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In Reply Refer To:
AESO/SE
02-21-03-M-0207 March 24, 2005
CL 2003482

Memorandum

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

From: Field Supervisor

Subject: Biological Opinion - Hereford Bridge Collapse Emergency Consultation

Thank you for your June 6, 2003, request for emergency consultation with the U.S. Fish and Wildlife Service (Arizona Ecological Services Field Office [AESO] under section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). At issue are impacts resulting from the decisions and activities related to the collapse of Hereford Bridge in the San Pedro Riparian National Conservation Area (SPRNCA), in Cochise County, Arizona, on the endangered Southwestern willow flycatcher (*Empidonax traillii extimus*), endangered Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *recurva*) with designated critical habitat, threatened spikedace (*Meda fulgida*) with designated critical habitat, and the threatened loach minnow (*Tiaroga cobitis*) with designated critical habitat.

This biological opinion is based on information provided in the biological evaluation (BE) and other information in our files. References cited in this biological opinion are not a complete bibliography of all references available on the species of concern and effects of disturbance on riparian and aquatic ecosystems. A complete administrative record of this consultation is on file at the AESO.

Consultation History

-April 29, 2003:	The BLM initiated emergency consultation by phone.
-June 6, 2003:	BLM sent a biological evaluation to our office.
-June 9, 2003:	We received BLM's biological evaluation.
-July 3, 2003:	We sent the BLM a 30-day initiation of consultation letter.
-September 14, 2004	We sent the BLM the draft biological opinion.
-March 9, 2005	We received the BLM's comments on the draft biological opinion

BIOLOGICAL OPINION

DESCRIPTION OF THE ACTION

The SPRNCA is located in the southeastern part of the State of Arizona, in Cochise County. The Bureau of Land Management (BLM) acquired the area for the SPRNCA through land trades in 1986, and Congress designated the SPRNCA in 1988. The area was acquired and designated because of its nationally significant riparian and aquatic resources.

On the morning of April 25, 2003, a large cement truck attempted to cross the San Pedro River on the one-lane Hereford Bridge (T. 23 S., R. 22 E., Section 16, NE ¼ NE ¼). The structure collapsed, sending the truck and its contents into the San Pedro River. Emergency personnel from local fire departments and Cochise County arrived on the scene. The driver was taken to the local hospital with minor injuries. The following actions were taken to remove the vehicle. Four Goodding's willow (*Salix gooddingii*) trees were cut down to make way for a large D-9 Caterpillar tractor. The tractor scraped a path about 120 feet long and 15 feet wide from the southeast corner of the bridge down into the river bottom to remove the vehicle. Straw bales were placed downstream of the bridge across the river to absorb gasoline, oil, and other fluids leaking from the cement truck. The cement truck was extricated and removed.

Due to partial collapse of the bridge structure (~ 250 feet long and 16 feet wide) and the danger of complete collapse, it was necessary to remove the bridge structure. This required that vegetation, including cottonwood trees (*Populus* sp.), willows (*Salix* sp.), seep willows (*Baccharis* sp.), herbaceous vegetation, mesquite (*Prosopis* sp.), and other species be cleared under and around the bridge. Some maneuvering by heavy equipment was necessary beyond the cleared zone, but this was kept to a minimum. Vegetation clearing was kept to a minimum but some damage to trees and other vegetation occurred in the process of dismantling the structure. The total area cleared was about 0.75 acre. Some vegetation along the banks was preserved, but about 60 feet along both banks was cleared of vegetation. About 1,100 square feet of stream bed was disturbed during bridge removal.

Three culverts, each two feet in diameter, were placed in the river upstream of the bridge, in the cleared area, parallel to one another. Material consisting of a mix of earth and gravel was deposited and leveled atop the culverts. This created a crossing point for heavy equipment operating in the area, allowing frequent crossing of the river by heavy equipment without additional sediment input and turbidity. The culverts were removed after completion of the project, and the banks were re-sloped to approximate the original contour.

The bridge steel was torch cut and removed in pieces by heavy equipment for recycling. All asphalt material and woody debris were removed to local landfills.

