UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
3616 W. Thomas, Suite 6
Phoenix, Arizona 85019

2-21-90-F-169b

November 29, 1990

David F. Jolly
Regional Forester
U.S. Forest Service
517 Gold Avenue, S.W.
Albuquerque, NM 87102-0084

Dear Mr. Jolly:

This responds to your request of July 13, 1990 for formal consultation pursuant to Section 7 of the Endangered Species Act (Act) of 1973, as amended, on proposed fencing, changes in livestock management, development of water sources, road closures, watershed stabilization structures and/or channel modifications, planting of riparian trees, and other actions in Redrock Canyon, Santa Cruz County, Arizona. The species of concern are the Gila topminnow (Poeciliopsis occidentalis occidentalis) and the Sanborn's long-nosed bat (Leptonycteris sanborni). The 90-day consultation period began on July 23, 1990, the date your request was received in our office. On October 12, 1990, the Fish and Wildlife Service (FWS) requested a 45-day extension to allow for development of additional information. The end date of this extension is November 30, 1990.

The following biological opinion is based on information provided in the June 1990 Biological Evaluation, the June 1990 draft Redrock Canyon Action Plan, a June 1990 map of all proposed features of the plan as revised by Jeanne Wade (Sierra Vista Ranger District Range Staff Officer) on August 13, 1990, a letter of September 4, 1990 and FAX of November 28, 1990 from the Sierra Vista Ranger District with added information regarding the action plan and mutually agreed upon changes to the plan, a November 2, 1990 meeting and other discussions with Sierra Vista Ranger District staff, data in our files, and other sources of information.

BIOLOGICAL OPINION

It is my biological opinion that implementation of the actions proposed in the June 1990 draft Redrock Canyon Action Plan, as modified by additional communications listed above, is not likely to jeopardize the continued existence of the endangered Gila topminnow or the endangered Sanborn's long-nosed bat.

BACKGROUND INFORMATION

Species Description - Gila topminnow

The Gila topminnow was listed as an endangered species on March 11, 1967. No critical habitat has been designated for this species. The Gila

topminnow is a small, one to two-inch long, livebearing fish (Minckley 1973) of the family Poeciliidae. It is known from the Gila, Sonora, and de la Concepcion River drainages in Arizona, New Mexico, and Sonora, Mexico (Minckley 1973, Vrijenhoek 1985). The Gila topminnow was once among the commonest fishes in the Gila River and its tributaries (Hubbs and Miller 1941). Destruction of its habitat through water diversion, stream downcutting, backwater draining, vegetation clearing, channelization, water impoundment, and other human uses of natural resources; plus competition with and/or predation by nonnative fish species, most notably mosquitofish (Gambusia affinis), have resulted in extirpation of the Gila topminnow throughout most of its range (USFWS 1984, Meffe et al. 1983). At present, the Gila topminnow is known from only 9 naturally occurring localities in the United States, about 30 introduced populations, and several captive populations.

Redrock Canyon supports one of only two relict populations of Gila topminnow existing on public lands today. The Gila topminnow population in Redrock Canyon was discovered in the late 1960's (Rinne et al. 1980). The Gila topminnow occupies the perennial stretches of water in Redrock Canyon in the Redrock Ranch area (T22S, R16E, S 1/2 Sec. 2 and NE 1/4 Sec. 11), the Gate Spring area (T22S, R17E, SE 1/4 Sec. 7), and the tributary below Cott Tank (T22S, R17E, Secs. 16, 21, and 22) and expands into other areas of the stream during times of plentiful surface water (Stefferud 1989). Perennial water in the tributary canyons remains mostly unsurveyed. Although numbers of Gila topminnow present and length of habitat occupied at any given time within Redrock Canyon fluctuate, the population has remained relatively large and healthy since its discovery. This is particularly important in light of the fact that mosquitofish have been recorded from the watershed since 1979 (Bagley et al. 1990). Mosquitofish are extremely detrimental to survival of Gila topminnow (Meffe et al. 1983, Minckley et al. 1977); however, the two species appear to have established some sort of equilibrium in Redrock Canyon. Mosquitofish are found primarily in the upper reaches of the canyon and are kept in low numbers in most of the canyon, presumably by flooding. The stock tanks in the upper ends of the drainage serve as sources of reinfection.

In addition to mosquitofish, the Gila topminnow in Redrock Canyon are also affected by the presence of largemouth bass (Micropterus salmoides) and other nonnative predatory species. Like the mosquitofish, the bass are confined to the upper reaches of the canyon and are probably kept in check by flooding. Attempts have been made to remove bass from the stream, but a constant source of reinfection is present in Cott Tank.

Species Description - Sanborn's long-nosed bat

Sanborn's long-nosed bat was listed as an endangered species on September 30, 1988, without critical habitat. Sanborn's bat is a phyllostomid bat of Central America that summers in southern Arizona. It is known from Maricopa, Pinal, Pima, Santa Cruz, Graham, and Cochise Counties (Hoffmeister 1986) and may be found in Arizona between May and October, although its use of a specific area will depend upon the presence of blooming columnar cacti and agaves, the primary food of the species in

Arizona. The primary food sources in Redrock Canyon are Agave parryi and Agave palmeri. Threats to the species include loss of roost and maternity colony sites and loss of feeding habitat to human activities. The species is still known from much of its range but at reduced numbers.

The bat roost near the Redrock Canyon project area is located on the south rim of the watershed and is a summer roost used by Sanborn's bat, probably from June to late September. The number of bats utilizing this cave varies but may reach several hundred. Other species, including Myotis velifer, utilize the cave. Recent surveys have documented human disturbance inside the cave (Sidner, R. pers. com. 4-24-89).

