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AESO/SE
2-21-00-F-286 February 26, 2001

Ms. Eleanor Towns
Regional Forester
Attn: Mr. James Lloyd
U.S. Forest Service Southwestern Region
517 Gold Avenue, SW
Albuquerque, New Mexico 87102-0084

Dear Ms. Towns:

This biological opinion responds to the Forest Service's April 21, 2000, letter requesting initiation of formal section 7 consultation under the Endangered Species Act (Act) of 1973, as amended. The consultation concerns possible effects to species listed under the Act and their critical habitats due to reauthorizing permitted livestock grazing on National Forest System Lands in the Southwestern Region of the Forest Service.

This biological opinion covers allotments contained in the Apache-Sitgreaves National Forests (Forest), which comprises four of the six allotments for which formal consultation was initially requested. On the Apache-Sitgreaves National Forests, formal consultation was requested for loach minnow (*Tiaroga cobitis*) on all allotments, while concurrence was requested for Little Colorado spinedace (*Lepidomeda vittata*) on two allotments. The four allotments and the consultation requests by the Forest are as follows:

Allotment	Species	Critical Habitat	Concurrence
Black River	Loach minnow	Loach minnow	
Boneyard	Loach minnow	Loach minnow	Little Colorado spinedace
Nutrioso Summer	Loach minnow	Loach minnow	Little Colorado spinedace
Williams Valley	Loach minnow	Loach minnow	

Concurrences

The Little Colorado spinedace does not occur on either the Boneyard or Nutrioso Summer allotments. It does occupy Nutrioso Creek, which is near the Boneyard Allotment boundary, and is about 3.5 miles from the Nutrioso Summer Allotment. Primary effects to Little Colorado

spinedace would be from sediment generated by livestock on the two allotments. However, any possible sediment would be captured or filtered by agricultural fields or private land impoundments prior to reaching occupied spinedace habitat. Based on the above, the Fish and Wildlife Service (Service) concurs with your determination of "not likely to adversely affect" for Little Colorado spinedace and its critical habitat within the action area of the Boneyard and Nutrioso Summer allotments.

Consultation History

On February 6, 1998, the Regional Director of the Service's Southwest Region and the Acting Regional Forester of the Forest Service Southwestern Region signed a consultation agreement that defined the process, products, actions, and schedule for completion of consultation for the ongoing site specific grazing activities on an allotment-by-allotment basis in the Forest Service Southwestern Region. However, the consultation agreement was pertinent only to ongoing grazing activities. Thus, in a letter dated September 18, 1998, the Regional Director of the Service's Southwest Region acknowledged and agreed to the use of guidance criteria for term grazing permits, which is similar procedurally to the process used for consulting on ongoing grazing activities.

Similar to the consultation agreement for ongoing grazing activities, the Forest and the Service established a Federal "Interagency Grazing Consultation Team," including personnel from both agencies, to assess the effects to listed and proposed species and their critical habitats from term grazing permits on an allotment-by-allotment basis, and develop the supplemental biological assessment. The team worked with each respective Forest staff to review allotment management, describe the effects of term-permitted grazing on listed species, and arrive at final determinations of grazing effects on an allotment-by-allotment basis. The objectives of the Interagency Grazing Consultation Team and the process that determines when and how the Service consults on various allotments has been detailed in the Biological Opinion for Southwest Region, U.S. Forest Service Ongoing Livestock Grazing Activities on Allotments (hereafter, Ongoing Grazing Opinion; USFWS 1999).

In a letter dated April 21, 2000, the Forest Service requested initiation of formal consultation, and transmitted the *USDA Forest Service Southwestern Region Biological Assessment for Issuing Term Grazing Permits* (BA). The consultation initiation package contained the basic information required to begin formal consultation, including the "Guidance Criteria for Determining the Effects of Issuing Term Grazing Permits on Threatened, Endangered, or Species Proposed for Listing" dated August 25, 1998. On May 22, 2000, the Service received each allotment specific biological assessment. The Service responded to the Forest's request for consultation with a letter (June 2, 2000) confirming initiation of formal consultation.

The Service issued a draft biological opinion on November 16, 2000, and received the Forest's comments on December 21, 2000. The Service requested an 60-day extension (beginning December 21, 2000) to the consultation period, to which the Forest agreed in their letter of

February 5, 2001. Finally, the Forest disclosed numerous applicants in a facsimile dated January 3, 2001.

BIOLOGICAL OPINION

Description of Proposed Action

Black River Allotment

This allotment consists of three pastures; Open Draw, Three Forks, and East Pasture. Only East Pasture is scheduled for grazing. The proposed season of use is from July 15 to October 15 with 220 cattle (330 AUM's). Grazing will occur in a two-year cycle, with each grazing season lasting 6 weeks. Cattle are scheduled to enter the East Pasture on July 15 and exit the pasture on September 1 of the first year, and will enter the pasture on September 1 and exit the pasture on October 15 of the second year. The allotment will receive complete rest during the spring growing season (April to mid-July).

Using best management practices, this allotment is proposed for 20% forage utilization objectives. No re-grazing of pastures will be allowed. Grazing will not be allowed in the Boneyard Creek holding trap and in the creek below the holding trap to the pasture boundary. No regrazing of pastures will be allowed. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to immediately move to the next scheduled pasture or removed from National Forest System Lands. If forage utilization at or near midpoint is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

Livestock shipping will be conducted from the Open Draw Holding Trap and corral #1537, and trailed to the East Pasture. When cattle exit the East Pasture they will be trailed back to the Open Draw shipping corral and trap. When trailing livestock, cattle will only cross the North Fork of the East Fork of the Black River at the confined road crossing of Forest Road 249. Livestock trailing to and from the Open Draw holding trap and corral is limited to four days. Boneyard corral #1096 and the cabin complex corral #1321 will be removed from National Forest System Lands. A range fence will replace a portion of the corral complex to prevent livestock access into Boneyard holding trap #1318.

The following provides details on the condition, use, and acreage of the Black River Allotment:
Period of Proposed Action:

- 10 years

Allotment Acres:
- 14,371 total
- 7,308 full capacity range; approximately 3,600 in East Pasture

Proposed Use:
- 220 cow/calf, 07/15-10/15

Elevation and Major Vegetation Types:
- 7,600'-9,200'
- ponderosa pine
- mixed conifer
- meadow and grasslands

Projected Stocking Density:
- reduced to 330 animal months from 2134 animal months by 2002

Type of Grazing System:
- 1 pasture (time rotation)

Major Drainages:
- Boneyard Creek
- Coyote Creek
- Deer Creek
- East Fork Black River
- North Fork of East Fork Black River
- Open Draw
- Three Forks

Allotment Condition by Key Area:
- 25% meets Forest Plan soil standards; 75% does not
- 50% meets Forest Plan range standards; 50% does not

Listed Species Adversely Affected:
- loach minnow and loach minnow critical habitat

Ecological Condition and /or Management Action that Contributes to Adverse Effects:
- Grazing in the East Pasture generates sediment that enters Boneyard Creek, which flows into the North Fork of the East Fork of the Black River.

Boneyard Allotment

This allotment is proposed to be a consolidation of Boneyard and Nutrioso Winter allotments. The Forest proposes to permit 97 cattle (292 AUM's) from July 15 to October 15, based on the 1998 Production-Utilization Survey. Using a deferred grazing system, Boneyard, Grassyhollow, and Middle pastures are scheduled for use from July 15 to September 20. Each pasture will

receive approximately 3 weeks of grazing (Buck McKinney, USFS, pers. com.). The Nutrioso Winter Pasture is proposed for use from September 21 to October 15 each year.

