DRAFT RESTORATION PLAN AND ENVIRONMENTAL ASSESSMENT FOR THE HAZARDOUS SUBSTANCE RELEASES FROM THE HAYDEN SMELTER AND RAY MINE FACILITIES

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1.0 INTRODUCTION

In April 2009, the Department of the Interior and the State of Arizona, acting as natural resource trustees (Trustees) received a monetary settlement and three parcels of land from ASARCO, L.L.C. through the Natural Resource Damage Assessment and Restoration (NRDAR) program. The NRDAR program regulations are a part of the CERCLA statue and are set forth at 43 Code of Federal Regulations (C.F.R) Part 11. This settlement was sought by the Trustees to account for injuries to trust resources incurred through multiple releases of hazardous substances by ASARCO L.L.C. into Mineral Creek and the Gila River in Pinal County, Arizona over the past three decades. In accordance with the regulations of this program, the Trustees have prepared a draft restoration plan which details a strategy to replace, restore, or acquire the equivalent of the injured natural resources.

The site of injury stretches from the Ray Mine and the Hayden Facility, to the Gila River from the Ashurst-Hayden Diversion Dam, upstream past the confluence of the San Pedro and Gila Rivers, and for a distance of 5 miles up each of those rivers beyond the confluence and to Mineral Creek from its confluence with the Gila River upstream to a point one mile above the Big Box Canyon Dam. The proposed sites for restoration are the former ASARCO properties on the lower San Pedro River conveyed to the Arizona Game and Fish Commission as a part of the NRDAR settlement agreement.

1.1 PURPOSE AND NEED

The purpose of this restoration plan/environmental assessment (RP/EA) is to identify restoration project alternatives, evaluate the environmental impact of the alternatives, and select a restoration project to compensate the public for injuries to natural resources on Mineral Creek and the Gila River. The alternative selected should lead to recovery, restoration, or acquisition of natural resources and ecological services as compensation to the public for the injury of trust resources and services caused by hazardous substance releases. Any selected alternative must be feasible, safe, cost-effective, address injured natural resources, consider actual and anticipated conditions, have a reasonable likelihood of success, and be consistent with applicable laws and policies.

ASARCO operates the Ray Mine/Hayden Smelter Complex near Hayden, AZ which includes the Ray Mine and Hayden Smelter facilities (Figure 1). Between August 1988 and November 1997, 47 separate releases of hazardous substances into Mineral Creek from the Ray Mine were reported (ADEQ 2002). A large portion of these releases were uncontained and eventually entered Mineral Creek and the Gila River. Hazardous chemicals released included copper sulfate, copper tailings and leachate. The amount of hazardous substances released was often not quantified, but at least one major release of 324,000 gallons was recorded, and at least three releases were greater than 10,000 gallons. In addition, multiple groundwater wells down-gradient of the Ray Mine were found to be highly contaminated by a common leachate solution which was attributed to releases by ASARCO into shallow groundwater along Mineral Creek (USEPA 1997). It is likely that the hazardous substance present in shallow groundwater will represent an ongoing source of chronic contamination to Mineral Creek (Lipton 2009).

Numerous spills of mine wastes have also occurred at the Hayden Smelter facility, located approximately 20 miles southeast of the Ray Mine in the Town of Hayden. At least two major releases of metals-rich tailings occurred directly into the Mineral Creek and the Gila River since 1993, in quantities totaling more than 300,000 tons (ADEQ 2007, USEPA 1997).

Figure 1. Location of the Ray Mine and Hayden Smelter in Pinal County, Arizona.

In 1998, ASARCO entered into a consent decree with the U.S. Environmental Protection Agency (USEPA) that required response actions to be taken to prevent further releases of hazardous substances into Mineral Creek. These actions included extending an existing tunnel around Mineral Creek by 13,000 feet to prevent contamination of Mineral Creek by upper workings at the Ray Mine, and isolating a portion of Mineral Creek into a lined channel to prevent further contaminated of the creek by from groundwater.

Substantial injuries to public trust doctrine resources, including riparian habitat (land), fish, wildlife, biota, and water[1], have occurred throughout the past three decades as a result of the hazardous substance releases and response actions to these releases at the Ray Mine/Hayden Smelter. The most substantial injuries occurred in the reach of Mineral Creek that extends from the tunnel outlet to the Gila River. Dissolved copper concentrations in the surface water of this reach have been recorded up to 130 times surface water quality standards that will sustain aquatic life, and sediment copper concentrations have been recorded to exceed up to 22 times the level beyond which injury is inflicted on sediment-dwelling organisms (MacDonald et al. 2000). These concentrations of copper caused a complete loss of aquatic life in this reach including the endangered Gila chub (*Gila intermedia*) and native longfin dace (*Agosia chrysogaster*), as well as many species of aquatic invertebrates. Other species of wildlife including migratory and non-migratory birds were likely affected either through direct mortality or indirectly through the loss of habitat (Lipton 2009). These hazardous releases also resulted in loss or reduced vigor of riparian vegetation in and around Mineral Creek. Overall, ecosystem services lost in the 117 acres that include Mineral Creek and its associated riparian habitat were estimated to be 100% from 1981-2005, and up to 50% from 2005 to the present (Lipton 2009).

Hazardous releases also affected the aquatic and riparian portions of the Gila River near the Ray Mine/Hayden Smelter Complex, including approximately 2,930 acres upstream of Mineral Creek to the confluence with the San Pedro River, and approximately 1,620 acres downstream of Mineral Creek to the Ashurst-Hayden Dam. The most substantial loss of ecosystem services in

[1] 43 CFR 11.14(z)

these areas occurred during the three years following the release of 300,000 tons of tailings in 1993, when ecosystem service losses were estimated at 10-25% (Lipton 2009).

1.2 AUTHORITY

The Federal Water Pollution Control Act, 33 U.S.C. § 1251, *et seq*. (commonly known as the Clean Water Act, CWA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601, *et.seq*, authorize States, Indian Tribes, and certain Federal agencies that have authority to manage or control natural resources, to act as "trustees" on behalf of the public, to restore, rehabilitate, replace, and/or acquire natural resources equivalent to those injured by hazardous substance releases. The Natural Resources Damage Assessment and Restoration (NRDAR) regulations are a part of the CERCLA statute and are set forth at 43 Code of Federal Regulations (CFR) Part 11.

The National Environmental Policy Act (NEPA; 42 U.S.C. §§4321-4347) requires that the Trustees provide a reasonable range of alternatives prior to the selection of a preferred alternative as well as a public comment period. The final RP/EA will also provide the information needed to determine whether an EA is adequate to support a Finding of No Significant Impact (FONSI) decision or whether an Environmental Impact Statement (EIS) needs to be prepared.

1.3 SETTLEMENT OF NATURAL RESOURCE CLAIM

The Trustees estimated injuries to public trust doctrine natural resources[2] using the Habitat Equivalency Analysis method, which uses a process for valuing natural resources as outlined in

[2] Natural resource: land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States, any State or local government, any foreign government, any Indian tribe.

the NRDAR regulations (43 CFR. 11.60-11.84). This included injury to land, fish, wildlife, biota, air, and water. On June 8, 2009, the U.S. Bankruptcy Court, Southern District of Texas, approved a settlement agreement between ASARCO and the State of Arizona and the Department of the Interior to compensate the public for natural resource injuries due to releases of hazardous substances from Ray Mine and the Hayden Facility to Mineral Creek and the Gila River. According to the settlement agreement and 43 CFR 11, the Trustees must use the damages for primary and/or compensatory restoration, rehabilitation, or replacement of injured natural resources and/or acquisition of equivalent natural resources, including but not limited to any administrative costs and expenses necessary or incidental to restoration planning and restoration.

This settlement agreement granted conveyance of three parcels of land totaling approximately 995 acres (the San Pedro River Properties) including water rights to the Arizona Game and Fish Commission in addition to funds for restoration activities at or in connection with the land (including, but not limited to, restoration activities at the San Pedro River Properties) as the Trustees jointly direct in accordance with an approved restoration plan. The settlement agreement also specified that a council of Trustees be established to coordinate development and implementation of a Restoration Plan. The federal agencies included in the Council, are the Department of the Interior's (DOI) Bureau of Land Management (BLM) and United States Fish and Wildlife Service (USFWS), who lead for the DOI. State of Arizona trustee resource agencies include the Department of Environmental Quality (ADEQ), State Land Department (ASLD), and the Game and Fish Department (AGFD). The lead natural resource trustee for the State of Arizona is the Director of ADEQ. USFWS's Southwest Regional Director has been designated the Federal Authorized Official (AO) for this site. The Federal AO is the DOI

official delegated the authority to act on behalf of the Secretary to conduct a natural resource damage assessment, restoration planning and implementation.

2.0 NATURAL RESOURCES AND SERVICES AFFECTED BY THE HAZARDOUS SUBSTANCE RELEASES

Aquatic and riparian natural resources exposed to hazardous substances released from the Ray/Hayden sites include Mineral Creek as it passes through the Ray Mine and downstream to the mouth of the Gila River, and the Gila River from Hayden downstream to approximately the Ashurst-Hayden Dam (Figure 1).

2.1 RESOURCES AFFECTED BY HAZARDOUS SUBSTANCE RELEASES

ASARCO operates the Ray Complex, including the Ray Mine in Ray, AZ and the Hayden Smelter in Hayden, AZ (Figure 1). The Ray Complex falls within the Middle Gila River watershed, at an elevation of approximately 2,000 feet. The Gila River flows northwest through Hayden, between two large tailings impoundments, toward the towns of Kearny and Florence. Mineral Creek drains the Ray Mine area and enters the Gila River approximately 12 miles downstream of Hayden (Figure 1, Lipton 2009).

The Gila River is a perennial river, although its flow is largely controlled by upstream dams. Mineral Creek is perennial upstream of Ray Mine and ephemeral downstream of the Mine. The San Pedro River originates in northern Mexico and flows north past Benson and Mammoth, Arizona, before reaching the confluence with the Gila River in Winkelman (Figure 1). The San Pedro River near the confluence with the Gila River is perennial. Immediately upstream of this perennial reach, the valley is broader and the river is ephemeral. The Ray Complex lies within

the Sonoran Basin and Range Ecoregion, in the northeastern corner of the Sonoran desert-scrub biome. The annual average precipitation is 13.9 inches, and temperatures range from a low of about 30ºF in winter to a high of about 103ºF in summer. The yearly average low is 46ºF and the yearly average high is 84ºF. Precipitation primarily occurs in two periods, winter (December to March) and summer/fall (July to October); most precipitation occurs in July and August (Turner 1994, CH2M Hill, 2008a). The Gila River riparian area is characterized as Sonoran Riparian Deciduous Forest; it includes stands of native Gooddings willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), mesquite (*Prosopis* spp.), seepwillow (*Baccharis salicifolia*), and non-native tamarisk (*Tamarix* spp.), with average canopy heights between 12 and 20 feet (CH2M Hill 2008b, Lipton 2009).

Upstream of the Ray Mine and the Big Box Dam, Mineral Creek is generally a perennial stream, with low-gradient riffles and several plunge pools (Lipton 2009). It has been designated as critical habitat for the Gila chub (*Gila intermedia*), with water quality and habitat suitable for re-establishment of a native fishery (Robinson 2008). The Arizona Game and Fish Department (AGFD) found native Gila chub and long fin dace (*Agosia chrysogaster*) in upper Mineral Creek in 1993, as well as non-native mosquitofish (*Gambusia affinis*), green sunfish (*Lepomis cyanellus*), and fathead minnows (*Pimephales promelas*) (AGFD 1993). Surveys conducted in upper Mineral Creek between 2002 and 2006 found no fish, potentially because fish populations did not survive intense flooding (AGFD 2006). Although chemical water quality data from upstream of the mine are scarce, AGFD (2006) noted during a 2006 aquatic biota survey that "aquatic invertebrates were abundant and should provide a forage base for native fishes. The presence of sensitive aquatic invertebrates and lowland leopard frogs indicates good water

quality." Based on that assessment, longfin dace were re-introduced and successfully reproduced in 2006. Green sunfish and fathead minnows subsequently returned to Big Box reservoir and reaches near the reservoir in 2007. Thus, baseline water quality in Mineral Creek appears to support native aquatic biota.

