

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513

In Reply Refer To:
AESO/SE
02EAAZ00-2014-F-0207

August 14, 2014

Mr. M. Earl Stewart
Forest Supervisor
Coconino National Forest
1824 South Thompson Street
Flagstaff, Arizona 86001-2529

RE: Windmill West Range Allotment

Dear Mr. Stewart:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request and biological assessment (BA) were dated March 31, 2014, and received by us on April 3, 2014. This consultation concerns the possible effects of livestock grazing and management activities on the Windmill West Range Allotment (WWRA) located on the Red Rock Ranger and Flagstaff Ranger Districts, Coconino National Forest (NF) in Coconino and Yavapai Counties, Arizona. The Forest Service has determined that the proposed action may affect the endangered Arizona cliffrose (*Purshia subintegra*).

Your letter also requested our concurrence that the proposed action may affect, but is not likely to adversely affect the Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat, southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat, the narrow-headed gartersnake (*Thamnophis rufipunctatus*) and its proposed critical habitat, the northern Mexican gartersnake (*Thamnophis eques*) and its proposed critical habitat, Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*) and its critical habitat, spikedace (*Meda fulgida*) and its critical habitat, loach minnow (*Tiaroga cobitis*) and its critical habitat, Gila topminnow (*Poeciliopsis occidentalis occidentalis*), the proposed western yellow-billed cuckoo (*Coccyzus americanus*), and the candidate roundtail chub (*Gila robusta*). We concur with your determinations. The basis for our concurrences is found in Appendix B.

You letter also requested our review and technical assistance regarding bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). The BA also requested that we provide our technical assistance with respect to compliance with the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) for bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). Our documentation of the Forest Service's implementation of minimization measures to reduce the likelihood of take is included in Appendix C.

This biological opinion is based on information provided in the March 2014, BA, conversations and electronic correspondence with your staff, and other sources of information found in the administrative record supporting this biological opinion. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

Details of the consultation history are summarized in Table 1.

Table 1. Summary of Consultation History

Date	Event
September 27, 1995	We issued a non-jeopardy biological opinion for effects to the southwestern willow flycatcher on the Windmill Allotment.
October 28, 1997	We issued a non-jeopardy/no adverse modification biological opinion for effects to the Arizona cliffrose, razorback sucker, and razorback sucker critical habitat on the Windmill Allotment.
May 28, 1998	We issued an amendment to our October 28, 1997, biological opinion.
February 2000	The Forest Service initiated a revision to the existing Final Environmental Impact Statement for the Windmill Allotment. This revision was never completed. Since this time, the Forest Service has managed the Windmill Allotment through Annual Operating Instructions.
May 2, 2000	We met with Forest Service staff to discuss a revised draft proposed action for the Windmill Allotment. The goal of the meeting was to modify the proposed action to maintain or improve habitat for and reduce/avoid adverse effects to listed species.
July 10, 2000	We received a July 6, 2000, letter from the Forest Service withdrawing the Windmill Allotment Environmental Impact Statement. Attached to this letter was a new proposed action for the area.
February 21, 2003	We met with Forest Service staff to discuss the planning process for several allotments, including the Windmill Allotment.
2003 to 2012	The Forest Service worked on revising management of the Windmill Allotment and divided the Windmill Allotment into two allotments – Windmill and Windmill West.
March 22, 2012	We received your March 20, 2012, letter informing us that the permittee requested and was granted applicant status for the WWRA.
November 21, 2012	We met with Forest Service staff to discuss the planning effort for the WWRA.

December 11, 2012	We received a copy of the December 10, 2012, public scoping letter for the project.
April 3, 2014	We received your March 31, 2014, request for formal consultation and the BA.
May 8, 2014	We issued a thirty-day letter initiating formal consultation.

DESCRIPTION OF THE PROPOSED ACTION

The WWRA is located on the Flagstaff and Red Rock Ranger Districts of the Coconino NF and is administered and managed by the Flagstaff Ranger District. The allotment is generally located southwest of Flagstaff and west of Sedona; roughly bounded by Highway 89A to the east, the city of Cottonwood to the south, the Coconino NF boundary to the west, and Interstate 40 to the north. The Mogollon Rim bisects the allotment delineating the summer range to the north and winter range to the south. Elevations range from 3,300 feet in the winter range on the Red Rock Ranger District to 7,500 feet in the summer range on the Flagstaff Ranger District. Vegetation communities adhere to typical elevation regimes: ponderosa pine, mountain meadows and mixed conifer forests are present in the higher elevations (summer range); pinyon/juniper woodlands, chaparral, semi-desert grasslands and desert scrub are typical at the mid- to lower elevations (winter range).

The WWRA is approximately 154,000 acres in size. Land ownership within the allotment includes approximately 140,500 acres of National Forest System (NFS) lands and approximately 13,500 acres of Arizona State Trust land or private land. The Coconino NF only has management jurisdiction over NFS land, the remaining acreage is managed by the Arizona State Land Department (ASLD) or private land owners (Figure 1, Appendix A). Of the 140,500 acres managed by the Coconino NF, approximately 32,400 acres have not been actively grazed in the past 10 years.

The action area includes all lands within the WWRA boundary plus a 0.50 mile area outside of and adjacent to the allotment boundary. Although we do not expect effects to Arizona cliffrose to extend beyond the allotment boundary, for the purposes of this consultation (including our concurrences in Appendix A), we have defined the action area as all areas to be affected directly or indirectly by the proposed action, and not merely the immediate area involved in the action (50 CFR § 402.02).

The Proposed Action consists of six components: authorization, improvements, vegetation treatments, monitoring, adaptive management, and resource protection measures. The proposed action follows current guidance from Forest Service Handbook (FSH) 2209.13, Chapter 90 (Grazing Permit Administration; Rangeland Management Decision making).

Authorization

The Coconino NF proposes to continue to authorize yearlong livestock grazing for the WWRA under the following terms:

- **Permitted livestock numbers** in the Term Grazing Permit would be a maximum of 565 head of adult cattle or 6,780 Animal Unit Months (AUMs). This stocking rate is based on existing conditions; however, authorized livestock numbers would be determined on an annual basis, based on the previous year's utilization levels and current year's existing

and predicted forage production, available water, and precipitation levels. Adjustments to the annual authorized livestock numbers (increase or decrease) may occur during the grazing year, based on conditions and/or range inspections. Annual authorized livestock numbers would not exceed permitted numbers.

