

Table 6. Summary of impacts to biological resources.

BIOLOGICAL RESOURCES	IMPACT
HABITAT	permanent loss of less than 2.0 acres of terrestrial habitat
	temporary impact to approximately 9.0 acres of terrestrial habitat
WILDLIFE	permanent loss of less than 2.0 acres of habitat for small mammals and herpetofaunal species
	loss of slow moving species (small mammals and herpetofauna) in construction zone
	temporary disturbance to wildlife species adjacent to construction areas
AQUATIC RESOURCES	permanent loss of 0.3 acre of open water habitat
	temporary impact to approximately 2.0 acres of open water habitat
	losses of drifting fish larvae and displaced juveniles and adults
	loss of fishes due to chemical or mechanical treatment of the stream between the barriers
	potential loss of certain instream habitat types in the sedimentation zones
SPECIAL STATUS SPECIES	no impacts to terrestrial special status species
	long-term beneficial impacts (increased protection) to native fishes; potential loss of individual fish during construction and periodic chemical treatment
	no adverse impacts to frogs or garter snakes

C. Mitigation

Table 7 summarizes the total acreage affected within each habitat type impacted by various construction activities and the proposed mitigation.

Table 7. Summary of impact areas and associated mitigation

HABITAT TYPE	AC	IMPACT TYPE	IMPACT AREA	MITIGATION
SONORAN DESERT SCRUB 2.11 TEMP <u>0.03 PERM</u> 2.14	2.10	TEMP	STAGING AREA	REVEGETATE/NATIVE SPECIES
	0.01	TEMP	ACCESS ROAD	NO MITIGATION REQUIRED
	0.03	PERM	BARRIER	NO MITIGATION REQUIRED
STREAM CHANNEL 2.21 TEMP <u>0.30 PERM</u> 2.51	0.20	TEMP	CONSTRUCTION ZONE	NO MITIGATION REQUIRED
	1.86	TEMP	SEDIMENTATION ZONE	NO MITIGATION REQUIRED
	0.30	PERM	BARRIER	NO MITIGATION REQUIRED
SEEPWILLOW/BURRO BRUSH 6.23 TEMP <u>1.40 PERM</u> 7.63	0.05	TEMP	ACCESS ROAD	LAND ACQUISITION
	1.08	TEMP	CONSTRUCTION ZONE	LAND ACQUISITION
	5.10	TEMP	SEDIMENTATION ZONE	LAND ACQUISITION
	1.40	PERM	BARRIER	LAND ACQUISITION
MESQUITE 0.40 TEMP <u>0.06 PERM</u> 0.46	0.20	TEMP	ACCESS ROAD	NO MITIGATION REQUIRED
	0.01	TEMP	CONSTRUCTION ZONE	LAND ACQUISITION
	0.19	TEMP	SEDIMENTATION ZONE	NO MITIGATION REQUIRED
	0.06	PERM	BARRIER	LAND ACQUISITION
MIXED MESQUITE 0.24 TEMP <u>0.00 PERM</u> 0.24	0.04	TEMP	ACCESS ROAD	NO MITIGATION REQUIRED
	0.20	TEMP	SEDIMENTATION ZONE	NO MITIGATION REQUIRED
MIXED RIPARIAN 0.02 TEMP <u>0.02 PERM</u> 0.34	0.01	TEMP	CONSTRUCTION ZONE	LAND ACQUISITION
	0.01	TEMP	SEDIMENTATION ZONE	NO MITIGATION REQUIRED
	0.02	PERM	BARRIER	LAND ACQUISITION

Sonoran desert scrub - The Sonoran desert scrub habitat would primarily be impacted by use of the contractor staging area. This area would be revegetated at the end of construction. The two remaining impact areas only account for 0.04 acre of habitat. Due to the extensive nature of this habitat type and the negligible amount of habitat impacted, no mitigation is proposed.

Stream channel - Approximately 0.3 acre of instream habitats capable of supporting fishes would be permanently affected by construction of the barriers. Additional temporary impact to about 2 1/4 additional acres of open water (mostly between the barriers) would occur. The permanent benefit to the aquatic resources within 22 miles of stream channel upstream of the barriers that would result from this project should more than offset the temporary and permanent impacts to aquatic resources caused by construction of the barriers. Therefore, no additional in-kind on-site mitigation is proposed.

Seepwillow/burrobrush - The seepwillow/burrobrush community would sustain the majority of impacts from the proposed project. Approximately 7.63 acres of habitat would be affected (but only 1.4 acres permanently lost). The majority of acreage (82 percent) would only be affected on a short-term basis. This habitat type occurs immediately adjacent to the stream flow and receives the full impact of any flood flows. Consequently, this habitat is in a continuous state of regeneration.

