado NF and range from approximately 4,000 to 7,000 feet in elevation. These woodlands are bounded by Madrean encinal woodlands, plains, and savannah grasslands at the lowest elevations, the upper elevations are bounded by ponderosa pine-evergreen shrub (oak) and dry mixed-conifer communities. In Madrean pine-oak woodland communities, the predominant species are native trees including: Arizona white oak, Emory oak, silverleaf oak, alligator juniper, Apache pine, and Chihuahua pine. Current conditions of Madrean pine-oak woodland are dominated by old pine-oak without understory structural classes, and the goal is to move to desired conditions that will maintain old pine-oak with the addition of understory. The objective for this vegetation community will be accomplished by treating at least 25,000 acres of Madrean

pine-oak woodlands using wildland fire (planned and unplanned ignitions), prescribed cutting, and mastication every 10 years. Guidelines include:

1. Vegetation treatments in Madrean pine-oak woodlands should provide for maintaining a sustainable population of paniculate agaves.
2. Clusters of trees, shrubs, and snags should be maintained in treatment areas to benefit species that require these structures for breeding, feeding, shelter, and other needs.
3. Slash piles should be burned in locations and at times that will minimize scorching of adjacent trees and shrubs.
4. An uneven-aged forest management approach should be emphasized; however, both even-aged and uneven-aged systems may be used where appropriate to provide variation in existing stand structure and species diversity.
5. Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 2,000 acres.
6. Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area and/or lack of nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.

Ponderosa pine-evergreen shrub (oak) makes up 2.3% of the Coronado NF and generally occurs as a discontinuous band of vegetation at elevations ranging from approximately 5,000 to 10,000 feet. This community is dominated by ponderosa and Arizona pines and is interspersed in the transition between the Madrean pine-oak woodland and mixed-conifer vegetation types. Current conditions of Ponderosa pine-evergreen shrub (oak) are dominated by old with grass, closed structural classes, and the goal is to move to desired conditions that include more old with grass, closed and young with grass, moderate cover structural classes. The objective for this vegetation community will be accomplished by: every 10 years, treat at least 12,500 acres of ponderosa pine-evergreen shrub (oak) using wildland fire (planned and unplanned ignitions) and mechanical treatments (prescribed cutting and mastication). Guidelines include:

1. Vegetation treatments reflect the characteristic structure stage proportions in order to provide continuous representation of old growth and all structure stages on the landscape.
2. Slash piles from harvest activities should be burned in locations and at times that will minimize scorching of adjacent trees and shrubs.
3. Fuel reduction or fuelwood gathering projects should retain some large-diameter trees, snags and shrubs, and these should be protected well enough from scorching to survive subsequent burn treatments.
4. Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 2,000 acres.
5. Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area and/or lack of nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.

Mixed-conifer forest makes up 3.2% of the Coronado NF and is an upper elevation coniferous forest composed of multiple species. Douglas-fir is common throughout this type. Composed of both wet and dry mixed-conifer forest types, this vegetation community generally occurs at elevations ranging from approximately 5,500 to 10,000 feet. This community is transitional, merging with the ponderosa pine-evergreen shrub (oak) community at lower elevations and with spruce-fir forest at higher elevations in the Pinaleño Mountains. Current conditions of dry mixed-conifer are dominated by mid-aged and mature/old

generation, closed structural classes, and the goal is to move to desired conditions of mature/old with regeneration, open structural classes. Current conditions of wet mixed-conifer are dominated by aspen/mixed deciduous, small-medium mixed-conifer, and old mixed-conifer with regeneration structural classes; the goal is to move to desired conditions of increased aspen/mixed deciduous and old mixed-conifer with regeneration structural classes and decreased small-medium mixed-conifer structural classes. The objectives are: treat at least 13,800 acres dry mixed conifer and 2,400 acres of wet mixed conifer using wildland fire (planned and unplanned ignitions) and prescribed cutting every 10 years.

Guidelines for dry mixed-conifer include:

1. Vegetation treatments reflect the characteristic structure stage proportions in order to provide continuous representation of old growth and all structure stages on the landscape.
2. Slash piles should be burned in locations and at times that will minimize scorching of adjacent trees and shrubs.
3. Fuel reduction or firewood gathering projects should retain some large diameter trees, snags and shrubs, and these should be protected well enough from scorching to survive subsequent burn treatments.
4. Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 2,000 acres.
5. Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area and/or lack or nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.

Guidelines for wet mixed-conifer include:

1. Vegetation treatments reflect the characteristic structure stage proportions in order to provide continuous representation of old growth and all structure stages on the landscape.
2. Slash piles should be burned in locations and at times that will minimize scorching of adjacent trees and shrubs.
3. Vegetation treatments should be designed to create stand conditions that enhance cone production of white fir, corkbark fir, Engelmann spruce, and Douglas-fir in order to provide a reliable Mount Graham red squirrel food source.
4. Fuel reduction or fuelwood gathering projects should retain some large diameter trees, snags and shrubs, and these should be protected well enough from scorching to survive subsequent burn treatments.
5. Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 1,000 acres.
6. Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area and/or lack or nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.

