

AESO/SE  
2-21-00-F-298

October 31, 2000

Mr. Frank A. Hayes, District Ranger  
Apache-Sitgreaves National Forests  
Clifton Ranger District  
HC1 Box 733  
Duncan, Arizona 85534

Dear Mr. Hayes:

This biological opinion responds to the Fish and Wildlife Service's (Service) July 28, 2000, receipt of the Apache-Sitgreaves National Forests' (Forest) July 26, 2000, letter requesting initiation of formal section 7 consultation under the Endangered Species Act of 1973, as amended. The consultation concerns possible effects of your proposed Eagle Creek bank stabilization project (at Honeymoon Campground) in Greenlee County, Arizona, on Mexican spotted owl (*Strix occidentalis lucida*), spikedace (*Meda fulgida*), loach minnow (*Tiaroga cobitis*), razorback sucker (*Xyrauchen texanus*), and critical habitat of spikedace and loach minnow. The Forest has made a determination of "not likely to jeopardize" the experimental, nonessential population of Mexican gray wolves (*Canis lupus baileyi*), "may affect, not likely to adversely affect" for Mexican spotted owl, loach minnow, razorback sucker and spikedace, and "not likely to adversely affect [modify]" for loach minnow and spikedace critical habitat.

We understand from speaking with you, and from a site visit on August 2, 2000, that you have already completed a portion of the proposed action. Specifically, beginning July 10, 2000, you initiated blasting of a rock quarry in inadequately surveyed restricted (riparian) Mexican spotted owl habitat during the owl's breeding season. This action and its associated effects have taken place without the benefit of consultation with the Service. Therefore, this aspect of the project cannot be included as part of the proposed action, nor can it be permitted as part of an incidental take statement in this biological opinion.

The following biological opinion is based on the information provided in the May 30, 2000, biological assessment (BA), data in our files, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern or other subjects considered in this opinion. A complete administrative record of this consultation is on file in this office.

## **Concurrences**

The proposed project will not alter Mexican gray wolf habitat detrimentally, and disturbance from work activity is not expected to reduce the likelihood of both the survival and recovery of this species. The razorback sucker was stocked into Eagle Creek from 1981 to 1988 and no razorback have been found in Eagle Creek since 1992. These stockings were approximately 20 miles downstream of the project area, where the stream is larger. It is highly unlikely the project will affect razorback sucker. Based on the above, the Service concurs with your determination of “not likely to jeopardize” for the experimental, nonessential population of Mexican gray wolves and “may affect, not likely to adversely affect” for razorback sucker.

## **Consultation History**

The proposed action was jointly designed by the Forest Service and the Natural Resources Conservation Service (NRCS). A portion of the land is National Forest and the other is privately owned and for which NRCS has authorization to provide funding and technical assistance. In addition, the placement of fill into Eagle Creek must be authorized by the U.S. Army Corps of Engineers under section 404 of the Clean Water Act. The NRCS and the Corps, by letters of January 11, 2000, and June 7, 2000, have authorized the Forest Service to act as lead for this consultation. This biological opinion, including the incidental take statement, applies to all three agencies, as appropriate under their differing authorities.

Informal consultation began on January 14, 2000, when the Forest sent us a facsimile copy of a January 11, 2000, letter sent to the Forest from the NRCS concerning funding the Eagle Creek Stabilization Project. On February 24, 2000, the Service met with the Forest to discuss the draft BA. The Service received the final BA from the Forest on May 30, 2000. The Service responded on June 21, 2000, with a 30-day letter confirming initiation of formal consultation. On June 22, 2000, the Forest expressed concern (over the telephone) with the time-line for formal consultation, as the Forest wished to begin blasting a rock quarry on July 10, 2000. In an email dated June 23, 2000, the Service informed the Forest that beginning work on the project (specifically blasting) prior to receiving a biological opinion would be inconsistent with consultation procedures. On July 6, 2000, the Forest informed us that since we could not concur with the Forest’s determinations, or submit a biological opinion prior to the project start date (in the next 5 days), the project action would take place without meeting consultation requirements, and that the Forest wished to withdraw from consultation.

On July 25, 2000, the Forest contacted the Service (via a conference call) to inform us that they could not obtain a Section 404 permit for discharging material into the waters of the U.S. because they had not complied with their section 7 obligations. During the conference call, we were informed that the Forest had been blasting the rock quarry every 4 days since July 10, 2000, and that blasting activities were completed. Blasting took place in Mexican spotted owl restricted (riparian) habitat during the owl’s breeding season.

On July 28, 2000, we received the Forest's July 26, 2000, letter requesting that we resume formal section 7 consultation for the project. The Service visited the proposed project location on August 2, 2000, and confirmed reinitiation of formal consultation in an August 11, 2000, letter to the Forest, with the exception of activities that took place outside of consultation with the Service.

## **BIOLOGICAL OPINION**

### **Description of Proposed Action**

In cooperation with the NRCS, Greenlee County, and the private land owner at the 4-Drag Ranch (East Eagle allotment), the Clifton Ranger District of the Apache-Sitgreaves National Forest propose to use Emergency Watershed Protection funding to control streambank erosion and repair damage from the August 1999 flood event that impacted private lands and bank protection structures at the Honeymoon Campground area along Eagle Creek. Two work sites have been surveyed and assessed for repair by the Forest and the NRCS. The Honeymoon Campground work site includes stabilizing and replacing damaged gabions which provide structural support to Forest Road 217 at the Honeymoon Campground. The 4-Drag Ranch work site includes stabilizing and extending existing rock riprap that protects private lands associated with the 4-Drag headquarters and the historic Honeymoon Ranger Station. Work is expected to take about 45 days to complete, including the quarrying that was completed before consultation.

Proposed actions include: repairing/replacing damaged gabions with rock riprap (no new gabions will be constructed), adding about 550 linear feet of rock riprap along two separate sections of the western bank of Eagle Creek, and partially blocking flow to about 1,600 feet of a side channel to Eagle Creek. The temporary rock quarry that has already been established will be rehabilitated to expand trailhead access, extend vehicular parking, and expand existing livestock holding pens. Streambank stabilization will occur on both work sites. The action area is defined as 2 miles above the project site and 11 miles below the project site for reasons that will be explained and discussed in the 'Environmental Baseline' section of this consultation.

