Site Conservation Plan

Gila River Iron Bridge Conservation Area

The Nature Conservancy
Southwest New Mexico Field Office
Silver City, New Mexico

and

New Mexico Department of Game & Fish
Santa Fe, New Mexico

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SITE INFORMATION AND ANALYSIS

INTRODUCTION

In 2007, The Nature Conservancy (TNC) and the State of New Mexico acquired fee title to the 168.26-acre McCauley tract in the Cliff-Gila Valley along the Gila River in Grant County, New Mexico. This property, referred to as the Iron Bridge Conservation Area (hereafter, the 'Conservation Area'), will compliment other properties owned by TNC in the Cliff-Gila Valley, referred to collectively as the Gila Riparian Preserve.

The purchase of the Iron Bridge Conservation Area was made under the authority of the Natural Lands Protection Act (NLPA). A summary of the NLPA is found in Appendix A. The State of New Mexico was responsible for 90% of the acquisition cost and funding was appropriated by the 2005 New Mexico Legislature to New Mexico Department of Game and Fish to complete the acquisition. TNC was responsible for the remaining 10% of the acquisition cost. TNC has a contract with the New Mexico Energy, Minerals and Natural Resources Department for NLPA projects, and is required to manage and maintain acquired properties, and to develop management plans. This document is intended to comply with that contractual requirement. The Department of Game and Fish has been monitoring target species on the property for 20 years and supported the acquisition. This management plan was developed cooperatively with Department of Game and Fish staff and incorporated information found in the Comprehensive Wildlife Conservation Strategy for New Mexico (NMDGF 2006a).

The Iron Bridge Conservation Area contains mixed stands of Fremont cottonwood - Goodding willow (*Populus fremontii – Salix gooddingii*) and lies in the middle of the largest contiguous stretch of multi-aged cottonwood-willow forest remaining in New Mexico. The property will present the opportunity to create and protect riparian and riverine habitats for the federally endangered Southwestern Willow Flycatcher (*Empidonax traillii extimus*), an obligate riparian species, and two federally- and state-protected fishes, spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*). The primary rationale for acquisition of this Conservation Area is to provide for the management of lands within the active flood channel so as to increase the extent, cover, and quality of riparian and aquatic habitats. While a primary motivation for acquisition was to protect habitat for listed species, the overarching management goal is to conserve all native species assemblages at the Conservation Area. The purpose of the site conservation plan is to identify management actions, research, and monitoring necessary to protect the ecological viability of the site and to achieve management goals.

The Site Conservation Planning process is a standardized, comprehensive method for identifying and evaluating the following four elements: 1) biological attributes, ecological functions, and physical processes at a site; 2) the major stressors that limit the viability of a site's biological attributes and ecological functions; 3) the human context in which site management will occur (e.g., traditional land uses and values of citizens in the surrounding area); and 4) practical management strategies to ensure the viability of the site's attributes and functions. The Conservation Area is ecologically, culturally, and sociologically linked with the surrounding

landscape and landowners. This Site Conservation Plan identifies actions that will be carried out through the end of 2012 (for a minimum of 5 years).

Pursuant to the NLPA, this document summarizes the ecological significance, acquisition steps, and management activities for the Iron Bridge Conservation Area.

SITE DESCRIPTION

The Gila River originates in the Mogollon Mountains in the Gila National Forest of southwest New Mexico and flows for about 34 miles through a narrow canyon reach within the Gila Wilderness before entering the broad 22-mile-long Cliff-Gila Valley. The Cliff-Gila Valley contains some of the most intact riparian habitat remaining in the lower Colorado River basin (Zimmerman 1970; Hubbard 1977; Montgomery 1985; Baltosser 1986; Brown 1994; NMDGF 2006a). The Gila River then flows through the 9-mile reach of the 'Middle Box' above Redrock, New Mexico. Below the Middle Box, the Gila River flows another 30 miles, through the 'Lower Box' (about 6 miles) and the Virden Valley, to the Arizona-New Mexico state line.

The Gila River in New Mexico is a free-flowing river, the only remaining un-dammed major river in New Mexico, and supports one of the highest levels of aquatic and riparian biological diversity in the state, including the largest assemblage of native fishes (eight species) in the lower Colorado River Basin (La Bounty and Minckley 1972; Montgomery 1985). Perennial surface flow occurs throughout the reach of the river in New Mexico, although irrigation withdrawals cause intermittent drying of the river during dry summer months. The Gila River is characterized by large, contiguous stands of cottonwood-willow gallery forest and a few patches of nonnative trees, such as tamarisk. The river is an important migration corridor and breeding area for many Neotropical migratory bird species (NMDGF 1990; Williams 1993; NMDGF 2006a).

The Conservation Area lies in the downstream half of the Cliff-Gila Valley (Figure 1). It is bounded by Mogollon Mountains to the north and east and the Burro Mountains to the south. Floodplain elevation at the Conservation Area is about 4,460 feet (1,448 meters). Based on soil survey information reviewed for the Environmental Site Assessment, the majority of soils in the low lying areas are classified as Paymaster-Ellicot Complex soils and terraces in the northeast portion of the site consist of the Manzano Loam series soils (AMEC 2007).

The Conservation Area consists of 168.26 acres of deeded lands located in and adjacent to the floodplain. Deeded lands consist of river bottoms and adjacent floodplain terraces in the following amounts: approximately 82.5 acres are located in the river's active floodplain and are dominated by cobble bars vegetated with seep willow; approximately 40 acres of higher floodplain terraces occur on both sides of the river and are characterized by grasses and shrubs; and approximately 19.5 acres consist of an abandoned agricultural field (Table 1). The primary conservation targets occur within the active floodplain (Figure 2).

BIOLOGICAL ELEMENTS AND CONSERVATION TARGETS

Important biological communities and taxa, such as cottonwood-willow gallery forest, native fishes, Neotropical migratory bird communities, and the endangered Southwestern Willow Flycatcher are present at the Iron Bridge Conservation Area.

Biological elements (i.e., communities, species, and subspecies) documented within the Conservation Area and their ranking relative to federal listing, NM Department of Game and Fish's Comprehensive Wildlife Conservation Strategy, and conservation targets of the New Mexico Field Office of The Nature Conservancy are listed in Table 2.

Conservation targets are the subset of biological and ecological elements for which management and conservation goals are developed. The conservation targets for the Conservation Area include the cottonwood-willow riparian forest, floodplain grassland, federally- and state-listed species (e.g., spikedace, loach minnow, and Southwestern Willow Flycatcher), the avian community (e.g., Common Black-Hawk, Bald Eagle, Yellow-billed Cuckoo), and the aquatic community.

The elements of greatest concern and primary conservation target for the land within the active flood channel of the Conservation Area are the two protected fish species, spikedace and loach minnow. These lands will be managed first and foremost for the benefit of these fish.

Detailed information on the Conservation Area's conservation targets is provided below.

Cottonwood-Willow Riparian Forest

One of the most notable features of the Conservation Area is the Fremont cottonwood - Goodding willow gallery forest. For ecological descriptions of this plant community type see Stromberg (1992) and Szaro (1989). Based on aerial photographs taken in October 2005, approximately 10 acres of the Conservation Area was forested. Although the actual plant species composition of the Conservation Area's forested stands has not been determined, informal surveys indicated that, in addition to the native cottonwood and willow, a small number of exotic tamarisk plants are present.

Wetlands

Wetland habitat fed by lateral seepage or low areas that hold water after high flows occur throughout the Conservation Area. Vegetation surrounding these wet areas is sparse due to intensive grazing by cattle.

Floodplain Grasslands

An abandoned agricultural field on the east side of the river is subject to inundation during floods. Aerial photographs suggest that plant species composition of this floodplain grassland

varied considerably over time and space. Currently, the floodplain supports a mixed assemblage of native annuals and exotic plants (Appendix B).

Aquatic Community

Historically, the Gila watershed provided habitat for at least 11 and perhaps 13 native fish species. Today only 10 native fishes persist in the drainage. Most native species are classified as vulnerable, imperiled, or critically imperiled both within the state and across the nation. Status of native fish species is provided in Table 2. Over the past 20 years, sampling by New Mexico Game and Fish Department documented 6 native and 11 nonnative fish species within the Conservation Area (Paroz et al. 2006; Propst 2006), as summarized in Table 3.

Several nonnative fishes, such as red shiner (*Cyprinella lutrensi*s), fathead minnow (*Pimephales promelas),* and channel catfish (*Ictalurus punctatus)* occupy the Cliff-Gila Valley, but none are common. Nonnatives, such as channel catfish, prey upon native fishes and others, such as red shiner, compete with native fishes for limited resources (Marsh et al. 1990).

Spikedace (*Meda fulgida*)

Spikedace is federally listed as threatened (USFWS 1986) with critical habitat designated in 2006 (USFWS 2007); is state listed as endangered in New Mexico (NMDGF 2006b); and is listed as a sensitive species by the USFS Region 3 (Southwest Region: Arizona and New Mexico) (USFS 1999). Critical habitat for spikedace includes sections of the East, Middle, and West forks of the Gila River, and 102 miles of the upper mainstem Gila River, including the Iron Bridge Conservation Area. Currently in New Mexico, spikedace is found in the lower portion of the West Fork Gila River, mainstem Gila River in the Cliff-Gila Valley, and mainstem Gila River in uppermost Redrock Valley (AGFD 2002; Propst 2006; Paroz and Propst 2007).

Spikedace, the only species in the genus *Meda* of the minnow Family Cyprinidae, is a small (less than 80 mm total length), slim fish characterized by silvery sides and fused anterior rays of both the dorsal and pelvic fins. Coloration on the back is olive to brown, often with dark blotches. The abdomen is usually a yellowish white. Breeding males have numerous tiny tubercles on the head and develop a brassy golden color, which intensifies on the head and fin bases (Minckley 1973).

Spikedace are associated with low- to moderate-gradient perennial streams within the Gila River drainage of New Mexico, Arizona, and Sonora (Minckley 1973; Propst et al. 1986; Sublette et al. 1990) at elevations ranging from about 495 to 1830 meters. Spikedace occur in slow- to moderate-velocity water (25.0 cm/sec) in streams across its range in the southwest (Propst et al 1986; Rinne 1991). Occupied habitats of spikedace vary seasonally and with maturation; young are often found in shallow, low velocity runs over sand substrates and adults are found in riffle eddies, along edges of cobble bars, and in deeper runs (Propst et al. 1986). During colder months, spikedace tend to be more common in lower velocity water.

Spikedace feed mainly on drifting aquatic insects, with mayflies, caddisflies, and true flies comprising a large proportion of its diet (Propst et al.1986). The general lack of terrestrial insects in the stomachs of examined specimens indicate that the species is largely dependent on aquatic insects for sustenance. Therefore, maintenance of unmodified riffles that provide habitat for many aquatic insects and management to avoid sedimentation of riffle reaches is essential for survival of this fish species (Propst et al. 1986).

Spawning typically occurs in spring in association with elevated runoff in shallow (less than 15 cm deep) riffles over gravel and sand substrates in moderate flow (Barber et al. 1970; Anderson 1978). Spawning appears to be initiated by decreasing stream flows and an increase in water temperatures (USFWS 2004). Recurrent flooding and a natural flow regime are essential to the feeding and reproduction of the spikedace, and help it sustain a competitive edge over nonnative aquatic species (Propst et al. 1986).