- **Annual authorized livestock numbers** would be based on existing conditions, available water and forage, and predicted forage production for the year. Adjustments to the annual authorized livestock numbers and AUMs (increase or decrease) may occur during the grazing year, based on conditions and/or range inspections.
- **The permitted season of use** would be yearlong.
- **Grazing Management** would use a rotational system (either a deferred rotation system or a deferred rest-rotation system), which would allow for plant growth and recovery. Generally pastures would be grazed only once during the grazing year. However, pasture re-entry may be needed to facilitate livestock movement on the allotment. Pastures would be grazed no more than once per year unless authorized by the Responsible Official when conditions warrant. Pasture re-entry would only be authorized if it has been determined through range inspections that soil, water and vegetation conditions are appropriate, and that utilization guidelines for the pasture would not be exceeded as a result of re-entry.
- **Utilization** is defined as the proportion or degree of current year's forage production that is consumed or destroyed by animals (including insects). A management guideline of 30 to 40 percent forage utilization (as measured at the end of the growing season) would be employed to maintain or improve rangeland vegetation and long term soil productivity. Within riparian areas, allowable use would not exceed 20 percent on the woody vegetation. This number (20%) does take into account the cumulative browsing effects of wildlife and livestock.
- **Grazing Intensity** is defined as the amount of herbage removed through grazing or trampling during the growing period. Grazing intensity would be managed to allow for the physiological needs of plants. For the summer range, the Forest Service would manage for 30 to 50 percent grazing intensity in the late spring to early summer months when sufficient opportunity exists for plant regrowth. During the remainder of the summer grazing period, grazing intensity would be managed at 30 to 40 percent when the potential for plant regrowth is limited. For the winter range, the Forest would manage for 30 to 40 percent grazing intensity. On both summer and winter ranges, grazing intensity would be managed to allow for the physiological needs of plants.
- **Pasture Use Periods** are approximately 5 to 60 days within each pasture and would be based upon climatic conditions, existing and predicted forage production, pasture size, authorized livestock numbers and the need to provide for plant regrowth following grazing. Other factors that may occasionally affect the grazing period include drought and wildfires. The length of the grazing period within each pasture may be slightly modified from that authorized in the AOI based on monitoring information in order to consider and manage for the desired grazing intensity and utilization guidelines. Movement between the summer and winter ranges would also be based on vegetation and

climatic conditions, but would generally be for approximately six months at a time in each range.

- **Trailing** of livestock currently occurs between the summer range and winter range via the Historic Mooney Livestock Trail in the Black Tank pasture; use of the Mooney Trail would continue as part of this proposed action. The Mooney Trail is about 4.5 miles long, extending from the Flagstaff Ranger District (Township 19 North, Range 4 East, Section 35) south to the Red Rock Ranger District (Township 18 North, Range 4 East, Section 16) and is located within the Casner Mountain and Black Tank pastures. Approximately 0.5 mile of the trail is located on private land. The Winter Cabin Livestock Driveway would also be retained as part of the allotment and used to move livestock between Winter Cabin Holding and Lockwood Springs pastures.
- **Monitoring** will be implemented to measure the utilization of new growth of Arizona cliffrose by wildlife and livestock in the North Gyberg pasture. This monitoring will aid managers in determining length of use and effectiveness of proposed management designed to protect cliffrose from livestock. The monitoring method is described in Appendix A of the BA (pages 81-84).

Drought Management Strategy

Allotment management would be adjusted during drought conditions. Following FSH 2209.13, the Standardized Precipitation Index (SPI), combined with site-specific information, would be used to assess moisture conditions. Using the SPI as a baseline and combining it with site-specific information from monitoring plots, a determination for drought would be made, and adaptive management alternatives would be evaluated.

The Southwestern Region of the Forest Service and the Coconino NF drought management policies identify numerous adaptive management actions for mitigating grazing effects during drought. The following management actions would be used on the WWRA allotment during periods of drought:

- Stocking levels (livestock numbers) may need to be reduced. Reductions may be necessary prior to the permitted season of use and/or during the permitted season of use.
- Season of use may need to be shortened. Depending on the severity of the drought and the stocking level, a reduced grazing season may be necessary.
- Pasture use periods may need to be shortened. Pastures will not be grazed twice during the same grazing season, and this may ultimately result in an early exit from the allotment.
- Pastures may need complete rest from livestock use. How long a pasture, or pastures, would be rested depends on the severity of the drought.
- Utilization and/or grazing intensity levels may need to be reduced. Depending on the severity of the drought and the stocking level, reduced utilization and/or grazing intensity levels will likely result in shortened pasture use periods and may ultimately result in an early exit from the allotment.

- Lack of livestock water, or poor distribution of livestock water, may result in reduced pasture/allotment use periods.
- Livestock use of planned rested pastures due to drought will not be authorized.

Any adaptive management actions necessary due to drought conditions would be made by the Responsible Official after consulting the Range Specialist and the permittee.

Pastures Removed from the Allotment

The North Sycamore, South Sycamore, Loy Canyon, Secret Mountain, South Gyberg, #60, #51 pastures and part of the Winter Cabin pasture would be removed from the WWRA and closed to grazing, for the following reasons:

- North Sycamore, South Sycamore, Loy Canyon, Secret Mountain, #60, #51 and part of Winter Cabin have not been grazed in the past 10 to 15 years due in part to how difficult it is to manage livestock in these areas, and would be officially closed to grazing under this proposal. However, a portion of Winter Cabin, approximately 280 acres located on the eastern side of the pasture, would remain in the Windmill West allotment to continue serving as a livestock driveway between adjacent pastures.
- South Gyberg pasture would be removed from the Windmill West grazing allotment and closed to grazing. South Gyberg pasture has not been grazed in the past 10 years due to occurrence of Arizona cliffrose.

Black Springs pasture was removed from the Windmill Allotment through a 1987 Forest Service decision; therefore, since it is not part of the WWRA, livestock grazing use in this pasture is outside the scope of this analysis.

Structural Range Improvements

In order to protect the wetland vegetation in Rogers Lake, about 0.5 mile of fence would be constructed along the section line between sections 31 and 6 in the Rogers Lake pasture to create a new pasture (North Rogers Lake). This fence would exclude livestock from section 31 while allowing livestock to graze the rest of Rogers Lake pasture. A gate would be constructed along the fence to allow livestock grazing to occur in the new North Rogers Lake pasture a) after July 15 and b) if wildlife utilization of riparian species in Rogers Lake has not exceeded 20 percent utilization of woody vegetation, or 40 percent utilization of other emergent vegetation. The proposed fencing would be constructed to wildlife specifications to facilitate safe wildlife passage.

If necessary to protect wetland vegetation in Fry Lake and to permit grazing of the Fry Park East pasture prior to July 15, approximately 1.5 miles of livestock enclosure fence may be constructed. The livestock enclosure fence would include a fenced lane to the existing earthen stock pond in Fry Lake to allow for livestock watering. For the first two years, grazing would not occur in the Fry Park East pasture until after July 15. Afterwards, as part of the adaptive management options, upland vegetation in Fry Park West, Harding Point, Mexican Pocket, and Mill Park pastures would be monitored for condition and trend to determine if these pastures are

being used too much at the same time of year. If monitoring indicates a downward trend in native plant community abundance and diversity in these pastures, or if the permittee requests increased flexibility in pasture rotations, the emergent vegetation and surrounding upland buffer around Fry Lake would be fenced.

Fifteen springs are known to occur on the WWRA, nine of which occur on pastures proposed for closure from grazing (see Table 1 in BA, page 7). Of the remaining springs, Maple and Buzzard Springs are located in canyons and are inaccessible to livestock, and Bunker Hill occurs in the Winter Cabin Holding pasture, which is only used roughly less than 10 days a year. Restoration activities, including fencing, for Lockwood Springs are proposed to aid in the restoration of riparian vegetation, and to protect the spring and associated riparian areas from livestock and wild ungulate browsing. Spring developments at Paterson Spring and Barney Spring are currently not functional because of lack of water and so no additional protections are being proposed at this time. Paterson Spring is located in the North Rogers Lake pasture which is proposed for infrequent and low intensity use of livestock for the purpose of maintaining riparian condition and function. If the drinker at Paterson Spring becomes functional in the future, this spring may be partially fenced. Proposed restoration activities include enclosure fencing that would still allow livestock and wildlife access to the existing drinkers but would restrict access to Lockwood Spring, and may also include re-plumbing the spring box to allow a portion of the water to discharge near the spring's natural emergence area.

