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AESO/SE
02-21-00-F-0029 October 23, 2003

Memorandum

To: Field Manager, Tucson Field Office, Bureau of Land Management, Tucson, Arizona

From: Field Supervisor

Subject: Biological Opinion:
Livestock Grazing on 18 Allotments Along the Middle Gila River Ecosystem

This biological opinion responds to your request for 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 (ESA). Your original request was dated November 24, 2000, and received in our office November 27, 2000. Due to changes made in the proposed action, your office resubmitted the biological evaluation on March 12, 2001. Thus, formal consultation commenced on that date.

At issue are impacts that may result from the Tucson Field Office's grazing program in portions of the Middle Gila River Ecosystem, Gila and Pinal counties, Arizona. These impacts may affect the following listed species: southwestern willow flycatcher *(Empidonax traillii extimus)*; cactus ferruginous pygmy-owl *(Glaucidium brasilianum cactorum)*; lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae)*; spikedace *(Meda fulgida)*; and loach minnow *(Tiaroga cobitis),* and critical habitat designated for the spikedace and loach minnow.

The Bureau of Land Management (BLM) requested our concurrence that the proposed action may affect, but is not likely to adversely affect, the Arizona hedgehog cactus *(Echinocereus triglochidiatus* var. *arizonicus)* and the bald eagle *(Haliaeetus leucocephalus)*. We concur with the BLM's determinations for these species. The rationale for our concurrences is detailed in Appendix I.

This biological opinion is based on information provided in the November 24, 2000, biological evaluation and the March 12, 2001, updated memo; telephone conversations; site investigations; meetings with the BLM and other sources of information. References cited in this biological opinion are not a complete list of all available literature on the species of concern, associated actions, management and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at our office.

CONSULTATION HISTORY

During the BLM's boundary changes and reorganizations of the 1990s, BLM "honored" all original land use plans and implemented the land use plans written for the original geography for which they were prepared. Hence, the Tucson office manages most of its lands under the appropriate geographic portion of the Phoenix Resource Management Plan (RMP) and the appropriate geographic portion of the Safford RMP. It also manages grazing under two grazing Environmental Impact Statements (EISs) (Upper Gila-San Simon and Eastern Arizona).

Because the Safford District also managed Tucson during the 1995 boundary change, Safford consulted on the Upper Gila-San Simon area and its share of the Eastern Arizona Grazing EIS together. The resulting biological opinion was entitled Safford/Tucson Programmatic Grazing Consultation (02-21-96-F-0160; Sept. 26, 1997). It was at the program level, but also at the project level, thereby requiring no subsequent more detailed consultation in most instances. Due to litigation and other reasons, including species listings and designation of critical habitat, the biological opinion has been amended five times. The most recent amendment was dated December 5, 2001. In 1998, BLM received biological opinions on the remainder of the land-use plans and grazing EISs where consultation was requested in 1996.

The Phoenix Field Office manages the remainder of the lands in the Phoenix Portion of the Eastern Arizona Grazing EIS (02-21-96-F-0422, March 4, 1998). They consulted separately on their portion of this EIS. The analysis of the resulting biological opinion was at the plan-program level and did not address the project level as the Safford/Tucson programmatic grazing consultation had done.

- The Phoenix Field Office reinitiated consultation on the Phoenix RMP in 1996. The Phoenix RMP covered land-use decisions, other than grazing, on much the same lands as those covered in the Eastern Arizona Grazing EIS.

- Subsequent to designation of critical habitat for the cactus ferruginous pygmy-owl and Huachuca water umbel, BLM reinitiated consultation on the Phoenix RMP, the Phoenix portion of the Eastern Arizona Grazing EIS, and the Safford/Tucson grazing program on October 12, 1999. These biological opinions were amended on July 12, 2000, for the Phoenix RMP and Eastern Arizona Grazing EIS, and December 4, 2001 for the Safford/Tucson Grazing program.

- Formal consultation began originally for the 18 allotments on the middle Gila River in 1996 (02-21-96-F-0205). The biological evaluation was revised by BLM to include the Standards and Guidelines and the Conservation Measures for the cactus ferruginous pygmy-owl and the southwestern willow flycatcher.

- On November 24, 2000, you resubmitted the revised biological evaluation for formal consultation on 18 allotments in the Middle Gila River Ecosystem. We received your request on November 27, 2000. Due to changes made in the proposed action your office resubmitted the biological evaluation. On June 11, 2001, we sent a letter to your office responding to

your request for formal consultation on livestock grazing on the 18 allotments and stated that we would issue a final biological opinion by July 27, 2001. Due to the complexity of this consultation and our office workload we were not able to meet this deadline.

- We requested that the consultation be extended 60 days in a memorandum dated July 23, 2001 and informed you that we would issue a biological opinion on September 27, 2001.

- On December 29, 2001, we submitted to you a draft of this Biological Opinion. You provided comments on the draft in a memorandum dated February 25, 2002, and in a meeting between our agencies on February 25, 2002.

- Due to extensive comments on the draft opinion and changes in the status of critical habitat for the flycatcher, spikedace, loach minnow, and pygmy-owl, we revised the draft opinion. This second draft was dated June 30, 2003.

- You submitted comments on the June 30, 2003, draft opinion in a memo dated August 13, 2003.

DESCRIPTION OF PROPOSED ACTION

This consultation addresses 18 allotments within the Middle Gila River Ecosystem administered by the BLM in Gila and Pinal counties. The proposed action is set by term grazing permits, and is further defined by Annual Operating Plans/Instructions and Land Use Plans. The time frame of the proposed action will be over a ten-year period beginning on the date of the final biological opinion. The proposed action includes implementing changes in the livestock grazing program; any future range improvements, such as fencing and water development, will undergo project-specific consultation. This proposed action; however, includes programmatic measures to minimize the effects of any future range improvements.

The proposed action is to implement changes in grazing strategies on 18 allotments along the Middle Gila River below Coolidge Dam downstream to the area of Ashurst-Hayden Dam (Figure 1) over the next ten years, along with applying the Southwestern Willow Flycatcher Action Plan and the Conservation Measures for the cactus ferruginous pygmy owl on all applicable allotments.

The proposed Middle Gila River Management Strategy will facilitate better management of the riparian corridor. Actions will include seasonal exclusion of livestock grazing along portions of the Middle Gila River. Fences are currently in place (Appendix II) to implement seasonal restrictions on livestock grazing in riparian areas. The BLM proposes to conserve the cactus ferruginous pygmy-owl and southwestern willow flycatcher, and other listed species and their habitat, while managing livestock grazing use through the implementation of Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration, specific range improvements, and grazing lease terms and conditions to meet existing Land Use Plan objectives on the 13 riparian allotments and five upland allotments whose leases have expired.

The BLM proposes to achieve the following objectives in the riverine and upland habitats with the respective conservation measures:

Riverine habitat

Thirteen of the 18 allotments contain riverine riparian habitat. Riparian areas having, or capable of supporting, large cottonwoods, willows, or large mesquite trees would have utilization levels of riparian woody species, such as cottonwoods and willows, that would be < 30 percent of the apical meristems of seedlings and saplings from 0-6 ft tall. Such utilization limits would encourage tree recruitment.

The BLM proposes to eliminate authorized livestock grazing between April 1 and November 1 annually on 17 of the lower 20 miles of the Middle Gila River between Ashurt-Hayden Dam and Winkelman within the project area on the Whitlow, Cochran, LEN, Battle Axe, Hidalgo, Piper Springs, and Mescal Mountain allotments, and continue authorized year-long grazing on the Christmas allotment. No seasonal or riparian exclusion grazing restrictions are proposed on the Christmas allotment because the land ownership patterns are complex, severely limiting the ability of BLM to restrict livestock access. Exclusion of livestock grazing in the riparian corridor will be specified in the terms and conditions of the grazing permits through written agreements or decisions with the permittees. The entire upper reach (26.5 miles) of the Gila River is expected to have periodic unauthorized livestock grazing in the riparian area until trespass livestock from the San Carlos Indian Reservation are controlled. Tables 5 and 6 list the current management on all 13 allotments along the Middle Gila River.

Monitoring will be conducted in accordance with the protocols established in the draft Cactus Ferruginous Pygmy-Owl Recovery Plan, as funding permits. Monitoring will be conducted for the southwestern willow flycatcher along the Middle Gila River following the currently accepted protocol. Any grazing lease found not to be in conformance with the Arizona Standards and Guidelines for livestock use will be adjusted through new terms and conditions. These adjustments may include changes in season of use for the allotment or pastures, prescribed grazing levels, adjustments in authorized numbers, or other changes that will lessen or eliminate the impacts to southwestern willow flycatcher and cactus ferruginous pygmy-owl habitats in view of the conservation measures and action plans already adopted by the BLM.

Upland habitat

Five of the 18 allotments are classified as upland allotments; however, all 18 contain some upland habitat. The BLM will manage livestock grazing on upland habitats to avoid adverse effects to pygmy-owl habitat through implementation of specific actions to achieve two objectives:

1. Attain sufficient long-term recruitment of cavity trees and saguaros on capable ecological sites by proposing a utilization level of <30 percent in the upland allotments.

2. Achieve or maintain a diversity of shrubs, trees, and herbaceous plants on capable ecological sites. On the Teacup, Whitlow, and Horsetrack allotments, the BLM may

authorize additional livestock during infrequent ephemeral blooms under the BLM's ephemeral policy as long as the following conditions are met:

a. Ephemeral vegetation is present in draws, washes, and under shrubs.

b. Sufficient surface and subsurface soil moisture for continued plant growth exists.

c. Ephemeral forage has grown to usable levels by the time grazing begins.

d. Enough serviceable waters are present to provide good grazing distribution on the allotment for the number of livestock to be authorized.

e. All range improvements and livestock facilities needed for proper administration of authorized grazing are properly maintained.

f. The level of utilization allows for sufficient annual vegetation to remain on site to satisfy other resource concerns: (i.e., watershed, wildlife, wild horses, and burros) as long as those livestock would not:

i. browse perennial shrubs more than 20 percent;

ii. accumulate in large numbers around waters within 5 miles of southwestern willow flycatcher habitat so as to attract brown-headed cowbirds; and

iii. switch to grazing perennials such that recruitment of trees and shrubs used by either the southwestern willow flycatcher or cactus ferruginous pygmy owl would be lessened.

If any future range improvements in upland sites are proposed, the following mitigating measures will be implemented:

1. Project areas will be surveyed for listed species as part of the National Environmental Policy Act (NEPA) clearance process.

2. Construction will not be allowed between February 1 to July 31 on projects in xeroriparian areas to avoid the possibility of disturbing the breeding activities of the pygmy-owl.

3. Mechanical clearing of fence lines will not be allowed.

4. New fences will be placed outside of floodplain vegetation.

5. New water developments will be placed to minimize livestock concentration areas within five miles of flycatcher habitat.

6. Projects will be designed to minimize or avoid destruction of agaves and saguaros.

No projects or activities are planned in the habitat or potential habitat of the Arizona hedgehog cactus.

The allotments in the project area are classified through the Eastern Arizona Grazing EIS as being either a perennial/ephemeral allotment or strictly ephemeral allotments, the difference being that perennial allotments have a set number of animal unit months as part of the terms and conditions of the lease, whereas ephemeral allotments do not have a set number of animal units, but operate under the special ephemeral rule. The rule provides that the stocking rate is variable based on the amount of forage available with considerations being given to the needs of wildlife and other issues and concerns. All of the allotments in this consultation are perennial/ephemeral except for the Piper Springs allotment which is ephemeral only.

There are different systems of grazing management. The system developed for an allotment is based on multiple-use resource management objectives for the allotment and the preference of the livestock operator. Proposed grazing systems by allotment are found in Appendix III, Tables 3, 4, and 5, and are summarized over the project area. The various grazing systems are described as follows:

Year-long Grazing

Year-long grazing is continuous grazing for the full calendar year. The primary criterion for selecting year-long grazing is the restriction of management and system options that provide periodic rest or rotation by either grazing unit size or physiography. Year-long grazing is a common system on semi-desert ranges. Proper grazing use under this system is dependent upon stocking rates consistent with the grazing capacity of the range and upon proper distribution of livestock use.

Ephemeral Grazing

Ephemeral ranges are areas of low rainfall and low perennial forage production. These areas are grazed infrequently for short periods when favorable precipitation allows the growth of relatively large amounts of short-lived annual forage. Rangelands under ephemeral management generally receive less than eight inches of average annual precipitation and are located in the lower elevations (below 3,500 feet). Ephemeral range plant communities have a minor percentage of perennial forage plants, usually not more than 10 percent of the total plant composition. These ranges annually produce an average of no more than 25 pounds of perennial forage per acre.

To comply with resource constraints of ephemeral range areas, livestock use is authorized only during favorable periods when relatively large amounts of annual vegetation are produced. Such authorized grazing use is based on range inspections following favorable rainfall and growth conditions.

Rest-rotation Grazing

The rest-rotation grazing management system is designed to provide for the growth requirements of vegetation valuable for the production of livestock and other resource values. Under this system, each range area is rested from 20 to 50 percent of the time. Under rest-rotation grazing management, the range is divided into pastures. Each pasture is systematically grazed and rested to provide for the production of livestock forage and other resource values and at the same time maintain and improve soil fertility and vegetation.

Resting a unit of range after a period of grazing allows the opportunity for (1) plants to make and store food to recover vigor, (2) seeds to ripen, (3) seedlings to become established, and (4) litter to accumulate between plants.

Rest-rotation grazing includes the following basic treatments: (1) grazing for livestock production; (2) rest after grazing to allow seeds to ripen, followed by grazing for seed trampling; and (3) rest to recover plant vigor, to allow for litter production, and to allow seedling establishment. Rest-rotation grazing is being applied on four allotments on 160,320 acres of Federal lands.

Deferred Rotation

The deferred rotation system provides for periodic rest from livestock grazing for various parts of the range in succeeding years during the growing season, usually from July through October. Each allotment using deferred rotation may be unique in the timing and amounts of livestock use or rest provided, depending upon the situation. This system can be used in two, three, four, or five- pasture allotments. It provides for rest from 25 to 50 percent of the time.

Seasonal Grazing

Under seasonal grazing, the grazing allotment is used only a portion of the year during a specified period, and livestock are removed for the rest of the year. Seasonal grazing is practiced on two allotments.

The three basic types of seasonal grazing management include:

Summer Seasonal Grazing

Summer seasonal grazing occurs on allotments where the predominant forage production and livestock use occurs on privately owned irrigated land. The public lands are grazed lightly during the summer and livestock are returned to private lands in the fall. Generally, the public lands are grazed June through August.

Winter Seasonal Grazing

The allotment is grazed each fall, winter, and early spring and is rested from livestock grazing for the rest of the year. Typically, the allotments are grazed from November 1 through April each year.

Winter Seasonal Rotation

This system allows livestock grazing in alternating winter seasons. Winter grazing during one or two years is followed by a complete year's rest.

Non-use (NU)

Allotments under NU are where permitted use is still allocated to the allotment but for management reasons livestock use is not currently being licensed.

The following provides additional description of the current and proposed management for the 18 allotments.

Riparian Allotments

1. **Myers**

Current management: The Myers allotment is fenced along the north side of the Gila River, however, the fence is old and is not fully functional in some areas due to damage by recreationists. This reach of the Gila River has roads along the north and south sides of the floodplain. A railroad track exists along the north side of the floodplain in this allotment.

Proposed changes in management: The proposed livestock management for the Myers allotment will consist of two pastures, one riparian pasture above the Ashurst Hayden diversion dam and one upland pasture below the diversion dam. Livestock will be excluded from using the riparian areas from April 1 to November 1.

2. **Whitlow**

Current management: This allotment was inventoried in 1990, and a coordinated management plan was written which included this and the Teacup allotment, by the Arizona State Land Department with cooperation from the Natural Resource Conservation Service, Arizona Game and Fish Department, and the BLM. The majority of the allotment was rated in the high-seral condition with two small areas rated as mid seral. The allotment is part of the Teacup Ranch and provides three pastures in the overall grazing management. These pastures are used by pasture livestock which are only placed on the ranch for short periods of time during years with good ephemeral feed, and either rested or used by part of the base herd to provide rest for the other parts of the operation in dry years with very little ephemeral feed. There is no fencing in place to restrict livestock access to the riparian areas in this allotment.

Proposed changes in management: The Gila River is the boundary between the Myers allotment to the north and the northern most pasture within this allotment. The riparian pasture will only be grazed from November 1 to April 1. Livestock use of the riparian pasture will be restricted during the summer and spring by altering the existing management plan for this allotment in accordance with the proposed Conservation Measures in the BE.

3. **Horsetrack**

Current management: This allotment is bounded by a short reach of the Gila River; livestock cannot access the river from this allotment due to local terrain features. It is currently run as an ephemeral grazing operation, where livestock are placed on the allotment only when there is abundant annual forage from winter precipitation. The livestock are then removed by the end of April. This allotment is divided into two pastures and is used as an ephemeral allotment even though it is classified as perennial. This has allowed summer growing season rest every year since the grazing management was changed in 1990. This change in management has resulted in an upward trend in range condition.

Proposed changes in management: There is no change from the current grazing management proposed for the Horsetrack allotment.

4. **Teacup**

Current management: The Teacup allotment currently has fencing in place to prevent livestock grazing in the riparian corridor of the Gila River. The livestock operator does not want their livestock to use the river, and there are no plans to allow them access during any season. This allotment is part of the Teacup Ranch and provides five pastures in the grazing strategy. This allotment is on a deferred rotation system, in which livestock are rotated through the pastures with each pasture being left out of the rotation in different years allowing for several consecutive growing seasons of rest. A railroad track runs adjacent to the floodplain on the south side of the river for the entire reach.

Proposed changes in management: There is no change from the current grazing management proposed on this allotment.

5. **Cochran**

Current management: There is no fencing on this allotment to restrict livestock access to the Gila River. There has been no authorized livestock grazing on this allotment in the past 8 years. Due to its small acreage and location, livestock use will not be authorized until riparian fencing is in place. A railroad track runs adjacent to the floodplain on the south side of the Gila River for the entire reach, which is the border of the allotment.

Proposed changes in management: Fencing will be constructed along the south side of the railroad track, creating a riparian and an upland pasture. A well will be redeveloped to provide water for livestock. The riparian pasture will only be grazed from November 1 to April 1.

6. **LEN**

Current management: Livestock are placed on the LEN allotment seasonally as forage conditions permit. Fencing is in place on the north side of the Gila River of this allotment. During the river's high flows (> 800 cfs) livestock can access the river channel only where incoming washes or tributaries intersect the river. At the river's low flows livestock can access the river more easily and move up and down within the river channel.

The uplands of this allotment are divided into three pastures, but there is no management strategy to allow growing season rest on these various pastures. Most of this allotment is inaccessible and the terrain is rugged. The western end of this allotment is in the White Canyon Wilderness.

Proposed changes in management: If and when livestock are authorized, the necessary terms and conditions will be put in place in the lease to limit livestock use in riparian areas. Grazing will only occur in the riparian areas of the Gila River from November 1 to April 1.

7. **A Diamond**

Current management: This allotment currently has fencing in place to restrict livestock grazing in the riparian areas. The current livestock operator does not want livestock to use the river's riparian corridor. There are no plans to allow livestock access to the river during any season. A railroad track runs adjacent to this allotment's boundary on the south side of the river. The railroad track crosses the river near the boundary with the Rafter Six Allotment. This allotment is divided into two pastures and is used in a rotation where the livestock only use one pasture at a time, allowing rest for the other pasture.

Proposed changes in management: There is no change in grazing management proposed for this allotment.

8. **Battle Axe**

Current management: There is currently fencing on the north side of this allotment along the Gila River to limit livestock grazing in the riparian corridor. This allotment has no interior fencing due to the rough terrain. Livestock are moved around the allotment as water availability dictates. This allotment is permitted for about 160 cattle but has recently been reduced from 800 livestock.
Proposed changes in management: Grazing will only occur in riparian areas of the Gila River from November 1 to April 1.

9. **Rafter Six**

Current management: This allotment has one pasture at the west end with the BLM lands along the riparian corridor. There is some fencing in place to limit livestock use of the riparian corridor on the BLM lands within this pasture. Because BLM has very little control of the livestock grazing in the riparian areas, livestock have year-long access to the riparian corridor. Complex landownership in this area makes controlling livestock access to the river very difficult. Most of the livestock use occurs on the privately owned pastures along the Gila River with very little use of the BLM lands in the uplands. In periods of drought, the lessee moves all the livestock off the ranch to other parts of the state. This allotment also has problems of livestock accessing the river during low flows and moving up and down the river channel.

Proposed changes in management: Authorize seasonal use of BLM lands from November 1 to April 1.

10. **Hidalgo**

Current management: This allotment has been in non-use since 1990. It is held by the ASARCO company and is used as a buffer for their smelter operations at Winkelman. Arizona Highway 77 runs through this allotment adjacent to the Gila River on the northwest side just outside of the floodplain. The highway creates a riparian pasture. Livestock from the San Carlos Apache Indian Reservation have access to the riparian areas of the Gila River on this allotment.

Proposed changes in management: If livestock use is reauthorized, grazing in the riparian pasture will only occur from November 1 to April 1.

11. **Piper Springs**

Current management: Of the allotments under consultation, this is the only ephemeral use allotment. Use can be restricted administratively as the permit must be authorized monthly and is dependent upon the availability of forage for livestock. Livestock from the San Carlos Apache Indian Reservation have access and move up and down the river channel due to lack of barriers.

Proposed changes in management: There is no change of use proposed for this allotment.

12. **Christmas**

Current management: This allotment has no fencing in place for restricting livestock in the riparian areas on BLM lands. Livestock use is year-long in this allotment. The upstream half of the Gila river in this allotment is the boundary with the San Carlos Apache Indian Reservation to the south. The river section in this allotment is used by the reservation livestock. Precluding BLM authorized livestock in the riparian areas in this allotment does not affect tribal livestock use in the riparian areas.

Proposed changes in management: There is no change of use proposed for this allotment.

13. **Mescal Mountain**

Current Management: This allotment is bordered on the north and south by the San Carlos Apache Indian Reservation. The Gila River is the boundary with the reservation on the south. Currently there are 10 cows authorized to graze on this allotment. Livestock have access to the river along 4 miles at the upstream end of the allotment. Livestock have no known access to the river on the remainder of the allotment due to the steep terrain and canyon walls. This allotment currently experiences trespass livestock from the San Carlos Apache Indian Reservation.

Proposed changes in management: Authorized use of the riparian pasture will occur from November 1 to April 1.

Upland Allotments

14. **Smith Wash**

Current management: This is a custodial allotment with a year-long grazing system and is comprised of 29 percent BLM land.

Proposed changes in management: Authorize year-long grazing and continue to evaluate future range improvements that are within 5 miles of southwestern willow flycatcher habitat. This allotment will have a reduced utilization level of 30 percent for pygmy-owls.

15. **Dripping Springs**

Current management: This allotment has no range improvement on public land within 5 miles of southwestern willow flycatcher habitat. This allotment is comprised of 60 percent BLM land and has three pastures that are used in a deferred rotation grazing system.

Proposed changes in management: No change in management for this allotment.

16. **Ponderosa**

Current management: This allotment is comprised of 44 percent BLM land and is classified as custodial year-long grazing.

Proposed changes in management: There is no change in grazing management for this allotment.

17. **Kearny**

Current management: This is a custodial allotment with year-long grazing. The allotment is 95 percent BLM land.

Proposed changes in management: Continue year-long grazing and continue to evaluate future range improvements that are within 5 miles of southwestern willow flycatcher habitat. This allotment will have a reduced utilitization level of 30 percent for pygmy-owls.

18. **Government Springs**

Current management: This is a custodial allotment with year-long grazing.

Proposed changes in management: No change in the current management of this allotment.

Please refer to Appendix III for further information on the individual allotment acreages, AUMs, range conditions, and trends.

Conservation Measures

The purpose of the proposed action includes protection of flycatchers, pygmy-owls, and their habitat. The BLM proposes the following additional conservation measures for these species.

Southwestern Willow Flycatcher:

The BLM will implement the conservation measures for the southwestern willow flycatcher through the Action Plan in Instruction Memorandum No. AZ-99-018 and as described here:

The Bureau's Proposed Flycatcher Action Plan

The BLM's conservation objectives for the flycatcher on public lands are three-fold:

- Ensure that the flycatcher is protected on suitable-occupied habitat.
- Ensure suitable-unoccupied habitat remains suitable for flycatcher nesting.
- Ensure that potential habitat is allowed to become suitable for the flycatcher.

The Action Plan consists of four major action categories and an implementation schedule. Now that the flycatcher Recovery Plan is finalized, the BLM will update this Action Plan to be consistent with that plan as needed.

Mapping Flycatcher Habitat

Maps will be developed that convey the following information about flycatcher habitat managed by each Field Office:

- Location, size, shape, and spacing of habitat areas.

- Habitat stage with respect to flycatchers according to the following classifications: suitable-occupied, suitable-unoccupied, suitable-unsurveyed, and potential.

- Status of flycatcher surveys for each area of suitable habitat: either the date(s) surveyed or indication that the area has not been surveyed.

Flycatcher Occurrence Surveys

The BLM will develop and maintain a list of areas to be surveyed along with the anticipated completion date or actual completion date for the survey of each area. The purposes for surveys may be many. They include identifying whether incidental take could occur due to BLM actions or authorizations, identifying a baseline for later monitoring, or improving our knowledge about the status of the species in a particular area. Surveys may not always be necessary in all suitable habitats everywhere. Because surveys are labor-intensive, managers may assume flycatcher presence in suitable habitat.

The BLM will conduct occurrence surveys for flycatchers according to the protocol described by Sogge *et al.* (1997). In the event that agency cooperators develop new or modified protocols in the future, this plan calls for the use of the most current accepted methodology. All BLM personnel involved in flycatcher surveys must take the FWS-sponsored training course and secure a Federal permit to conduct surveys prior to doing taped playbacks in the field. Habitat patches are considered surveyed only when the established survey protocol is correctly used. Areas with suitable habitat that are not surveyed with this protocol are considered suitable unsurveyed habitat until the first survey is completed.

Habitat Management Guidelines

<u>Suitable- Occupied habitat or unsurveyed suitable habitat:</u>

- The BLM will exclude livestock during the breeding season (April 1-September 1) in order to ensure that incidental take of flycatchers due to livestock grazing activities does not occur. (Note- BLM is not accomplishing this measure on all allotments - see previous section)

- The BLM will evaluate other new or existing plans, authorizations, or activities to determine whether they may affect the flycatcher and take steps to benefit the flycatcher, if practicable. The BLM will make adjustments to avoid adverse effects, including take of the species and monitor to ensure adjustments are effective. If no alternative to adverse effects exists, formal consultation will begin as soon as possible.

<u>Suitable- Unoccupied Habitat</u>

- The BLM will evaluate new or existing plans, authorizations, or activities to determine whether they may affect the flycatcher by degrading or eliminating the suitable characteristics of the habitat for the species. They will make adjustments to avoid adverse effects and/or to benefit the species and monitor to ensure adjustments are effective. If no alternative to adverse effects exists, formal consultation will begin as soon as possible.

Potential Habitat

- The BLM will evaluate new or existing plans, authorizations, or activities to determine whether they may affect the flycatcher by diminishing or eliminating regeneration or recruitment of woody vegetation needed by the species. The BLM will make adjustments to avoid adverse effects and/or to benefit the species and monitor to ensure adjustments are effective. If no alternative to adverse effects exists, formal consultation will begin as soon as possible.

Cowbird Control

To reduce the likelihood of nest abandonment and loss of flycatcher productivity owing to cowbird parasitism associated with BLM-authorized grazing activities in or near occupied habitats, the BLM will implement the following:

- The BLM will investigate and identify livestock concentration areas that are likely foraging areas for brown-headed cowbirds within a five-mile radius of suitable flycatcher habitat, and evaluate ways to reduce any concentration areas found.

    1. The BLM will evaluate the presence or likelihood of cowbird concentration areas in the following habitats or sites, including but not limited to: riparian areas and livestock facilities such as feeding areas, waters, and corrals.

- If cowbird concentrations indicate that parasitism of flycatcher nests is occurring or actual parasitism is documented through nest monitoring the BLM will evaluate and carry out opportunities to reduce observed cowbird concentration areas in the following priority order:

    1. Modify grazing practices (e.g., season of use, relocation of facilities or concentration areas, etc.) within five miles of suitable flycatcher nesting habitat. See the grazing effects determination guidance criteria referred to in Habitat Management Guidelines for additional guidance.

    2. Initiate a cowbird trapping program in or next to cowbird concentration areas within five miles of suitable habitat if cowbird parasitism of flycatcher nests is documented or there is strong likelihood that parasitism may be occurring.

Conservation Measures for the Cactus Ferruginous Pygmy-owl

1. Habitat Description: The BLM will work with the FWS, U.S. Forest Service, and Arizona Game and Fish Department in a cooperative effort to refine the FWS' habitat profile and delineation of distribution for the pygmy-owl. The habitat profile will include habitat features necessary to support breeding populations for owls and a profile for the subset of Sonoran Desert scrub that is likely to support pygmy-owls.

2. Mapping: The BLM will map suitable habitat within the planning area based on the FWSs' most current habitat profile and distribution map. Progress reports on mapping will be submitted along with annual report.

3. Survey: The BLM will survey for the presence of owls on BLM-administered lands over all mapped areas of suitable habitat within a time frame identified in an action plan developed in cooperation with the FWS. Priorities for survey include:

    a. Survey before any habitat disturbing activity (this applies to all suitable habitat, regardless of the status of the mapping effort described in number 2 above);

    b. areas in proximity to occupied or recently (within the last 10 years) occupied habitat;

    c. historical localities; and

    d. likely historical habitat, based on historical localities and the habitat profile.

4. Habitat Management: Maintain habitat features necessary to support breeding populations of the pygmy-owl within its historical range:

    a. The BLM will maintain essential habitat features on suitable habitat as identified in the most current FWS-approved habitat profile for the pygmy-owl.

    b. The BLM will review ongoing activities for effects on essential habitat features needed by pygmy-owls, and modify activities, where necessary, to sustain the overall suitability of the habitat for pygmy-owls. Priority will be given to activities in or near occupied or recently (within the last 10 years) occupied habitat.

    c.. Where potentially suitable habitat is identified, an interdisciplinary team will assess the grazing activities for compliance with Arizona's Standards for Rangeland Health and Guidelines for Grazing management. If livestock grazing is causing the site to not meet or be making progress toward meeting standard three (desired resource conditions), the lease will be amended and corrective action will be implemented before the beginning of the next grazing season.