The Gila River, even absent releases of hazardous substances from Ray and Hayden operations, is not a pristine waterbody (Lipton 2009). The Coolidge Dam upstream of Hayden controls the flow of the river for irrigation purposes. During the growing season in dry years, the flow of the Gila River can be greatly reduced. The surrounding Sonoran Desert mountainous terrain is highly prone to flash flooding during rainfall, particularly during the summer monsoon season. Thus, the middle Gila River is prone to large, rapid fluctuations in flow. The nature of flash flooding in the area, together with the common practice of irrigated agriculture in the floodplain, results in high sediment loads in the Gila River.

3.0 RESTORATION ALTERNATIVES

Damages recovered by the Trustees for natural resource injuries or ecological service losses due to hazardous substances releases must be used to restore, replace or acquire natural resources or services equivalent to those injured or lost. The goal of the restoration planning process to is to describe alternatives considered by the Trustees to most effectively compensate for the injuries incurred. The NRDAR regulations provide that restoration plans should consider specific factors when evaluating and selecting projects to restore or replace injured natural resources. The criteria below will be used to evaluate and select restoration projects: (See 43 C.F.R. § 11.82)

1. Technical feasibility

2. The relationship of the expected costs of the project to the expected benefits

3. Cost effectiveness

4. The potential for additional ecological injury resulting from the proposed actions, including long-term and indirect impacts to the injured or other resources

5. Ability of the resources to recover with or without alternative actions

6. Potential effects of the action on human health and safety

7. Compliance with applicable federal, state, and tribal laws

3.1 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Several potential restoration actions were considered but were not deemed warranted for further consideration. These include creation of the moist soil units and emergent wetlands within the active agricultural field of the property conveyed to the AGFD. The Trustees decided against taking these two activities forward for several reasons, including the fact that initial percolation tests of the soils on the property indicated high rates of infiltration that would not be amenable to these types of uses. The Trustees also decided not to pursue reconnection of ephemeral washes across the current agricultural fields after initial inspection of the site indicated that due to current topography, a large degree of earthwork would be required to stabilize head cutting toward SR77 and encourage water flow to the San Pedro River.

3.2 ALTERNATIVES CONSIDERED

3.2.1 Alternative 1: No Action

As with all federal actions, the NRDAR regulations require the consideration of a “no action” alternative among the viable options. Under this alternative no action will be taken to compensate the public for injuries to natural resources incurred through hazardous releases at the

Ray Mine Complex. Instead, restoration would occur naturally over time at Mineral Creek and the Gila River.

Considering the extent of the damage to Mineral Creek and the Gila River, it would likely take many years for injured resources to recover. Further, remaining sources of contamination (e.g., in groundwater) as well as continued operation of the Ray Mine/Hayden Smelter would likely impede rehabilitation of these ecosystems. Under NRDAR regulations, the Trustees are required to fully compensate the public for resources lost as a result of releases of hazardous substances to the environment. Thus, this was not considered a reasonable alternative and is not recommended by the Trustees.

3.2.2 Alternative 2: Restoration at acquired San Pedro River Properties & Acquisition of adjacent parcels

Under this restoration alternative, the Trustees have prioritized a series of restoration actions to be conducted at or around the San Pedro Properties acquired through the settlement with ASARCO ("Project Area", Figure 2). These activities will be implemented to restore the resources lost through the releases at the Ray Mine/Hayden Smelter Complex, which included losses of the ecosystem services of riparian, emergent, and aquatic vegetation, as well as loss of aquatic insects and native fish. After the public review period, the Trustees will finalize the Restoration Plan/Environmental Assessment and will transfer settlement money to AGFD to implement the restoration actions. Also, the Trustees will consider grant opportunities that allow us to achieve our restoration goals while partnering with others to share implementation expenses.

Currently, the San Pedro River properties consist of approximately 995 acres, or which approximately 500 acres of riparian habitat, 390 acres of uplands, and 105 acres of currently

active agricultural fields exist. Approximately 20% of the riparian area is covered with nonnative vegetation, primarily salt cedar (*Tamarix* spp.). The agricultural fields (outside the area to be used in Action 4 described below) will be used by the AGFD for the benefit of wildlife and their habitat. The riparian corridor has also been subject to herbivory by trespass livestock since portions of fencing around the parcel boundaries are in a state of disrepair. Under AGFD ownership, the San Pedro River properties will be open to hunting and limited outdoor recreation (e.g., bird watching, hiking, nature photography, etc.). The Trustees considered a variety of potential restoration actions to be carried out on the San Pedro River properties. Potential actions in our order of preference include the following:

1. **Construction of Livestock Exclusion Fencing**

   Objective: Establish property boundaries, and protect parcel from trespass livestock, encouraging restoration and maintenance of native vegetation.

   Action: Install 3-rail steel fence around riparian areas and 4-strand wildlife-friendly barbed wire around upland boundaries. Best management practices (BMP) would include limiting use of heavy machinery outside of breeding seasons of sensitive species to minimize disturbance and negative impacts as well as erosion/sedimentation controls.

2. **Land Acquisition/Conservation Easements**

   Objective: Work with willing, adjacent landowners to acquire or protect through easement additional lands on the lower San Pedro River adjacent to the parcels acquired by AGFD through the settlement with ASARCO.

   Action: Work with willing landowners to purchase or protect small parcels of State Trust Land and/or private holdings that include riparian habitat along the San Pedro River.

Properties will be acquired or protected at costs not to exceed fair market value. Settlement funds would be used to purchase adjacent parcels of land which will make the three main parcels contiguous for fencing purposes (State Trust Land) and to enlarge the length of the San Pedro River floodplain under protection for conservation.

3. **Enhancement of emergent wetland habitat within the bankfull area of the river**

   Objective: Increase the amount of emergent wetland habitat available to waterfowl, wading birds, amphibians, native fish, and beavers.

   Action: Utilize various methods to increase the amount of emergent wetland habitat within the San Pedro River. Methods to be explored include encouraging colonization by beavers, and deposition of coarse debris into stream to increase watering of floodplain. BMPs would be employed during activities, such as sedimentation screens and mats to reduce risk of erosion, and limiting use of heavy machinery outside of breeding seasons of sensitive species, to minimize disturbance and negative impacts.

4. **Native Vegetation Restoration**

   Objective: Increase the area of riparian vegetation along the San Pedro River

   Action: Plant native riparian plant species (e.g., cottonwoods and willows) in a portion of the agricultural fields in the southwestern portion of the southernmost parcel. Equipment such as tractors and augers would be used to prepare the soil and plant trees. BMPs would include limiting use of heavy machinery outside of breeding seasons of sensitive species to minimize disturbance and negative impacts as well as erosion/sedimentation controls.

5. **Invasive Non-native Plant Species Control**

Objective: Increase the quantity of native riparian vegetation along the San Pedro River, thereby increasing the quality of habitat for the native ecological community.

Action: Remove nonnative riparian vegetation (e.g. saltcedar) along the river corridor using mechanical and/or herbicide treatment, and replace with native riparian species (e.g., *Populus* spp., *Salix* spp.). BMPs would include limiting use of heavy machinery outside of breeding seasons of sensitive species to minimize disturbance and negative impacts. For example, we will avoid any restoration activities within active breeding territories of southwestern willow flycatchers during the breeding season.

3.3 PREFERRED ALTERNATIVE

Each restoration alternative, and specific actions under the restoration at the acquired San Pedro Properties alternative, were evaluated by the Trustees based on criteria described in section 4.0 of this plan. These evaluations are summarized in Table 1. None of the alternatives result in long-term and indirect injuries to the existing environment. The Trustees recommend alternative 2 as the preferred alternative. Alternative 2, restoration at the San Pedro Properties and adjacent land acquisition, will result in an immediate benefit to wildlife and vegetation resources. Further, maintenance of implemented restoration actions will be ensured since the property will be owned and managed by AGFD. Land acquisition, will result in the conservation of additional riparian lands that could be potentially developed in the future or may not be managed in a way that maximizes benefit to natural resources. Acquisition of additional riparian lands will contribute to the protection and recovery of many native wildlife species by protecting important riparian habitat along the San Pedro River. These species include the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), which utilizes a large portion of the San Pedro River on and nearby the acquired San Pedro Properties.

Figure 2. Parcels of property north of Mammoth, AZ transferred to the Arizona Game and Fish Department as part of the NRDA settlement with ASARCO.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Actions undertaken by the Trustees to restore natural resources and their services under CERCLA and other federal laws are subject to the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., and the regulations guiding its implementation at 40 C.F.R. Parts 1500 through 1517. NEPA and its implementing regulations outline the responsibilities of Federal agencies, including those for preparing environmental assessments (EAs). In general, Federal agencies contemplating implementation of a major Federal action must produce an environmental impact statement (EIS) if the action is expected to have significant impacts on the quality of the human environment. When it is uncertain whether a contemplated action is likely to have significant impacts, Federal agencies prepare an EA to evaluate the need for an EIS. If the EA demonstrates that the proposed action will not significantly impact the quality of the human environment, the agency issues a Finding of No Significant Impact (FONSI), which satisfies the requirements of NEPA, and no EIS is required

Table 1. Summary of Trustee's evaluation of restoration alternatives to account for injuries at the Ray Mine/Hayden Smelter. Assessment was highly positive (++), positive (+), negative (-), or neutral (0).

Restoration Alternative	Restoration Action (if evaluated)	Technical Feasibility	Nexus to Injury	Cost-Effectiveness	Avoids Injury to Existing Resources	Recommend for inclusion in Final Restoration Plan
No Action		++	0	0	0	N
Restoration at the Site of Injury		-	++	0	0	N
Restoration at the Acquired San Pedro Properties	Livestock exclusion	++	++	++	0	Y
	Invasive plant control	+	++	+	-	Y
	Moist soil unit creation	+	+	+	0	N
	Creation of emergent wetlands in agricultural fields	-	++	-	0	N
	Enhancement of emergent wetland habitat within the bankfull of the river	+	++	++	0	Y
	Restoration of ephemeral wash connections to the river	-	-	0	-	N
	Riparian vegetation restoration in the southernmost parcel	+	+	++	0	Y
Land Acquisition		++	++	++	0	Y

4.2 WATER RESOURCES

General Setting

The project area, located approximately 9 miles north of Mammoth in Pinal County, encompasses portions of Township 6 South, Range 16 East and Township 7 South, Range 16 East, of the Gila and Salt River Base and Meridian. The climate in the region is semi-arid, hot in the summer and moderate in the winter. Temperatures in the general vicinity range from a monthly average minimum 47.4° Fahrenheit to 82.2° Fahrenheit. The annual mean precipitation is 13.79 inches; the annual mean snowfall is 0.7 inches (Western Regional Climate Center 2011). About half of the precipitation falls during the summer thunderstorms, and the remainder occurs as intermittent winter or spring storms. These descriptions were adapted from the Bureau of Reclamation's Environmental Assessment for Habitat Acquisition for the southwestern willow flycatcher on the lower San Pedro River (BOR 2006).

Affected Environment

The San Pedro River originates in the mountains near Cananea Sonora, Mexico. It enters the United States around Palominas, Arizona, and extends northward for approximately 140 miles to join the Gila River near Winkelman, Arizona. The watershed covers a total of approximately 7,015 square-miles. It is the last major undammed river in the American Southwest and exhibits a remarkably intact riparian system including extensive stands of Fremont cottonwood (*Populus fremontii*)/Goodding's willow (*Salix gooddingii*) gallery forest and large mesquite (*Prosopis velutina*) bosques. The San Pedro River serves as a corridor between the Sky Islands of the Madrean Archipelago in northern Sonora and southern Arizona in its southernmost reaches and, in the north, Arizona's Central Highlands. The river is not only a major corridor between varied

habitat types and ecoregions, it represents a ribbon of water and riparian vegetation in an otherwise arid environment. The river thus exhibits a remarkably high biodiversity, both in resident and migratory species. Over 100 species of breeding birds and another approximately 250 species of migrant and wintering birds occur in the area, representing roughly half the number of known breeding species in North America. The river serves as a migratory corridor for an estimated 4 million migrating birds each year.