After the 1993 flood, which United States Geological Survey (USGS) records indicate peaked at 13,000 cfs, nearly 85 percent of the habitat was scoured clean. Existing vegetation being considered for mitigation has developed in the subsequent 5 years. Vegetation ranges in height from 2 to 5 feet in height, indicating that lower velocity flows have rescoured the channel since 1993. USGS records indicate that two smaller flood events (8,930 and 5,260 cfs) occurred in early 1995 and were most likely responsible for the more recent growth. USGS records also indicate there has been a flow event of greater than or equal to 5,000 cfs every 3 years. Consequently, the majority of seepwillow/burrobrush habitat in the immediate channel area would be lost on a 3-year average.

Mitigation, therefore, is based on loss of function and value during the initial 3 - 5 year period following impact. Reclamation proposes to acquire land to offset the lost functions and values.

Mesquite - Less than 1/2 an acre of mesquite habitat (0.46 acre) would be impacted by this project. The temporary impacts associated with the construction access roads (0.2 acre) includes existing roads. The actual impact area is restricted to minor trimming and removal of only a few trees. No mitigation is proposed for this impact. Likewise impacts to mesquite habitat from the sedimentation zone (0.19 acre) would consist of minor amounts of sediment accumulation. No adverse impacts would occur, and no mitigation is proposed.

Construction of the fish barrier would result in permanent loss of 0.06 acre of mesquite habitat. This acreage coupled with the 0.01 acre of impact from the construction zone would be mitigated by land acquisition.

Mixed Mesquite - No permanent impacts would occur in the mixed mesquite habitat. Temporary impacts associated with the access road (0.04 acre) are considered minimal. Temporary impacts associated with the sedimentation zone (0.2) would consist of minor sediment accumulation with no adverse impact to the habitat. No mitigation is proposed.

Mixed riparian - Impacts to mixed riparian habitat from the sedimentation zone would be similar to those described for mixed mesquite and mesquite. Minor amounts of sediment accumulation in these areas would not impact the habitat.

Impacts from the construction zone (0.01 acre) and barrier footprint (0.02 acre), although minor, would be mitigated by land acquisition.

1. Mitigation Proposal

Reclamation would impact 0.10 acre of higher quality mesquite/mixed riparian habitat (Table 8). Although these habitat types rank high with respect to wildlife values, habitat in the project area has been degraded by grazing and past flood events which have reduced the vegetation to small, fragmented pockets. Impacts would also occur to 7.63 acres of seepwillow/burrobrush habitat (Table 8).

Table 8. Summary of habitat types (acres) for which mitigation is proposed

HABITAT TYPE	PERM. IMPACT (ACRES)	TEMP. IMPACT (ACRES)	MITIGATION
Sonoran desertscrub		2.10	Revegetate with native vegetation
Seepwillow/burrobrush		7.63	1) Acquire 5 acres of land along the San Pedro River or Aravaipa Cr. (OR) 2) Acquire a Conservation Easement on property along Aravaipa Creek.
Mesquite	0.07		
Mixed riparian	0.03		
TOTAL ACRES	0.10	9.73	

Anderson and Ohmart (1993) devised a ranking system for riparian habitats based on a long-term data set of avian and mammalian censusing conducted primarily in southern Arizona. The ranking system takes into account geographic location, elevation, habitat type, and structure type (vegetative layering - understory, midstory and canopy). The designed intent of this model is to allow the user to gather minimal data from a riparian community (plant species composition and structure type) and predict wildlife use values and density estimates or species richness (Anderson and Ohmart 1993).

Based on the Anderson and Ohmart (1993) scale of -3 to +3, where 0 represents the average value, wildlife values in the project area are ranked as follows:

mixed riparian habitat	+3.1
mesquite	+2.1
seepwillow/burrobrush	- 2.4
Sonoran desertscrub	not considered in study

Reclamation personnel believe that based on the minimal impacts to moderate quality mixed riparian and mesquite habitat (0.10 acre) and low quality seepwillow/burrobrush habitat (7.63 acres), mitigation would be accomplished by land acquisition on a 1:1.7 basis for the seepwillow/burrobrush habitat and 5:1 basis for the riparian vegetation.

Because Reclamation would not retain fee title to the project area property, we are unable to control future actions and, consequently, off-site mitigation is proposed. We propose to select one of two mitigation options: (1) acquire 5 acres of riparian habitat on the San Pedro River or Aravaipa Creek which shall be managed by an appropriate agency, or (2) acquire a Conservation Easement on riparian habitat on Aravaipa Creek.

Additional Mitigation Measures

The following measures would be implemented during the construction phase of the project:

1. If any federally-listed species (other than fish) are identified in the project area, construction activities would be halted until appropriate officials from FWS and Reclamation are notified and actions taken.
2. All construction areas not required for permanent facilities would be scarified and recontoured.
3. All barrel and cholla cacti in the contractor use area would be stockpiled and replanted at the end of construction.
4. All saguaro cactus in contractor use area would be avoided, if possible, or stockpiled and replanted following construction.