Loach Minnow (*Tiaroga cobitis*)

Loach minnow is currently federally listed as threatened (USFWS 1986) and critical habitat was designated in 2006 (USFWS 2007); listed as threatened by the State of New Mexico (NMDGF 2006b); and listed as a sensitive species by the USFS Region 3 (USFS 1999). In New Mexico, critical habitat was recently designated for loach minnow in East, Middle, and West forks Gila River, 102 miles of the upper mainstem Gila River (include the Iron Bridge Conservation Area), and much of the San Francisco River drainage. In New Mexico, the range of loach minnow in the Gila drainage is fragmented (Propst et al. 1988; Paroz and Propst 2007). At a permanent monitoring site located near the town of Riverside (and the Iron Bridge Conservation Area), loach minnow was found in annual surveys conducted between 1988 and 2005, except in 1996 (Paroz et al. 2006). Density of loach minnow in the Cliff-Gila Valley has varied over the past 20 years, but has not declined.

Loach minnow is an obligate stream fish of the Family Cyprinidae that rarely exceeds 65 mm in total length. The body is slender, elongate, and ventrally flattened. Eyes are upward directed and mouth is small, terminal, and highly oblique with no barbels present. Loach minnow generally has an olive color that is highly pocked with darker pigments. Breeding males develop bright, red-orange coloration at the bases of paired fins, on adjacent fins, and on the base of the caudal opening (Minckley 1973).

Loach minnow is a bottom-dwelling fish that typically utilizes spaces between and in the lee of larger substrates and is absent where fine sediments fill the interstitial spaces between larger substrates (Propst and Bestgen 1991). Consequently, loach minnow is generally associated with cobbled riffle habitats where water is shallow and turbulent (Propst and Bestgen 1991). Water velocity, water depth, and substrate utilization at different stages of the life cycle have been documented by Propst et al. (1988).

Loach minnow are opportunistic, benthic insectivores that feed primarily on larval insects inhabiting riffles. In the Gila drainage in New Mexico, loach minnow primarily consume true flies and mayflies (Propst et al. 1988; Propst and Bestgen 1991).

Spawning occurs between mid-March and early June in habitats similar to those occupied by adults during the non-breeding season. Adhesive eggs are deposited on the underside of flattened rock that forms the roof of a small cavity in the substrate of the downstream side (Britt 1982; Propst and Bestgen 1991).

Natural flows and flooding seem to play a major role in maintaining loach minnow habitat and have a positive effect on loach minnow population dynamics (Propst et al. 1988). During periods of low flow, sediment accumulates at the downstream side of gravel, cobble, and boulder substrates (Rinne 2001). Periodic flooding rearranges these substrates, cleans interstitial spaces and maintains riffles, all critical to loach minnow habitat (Britt 1982).

Longfin dace (*Agosia chrysogaster*), roundtail chub (*Gila robusta*), desert sucker (*Catostomus clarki*), and Sonora sucker (*Catostomus insignis*)

Longfin dace, a small brownish-golden (<80 mm total length) cyprinid, is a comparatively common inhabitant of low-gradient, sand and gravel bottomed streams of the Gila River drainage. It primarily feeds on aquatic invertebrates along cobbled shorelines and shallow, sand-bottomed runs. Longfin dace frequently is found in large, mixed schools with spikedace. Spawning occurs in excavated depressions in low-velocity, sand-bottomed areas during spring through early summer (Minckley and Barber 1971).

Although roundtail chub historically occurred in the mainstem Gila River in New Mexico (LaBounty and Minckley 1972), it has not been reported for over 15 years and is presumed extirpated (Paroz and Propst 2007). Roundtail chub, a large (300 to 400 mm total length), moderately long-lived (8 to 10 years) cyprinid, is most commonly in large pools associated with root masses and extensive cover. During spawning season, abdomen and basal areas of paired fins of males are bright red-orange; otherwise adults are olive-slate gray dorsally, gray on sides, and white to pale yellow-white ventrally (Bestgen and Propst 1989). Young (<100 mm total length) are superficially similar to longfin dace.

Desert sucker is generally distributed in the Gila River drainage, but tends to be more common where cobble, boulder, and bedrock are common and water velocity comparatively swift. Dorsally, it is dark gray and ventrally it is pale yellow. Its most distinctive anatomical feature is a cartilaginous ridge that forms its lower jaw. This sucker feeds mainly on algae and diatoms attached to rocky substrates (Minckley 1973). Spawning occurs in spring among gravel of riffles.

Like desert sucker, Sonora sucker is generally distributed in the Gila River drainage. Although occasionally found in moderate velocity habitats, it is most commonly associated with deep slow-velocity areas over silt and sand substrata. Dorsally and laterally, Sonora sucker is dark to golden brown and pale yellow ventrally (Minckley 1973). Sonora sucker feeds among bottom

sediments, gaining its sustenance from insects and algae (Clarkson and Minckley 1988). Spawning occurs in riffles from late spring through early summer.

Nonnative crayfish numbers fluctuate widely, but are often common along the Gila River. They have been found irregularly at the Iron Bridge Conservation Area during fish sampling by NMDGF (Propst 2007).

Terrestrial Community

Herpetofauna

Herpetofauna (amphibians and reptiles) listed in NMDGF's Wildlife Conservation Strategy that could potentially be found at the Iron Bridge Conservation Area include: Arizona toad (*Bufo microscaphus*), Chiricahua leopard frog (*Rana chiricahuensis*), Mexican gartersnake (*Thamnophis eques*), narrow-headed gartersnake (*Thamnophis rufipunctatus*), and Gila monster (*Heloderma suspectum*) (NMDGF 2006a). Jennings (2007) recently surveyed the herpetofauna of the Cliff-Gila valley provided the following information relevant to the Iron Bridge Conservation Area. Chiricahua Leopard Frogs have not been found near the Iron Bridge since the 1970s. Similarly, Mexican gartersnakes likely no longer occur in the area. Both the Arizona toad and Gila monster are likely present, but uncommon. Narrow-headed gartersnakes were found within 0.5 miles of the site in 2007. Exotic species documented within the vicinity of the Conservation Area include American bullfrog (*Rana catesbeiana)* and spiny softshell turtle *(Apalone spinifera),* American bullfrogs are abundant along the Gila River corridor and are found in the river, irrigation ditches, and nearby ponds. Spiny softshell turtles are not common.

Southwestern Willow Flycatcher *(Epmidonax traillii extimus)*

Southwestern Willow Flycatcher is federally listed as an endangered species (USFWS 1995) with designated critical habitat (USFWS 2005), listed as endangered by the State of New Mexico (NMDGF 2006b), and listed as a USDA Forest Service sensitive species in USFS Region 3 (USFS 1999).

Southwestern Willow Flycatcher has brownish-olive upper parts, a whitish throat that contrasts with the pale olive breast, a pale yellow belly, and two light wing bars (Sedgewick 2000). It generally lacks a conspicuous eye ring. Like other flycatchers, the bill is depressed and wide at the base (Sedgewick 2000; Sogge et al. 1997).

An obligate riparian species, the Southwestern Willow Flycatcher breeds in low- to mid-elevation riparian habitats associated with major river drainages (Sedgewick 2000; Sogge and Marshall 2000). It eats mainly insects caught in flight, but sometimes gleans insects from foliage and occasionally eats berries. During the breeding season, it forages within and occasionally above dense riparian vegetation.

Southwestern Willow Flycatcher nesting typically occurs from early June through July (Sedgewick 2000). Flycatcher nests can incur a high rate of cowbird parasitism. Nesting occurs primarily in swampy thickets, especially of willow, but also other vegetation that is 4 to 23 feet (1.3 to 7.5 meters) or more in height (Sogge and Marshall 2000; USFW 2002; Paradzick and Woodward 2003). Along the Gila River, the main nesting substrates are boxelder (*Acer negundo*) and Goodding willow (Brodhead and Finch 2007)
.
Southwestern Willow Flycatcher is currently known to breed in 35 drainages in California, Arizona, New Mexico, Nevada, Utah, and Colorado (Stoleson and Finch 2000). The population found in the Cliff-Gila Valley is one of the largest known nesting concentrations (Sedgewick 2000; USFWS 2002; Stoleson and Finch 2000; Sogge et al. 2001). Breeding pairs have been documented immediately upstream of the Iron Bridge Conservation Area (Shook 2007) and downstream in the Gila River Bird Area, within the Gila National Forest (Stoleson and Finch 1999; Brodhead 2006; Boucher et al. 2003). In New Mexico, high numbers of breeding pairs are also found in the Rio Grande Valley, particularly along the Rio Grande between San Marcial and Elephant Butte Reservoir (Sogge et al. 2001) and in the Lower Gila River Valley near Redrock (H.Walker, pers.comm..).

In 1999, the Cliff-Gila Valley supported the largest documented population of Southwestern Willow Flycatcher (Sogge et al. 2001) when 243 pairs were found (Stoleson and Finch 1999). However, the population dropped by 43 percent to only 131 pairs in 2000, likely a consequence of drought, (Sogge et al. 2001). In subsequent years, the number of breeding pairs has increased only modestly (RMRS unpublished data; Brodhead and Finch 2003; Brodhead 2004, 2005, 2006; Woodward 2007).

Systematic surveys for Southwestern Willow Flycatchers have not yet been conducted at the Iron Bridge Conservation Area. The Conservation Area lies between occupancy areas and as suitable vegetation returns, so likely will Southwestern Willow Flycatcher. Areas upstream and downstream of the Conservation Area that contain flycatchers or potentially suitable habitat are also targets for conservation action.

Common Black-Hawk *(Buteogallus anthracinus)*

Common Black-Hawk is a large (4-ft wing spread) buteonine with broad and rounded wings and a short, broad tail (Schnell 1994). It can be identified by the distinctive shape of its wings and broad white band crossing the middle of its tail. Legs and cere are orange-yellow. It is common along the U.S – Mexican border and south to Ecuador. In New Mexico, it is an uncommon summer resident, being most numerous in the Gila Basin where several pairs are known to nest (NMDGF 2006a). Common Black-Hawks prefer wooded riparian areas, such as those found along the Gila and Mimbres rivers and their tributaries. Nesting pairs were observed at southern boundary of the Iron Bridge Conservation Area, at the base of the bluff, during summer 2007 (Schumann 2007), and pairs have been observed nesting at the same location since the 1970s (Sadoti 2007).

Bald Eagle **(***Halietus leucocephalus**)***

Bald Eagle was downlisted in 1995 from federally endangered to threatened (USFWS 1995), and in 2007 was removed from the federal list of threatened and endangered species (USFWS 2007). The species remains listed as threatened by the State of New Mexico (NMDGF 2006b) and as a sensitive species by the USFS Region 3 (USFS 1999).

Adult Bald Eagles have a white head, white tail, and a large bright yellow bill. The majority of Bald Eagles in New Mexico are found near streams and lakes (NMDGF 1988). The upper Gila Basin is one key habitat area in the state for winter roosts. Bald Eagles are rare summer residents in the Gila National Forest (Zimmerman 2002).

Riparian Associated Bird Species

A variety of Neotropical migrant birds and riparian obligate species use the Gila River corridor for migration and breeding, including numerous species that are stated-listed or considered Species of Greatest Conservation Need by NMDGF (NMDGF 2006a) (Table 2). The Gila River corridor has supported some of the highest non-colonial breeding bird densities north of Mexico (Stoleson and Finch 1997).