Project Description

Redrock Canyon is located east of the town of Patagonia, Santa Cruz County, Arizona on the Sierra Vista Ranger District of the Coronado National Forest. Five livestock grazing allotments are located in the Redrock watershed. Three of these, the Seibold, Kunde, and a portion of the San Rafael, would be affected by this proposed action. A fourth, the Papago Allotment, would be affected only by the watershed stabilization portion of the proposed plan. The purpose of the proposed action is to improve vegetation conditions within the canyon, increase species and age class diversity of streamside vegetation, control erosion, and improve habitat for the Gila topminnow. The proposed Redrock Action plan includes several types of activities, as follows.

1. Pasture Fences

The proposed Redrock Canyon Action Plan includes construction of several new livestock pasture fences. These fences are shown on Figure 1. They include:

- about 2.3 miles in the Seibold Allotment in T22S, R16E Secs. 1, 2, and 3, and T21S, R16E, Sec. 34
- realignment of about one mile of existing fence on the Seibold Allotment in T21S, R16E, Secs. 26 and 35
- about 2.5 miles in the Kunde Allotment in T22S, R16E, Secs. 1, 2, and 12 and T22S, R17E, Sec. 7
- about 1.3 miles in the Kunde Allotment in T22S, R17E, Secs. 5 and 6
- about 1.7 miles in the San Rafael Allotment in T22S, R17E, Secs. 16 and 17
- a possible additional 1.25 miles in the Kunde Allotment in T22S, R16E, Secs. 6 and 7 to create a fourth pasture.

In addition, a holding pasture fence in the Kunde Allotment would be removed and replaced with a smaller holding pasture requiring construction of about 0.75 miles of fence in T22S, R16E, Secs. 1, 2, and 11.

2. Livestock Grazing Management

Seasons of use and movement of cattle would be altered from the existing management on all three allotments. The proposed pastures and their seasons of use are shown in Figure 1 and Table 1. Numbers of cattle and/or animal unit months (AUM's) permitted on each allotment would not be changed from the present. However, temporary or permanent reductions of livestock

USDA—FOREST SERVICE

GRAZING SYSTEM

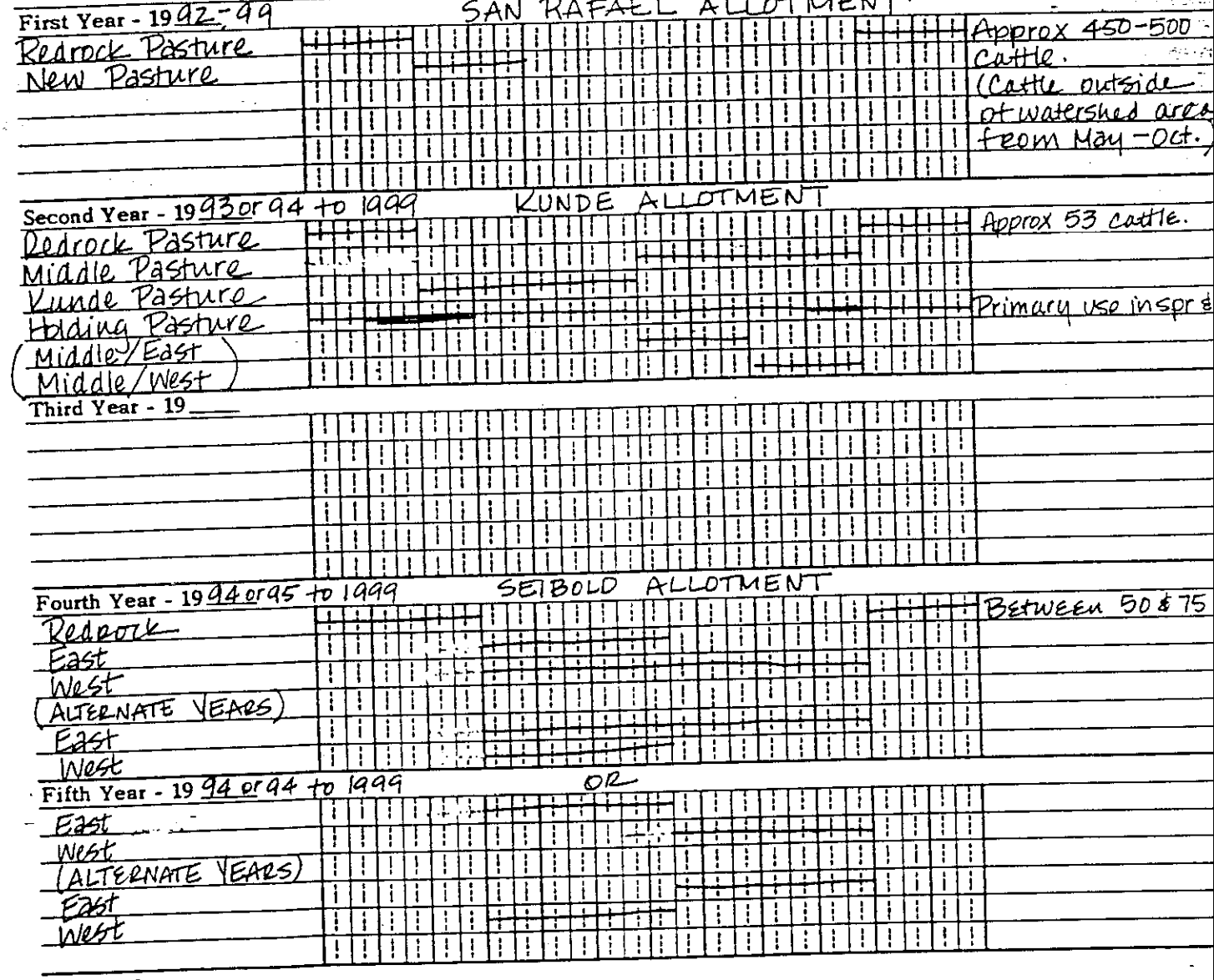
MANAGEMENT UNIT ALLOCATIONS

REGION	FOREST
Southwest	Coronado
DISTRICT	DATE PREPARED
Sierra Vista	June 1990

ALLOTMENT: RED ROCK WATERSHED PLAN San Rafael, Seibold and Kunde

PERMITTEE: Timken & Baker, Paul & Ray Kunde & Seibold Ranches

LEGEND: ☐ Area Grazed



REMARKS:

TABLE 1. Redrock Action Plan - Proposed Livestock Seasons of Use

numbers may occur within the scope of this proposed plan, if necessary, dueto resource concerns or in case of drought. The proposed seasons of use, pasture locations, numbers of livestock, exclosure fencing and maintenance, location and use of water developments, and maintenance of pasture fences and water developments would be a part of the allotment management plans for the three affected allotments. The approved Redrock Action Plan, as modified by the agreements and addendum discussed in this biological opinion, would serve as the allotment management plan for the Kunde and Seibold allotments and the appropriate portions of the plan would be incorporated into the San Rafael allotment management plan when it is written.