5. The staging area would be scarified, recontoured, and revegetated with native species.
6. All construction personnel will be instructed not to collect, disturb, or molest wildlife species during construction.
7. Contractor will be instructed to exercise care to preserve the natural landscape and conduct operations so as to prevent unnecessary destruction, scaring, or defacing of the natural surroundings in the vicinity of the work.
8. Contractor will be directed to comply with the statutes of the Arizona Native Plant law.
9. Impacts associated with bank protection will be identified, quantified, and mitigated.

D. Scientific Monitoring

Not all impacts of the Aravaipa Creek fish barrier project on aquatic ecology are known with certainty. Reclamation would institute a scientific monitoring program of the stream biota potentially impacted by the fish barriers prior to construction of the fish barriers. Results of this monitoring would be used to more fully assess the impacts of the barriers on Aravaipa Creek, refine the design and impact analysis of future barrier projects, and provide additional scientific insight into barrier effects on the ecology of aquatic and riparian communities of Aravaipa Creek.

Specifically, existing monitoring studies of native and nonnative fish populations of Aravaipa Creek would be modified or refined into a dedicated program to evaluate their responses to the presence of fish barriers, including larval drift and emigration studies. Contingency plans for harvest of fishes from below the barriers for repatriation elsewhere within their natural ranges will be made.

In addition, routine monitoring of fish populations between the fish barriers and upstream of the upper barrier would be performed. Monitoring would likely be conducted annually and following episodes of flooding. If nonnative species are found between the barriers, they would be removed mechanically or chemically.

No Action Alternative

Existing and future environmental conditions within the project area would not be influenced by construction and operation of fish barriers. Project-related effects to aquatic and terrestrial environs, including short-term and long-term impacts to habitats, fish, wildlife, and vegetation, would not occur. The unabated incursion of nonnative fishes into upper reaches of Aravaipa Creek could threaten the existence of resident populations of native fishes. Continued recreational use and cattle grazing would impact vegetation on riparian areas.

E. Land Use

Affected Environment

Lands encompassing the project area consist of open, sparsely populated desert and low mountains, intersected by numerous drainages. Considerable agricultural production and mining exist several miles west and northwest of the project area, but would not be affected by the proposed action. Portions of Indian Trust Allotment 013622, which is downstream of the project area, have historically been cultivated.

The project area falls within part of the undeveloped floodplain of Aravaipa Creek on land allotted to members of the San Carlos Apache Tribe (Indian Trust Allotment 013736). No human habitation or permanent improvements occur on this land. A crushed rock-surface road maintained by Pinal County (Aravaipa Road) bisects the allotment and provides the only transportation corridor to upstream private properties and the BLM-managed wilderness area. Land use upstream of the allotment is predominately undeveloped open space with isolated residences, small farms, and ranches.

Portions of the project area in the mesquite bosque and near the stream channel are utilized by local residents for picnicking and camping. This casual recreational use is not sanctioned by allottees, and is, in fact, a property trespass. Several primitive roads and trails transect the mesquite bosque, encouraging continued unauthorized use. Lack of access controls have contributed to degradation of vegetation, accumulation of trash, and vehicle use in the mesquite bosque, along the streambank, and within the channel. The project area also shows evidence of trespass cattle grazing.

Environmental Consequences

Indian Trust Allotment 013736 would be most directly affected by construction and operation of the fish barriers. Construction activities would create temporary restrictions on allottee use of sites needed by the contractor for equipment access, maneuvering, and material storage during the 4-month construction period. Less than 6 acres of land in the allotment would be impacted during construction. Land use within the 1.81-acre footprints of the two barriers would be restricted during both the construction phase and the 100-year operational life of the project. Bank stabilization would limit vehicle access to the active stream channel and alter the

aesthetic quality of the stream bank near each barrier. Project operation also requires long-term access for periodic inspection of the barriers and biological monitoring, which could affect the allottees' use of a portion of the property.

Construction of the lower barrier could foreseeably create an impediment for allottees to divert stream water from an upstream source to supply potential agricultural production on historically cultivated land within allotments 013622 and 013736. Reclamation would design a diversion feature into the lower barrier to ensure that the project does not preclude tribal members from diverting water pursuant to their water rights.

Approximately 7.5 acres of stream channel would aggrade with sediment deposited upstream of the barriers. Shifts in sediment deposition and the resulting loss of vegetation within this portion of the channel would imitate effects caused by flooding. The "natural" character and aesthetic quality of the channel would quickly be restored as vegetation recolonizes the sedimentation zone.

Project-related impacts to land uses due to flooding would be low. Incremental increases in flooding would be most pronounced on allotted land immediately upstream of the barriers. Project-induced backwater flooding would impact less than 3 acres (1.9 percent) of the allotment through a 100-year flood (Figure 3-1). These temporary flood effects would be confined to undeveloped portions of the floodplain and would not change current allottee use of the land.