***Honeymoon worksite:*** Emergency repairs at this location include pulling back and stabilizing wire and rock gabions that collapsed into the Eagle Creek channel during the 1999 flood, and placing large rock (2-5 feet diameter) riprap material on the stream side of the gabion structures to further stabilize the stream bank at this location. Where gabions have been lost, only rock riprap will be placed and sloped along the bank. Work will be completed with a track-hoe, operated from the west side of the bank. Equipment will remain at the top of the bank and will not enter the wetted stream channel. Rock will be dumped near the bank edge, and will be moved and placed using the track-hoe. Smaller size rip-rap (0.5-2.0 feet diameter.) will be used as fill between larger rock. Finer materials will be separated at the rock pit location, again at the placement location, and then removed from the bank site. Locally obtained cuttings of woody riparian species will be inserted among the riprap to initiate recruitment of woody riparian cover to provide long-term streambank stability. The length of streambank proposed for work at this

location is about 250 feet. All large trees (>9" diameter at breast height) will be retained, but smaller riparian species may be lopped to allow rock placement and encourage sprouting through the rock rip-rap.

***Four Drag worksite:*** Emergency stabilization work at the Four Drag Ranch location will consist of back sloping the existing bank for a 1:2 finished slope and adding large rock (3-5 feet diameter) riprap and riparian species plantings to provide bank stability. Length of disturbed stream bank at this location will be about 300 feet. Machinery operation will be limited to dry bank conditions, and a minimal amount of track-hoe activity within a dry side channel may be necessary in order to avoid damaging larger trees already established at this location. This type of access may be needed for about 2 hours on a 50 foot stretch of streambank to complete material placement. Additionally, in order to reduce sediment movement from this site location into the main Eagle Creek channel (about 50 yards to the south), a small side channel will be blocked by hand-placing visqueen, rocks, and other on-site materials to reduce stream flow and subsequent sediment movement from the job site into the main stream channel. Length of this side channel is about 1,600 feet, with dimensions averaging 4 feet wide and 1-4 inches deep. Current flow rate is estimated at 1 cfs.

***Rock Pit Management:*** The rock source for both project sites is located on Forest and adjacent private land. The area consists of a large rock out crop that was blasted to generate the material necessary for the proposed riprap. The size of the pit is approximately 0.5 acres. The intent was to remove the majority of rock from the western edge of the pit, primarily on private lands, and work east onto Forest lands as material was needed. Unused rock or material generated at the quarry site is being temporarily stored at the pit and will be completely removed at project completion. A buffer of at least 100-150 feet is being retained between quarry work and the wetted stream channel to eliminate sediment movement into the stream. The work site will also be watered for dust abatement. The slope and construction of the pit was designed to avoid possible runoff from the pit. Unused fines and small fractured rock not suitable for riprap was moved by a dump truck and stockpiled directly adjacent to Forest Road 217, about 2 miles south of the project location, and about 0.5 miles north of Smelley crossing. Material was sloped and blended into the terrain to reduce visual intrusion until it could be used for future roadway maintenance. Overstory vegetation at the storage location consists of alligator and pinyon-juniper tree species and ground cover is dominated by gramma grasses.

***Connected Actions:*** Activities that are associated with proposed emergency work include hauling or driving heavy equipment to the Honeymoon work site on Forest Road 217; use of haul trucks to move rock from the quarry site to the established work sites; blasting at the quarry to generate riprap material; use of a track-hoe to replace gabions and place rock along streambanks; storage and refueling of large equipment; and extending the temporary road closure into the Honeymoon Campground location. The quarry base and the staging area for equipment are within the probable 100-year flood-plain of Eagle Creek.

***Conservation Measures:***

The Forest has included a number of conservation measures in the proposed project. These include: (1) requiring off-site cleaning of heavy equipment prior to use for this project, (2) limiting the use of heavy equipment to those sites identified during the field review, (3) reseeding all disturbed areas with native species to help stabilize disturbed areas and to minimize competition from noxious weeds and exotic species, (4) raking seeded sites to enhance germination potential, (5) delaying work until after June to reduce potential impacts to native fishes' spring spawning, (6) placing silt fencing between Eagle Creek, road surfaces, and blast sites to prevent the possible siltation originating from these sources, (7) placing instream silt fencing immediately downstream from the bank disturbed during gabion replacement and riprap placement, (8) pumping silt collected behind silt fences away from the stream course, (9) confining stream flow to the eastern channel and allowing the existing pool to de-water prior to working at the proposed riprap section above the private residence, (10) moving any fish that may become trapped into the flowing portion of the stream, (11) pumping subsurface water accumulations (if necessary for work) into unconsolidated gravels (into depressions protected with silt fencing) around the work area to allow sediments to settle and filter out, and finally, (12) prior to project completion, planting all rip-rapped banks with woody riparian vegetation to hasten recovery and provide long term stabilization.

Other "management recommendations" include (1) reducing trampling of vegetation by restricting equipment use to areas currently impacted at the existing campground and trailhead parking areas, (2) facilitating the establishment of native woody riparian species along riprap portions of the stabilization project, in order to provide long-term stabilization of these sites, (3) extending riprap placement beyond the last downstream gabion, in order to further dissipate water velocity and energy during peak flows.

**Status of the Species (range-wide)**1. Loach minnow (*Tiaroga cobitis*)

Loach minnow was listed as a threatened species on October 28, 1986 (USDI 1986a). 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. Direct alteration of loach minnow and spinedace critical habitat constituent elements at the project site is expected to be minimal. Constituent elements for both spinedace and loach minnow include such habitat components as permanent, flowing, unpolluted water; areas of slow to relatively swift flow velocities in shallow water; moderate to high instream cover; pool, riffle, run, and backwater components; low to moderate stream gradient; periodic flooding; abundant aquatic insect prey base; habitat devoid of nonnative fish; uncemented sand, gravel, and cobble substrates; low to moderate amounts of fine sediment and substrate

embeddedness; a hydrograph that demonstrates an ability to support a native fish community; and water temperatures in the approximate range of 1-30°C (35-85° F; USDI 2000).

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, USDI 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).

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 1994a).

## 2. Spikedace (*Meda fulgida*)

Spikedace was listed as a threatened species on July 1, 1986 (USDI 1986b). Critical habitat was designated for spikedace on April 25, 2000 (USDI 2000). Critical habitat includes portions of the Verde, middle Gila, San Pedro, San Francisco, Blue, and upper Gila rivers and Eagle, Bonita,

Tonto, and Aravaipa creeks and several tributaries of those streams. On Eagle Creek, critical habitat extends from the Phelps Dodge diversion dam upstream to the confluence of Dry Prong and East Eagle Creek. This includes the entire project and action areas.

Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from the Verde, middle Gila, and upper Gila rivers, and Aravaipa and Eagle creeks (Barber and Minckley 1966, Minckley 1973, Anderson 1978, Marsh et al. 1990, Sublette et al. 1990, Jakle 1992, Knowles 1994, Rinne 1999). Habitat destruction along with competition and predation from introduced nonnative species are the primary causes of the species decline (Miller 1961, Williams et al. 1985, Douglas et al. 1994).