The project area is located within Arizona Department of Water Resources' (ADWR)-designated Lower San Pedro Basin, which begins at an area termed "the Narrows" upstream of the community of Cascabel and extends approximately 65 miles to the confluence with the Gila River. The Lower San Pedro basin drains 1,600 square miles of the watershed. Uplands surrounding this reach are characterized by saguaro cactus-dominated Sonoran Desertscrub, rather than the Chihuahuan Desert-influenced uplands adjoining the upper San Pedro River. The following discussions provide more detailed information regarding the ground and surface water resources in the vicinity of the project area.

Surface Water. The project area lies within Hydrologic Unit Code (HUC) 15050203. The U.S. Geological Survey (USGS) stream gage that was nearest to the project area is no longer in existence. This gage was located below the Aravaipa Creek confluence with the San Pedro River near Mammoth, Arizona (USGS 09472500), approximately 3 miles upstream from the farmfields on southernmost parcel. The contributing drainage area for the watershed at that location along the river is 4,343 square miles. The period of record for that gage began in 1979 and ended in 1983. The closest stream gage upstream of the project area is the San Pedro River at the

Redington Bridge near Redington, Arizona (USGS 09472050). This is approximately 30 miles upstream of the project site. The period of record for this gage is from 1998 through present (January 2012). There was another gage located on the San Pedro River near Redington, Arizona (USGS 09472000), from 1943 to 1998. The current Redington Bridge gage measures a drainage area of approximately 3,096 square miles. Selected flow data from these gages are provided in Table 2.

Table 2. Flow Data from USGS Stream Gages on the San Pedro River in the General Vicinity of the Project Area, Arizona.

Station Name USGS #	San Pedro River near Redington 09472000	San Pedro River at Redington Bridge 09472050	San Pedro River near Mammoth 09472500
Period of Record	1944-1995	1998-present	1932-1941
Annual Mean Flow for Period of Record	44.6 cfs	26.0 cfs	61.6 cfs
Highest Peak Flow (cfs) Date	90,000 cfs (estimated historic peak in 1926)	5,990 cfs July 2003	19,200 cfs August 1940
Highest Annual Mean Flow Year	180.8 cfs 1955	98.9 2006	90.8 cfs 1932
Lowest Annual Mean Flow Year	0.727 cfs 1989	0.331 cfs 2009	20.8 cfs 1933

According to the USGS stream gage data, months of lowest flow on the river tend to be in May and June, while highest flows tend to occur in the summer monsoon season during August and September. Stream flows in the San Pedro River follow the bimodal pattern of precipitation in this region, with intense and localized storm events in the summer and more gentle but sustained winter flows.

The portion of the San Pedro River flowing through the project area can be considered to be intermittent to perennial flows, depending on the parcel. This situation, where perennial flow is not continuous, is sometimes referred to as interrupted stream flow. The stream may lose flow until all surface water disappears for a distance then reappears at some distance downstream. This interruption in surface flow may be the result of increased consumption by riparian vegetation, from ground-water withdrawals by wells or by geological variations in the streambed. Streamflow is also dependent on the area and storage capacity of the alluvium underlying the stream. For example, if sub-surface geologic boundaries significantly reduce the cross-sectional area of the alluvium, then water is forced to the surface and streamflow increases (ADWR 1994).

Groundwater. Data available from the ADWR (1994) identifies two major water-bearing units in the Lower San Pedro basin based on their ability to transmit and supply groundwater: (1) the streambed alluvium that forms the San Pedro River's channel and floodplain; and, (2) the alluvial basin-fill sediments that fill the valley. The streambed alluvium is more permeable than the basin-fill, but the alluvium's limited areal extent makes it an important local aquifer in the central valley along the San Pedro River floodplain. The alluvial basin-fill sediments are composed of a younger basin-fill, older basin-fill, and basal conglomerate and form the basin's principal aquifer because of its high permeability and large volume. The streambed alluvium is recharged primarily by surface water flows in the San Pedro River. As a result, water levels in the alluvium fluctuate seasonally in response to surface water flows in the riverbed, rising slightly in the spring and early summer and declining in the fall and winter (Page 1963). Groundwater in the basin generally moves from higher elevation in the mountains toward the

valley and then northwest along the riverbed (ADWR 1994). Water levels in the streambed alluvium typically are less than 60-feet below ground surface. For unconfined zones within the basin-fill aquifer, water levels vary in depth from 50 to 253 feet (Jones 1980). Water levels are generally stable in the basin except in the area around San Manuel and Mammoth where large ground-water pumpage rates caused water-level declines (ADWR 1990). Mountain-front recharge is the main source of recharge for the regional basin-fill aquifer, and streambed infiltration is the main source of recharge for the streambed alluvium in the San Pedro River. Recharge also enters the regional aquifer as infiltration from the streambed alluvium. Groundwater is discharged from the basin by pumpage from wells, evapotranspiration from phreatophytes and crops, evaporation from open water in the riverbed, and by discharge from springs and seeps. Pumpage is the largest source of discharge (ADWR 1990). Water rights were transferred from ASARCO to AGFD with the parcel containing the farmland. Within the project area, ground-water pumping is limited to 3 wells for agricultural associated with the farmlands. Downstream from the project area at the PZ Ranch, there are several active commercial wells associated with mining operations. Upstream, there were several active commercial wells at the San Manuel Mine, but pumping for the mine stopped in the early 1990s and may be activated in the future for other uses, such as commercial and residential development.

Water Quality. Information in ADEQ's assessments of surface water quality in Arizona (commonly referred to as the CWA §305(b) Report) indicates that segments of the San Pedro River within the project area have been identified as attaining, inconclusive, and impaired depending on the designated uses. The draft 2010 305(b) report describes two segments within the project area. One segment of the San Pedro River, between Peppersauce Wash and Aravaipa

Creek, was assessed between 2005-2008 as inconclusive for the full body contact designated use due to arsenic, copper, E.coli and lead, inconclusive for the agricultural livestock watering designated use due to copper and lead, and inconclusive for the A&Ww designated use due to copper and dissolved oxygen. The segment from Aravaipa Creek to the Gila River was assessed between 2004-2008 as impaired for the full body contact designated use due to lead, inconclusive for agricultural livestock watering due to copper and lead exceedances, and impaired for full body contact due to E.coli exceedances. This reach has been placed on the CWA §303d list due to *Escherichia coli* exceedances for the Full Body Contact designated use (ADEQ 2011).

Environmental Consequences – Water Resources

No Action

In the absence of habitat restoration projects on the 995 acres of former ASARCO land along the lower San Pedro River, the water resources in the general vicinity would be used in the same manner and at about the same rate as they are currently. Under the No Action alternative, it is assumed the 895 acres would continue to remain vegetated and the 100 acre agricultural field on the southernmost parcel would continue to be farmed. The existing riparian vegetation within the floodplain would continue to be sustained by San Pedro River water. With or without the project, it is expected the river channel would continue to widen and narrow, migrating laterally within the boundaries of the alluvial valley. Vegetation is expected to change in response to natural hydrologic and anthropogenic events or uses. No trustee actions would be performed at the site; therefore, no significant impacts are expected.

Proposed Action

Under the proposed action, stream channel and riparian habitat and riparian fencing restoration projects would be performed on portions of the 995 acres on the San Pedro River transferred from ASARCO to the AGFD as a part of the original settlement. AGFD would manage the property in perpetuity for the benefit of the aquatic and riparian ecosystems, floodplain vegetation, and associated wildlife (including macroinvertebrates, fish, frogs, beaver, migratory waterfowl and passerines). Water rights were transferred from ASARCO to AGFD with the parcel containing the farmland. There are no immediate anticipated changes to water use under the Proposed Action and AGFD would work with a local farmer to continue farming for a least another 3 growing cycles (approx. 1.5 years). It is anticipated there would be no change to water quality in the project area. Because the existing vegetation is mature, no substantial increase in evapotranspiration from protection and preservation of the habitat is expected under the current and proposed flow regime. The potential exists for enhanced groundwater recharge due to an increase in the ponding of water by beavers. As in the No Action alternative, the vegetation would change through time in response to flood, fire, and other natural events. Since BMPs are planned as part of any project that would involve disturbance of upstream or up-gradient soils, or sediments within water channels, impacts involved in these types of projects would be short-term and not significant.

Cumulative Impacts

Because BMPs are planned as a part of the proposed actions, no long-term, cumulative impacts would occur to water resources.

4.3 BIOLOGICAL RESOURCES

Affected Environment

Vegetation

The parcels transferred to AGFD contain a mixture of San Pedro River floodplain habitat (60%) and upland habitat (40%). There are 100 acres of farm fields on the southernmost parcel. Other parcels to be considered for acquisition or protections include both upland habitat (to straighten out fence lines) and riparian habitat (to conserve and protect this important habitat type). These riparian and upland communities, described below, were adapted from the Bureau of Reclamation's Environmental Assessment for Habitat Acquisition for the southwestern willow flycatcher on the lower San Pedro River (BOR 2006).

Riparian Vegetative Communities - In general, the riparian habitat in the vicinity of the preferred alternative is in fair to good condition, but has been impacted somewhat by activities within the stream channel that are not conducive to maximum riparian system health. The project area primarily has native riparian vegetation interspersed with saltcedar. Naturally occurring flood events will continue to scour out existing vegetation and woody debris, deposit sediment and seeds, and promote regeneration. This natural cycle is important for riparian plant succession and riparian-dependent wildlife species such as willow flycatchers. Five different riparian communities found on the parcels are described below.

<u>Fremont Cottonwood-Gooding's Willow Gallery Forest</u>

One of the dominant riparian associations in the river floodplain is the Fremont cottonwood-Goodding's willow series of the Warm Temperate Interior Riparian Deciduous Forest (Brown

1994). The San Pedro River supports one of the best remaining examples of this formerly widespread riparian vegetation type (McNatt 1978).

This is a lowland, forested riparian association that is found in streams with moderate gradients (0.3-0.9 percent) and gravelly or finer channel substrates. It occurs on low- to mid-elevation bars within and along the channel where flood-recurrence intervals vary widely, but typically range between 2 and 5 years. Some sites are considerably higher in the floodplain and are rarely flooded (25-100 years). The vegetation is characterized by young to middle-aged stands of Fremont cottonwood and Goodding's willow with moderate to closed canopies (usually greater than 60 percent cover). Large, mature individuals of Fremont cottonwood and Goodding's willow are uncommon and tend to be located further away from the active channel. Seep willow (*Baccharis salicifolia)* is well-represented to abundant in the shrub layer. Saltcedar (*Tamarix ramossisima)* is present on this site and represents both an invasive species as well as an important habitat component for the flycatcher when it occurs as dense understory in stands of Goodding's willow. Other shrubs and annuals are scattered and include burrobush (*Hymenoclea salsola),* rabbitbrush (*Chrysothamnus nauseosus),* snakeweed (*Guttierezia sarothrae),* and cocklebur *(Xanthium strumarium).*

Mixed Riparian

This category describes vegetation where Fremont cottonwoods and Goodding's willows are present but are codominant with other species, primarily saltcedar, but also velvet ash *(Fraxinus velutina),* Mexican elder *(Sambucus mexicana),* and seep willow. No single species comprises more than 80 percent of the total composition. Vegetation density is variable. Some areas are

relatively open with widely spaced trees or linear stands, while other areas support small patches of tall, dense vegetation. Riparian strand vegetation is intermixed throughout this community on more xeric substrates, such as sandy or cobbly channel bars.