Increases in flooding attributable to the project would have negligible effect on upstream properties through a 5-year flood (Figure 3-1). A slight incremental increase in the extent and duration of flooding would impact three upstream properties during higher magnitude flood events (greater than 5-year frequency floods). However, less than 0.20 additional acres of private land would be affected by backwater flooding up through a 100-year frequency flood. These temporary effects would not be expected to change short-term or long-term land use patterns. Reclamation would attempt to acquire flowage easements from affected private land owners. The project would not change land use on properties downstream of allotment 013736.

The project would cause short-term inundation of two low-lying sections of Aravaipa Road during 5 and 10-year floods (Figures 3-1 and 3-2). Although this backwater flooding would be of short duration, temporary disruption of traffic flow is possible. To negate any such adverse impact, Reclamation would modify the affected sections of Aravaipa Road to conform with Pinal County's all-weather road standards. The County standards require that single access public roads, such as Aravaipa Road, be covered by no more than 8 inches of water during any 25-year frequency flood. Floods of magnitudes greater than a 12-year event already submerge the potentially affected sections of road; therefore, elevation of the road surface in conformance with County standards would be an improvement over existing conditions. Beyond a 25-year flood, the project's long-term effect would be to slightly increase the duration of flooding on the two affected sections of road.

Mitigation Measures

1. Reclamation would compensate affected tribal members for impacts caused by construction and operation of the barriers. Easements would be purchased for the barrier sites, temporary construction areas, and lands potentially affected by project-related flooding. Reclamation would also attempt to acquire flowage easements for upstream properties potentially affected by project-related flooding.
2. Reclamation would install heavy-duty gates, and fencing, to limit unauthorized vehicle access to allotted land adjacent to and upstream of the barriers. Restricting access to the property would lessen current problems associated with trespass, litter, and off-road vehicle operation.
3. Sections of Aravaipa Road on Allotment 013736 would be modified to minimize potential project-related flood impacts.
4. Reclamation would include a diversion feature in the lower barrier to ensure the allottees' ability to divert water to historically cultivated lands.

No Action Alternative

Impacts to land use attributable to the project would not ensue. Reclamation would not purchase easements or install restrictive fencing and gates. It is anticipated the area would continue to be used by recreationists, and Aravaipa Road would continue to be inundated with each 12-year frequency flood.

F. Water Quality

Affected Environment

Aravaipa Creek is a relatively pristine, mostly perennial stream. Water quality is considered generally good, with little empirical evidence of chemical contamination. Small farms and livestock grazing along the water course likely contribute minor amounts of organic and inorganic pollution. Sparse submergent aquatic vegetation, particularly filamentous algae, is indicative of acceptable nitrogen loading. Abundant and diverse populations of native fishes and aquatic insects also suggest admissible, low levels of oxygen-demanding (biodegradable) contaminants. The stream water during dry conditions is slightly turbid with extremely fine, suspended silt. Turbidity increases substantially with sediment inputs from storm water runoff.

Environmental Consequences

Disturbances to the channel during construction would cause a temporary increase in turbid conditions downstream of the project area. Excavation of alluvium, movement of equipment within the channel, and dewatering practices would contribute to elevated sediment

loading during the construction phase. Slightly elevated turbidity may persist briefly following construction as finer sediments are washed from disturbed gravel beds. These minor, short-term construction impacts would affect surface water quality only in the lowest perennial reach of Aravaipa Creek, extending from the project area to a point approximately 1-mile downstream where flow becomes subterranean. The construction phase of the project would not introduce measurable long-term water quality impacts.

Project operation would include periodic monitoring of fish populations between the barriers and mechanical (use of nets) or chemical removal of nonnative fishes, if present. If chemical control becomes necessary, a U.S. Environmental Protection Agency certified ichthyotoxin (fish toxin), such as Fintrol[®], would be applied to the stream between the barriers. Fintrol[®], as well as other commercially available ichthyotoxins, is toxic only to aquatic animals possessing gills (see discussion in Biological Resources chapter, section h). Use of a neutralizing agent at the lower barrier would prevent the downstream migration of the toxin. No residual toxic effect is expected in waters between the barriers due to dilution and rapid degradation of the toxin (e.g., Fintrol[®] completely degrades within a few hours after use). Adverse effects to aquatic biota or water quality would not occur downstream of the project area.

No Action Alternative

Existing water quality would not be affected by the project. Potential short-term increases in turbidity caused by construction would not occur.

G. Cultural Resources

Affected Environment

The project area encompasses portions of the Aravaipa Creek stream bed, floodplain and adjoining upland environs. The potential for prehistoric archeological sites in the channel and floodplain are quite low due to recurrent flooding and resultant modification of erodible landforms. Upland areas potentially affected by the project have the highest probability of containing prehistoric or historic cultural material.