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

Recent taxonomic and genetic work on spikedace indicate there are substantial differences in morphology and genetic makeup between remnant spikedace populations. Remnant populations occupy isolated fragments of the Gila basin and are isolated from each other. Anderson and Hendrickson (1994) found that spikedace from Aravaipa Creek is morphologically distinguishable from spikedace from the Verde River, while spikedace from the upper Gila River and Eagle Creek have intermediate measurements and partially overlap the Aravaipa and Verde populations. Mitochondrial DNA and allozyme analyses have found similar patterns of geographic variation within the species (Tibbets 1992, 1993).

The status of spikedace is declining 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 1994b).

### **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.

Eagle Creek is a tributary of the Gila River in Greenlee County, Arizona. Within the Forest Service's analysis area, about 12 miles of Eagle Creek (70%) flow through private lands (from BA). The remainder is Forest Service land. The upper reaches of Eagle Creek are spatially and temporally intermittent, with perennial flow in the proposed project area. According to the BA, perennial streams within the analysis area include Eagle (16.8 miles), East Eagle (16.3 miles), Salt House and Chitty (5.6 miles) creeks. Flows in upper Eagle Creek are ungauged and no discharge data is available for this consultation.

Eagle Creek stream width is variable, averaging 10-15 feet wide and 120 inches deep with pools greater than 4 feet deep occurring intermittently throughout its length (from BA). In-stream sediments at upper reaches, including the project site, are mostly sand and cobble, but change to sand and silt substrates at lower sections (Walls and Subirge 1998). At the project site, the stream is a C4 channel, using the Rosgen (1996) classification system, which means it is relatively vulnerable to significant and rapid alteration due to artificially imposed changes in bank stability, watershed condition, or flow regime. The gradient is low, about 1.5% in the project area, diminishing to below 1% in valley reaches downstream (Walls and Subirge 1998, Natural Channel Design 1999). The stream is only slightly entrenched at the project site but its high width-depth ratio indicates significant lateral erosion (Natural Channel Design 1999). Streams with a high width-depth ratio have a higher probability of bank erosion (Rosgen 1996).

Human influences to Eagle Creek have come primarily from livestock grazing, water development, mining, irrigated agriculture, roads, recreation, beaver removal, and flood control/channelization. Although the area is remote and sparsely settled, these human activities have caused changes to the watershed and the stream channel. Altered hydrologic conditions within the Eagle Creek watershed have resulted in a braided stream channel throughout much of the upper, non-canyon reach of Eagle Creek. Surface flow in substantial areas of the creek ceases during parts of the year, where anecdotal information from local residents indicates the stream may have flowed perennially throughout in the early 1900's. These changes were occurring as early as 1921, when Leopold noted that significant erosion of the floodplain was underway (Leopold 1921, 1946).

Grazing by livestock has been the primary pervasive use of the Eagle Creek watershed for the past 150 years with substantial alteration of watershed vegetation, soil, erosion, and hydrologic characteristics (Leopold 1946). Livestock grazing within the watershed has been reduced from historic levels and the Forest Service and private landowners are working cooperatively to improve the management of livestock in the riparian corridor of Eagle Creek (from BA). These cooperative efforts have facilitated improvement of riparian vegetation (Hayes 2000). Almost all livestock grazing on the main stream channel has been removed on Forest lands, although it continues on some private land. Current stocking levels are 1 cow per 222 acres in the summer months and 1 per 172 acres in the winter months (from BA).



Water development and interbasin water transfers have altered the volume and timing of flow in the creek. In 1945, Phelps Dodge Corporation constructed a diversion from the Black River (Salt River basin) into Willow Creek, a tributary of middle Eagle Creek. This diversion augments flow in Eagle Creek below Willow Creek by about 27 percent (Minckley and Sommerfeld 1979). That water, plus an additional 9 percent, is removed about 15 miles downstream at a diversion dam and pumping station. That diversion has been in place since before 1919 (Olmstead 1919) and the water is piped to the Phelps Dodge copper mine at Morenci, where mining started in 1872 (Bahre 1991). Furthermore, local residents pump groundwater from the basin for domestic and agricultural use and Phelps Dodge pumps groundwater and places it into the stream channel for transport to the diversion dam for subsequent removal (USGS 1994).

While no major mining occurred in the Eagle Creek drainage, the massive copper mine in adjacent San Francisco drainage at Clifton/Morenci has impacted Eagle Creek. Augmentation and diversion of water by Phelps Dodge is primarily for supporting mining operations. Also affecting the Eagle Creek watershed was the historic cutting of timber for mine construction and fuel. According to Olmstead (1919) "the watershed [of Eagle Creek] has been badly torn up for the past nine years, largely on account of changes in the ground cover conditions, due to extensive mining operations." Extensive harvest of wood from watersheds surrounding the Clifton/Morenci mines decimated both upland and riparian woodlands and its depletion made it necessary to bring additional wood for the mines from as far away as Wilcox (Bahre 1991). In addition, it is likely that some of the wood from the Eagle Creek watershed was moved down the creek in tie-drives similar to those on the adjacent Blue and San Francisco rivers (Coor 1992). To facilitate this on small streams without sufficient flow to carry logs, cut logs were stockpiled behind small trees on a slope near the stream and when flood flows rose, the small trees were knocked down with small charges of dynamite allowing the logs to roll into the flood waters and be carried downstream (B. Marks, Blue, Arizona, pers. com. 1994). Water transportation of logs is highly destructive of stream channels and fish habitat (Meehan 1991).

Roads in the Eagle Creek drainage have contributed to the degradation of the stream. According to the BA there are approximately 14 miles of road within the Eagle Creek riparian corridor, and road density in the upper Eagle Creek watershed is about 0.65 miles per square mile, including about 10 miles of paved highway, 11 miles of surfaced, all-weather road, and 44 miles of mixed unimproved or low-maintenance four-wheel drive tracks. There are a number of places in the drainage outside the riparian corridor where serious erosion is occurring as a result of roadcuts, fills, and stream crossings, several of which are clearly visible along Forest Road (FR) 217 as it descends into the drainage. The sediment and instabilities generated in these places eventually reach and influence the channel of Eagle Creek. FR 217 crosses Eagle Creek in three low-water ford crossings and a number of spur roads from FR 217 have low-water crossings of Eagle Creek and tributaries. The main road crossings and some of the spur crossings are periodically maintained by Greenlee County in cooperation with the Forest Service (see documentation provided in earlier consultation 2-21-95-I-165). Some on private land receive periodic maintenance by the private landowners. The most recent work was on the northernmost crossing

(Smelley crossing). Maintenance generally includes restructuring of the streambanks to keep them low and gradually sloped and restructuring of the stream channel to fill pools, remove large rocks, and provide a relatively flat, wide, shallow crossing. Gravel is sometimes removed and dumped on the floodplain. A high-clearance vehicle track (FR 8369) continues up Eagle Creek beyond the project site and crosses the creek 13 times to the confluence of East Eagle and Dry Prong, where it continues up the bottom of Dry Prong for about a mile before climbing the ridge. This track is maintained by heavy equipment following large floods, such as 1983 and 1993 (from BA). It has been identified as one of the major contributing factors to excess sediment in Eagle Creek (Walls and Subirge 1998) and in 1999, the Forest Service closed use of FR 8369 from February 1 to June 30 to reduce adverse effects to Eagle Creek. At the same time, about 1 mile of FR 217L, up the bottom of Middle Prong was also closed to remove adverse effects to the streams. Roads have had a major adverse influence on Eagle Creek and even with recent Forest Service improvement efforts continue to contribute negatively to the condition of the stream and floodplain. The numerous effects of roads to streams and wetlands are well documented (Dobyns 1981, Brozka 1982, Patten 1989, Waters 1995, Jones et al. 1999, Findlay and Bourdages 1999, Trombulak and Frissel 1999).