The Western Yellow-billed Cuckoo (*Coccyzys americanus occidentalis*) has declined rangewide over the past century due to habitat loss, fragmentation, and degradation (Hughes 1999). The U.S. Fish and Wildlife Service lists Western Yellow-billed Cuckoo as a candidate species for listing under the Endangered Species Act. Listing has been precluded due to a lack of funding and higher priority listings (USFWS 2001). The Cliff-Gila Valley supports relatively large populations of the Western Yellow-billed Cuckoo. A Western Yellow-billed Cuckoo has been seen along the west side of the river within the Iron Bridge Conservation Area (Appendix C).

Avian species listed by the state of New Mexico as threatened that might occur in the Iron Bridge Conservation Area include Abert's Towhee (*Pipolo abertii*), Bell's Vireo (*Vireo bellii),* Gila Woodpecker (*Melanerpes uropygiali),* and Elf Owl (*Micrathene whitneyi*). Abert's Towhee and Bell's Vireo depend on a well developed understory and Elf Owl and Gila Woodpecker require trees with cavities. Two Bell's Vireo males were observed just above the Iron Bridge Conservation Area in 2007 (Woodward 2007).

In the Cliff-Gila Valley, there are relatively large populations of Lucy's Warbler (*Vermivora luciae),* Yellow Warbler (*Dendroica petechia*), and Summer Tanager (*Piranga rubra)* (Fugagli 2007). Declining in much of its range, Yellow-breasted Chat (*Icteria virens*), a species that is an indicator of early-successional vegetation in riparian areas, maintains viable populations in the Cliff-Gila Valley (Fugagli 2007). Appendix C lists birds identified during a site visit in 2007.

CULTURAL RESOURCES

The Conservation Area contains archaeological and cultural resources. Archaeological sites have been documented between Highway 180 and the old highway leading to the Iron Bridge. Portions of these sites have been demolished (Schiowitz 2007). Two prehistoric structural sites were excavated or tested during the late 1960s when the U.S. Highway 180 was re-aligned (Schiowitz 2007). Fort West, a historic U.S. Military post, was located just north of the Iron Bridge Conservation Area.

LAND USE/DEMOGRAPHIC CHARACTERIZATION

Demographics

Recent United States census data indicate a population of 31,002 for Grant County (US Census Bureau 2000). Based on development patterns within Grant County, it appears that most of the increase in population has occurred in the vicinity of Silver City, population 10,545 (US Census Bureau 2002).

Land Use & Land Ownership

Primary land uses within and adjacent to the Iron Bridge Conservation Area are irrigated agriculture (alfalfa), livestock grazing, private residences, and recreation.

Landowners within the general vicinity of the Iron Bridge Conservation Area include private individuals, Freeport McMoran International, U.S. Bureau of Land Management, U.S. Forest Service, State of New Mexico, and The Nature Conservancy. Grant County Road Department, a private landowner, and local telephone and electric companies have rights-of-way through the Conservation Area.

Economics

Primary economic activities in the general area are mining and agriculture. Potential for expansion of agriculture is small because most land suitable for agriculture is already developed for such use, or has been subdivided for home construction. However, increased water availability for irrigation, as water use shifts from mining, could increase agricultural activity in the valley on floodplain lands that have been fallow or pasture.

Cultural Context

A variety of attitudes exist among residents and entities regarding the Iron Bridge Conservation Area. Local opinions regarding The Nature Conservancy range from support to distrust and an assumption that TNC is essentially a government agency. Attitudes towards the New Mexico Department of Game and Fish also vary. Some people view the Department as regulatory, while others perceive it as stewards of New Mexico's wildlife. Local residents are oriented mostly

toward human values with natural resources viewed primarily as commodities. The river is also used for recreation (e.g., fishing, swimming, off-road-vehicle [ORV] use) and livestock grazing. The river appears to be viewed as a 'commons,' or public property with opportunity and right for everyone's use. Conversely, private property rights are also highly valued, as are cultural and historical ties to living and working on the land. The mixture of land uses, ownership, and natural resource values bring a host of laws, policies, and initiatives into consideration for activities within the Conservation Area. These include:

- Endangered Species Act: the site was designated in 2005 as critical habitat for Southwestern Willow Flycatcher.

- Endangered Species Act: action(s) having a federal nexus that might affect federally-listed species or their habitats requires review under Section 7 of Act.

- Arizona Water Settlement Act: potential to diminish surface discharge of Gila River.

- New Mexico Environment Department: aquifer and surface water protection programs.

- Grant County Soil and Water Conservation District: land, water, and soil conservation planning.

- New Mexico Wildlife Conservation Act: actions or activities that harm state-listed species prohibited.

- National Environmental Policy Act: any action that has a federal nexus requires environmental effects review.

- Clean Water Act: 404 permits through the Army Corps of Engineers are required for in-channel earth moving and any activities that directly contribute or cause introduction of sediments into the water way..

ECOLOGICAL AND PROGRAM GOALS

The primary management goals for land within the active flood channel of the Conservation Area are to maintain and enhance habitat for spikedace and loach minnow, and to restore riparian plant communities that provide habitat for the Southwestern Willow Flycatcher.

The ultimate goal for the Conservation Area is to enhance the quantity and quality of the natural resources by managing and protecting the floodplain, surface water, and riparian habitats. The Nature Conservancy will work cooperatively with local landowners and federal, state, county agencies interested in the management of the Conservation Area. On the Iron Bridge Conservation Area, TNC will also provide opportunities for scientific and educational uses that help to further the mission and cooperative management goals of TNC and NMDGF. Specific objectives that will help accomplish management goals for the Iron Bridge Conservation Area are:

1) Increase the aerial extent and age-class diversity of the cottonwood-willow riparian forest community by promoting dynamic floodplain processes, including natural floodplain disturbance regimes, and maintaining adequate hydrological conditions for the establishment and recruitment of dominant native woody plant species. Increases should be viewed in the appropriate temporal context given that desired disturbance regimes can (or might) temporarily decrease aerial extent and age-class diversity.

2) Increase or maintain populations of riparian obligates, such as the Southwestern Willow Flycatcher, Common Black-Hawk and Bald Eagle, by protecting riparian plant communities from anthropogenic disturbances.

3) Increase or maintain populations of aquatic species by protecting surface water and increasing bank-side vegetation and instream cover through the reduction of anthropogenic disturbances.

4) Maintain and restore floodplain grassland on the Conservation Area where ecological conditions are appropriate.

In addition to the above conservation goals and objectives, a set of program goals for communications and development are identified below.

6) Develop awareness of and support for conservation goals for the Conservation Area.

7) Ensure adequate resources to accomplish conservation goals for the Conservation Area.

8) Use the Conservation Area to promote the Gila River and its unique biological diversity.

STRESS ASSESSMENT

A wide variety of threats were identified for the eight conservation targets within the Conservation Area. The matrix in Table 4 lists the threats and their sources by conservation target.

The primary threat identified is the loss and degradation of riparian and associated aquatic habitats. Some of the potential sources of this threat are local in origin and largely reversible (e.g., grazing). However, the Conservation Area lies within a large watershed subject to a variety of land-uses and natural disturbances. Sources of stress, such as magnitude and frequency of floods, sediment loads, and levels of total dissolved solids that originate in upper parts of the watershed, might threaten the functional integrity of the floodplain and maintenance of its dynamic mosaic of vegetation patches. TNC's ability to control these stresses is limited. The following stresses described are ones that can be affected by policies or management actions.

Water withdrawal

Water withdrawal for irrigation in the Cliff-Gila Valley depletes surface flows in the Gila River. In drought years, water withdrawals can result in complete drying in some sections of the river Currently, the Gila River is the last large river in New Mexico without major water development – however, this status might be affected by the Arizona Water Settlement Act.

Grazing practices

In the Gila Basin, inappropriate grazing of the upper watersheds and floodplain for the past 100+ years negatively affects riparian vegetation, ecosystem function, and ecosystem structure (NMDGF 2006a, citing: Marlow and Pogacnik 1985; Medina 1986; Chaney et al. 1991; Krueper 1996; Ohmart 1996; Shaw and Clary 1996). Along the Gila River, inappropriate grazing is a major cause of degradation of stream banks and plant communities, affecting the ecological condition of riparian habitats (Ohmart 1996). Inappropriate grazing, in this context, is defined as grazing practices that reduce long-term plant and animal productivity (Wilson and Macleod 1991).

Nonnative invasive species

Nonnative invasive species can threaten the viability of native populations through a variety of mechanisms (e.g., competition for resources and displacement of native fauna from preferred habitats). Regulations related to bait fish use must be enforced by NMDGF. Stocking of nonnative sport fishes in the Gila River by NMDGF does not occur and nonnative fishes are removed during annual surveys.

Transportation Infrastructure

Upstream of Highway 180 bridge crossing (approximately 0.25 miles upstream of the Iron Bridge), a large gabion bank retention structure was installed by the New Mexico Department of Transportation. This structure alters river dynamics and increases problems associated with bank erosion and stability. Projects proposed to restore levees and harden stream banks, particularly near bridges, cause considerable loss of aquatic habitats by channel incision and increase flood damage to surrounding floodplains and the probability of bridge failure (NMDGF 2006a). The western earthen approach to Iron Bridge is eroding and may be breached during a large volume flood. On the east side of the river within the Conservation Area, a large sweeping meander is eroding the floodplain and washing portions of an old paved road downstream. Downstream of this meander, and within the Conservation Area, is a large in-stream accumulation of eroded woody which contributes to aquatic habitat diversity and benefits native fishes (NMDGF 2006a).

Fire

Ash-laden flows and elevated soil erosion rates associated with upland wildfires increase sediment loads occur until herbaceous vegetation recovers in the watershed. Ash and sediment fill interstitial spaces in riffle habitats, thereby reducing the availability of spawning substrates for loach minnow, smothering fish eggs, and decreasing habitat quality for aquatic invertebrates and riffle-dwelling fishes (NMDGF 2006a).

CONSERVATION ZONES

Conservation zones characterize and depict the locations for implementing conservation strategies such as biological management, restoration, and monitoring. Based on the distribution of conservation targets within the Conservation Area, the threats and sources of threats identified in Table 4, and our overall ecological goals for the conservation targets and programmatic goals for the Conservation Area, three conservation zones were identified and are described below (see Figure 2).

Zone 1: Floodplain

Zone 1 is the active floodplain (Figure 2) and includes portions of the floodplain that support, or with management could support, cottonwood-willow habitat, wetlands, aquatic habitats, and floodplain grasslands. This is the primary zone for protection efforts because it supports most of the conservation targets (Table 2).

Zone 2: Terrace

Zone 2 includes approximately 40 acres adjacent to the active floodplain. This area currently is dominated by weedy herbaceous and shrub species, but could be accessed by

a very large flood event. This is a secondary zone for protection and management because it supports fewer conservation targets.

Zone 3: Riparian Forest

Zone 3 encompasses approximately 10 acres of cottonwood and semi-riparian woodland trees. The majority of trees and shrubs listed in Appendix B are located in the forested area of the Conservation Area. Mature cottonwood trees provide habitat for conservation targets, including the Common Black Hawk and Gila Woodpecker (Table 2).