Riparian Strand

Riparian strand vegetation occurs within the active channel and floodplain of the river on sandy/cobbly channel bars where more extreme moisture conditions occur and where scouring or depositional flows may be relatively common. This vegetation community is classified as Warm-Temperate Interior Strand by Brown (1994). Vegetation is composed of short-lived successional species or plants adapted to periodic flooding, scouring, or soil deposition. The strand community in this reach of the San Pedro River tends to be composed of: (1) riparian scrub species such as seep willow, burrobush, desertbroom (*Baccharis sarothroides)*, sacred datura (*Datura wrighti)*, rabbitbrush, snakeweed, and cocklebur; (2) seedlings and saplings of riparian trees (Fremont cottonwood, Goodding's willow, velvet ash, and saltcedar); and, (3) any number of characteristic annuals, biennials, short-lived perennials, and grasses.

Velvet Mesquite Forest (Bosque)

River terraces on the lower San Pedro River are dominated by a Mesquite *(Prosopis velutina)* Forested association (Brown 1994). This vegetation community occurs on mesic areas of floodplains, streambanks, intermittently flooded arroyo terraces, alkali sinks and washes, and extends into the upland on dry terraces above streams and arroyos. These woodlands are characterized by a moderate to dense, tall woody canopy dominated by velvet ash. The diversity of other species can vary greatly with geography and substrate (Natureserve 2002). Dominant

understory shrubs include graythorn (*Zizyphus obtusifolia)*, catclaw acacia (*Acacia gregii)*, and wolfberry (*Lycium* spp). Succulents include prickly pear cactus (*Opuntia* spp.), yucca (*Yucca* spp.), hedgehog cactus (*Echinocereus* spp.), and barrel cactus (*Ferocactus* and *Echinocactus* spp.). The herbaceous layer is variable from moderately dense to nearly absent. Characteristic perennial grasses may include threeawn (*Aristida* spp.), grama (*Bouteloua* spp.), buffalograss (*Buchloe dactyloides)*, tobosa grass (*Pleuraphis mutica)*, bush muhly (*Muhlenbergia porteri)*, and *Sporobolus* spp. Annual grasses and forbs are present but tend to be sparse under dense canopies. However, where canopy cover is sparse, understory species have the potential to be relatively diverse (McNatt 1978).

Saltcedar Mixed

Young and mature saltcedar can be found sporadically throughout the floodplain where it is intermixed with cottonwoods and willows. It can also be found on the river terraces where it grows with mesquites. Both saltcedar and athel trees (*T. aphylla)* are found along the river channel.

Sonoran Upland Community

Sonoran Desertscrub

This vegetation community occurs away from the valley floor on the gently to steeply sloping bajadas of the adjacent mountain ranges. This habitat exists primarily on the east side of the floodplain, within the parcels. Vegetation in the upper strata of this community include saguaro *(Cereus giganteus)* and foothills palo verde *(Parkinsonia microphyllum)*, blue palo verde *(Parkinsonia floridum)*, and ironwood *(Olneya tesota).* The shrub layer is composed of shrubby

mesquite *(Prosopis* spp.*),* creosote *(Larrea tridentata),* catclaw acacia, and *Lycium* spp. A variety of cacti are also common, including species of *Opuntia, Echinocereus, Ferocactus, and Echinocactus* (Brown 1994).

Wildlife

Riparian ecosystems are characterized by high diversity in both plant and wildlife species. The presence of water permits the establishment and growth of many plant species not found on adjacent, drier uplands (Briggs 1996). Covering less than one percent of the state, riparian habitat is a valuable natural resource; approximately 60 to 75 percent of Arizona's resident wildlife species are dependent on riparian habitats (Arizona Riparian Council 2004). Riparian areas also function as movement corridors for neotropical migratory birds and other wildlife species. Within the last 100 years, most of these low-elevation habitats, including those within the project area, have been altered. The project area has been designated part of a Global and State Important Bird Area by the Audubon Society (Audubon 2012) due to its exceptional habitat for breeding and migrating birds of conservation concern.

Many of the following birds likely to breed in riparian habitat either nest within riparian communities exclusively or in greater numbers than in adjacent communities. Bird species typical of this geographic area include Abert's towhee (*Pipilo aberti*), Bell's vireo (*Vireo bellii),* black phoebe (*Sayornis nigricans*), blue grosbeak (*Passerina caerulea*), common yellowthroat (*Geothlypis trichas*), Lucy's warbler (*Vermivora luciae*), mourning dove (*Zenaida macroura*), northern cardinal (*Cardinalis cardinalis*), summer tanager (*Piranga rubra*), vermilion flycatcher (*Pyrocephalus rubinus),* western yellow-billed cuckoo, white-winged dove (*Zenaida asiatica*),

southwestern willow flycatcher, yellow warbler (*Dendroica petechia*), and yellow-breasted chat (*Icteria virens*) (Latta et al. 1999; Snow et al. 2004). The western yellow-billed cuckoo is a State Species of Special Concern (AGFD 2008) and a candidate for Federal listing (66 FR 38611). Native resident and migratory birds also are protected under the Migratory Bird Treaty Act (16 United States Code 703-712). Investigations conducted along the lower San Pedro River in the 1940s and 1970s documented between 95 and 111 bird species solely within the mesquite bosque currently owned by the Resolution Copper Company (Gavin and Sowls 1975). Furthermore, the lower reaches of the San Pedro River have been intensively surveyed, largely by AGFD biologists, for the endangered southwestern willow flycatcher. The aforementioned survey effort has shown the project area to be densely occupied by willow flycatchers. More information on southwestern willow flycatchers is presented in the 'Federally Listed Species' section below.

Mammals likely using riparian habitats along the San Pedro River for at least part of their home ranges or as movement corridors include coyote (*Canis latrans*), red fox (*Vulpes vulpes*),raccoon (*Procyon lotor*), ringtail (*Bassaricus astutus*), American badger (*Taxidea taxus*), coati (*Nasua narica*), striped skunk (*Mephitis mephitis*), hooded skunk (*Mephitis macroura*), hognosed skunk (*Conepatus mesoleucus*), mountain lion (*Felis concolor*), black bear (*Ursus americanus*), bobcat (*Lynx rufus*), collared peccary (*Pecari tajacu*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), white-throated woodrat (*Neotoma Albigula*), round-tailed ground squirrel (*Spermophilus tereticaudus*), botta's pocket gopher (*Thomomys bottae*), merriam's kangaroo rat (*Dipodomys merriami*), and several other rodent and bat species (Brown 1994).

Riparian-dependent reptiles and amphibians that may be found in the project area include Sonoran Desert toad (*Bufo alvarius*), zebra-tailed lizard (*Callisaurus draconoide*), whiptail lizards (*Cnemidophorus* spp.), western banded gecko (*Coleonyx variegatus*), western diamondback rattlesnake (*Crotalus atrox*), mojove rattlesnake (*Crotalus scutulatus*), common collared lizard (*Crotaphytus collaris*), ringneck snake (*Diadophis punctatus*), desert tortoise (*Gopherus agassizii*), Gila monster (*Heloderma suspectum*), canyon tree frog (*Hyla arenicolor*), Sonoran mud turtle (*Kinosternon sonoriense*), common king snake (*Lampropeltis getula*),western blind snake (*Leptotyphlops humilis*), coachwhip (*Masticophis flagellum*), horned lizards (*Phrynosoma* spp.), gopher snake (*Pituophis catenifer*), lowland leopard frog (*Rana yavapaiensis*), ground snake (*Sonora semiannulata*), blackhead snake (*Tantilla spp.*), gartersnake (*Thamnophis* spp.), and tree lizard (*Urosaurus ornatus*) (Brown 1994). The project area is described as having mixed stands of native and non-native riparian trees. Non-native tree species include saltcedar. Although this tree is considered to be invasive, mixed stands have been found to be among the most productive for willow flycatchers (Paradzick and Woodward 2003; Sogge et al. 2005). A relatively small percentage of native cottonwood/willow or mesquite vegetation within saltcedar-dominated habitat can have a disproportionately positive influence on bird species diversity and abundance (Van Riper et al. 2004). The mixture of native plant species and saltcedar provides greater structural diversity and a more diverse prey base.

Federally Listed Species

Federal agencies are required by Section 7 of the ESA to assess the potential effects of proposed actions on federally protected species and designated critical habitat. The USFWS lists 18 species that are endangered, threatened, or proposed for listing in Pinal County (Table 3). The

two federally threatened or endangered species potentially occurring within the project area are the southwestern willow flycatcher and lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). One candidate species, the yellow-billed cuckoo (*Coccyzus americanus*), is also likely to be found within the project area. The remaining 12 species would not be found within the project area, due to lack of suitable habitat and/or because the current range for the species is outside the project area: Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*), desert pupfish (*Cyprinodon macularius*), Gila chub (*Gila intermedia*), Gila topminnow (*Poeciliopsis occidentalis occidentalis*), loach minnow (*Tiaroga cobitis*), Mexican spotted owl (*Strix occidentalis lucida*), Nichol Turk's head cactus (*Echinocactus horizonthalonius* var. *nicholii*), razorback sucker (*Xyrauchen texanus*), spikedace (*Meda fulgida*), Yuma clapper rail (*Rallus longirostris yumanensis*), and Acuna cactus (*Echinomastus erectocentrus* var. *acunensis*). The USFWS will perform an intra-service consultation for the preferred alternative's projects to determine the effects of the restoration on the lesser long-nosed bat and southwestern willow flycatcher, and the proposed designated critical habitat for willow flycatcher.

Table 3. USFWS Threatened, Endangered, or Candidate Species in Pinal County, Arizona (U.S. Fish and Wildlife Service 2012).

Common Name	**Status**
Arizona hedgehog cactus	E
Nichol Turk's head cactus	E
Desert pupfish	E
Gila chub	E
Gila topminnow	E
Lesser long-nosed bat	E
Loach minnow	T
Mexican spotted owl	T
Ocelot	E
Razorback sucker	E
Southwestern willow flycatcher	E
Spikedace	T
Yuma clapper rail	E

Acuna cactus	C
Desert tortoise, Sonoran population	C
Northern Mexican Gartersnake	C
Roundtail chub	C
Tucson shovel-nosed snake	C
Yellow-billed cuckoo	C

Following are descriptions of the listed species that may occur in or near the project area and designated Critical Habitat located within the project area:

Lesser Long-nosed Bat - The lesser long-nosed bat was listed as endangered, effective September 30, 1988 (53 FR 38456). It is also listed as a Species of Special Concern by the State of Arizona (AGFD 2008). Critical Habitat designation was not considered prudent at the time of listing. The Recovery Plan was approved on March 4, 1997 (USFWS 1995). A 5-year review under the Endangered Species Act of 1973 of the lesser long-nosed bat was completed in 2007 (70 FR 5460). The lesser long-nosed bat is one of three genera in the family Phyllostomidae found in Arizona. There is still some debate over the taxonomic classification of the species in the genus as well as the naming of the species and subspecies. *Leptonycteris curasoae yerbabuenae* is the only subspecies found in Arizona. The range of the species can vary depending upon the form of classification used, but in Arizona it covers the area between the Picacho Mountains to the Agua Dulce, Galiuro, and Chiricahua Mountains south into Mexico (USFWS 1995). Lesser long-nosed bats are migratory in nature following their food source, flying to Mexico during the fall (September/October) where they over winter and breed. They return to Arizona in the spring to congregate in large maternity caves (numbering from hundreds to thousands) to bear their young. The bats tend to follow nectar corridors, or the flowering of agave and columnar cacti, which serve as their main source of food. During the day they roost in caves, and abandoned mine tunnels; and, at night, they forage for nectar, pollen, and fruit of

agaves and columnar cacti (USFWS 1995). Although, more common in Arizona than was once believed, major threats to these mammals are the loss of roosting sites and a decline in food sources. Roosting/ breeding colonies can be excluded from or disturbed at certain sites. It is also believed that excessive harvesting of agaves for tequila and mescal and the encroachment of civilization on desert lands are having an impact on the number of food source locations as well as their proximity to each other along a migration route (USFWS 1995).