5. The BLM will review management direction for the pygmy owl (including such things as habitat profiles, habitat categorization, mapping, and surveys) with the FWS annually. Adjustments will be made, as necessary, based on these findings, other new information, or accepted recovery prescriptions.

ENVIRONMENTAL BASELINE (GENERAL)

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 that are contemporaneous with the consultation process. The environmental

baseline defines the status of the species and its habitat in the action area to provide a platform from which to assess the effects of the action now under consultation. This section discusses the baseline of the general area containing the 18 allotments. Information specific to each species is presented later in this document.

The action area (where the effects of the action manifest) includes all of the allotments shown on Table 3. Adjacent areas may also be affected due to watershed degradation. Effects on the Gila River probably do not extend significantly below Ashurst-Hayden Dam due to lack of surface flow, the diversion dam, and absence or rarity of listed species.

The action area encompasses both riverine and upland habitats from the Ashurst-Hayden Dam on the Middle Gila River upstream to Coolidge Dam and includes 5 miles of the confluence area of the lower San Pedro River. The San Pedro River enters the Gila River at Winkelman, and is the major tributary in this reach of the Gila River. Other minor tributaries include Deer and Ash creeks upstream of Winkelman, and Mineral Creek which enters the Gila River near Kelvin. Southwestern willow flycatcher habitat and potential habitats are limited to the riparian zone along the Gila River.

Early descriptions of the Gila River through the project area suggest that riparian vegetation was much more extensive in the 19th century than it is currently (Ohmart 1982), and saltcedar may not have occurred on the Gila River before high flows in 1916 (Schwennesen 1916, Robinson 1965). In 1775, Francisco Garces noted much brush and carrizo (*Phragmites*) near present day Sacaton (Cous 1900), and an anonymous Jesuit reported a large reservoir and natural lagoons three leagues upstream of the Casa Grande ruins (Nentvig 1951). In 1848 at the San Pedro River confluence, W. H. Emory found the Gila River channel to be deep, steep-sided, and well grown over with cottonwood, willow, and mesquite. However, Mowry (1864) described a woodland of ash (*Fraxinus* spp.) at the San Pedro confluence. Downstream of Mineral Creek, willows were so thick as to impede travel. At the Coolidge Dam site in 1846, large cottonwoods grew in a strip 200-300 feet wide. Emory also noted four-wing saltbush (*Atriplex canescens*) and arrowweed (*Tessaria sericea*) in the river bottom in the project area (Ohmart 1982, Ross 1923). The river was mostly perennial during the early 19th century (Dobyns 1981).

Agricultural practices of native Americans, including diversions, clearing and planting of crops, and use of fire altered riparian communities before European colonization. However, dramatic changes occurred concurrently with development of modern agriculture and other development in the late 1800s. Riparian vegetation was cleared for agriculture, and cottonwood and mesquite were cut for fuel and building materials (Horton and Campbell 1974). Farmers built a canal at Florence in 1887 that significantly reduced downstream flow (Tellman *et al.* 1997).

Cattle ranching was common on the Gila as early as 1872. Excessive stocking rates in the following three decades lead to watershed degradation. Beginning in the early 1890s, periodic above-average precipitation was followed by large runoff events from the degraded watershed that cut channels, scoured out riparian vegetation, and turned the Gila into a very muddy river

(Bryan 1925, Calvin 1946, Ohmart 1982). Overharvest of beaver and loss of the dams they built, combined with erosion caused by poorly-developed irrigation projects in the 1880s excacerbated the problem (Bryan 1925, Dobyns 1978). Most of the dense stands of willow and cottonwood that grew along the river prior to 1905 were destroyed during 1905-1917 (Burkham 1972). Cattle also directly affected riparian vegetation by browsing on willows, cottonwoods, and other palatable species. Cattlemen burned heavy brush along the Gila River near Arlington to drive cattle into the open, resulting in loss of riparian vegetation and erosion of river banks (Ross 1923). This method of driving cattle was likely used in the project area, as well.

Coolidge Dam was constructed in 1928, forming San Carlos Reservoir, and Ashurst-Hayden Dam, a minor diversion dam at the downstream end of the project area, was constructed at about the same time (Ohmart 1982). Dams and diversions reduced flows to a point where the river became intermittent and riparian vegetation was lost in the Sacaton area (Ohmart 1982). Coolidge Dam also reduced high flows that produced conditions for germination of cottonwoods, willows, and other native riparian plant species. These conditions favored establishment of saltcedar, which by 1941 was well-established near Winkelman (Ohmart 1982). Operation of Coolidge Dam allows for periodic extended flood releases that may drown riparian plants, or extended periods of low flow that may result in dessication of riparian vegetation.

Ohmart (1982) mapped riparian vegetation communities through the project area in 1978. At that time, the most extensive stands of riparian vegetation occurred from Winkelman downstream of Kearny to near Riverside or Kelvin. Below Riverside, the riparian corridor was relatively narrow. Riparian vegetation downstream of Ashurst-Hayden Dam was patchy and mostly in narrow strips adjacent to the river. At lower elevations in Arizona, such as in the project area, southwestern willow flycatchers typically breed in saltcedar, 12-33 feet in height that forms a continuous closed canopy (Sogge *et al.* 1997, Paradzick *et al.* 1999). This would correspond to Ohmart's saltcedar type III and IV communities (although some of the stands identified by Ohmart may not contain adequate vegetation volume or density for this species). Cottonwood/willow and mixed saltcedar, cottonwood, and/or willow III and I communities frequently contain dense understories of saltcedar and also serve as breeding sites for willow flycatchers. Large stands of saltcedar III and IV stands occurred in 1978 in the project area from about eight miles downstream of Winkelman to near Riverside, and in an area just upstream of Ashurst-Hayden diversion Dam. Significant stands of cottonwood/willow and mixed saltcedar, cottonwood, and willow type III and I communities occurred only from about two miles northwest of Winkelman downstream for about 10 miles, although narrow stands of cottonwood/willow communities occurred periodically downstream of Kearny and upstream from Winkelman.

The Gila River is regulated by releases from Coolidge Dam, which is administered by the San Carlos Irrigation District. Typically, water is stored through the fall and winter and released in the spring and summer for irrigating farmland downstream. Releases are generally dependent upon agriculture demands. Unusually wet winters may require the release of large amounts of water in the late winter and early spring. During January 1993, river flows reached 52,400 cubic feet per second (cfs) at Kelvin. A comparison of the peak flows for the January 1993 flood

reveals that a large amount of water is added to the Gila River downstream of Coolidge Dam during significant weather events by several tributaries including the lower San Pedro River. During the 1993 flood, peak flows were recorded at 32,800 cfs below Coolidge Dam and 74,900 cfs at Kelvin, a difference of 42,100 cfs. Unusually dry winters may require that the release of dam water be discontinued due to threats of fish kill in San Carlos Reservoir. In spring 2002, the releases were discontinued for the months of April, May, and June. This action placed additional stress on the riparian area between the reservoir and Ashurst Hayden diversion Dam.

Degraded watershed conditions along the upper San Pedro River and the upper Gila River above Coolidge Dam may contribute to the peak flows during flood events. The 18 allotments addressed in this biological opinion represent a small percentage of the watershed-influencing flows in this particular reach of the Middle Gila River.

In the uplands of the allotments vegetation is comprised of Interior Chaparral and Semidesert Grasslands at the upper elevations to Sonoran Desert scrub at the lower elevations. The Interior Chaparral is confined to the north facing slopes along the top of the Dripping Springs and Pinal mountains and consists mainly of shrubs and small trees such as turbinella oak, mountain mahogany, ceanothus, and skunk bush, with an understory of grama grasses, three awns, and curly mesquite. The Semidesert Grasslands were dominated by perennial grasses such as the grama grass and the three awns, but due to historical grazing activities have been degraded to mid-seral (fair) ecological condition resulting in a shrubland dominated by mesquite and cacti such as cholla and prickly pear, with some grasses such as three awns, plains bristle grass, and bush muhly.

Sonoran Desert scrub exists at lower elevations of the project area, primarily around the Florence area and a narrow corridor along the Gila and San Pedro rivers away from the riparian areas. These areas are dominated by palo verde, saguaro, and mesquite with ironwood trees along the drainages, and an understory of triangle leaf bursage, creosote, and various cacti.

A major land use in the vicinity of the proposed project area is the operation of ASARCO's Ray Mine, which has significant effects on the Middle Gila River Ecosystem's watershed. Recreational activities such as off-highway-vehicle use and commercial river rafting that occur in the vicinity of the project area could have adverse effects from noise disturbance on threatened and endangered species in the area. In 1994, BLM issued a Federal Register Notice closing the upper reach of the Gila River within the project area to rafting and boating from January 1 through July 1 annually to protect the bald eagle from disturbance during the nesting season. This seasonal closure remains in effect.

General Grazing Effects

A large body of research and literature exists on the effects of livestock grazing, positive, negative, or neutral, on numerous ecosystems and can be found in several bibliographies and literature reviews (Ffolliott *et al.* no date, Willoughby 1997, Southwest Center for Biological Diversity 1995, 1999, Burgess 1999, Forest Guardians 1999, Belsky *et al.* 1999, and Jones 2000). The following section identifies some general effects that livestock grazing has on ecosystems,

habitat types, and species groups. Livestock grazing effects to specific species will be discussed later in this document.

The effects of livestock management on the landscape are related to numerous factors (Holechek *et al.* 1998). Environmental parameters such as precipitation, temperature regimes, vegetation types, and growing season provide the basics upon which a grazing program is developed (Schmutz 1977). Abiotic factors include soils, climate, geography, and topography. Stocking rates, season of use, utilization levels, class of livestock, and rotation patterns comprise livestock management choices. Grazing utilization levels assigned to the upland allotments are <30 percent on perennial palatable shrubs and grasses, and utilization levels of <30 percent of the apical stems of woody species such as cottonwood and willow seedlings and saplings < 6 feet tall are assigned in riparian areas.

Reviews of grazing literature for southwestern habitats support the need to limit levels of utilization (Martin 1973, 1975; Holechek *et al.* 1998; Holechek *et al.* 1999). Martin and Cable (1974), working in semi-desert grasslands on the Santa Rita Experimental Range in southern Arizona, found that perennial grass vigor declined when average utilization for a ten-year period exceeded 40 percent. The numbers used by these researchers represent average utilization rates (Holechek 1999). The averages may cover a whole pasture, and not just one key area, and be for more than one year. The application of average utilization rates to a landscape that is not homogenous is problematic. Livestock do not distribute themselves evenly through a pasture, despite efforts by the permittee to move them. It is certain that some areas will be used more than the average, and thus may lead to more localized impacts.

Livestock grazing has damaged about 80 percent of stream and riparian ecosystems in the western United States. Although these areas are only 0.5 to 1.0 percent of the overall landscape, a disproportionately large percentage (~70 to 80 percent) of all desert, shrub, and grassland plants and animals depend on them. The introduction of livestock 100 to 300 years ago caused a disturbance with many ripple effects. Livestock seek out water, succulent forage, and shade in riparian areas leading to trampling of streambanks, overgrazing of riparian vegetation, soil erosion, loss of streambank stability, declining water quality, and drier, hotter conditions. These changes have reduced habitat for riparian plant species, cold-water fish, and wildlife, thereby causing many native species to decline in number or become locally extirpated. Such modifications can lead to large-scale changes in adjacent and downstream ecosystems (Belsky *et al.* 1999).

One of the most significant adverse impacts within western riparian systems has been the perpetuation of improper grazing practices (Hastings and Turner 1965, Ames 1977, Glinski 1977, Marlow and Pogacnik 1985). Chaney *et al.* (1990) noted that initial deterioration of western riparian systems began with severe overgrazing in the late nineteenth century. For the last 75 years, public land management agencies have acknowledged the continued damage cattle have done to riparian areas, upland tributaries, and ranges.

Proper stocking is an essential principle of range management, which should precede or coincide with the initiation of any grazing management system. Studies conducted at the Santa Rita Experimental Range, south of Tucson, Arizona, indicated that use levels in semi-desert grasslands should be at an average of about 40 percent to minimize vegetation damage during times of drought. At a given stocking rate during years of high forage production (above normal rainfall) utilization in the use pasture might be as low as 20 percent. During years of low forage production utilization could be as high as 60 percent. Total use of the key species is measured and any wildlife use is included in the measurement. It does not matter whether wildlife or livestock are using the plant, total use is what is important. During abnormal years, whether dry or wet, stocking rates are adjusted. Policy and regulation allow for temporary nonrenewable licensing for increases in use or reductions in use.

Holecheck *et al.*(1999) recommended that routine stocking rates should be conservative, resulting in an average of 30-35 percent use with some destocking in drought years (Holecheck *et al.*1999). Holecheck *et al.* (1998) found that the following average utilization rates were appropriate for maintaining range condition: 25-35 percent (desert scrub), and 30-40 percent (semi-desert grassland and pinyon-juniper woodland). Within these ranges, several factors determine whether a low, medium, or high value should be selected. Holecheck *et al.* (1998) suggest that on ranges in good condition with relatively flat terrain and good water distribution, the higher utilization limit may be appropriate. If the range is in poor or fair condition, or the allotment has thin soils, rough topography, and poor water distribution, the lower utilization rate may be appropriate. Galt *et al.* (2000) hold the opinion that a 25 percent harvest coefficient is a sound idea for most western rangelands. Because of better ecological condition and forage production, cattle productivity is substantially higher in conservatively stocked pastures than in more intensely grazed scenarios.

The extensive and intensive effects of livestock grazing on soil and vegetation have been documented often in many areas. All grazing, including that of domestic livestock, can alter vegetation composition, structure, and biomass; cause soil erosion and compaction, reduce water infiltration rates, and increase runoff (Klemmedson 1956, Ellison 1960, Arndt 1966, Gifford and Hawkins 1978, Webb and Stielstra 1979, Guthery *et al.* 1990, Orodho *et al.* 1990, Krueper *et al.* 2003). Livestock grazing effects to native southwestern fishes and their habitats have been long recognized (Chamberlain 1904, Miller 1961, Hendrickson and Minckley 1984, Minckley *et al.* 1991).

New information is available in regard to the effects of grazing in uplands and watersheds. Jones (2000) quantitatively reviewed the effects of cattle grazing on North American arid ecosystems. Eleven of 16 analyses reviewed revealed significantly detrimental effects of cattle grazing. Soil related variables were most affected, followed by vegetation characteristics, and rodent populations. Grazed areas had significantly reduced cryptobacteria crust cover, infiltration rates, and greater soil loss to erosion when compared to ungrazed areas. Grazed areas also had significantly reduced litter biomass and cover, total vegetation biomass, and grass and shrub cover, than ungrazed areas. Rodent species diversity and richness were reduced in grazed versus

ungrazed areas. However, Jones found that most of the studies she evaluated were "quasi-experiments and many failed to present any measure of variability", which precluded quantitative analyses (also see Rinne 1999 and Larsen *et al.* 1998)

Livestock grazing in riparian areas can cause changes in plant species composition (Ryder 1980, Schulz and Leininger 1991, Stromberg 1993a), reduce structural complexity (Ohmart and Anderson 1986), reduce understory, and replace native species with nonnative species (Krueper 1995). Greater soil erosion and compaction, changed flooding regimes, and decreased water quality also result from livestock presence in riparian areas (Lusby *et al.* 1971, Lusby 1979, DeBano and Schmidt 1989b, Szaro 1989, Armour *et al.* 1991, Platts 1991, Fleischner 1994). Livestock disrupt streambanks through chiseling, sloughing, compaction, and collapse. This in turn can lead to wider and shallower stream channels (Armour 1977, Platts and Nelson 1985b, Platts 1990, Meehan 1991). These changes in channel morphology will affect fish habitat elements (Bovee 1982, Rosgen 1994). Livestock damage to riparian and aquatic zones occurs shortly after livestock entry into the area and occurs at all levels of use (Marlow and Pogacnik 1985, Platts and Nelson 1985a, Goodman *et al.* 1989). Even after rest, the recovery of streambanks and vegetation may be halted or lost soon after cattle return (Duff 1979, Platts and Nelson 1985a). Degradation of aquatic habitat is also a factor in the invasion and establishment of nonindigenous aquatic species (Courtenay and Stauffer 1984, Arthington *et al.* 1990, Soule 1990, Aquatic Nuisance Species Task Force 1994).

Effects from the proposed continued livestock grazing and its management on the 18 allotments included in this consultation would occur through three mechanisms: 1) physical damage and changes to streambanks, stream channels, and water column; 2) watershed alteration; and 3) alteration of the riparian vegetation community. Some protection and enhancement measures are described in the biological evaluation.

Physical Damage and Riparian Alteration

Livestock destabilize streambanks through chiseling, sloughing, compaction, and collapse which results in wider and shallower stream channels (Armour 1977, Platts and Nelson 1985c, Platts 1990, Meehan 1991). This alters the configuration of pools, runs, riffles, and backwaters; elevates levels of fine sediments and substrate embeddedness; reduces availability of instream cover; and alters other habitat factors. It also changes the way flood flows interact with the stream channel and may exacerbate flood damage to banks, channels, and riparian vegetation.

These impacts occur at all levels of livestock presence, but increase as number of livestock and length of time the livestock are present increase (Marlow and Pogacnik 1985). Damage begins to occur almost immediately upon entry of livestock onto the streambanks, and use of riparian zones may be highest immediately following entry of livestock into a pasture (Platts and Nelson 1985a, Goodman *et al.* 1989). Vegetation and streambank recovery from long rest periods may be lost within a short period following grazing reentry (Duff 1979). Bank configuration, soil type, and soil moisture content influence the amount of damage with moist soil being more vulnerable to

damage (Marlow and Pogacnik 1985, Platts 1990). Livestock presence on streambanks retards rehabilitation of previous damage as well as causing additional alteration (Platts and Nelson 1985a).

Livestock grazing in and on riparian vegetation may cause changes in the structure, function, and composition of the riparian community (Warren and Anderson 1987; Platts 1990; Schulz and Leininger 1990, 1991; Stromberg 1993b). Species diversity and structural diversity may be substantially reduced. Nonindigenous plant species may be introduced through spread in cattle feces. Reduction in health and density of riparian vegetation and shifts from deep rooted to shallow rooted vegetation contribute to bank destabilization and collapse and production of fine sediment (Meehan 1991). Loss of riparian shade results in increased fluctuation in water temperatures with higher summer and lower winter temperatures (Platts and Nelson 1989). Litter is reduced by trampling and churning into the soil thus reducing cover for soil, plants, and wildlife (Schulz and Leininger 1990). The capacity of the riparian vegetation to filter sediment and pollutants to prevent their entry into the river and to build streambanks is reduced (Lowrance *et al.* 1984, Elmore 1992). Channel erosion in the form of downcutting or lateral expansion may result (U.S. BLM 1990).

Physical damage to streambanks and channels in conjunction with loss or reduction of riparian vegetation may change the timing and volume of streamflow (Stabler 1985, Meehan 1991). Flood flows may increase in volume and decrease in duration, and low flows may decrease in volume and increase in duration. Livestock trampling and grazing of the riparian corridor make banks and vegetation more susceptible to severe damage during catastrophic flooding (Platts *et al.* 1985).

The most commonly acknowledged impact of livestock grazing in riparian systems is increased sediment production and transport (Platts 1990, Johnson 1992, Weltz and Wood 1994). Negative impacts of sediment to fish and fish habitat is well documented (Newcombe and MacDonald 1991, Barrett 1992, Megahan *et al.* 1992). Excess sediment may cause the change or loss of habitat used by fish. Excess sediment can also smother invertebrates, reducing production and availability of fish food. Livestock grazing has also been shown to increase nutrients in streams (Kaufman and Krueger 1984).

Belsky *et al.* (1999) summarized that, “cattle cause more damage to riparian zones than their often small numbers would suggest. Livestock tend to avoid hot, dry environments and congregate in wet areas for water and forage, which is more succulent and abundant than in uplands. They are also attracted to the shade and lower temperatures near streams, most likely because their species evolved in cool, wet meadows of northern Europe and Asia. In fact, cattle spend 5 to 30 times as much time in these cool, productive zones than would be predicted from surface area alone (Skovlin 1984). One study found that a riparian zone in eastern Oregon comprised only 1.9 percent of the grazing allotment by area, but produced 21 percent of the available forage and 81 percent of the forage consumed by livestock (Roath and Krueger 1982).” It can be argued that in the arid southwest these impacts are greater than a typically wetter Oregon.

Belsky *et al.* (1999) also discussed that grazing negatively affects water quality and seasonal quality, stream channel morphology, hydrology, riparian zone soils, instream and streambank vegetation, and aquatic and riparian wildlife. No positive environmental impacts were found (after examining the literature). Livestock were also found to cause negative impacts at the landscape and regional levels. Although Belsky *et al.* (1999) believed it was sometimes difficult to draw generalizations from the many studies on cattle grazing, due in part to differences in methodology and environmental variability among study sites, most recent scientific studies document that livestock grazing continues to be detrimental to stream and riparian ecosystems. To reduce these effects, on all but 2 of the 13 riparian allotments, the BLM proposes to restrict livestock grazing in riparian areas to winter use only by fencing riparian areas of the Middle Gila River, excluding only those portions that are inaccessible due to the local topography. Due to the complex landownerships of the Rafter 6 and Christmas allotments, livestock will continue to have year-long access to the Gila River. In addition, BLM proposes no fencing or other measures to prevent trespass cattle from the San Carlos Apache Indian Reservation from using riparian habitats on the Mescal, Piper Springs, and Hidalgo allotments.

Utilization Rates

As described by the BLM in their biological evaluation, grazing in potential southwestern willow flycatcher habitat will inhibit the progress of riparian areas reaching their potential natural community. Grazing at proposed utilization levels in the uplands may help reduce some impacts to the existing riparian habitat but will eliminate the impacts only if the new utilization levels are strictly followed. Summer livestock grazing will be excluded seasonally from the riparian areas on 11 of 13 riparian allotments. On the Rafter 6 and Christmas allotments, the BLM cannot ensure that the 30 percent use limit will not be exceeded. Utilization limits could also be exceeded on the Mescal, Piper Springs, and Hidalgo allotments due to trespass cattle. The remaining 5 allotments do not have any riparian areas.

Reducing percent use of riparian woody and herbaceous plants and on upstream ranges is not the most expeditious recovery action to establish or rehabilitate flycatcher nesting habitat. The elimination of grazing in potential southwestern willow flycatcher habitat represents the quickest and most certain way to recover riparian habitat suitable for nesting flycatchers (U.S. Fish and Wildlife Service 2002). Grazing of much Federal land for the last 75 years has degraded and prevented recovery of flycatcher habitat. As a result, grazing was a significant cause for listing the bird as endangered (U. S.Fish and Wildlife Service 1995a).

If permitted numbers remain the same as in the past, the Service and the BLM expect that livestock will be moved off of the BLM land more regularly because use limits will be reached rapidly. Without intensive monitoring, herding of livestock, or a reduction in stocking levels, use will be exceeded. Monitoring and implementing management based upon the results will be the key activities to prevent livestock from exceeding use limits.

Seasons of Use

Livestock grazing will occur between November 1 to April 1 in riparian areas in the Myers, Whitlow, Cochran, LEN, Battle Axe, Rafter Six, Hidalgo, Piper Springs, Christmas, and Mescal Mountain allotments. Limiting use of riparian areas to this period can reduce, but not eliminate the impacts of grazing. The strategy is for livestock to graze plentiful herbaceous perennial grasses when cottonwood and willow trees are dormant. Additionally, cold air circulating throughout river drainages can prevent livestock from congregating in the riparian areas. Grazing during this period can still cause severe damage to riparian areas if precautions are not taken (Elmore and Kauffman 1994).

Another key to properly managing this season of use is establishing the accurate dormant season for the plants at a particular elevation. Typically, higher elevations will have a longer dormant season. These times can fluctuate from year to year by a couple weeks depending on seasonal temperature shifts. It has been recommended that a more accurate dormant season is from leaf drop to first bud break. Along the middle Gila River cottonwoods and willows are leafed out before April 1 and may retain their leaves after November 1. Thus, BLM proposes to graze livestock during at least part of the growing season for these species. Cottonwood and willow shoots are particularly palatable for livestock early in the growing season.

Again, similar to use limits, monitoring these pastures is important when determining if it is appropriate to graze these riparian areas from November 1 to April 1. Without establishing the herbaceous forage component before allowing livestock entering the pasture, it will not be known whether there is enough herbaceous forage available for livestock. If livestock are found staying in the riparian areas as a result of mild winters and not being regularly herded, then cattle can physically harm riparian trees by browsing, trampling, trailing, and bedding. If livestock are present when cottonwood and willow trees are not dormant, the trees can be significantly affected by herbivory.

Trespass Livestock

Ensuring that only the permitted livestock are present on an allotments and during the appropriate times is important to not exceeding use limits. Maintaining fences and monitoring conditions and use of allotments before, during, and after livestock are present is needed to ensure that trespass livestock are not contributing or causing use limits to be surpassed. As stated previously, strict monitoring of the San Carlos Apache Indian Reservation livestock and fencing is needed to ensure trespass livestock are eliminated is important. However, measures proposed are inadequate to prevent trespass cattle in the riparian areas of the Gila River on four of the allotments (Mescal, Christmas, Piper Springs, and Hidalgo). The livestock lessee on the Rafter Six allotment has also reported trespass livestock along the Gila River between Kearny and Kelvin.

Alteration of Vegetation Communities

Livestock grazing alters the species composition of plant communities, disrupts ecosystem functioning, and alters ecosystem structure (Fleischner 1994). Some grasses are adapted to respond to grazing because growth originates at the basal meristem, close to the soil surface. Plants may regenerate quickly if the root crown is not damaged, and if sufficient photosynthesis has taken place to provide for root development and annual replacement. In fact, light or moderate grazing may stimulate growth in some plants (Ellison 1960), because removal of plant material containing carbohydrate reserves may increase photosynthetic activity to replace the lost material (Humphrey 1958). However, a review of the effects of herbivory on grazed plants conducted by Belsky (1986), illustrated there is little evidence to show that grazing benefits plants ecologically. Other authors, including Ellison (1960), have reached the same conclusion (Jameson 1963, Silvertown 1982).

Grazing in desert scrub communities probably has mixed effects on fire frequency and behavior. Weedy nonnative plants, split grass (*Schismus barbatus*), checker fiddleneck (*Amsinckia intermedia*), filaree (*Erodium cicutarium*), brassica (*Brassica tournefortii*), and cheatgrass (*Bromus rubens*) have benefitted from grazing, while native perennial bunchgrasses, which are highly palatable grazing forage, have become less abundant in many areas (Berry and Nicholson 1984, Kie and Loft 1990, Minnich 1994). When nonnative annual plants cure, they can form continous stands of fine fuels that carry fire. These fine fuels have resulted in increased fire frequency in desert scrub (Rogers and Steele 1980, 1988; Minnich 1994). Many desert shrubs and cacti, including saguaro, are poorly adapted to fire and decline in burned areas. For examply, Esque *et al.* (2000) reported mortality of adult saguaros in excess of 20 percent after a fire in desert scrub at Saguaro National Park. Altlhough cattle grazing probably contributed to the spread of nonnative annuals into desert scrub communities, heavy grazing can also reduce fuel loads, making it less likely that fire will occur.

Reductions in vegetation cover increase raindrop impact, decrease soil organic matter and soil aggregates, and decrease infiltration rates (Blackburn 1984, Orodho *et al.* 1990). Other detrimental impacts include increased overland flow, reduced soil water content, and increased erosion (DeBano and Schmidt 1989a, Guthery *et al.* 1990, Orodho *et al.* 1990). Continuous year-long grazing can result in large bare areas around water sources and creation of trails to and from points of livestock concentrations (Platts 1990).

Impacts to vegetation and litter from livestock grazing can affect watershed condition and function (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989a, Belnap 1992, Belsky and Blumenthal 1997). Heavy grazing effects are well known and can be severe (Guthery *et al.* 1990, Platts 1990). Conflicting information exists about the effects of moderate or light grazing schemes (Gifford and Hawkins 1978, Blackburn 1984, Lovich and Bainbridge 1999). Studies by Dadkhah and Gifford (1980) in the western United States show trampling by livestock causes a decline in infiltration rates, but despite trampling, sediment yields remain uniform after grass cover reaches 50 percent.

A system which provides ample rest periods and grazing deferments should improve plant vigor, herbage production, and slowly over time, change the species composition to more desirable species (Hormay 1970, Hughes 1979, Van Poolen and Lacey 1979). The time required and how much change occurs will vary from site to site depending on the site potential of the particular range site, present trends, and the grazing levels. The lighter the grazing, the quicker the recovery. Riparian vegetation tends to rebound quickly with rest or less grazing (Platts and Nelson 1985b, Elmore and Beschta 1987, Schulz and Leininger 1990).

Watershed function is an important factor in maintaining stream function (Platts 1986, Meehan 1991, Chaney *et al.* 1993) and is extremely important to cienegas which are sensitive to flood disturbance (Hendrickson and Minckley 1984). The riparian vegetation and streambank condition in tributaries, including intermittent and ephemeral ones, form essential screens between upland effects and perennial streams (Erman *et al.* 1977, Mahoney and Erman 1981, Osborne and Kovacic 1993).

Invasion of Tamarisk

Tamarisk is generally unpalatable to cows. As a result, in areas where native plants and tamarisk exist grazing of native plants may favor tamarisk. Stands of tamarisk have high fuel loads that are very flammable. The subsequent transition of native plants to tamarisk has increased the fire risk in the nesting habitat of the flycatcher. However, tall, dense stands of tamarisk, particularly near surface water is the favored nesting habitat of the southwestern willow flycatcher below 5,000 feet (U.S. Fish Wildlife Service 2003).

Upland effects and Watershed

The history of upland grazing and its continued effects on riparian habitat is presented in the environmental baseline. To generate and maintain riparian habitat, a healthy watershed (uplands, tributaries, ranges, etc.) is a key component (Elmore and Kauffman 1994, Briggs 1996). Elmore and Kauffman (1994) reported that "simply excluding the riparian area (from grazing) does not address the needs of the upland vegetation or the overall condition of the watershed. Unless a landscape-level approach is taken, important ecological linkages between the uplands and aquatic systems cannot be restored and riparian recovery will likely be limited."

Continuing to graze in uplands where the soil conditions and riparian or xero-riparian habitat in upland tributaries are unsatisfactory will continue to delay recovery and generate the most significant effect of unhealthy ranges, which is unnatural flooding. Unnatural flooding subsequently will topple existing trees and shallow rooted saplings and poles, and continue to erode rivers like the current conditions observed on the Salt and Verde rivers, Tonto Creek, and their tributaries.