FEASIBILITY ANALYSIS

The potential for success in protecting the viability of conservation targets within the Conservation Area is very high because of the following factors:

1) The functional integrity of the system throughout the majority of the Conservation Area is high as evidenced by the positive response of vegetation and changes in channel morphology since the 1930s (Soles 2003);

2) With a local presence, TNC has the capacity to affect management changes;

3) TNC is actively building community support for its conservation goals; and

4) The biological diversity of the Gila River is recognized statewide, nationally, and internationally. This high profile will continue to focus attention on the management and conservation needs at the Conservation Area.

The primary constraint to achieving success is change in upstream water use and floodplain management practices that will influence hydrological conditions (e.g., size, duration and frequency of flood flows, and base flows) within the Iron Bridge Conservation Area.

CONSERVATION PLAN

The primary conservation goal at the Iron Bridge Conservation Area is to enhance the quantity and quality of natural resources by protecting and managing groundwater, surface water, floodplain, and riparian habitats. One of the primary objectives towards accomplishing this goal is to enable floodplain processes to continually generate aquatic and riparian habitat types throughout the Conservation Area and to protect those habitats from threats other than natural disturbance regimes. To accomplish this objective, TNC will use a set of conservation strategies to abate individual threats. In addition, we have developed a set of management objectives and strategies specific to the Iron Bridge Conservation Area. Each of these is described below.

THREAT ABATEMENT

In the Stress Assessment section, we identified the primary threats to the Conservation Area's conservation targets and the sources of those threats (see Table 4). Below, we outline specific objectives and strategies to abate the major threat: degradation of riparian habitat. Riparian habitat includes spikedace and loach minnow aquatic habitats. The actions that correspond to these objectives and strategies are identified in Table 5. The Nature Conservancy assumes primary responsibility for implementing these strategies, but will communicate and work closely with NMDGF. NMDGF, in turn, will take steps to ensure that warmwater nonnative fishes are not stocked or released in the Gila River and will enforce bait fish regulations.

Threat of Riparian Habitat Degradation

Objective 1: Eliminate livestock grazing within the active floodplain on the Iron Bridge Conservation Area.
Objective 2: Work with neighboring landowners to eliminate livestock grazing and ORV use in the floodplain on their private property.
Objective 3: Maintain or decrease depth to groundwater in Zone 1.
Objective 4: Protect natural shifting of the stream channel and flow variability.
Objective 5: Maintain in-stream flows.

Strategies:

- Characterize fluvial geomorphology at the Conservation Area and within the Cliff-Gila Valley to determine the current degree of channel instability and probable trend based on historical hydrographs and current physical features.
- Fence the entire Conservation Area, and work with neighbors and the surrounding community to eliminate trespass grazing and ORV use/access to the riparian corridor.
- Utilize existing laws and policies, through public processes, to reduce water withdrawals from the Gila River and promote maintenance of natural flow variability.

PRESERVE MANAGEMENT PLAN

For most of its recent history, the property was operated as one parcel within a much larger livestock operation. Historically, floodplain terraces were cropped for alfalfa or used as irrigated pasture. The Riverside Ditch was built in the late 1800s, but maintenance of the ditch ceased 15 to 20 years ago. The previous owner acquired the ranch early in the 1980s.

With cessation of irrigated agriculture, abandoned agricultural fields support a mixed plant assemblage comprised primarily of native grasses with some exotic plant species (Appendix B). One section of the Conservation Area is considered 'upland,' because it is not within the floodplain. The remaining fields are considered 'floodplain grasslands,' because they are covered in water during high floods.

Cottonwood (*Populus fremontii*), willow (*Salix* sp), and seepwillow (*Baccharis salicifolia*) occur in the floodplain, although most vegetation shows signs of intensive grazing pressure.

Management Objectives

The Conservation Area will be managed first and foremost for the benefit of spikedace and loach minnow. Funding and implementation of all activities on the Conservation Area shall be consistent with the array of purposes stated in the Natural Lands Protection Act. The overall management objectives for the Iron Bridge Conservation Area are:

- Maintain natural ecosystem processes, including flood-induced disturbance regimes to promote all riparian-obligate conservation targets, and work to restore natural baseflows to the stream channel during the growing season.
- Suppress or eliminate nonnative fish populations within the Conservation Area.
- Restore and maintain native riparian plant communities on the slopes and terraces of the Conservation Area. Reduce, to the extent possible, abundance and cover of exotic herbaceous species.
- Use fluvial geomorphological studies and repeat aerial photography to determine active floodplain dynamics, stream channel characteristics, and cover changes in riparian vegetation over time.
- Protect and enhance existing riparian forest habitat to support native avifauna, including potential habitat for the Southwestern Willow Flycatcher.
- Use the Conservation Area for guided field trips and public recreation, provided it does not conflict with management objectives and aligns with direction offered by the State Game Commission. As the Conservation Area was 90% purchased with state funds, the Commission has a primary role in determining regulations pertaining to appropriate uses.

Riparian Habitat Management

The wetlands on the property consist of the perennial main channel of the Gila River and side channel sloughs. These support the cottonwood and willow community that is characteristic of a healthy riparian area. Supplemental plantings of coyote willow (*Salix exigua*), which exist only in small numbers, will likely occur on the Conservation Area.

As the property represents one small segment of a large river system, much of TNC's management approach will focus on alleviating stresses on the natural hydrologic cycle upstream. TNC maintains a network of landowner relationships and protection instruments along the length of the upper Gila River and is committed to working cooperatively to promote floodplain management that will allow for the perpetuation of habitat for the conservation targets identified earlier in this plan.

On the Conservation Area, the river and associated wetland communities will be protected by excluding ORV use, livestock grazing, and other activities that might negatively impact stream bank stability, diminish recruitment of riparian plant species, reduce water quality, alter river channel dynamics, or cause harm to native aquatic and terrestrial wildlife. This will be accomplished by fencing the Conservation Area's perimeter boundary, posting use regulations and restrictions, and conducting periodic patrols to ensure the integrity of the fence and compliance with State Game Commission approved regulations.

Saltcedar (*Tamarix* sp.) is an exotic species that is present at very low levels on this Conservation Area. Saltcedar will be either mechanically removed or spot treated with herbicides. Nonnative Russian-olive (*Elaeagnus angustifolia*) and Siberian elm (*Ulmus pumila*) are also present on the Conservation Area and will be targeted for removal.

Fish Habitat Enhancement

It is anticipated that protection of the river and floodplain, by livestock exclusion and prohibition of other non-compatible uses, will enhance aquatic habitat quality for the benefit of native fishes. To measure and monitor changes in channel morphology, a prescribed set of measurements (e.g., channel width, water depth, substrate, and water velocity) will be made annually along each of a series of transects across the width of the active channel within the Conservation Area.

Southwestern Willow Flycatcher Habitat Enhancement

It is anticipated that management approaches described above for the cottonwood-willow community will result in suitable habitat for the Southwestern Willow Flycatcher. The best way to manage native riparian habitats is to maintain the natural hydrological processes that control recruitment, species composition, and canopy structure while working on-site to remove stresses caused by past livestock grazing, ORV use, stream channel alterations, or other activities. Passive and active restoration of the floodplain at the Gila River Bird Area created and improved

Southwestern Willow Flycatcher habitat and provides an example of what might be achieved within the Iron Bridge Conservation Area (Boucher et al. 2003). Habitat enhancement will also be achieved through cooperative efforts with landowners adjacent to the Iron Bridge Conservation Area.

Fire Management

All TNC properties are required to have a fire management plan that addresses both wildfire response protocols and use of fire as a natural ecological process. Given the management goal of maintaining a riparian forest on the property, a policy of wildfire suppression will be pursued in areas where cottonwood and willow habitat is present. Typically, large floods will rearrange downed woody debris and reduce wildfire risk. However, the exclusion of livestock from riparian areas may increase surface fuel loads and the risk of wildfires, so particular attention will be paid to fire prevention and containment practices and close coordination with wildfire response agencies. In support of this objective, a fire response plan for the entire TNC Gila Riparian Preserve is in preparation and will be completed by June 2008. The primary objective of the plan will be to outline response measures in the event that a fire is ignited. The primary response will be to ensure that the New Mexico State Forestry Division, which is responsible for private lands wildfire suppression, is notified in a timely manner.

Grazing

Livestock grazing within the Iron Bridge Conservation Area has been discontinued and will not be allowed.

Habitat Restoration and Enhancement

A small portion of the Iron Bridge Conservation Area lies outside the active flood channel on a higher terrace that has been heavily modified by past land uses, including irrigated agriculture and grazing. These disturbed areas are vegetated by various exotic species. TNC intends to restore these areas as appropriate to native habitats. However, the fields are not irrigated so shifting species composition from exotic to native might be a slow process.

Hydro-geologic Monitoring - One shallow groundwater monitoring piezometer with a recording pressure transducer will be installed, and a corresponding cross-section will be established and re-measured after channel-changing events. Hourly groundwater levels, cross-section survey, USGS Gila at Gila gauge, and crest stage data will be used to relate changes in river flow/stage to groundwater elevation. Long-term datasets will enable evaluation of groundwater, floodplain morphology, and vegetative responses to management actions.

Fluvial Geomorphological Characterization - Our understanding of the fluvial geomorphological characteristics of the Gila River in the vicinity of the Iron Bridge Conservation Area is limited. Using cross-section data provided by Ellen Soles, TNC will investigate the fluvial geomorphology features of the stream reach within the lower section of the

Cliff-Gila Valley to better understand the dynamic characteristics of the river. Our primary goal is to identify what constitutes stability in this river system and identify unstable areas. Natural stability is defined as the ability of the stream to move sediment so that the pattern, profile, and dimensions of the stream do not change over time. Therefore, TNC will measure the physical (geomorphic) characteristics of the channel and floodplain and integrate this information with discharge data from the USGS Gila River near Gila gauge.

Physical data to be gathered within the Iron Bridge Conservation Area include discharge, channel width, sediment size and concentration (distribution), and slope. Data will be collected during the summer low-flow period. From this information, TNC will develop cross-channel and longitudinal channel profiles, width/depth ratios of the active channel, base flow, bankfull, and floodplain channel dimensions, sinuosity, and valley/channel slope, then classify stream segments. These data will provide the necessary information for TNC to undertake successful restoration activities, such as stream bank stabilization and floodplain revegetation for habitat improvement. These activities will be integrated with the vegetation transect and riparian classification coverage described below.

Agricultural Fields - Agricultural fields on the property will be evaluated for their potential to support natural flood terrace plant communities. Soils within the Conservation Area have undergone extensive modifications over the past century, including tillage and compaction from machinery and vehicular traffic. These practices contribute to conditions that favor nonnative plants. Potential natural communities range from sacaton (*Sporobolus wrightii*) grassland to mesquite (*Prosopis glandulosa)* bosque, depending on such factors as depth to groundwater, soil conditions, and the frequency of overbank flooding. With time, elimination of grazing, natural recruitment or planting, it might be possible to establish additional cottonwood-willow habitat outside the active flood plain of the river. Limiting factors include whether natural recruitment occurs and, if not, whether planting is a viable option (weighing costs and probability of success).

Restoration Zones

The Conservation Area has been divided into restoration zones for the purpose of designing future restoration treatments.