The closest known maternity colony is about 30 miles south in the Rincon Mountains. There are also colonies in the Little Rincon Mountains and Little Dragoon Mountains approximately 30 miles south and southeast. The closest known roost site is approximately 50 miles west in the Picacho Mountains. The closest observations, from capture in mist nets, are 12 and 20 miles to the southeast and 15 miles to the southwest (personal communication, Scott Richardson, USFWS).

Southwestern Willow Flycatcher - The southwestern subspecies of the willow flycatcher was listed as endangered, effective March 29, 1995 (60 FR 10694). This bird is also listed as a Species of Special Concern by the State of Arizona (AGFD 2008). Critical habitat was proposed on Monday, August 15, 2011 and the final rule is pending (76 FR 50542, USFWS 2011).

The willow flycatcher is a neotropical migrant that breeds in the southwestern United States and migrates to Mexico, Central America, and possibly northern South America during the nonbreeding season (Phillips 1948; Stiles and Skutch 1989; Ridgely and Tudor 1994; Howell and Webb 1995). Declines in the distribution and abundance of flycatchers in the Southwest are

attributed to habitat loss and modification caused by impacts of dams and reservoirs, stream diversions and groundwater pumping, channelization and bank stabilization, phreatophyte control, livestock grazing, agricultural development, urbanization, recreation, and fire (USFWS 2002). The willow flycatcher breeds in riparian habitats along rivers, streams, or other wetlands, where patchy to dense trees and shrubs are established, usually near or adjacent to surface water or saturated soil (USFWS 2002). Plant species composition and height vary across the geographical range of this species, but occupied habitat usually consists of a mosaic of dense patches of vegetation, often interspersed with small openings, open water, or shorter/sparser vegetation. Dense vegetation usually occurs within the first 10- to 13-feet aboveground. Periodic flooding and habitat regeneration are important to the recovery of this species. Willow flycatchers can nest in habitat within 3 to 5 years of a flood event (Paradzick and Woodward 2003).

The Recovery Plan divides the Southwest into six Recovery Units, which are further subdivided into Management Units. The project area is located within the Middle Gila/San Pedro Management Unit in the Gila Recovery Unit. The Middle Gila/San Pedro Management Unit extends from the Mexican border to south-central Arizona. One of the Recovery Plan goals is the establishment of a minimum of 150 willow flycatcher territories in the Middle Gila/San Pedro Management Unit (USFWS 2002). The number of territories documented in 2007 within this Management Unit was 233 (Durst et al. 2008). The San Pedro River alone contained 13.2 percent of the known southwestern willow flycatcher territories within the United States in 2007 (Durst et al. 2008). Within this Management Unit, Critical Habitat has been proposed in the following areas: (1) 79 miles of the San Pedro River, from the USGS gauging station at the

Narrows to the confluence of the Gila River, and, (2) 80.6 miles of the Gila River from Dripping Springs Wash downstream to Ashurst-Hayden Diversion Dam near the Town of Cochran (76 CFR 50542).

In Arizona, willow flycatchers nest in a variety of riparian tree and shrub species, including saltcedar. In a 2007 rangewide summary, the percentage of southwestern willow flycatchers territories varied by habitat as follows: 22% saltcedar, 58% *Salix* spp., 11% in boxelder (*Acer* spp.), and 9% were in other vegetative types or not reported (Durst et al. 2008). Nesting substrate in the San Pedro River in Arizona is primarily Gooding's willow and saltcedar, although nests have also been found in mesquite, seepwillow, cottonwood, buttonbush, coyote willow (*Salix exigua*), and graythorn. In recent years, surveys to locate willow flycatcher territories have been conducted annually at selected locations having suitable habitat along the San Pedro River. Table 4 provides a summary of the number of territories documented annually from 1996 to 2005 at 14 sites along the lower San Pedro River (Ellis et al. 2008). More recent surveys have focused on the mainstem of the middle Gila River and as a result, the best data we have for the project area is from 2005-2007. These numbers are considered to be an underestimation because only a portion of existing suitable habitat has been surveyed, and all 14 sites have not been surveyed every year. It is likely there are more than 157 territories along the lower San Pedro River. Territories located through these surveys contribute toward the overall Recovery Plan goal of establishing 150 willow flycatcher territories within the Middle Gila/San Pedro Management Unit. The San Pedro River hosts the third largest population of southwestern willow flycatchers in the southwest (Durst et al. 2008).

Given the dynamic nature of flooding and drought on the San Pedro River, combined with the flycatcher's ability to adapt territory locations to site conditions, the number of flycatcher territories can vary widely in between scouring events or wetting/drying cycles. The lower San Pedro hydrograph in the project area has varied substantially from 2005 to present. For example, flow has varied from an annual mean low of 0.331 cfs in 2009 to a high 98.8 cfs in 2006 at the Redington Bridge USGS gage station (USGS 2012). Despite this variation, we assumed that the number of willow flycatcher territories has remained the same.

Table 4. Southwestern willow flycatcher territories by year for the San Pedro River study area, 1996-2005 (Ellis et al. 2008). Sites ordered from upstream to downstream. Blank cells indicate that surveys were not performed.

AGFD Site Name	**Year**									
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
CB Crossing SE		5	4	7	6	3	1	0	2	1
Indian Hills	3	15	12	12	9	0	1	0	0	0
Dudleyville Crossing	1	3	6	10	14	14	26	8	9	15
Malpais Hill	0	0	1	2	3	2	8	11	2	0
PZ Ranch	8	5	1	1	0	0	0	0	0	0
PZ Ranch West			0	0	0		0	3	2	1
Cook's Lake Cienega/Seep	17	13	13	11	7	5	15	10	12	11
Aravaipa Inflow North			0	7	11	22	36	28	23	18
San Pedro / Aravaipa Confluence			6	14	8	8	7	7	9	10
Aravaipa Inflow South			0	0	3	7	4	5	13	16
Wheatfields		2	1	2	7	14	13	18	18	12
Wheatfields South			0	0	0		0	2	9	14
San Manuel Crossing	0		0	0	0		7	35	59	55
Catalina Wash			0	0	0	2	3	13	6	4

Total Territories	29	43	44	66	68	77	121	140	164	157
No. of Sites Surveyed	6	7	14	14	14	11	14	14	14	14
No. Sites with Territories	4	6	8	9	9	9	11	11	12	11

In 2005, 11 territories were present immediately north of the project area at Cook's Lake and there were 12 and 14 territories were present nearby at the Wheatfields and Wheatfields South survey locations (Ellis et al. 2008). The proximity and abundance of known breeding willow flycatchers upstream and downstream of the AGFD parcels suggest that it may also be used for migration and dispersal. Suitable habitat within close proximity to breeding populations is more likely to become occupied sooner than distant and disjunct habitat (USFWS 2002).

Yellow-billed Cuckoo - On July 25, 2001, the USFWS concluded that listing the yellow-billed cuckoo (cuckoo) was warranted as a Distinct Vertebrate Population Segment west of the Rocky Mountains but was precluded by higher priority listing actions (66 FR 38611). The western yellow-billed cuckoo remains a candidate species. The cuckoo is also listed as a Species of Special Concern by the AGFD (AGFD 2008). The cuckoo is a neotropical migrant that breeds throughout the United States, southern Canada, and northern Mexico. The cuckoo's range and population numbers have declined substantially across much of the western United States over the past 50 years, primarily due to habitat loss and fragmentation (66 FR 38813). Arizona probably contains the largest remaining cuckoo population among the western states, but cuckoo numbers in 1999 were substantially less than some previous estimates as habitat has declined (USFWS 2001). The cuckoo is an uncommon to fairly common breeder in riparian habitats in western, central, and southeastern Arizona along perennial drainages below 5,000 feet (Corman

2005). The Arizona Breeding Bird Atlas (Corman 2005) documented the highest breeding concentrations along the Agua Fria, San Pedro, upper Santa Cruz, and Verde river drainages and Cienega and Sonoita creeks.

Cuckoos have large home ranges, varying in size between 12 to 49 acres, with 25 acres being the average in California and western Arizona (Halterman 2002). Smaller home ranges have been observed in Nevada and central and southeastern Arizona (Halterman 2002). In the western United States, suitable breeding habitat consists of large reaches of riparian habitat, particularly woodlands with cottonwoods and willows (USFWS 2001). Cuckoos have also been found in riparian habitat that includes a mixture of native tres and exotic saltcedar within the project area (SRP 2008). The landscape matrix may also be important. For example, the presence of mesquite stands adjacent to occupied cottonwood-willow habitat may contribute toward overall suitability (Johnson et al. 2005). Occupied cuckoo habitat exists adjacent to the project area as well as along the entire San Pedro River (Corman 2005, SRP 2008). A total of 86 cuckoo detections and 10 confirmed pairs were documented during surveys conducted in 2008 on the Salt River Project's and The Nature Conservancy's properties (TNC; SRP 2008).

Environmental Consequences – Biological Resources

No Action

Under the No Action alternative in the foreseeable future, the project area is likely to continue to support about the same variety and number of species that currently exist. The existing riparian habitat would change as flooding/scouring and drought affect the area, but since the parcels are protected for conservation, any natural, short-term disturbance would be naturally restored over

time. As has occurred historically, the San Pedro River is expected to migrate laterally and change course following large floods, and cause over-bank flooding. Since the AGFD parcels are located within the active floodplain, scouring and flooding will continue. Given these processes, southwestern willow flycatchers and yellow-billed cuckoos abundance and distribution will fluctuate accordingly.

The No Action alternative is not expected to affect the habitat of the lesser long-nosed bat. There is likely to be no change in the number or vigor of agave and columnar cacti, which serve as the main source of food for this species. Roost sites are unlikely to exist in the floodplain habitat, but, if present, they will probably remain unaffected if current management practices continue. However, a change in land use in the future could reduce foraging habitat. Since no actions would be performed at the site, no significant adverse impacts are expected.

Proposed Action

Under the preferred alternatives, AGFD would improve the quality of riparian habitat within the project area and maintain it into perpetuity. The acquisition, restoration, and protection actions (i.e., livestock exclusion, invasive plant control, enhancement of emergent wetland habitat, native vegetation restoration, and the acquisition and protection of riparian habitat) would benefit the riparian ecosystem along the San Pedro River by providing increased nursery, foraging and cover habitat for critical species that inhabit the area (e.g., Southwestern willow flycatcher). Fencing and on-site monitoring of 500 acres of riparian habitat would assist in maximizing the restoration efforts on the property by restricting unauthorized activities. As noted above under the No Action alternative, naturally occurring large flood events will continue to scour out riparian vegetation in the floodplain. Periodic floods are expected to remove existing vegetation

and woody debris, deposit sediment and seeds, and promote regeneration. This natural cycle is important for riparian plant succession and riparian-dependent wildlife species.

In general, the creation of emergent wetlands and enhancement of the cottonwood/willow riparian forest will provide positive long-term impacts to the area by increasing the amount of resource services. The restoration actions under the preferred alternative would have a largely long-term positive effect on the threatened and endangered species within the project area. Specifically, the proposed action is likely to benefit the continued existence of the willow flycatcher. Management of the subject property would ensure the existence of suitable habitat to allow willow flycatcher movement within and between drainages, consistent with the Recovery Plan objectives. Occupied cuckoo habitat exists adjacent to the project area, as well as along the entire San Pedro River (Corman 2005, SRP 2008). The proposed action is likely to benefit the continued existence of the cuckoo. The proposed action is not expected to affect the habitat of the lesser long-nosed bat. There is likely to be no change in the number or vigor of agave and columnar cacti, which serve as the main source of food for this species. Roost sites are unlikely to exist in the floodplain habitat, but, if present, they will probably remain unaffected. Management of the subject parcels is likely to have no effect on the lesser long-nosed bat.