Conservation Measures

There were multiple conservation measures implemented during the response to the emergency action. The conservation measures included:

- Only heavy equipment free of oil and fluid leaks was allowed to work in the area.
- All equipment was pressure washed, off site, to remove weed seeds and debris before it worked in the area.
- All work was completed before the middle of June and the onset of the monsoon season.
- Straw wattles were placed downstream to absorb silt and any accidental fluid discharge. These were removed after bridge demolition was completed.
- Water needed for bridge removal activities was hauled to the site from a municipal water source. No water was pumped from the river or from nearby ponds.
- Because the bridge will be rebuilt using the existing pillars and abutments, these were not removed.
- Fences and guard rails were constructed across the road to prevent entry by vehicles.
- No restoration or revegetation of the cleared area was done. The rationale for this was that the monsoon flooding would scour the site before the planted vegetation had time to establish.

STATUS OF THE SPECIES

Southwestern willow flycatcher

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

We listed the southwestern willow flycatcher as endangered, without critical habitat on February 27, 1995 (USFWS 1995) and we designated critical habitat on July 22, 1997 (USFWS 1997b). However, on May 11, 2001, the 10th Circuit Court of appeals set aside designated critical habitat in those states under the 10th Circuit's jurisdiction (New Mexico). We decided to set aside critical habitat designated for the southwestern willow flycatcher in all other states (California, and Arizona) to re-assess the economic analysis. Critical habitat was proposed on October 12, 2004. No parts of the SPRNCA were included in proposed critical habitat.

Declining southwestern willow flycatcher numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (Sogge et al. 1997, McCarthey et al. 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton et al. 1996), especially in monotypic salt cedar vegetation (DeLoach 1991) and where water diversions or groundwater pumping desiccates riparian vegetation (Sogge et al. 1997). Willow flycatcher nests are parasitized by brown-headed cowbirds (*Molothrus ater*) which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range improvements such as waters and corrals, agriculture, urban areas, golf courses, bird feeders, and trash areas. These feeding areas, when in close proximity to flycatcher breeding habitat, especially when coupled with habitat fragmentation, facilitate cowbird parasitism of flycatcher nests (Hanna 1928, Mayfield 1977a, 1977b, Tibbitts et al. 1994).

The U.S. Fish and Wildlife Service's Region 2 Director signed a final recovery plan for the southwestern willow flycatcher on August 30, 2002. The Plan describes the reasons for endangerment, discusses the current status of the flycatcher, addresses important recovery actions, includes detailed issue papers on management, and provides recovery goals (USFWS 2002).

Rangewide, the population is comprised of extremely small, widely-separated breeding groups including unmated individuals. For example, in Arizona, 57 percent (27/47) of the sites where flycatchers were found in 2000 (Paradzick et al. 2001) comprised five or fewer territories. In Arizona during the 2000 season, all but the Salt River Inflow Site at Roosevelt Lake had 20 pairs or less (Paradzick et al. 2001). Rangewide, 81 percent of all sites from 1993 to 1999 had five or fewer flycatcher territories present at the site (Sogge et al. 2000). For further information on the ecology, range, status, and threats to this subspecies, refer to Harris et al. (1987a, b), Unitt (1987), Brown (1988), Harris (1991), Tibbitts et al. (1994), Paxton et al. (1996), Sferra et al. (1997), Sogge et al. (1997), McCarthey et al. (1998), Stoleson and Finch (1998), Uyehara et al. (1998), Paradzick et al. (1999), and USFWS (1995, 2002).

No breeding southwestern willow flycatchers were observed on public land in the upper San Pedro, Cienega Creek, or riparian areas within the Muleshoe Ranch TNC Preserve despite three years of call surveys (Whetstone 1996). One breeding bird was observed near Cascabel along the San Pedro River in 1995 (Whetstone 1996). Multiple nests have been found on Three Links Farm, about 15 miles north of Benson (Service files).

Huachuca water umbel

The Huachuca water umbel is an herbaceous, semi aquatic perennial plant with slender, erect leaves that grow from creeping rhizomes. We listed the umbel as an endangered species in January 1997 (USFWS 1997a). We designated critical habitat on the upper San Pedro River, Garden Canyon on Fort Huachuca, and other areas of the Huachuca Mountains, San Rafael Valley, and Sonoita Creek in July 1999 (USFWS 1999c).