All range improvements would follow the Forest Service Construction Guidelines.

Vegetation Treatments

Vegetation treatments are proposed to improve soil condition, herbaceous cover, and watershed health on up to 3,179 acres of unsatisfactory and impaired soils within the winter range of the WWRA. Proposed treatments would include hand thinning of juniper trees to reduce the canopy cover of these species toward desired conditions. Lopping and scattering of the resultant slash on site would be employed to aid in soil protection and nutrient cycling. Thinning treatments are being proposed where potential juniper canopy cover, as identified in Terrestrial Ecosystem Survey (TES), is less than 10% and current juniper canopy cover exceeds 10%. These conditions have been noted in portions of six pastures: Greasy West, Greasy East, Malpais, Black Tank, Red, and DK Unit.

Observations of plant recovery in previously treated areas similar to the ones proposed indicate minimal effects on herbaceous vegetation recovery by ongoing livestock grazing; however, if post-treatment monitoring shows cattle are congregating in treatment areas and impacting herbaceous vegetation establishment or recovery, pastures being treated may be deferred or rested from grazing through use of the rest-rotation schedule for up to one year after treatment to facilitate vegetation recovery. In areas where canopy cover exceeds 40 percent, seeding may be necessary to facilitate vegetation recovery. Hand broadcast seeding would be done with a native herbaceous seed mix consistent with TES potential vegetation data.

Monitoring

Two types of monitoring would be used for monitoring vegetation, implementation monitoring and effectiveness monitoring:

- Implementation monitoring would be conducted on an annual basis and would include, but is not limited to: livestock actual use, grazing intensity evaluations during the grazing season (within key areas), utilization at the end of the growing season (within key areas) in order to practice adaptive management and make necessary management changes needed for plant development and plant recovery from livestock grazing. Managing for plant development and recovery will provide for increased ground cover and potential changes in species composition. Implementation monitoring may also include the condition of range improvements and deviations from the AOI.
- Effectiveness monitoring to evaluate the success of management in achieving the desired objectives would occur within key areas on permanent transects at an interval of 10 years or less. Effectiveness monitoring may also be conducted if data and observations from implementation monitoring indicate a need. Monitoring frequency of vegetation and soil condition and trend would be accomplished collaboratively by Forest Service personnel, permittee, and cooperating agencies as funding, personnel, and time are available. Both qualitative and quantitative monitoring methods would be used in accordance with the Interagency Technical References, Region 3 Rangeland Analysis and Management Training Guide, and the Region 3 Allotment Analysis Handbook.

As described earlier, specific Arizona cliffrose monitoring will also be conducted to estimate the utilization of new plant growth by wildlife and livestock in the North Gyberg pasture (see BA, pages 81-84).

Adaptive Management

The Proposed Action includes adaptive management, which provides a menu of management options that may be needed to adjust management decisions and actions to meet desired conditions as determined through monitoring. If monitoring indicates that desired conditions are not being achieved, management would be modified in cooperation with the permittee. Adaptive management allows the Forest Service to adjust the following: the timing, intensity, frequency and duration of grazing; the grazing management system, and livestock numbers. If adjustments are needed, they are implemented through the AOIs, which may be amended throughout the grazing season. Examples of situations that could call for adaptive management adjustments include: livestock numbers or grazing duration are decreased during the grazing season as a result of persisting drought conditions or projects by other agencies that may be conducted to attempt restoration of riparian and other wildlife habitat.

STATUS OF THE SPECIES

Arizona cliffrose was listed as endangered under the Act on May 29, 1984 (USDI 1984). Critical habitat has not been designated. The Arizona Cliffrose Recovery Plan (Recovery Plan) was completed in 1995 (USFWS 1995). This species has narrow habitat requirements and occurs in four widely separated areas in central Arizona: near Bylas (Graham County), the Horseshoe Lake vicinity (Maricopa County), near Burro Creek (Mohave County), and near Cottonwood in the Verde Valley (Yavapai County) (Rutman 1992). These sites differ slightly in elevation and associated vegetation, but all sites have limestone soils (generally white but also reddish in color) derived from Tertiary lakebed deposits, and at each site Arizona cliffrose is part of a locally unique vegetative community (Anderson 1993).

Arizona cliffrose is a long-lived, xerophytic, edaphic endemic woody perennial in the family *Rosaceae*. Plants are of low stature and open growth form compared with its congener Stansbury cliffrose (*P. stansburiana*). Flowers are perfect and pollination can occur on any of the first three days of anthesis. Experiments have shown that this species is partially self-compatible, but sets significantly more seeds and produces fruit more often when outcrossed (Fitts *et al.* 1993). Arizona cliffrose generally flowers from late March through early May and is visited by a wide variety of insects, including lepidopterans, dipterans, and bees. Native and introduced honeybees (*Apis mellifera*) are the most important pollinators, the latter becoming the predominant pollinator later in the flowering season (Fitts *et al.* 1993). Fruit dispersal occurs when summer rains dislodge seeds from plants (USFWS 1995). Flower and seed production varies between years based on climatic conditions, plant vigor, browsing, and other factors. Typically hundreds of flowers are produced on each mature plant, which can reproduce for many years (USFWS 1995). Other life history traits, such as age at first reproduction, gross and net reproductive rates, and longevity, are unknown (USFWS 1995).

The geographic and local distribution of Arizona cliffrose appears to be limited by competition from other plant species rather than a requirement for a specific soil type. At all four widely-separated locations, Arizona cliffrose is restricted to limestone-tuff soils derived from Tertiary lacustrine (lakebed) deposits. These soils are relatively infertile and have significantly lower amounts of phosphorus and organic matter compared with surrounding areas where Arizona cliffrose is absent (Anderson 1986, Anderson 1993). These surrounding areas are typically dominated by creosotebush (*Larrea tridentata*), which is thought to have a competitive advantage over Arizona cliffrose due to its aggressive seedling establishment (Anderson 1993). Creosotebush is unable to grow on the relatively infertile lacustrine soils. However, it has been found growing together with Arizona cliffrose in the Verde Valley, in areas with higher amounts of organic matter and phosphorus. This suggests that the distribution of Arizona cliffrose is limited primarily by competition from creosotebush, rather than a requirement for specific soil properties (Anderson 1986, Anderson 1993).

Arizona cliffrose populations in the state are genetically variable, exhibit phenotypic plasticity in response to environmental conditions, and hybridize with common cliffrose. These factors have complicated taxonomic identification and quantification of population sizes. Phenotypic and genetic variability between populations has been studied using morphometrics and DNA analysis. These studies, which are summarized in the Recovery Plan, indicate that *P. subintegra* is distinct from the more common *P. stansburiana*, despite sometimes overlapping plant characteristics (USFWS 1995). Introgression or hybridization between *P. subintegra* and the more common *P. stansburiana* has resulted in hybrid swarms in the Tonto Basin and Verde Valley of central Arizona (USFWS 1995). Hybrid plants were found in areas supporting Arizona cliffrose along Mingus Avenue south of the project area and appear to grow more readily in disturbed areas (USFWS 2001). The proliferation of hybrids has the potential to negatively affect long-term population dynamics of Arizona cliffrose through loss of genetic integrity (Fitts *et al.* 1993).