Using best management practices, this allotment is proposed for 25% forage utilization objectives. No regrazing of pastures will be allowed. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to be immediately moved to the next scheduled pasture or be removed from National Forest System Lands. If forage utilization at or near midpoint is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

Livestock grazing in the Duck Trap adjacent to Sierra Blanca Lake in the Boneyard Pasture will not be permitted. The permittee will be responsible for maintenance of the Duck Trap exclosure, and other gathering traps will only be used by livestock to facilitate scheduled pasture moves. The permittee will finance 100% of new range development materials and construction. The following may be installed: a new storage tank with trough on Robinson Spring development located in the Nutrioso Winter Pasture, and a pipeline with trough from the Forest Service horse pasture. However, these new range developments are not required for implementation or monitoring.

<u>The following provides details on the condition, use, and acreage of the Boneyard Allotment:</u>

Period of Proposed Action:
- 10 years

Allotment Acres:
- 4,478 total
- 3,465 full capacity range

Proposed Use:
- 97 cattle, 07/15-10/15

Major Vegetation Types:
- ponderosa pine
- mixed conifer
- grasslands

Projected Stocking Density:
- reduced to 292 animal months from 795 animal months by 2004

Type of Grazing System:
- 3 pasture deferred rotation (Nutrioso Winter pasture is season long)

Major Drainages:
- Coyote Creek
- Watts Creek
- Davis Creek

Allotment Condition by Key Area:
- 55% of the area meets Forest Plan soils standards; 45% does not
- 44% of the allotment meets Forest Plan range standards; 56% does not

Listed Species Adversely Affected:
- loach minnow and loach minnow critical habitat

Ecological Condition and /or Management Action that Contributes to Adverse Effects:
- Grazing will occur in the headwater areas of streams occupied by loach minnow.
- Some riparian areas influencing aquatic conditions in Boneyard and Coyote creeks are highly eroded and contribute sediment downstream to loach minnow habitat.

Nutrioso Summer Allotment

The Forest proposes to implement a two pasture, deferred grazing system with a season of use extending from July 15 to October 15 of each year. Four pastures will be consolidated into two pastures for this action: North Springs and Pace Draw Trap will be consolidated, and Boneyard and Sulzberger pastures will be consolidated. One-hundred six adult cattle (318 AUM's) will use the resulting two pastures. Auger Canyon and Miller pastures will both be excluded from livestock grazing, and the Forest fenced Boneyard Bog in 1999 to exclude livestock. Rogers Marsh will be excluded from livestock grazing, with the exception of one small livestock watering point.

Using best management practices, this allotment is proposed for 25% forage utilization objectives. No re-grazing of pastures will be allowed. No regrazing of pastures will be allowed. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to immediately move to the next scheduled pasture or removed from National Forest System Lands. If forage utilization at or near midpoint is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

The following provides details on the condition, use, and acreage of the Nutrioso Summer Allotment:

Period of Proposed Action:
- 10 years

Allotment Acres:
- 15,000 total
- 13,465 full capacity range

Proposed Use:
- 106 cattle, 07/15-10/15

Major Vegetation Types:
- ponderosa pine
- mixed conifer
- grasslands

Projected Stocking Density:
- reduce to 318 animal months from 1,441 animal months by 2004

Type of Grazing System:
- 2 pasture deferred rotation

Major Drainages:
- Boneyard Creek
- Colter Creek
- Nutrioso Creek
- Auger Creek

Allotment Condition by Key Area:
- 20% meets Forest Plan soils standards; 80% does not
- 20% meets Forest Plan range standards; 80% does not

Listed Species Adversely Affected:
- loach minnow and loach minnow critical habitat

Ecological Condition and /or Management Action that Contributes to Adverse Effects:
- Grazing will occur in the headwater areas of streams occupied by loach minnow.
- Some riparian areas influencing aquatic conditions in Boneyard and Coyote creeks are highly eroded and contributing sediment downstream to loach minnow habitat.

Williams Valley Allotment

The Forest proposes to implement a three pasture deferred rotation to include Noble/Williams, Addition, and Talwiwi pastures. Permitted season of use is scheduled between July 15 and October 15 of each year. Capacity is 455 AUM's based on the 1998 Production-Utilization survey (from BA). The small holding pastures for horses and cattle, which are wet meadows in

Alpine Valley, will be excluded from livestock grazing. In total, 151 adult cattle (cow/calf) are proposed for this allotment. Three periods of use are proposed (early, mid, and late season), with 1 month of use for each period. No re-grazing of pastures will be permitted. Each pasture will receive two periods of deferment out of three periods during a three-year cycle. On the fourth year, the rotation cycle repeats. This deferred system will be implemented as follows:

Using best management practices, this allotment is proposed for 25% forage utilization objectives. No re-grazing of pastures will be allowed. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to be immediately moved to the next scheduled pasture or be removed from National Forest System Lands. If forage utilization at or near midpoint is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

Year 1 - Talwiwi Pasture, early season, July 15 to August 15
Year 1 - Addition Pasture, mid season, August 16 to September 15
Year 1 - Williams/Noble Pasture, late season, September 16 to October 15

Year 2 - Williams/Noble, early season
Year 2 - Talwiwi Pasture, mid season
Year 2 - Addition Pasture, late season

Year 3 - Addition Pasture, early season
Year 3 - Williams/Noble, mid season
Year 3 - Talwiwi Pasture, late season

Year 4 - Grazing cycle repeats beginning with year 1

<u>The following provides details on the condition, use, and acreage of the Williams Valley Allotment:</u>

Period of Proposed Action:
- 10 years

Allotment Acres:
- 13,378 total
- 7, 231 full capacity range

Proposed Use:
- 151 cow/calf, 07/15-10/15

Elevation and Major Vegetation Types:
- 8,000'-9,600'
- ponderosa pine
- grasslands

Projected Stocking Density:
- reduce to 455 animal months from 1045 animal months by 2004

Type of Grazing System:
- 3 pasture deferred rotation

Major Drainages:
- Coyote Creek
- San Francisco River

Allotment Condition by Key Area:
- 75% meets Forest Plan soils standards; 25% does not
- 58% meets Forest Plan range standards; 42% does not

Listed Species Adversely Affected:
- loach minnow and loach minnow critical habitat

Ecological Condition and /or Management Action that Contributes to Adverse Effects:
- Grazing in the Addition Pasture generates sediment that enters Coyote Creek, which flows into the East Fork of the Black River. Elk use in the Kentucky bluegrass bottoms of Coyote Creek are likely to affect the rate of recovery and ability of the vegetation to filter sediments.

Status of the Species (range-wide)

1. Loach minnow (*Tiaroga cobitis*)

Loach minnow was listed as a threatened species on October 28, 1986 (USDI 1986). Critical habitat was designated for loach minnow on April 25, 2000 (USDI 2000). 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.

The loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley 1973). Historic 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, Pace, Frieborn, Negrito, Whitewater, and Dry Blue creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst et al. 1985, Propst et al. 1988, Marsh et al. 1990, Bagley et al. 1995, Bagley et al. 1998, Miller 1998).

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 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). The life span of loach minnow is about 2 years (Britt 1982, Propst and Bestgen 1991). Loach minnow feeds exclusively on aquatic insects (Schreiber 1978, Abarca 1987). 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 above characteristics serve as the underlying reasoning for the following constituent elements of loach minnow critical habitat: 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 flow velocities in shallow water with uncemented cobble and rubble substrate; 6) Low amounts of fine sediment and substrate embeddedness; 7) Riffle, run, and backwater components present in the aquatic habitat; 9) Low to moderate stream gradient; 10) Water temperatures in the approximate range of 1-30 deg.C (35- 85 deg.F), with natural diurnal and seasonal variation; 11) Abundant aquatic insect food base; 12) Periodic natural flooding; 13) A natural unregulated hydrograph or, if flows are modified or regulated, then a hydrograph that demonstrates an ability to support a native fish community; and 14) Habitat devoid of nonnative aquatic species detrimental to loach minnow, or habitat in which detrimental nonnative species are at levels which allow persistence of loach minnow.