Prehistoric Setting

Archaeological data on the occupation of the lower San Pedro Valley by Paleo-Indian big-game hunters and Archaic hunters and gatherers is limited, and as a consequence not much is known about these early inhabitants. More data are available on a sedentary group known as the Hohokam. Primarily farmers, the Hohokam established villages along the lower San Pedro River beginning around the 5th century A.D. Villages were often located near the mouths of major tributary drainages, because these locations offered the Hohokam not only

fertile floodplain areas for farming, but two riparian systems that could be exploited for their plant and animal resources (Masse 1980:210). The Hohokam were represented in the region until the 5th century A.D.

Beginning in the 13th century A.D., what archaeologists call the Classic Period began. Lasting until around A.D. 1400, the Classic period along the lower San Pedro Valley is associated with immigration of Indian groups from plateau and mountain areas to the north and east. The Classic period in southern Arizona is associated with platform mounds and surface structures of adobe and cobbles enclosed by walls (these walled communities are known as compounds). Recent survey along the San Pedro River (Doelle 1990a; 1990b; 1995) identified several platform mound and compound sites.

Between A.D. 1400 and 1500, the Classic period ended for reasons that remain unclear to archaeologists. Native populations along the lower San Pedro (and throughout most of southern Arizona) declined, and settlement patterns shifted to fewer and smaller villages. When the first Spanish explorers ventured into southern Arizona and down the San Pedro River, groups of native farmers resided in a string of villages located along the river. These villages lacked the platform mounds, compounds, and adobe and stone masonry architecture that marked the Classic period.

The Apache arrived in the southwest sometime in the late 15th and early 16th centuries and are related to Athapaskan groups in Alaska, Canada, and Northern California (Bronitsky and Merritt 1986:257). The lower San Pedro River and surrounding area to the east was occupied by the Aravaipa band of the San Carlos group of Western Apache, who controlled the area until eventually forced onto a reservation by the U.S Army in the late 1800s.

The Apache were farmers, who also moved frequently in search of game and wild plant foods. When they eventually acquired the horse from the Spanish, raiding also became an important subsistence pursuit. Apache settlement (for example, the lack of permanent architecture) and subsistence practices have contributed to the absence of archaeological visibility of Apache sites. Because archaeologists have had trouble identifying Apache sites, archaeological data are limited (Bronitsky and Merritt 1986:258). See Appendix E for a more extensive discussion of prehistoric and historic occupation of the project area.

Survey Methods and Results

The active stream channel where the fish barriers would be built was not surveyed due to recurrent land disturbances caused by baseline stream flow and occasional severe flooding.

A Class III survey of three proposed contractor use areas was completed in June 1998. A second more extensive Class III survey of the upland site (Site B) was performed in September 1998. The contractor use areas are adjacent to each other and are designated Sites A, B, and C (Figure 2-3). Site A is the furthestmost upstream proposed contractor use area. It is located in the floodplain on the north bank of Aravaipa Creek. Site B, the desertscrub upland site, is on a terrace immediately west (downstream) of Site A. Site B is the preferred location for the contractor use area. Site C is also in the floodplain and lies immediately west and downstream of the upland site. Sites A and C are covered with a dense stand of mesquite and other riparian vegetation. Both areas have been and continue to be disturbed by vehicular activity associated with picnicking and camping along the creek. The uplands site rises above the creek and contains scattered mesquite, palo verde, ocotillo, and various cacti. It has not been as severely disturbed by recreational users as the other two sites.

The Class III surveys were conducted in accordance with the National Historic Preservation Act of 1966 (NHPA), as amended (P.L. 89-665). A Class III survey consists of an intensive on-the-ground examination of all areas to be affected by the proposed action. The survey is intended to identify all cultural resources within the project area. Survey data are used to evaluate the significance of cultural resources and to develop plans to avoid, minimize, or mitigate adverse effects to significant cultural resources from the proposed construction activity. A check of site maps at the Arizona State Museum indicated that no previous surveys had taken place in the project area, although recent surveys have been completed along the San Pedro 3 to 4 miles west of the project area (Doelle 1990a; 1990b; 1995). Farther upstream on Aravaipa Creek, a 1939 survey by Grenville Goodwin recorded 15 rock shelters (Gilman and Richards 1975).

Approximately 7 acres were surveyed. Several archeological features were noted and mapped near Site B; no features were detected on Sites A and B. A scatter of historic metal artifacts may be associated with a power line and maintenance road that run through Site B; alternatively, they may also be associated with a recent (late 19th or early 20th century) Apache occupation of the site.

The project area was visited on July 21, 1998, during which several members of the San Carlos Apache Elders Council were present. They confirmed the area as being a traditional cultural property (TCP) for the San Carlos Apache.

Environmental Consequences

There would be no impacts to cultural resources from construction of the two fish barriers. Cultural resource sites potentially eligible for National Register listing or considered sensitive by the San Carlos Apache Tribe would be avoided. The TCP could be impacted from development of the contractor use area, however.