Recreation was not historically an influence on the degradation of Eagle Creek, but it has current impacts. Presently, recreation is light to moderate; the BA estimates use at 400 recreational visitor days at the Honeymoon Campground and Eagle Creek trailhead. These two facilities are at the project site and illustrate the localized influence that recreation (excluding road use) has on the stream. The presence of the Honeymoon Campground on a terrace on the outside of a meander bend of Eagle Creek is a major reason for the proposed construction of channel constraints. This will be discussed further in the effects section.

According to the BA, beaver are present in Eagle Creek, although they are not abundant. Intensive beaver trapping likely occurred in Eagle Creek during the early 1800's, which has all but removed the stabilizing force that beaver normally provide to their native river systems. As a result, channel erosion and the loss of bank storage of water have likely increased (Parker et al. 1985).

There are no comprehensive data on how much of the length of Eagle Creek (above the canyon at Sheep Wash) has been modified by flood control and channelization. Such efforts began very early and much of the work is undocumented. In 1916, Olmstead recommended construction of \$244,950 worth of flood control and "stabilization" work on Eagle Creek. In 1934, Carbine noted that "there has been a good deal of erosion work done here," referring to upper Eagle Creek. His purpose for visiting Eagle Creek was to report on extensive fish "habitat improvement" work being done along Eagle Creek in an attempt to provide "cover" for sport fish.

Flooding is often considered the "natural" reason for the degraded condition of Eagle Creek and other streams in the southwest. Although flooding may appear to be a disruptive force on stream channels, maintenance of the stream's dynamic equilibrium requires the full range of flows occurring in nature and "it is an important characteristic of a natural channel to accept both high and low flows with their associated sediment load without long-term changes in morphology"

(Leopold 1997:60). Floods may rearrange materials within the channel and floodplain, but the channel returns to a state that is determined by geology, gradient, sediment load, among other factors. The stream's dynamic equilibrium does not mean the stream channel always returns to exactly the same location. "The manner in which a channel moves across the valley floor, eroding one bank and building a nearly flat floodplain on the other, while maintaining a cross section approximately constant in shape and size, is an aspect of the dynamic equilibrium that characterizes many channel systems" (Leopold 1997:81).

Human disturbances of the watershed, floodplain, and stream channel change many of the factors determining channel configuration. Increased sediment off the watershed is a common result of human actions and sediment is a major determinant of channel shape (Leopold 1997). When the dynamic equilibrium has been disrupted, the channel begins a process of adjustment as it attempts to restore a dimension, pattern, and profile that are consistent with controlling hydraulic variables (Rosgen 1996). These adjustments may lead to dramatic changes in the stream channel width, depth, and geometry that encroach on human activities, such as has occurred in Eagle Creek. As human activities are affected, additional flood control and channelization measures may occur, which exacerbate the problems in adjacent areas (Pearthree and Baker 1987), and the channel will continue to become increasingly unstable.

The most recent Eagle Creek flood event occurred in August 1999, and was the impetus for this proposed project. This event was of short duration (4 hour), but had intense flow. The flood originated in the Dry Prong drainage of Eagle Creek on the San Carlos Reservation, and brought down large amounts of woody debris (particularly logging slash) that accumulated against existing large woody debris (from BA). As debris jams broke free, large amounts of riparian vegetation and rock cobble were moved and re-deposited throughout the system. The effects of this event are noticeable throughout the analysis area, but are especially noticeable from the confluence of Dry Prong and East Eagle creeks up to the 4-Drum Headquarters and Honeymoon Campground. The 1999 flooding created numerous sand bars, cut banks, and large deep pools capable of supporting larger non-native predatory species (e.g., small mouth bass [*Micropterus dolomieu*]). Very little flow was noted from either East Eagle Creek or Robinson Canyon during this event.

Flood control and channelization efforts usually take one of several forms: diking, riprap, soil-cement, and/or gabions parallel to the channel; check dams across the channel; removal of woody debris from the channel and floodplain; and rerouting the channel. The Forest Service is aware of seven locations along FR 217 where there has been some level of riprap placement in the past (from BA). The last recorded work was 700 feet of large riprap placed at culvert locations or eroding banks along the road. In 1994, the NRCS rebuilt dikes along 1,300 feet of Eagle Creek on the Fillman Ranch, about 5 miles below the project area. At the project site, the existing gabions cover about 250 feet and there are an additional 400-500 feet of old riprap (from BA). Repair on the gabions was done in 1985. No check dams are presently known to exist, but the work recommended by Olmstead in the early 1900's included check dams. It is unknown how many of those were ever constructed, but none remain.

Removing trees, logs, and other woody debris from stream channels is a common form of flood control practiced by private landowners and is seldom documented. Woody debris is very important in stream function and fish habitat (Minckley and Rinne 1985, DeBano et al. 1996). From work on the Blue River road, which is also maintained by Greenlee County, we are aware that it was a common practice of the Greenlee County Roads and Public Works Department prior to 1994 to remove any large woody debris in the stream near the road or stream crossings. The BA notes that in 1984 the Forest Service removed and burned all large woody debris from the Eagle Creek system above Honeymoon Campground (the project site).

The action area for this project is defined as all areas to be affected directly or indirectly by the Federal action. In streams, the action area is often much larger than the area of the proposed project because impacts may be carried downstream with the flow, and radiating channel adjustments, both upstream and downstream, occur whenever stream channels are altered (see Dunne and Leopold 1978). However, those distances are hard to predict and are highly dependent upon localized channel geomorphology, and flooding during and after the project. For the proposed project, the upstream extent of the affected, or action, area is between the project and the confluence of Dry Prong and East Eagle Creeks. The downstream extent of geomorphologic effects may be at the confluence of Eagle Creek with Willow Creek. The change in watershed size and the unnatural base flow augmentation due to that confluence are likely to be large enough to overwhelm any radiating channel changes from the proposed action. Thus, the action area for this project includes 13 stream miles, approximately 2 above the project and 11 below.