The total population size of Arizona cliffrose is not known. Not all areas of potential habitat have been surveyed, and in some areas (e.g., Cottonwood/Verde Valley population) the presence of hybrids or introgressed forms has made quantification of total numbers difficult (USFWS 2001). Total population size for all four sites was estimated to exceed 40,000 plants, although a large percentage may include hybrids (USFWS 1988). At the time of listing, the USFWS estimated 600 acres of habitat at Burro Creek and 100 acres at Bylas, with an estimated total of 700 plants (USDI 1984). At this time, roughly 10,000 plants are thought to occur in the largest

subpopulation at Burro Creek (USFWS 2004). Discovery of additional populations in the Verde Valley and at Horseshoe Lake and discovery of two smaller subpopulations at Burro Creek substantially increased the known geographic range and population size of the species. The Horseshoe Lake population is estimated to include 750 plants (USFWS 1987). The Verde Valley population is the largest, covering over 1,000 acres (USFWS 1995), but total plant numbers are not known. Dead Horse Ranch State Park was estimated to support over 40,000 plants, although many were likely to be hybrids (USFWS 1988). The Verde Valley Botanical Area (VVBA) established in 1987 is thought to contain 50-60% of the plants in the Verde Valley. Completion of the Mingus Avenue Extension impacted an estimated 600 Arizona cliffrose within about 12 acres of right-of-way. Based on these figures, the Arizona cliffrose population in the Verde Valley is conservatively estimated to include several tens of thousands of plants.

Reproductive output is potentially large, but recruitment rates vary among populations. No demographic studies have been completed in any populations to determine whether recruitment rates are sufficient to maintain or increase population sizes (USFWS 1995). The Cottonwood population appears to have the most recruitment and is likely to be the most stable, while the other populations appear to have poor recruitment (USFWS 1995). When the species was listed, the Burro Creek and Bylas populations were found to lack fertile seeds and have low seedling recruitment, suggesting that reproduction was inadequate to maintain the existing population size (USDI 1984). Factors potentially affecting reproductive output include browsing by animals; climatic conditions that influence fruit production, seed viability, and seedling recruitment; and ground-disturbance that affect seedling and adult survival.

Arizona cliffrose is subject to browsing by livestock and wildlife, which may affect its reproductive output. Plants are browsed by livestock, deer, and wild burros, which preferentially select tender seedlings, new growth, and branches with flowers and developing fruit and may therefore reduce plant vigor, reproduction, and seedling establishment (Bingham 1976, USDI 1984, Phillips 1986, Phillips *et al.* 1980, Denham 1992, Rutman 1992, USFWS 1995). This relatively palatable shrub often receives moderate to heavy grazing pressure when exposed to ungulate herbivores, particularly in the vicinity of water sources and frequently used trails (Bingham 1976, Phillips *et al.* 1980, Reichenbacher 1987). Tender seedlings, new growth, and branches with flowers and developing fruit are preferentially selected (Bingham 1976, Denham 1992). Observations and preliminary data analysis of Bureau of Land Management (BLM) exclosure studies on the Burro Creek population indicate that consistent yearly browsing pressure may have reduced the vigor and/or form-size class of the remaining plants. Reduced vigor may result in less than optimal reproductive success, and the presence of livestock is also thought to reduce seedling establishment (USFWS 1995). The extent to which browsing has altered successful reproduction in any Arizona cliffrose population has not been quantified (USFWS 2001). However, the studies conducted at Burro Creek showed that exclusion of livestock reduced browsing of Arizona cliffrose from 65% to between 16 and 18%. The relatively low levels of browsing following exclusion of livestock and burros were attributed to mule deer and other wildlife (USFWS 1995).

The type locality for the species is Burro Creek. This population occurs on BLM-administered lands. Primary threats to the species in this area are grazing by wildlife, livestock and feral burros; mining; road and utility development; recreational developments; and off-highway vehicle (OHV) use (USFWS 1991). Exclosure studies at this site suggest that browsing by large animals reduces the vigor of plants and may reduce reproductive success. Mining and exploration activities for the extraction of bentonite have resulted in a loss of 14% of Arizona

cliffrose habitat in the Burro Creek area. This population is divided by a graded dirt road and parallel natural gas pipeline and overhead electric power line easements (USFWS 2001). Increased recreational activity from development of the Burro Creek campground and from rock-collecting activities and associated OHV travel may also affect seedling establishment and survival of adult plants (USFWS 2001). The Kingman Resource Management Plan (BLM 1993) was approved in 1995 and established the 1,119-acre Clay Hills Area of Critical Environmental Concern (ACEC; USFWS 2004). Approximately 98% of the Arizona cliffrose population at Burro Creek occurs within the fenced-off portion of the ACEC. Only a small population of about 100 plants several miles from the main population is located outside the ACEC (John Anderson, BLM, pers. comm., 2005).

Primary threats to the Bylas population of Arizona cliffrose are livestock grazing and road maintenance/construction activities. Observational data suggests that livestock grazing substantially reduced seedling recruitment at this site (USFWS 1995, AGFD 2001). At the time of listing, there was a concern regarding potential widening of U.S. Highway 70, which bisects this population, and herbicide application for road shoulder maintenance. No special land management designations or other special protections are afforded this population, although the Arizona Department of Transportation (ADOT) agreed to contact the FWS regarding any activities potentially affecting Arizona cliffrose in this area (USDI 1984).

The Horseshoe Lake population includes several subpopulations and is found on the Tonto National Forest. This population was the subject of a biological opinion issued on March 10, 1987 for the Central Arizona Water Control Study Plan 6. This biological opinion determined that 250 plants would be affected due to construction and operation of the Cliff Dam (33 percent of the Horseshoe Lake population, USFWS 1987), although the dam was never constructed (USFWS 2001). Increased recreation from the development of a Forest Service recreation area may pose a threat to the Lime Creek subpopulation (AGFD 2001).

The Verde Valley (or Cottonwood) Arizona cliffrose population is the largest and occurs on lands administered by the Coconino NF, Arizona State Parks, ASLD, and privately-held lands. Threats to this population include grazing by livestock and wildlife, road development and maintenance, urban development, and recreation (USFWS 2001).

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Status of the Arizona cliffrose within the Action Area

The Verde Valley supports the largest number of Arizona cliffrose in the state and represents the only population where seedling establishment is resulting in population recruitment (AGFD 2001, USFWS 2001). Habitat for this species extends over an area approximately one mile wide and three miles long (USFWS 2001), and is estimated to exceed 2,000 acres in size (USFWS 1995). This population occurs mostly north of US 89A and east of the Verde River. An estimated 60 to 80% of the habitat occurs on NFS lands, with the remainder located on Arizona

State Parks, ASLD, and privately-held lands (USFWS 2001). Hybrid forms between *P. subintegra* and *P. stansburiana* have been found in the Cottonwood area. These introgressed forms are considered to be outside the definition of *P. subintegra* and present some threat from genetic assimilation (Fitts *et al.* 1993, USFWS 2001). The presence of hybrids makes estimates of the number of individuals in this population problematic, although existing information suggests there are at least several tens of thousands of individuals in this population (USFWS 1988).