Floodplain – Approximately 82.5 acres of active floodplain exist on the Iron Bridge Conservation Area. Much of this area is vegetated with Fremont cottonwood-Goodding willow riparian forest of varying age classes. Understory species in the forested areas include seepwillow, boxelder (*Acer negundo*), three-leaf sumac (*Rhus trilobata*), and hackberry (*Celtis reticulata*). Near the stream channel, herbaceous vegetation is a mix of sedges, seepwillow, and goosefoot (*Chenopodium* spp.), although none in high density. Interspersed with this vegetation are saplings of Fremont cottonwood and Goodding willow. This habitat could support a large variety of Neotropical migratory and nesting bird species including Yellow-billed Cuckoo, Common Black-Hawk, Bullock's Oriole, and Southwestern Willow Flycatcher. Mammals known to use the area include javelina, coyote, black bear, and gray fox. The river itself

supports spikedace and loach minnow, as well as a number of nonnative species including red shiner, channel catfish, and bullfrogs.

Although this habitat is of relatively high quality with significant wildlife values, it is degraded to varying extents by inappropriate livestock management and ORVs. To reduce these impacts, fences will be installed and maintained to exclude cattle and ORVs. Fencing, however, will not preclude continuation of lower impact uses, such as foot travel and bird watching.

An old well that is no longer in use is located in the floodplain. TNC will cap the well and will measure depth to groundwater four times per year.

Agricultural Field - The management objective for the abandoned agricultural field adjacent to the old ditch is to restore native grasses. Approximately 20 acres may be seeded with warm and cool season perennial grasses, warm season annual grasses, and other forbs and wildflowers. As the fields cannot be irrigated, they would be tilled and seeded just prior to the onset of the normal summer and winter seasonal rains.

MEASURES OF SUCCESS

Measures of success enable TNC to evaluate conservation strategies and adjust, if necessary, the actions implemented. The list below identifies measures specific to each of the strategies outlined in the Stress Assessment section above. Where possible, we have identified direct measures for the conservation targets (e.g., population trend for spikedace, loach minnow, and Southwestern Willow Flycatcher, acreage of cottonwood-willow). However, success measures will have to be accompanied by further research and monitoring that establish both a baseline and the pattern of variation for conservation targets so we can better understand the proportion of variation attributable to TNC management and that which is independent of our management. Monitoring needs will require additional funding or technical support from other agencies.

Success Measures for Riparian Habitat Restoration

1. Loach minnow and spikedace densities are maintained or increased; quality of aquatic habitat is improved (e.g., increased bank-side and instream cover; increased aquatic macrohabitat diversity; decreased wetted channel width:depth ratio).

2. Abundance and richness of native fish populations are maintained or increased.

3. Abundance of nonnative fishes declines or nonnative species eliminated.

4. Depth to water table is maintained or decreased (trend over time after baseline established that incorporates wet/dry cycle); cover of riparian woody species (cottonwood, willow, boxelder) is increased in the active floodplain.

5. Livestock grazing is eliminated from the Conservation Area.

6. Abundance and richness of breeding bird community is maintained or increased.

7. Extent of suitable Southwestern Willow Flycatcher nesting habitat is increased.

8. Number of breeding flycatchers within the Conservation Area is increased or maintained at levels documented in 2008.

9. Number of reports of evidence of beaver activity is increased.

10. Abundance of woody nonnative plants (e.g., saltcedar and Russian-olive) is decreased.

RESEARCH AND MONITORING NEEDS

Below is a description of the research and monitoring needs for the Conservation Area, listed as currently prioritized from highest to lowest priority. Each of the proposed studies would yield information needed to better understand management needs at the Conservation Area. Funding for the research and monitoring studies listed below does not exist.

1. *Aquatic Community Monitoring:* The annual fish surveys conducted by the New Mexico Department of Game & Fish should continue. Surveys should be expanded to include macro-invertebrate fauna that can be used to more completely characterize biological richness and water quality.

2. *Breeding Bird Community Inventory and Monitoring:* The Conservation Area is recognized for its high value to migratory and breeding birds, particularly Neotropical migrants. However, no systematic monitoring program has been established to document and track bird communities. Data collected from point-count or spot-mapping surveys of the entire Conservation Area would establish a baseline that could be evaluated periodically.

3. *Mapping and Monitoring of Riparian Vegetation:* Characterize temporal distribution and extent of riparian cover types throughout the Conservation Area using both aerial photography and mapped photo points, or LIDAR and ground-truthing (see #8 below). Mapping of riparian habitats at five-year intervals will be critical to measuring TNC's success and to understanding riparian recruitment patterns after disturbance. Sequencing aerial photography to capture post-flood conditions, both immediately after floods and several years after, will also help refine our ecological model for the floodplain dynamics/riparian habitat relationships. Site visits after flood events could be used to document the extent of overbanking flows.

4. *Permanent Photopoint Monitoring:* Establish photopoints and document changes in the riparian vegetation by taking photographs annually during the same season

(summer). Photopoints were established during the summer of 2007 (Figure 3) and will establish a baseline to compare change qualitatively.

5. *Southwestern Willow Flycatcher Demographic and Habitat Study:* Research and monitoring of the Southwestern Willow Flycatcher's population size, reproductive success, dispersal patterns, and habitat use is needed to evaluate the effects of management within the Conservation Area on this bird species.

6. *Water Quality Study:* Identify and characterize sources of potential water quality problems (e.g., increases in total dissolved solids or sediment loads). TNC will work with the NM Environment Department to track coarse-scale water quality changes in the Cliff-Gila Valley. Installing an inexpensive temperature logger in this reach will also be considered. Data collected by Cliff High School students, as part of the Watershed Watch program, will also be compiled on an annual basis.

7. *Fluvial Geomorphological Study:* Characterize historical and current trends and pattern of the river channel to evaluate the system's current state (i.e., aggrading or degrading, widening or stable). A geomorphological characterization will help TNC & NMDGF: 1) develop management strategies for protecting and enhancing riparian habitats at the Conservation Area; and 2) evaluate the effect of upstream diversions and floodplain disturbances on the potential and trajectory of riparian vegetation recovery.

8. *Geo-hydrologic Monitoring*: Monitor seasonal and longer-term changes in the water table using a piezometer coupled with a floodplain cross-section to track changes in the active stream channel and to evaluate the potential for cottonwood-willow recruitment at the Conservation Area. Depth to groundwater will also be measured four times a year using an abandoned well across the river from the piezometer. As the stream system recovers from grazing, vegetation might increase, and groundwater levels might be affected.

9. *Site-Specific Ecological Model for Riparian Habitat Development:* The ecological model used in this site plan was adapted from a TNC model developed for the Lower San Pedro River Preserve. While the basic processes that govern the cottonwood-willow community are similar, the model should be calibrated for the Gila River in the Cliff-Gila Valley and incorporate the conditions that promote/limit saltcedar. This effort will require establishment of vegetation transects coupled with photo-monitoring so that quantitative and qualitative vegetation measurements can be obtained over time.

IMPLEMENTATION PLAN

The implementation plan for the Conservation Area presented in Table 5 is a matrix that includes a series of actions to be taken, funding needs and sources (when known), and priority rank. Actions addressed in this plan are to be carried out over a five-year period ending with TNC fiscal year 2012. The matrix is organized according to the four primary protection sections in the Conservation Plan – Preserve Management, Threat Abatement, Land Protection and Preserve Restoration.

ENVIRONMENTAL COMPLIANCE

A project plan shall be prepared by The Nature Conservancy (TNC) before any proposed action can be implemented on the Gila River Iron Bridge Conservation Area. This plan shall outline what is to occur, how long, where (maps), when, and any other necessary details. The plan should also state if ground-disturbing activities would occur. This plan can involve more than one proposed action to streamline environmental clearance efforts. New Mexico Department of Game and Fish (NMDGF) shall review for compliance and approve all project plans prior to implementation.

Proposed projects should comply with the National Environmental Policy Act (NEPA) and the Endangered Species Act. To comply with NEPA, proposed projects could be tiered under the Environment Assessment: Designation of Critical Habitat for the Spikedace (*Meda fulgida)* and the Loach Minnow *(Tiaroga [=Rhinichthys] cobitis)*, or Categorically Excluded under the Federal Assistance Program of the US Fish and Wildlife Service. In both cases, a Section 7 Biological Evaluation shall be prepared by The Nature Conservancy to determine potential impacts of proposed actions on species listed under the Endangered Species Act. The Section 7 Biological Evaluation would be reviewed and approved by NMDGF and/or USFWS as necessary, prior to project implementation.

State-listed Threatened and Endangered Species as outlined in the most recent publication of the Biennial Review, and Species of Greatest Conservation Need as listed in the Comprehensive Wildlife Conservation Strategy should also be considered before project implementation. To facilitate this, TNC shall consult with appropriate staff biologists with NMDGF.

If a proposed project involves ground-disturbing activities, then compliance with State and Federal cultural resource laws are required. Compliance involves some level of database and/or ground survey, preparation of an appropriate report, tribal consultation, and obtaining State Historic Preservation Office (SHPO) concurrence. Database research, ground surveys, and preparation of reports shall be done by TNC or their agent in consultation with NMDGF Staff Archaeologist. The Archeologist performing this work shall have the appropriate Archeological Permits issued by the Historic Preservation Division of New Mexico Department of Cultural Affairs. The report shall meet State and Federal criteria, and be reviewed and approved by

NMDGF's Staff Archeologist. Tribal consultation and SHPO concurrence would be performed by NMDGF's Staff Archeologist.

GAINING ACCESS INTO NATURE (GAIN)

Gaining Access into Nature (GAIN) is a program offered by the New Mexico Department of Game and Fish. Many Game Commissioned-owned properties are being opened to additional wildlife-associated recreation activities beyond traditional uses of hunting and fishing. Wildlife viewing and photography while hiking, bicycling, and horseback riding are examples of activities allowed on some properties. These activities are designed to offer new incentives to recreate and to draw attention to the conservation of wildlife and wildlife habitat.

To allow GAIN activities on the Gila River Iron Bridge Conservation Area, The Nature Conservancy in collaboration with New Mexico Department of Game and Fish would agree on specific, appropriate GAIN activities. These activities would help achieve the objectives of this plan and would not adversely impact native habitats and species that occur on and adjacent to the property. Activities can be restricted to certain areas and certain times of year. After an agreement is reached, an authorization letter is prepared for NMDGF Director's signature. Any infrastructure or development needs would follow any outlined compliance as stated.

CONTACTS

Landowners/Neighbors

Freeport McMoran International
Fred McCauley
Diane Harsh
Marilyn and Kenneth Rosenbauer

Partners

Federal Agencies:
Bureau of Reclamation (USBR)
Fish and Wildlife Service (USFWS)

State Agencies:
Environment Department (NMED)
Department of Game and Fish Department (NMDGF)

County and Local Governments:
Grant County Road Department
Grant County Soil and Water Conservation District

Natural Resource Oriented Groups:
Southwest New Mexico Audubon Society
Native Plant Society (Gila Chapter)

Planners/Consultants

Dr. David Gori, Senior Ecologist, TNC NMFO
Adrian Oglesby, Living Rivers Program Manager, TNC NMFO
Jeanmarie Haney, Biohydrologist, TNC AZFO
Mike Fugagli, Naturalist, Bear Mountain Lodge, TNC NMFO
Ellen Soles, Geographer, NAU
Dr. Marilyn Myers, Wildlife Biologist, U.S. Fish and Wildlife Service, Albuquerque
Dr. Randy Jennings, Professor, Western New Mexico University
Hope Woodward, Ornithologist, New Mexico State University

Preparers

Martha Schumann, SW NM Field Representative, TNC NMFO
Robert M. Findling, Director of Conservation Projects, TNC NMFO
Lara Wood Miller, Conservation Information Manager, TNC NMFO
Dr. David Propst, Biologist, NMDGF

Table 1. Acreages for Land Cover Patterns at the Iron Bridge Conservation Area.