Huachuca water umbel has been documented from 27 sites in Santa Cruz, Cochise, and Pima counties, Arizona, and in adjacent Sonora, Mexico, west of the continental divide (Warren et al.

1989, Saucedo 1990, Warren et al. 1991, Warren and Reichenbacher 1991, Haas and Frye 1997). The plant has been extirpated from six of the 27 sites. The 21 extant sites occur in four major watersheds - San Pedro River, Santa Cruz River, Rio Yaqui, and Rio Sonora. All sites are between 3,500 and 6,500 feet in elevation.

Huachuca water umbel has an opportunistic strategy that ensures its survival in healthy riverine systems, cienegas, and springs. In upper watersheds that generally do not experience scouring floods, the umbel occurs in microsites where interspecific plant competition is low. At these sites, the umbel occurs on wetted soils interspersed with other plants at low density, along the periphery of the wetted channel, or in small openings in the understory. The upper Santa Cruz River and associated springs in the San Rafael Valley, where a population of Huachuca water umbel occurs, is an example of a site that meets these conditions. The types of microsites required by the umbel were generally lost from the main stems of the San Pedro and Santa Cruz rivers when channel entrenchment occurred in the late 1800s to early 1900s. Habitat on the upper San Pedro River is recovering, and Huachuca water umbel has recently been found along short reaches of the main channel. The density of umbel plants and size of populations fluctuate in response to both flood cycles and site characteristics.

In stream and river habitats, Huachuca water umbel can occur in backwaters, side channels, and nearby springs. After a flood, it can rapidly expand its population and occupy disturbed habitat until interspecific competition exceeds its tolerance. The expansion and contraction of Huachuca water umbel populations appear to depend on the presence of refuges where the species can escape the effects of scouring floods, a watershed with an unaltered hydrograph, and a healthy riparian community that stabilizes the channel. The density of umbel plants and size of populations fluctuate in response to both flood cycles and site characteristics.

Livestock grazing can affect the umbel through trampling and changes in stream hydrology and loss of stream bank stability; however, existence of the umbel appears to be compatible with well-managed livestock grazing (USFWS 1997a). Groundwater pumping has eliminated habitat in the Santa Cruz River north of Tubac and threatens habitat in the San Pedro River. Portions of the San Pedro River occupied by the umbel could be dewatered unless measures are implemented to halt or mitigate groundwater pumping in the Sierra Vista-Fort Huachuca area (ASL 1998). Severe recreational impacts in unmanaged areas can compact soils, destabilize stream banks, and decrease riparian plant density, including densities of the Huachuca water umbel. Trampling and off-highway vehicles have impacted populations in Bear Canyon in the Huachuca Mountains. Finally, a suite of nonnative plant species has invaded wetland habitats in southern Arizona (Stromberg and Chew 1997), including those occupied by the Huachuca water umbel (Arizona Department of Water Resources 1994). In some cases their effect on the umbel is unclear; however, in certain microsites, the nonnative Bermuda grass (*Cynodon dactylon)* and watercress may directly compete with the umbel.

Limited numbers of populations and the small size of populations make the Huachuca water umbel vulnerable to extinction as a result of stochastic events that are often exacerbated by habitat disturbance. For instance, the restriction of this taxon to a relatively small area in southeastern Arizona and adjacent Sonora increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought, could eliminate populations or cause extinction. Populations are in most cases isolated, as well, which make the chance of natural recolonization after extirpation less likely. Small populations are also subject to demographic and genetic stochasticity, which increases the probability of population extirpation (Wilcox and Murphy 1985, Shafer 1990).

Critical Habitat For The Huachuca Water Umbel

Critical habitat was designated on the July 12, 1999 (USFWS 1999c). The constituent elements identified in the final rule provide for permanent water, stable stream channels, and riparian plant communities composed of native plant species. The constituent elements also provide for continuous reaches of habitat to allow *Lilaeopsis* populations to expand and contract in response to flood events. The primary constituent elements of umbel critical habitat are:

- sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction;

- a stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for water umbel expansion;

- a riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for water umbel growth and reproduction; and

- refuge sites in streams and rivers, in each watershed and in each reach, including but not limited to springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas.