Livestock grazing may cause long-term changes to the watershed and its functions. The extent of these changes varies with watershed characteristics, grazing history, and cumulative effects from other human uses and natural watershed processes. Watershed changes due to grazing are more

difficult to document than direct livestock impacts to the riparian and aquatic communities because of their long-term, incremental nature, the time lag and geographic distance between cause and effect, and numerous confounding variables. Despite this, the relationship between livestock grazing in a watershed and effects to river systems is widely recognized and documented (Chaney *et al.* 1990, Platts 1990, Bahre 1991, Meehan 1991, Fleischner 1994).

Livestock grazing may alter the vegetation composition of the watershed (Martin 1975, Savory 1988, Vallentine 1990, Popolizio *et al.* 1994). It may cause soil compaction and erosion, alter soil chemistry, and cause loss of cryptobiotic soil crusts (Harper and Marble 1988, Marrs *et al.* 1989, Orodho *et al.* 1990, Schlesinger *et al.* 1990, Bahre 1991, Evans and Belnap 1999). Cumulatively, these alterations contribute to increased erosion and sediment input into the streams (Johnson 1992, Weltz and Wood 1994). They also contribute to changes in infiltration and runoff patterns, thus increasing the volume of flood flows while decreasing their duration, and decreasing the volume of low flows while increasing their duration (Brown *et al.* 1974, Gifford and Hawkins 1978, Johnson 1992). Groundwater levels may decline and surface flows may decrease or cease (Chaney *et al.* 1990, Elmore 1992). Development of livestock waters may alter surface flows by impoundment, spring capture, or runoff capture.

Cryptobiotic crusts, consisting of lichens, fungi, algae, mosses, and cyanobacteria are important soil stabilizers and are often the dominant nitrogen source in desert soils (Belnap 1992, Belnap and Lange 2001). These crusts decrease wind erosion and have a significant effect on soil stability and rates of water infiltration (Belnap and Gardner 1993). Cyanobacterial soil crusts have been shown to increase soil retention through absorbency of the polysaccharide sheath material that surrounds groups of living filaments. These crusts also act to increase the availability of many nutrients in sandy soils (Belnap 1992; Belnap and Gardner 1993), and are critical to nitrogen production in Sonoran Desert soils (Belnap 2002). In deserts, after water, nitrogen is the element most limiting to primary productivity (Romney *et al.* 1978).

Disturbance of soils, including cryptobiotic crusts, and removal of vegetation by grazing combine to increase surface runoff and sediment transport, and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997). Loss of vegetation cover and trampling of soils promote further deterioration of soil structure, which in turn accelerates vegetation loss (Belsky and Blumenthal 1997). These changes tend to increase peak flows in drainages (DeBano and Schmidt 1989), making water courses more “flashy”, which promotes erosion, downcutting, and loss of riparian and xero-riparian vegetation (Belsky *et al.* 1999).

Although watershed effects vary depending upon the number and type of livestock, the length and season of use, and the type of grazing management, the mechanisms remain the same and the effects vary only in the extent of area and severity (Blackburn, 1984; Johnson, 1992). Most landscapes are composed of mostly upland slopes and it is here that cattle have perhaps collectively their greatest effects. They directly reshape the earth, compact the soil and cause increased runoff, sometimes transforming the runoff regime from variable source area to saturated (Hortonian) overland flow. They further weaken biological resistance and trample and loosen soil, changing its susceptibility to both water and wind erosion.

The direct force of cattle hooves reshapes the land. The most common manifestation of direct force is the path or trail. Although cows tend to range widely on a daily basis, they do use the same path enough to create trails. Because the trails are less permeable (from compaction and crusting, Rostagno 1989) and because they conduct water, they may erode to larger proportions (Hole 1981) even under "light" grazing, and direct water and/or sediment cascades onto other, perhaps more vulnerable areas, themselves often created by the cow (Kaufman *et al.* 1983 a,b).

Compaction is a strong direct effect of force which leads to reduced infiltration and increased overland flow, which in turn leads to increased erosion. Another soil characteristic that is affected by cattle grazing is the bulk density. For example, the combination of grazing and trampling will usually reduce the density of grass cover (e.g. Hofmann and Ries 1991). Among other effects, severe compaction often reduces the availability of water and air to the roots, sometimes reducing plant vitality (e.g., Reed and Peterson 1961). Grass species change from perennial to annual and from deep-rooted to shallow-rooted. Removal of phytomass by grazing and lessened phytomass production can reduce fertility and organic matter content of the soil. Soil aggregate stability is decreased and the surface sometimes becomes crusted. Proportion of bare soil appears to correlate well with surface run-off and sediment yield (Warren *et al.* 1986a).

One of the biological factors that is often neglected in analyzing the effects from livestock grazing is fauna, in particular soil fauna. Soil fauna (endopedofauna) generally have positive effects on the hydraulic conductivity of soil by (1) increasing porosity and permeability, (2) improving soil structure, and (3) increasing fertility. It appears that soil fauna ranging from earthworms to moles have more difficulty surviving in the impacted soil conditions resulting from heavy grazing.

Watershed condition is based on percent of ground cover with effective cover present. Effective ground cover is rock, plants, or plant material that is capable of continously intercepting falling rain drops and dissipating their potential erosive energy before they encounter bare soil. Watershed ratings are relative to a predetermined percentage of effective ground cover at various monitoring sites. The major concern is the concentrated use by livestock in the flatter slopes, where soil conditions are impaired or unsatisfactory. These areas are close in proximity to stream channels where potential for erosion during flooding could be greatly increased by the impaired and unsatisfactory soils conditions. In addition, these soil conditions have retarded the capability to filter sediment from uplands during runoff, and reduce water retention abilities.

INTERRELATED AND INTERDEPENDENT ACTIONS

Grazing would occur on both Federal and non-Federal lands in the 18 allotments. Although the BLM has no discretion over activities on non-BLM lands in the allotments, and therefore has no control over the types, extent, or intensity of effects to listed species on those lands, grazing systems and prescriptions on BLM lands may influence the way cattle are grazed on non-Federal lands. In these cases, grazing on the non-BLM lands in the allotment may be interrelated or interdependent to grazing on the BLM lands.

In accordance with 50 CFR 402.14(g), the Service is required to consider all effects of the proposed action, which refer to "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or 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" (50 CFR 402.02). The Service's Section 7 Handbook provides further guidance on the definition of "interrelated and interdependent actions" by establishing the following rule: Determining if an action is interrelated or interdependent depends on the "but for" test. Ask whether the Federal, State, or private activity could occur "but for" the proposed action.

The percentage of BLM lands in an allotment is a determining factor in whether grazing on non-BLM lands in an allotment is interrelated or interdependent to the proposed action. If the BLM owns a large percentage of the allotment, grazing on the non-Federal portions might be conducted very differently or not at all if the BLM lands could not be grazed. On allotments in which the BLM owns a lesser, but still significant, acreage the way that the non-Federal lands are grazed might be affected if the BLM lands are not grazed. For instance, if the BLM lands comprise one pasture in a three pasture rest-rotation grazing system, then if that pasture cannot be grazed, the non-Federal lands may be grazed year-round or under some other grazing system. These other grazing systems may have significantly different effects on listed species as compared to a three pasture system.

Determining which allotments grazing on the non-Federal portions of the allotment is interrelated or interdependent would require an allotment by allotment analysis. Because of the large number of allotments under consultation and the programmatic nature of this biological opinion, such an analysis is not warranted. Instead, the Service assumes that the effects of grazing on the non-Federal portions of the allotments are interrelated and interdependent when the BLM lands exceed 30 percent of the total area within an allotment. Under this land ownership scenario, the way the non-Federal lands are grazed would likely be influenced by decisions to graze or not graze the BLM lands, or in cases where the BLM owns most of an allotment, a decision not to graze the BLM lands might result in a non-viable operation on other lands in the allotment and a decision not to graze those lands, as well. All of the 18 allotments in this consultation excluding Government Springs, Smith Wash, and A-Diamond allotments have 30 percent or more of BLM land ownership.

This opinion evaluates all effects of the proposed action, including interdependent and interrelated effects (50 CFR 402.02), some of which occur on non-Federal lands in the allotments. Although the effects of grazing activities on non-Federal lands are addressed herein where they are interrelated or interdependent to the proposed action, reasonable and prudent measures and terms and conditions only apply to discretionary BLM actions, not actions conducted by private individuals, the State of Arizona, or others that do not require authorization from the BLM. Anticipated incidental take in the "Take Statements" for animal species is based on these effects analyses, and if the reasonable and prudent measures and terms and conditions are implemented,

the BLM is exempted from incidental take prohibitions in section 9 of the Act so long as such take is in compliance with the incidental take statement. The take statement only applies to activities funded, authorized, or carried out by the BLM and does not authorize take by private individuals, the State of Arizona, or others, unless such take is incidental to an action that is authorized by the BLM and described in the "Description of the Proposed Action." Permittees and others conducting grazing activities not authorized by the BLM should apply for a section 10(a)(1)(B) incidental take permit from the Service for those activities that may result in take of a listed species. BLM has proposed few new range improvement projects, and has indicated they would consult on these projects separately. Although not part of the proposed action, any construction or maintenance of corrals, pipelines, water tanks, or other range improvements on the allotments during the life of the project are interrelated or interdependent activities, the effects of which are effects of the proposed action.

SOUTHWESTERN WILLOW FLYCATCHER (*Empidonax trailii extimus*)

Status of Species

The southwestern willow flycatcher (WIFL) is a small grayish-green passerine bird (Family Tyrannidae) measuring about 5.75 inches. It has a grayish-green back and wings, a whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark, and the lower is light yellow grading to black at the tip. The song is a sneezy “fitz-bew” or a “fit-a-bew”, the call is a repeated “whitt”. The southwestern willow flycatcher was listed as endangered in 1995. No critical habitat is currently proposed or designated for the species. A final recovery plan was released to the public in March 2003.

The southwestern willow flycatcher is one of four currently recognized willow flycatcher subspecies (Unitt 1987, Browning 1993). It is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical breeding range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja)(Unitt 1987).

Declining southwestern willow flycatcher numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (*Molothrus ater*)(Sogge *et al.* 1997, McCarthey *et al.* 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996), especially in monotypic salt cedar vegetation (DeLoach 1991) and where water diversions or groundwater pumping desiccates riparian vegetation (Sogge *et al.* 1997). Willow flycatcher nests are

parasitized by brown-headed cowbirds which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range projects such as waters and corrals, agriculture, urban areas, golf courses, bird feeders, and trash areas. These feeding areas, when in close proximity to flycatcher breeding habitat, especially when coupled with habitat fragmentation, facilitate cowbird parasitism of flycatcher nests (Hanna 1928; Mayfield 1977a, 1977b; Tibbitts *et al.* 1994).

The southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to around 8000 feet in Arizona and southwestern Colorado. Historical egg and nest collections and species descriptions throughout its range describe the southwestern willow flycatcher's widespread use of willow (*Salix* spp.) for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, T. Huels *in litt.* 1993, San Diego Natural History Museum 1995). Currently, southwestern willow flycatchers primarily use Geyer willow, Goodding's willow, boxelder (*Acer negundo*), salt cedar, Russian olive (*Elaeagnus angustifolio*), and live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include: buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood, white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.). Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the southwestern willow flycatcher: monotypic willow, monotypic nonindigenous, native broadleaf dominated, and mixed native/nonindigenous (Sogge *et al.* 1997).

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher territories and nests; flycatchers sometimes nest in areas where nesting substrates were in standing water (Maynard 1995; Sferra *et al.* 1995, 1997). However, hydrological conditions at a particular site can vary remarkably in the arid southwest within a season and among years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g., creation of pilot channels), where modification of subsurface flows has occurred (e.g., agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer *et al.* 1996).

Throughout its range the southwestern willow flycatcher arrives on breeding grounds in late April to early May (Sogge and Tibbitts 1992; Sogge *et al.* 1993; Muiznieks *et al.* 1994; Maynard 1995; Sferra *et al.* 1995, 1997). Nesting begins in late May and early June, and young fledge from late June through mid-August (Willard 1912; Ligon 1961; Brown 1988a, b; Whitfield 1990, 1994; Sogge and Tibbitts 1992; Sogge *et al.* 1993; Maynard 1995). Southwestern willow flycatchers typically lay three to four eggs per clutch (range = 2-5). Eggs are laid at one-day intervals and are incubated by the female for about 12 days (Bent 1960, Walkinshaw 1966, McCabe 1991). Young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Typically one brood is raised per year, but birds have been documented raising two broods during one season and renesting after a failure (Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Whitfield 1994, Whitfield and Strong 1995). The entire breeding cycle, from egg laying to fledging, is about 28 days.

The distribution of breeding groups is highly fragmented, with groups often separated by considerable distances (e.g., in Arizona, about 55 miles straight-line distance separate breeding flycatchers at Roosevelt Lake and the next closest breeding groups known on either the San Pedro or Verde river). To date, survey results reveal a consistent pattern range wide: the southwestern willow flycatcher population contains extremely small, widely-separated breeding groups which include unmated individuals.

Unitt (1987) concluded that "...probably the steepest decline in the population level of *E.t. extimus* has occurred in Arizona...", Historical records for Arizona indicate the former range of the southwestern willow flycatcher included portions of all major river systems (Colorado, Salt, Verde, Gila, Santa Cruz, and San Pedro) and major tributaries, such as the Little Colorado River and headwaters, and White River.

In 2001, 346 territories were known from 46 sites along 11 drainages in Arizona (Smith *et al.* 2001). The lowest elevation where territorial pairs were detected was 459 feet at Topock Marsh on the Lower Colorado River; the highest elevation was at the Greer River Reservoir (8202 feet).

As reported by Smith *et al.* (2002), the largest concentrations or breeding locations of willow flycatchers in Arizona in 2001 were at the Salt River and Tonto Creek inflows to Roosevelt Lake (255 flycatchers, 141 territories); near the San Pedro/Gila river confluence (219 flycatchers, 118 territories); Gila River, Safford area (46 flycatchers, 21 territories); Alamo Lake on the Bill Williams River (includes lower Santa Maria and Big Sandy river sites) (39 flycatchers, 21 territories); Topock Marsh on the Lower Colorado River (26 flycatchers, 14 territories); Lower Grand Canyon on the Colorado River (21 flycatchers, 12 territories); Big Sandy River, Wikieup (14 flycatchers, 10 territories); and Alpine/Greer on the San Francisco River/Little Colorado River (5 flycatchers, 3 territories). The two largest sub-populations locations, Roosevelt Lake and the San Pedro/Gila confluence, make up 75percent of the territories known in the state.

Only 68 (20 percent) of all known Arizona flycatcher territories in 2001 (40 on Gila River, 26 on Colorado River, 2 on Bill Williams River) were found below dams. Territories are primarily found on free-flowing streams or surrounding impoundments. At Roosevelt (n=141) and Alamo (n=21) lakes, 162 territories (47 percent of statewide total) are found in the exposed lake bottoms (Smith *et al.* 2002). Recorded for the first time in the 2002 season, 5 to 10 territories were discovered in the conservation space of Horseshoe Reservoir on the Verde River (M. Ross, USFS, pers. comm.).

Soon after listing, following the 1996 breeding season, 145 territories were known to exist in Arizona. In 2001, 346 territories were detected; a statewide increase of 201 known territories. During this increase in statewide numbers, some sites became unoccupied or had reductions in number of territories, other new sites were detected, some sites grew in numbers, and better surveys provided more comprehensive information on actual abundance (Sogge *et al.* in prep.). Since 1995, the increase of 184 territories (75 to 259) at Roosevelt Lake and at San Pedro/Gila River confluence represents almost 90 percent of the statewide growth. Survey effort was initially

a factor in detecting more birds at San Pedro/Gila river confluence (more recently, habitat growth has occurred), but the Roosevelt population grew as a result of increased habitat development and reproduction in the conservation pool of the reservoir.

While numbers have increased in Arizona and significantly at a few specific areas, distribution throughout the state has changed little. Recovery and survival of the flycatcher depends not only on numbers of birds, but territories/sites that are well distributed (U.S.Fish and Wildlife Service 2002). Currently, population stability in Arizona is believed to be largely dependent on the presence of two large populations (Roosevelt Lake and San Pedro/Gila River confluence). Therefore, the result of catastrophic events or losses of significant populations either in size or location could greatly change the status and survival of the bird. Conversely, expansion into new habitats or discovery of other populations would improve the known stability and status of the flycatcher. A habitat conservation plan and incidental take permit to Salt River Project (SRP) was signed in February 2003. To mitigate periodic loss of flycatchers at Roosevelt Lake due to dam operations, SRP will protect and manage in perpetuity at least 2,250 acres of riparian habitat on the San Pedro, Verde, Gila, and possibly other rivers in Arizona.

In 2000, a total of 351 nesting attempts were documented in Arizona at 38 sites (Paradzick *et al.* 2000). The outcome from 227 nesting attempts from 12 sites was determined (not every nesting attempt was monitored). Of the 227 nests, 45 percent (n=103) of the nests were successful. Causes of nest failure (n=124) included predation (n=62), nest abandonment (n=40), brood parasitism (n=8), infertile clutches (n=7), weather (n=2), and unknown causes (n=8). Eight nests were parasitized; two parasitized nests fledged at least one willow flycatcher along with cowbird young. Eight of 12 monitoring sites had cowbird trapping in 2000. Two additional breeding sites (Bill Williams National Wildlife Refuge and Alamo Lake) had traps, but no nest monitoring occurred. The upper San Pedro River in BLM's conservation area had cowbird trapping, but no breeding flycatchers were known to be present.

In 2001, a total of 426 nesting attempts occurred statewide at 40 sites. Of these, 329 were monitored; 191 (58 percent) fledged young, 114 (35 percent) failed, and 24 (7 percent) had unknown outcomes. Predation was the major cause of nest failure. The earliest southwestern willow flycatcher egg laying events were documented on 21 May at Dudleyville and San Pedro/Aravaipa confluence. The first hatching date was June 5 at San Pedro/Aravaipa confluence. The first flycatcher fledged on 20 June at Aravaipa Inflow North. The last documented fledging events occurred on 24 August at GRN018 and San Pedro/Aravaipa confluence. Results from the 2001 breeding season were similar to those in 2000; most areas occupied in 2000 had similar abundance reports in 2001, with 76 percent of the southwestern willow flycatchers concentrated within two areas of the state (Roosevelt Lake and Winkelman, AZ). However, there were 4 areas that differed noticeably from previous years and there was an increase in the statewide southwestern willow flycatcher population from 1993-2001.

Environmental Baseline

The riparian habitat condition along the Middle Gila River on both the upper and lower reaches (above and below the San Pedro River confluence) as described in the biological evaluation was evaluated in June and July of 1995 and in 2000 concurrent with surveys for southwestern willow

flycatchers using the BLM's Proper Functioning Condition methodology (U.S. Department of the Interior 1993). Of the 42.05 miles of river administered by the BLM, 27.25 miles (64 percent) are considered to be in "proper functioning condition" and 14.8 miles (36 percent) are considered "functioning at risk".

The lower reach of the Middle Gila River forms the allotment boundary for all or part of nine allotments. The river runs through the Rafter Six and northern end of the Kearny allotments. There are no fences across the Gila River through this entire reach. Past attempts to maintain fences across the river have failed, due to periodic high water flows. Livestock from any one allotment can freely roam up and down the river at low flow.

The upper reach of the Middle Gila River runs through the Hidalgo, Piper Springs, and the lower portion of the Christmas allotments. The river is the boundary between the Mescal Mountain and the upper portion of the Christmas allotments and the San Carlos Apache Indian Reservation. Where the river is the boundary with the San Carlos Apache Indian Reservation, livestock from both the BLM administered lands and the Reservation graze the river bottom. There are no fences across the Gila River through this entire reach. Livestock from any one of these allotments can freely graze up and down the river when water flows are low. Livestock can not move freely up and down the river bottom on the lower end of the Mescal Mountain and upper end of the Christmas allotments due to the confined canyon when the water flow is high.

No current vegetation community inventory is available. However, based on our observations, general patterns have remained similar since 1978 (Ohmart 1982). The most significant stands of riparian vegetation in the project area still occur from Winkelman to about Riverside. However, from Ashurst-Hayden Dam to Kelvin, the river supports regenerating stands of cottonwoods and willows and in areas, extensive mesquite or saltcedar stands (Richardson *et al.* 2000). Most flycatcher territories, pairs, and nests found from Coolidge Dam to Ashurst-Hayden Dam have been found in the Winkelman to Riverside reach, although some birds have been found consistently near the Mineral Creek confluence since 1997, and two birds were found in 1996 in the reach below Mineral Creek (Table 3). In 2002, flycatchers were detected at the Dripping Springs confluence. By far, the most significant site for flycatchers in the project area is the Gila River adjacent to the Kearny Sewage Ponds, where as many as 24 pairs and 42 nesting attempts have occurred in a year. This is one of the most significant flycatcher sites in Arizona. In 1997, more pairs and nesting attempts were documented at the Kearny site than any other site in Arizona. The southwestern willow flycatcher currently uses this area for nesting which is within the Rafter Six and Kearny allotments. The Kearny site is not within a BLM allotment, but it lies within a mile of the Rafter Six and Kearny allotment boundaries.

Previous consultations that have been issued for this species within the action area include:

Phoenix Resource Management Plan (Consultation 02-21-88-F-0167). The BLM made a determination of "may affect, likely to adversely affect" for the southwestern willow flycatcher in the biological evaluation for the Phoenix RMP. The FWS issued a biological opinion concluding "no jeopardy" for the southwestern willow flycatcher. Conservation measures in the proposed

action for this species included southwestern willow flycatcher habitat mapping, surveys, guidelines for habitat management, and cowbird control.

Phoenix District Portion of the Eastern Arizona Grazing Environmental Impact Statement (Consultation 02-21-96-F-0422). The BLM made a determination of "may affect, likely to adversely affect" for the southwestern willow flycatcher in their biological evaluation for this EIS. Our biological opinion concluded "no jeopardy" for this species. Conservation measures in the proposed action included stipulations on southwestern willow flycatcher habitat mapping, surveys, guidelines for habitat management, and cowbird control.

Upper Gila River - San Simon Grazing EIS (Consultation 02-21-96-F-0423). The BLM made a determination of "may affect, likely to adversely affect" for the southwestern willow flycatcher in their biological evaluation for this EIS. Our biological opinion concluded "no jeopardy" for this species. Conservation measures in the proposed action included development of an action plan for mapping flycatcher habitat, conducting surveys, implementation of habitat management guidelines, and cowbird control.

Status of the Species in the Action Area

The southwestern willow flycatcher was documented along the Gila River during the 1995, 1996, 1997, and 1998 nesting seasons on the Mescal Mountain, A Diamond, Battle Axe, Teacup, LEN, and Cochran allotments (Appendix II Figure 1.) However, these sightings have not been officially confirmed by the AGFD, and may not be valid. Southwestern willow flycatchers have occupied habitat on the Rafter Six allotment since 1997. A 5.4 mi. reach of the Gila River on the lower end of the Mescal Mountain allotment and the upper end of the Christmas allotment is not considered potential habitat for southwestern willow flycatcher. The river through this area is confined by canyon walls and lacks potential for the required floodplain development and suitable habitat patch development for southwestern willow flycatcher.

Table 1 lists locations of flycatchers based on AGFD surveys. In 1999, the AGFD conducted surveys for the southwestern willow flycatcher at 8 sites on the Gila River in the action area. All suitable habitat (where landowner access was granted) from Redington on the San Pedro River downstream to the confluence with the Gila River was surveyed (42.2 mi.). Additionally, approximately 36 mi. of habitat from Dripping Springs Wash to North Butte on the Gila River was surveyed. Potentially suitable riparian vegetation in these areas varied along a continuum from monotypic tamarisk to stands of native coyote or Goodding willow and Freemont cottonwood. Riparian habitat was surrounded by upland Sonoran Desert as described by Brown (1994). No flycatchers were found from North Butte to Kelvin. From Kelvin to the San Pedro River confluence, 118 resident flycatchers and 68 territories were detected. One resident flycatcher and one territory was found at Dripping Springs Wash upstream of Winkelman.

Table 1. Southwestern Willow Flycatcher Breeding Surveys for the Middle Gila Ecosystem Territories/Pairs/Nests in the Proposed Action Area[1]

Gila River locations[2]	Allotment	1994	1995	1996	1997	1998	1999	2000	2001	2002
Ray Junction to Donnelly Wash	A-Diamond	-	0	2/0/?		0	0	0	0	0
Downstream of Mineral Ck.		-	-	-	2/2/1	2/2/2	5/4/5	0	0	0
Confluence (GRN020)	Rafter Six									
Downstream of Kearny (GRN018)	“”“”	-	-	-	2/2/0	2/2/3	5/5/8	4/4/5	9/9/19	7/7/7
Downstream of Kearny (GRS018)	“”“”	-	-	-	1/1/0	1/1/1	4/4/0	4/2/2	2/2/1	7/73
Downstream of Kearny (GRS015)	“”“	-	-	-	1/1/1	1/1/1	1/1/2	1/1/1	2/2/1	-
Kearny	“”“	1/0/?	-	6/3/?	8/8/11	25/24/42	23/22/42	19/19/32	14/14/21	14/14/18
Upstream of Kearny (GRS013)	Private	-	-	-	1/1/N	0	0	0	0	0
Upstream of Kearny (GRS012)	“”		-	-	-	4/3/3	6/5/5	8/7/10	7/7/10	5/5/9
Upstream of Kearny (GRN011)	“”		-	-	-	2/1/1	0	0	0	0
Upstream of Kearny (GRS011)	“”	-	-	-	0	0	1/1/2	2/2/3	1/1/1	1/1/1
Between Kearny and Winkelman (GRN010)	“”	-	-	-	5/5/4	4/4/5	4/4/6	2/2/2	1/1/1	1/0/0
Between Kearny and Winkelman (GRS010)	“”	-	-	-	3/3/2	0	4/1/1	0	0	0
Between Kearny and Winkelman (GRS007)	“”	-	-	-	3/3/4	6/6/10	11/10/17	10/10/13	5/5/10	7/7/7
Downstream of Winkelman (GRN004)	“”	-	-	-	1/0/0	0	2/1/1	2/0/0	2/2/0	2/2/2
Dripping Springs Wash		-	-	0	0	0	1/0/0	0	0	0

[1] From Muiznieks *et al.* (1994), Spencer *et al.* (1995), Sferra *et al.* (1995), Sferrra *et al.* (1997), McCarthey *et al.* (1998), Paradzick *et al.* (2000, 1999), and Service files.

[2] Refer to maps in above citations for maps of site locations

The AGFD surveyed the middle Gila River between the confluence of the lower San Pedro downstream to the Ashurst-Hayden Dam in 2000 and 2001. In 2001, southwestern willow flycatchers occupied 21 acres of riparian habitat from Winkelman to Kelvin bridge. Approximately 76 acres of potentially suitable habitat existed between the Kelvin bridge and the Ashurst-Hayden Dam. However, no resident flycatchers were documented in this latter area. In 2000, a total of 68 territories and 97 resident flycatchers were documented between Winkelman and the Kelvin bridge. No resident flycatchers were found from North Butte to Kelvin or upstream of Winkelman on the Gila River (Paradzick *et al.* 2001). In 2001, 75 resident flycatchers and 52 territories were detected from Kelvin to Winkelman. No resident flyactchers were found from North Butte to Kelvin or upstream of Winkelman in the action area (Smith *et al.* 2002). In 2002, 88 resident flycatchers and 46 territories were present from Kelvin to Winkelman. No resident flycatchers were detected from North Butte to Kelvin or upstream of Winkelman on the Gila River in the action area (Smith *et al.* 2003). Low flows on the Gila River were associated with fewer flycatcher nesting attempts and a shorter nesting season. Final survey results are not yet available for 2003; however, numbers of territories, pairs, and nests appear to have declined again on the middle Gila River. Nesting flycatchers were observed in the same reaches as in 2002.

Cowbirds were found at all sites surveyed for flycatchers in the action area in 2002. Four nests were parasitized by cowbirds and failed directly due to parasitism in the Winkelman Study Area (which includes the Gila River in the action area as well as the San Pedro River in the Dudleyville area; Smith *et al.* 2003).

In the summer of 2001, the breeding surveys documented that the Rafter Six had nesting flycatchers and resident flycatchers were documented using the adjacent private riparian areas near the Kearny, Smith Wash, Hidalgo, and Piper Springs allotments. The majority of the occupied habitat extends from the confluence of the lower San Pedro River downstream to the Kelvin bridge; all of this reach is privately owned. The habitat from Kelvin downstream to the Ashurst-Hayden Dam is potentially suitable habitat but unoccupied.

The Kearny allotment is categorized as an upland allotment, however, its boundary is within a mile of occupied southwestern willow flycatcher habitat and livestock grazing is occurring in this area (Appendix II, Figure 1). As previously stated, by far the greatest acreage of occupied southwestern willow flycatcher habitat in any allotment occurs in the Rafter Six allotment since 1997, however, most of that acreage is not managed by BLM (Appendix II Figure 1). Currently, livestock grazing occurs within the breeding season in Rafter Six. There is one permittee that uses this section of the river. Livestock is rotated from the uplands to the riparian area; however, cattle currently use a private section on the floodplain as a holding facility from May 1 to August 1.

To summarize, the most significant stands of riparian vegetation in the project area occur from Winkelman to about Riverside. The riparian habitat quality and suitability for southwestern willow flycatchers is evident by the relatively high densities of southwestern willow flycatchers occupying some areas. These birds have been returning to this same area from years past.

However, from Ashurst-Hayden Dam upstream to Kelvin, the river supports regenerating stands of cottonwoods and willows and, in areas, extensive mesquite or saltcedar stands (Richardson *et al.* 2000) that are potentially suitable for flycatchers. Most flycatcher territories, pairs, and nests found from Coolidge Dam to Ashurst-Hayden Dam have been found in the Winkelman to Riverside reach, although some birds were found in 1996 in the reach below Mineral Creek, and one territory was found at Dripping Springs Wash upstream of Winkelman (Hidalgo allotment) in 1999. By far, the most significant site for flycatchers in the project area is the Gila River adjacent to the Kearny sewage ponds, where as many as 24 pairs and 42 nesting attempts have occurred in a year (Appendix II Figure 2). This is one of the most significant flycatcher nesting sites in Arizona. Breeding southwestern willow flycatchers have only been documented on the Rafter Six allotment. Portions of the Christmas, Kearny, Piper Springs, Hidalgo, and Smith Wash allotments are within 5 miles of occupied habitat (Table 2.). Since 1998, much of the riparian habitat on the A-Diamond, Battle Axe, LEN, Cochran, and Myers was considered potential or marginal habitat at best. Few or no flycatchers have been known to nest in these areas.