Mitigation Measures

1. Because of the presence of a TCP in the project area, traditional elders of the San Carlos Apache Tribe will be consulted on a continuing basis regarding the specific siting of the contractor use area. The TCP would be fenced or otherwise protected from any potential disturbance from the contractor use area. Approval of any mitigation measure would be required by the allottee owners, and concurred with by tribal elders. Concurrence of the State Historic Preservation Office (SHPO) and BIA would also be obtained.

2. The TCP will be assigned an appropriate site number, and it will be accurately mapped using a total station. Surface transects will be made to identify and record all surface artifacts and features. No artifact collections will be made. A previously unsurveyed area that could provide an alternative location for a contractor use area will also be surveyed and mapped.

3. Consultation with the SHPO as required by section 106 of the NHPA will be completed prior to commencement of any land disturbing activities. Appropriate mitigation measures will be developed in consultation with the SHPO, the San Carlos Apache Tribe, and the BIA.

4. Pursuant to section 106 of the NHPA, consultation has been initiated with the San Carlos Apache Tribe regarding the presence of TCPs in the project area. The only other TCP thus far identified is the site of the Camp Grant Massacre that is located about 0.5 mile downstream from the fish barriers.

5. If previously unidentified cultural resources, especially human remains or burials, are encountered during construction, work shall cease immediately at the location, and personnel from Reclamation's Cultural Resource Branch shall be notified.

No Action Alternative

Because a contractor use area would not be required, there would be no impact to the archaeological site in the upland area. Impacts from casual recreational use of the project area would continue.

H. Environmental Justice

Executive Order (EO) 12898 requires Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of Federal actions on minority populations and low-income populations. Low-income populations include communities, or individuals living in close geographic proximity to one another,

identified by Bureau of Census statistical thresholds for poverty. Minority populations are identified where the percentage of minorities in the affected area exceeds 50 percent, or where the minority population percentage of the affected area is meaningfully greater than the minority population percentage of a much broader area. For the purpose of this analysis, Pinal County and the State of Arizona are selected as comparative geographic units.

Affected Environment

Pinal County is composed primarily of persons of white, Hispanic, or American Indian ethnic or racial backgrounds (96 percent of total population). County-wide populations of American Indians are further divided into several tribal affinities, with population concentrations centered on reservations. Populations of whites and Hispanics are more uniformly distributed throughout the county. Table 9 shows that percentages of minority populations are higher in Pinal County compared to the State of Arizona. Minority populations account for approximately 41 percent of the total population in Pinal County.

Table 9. Income and population statistics for Pinal County and the State of Arizona

Type of Income/Population	Pinal County	Arizona
Median household income	\$21,301	\$27,540
Median family income	\$23,993	\$32,178
Per capita income	\$9,228	\$13,461
Persons below poverty	23.6%	15.7%
Families below poverty	18.7%	11.4%
White (non-Hispanic)	59%	72%
Hispanic	29%	19%
Indian	8%	5%
Black	3%	3%

Source: Bureau of Census, 1990 Population and Housing Statistics

According to the 1990 census, poverty levels in Pinal County are higher than State averages. Percentages of persons and families below the poverty level are comparatively high; and household income, median family income, and per capita income are quite low. Few economic opportunities are available near the project area, and most employment is dependent on agriculture or mining.

Properties potentially affected by the project are either uninhabited or sparsely populated. Reclamation anticipates the EO 12898 effects of the proposed action are confined to minority or low-income populations that might use, or have a legal property interest in, BIA Indian Trust Allotment 013736. The allotted land, although not inhabited, is owned by members of the San Carlos Apache Tribe. San Carlos Apache tribal members belong to a minority population, as defined by EO 12898. Owners of potentially affected upstream properties do not qualify as minority or low-income "populations."

Other populations potentially affected by the project include residents from nearby communities and rural areas that use the allotted land for picnicking and camping. Since no specific demographic data exist for these users, it is assumed their race and ethnic backgrounds and income status generally conform to county-wide statistics.

Environmental Consequences

The proposed action would not result in disproportionately high, adverse health effects to low income populations or minority populations. No minority or low-income populations reside on areas affected by the project; thus direct impacts to resident EO 12898 populations would not occur. Construction and operational aspects of the project would not introduce chemical, biological, physical agents, or situations that have the potential to adversely affect the health of low-income or minority populations. The environmental effects of the project are not expected to adversely impact San Carlos Apache tribal members with legal property interests in allotment 013736.

Access to the allotted land by unauthorized persons would be restricted by the proposed action. The current casual recreational use of the property by local residents is not sanctioned by allottees and constitutes a trespass of private property. Locked gates and fencing would be erected by Reclamation to prevent unauthorized vehicle access to allotted land adjacent to, and upstream of, the barriers. Reclamation anticipates recreational use of the site would be reduced, but not eliminated. Individuals could still access the property by parking along Aravaipa Road and climbing over the fence. The installation of fencing and other restrictive barriers would not preclude any legal right to use or access the allotment.