Biochemical genetic work on loach minnow indicate there are substantial differences in genetic makeup between 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 range-wide. Although it is currently listed as threatened, the Service has found that a petition to uplist the species to endangered status is

warranted. A reclassification proposal is pending, however work on it is precluded due to work on other higher priority listing actions (USDI 1994).

Environmental Baseline

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

Status of the Species (in the action area)

Wild ungulate grazing is common to all the allotments. Although wild ungulate grazing is not an element of the proposed action, the effects of the action must encompass current wild ungulate use and past livestock use, as both have contributed to the degraded baseline condition of loach minnow and its critical habitat in the action area. As such, the effects of the Forest's proposed action are heightened by the current degraded condition of the area from wild ungulate use and past grazing practices.

Black River Allotment

Within an elevation range of 7,600 to 9,200 feet, the vegetation communities are ponderosa pine and mixed conifer forests with large areas of open grassland or meadow. There are three pastures on the allotment: Open Draw, Three Forks, and East Pasture. The East Pasture is of primary concern in this allotment because no other pastures will be grazed under this proposed action. All of the East Pasture is within the lower portion of the Boneyard Creek watershed. Boneyard Creek is perennial through this pasture, with several intermittent tributaries. Livestock currently have direct access to Boneyard Creek, and the defined ephemeral drainages that feed into it in the East Pasture. However, livestock have not grazed Boneyard Creek since 1997 because of personal convenience non-use of the permittee. As a result, Boneyard Creek has received rest for three full years. No "in-stream" tanks exist that might capture sediments from the runoff of the East Pasture. Based on data collected in 1998, 50% of key areas in the allotment are in unsatisfactory condition, and 75% of the key areas are in unsatisfactory soil condition.

In 1996, loach minnow was discovered in the East Fork of the Black River (EFBR). Additional sampling in 1997 revealed that the population of loach minnow in EFBR extends from the confluence of Open Draw, upstream to about the confluence of Boneyard Creek (approximately 2.5 miles total) within the North Fork of the East Fork of the Black River. More recently, surveys in 2000 by the Arizona Game and Fish Department discovered loach minnow further upstream in the North Fork of the East Fork of the Black River. Approximately one dozen individuals were recorded 328-492 ft. upstream of the Forest Route (FR) 249 road crossing, 10-

11 individuals were recorded 2,257 ft. upstream of the FR 249 road crossing, and 1 individual was found 5,006 ft. upstream of the FR 249 road crossing (J. Ward, USFS, pers. com.).

Critical habitat is present within the East Pasture of this allotment. Since the East Pasture is the only pasture that will be grazed, it essentially comprises the allotment for this consultation. Approximately 1 river mile of loach minnow critical habitat exists on the southwestern edge of the East Pasture on Boneyard Creek. Cattle are not authorized in this area, by terms of the permit.

This allotment was not in use in 1998, 1999, or 2000, and was thus not consulted on as part of the Ongoing Grazing Opinion (USFWS 1999). Thus, although livestock access to Boneyard Creek was not restricted, Boneyard Creek has had 3 years of recovery time since grazing did not occur in recent years. However, given that soil condition is unsatisfactory (75% does not meet Forest Plan Standards), it is reasonable to conclude that the allotment has been in a very poor state for some time, and that livestock grazing has have contributed a measurable amount of sediments into the stream channels. Furthermore, since the soil condition is generally unsatisfactory, the filtration of sediments is not likely, and transportation overland is likely to occur. Once sediments reach a defined drainage channel, their transport directly into Boneyard Creek and the East Fork of the Black River is likely.

Populations of loach minnow in the North Fork of the East Fork of the Black River and East Fork of the Black River are considered to be within the action area of livestock grazing within the entire Black River Allotment. Nonnative aquatic species within the East Fork of the Black River may impact the loach minnow. Brown trout and brook trout are active fish predators, fathead minnow may compete for habitat with the loach minnow, and crayfish add to sedimentation problems. Degraded watershed conditions are primarily due to roads, livestock management, and wild ungulates. These conditions, in addition to the presence non-native species appear to be the greatest threats to this small population of loach minnow. Periodic flooding that cleans riffles of embedding sediments is important to the survival of loach minnow.

Boneyard Allotment

The Boneyard Allotment is a rather small allotment (4,478 acres) in the upper watershed of the Black River drainage. Within an elevation range of 8,400 to 9,100 feet, the vegetation communities are ponderosa pine and mixed conifer forests with large areas of open grassland or meadow. There are four pastures on the allotment: Boneyard, Middle, Nutrioso Winter, and Grassy Hollow. These lie within the watershed of Coyote and Boneyard creeks.

Coyote Creek crosses through the lower portion of the allotment within the Grassy Hollow Pasture, about 3 miles upstream from its confluence with the East Fork of the Black River, just downstream of the area known as Three Forks of the Black River. Most of Grassy Hollow and Middle pastures are within the Coyote Creek watershed. Coyote Creek can be characterized as permanent/interrupted throughout much of the reach through the allotment (in some years, flow is interrupted by dry stretches, though pools are expected to remain). Access to Coyote Creek and the defined ephemeral drainages that feed from both pastures is unhindered. However, in

accordance with the 1999 Ongoing Grazing Opinion, the Forest and grazing permittee protected Coyote Creek from grazing in 1999 and 2000 by not allowing livestock grazing in the Grassy Hollow pasture. The Forest and permittee are to be commended for this, as Coyote Creek has now had 2 full seasons of rest. The soil condition for this allotment shows 55% are meeting Forest Plan Standards in key areas. Some opportunity exists for filtration of sediments by vegetation; however, once sediments reach a defined drainage channel, some transport into the East Fork of the Black River is possible.

Boneyard Pasture and part of Middle Pasture are within the Boneyard Creek watershed. About half of Boneyard Pasture appears to drain into Sierra Blanca Lake, an impoundment created by the construction of an earthen dam that empties directly into Boneyard Creek approximately 3 miles above Three Forks. It is likely that this reservoir functions to trap sediments and nutrients that might be generated through livestock grazing on that portion of Boneyard Pasture, and precludes their entry into Boneyard Creek. The balance of the Boneyard Pasture and a small section of Middle Pasture drain into a portion of Williams Valley that, in turn, drains into Boneyard Creek without first flowing through Sierra Blanca Lake. Runoff in this portion of the allotment travels overland or in an eroded channel from 1 to about 4 miles prior to reaching perennially flowing water at the Boneyard Springs complex. Sediments flowing into the incised channel on the east end of the Boneyard and Middle pastures of the Boneyard Allotment are likely to travel into Boneyard Creek and then to the North Fork of the East Fork of the Black River. Boneyard Creek appears to be heavily embedded and is characterized by incised channels.

The 1999 Ongoing Grazing Opinion documented the poor distribution of livestock which had contributed to ongoing erosion problems. Areas easily accessible to livestock had been overgrazed, and less accessible areas had been ungrazed. Range condition on 56% of the allotment is currently unsatisfactory. Elk contribute to heavy forage utilization on the allotment, and often use areas before livestock enter the allotment.