On the WWRA, the majority of plants are located in the South Gyberg Pasture (see BA, Figure 1, page 18). Inventories of Arizona cliffrose in the Verde Valley conducted from 2010 to 2012 (Goodwin 2012) found 6,499 individual plants on NFS lands with approximately 75 percent of the population found in the South Gyberg Pasture. Less than 2 percent of the Arizona cliffrose plants detected are located in the North Gyberg Pasture on the WWRA.

Factors Affecting the Arizona cliffrose within the Action Area

Because the majority of Arizona cliffrose habitat in the Cottonwood population is located on NFS lands, land management practices such as livestock grazing and recreation have affected Arizona cliffrose. Section 7 consultations with the Coconino NF were completed in 1992 and 1997 for the Windmill Allotment Management Plan (AMP), which contained most of the Cottonwood population of Arizona cliffrose, and for the Apache Maid Allotment in 1995, which supports potential habitat. The Cottonwood population of Arizona cliffrose is contained within the Gyberg, Rocking Chair, and Cornville pastures addressed in the Windmill AMP. Grazing has been excluded since 1992 from the Rocking Chair and Cornville pastures. Seasonal grazing has continued in the Gyberg pasture under a deferred rest rotation system (USFWS 1995), although the South Gyberg pasture has not been grazed for the last 10 years. From 2001 through 2007, range personnel conducted annual monitoring of use on Arizona cliffrose in North Gyberg pasture. From 2001 through 2007, ungulate utilization of Arizona cliffrose in this pasture was either not detected or was very light. There are no monitoring records for the period of time from 2008 to 2012. Forest Service staff conducted a field visit in November 2012 and did not find any utilization of Arizona cliffrose, although the North Gyberg pasture was not grazed during winter 2012/2013. In winter 2013/2014, the monitoring plan included in the proposed action for the WWRA was implemented. Three visits were made by range, wildlife, and botany personnel to three transects in North Gyberg Pasture: once before the livestock entered the pasture, once in the middle of the grazing period, and once immediately after the livestock were removed. The utilization across this time period was measured as 17 percent.

The 472-acre Verde Valley Botanical Area (VVBA) was established by the Coconino NF in 1987 for the protection of Arizona cliffrose and its unique associated plant communities. The VVBA is located within the WWRA and includes an estimated 50 to 60 percent of Arizona cliffrose in the Verde Valley, with an additional 10 to 20 percent occurring on other Coconino NF lands. Livestock grazing within the VVBA in 1994 and 1995 was inconsistent with Recovery Plan guidelines and the Windmill AMP Biological Opinion issued in 1992 (USFWS 1997, USFWS 2001). The AOIs under which livestock grazing has been managed in the area since 2000, have allowed for seasonal livestock grazing within the VVBA, up to a maximum of 20 percent utilization of key forage grasses. A draft management plan has been developed for the VVBA, but has not been finalized. The draft management plan establishes long-term monitoring plots and precludes road development, OHV use, mining, and land exchanges.

Recreational activities and OHV use have impacted the Verde Valley population of Arizona cliffrose. Impacts have resulted from unauthorized parking lots, illegal dump sites, a target

shooting range, OHV use areas, “party” sites, and the development of mountain bike trails (USFWS 1997, USFWS 2001). In order to protect Arizona cliffrose, the Coconino NF has delineated and fenced the parking area at Rocking Horse Road and US 89A, constructed additional fencing along Rocking Horse Road to restrict OHV use, closed and rehabilitated several two-track roads, and relocated a shooting range out of Arizona cliffrose habitat (USFWS 2001). Arizona State Parks has coordinated the planning of a proposed campground at Dead Horse Ranch State Park with the FWS and Coconino NF to avoid impacts to Arizona cliffrose. Dead Horse Ranch State Park has also coordinated with the Coconino NF regarding trail development and recreational use in this area (USFWS 2001).

Road construction has affected Arizona cliffrose in the action area. The improvement of Segment 2 of US 89A (Mingus Avenue Extension) resulted in the elimination of an estimated 14.7 acres of Arizona cliffrose habitat and removed or indirectly affected a total of 29 plants. This roadway now bisects the southern portion of the Cottonwood population and directly or indirectly impacted about 600 mature plants and seedlings. As part of the consultation, Yavapai County agreed to acquire 357 acres of ASLD lands to be exchanged to the Coconino NF and managed for Arizona cliffrose. As a part of the Mingus Avenue Extension proposed action, Yavapai County provided funding to the Arboretum to conduct research on the ecology of Arizona cliffrose and potential propagation/transplant techniques (USFWS 2001). Yavapai County also funded the collection and propagation of cuttings from each of the impacted plants, and the subsequent transplantation of nursery-grown plants back into Section 36 (USFWS 2001). A total of 4,595 cuttings were taken from 513 plants and an additional 23 small plants were collected and potted. Of the plants collected, 405 plants representing 148 individuals were transplanted to portions of the VVBA and Dead Horse Ranch State Park (Murray 2004). Currently, about 250 plants have survived, representing about 50% survival (Sheila Murray, The Arboretum at Flagstaff, pers. comm., 2005).

Long-term drought and climate change also seem to be impacting Arizona cliffrose. Maschinski, et al. (2006) determined that Arizona cliffrose has an increased risk of extinction from progressively more arid climates and may eventually go extinct without human intervention. These risks would be even higher if the fragmentation of existing habitat increases from additional roads, trails and other forms of human disturbance.

EFFECTS OF THE ACTION

Effects of the action means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

The Proposed Action consists of six components: authorization, improvements, vegetation treatments, monitoring, adaptive management, and resource protection measures. The components that apply to Arizona cliffrose include authorization, monitoring, and adaptive management, and resource protection measures.

Actions specific to the Arizona cliffrose in the WWRA proposed action include the following:

- Grazing would occur using a rotational management system (either a deferred rotation system or a deferred rest-rotation system), which would allow for plant growth and

recovery. Having the option to use either the deferred rotation or deferred rest rotation grazing system would allow the Forest Service to adjust management depending on monitoring and conditions. Generally pastures would be grazed only once during the grazing year.

- The North Gyberg pasture would be grazed in accordance with Arizona Cliffrose Recovery Plan guidance, which currently states that the pasture would be rested every other year, only grazed from October-January, and that monitoring will occur (USFWS 1995). If the Recovery Plan is updated during the life of the project, management of the North Gyberg pasture would reflect any change in guidance. The proposed action will also comply with the guidance for mineral supplement placement in Arizona cliffrose habitat to aid in keeping cattle from congregating near patches of cliffrose habitat.
- The South Gyberg pasture would be removed from the Windmill West grazing allotment and closed to grazing. The South Gyberg pasture contains most of the documented locations of Arizona cliffrose on the Coconino NF (about 75 percent) and has not been grazed in more than 10 years when the Gyberg Pasture was divided into the North and South Gyberg pastures and cattle were excluded from South Gyberg. The result of this action will be complete removal of the effects from cattle grazing to Arizona cliffrose in the South Gyberg Pasture.
- If additional populations of Arizona cliffrose are detected outside of North and South Gyberg pastures, protective measures would be implemented in compliance with the Arizona cliffrose Recovery Plan (USFWS 1995) to reduce effects to the plant. The Coconino NF, in cooperation with the permittee and FWS, would collaboratively determine the appropriate action for long-term persistence of the species.
- There are no vegetation treatments or improvements proposed in the habitat of Arizona cliffrose.