Land Cover	Acres	Description
Active Floodplain	82.5	Largely unvegetated portions of the river channel
Floodplain Terrace	40.0	Shrub dominated areas adjacent to floodplain
Agriculture	19.5	Abandoned agricultural field dominated by annual weeds
Upland	16.0	Dry grassy hillsides dominated by grass and mesquite
Forest	10.0	Cottonwood and semi-riparian woodland trees
TOTAL	168.0	

Table 2. Biological Elements and Ranking

Global/State/Taxonomic Ranks (for further information, go to http://nhnm.unm.edu/pdf/ranks_status.pdf):
G=Global Natural Heritage Program Ranks. G1- Critically Imperiled, G2 - Imperiled, G3 - Vulnerable, G4 - Apparently Secure, G5 - Secure.
T=Infraspecific Taxon Ranks. T# - Status of subspecies.
S=State Natural Heritage Program Ranks. S1- Critically Imperiled, S2 - Imperiled, S3 - Vulnerable, S4 - Apparently Secure, S5 – Secure, SA - Accidental.
Species of Greatest Conservation Need: A classification identified by NMDGF in the Comprehensive Wildlife Conservation Strategy for New Mexico (NMDGF 2006a).
TNC Target Species: Species identified as conservation targets in TNC's Conservation Action Plan or Ecoregional Plans.
State status (Determined by NMDGF): E - Endangered , T–Threatened, , S – Sensitive Species.
Federal status (Determined by USFWS): C – Candidate Taxa, LE – Listed Endangered, LT – Listed Threatened, PE - Taxa Proposed to be Listed as Endangered, SC – Species of Concern.

Species and Natural Communities	**Global/State/ Taxonomic Ranks***	**Species of Greatest Conservation Need****	**TNC Target Species*****	**State Status**	**Federal Status**
Communities					
Gila River Riverine Habitat	G1S1				
Fremont Cottonwood- Willow Riparian Community (*Populus fremontii - Salix*)	G2S2				
Fish					
Spikedace (*Meda fulgida*)	G2S1	X	X	E	LT
Loach Minnow (*Tiaroga cobitis*)	G2S1	X	X	T	LT
Roundtail Chub (*Gila robusta*)*	G3S2	X	X	E	SC
Gila Chub *(Gila intermedia)*	G2S1	X	X	E	PE
Sonora Sucker (*Catostomus insignis*)	G4S3	X	X	S	SC
Desert Sucker (*Catostomus clarki)*	G3G4S2	X	X	S	SC
Birds					
Bald Eagle (*Halietus leucocephalus)*	G4S2S3	X	X	T	T
Common Black-Hawk (*Buteogallus anthracinus*)	G4G5S3	X	X	T	
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	G5S1T2	X	X	E	LE

Table 2 continued					
Species and Natural Communities	**Global/State/ Taxonomic Ranks***	**Species of Greatest Conservation Need****	**TNC Target Species*****	**State Status**	**Federal Status**
Gray Flycatcher (*Empidonax wrightii)*	G5S3B,S5N		X		
Yellow-Billed Cuckoo (*Coccyzus americanus*)	G5S3T3	X	X	S	C
Eared Grebe *(Podiceps nigricollis)*	G5S3B,S5N	X			
Northern Pintail (*Anas acuta*)	G5S4B, S5N	X			
Osprey (*Pandion haliaetus*)	G5S2B,S4N	X			
Northern Harrier (*Circus cyaneus*)	G5S2B,S5N	X			
Peregrine Falcon (*Falco perigrinus*)	G4S2B,S3N	X	X	T	
Sandhill Crane *(Grus canadensis)*	G5S4N	X	X		
Gila Woodpecker *(Melanerpes uropygialis)*	G5S2B,S2N	X	X	T	
Bell's Vireo (*Vireo bellii*)	G5S2B,S3N	X	X	T	
Lucy's Warbler (*Vermivora luciae*)	G5S3B,S4N	X	X		
Yellow Warbler (*Dendroica petechia*)	G5S4B,S5N	X	X		
Abert's Towhee (*Pipolo aberti*)	G3G4S1B,S1N	X	X	T	
Elf owl (*Micrathene whitneyi)*	G5,S3B,S3N		X	T	
Whip-poor-will (*Caprimulgus vociferous*)	G5S4B,S4N		X		
Mammals					
Arizona Shrew (*Sorex arizonae*)	G3S1	X		E	SC
Western Red Bat (*Lasiurus blossevillii*)	G5S2	X		S	
Spotted Bat (*Euderma maculatum*)	G4S3	X		T	
Allen's Big-Eared Bat (*Idionycteris phyllotis*)	GSG4S2	X		S	SC
Pocketed Free-Tailed Bat (*Nyctinomops femorosaccus*)	G4SA	X			
American Beaver (*Castor canadensis*)	G5S3	X			
New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*)	G5T2S1	X		E	SC
Amphibians					
Arizona Toad (*Bufo microscaphus*)	G3G4S2?	X		S	SC
Chiricahua Leopard Frog (*Rana chiricahuensis*)	G3S1	X	X	S	LT

Table 2 continued					
Species and Natural Communities	**Global/State/ Taxonomic Ranks***	**Species of Greatest Conservation Need****	**TNC Target Species*****	**State Status**	**Federal Status**
Reptiles					
Mexican Garter Snake (*Thamnophis eques*)	G3S1	X		E	SC
Narrowhead Garter Snake (*Thamnophis rufipunctatus*)	G3G4S2	X		T	SC
Crustacean					
Sideswimmers / Scuds	NA	X			
Plants					
Goodings Onion (*Allium gooddingii*)	G4S1		X	E	
Mogollon Mustard (*Draba mogollonica*)	NA		X		
Special Daisy (*Erigeron hessii*)	NA		X		

Table 3: Occurrence of Native and Nonnative Fish at the Iron Bridge Conservation Area.

Species		**Occurrence**
Native		
Longfin dace	*Agosia chrysogaster*	Common
Roundtail chub	*Gila robusta*	Rare
Spikedace	*Meda fulgida*	Uncommon
Loach minnow	*Tiaroga cobitis*	Uncommon
Desert sucker	*Catostomus clarki*	Common
Sonora sucker	*Catostomus insignis*	Common
Nonnative		
Common carp	*Cyprinus carpio*	Rare
Red shiner	*Cyprinella lutrensis*	Uncommon
Fathead minnow	*Pimephales promelas*	Rare
Black bullhead	*Ameiurus melas*	Rare
Yellow bullhead	*Ameiurus natalis*	Rare
Channel catfish	*Ictalurus punctatus*	Rare
Flathead catfish	*Pylodictus olivaris*	Rare
Western mosquitofish	*Gambusia affinis*	Uncommon
Green sunfish	*Lepomis cyanellus*	Rare
Smallmouth bass	*Micropterus dolomeiui*	Rare
Largemouth bass	*Micropterus salmoides*	Rare

Table 4. Primary Threats and Sources of Threats to Conservation Targets Found within the Iron Bridge Conservation Area

Conservation Targets						
Cottonwood-Willow-Saltcedar Riparian Forest	**Wetlands**	**Floodplain Grasslands**	**Southwestern Willow Flycatcher**	**Common Black-Hawk & Bald Eagle**	**Neotropical Songbirds**	**Fish/Aquatic Community**
Habitat Loss/Degradation *from:* • ORV use in floodplain. • Livestock grazing in floodplain. • Invasion by exotic species. • Surface water and groundwater depletion. • Declines in water quality.			**Habitat Loss/ Degradation *from:*** • All factors identified at left for riparian habitats.	**Altered Vegetation Composition *from:*** • Lack of young trees to replace older trees that die naturally due to flooding or old age.	**Habitat Loss/Degradation *from:*** • All factors identified at left for riparian habitats.	**Habitat Loss/Degradation *from:*** • Surface water and groundwater depletion. • Declines in water quality. • Livestock grazing in floodplain.
Surface Water and Groundwater Depletion *from:* • Overdraft of alluvial aquifer for agriculture and mining. • Diversion of surface water for irrigation.			**Cowbird Parasitism *from:*** • Brown-headed Cowbird	**Human Disturbance near Nests *from:*** • Recreation.		**Exotic Species *from:*** • Dumping of bait fish. • Bull frogs • Crayfish • Stocked nonnative sport fish • Pathogens associated with nonnative fishes
Declines in Water Quality *from:* • Agricultural runoff.				**Inadequate Fish or Other Prey *from:*** • Surface Water Depletion.		

Table 5. Matrix Depicting Actions to be Implemented at the Iron Bridge Conservation Area
(*Funds available and funds needed are a one-time expense, not an annual expense, unless otherwise noted.)

ACTIONS	Funds Available*	Funds Needed*	Source	Priority	Status
MANAGEMENT					
Fence and post boundaries	$10K		TNC	High	Completed
Patrol boundaries to prevent livestock grazing and ORV travel	$3K		TNC	High	Ongoing
Control saltcedar		$500 initially	TNC & UGWA	Medium	Not Started
Complete interpretive plan		$1K	TNC	Low	Not Started
THREAT ABATEMENT					
Participate in public process related to the Arizona Water Settlement Act.	$5K		TNC	High	Ongoing
Complete cooperative fire response plan with local and state fire management entities	$1K		TNC	Medium	Not Started
Monitor Conservation Area for potential high impact activities	$1K		TNC	High	Ongoing
Complete riparian cover typing from aerial photography		$1K	TNC	Medium	Not Started
Work with local teachers on site to develop resource awareness among school kids		$1K	TNC	Medium	Not Started
LAND PROTECTION					
Purchase adjacent priority Conservation Areas as they become available		$200K-$500K	Various	High	Ongoing
Maintain a network of landowner relationships & protection instruments	$1K		TNC	High	Ongoing
RESTORATION					
Conduct hydrogeology and fluvial geomorphology studies of stream reach in the Cliff-Gila Valley.		$10K	TNC	Medium	Ongoing

ACTIONS	Funds Available*	Funds Needed*	Source	Priority	Status
RESEARCH AND MONITORING					
Monitor aquatic community	Yes		NMDGF	High	Ongoing
Inventory and monitor breeding bird community		$3K		Medium	Ongoing
Map and monitor riparian vegetation				Medium	Not Started
Monitor changes using permanent photopoints	$500 (annually)		TNC	High	Ongoing
Conduct demographic and habitat study of Southwestern Willow Flycatcher		$3K		Medium	Not Started
Monitor water quality			NMED/ Water-Shed Watch	Medium	On-going
Study fluvial geomorphological changes		$10K		Medium	Not Started
Conduct geo-hydrologic monitoring		$2K	TNC	Medium	On-going
Devleop site-specific ecological model for riparian habitat				Low	Not-Started