Loach minnow do not occur within the boundary of the Boneyard Allotment. However, in 1996, the species was discovered in the North Fork of the East Fork of the Black River, near Three Forks of the Black River. This population is at the highest known elevation for loach minnow, approximately 8,200 feet. Based on additional sampling in 1997, it appears that the population of loach minnow in the East Fork of the Black River extends from about 1 mile downstream of the Coyote Creek confluence (approximately at the confluence with Open Draw), and upstream in the North Fork of the East Fork of the Black River to about the confluence with Boneyard Creek (about 2.5 miles total). As discussed above, loach minnow have recently been found in new areas of the North Fork of the East Fork of the Black River. In addition, Arizona Game and Fish Department surveys this year (2000) have detected the presence of loach minnow (1 individual) in Coyote Creek, 1850 ft. upstream of the confluence of the North Fork of the East Fork of the Black River (J. Ward, USFS, pers. com.). As a result of the survey the known distribution is greater than in 1997.

Critical habitat is not present within the Boneyard Allotment. Critical habitat begins approximately 0.38 river miles downstream of the Grassy Hollow Pasture boundary on Coyote Creek.

Populations of loach minnow in the North Fork of the East Fork of the Black River and East Fork of the Black River are considered to be within the action area of livestock grazing within the entire Boneyard Allotment. Nonnative aquatic species within the East Fork of the Black River may impact the loach minnow. Brown trout and brook trout are active fish predators, fathead minnow may compete for habitat with the loach minnow, and crayfish add to sedimentation problems. Degraded watershed conditions are primarily due to roads, livestock management, and wild ungulates. These conditions, in addition to the presence non-native species appear to be the greatest threats to this small population of loach minnow. Periodic flooding that cleans riffles of embedding sediments is important to the survival of loach minnow.

Nutrioso Summer Allotment

The Nutrioso Summer Allotment is in the upper watershed of the Black River drainage. Within an elevation range of 7,600 to 8,200 feet, the vegetation communities are ponderosa pine and mixed conifer forests, with scattered tracts of open grassland or meadow. Four pastures of the Nutrioso Summer Allotment (North Springs, Boneyard, Pace Draw Trap, and Sulzberger) lie partially or entirely within the upper watershed of Boneyard Creek, about 3 to 4 miles upstream from its confluence with the North Fork of the East Fork of the Black River.

The Nutrioso Summer Allotment within Boneyard and Sulzberger pastures may provide some filtration of sediments when the flow is spread overland across the wide, relatively low-gradient Williams Valley. Sediments flowing into the incised channel on the east end of the Boneyard and Middle pastures of the Boneyard Allotment are likely to travel into Boneyard Creek and then to the North Fork of the East Fork of the Black River. Boneyard Creek appears to be heavily embedded and is characterized by incised channels.

On the Nutrioso Summer Allotment, range condition in 80% of key areas in the allotment do not meet Forest Plan standards. Elk contribute to heavy forage utilization on the allotment. Active erosion is occurring and, based on monitoring, soil condition does not meet Forest Plan Soil Standards on 80% of key areas in the allotment. Much of the runoff from these pastures (especially in the southwest portion of Boneyard Pasture and a portion of the Sulzberger Pasture) eventually flows across the wide, relatively low-gradient grasslands of Williams Valley. Although these grass meadows may provide some opportunity for filtering overland runoff, the runoff eventually must flow through degraded, ephemeral drainage channels that offer little filtering capability. Because of direct access by livestock, erosion from the banks of these channels likely has contributed a measurable amount of sediments downstream. Once these sediments enter the degraded channels, they are transported directly into the North Fork of the East Fork of the Black River, and downstream into the East Fork of the Black River.

The Ongoing Grazing Opinion directed the Forest to exclude livestock access to the riparian/stream corridor of Boneyard Creek and main tributary channels in Boneyard and North

Springs pastures within this allotment in 1999. While livestock did not have access to the primary Boneyard Creek corridor, livestock did graze the main tributary channels in Boneyard and North Springs pastures. This was not in accordance with the Ongoing Grazing Opinion, but the Forest did remove livestock once utilization levels reached the maximum level of 25% (Buck McKinney, USFS, pers. com.).

The Forest completed a fence project in 1999 that excluded livestock access to the sensitive Boneyard Bog area within the Boneyard Pasture. The fencing will exclude livestock from approximately 20 acres within the pasture.

Loach minnow do not occur within the boundary of the Nutrioso Summer Allotment. However, in 1996, the species was discovered in the North Fork of the East Fork of the Black River, near Three Forks of the Black River. This population is at the highest known elevation for loach minnow, approximately 8,400 feet. Based on additional sampling in 1997, it appears that the population of loach minnow in the East Fork of the Black River extends from about 1 mile downstream of the Coyote Creek confluence (approximately at the confluence with Open Draw), and upstream in the North Fork of the East Fork of the Black River to about the confluence with Boneyard Creek (about 2.5 miles total). As mentioned above, loach minnow have recently been found in new areas of the North Fork of the East Fork of the Black River and in Coyote Creek.

Although loach minnow critical habitat does not occur within this allotment, the population of loach minnow in the North Fork of the East Fork of the Black River and East Fork of the Black River is considered to be within the action area of livestock grazing. Nonnative aquatic species within the East Fork of the Black River may impact the loach minnow. Brown trout and brook trout are active fish predators, fathead minnow may compete for habitat with the loach minnow, and crayfish add to sedimentation problems.

Degraded watershed conditions are primarily due to roads, livestock management, and wild ungulates. These conditions, in addition to the presence non-native species appear to be the greatest threats to this small population of loach minnow. Periodic flooding that cleans riffles of embedding sediments is important to the survival of loach minnow.

Williams Valley Allotment

The eastern portion of the allotment, including the Talwiwi and Noble/Williams Valley pastures, essentially forms the upper-most headwaters of the San Francisco River. Loach minnow occur in the San Francisco River about 35 miles downstream from the allotment, in the vicinity of Reserve, New Mexico. Luna Lake, a human-made reservoir on the San Francisco River, is located about 5 miles downstream of the allotment (about 30 miles upstream of the occupied habitat near Reserve) and likely functions to collect most of the sediments that may originate from the allotment. Because of this, populations of loach minnow in the San Francisco River are not considered within the action area of the Williams Valley Allotment.

The disjunct western portion of this allotment (Addition Pasture) includes the downstream portion of the Coyote Creek watershed, which drains into occupied habitat in the East Fork of

the Black River just downstream of the area known as Three Forks of the Black River. Coyote Creek, as it leaves the Addition Pasture, is about 0.7 miles from the East Fork of the Black River. An unnamed tributary of the East Fork of the Black River drains a portion of the Addition Pasture, joining the East Fork of the Black River downstream of Coyote Creek and above Open Draw.

On the Williams Valley Allotment, range condition in all areas is poor, with low plant vigor. Elk contribute to heavy forage utilization on the allotment. Active erosion is occurring, although the soil condition is satisfactory across 75% of the key areas in the allotment. On the Addition Pasture, sediments in overland runoff may be filtered somewhat by the litter accumulated in forested areas. Tanks located in small drainages on the pasture may capture some sediments and prevent them from entering the East Fork of the Black River. Livestock are not restricted from accessing Coyote Creek or any of the other drainage bottoms within the Addition Pasture. In addition, Coyote Creek on the Addition Pasture is characterized by an incised channel running through a heavily impacted grassland/meadow and likely does not function as an effective sediment filter/buffer. Sediments generated from the cutbanks directly enter the drainage channel. Sediments generated in these areas would have little opportunity to be removed from runoff prior to entering the East Fork of the Black River.