Table 2. **Southwestern Willow Flycatcher Current Occupancy by Allotment**

Allotments	Occupied during breeding season (late April to early August)	Potential habitat	w/in 5 miles of occupied habitat
Christmas		this allotment is located near potential habitat in Dripping Springs Wash	yes
Rafter Six	yes		
Kearny (upland)			yes
Piper Springs		this allotment is near the confluence of the San Pedro River, and flycatchers have been observed using this section of the river.	yes
Hidalgo			this allotment is currently in non-use. flycatchers have been documented nesting in the riparian areas adjacent to this allotment.
Smith Wash (upland)			yes

Effects of the Proposed action

Please refer to the EFFECTS OF THE PROPOSED ACTION (GENERAL) section for an overview of the effects of livestock grazing in riparian areas.

The BLM is proposing to manage its riparian areas for "proper functioning condition." The Service believes riparian systems that have achieved proper functioning condition will have areas of habitat suitable for southwestern willow flycatchers that vary in location and time, given that other favorable physical and biological requirements are met, such as width of floodplain.

The proposed action is complex and varied. Two key components are implementation of the Arizona standards and guidelines for rangeland management and the proposed mitigation measures for the southwestern willow flycatcher. The BLM would, during the term of this consultation, implement changes to grazing practices that improve riparian habitat of the southwestern willow flycatcher, including total exclusion or seasonal exclusion of authorized cattle from public lands from April 1 to November 1 in all riparian areas except the Rafter Six and Christmas allotments. Trespass year-long grazing in southwestern willow flycatcher habitats is anticipated on the Mescal, Christmas, Piper Springs, and Hidalgo allotments. The BLM will also evaluate and cooperate on actions to lessen the effects of brown-headed cowbird parasitism as stated in their action plan for the southwestern willow flycatcher.

Table 3. **Effects to occupied southwestern willow flycatcher habitat by allotments**

Allotments	Permitted Livestock grazing	Trespass livestock	Cowbird parasitism
Rafter Six	Grazing within the flycatcher breeding season due to no fencing to restrict access to Gila River	Livestock from the community of Kearny have access to Gila River	Additional trespass livestock add to the parasitism from cowbirds on flycatcher nests
Kearny	No fencing in place between private and BLM lands, therefore, livestock have access to Gila River		Presence of cowbirds has increased the parasitism of flycatcher nests
Smith Wash	Livestock grazing occurs within five miles of occupied flycatcher habitat		Livestock grazing within five miles of occupied flycatcher habitat will attract additional cowbirds
Christmas		Livestock from San Carlos Reservation have access to Gila River	Added cowbird parasitism
Hidalgo	Currently is in non-use however, if livestock grazing is authorized it could occur within five miles of occupied habitat		If livestock grazing is permitted on this allotment, it would occur within 5 miles of occupied flycatcher habitat and would attract additional cowbirds.
Piper Springs		Livestock from the San Carlos Reservation have access to Gila River	

There are direct and indirect effects from the proposed action to the southwestern willow flycatcher and its suitable or potential habitat. Because the southwestern willow flycatcher predominantly uses riparian areas, the following discussion will emphasize the direct effects to the southwestern willow flycatcher and their nests and the indirect effects to its existing habitat. The following discussion will focus on the Rafter Six and nearby Kearny allotment, where southwestern willow flycatchers have consistently occupied habitat within the action area. The Kearny allotment is an upland allotment; however, the allotment boundary is within a mile of occupied southwestern willow flycatcher habitat. Discussions will follow about the remaining nearby riparian allotments that could have adverse effects on the southwestern willow flycatcher.

Rafter Six Allotment

Rafter Six allotment is located between the communities of Kearny and Kelvin on the middle Gila River (Appendix II, Figure 2). Southwestern willow flycatchers have been monitored and observed on Rafter Six allotment by AGFD since 1997. The Rafter Six allotment currently is managed for livestock grazing year-round. This is based on the fact that the land ownership pattern on this allotment is a mix of private and BLM and is laid out in such a way that it makes fencing not feasible on most of the allotment. The Rafter Six allotment is divided up in such a way that the BLM portions are located at the far northern and far southern portions of the allotment. In between these is the private portion which lies within the riparian and river sections. It is this private land within which the flycatcher nests. As a result, livestock have access to the riparian areas in this reach of the river and have degraded the existing habitat. Livestock grazing, particularly corrals and gathering areas, benefit brown-headed cowbirds which may parasitize flycatcher nests.

The permittee grazes the Rafter Six allotment on a year-round basis; however, livestock are in the riparian pasture on his private land during the flycatcher breeding season, from May 1 to August 1. The rest of the year livestock are on the uplands. The BLM has proposed a riparian pasture on the BLM lands on the Gila River that would be grazed from November 1 to April 1. In 2002, livestock were removed from Rafter Six due to drought. Riparian fencing will be installed on the BLM portion of Rafter Six allotment to limit or control, to some extent, grazing during the riparian growing season and nesting season for the flycatcher. The current permittee has agreed to implementation of a seasonal grazing scheme for Rafter Six allotment versus a year-round grazing scheme.

The overuse of riparian areas by livestock has been a major factor in degradation and decline of willow flycatcher habitat (Tibbitts *et al.* 1994, Service 1993e). Grazing in the riparian area during the growing season of willows and cottonwoods often precludes their regeneration. These trees, particularly willows, are favored by this species. The length of the growing season can vary depending on a site's elevation, climate, and amount of yearly precipitation received. A recent study done on the Tonto Creek Riparian Unit upstream of Roosevelt Lake showed that the growing season can begin as early as mid-late February and continue to December 1 (Bureau of

Reclamation 1999). The Middle Gila River riparian area is similar in elevation and vegetation type to that in Tonto Creek. A monitoring plan should be implemented to better determine when the actual growing season occurs in the action area to help alleviate overuse of riparian areas by livestock in the project area. Livestock grazing, particularly year-long or during the growing season in riparian areas, can reduce the diversity and density of riparian plant species, especially cottonwood and willows. Livestock can reduce the suitability of riparian areas by reducing canopy cover especially at the lower levels preferred by flycatchers. When livestock grazing is reduced or eliminated, southwestern willow flycatcher numbers can rebound (Service 1993e). Direct destruction of nests, eggs, and nestlings by foraging livestock has been documented (Tibbitts *et al.* 1994), and could occur on the Rafter Six or other allotments where southwestern willow flycatchers nest.

Grazing livestock and management activities in riparian vegetation during the breeding season can disturb the birds and disturb or destroy their nests, or render them more vulnerable to predation, as many nests are well within the likely contact zone of cattle, horses, or people. Livestock have the ability to brush up against vegetation and knock down nests and trample eggs or chicks.

Because the primary threat to the species is habitat destruction, more specifically riparian nesting habitat reduction, degradation, and elimination as a result of agricultural and urban development, it logically follows that additional riparian habitat will have to be created or recovered in order to achieve the objectives of the recovery plan. Because livestock grazing is such an obvious cause of habitat destruction (livestock literally "eat" flycatcher habitat, destroying it or curtailing its development), this land use would seem to be in direct conflict with the recovery of the flycatcher. Based on the recent surveys for southwestern willow flycatchers that have been conducted in the action area, the occupied habitat between Winkelman and Kelvin will continue to be directly affected by the proposed action. The recovery plan concludes excessive grazing is harmful to riparian habitat needed by the flycatcher. The recovery plan further concludes that evidence and field examples indicate that, with respect to livestock grazing, southwestern willow flycatcher recovery would be most assured, and in the shortest time, with total exclusion of livestock grazing from those riparian areas deemed necessary to recover the flycatcher and where grazing has been identified as a principal stressor. The plan also provides recommendations to Federal land managers on conservation planning for the flycatcher. The focus of these recommendations is on identifying riparian areas that pose the best opportunities for recovering flycatcher habitat (within the context of economic and other constraints) and excluding them from grazing (see Appendix G of the recovery plan).

The recovery plan notes that certain types of livestock grazing in specific situations may be compatible with flycatcher recovery. An example, one that is often cited by the livestock industry, is the Cliff/Gila Valley flycatcher population in New Mexico. While in this instance livestock grazing and management for flycatchers appear to be compatible, Cliff/Gila is unique for a number of reasons. Flycatchers at this location nest almost exclusively in box elders (*Acer negundo*) in a broad flood plain at an elevation of about 4500 feet (Stoleson and Finch 2000). The site is best

characterized as a large expanse of predominantly box elder-dominated riparian woodland (the site is approximately four miles long and one mile wide) in a large broad flood plain. This type of habitat has not been documented anywhere else in the species' range. Additionally, the type of irrigated grazing management that is in practice at the U-Bar Ranch at Cliff/Gila is also unique and is undocumented elsewhere in the species' range. This land use practice is not representative of the vast majority of livestock grazing programs practiced in the American Southwest.

Kearny and Rafter Six Allotments: Grazing and Cowbirds

Willow flycatcher nests are parasitized by brown-headed cowbirds (*Molothrus ater*) which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range improvements such as waters and corrals; agriculture; urban areas; golf courses; bird feeders; and trash areas. When these feeding areas are in close proximity to flycatcher breeding habitat, especially coupled with habitat fragmentation, cowbird parasitism of flycatcher nests may increase (Hanna 1928, Mayfield 1977a,b, Tibbitts *et al.* 1994). Both the BLM and AGFD have documented consistent and widespread presence of brown-headed cowbirds in the occupied southwestern willow flycatcher habitat on the middle Gila River.

Livestock handling facilities and cattle themselves tend to attract brown headed cowbirds, leading to a greater incidence of nest parasitism than would otherwise occur. Cattle grazing and man-made pastures create bare ground and open areas preferred by cowbirds. Brown-headed cowbirds, historically associated with bison, have adapted to expansion of agriculture and have experienced rapid population growth and range expansion in this century (Lowther 1993). Livestock-watering and feeding developments can result in a denuded area due to the concentration of livestock. These sites on public lands are less attractive for cowbirds due to the fact that supplemental feeding is not authorized on public land, although it may occur on non-Federal lands within the allotment. Hence, a prime cowbird food source, spilled feed grains and seeds in leftover hay, are not available in and around livestock corrals on public land, but may be on adjacent private land. Accumulations of seeds and a variety of insects may be abundant at corrals and water sources on public lands. Cowbirds were found at every site surveyed for flycatchers in the action area in 2002. Low rates of parasitism consistently occur in the Winkelman Study Area. Four nests were parasitized and then subsequently failed due to that parasitism in 2002. Cowbirds parasitized from 0-5 percent of all nests monitored annually in the Winkelman Study Area during 1998-2002. In 1998, parasitism of a nest at Kearny was recorded on video (Paradzick *et al.* 1999).

Cowbird trapping has been demonstrated to be an effective management strategy for increasing reproductive success for the southwestern willow flycatcher in certain areas as well as for other endangered passerines (e.g., least Bell's vireo [*Vireo bellii pusillus*], black-capped vireo [*V. atricapillus*], golden-cheeked warbler [*Dendroica chrysoparia*]) (Table 6). It may also benefit juvenile survivorship by increasing the probability that parents fledge birds early in the season. Expansion of cowbird management programs may have the potential to not only increase reproductive output and juvenile survivorship at source populations, but also to potentially convert small, sink populations into breeding groups that contribute to population growth and

expansion. BLM's flycatcher action plan calls for investigating livestock concentration areas within a 5-mile radius of suitable flycatcher habitat (which is a distance that cowbirds commonly travel between morning breeding and afternoon feeding sites - see Appendix F of U.S. Fish and Wildlife Service 2002), and then evaluating ways (including modifying grazing or cowbird trapping) to reduce the likelihood of parasitism. However, BLM has proposed no specific actions to address cowbird parasitism on the Rafter 6 or Kearny allotments; southwestern willow flycatchers nest in abundance on or nearby these allotments and cowbird parasitism has been documented at the Kearny Sewage Ponds.

Livestock tend to concentrate in riparian areas for forage, water, and shade, due to the aridity of the surrounding uplands. Riparian areas often comprise a small percentage of the total acreage of a given allotment resulting in a tendency to cause degradation of riparian areas regardless of the stocking rate.

Other Allotments Affecting Southwestern Willow Flycatchers

Smith Wash is classified as an upland allotment, however, its boundaries are within 5 miles of occupied southwestern willow flycatcher habitat, and currently there is no fencing on the BLM portion that separates BLM from the private land on both allotments. The Christmas and Piper Springs allotments border the Gila River and have problems of trespass livestock from the reservation. Both of these allotments are within 5 miles of occupied or recently occupied habitat near the San Pedro/Gila River confluence (Piper Springs) or at Dripping Springs Wash (Christmas). It has been reported that some of the San Carlos Apache Indian Reservation livestock gain access to the Gila River near Winkelman through improperly maintained fences up on the reservation border with BLM land. Christmas allotment is the other allotment that has authorized year-long grazing due to complex land ownership, and no fencing is in place to restrict cattle from accessing the riparian areas. There are additional livestock that appear to be coming from the communities of Winkelman and Kearny, but the ownership is unclear. In all of these allotments, proposed livestock grazing is expected to adversely affect existing occupied southwestern willow flycatcher riparian habitat either through grazing in the riparian areas or via cowbird parasitism.

Watershed effects on allotments with downward trends or that are in poor or fair (low to mid seral) range condition, that diminish stream and riparian development, would be similar to those discussed in the spikedace and loach minnow section of this biological opinion. Livestock grazing can initiate changes in structure, composition, and ground cover in the upland plant community. Such changes can be evidenced by rangeland condition and trend results (U.S.BLM 1996a). These changes are often linked to widespread changes in watershed hydrology that may be detrimental to the flycatcher. However, many grazing and grazing-related activities outside the growing season, greater than five miles from rivers and riparian corridors, and within carrying capacity can have negligible effects to the flycatcher and the ecosystem upon which it depends. Range improvements and required maintenance on existing fences could have adverse effects on the watershed through the required access to these sites.

The current management on the Smith Wash allotment is classified as custodial with year-long grazing on a five-pasture rotation. This allotment is comprised of 29 percent BLM lands, which consists of 7 sections in the northwest portion of the allotment. These 7 BLM sections are within 5 miles of occupied southwestern willow flycatcher habitat. BLM proposes to continue year-long grazing in Smith Wash which will continue to have adverse effects on nearby occupied southwestern willow flycatcher habitat. Without proper monitoring of livestock management there will be no control of the effects of brown headed cowbirds on nearby southwestern willow flycatcher habitat. As mentioned above, the watershed effects from improperly monitored livestock will have adverse effects on the nearby occupied southwestern willow flycatcher habitat.

BLM proposes to exclude livestock grazing on all riparian allotments mentioned above with the exception of Rafter Six and Christmas allotments; however, not all the riparian areas can be fenced off due to rough topography and portions of private land within the various allotments. Grazing will still occur from November 1 to April 1 in riparian areas except where excluded, and utilization levels will be monitored. However, except in existing fenced riparian pastures, if utilization of riparian plants exceeds 30 percent, the BLM will not be able to control excess utilization. A <30 percent utilization level will be implemented for all the upland portions of the riverine allotments. BLM will continue to monitor for the southwestern willow flycatcher on these riparian allotments for the life of the project.

Improving habitat conditions is reliant in part on the BLM's monitoring and appropriate response to the results. As mentioned earlier, due to use limits and permitted numbers of cows largely remaining the same, timely and frequent monitoring will be needed. The result will likely be that cattle will need to be herded and moved among pastures or off allotments more frequently to meet utilization standards. Without this, the consequences will likely be continued degradation of the land. Monitoring will also be a key instrument in documenting and minimizing the effects of trespass cattle and extended winter grazing.

The BLM in Arizona committed via Instruction Memorandum No. AZ-98-001(summarized earlier in this document), to developing and implementing an action plan for the southwestern willow flycatcher that provides protective guidance for managing flycatcher habitat and implementing BLM authorized activities. Please refer to the biological evaluation for more detailed information on specific objectives and goals (BLM 1999). Prompt and thorough implementation of this action plan is imperative to reduce or eliminate threats to the southwestern willow flycatcher.

CUMULATIVE EFFECTS

Cumulative effects are those adverse effects of future non-Federal actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed action. Effects of past Federal and private actions are considered in the Environmental Baseline.

Many activities without a Federal nexus occur and are expected to continue in occupied, suitable, and potential habitat of the southwestern willow flycatcher and in the watersheds of such habitats throughout the project area. Farming and ranching activities occur near the lower section of the Middle Gila River, particularly downstream of the San Pedro River confluence. Upstream effects such as groundwater pumping in the Safford area as well as operation of Coolidge Dam threaten the base flow of the Middle Gila River. Diversion of streamflow for agriculture and pumping of groundwater occurs along all major stream courses within the action area, usually on private land. These types of activities can result in lower stream flows or complete drying of the stream course for all or part of the year. The result is reduced survival of cottonwood and willow, which must have water available to their root zones throughout the year.

Dewatering combined with more than negligible grazing levels in the riparian zone can further reduce the quality and availability of nesting habitat for the southwestern willow flycatcher and all other riparian dependent species. Livestock grazing on the private and State lands portions of the BLM allotments as well as outside of allotments have the same effects as those described here. Pasture development and livestock developments (corrals, wells, etc.) on private land adjacent to and within five miles of riparian areas provide suitable habitat for cowbirds with resulting increased incidence of cowbird parasitism. Nest parasitism combined with high grazing levels within the riparian zone, whether public or private, can depress willow flycatcher nesting or eliminate nesting entirely. Water diversions, agricultural return flows, and recreational activities, particularly in the river bottoms, all are expected to occur outside of section 7 consultations. Flood control and channelization projects will typically require Federal permitting, and therefore effects of such actions are not cumulative. Many actions in the watersheds of the Middle Gila River will likely be Federal actions requiring consultation due to the extent of Federal lands (BLM and Forest Service) in the action area. Recreation and mine operation are additional activities that are likely to continue to affect the riparian habitat of the southwestern willow flycatcher in the action area.

Conclusion

After reviewing the current status of the southwestern willow flycatcher, the environmental baseline for the action area, the cumulative effects, and the anticipated effects of the proposed action, it is the our biological opinion that the proposed action is not likely to jeopardize the continued existence of the southwestern willow flycatcher. No critical habitat is currently designated, thus none will be affected. We present this conclusion for the following reasons:

1. The utilization level in the riparian areas is limited to 30 percent.

2. Riparian fencing will be installed on the BLM portion of Rafter Six allotment to limit or control, to some extent, grazing during the riparian growing season and nesting season for the flycatcher. The current permittee has agreed to implementation of a seasonal grazing scheme for Rafter Six allotment versus a year-round grazing scheme.

3. Authorized livestock grazing will not be allowed from April 1 to November 1 in key riverine riparian areas. Based on the current available southwestern willow flycatcher habitat, most of the occupied habitat is concentrated in the Rafter Six allotment. The current drought and management of Coolidge Dam have also contributed to limited available habitat; however, the proposed restricted authorized seasonal livestock grazing will help lessen the effects from livestock grazing in occupied flycatcher habitat. The Kearney and Smith Wash allotments are both within five miles of occupied and potential habitat; therefore utilization levels will not exceed 30 percent, and livestock will only graze the uplands.

4. BLM has committed to implementing the Southwestern Willow Flycatcher Action Plan, which includes monitoring of flycatchers and their habitat, habitat management, and control of cowbirds.

The survival of the flycatcher is likely to depend on the rate that its habitat can be increased over the immediate future. Because so much former southwestern willow flycatcher habitat on non-Federal lands has been lost to urbanization and agriculture, management of BLM lands is very important in achieving survival and recovery of the subspecies. The fact that southwestern willow flycatchers have been returning to the middle Gila River since 1996 does not allow BLM to negate their occupancy. The project area encompasses part of one of the two largest populations of nesting southwestern willow flycatchers in the state of Arizona. The Recovery Plan for the southwestern willow flycatcher states that the best recovery strategy for this species is to remove livestock grazing completely from all occupied riparian areas. BLM has stated in their BE that management for the southwestern willow flycatcher is their highest priority. BLM has proposed to restrict livestock grazing in the riparian areas to winter use only. However, unless strict monitoring is adhered to this management priority will not be met. The effects from the proposed action on the southwestern willow flycatcher and its habitat has been ongoing for a number of years. The fact that the southwestern willow flycatcher nests in the existing monotypic salt cedar riparian areas is a result of past cumulative effects in the project area. The southwestern willow flycatcher has adapted to this habitat type in the project area because it is the only nesting habitat available. It behooves the BLM to increase their monitoring efforts for the southwestern willow flycatcher and its habitat in order to continue the current existence of the species in the project area. The southwestern willow flycatcher will likely persist in the project area; however, BLM must take action, including cowbird control in accordance with the Action Plan, to ensure that the existing nesting habitat continues to support southwestern willow flycatchers in the middle Gila River ecosystem.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. “Harm” is defined (50CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by

significantly impairing behavioral patterns such as breeding, feeding, or sheltering. "Harass" is defined (CFR 17.3) as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or extent of take

We anticipate that the proposed action will result in incidental take of southwestern willow flycatcher on 20 river miles between Winkelman and Kelvin, in which the Rafter Six and Kearny allotments exist. Livestock grazing will continue in the occupied flycatcher habitat on the Rafter Six allotment at least until fences and seasonal grazing is implemented, and both allotments are within easy cowbird dispersal distance of a key flycatcher breeding locale (Kearny Sewage Ponds), and cowbird parasitism has been documented at that site. Take may be in the form of harm, harassment, injury, or death resulting from the loss of nesting sites, loss or disturbance of nests, and nest parasitism by cowbirds. We conclude that authorized incidental take from the proposed action will be exceeded if one or more of the following conditions are met.

1. More than 5 southwestern willow flycatcher territories are degraded during the life of the project in occupied habitat in the riparian pasture of the Rafter Six allotment.

2. Cowbird parasitism that results in annual nest failure of more than 10 percent of southwestern willow flycatcher nests within 5 miles of the Kearny and Rafter Six allotments.

3. Harassment of more than 5 southwestern willow flycatcher nests from fence construction and maintenance in occupied habitat in the Rafter Six and Kearny allotments.

This biological opinion does not authorize any form of take not incidental to the proposed action.

Effect of the take

We have determined that the level of anticipated take is not likely to result in jeopardy to the southwestern willow flycatcher, for the reasons described above in the "Conclusion".

MIGRATORY BIRD TREATY ACT

To the extent that this statement concludes that take of any threatened or endangered species of migratory bird will result from the agency action for which consultation is being made, we will not refer the incidental take of any such migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C.§§ 703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

REASONABLE AND PRUDENT MEASURES

The following reasonable and prudent measures are necessary and appropriate to minimize take of the southwestern willow flycatcher due to the proposed activities in the Rafter Six, Kearny, Smith Wash, Christmas, Piper Springs, and Hidalgo allotments:

1. Actions shall be taken to ensure effects of grazing in occupied riparian habitat are minimized and that cowbird parasitism resulting from the proposed action is minimized.

2. The BLM shall monitor incidental take resulting from the proposed action and report the findings of that monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the BLM must comply with the following terms and conditions in regards to the proposed action. These terms and conditions implement the reasonable and prudent measures described above. Terms and conditions are nondiscretionary. The BLM's proposed mitigation measures are considered part of the proposed action.

The following terms and conditions implement reasonable and prudent measure number 1:

1.a. On BLM lands, livestock grazing on the Rafter Six allotment shall be restricted to winter grazing of riparian pastures from November 1 to April 1 and monitoring of utilization levels shall be done to ensure <30 percent utilization limits are not exceeded on the occupied allotments. Monitoring will be done prior to, during, and after the livestock have used a riparian pasture. Once the 30 percent utilization limit is met, all livestock will be removed from the pasture. To the extent feasible, the BLM shall offer to assist the permittee in managing livestock use in the non-BLM portions of the allotment for the benefit of the flycatcher.

1.b The BLM shall take immediate action to remove trespass cattle from or within 5 miles of occupied flycatcher habitats on the Rafter Six and Kearny allotments, and measures, including fencing shall be developed and implemented by 2006. BLM shall work diligently

with adjacent landowners to ensure that trespass does not continue. All reasonable efforts shall be made to remove any trespass livestock from the riparian pastures that include occupied southwestern willow flycatcher habitat as soon as discovery of fence damage and livestock intrusion is detected. The BLM shall notify us within 24-48 hours upon observation of such livestock trespass and any corrective action.

1.c. The BLM shall not authorize grazing in riparian pastures with occupied habitat until riparian fencing is completed.

1.d. If Allotment Management Plans (AMPs) are not yet developed for the Kearny and Rafter Six allotments, they shall be completed within three years (or according to a schedule approved by us). AMPs for these allotments shall be implemented no later than two years after completion.

1.e. The BLM shall not authorize range improvement projects in the riparian corridor of the Rafter Six allotment, except for fences, cattle guards, and gates to exclude and better manage cattle.

1.f. Maintenance and management activities in occupied southwestern willow flycatcher habitat shall occur outside the southwestern willow flycatcher breeding season (April 15 - August 31).

1.g. Maintenance and management activities in occupied southwestern willow flycatcher habitat shall be planned to avoid removing trees and shrubs.

1.h. The BLM shall remove cattle from within 5 miles of occupied southwestern willow flycatcher habitat or implement cowbird trapping in the action area if cowbird parasitism that results in excess of 5 percent nest failure per year between the San Pedro River confluence and Kelvin. These actions shall be taken in coordination with the Service.

The following term and condition implements reasonable and prudent measure number 2:

The BLM shall submit an annual monitoring report to the Arizona Ecological Services Field Office on or before March 15 of each year beginning in 2004. These reports shall briefly summarize for the previous calendar year: 1) effectiveness of these terms and conditions, and 2) documentation of take, if any. The report shall also summarize any inventory, monitoring, and evaluations conducted as described in the BLM's proposed action (BLM 2000) and applicable sections of the BLM Manual, results of a re-assessment of riparian functioning condition conducted every five years to assess achievement of habitat improvement; and grazing actions initiated or completed, including range improvement projects, prescribed fire, and vegetation management in all the allotments. The report shall also include records of downed or damaged fencing and incidents of livestock intrusion within the riparian pastures in the project area.

Reports should include dates of observations, sightings of any livestock use, number of livestock, area of use, and any other pertinent information. The report shall also make recommendations for modifying or refining these terms and conditions to enhance protection of the southwestern willow flycatcher and its habitat. These reports may be batched with other similar reports, such as for the Tucson-Safford Grazing biological opinion.

If flycatchers are found to nest during the life of the project in grazed portions of allotments other than the Rafter Six or Kearny allotments, incidental take could potentially occur that is not addressed herein. Such information may warrant reinitiation and reconsideration of the scope of this incidental take statement (50 CFR 402.16b).

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for southwestern willow flycatcher. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The BLM should consider adding protective guidance based on the reasonable and prudent measures and terms and conditions as an amendment to the RMP/EISs applicable to the Tucson Field Office.

2. The BLM should develop a fire management program that directs protection to riparian habitats and avoids effects to flycatchers to the maximum extent practicable if fires do occur.

3. The BLM should develop an active management plan for cowbirds, removing eggs from southwestern willow flycatcher nests upon detection and monitoring effectiveness of cowbird trapping.

4. The BLM should work with the Natural Resource Conservation Service and landowners in the allotments to develop and implement watershed improvement projects that will increase infiltration.

5. The BLM should implement the Southwestern Willow Flycatcher Recovery Plan, including recommendations for grazing management.

6. The BLM should promptly complete implementation of the Southwestern Willow Flycatcher action plan.

7. The BLM should work with the San Carlos Apache Tribe to remove trespass livestock from

potential or suitable flycatcher habitat on the Gila River above Winkelman.

In order that we be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

(Note: capture or control of cowbirds requires appropriate permits from Arizona Game and Fish Department and the Service.)

CACTUS FERRUGINOUS PYGMY-OWL (*Glaucidium brasilianum cactorum*)

Status of Species

A detailed description of the life history and ecology of the cactus ferruginous pygmy-owl (pygmy-owl) can be found in the *Birds of North America* (Proudfoot and Johnson 2000), *Ecology and Conservation of the Cactus Ferruginous Pygmy-owl in Arizona* (Cartron and Finch 2000), and in other information available from the Arizona Ecological Services Field Office (arizonaes.fws.gov). Information specific to the pygmy-owl in Arizona is preliminary. Research completed in Texas has provided useful insights into the ecology of this subspecies and, in some instances, represents the best available scientific information. However, habitat and environmental conditions are somewhat different than in Arizona and conclusions based on Texas information need to be qualified.

Species Description

The pygmy-owl is in the order Strigiformes and the family Strigidae. They are small birds of prey, averaging 6.75 inches in length. Males average 2.2 ounces with females slightly larger averaging 2.6 ounces. The pygmy-owl is reddish brown overall, with a cream-colored belly streaked with reddish brown. The crown is lightly streaked and a pair of dark brown/black spots outlined in white occur on the nape suggesting "eyes." The species lacks ear tufts and the eyes are yellow. The tail is relatively long for an owl and is reddish brown in color with darker brown bars. Pygmy-owls have large feet and talons relative to their size.

Listing and Critical Habitat

The Arizona population of the pygmy-owl was listed as an endangered distinct population segment on March 10, 1997 (U.S. Fish and Wildlife Service 1997 [62 FR 10730]) without critical habitat. In response to a court order, approximately 731,712 acres of critical habitat were designated on July 12, 1999 (U.S. Fish and Wildlife Service 1999 [64 FR 37419]) in areas within Pima, Cochise, Pinal, and Maricopa counties in Arizona. However, that designation was struck down by court order in 2001. We submitted a proposed rule to redesignate critical habitat to the Federal Register on November 27, 2002 (U.S. Fish and Wildlife Service 2002 [67 FR 71032). The proposal includes approximately 1,208,000 acres in portions of Pima and Pinal counties, Arizona.

In September 1998, we appointed the Cactus Ferruginous Pygmy-Owl Recovery Team. The Team is comprised of a Technical Group of biologists (pygmy-owl experts and raptor ecologists) and an Implementation Group which includes representatives from affected and interested parties (i.e., Federal and State agencies, local governments, the Tohono O'odham Nation, and private groups). A draft recovery plan was released for public comment in January 2003.

Life History

Pygmy-owls are considered non-migratory throughout their range. There are winter (November through January) pygmy-owl location records from throughout Arizona (R. Johnson unpubl. data 1976, 1980; University of Arizona 1995, Tibbitts, pers. comm. 1997, Abbate *et al.* 1999, 2000, U.S. Forest Service, unpubl. data,). These winter records suggest that pygmy-owls are found within Arizona throughout the year and do not appear to migrate southward to warmer climates during the winter months.