On the Seibold Allotment, the permitted 100 head of cattle (with nonuse for 25 head) would be grazed under a four-pasture deferred rotation grazing system. Grazing on the two northern pastures (East and West) of the allotment would be split from April through October and the two southern pastures (Redrock) would be grazed from November through March. In addition, there would be the flexibility to extend use of each pasture by up to one month on either or both ends of the proposed grazing period.

On the Kunde Allotment, the permitted 53 cattle and 3 horses would be grazed under a three-pasture deferred rotation grazing system, with the possibility of establishing a fourth. The northeastern pasture (Kunde) of the allotment would be grazed from March through June, the central pasture (Middle) from July through October, and the southwestern pasture (Redrock) from November through February. Again, there would be a one month flexibility to extend the season of use for each pasture on each end of the specified period. If a fourth pasture is established, it would be formed by splitting the central pasture into two pastures. This would help to facilitate partial growing season deferment on the central pasture. The seasons of use would change accordingly; with the east-central pasture being grazed from July through August and the west-central pasture from September through October. Season of use on the central (Middle) and northeastern (Kunde) pastures may be changed from this pattern in response to vegetative conditions and the patterns of cattle use that develop in response to new water sources. The holding pasture on the western edge of the allotment would be used on an as-needed basis, primarily for shipping cattle and holding sick animals.

On the San Rafael Allotment, the permitted use for the entire allotment is 700 cattle, plus 221 cattle yearlong which are permitted based upon private land holdings. For the current Redrock pasture, which includes all of the allotment located within the Redrock drainage, the permitted use is 450 to 500 cattle or 3250 to 3825 AUM's. Under the proposed plan these cattle would be grazed in the northern half (to be called Redrock pasture) of the Redrock pasture from November through February and in the southern half (to be called the New pasture) from March through April, with flexibility for extension of those seasons by one month on either or both ends.

3. Stream Exclosures

The proposed action plan would provide for exclusion of livestock grazing on the three sections of perennial water in Redrock Canyon, thus

eliminating direct grazing of streambanks in Gila topminnow habitat. A fourth grazing exclosure would be constructed at Pig Camp Spring to enhance intermittently used expansion habitat of Gila topminnow. Exclusion would be accomplished by fencing. The proposed exclosures are shown on Figure 1.

The Pig Camp exclosure would be located on the Seibold Allotment in T22S, R16E, NW 1/4 Sec. 2). About 0.125 miles of stream channel and spring would be excluded from grazing, extending from the confluence of the drainage with the mainstream in Redrock Canyon upstream above the spring to include the associated riparian vegetation. The side fences will be placed back from the stream channel to allow for recovery of stabilizing vegetation. Exact location of the fenceline will be determined later to accommodate on-the-ground needs. Two "water gaps" would be present in the exclosure fence. Water gaps are the method of fencing the points at which the fence crosses the stream and would be constructed using the method that would be most likely to withstand flooding. Livestock use would be allowed inside this exclosure if all other water sources in the area become dry and provided that forage utilization in the surrounding area is below allowable use levels.

Two of the exclosures are located in the Kunde Allotment. The most downstream exclosure would be located in T22S, R16E, Secs. 11 and 2 and will require about 1.5 miles of fence. This would result in exclosure of slightly longer than 0.5 miles of stream. The exclosure would extend from about 0.25 miles below the falls to about 0.25 miles above the falls and would include all perennial water in the area. On the northeast side, the fence would be far up on the ridgeline, and on the southwest the fence would be placed far enough up onto the upland to prevent formation of an "alley" for cattle movement between the fence and steep terrain that inhibits cattle movement. Exact location of the fenceline will be determined later to accommodate on-the-ground needs. Two "water gaps" would be present in the exclosure fence.

The second exclosure in the Kunde Allotment would be in the area of Gate Spring in T22S, R17E, Sec. 7 and would require 0.75 miles of fence. The exclosure would include about 0.25 miles of stream. The side fences would be placed uphill on the ridge away from the stream bottom. One water gap would be present in the exclosure fence and one on the existing pasture fence which would form the upstream exclosure boundary. Both would be constructed using the method that would be most likely to withstand flooding.

The third exclosure is located on the San Rafael allotment and would include all of the Forest Service portion of the unnamed Redrock Canyon tributary which originates from Cott Tank (T22S, R17E, Secs. 16 and 21). This exclosure would require about 4.5 miles of fencing and will enclose about 2 miles of stream. The side fences would be placed uphill on the ridge away from the stream bottom. Exact location of the fenceline will be determined later to accommodate on-the-ground needs. One water gap would be present in the exclosure fence on the downstream end and would be constructed using the method that would be most likely to withstand flooding.

All exclosures would have a gate for removing cattle which get into the exclosure. These gates would be placed in an area of the exclosure where they are unlikely to be used by recreational visitors and would be sized to prevent vehicular access. One or more walk-throughs or stiles to allow pedestrian access without allowing livestock or vehicular access would be built into all exclosure fences. Maintenance of exclosure fences may be a condition of the grazing permit or may be accomplished through a cooperative agreement with a private conservation group.