We would perform all environmental compliance in accordance with local, state, and federal laws. We will develop conservation measures to reduce and minimize any potential adverse effects to the flycatcher and the proposed and/or designated critical habitat. Of all of the types of restoration actions we have proposed, removing saltcedar and replacing it with native riparian species would have the greatest potential short-term negative impacts on the flycatcher and

cuckoo (e.g., cuckoo prey availability and willow flycatcher nesting habitat availability may be affected). Although we would be very selective when selecting sites for non-native plant control, the short-term disturbance could create islands free from potential nesting habitat for up to 5 years (Paradzick and Woodward 2003). It takes native species 5-10 years to grow to an equivalent forest density and structure to provide potential nesting habitat. As a BMP, saltcedar management projects would be as small as possible (< 10 acres at a time) in order to minimize the potential short-term disturbance to the flycatcher and the cuckoo.

Cumulative Impacts

The Trustees would conduct a thorough site survey and engineering analysis to address any significant uncertainties before implementing the restoration actions. The AGFD is currently working to acquire other private parcels along the lower San Pedro River adjacent to the project area. The goal of AGFD's acquisition(s) is to protect and manage a large tract of contiguous riparian forest on the lower San Pedro River for conservation. Other lands on the lower San Pedro River protected into conservation include the Bureau of Reclamation, Salt River Project (SRP), and The Nature Conservancy (TNC). Even without additional lower San Pedro River parcel acquisition, AGFD will continue to work with the Bureau of Reclamation, SRP, and TNC to manage the project area parcels to benefit migratory birds and threatened, endangered, and candidate species.

Other than these positive cumulative effects, the Trustees know of no adverse impacts to the environment to which the selected restoration actions would cumulatively contribute. The selected restoration actions would only restore habitat types that originally existed and naturally occurred in the area.

4.4 CULTURAL RESOURCES

The description of cultural resources and potential consequences of the preferred alternative were developed using the cultural resources section in the Bureau of Reclamation's Environmental Assessment for Habitat Acquisition for the southwestern willow flycatcher on the lower San Pedro River (BOR 2006).

The Trustees are aware of recorded archeological sites located in the area of the selected projects. The restoration actions prescribed (e.g., fencing the area to preclude livestock) would benefit the preservation of any historic resources by preventing adverse impacts from off-highway vehicular traffic. The Trustees believe the selected restoration actions will not affect any designated National Historic Site or any nationally significant cultural, scientific, or historic resources.

Affected Environment

The Lower San Pedro Valley has been occupied since the Paleoindian period (ca. 9500-8500 BC), although most prehistoric sites in the area represent a Ceramic period occupation lasting from about AD 800 to 1450. These sites include pithouse villages and ballcourt sites more typical of Preclassic Hohokam, as well as compound and platform mound sites associated with the later Salado occupation. Several sites in the middle to southern stretch of the lower San Pedro Valley include artifacts and architectural remains that appear to represent migrant populations from the Kayenta/Tusayan area of northern Arizona who entered the area from the Point of Pines vicinity northeast of the area of potential effect. Numerous agricultural sites on the terraces, many with rock piles probably intended for agave cultivation, indicate that agricultural fields extended beyond those fed by irrigation ditches in the floodplain. The agriculture-based

prehistoric occupation appears to have ended around AD 1450 when the area was apparently abandoned. In the late 17th century, the Spanish identified O'odham groups they called the Sobaipuri living in small agricultural villages in both the upper and lower San Pedro Valley. The Sobaipuri abandoned the San Pedro in the mid-1700s in response to increased raiding from Apaches from the mountains and valleys to the east. The Apaches essentially retained control of the valley until the 1880s when American settlers moved into the area; some Apache allotments continue to be held in the valley today. Historically, the lower San Pedro Valley was never heavily settled but was devoted largely to cattle ranches, agriculture in the bottomland, and mining along the edges. While many sites in the Lower San Pedro Valley were first located by vocational archaeologists and early visitors to the area, only four systematic surveys have been completed in the immediate project area. The most comprehensive was a large-scale, multi-year survey by the Center for Desert Archaeology (Wallace et al. 1998). It focused on identifying Ceramic period cultural resources on the terraces and lower bajadas that line the river valley; very little private bottomland was surveyed. The survey located a vast array of mostly Ceramic period sites that represented large and small habitation sites, ballcourt sites, sites with compounds and platform mounds, as well as numerous agricultural sites characterized by rock pile and water control features. Most of the sites are located on the terraces that are 20 to 50 feet above the valley bottom, though some have been identified on the valley bottom on the low terrace above the relatively active flood channel. Although a large portion of the proposed project area has been affected by the historic flood channel, surviving terrace remnants are present along the eastern and especially the western margin of the property. Cultural resources most likely to occur on these remnants include Ceramic period sites on the surface and buried

Archaic and Ceramic period occupations exposed in the terrace bankcuts along the western margins.

Environmental Consequences – Cultural Resources

No Action

There would be no change in existing conditions. No archaeological surveys of the parcel would be undertaken. No specific protection would be afforded to any sites that may be located on the land. Current land use and management practices would continue.

Proposed Action

The proposed action constitutes an undertaking under the National Historic Preservation Act (NHPA) of 1966, as amended (P.L. 89-6650). The NHPA requires an inventory of significant cultural resources that may be affected by the undertaking. We will perform archeological surveys prior to implementing any restoration action. Since the land was transferred for conservation purposes, any sites that might be present have been protected from development. No substantial impacts to cultural resources are anticipated since the land management activities would result in minimal disturbance. As part of the proposed action we would develop mitigation options for sites determined to be significant and would emphasize avoidance of any significant cultural resources.

If previously unidentified cultural resources, especially human remains or burials, are encountered during future land disturbance on the parcels, work shall cease immediately at the location. Any required consultation will be conducted prior to any disturbance to the newly

identified cultural resources. Long-term beneficial impacts could be possible through the protection and conservation of the parcels into perpetuity.

Cumulative Impacts

Efforts will likely be made to purchase additional parcels of public and/or private land. As part of any future acquisitions, AGFD would conduct cultural resources surveys to identify any sites that would be considered eligible or potentially eligible for nomination to the National Register of Historic Places as per the NHPA. Further acquisition would result in the identification of significant cultural resources and their added protection under Federal preservation laws.

4.5 LAND OWNERSHIP AND USE

Affected Environment

The project area is located on undeveloped land within the San Pedro River floodplain in Pinal County, Arizona. Pinal County encompasses approximately 5,374 square miles (roughly 343,936 acres), of which 4.5 square miles are water (Arizona Department of Commerce 2006). The State of Arizona is the county's largest landholder (Table 5).

Table 5. Land Ownership Status in Pinal County, Arizona (Pinal County 2012a).

Ownership Status	Percent
Private/Corporate	22
State of Arizona	35
Federal	14
Tribal Reservations	23
Other Public	6

The communities in the project area have traditionally been active in copper mining, smelting, milling, and refining. Agriculture and ranching are also currently and historically important to the area. In 2007, the types of land in farms were 24.5% as crops and 71.7% as pasture in Pinal

County. The market value of agricultural products sold in 2007 was $799,811,000, an increase of 88 percent from 2002 (USDA 2007). In the project area, irrigated agriculture occurs on lands within and adjacent to the San Pedro River floodplain. Grazing occurs on private lands, State Trust land, and federally administered public land, where permitted. The presence of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties engaged in actions that do not require Federal permitting or receive Federal funding assistance.

Ownership of lands along the San Pedro River is mixed. There are approximately 960 acres of Indian allotments held in trust by the United States along the lower San Pedro River (United States 1985). Several of these allotments are in the vicinity of Dudleyville, and several are along Aravaipa Creek downstream of the San Carlos Apache Indian Reservation. No Indian trust allotments are known to be present within or near the project area. The Bureau of Land Management (BLM) and Reclamation own disjunct parcels within the lower San Pedro River area. The BLM and TNC also own and co-manage lands within the Aravaipa Canyon and Muleshoe Ecosystem Management Areas, both located on major tributaries to the lower San Pedro River. Lands along the lower San Pedro, however, are predominately in private ownership (including the lands immediately adjacent to the project area).

In the recent past, properties within the County, particularly along the San Pedro River, have come under management for habitat conservation purposes. TNC and SRP also own lands along the lower San Pedro River. These TNC and SRP lands, along with those owned by Reclamation, are encumbered by easements and are specifically managed to conserve willow flycatchers and

mitigate for the impacts of raising Roosevelt Dam and flooding territories there. These properties include TNC's San Pedro Preserve, Three Links Farm, H&E Farm, and other parcels. SRP's properties include the Adobe Preserve, Spirit Hollow Preserve, Black Farm, and Stillinger parcels. Pima County owns the Bingham Cienega Preserve and is actively restoring riparian and sacaton wetland ecosystems.

The Resolution Copper Company parcel owns the 7B Ranch, which includes approximately 7 miles of the river corridor near Mammoth, Arizona. TNC manages the property on behalf of the mining company. The parcel is part of a proposed exchange for Federal lands outside of Superior, Arizona. If the land exchange is successful, the parcel will be managed for habitat conservation purposes. In November 2005, BHP-Billiton (BHP) presented a conceptual development plan for their San Manuel Mine site, downstream from the project site, to the Pinal County Board of Supervisors. The initial development concept, as presented at that time, included approximately 8,000 acres of development in rural and urban zoning, 3,600 acres of "riparian-sensitive" development along the San Pedro River, 3,000 acres of recreational development (i.e., golf courses and parks) within reclaimed tailings piles, and 600 acres of light industrial development near the current mine smelter. A 7,000-acre area including the mine's open pit will be left to mining activities. Given the current economic downturn, BHP has placed the development plan on hold.

Environmental Consequences – Land Ownership and Use

No Action

Under the No Action alternative, current land use practices in the project area will continue. The existing habitat on the property would remain unchanged unless a major storm event or fire occurred that removed the vegetation. The current private landowners would continue to be subject to federal, state, and county regulations regarding any land use activities. The public would be excluded from those private lands not acquired.

Proposed Action

Purchase of state and/or privately owned land would not appreciably change land ownership patterns within Pinal County, nor would it result in a change in current land use in the area. There could be a slight increase in the number of river miles being managed for riparian habitat conservation. Because the riparian vegetation on the property would continue to exist in its present condition, no increase in flooding potential is expected to occur. To the degree that any recreation (e.g., off-highway vehicle traffic) and trespass livestock grazing occurs within the project area, fencing that would be undertaken as part of ongoing management would curtail those activities. Utility easement access would not be impacted by the proposed action. AGFD will continue to pay property taxes on lands acquired.

Under the proposed action, surveys for federally listed species would be conducted on the property. These surveys may increase the overall awareness of the number of willow flycatchers utilizing habitat in the general vicinity which could, in turn, increase the concern about land use activities on adjacent private properties. However, the results from these surveys would not measurably alter the land use activities along the lower San Pedro River since prior studies have already determined willow flycatchers utilize areas both upstream and downstream of the subject property.

Any proposed land acquisition would be incorporated into the current land holdings of the AGFD. Therefore, the public would have access to these acquired lands for limited recreational purposes such as hunting, bird watching, hiking, wildlife photography, etc. No off highway vehicle traffic will be allowed on any lands acquired. These low impact recreational activities would have no long-term environmental impacts.

Cumulative Impacts

The Trustees do not expect controversy to arise in connection with the goals of riparian restoration. However, if there is concern about AGFD acquiring additional parcels in the area, the Trustees will continue to work with the local community as the plan is implemented to ensure open, clear communication. It is anticipated that land use practices within the project area would not change substantially in the reasonably foreseeable future. If BHP's planned development activities upstream of our project area commence, increased ground water withdrawals may impact our ability to restore riparian habitat. The Bureau of Reclamation and others, including SRP, may acquire additional properties along the lower San Pedro River in the future as part of ongoing mitigation and conservation. The impact of the proposed action, when added to these potential future acquisitions, is not expected to have adverse effects on neighboring landowners and land uses, including Indian trust allotments. A number of properties along the San Pedro have already been acquired by various entities and are being managed as protected areas for flycatchers and other species. Additional acquisitions are likely to be in proximity to existing protected areas to maximize conservation values and to minimize management costs.