Figure 1. Iron Bridge Conservation Area Location Map

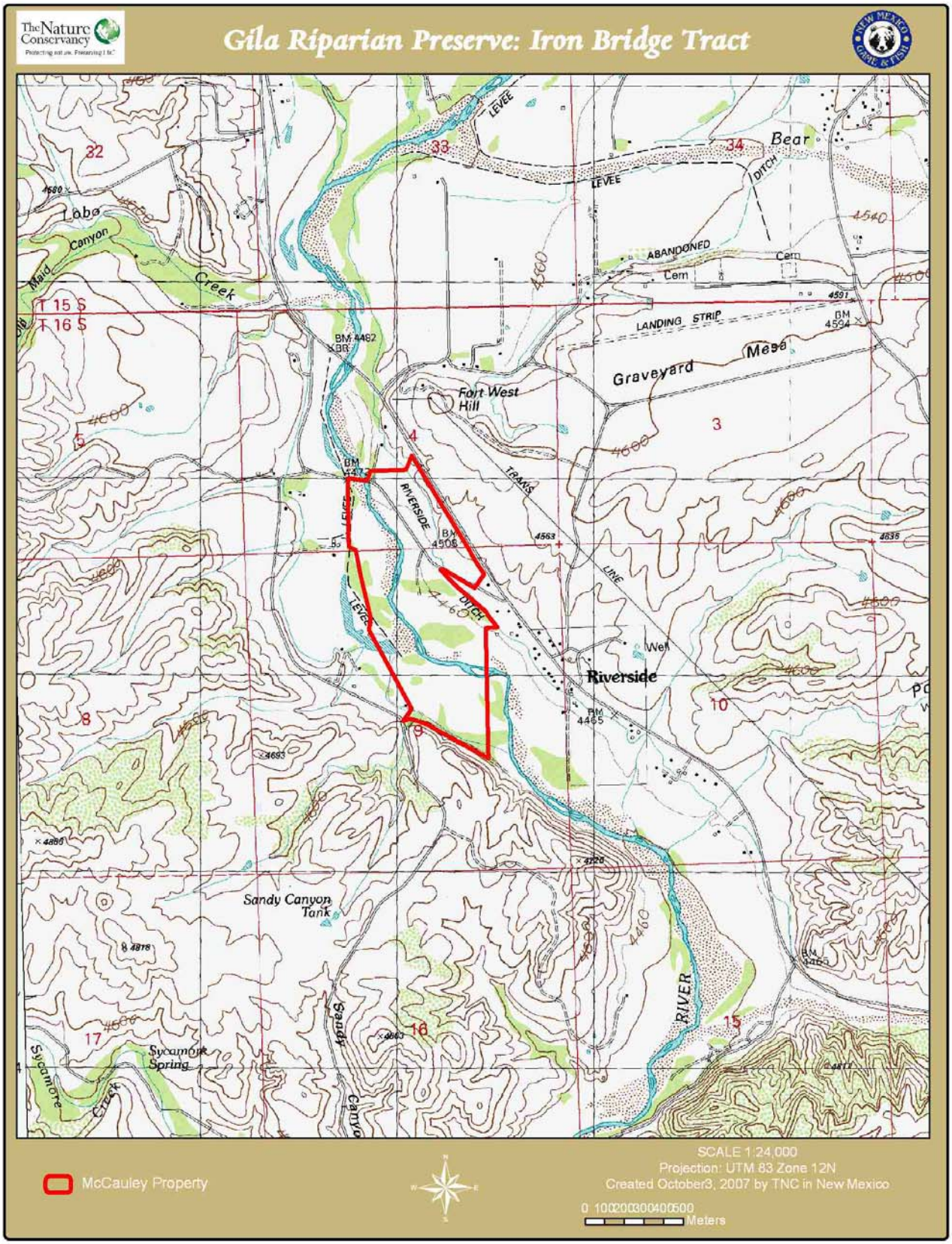


Figure 2: Land Cover at the Iron Bridge Conservation Area

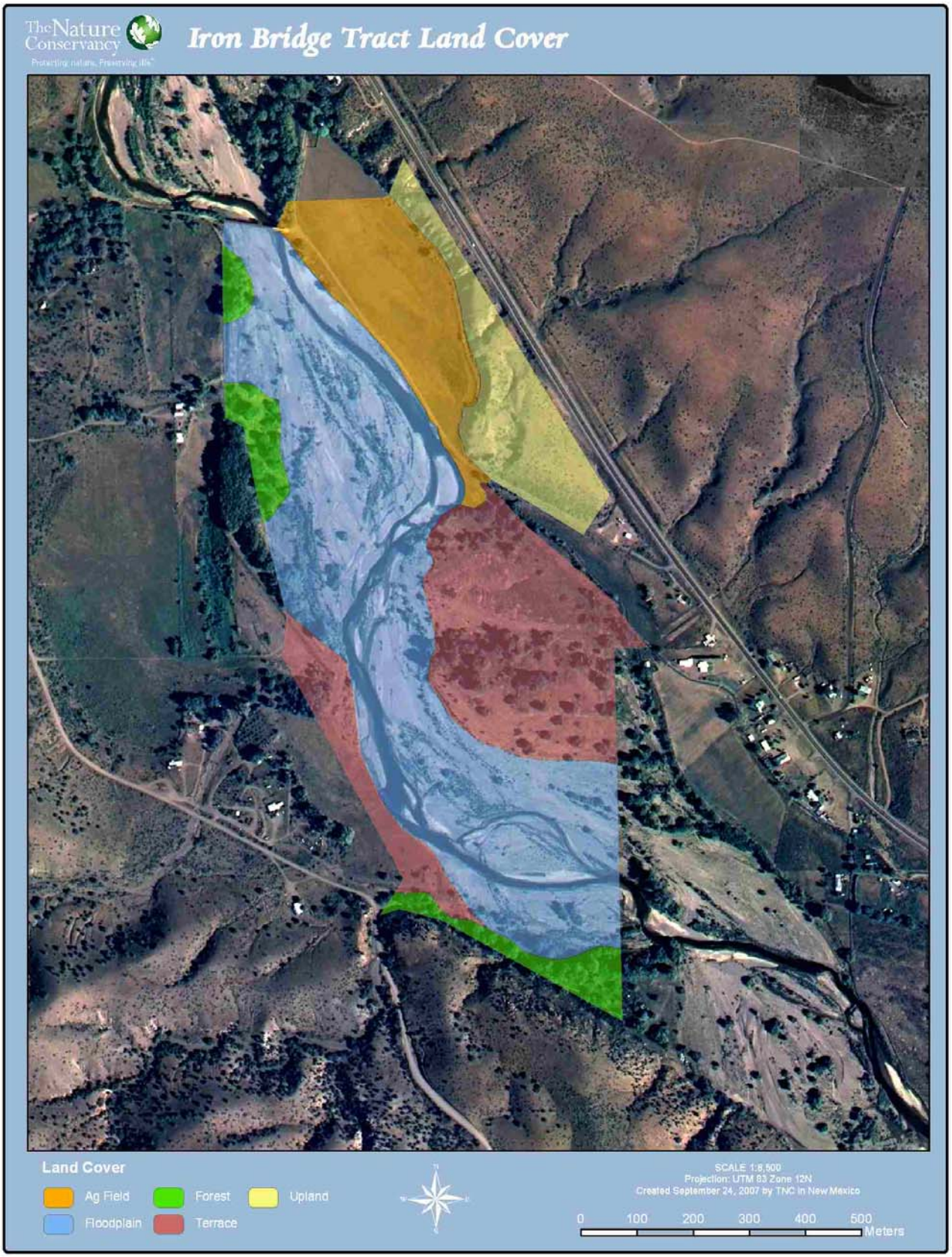
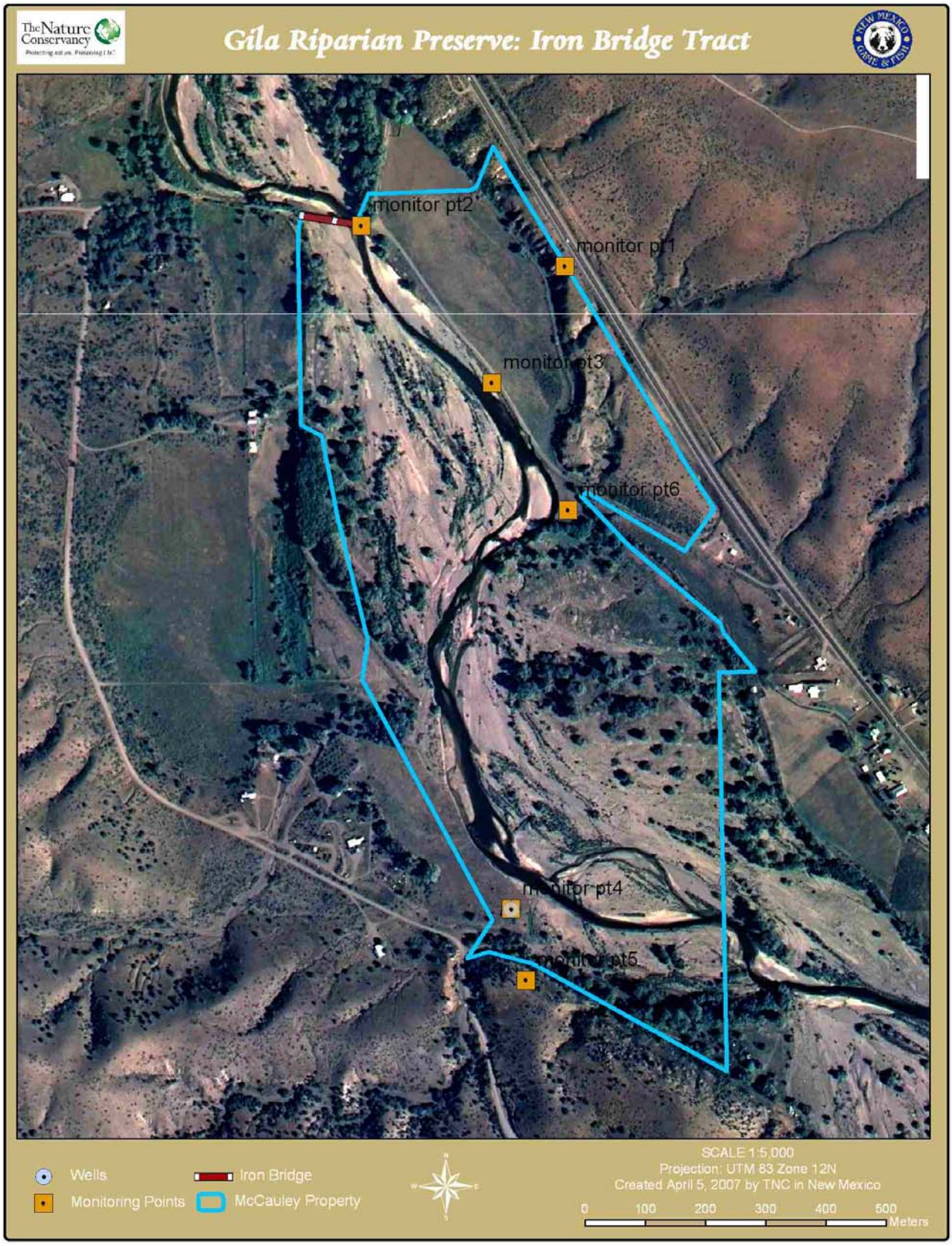


Figure 3. Iron Bridge Conservation Area Monitoring Points



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Appendix A: Description of the Natural Lands Protection Act

The Natural Lands Protection Act (NLPA) was enacted by the State Legislature in 1987 in order to assist in the protection and management of unique and ecologically significant lands for the benefit of all New Mexicans. The NLPA was passed in order that the state of New Mexico and non-profit New Mexico corporations jointly acquire and protect unique and ecologically significant lands in New Mexico. Land acquisition under this act can only occur by the voluntary sale of land and not through exercise of the state's power or eminent domain or any other condemnation process. The corporation must acquire at least ten percent undivided interest in the land. Once purchased, sites are held in undivided interest between the state and the corporation. Specific requirements for projects are as follow:

1) Land must be unique and ecologically significant in that they:

a) must afford habitat for species listed as rare, threatened or endangered by the state or federal government: and
b) constitute the best remaining examples of native ecological communities that are otherwise unprotected.