In summary, the proposed action provides protection for Arizona cliffrose by removing livestock grazing from the South Gyberg pasture and reducing the length of time that cattle will be allowed to use the North Gyberg Pasture, in accordance with the Recovery Plan. However, because there will be some livestock grazing occurring in the areas where there are documented occurrences of Arizona cliffrose in the North Gyberg pasture, there is still a risk of livestock grazing and trampling of individual plants..

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Unregulated activities on Federal and non-Federal lands, such as trespass livestock, inappropriate use of OHVs, and the introduction of non-native species, are cumulative effects and can adversely affect the species through a variety of avenues. Continued urbanization is the predominant cumulative effect on Arizona cliffrose in the Cottonwood area. The human population in Cottonwood is projected to double from the year 2000 to the year 2040 and will

result in greater impacts to Arizona cliffrose on both NFS and other lands (Phillips et al. 1995). Direct impacts are likely to include removal of additional Arizona cliffrose habitat and individuals by development of other private lands, including ASLD lands auctioned and sold for private development. Human growth in the area will also result in increased demand for recreational opportunities, such as hiking and mountain biking trails, picnic areas, and OHV use areas. Although the Coconino NF Land and Resource Management Plan addresses the protection of Arizona cliffrose on NFS lands, there is expected to be an increase in unauthorized public access of Coconino NF, ASLD, and private lands by recreationists. This is expected to result in greater impacts to Arizona cliffrose as a result of trampling of plants and compaction of soils. Continued urbanization in the Cottonwood area may also result in the further proliferation of weedy plant species, which may impact Arizona cliffrose directly through competition for resources or indirectly through the promotion of wildfires. Potential sale and development of ASLD lands along US 89A in the project vicinity could isolate the protected Arizona cliffrose found on and directly adjacent to the project area and could compromise the long-term integrity of the plant in the Verde Valley.

CONCLUSION

After reviewing the current status of the Arizona cliffrose and its critical habitat, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, we conclude that implementation of the proposed livestock grazing management on the WWRA will not jeopardize the continued existence of the cliffrose. We present this conclusion for the following reasons:

- The proposed action provides protection for Arizona cliffrose by removing livestock grazing from the South Gyberg pasture, which will aid in protecting almost 75 percent of the known population on NFS lands in the Verde Valley. Where livestock will still have access to Arizona cliffrose plants in the North Gyberg pasture, the proposed management will aid in minimizing effects to the plant from livestock browsing.
- The proposed action will aid in recovery of the species within the project area by incorporating Recovery Plan recommendations into the proposed action.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Forest Service work with the FWS and others in the Verde Valley to control invasive and weedy species. An invasive species control program would aid in protecting native plant species, including Arizona cliffrose.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR Section 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or, 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your continued coordination. In all future correspondence on this project, please refer to the consultation number 02EAAZ00-2014-F-0207. We also encourage you to coordinate the review of this project with the AGFD. Should you require further assistance or if you have any questions, please contact Shaula Hedwall at (928) 556-2118 or Brenda Smith at (928) 556-2157.

Sincerely,

/s/ Brenda Smith for

Steven L. Spangle
Field Supervisor

cc (electronic copy):

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ
District Ranger, Coconino National Forest, Flagstaff Ranger District, Flagstaff, AZ
District Biologist, Coconino National Forest, Flagstaff Ranger District, Flagstaff, AZ
(Attn: Julia Camp)

Mr. M. Earl Stewart

17

Director, Aha Makav Cultural Society, Fort Mohave Indian Tribe
Director, Hopi Cultural Preservation Office, Kykotsmovi, AZ
Director, Apache Cultural Program, Yavapai-Apache Nation, Camp Verde, AZ
Director, Yavapai Cultural Program, Yavapai-Apache Nation, Camp Verde, AZ
Director, Cultural Research Program, Yavapai-Prescott Indian Tribe, Prescott, AZ
Director, Zuni Heritage and Historic Preservation Office, Zuni, NM
Supervisor, Cultural Preservation Program, Cultural Resources Department, Salt River
Pima-Maricopa Indian Community, Scottsdale, AZ
Environmental Specialist, Environmental Services, Western Regional Office, Bureau of
Indian Affairs, Phoenix, AZ

C:\Users\shedwall\Documents\Final Documents\Final BO\Windmill West BO Final.docx

LITERATURE CITED FOR BIOLOGICAL OPINON

- Anderson, J.L. 1986. Biogeographical analysis of *Cowania subintegra* Kearney (Rosaceae): an Arizona Sonoran Desert endemic. Master's Thesis. Arizona State University, Tempe.
- Anderson, J. L. 1993. A synthetic analysis of a rare Arizona species, *Purshia subintegra* (Rosaceae). Pages 205-220, *In* Sivinski, R. and K. Lightfoot (eds). Proceedings of the Southwestern rare and endangered plant conference. New Mexico Forestry and Resources Conservation Division, Miscellaneous Publication Number 2, Santa Fe, New Mexico.
- Arizona Game and Fish Department. 2001. *Purshia subintegra*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- Bingham, S. 1976. Proposed threatened and endangered plant species in the Upper Gila-San Simon EIS area. Bureau of Land Management, Safford District. Safford, Arizona.
- Brown, D.E. and R.A. Minnich. 1986. Fire and changes in creosote bush scrub of the western Sonoran Desert, California. *American Midland Naturalist* 116 (2): 411-422.
- Bureau of Land Management (BLM). 1993. Kingman Resource Area Proposed Resource Management Plan and Environmental Impact Statement. Kingman Resource Area, Kingman Area. 606 pp.
- Denham, R. 1992. Subintegration. A series of unpublished essays to the U.S. Fish and Wildlife Service. Phoenix, Arizona.
- Fitts, R.D., V.J. Tepedino, and T.L. Griswold. 1993. The pollination biology of Arizona cliffrose (*Purshia subintegra*), including a report on experimental hybridization with its sympatric congener *P. stansburiana* (Rosaceae). Pages 359-368, *In*: Sivinski. R. and K. Lightfoot (eds). Proceedings of the Southwestern rare and endangered plant conference. New Mexico Forestry and Resources Conservation Division, Miscellaneous Publication Number 2, Santa Fe, New Mexico.
- Goodwin, G.D. 2012. Design and implementation of a geodatabase for *Purshia subintegra* (Arizona cliffrose). Thesis. Northern Arizona University, 110 pp.
- Maschinski, J., J.E. Baggs, P.F. Quintana-Ascencio, and E.S. Menges. 2006. Using Population Viability Analysis to Predict the Effects of Climate Change on the Extinction Risk of an Endangered Limestone Endemic Shrub, Arizona Cliffrose. *Conservation Biology*. Vol. 20. Pages 218-228.
- McLaughlin S.P. and J.E. Bowers. 1982. Effects of wildfire on a Sonoran Desert plant community. *Ecology* 63(1): 246-248.
- Murray, S. 2004. Report of the Reintroduction of *Purshia subintegra* in the Verde Valley for 2001-2004. Unpublished report prepared by the Arboretum at Flagstaff, Flagstaff, AZ. 3 pp.