Having established the degraded conditions in this allotment, some improvements have been made in the past couple of years. In accordance with the 1999 Ongoing Grazing Opinion, the Forest and permittee took action to ensure that cattle were excluded from Coyote Creek. Within the grazing permit, the Forest stipulated that livestock were to remain out of Coyote Creek, and if ever found in the drainage, cattle were to be promptly removed. In 1999, livestock were found in the Coyote Creek drainage, and were also removed by the permittee (Buck McKinney, USFS, pers. com.). In addition to this, the Forest has implemented $15,000 worth of erosion control structures to reduce sediment transport into the East Fork of the Black River from Coyote Creek. In total, 33 small rock structures were constructed on 5 ephemeral drainages within the Addition Pasture. Four of the drainages flow into an existing earthen stock tank prior to entering Coyote Creek, while the fifth flows uninterrupted into the East Fork of the Black River.

In 1996, loach minnow was discovered in the East Fork of the Black River, near Three Forks. This population is at the highest known elevation for loach minnow, approximately 8,200 feet. Based on additional sampling in 1997, it appears that the population of loach minnow in the East Fork of the Black River extends from about 1 mile downstream of the Coyote Creek confluence (approximately at the confluence with Open Draw), and upstream in the North Fork of the East Fork of the Black River to about the confluence with Boneyard Creek (about 2.5 miles total). Loach minnow have recently been found further upstream in the North Fork of the East Fork of the Black River, 4265 ft., and in Coyote Creek, 1850 ft. upstream of the confluence of the East Fork of the Black River. This area lies within the Addition Pasture of the allotment.

Critical habitat for the loach minnow occurs on the Williams Valley Allotment within the Additon Pasture in Coyote Creek for approximately 1.75 miles. Critical habitat also occurs downstream of the allotment within Coyote Creek for approximately 0.25 miles, and the East Fork of the Black River for approximately ten miles. Known occupied loach minnow habitat

occurs within the lower one mile of Coyote Creek and approximately two miles of the East Fork of the Black River below its confluence with Coyote Creek.
Degraded watershed conditions are primarily due to roads, livestock management, and wild ungulates. These conditions, in addition to the presence non-native species appear to be the greatest threats to this small population of loach minnow. Periodic flooding that cleans riffles of embedding sediments is important to the survival of loach minnow.

Effects of the Action

To avoid redundancy, this section will begin with an analysis of effects applicable to grazing actions on all allotments. It will then follow with allotment-specific effects which may differ among allotments.

Effects of Proposed Action Encompassing All Allotments

Livestock grazing activities on the Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments generate sediments and/or nutrients that could degrade occupied loach minnow habitat in the North Fork of the East Fork of the Black River and the East Fork of the Black River.

Degraded watershed conditions due to over-stocking of livestock, over-utilization of forage by livestock and wildlife, and active erosion of stream channels is exacerbated by the presence of livestock in the streams, may contribute to altering the hydrologic regime (water quality, quantity, intensity, duration, and pattern) of Boneyard and Coyote creeks, thereby increasing erosion and sedimentation into occupied loach minnow habitat in the North Fork of the East Fork of the Black River, and East Fork of the Black River, respectively. The accumulation of sediments in the interstitial spaces of cobbles and gravels in riffle habitats is especially detrimental to successful reproduction of loach minnow, and may impact the invertebrate food base. Hence, numerous critical habitat constituent elements of the loach minnow's life history are adversely affected such as low amounts of fine sediments, abundant invertebrate food base, and spawning areas with uncemented substrate.

The effects that livestock management activities can have on riparian and aquatic habitats, both direct and through upland/watershed effects, have been well documented and discussed in recent years (Platts 1990, Bahre 1991, Meehan 1991, Fleischner 1994). Livestock grazing activities in the uplands can contribute to changes in surface runoff quantity and intensity, sediment transport, soil chemistry, and infiltration and water holding capabilities of the watershed; flood flows may increase in volume while decreasing in duration, and low flows may decrease in volume and increase in duration (Brown *et al.* 1974, Gifford and Hawkins 1978, Johnson 1992). All of these impacts relate directly to critical habitat of the loach minnow by changing stream velocity, the natural flood regime, and natural sediment load levels. Reduced herbaceous vegetation leads to accelerated soil loss due to increased exposure of soils to downpour events and reduced sediment filtering capabilities of the vegetation (Erman *et al.* 1977, Mahoney and Erman 1992, Osborne and Kovacic 1993), and can heavily influence the living areas for larval loach minnow by reducing instream cover; an element characteristic of loach minnow critical

habitat. Hoof action can cause loss of cryptobiotic soil crusts, soil compaction, erosion, and gullying (Harper and Marble 1988, Marrs *et al.* 1989, Orodho *et al.* 1990, Schlesinger *et al.* 1990, Bahre 1991, Klemmedson 1956, Ellison 1960, Arndt 1966, Gifford and Hawkins 1978, Webb and Stielstra 1979, McClaran and Anable 1992). Litter is reduced by trampling and churning into the soil thus reducing cover for soil, plants, and wildlife (Schulz and Leininger 1990). Overuse of vegetation by livestock can cause changes to plant root structures, and alter plant species composition and overall biomass (Martin 1975, Menke 1988, Vallentine 1990, Popolizio *et al.* 1994). These conditions may increase sediment delivery into the stream (Platts 1990, Meehan 1991, Johnson 1992, Weltz and Wood 1994), change the way in which flood flows interact with the stream channel, and may exacerbate flood damage to banks, channel bottoms, and riparian vegetation.

Sediment deposition may eliminate the under-cobble pockets needed by loach minnow, degrading critical habitat, and making potential habitat unsuitable. 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, Waters 1995, Newcombe and Jensen 1996). Excessive sediment may smother invertebrates, reducing fish food production and availability. Excessive sediment buries gravel, cobble, and coarse sand substrates. Loach minnow and their eggs are particularly vulnerable to substrate sedimentation that reduces available habitat and smothers eggs (Propst *et al.* 1988).

Sedimentation from tributary canyons and streams leading to the East Fork of the Black River contributes to the condition of the river downstream. The riparian vegetation and streambank condition in tributaries, including intermittent and ephemeral channels, form important buffers between upland impacts and the mainstem or perennial stream. A healthy riparian zone with substantial herbaceous cover is a very effective buffer for filtering sediment and pollutants before they can reach the stream (Erman *et al.* 1977, Mahoney and Erman 1981, Lowrance *et al.* 1984, Bisson *et al.* 1992, Osborne and Kovacic 1993). The riparian vegetation also serves to reduce streambank erosion (Thomas *et al.* 1979, Heede 1985, Stromberg 1993).

The short lifespan of the loach minnow, coupled with the comparatively low fecundity of the species and small population in the East Fork of the Black River, makes it vulnerable to serious adverse effects from activities which may only impact the species' habitat for relatively short time periods, especially during the spawning season. Any situation that eliminated or greatly reduced a year-class would severely deplete recruitment to a population. For example, excessive sedimentation during the spawning season might suffocate a large portion of that year's reproductive effort. In the succeeding year, total reproductive effort would be diminished. The net effect would be a major reduction in population size (Propst *et al.* 1988).

Loach minnow are adversely affected by activities which contribute to altering the flow regime (water quality, quantity, intensity, and duration), degrading the stream channel, and modifying the floodplain and riparian vegetation structure and diversity. These impacts occur at all levels of cattle presence, regardless of season, but increase as number of livestock and length of time the cattle are present increase (Marlow and Pogacnik 1985). The way in which the effects of livestock grazing are manifested and the magnitude of the effects in the watershed, is dependant

on local site conditions. Range condition, considered together with soil, watershed, and riparian condition, is assumed to be closely correlated with ecological condition and function. Watershed/ecological effects of grazing are generally expected to be more evident where stocking levels are high, soils are impaired, and/or rangelands are in fair, poor, or very poor condition.