*Status of the species within the action area -Loach minnow and Spikedace*

The historic fish fauna of Eagle Creek is incompletely documented. There are no early records of the fish, except at the confluence with the Gila River. However, using the few records available, in conjunction with records from the nearby Gila, San Francisco and Blue rivers and Bonita Creek, and based on information of earlier conditions of the stream and its habitat, it can be concluded that 12 species of native fish were probably found in the Eagle Creek system. Of those 8<sup>1</sup> (66%) are still present; a much higher proportion than in the adjacent San Francisco and Blue River systems, where only 35 and 40% of the native species remain, respectively. Eagle Creek retains more native fish species than any other stream in the Gila River basin. Aravaipa Creek and the upper Gila River in New Mexico both retain 7 species. In addition, razorback sucker have been reintroduced into Eagle Creek, although it is unknown if any remain.

In 1934, Madsen (1935) and Gorsutch (University of Michigan Museum of Zoology Catalogue) sampled upper Eagle Creek and East Eagle Creek, respectively, looking for sport fish opportunities. Madsen (1935) recorded it to be full of "suckers", "bonytails", and Gorsutch

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<sup>1</sup>Longfin dace (*Agosia chrysogaster*), speckled dace (*Rhinichthys osculus*), spikedace (*Meda fulgida*), loach minnow (*Tiaroga cobitis*), Gila chub (*Gila intermedia*), roundtail chub (*Gila robusta*), desert sucker (*Pantosteus clarki*), and Sonora sucker (*Catostomus insignis*)

found longfin dace, chub, speckled dace, and desert sucker. The first extensive survey was in 1950, when Miller recorded 7 native species, including loach minnow but not spikedace (Marsh et al. 1990). He found no nonnative fish species. In 1978, Minckley and Sommerfeld (1979) recorded 4 native species and 8 nonnatives, primarily in the lower creek, downstream from the Forest. Beginning in the mid-1980's, sampling of Eagle Creek fishes became more frequent and thorough. In 1985 larval samples from Eagle Creek revealed the presence of spikedace and 6 other natives, plus 3 nonnatives (Bestgen 1985, Propst et al. 1985). Spikedace were abundant in 1987 (Marsh et al. 1990) but have not been found since 1989 (Marsh 1996). In 1994, loach minnow were found for the first time since 1950 (Knowles et al. 1995). Loach minnow continue to be found in the area from the first road crossing below the Honeymoon Campground (Smelley crossing) to the campground (Knowles 1995, Marsh 1996, Bagley and Marsh 1997) and were observed just below the project site by Service biologists in April 2000.

Recent fish surveys were completed in Eagle Creek on April 23-24, 1999, by Forest biologists (Myers et al. 1999) in the project area and upstream. Fish collected in surveys were speckled and longfin dace, Sonora and desert sucker, and Gila chub. Neither loach minnow nor spikedace were found during these surveys. Crayfish were also recorded during these surveys. Following the August 1999 flood event, Clifton District personnel observed smallmouth bass in deeper pools within the project area. Surveys by Myers and Lopez on March 14, 2000, did not find any small mouth bass during random sampling and visual observations of Eagle Creek (personal communication). In April and again in August 2000, Service staff also observed, speckled dace, Gila chub, and bass (presumably smallmouth) at the project site.

On Eagle Creek, critical habitat for both species extends from the Phelps-Dodge diversion dam, upstream to the confluence of Dry Prong and East Eagle Creek. The project area and the entire action area (see Environmental Baseline section for definition) are within critical habitat of both the spikedace and loach minnow.

Various nonnative aquatic species have been introduced by humans into Eagle Creek and have adversely affected loach minnow and other native fishes through predation and competition (Marsh et al. 1990, Marsh 1996). Nonnative species that have been reported from Eagle Creek include black bullhead (*Ameiurus melas*), yellow bullhead (*Amilurus natalis*), common carp (*Cyprinus carpio*), red shiner (*Cyprinella lutrensis*), mosquitofish (*Gambusia affinis*), channel catfish (*Ictalurus punctatus*), smallmouth bass, largemouth bass (*Micropterus salmoides*), rainbow trout (*Oncorhynchus mykiss*), cutthroat trout (*Oncorhynchus clarkii*), fathead minnow (*Pimephales promelas*), flathead catfish (*Pylodictis olivaris*), and crayfish (*Oreonectes virilis*) (Kynard 1976, Minckley and Sommerfeld 1979, Propst et al. 1985, Hendrickson 1987, Papoulias et al. 1989, Brown 1990, Marsh et al. 1990, Knowles 1994, Marsh 1996, Myers et al. 1999, Kesner and Schwemm 2000). Native species still form the majority of the fish community in Eagle Creek above the Phelps Dodge diversion dam, but nonnatives predominate below the dam. The long-term trend in the native/nonnative species balance is toward more nonnatives and fewer natives. Crayfish, in particular, are becoming more abundant and widespread, and smallmouth bass appear to be increasing in the Honeymoon area.

*Section 7 Consultation Environmental Baseline in Action Area*

Within the Eagle Creek drainage, but excluding the San Carlos Apache Reservation<sup>2</sup>, there have been 8 formal consultations involving effects to spikédace and/or loach minnow. There have also been 3 emergency consultations and 5 informal concurrences with "is not likely to adversely affect." These consultations are summarized in Table 1.

TABLE 1. SECTION 7 CONSULTATIONS ON EAGLE CREEK			
Project	Date of Opinion or Concurrence	Species <sup>3</sup>	Finding
<b>FORMAL CONSULTATIONS</b>			
Apache-Sitgreaves NF Land and Resource Management Plan	May 6, 1986	spikédace	net benefit
Channel stabilization and flood repair at Fillman Ranch	January 28, 1994	spikédace	Nonjeopardy
Livestock grazing on the Baseline/Horse Springs allotment	July 20, 1995	spikédace loach minnow	Nonjeopardy
Spillway repair on Phelps-Dodge diversion dam	July 22, 1996	spikédace	Nonjeopardy
Land and resource management plans, as amended for 1 Nat. Forest and grasslands	December 19, 1997	loach minnow spikédace	Nonjeopardy
Livestock grazing on East Eagle allotment - ongoing grazing	February 2, 1999	loach minnow spikédace	Nonjeopardy

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<sup>2</sup>Section 7 consultations on the Reservation are conducted by the Service's Arizona Fisheries Resources Office, and information on those consultations is not available to the Arizona Ecological Service's Office, in compliance with Service policy regarding the San Carlos and White Mountain Apache Tribes.