4. Water Development

Due to the proposed livestock management changes in the action plan, it would be necessary to develop new water sources for cattle. The proposed water developments are shown in Figure 1 and include:

- renewed operation of Redrock Well using existing storage and troughs (T22S, R17E, NW 1/4 Sec. 7)
- drilling a new well (Kunde Well) in T22S, R16E, SE 1/4 Sec. 2 and constructing water storage and pipelines with stock troughs
- improvement of Meadow Valley Well with addition of water storage and 1.5 miles of pipeline with 2-3 troughs (T22S, R17E, Secs. 15, 22, and 23)
- addition of a pipeline and trough at the present Silver Tank well (T22S, R17E, Sec. 16)
- addition of a pipeline and trough from an old mine adit in T22S, R17E, Sec. 17
- reconstruction of a pipeline from Meadow Valley Well in T22S, R17E, Sec. 20
- addition of a pipeline and trough in T22S, R17E, Secs. 9, 15, and 16 from a well in Sec. 9.
- development of a small channel bottom spring/seep area in an unnamed tributary of Oak Grove Canyon (T21S, R16E, SW 1/4 Sec. 35) including a small dam, a pipeline, and trough

Construction of three earthen stock tanks on the Kunde Allotment in T22S, R17E, Secs. 5 and 18 and T21S, R17E, Sec. 32 was proposed in the original Redrock Canyon Action Plan. Following discussion of the potential of these tanks for increasing the threat to Gila topminnow from mosquitofish and other nonnative fishes, all of these tanks were dropped from the proposal. To avoid impounded water, the proposed action would substitute trick tanks, vertical or horizontal wells, or backfilled cement dams with some type of infiltration pipelines, in the vicinity of these sites. All would have attendant metal or fiberglass storage and small drinkers.

In addition to water development for livestock use, the proposed action would include cleaning out of sediments from Pig Camp Spring (T22S, R16E, NW 1/4 Sec. 2) and possible excavation to create cienga-like conditions and enhance habitat for Gila topminnow.

5. Road Closures and Improvements

The proposed action plan includes several road closures and improvements. These are shown on Figure 1 and include:

- closure of Forest Road 138 from Redrock Well in T22S, R17E, NW 1/4

Sec. 7 southeast 1.7 miles to Red Bank well in T22S, R17E, NW 1/4 Sec. 17
- construction of an unpaved parking area near Redrock Well in T22S, R17E, NW 1/4 Sec. 7
- closure of Forest Road 765 from the ridge above the spring in T22S, R17E, NE 1/4 Sec. 21 northwest 1.2 miles to approximately 1/4 mile west of Silver Tank windmill in T22S, R17E, center Sec. 16
- construction of an unpaved parking area on the ridge above the spring in T22S, R17E, NE 1/4 Sec. 21
- improvement of Forest Road 4629 and/or 4630 from Meadow Valley (T22S, R17E, SW 1/4 Sec. 14) to Down Under Tank (T22S, R17E, SE 1/4 Sec. 15) to be passable by high clearance vehicles
- improvement of Forest Road 4632 and rerouting of the lower end, from Down Under Tank to junction with Forest Road 765 to be passable by high clearance vehicles

The proposed action would also include continuation of permittee maintenance of Forest Road 138 in the existing right-of-way from the Forest boundary (T22S, R16E, west boundary Sec. 3) to the Kunde homestead (T22S, R16E, NW 1/4 Sec. 12) on an as-needed basis.

6. Structural Watershed Improvement Projects

As part of the Redrock Canyon Action Plan, four gully and headcut control projects are proposed. These projects would be located in areas tributary to stockponds and high priority riparian areas and are shown in Figure 2. None are located within the perennial water sections of Redrock Canyon. Structures would be small check dams constructed of rock, wire, metal posts, and erosion control cloth. They would not impound water. Structures would be built throughout approximately 10,500 feet of channel in the Falls area of lower Redrock Canyon in T22S, R16E, Secs. 1, 2, and 11; approximately 12,000 feet of channel in the Red Bank area in T22S, R17E, Secs. 8, 17, and 20; approximately 16,000 feet of channel in the area of T22S, R17E, Secs. 21 and 22; and approximately 7,500 feet of channel in the upper end of Box Canyon T21S, R17E, Sec. 34.

7. Planting of Riparian Trees

Plantings of riparian trees are proposed for enhancement of the road closure area on Forest Road 765 and in the drainage below Cott Tank. Additional plantings may be made along the perennial waters in the exclosures at Gate Spring and the Falls if natural reproduction does not appear to be sufficient to restore a desirable age-class diversity of riparian trees.

8. Fuelwood Gathering and Off-Road Vehicle Closure

The Redrock watershed would be closed to all gathering of fuelwood and to off-road travel.

9. Monitoring

Upland vegetation would be monitored in areas where existing range transects are located. Riparian vegetation would be monitored where current transect information is available and in areas of current photo points. Additional photo points and transects would be established in the

newly fenced exclosures. No monitoring of Sanborn's long-nosed bat is planned.

Although not included in the original action plan, discussion with Sierra Vista Ranger District staff led to an agreement that the proposed action would also include monitoring of the aquatic system. This monitoring would consist of two types. The first would be low level, including monitoring of the visible presence or absence of topminnow/mosquitofish, any obvious changes in the availability of water or the stream channel, and any changes in human uses of the area. This would be accomplished through annual allotment inspections. The second would be a higher level, consisting of periodic monitoring of the Gila topminnow by net or other appropriate method, and a determination of the condition of the population, presence or absence of topminnow reproduction, and the presence or absence of non-native fishes. This effort would be coordinated with the Forest Service (USFS) Zone Fisheries Biologist.

10. Arizona Trail

Following discussions with Sierra Vista Ranger District staff, it was concluded that Section 7 consultation cannot be conducted at this time on the possible routing of the Arizona Trail through Redrock Canyon. Sufficient information is not available on the trail, possible routes, accessory camping areas, and other features to allow for an analysis of the impacts of such a proposal on the Gila topminnow, Sanborn's long-nosed bat, and other sensitive species. When plans are developed for the Arizona trail additional Section 7 consultation will be necessary.