Natural water sources on the Coronado NF include approximately 100 miles of perennial streams, many more miles of ephemeral and intermittent tributaries to more major streams and drainages, and approximately 1,500 springs and seeps. The objectives for natural water sources are:

1. Every 10 years, apply for at least 10 instream flow water rights on streams for recreation and wildlife purposes, prioritizing locations necessary for sustaining native fish populations and species of conservation concern.
2. Reconstruct at least 3 developed springs every 10 years to provide aquatic habitat for the recovery of plant and/or animal species.

Guidelines for natural water sources include:

1. Projects in upland habitats adjacent to streams should be designed to minimize input of sediment to streams.
2. Water quality, quantity, soil function and structure, and wildlife habitat (including aquatic species habitat) should be protected or enhanced at natural springs and seeps.
3. Fuel buildup should be reduced around natural water sources to protect them from uncharacteristic fire effects.
4. Management activities should not impair soil moisture recharge at outflows of natural water sources.
5. Vegetation treatments should favor the retention of snags, large-diameter woody debris, and growth of large riparian trees along stream channels.
6. Fences constructed around natural waters should allow bats and other desirable wildlife to pass through unharmed.
7. New road construction near springs and seeps should be avoided, unless alternate routes have greater overall resource impacts. If road construction near springs and seeps is unavoidable, it should be designed and implemented to minimize effects to natural water flow and aquatic species.
8. Projects affecting perennial streams should be designed and constructed to allow for natural instream movement of aquatic species, except where barriers are necessary to preclude the movement of nonnative species.

Constructed water sources on the Coronado NF include approximately 400 developed springs, 300 wells, and 1,100 stock ponds. These water features provide surface water resources, in many cases perennial sources, which augment natural water resources. Structures include earthen stockponds, reservoirs, such as tanks, wildlife drinkers, and concrete or steel storage tanks or watering troughs fed by a natural spring, groundwater well, or stream diversion. The objective for constructed waters is: install wildlife escape ramps in all aboveground constructed waters within 10 years of plan approval. Guidelines include:

1. Wildlife escape ramps should extend to the bottom and near the edge of aboveground constructed waters, and at an angle to avoid entrapment of wildlife in constructed water facilities.
2. Artificial waters constructed for livestock should be designed and/or retrofitted to provide a year-round drinking and habitat resource for native wildlife.
3. Overflow should be diverted to allow for soil moisture recharge and creation or maintenance of wetland habitat features.

The emphasis on fuels reduction activities in these vegetation communities was a key consideration in identifying focal species for those habitats. Some other considerations the Coronado NF used in determining how many and which ecological conditions to select focal species for included the existing departure from desired conditions and trend of vegetation communities, whether active management activities are anticipated in those types as identified in objectives, the existence of standardized

monitoring protocols, existing information on potential species, monitoring efficiencies (ability to monitor multiple species with one method/protocol), and the ability to partner with others to conduct the monitoring (e.g., other agencies and non-governmental organizations). Considering all of those factors, the 2012 Rule definition of focal species, and specified goals and requirements for identifying focal species, the Coronado NF is recommending the following three species as focal species.

#### Mexican Spotted Owl

On the Coronado NF, the Mexican spotted owl (MSO) serves as an indicator of mixed-conifer, Ponderosa pine-evergreen shrub (oak), and Madrean pine-oak woodland habitats. In general, MSO prefer late seral forests containing mature or old-growth, complex, uneven-aged, multistoried stands with high canopy cover that offer habitats for nesting, roosting, and foraging (Corman and Wise 2005, U.S. Fish and Wildlife Service 2012). Throughout the species' range, it is often, but not always, associated with steep topography, although the MSO also occurs in areas of gentle terrain, as long as suitable forest structure exists. The proposed treatments in combination with the varied desired conditions for the habitat types in which the MSO occurs on the Coronado NF should result in the return to the diversity of habitats and structures that MSO prefer: for dry mixed-conifer, moving to mature/old with regeneration, open structural classes; for wet mixed-conifer, increased aspen/mixed deciduous and old mixed-conifer with regeneration structural classes; for Ponderosa pine-evergreen shrub (oak), moving to more old with grass, closed and young with grass, moderate cover structural classes; and for Madrean pine-oak woodland, maintaining old pine-oak with the addition of understory. Although these vegetation treatments may have short-term impacts to MSO, these treatments are expected to result in long-term sustainability and increased resilience to stand-replacing fires and insect outbreaks. As the Coronado NF moves forward with vegetation treatment efforts, monitoring the MSO will help evaluate the persistence of ecological conditions of mixed-conifer, Ponderosa pine-evergreen shrub (oak), and Madrean pine-oak woodland habitats that support nesting MSO.