Spikedace

We listed the spikedace as a threatened species on July 1, 1986 (USFWS 1986a). We designated critical habitat for spikedace on March 8, 1994 (USFWS 1994b), but it was set aside by order of the Federal court in Catron County Board of Commissioners, New Mexico v. U.S. Fish and Wildlife Service, CIV No. 93-730 HB (D.N.M., Order of October 13, 1994). It was again designated on April 25, 2000 (USFWS 2000). That designation was also set aside (CIV 02-0199 JB/LCS). However, since critical habitat for the species was in place at the time of the emergency action, we analyze the action's effects on critical habitat in this consultation. Critical habitat included portions of the Verde, middle Gila, San Pedro, San Francisco, Blue, and upper Gila rivers; Eagle, Bonita, Tonto, and Aravaipa creeks, and several tributaries of those streams.

Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is recently known only from the upper 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). However, spikedace has not been detected on the Verde River since 1999 (AGFD 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). 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 and 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 live 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 indicates 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 are morphologically distinguishable from spikedace from the Verde River, while spikedace from the upper Gila River and Eagle Creek have intermediate measurements and partially overlap the Aravaipa and Verde populations. Mitochondrial DNA and allozyme analyses have found similar patterns of geographic variation within the species (Tibbets 1992, 1993).

The status of spikedace is declining rangewide. Although it is currently listed as threatened, we have 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 higher priority listing actions (USFWS 1994c).

Critical Habitat

Constituent elements of critical habitat include those habitat features required for the physiological, behavioral, and ecological needs of the species. For spikedace, these included:

- permanent, flowing, unpolluted water;

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

- living areas for juvenile spikedace with slow to moderate flow velocities in shallow water with moderate amounts of instream cover;

- living areas for larval spikedace with slow to moderate flow velocities in shallow water with abundant instream cover;

- sand, gravel, and cobble substrates with low to moderate amounts of fine sediment and substrate embeddedness;
- pool, riffle, run, and backwater components present;
- low stream gradient;
- water temperatures in the approximate range of 35-85^{o} F with natural diurnal and seasonal variation;
- abundant aquatic macroinvertebrate food base [prey may include the taxa Ephemeroptera, Chironomidae, and Trichoptera (Sublette et al.1990)];
- periodic natural flooding;
- a natural, unregulated hydrograph or, if the flows are modified or regulated; then a hydrograph that demonstrates an ability to support a native fish community; and
- habitat devoid of nonnative aquatic species detrimental to spikedace, or habitat in which detrimental nonnative species are at levels that allow persistence of spikedace.

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

Loach minnow

We listed the loach minnow as a threatened species on October 28, 1986 (USFWS 1986b). We designated critical habitat for loach minnow on March 8, 1994 (USFWS 1994a), but it was set aside by order of the Federal court in Catron County Board of Commissioners, New Mexico v. U.S. Fish and Wildlife Service, CIV No. 93-730 HB (D.N.M., Order of October 13, 1994). It was again designated on April 25, 2000 (USFWS 2000). That designation was also set aside (CIV 02-0199 JB/LCS). However, since critical habitat for the species was in place at the time of the emergency action, we analyze the action’s effects on critical habitat in this consultation. Critical habitat included portions of the Verde, Black, middle Gila, San Pedro, San Francisco, Tularosa, Blue, and upper Gila rivers; Eagle, Bonita, Tonto, and Aravaipa creeks; and several tributaries of those streams.

Loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley 1973). Historical range of loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers (Minckley 1973, Sublette et al. 1990). Habitat destruction plus competition and predation by nonnative species have reduced the range of the species by about 85 percent (Miller 1961, Williams et al. 1985, Marsh et al. 1989). Loach minnows remain in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White rivers and Aravaipa, Turkey, Deer, Eagle, Campbell Blue, Dry Blue, Pace, Frieborn, Negrito, Whitewater, and Coyote creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst et al. 1985, Propst et al. 1988, Marsh et al. 1990, Bagley et al. 1995, USBLM 1995, Bagley et al. 1996, Miller 1998).

The loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989, Propst and Bestgen 1991). The loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst et al. 1988; Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). Loach minnows feed exclusively on aquatic insects (Schrieber 1978, Abarca 1987). Spawning occurs in March through May (Britt 1982, Propst et al. 1988); however, under certain circumstances loach minnows also spawn in the autumn (Vives and Minckley 1990). The eggs of loach minnows 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).

Recent biochemical genetic work on loach minnow indicates that 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 the loach minnow is declining rangewide. Although it is currently listed as threatened, we have 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 higher priority listing actions (USFWS 1994c).

Critical Habitat

The primary constituent elements for loach minnow critical habitat included:

- permanent, flowing, unpolluted water;
- living areas for adult loach minnows with moderate to swift flow velocities in shallow water with gravel, cobble, and rubble substrates;
- living areas for juvenile loach minnows with moderate to swift flow velocities in shallow water with gravel, cobble, and rubble substrates;

- living areas for larval loach minnows with slow to moderate flow velocities in shallow water with sand, gravel, and cobble substrates and abundant instream cover;

- spawning areas for loach minnow with slow to swift flow velocities in shallow water with uncemented cobble and rubble substrate;

- low amounts of fine sediment and substrate embeddedness;

- pool, riffle, run, and backwater components present;

- low to moderate stream gradient;

- water temperatures in the approximate range of 35-85^{o} F with natural diurnal and seasonal variation;

- abundant aquatic macroinvertebrate food base [prey may include chironomids, simuliids, ephemeropterans, plecopterans, and tricopterans and juvenile loach minnows generally take chironomids (Sublette et al. 1990)];

- periodic natural flooding;

- a natural, unregulated hydrograph or, if the flows are modified or regulated; then a hydrograph that demonstrates an ability to support a native fish community; and

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

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

ENVIRONMENTAL BASELINE

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

With the arrival of Europeans, major alterations began in the Gila River basin. Beaver, which were a major influence on the structure of the Gila basin aquatic ecosystem, were diminished almost to extirpation. The introduction of livestock began very early and has resulted in substantial alteration of the watershed and its soil and vegetation (York and Dick Peddie 1969, Humphrey 1987, Bahre 1991). Croplands increased, often along river terraces, resulting in destabilization and erosion of floodplains (Leopold 1946, Rea 1983). Roads and trails caused extensive erosion and substantial destruction of river channels (Leopold 1921, Dobyns 1981). Diversion of water, which was already practiced by Native Americans in some areas, increased in those areas and was initiated in others. As diversion and irrigation increased, the demand for water storage increased, resulting in a variety of large and small dams and impoundments. By the mid 1900's, large stretches of river in the Gila basin no longer had perennial flow, and the remaining areas were separated by long dry stretches, dams, and impounded water (Rea 1983, Hendrickson and Minckley 1984). As a result of these changes, the riverine habitats of the Gila basin became fragmented, and connectivity was substantially reduced. Populations of fish or other aquatic species eradicated by perturbation were not replaced by colonization. Habitat fragmentation contributes to the genetic isolation of populations. Population fragmentation can reduce genetic variation and viability. This, in turn, can increase the risk of extinction by reducing survival, reproduction, and dispersal. Isolation also precludes re-colonization should one or more populations be eliminated. When an inhospitable environment that imposes a high degree of threat on the remnant habitat surrounds isolated populations, these risks are compounded. This fragmentation has been a major factor in the decline of almost all of the native fishes in the Gila River basin (Minckley and Deacon 1991).

Overgrazing, mining, hay harvesting, timber harvest, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and cienegas when above-average precipitation and flooding occurred in the late 1800s and early 1900s (Bryan 1925, Martin 1975, Hastings and Turner 1980, Dobyns 1981, Hendrickson and Minckley 1984, Sheridan 1986, Bahre 1991, Webb and Betancourt 1992, Hereford 1993). A major earthquake near Batepito, Sonora, approximately 40 miles south of the upper San Pedro Valley, resulted in land fissures, changes in groundwater elevation and spring flow, and may have preconditioned the San Pedro River channel for rapid flood-induced entrenchment (Hereford 1993, Geraghty and Miller, Inc. 1995). These events contributed to long-term or permanent degradation and loss of cienega and riparian habitat on the San Pedro River and throughout southern Arizona and northern Mexico. Much habitat of the Huachuca water umbel and other cienega-dependent species was presumably lost at that time.