Although this area of the San Pedro valley is rural and relatively remote, there is some potential threat of adverse land use in the future. Future development threats could include future residential construction, highway construction or expansion, or agriculture. Adding to existing lands already protected in the corridor offers an opportunity to protect large blocks of habitat and prevent fragmentation due to further development. Having considered these points, the trustees have determined that any impacts will be either short-term and not significant, or beneficial.

4.6 SOCIOECONOMICS

Affected Environment

Pinal County is composed primarily of persons of White or Hispanic racial and ethnic backgrounds (Table 6). The population of Pinal County has grown significantly since the 2000 census, experiencing a 99 percent increase from 2000 to 2010, as compared to an overall increase in State population of almost 24.6 percent during the same time period (Table 7). Most of this growth occurred in three communities: Queen Creek (442%), Casa Grande (79%), and Maricopa (2,414%) (Pinal County 2012). Recent population growth data was 37.8% in Mammoth from 2005-2009, which is the closest community to the project area (USA.com 2012). Population density in the county is 65.2 persons per square mile (Pinal County 2012) versus 45.2 persons per square mile statewide in 2000 (BOR 2006).

Table 6. Comparison of population statistics for Arizona, Pinal County, and nearby towns, 2010 (U.S. Census Bureau 2012).

Geographic Area	Total Population	White (%)	Black (%)	American Indian (%)	Asian/Native HI and other Pacific Islander (%)	Other (%)	Two or more races (%)	Hispanic or Latino origin (of any race) (%)
Arizona	6,392,017	73	4.1	4.6	3.0	11.9	3.4	29.6
Pinal County	375,770	72.4	4.6	5.6	2.1	11.5	3.8	28.5
San Manuel	3,551	78.1	0.8	2.4	0.5	13.3	4.9	49.9
Winkelman	353	60.6	0.6	3.7	0.6	31.4	3.1	82.4
Mammoth	1,426	64.8	0.2	1.5	0.1	27.4	6	69.7
Dudleyville	959	65.3	0.1	2.5	0.2	28.7	3.2	63.4

The 2009 median household and per capita incomes for residents of Mammoth and San Manuel were lower than the Pinal County average. Mammoth and San Manuel had a higher unemployment rate and lower poverty level than either the county or the State (Table 7).

Table 7. Income and Poverty Statistics for Arizona, Pinal County and San Manuel [U.S. Census Bureau (2012) and USA.com (2012)[1]].

Population Attribute	**Arizona**	**Pinal County**	**Mammoth**	**San Manuel**
Population, 2010	6,392,017	375,770	2,428	4,107
Population, % change, 2000-2010	24.6	99.9	37.8	-6.1
Median household income, 2009 ($)	48,771	49,088	42,981	36,521
Per capita income, 2009 ($)	25,203	21,526	17,224	15,642
Percent of population below poverty level, 2009 (%)	16.5	13.7	27.9	24.3
Unemployment rate 2009 (%)	3.4	3.9	5.0	8.7

Government (local, State, and Federal), trade, transportation, utilities, leisure and hospitality, and education and health services constituted most of the work force within Pinal County. In 2008, the total employment was 51,875 (Table 8).

Table 8. Employment by occupational sector in 2008, Pinal County (Pinal County 2012).

Occupation	**No. of Employees**
Professional and Business Services	3,450
Education and Health Services	4,275
Mining and Construction	3,925
Trade, Transportation and Utilities	9,150
Financial Activities	1,500
Government	19,225
Information	350
Leisure & Hospitality	4,550
Manufacturing	3,825
Service – Providing	1,625

Property taxes comprise 25.1 percent of the budgeted revenues for Pinal County (Pinal County 2012). During the 2012 fiscal year Pinal County expects to collect approximately $80 million in taxes, which includes a 31 percent increase in property tax revenue (Pinal County 2012). Although property tax revenues have increased, the state of the economy during this timeframe has been poor. Pinal County is facing declining revenues and numerous state cost shifts. Pinal County's net assets have declined the last two years.

AGFD will continue to pay property taxes on the ASARCO parcels. Although AGFD will continue to pay taxes, since the Federal government does not pay local real estate property tax, and there is a lot of Federal land in Pinal County (Table 5), "Payments in Lieu of Taxes"(PILT) are very important. Through PILT, the Federal government offsets the loss of tax revenue to local governments. Congress authorized 100% of PILT payments from 2008-2012 in the

Emergency Economic Stabilization Act of 2008. Pinal County has assumed that PILT payments will drop to 65% in 2013, based on the 2007 level of funding (Weedon 2011). PILT payments to a State are in addition to other Federal revenues made to a State from activities such as oil and gas leasing, livestock grazing, or timber harvesting. In 2010, PILT payments were made to Pinal County in the amount of $1.1 million based upon 625,328 acres of Federal property (Weedon 2011). This represents 2.2 percent of the total PILT payments made to all the counties in the State (Cronkite News 2011).

Environmental Consequences - Socioeconomics

No Action

Under the No Action alternative, it is anticipated the current socioeconomic trends within Pinal County would continue into the foreseeable future.

Proposed Action

Increased habitat for birds and other wildlife species would likely enhance recreational opportunities for birders, naturalists and hunters. Construction and other stewardship start-up activities could provide a minor contribution to local area businesses but would not be expected to affect the local economy in a measurable way. The AGFD will continue to pay property taxes on the parcels acquired, so there will be no negative impact. AGFD will continue to work with local farmers in cultivating agricultural lands acquired and with ranchers to maintain grazing leases acquired through property acquisition. Therefore, the proposed action is not expected to adversely affect socioeconomic trends in the local area.

Cumulative Impacts

The Trustees would approve and fund the purchase of additional parcels of private or State Trust land in accordance with the proposed action and place these parcels under the ownership and management of AGFD. The priority for these additional acquisitions would be along the lower San Pedro River adjacent to the lands already conveyed to AGFD as part of these restoration activities. If additional land(s) is acquired, those purchase(s), in combination with the preferred alternative, would result in no significant reductions in property taxes. There would be no economic limitations on the development of surrounding properties as a result of implementing the proposed action. Anecdotal evidence indicates one prior purchase for habitat conservation purposes did result in an increase in land values (BOR 2006). Given continued habitat mitigation measures being required for Federal actions or actions requiring Federal approval/permits and a limited amount of available land that meets the habitat criteria, the price of suitable land would be expected to increase. The incremental economic effect of the proposed action, when taken into consideration with other measures to conserve habitat along the San Pedro River, is minor.

Both the U.S. Fish and Wildlife Service and the AGFD have experience implementing wetland and riparian restoration projects. The AGFD regularly implements wetland restoration projects in Arizona as mitigation for loss of wetlands under the CWA 404 program; many of these projects protect against erosion, provide wildlife habitat and promote native vegetation. The selected restoration actions set no precedents for future actions of a type that would significantly affect the quality of the human environment.

5.0 SUMMARY OF ENVIRONMENTAL IMPACTS BY ALTERNATIVE

The selected restoration actions do not require nor do the Trustees anticipate any violation of federal, state or local laws, designed to protect the environment incident to or as a consequence of the implementation of either of the selected actions. The restoration actions will be implemented in compliance with all applicable environmental laws. Table 9 summarizes the comparisons of impacts by alternative.

Table 9. Comparison of impacts by alternative

Category of impact	No-action alternative	Proposed action/preferred alternative
Water impacts	No change in water use or quality	Potential increase in groundwater recharge due to increased ponding by beavers. Increase in water quality due to the exclusion of livestock. No long-term or significant impacts are expected from the preferred alternative.
Biological impacts	No additional habitats preserved, restored or enhanced, therefore compensation for injuries to wildlife and habitats would not occur.	Approximately 500 acres of riparian habitat protected from trespass livestock. Additional riparian habitat acquired and protected. Creation of riparian woodlands and emergent vegetation, while controlling the spread of invasive weeds. Improvements to wildlife conservation resulting from an increase in habitat protection and enhancement. No long-term or significant negative impacts are expected from the preferred alternative. Most impacts would be beneficial.
Cultural resource impacts	Continued impacts to historic properties due to livestock and off-highway vehicle traffic	Protection of cultural and historic resources from off-highway vehicle traffic. Possible long-term beneficial impacts could occur through surveys, mitigation, and future management

Landownership and Use	No impacts expected, the settlement provided the lands to AGFD	The amount of land in State ownership would increase and property taxes would be paid as if privately owned. No long-term or significant negative impacts are expected from the preferred alternative
Socioeconomic impacts	No indirect economic impacts on the local economy expected	Fence construction and habitat enhancement activities may generate short-term economic benefits. Improved recreational wildlife viewing and hunting opportunities would generate long-term economic and recreational benefits. No long-term or significant negative impacts are expected from the preferred alternative.
Indirect impacts	No indirect impacts are expected	Indirect beneficial impacts expected through improved habitat for wildlife as a result of the preferred alternative.
Cumulative impacts	Cumulative impacts would be negative because public not fully compensated for natural resource injuries.	Beneficial cumulative impacts expected to through long-term benefits to water quality, wildlife habitat, and to cultural and recreational resources. No long-term or significant negative impacts are expected from the preferred alternative.

6.0 CONCLUSIONS AND PRELIMINARY FINDING OF NO SIGNIFICANT IMPACT ON THE QUALITY OF THE HUMAN ENVIRONMENT

Based on the analysis in this Section and the other information and analyses included throughout the document as part of the environmental review process for the proposed restoration actions, the Trustees have preliminarily concluded, pending public review and comment, that none of the preferred restoration actions will, if implemented, result in a significant impacts on the quality of the human environment.

The selected restoration projects would provide habitat which would be beneficial to aquatic and terrestrial species, and T&E species of this riparian ecosystem within the proposed project areas. The selected restoration projects will not significantly impact the cultural and human environment negatively long-term. In fact, we expect the restoration actions will provide for increased opportunities for recreation (e.g., bird watching, hiking, hunting, etc.) and will improve riparian habitats for riparian-dependent wildlife.

7.0 MONITORING

The quantity and quality of resources on the San Pedro River Properties must be documented to determine baseline conditions, from which the success of restoration activities can be measured. At the beginning of restoration implementation, intensive monitoring of baseline conditions shall be conducted on the following resources, at a minimum: surface and groundwater resources, stream, floodplain and riparian condition, vegetative and wildlife resources including species occurrence lists and abundance. One year pre-restoration monitoring and four years post-restoration monitoring will be conducted.

Monitoring will be conducted largely by the Trustees. Consultants may be needed for some monitoring tasks and some funding may be required for that purpose. Indicators of project effectiveness will be selected and monitored for the first 5 years, then every 5 years or at regular intervals throughout the 30 year period. Project success will be evaluated every 5 years and management activities will be reviewed and adjusted accordingly. Table 10 identifies resources targeted for monitoring.

Table 10. Resources to be monitored within the restoration sites on the San Pedro River properties.