The pygmy-owl is primarily diurnal (active during daylight) with crepuscular (active at dawn and dusk) tendencies. They can be heard making a long, monotonous series of short, repetitive notes, mostly during the courtship and nesting season which runs from February through July. Male pygmy-owls establish territories using territorial-advertisement calls to repel neighboring males and attract females. In Arizona, noticeable spontaneous calling begins in February, peaks from March-April, and tapers off by early June. Peak calling occurs from April-May in Texas, with incline and descent similar to Arizona birds. In Texas, spontaneous calling is infrequent from July through March; however, responses to broadcasted conspecific calls during this period were not reduced (Proudfoot and Beasom 1996). Pygmy-owls are most vocal and responsive during the courtship and nesting period (February through June). However, calling and defensive behavior is also manifest in nesting territories from fledging to dispersal (June through August).

Usually, pygmy-owls nest as yearlings (Abbate *et al.* 1999, Gryimek 1972), and both sexes breed annually thereafter. Territories normally contain several potential nest-roost cavities from which responding females select a nest. Hence, cavities/acre may be a fundamental criteria for habitat selection. Historically, pygmy-owls in Arizona used cavities in cottonwood, mesquite, and ash trees, and saguaro cacti for nest sites (Millsap and Johnson 1988).

Pygmy-owls exhibit a high degree of site fidelity once territories (the area defended) and home ranges (the area used throughout the year) have been established (AGFD unpubl. data). Because of strong site fidelity, pygmy-owls are more likely to be affected by projects within their home range. Behaviorally, the option to seek alternative areas outside of the home range appears limited, particularly for males.

Data on the size of areas used by pygmy-owls on an annual basis in Arizona are limited. Until more complete information is available from Arizona, the home range size estimate we are using is based on telemetry work completed in Texas. In Texas, Proudfoot (1996) noted that, while

pygmy-owls used between 3 and 57 acres during the incubation period, they defend areas up to 279 acres in the winter. Proudfoot and Johnson (2000) indicate males defend areas with radii from 1,100 - 2,000 feet. Initial results from ongoing studies in Texas indicate that the home range of pygmy-owls may also expand substantially during dry years (G. Proudfoot unpubl. data). Therefore, a 280-acre home range is considered necessary for pygmy-owls to meet their life history requirements on an annual basis.

Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. Documented and suspected pygmy-owl predators include great horned owls (*Bubo virginianus*), Harris' hawks (*Parabuteo unicinctus*), Cooper's hawks (*Accipiter cooperii*), screech-owls (*Otus kennicottii*), and domestic cats (*Felis catus*) (Abbate *et al.* 2000, AGFD unpubl. data). Pygmy-owls may be particularly vulnerable to predation and other threats during and shortly after fledging (Abbate *et al.* 1999). Cover near nest sites may be important for young to fledge successfully (Wilcox *et al.* 1999, Wilcox *et al.* 2000).

Pygmy-owls typically hunt from perches in trees with dense foliage using a perch-and-wait strategy. Their diverse diet includes birds, lizards, insects, and small mammals (Bendire 1888, Sutton 1951, Sprunt 1955, Earhart and Johnson 1970, Oberholser 1974, Proudfoot 1996, Abbate *et al.* 1996,1999). Free-standing water does not appear to be necessary for the survival of pygmy-owls. It is likely that pygmy-owls meet much of their biological water requirements through the prey they consume. However, the presence of water may provide related benefits to pygmy-owls.

Additional life history information can be found on the Arizona Ecological Services website (arizonaes.fws.gov), in the draft recovery plan, published listing and critical habitat documents (U.S. Fish and Wildlife Service 1997, 1999, 2002), and in Abbate et al. (1999, 2000), Cartron and Finch (2000) and Proudfoot and Johnson (2000).

Environmental Baseline

The environmental baseline for the flycatcher describes the history and current status of the riparian habitats in the project area. That baseline is included here by reference. Johnson *et al.* (2000) suggest that declining populations of pygmy-owls along the middle Gila River coincided with intensive wood cutting and construction of the first dams, which together caused deforestation and reduced waterflow early in the 20th century. The lack of recent records of pygmy-owls from riparian habitats in Arizona is perplexing. Cartron and Stoleson *et al.* (2000) suggest a lack of recent riparian localities birds may coincide with a loss of habitat connectivity, rather than lack of suitability at specific sites. Apparently suitable riparian habitat occurs along the Gila River through the action area.

Plant communities in the uplands adjacent to the Gila River are predominantly Arizona upland subdivision of Sonoran Desert scrub (Brown and Lowe 1980, Turner and Brown 1982); with patches of chaparral and semi-desert grasslands at higher elevations in the eastern allotments (U.S.BLM 1999). Near Ashurst-Hayden Dam the desert scrub becomes more simple in terms of

species richness, and grades into the Lower Colorado River Valley subdivision. The historical conditions of the uplands in the project area are not well known. However, anecdotal information and trends in grassland communities elsewhere in Arizona suggest vegetation communities may have changed to some degree in the project area. For instance, W.E.D. Scott (1886-1888) noted that scaled quail were very rare at Riverside, but were common at Florence. This is predominantly a grassland species that has not been reported from Florence or Riverside in recent times (Ohmart 1982), and currently is restricted to grasslands and mesquite-grasslands in southeastern Arizona (Phillips *et al.* 1964, Davis and Russell 1995). There are patches of degraded mesquite and tobosa grass (*Hilaria mutica*) stands in the Florence area, suggesting this community type may have been more widespread in the past.

Much of the Southwest's semi-desert grasslands have been converted to shrublands over the past century (Leopold 1924, Humphrey 1958, 1987; Hastings and Turner 1964, Martin 1975, Bahre 1991, 1995; Mac *et al.* 1998). This shift in vegetation communities has been attributed to grazing, fire suppression (caused by grazing and active fire suppression), wild hay harvest, climate change, increased atmospheric CO_2, dispersal of woody plant seeds by livestock, and/or changes in native herbivore communities (Bahre 1995, McClaran and Brady 1994, McPherson *et al.* 1993). Documentation of such conversions are primarily from areas south and east of the project area; however, McAuliffe (1995) provides evidence of similar conversions at Cave Creek north of Phoenix and on the south flank of the Date Creek Mountains northwest of Wickenburg. The biological evaluation states that semi-desert grasslands in the project area are characterized by shrub invasion. However, the extent to which semi-desert grasslands in the project area have converted to desert scrub is unknown.

We are not aware of pygmy-owls records from any of the allotments under consultation. The nearest records are from Dudleyville on the San Pedro River in 1985 and 1986. Other records include Blackwater and Sacaton along the Gila River to the west of the project area (Gilman 1909), and one individual near Superior (Monson 1998). However, historical accounts suggest the species may have been well-represented on the middle Gila River at the end on the 19th century and early in the 20th century. Breninger (1898) described the pygmy-owl as common along the lower and middle Gila Rivers. At Agua Caliente, Sacaton, and Blackwater, the bird was fairly numerous (Gilman 1909, Johnson *et al.* 2000). However, when Rea (1983) surveyed avian fauna on the Gila River Indian Reservation, including Blackwater and Sacaton, the species was apparently absent. Nevertheless, habitats appear suitable in the project area, and the lack of current records may reflect a lack of survey data. Cartron and Richardson *et al.* (2000) speculate that the species may still occur on the largely unsurveyed middle Gila River.

Habitat for the pygmy-owl potentially occurs anywhere below 4,000 feet where there are rich stands of Arizona upland subdivision of Sonoran Desert scrub or riparian vegetation with trees large enough to support cavity nesting birds. Such lands occur within all of the allotments, but the extent to which suitable habitats occur in these allotments is unknown. Habitat and owl surveys to which the BLM has committed in the Phoenix RMP consultation are largely in the planning stages; however, the BLM has conducted surveys for pygmy-owls and/or pygmy-owl

habitat on some lands in the allotments as part of the Ray Mine land exchange project (consultation 02-21-95-F-0156). These surveys included portions of the Battle Axe and Rafter Six allotments. Another 40 acres of the Helmwheel allotment has been surveyed. On the Battle Axe allotment, five quarter sections were found to support suitable habitat for owls; however, surveys for pygmy-owls according to the 1995 Service protocol were negative. Five quarter sections of suitable habitat were also identified on the Rafter Six allotment, but surveys for owls were not conducted. The 40-acre parcel of the Helmwheel allotment was found to be suitable habitat, but surveys for owls according to the 1995 protocol were negative.

The pygmy-owl and habitat surveys for the Ray Mine/ASARCO land exchange are the only comprehensive surveys for the species in the general area of the allotments. Surveys for pygmy-owls in accordance with the 1995 Service protocol were conducted on BLM parcels selected for exchange to ASARCO unless they met one or more of the following criteria:

1. Above 4,000 feet;

2. No saguaros >8 feet tall or with woodpecker cavities, and/or ironwood, mesquite, palo verde greater than six inches in diameter;

3. Factored habitat score <15.

The following consultations have occurred in or near the action area for the pygmy-owl.

1. *Phoenix Resource Management Plan (Consultation 02-21-88-F-0167)*. The biological opinion issued by the Service concluded "no jeopardy" for this species. Conservation measures in the proposed action included: pygmy-owl habitat descriptions, mapping, habitat management and surveys.

2. *Phoenix District Portion of the Eastern Arizona Grazing Environmental Impact Statement (Consultation 02-21-96-F-0422)*. The biological opinion issued by the Service concluded "no jeopardy" for this species. Conservation measures in the proposed action included: habitat descriptions, mapping, habitat management and surveys.

3. *Upper Gila River-San Simon Grazing EIS (02-21-96-F-0423)*. The biological opinion issued by the Service concluded "no jeopardy" for this species. Conservation measures in the proposed action included mapping, habitat descriptions, surveys and habitat management.

4. *Ray ARSARCO Mine Land Exchange (02-21-95-F-0156).* The biological opinion issued for the pygmy owl was a "no jeopardy". Conservation measures in the proposed action included: mapping, surveys and habitat management.

5. *Military activities at the Florence Military Reservation (02-21-01-F-0415).* The opinion found that the proposed action was not likely to jeopardize the continued existence of the pygmy-owl. Also included was a determination that the action may affect, but was not likely

to adversely affect, the lesser long-nosed bat.

There is no proposed critical habitat for the pygmy-owl in the action area.

Effects of the Proposed Action

Of the 18 allotments addressed in this consultation, the BLM has concluded that thirteen allotments; Myers, Whitlow, Horsetrack, Teacup, Cochran, LEN, A Diamond, Battle Axe, Rafter Six, Hildalgo, Piper Springs, Christmas, and Mescal Mountain; have potentially suitable pygmy-owl habitat and that grazing and its associated activities may affect, and are likely to adversely affect, the pygmy-owl because they failed to meet one or more of the following guidance criteria (BLM 1999):

1. Habitat for the species or primary constituent elements of critical habitat may be modified. Suitable upland and riparian habitat would not likely be maintained because utilization on perennial, palatable shrubs or grasses would be > 30 percent, which would likely change the plant species composition and/or structural components of suitable habitat or preclude the establishment of vegetation which eventually would develop into suitable habitat.

2. Improvement of potential habitat for the species, or development of primary constituent elements of critical habitat, may be precluded or impeded. Riparian areas having or capable of supporting riparian woody species such as cottonwood and willow seedlings and saplings would likely have utilization levels > 30 percent of the apical meristems of seedlings and saplings <6 feet tall, leading to a loss of recruitment.

3. An individual may be disrupted from breeding, feeding, or sheltering-related activities, or otherwise taken. Disruption of individuals during nesting by interrelated or independent activities (e.g. livestock gathering, range improvement construction or maintenance) would likely occur within a 0.25 mile radius of an occupied site, previously occupied territory, or unsurveyed suitable habitat between January 1 and June 30.

Livestock grazing can degrade riparian habitats used by pygmy-owls. The (General) EFFECTS OF THE PROPOSED ACTION, and the effects for the southwestern willow flycatcher describe how livestock grazing affects riparian systems and associated uplands. These section are included here by reference.

Grazing can alter prey populations important to the pygmy-owl. For instance, Jones (1981) found that grazing reduced lizard abundance and variety in a number of habitats in western Arizona. Pianka (1966) discussed the importance of vegetation structure, and found vegetation communities with increased plant structure supported more lizard species than those with less structure. Other authors have also documented detrimental effects of livestock grazing on lizard populations (Bock *et al.* 1990, Mitchell 1999). Overall, complex vegetation communities with a high degree of species diversity and structural heterogeneity provide habitat for many prey species including birds, insects, and mammals. Riparian communities, particularly where willows are

found, support one of the richest and most diverse insect fauna among plant communities, which are also important to fish, amphibians, reptiles, birds, and small mammals (Southwood 1961). In addition, birds have been shown to respond to alterations in vegetation structure and species richness within riparian habitats (Bull and Slovin 1982, Szaro and Jakle 1985). Higher densities and diversity of birds have been found in ungrazed riparian habitats as compared to adjacent grazed areas (Crouch 1981, Mosconi and Hutto 1981, Taylor 1986, Krueper *et al.* 2003).

Grazing pressure on vegetation has also been shown to alter growth form, plant vigor, and plant species composition, resulting in increases or decreases in populations of bird species (Glinski 1977, Townsend and Smith 1977, Ryder 1980). Excessive livestock grazing can also affect types and abundance of food items for birds (Ryder 1980) and effects on small mammals may be similar (Krueper 1995). Raptors which use small mammals as prey may not choose to frequent submarginal riparian habitats for feeding due to lack of preferred prey items. Additionally, insect biomass may be decreased in riparian habitats which are heavily grazed due to the lack of understory vegetation (Krueper 1995). This can be particularly important to the pygmy-owl since reptiles, birds, and small mammals are important prey species.

Steenbergh and Lowe (1977) looked at saguaro density and recruitment within Saguaro National Park which, until recently, was grazed by livestock. In addition, Burgess (1964) examined saguaro populations on the Tonto National Forest. They found that in Sonoran Desert scrub habitats, direct destruction of young saguaros has resulted from trampling by cattle seeking shade and forage beneath the crowns of desert trees, particularly palo verde and mesquite. They also found that livestock grazing has had the greatest impact in non-rocky habitats where germination, establishment, and survival of young saguaros are most directly dependent upon the physical protection of other vegetation. Grazing in rocky habitats has had far less impact upon young saguaro recruitment. They summarized that grazing has reduced the density of saguaro populations by decreasing the number of sites suitable for germination and establishment of young plants and increasing exposure to natural mortality-causing factors. Therefore, since most recent nest cavities used by pygmy-owls have been in saguaros in non-rocky habitat, activities which affect saguaro recruitment could be significant.

The BLM notes that thirteen allotments contain riparian habitat or Sonoran Desert scrub communities with potential habitat for the pygmy-owl. Plant species found within Sonoran Desert scrub occupied by pygmy-owls include saguaro, blue palo verde (*Parkinsonia floridum*), ironwood, acacia, prickly pear (*Opuntia* spp.), and cholla (*Cylindopuntia* spp.), with dense patches of triangle-leaf bursage, and other herbaceous species in the understory. A study conducted on the Sierra Ancha allotment of the Tonto National Forest near Roosevelt Reservoir indicated that cattle diets were mainly annual grasses and forbs in March, April, and early May, and that shrubs made up only three to 10 percent of the diet in these months. However, in May, as annuals begin to dry up and jojoba and mesquite starts to grow, livestock begin browsing more heavily on these species. Jojoba made up 53 percent of their diet in late May, declining to 13 percent in October. Mesquite ranged from 15 to 40 percent of their diet from June through October (Smith *et al.* 1993b). Thus, grazing in desert scrub communities includes browsing of shrubs and trees that are important components of pygmy-owl habitat.

In Sonoran Desert scrub, pygmy-owls are typically found in very well-developed thickets of desert vegetation and, within xeroriparian habitats, they appear to select relatively dense drainages lined with trees and shrubs. Grazing that reduces the structure and composition of desert scrub and xeroriparian communities below the site's potential likely adversely affects the suitability of the site as pygmy-owl habitat. Although grazing in semidesert grassland and Chihuahuan Desert scrub can cause a decrease in grasses and an increase in shrubby species (Holechek *et al.* 1994, Bahre 1995), this effect has not been documented in Sonoran Desert scrub. Grazing can result in reduced shrub cover (Webb and Stielstra 1979) and reduced desirable shrubs (Orodho et al. 1990) in Mojave Desert scrub and Great Basin Desert scrub, respectively. Browsing of shrubs and young trees, trampling or browsing of saguaros and their nurse plants (Abouhalder 1992), and adverse effects to soils and cryptobiotic crusts (see pages 27-28) are mechanisms by which the structure and composition of Sonoran Desert scrub could be affected by grazing. Reduction in shrub, tree, and columnar cactus cover and regeneration would degrade pygmy-owl habitat.

The BLM has concluded that in each of the allotments with potential pygmy-owl habitat, unsatisfactory conditions exist in one or more ratings of the soil, riparian, or watershed. This suggests that these allotments have been adversely affected to some degree by past or current livestock grazing, fire suppression, prescribed fires, wildfires, road construction, settlement, water diversion, mining, or recreational activities. We are concerned about the potential adverse effects to pygmy-owls in these allotments, which are all in various degrees of degraded condition, particularly since they contain unsurveyed potential habitat. We are particularly concerned with year-long grazing in riparian and Sonoran Desert scrub habitat. This type of grazing can, in the long-term, decrease potential nesting habitat for the pygmy-owl by suppressing regeneration of trees in riparian areas and by inhibiting recruitment of saguaros.

Holechek (1988) and Holechek *et al.* (1998) found that, in desert scrub, average utilization rates of 25-35 percent are appropriate for maintaining range condition. Within that range, several factors determine whether a low, medium, or high value should be selected. Holechek *et al.* (1998) suggest that on ranges in good condition with relatively flat terrain and good water distribution, the higher utilization limit may be appropriate. If the range is in poor or fair condition, or the allotment has thin soils, rough topography, and poor water distribution, the lower utilization rate may be appropriate. Using the guidance from Holechek (1988) and Holechek et al. (1998), BLM's proposed utilization rates of < 30 percent in desert scrub is probably appropriate to maintain areas of good and excellent range condition, and to restore, over time, degraded conditions elsewhere.

Use of ephemeral forage by livestock would occur during and after wet winters that provide for substantial annual plant growth, under certain conditions. No limits are put on the number of cattle that may be authorized for such use; rather stocking levels and permitted use are based on perceived availability of forage. Thus, our concern with ephemeral forage use by livestock is with habitat damage associated with large numbers of livestock. Livestock are not only consuming ephemeral forage at this time, but are also eating desirable perennial shrubs and grasses; trampling cryptobiotic crusts, banklines, and germinating perennial shrubs, trees, and

cacti; and causing soil compaction. It is during these periodic, brief wet periods that plants and cryptobiotic crusts have an opportunity to reproduce and achieve substantial germination and growth. Large numbers of livestock at this very crucial time for plants likely causes long-term degradation of plant communities and soils.

Livestock gathering activities that concentrate cattle or human activities such as at corrals, loading and unloading facilities, etc., may impact pygmy-owls if they are nesting near these areas. Such activities may disturb nesting owls, causing them to not nest in a particular area, or abandon active nests, particularly during the period the female is incubating eggs. The Service is concerned that adverse impacts from such activities may occur if they take place within 0.25 mi of a nesting owl. More research needs to be completed as to the effect such disturbance has on pygmy-owls.

In summary, the proposed project area encompasses a northern portion of the historical range of this species, and includes areas that were likely historically occupied by pygmy-owls. The BLM has indicated that allotments in the project area encompass potential habitat for this species. No pygmy-owls are currently known from the allotments; however; surveys completed to date have been limited. Therefore, the occupancy status of this species in the project area is unclear. Loss of vegetation essential for foraging and cover from aerial predators, potential decrease in nesting cavities from adverse effects to saguaro recruitment, reduced prey populations, and disturbance of owls at areas of high human or livestock acitivity could adversely affect this species. These effects could occur both on BLM lands or on non-Federal lands within allotments, where those effects are interrelated or interdependent to the proposed action.

Cumulative Effects

The cumulative effects section for the southwestern willow flycatcher is incorporated here by reference. Development of non-Federal lands in the project area is ongoing and presents a significant threat to pygmy-owls and their habitat in Arizona. Other activities expected to occur on non-Federal lands in potential pygmy-owl habitat include mining, agriculture, grazing on private and State lands, and woodcutting. Large-scale habitat fragmentation and loss of pygmy-owl habitat within the project area may continue into the future and may further impact the owl. Lower elevation areas below 4,000 ft. within BLM administered lands may be increasingly important habitat and may provide linkages and connectivity as adjacent areas are developed. State lands and other areas that are currently suitable habitat may be sold or developed, further impacting this species. In addition, recreational activities and associated effects to pygmy-owl and its habitat, will undoubtably increase as more people move into the area and as the population of the region increases.

Conclusion

After reviewing the status of the pygmy-owl, the environmental baseline for the action area, the anticipated effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the pygmy-owl. No proposed critical habitat occurs in the action area, thus none will be affected. We present

this conclusion in regard to jeopardy for the following reasons:

1. Authorized upland and riparian vegetation utilization on all allotments is limited to 30 percent.

2. No pygmy-owls have been found recently on nearby BLM administered lands, or on any of the 18 allotments.

3. Mitigation measures will be implemented to reduce effects to potential pygmy-owl riparian habitat.

Historically, the pygmy-owl occupied the middle Gila River; however, the last recorded sighting was in Dudleyville in 1986, since then no other documented sightings have been recorded. The current pygmy-owl surveys are inadequate in the project area; however, BLM has proposed to implement conservation measures for the pygmy-owl which include surveys and habitat mapping. With the implementation of <30 percent utilization levels in the uplands and riparian areas and additional monitoring will help reduce the effects from livestock grazing in potential pygmy-owl habitat. The existing habitat in the project area has been classified as potential and capable of supporting pygmy-owls. The cumulative effects to the pygmy-owl in the project area are the operation of the ASARCO Ray Mine and the San Carlos Apache Reservoir and with the increasing population in the state of Arizona, several OHV groups are looking at the middle Gila River as additional areas for off-highway vehicle use. All of these activities contribute to habitat fragmentation which is one of the larger threats to the pygmy-owl. In conclusion, the project area currently has no occupied pygmy-owl habitat and BLM proposes to implement conservation measures for the pygmy-owl in efforts to help lessen the impacts from livestock grazing. Therefore, the continued existence of the pygmy-owl will not be jeopardized in the project area.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Incidental Take

Recent, comprehensive survey data documenting presence or absence of the pygmy-owl is lacking for most areas in the allotments addressed in this consultation. No pygmy-owl are currently known to occur in or near the allotments. As a result, the Service can not reasonably conclude that incidental take is likely to occur as a result of the proposed action and, therefore, no terms and conditions or reasonable and prudent measures are provided for the pygmy-owl. If a pygmy-owl is located in any allotment or nearby, and it may be adversely affected by the proposed action, reinitiation of consultation is warranted [50 CFR 402.16 (b)]. The Service would reevaluate the need for an incidental take statement during consultation.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the cactus ferruginous pygmy-owl. In furtherance of the purposes of the Act, we recommend implementing the following action:

1. Encourage private landowners with riparian communities on their property to seek assistance in removing livestock from riparian areas or taking other riparian restoration measures through the Service's Partners for Wildlife Program.

2. Implement the pygmy-owl recovery plan, when finalized.

3. Promptly complete habitat mapping and pygmy-owl surveys proposed in the conservation measures.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species, the Service requests notification of implementation of any conservation actions.

(Note: surveys involving simulated or recorded calls of cactus ferruginous pygmy-owls require an appropriate permit from the Service. Arizona Game and Fish Department should be contacted in regard to State permitting requirements.)

LESSER LONG-NOSED BAT (*Leptonycteris curasoae yerbabuenae*)

Status of Species

The lesser long-nosed bat is a medium-sized, leaf-nosed bat. It has a long muzzle and a long tongue, and is capable of hover flight. These features are adaptations to feeding on nectar from the flowers of columnar cacti, such as the saguaro and organ pipe cactus, and from paniculate

agaves, such as Palmer's agave (*Agave palmeri*), and Parry's agave (*A. parryi*, Hoffmeister 1986), *A. desertii* (Engelman 1875), and *A. schotti* (Engelman 1875). Palmer's agave exhibits many characteristics of chiropterophily, such as nocturnal pollen dehiscence and nectar production, light colored and erect flowers, strong floral order, and high levels of pollen protein with relatively low levels of nectar sugar concentrations (Slauson 1996). Parry's agave demonstrates many (though not all) of these same morphological features (Gentry 1982).

The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered in 1988 (U.S. Fish and Wildlife Service 1988a). No critical habitat has been designated for this species. A recovery plan was completed in 1997 (U.S. Fish and Wildlife Service 1997a). Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. The recovery plan states that the species will be considered for delisting when three major maternity roosts and two post-maternity roosts in the United States, and three maternity roosts in Mexico have remained stable or increased in size for at least five years.

The lesser long-nosed bat is migratory and found throughout its historical range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. It has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County), southeast to the Chiricahua Mountains (Cochise County), and south to the international boundary. Roosts in Arizona are occupied from late April to September (Cockrum and Petryszyn 1991) and on occasion, as late as November (Sidner 1999, 2000); the bat has only rarely been recorded outside of this time period in Arizona (Fleming 1995, Hoffmeister 1986, Sidner and Houser 1990). In spring, adult females, most of which are pregnant, arrive in Arizona gathering into maternity colonies. These roosts are typically at low elevations near concentrations of flowering columnar cacti. After the young are weaned these colonies disband in July and August; some females and young move to higher elevations, primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Adult males typically occupy separate roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains and recently the Galiuro Mountains (Snow pers. comm. 1999) but also occur with adult females and young of the year at maternity sites (Fleming 1995). Throughout the night between foraging bouts both sexes will rest in temporary night roosts (Hoffmeister 1986).

The primary food source for the lesser long-nosed bat in southeastern Arizona from mid-summer through fall is Palmer's agave, which typically occurs on rocky slopes or hill tops, scattered within the desert grassland and oak woodland communities within the elevation range of 3,000-6,000 ft (Gentry 1982). Parry's agave reaches higher elevations than Palmer's, extending from grasslands into oak woodland, chaparral, pine/oak forests, and mixed conifer with an elevation range of approximately 4,900-8,200 ft (Gentry 1982). Like Palmers' agave, Parry's is typically found on rocky slopes (Gentry 1982). Concentrations of paniculate agaves are generally found on the rocky, shallow soils of hills and ridges. Palmer's and Parry's agaves are also found scattered in

areas of deep, heavy soils within grasslands or where there may be thick stands of shrubs, mesquite, oak, and other trees.

The ecology of Palmer's agave is poorly understood, especially as it is affected by livestock use and fire (Slauson, Pers. comm., 1997; Wendy Hodgson, Desert Botanical Gardens, Phoenix, pers. comm., 1997). Agaves are perennial succulents. Agave seeds germinate readily with adequate moisture, typically in open areas with limited competition from other plants (Tony Burgess, Biosphere Two Center, Tucson, pers. comm. 1997). Palmer's agave is relatively slow growing, often taking 20 or more years before initiating the single reproductive event in its life (Slauson 1996, 1999). A flowering stalk erupts from the rosette of a mature plant, growing rapidly through the spring and early summer. During the summer 8 to 12 flowering panicles are displayed on the upper third of a stalk 10-16 feet tall (Gentry 1982). Slauson (1996, 1999) has completed a pollination ecology study of Palmer's agave, finding that many pollinator species contribute to establishing seed set. Lesser long-nosed bats have been recorded visiting individual blooming Palmer's agaves more than 1,000 visits per night (R. Sidner, Tucson, pers. comm. 1997; Petryszyn, pers. comm.1999), while they may not visit other agaves at all (Slauson, pers. comm. 1997). Bat visits generally last less than one second (Slauson 1999). Apparently there are many factors which influence the year a particular plant may bloom. Precipitation one to several years before blooming is probably of special importance. In the Peloncillo Mountains, about 2 to 5 percent of the agave population flowers each year (Peter Warren, Nature Conservancy, Tucson, pers. comm.1997). Palmer's agave may occasionally produce off-sets (vegetative reproduction or cloning of "pups" produced from rhizomes) though this is less likely than for many other agave species (Hodgson, pers. comm. 1997). Parry's agave freely produces off-sets (Gentry 1982).

The importance of Parry's agave, as well as desert agave and amole, as a forage resource for *Leptonycteris* bats is unknown. As discussed, Parry's agave generally occurs at higher elevation than Palmer's agave, and occurs in forest openings. Benson and Darrow (1982) note that it typically flowers in June and early July, which is before the lesser long-nosed bat arrives at roosts in southeastern Arizona. However, J. Rorabaugh (AESO, pers. comm.1998) noted many Parry's agave in flower high in the Huachuca Mountains on the crest trail during late July in 1997. It may be that agaves at high elevation bloom later than at lower sites, and could potentially be blooming and be used as a forage resource when lesser long-nosed bats arrive in July or early August. In addition, Parry's agave may be very important as a forage plant for those bats which arrive in southeastern Arizona during late spring and early summer.

As indicated above, the lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. These bats often forage in flocks. Nectar of these cacti and agaves is high energy food. Concentrations of some food resources appear to be patchily distributed on the landscape and the nectar of each plant species utilized is only seasonally available. Cacti flowers and fruit are available during the spring and early summer; blooming agaves are available primarily from July through October. Columnar cacti occur in lower elevation areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desert scrub areas, semi-desert grasslands and shrublands, and

into the oak woodland (Gentry 1982). In the Huachuca Mountains, Parry's agave is generally found at higher elevations than Palmer's agave; the former is common in forest openings to the crest of the Huachuca Mountains.

Lesser long-nosed bats appear to be opportunistic foragers and extremely efficient fliers. Seasonally available food resources may account for the seasonal movement patterns of the bat. The lesser long-nosed bat is known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to flowering columnar cacti have been documented in Arizona at 15 miles, and in Mexico at 25 miles and 38 miles (one way)(Dalton *et al.* 1994; V. Dalton, Tucson, pers. comm. 1997; Y. Petryszyn, University of Arizona, pers. comm. 1997). Steidl (pers. comm. 2001) found that typical one-way foraging distance for bats in southeastern Arizona is roughly 12.5 miles. A substantial portion of the lesser long-nosed bats at the Pinacate Cave in northwestern Sonora (a maternity colony) fly 25-31 miles each night to foraging areas in Organ Pipe Cactus National Monument (U.S. Fish and Wildlife Service 1997a). Horner *et al.* (1990) found that lesser long-nosed bats commuted 30-36 miles round trip between an island maternity roost and the mainland in Sonora; the authors suggested these bats regularly flew at least 47 miles each night. Lesser long-nosed bats have been observed feeding at hummingbird feeders many miles from the closest known potential roost site (Yar Petryszyn, pers. comm. 1997).

Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the lesser long-nosed bat (Fleming 1995). Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified. Whatever the factors are that determine selection of roost locations, the species appears to be sensitive to human disturbance. Instances are known where a single brief visit to an occupied roost is sufficient to cause a high proportion of lesser long-nosed bats to temporarily abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days. However, this sensitivity suggests that the presence of alternate roost sites may be critical when disturbance occurs. Interspecific interactions with other bat species may also influence lesser long-nosed bat roost requirements.

According to Fleming (1995), there are 16 known large roost sites in Arizona and Mexico (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. According to the same surveys, the maternity roosts are occupied by over 150,000 lesser long-nosed bats and of these, just over 100,000 are found at just one natural cave at Pinacate National Park, Sonora, Mexico (Cockrum and Petryszyn 1991). Several new large roost sites have been located in Arizona, bringing the total number of large roosts to 21 (Mike Coffeen, AESO, pers. com. 2001). The numbers above indicate that although a relatively large number of these bats are known to exist, the relative number of known large roosts is quite small. Disturbance of these roosts, or removal of the food plants associated with them could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

Threats which may contribute to the decline of lesser long-nosed bat populations are excess harvesting of agaves in Mexico, the collection of cacti in the U.S., and the conversion of habitat for agricultural uses, livestock grazing and production of bufflegrass, wood-cutting, and other development.

The lesser long-nosed bat recovery plan (U.S. Fish and Wildlife Service 1994) identifies the need to protect foraging areas and food plants. Columnar cacti and agaves provide critical food resources for this bat. Populations of these plants need continued protection to sustain nectar-feeding bat populations. A critical need in this area is information about the size of the foraging areas around roosts so that adequate areas can be protected. This information will show the minimum area needed to support a roost of nectar- and fruit-eating bats, provided the roost locations are known. Additional life history information can be found in the recovery plan (U.S. Fish and Wildlife Service 1994) and other references cited therein.

Environmental Baseline

The nearest known roost to the project area is in the Picacho Mountains, approximately 40 miles away. An additional roost may occur in the Galiuro Mountains approximately 40 miles to the southeast. Male lesser long-nosed bats were detected in the Galiuro Mountains in 2000 (T. Snow, AGFD pers. comm.). The roost site has not been located. No roosts are known from the action area, however, potential roost surveys are incomplete.

The roosts in the Picacho and Galiuro Mountains are roughly within maximum foraging distance (~38 mi.) of several of the allotments. Potential foraging habitats, in the form of saguaro or agave stands occur in the action area; however; most of the available forage in the form of agaves is on the 5 upland allotments. Saguaros occur commonly in Sonoran Desert scrub communities below approximately 3,500 ft., and rarely to as high as 4,500 ft. (Benson 1982), whereas agaves may occur in many community types from low desert to high in the mountains. Desert agave occurs most frequently in Sonoran Desert scrub below 3,500 ft.. Palmer's agave, which is the most important agave for lesser long-nosed bat in southeastern Arizona, is typically encountered in semidesert grasslands and lower woodland communities at 3,000-6,000 ft; while Parry's agave occurs in openings in woodlands and chaparral at 4,500-8,000 ft. Amole is distributed primarily south of the Salt River in semidesert grasslands and woodlands at 3,300-6,500 ft. (Benson and Darrow 1982).

Saguaros flower in May and fruits mature in June and July (Benson 1982). Lesser long-nosed bats feed on both the nectar and fruits of saguaros. When saguaro fruits are no longer available in late July or early August, agave nectar is the only food resource for lesser long-nosed bats. Agaves typically bolt or flower and provide a nectar resource for foraging bats from about April 15 into October, depending on the agave. Palmer's agave begins to bolt in May, and typically flowers from July through early October (Howell 1996, Slauson 1996). Because livestock are known to eat agave stalks, an important part of the baseline information needed to quantify effects is identification of those allotments in which livestock grazing would occur in agave habitat during

bolting (April 15 to October). Most of the allotments in the action area provide habitat for agaves and are grazed during this period. However, the number of cattle or pastures grazed while agaves are bolting varies greatly among allotments. No specific information is available about agave densities in areas grazed during the bolting season. Also relevant are authorized upland utilization, range condition and trend, and soil condition. Proposed utilization is an indicator of future grazing intensity, while range condition and trend, and soil condition, are indicators of how grazing, other management, and natural processes have affected ecological condition up to the present.

Effects of the Proposed Action

The grazing program could affect the lesser long-nosed bat in two ways: 1) disturbance of roosts via access on roads associated with grazing, such as to a stock tank and 2) reduced forage resources through adverse effects to saguaro and agave populations and browsing of agave flowering stalks**.** Lesser long-nosed bats are very sensitive to human disturbance. Effects to roosts are speculative because no lesser long-nosed bat roosts are known to occur in the action area. As discussed above, comprehensive surveys are needed to fully assess whether such roosts are present.

The Myers, Whitlow, Teacup, A-Diamond, and Cochran allotments which are within proximity to the Picacho Mountains could provide forage for the lesser long-nosed bat. Piper Springs, Smith Wash, Hildalgo, and Christmas allotments are within foraging distance of the Galiuro Mountains. Lesser long-nosed bats require suitable forage plants. Grazing can affect changes in saguaro and agave populations by directly affecting individuals through trampling or browsing and destroying flowering agave stalks, or indirectly through alteration of the vegetation community, degradation of soil and watershed conditions, and modification of the fire regime. The severity of adverse effects to lesser long-nosed bats resulting from potential reduction in forage resources caused by grazing is dependent on the importance of forage plants in a specific area to bat reproduction, survival, and growth. It seems likely that the proposed project, which is located within areas with saguaros and agaves, could have some effects on bat foraging behavior, if bats are present. We consider loss of forage resources a great enough threat to include protection of foraging areas and food plants as a priority 1 task in the lesser long-nosed bat recovery plan.

As discussed in the “Effects of the Action” for the cactus ferruginous pygmy-owl, saguaro densities have been found to be reduced in grazed areas. Saguaros may be impacted both directly and indirectly by grazing activities. Impacts due to livestock grazing activities may occur from trampling of young saguaros, grazing of nurse plants which results in reduction or removal of protective cover, or grazing of the young saguaros themselves (Abouhalder 1992). Nurse plants which shade sensitive saguaro seedlings, may be reduced by grazing, and germination sites may be adversely altered due to soil compaction, erosion, and reduced infiltration. Livestock seek shade under trees, and forage for annual vegetation within shrub and tree cover. Benson (1982) noted grazing that has obliterated seedbeds of saguaros. Neiring et al. (1963) found that enhanced reproduction of saguaros on slopes was correlated with reduced localized levels of grazing.

An important factor for lesser long-nosed bats is the reliable availability every year of agave flowering stalks. Agaves are patchily distributed over the landscape and the presence of flowering agaves naturally fluctuates from year to year. Nectar feeding bats are opportunistic foragers, taking advantage of local floral resources. During the breeding season, lesser long-nosed bats may fly great distances in search of food resources, and later in the season they may shift roost sites and foraging areas based on the presence (or absence) of flowering agaves (U.S.Fish and Wildlife Service 1999a). The distance the bats will forage from a roost site appears to be related to the size of the colony and the available floral resources (U.S.Fish and Willdlife Service 1999a). Densities of flowering agave plants within bat home ranges in southeastern Arizona varied between an average of 8.1 plants/ac in 1998 to 1.9 plants/ac in 1999 (Ober *et al*. 2000). Areas supporting these densities of agaves, especially within 11 miles of roost sites, are probably very important to the bat (Ober et al. 2000).

Often an objective of livestock management is to increase the abundance of grasses. Grasses are probably one of the strongest competitors with agave seedlings (Burgess, pers. comm. 1997). Increased abundance of grass could result in reduced agave abundance. When overgrazing results in declines of perennial grasses (Martin and Cable 1974, Eckert and Spencer 1987), there may be less competition between grasses and agaves.

Current grazing practices may not be the only, or even the primary cause of degraded conditions on the allotments. Range vegetation and soil conditions may also be degraded by historical overgrazing; fire and subsequent erosion; changes in fire regimes; roads, off-road vehicles, urban, and other surface-disturbing activities; grazing by wildlife species; drought; floods; introduced nonindigenous plants, such as Lehmann lovegrass; or combinations of factors (Humphrey 1958, Hastings and Turner 1965, Martin 1975, Brown and McDonald 1995, Wang *et al.* 1997).

The BLM proposes a 30 percent utilization level in desert scrub communities, which is probably adequate to maintain range condition, and some degraded areas are likely to improve. This proposal, made primarily to minimize adverse effects to the cactus ferruginous pygmy-owl, would also benefit the lesser long-nosed bat and would apply in desert scrub in the following allotments: Myers, A-Diamond, Cochran, LEN, Teacup, Smith Wash, Dripping Springs, Ponderosa, Kearny, and Government Springs. Holechek (1988) and Holechek *et al.* (1998) found that in desert scrub, average utilization rates of 25 to 35 percent are appropriate for maintaining range condition.

Lesser long-nosed bats are opportunistic foragers and are capable of long distance flights. Temporary and minor shifts in the abundance of agaves and saguaros as a potential forage resource for these bats are expected to have limited adverse effects. However, as these impacts to lesser long-nosed bat food resources accumulate across large portions of the landscape, bat survivorship may be reduced through increased foraging flight distances and related energy expenditures, increased exposure to predators and likelihood of accidental death, changes in use patterns of limited large roost sites, and potential disruption of the “nectar corridor.” These effects may be most evident in those years where weather patterns, fire, or other causes have also affected agaves and saguaros. The long-term effect of livestock use contributes to ecosystem

based changes. The net result is that there are effects from livestock activities across the landscape to the ecosystem upon which the lesser long-nosed bat depends. Exactly how this alters the distribution and abundance of agaves and saguaros probably depends on site-specific conditions and grazing prescriptions.

In summary, the proposed action could potentially directly affect lesser long-nosed bat roosts in the action area (if present) through enhanced public access. No roosts or lesser long-nosed bats have been documented within the action area; however, roost surveys are incomplete. The species likely occurs at least as an occasional transient. Bats in the action area may be affected indirectly through effects to their forage resources, saguaros and agaves. Indirect effects to agave and saguaro populations from grazing include direct browsing and trampling, deterioration of soil and watershed conditions, changes in plant communities, and altered fire regimes.

Cumulative Effects

The cumulative effects section for the southwestern willow flycatcher is incorporated here by reference. Most of the activities expected to occur on the allotments and adjacent areas would be authorized by the BLM, and thus the effects of such activities are not considered cumulative. However, the allotments contain numerous, small private inholdings. Activities such as residential development, farming, and other activities occur on many of these lands. These actions, the effects of which are considered cumulative, may result in small-scale loss or degradation of potential lesser long-nosed bat foraging habitat. Commercial development, recreation and mining activities, and associated habitat loss, also occurs on private lands in the Winkelman, Kearny, and Kelvin communities within the project area.

Conclusion

After reviewing the status of the lesser long-nosed bat, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that proposed grazing activities on the 18 allotments within the Middle Gila River Ecosystem is not likely to jeopardize the continued existence of the lesser long-nosed bat. No critical habitat has been designated for this species; therefore, none will be affected. Our conclusion that the proposed action is not likely to jeopardize the species is based on the following:

1. Although roosts occur within maximum foraging distance, no lesser long-nosed bats or roosts have been found in the project area.

2. The allotments contain a large area of potential lesser long-nosed bat foraging habitat; however, the nearest known bat roosts are in the Picacho and likely the Galiuro Mountains, which are at about the maximum one-way foraging flight distance (~ 40 miles) from the allotments.

3. The proposed 30 percent or less utilization rate in desert scrub communities is expected to result in continued improvement of bat foraging habitat.

Based on the status of the lesser long-nosed bat and the proximity of the nearest roost, it is unlikely that the occurrence of lesser long-nosed bats will increase in the action area. In addition, the available suitable habitat in the project area is marginal at best. The availability of agaves in the project area is very small, because either the area does not support these plant species, or the impact from livestock grazing has adversely effected the reproduction of these plant species. The Recovery Plan identifies suitable day roosts and adequate concentration of food plants as the most critical resources for the recovery of lesser long-nosed bats. Day roosts consist primarily of caves and abandoned mines. However, these roosts must be within reasonable foraging distances of sufficient food plants before this bat will use them. The necessary surveys for both the bat and the agaves have not occurred in the project area and it is unclear where the status of these species currently stands. In conclusion, without the necessary species survey information for the project area, it is difficult to determine to what degree the proposed action is adversely affecting the lesser long-nosed bat; however, based on the current habitat conditions, it is likely that current livestock grazing is having adverse impacts on available bat forage. BLM proposes conservation measures for the pygmy-owl and the lesser long-nosed bat could benefit these species. The continued existence of the lesser long-nosed bat will not be jeopardized by the proposed action.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Incidental Take

We do not anticipate that the proposed action will result in incidental take of the lesser long-nosed bat based on the following: (1) no lesser long-nosed bats have been found on the allotments; and (2) the proposed utilization limits are expected to result in improvement of bat foraging habitat.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species.

Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendation provided here does not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the lesser long-nosed bat. In furtherance of the purposes of the Act, we recommend implementing the following action:

1. The BLM, in coordination with the Service and AGFD, should investigate the effects of the grazing program on the lesser long-nosed bat and its habitat, including clarifying the distribution of the bat and forage plants on allotments, and quantifying the direct and indirect effects of livestock grazing, maintenance of range improvement projects, and other aspects of the grazing program.

2. The BLM should conduct comprehensive surveys of potential lesser long-nosed bat roosts on and near the allotments and report to the Service the results of such surveys.

3. The BLM should assist us in the implementation of the lesser long-nosed bat recovery plan.

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

(Note: surveys for lesser long-nosed bats, or other bats, that involve capture or take require appropriate permits from the Service and Arizona Game and Fish Department.)

SPIKEDACE (*Meda fulgida*)

Status of Species

Spikedace was listed as a threatened species on July 1, 1986 (USFWS 1986c). Critical habitat was designated on April 25, 2000 (USFWS 2000a). Critical habitat includes portions of the Verde, middle Gila, San Pedro, San Francisco, Blue, and upper Gila rivers and Eagle, Bonita, Tonto, and Aravaipa creeks and several tributaries of those streams.

Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from the middle Gila, and upper Gila rivers, and Aravaipa and Eagle creeks (Barber and Minckley 1966, Minckley 1973, Anderson 1978, Marsh *et al*. 1990, Sublette *et al*. 1990, Jakle 1992, Knowles 1994, Rinne 1999). The species also occurs in the upper Verde River, but appears to be declining in numbers. It has not been documented in the Verde River since 1999 despite annual surveys, and additional survey work is needed to determine its current status. Habitat destruction along with competition and predation from introduced nonnative species are the primary causes of the species decline (Miller 1961, Williams *et al*. 1985, Douglas *et al*. 1994).

Spikedace live in flowing water with slow to moderate velocities over sand, gravel, and cobble substrates (Propst *et al*. 1986, Rinne and Kroeger 1988). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at the downstream riffle edges (Propst *et al*. 1986). Spikedace spawn from March through May with some yearly and geographic variation (Barber *et al*. 1970, Anderson 1978, Propst *et al*. 1986). Actual spawning has not been observed in the wild, but spawning behavior and captive studies indicate eggs are laid over gravel and cobble where they adhere to the substrate. Spikedace lives about two years with reproduction occurring primarily in one-year old fish (Barber *et al*. 1970, Anderson 1978, Propst *et al*. 1986). It feeds primarily on aquatic and terrestrial insects (Schreiber 1978, Barber and Minckley 1983, Marsh *et al*. 1989).

The primary constituent elements for spikedace critical habitat include those habitat features required for the physiological, behavioral, and ecological needs of the species. For spikedace, these include permanent, flowing, unpolluted water; living areas for adult spikedace with slow to swift flow velocities in shallow water with shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges; living areas for juvenile spikedace with slow to moderate flow velocities in shallow water with moderate amounts of instream cover; living areas for larval spikedace with slow to moderate flow velocities in shallow water with abundant instream cover; sand, gravel, and cobble substrates with low to moderate amounts of fine sediment and substrate embeddedness; pool, riffle, run, and backwater components present in the aquatic habitat; low stream gradient; water temperatures in the approximate range of 35 to 65 degrees Fahrenheit; abundant aquatic insect food base; periodic natural flooding; a natural, unregulated hydrograph or, if the flows are modified or regulated, then a hydrograph that demonstrates an ability to support a native fish community, and; habitat devoid of nonnative aquatic species detrimental to spikedace or habitat in which detrimental nonnative species are at levels that allow the persistence of spikedace.

The constituent elements are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of spikedace. The appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the constituent elements must include consideration of the season of concern and the characteristics of the specific location. The constituent elements are not independent of each other and must be assessed holistically, as a functioning system, rather than individually. In addition, the constituent elements need to be assessed in relation to larger habitat factors, such as watershed, floodplain, and streambank conditions, stream channel geomorphology, riparian vegetation, hydrologic patterns, and overall aquatic faunal community structure.

Recent taxonomic and genetic work on spikedace indicate there are substantial differences in morphology and genetic makeup between remnant spikedace populations. Remnant populations occupy isolated fragments of the Gila basin and are isolated from each other. Anderson and

Hendrickson (1994) found that spikedace from Aravaipa Creek is morphologically distinguishable from spikedace from the Verde River, while spikedace from the upper Gila River and Eagle Creek have intermediate measurements and partially overlap the Aravaipa and Verde populations. Mitochondrial DNA and allozyme analyses have found similar patterns of geographic variation within the species (Tibbets 1992, 1993).

The status of spikedace is declining rangewide. It is now restricted to approximately 289 miles of streams, and its present range is only 10 to 15 percent of its historical range. Within occupied areas, it is common to very rare, but is presently common only in Aravaipa Creek and some parts of the upper Gila River in New Mexico (USFWS 2000a). Although it is currently listed as threatened, the Service has found that a petition to reclassify the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded by higher priority listing actions (USFWS 1994c). For additional information on the spikedace please refer to the recovery plan.

ENVIRONMENTAL BASELINE

Spikedace were recorded from the middle Gila River historically (Minckley 1973) and as recently as 1991 at Cochran Crossing in the action area (Jakle 1992). Bureau of Reclamation sampled fish from 1991 through 1994 along reaches of the Gila River and on the San Pedro River from Dudleyville to Lewis Springs. Sampling stations on the Gila River included seven sites from just below Coolidge Dam to the Ashurst-Hayden Diversion Dam. Six stations were sampled on the San Pedro River including the Dudleyville Crossing, Aravaipa confluence, San Manuel Crossing, Hughes Ranch near Cascabel, near Charleston, and near Lewis Springs. Thirteen species and a hybrid sunfish were collected on the Gila River. Native species included longfin dace, Sonora sucker, desert sucker, and a single spikedace collected at Cochran Crossing. On the San Pedro River, 11 species were collected, including two native species: longfin dace and desert sucker. No spikedace were collected on the San Pedro River. Numbers and distribution of desert suckers and longfin dace on the San Pedro and Gila rivers, and Sonora sucker on the Gila River increased markedly following high flows in 1993. Cumulative absolute abundance of nonnative fish did not change after high flows, although mosquitofish were greatly reduced in the Gila River and were not found at sampling stations on the San Pedro after the high flows.

Some believe the 1991 record of one spikedace in the middle Gila River at Cochran Crossing represents a fish displaced during some unspecified flood event from Aravaipa Creek, 50 miles upstream, and does not represent a population in the Gila River. However, in the year preceding the October sampling, there was only one marginally significant flood, which occurred in March (USGS discharge records). It is unlikely that such a relatively minor flood would displace spikedace 50 miles downstream to survive for 6 months. In addition, it is even more unlikely that, at the precise time of the only sampling conducted that year, the displaced fish would be present at one of the 7 sites sampled, totaling less than 1 mile of the 50 mile reach. Given the sparse sampling in the middle Gila River, it is far more likely that the 1991 spikedace represents a small population of spikedace either permanently resident in that area or which occupy the area in a periodically fluctuating pattern dependent upon conditions. Documentation of such small populations is very difficult and often results in false declarations of extirpation.

When spikedace populations are at low levels, they can be very difficult to locate. Fish sampling data from the lower San Pedro and middle Gila rivers is limited and localized. Perennial flows in the Gila River, perennial and ephemeral flows that connect reaches of the San Pedro River with the Gila River and Aravaipa Creek, and the spikedace record at Cochran Crossing suggest that a small number of spikedace may be present in the project area on the lower San Pedro River from the Aravaipa confluence to Dudleyville, and downstream of the project area on the middle Gila River. Based on findings for other native fish in these reaches, numbers of spikedace may increase temporarily in this area following flood events.

In October and December of 1999 and September 2000 to January 2001, AGFD, Bureau of Reclamation, and Arizona State University conducted stream surveys for the Central Arizona Project (CAP). One of the sampling sites was the Gila River which consisted of four reaches. Reach 1 is Coolidge Dam to Needles Eye. Reach 2 is Little Ash Creek to Hayden. Reach 3 is Hayden to Mineral Creek. No spikedace were found during these surveys. It is believed that based on these surveys the number one threat to spikedace and its critical habitat in the project area is the presence and abundance of nonnative fish species. The historical degradation of the Middle Gila River and the ongoing degradation has helped to increase the abundance of nonnative fish species in the action area. Improving the livestock grazing management in the riparian areas in the project area will help lessen the impacts to spikedace and its critical habitat but without complete livestock removal conditions will not improve quickly.

The following allotments include critical habitat for the spikedace; Kearny, Rafter Six, A-Diamond, Cochran, LEN, Myers, Teacup, Battle Axe, and Whitlow. All of these allotments have riparian areas along the Gila River. There is a total of 39.0 river miles designated as critical habitat for spikedace on the Middle Gila River which occurs between the confluence with the lower San Pedro River and continuing downstream to the Ashurst-Hayden Diversion Dam. Livestock grazing will be authorized only for winter use between Nov. 1 to Apr. 1, except as described in the description of the proposed action. The following allotments are in the watershed of critical habitat for spikedace; Hidalgo, Piper Springs, Smith Wash, Government Springs, Dripping Springs, Horsetrack, Whitlow, and LEN.

Existing habitat conditions for spikedace within the action area are highly degraded. The watershed of the Middle Gila River is naturally fragile due to erosive soils, arid climate, and a naturally flashy hydrograph. Superimposed on this natural fragility are a number of human uses that have exacerbated current threats by denuding vegetation, severely increasing erosion, altering channel morphology, and substantially increasing the flashiness of the hydrograph. These uses have historically included, and continue to include, copper mining, water diversions for agriculture, groundwater pumping, some road building, and off-highway vehicle (OHV) travel. Today ASARCO mining company is the biggest land owner in the project area. OHV travel is occurring throughout the project area. Water from the Gila River is diverted at the Ashurst-Hayden Diversion Dam to downstream agriculture fields.

Previous consultations for spikedace and loach minnow within the action area include:

02-21-96-F-0422 Phoenix District Portion of the Eastern Arizona Grazing Environmental Impact Statement. The biological opinion issued by the Service concluded "no jeopardy" for these species. Conservation measures include monitoring of these species and authorized seasonal livestock grazing in riparian areas.

02-21-01-I-0084 Reconstruction on the airport for the town of Kearny, Arizona. The biological opinion issued by the Service concluded "no jeopardy" for these species.

02-21-01-I-0084 Concurrence on Ephemeral Livestock Grazing on the Whitlow and Helmwheel Allotments, Pinal County, Arizona. The biological opinion issued by the Service did not concur with BLM's determination "may affect, but is not likely to adversely affect these species. The Service recommended that the BLM initiate formal consultation.

Effects of the Proposed Action

The adverse effects of livestock grazing on native fishes of the southwest, have long been recognized (Chamberlain, 1904; Miller, 1961; Hendrickson and Minckley, 1984; Minckley, 1985; Williams *et al.*, 1985; USFWS, 1989; Marsh *et al.*, 1990; Minckley *et al*, 1991b; Rinne and Minckley, 1991; USFWS, 1991b, Clarkson and Wilson, 1995). Please refer to the EFFECTS OF THE ACTION (General) for detailed discussion. While some of the most serious of those effects took place in the late 1800's, ongoing livestock grazing continues to exert adverse effects on the remaining native fish species today. Effects of proposed grazing are expected to inhibit recovery from underlying habitat alteration and destruction that occurred as a result of the serious overgrazing of the late 1800's and early 1900's.

Reduction in aquatic habitat complexity due to livestock grazing effects is probably the most important adverse effect to spikedace. Habitat complexity allows partitioning of habitat among the various fish species and their life stages. Reduction of habitat complexity increases inter-species and inter-lifestage conflicts. It also exacerbates the adverse effects of generalistic nonnative species on native species (Bestgen, 1986; Rinne and Minckley, 1991; Baltz and Moyle, 1993; Douglas *et al.*, 1994). Most nonnative species in the middle Gila River are predatory, and decreased habitat complexity results in decreased hiding cover, thus making predator-naive native species more vulnerable to predation (Minckley, 1983; Fraser *et al.*, 1987). Cover is an important factor in the ability of native fish species to avoid adverse effects from flooding (Bulkley and Pimentel, 1983; Meffe, 1984). Livestock grazing and its attendant reduction in habitat complexity, as observed in the middle Gila River, make spikedace more vulnerable to death and displacement from flooding at the same time that livestock effects on the watershed and streambanks contribute to increased flood volume, velocity, and abrasive power.

Direct Effects to Spikedace

Livestock may directly affect fish through trampling (Roberts and White 1992) or ingestion of

adults, larvae, or eggs.

Effects to Critical Habitat

Constituent Elements of Critical Habitat

Effects analyses must determine if the proposed action would destroy or adversely modify critical habitat. "Destruction or adverse modification" means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical (50 CFR 402.02). The primary constituent elements identified in the final rule as necessary for the survival and recovery of the spikedace are as follows:

1. Permanent, flowing, unpolluted water.

2. Living areas for adult spikedace with slow to swift flow velocities in shallow water with shear zones where rapid flow borders slower flows, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges.

3. Living areas for juvenile spikedace with slow to moderate flow velocities in shallow water with moderate amounts of instream cover.

4. Living areas for larval spikedace with slow to moderate flow velocities in shallow water with abundant instream cover.

5. Sand, gravel, and cobble substrates with low to moderate amounts of fine sediment and substrate embeddedness.

6. Pool, riffle, run, and backwater components present in the aquatic habitat.

7. Low stream gradient.

8. Water temperatures in the approximate range of 1-30° C with natural diurnal and seasonal variation.

9. Abundant aquatic insect food base.

10. Periodic natural flooding.

11. A natural, unregulated hydrograph or, if flows are modified or regulated, then a hydrograph that demonstrates an ability to support a native fish community.

12. Habitat devoid of nonnnative aquatic species detrimental to spikedace, or habitat in which detrimental nonnative species are at levels that allow persistence of spikedace.

The constituent elements are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of spikedace. The appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the constituent elements must include consideration of the season of concern and the characteristics of the specific location. The constituent elements are not independent of each other and must be assessed holistically, as a functioning system, rather than individually. In addition, the constituent elements need to be assessed in relation to larger habitat factors, such as watershed, floodplain, streambank conditions, stream channel geomorphology, riparian vegetation, hydrologic patterns, and overall aquatic faunal community structure. The following effects analyses address effects to these constituent elements as well as to the species.

Analysis of the effects of livestock grazing on fish and their habitat requires examination of subtle, long-term, incremental changes in watershed functions, riparian and aquatic communities, and stream channel morphology. Limited data available on range condition, fish, and fish habitat make an empirical analysis of the effects of grazing and grazing management difficult and often misleading, particularly on an allotment-by-allotment basis. However, extrapolations of general hydrologic and biologic principles and site-specific research data provide a large body of evidence linking degradation of watersheds, stream channels, aquatic and riparian communities, and fish habitat and populations in western North America to grazing and grazing management (Leopold 1924; Leopold 1951; York and Dick-Peddie 1969; Hastings and Turner 1980; Dobyns 1981; Kauffman and Krueger 1984; Skovlin 1984; Kinch 1989; Chaney *et al.* 1990; Platts 1990; Armour *et al.* 1991; Bahre 1991; Meehan 1991; Fleischner 1994).

It is doubtful that any grazing scheme will improve a local hydrologic circumstance over that found under ungrazed conditions (Platts 1990, Belsky *et al*. 1999). Platts (1990) indicates that the two primary reasons why grazing strategies of any type have not protected riverine-riparian systems in the past are: 1) streamside areas are generally incorporated into the larger pastures and not identified as distinct areas needing specialized management, and 2) the range is generally overstocked. In this case, BLM proposes seasonal exclusion of livestock on 20 riparian miles of spikedace habitat but year-long grazing would still occur on 19 riparian miles. Most of this remaining 19 miles is non-federal land. BLM proposes to continue monitoring and assessing grazing leases for conformance with Arizona's Standards and Guidelines, in particular standard three which deals with habitat for threatened and endangered species. Any lease found to not be in conformance with standards and guidelines will be adjusted through terms and conditions. These adjustments may include changes in season of use, prescribed grazing levels, adjustments in authorized numbers, or other changes that will lessen or eliminate the impacts to listed species in view of the conservation measures and action plans adopted by the BLM.

The effects of livestock grazing within the project area on spikedace survival and recovery, as well as on their critical habitat, from the proposed ongoing livestock grazing and its management would occur through four mechanisms: 1) watershed alteration; 2) physical alteration of streambanks, stream channels, water column, and the riparian vegetation community; 3) alteration of the faunal and floral community; and 4) effects of grazing-related structural elements. These mechanisms have varying effects on spikedace and critical habitat.

1) Watershed Alteration

Unsatisfactory range and watershed conditions due to past heavy livestock grazing, roads, and other human uses contribute to changes in overland flows and sediment transport to the river. Soil compaction, changes to root structures in overused plants, changes in plant species composition and overall biomass, and loss of soil from erosion can result from overuse by livestock. In some cases, restoration of the historical condition may not be possible. Watershed changes due to grazing are difficult to document due to their long-term, incremental nature; the time lag and geographical distance between cause and effect; and numerous confounding variables. Despite this, the relationship between livestock grazing in a watershed and effects to river systems is widely recognized and documented (Leopold 1946; Blackburn 1984; Skovlin 1984; Chaney *et al.* 1990; Platts 1990; Bahre 1991; Meehan 1991; Fleischner 1994; Myers and Swanson 1995). Although watershed effects vary depending upon the number and type of livestock, the length and season of use, and the type of grazing management, the mechanisms remain the same and the effects vary only in extent of area and severity (Blackburn 1984; Johnson 1992).