Some actions known to be detrimental to the species under consideration in this biological opinion are: clearing of riparian vegetation, diversion of surface flows, pumping of ground water from alluvial aquifers, nonindigenous species, livestock grazing, mineral development, gravel extraction, and off-highway vehicle disturbance.

The pumping of groundwater affects the quality of riparian and aquatic habitat in the project area. This activity can result in lower stream flows or complete drying of the stream course for all or part of the year. The result is reduced survival of cottonwood and willow, species requiring water available to their root zones throughout the year. Salt cedar may gain a competitive advantage and dominate the plant community if future trends continue.

The San Pedro River is a meandering desert river with stretches of perennial and intermittent flows. Dry season flows during May and June may be as low as 1 cubic foot per second (cfs.). Floods occur in winter and during the summer "monsoon" season. These are often sudden and with flows as high as 20,000 cfs. The area has been rested from authorized livestock grazing. No gravel extraction or vehicle use has been allowed in the riparian zone.

Past heavy livestock grazing in the riparian zone has further reduced the quality and availability of nesting habitat for the southwestern willow flycatcher. Although livestock grazing has been reduced within the San Pedro NCA, it has not been completely eliminated.

Grazing and pasture development near the riparian areas can increase habitat for cowbirds thereby increasing the incidence of cowbird parasitism on flycatchers. Urban and rural subdivision of private lands also provides food sources and habitat for cowbirds. Since cowbirds are capable of flying six miles or more in search of parasitism opportunities, these activities can combine to depress willow flycatcher nesting despite beneficial management measures within the NCA.

Status of the species within the action area

Willow flycatchers (subspecies unknown) were documented as migrating individuals during the spring in the San Pedro Avian Inventory in the SPRNCA(Krueper and Corman 1988). Close to 100 nests of the endangered southwestern sub-species have been documented on the lower San Pedro River in recent years (FWS files). Nesting or territorial birds are periodically found in the St. David area on the river.

Dave Krueper (BLM) documented one active southwestern willow flycatcher nest on the SPRNCA in 1997. However, this nest was parasitized by cowbirds and abandoned. Engineering and Environmental Consultants (EEC), conducted comprehensive surveys for the species on the SPRNCA. No southwestern willow flycatchers were detected along the SPRNCA during 2001 and 2002 surveys (EEC 2002a, 2002c). However, Jack Whetstone (BLM) made an incidental sighting while conducting weekly Monitoring Avian Productivity and Survivorship (MAPS) at the Banding Station near Kingfisher Pond in August 2000 and 2001 (Whetstone, pers. comm., 2000, 2001). The EEC surveys detected three southwestern willow flycatchers in 2003, including one south of State Route 92. These birds were probably migrants (EEC 2003). Two probable migrants were also detected in 2003, near State Route 90 (EEC 2003).

A survey of the stream course in Fall 2001 by EEC documented 43 sites occupied by Huachuca water umbel within the SPRNCA (EEC 2002b). This survey was performed about one year after a large flood (in excess of 20,000 cfs peak flow) in October 2000. The species was located in 17 previously unknown locations in 2001 but was not found in 17 sites where it had been documented.

Except for the presence of nonnative competitors and predators, and extremely low summer flows, the SPRNCA appears potentially suitable for both spikedace and loach minnow. The SPRNCA is contaminated by a wide range of nonnative fishes including bullhead, which are known to forage heavily on native fishes (Minkley 1987). Livestock grazing in the project area can be characterized as light. The San Pedro has been rested about fourteen years from permitted livestock grazing.

The presence of the loach minnow in this reach of the San Pedro River is hypothetical at best. No recent collections of this species have been made. The species was last collected from the main stem of the San Pedro River in about 1950 (Minkley 1987). Spikedace is probably extirpated from the main stem San Pedro River. It was last documented in 1964 (Minkley 1987).