11. Removal of Exotic Fishes

The Redrock Canyon Action Plan proposes to remove exotic fishes from Redrock Canyon with cooperation from the Arizona Game and Fish Department (AGFD) and the FWS. This portion of the proposed action will not be covered by this consultation because of lack of specific information on how and when such action would occur. Some exotic fish removal may be accomplished through permits from the AGFD and FWS. Other types of removal may need separate Section 7 consultation.

12. Introduction of Gila Topminnow into Other Redrock Watershed Waters

The proposed action would include investigation of the feasibility of establishing Gila topminnow in other perennial waters in Redrock and Lampshire Canyons. No information is currently available on other perennial waters in the drainage or their suitability for Gila topminnow. Feasibility studies would not require Section 7 consultation. Translocation of Gila topminnow would require Section 7 consultation, but this portion of the proposed action would be more appropriately considered in a separate Section 7 consultation and will not be further addressed here.

IMPACTS OF THE ACTION

Environmental Baseline

Redrock Canyon supports a rich diversity of natural resources and has also supported numerous human activities. In addition to the Gila topminnow and Sanborn's long-nosed bat, 15 other sensitive species are either known from or potentially found in the watershed. Human uses include remains of prehistoric occupation, livestock grazing, mining, water development, roads, hunting, fishing, and general recreation. These human uses have resulted in changes to the watershed that have negatively affected the Gila topminnow and Sanborn's long-nosed bat.

Livestock grazing has resulted in reduction of ground cover, soil erosion, and loss of riparian vegetation. The effects of this on Sanborn's long-nosed bat are speculative but may include a reduction in food resources. Effects of livestock grazing on Gila topminnow are more obvious. Degradation of the watershed has resulted in faster runoff with resultant higher flood intensities and widening of the stream channel. Livestock use of the streambanks has eroded streambanks and reduced riparian density and reproduction, thus creating wider, shallower, more braided stream channels with less shade and consequent higher water temperatures. Erosion in the watershed and on the streambanks has resulted in increased movement of sediments into the stream channel. As a result of the combined effects of livestock grazing, the stream channel in Redrock Canyon has lost a substantial proportion of what we believe was its original complexity of habitat, particularly in the more downstream reaches.

Development of impounded bodies of water in stock tanks in the upper reaches of the watershed has created opportunities for stocking of non-native fishes, such as largemouth bass, bluegill (Lepomis macrochirus), and mosquitofish. These non-native fishes are detrimental to the Gila topminnow through predation and competition. Largemouth bass are found in Cott Tank and the drainage below that tank. Mosquitofish have been documented in Cott and Downunder Tanks and are found in varying numbers downstream of those tanks. Other tanks in the drainage have not been sampled. Although flooding seems to keep non-native species limited in distribution and numbers, Gila topminnow are depleted in or absent from the areas inhabited by those non-natives. Mosquitofish have been shown to be particularly detrimental to Gila topminnow (Meffe et al. 1983, Minckley et al. 1977).

Development of roads in the canyon have resulted in destruction of streambanks and channel erosion in Redrock Canyon. This is most apparent in the drainage above Silver Tank windmill, but has also occurred elsewhere. General recreational use of the area is presumably the source of the human disturbance which has been noted in the Sanborn's bat roost cave in Redrock Canyon.

As a result of previous or existing human uses of the area, the present condition of Gila topminnow and Sanborn's long-nosed bat and their habitats in Redrock Canyon is degraded. Therefore, all future actions must be

judged from this baseline; i.e. how will the proposed action, in conjunction with the results of past actions, affect the short-term status and long-term survival of either of these species.

Direct and Indirect Effects of the Proposed Action - Gila Topminnow

Implementation of the various aspects of the proposed Redrock Action plan would be expected to produce both positive and negative effects on the Gila topminnow. Although adverse impacts would result from portions of the action, we believe that as a whole the action would result in improved status and a higher probability of long-term survival for the Gila topminnow.

1. Pasture Fences

The construction and maintenance of the proposed pasture fences is not expected to have any adverse effects on the Gila topminnow.

2. Livestock Grazing and Management

Grazing and management of livestock within the watershed of Redrock Canyon presently cause adverse effects on the survival and recovery of the Gila topminnow. Under the proposed action plan, management of livestock grazing in Redrock Canyon would alleviate some, but not all, of those adverse effects. Even under the proposed improved management, grazing will continue to result in some adverse effects.

As discussed earlier in the Environmental Baseline portion of this document, livestock grazing detrimentally affects the watershed, streambanks, channel substrate, and stream channel morphology, increases the frequency and severity of flooding, reduces aquatic habitat complexity, reduces riparian vegetation, and may indirectly reduce the amount of perennial surface flow (Chaney et al. 1990, Platts 1981, Schulz and Leininger 1990). Although Gila topminnow are relatively tolerant of a wide variety of habitat conditions and can survive in the short-term in heavily degraded habitat, their long-term survival and ability to withstand stochastic catastrophic events such as major floods and droughts, probably depends upon a complex habitat which provides a variety of habitat factors.

The type and extent of effect of livestock grazing upon the stream and Gila topminnow may vary under different types of grazing management. Table 2 depicts the proposed changes in season of livestock use in the canyon bottom in Redrock Canyon. The removal of livestock use from the canyon bottom in the Seibold (Redrock Pasture) and Kunde (Redrock Pasture) allotments during the late spring, summer, and early fall, and the reduction of spring grazing in the canyon bottom on the San Rafael (Redrock Pasture) by three months would be expected to result in less adverse effects to the Gila topminnow than under present livestock management.

TABLE 2. Existing and Proposed Livestock Grazing Seasons in the Canyon Botton on Three Allotments in Redrock Canyon Watershed.