#### Acorn Woodpecker

The acorn woodpecker is recommended as a focal species for the Madrean encinal and Madrean pine-oak woodlands vegetation communities and, to a lesser extent, Ponderosa pine-evergreen shrub (oak). This species requires mature oaks for food sources and for nest cavities in snags. The acorn woodpecker is widespread and common across the Coronado NF. The proposed treatments in combination with the varied desired conditions for the habitat types in which the acorn woodpecker occurs on the Coronado NF should result in the return to the diversity of habitats and structures that acorn woodpecker prefer: for Madrean encinal woodland, moving from late- to more mid-seral closed structural classes; for Madrean pine-oak woodland, maintaining old pine-oak with the addition of understory; and for Ponderosa pine-evergreen shrub (oak), moving to more old with grass, closed and young with grass, moderate cover structural classes. Although these vegetation treatments may result in a reduction of mature oaks in Madrean encinal woodlands, these treatments are expected to maintain the old structural classes in Madrean pine-oak woodland and Ponderosa pine-evergreen shrub (oak) and result in long-term sustainability and increased resilience to stand-replacing fires and insect outbreaks. As the Coronado NF moves forward with fuels vegetation treatment efforts, monitoring the acorn woodpecker will help evaluate the persistence of ecological conditions of Madrean encinal and Madrean pine-oak woodlands and Ponderosa pine-evergreen shrub (oak) that support acorn woodpeckers.

#### Sonora Mud Turtle

The Sonora mud turtle is recommended as a focal species for natural and constructed water sources in grassland, Madrean encinal woodland, and Madrean pine-oak woodland vegetation communities because it can be found in a variety of habitat settings where permanent water is found. Although it is associated with permanent waters, it may be restricted to perennial pools during droughts. The proposed treatments in combination with the varied habitat types in which the Sonora mud turtle occurs on the Coronado NF is expected to result in: minimized input of sediment to streams; protected or enhanced water quality,



quantity, soil function and structure, and wildlife habitat (including aquatic species habitat) at natural springs and seeps; and reduced fuel buildup around natural water sources to protect them from uncharacteristic fire effects. Although these vegetation treatments may result in minimal, short-term, temporary impacts to natural and constructed water sources (e.g., increased sedimentation and decreased water quality), they are expected to result in long-term sustainability and increased resilience to stand-replacing fires and insect outbreaks and, hence, healthier watersheds that feed into waters. As the Coronado NF moves forward with vegetation treatment efforts and activities that promote resiliency of natural and constructed water features, monitoring the Sonora mud turtle will help evaluate the persistence of ecological conditions of natural and constructed water sources that support Sonora mud turtles.

## **Strategy for Monitoring Focal Species**

### Mexican Spotted Owl

The 2012 revised MSO recovery plan recommended that the population be monitored by estimating the rate of site occupancy for a period of 10 years. The Regional Office contracted with Bird Conservancy of the Rockies (BCOR, formerly Rocky Mountain Bird Observatory or RMBO) to conduct a 2014 pilot study implementing the monitoring protocol from the recovery plan. Based on the results of the pilot study, a random subsample of 200 sites were selected on National Forest lands in Arizona and New Mexico to monitor for the duration of the study. Thirteen of those sites occur on the Coronado NF. BCOR has continued to monitor from 2015-2019, and will continue through 2023. Results to date show that site occupancy increased from 2014 to 2016 and decreased from 2016 to 2018 (Lanier and Blakesly 2018).

### Acorn Woodpecker

Birds are relatively easy to survey because data can be collected on many species at one time, and there are a couple strategies for monitoring acorn woodpeckers on the Coronado NF:

- There are seven Important Bird Areas (IBAs) within six of the 12 Ecosystem Management Areas (EMAs) on the Coronado NF. Arizona's IBA program was established with the Audubon Society in 2001 and is co-administered between Audubon Arizona and the Tucson Audubon Society. The Tucson Audubon Arizona IBA Program office coordinates the Avian Science Initiative and Southern Arizona IBA Conservation Initiative; the Avian Science Initiative is an effort to collect science-based bird survey inventory data at sites for IBA identification and continued monitoring at priority Identified IBAs through citizen and agency efforts. The Tucson Audubon Arizona IBA Program office is funded by the Arizona Game and Fish Department (AGFD) (contracts renewed every 5 years) which manages all IBA bird survey data and a web accessible AZ IBA Bird Survey Database (aziba.org) that allows analysis and reports of bird survey data from IBA survey locations to both participants and partnering agencies. The Tucson Audubon Society enters all survey data into their IBA database as well as eBird, and queries can be made by IBA and date(s) resulting in maps (e.g., presence), frequency, and abundance per species.
- Forest-wide breeding bird surveys were conducted on the Coronado NF by BCOR in 2013. BCOR coordinates the Integrated Monitoring in Bird Conservation Regions (IMBCR) in the west. The program uses a statistically rigorous design based on random sampling, and survey data are analyzed using widely accepted statistical methods. With enough samples, the methodology yields robust and statistically sound density and/or occupancy estimates. The protocol records all birds detected along completed survey transects, so separate monitoring efforts are not required for the each species. On the Coronado NF, survey data have yielded robust occupancy and density estimates for the acorn woodpecker. These data serve as a solid baseline for future analyses and monitoring, and continuing BCOR surveys would provide a feasible and efficient way to monitor acorn woodpeckers and all birds on the Coronado NF. The survey methodology