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the action and are later in time, but are still reasonably certain to occur.

The conservation measures that BLM implemented during the response to the emergency action helped reduce the impacts of the action to listed species and their habitat. The conservation measures minimized the release of contaminants, the potential for nonindigenous species to be transported to the site, and excessive sediment transport.

Southwestern willow flycatcher

Willow flycatchers occur in the area from April through September, nesting between May and August. The removal of the vehicle and cleanup took place on April 25 and April 26, 2003. Dismantling of the damaged bridge structure occurred during the nesting season. Some disturbance to nesting or migrating individuals may have occurred. Surveys in the area by EEC detected no nesting or migrating southwestern willow flycatchers in 2003 (EEC 2003).

The emergency action resulted in the removal of 12 to 15 cottonwood trees, 10 to 12 willow trees, and surface clearing of 0.75 acre (0.3 ha) of riparian vegetation, including about 200 square feet of shrubby willows. These willows may have provided perching and foraging points for willow flycatchers. This loss of habitat may have adversely affected migrating individuals by displacing them to other areas less preferred or exposing them to predators by reducing escape cover. Birds could have been disturbed by the noise and activity and forced to move to potentially less-desirable sites.

The vegetation clearing improved habitat conditions for cowbirds, a nest parasite of willow flycatchers and other species. A slightly increased risk of nest parasitism may have resulted, although there are no known nesting southwestern willow flycatchers in the action area. The noise and activity associated with the bridge removal may also have caused avoidance by migrants or individuals searching for suitable nest territories.

Since no revegetation or restoration of native plant species was undertaken, there is a risk that nonnative species may colonize and dominate the site. This could result in lower-quality habitat for willow flycatchers in the long-term.

Huachuca water umbel

One patch of Huachuca water umbel was documented growing directly under the bridge on the east bank of the river. The span of the bridge dropped to the ground directly on top of this site. This patch is now considered lost along with all stream bank habitat directly under the bridge. About 65 ft (20 m) of moist stream bank, on both sides of the river, were cleared; hence, other patches of water umbel on site may have been removed and lost. During a site visit on April 30, 2003, no Huachuca water umbel plants were observed. However this species is cryptic and can be easily missed. Though there were short-term effects to critical habitat, no long-term effects to critical habitat likely occurred from the BLM's response to the emergency.

Spikedace and loach minnow

The disturbance to vegetation on 65 ft (20 m) of stream bank on both sides of the river and the removal of 0.75 acre (0.3 ha) of riparian vegetation likely resulted in an increase in sediment load in the stream. About 1000 square feet (100 m^2) of stream bottom were disturbed by the proposed action, which likely resulted in temporary loss of potential recovery habitat in the vicinity of the bridge. Because neither species has been documented in the action area for decades, the chance that any individual fish were affected is exceedingly small. Overhead tree and shrub canopy cover were removed in the vicinity of the Hereford Bridge, which may have resulted in temporarily elevated stream water temperatures. However, this temporary effect should not significantly reduce the potential for recovery of the species. Short-term effects to critical habitat were small because the area affected was small and also because the BLM's conservation measures helped reduce those impacts. There should be no long-term effects to critical habitat from the BLM's response to the emergency.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Effects from undocumented aliens crossing the Refuge are expected to continue, resulting in new trails and wildfires from unattended fires. Since the SPRNCA is Federal, all authorized actions affecting listed or proposed species will undergo section 7 consultation.

The pumping of groundwater in the Sierra Vista subwatershed could affect the quality of the riparian habitat in the project area. This activity can result in lower stream flows or complete drying of the stream course for all or part of the year. The result could be reduced survival of cottonwood and willow, species requiring water available to their root zones throughout the year. Salt cedar may gain a competitive advantage and dominate the plant community if water-use trends continue.

Grazing and pasture development near the riparian areas on non-Federal lands can increase habitat for cowbirds thereby increasing the probability of cowbird parasitism. Urban and rural subdivision of private lands also provides food sources and habitat for cowbirds. Since cowbirds are capable of flying six miles or more in search of parasitism opportunities, these activities can combine to depress willow flycatcher nesting.