	J	F	M	A	M	J	J	A	S	O	N	D
Seibold Allotment - Redrock Pasture												
existing	X	X	X	X	X	X	X	X	X	X	X	X
proposed	X	X	X	F*						F	X	X
Kunde Allotment - Redrock Pasture												
existing	X	X	X	X	X	X	X	X	X	X	X	X
proposed	X	X	F							F	X	X
San Rafael Allotment - Redrock Pasture												
existing	X	X	X	X	X	F				F	X	X
proposed	X	X	F							F	X	X

*F = flexibility to extend the allowed grazing season by one month on either or both ends of season, to allow for response to weather and vegetative conditions.

3. Stream Exclosures

The construction and maintenance of fenced areas that will exclude livestock grazing from the stream and riparian along three perennially flowing portions of Redrock Canyon and in intermittently occupied expansion habitat at Pig Camp Spring are expected have beneficial effects on the Gila topminnow. These benefits will result from increased density and diversity of riparian vegetation, stabilization of streambanks which are presently subject to cattle traffic, increased instream habitat structure and complexity, decreased sediment input into the stream, and other related factors. Sporadic grazing use of the exclosure at Pig Camp Spring in periods of drought would result in less benefits to the Gila topminnow than total exclosure of grazing. However, adverse impacts from that sporadic livestock use are not expected to be substantial.

Provision for gates for removing cattle that may get into the exclosures and for walk-through access are not expected to adversely impact the Gila topminnow. Placement of the livestock gates away from areas of heaviest use will help to ensure that these gates are not left open by recreationists and are not used for access by off-road vehicles.

4. Water Development

Effects of the proposed water developments will vary. In general, the proposed water developments will not have adverse impacts to the Gila

topminnow and may actually benefit the topminnow by dispersing livestock use throughout a larger area.

Operation of shallow wells in the bottom of Redrock Canyon has some potential for adverse effects on the streamflow and thus on the Gila topminnow. Redrock Well, Redbank Well, Silver Tank, and an unnamed well (T22S, R17E, NW 1/4 Sec. 16) are located in the main canyon bottom and several wells exist in tributary canyons. All are existing wells that have been used in the past, but most are presently inactive. Redrock Well is currently inactive and would be reactivated under this proposed plan. Redbank Well is currently partially in use and no change in its use is anticipated. Silver Tank Well is currently inactive and would be reactivated with addition of a pipeline and trough. If, as we believe, these wells are shallow and draw water off of the subsurface alluvial streamflow, then their operation has the potential to reduce downstream surface streamflow. Since all three have been used in the past with no known change in downstream surface flow, we anticipate no significant effects on surface flow from their reactivation. However, such effects may occur and monitoring to detect any changes in surface flow during low flow periods should be conducted and correlations between pumping from the alluvial wells and streamflow should be investigated.

Construction in the Redrock watershed of any open water, particularly earthen tanks holding impounded water of a size which appears sufficient to support game or bait fishes, would create a significant threat to the survival of the Gila topminnow. The presence of ponded water attracts unauthorized stockings of nonnative game and bait fishes by recreationists, sportsmen, ranchers, miners, etc. Such unauthorized releases of fish are a major threat to the survival of native fish in Arizona. For Gila topminnow, the most serious threat to their survival at the current time is the introduction and proliferation of mosquitofish. While mosquitofish are already present in the uppermost reaches of Redrock Canyon, the current situation appears to be unfavorable to their proliferation. Addition of other sources of mosquitofish in other locations in the drainage may tip the balance and allow mosquitofish to proliferate and eliminate topminnow. Because of this problem, the three earthen stock tanks that were originally part of the Redrock Action Plan have been dropped from the proposal. The trick tanks, wells, or backfilled cement dams with infiltration piping (and no impounded water) which have been substituted are not expected to have any adverse effects to the Gila topminnow.

Proposed habitat reconstruction and enhancement for Gila topminnow at Pig Camp Spring through sediment removal and possible excavation to create cienega-like habitat would be expected to have beneficial effects on Gila topminnow. Protection and restoration of riparian vegetation at Pig Camp Spring may result in additional surface water. This water, together with a larger and more complex habitat may result in habitat which could support Gila topminnow on a perennial basis.

5. Road Closures and Improvements

The proposed closures of portions of Forest Roads 138 and 765 with construction of unpaved parking lots at road ends would have a beneficial

effect upon Gila topminnow. Because these two roads are located in the stream bottom their use has destructive effects on the channel and stream banks and results in large amounts of erosion and sedimentation. Benefits to topminnow would result from stabilization of the streambanks when vehicle use is removed. Improvement of Forest Roads 4632, and 4629 and/or 4630 would not affect the Gila topminnow.

6. Structural Watershed Improvement Projects

Construction of the gully and headcut erosion control structures in intermittent side tributaries of Redrock Canyon, as proposed, is not expected to significantly affect the Gila topminnow. In the long-term these structures may have positive benefits to the topminnow through reduction of sediment reaching the perennial stream and improvement of tributary vegetation and rainwater retention time.

7. Planting of Riparian Trees

The proposed planting of riparian trees in the areas of perennial flow would be expected to have beneficial impacts to the Gila topminnow. Riparian vegetation is important factor in habitat complexity and plays a major role in shaping the stream channel.

8. Fuelwood Gathering and Off-Road Vehicle Closure

Impacts to the watershed from fuelwood gathering and off-road vehicle use help to create conditions which favor erosion, increased flood intensities, and increased sedimentation. Off-road vehicle use in the stream channel and on the streambanks causes erosion and destabilization of the channel. Removal of these impacts would be expected to have positive effects on the Gila topminnow.

9. Monitoring

Monitoring of the aquatic system and of Gila topminnow would help to ensure the survival and recovery of Gila topminnow. Monitoring would give data needed to assess value and success of other aspects of this proposed plan. Information on the status of topminnow will help to give early warning of any problems with the population and allow time for remedial action.

10. Arizona Trail

This part of the proposed action is not being addressed in this biological opinion.