- Phillips, A.M., B.G. Phillips, L.T. Green, J. Mazzoni, E. M. Peterson. 1980. Status report for *Cowania subintegra*. Prepared for U.S. Fish and Wildlife Service. Phoenix, Arizona.
- Phillips, B.G. 1986. Endangered species information system workbooks I & II on *Cowania subintegra* for USDI Fish and Wildlife Service. Arlington, Virginia.
- Reichenbacher, F.W. 1987. Specimen collection and data reduction for *Purshia subintegra*, an endangered species. U.S. Bureau of Reclamation Arizona Projects Office. Phoenix, Arizona. P.O. #7-PG-32-16590.
- Rogers, G.F. 1986. Comparison of fire occurrence in desert and nondesert vegetation in Tonto National Forest, Arizona. *Madroño* 33(4): 278-283.
- Rutman, S. 1992. Handbook of Arizona's endangered, threatened and candidate plants. U.S. Fish and Wildlife Service. Phoenix, Arizona.
- U.S. Department of the Interior. 1984. Final rule to determine *Cowania subintegra* (Arizona cliffrose) to be an endangered species. Federal Register 49(104):22326-22329.
- U.S. Fish and Wildlife Service (USFWS). 1987. Biological Opinion for Central Arizona Water Control Study Plan 6. March 10, 1987. Arizona Ecological Services Field Office. 4 pp.
- U.S. Fish and Wildlife Service (USFWS). 1988. Biological Opinion, MPO-88-K-10, Mohave County, Arizona. March 9, 1988. Arizona Ecological Services Field Office. 3 pp.
- U.S. Fish and Wildlife Service (USFWS). 1991. Biological Opinion for Kingman Resource Area Management Plan. March 8, 1991. Arizona Ecological Services Field Office. 8 pp.
- U.S. Fish and Wildlife Service (USFWS). 1995. Arizona Cliffrose (*Purshia subintegra*) Recovery Plan. USDI Fish and Wildlife Service, Arizona Ecological Services State Office, Phoenix, AZ. 90pp + appendix.
- U.S. Fish and Wildlife Service (USFWS). 1996. Biological Opinion for Widening of State Route 89A, Segment 2. July 8, 1996. Arizona Ecological Services Field Office. 15 pp.
- U.S. Fish and Wildlife Service (USFWS). 1997. Biological Opinion for the Windmill Grazing Allotment. October 28, 1997. Arizona Ecological Services Field Office. 50 pp.
- U.S. Fish and Wildlife Service (USFWS). 2001. Biological Opinion for Mingus Avenue Extension. March 9, 2001. Arizona Ecological Services Field Office. 50 pp.
- U.S. Fish and Wildlife Service (USFWS). 2004. Biological and Conference Opinion for the Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management. September 3, 2004. Arizona Ecological Services Field Office. 355 pp.

APPENDIX A - FIGURES

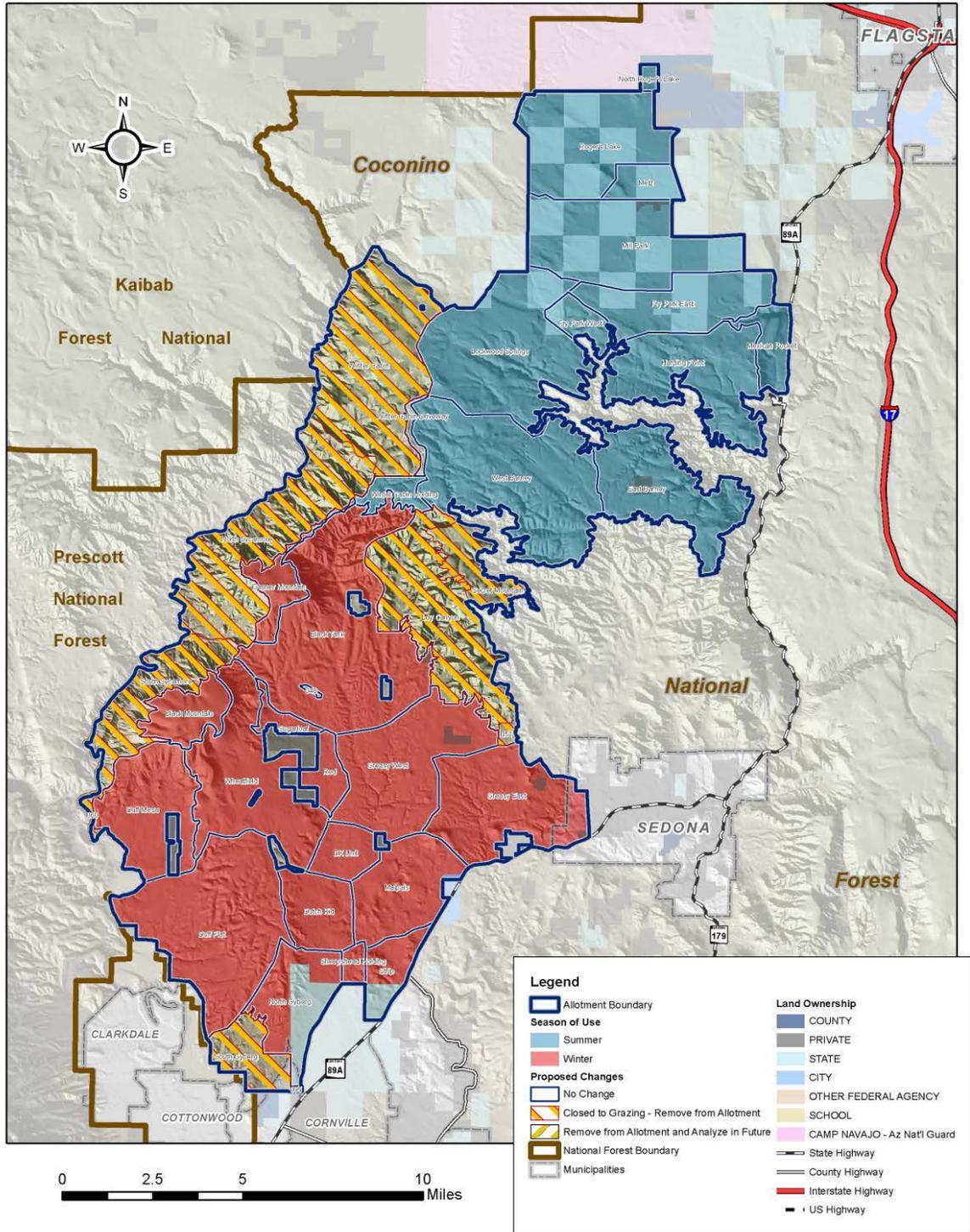


Figure 1. Vicinity map of the Windmill West Allotment.

APPENDIX B – CONCURRENCES

This appendix contains our concurrences with your “may affect, not likely to adversely affect” determinations for the threatened Mexican spotted owl and its critical habitat, the endangered southwestern willow flycatcher and its critical habitat, the proposed yellow-billed cuckoo, the threatened narrow-headed gartersnake and its proposed critical habitat, the threatened northern Mexican gartersnake and its proposed critical habitat, the endangered razorback sucker and its critical habitat, the 10j experimental population of Colorado pikeminnow, the endangered loach minnow and its critical habitat, the endangered spikedace and its critical habitat, and the endangered Gila topminnow. The appendix also contains our concurrence with your “not likely to contribute in a trend toward Federal listing, loss of viability, or jeopardize the continued existence” determination for the candidate roundtail chub.