The loach minnow population in the East Fork, and North Fork of the East Fork of the Black River, is small and may be highly sensitive to environmental perturbations (e.g., altered stream flow, sedimentation, water temperatures). This is the highest elevation site known for the species. In order to interpret the ramification of management actions, ecological/biological information on the species is needed, especially related to spawning periods. Any direct monitoring of the loach minnow population must be undertaken very cautiously.

The combined effects of livestock management activities associated with the Boneyard, Nutrioso Summer, Williams Valley, Black River, and other allotments in the watershed, contribute to a serious concern regarding the viability of the loach minnow population in the East Fork of the Black River, North Fork of the East Fork of the Black River, and Coyote Creek.

As stated above, past management activities have resulted in alteration of the hydrologic regime and contributed to deterioration of the ecosystem. There have been recent efforts by the Forest to ameliorate some of the erosion and sedimentation problems aggravated by ongoing livestock grazing activities on the Williams Valley Allotment. In addition, the Black River Allotment, which includes occupied loach minnow habitat at Three Forks, has been rested for the past 3 years prior to this consultation. These actions have potential for success, but need to be monitored to determine their effectiveness. Continued assertive management by the Forest is necessary to prevent further risk to the survival and recovery of the loach minnow in the East Fork of the Black River, North Fork of the East Fork of the Black River, and Coyote Creek.

Allotment-Specific Analysis of Effects

While the effects of this proposed action have been established in the above discussion, changes in grazing activities on these allotments (since the Ongoing Grazing Opinion) are relevant to accurately assessing effects. The following will outline the proposed changes in livestock grazing, whether beneficial or detrimental to loach minnow, and analyze the overall effects in light of the changes.

Black River Allotment

The Black River Allotment has not been grazed since 1997. During that time, the stocking rate was 388 head of cattle at 1,796 animal unit months (AUM's); the season of use was from May 16 through October 3; the utilization standard ranged from 40-55% (depending on the area); and livestock were scheduled to graze in all pastures. In contrast, the proposed stocking rate for this action is 220 cow/calf at 330 AUM's; the season of use alternates from July 15 to September 1 for one year, to September 1 to October 15 for the alternate year; the utilization standard is 20% in any given key area; and only the East Pasture is proposed for grazing. In addition, this action

is scheduled to occur after the allotment has been rested from authorized livestock use for 3 consecutive years. This action represents a substantial reduction in all areas of grazing management for this allotment with respect to past use. The proposed stocking rate (AUM's) is reduced by 82% of that in 1997. The utilization standard has been reduced by 20-35%, and 2 of 3 pastures will not be grazed at all. Although effects clearly exist as described above, the reduced stocking rate, shorter and later season of use, the lower utilization standard, and the reduced amount of grazed pastures will reduce the level of adverse effects under the proposed action compared to past grazing practices.

The Service recognizes the Forest's efforts to reduce the impacts of grazing in this allotment. Nevertheless, adverse effects to loach minnow and its critical habitat are anticipated as a result of both the degraded baseline condition of the allotment and the direct effects of grazing (albeit reduced grazing). The Service's primary concerns with respect to effects related to this action are two-fold. First, according to the proposed action, livestock will have access to the upper riparian/stream corridor on Boneyard Creek. Since critical habitat for the loach minnow occurs in this area, the effects of grazing are more meaningful to the status of the fish for reasons detailed in the above effects discussion. Second, although the Forest has established lower utilization standards (20%) for key areas of this allotment, it is often difficult to ensure that these standards are met. The ability to know when utilization standards are met is a function of the frequency with which utilization is monitored.

The Forest proposes to document resource conditions and wild ungulate forage utilization during pre-livestock and range readiness inspections. These resources conditions will be documented and professional judgement will be used when determining the actual date for a second forage utilization measurement within key areas in each pasture. Because such forecasting is subject to the interpretation of individual experience and opinion, there is a possibility that utilization standards will be exceeded prior to the second utilization check. The probability of this occurring is magnified when elk can be expected to elevate the baseline utilization rates to levels that are near (and sometimes exceed) the utilization standard applied by the Forest. Furthermore, even though the Forest has been diligent in enforcing the withdrawal of livestock to meet forage utilization objectives, removing livestock from any given pasture can be a time consuming process that commonly takes a week or more to complete. Given that the season of use for this allotment is only 6 weeks long, a single week of extended use (beyond the utilization standard) can have significant additional adverse effects.

Boneyard Allotment

The Boneyard Allotment has been grazed for some time, but the Service only has allotment information for 1997-2000. During these four years, the stocking rate ranged from 159 head of cattle at 795 AUM's for 1997, 1998, and 2000, to 60 head of cattle (238 AUM's) during 1999 (because of a drought); the season of use was from June 1 through October 31, except for 1999, which lasted from late July to October 31; the utilization standard was about 40% for 1997 and 25% for all subsequent years; and livestock were allowed to graze in all pastures except in 1999 and 2000, when the Grassy Hollow Pasture was in non-use to comply with the Ongoing Grazing Opinion. In contrast with past years, the proposed stocking rate for this action is 97 cattle at 291

AUM's; the season of use for Boneyard, Grassyhollow, and Middle pastures is from July 15 to September 20, and for Nutrioso Winter, September 21 to October 15; and finally, the utilization standard of 25% will be monitored in key areas.

This action represents a substantial reduction in many areas of grazing management for this allotment with respect to past use. The proposed stocking rate (AUM's) is reduced by 63% of current permitted numbers. The utilization standard remains unchanged, but key areas will be monitored, which will trigger removal of cattle once utilization standards are met. The season of use has been reduced from 5 months to about 3 months, providing much needed periods of rest for pastures. Although effects clearly exist as described above, the reduced stocking rate, shorter and later season of use, and the monitoring of key areas will reduce the level of adverse effects under the proposed action compared to past grazing practices.

The Service recognizes the Forest's efforts to reduce the impacts of grazing in this allotment. Nevertheless, adverse effects to loach minnow and its critical habitat are anticipated as a result of both the degraded baseline condition of the allotment and the direct effects of grazing (albeit reduced grazing). The Service's primary concerns with respect to effects related to this action are two-fold. First, according to the proposed action, livestock will have access to the upper riparian/stream corridor on Boneyard Creek. Since critical habitat for the loach minnow occurs in this area, the effects of grazing are more meaningful to the status of the fish for reasons detailed in the above effects discussion. Second, although the Forest has established lower utilization standards (20%) for key areas of this allotment, it is often difficult to ensure that these standards are met. The ability to know when utilization standards are met is a function of the frequency with which utilization is monitored.

The Forest proposes to document resource conditions and wild ungulate forage utilization during pre-livestock and range readiness inspections. These resources conditions will be documented and professional judgement will be used when determining the actual date for a second forage utilization measurement within key areas in each pasture. Because such forecasting is subject to the interpretation of individual experience and opinion, there is a possibility that utilization standards will be exceeded prior to the second utilization check. The probability of this occurring is magnified when elk can be expected to elevate the baseline utilization rates to levels that are near (and sometimes exceed) the utilization standard applied by the Forest. Furthermore, even though the Forest has been diligent in enforcing the withdrawal of livestock to meet forage utilization objectives, removing livestock from any given pasture can be a time consuming process that commonly takes a week or more to complete. Given that the season of use for this allotment is 3 months long, a single week of extended use (beyond the utilization standard) can have significant additional adverse effects.