The loss of native fish may occur from the presence of nonnative fish and amphibians. These nonnative species find their way into the system through accidental introduction, and humans may transport them. Flooding can also move nonnative fish and frogs from reservoirs or ponds in the watershed to downstream habitats occupied by native fishes. This contamination of native fish habitat with nonnative fish and frogs often results in the loss of entire populations through predation or competition (Miller 1961, Minckley and Deacon 1991).

Unauthorized transport of nonnative fishes routinely occurs, often across watershed boundaries. The release of nonnative fish by the public has been a major factor in the spread of these species (Moyle 1976a, 1976b). Nonnative fish are transported for bait and sporting purposes (Moyle 1976a, 1976b), for mosquito control (Meffe et al. 1983), and by the release of aquarium fishes (Deacon et al. 1964).

The aggregate effects of human activities are likely to magnify deleterious effects to the watershed and the stream. These activities include recreation, road placement and extent, past watershed degradation, mining, livestock grazing, pollution from mines, etc. (Gifford and Hawkins 1976, Furniss et al. 1991, Nelson et al. 1991, Taylor et al. 1991, Fleischner 1994, Skovlin 1984). Many watershed impacts are cumulative, slow acting, and show effects on a time scale not usually considered by land-management agencies. Over 200 years of human activity have resulted in an altered hydrological function and lowered water tables, disrupting the original flow conditions in many areas (Rabini 1992).

The impacts of past mining are present today. Past mining activity has resulted in heavy-metal pollution into the San Pedro River (Minckley 1987). Mining activities can lead to excessive sedimentation, water pollution, and large-scale watershed degradation that affect the quality of aquatic habitats for fish and other organisms (Nelson et al. 1991, Minckley 1981).

The residue of past mining can cause a series of problems. Tailing piles can mass wastes, hill slopes can be destabilized, and there can be increased sediment load from erosion of tailings and increased leaching of heavy metals into flood waters. Increased sediment loads can cause changes in channel depth, width, and meander pattern (Hadley et al. 1991).

CONCLUSION

After reviewing the current status of southwestern willow flycatcher, Huachuca water umbel and its designated critical habitat, spikedace and its designated critical habitat, and loach minnow and its designated critical habitat, the environmental baseline for the action area, the effects of the emergency response activities, and the cumulative effects, it is our biological opinion that the actions, as implemented by the BLM, did not jeopardize the continued existence of the southwestern willow flycatcher, Huachuca water umbel, spikedace, or loach minnow. There was no destruction or adverse modification of critical habitat for Huachuca water umbel, spikedace, or loach minnow. Our findings are based upon the following:

- Best management practices were used to minimize sedimentation and erosion, and reduce the potential for nonnative species to spread.
- Surveys at Hereford Bridge have not found southwestern willow flycatchers over a three-year period.
- Spikedace and loach minnow have not been found in the upper San Pedro basin for decades.
- Vegetation and ground disturbance was limited to 0.75 acre.
- Aquatic habitat disturbance was limited to about 1,000 square feet.
- A small patch of Huachuca water umbel was impacted. There are many patches on the SPRNCA, and the impacted patch may still be present. Recolonization is not precluded.

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 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 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.

EXTENT OF TAKE

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

We do not believe the response to the emergency resulted in incidental take of any southwestern willow flycatchers, spikedace, or loach minnows. Incidental take statements in emergency consultations do not include reasonable and prudent measures or terms and condition to minimize take unless the action agency has an ongoing action related to the emergency. The BLM has not advised us of any such action.

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 affects of an action on listed species or critical habitat, to help implement recovery plans, or to develop information.

We recommend that BLM take the following measures at the site after the proposed new bridge is constructed:

1. If Huachuca water umbel is not found again in the area, consider reestablishing it there.

2. If construction removes cottonwood and willow trees, replace them.

For us to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

We appreciate the BLM's efforts to identify and minimize effects to listed species from this project. For further information please contact Doug Duncan at (520) 670-6150 (x236) or Sherry Barrett at (520) 670-6150 (x223). Please refer to the consultation number, 02-21-03-M-0207, in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

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