Livestock grazing may alter the vegetation composition of the watershed (Martin 1975; Savory 1988; Vallentine 1990; Popolizio *et al.* 1994). It may cause soil compaction and erosion, alter soil chemistry, and cause loss of cryptobiotic soil crusts (Harper and Marble 1988; Marrs *et al.* 1989; Orodho *et al.* 1990; Schlesinger *et al.* 1990; Bahre 1991). Cumulatively, these alterations contribute to increased erosion and sediment input into streams (Johnson 1992; Weltz and Wood 1994). They also contribute to changes in infiltration and runoff patterns, thus increasing the volume of flood flows while decreasing their duration, and decreasing the volume of low flows while increasing their duration (Brown *et al.* 1974; Gifford and Hawkins 1978; Johnson 1992). Groundwater levels may decline and surface flows may decrease or cease (Chaney *et al.* 1990; Elmore 1992). Development of livestock waters may alter surface flows by impoundment, spring capture, or runoff capture.

With the information available to us, it is difficult to differentiate watershed alteration effects caused by current livestock grazing on the allotments under consultation from those caused by past grazing, grazing upslope of the allotments, agriculture, roads, or other watershed effects. However, implementation of a maximum of 30 percent utilization should improve watershed conditions on the allotments over time (see page 58).

2) Physical Alteration of Streambanks, Stream Channels, Water Column, and Riparian Vegetation Community

Livestock grazing will occur in limited areas of streambanks within the allotments. The potential effects of grazing on streambanks include the shearing or sloughing of streambank soils by either hoof or head action; elimination of streambank vegetation; erosion of streambanks following exposure to water, ice, or wind due to loss of vegetation cover; and an increased streambank angle which increases water width and decreases stream depth. High width to depth ratios result from livestock impacts to streambanks and stream channels. For spikedace, an increased width to depth ratio increases riffle habitat, but may decrease the amount of "shear zones," the transitional habitat between fast and slow water favored by adult spikedace (Propst *et al.* 1986). A wider, shallower river will reduce velocities in riffle/run/glide habitat thus increasing the amount of habitat favorable to the red shiner. Red shiner are believed to adversely impact spikedace (Bestgen, 1986; Marsh *et al.*, 1989). The mechanism for the intolerance is poorly understood, but appears to include displacement of spikedace into faster water in the presence of red shiner (Rinne, 1991; Douglas et al., 1994; J. Rinne and J. Stefferud, USFS, unpublished data). Increased width to depth ratios and decreased velocities in riffle/run/glide areas likely exacerbate the adverse effects of red shiner on spikedace. Damage can begin to occur almost immediately upon entry of the livestock onto the streambanks, and use of riparian zones may be highest immediately following entry of cattle into a pasture (Platts and Nelson 1985; Goodman *et al.*1989). Vegetation and streambank recovery from long rest periods may be lost within a short period following grazing reentry (Duff 1979). Bank configuration, soil type, and soil moisture content influence the amount of damage, with the moist soil being more vulnerable (Marlow and Pogacnik 1985; Platts 1990).

Following streambank alteration, potential effects to the channel itself can include changes in channel morphology and altered sediment transport processes (Platts 1990). Within the stream itself, there can be changes to pools, riffles, runs, and the distribution of backwater areas, a reduction in cover for fishes, elevated water temperatures, changes in nutrient levels, and increased sedimentation (Platts 1990; Belsky *et al.* 1999). Limiting authorized riparian grazing to April 1 to November 1 in most areas will provide some improvement in grazing-related streambank alteration.

Increased sediment production and transport is probably the most commonly acknowledged effect of livestock grazing (Platts, 1990; Meehan, 1991; Johnson, 1992; Waters, 1995; Weltz and Wood, 1994). Adverse effects of stream sedimentation to fish and fish habitat have been extensively documented (Murphy *et al.*, 1981; Wood *et al.*, 1990; Newcombe and MacDonald, 1991; Barrett, 1992; Megahan *et al.*, 1992). Adult and juvenile spikedace are not inordinately sensitive to moderate amounts of sediment. However, excessive sedimentation may cause channel changes that are adverse to both species. Excessive sediment may fill backwaters that provide larval and juvenile spikedace habitat, and sediment deposition in the main channel may cause a tendency toward stream braiding, thus reducing adult spikedace habitat (Waters, 1995).

Livestock, if allowed access to riparian corridors designated as critical habitat for extended time periods, especially during growth periods, are likely to directly alter riverside vegetation by trampling, rubbing, and feeding on herbaceous plants and shrubs. Use and removal of herbaceous

vegetation leads to changes in species composition, species diversity, and biomass, while use and removal of woody vegetation can lead to changes in foliage cover, structural height diversity, and stand reproduction. Livestock may also have indirect effects on riparian vegetation by compacting the soils and causing increased runoff and decreased water availability to plants, and by increasing soil temperatures which can lead to increased evaporation due to the removal of vegetation (Kauffman and Krueger 1984).

Changes to the water column within the stream can be many and varied. Water-column alterations can be caused by changes in the magnitude and timing of organic and inorganic energy inputs to the river; increases in fecal contamination; changes in water temperatures due to removal of vegetation; changes in water column morphology, including increases in stream width and decreases in stream depth, as well as reduction of stream shore water depth; changes in timing and magnitude of streamflow events from changes in watershed vegetative cover; and increases in stream temperature (Platts 1990; Fleischner 1994).

The effects of grazing in the uplands on riparian systems have been discussed elsewhere in the opinion. To generate and maintain riparian habitat, a healthy watershed (uplands, tributaries, ranges, etc.) is a key component (Elmore and Kauffman 1994; Briggs 1996). Elmore and Kauffman (1994) note that "simply excluding the riparian area (from grazing) does not address the needs of upland vegetation or the overall condition of the watershed. Unless a landscape-level approach is taken, important ecological linkages between the uplands and aquatic systems can not be restored and riparian recovery will be limited." Continuing to graze in uplands where the soil conditions and riparian habitat in upland tributaries are unsatisfactory will continue to impact spikedace habitat, and result in unnatural flooding, delaying recovery of these species' populations.

Although the majority of the riparian areas in the project area will be seasonally excluded from livestock use through fencing and topographic features, some areas remain accessible to livestock. Even where fencing exists, there will inevitably be some use of the riparian area due to cows gaining access through broken fences. Fence maintenance is imperative to improving the watershed and reducing direct impacts to the spikedace habitat, improving habitat for spikedace, and reducing impacts to the critical habitat. Effects of grazing in the riparian areas have been summarized by many authors including Szaro and Pase 1983; Warren and Anderson 1987; Platts 1990; Schulz and Leininger 1990; Schulz and Leininger 1991; Stromberg 1993. Many of these changes in the structure, function, and composition of the riparian community can be expected to occur in the action area. Reduction in riparian vegetation quantity and health, plus shifts from deep-rooted to shallow-rooted vegetation contribute to bank destabilization and collapse and production of fine sediment (Meehan 1991). Loss of riparian shade results in increased fluctuation in water temperatures with higher summer and lower winter temperatures (Karr and Schlosser 1977, Platts and Nelson 1989). Litter is reduced by trampling and churning into the soil, thus reducing cover for soil, plants, and wildlife (Schulz and Leininger 1990). The capacity of the riparian vegetation to filter sediment and pollutants to prevent their entry into the river and to build streambanks is reduced (Lowrance *et al*. 1984; Elmore 1992). Channel erosion in the form of downcutting or lateral expansion may result (Heede and Rinne 1990; USBLM 1990). All of

the effects should be reduced over the baseline due to implementation of seasonal riparian exclusions and grazing utilization levels compatible with habitat maintenance or improvement.

3) Alteration of the Faunal Community

Livestock use of the riparian corridor causes changes in species composition and community structure of the aquatic and riparian fauna, in addition to floral changes already addressed. The aquatic invertebrate community may change from its baseline because of altered stream channel characteristics, because of sediment deposition, or because of nutrient enrichment (Rinne 1988, Meehan 1991, Li *et al*. 1994). Excessive sediment may smother invertebrates, reducing spikedace food production and availability, and related turbidity may reduce spikedace ability to see and capture food. Spikedace are believed to use gravel/cobble/coarse sand substrates for spawning (Propst *et al.* 1986; Minckley *et al.* 1991a). Excessive sediment buries those necessary habitats and reduces reproductive success of spikedace. This change in the food base of many aquatic vertebrates, particularly fish, may contribute to loss of, or change in, the vertebrate community. In addition, the structure and diversity of the fish community may shift due to changes in availability and suitability of habitat types (Storch 1979; Van Velson 1979). Livestock grazing may lead to loss of aquatic habitat complexity, thus reducing diversity of habitat types available and altering fish communities (Li *et al.* 1987).

4) Effects from Grazing-related Structural Elements

Continued livestock use on the riparian allotments requires that roads and fences be maintained. Roads are of concern since they are often contributors of sediment to stream courses. The continued use and maintenance of existing waterlots and stock tanks within the allotments increases the potential for both authorized and unauthorized stocking of non-native fish and bullfrogs. Flood events may then cause breaches in these water developments and allow non-native fish to enter tributaries and major waterways. However, it is unlikely that novel nonnative species would be added to the Gila River by breached stock tanks.

5) Temperature tolerances are unknown for spikedace (Bulkley and Pimental 1983). This species appears to be relatively tolerant of warm water. Alteration of water temperature patterns may be of more importance in assessing effects to spikedace than alteration of highs and lows. Initiation of spawning in spikedace habitat is believed to be tied to water temperature (Barber *et al.* 1970, Langhorst and Marsh 1986, Propst *et al.*1986; Tyus and Karp 1990). Changes in water temperature fluctuations and timing may disrupt spawning initiation for spikedace. Alteration of water temperatures over the past century of livestock grazing on the Gila River may be a factor in the loss of several native fish species, including the spikedace. Failure to restore a more natural temperature regime through better management of the riparian and aquatic habitats may preclude recovery of spikedace in the Gila River.

Improving habitat conditions is reliant in part on the BLM's monitoring and appropriate response reaction to the results. As mentioned earlier, due to use limits and permitted numbers of cows largely remaining the same, timely and frequent monitoring will be needed. The result will likely

be that cattle will need to be herded and moved among pastures or off allotments more frequently to meet utilization standards. Without this, the consequences will likely be continued degradation of the land. Monitoring will also be a key instrument in documenting and minimizing the effects of trespass cattle and extended winter grazing. Seasonal restrictions on riparian grazing and utilization limits consistent with riparian and upland habitat maintenance or improvement should result, in the long term, in more natural temperature regimes for spikedace. However, watershed alteration outside the action area, Coolidge Dam, and other factors preclude restoration of historical temperature regimes, and other elements of spikedace habitat.

Cumulative Effects

The cumulative effects section for the flycatcher is included here by reference. Most of the activities expected to occur on the allotments and adjacent areas would be authorized by the BLM, and thus the effects of such activities are not considered cumulative. However, the allotments contain numerous, small private inholdings. Activities such as residential development, farming, and other activities occur on many of these lands. Any grazing that occurs on these lands is likely interrelated or interdependent to the proposed action, as discussed previously, and thus is not cumulative. Commercial development, recreation and mining activities, and associated habitat loss, also occurs on private lands in the Winkelman, Kearny, and Kelvin communities within the project area.

Activities, such as recreation are increasing. The area between Winkelman downstream to the Kelvin community is privately owned, and there is always the potential for future commercial and residential use to increase. Increasing recreational, residential, or commercial use of the private lands along the middle Gila River would likely result in increased cumulative adverse effects to spikedace and its habitat through increased water use, increased pollution, and increased alteration of the streambanks through riparian vegetation suppression, bank trampling, and erosion. An increase in human structures in the area would likely lead to more bank stabilization and channelization, changing the availability and quantity of suitable spikedace habitat.

Conclusion

After reviewing the current status of the spikedace, the environmental baseline for the action area, the anticipated effects of the proposed grazing program, and cumulative effects, it is the Services's biological opinion that the proposed action is neither likely to jeopardize the continued existence of the spikedace nor result in the adverse modification of critical habitat designated for the species. We base our biological opinion on the following reasons:

1. The BLM proposes substantial measures such as fencing portions of the riparian corridor and maintaining utilization levels <30 percent in both riparian and upland areas that eliminate or reduce the adverse effects of the action to the spikedace and its critical habitat.

2. The BLM proposes to take action to ensure that range condition does not deteriorate on BLM lands in the watershed of spikedace habitat, and to improve range condition in areas of fair or poor condition.

3. The number of spikedace in the project area is very low due to predation by nonnative fish and degraded habitat conditions. The current status of spikedace in the project area has not increasesd since the early 1990s. There has been no documentation of spikedace in the project area since 1991. Livestock grazing has only helped to exacerbate the effects to spikedace and its critical habitat.

Spikedace have only been documented once in the action area since 1991. Because of degraded conditions, it is very unlikely that spikedace will ever be common on the middle Gila River. The effects of the proposed action to spikedace are minimal due to the almost nonexistence of this native fish in the project area. The cumulative effects will continue to have adverse effects on the critical habitat for spikedace, unless better monitoring of current land uses are implemented. BLM proposes to implement changes in their grazing strategies on the 18 allotments along the middle Gila River over the next ten years along with applying the Southwestern Willow Flycatcher Action Plan and the Conservation Measures for the cactus ferruginous pygmy-ow on all applicable allotments. The results from these changes will benefit spikedace and its critical habitat. In conclusion the proposed action will not jeopardize the continued existence of the spikedace nor result in the adverse modification of its habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take Anticipated

Due to the very low number of spikedace occurring in this part of the Gila River, we do not anticipate that incidental take will occur as a result of the proposed action.

CONSERVATION RECOMMENDATIONS

Section 2(c) and 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the loach minnow. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The BLM should regularly monitor for spikedace within the proposed project area and report all results to this office and the AGFD.

2. The BLM should work with us and the AGFD in the planning of further reestablishment of spikedace into suitable habitats.

3. The BLM should coordinate actions with us that minimize or avoid adverse effects, or that benefit listed species or their habitats.

4. The BLM should develop an agreement with the San Carlos Apache Indian Reservation to construct the necessary fences to alleviate trespass livestock occurring on the Gila River.

5. The BLM should work with us and others to implement the spikedace recovery plan.

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

LOACH MINNOW (*Tiaroga cobitis*)

Status of Species

Loach minnow was listed as a threatened species on October 28, 1986 (USFWS 1986d). Critical habitat was designated for loach minnow on April 25, 2000 (USFWS 2000a). Critical habitat includes portions of the Verde, Black, middle Gila, San Pedro, San Francisco, Tularosa, Blue, and upper Gila rivers and Eagle, Bonita, Tonto, and Aravaipa creeks, and several tributaries of those streams.

Loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley 1973). Historical range of loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers (Minckley 1973, Sublette *et al.* 1990). Habitat destruction plus competition and predation by nonnative species have reduced the range of the species by about 85 percent (Miller 1961, Williams *et al.* 1985, Marsh *et al.* 1989). Loach minnow remains in limited

portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White rivers and Aravaipa, Turkey, Deer, Eagle, Campbell Blue, Dry Blue, Pace, Frieborn, Negrito, Whitewater and Coyote creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst *et al*. 1986, Propst *et al*. 1988, Marsh *et al*. 1990, Bagley *et al*. 1995, USBLM 1995, Bagley *et al*. 1996).

Loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989, Propst and Bestgen 1991). Loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst *et al*. 1988; Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). Loach minnow feeds exclusively on aquatic insects (Schrieber 1978, Abarca 1987). Loach minnow live 2-3 years with reproduction occurring primarily in the second summer of life (Minckley 1973, Sublette *et al*. 1990). Spawning occurs in March through May (Britt 1982, Propst *et al*. 1988); however, under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley 1990). The eggs of loach minnow are attached to the underside of a rock that forms the roof of a small cavity in the substrate on the downstream side. Limited data indicate that the male loach minnow may guard the nest during incubation (Propst *et al*. 1988, Vives and Minckley 1990).

The Final Rule lists constituent elements of critical habitat for loach minnow. These elements include permanent, flowing, unpolluted water; living areas for loach minnow adults, juveniles, and larvae with appropriate flow regimes and substrates; spawning areas; low amounts of fine sediment and substrate embeddedness; riffle, run, and backwater components; low to moderate stream gradients; appropriate water temperatures; periodic natural flooding; an unregulated hydrograph, or, if flows are modified, a hydrograph that demonstrates an ability to support a native fish community; and, habitat devoid of non-native aquatic species detrimental to loach minnow, or habitat where such nonnative species are at levels which allow persistence of loach minnow. These constituent elements are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of loach minnow.

As noted under spikedace, the appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the constituent elements must include consideration of the season of concern and the characteristics of the specific location. The constituent elements are not independent of each other and must be assessed holistically, as a functioning system, rather than individually. In addition, the constituent elements need to be assessed in relation to larger habitat factors, such as watershed, floodplain, and streambank conditions, stream channel geomorphology, riparian vegetation, hydrologic patterns, and overall aquatic faunal community structure.

Recent biochemical genetic work on loach minnow indicate that there are substantial differences in genetic makeup among remnant loach minnow populations (Tibbets 1993). Remnant

populations occupy isolated fragments of the Gila River basin and are isolated from each other. Based upon her work, Tibbets (1992, 1993) recommended that the genetically distinctive units of loach minnow should be managed as separate units to preserve the existing genetic variation.

The status of loach minnow is declining rangewide. As noted in the Final Rule designating critical habitat, loach minnow are restricted to 419 miles of streams, and their current range represents only 15 to 20 percent of their historical range. In occupied areas, loach minnow may be common to very rare. Loach minnow are common only in Aravaipa Creek, the Blue River, and limited portions of the San Francisco, upper Gila, and Tularosa rivers in New Mexico (U. S. Fish and Wildlife Service 2000). Although it is currently listed as threatened, the Service has found that a petition to reclassify the species to endangered status is warranted. A reclassification proposal is pending, however, work on it is precluded by higher priority listing actions (U.S. Fish and Wildlife Service 1994b). For additional information on the loach minnow please refer to the recovery plan.

ENVIRONMENTAL BASELINE

Historically, loach minnow likely occurred in the middle Gila River, although no records exist. The most recent fish surveys in the action area were conducted as a result of the Biological Opinion for the Central Arizona Project during 1999-2001. No loach minnow were found during those surveys. Designated critical habitat for the loach minnow within the project area is the same as the spikedace.

Allotments that include critical habitat for loach minnow are: Myers, Whitlow, Horsetrack, Cochran, LEN, Teacup Ranch, Battle Axe, A-Diamond, Rafter Six, Kearny, Hidalgo, and Piper Springs. The following allotments are in the watershed of critical habitat for loach minnow; Government Springs, Dripping Springs, Horsetrack, Whitlow, and LEN.

Effects of the Action

The constituent elements for loach minnow are very similar to those of spikedace, but differ in some aspects, which reflect minor differences in the habitat use and life history of the two species. The constituent elements for loach minnow critical habitat are as follows:

1. Permanent, flowing, unpolluted water.

2. Living areas for adult loach minnow with moderate to swift flow velocities in shallow water with gravel cobble, and rubble substrates.

3. Living areas for juvenile loach minnow with moderate to swift flow velocities in shallow water with sand, gravel, cobble, and rubble substrates.

4. Living areas for larval loach minnow with slow to moderate velocities in shallow

water with sand, gravel, and cobble substrates and abundant instream cover.

5. Spawning areas for loach minnow with slow to swift velocities in shallow water with uncemented cobble and rubble substrates.

6. Low amounts of fine sediment and substrate embeddedness.

7. Riffle, run, and backwater components present in the aquatic habitat.

8. Low to moderate stream gradient.

9. Water temperature in the approximate range of 1-30° C with natural diurnal and seasonal variation.

10. Abundant aquatic insect food base.

11. Periodic natural flooding.

12. A natural unregulated hydrograph or, if flows are modified or regulated, ability to support a native fish community.

13. Habitat devoid of nonnative aquatic species detrimental to loach minnow, or habitat in which detrimental nonnative species are at levels that allow persistence of loach minnow.

The effects of the proposed action on loach minnow are similar in nature to the spikedace and southwestern willow flycatcher. Effects analyses for those species are included here by reference. Primary effects include trampling or ingestion of fish; watershed alteration; alteration of streambanks, channels, water column, and riparian vegetation community; alteration of aquatic fauna; and effects from structural improvements, as described for spikedace.

Cumulative Effects

Cumulative effects are the same as described for the spikedace. That cumulative effects analysis is included here by reference.

Conclusion

After reviewing the current status of the loach minnow, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is neither likely to jeopardize the continued existence of the loach minnow, nor likely to destroy or adversely modify its designated critical habitat. We base our biological opinion on the following reasons:

1. The BLM proposes substantial measures such as fencing portions of the riparian corridor and maintaining utilization levels <30 percent in both riparian and

upland areas that eliminate or reduce the adverse effects of the action to the loach minnow and its critical habitat.

2. The BLM proposes to take action to ensure that range condition does not deteriorate on BLM lands in the watershed of loach minnow habitat, and to improve range condition in areas of fair or poor condition.

3. Loach minnow is absent or very rare in the action area due to degraded habitat condition and the presence of predatory nonnative fish species.

Based on the current status of the loach minnow and current habitat conditions, it is very unlikely that loach minnow will ever inhabit the middle Gila River. Current land uses and livestock grazing management prohibit the current habitat from recovery in a reasonable timeframe to allow loach minnow occupancy. The current habitat in the middle Gila River is really not favorable to loach minnow, which prefers smaller stream channels. Loach minnow have never been documented in the Gila River, although it is believed that loach minnow historically occupied the middle Gila River. BLM proposes to lessen the impacts from livestock grazing by implementing a < 30 percent utilization level in the riparian areas, however unless livestock are completely removed from the project area and strict monitoring is conducted, recovery of native fish can never be initiated. In conclusion the impacts from livestock grazing are not likely to jeopardize the continued existence of the loach minnow, destroy or adversely modify its designated critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take

The loach minnow is absent or very rare in the action area, therefore, we do not anticipate take of loach minnow as a result of the proposed action.

CONSERVATION RECOMMENDATIONS

Section 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the loach minnow. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The BLM should regularly monitor for loach minnow within the action area and report results to this office and the AGFD.

2. The BLM should work with us and the AGFD on planning for further reestablishment of loach minnow into suitable habitats.

3. The BLM should coordinate actions with us that minimize or avoid adverse effects, and actions that benefit listed species or their habitats.

4. The BLM should coordinate actions with us to implement the loach minnow recovery plan.

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

(Note: capture, collection, or reintroductions of fish require appropriate permits from Arizona Game and Fish Department, and for listed species, from the Service)

Disposition of Dead or Injured Listed Animals

Upon finding a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, 2450 W. Broadway Road Suite 113, Mesa, Arizona 85202 (480) 835-8289 within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal

species shall be submitted as soon as possible to the nearest Service or AGFD office, educational, or research institutions (e.g., University of Arizona in Tucson) holding appropriate State and Federal permits.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on proposed livestock grazing activities on 18 allotments on the middle Gila River. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (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.

We appreciate your interest in furthering the conservation of these species. If we can be of further assistance, please contact Ann Watson (520) 670-4618 or Jim Rorabaugh (602) 242-0210 (x238) of my staff. Please refer to number 02-21-00-F-0029 in future correspondence concerning this consultation.

/s/ Steven L. Spangle

cc: Regional Director, U.S. Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

State Director, Bureau of Land Management, Phoenix, AZ
John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

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APPENDIX I

CONCURRENCES

ARIZONA HEDGEHOG CACTUS (*Echinocereus triglochidiatus* var. *arizonicus*)

The Arizona hedgehog cactus *(Echinocereus triglochidiatus* var. *arizonicus*), was listed as endangered by the U. S. Fish and Wildlife Service in 1979 (U.S. Fish and Wildlife Service 1979). It is listed wherever it occurs (50 CFR 17.12), but is only known to occur at and near the type locality near US Highway 60 and the Gila and Pinal county line. Factors contributing to this species' listing include habitat destruction through mining activities, demand by collectors, and insect damage.

At the time of listing, some confusion existed among experts regarding the taxonomic separation of several varieties of the species *Echinocereus triglochidiatus*. Consequently, the Service clarified that "populations showing extensive variation but with some affinities toward var. *arizonicus* are not to be considered classical var. *arizonicus* and therefore will not be subject to the protection and restrictions of the Endangered Species Act" (U.S. Fish and Wildlife Service 1979).

The Arizona hedgehog cactus has not been detected on any of the allotments in the project area; however, potential habitat may exist on Mescal Mountain and Christmas allotments. The Arizona hedgehog cactus is unlikely to occur on any of the allotments since the soils within the elevation and ecotone range of this project area are derived from sedimentary (mostly limestone) rather than granite rocks. Intensive inventory efforts for this species have not been done on these allotments. Complete distribution, abundance, and taxonomic status is unknown at this time.

CONCLUSION

Because this species is unlikely to occur on any of the allotments, we concur with the BLM's determination that the proposed action may affect, but is not likely to adversely effect, the Arizona hedgehog cactus.

BALD EAGLE (*Haliaeetus leucocephalus*)

Status of Species (Rangewide)

The bald eagle south of the 40th parallel was listed as endangered under the Endangered Species Preservation Act of 1966, on March 11, 1967 (U.S. Fish and Wildlife Service 1967), and was reclassified to threatened status on July 12, 1995 (U.S. Fish and Wildlife Service 1995a). No critical habitat has been designated for this species. The bald eagle was proposed for delisting on July 6, 1999 (U.S. Fish and Wildlife Service 1999). The bald eagle is a large bird of prey that historically ranged and nested throughout North America except extreme northern Alaska and Canada, and central and southern Mexico.

The bald eagle occurs in association with aquatic ecosystems, frequenting estuaries, lakes, reservoirs, major rivers systems, and some seacoast habitats. Generally, suitable habitat for bald eagles includes those areas that provide an adequate food base of fish, waterfowl, and/or carrion, with large trees for perches and nest sites. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and offer good perch trees and night roosts (U.S. Fish and Wildlife Service 1995a).

Even though the bald eagle has been reclassified to threatened, and the status of the birds in the Southwest is on an upward trend, the Arizona population remains small and under threat from a variety of factors. Human disturbance of bald eagles is a continuing threat which may increase as numbers of bald eagles increase and human development continues to expand into rural areas (U.S. Fish and Wildlife Service 1999). The bald eagle population in Arizona is exposed to increasing hazards from the regionally increasing human population. These include extensive loss and modification of riparian breeding and foraging habitat through clearing of vegetation, changes in groundwater levels, and changes in water quality. Threats persist in Arizona largely due to the proximity of bald eagle breeding areas to major human population centers and recreation areas. Additionally, because water is a scarce resource in the Southwest, recreation is concentrated along available water courses. Some of the continuing threats and disturbances to bald eagles include entanglement in monofilament fish line and fish tackle; overgrazing and related degradation of riparian vegetation; malicious and accidental harassment, including shooting, off-road vehicles, recreational activities (especially watercraft), and low-level aircraft overflights; alteration of aquatic and riparian systems for water distribution systems and maintenance of existing water development features such as dams or diversion structures; collisions with transmission lines; poisoning; and electrocution (Beatty *et al.* 1999; Stahlmaster 1987). In Arizona, the use of breeding area closures and close monitoring of nest sites through the Arizona Bald Eagle Nest Watch Program has been and will continue to be essential to the recovery of the species. Ensuring the longevity of the bald eagle is of primary concern to the Service (U.S. Fish and Wildlfie Service 1999).

Environmental Baseline

Wintering bald eagles can be found on the Gila River through the winter months. Effects of the proposed action are most important however, to breeding birds. Since 1992, AGFD has closely monitored the occurrence of breeding bald eagles on the middle Gila River (Driscoll 1999; Driscoll and Beatty 1994). With the discovery of the Winkelman breeding area (BA) in 1995, AGFD considered the possibility that the bald eagles observed at Granite Basin were from the Winkelman BA. However, AGFD continued monitoring for the presence of bald eagles and searched for new nests between the Coolidge and Winkelman BAs.

In 1999, AGFD surveyed the middle Gila River from January to March by helicopter. During the March flight, AGFD discovered an adult bald eagle incubating in a new pinnacle nest at the downstream end of the Granite Basin area.

In May 1999, Amanda Moors, San Carlos Recreation and Wildlife Department, reported a new bald eagle nest above Coolidge Dam. On May 28, 1999, AGFD discovered a large nest (Suicide nest), two adults, and two newly fledged juveniles near Suicide Point. Unsure if this was a new BA or an alternative San Carlos BA nests, AGFD waited until they identified the adults in 2000 before naming it the new Suicide BA.

Bald eagles have been observed at various locations along the Gila River. Bald eagles have been observed using the action area from the San Carlos Reservoir downstream to the confluence of the Gila River with the lower San Pedro River. There are two breeding areas within the action area; Coolidge Breeding Area which is below Coolidge Dam and Granite Basin Breeding Area. The Coolidge Breeding Area was first found in 1985 and Granite Basin was established in 1999. The following is a summary of the success of these breeding areas:

Coolidge Breeding Area

1995– successful with two young
1996– failed
1997– successful with two young
1998– failed
1999– failed
2000– failed
2001– failed
2002- failed
2003-occupied

Granite Basin Breeding Area

1999– failed
2000– occupied
2001– failed
2002– occupied
2003- occupied

Bald Eagles were observed in the Granite Basin Breeding Area in 2002. There is one additional territory near the project area, called the Winkelman site, it is located just upstream on the lower San Pedro River above the confluence with the Gila River. The Winkelman site was unoccupied in 2001, 2002, and 2003.

The discovery of the Granite Basin BA, reiterates the need for long term monitoring and nest surveys in areas with potential bald eagle habitat. In May 1993, AGFD observed the first adult occupying the Granite Basin area on a nest survey flight. AGFD thoroughly examined this stretch of river every year, and started to see bald eagles regularly occupy the area in 1997. Six years after first observing bald eagles, AGFD found the new BA.

With the addition of the Suicide BA, competition for resources of the San Carlos Reservoir may affect productivity for the three BAs surrounding the reservoir. The new pair established their BA within the foraging area of the Coolidge pair. With Suicide disallowing the Coolidge pair to forage on the reservoir, productivity may decrease at Coolidge.