Nutrioso Summer Allotment

Like the Boneyard Allotment, the Nutrioso Summer Allotment has probably been grazed for many years, but the Service only has allotment information for 1997-2000. During these four years, the stocking rate was 288 head of cattle (1,441 AUM's) for 1997-1999, and 130 head of cattle (292 AUM's) for 2000; the season of use for 1997-1999 was from June 1 through October

31, and for 2000 the season lasted from August 1 to October 7; the utilization standard was about 40% for 1997 and 25% for all subsequent years; and livestock were allowed to graze in all pastures except in 1999, when the Auger Canyon Pasture was not grazed. In contrast to past years, the proposed stocking rate for this action is 106 cattle at 318 AUM's; the season of use is from July 15 to October 15; and finally, the utilization standard of 25% will be monitored in key areas.

This action represents a reduction in many areas of grazing management for this allotment with respect to past use. The proposed stocking rate (AUM's) is reduced by 78% of that in 1997-1999. The utilization standard remains relatively unchanged, but key areas will be monitored, which will trigger removal of cattle once utilization standards are met. The season of use has been reduced from 5 months to 3 months, and a deferred rotation system is proposed, both of which will provide much needed periods of rest for pastures. Finally, neither Auger Canyon nor Miller pastures would be grazed under the proposed action. Although effects clearly exist as described above, the reduced stocking rate, shorter and later season of use, and the monitoring of key areas will reduce the level of adverse effects under the proposed action compared to past grazing practices.

The Service recognizes the Forest's efforts to reduce the impacts of grazing in this allotment. Nevertheless, adverse effects to loach minnow and its critical habitat are anticipated as a result of both the degraded baseline condition of the allotment and the direct effects of grazing (albeit reduced grazing). The Service's primary concerns with respect to effects related to this action are two-fold. First, according to the proposed action, livestock will have access to the upper riparian/stream corridor on Boneyard Creek. Since critical habitat for the loach minnow occurs in this area, the effects of grazing are more meaningful to the status of the fish for reasons detailed in the above effects discussion. Second, although the Forest has established lower utilization standards (25%) for key areas of this allotment, it is often difficult to ensure that these standards are met. The ability to know when utilization standards are met is a function of the frequency with which utilization is monitored.

The Forest proposes to document resource conditions and wild ungulate forage utilization during pre-livestock and range readiness inspections. These resources conditions will be documented and professional judgement will be used when determining the actual date for a second forage utilization measurement within key areas in each pasture. Because such forecasting is subject to the interpretation of individual experience and opinion, there is a possibility that utilization standards will be exceeded prior to the second utilization check. The probability of this occurring is magnified when elk can be expected to elevate the baseline utilization rates to levels that are near (and sometimes exceed) the utilization standard applied by the Forest. Furthermore, even though the Forest has been diligent in enforcing the withdrawal of livestock to meet forage utilization objectives, removing livestock from any given pasture can be a time consuming process that commonly takes a week or more to complete. Given that the season of use for this allotment is 3 months long, a single week of extended use (beyond the utilization standard) can have significant additional adverse effects.

Williams Valley Allotment

The Williams Valley Allotment has likely been grazed for many years, but the Service only has allotment information for 1997-2000. During these four years, cattle were grazed from 1997-1999. The stocking rate ranged from 209 head of cattle (1045 AUM's) for 1997 and 1998, to 150 head of cattle (455 AUM's) during 1999 because of a drought; the season of use was from June 1 through October 31, except for 1999, which lasted from late July to October 31; the utilization standard was about 40% for 1997 and 25% for all subsequent years; and livestock were allowed to graze in all pastures except in 1999, when the Addition Pasture was only grazed for one week because of drought conditions. In contrast to past years, the proposed stocking rate for this action is 151 cattle at 453 AUM's; the season of use will alternate between the three pastures in such a fashion so that each pasture will only receive 4 weeks of use from July 15 to October 15; and finally, the utilization standard of 25% will be monitored in key areas.

This action represents a substantial reduction in many areas of grazing management for this allotment with respect to past use. The proposed stocking rate (AUM's) is reduced by 57% of that in 1997 and 1998 (non-drought years). The utilization standard remains unchanged (25%), but key areas will be monitored, which will trigger removal of cattle once utilization standards are met. The season of use has been reduced from 5 months to 3 months, providing much needed periods of rest for pastures. Although effects clearly exist as described above, the reduced stocking rate, shorter and later season of use, and the monitoring of key areas will reduce the level of adverse effects under the proposed action compared to past grazing practices. Moreover, in accordance with the 1999 Ongoing Grazing Opinion, the Forest and permittee took action to ensure that cattle were excluded from Coyote Creek by enforcing the removal of cattle when they were discovered in the creek bottom. The Forest also constructed over 30 sediment control structures in the Addition Pasture to remedy some of the sedimentation problems occurring from drainages to Coyote Creek. Finally, the Forest did not graze this allotment in 2000, allowing the pastures a year of rest.

The Service recognizes the Forest's efforts to reduce the impacts of grazing in this allotment. Nevertheless, adverse effects to loach minnow and its critical habitat are anticipated as a result of both the degraded baseline condition of the allotment and the direct effects of grazing (albeit reduced grazing). The Service's primary concerns with respect to effects related to this action are two-fold. First, according to the proposed action, livestock will have access to the upper riparian/stream corridor on Boneyard Creek. Since critical habitat for the loach minnow occurs in this area, the effects of grazing are more meaningful to the status of the fish for reasons detailed in the above effects discussion. Second, although the Forest has established lower utilization standards (25%) for key areas of this allotment, it is often difficult to ensure that these standards are met. The ability to know when utilization standards are met is a function of the frequency with which utilization is monitored.

The Forest proposes to document resource conditions and wild ungulate forage utilization during pre-livestock and range readiness inspections. These resources conditions will be documented and professional judgement will be used when determining the actual date for a second forage utilization measurement within key areas in each pasture. Because such forecasting is subject to

the interpretation of individual experience and opinion, there is a possibility that utilization standards will be exceeded prior to the second utilization check. The probability of this occurring is magnified when elk can be expected to elevate the baseline utilization rates to levels that are near (and sometimes exceed) the utilization standard applied by the Forest. Furthermore, even though the Forest has been diligent in enforcing the withdrawal of livestock to meet forage utilization objectives, removing livestock from any given pasture can be a time consuming process that commonly takes a week or more to complete. Given that the season of use for this allotment is 3 months long, a single week of extended use (beyond the utilization standard) can have significant additional adverse effects.

Cumulative Effects

Cumulative effects reasonably certain to occur in the action area are considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The majority of the East Fork of the Black River watershed is administered by the Forest Service, and thus, there are few cumulative effects. However, elk likely contribute to adverse effects on streamside vegetation and water quality.