<sup>3</sup>Only species also in this biological opinion are included here and only if the analysis was for that species in Eagle Creek

Livestock grazing on Dark Canyon allotment-grazing permits	June 30, 1999	loach minnow spikedace	Nonjeopardy
Robinson Mesa prescribed burn	October 8, 1999	loach minnow	Nonjeopardy
<b>EMERGENCY CONSULTATIONS</b>			
Road repairs on FR 217	January 27, 1995	loach minnow spikedace	never finalized
Road repairs on FR 217	February 14, 1995	loach minnow spikedace	never finalized
Road repairs on FR 217	March 10, 1995	loach minnow spikedace	never finalized
<b>INFORMAL CONSULTATIONS - IS NOT LIKELY TO ADVERSELY AFFECT CONCURRENCES</b>			
Spillway repair on Phelps-Dodge diversion dam	July 22, 1996	loach minnow	concurrence
East Eagle Addition prescribed burn	May 2, 1997	loach minnow	concurrence
Programmatic on Forest Service grazing permits - unknown allotments	May 1995 (FWS programmatic concurrence)	loach minnow spikedace	blanket concurrence based on "guidance criteria"
Ongoing grazing activities on Forest Lands - Bee Springs, Big Dry, Dark Canyon, and Mud Springs allotments	May 1, 1998 (FWS programmatic concurrence)	loach minnow spikedace	blanket concurrence based on "guidance criteria"
Robinson Mesa prescribed burn	October 8, 1999	spikedace	concurrence

Since 1986, formal consultation has documented various effects from Federal actions to spikedace and loach minnow. Many of these actions contained components that lessened adverse effects of ongoing actions or were aimed at improving watershed conditions (livestock grazing management changes and prescribed fire). These adverse effects are accumulative to the existing highly degraded state of Eagle Creek stream channel and floodplain.

### **Effects of the Action**

The proposed action is expected to have adverse effects to spikedace and loach minnow and their critical habitats. Some of these effects will be short-term, but some are long-term. Given the tentative nature of the populations of both of these fish in Eagle Creek and the degraded

environmental baseline, additional adverse effects or loss of recovery potential must be assessed. Although improbable events (e.g., flooding during construction) may increase erosion or the downstream extent of effects, large amounts of sediment are generally not expected to be generated by this project.

The Eagle Creek populations of both spikedace and loach minnow are vital to the survival of the two species. According to the geneticist working on loach minnow, the population in Eagle Creek is genetically distinct from all other loach minnow populations (A. Tibbets pers. com., March 2000). As one of only 7 known populations of loach minnow, loss or serious alteration to the Eagle Creek population would damage the long-term survival of the species. The spikedace population in Eagle Creek is one of only 4 populations of that species, all of which are genetically distinct (Tibbets 1992, 1993). The species status in Eagle Creek is also tenable, and any adverse actions there that damage individuals, the population, or cause modification of critical habitat, could damage the long-term survival of the species by reducing the recovery potential.

The purpose of the proposed action is to repair damage from flooding, control erosion, and protect the stream bank. Honeymoon Campground and the structures on the 4-Drag Ranch are built on an alluvial stream terrace at the outside of a bend of Eagle Creek. The natural tendency of a stream is toward sinuosity and to cut outward on the outside curve of channel bends (Leopold 1994, Rosgen 1996). Thus, the campground and ranch buildings are threatened by the natural outward erosion of the streambank. Lateral erosion appears to have occurred in upper Eagle Creek. Erosion repair and prevention using riprap and gabions will redirect the stream's energy elsewhere (most likely downstream). This may only temporarily solve the lateral erosion problem at the project site (Dunne and Leopold 1978, Pearthree and Baker 1987), but if the lateral erosion continues despite the repair efforts, the effect of the project is the difference between erosion that occurred with the repair structures as opposed to that which may have occurred without the structures.

Short-term effects expected from the proposed project are those associated with the actual construction activities. Increased road use, use of heavy equipment on the immediate bank of the wetted channel, and the dumping of riprap into the water will contribute to fine sediment in the creek. Unlike natural infusions of fine sediment, this will occur during baseflow conditions and will therefore tend to settle on the substrate at or near the project site. The project site and downstream, to below Smelley crossing, are the only areas in which loach minnow have been documented in Eagle Creek. Thus, sediment generated by this project may settle directly onto loach minnow occupied areas. 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, Waters 1995) and loach minnow are particularly vulnerable to excess sediment which fills the interstitial spaces where they live and may smother their sessile eggs (Propst et al. 1988). Sediment control measures are built into the project that will, if correctly implemented, prevent the bulk of the fine sediment from entering the stream, so the adverse effects from fine sediment are not expected to be substantial. In addition, the total amount of sediment is unlikely to be at a level it would cause channel alteration.



The increased use of the road and the adjacent terrace will contribute to the alteration of the floodplain, through compaction, loss of infiltration, and decreased bank storage (see Baker et al. 1998). The terrace is already highly impacted by the presence of the campground, road, quarry, and 4-Drag Ranch buildings and corrals. Although the stream would naturally erode this terrace at some point in time, its erosion is probably exacerbated by the accumulative loss of vegetation and infiltration and the channeling of flood flows along the roadbed which lies parallel to the channel.

Most of the area in which riprap will be placed is relatively deep pool or run habitat. While spikedeace might use the edges of this habitat, loach minnow will not be found there. However, the filling of the pooled edge will cause the channel to adjust and will alter the location and configuration of the adjacent riffle habitats. It may also decrease the amount of shear habitat used by spikedeace by altering the interface of slow and fast water areas. Whether these changes will result in the same, less, or more habitat for spikedeace or loach minnow cannot be predicted.

Additional short-term effects are expected from the use of three low-water crossings on Eagle Creek in transporting equipment and materials to and from the site. These crossings are part of the county-maintained Forest Road 217 and the additional use is not expected to be significant. However, the existence of the road, its use, and its maintenance, have never undergone formal section 7 consultation, so the effects from normal use are not fully understood.

Long-term effects expected from the project include the long-term effects on the channel morphology from channel constraint and the long-term indirect effects that will accrue from the presence of the campground on the stream terrace. Interrelated and interdependent actions include the continued use of the terrace for the ranch headquarters and livestock corrals. The continued presence of the campground and the ranch facilities are due, at least in part, to the ongoing bank stabilization and alteration efforts.

As discussed earlier in the environmental baseline section, bank stabilization projects, such as the one proposed here, have ramifications for the channel up and downstream from the project site. This project itself illustrates on a localized scale the way in which bank stabilization and other flood control actions expand the impact and require repeated and expanded bank alteration to deal with the erosion that occurs elsewhere as a result of the bank stabilization. The BA documents 400-500 feet of riprap at the project site that was placed at an earlier, but unknown date. The riprap failed to solve the problem and additional gabions were placed as a result. Those gabions required repair work in 1985. They have since failed and the area of altered bank is being expanded both upstream and downstream to encompass about 550 linear feet.