11. Removal of Exotic Fishes

Not addressed in this biological opinion.

12. Introduction of Gila Topminnow into Other Redrock Watershed Waters

Not addressed in this biological opinion.

Direct and Indirect Effects of the Proposed Action - Sanborn's Long-Nosed Bat

The proposed Redrock Canyon Action Plan would not affect the Sanborn's long-nosed bat roost site since is located outside of the area within which

any action is to be taken. However, the roost is adjacent to the action area and the Redrock watershed is feeding habitat for the bat.

1. Pasture Fences

Construction and maintenance of the proposed fences is not expected to significantly affect the Sanborn's long-nosed bat. Although some agaves might be destroyed during this construction, they are expected to be a small proportion of the total bat food resources in the Redrock watershed.

2. Livestock Grazing and Management

Grazing of cattle in the Redrock watershed has had and continues to have negative effects on Sanborn's long-nosed bat. Since this bat feeds on nectar of agave and columnar cacti, any action which depletes that resource in the vicinity of the roost cave would adversely affect the bat. In Redrock Canyon, agave flowering stalks are eaten by cattle and trampling has a negative effect on small agaves. Both actions result in reduction of Sanborn's long-nosed bat food source.

The proposed management of livestock grazing on the three affected allotments will likely reduce the negative effects of grazing on Sanborn's long-nosed bat. The primary blooming season of the two most important food plants, Agave parryi and A. palmeri, in the area is during June and July. Removal of grazing from approximately half of the Kunde and Seibold allotments and all of the Redrock and New pastures of the San Rafael allotment from May through October will prevent loss of agave reproduction by cattle consumption of flower stalks. Impacts from livestock grazing to agave flower stalks will still occur on the remaining portions of the Seibold and Kunde allotments and impacts from trampling of agaves will continue in all non-exclosure areas.

Benefits of the proposed reduction of livestock impacts to agaves, and therefore Sanborn's long-nosed bat, within the Redrock watershed may be partially negated by increases in natives mammals due to the enhanced vegetative conditions. Native mammals also consume agave flowering stalks.

3. Stream Exclosures

The proposed construction and maintenance of stream exclosures will have mixed effects on the Sanborn's long-nosed bat. Some agaves may be destroyed during construction of the fences and due to the concentrating effects of fences on livestock movement and consequent trampling of vegetation. However, there will be some agaves inside the exclosures which will receive complete protection from grazing impacts. Overall effects on the bat are not expected to be significant.

4. Water Development

Because Sanborn's long-nosed bat is primarily a nectar feeder, it does not generally utilize free water and is not benefited by increased availability of insects from enhanced or expanded aquatic and riparian habitats, although other bat species may benefit. Although construction of wells, pipelines, troughs and other water development features may result in

destruction of some individual agaves, adverse effects on Sanborn's long-nosed bat are expected to be small and avoidable through various measures.

5. Road Closures and Improvements

Possible negative effects may occur due to destruction of agaves during road improvement. Positive effects may occur as former roadbeds revegetate and new agaves colonize those areas.

6. Structural Watershed Improvement Projects

Construction and maintenance of the proposed watershed improvement projects may result in destruction of individual agaves and may eliminate some agave habitat through sediment inundation and rising water tables. However, these impacts are expected to be extremely limited in their scope and no significant impacts to the Sanborn's long-nosed bat are expected.

7. Planting of Riparian Trees

No effects on the Sanborn's long-nosed bat are expected from the proposed riparian tree planting.

8. Fuelwood Gathering and Off-Road Vehicle Closure

Closure of the Redrock watershed to off-road vehicle use is expected to have positive effects on the Sanborn's long-nosed bat. Off-road vehicles crush agaves and thus reduce the bat's food source. Open use of the watershed by off-road vehicles would result in proliferating tracks and increasing damage to agaves. Closure to fuelwood gathering is not expected to affect the bat.

9. Monitoring

Monitoring of upland vegetation in the Redrock watershed would help to ensure the survival and recovery of Sanborn's long-nosed bat. Monitoring under the proposed grazing management system could yield valuable data on the relationship between cattle grazing and agave density. Comparative data from the pastures grazed in winter versus those grazed in summer may give information on the rate of cattle consumption of agave flowering stalks. This information would allow for refining of analysis of livestock impacts on Sanborn's long-nosed bat and help in developing management methods to alleviate or minimize such impacts.

10. Arizona Trail

Section 7 consultation is not being conducted on this portion of the proposed action at this time.

11. Removal of Exotic Fishes

Not addressed in this consultation.

12. Introduction of Gila Topminnow into Other Redrock Watershed Waters

Not addressed in this consultation.

Cumulative Effects of the Proposed Action

Cumulative effects are those effects of future non-Federal (State, local government, or private) activities on endangered or threatened species or critical habitat that are reasonably certain to occur during the course of the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in Section 7 and, therefore, are not considered cumulative in the proposed action.

Future anticipated non-Federal actions within the Redrock watershed include increases in recreational use and introduction of non-native fishes by private parties. The only private lands located within the watershed are the Kunde property near the Falls (T22S, R16E, NW 1/4 Sec. 12) and a private inholding in T22S, R17E, NW 1/4 Sec. 27. No changes in the use of the Kunde property are anticipated in the near future. This property is a center for the Kunde cattle operation and has a small house, used only occasionally.

Only a small corner of the private inholding in T22S, R17E, NW 1/4 Sec. 27 lies within the Redrock watershed. However, that small corner is the location of Cott Tank, a major source on non-native fishes in Redrock Canyon. Cott Tank is apparently periodically stocked by the landowner with various game fishes. The largemouth bass, bluegill, and mosquitofish in the drainage below the tank most likely originated from the tank and continue to be supplemented by fish which are washed down from the tank. These non-native fishes have significant adverse effects on the Gila topminnow.