Conclusion

After reviewing the current status of the loach minnow and its critical habitat, 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 issuing term grazing permits for the Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments, as proposed, is not likely to jeopardize the continued existence of loach minnow. It is also the Service's biological opinion that the proposed action is not likely to destroy or adversely modify the critical habitat of loach minnow. In summary, despite the degraded baseline condition of the action area, the Forest has sufficiently modified the grazing regime in the action area so that the overall condition of the action area is expected to improve. We base this conclusion on the substantial reduction in utilization standards, duration of use, and number of cattle proposed for this grazing action. The later season of use for all allotments also does much to reduce adverse effects associated with grazing, as pastures are rested during the growing season.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to 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 behavioral patterns, including breeding, feeding, or sheltering. Harass is defined 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 which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take

that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. 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 to be prohibited taking under the Act 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 undertaken by the Forest Service. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the agencies must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

The Service anticipates that the proposed term grazing permits for the Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments will result in incidental take of loach minnow. The primary type of take of loach minnow expected to result from the ongoing grazing activities on the above allotments is harm, which occurs through the effects to habitat that alter the suitability of the habitat to support loach minnow. The Service anticipates, however, that incidental take of loach minnow associated with the proposed action cannot be directly quantified and will be difficult to detect for the following reasons: finding dead or impaired individuals is unlikely; and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. Therefore, the Service defines incidental take in terms of habitat characteristics, and is using this surrogate measure to identify when take has been exceeded. The Service concludes that incidental take of loach minnow from the proposed action will be considered to be exceeded if any of the following conditions are met:

1 Ecological conditions do not improve under the proposed livestock management. Improving conditions can be defined through measurable improvements in watershed condition, soil condition, trend and condition of rangelands, riparian conditions, and stream channel conditions within the natural capabilities of the landscape in all representative reaches on all above named allotments within the East Fork of the Black River watershed. Ecological conditions will be assessed at 3, 6, and 9 years as is directed in term and condition 1.1.

2. Forage utilization standard is exceeded on three pasture entries within any five-year period on any one allotment.

3. ny time livestock access any portion of the riparian/stream corridor of Coyote Creek, Boneyard Creek, or the Boneyard tributary which is adjacent to the northeast boundary of the allotment (located in Sections SW ¼ of 21 and NE ¼ of 28, T6N R30E).

Effect of Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to loach minnow.

Reasonable and Prudent Measures:

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental taking authorized by this biological opinion.

1. Actions will be taken to improve ecological conditions (watershed, soil, range, riparian, and stream channel conditions) on allotments within the Black River watershed.

2. Reduce impacts to stream courses and aquatic habitats from the impacts of livestock use.

3. Monitor activities resulting in incidental take. Report findings to the Service.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

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

1.1. As directed in the Ongoing Grazing Opinion, continue monitoring allotment condition in all allotments. Monitoring will take place at a minimum of every 3, 6, and 9 years. Data collected for monitoring must adhere to the following guidelines at a minimum: 1) a journey-level fish biologist must collect the data, 2) monitoring must be standardized so that the same variables are measured for each of the three years, 3) monitoring must include soil transects located at heavily-used areas on several, lower-end portions of all pertinent drainages, and 4) data on embeddedness and water temperature (using a data-logger type device) will be collected, and photopoints will be taken at the soil transect locations. Other measurements might include: vegetative litter; plant vigor and species diversity; bank, terrace, and floodplain morphology; channel profile; base flow; and other riparian and aquatic habitat measures. If monitoring does not show improvement of unsatisfactory conditions or maintenance of existing satisfactory conditions during the period covered by this consultation, evaluate the grazing management and identify and implement changes as appropriate. Ensure that the language in the term grazing permit allows for this type of adaptive management.

1.2. The Ongoing Grazing Opinion contained a term and condition directing the Forest to initiate an ecosystem-level analysis of the East Fork of the Black River watershed by December 31, 1998. The analysis was to be completed by September 30, 2000. Provide a copy of the Cumulative Effects by 5th Code Watershed for allotments analyzed to date, and transmit a copy of the completed Black River Watershed analysis to the Service's Phoenix Field Office by September 30, 2001.

The following terms and conditions will implement reasonable and prudent measure 2:

2.1. For the Black River Allotment, exclude livestock access to all of the riparian/stream corridor on Boneyard Creek and Boneyard tributary (as described above) within the East Pasture.

2.2. For the Boneyard Allotment, exclude livestock access to the riparian/stream corridor on Coyote Creek for its entire length within the allotment; or exclude all of Grassy Hollow Pasture from grazing.

2.3. For the Nutrioso Summer Allotment, exclude livestock access to all of the riparian/stream corridor on Boneyard Creek within the Sulzberger and Boneyard pastures.

2.4. For the Williams Valley Allotment, exclude livestock access to all of Coyote Creek within the Addition Pasture.

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 Monitor forage utilization on pastures within all allotments within three weeks after livestock exit each pasture.

3.2 For pre-livestock, midpoint, and exit utilization measurements, if ocular estimates are used, and show utilization to be within 10 percentage points of the utilization standard, forage must be physically measured using a quantitative, repeatable method to determine if the utilization standard has been met or exceeded. After 2 years of monitoring, ocular estimates can be compared to quantitative measurements to determine the true discrepancy in ocular estimates. If ocular estimates show accuracy within 5 percentage points of the utilization standard, then 5 percentage points may be used as the trigger to follow up an ocular estimate with a quantitative measurement. Otherwise, when ocular estimates are within 10 percentage points of the utilization standard, forage must be physically measured using a quantitative method to determine if the utilization standard has been met or exceeded. Monitoring will occur in key areas: these are to include the most ecologically sensitive areas for the loach minnow (e.g., riparian areas, tributary channels, source areas of sediment). Provide field data sheets, key species monitored, locations of key areas, analysis summaries, turnout criteria, and target utilization limits to the Service annually at least 30 days prior to issuance of the Annual Operating Plan.

3.3 All monitoring required as part of this incidental take statement, and reporting of the effectiveness of the terms and conditions shall be completed annually, and submitted to the Arizona Ecological Services Field Office at least 30 days prior to the issuance of the Annual Operating Plan. This report shall summarize for the previous calendar year: 1) application and effectiveness of the terms and conditions; 2) documentation of direct take, if any; 3) utilization monitoring summary and analysis; 4) fish monitoring data; 5) progress made toward completion of multi-year terms and conditions; and 6) any suggestions for improving how terms and conditions are to be applied. If, at any time, expected monitoring

results are not accomplished (e.g., utilization levels exceeded, monitoring is not completed on schedule) report these findings and any corrective actions taken to the Service within 15 days.

CONSERVATION RECOMMENDATIONS

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

1. Initiate a cooperative effort with the Arizona Game and Fish Department to ameliorate the impacts of elk on the above allotments. Of particular concern are the Three Forks and Boneyard springs complexes which have experienced bank degradation, soil compaction, and increased turbidity along the spring runs due, in part, to elk foraging, trampling and wallowing. Efforts to alleviate such impacts would not only benefit the loach minnow, but also the Three Forks springsnail (*Pyrgulopsis trivialis*), the California floater (*Anodonta californiensis*), and the Chiricahua leopard frog (*Rana chiricahensis*).

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 recommendations.

REINITIATION NOTICE

This concludes consultation for the Forest's issuance of term grazing permits for the Black River, Boneyard, Nutrioso Summer and Williams Valley allotments. As required by 50 CFR 402.16, reinitiation of formal consultation is required 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 action is subsequently modified in a manner that causes an effect on 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. When the amount or extent of incidental take is exceeded any operations causing such take must cease pending reinitiation.

We appreciate your efforts in this consultation. If we can be of further assistance, please contact Darrin Thome (x250) or Debra Bills (x239). Please refer to consultation number 2-21-00-F-286 in further communication on this project.

Sincerely,

/s/ David L. Harlow
Field Supervisor

cc: Forest Supervisor, Apache-Sitgreaves National Forests, Springerville, AZ
District Ranger, Alpine Ranger District, Apache-Sitgreaves National Forests, Alpine, AZ
Regional Director, Fish and Wildlife Service, Albuquerque, NM
(ARD-ES; ATTN: Cindy Schulz)
Project Leader, Arizona Fishery Resources Office, Pinetop, AZ
Field Supervisor, Fish and Wildlife Service, Albuquerque, NM

John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Richard Remington, Regional Supervisor, Arizona Game and Fish Department, Pinetop, AZ

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