The riparian area below Coolidge Dam is lush, and among the best riparian habitat inhabited by bald eagles in Arizona. Hawk Creek flows past old stone ranch house and enters the Gila River below the dam. The confluence area supports a cottonwood grove, with willows scattered along the banks. This riparian composition extends downstream until the river enters a canyon, bounded by promontory cliffs. Because there is no fencing in place to keep livestock out, livestock will wander upstream when the river's flow is at its lowest.

Effects of the Proposed Action

Steenhoff (1978) and Martell (1992) reviewed the habitat requirements of wintering bald eagles and developed guidelines for land management practices that would encourage use by wintering bald eagles. Steenhoff (1978) found that "grazing activities rarely interfere with wintering bald eagles." No management guidelines were developed in regard to grazing activities; however, Steenhoff makes the following recommendations that are relevant to activities in the project area:

1. Manage and maintain food sources throughout the winter during all weather conditions;

2. do not allow open bait trapping or use of poisoned bait within the area used by eagles;

3. do not remove trees that are within 100 ft of a riverbank or lakeshore if they have diameters exceeding 12 in;

4. establish new trees in areas devoid of tree reproduction. New plantings should be within 100 ft of the riverbank or lakeshore, and

5. terminate construction and habitat improvement activities during periods of eagle use.

Martell's (1992) recommendations are similar, but he adds that large trees that serve as "buffers" for perch or roost trees should also be maintained. These trees buffer perch or roost trees from wind damage, noise, and disturbance, and are important in determining whether an area is suitable for occupation during the winter. Roost trees are an especially important habitat feature for wintering bald eagles. Platt (1976) found "The entire population of bald eagles roosted in four well-defined roost sites...Night after night the same trees were selected for use by birds." Also, "Eagles can be found in the roost trees throughout the afternoon but the bulk of the birds arrive during the last two hours of light."

One impact of livestock grazing has on bald eagle habitat is that livestock prevent the regeneration of riparian trees that would benefit the bald eagle as nests or perch sites. The current livestock grazing within the three above mention allotments will have adverse effects on the bald eagle habitat. In addition, due to current drought conditions, impacts from livestock grazing will

only exacerbate stresses to bald eagles and their habitat that currently exist. AGFD documented dying cottonwood trees below the reservoir with no signs of regeneration. For a drought year like 2002, average productivity was 0.88 (37/42). Productivity has averaged between 0 - 1.6 in previous years. Detailed analysis on how drought affects bald eagles and their reproductive success has not been done. It is possible that drought does not affect bald eagles significantly. However, it is also possible that bald eagles are not affected the year that drought occurs, but rather later in time. Last year there were two nestling that died on the San Carlos Reservoir Coolidge breeding areas, this is most likely due to unsuitable habitat due to lowered water levels in the reservoir.

Relationship of Riparian Zone and Stream Channel Conditions to the Bald Eagle's foraging base

The condition of the riparian zone not only directly affects the stability and recruitment of bald eagle nest trees, but may indirectly affect the forage base of bald eagles.

Nesting bald eagles in south-central Arizona forage in free-flowing and regulated rivers, reservoirs, small tributaries, and on land. Bald eagles forage proportionally more on fish than other birds or mammals. Hunt *et al.* (1992) found over 71 percent of the biomass of nesting bald eagles in Arizona consist of fish. Four groups of fish accounted for nearly 100 percent of the biomass: most important were catfish spp. (mainly channel catfish), followed by sucker spp. (desert and Sonora suckers), carp, and perciforms (mainly black crappie, yellow bass, and largemouth bass). Of these fish, only the suckers are native to Arizona. The variation in the fish groups taken by eagles along Arizona rivers and reservoirs suggests that fish are taken more or less relative to their abundance (Hunt *et al.* 1992). Suckers appear most commonly in remains collected at nests situated on or near regulated reaches downstream of the last dams and in the free-flowing reaches nearest the headwaters. Perciforms were taken mainly in the reservoirs and in free-flowing river sections. Carp were taken largely in the warm reaches upstream of reservoirs and in the reservoirs fed by them, implying the occurrence of spawning migrations of carp out of the reservoirs and into the rivers.

Recommendations 1, 3, and 4 of Steenhoff (above) address habitat conditions in riparian/aquatic systems. As discussed elsewhere in this document, grazing can inhibit development of riparian vegetation, and adversely affect fish habitat. However, conservation measures proposed for the southwestern willow flycatcher and the cactus ferruginous pygmy owl all should ensure that effects of grazing along rivers and streams with potential habitat is minimized. No construction activities are proposed that are near bald eagle roosts or perches, that may disturb wintering birds or cause them to abandon wintering habitat (Steenhoff 1978).

The 2003 bald eagle surveys have been conducted in the action area this year; however, no nesting has been documented. However, given past performance, bald eagles are expected to continue to nest in the action area during the life of the project. The BLM has proposed to reinitiate consultation if any new sightings of bald eagles are documented in the action area during the life of the project. No critical habitat is designated for this species therefore, none will be affected.

CONCLUSION

The Service concurs with the BLM's determination that the proposed project may affect, but is not likely to adversely affect, the bald eagle. Our concurrence is based upon the following:

1. Conservation measures for the southwestern willow flycatcher and the cactus ferruginous pygmy-owl that address riparian area protection will minimize potential effects to bald eagle nest, perching, and roosting trees

2. BLM will continuing monitoring for the bald eagle and will reinitiate consultation if new sightings of nesting eagles are made.

Appendix II
Figure 1. 18 Gila River Grazing Allotments

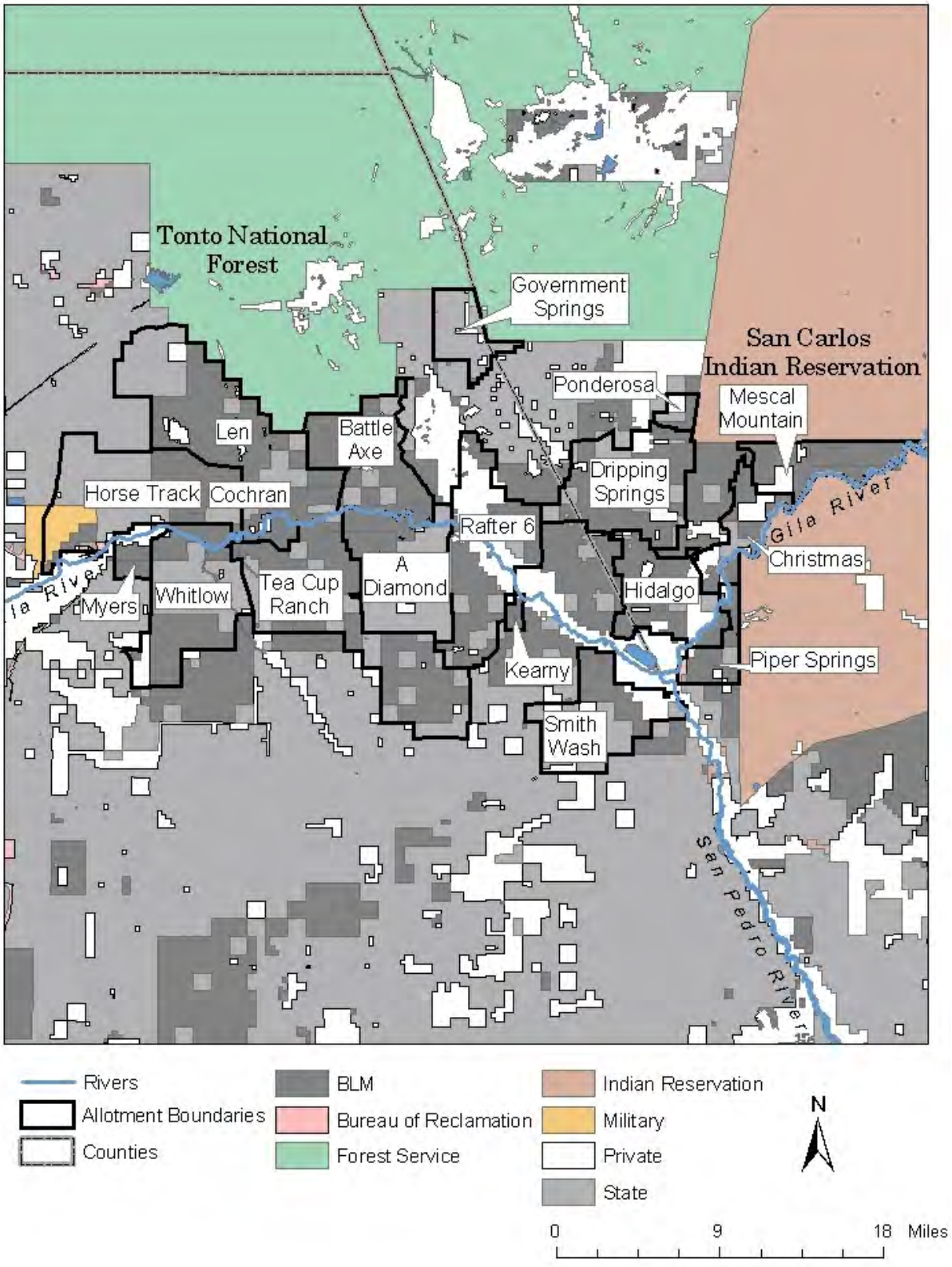


Figure 2.

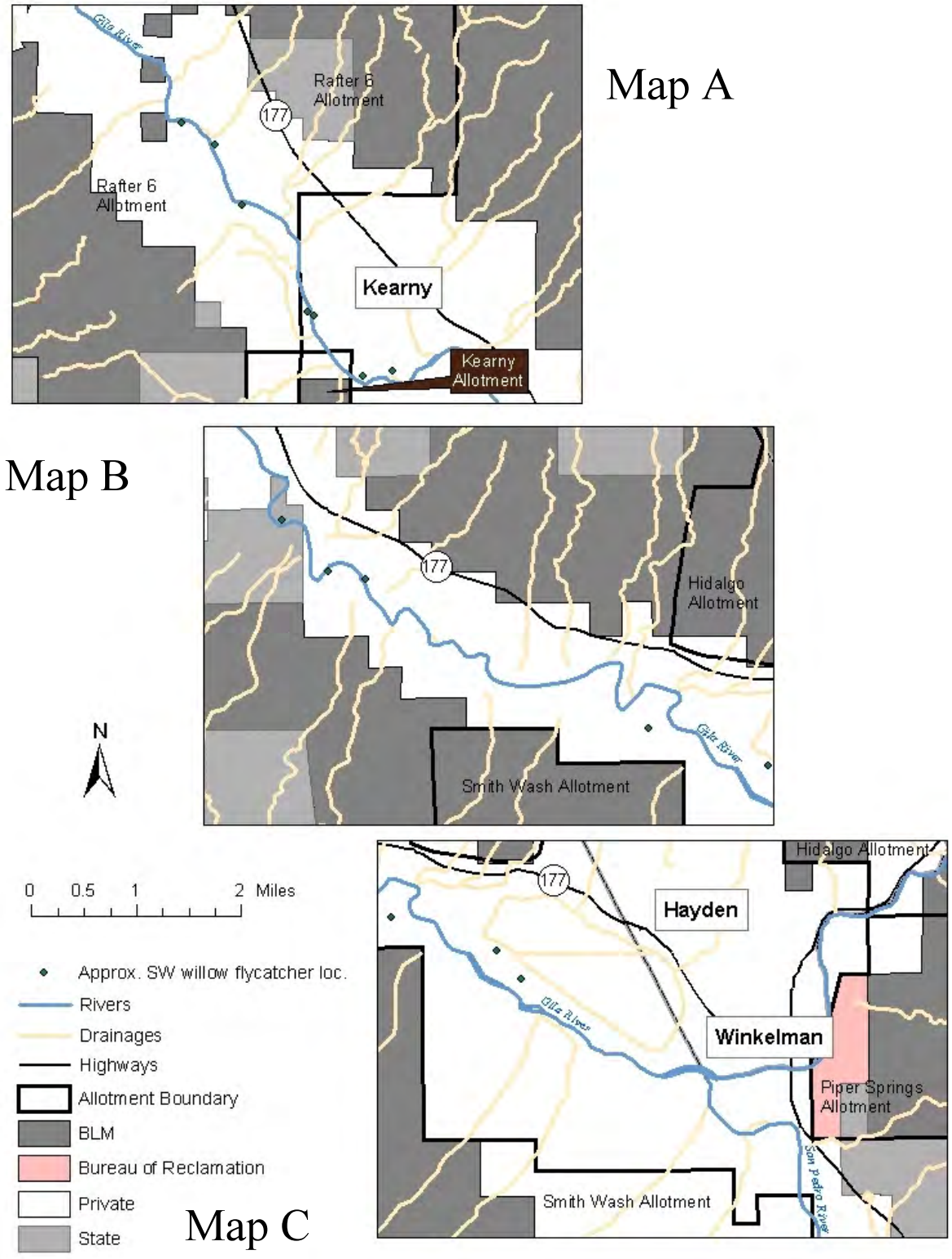

Map A
Gila River
Rafter 6 Allotment
177
Rafter 6 Allotment
Kearny
Kearny Allotment
Map B
177
Hidalgo Allotment
Gila River
Smith Wash Allotment
N
0 0.5 1 2 Miles
Approx. SW willow flycatcher loc.
Rivers
Drainages
Highways
Allotment Boundary
BLM
Bureau of Reclamation
Private
State
Map C
Hidalgo Allotment
177
Hayden
Gila River
Winkelman
Piper Springs Allotment
San Pedro River
Smith Wash Allotment

Figure 3

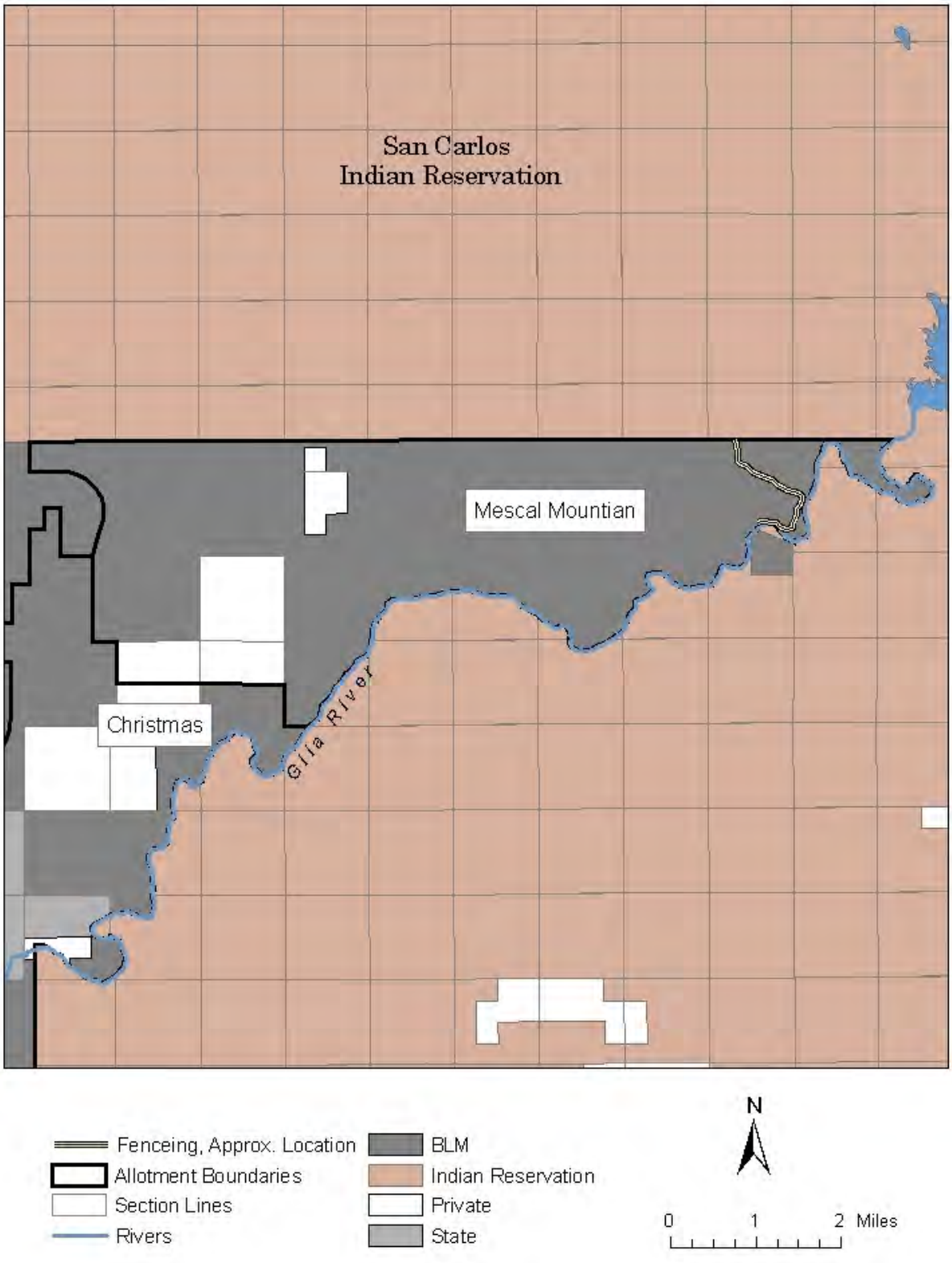

San Carlos
Indian Reservation
Mescal Mountian
Christmas
Gila River
Fenceing, Approx. Location
Allotment Boundaries
Section Lines
Rivers
BLM
Indian Reservation
Private
State
N
0
1
2 Miles

Figure 4.

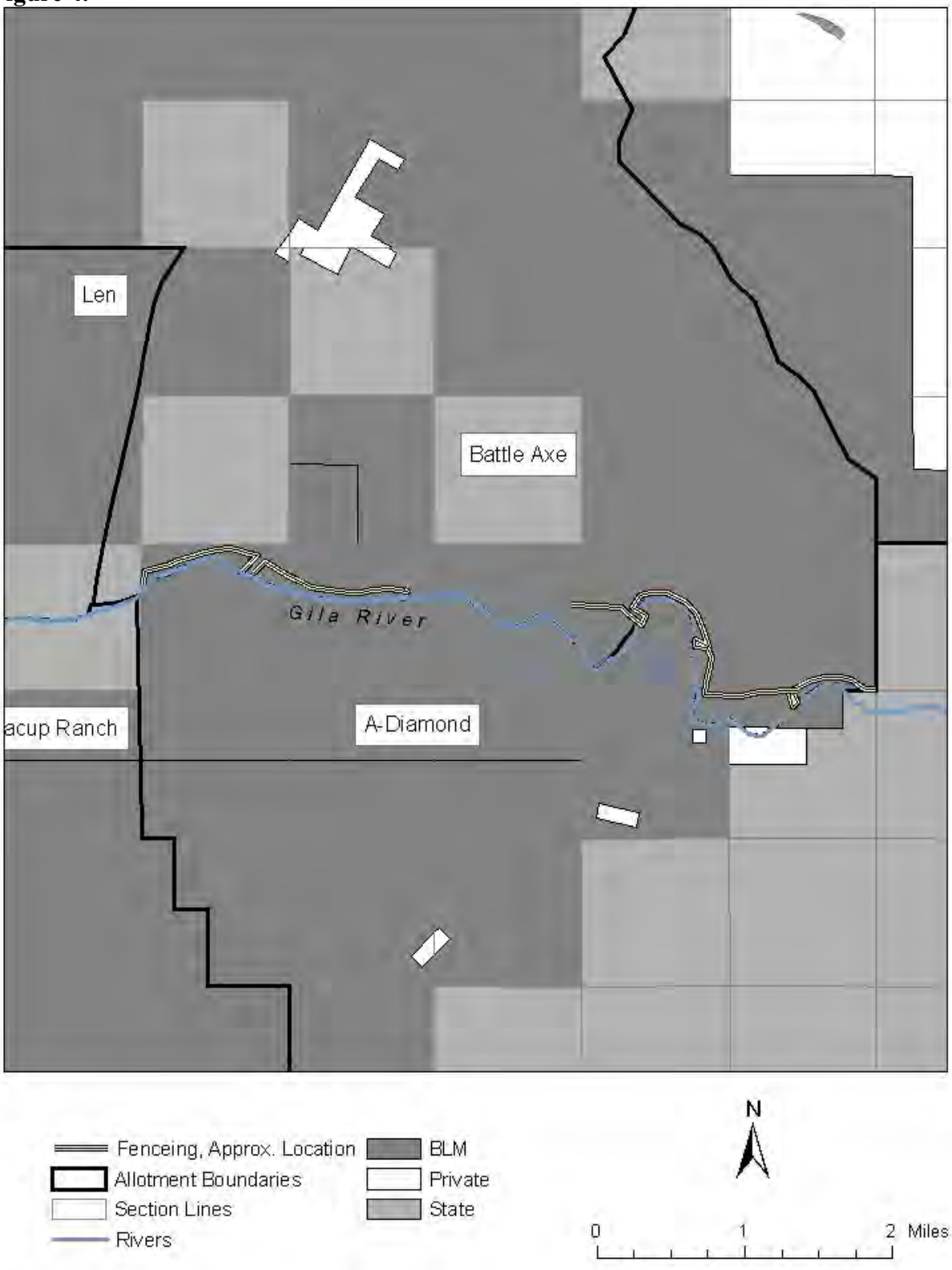
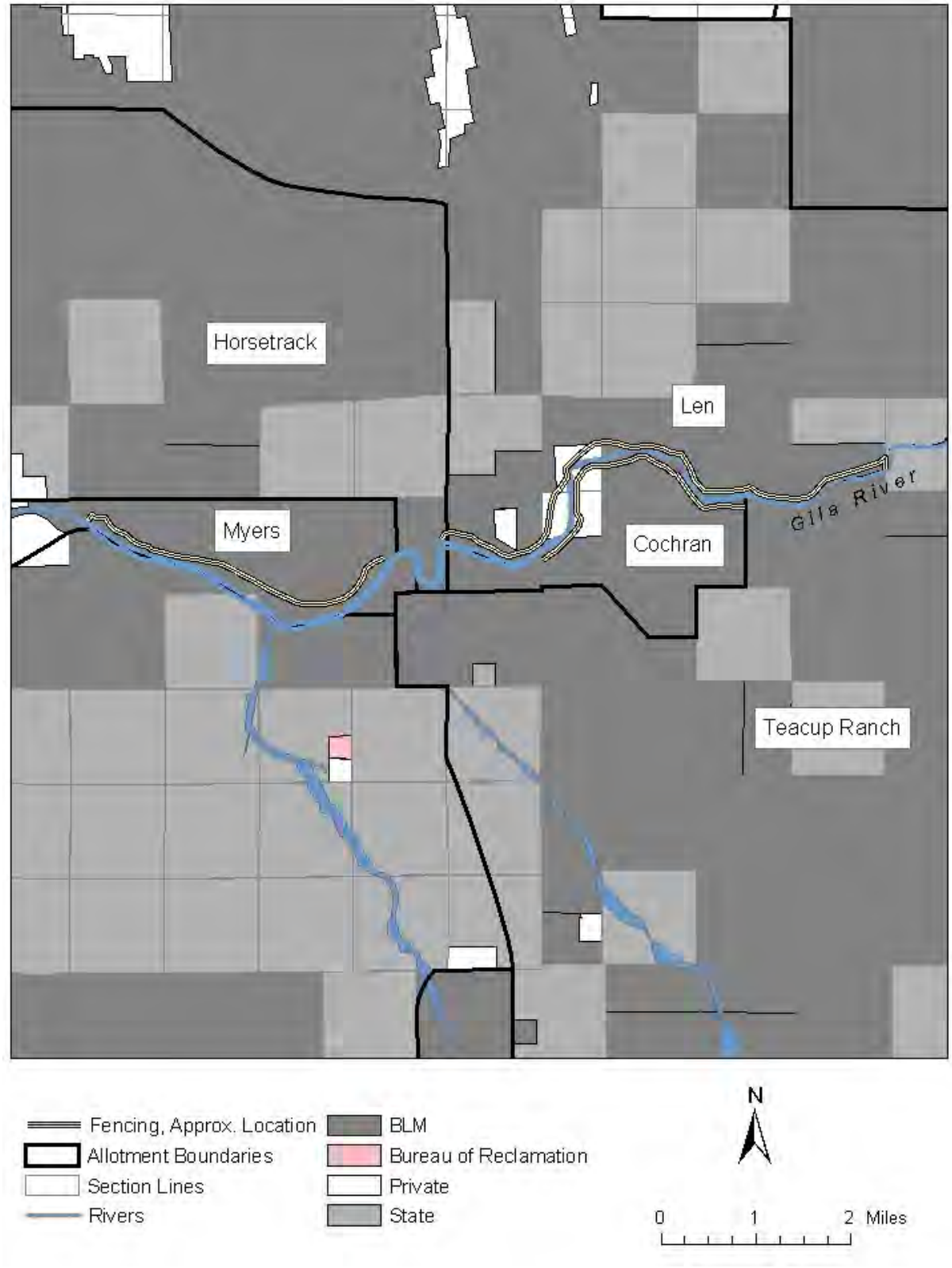

Len
Battle Axe
Gila River
acup Ranch
A-Diamond
Fenceing, Approx. Location
Allotment Boundaries
Section Lines
Rivers
BLM
Private
State
N
0
1
2 Miles

Figure 5.


Horsetrack
Len
Myers
Cochran
Gila River
Teacup Ranch
Fencing, Approx. Location
Allotment Boundaries
Section Lines
Rivers
BLM
Bureau of Reclamation
Private
State
N
0
1
2 Miles

APPENDIX III

The following table shows the most current allotment condition, trend, analysis, and latest inspection for the 18 allotments.

Table 4. Middle Gila River Allotments Current Range Condition and Trend

Allotment Name	Allotment number	Range Condition	Range Trend	Type of Analysis	Last Inspected
Myers	6123	Meeting Standards	Stable	Upland Assessment,PFC	2000
Whitlow	6032	Good	Stable	ESI, PFC	2000
Horsetrack	6111	Good	Improving	Professional Judgement	1998
Teacup	6168	Meeting Standards	Stable	ESI, PFC, Upland Assessment	2000
Cochran	6113	Good	Stable	Professional Judgement, PFC	2000
LEN	6197	Fair	Stable	Professional Judgement, PFC	2000
Battle Axe	6059	Fair	Stable	Professional Judgement, PFC	2000
A Diamond	6120	Good	Stable	ESI, PFC	2000
Rafter Six	6067	Meeting Standard	Stable	Upland Assessment, PFC	2000
Hidalgo	4513	Meeting Standards	Stable	Upland Assessment, PFC	2000

Piper Springs	4514	Meeting Standards	Stable	Upland Assessment, PFC	2000
Christmas	4511	Fair	Stable	Professional Judgement, PFC	2000
Mescal Mt.	4509	Fair	Stable	Professional Judgement, PFC	2000
Smith Wash	6221	Meeting Standards	Stable	Upland Assessment	2000
Dripping Springs	4507	Fair	Stable	Professional Judgement	2000
Ponderosa	4505	Good	Stable	Professional Judgement	1999
Kearny	6117	Fair	Stable	Professional Judgement	2000
Government Springs	4544	Meeting Standards	Stable	Upland Assessment	1999

Table 5. Middle Gila River Proposed Riparian Allotments Management, River Miles, and Acreage

Allot. Name	* # AUM's	Total Acres	BLM Acres %BLM	Present Mgt.	Other Acres	BLM River Miles	Other River Miles	** Total River Miles (PFC rating)
Myers	562	6,432	4,286 66%	rest-rotation	2,146	.60	0.20	3.80 (FAR)
Whitlo.	588	21,469	10,254 48%	deferr.	11,215	2.80	0.20	3.00 (FAR)
Horse-track	1,224	27,742	10,883 39%	seasnl./ winter/9 /1-4/1	16,859	1.00	0.00	1.00 (PFC)
Teacup	3,060	39,572	27,230 69%	deferr.	12,342	4.20	1.30	5.50 (PFC)
Coch-ran	168	2,008	1,688 84%	non-use	320	2.70	1.10	3.80 (PFC)
LEN	2,956	37,224	23,303 81%	year-long/9/ 1-4/1	13,921	5.10	2.00	7.10 (PFC)
Battle Axe	1560	18,468	14,925 81%	year-long/9/ 1-4/1	3543	6.20	1.20	7.40 (PFC)
A Dia-mond	696	26,333	6566 25%	deferr.	19,767	6.20	1.20	7.40 (PFC)
Rafter Six	1,664	26,960	15,961 59%	seasonl. /winter/ spring	10,999	1.20	.20	6.40 (PFC)
Hidalgo	979	14,786	12,848 87%	non-use	1,938	2.80	0.50	3.30 (FAR)

Piper Springs	ephem.	6,420	5,300 82%	seasonl. / winter/ spring	1,120	0.50	0.90	1.40 (FAR)
Christ-mas	446	7,794	4,839 62%	year-long	2,955	8.60	1.50	10.10 (PFC)
Mescal Mt.	1,235	12,407	12,167 98%	year-long/9/ 1-4/1	240	13.00	0.00	13.00 (PFC)

*** (AUM) Animal Unit Month = the amount of livestock permitted based on 1 cow or its equivalent for 1 month**
**** River miles are those that border or are within the allotment. Where the river forms the allotment boundary, these miles are also included in the adjacent allotment's total miles. For this reason, the river miles add up to more than the actual river length.**

Table 6. Middle Gila River Upland Allotments Acreage and Current Management

Allotment Name	Total Acres	BLM Acres	BLM AUM'S	Current/Proposed Mgt	% BLM
Smith Wash	20031	5890	552	year-long/custodial	29
Dripping Springs	23090	13854	1491	3 Pasture Rotation	60
Ponderosa	2022	902	60	year-long /custodial	44
Kearny	1088	1038	108	year-long/ custodial	95
Government Springs	31960	120	24	coordinated plan with the Tonto NF/custodial/ year-long	< 1

Table 7.
Willow flycatcher productivity from Wheatfields to Winkelman on the lower San Pedro River and Kearny on the Gila River, Arizona, from 1996 to 2002. Percent productivity, followed by number of successful nests (total nests with known outcome) (AGFD unpublished data).

	1996	1997	1998	1999	2000	2001[3]	2002[4]
Kearny Gila River	50 2(4)	80 8(10)	52 22(42)	40 16(40)	56 18(32)	21 6(28)	21 3(14)
San Pedro River		45 17(38)	53 35(66)	47 29(62)	30 17(56)	53 23(43)	9 3(35)

1. Production through June, 2001
2. Production through June, 2002