INCIDENTAL TAKE

Section 9 of the Act prohibits any 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 and wildlife without a special exemption. Harm is further defined 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. 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 taking provided that such taking is in compliance with this incidental take statement. **The measures described below are nondiscretionary and must be undertaken by the agency or made a binding condition of any grant or permit issued to the applicant, as appropriate.**

The FWS anticipates that the proposed Redrock Canyon Action Plan may result in incidental take of Gila topminnow as follows:

1. Direct loss of individual fish during construction of fence crossings of perennial or intermittent surface waters.

2. Direct loss of individual fish during pole plantings along perennial or intermittent surface waters.

3. Direct loss of individual fish during habitat enhancement and pool excavation at Pig Camp Spring.

4. Indirect loss of Gila topminnow and their habitat through depletion of streamflow due to pumping of alluvial subsurface water from Redrock, Redbank, and Silver Tank Wells.

Because reliable estimates of populations of Gila topminnow are not obtainable due to sampling difficulties and to the rapid population changes inherent in a short-lived species with high fecundity, the direct incidental take anticipated as a result of the various aspects of this project cannot be quantified. Therefore, except for the work at Pig Camp Spring, greater incidental take than anticipated will be assumed to occur if more than 20 dead topminnow and/or 20 longfin dace (Agosia chrysogaster) (as an indicator species) are observed downstream from any activity within the stream channel during and within a few hours following that activity. If 20 dead fish of either species is observed, then work should be halted and consultation reinitiated. At Pig Camp Spring, incidental take is anticipated to result in loss of up to all of the Gila topminnow present in the spring at the time of habitat work.

The FWS anticipates that the proposed Redrock Canyon Action Plan may result in incidental take of Sanborn's long-nosed bat through loss of habitat due to destruction of agaves during construction and maintenance of fencelines, water developments, exclosures, road improvements, and other plan components. Anticipated level of take is not more than 100 agaves of Agave parryi plus Agave palmeri killed, crushed, or uprooted during all construction on features of the action plan.

Reasonable and Prudent Measures

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental take.

1. Conduct all proposed actions in a manner which will minimize direct mortalities of Gila topminnow and Sanborn's long-nosed bat (Terms and Conditions 1.1 through 1.2).

2. Conduct all proposed actions in a manner which will minimize take of Gila topminnow and Sanborn's long-nosed bat habitat (Terms and Conditions 2.1 through 2.2).

3. Maintain complete and accurate records of actions which may result in take of Gila topminnow and their habitat (Terms and Conditions 3.1 through 3.2).

Terms and Conditions for Implementation

In order to be exempt from the prohibitions of Section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with.

1.1 The Coronado National Forest shall make all reasonable efforts to minimize disturbance of and work within surface waters and the stream channel of Redrock Canyon.

1.2 Habitat enhancement work at Pig Camp Spring shall be carried out in a manner which will minimize take of Gila topminnow. Work will be planned and supervised with the assistance of a qualified fisheries biologist.

2.1 At the time of renewed operation and/or improvements to Redrock and/or Silver Tank Wells, the Coronado National Forest shall conduct an analysis of data on well depths, recharge, amount to be pumped, and other pertinent data on Redrock, Silver Tank, and Red Bank Wells. This data shall be used to determine, in conjunction with the FWS, the potential effect of the renewed operation of the two wells on the streamflow of Redrock Canyon and the potential for adverse effects to the Gila topminnow. If it is determined that there is likely to be an adverse effect on Gila topminnow, then consultation on the operation of those wells must be reinitiated.

2.2. The Coronado National Forest shall take all necessary measures to minimize loss of agaves during the construction and maintenance of fencelines, exclosures, water developments, and watershed improvement projects, and during the improvement and maintenance of roads. Agave palmeri and A. parryi which would be destroyed during such construction and maintenance activities shall be transplanted out of the disturbance area. Staging and transport areas for any construction activities shall be cleared of any individual agaves of the above two species which are likely to be crushed or otherwise destroyed. Removed agaves shall be transplanted into an appropriate site.

3.1. The Coronado National Forest shall notify the FWS prior to initiation of any activities that have been determined under this opinion to have the potential to affect (either adversely or beneficially) Gila topminnow or Sanborn's long-nosed bat.

3.2. The Coronado National Forest shall maintain a written record of the implementation of any actions addressed in this opinion which may affect (either adversely or beneficially) the Gila topminnow or Sanborn's long-nosed bat. This record shall include project plans, appropriate photo documentation, maps, actual construction records, etc. This information shall be furnished, in writing, to the FWS within two months following completion of the action.

If, during the course of the proposed action, the amount or extent of the incidental take limit is reached, the USFS must reinitiate consultation with the FWS immediately to avoid violation of Section 9. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). The USFS should provide an explanation of the causes of the taking.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term conservation recommendations has been defined as suggestions of the FWS regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's 7(a)(1) responsibility for these species. The following conservation recommendations are made for the proposed Redrock Canyon Action Plan:

1. Livestock use of the Pig Camp Spring exclosure during drought should be disallowed if the permittee has not maintained and kept nearby water developments in operating condition.

2. Survey the Redrock drainage, including all springs and tributaries for the presence of perennial water. All apparently perennial water should be evaluated for its potential as Gila topminnow transplant sites. Survey and evaluation should be conducted by a a qualified fisheries biologist.

3. Field determination of exact location of exclosure fences should be conducted with the assistance of a qualified fisheries biologist.

4. All riparian tree plantings should be made from local stock of native species.

In order for the FWS to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the FWS requests notification of the implementation of conservation recommendations.

CONCLUSION

This concludes formal consultation on this action. Reinitiation of formal consultation is required if the amount or extent of incidental take is exceeded, if new information reveals effects of the action that may impact

listed species or critical habitat in a manner or to an extent not considered in this opinion, if the 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 if a new species is listed or critical habitat designated that may be affected by the action.

Sincerely,

Lesley A Fitzpatrick

Lesley A. Fitzpatrick
Acting Field Supervisor

cc: Director, Arizona Game and Fish Department
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Maps are too large to scan. They are available upon request.