Also, as discussed in the environmental baseline section, Eagle Creek has been altered by various actions, including flood control and bank and channel stabilization. The lack of comprehensive data on the extent to which Eagle Creek has been affected by these activities precludes us from understanding with any certainty how this particular addition contributes to the overall loss of the natural channel form and function. Dissecting the effects of the present project from those from the past alteration is very difficult and cannot be done without gathering much more extensive data. What we do know, however, is that the long-term survival of both

spikedace and loach minnow in Eagle Creek depend heavily on recovery of the stream channel to a more natural system in dynamic equilibrium.

The effects to loach minnow from the exacerbation of channel destabilization and loss of ecosystem function is of more direct concern than for spikedace. Spikedace have not been documented in the immediate project area nor in the action area, however, the presence of suitable habitat in the action area indicates that occupancy in the area is likely (albeit in very low numbers). When present in low numbers, standard sampling techniques often fail to detect the species. Because there is no historic information on spikedace in Eagle Creek, there is no way to determine the level at which the action area may once have been populated by spikedace. Given information on declines of spikedace in similar areas with similar habitat alteration, it is likely that spikedace were historically common throughout the action area. Thus, a primary concern with spikedace is to ensure that the potential for recovery of spikedace habitat and population in the action area does not continue to decline.

Loach minnow, on other hand, are present at the project site and for a short distance below. They have never been taken elsewhere on Eagle Creek. As with spikedace, they may still occur at very low levels throughout the stream and the lack of historic information conceals the earlier distribution in the system. Also, like spikedace, information from populations and declines of loach minnow elsewhere suggest that the historic distribution and population of loach minnow in Eagle Creek was much more extensive. Nevertheless, their population is now concentrated in the area of the Honeymoon Campground and Smelley Crossing and restoration of that reach is of utmost importance in ensuring the survival of loach minnow in Eagle Creek.

The presence of concentrated recreation facilities and activities on the terrace at the Honeymoon Campground and FR 8369 trail head causes adverse effects to Eagle Creek and therefore to spikedace and loach minnow and their critical habitats. Most of these effects are similar to those discussed above and include production of fine sediment, soil compaction, and reduction of infiltration, vegetation, and bank storage of water. All of these contribute to alteration of the stream's dynamic equilibrium and thus channel morphology and stream function. The proposed project would move the trail head away from the immediate streambank back into the rock quarry, which will reduce, but not remove, the adverse effects from that particular feature.

The interrelated and interdependent actions of the ranch buildings and corrals will have the same effects as the continued maintenance and use of the recreational facilities. Although this is a private facility, the use of Federal funds, actions, and permits to keep the facility from being damaged by the stream requires that the effects of the facility itself be considered in the overall effects of the proposed project; as the facility may not remain "but for" the proposed project. This is only true in part, as all of the ranch facilities might not be lost to flooding. However, the incremental portion of the sediment, pollution, compaction, and loss of infiltration, vegetation, bank storage, and streambank condition cannot be teased out from the whole. Since the effects of the interdependent and interrelated action are only a small part of the whole effect of the proposed project, that level of discernment is not necessary.

In summary, there are both short and long-term adverse effects from the proposed project that have negative consequences for the spikedace and loach minnow in Eagle Creek. Adverse effects to loach minnow and its critical habitat are greater than those to spikedace. The streambank in the project area has already been altered by earlier bank stabilization attempts, and the effects of these earlier projects are difficult to separate from those of the proposed project. Although the effects from the incremental effect of the proposed repair and expansion are expected to be substantive, we do not believe they would be as severe as would be the alteration of an unaltered streambank.

The American Fisheries Society has adopted a position statement regarding the cumulative effects of small modifications to fish habitat (Burns 1991). That statement concludes that accrual of localized impacts, often from unrelated human actions, can pose a threat to fisheries. It also points out that some improvement efforts to fish habitat may not result in cumulative increases in status of the species, but instead may simply mitigate cumulative habitat alterations from other activities. This is particularly true on Eagle Creek, where the accumulating effects of a large number of small and localized impacts over the past century have resulted in a damaged stream channel with depleted flows and degraded aquatic habitat. As a result, each small and localized project that will affect the stream and its listed fish must be viewed in the context of the current degraded situation.

To address these concerns and improve the overall status of the fish, the Forest has both improved the condition of the aquatic habitat, and has included mitigation measures to ameliorate effects. Some of the measures the Forest is implementing to reduce the level of effects for this project include: using straw bales and silt fencing to eliminate or minimize sediment movement away from work sites; temporarily closing FR 217 around the project area to vehicular traffic; temporarily closing the Honeymoon campground during the designated work period; avoiding the use of machinery within the stream; storing and refueling of equipment at least 100 feet away from the wetted stream channel; monitoring work daily, or on an alternate day basis, by Forest Service personnel and the contract inspector; encouraging riparian vegetation along rip-rapped portions of the channel to help promote some restoration of natural processes which can act in concert to resist erosion in subsequent events; and reducing grazing with respect to past use in the project area.

### **Cumulative Effects**

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

A large proportion of the Eagle Creek stream channel downstream from the East Eagle Allotment is on private inholdings within the National Forest. Ongoing activities occurring on these private lands that would be cumulative to the proposed action include residential use, roads, livestock grazing, and irrigated cropping. No data are available at this time to estimate the

level of impacts from those activities on Eagle Creek and its fish. However, it is probable that these activities contribute to the degraded condition of the stream channel and fish habitat in Eagle Creek and to the intermittent stream flow.

Land use practices in the Eagle Creek watershed, including those of the State, private, and other lands may impact loach minnow within Eagle Creek. Stream channelization, bank stabilization, or other instream management for water diversion may impact loach minnow habitat within Eagle Creek. Most of the activities that would be cumulative to the proposed action are ongoing and are discussed in the environmental baseline section of this opinion.

### **Conclusion**

After reviewing the current status of the spokedace and the loach minnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Eagle Creek bank stabilization project at Honeymoon Campground and the 4-Drag Ranch, as proposed, is not likely to jeopardize the continued existence of spokedace or 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 or spokedace.

### **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, NRCS, and Corps. These agencies have a continuing duty to regulate the activity covered by this incidental take statement. If the agencies fail 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 Eagle Creek bank stabilization project at Honeymoon Campground and the 4-Drag Ranch will result in incidental take of loach minnow and spinedace. Incidental take could occur as direct loss of adult and juvenile fish and eggs due to smothering by sediment, exposure to toxic materials, and crushing during placement of riprap. Indirect take may occur through destruction or alteration of habitat resulting from modification or destabilization of the stream banks and stream channel. Such habitat loss or modification would alter behavioral patterns, food availability, access to cover and availability of habitat, thus reducing survival of individual loach minnow and spinedace and potentially reducing or precluding reproduction.