Mexican spotted owl and critical habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the threatened Mexican spotted owl and its critical habitat. We base this concurrence on the following:

- In the action area, livestock grazing or livestock management activities will occur within protected activity centers (PACs), but no human disturbance or construction actions associated with the livestock grazing will occur in PACs during the breeding season (March 1 through August 30).
- The key habitat components of Mexican spotted owl protected and recovery habitat and the primary constituent elements of spotted owl critical habitat will not be adversely affected. Livestock grazing and management activities will provide for levels that provide the woody and herbaceous vegetation necessary for prey species habitat, the residual biomass that will support prescribed natural and ignited fires, and the regeneration of riparian trees.

Southwestern willow flycatcher and critical habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the endangered southwestern willow flycatcher and its critical habitat. We base this concurrence on the following:

- There is no occupied habitat, or suitable habitat within the action area. Therefore, there will be no direct effects to the southwestern willow flycatcher.
- There are approximately 27 acres of designated critical habitat for southwestern willow flycatcher located in Duff Flat Pasture on the winter range. Livestock do not have access to these 27 acres because of fences or steep topography so there will be no effects to the primary constituent elements related to riparian vegetation from proposed action.
- Under the proposed action, livestock grazing could potentially affect the availability of insect prey through changes in water quality from increased suspended sediments and contaminants. By limiting the length of grazing of a pasture in a given year, using a rotational grazing management system, managing grazing intensity at moderate levels

and forage utilization at conservative levels, potential reductions in prey availability would be insignificant and discountable.

Yellow-billed cuckoo

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the proposed yellow-billed cuckoo. We base this concurrence on the following:

- Under the proposed action, livestock do not have access to riparian vegetation along the Verde River or Oak Creek; therefore, there will be no direct effects to yellow-billed cuckoos or their habitat.

Narrow-headed gartersnake and proposed critical habitat

We concur with your determination that the proposed action may affect, but will not likely adversely affect, the narrow-headed gartersnake and its proposed critical habitat. We base this concurrence on the following:

- There will be no direct effects to narrow-headed gartersnakes or proposed critical habitat as livestock do not have access to the Verde River, West Fork Oak Creek, or Oak Creek (or any perennial streams) and their associated riparian vegetation.
- The WWRA livestock management plan is designed to protect both riparian and upland habitats that the northern Mexican gartersnake is dependent upon. Efforts to reduce soil erosion and minimize impacts to gartersnake habitat in and adjacent to the Verde River and other perennial waters will result in insignificant and discountable effects to the snake and the PCEs of proposed critical habitat.

Northern Mexican gartersnake and proposed critical habitat

We concur with your determination that the proposed action may affect, but will not likely adversely affect, the northern Mexican gartersnake and its proposed critical habitat. We base this concurrence on the following:

- There will be no direct effects to northern Mexican gartersnakes or proposed critical habitat as livestock do not have access to the Verde River or Oak Creek (or any perennial streams) and their associated riparian vegetation.
- The WWRA livestock management plan is designed to protect both riparian and upland habitats that the northern Mexican gartersnake is dependent upon. Efforts to reduce soil erosion and minimize impacts to gartersnake habitat in and adjacent to the Verde River and other perennial waters will result in insignificant and discountable effects to the snake and the PCEs of proposed critical habitat.

Razorback sucker and critical habitat, Colorado pikeminnow, loach minnow and critical habitat, spinedace and critical habitat, Gila topminnow

We concur with your determination that the proposed action may affect, but will not likely adversely affect, the razorback sucker and designated critical habitat, the Colorado pikeminnow,

the loach minnow and its critical habitat, the spinedace and its critical habitat, and the Gila topminnow. We base our concurrence on the following:

- Conservation measures and best management practices will be implemented to minimize potential sedimentation from project activities to aquatic habitats. Therefore, the increase in sedimentation as a result of implementing the WWRA management plan to the Verde River and Oak Creek will be minor, and therefore, insignificant and discountable to these species' habitats.
- There will be no direct effects to razorback sucker, Colorado pikeminnow, loach minnow, spinedace, and Gila topminnow or their habitat from implementation of the WWRA as livestock do not have access to the Verde River or Oak Creek (or any perennial streams) and their associated riparian vegetation.
- Effects to primary constituent elements as defined in the 1994 critical habitat rule for the razorback sucker (59 FR 13374) would be insignificant and discountable because effects to the water (such as temperature, dissolved oxygen, turbidity, etc.), physical habitat, and biological environment (such as food supply, predation, competition) would not be measurable.
- Effects to primary biological factors defined in the 2012 critical habitat rule for spinedace and loach minnow critical habitat (75 FR 66482) would be insignificant and discountable because effects to water quality and quantity, temperature, habitat and flows in designated critical habitat would not be measurable.

Roundtail chub

We concur with your determination that the proposed action is not likely to contribute to a trend toward Federal listing, loss of viability, or jeopardize the continued existence of the candidate roundtail chub in the Verde River and Oak Creek. We base this concurrence on the following:

- There will be no direct effects roundtail chub or their habitat from implementation of the WWRA as livestock do not have access to the Verde River or Oak Creek (or any perennial streams) and their associated riparian vegetation.
- Conservation measures and best management practices will be implemented to minimize potential sedimentation from project activities to aquatic habitats. Therefore, the increase in sedimentation as a result of implementing the WWRA management plant to the Verde River and Oak Creek will be minor, and therefore, insignificant and discountable to the chub's habitats.

APPENDIX C – TECHNICAL GUIDANCE

This appendix contains recommendations to the Forest Service to reduce the likelihood of take of bald eagles (*Haliaeetus leucocephalus*) from implementation of the WWRA management plan.

The final rule to remove the bald eagle from the Federal List of Threatened and Endangered Species was published in the Federal Register on July 9, 2007, and took effect on August 8, 2007. However, bald and golden eagles continue to be protected by the Bald and Golden Eagle Protection Act (Eagle Act). The Eagle Act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking eagles, including their parts, nests, or eggs. “Take” is defined under the Eagle Act as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” eagles. Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based upon the best scientific information available: (1) injury to an eagle; (2) a decrease in an eagle’s productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or, (3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (USDI 2007).

FWS and the Forest Service jointly developed the following conservation measures to minimize impacts to bald and golden eagles in the project area. These measures are consistent with the strategies identified in the Conservation Assessment and Strategy for the Bald Eagle in Arizona (Driscoll et al 2006). We agree that implementation of the following measures will reduce the likelihood of take.

Bald eagles

- Breeding areas and winter roosts will be protected from noise and human disturbance.
- The Forest Service will coordinate with the FWS and AGFD to ensure that bald eagle nest location data are updated annually or as new data are collected.

LITERATURE CITED FOR APPENDIX C

Driscoll, J.T., K.V. Jacobsen, G.L. Beatty, J.S. Canaca, and J.G. Koloszar. 2006. Conservation assessment and strategy for the bald eagle in Arizona. Nongame and Endangered Wildlife Program Technical Report 173. Arizona Game and Fish Department, Phoenix, Arizona.

U.S. Department of the Interior (USDI), Fish and Wildlife Service. 2007. Protection of Eagles and Authorizations under the Bald and Golden Eagle Protection Act for Take of Eagles; Final Rule. Federal Register 72(107):31132-31140. June 5, 2007.