2) Priority among projects is determined by:

a) degree to which the lands in question are subject to threat or immediate alteration or destruction;
b) degree to which ecosystems in question are unduplicated elsewhere; and
c) usefulness for teaching and research.

3) Management of NLPA lands must include the following:

a) The corporation, which may be assigned to manage the lands by the secretary of natural resources, must develop and submit a management plan to the secretary of natural resources and the NLPA committee for review and compliance purposes.
b) Management shall be for education, research, and preservation. Access to the general public may be restricted to meet these requirements.
c) Lands adjacent to NLPA lands cannot be subject to regulation or restrictions as a result of such acquisitions.
d) The corporation must annually pay a sum equal to the amount which would have been paid in taxes, levies, and assessment to the state and its political subdivisions.

The Energy, Minerals and Natural Resources Department (ENNRD) and New Mexico Department of Game and Fish (NMDGF) are the administering agencies responsible for overseeing the NLPA program. The Act establishes a seven member Natural Lands Protection Committee (NLPC) to made recommendations for land acquisitions. The Secretary of the EMNRD chairs the committee. The other committee members are the State Land Commissioner, the Director of the Game and Fish Department, the Secretary of Agriculture, and three at-large members of the public appointed by the Governor.

APPENDIX B:
THE NATURE CONSERVANCY, IRON BRIDGE CONSERVATION AREA
PLANT LIST
August 24, 2007
Prepared by Donna Stevens

T = tree S = shrub H = herbaceous plant V = vine * = introduced species

Aceraceae – Maple Family		
Boxelder	*Acer negundo*	T
Amaranthaceae – Amaranth Family		
Pigweed, Amaranth	*Amaranthus* sp.	H
Anacardiaceae – Sumac Family		
Three leaf Sumac, Skunkbush	*Rhus trilobata*	S
Asteraceae – Composite Family		
Annual or Perennial Ragweed	*Ambrosia artemisiifolia* or *psilostachya*	H
Burrobrush	*Ambrosia* (*Hymenoclea*) *monogyra*	S
Great Ragweed	*Ambrosia trifida*	H
Sagebrush, Wormwood	*Artemisia* sp.	H/S
Seepwillow, Willow Baccharis	*Baccharis salicifolia*	S
Bahia, Yellow Ragweed	*Bahia dissecta*	H
Beggarticks, Spanish Needle	*Bidens odorata*	H
Brickelbush, Brickellia	*Brickellia* sp.	H/S
Thistle	*Cirsium* sp.	H
Canadian Horseweed	*Conyza canadensis* *	H
Chamisa, Rabbitbrush	*Ericameria nauseosa*	S
Blanketflower, Gaillardia	*Gaillardia pulchella*	H
Snakeweed	*Gutierrezia sarothrae*	S
Sunflower	*Helianthus annuus*	H
Camphorweed, Telegraph Plant	*Heterotheca subaxillaris*	H
Burroweed, Jimmyweed	*Isocoma tenuisecta*	S
Tansy Aster, Tahoka-daisy	*Machaeranthera tanacetifolia*	H
Rabbit-Tobacco	*Pseudognaphalium stramineum*	H
Mexican Hat, Coneflower	*Ratibida columnifera*	H
Cowpen Daisy	*Verbesina encelioides*	H
Showy Goldeneye	*Viguiera multiflora*	H
Sleep-daisy, Annual Goldenweed	*Xanthisma* (*Machaeranthera*) *gracile*	H
Cocklebur	*Xanthium strumarium*	H
Betulaceae – Birch Family		
New Mexico Alder, Arizona Alder	*Alnus oblongifolia*	T
Bignoniaceae – Catalpa Family		
Desert Willow	*Chilopsis linearis*	S/T
Brassicaceae – Mustard Family		
Tansy Mustard	*Descurainia* sp.	H

Capparaceae – Caper Family

Rocky Mountain Beeplant	*Cleome serrulata*	H
Clammyweed	*Polanisia dodecandra*	H

Chenopodiaceae – Goosefoot Family

Narrowleaved Goosefoot	*Chenopodium leptophyllum*	H
1 – 2 additional species of Chenopodium	*Chenopodium* sp.	H
Fetid Goosefoot	*Dysphania* (*Chenopodium*) *graveolens*	H
Russian Thistle, Tumbleweed	*Salsola tragus* *	H

Convolvulaceae – Morning Glory Family

Bindweed	*Convolvulus arvensis* *	H
Common Morning Glory	*Ipomoea purpurea* *	V

Cucurbitaceae – Gourd Family

Buffalo Gourd	*Cucurbita foetidissima*	H

Cupressaceae – Cypress Family

One-seeded Juniper	*Juniperus monosperma*	T

Cuscutaceae – Dodder Family

Dodder	*Cuscuta* sp.	V

Elaeagnaceae – Oleaster Family

Russian Olive	*Elaeagnus angustifolia* * (2 trees observed)	T

Euphorbiaceae – Spurge Family

Rattlesnake Weed	*Chamaesyce albomarginata*	H
Prostrate Spurge	*Chamaesyce prostrata*?	H
Thyme-leaf Spurge	*Chamaesyce serpyllifolia*	H
Croton	*Croton* sp.	H
Spurge	*Euphorbia* sp.	H

Fabaceae – Legume Family

False Indigo-bush	*Amorpha fruticosa*	S
Deervetch, Trefoil	*Lotus* sp.	H
Sweet-clover	*Melilotus officinalis* *	H
Honey Mesquite	*Prosopis glandulosa*	S/T

Juglandaceae – Walnut Family

Arizona Walnut	*Juglans major*	T

Lamiaceae – Mint Family

False Pennyroyal	*Hedeoma* sp.	H
Horehound	*Marrubium vulgare* *	H
Lanceleaf Sage	*Salvia reflexa* ?	H

Loasaceae – Blazing Star Family

Blazing Star, Stickleaf	*Mentzelia* sp.	H

Malvaceae – Mallow Family

Spurred Anoda	*Anoda cristata*	H
Globemallow	*Sphaeralcea* sp.	H

Moraceae – Mulberry Family

Texas Mulberry	*Morus microphylla*	T

Nyctaginaceae – Four O'Clock Family

Windmills	*Allionia* sp.	H
Spiderling	*Boerhavia* sp.	H
Sweet Four O'Clock	*Mirabilis longiflora*	H
Small-flowered Sandpuffs	*Tripterocalyx micranthus*	H

Oleaceae – Olive Family

New Mexico Olive	*Forestiera pubescens*	S/T
Velvet Ash	*Fraxinus velutina*	T

Onagraceae – Evening Primrose Family

Velvet-Weed	*Gaura mollis*	H
Gaura	*Gaura* sp.	H
Hooker's Evening Primrose	*Oenothera elata*	H

Papaveraceae – Poppy Family

Prickly Poppy	*Argemone pleiacantha*	H

Pedaliaceae – Devil's Claw Family

Devil's Claw	*Proboscidea parviflora*	H

Poaceae – Grass Family

Bluestem	*Bothriochloa* sp.	H
Sideoats Grama	*Bouteloua curtipendula*	H
Annual grama grass	*Bouteloua* sp.	H
Sandbur	*Cenchrus* sp.	H
Showy Windmillgrass	*Chloris virgata* *	H
False Buffalograss	*Munroa squarrosa*	H
Johnsongrass	*Sorghum halepense* *	H

Polemoniaceae – Phlox Family

Blue Trumpets	*Ipomopsis longiflora*	H

Polygonaceae – Buckwheat Family

Buckwheat	*Eriogonum* sp.	H
Dock-leaf Smartweed	*Polygonum lapathifolium* *	H
Dock	*Rumex* sp.	H

Portulaceae – Purslane Family

Shrubby Purslane	*Portulaca suffrutescens*?	H

Rhamnaceae – Buckthorn Family

Jujube	*Ziziphus jujuba* *	T

Salicaceae – Willow Family

Fremont Cottonwood	*Populus deltoides* ssp. *wislizeni*	T
Coyote Willow	*Salix exigua*? (heavily browsed)	S
Goodding's Willow	*Salix gooddingii*	T

Scrophulariaceae – Figwort Family

Mullein	*Verbascum thapsus* *	H

Solanaceae – Nightshade Family

Oak-leaf Thorn-apple	*Datura quercifolia* *	H
Sacred Datura	*Datura wrightii*	H
Pale Wolfberry	*Lycium pallidum*	S
Silverleaf Nightshade	*Solanum elaeagnifolium*	H
Melon-leaf Nightshade	*Solanum heterodoxum*	H
Buffalo-bur	*Solanum rostratum*	H

Tamaricaceae – Tamarisk Family

Tamarisk, Salt Cedar	*Tamarix chinensis* * (2 trees observed)	T

Ulmaceae – Elm Family

Western Hackberry	*Celtis reticulata*	T
Siberian Elm	*Ulmus pumila* *	T

Verbenaceae – Verbena Family

Verbena	*Verbena* sp.	H

Vitaceae – Grape Family

Thicket Creeper, Western five-leaved Ivy	*Parthenocissus vitacea*	V
Canyon Grape	*Vitis arizonica*	V

Zygophyllaceae – Caltrops Family

Goathead, Puncture-Vine	*Tribulus terrestris* *	H

Total: 99 species in 39 families

APPENDIX C:
THE NATURE CONSERVANCY, IRON BRIDGE CONSERVATION AREA
PRELIMINARY BIRD LIST

August 7, 2007

Prepared by Hira Walker, PhD: Non-game and Endangered Species Ornithologist

Bird list compiled during a site visit (August 7, 2007) to understand property boundaries and existing conditions, conducted during the middle of the day. Birds are not listed alphabetically. List is not comprehensive.

Birds of interest

Common Black-Hawk
Gila Woodpecker
Peregrine Falcon
Unknown Empidonax Flycatcher (poss. Southwestern Willow Flycatcher)
Yellow-billed Cuckoo

General birds

Bewick's Wren
Black Phoebe
Blue Grosbeak
Brown-headed Cowbird
Bullock's Oriole
Cassin's Kingbird
Common Raven
Common Yellowthroat
Curve-billed Thrasher
Great Horned Owl
House Finch
Ladder-backed Woodpecker
Lark Sparrow
Lazuli Bunting
Mourning Dove
Northern Cardinal
Northern (Red-shafted) Flicker
Rufous-crowned Sparrow
Spotted Towhee
Summer Tanager
Turkey Vulture
Western Kingbird
Western Meadowlark
Western Wood-Pewee
White-breasted Nuthatch
Vermillion Flycatcher
Yellow-breasted Chat