also incorporates data collection on fine-scale vegetation variables at each point count station, which can be incorporated into data analyses in the future.

#### Sonora Mud Turtle

The AGFD conducts surveys for Chiricahua leopard frog (CLF) within all or portions of seven of the eight recovery units (RUs) for this species; the Coronado NF is within four RUs. Sites are surveyed three times annually: spring (February-April), summer (June-July), and post-monsoon. AGFD also collects data on incidental observations of other aquatic species, such as Sonora mud turtle, and this information could provide information on trends of occupancy and frequency of this species in natural and constructed water sources where CLF surveys are conducted. Further, the Coronado NF has been approached by and is considered partnering with the Department of Defense (DoD) and the Rocky Mountain Research Station (RMRS) in a multi-year effort to engage military installations and regional partners to accomplish collaborative, environmental DNA (eDNA) monitoring in the Southwest region. It is unclear, however, whether eDNA would be the best approach for this species, as some pilot studies suggest that detection probabilities for turtles may be low; therefore, testing at known sites for this species would be conducted to assess prior to committing to this method.

### **Forest Plan Monitoring Strategy Updates**

#### Mexican Spotted Owl

**Questions:** Are post-treatment conditions and plan components guiding fuels reduction and forest restoration activities consistent with and moving toward desired ecological conditions within mixed conifer, Ponderosa pine-evergreen shrub (oak), and Madrean pine-oak woodland habitats that contribute to stable or increasing MSO populations? How have populations and distributions of MSO changed?

**Metric:** Site occupancy; pre- and post-project implementation monitoring of occupancy of Protected Activity Centers and reproductive success.

**Data Source(s):** Regional BCOR MSO site occupancy data (given funding); forest data on occupancy of Protected Activity Centers and reproductive success.

#### Acorn Woodpecker

**Questions:** Are post-treatment conditions and plan components guiding fuels reduction and forest restoration activities consistent with and moving toward ecological conditions within Madrean encinal and Madrean pine-oak woodlands, and Ponderosa pine-evergreen shrub (oak) habitats that contribute to stable or increasing acorn woodpecker populations? How have populations and distribution of acorn woodpeckers changed?

**Metric:** Trends in occupancy, frequency, abundance, and density.

**Data Source(s):** Arizona IBA, eBird, and BCOR (given funding).

#### Sonora Mud Turtle

**Questions:** Are post-treatment conditions and plan components guiding management activities consistent with and moving toward ecological conditions within natural and constructed waters found in grassland, Madrean encinal woodland, and Madrean pine-oak woodland habitats that contribute to stable or increasing Sonora mud turtle populations? How have populations and distribution of Sonora mud turtles changed?

**Metric:** Trends in occupancy, frequency, abundance, and density.

**Data Source(s):** Data collected by AGFD during CLF surveys; via eDNA through partnership with DoD and RMRS (given funding).

### ***Literature Cited***

- Corman, T.E. and C. Wise-Gervais, eds. 2005. Arizona Breeding Bird Atlas. University of New Mexico Press. Albuquerque, NM. 636 pp.
- Lanier, W.E., and J.A. Blakesley. 2018. Site Occupancy by Mexican Spotted Owls (*Strix occidentalis lucida*) in the US Forest Service Southwestern Region, 2018. Bird Conservancy of the Rockies. Brighton, Colorado, USA.
- USDA Forest Service. 2012. National Forest System Land Management Planning. Final rule and record of decision. Federal Register Vol. 77, No. 68, pp. 21162-21276.
- USDA Forest Service. 2015. FSH 1909.12 - Land Management Planning Handbook; Chapter 30 – Monitoring. Amendment No. 1909.12-2015-1. National Headquarters (WO), Washington, D.C.
- U.S. Fish and Wildlife Service. 2012. Final Recovery Plan for the Mexican Spotted Owl (*Strix occidentalis lucida*), First Revision. U.S. Fish and Wildlife Service. Albuquerque, New Mexico, USA. 413 pp.