Resource	Monitoring type	Monitoring frequency	Responsible party
Surface water quality and quantity	Water and macro-invertebrate samples & river bottom habitat measurements; Wet/dry mapping	Quarterly at one site for the first year, then annually at one site for 4 years, then once every 5 years at one site	AGFD & ADEQ
Groundwater levels	Well depth measurements at existing wells	Monthly	AGFD
Stream habitat condition	Habitat measurements; AGFDs JAWS surveys, ADEQ's SEM habitat surveys	Annual first 5 years, then every 5 years	AGFD & ADEQ
Riparian/floodplain vegetation resources	Plant species composition and density along river channel and in floodplain	Annual	AGFD
Wildlife resources	Species occurrence and relative abundance, including T&E species	Annual	AGFD
Geomorphic conditions	Assessment of river function; permanent cross-sections at Wheatfields corner & other locations, assess sediment conditions, bank stability	Year one, then every 5 years	Consultant AGFD ADEQ

8.0 PUBLIC PARTICIPATION

8.1 PUBLIC COMMENT PERIOD

The Trustees have prepared this draft restoration plan to provide the public with information regarding the ecological injuries that have occurred, the restoration objectives that have guided the development of this plan, and the Trustee's preferred approach to compensate the public for natural resources lost. Public review of the restoration plan proposed here is an integral and important part of the restoration planning process and is consistent with all applicable State and Federal laws and regulations, including CERCLA and the guidance for restoration planning found within 43 C.F.R. Part 11.81 and 11.93(a). The restoration plan presented here is being made available for review and comment by the public for a period of 30 days. The deadline for

submitting written comments on the draft restoration plan is specified in one or more public notices issued by the Trustees to announce its availability for public review and comment. Comments should be submitted in writing to:

Renee Wilcox, Project Manager
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086
restorationplancomments@azgfd.gov

Written comments received during the public comment period and the Trustees' responses to those comments, in the form of plan revisions and/or written explanations, will be summarized in the final restoration plan.

8.2 ADMINISTRATIVE RECORD

The Trustees have maintained records documenting the information considered and actions taken by the Trustees during this restoration planning process, and these records collectively comprise the Trustees' administrative record supporting this draft restoration plan. The administrative record is a dynamic file. Information and documents are included in the administrative record as they become available. These records are available for review by interested members of the public. Interested persons can access or view these records at the offices of:

Renee Wilcox, Project Manager
Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086

Arrangements must be made in advance to review or to obtain copies of these records by contacting the office listed above. Access to and copying of these records is subject to all applicable laws and policies including, but not limited to, laws and policies relating to copying fees and the reproduction or use of any material that is copyrighted.

9.0 LIST OF PREPARERS

This Draft RP/EA was prepared by representatives of the natural resource trustee agencies listed below:

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10.0 REFERENCES

Arizona Department of Environmental Quality. 2011. Draft 2010 Status of Water Quality in Arizona: Arizona's Integrated 305(b) Assessment and 303(d) Listing Report. Phoenix, Arizona.

ADEQ. 2010. Status of Water Quality: Arizona's Integrated 305(b) Assessment and 303(d) Listing Report, Arizona Department of Environmental Quality EQR-12-xxx. Phoenix, AZ.

Arizona Department of Environmental Quality 2007. ADEQ Cites ASARCO for Water Quality Violations at Hayden Mine. Available: http://www.azdeq.gov/pipermail/media/2007-May/000032.html. Accessed 4/26/2011.

Arizona Department of Environmental Quality. 2002. Arizona Pollutant Discharge Elimination System (AZPDES) Fact Sheet:
ASARCO Ray Operations, Kearny, AZ. Arizona Department of Environmental Quality.

Arizona Game and Fish Department. 2006. Upper Mineral Creek Survey. Arizona Game and Fish Department. Region 6.

Arizona Game and Fish Department. 2008. List of Species of Special Concern. http://www.azgfd.gov/w_c/edits/documents/ssspecies_bytaxon_001.pdf

Arizona Department of Water Resources. 1990. Preliminary Hydrographic Survey Report for the San Pedro River Watershed: Vol. I: General Assessment. Phoenix. Arizona.

Arizona Department of Water Resources. 1994. Arizona Water Resources Assessment, Volume II – Hydrological Summary. Phoenix, Arizona. August 1994.

Arizona Riparian Council. 2004. Riparian Fact Sheet No. 1. Arizona Riparian Council, Center for Environmental Studies, Arizona State University, Tempe, Arizona.

Audubon. 2012. Arizona important bird areas site profiles. http://iba.audubon.org/iba/viewSiteProfile.do?siteId=3040&navSite=state

Briggs, M. 1996. Riparian Ecosystem Recovery in Arid Lands: Strategies and References. University of Arizona Press, Tucson, AZ.

Brown, D. E. 1994. "Biotic Communities: Southwestern United States and Northwestern Mexico." University of Utah Press, Salt Lake City.

Bureau of Reclamation (BOR) 2006. Final Environmental Assessment: Habitat Acquisition for Southwestern Willow Flycatcher. Bureau of Reclamation, Phoenix Area Office. August 2006. 76 pp.

CH2M Hill. 2008a. Remedial Investigation Report for the ASARCO LLC Hayden Plant Site, Hayden, Gila County, Arizona. Draft. Prepared for U.S. Environmental Protection Agency Region IX, San Francisco, CA. August. Tempe, AZ.

CH2M Hill. 2008b. Screening-level Ecological Risk Assessment for the ASARCO LLC Hayden Plant Site, Hayden, Gila County, Arizona. Draft. Prepared for U.S. Environmental Protection Agency Region IX, San Francisco, CA. August. Tempe, AZ.

Cronkite News. 2011. Counties get $31.5 million for federal lands, but program's future is uncertain. http://cronkitenewsonline.com/2011/07/counties-get-31-5-million-for-federal-lands-but-programs-future-uncertain/

Corman, T. 2005. Yellow-billed cuckoo (*Coccyzus americanus*) in Arizona Breeding Bird Atlas. (T. Corman and C. Wise-Gervais eds.). University of New Mexico Press. Albuquerque, New Mexico. 636 pp.

Durst, S.L., Sogge, M.K., Stump, S.D., Walker, H.A., Kus, B.E., and Sferra, S.J., 2008, Southwestern willow flycatcher breeding sites and territory summary—2007: U.S. Geological Survey Open–File Report 2008–1303, 31 p.

Ellis, L. A., D. M. Weddle, S. D. Stump, H. C. English, and A. E. Graber. 2008. Southwestern willow flycatcher final survey and monitoring report. Arizona Game and Fish Department, Research Technical Guidance Bulletin #10, Phoenix, Arizona, USA.

Gavin, T.A. and L.K. Sowls. 1975. Avian Fauna of a San Pedro Valley Mesquite Valley. J. Arizona Acad. Sci. 10:33-41.

Halterman, M.D. 2002. Survey and life history studies of the yellow-billed cuckoo: summer 2001. Report to the Bureau of Reclamation, Lower Colorado Regional Office. Boulder City, Nevada.

Howell, S. N. G. and S. Webb. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford University Press.

Jones, S.C. 1980. Maps Showing Groundwater Conditions in the Lower San Pedro Basin Area, 1979: USGS Water Resource Investigations Open-File Report 80-954.

Latta, M. J., C. J. Beardmore, and T. E. Corman. 1999. Arizona Partners in Flight Bird Conservation Plan. Version 1.0. *Nongame and Endangered Wildlife Program Technical Report* 142. Arizona Game and Fish Department, Phoenix, Arizona.

Lipton, J.L. 2009. Estimation of Natural Resource Injuries and Damages from Releases of Hazardous Substances to Aquatic and Riparian Habitat Downstream of Ray and Hayden, Arizona. Prepared for U.S. Department of Justice (DOJ). Prepared by: Stratus Consulting Inc. as Expert Testimony for the DOJ in the ASARCO LLC Bankruptcy Estimation Hearing, January 23, 2009, SC11523. 67 pp.

MacDonald, D.D., Ingersoll, C.G. and Berger, T.A. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Archives of Environmental Contamination and Toxicology. 39: 20-31

McNatt, R. 1978. Possible strategies for preservation of the San Pedro River riparian community. Paper presented at the National Symposium on Strategies for Protection and Management of Floodplain Wetland and Other Riparian Ecosystems, Callaway Gardens, Pine Mountain, GA, December 1978.

Page, H.E. 1963. Water Regimen of the Inner Valley of the San Pedro River near Mammoth, Arizona – A Pilot Study: USGS Water Supply Paper 1669-I, 22 pp.

Paradzick, C. E. and A. A. Woodward. 2003. Distribution, Abundance, and Habitat Characteristics of Southwestern Willow Flycatchers (*Empidonax traillii extimus*) in Arizona, 1993 – 2000. Studies in Avian Biology 26: 22-29.

Pinal County. 2012. http://pinalcountyaz.gov/

Phillips, A. R. 1948. Geographic Variation in Empidonax traillii. Auk 65:507-514.

Ridgely, R. S. and G. Tudor. 1994. The Birds of South America. Volume II: The Suboscine Passerines. University of Texas Press, Austin.

Robinson, A. 2008. Mineral Creek Fish Survey, April 21-22, 2008. Arizona Game and Fish Department. May 1.

Snow, T. K., A. Averill-Murray, and C. L. Blasch. 2004. Vertebrate Inventory of the Gila Box Riparian National Conservation Area. Nongame and Endangered Wildlife Program Technical Report 230. Arizona Game and Fish Department, Phoenix, Arizona.

Sogge, M. K., E. H. Paxton, and A. A. Tudor. 2005. Saltcedar and Southwestern WillowFlycatchers: Lessons from Long-Term Studies in Central Arizona. In Aguirre-Bravo,Celedonio, et al., Eds. 2004. Monitoring Science and Technology Symposium:

UnifyingKnowledge for Sustainability in the Western Hemisphere: 2004 September 20-24:Denver, CO. Proceedings RMRS-P-000. Ogden, UT.

SRP (Salt River Project). 2008. Annual Report, Roosevelt Habitat Conservation Plan, Salt River Project. Prepared for the US Fish and Wildlife Service. Phoenix, Arizona. 202 pp.

Stiles, F. G. and A. F. Skutch. 1989. "A Guide to the Birds of Costa Rica." Cornell University Press, New York.

Turner, R.M. 1994. Sonoran desertscrub. In *Biotic Communities of the Southwestern United States and Northwestern Mexico*, D.E. Brown (ed.). University of Utah Press, Salt Lake City, UT. pp. 181-203.

USA.com. 2012. http://www.usa.com/mammoth-az.htm, /san-manuel-az-income-and-careers.htm

U.S. Department of Agriculture. 2007. 2007 Census of Agriculture: Pinal County Profile. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Arizona/cp04021.pdf

U.S. Census Bureau. 2012. http://quickfacts.census.gov/qfd/states/04/04021.html and http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

U.S. EPA. 1997. Damage Cases and Environmental Releases from Mines and Mineral Processing Sites. U.S. Environmental Protection Agency, Washington, DC.

U.S. EPA. 2007. Ecological Soil Screening Levels for Copper. Interim Final. U.S. Environmental Protection Agency, Washington, D.C.

U.S. Fish and Wildlife Service. 1995. Lesser Long-nosed Bat Recovery Plan. Albuquerque, New Mexico. 45 pp.

U.S. Fish and Wildlife Service. 2001. Yellow-billed cuckoo. Fact Sheet. Ecological Services. Phoenix, Arizona. One page.

U.S. Fish and Wildlife Service. 2002. Southwestern Willow Flycatcher (*Empidonax traillii extimus*) Final Recovery Plan. Albuquerque, New Mexico. August 2002.

U.S. Fish and Wildlife Service 2011. Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for Southwestern Willow Flycatcher; Proposed Rule. 89 pp.

U.S. Fish and Wildlife Service. 2012. Pinal County Species List. http://www.fws.gov/southwest/es/arizona/Documents/CountyLists/Pinal.pdf

USGS. 2012. Accessed January 19, 2012 at http://waterdata.usgs.gov/nwis/

Van Riper III, C., K. L. Ecton, C. O'Brien, and L. J. McGrath. 2004. Avian response to tamarisk invasion on the Lower Colorado River: A threshold hypothesis. U.S. Geological Survey Open-File Report SBSC/SDRS/No. 2004-1003.

Wallace, H. D., W. H. Doelle, and J. Murray. 1998. An Archaeological Survey of the Lower San Pedro River, Arizona, 1990-1995. Manuscript on file, Center for Desert Archaeology, Tucson.

Weedon, J. 2011. FY 2011-2015 Five-Year Financial Forecast. Memorandum from Budget and Research to the Pinal County Manager. Florence, AZ. 16 pp.

Western Regional Climate Center 2011. Accessed January 14, 2011. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?az9420