Early in the project, Reclamation considered eight potential sites for barrier construction. All but sites A1 and A2 were rejected due to possible access constraints or unacceptable adverse biological impacts. Sites below the "throat" of Aravaipa Canyon would have been impractical due to the amount of construction necessary to span the floodplain, which broadens considerably below site A1. Reclamation finally determined that sites A1 and A2 were the only practical locations available on Aravaipa Creek for barrier placement. Construction of the barriers on allotted land would not be possible without a plurality of consent among affected allottees, their heirs, and the BIA acting as trustee for the interests of minors, deceased unprobated heirs, and unlocatable heirs.

The public involvement associated with the project included a scoping meeting near Winkelman, Arizona; numerous informational mailings to agencies, organizations, and individuals; and issuance of news releases to local and State-wide media outlets, including the *San Carlos Apache Moccasin* newspaper. San Carlos Apache tribal members with allotted land interests in the project area were specifically contacted by Reclamation and invited to comment on the proposed action. Reclamation personnel also arranged a special bus tour of the project area for allottees. Copies of the draft EA were mailed to affected allottees.

No Action Alternative

The project would not be implemented and existing conditions on, and uses of, the allotment would persist. Future use by allottees and others would not be influenced by the project. Unauthorized recreational use of the allotment would not be restricted.

I. Indian Trust Assets (ITAs)

ITAs are legal interests in property, held in trust, by the United States for Indian Tribes or for individual Indians. Examples of trust assets are lands, forage, timber, minerals, hunting and fishing rights, and water rights. ITA effects of the proposed action were examined and evaluated in consultation with the BIA and involved tribal members.

The Secretary of the Interior (Secretary) is the United States' trustee on behalf of Indian Tribes and their members. All Federal agencies have trust responsibility requiring them to take all actions reasonably necessary to protect trust assets, and avoid adverse impacts when possible. When adverse impacts cannot be avoided, appropriate mitigation or compensation must be provided, in consultation with the affected tribes and/or tribal members.

"Legal interest" means there is a primary interest for which a legal remedy may be obtained, for example compensation or injunction. ITAs do not include things in which a tribe or its members have no legal interest. For example, a tribe and its members may have no legal interest, jurisdiction, or ownership of land which may contain part of the tribe's cultural heritage, history, or affiliation. These are termed TCP's. Federal laws do pertain to the TCP's, religious, or cultural heritage sites. Such matters should be addressed whenever impacts to such properties were to occur from actions of others.

Affected Environment

Trust Indian Patent No. 741639 was granted to Elin Chiquito (a.k.a. Elin Bullis), a member of the San Carlos Apache Tribe, on March 26, 1920, and presently is owned by his heirs. The allotment (Indian Trust Allotment 013736) contains 160 acres in the N2NE4,

SE4NE4, and NE4NW4 of Section 8, T.7S., R.17E., G&S, Pinal County, Arizona. The Chiquito Allotment is a TCP, albeit formally undeclared. It also has a long well-documented history of Apache tribal cultural affiliation (Appendix E).

Immediately downstream and west along Aravaipa Creek, adjoining the Elin Chiquito Allotment, is the 160-acre trust Allotment No. 013622 of his father, Captain Chiquito, or Bullis. It occupies the SW4SW4 of Section 5, the SE4SE4 of Section 6, the NE4NE4 of Section 7, and NW4NW4 of Section 8, T.7S., R.17E., G&S and contained 26.2 acres of cultivated bottom land, part of which was irrigated by Indian Ditch No. 3 heading on the right descending bank of Aravaipa Creek within the upstream Elin Chiquito Allotment, as shown by the Arizona State Water Commissioner Survey of 1921. Minimal impact to this allotment due to construction, maintenance, or operation of the proposed fish barriers is anticipated.

Environmental Consequences

The concrete barriers and entrapped sediment would change the land contours and elevations in the stream channel. Approximately 9.3 acres (5.8 percent of the allotment acreage) would be impacted by the footprints of the two barriers and resulting sediment deposition. A minor amount of stream channel within the sedimentation zone would experience temporary inundation by water impounded by the barriers. These temporary pools would eventually be displaced by sediment.

Approximately 0.30 acre of the allotment would be affected by improvement of two existing primitive roads that connect the county-maintained Aravaipa Road to the stream channel, and by protective fencing and/or gates across the access roads. Additional disturbances to approximately 2.10 acres of land would result from construction and temporary utilization of the contractor use area. Maneuvering of construction equipment and stockpiling of excavated materials within the channel would be confined to the sedimentation zones and barrier footprints (except for a small portion of channel below the lower barrier that might be used for vehicle maneuvering).