The anticipated level of incidental take of loach minnow and spinedace cannot be directly quantified at this time due to the lack of information on populations in the area and to the changes in instream habitat distribution over time. In addition, the rapid population fluctuations inherent in populations of short-lived species such as loach minnow and spinedace make accurate predictions of changes in population numbers impossible. Because of their small size, and the benthic habitat of loach minnow, the velocity of the stream, and the rapid consumption of dead or dying fish by predators, it is unlikely that loach minnow, spinedace, or eggs of either, that are killed as a result of the proposed project would be observed. Therefore, the Service defines incidental take in terms of the total fish community and habitat, as an index of expected effects to loach minnow and spinedace. The Service concludes that incidental take of loach minnow and spinedace from the proposed action will be considered exceeded if at any time during project activities any of the following occur:

1. more than 20 dead fish of any species are found in the area of any project activities or within 500 yards downstream,
2. project machinery and vehicles enter the water (except at existing low-water crossings of FR 217) at any time,
3. any spill of toxic materials occurs in Eagle Creek or its floodplain during, and as a result of, project activities.

### 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 or spinedace.

### 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. Some of the reasonable and prudent measures and their implementing terms and conditions may be wholly or

partly and implicit or explicit part of the proposed project and their inclusion in the incidental take statement is only an affirmation of their importance in minimizing take. Where the proposed project already adequately fulfills the following reasonable and prudent measures and terms and conditions, this incidental take statement does not imply any requirement for additional measures.

1. Conduct all proposed actions in a manner that will minimize directly mortality of loach minnow and spikedace.
2. Conduct all proposed actions in a manner that will minimize loss and alteration of loach minnow and spikedace habitat.
3. Monitor the fish community and habitat to document levels of take.
4. Maintain a complete and accurate record of actions that may result in take of loach minnow or spikedace or loss of their habitat.

#### 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.

1. The following terms and conditions will implement reasonable and prudent measure 1:
  - 1.1 All reasonable efforts shall be made to minimize activities within the wetted channel of Eagle Creek.
  - 1.2 Project activities shall not occur during the loach minnow spawning seasons (March 1 to June 1 and September 1 to October 31).
  - 1.3 No water shall be removed from Eagle Creek during the project, except minor amounts (no greater than 5 gallons at one time).
  - 1.4 All reasonable efforts shall be made to ensure that no pollutants enter surface waters during action implementation. No toxic chemicals (including petroleum products) shall be stored or deposited within the floodplain during the project or if stored on the terrace, they shall be secured in such a manner as to prevent them from leaking or being entrained into flood waters. Storage of any toxic materials on the terrace shall be only for the minimum time necessary to accomplish the project. An appropriate spill response kit for cleaning up accidental releases of petroleum products will be available at the work site whenever vehicles or machinery are present and at least one person present shall have training in use of that kit.
  - 1.5 All riprap, gabion, or other materials used shall be free from toxic substances.

2. The following term and condition will implement reasonable and prudent measure 2:
  - 2.1 All reasonable efforts shall be made to minimize damage to or loss of riparian and floodplain vegetation.
3. The following term and condition will implement reasonable and prudent measure 3:
  - 3.1 At all times when project activities are ongoing, all reasonable efforts shall be maintained to monitor for the presence of dead or dying fish in or within 500 yards downstream of the project area. The Service shall be notified immediately by telephone or e-mail upon detection of more than 20 dead or dying fish of any species.
  - 3.2 A biologist shall be available to advise and assist in application of these terms and conditions. The biologist must be on-site during project activities for the first three days of work in which any materials are removed from or placed onto the streambank or stream channel, to ensure that construction personnel are trained in application of these terms and conditions. For the duration of the project, the biologist must be on-site periodically, at a minimum of once every third work day. A biologist must be on-call at all times during the remainder of the time that project activities are underway.
  - 3.3 A set of permanent photo points to document project success or failure and stream channel changes in the immediate project area shall be established. The number of photo points will be sufficient to document the total project length, but shall be no less than 6. Photo points shall be read annually for six years (including the sixth year) after the project is completed, and subsequently during 8<sup>th</sup> and 10<sup>th</sup> year after the project is completed. Copies of the photos shall be provided to the Service.
  - 3.4 Two permanent cross-channel transects to monitor changes in channel morphology and substrate composition shall be established in the project area. These transects will be read annually for six years (including the sixth year) after the project is completed, and subsequently during 8<sup>th</sup> and 10<sup>th</sup> year after the project is completed. To best document changes due to the proposed action, one transect should be located no more than 1/4 mile downstream of the last riprap and the other should be located no more than 300 feet of the upstream end of the project.
4. The following terms and conditions will implement reasonable and prudent measure 4:
  - 4.1 A written report shall be submitted to the Service within 60 days of completion of the project. The report shall document the project, as implemented, and shall include photographs of the project area before project initiation and after project completion. The report shall also include a discussion of compliance with the above reasonable and prudent measures and terms and conditions.
  - 4.2 Monitoring information (i.e., photographs and transect data) shall be submitted for 10 years containing the data obtained from the photo points and channel transects. Data

analysis (including a summary and synthesis of channel condition and change with respect to data collected in prior years) will be submitted in a report at 5 and 10 years after completion of the project.

## 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 recommendations:

- 1) The Forest Service should consider moving the Honeymoon Campground and the trail head to another location where they are not in the path of natural stream erosion and so are not in need of stream channel modification to maintain the facilities. Campground placement within the floodplain is acceptable, but it is advisable to keep all facilities (including roads) at least 100 feet away from the edge of the bankfull channel (as defined by Rosgen 1996).
- 2) The Forest Service should consider closing FR 8369 completely. While the seasonal closure was useful, the road continues to adversely affect spikedace and loach minnow and their critical habitat. FR 217 should be closed on the ridge between Middle Prong and Eagle Creek and should not extend into the floodplain at Honeymoon, as it presently does. If road access to the 4-Drag Ranch is required, the Forest should consider rerouting the road to remain on the ridge until it descends to the ranch.
- 3) The Forest Service should consider acquiring management of the 4-Drag Ranch inholding (through purchase or cooperative agreement) and restore the natural riparian area and the natural terrace vegetation.
- 4) The Forest Service, Natural Resources Conservation Service, and Corps of Engineers should conduct a comprehensive study of historic and existing channelization, flood control, and other channel modification activities on Eagle Creek from Dry Prong downstream to Sheep Wash. The results of this study should be used to formulate long-range plans to restore the natural channel and function of Eagle Creek and achieve recovery of spikedace, loach minnow, and the native fish community. Additional channel modification projects should not be considered or implemented on Forest or private lands until such planning is completed to ensure that any future projects are compatible with long-term channel restoration and health.

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 Eagle Creek bank stabilization project at Honeymoon Campground and the 4-Drag Ranch . 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 Sally Stefferud (x235). Please refer to consultation number 2-21-00-F-298 in further communication on this project.

Sincerely,

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