Mining

There is no recorded history of mining or current mining on Allotment No. 013736, nor any known plans to set up mining activities in the future. Potential mining activities on land at or near the fish barriers would be precluded for the life of the project.

Use of Water

Many uses of water on Indian lands are not covered either by decree or by State permit. Aravaipa Creek and San Pedro River Apache Indian public domain allotments are among these, including both the Elin and Captain Chiquito Allotments. Undeclared water right

claims under the Winters Doctrine do exist for these allotments. Those rights derive from *Winters v. United States* (1908), 207 U.S. 564, and are referred to as "federally-reserved water rights." They are not merely for present uses, but for future uses as well. As to the quantity of waters reserved, that matter was directly passed upon in *Conrad Investment Co. v. United States*, 9 Cir., 161 F. 829, decided shortly after the Winters decision. The Conrad decision stated (page 832): "What amount of water will be required for these purposes may not be determined with absolute accuracy at this time, but the policy of the government 'to reserve whatever water of Birch Creek may be reasonably necessary' not only for present uses, but for future requirements, is clearly within the terms of the treaties as construed by the Supreme Court in the Winters case."

A limited adjudication of the waters of the Gila River, under Globe Equity No. 59, was decided on June 29, 1935, in *United States v. Gila Valley Irrigation District*. That case was reopened and currently is before the court. Water rights in the San Pedro River and Aravaipa Creek tributaries of the Gila River are being determined in the State Court Gila River System and Source general stream adjudication. The State adjudication process is under Revised Statutes §§ 45-251 to 45-260 and is being conducted in the State Superior Court. The general adjudication of the Gila River System and Source has been assigned to the Superior Court for Maricopa County. Water rights claims have been entered for these Indian allotments in this proceeding.

Exactly what impact construction of the proposed fish barriers might have on these water rights, beneficial uses, duty of water, season of use, and points of use have not been studied or determined. The barriers, however, are not intended, by design or function, to impound water, divert flow from allotted lands, or otherwise limit potential water use by allottees. The lower barrier would include a water diversion capability to ensure the Indian allottees would continue to be able to divert by gravity flow from Aravaipa Creek in accordance with their water rights.

Trust Income

Allotment 013736 currently is not being used to provide any income to the owners. Previously it was leased for grazing and as a buffer zone to public encroachment on adjoining private land immediately upstream of the allotment, and some control fencing was erected between the adjoining properties. Project operation requires periodic access of the property for barrier inspection and biological monitoring, which could affect future land use and income-generating potential. Allottees would be compensated by Reclamation for project-related usage of allotment 013736.

Privacy

It will be necessary for Reclamation employees or their contractors to inspect the condition of the barriers, and to monitor the effects of the barriers on native and nonnative fishes. Consequently, there would be a potential loss of privacy and seclusion for the original allottee heirs on their land.

Fishing

Aravaipa Creek is presently closed to fishing by order of the AGFD. A consequence of the project would be the elimination of any potential recreational or subsistence fisheries on the reach of Aravaipa Creek above the lower barrier. Aravaipa Creek, however, has never supported a "quality" sport fisheries. Only two species of game fish (green sunfish and yellow bullhead) routinely invade portions of the stream potentially affected by the project. Once the barriers are operational, populations of game fish in Aravaipa Creek would likely be limited to waters below the lower barrier. Although allottees have not frequently used the allotment for fishing in the past, the project would negatively affect any such future use above the lower barrier, if and when the current prohibition on fishing is cancelled.

Mitigation

See mitigation measures under "Land Use."

No Action Alternative

Without project implementation, no allotted land would be required for barrier construction and operation. Project-related construction and operation effects would not occur. Allottees with property interests in the allotment would not be compensated for potential project-related impacts.

J. Cumulative Impacts

Cumulative impacts result from the incremental effect of the proposed action when added to other past, present, and reasonably foreseeable future actions. The most influential action related to the project is the gradual displacement of native fishes by nonnative fishes throughout Arizona. Construction of the barriers on Aravaipa Creek, combined with other management strategies, could conceivably prevent localized extirpation and permanent endangerment of loach minnow and spikedace. Conversely, the project could prevent the dispersion of nonnative and native fishes into habitats upstream of barrier sites, thus restricting their ranges.

Land-disturbing activities in Arizona irrevocably and incrementally destroy a portion of the State-wide cultural resource base each year. Project-related construction could permanently impact scattered cultural material on approximately 2 acres of the allotment. Loss of cultural material resulting from actions associated with the project represents a small, but irretrievable, fraction of the regional cultural resource base.

K. Irreversible and Irretrievable Commitment of Resources

The term irreversible describes the loss of future options and applies to the effects of use of nonrenewable resources. Irreversible commitments cannot be reversed, except perhaps in the long term. Irretrievable refers to the loss of production, harvest or use of natural resources for a period of time. Loss of production or resources can be irretrievable, while the action may not be irreversible.

Construction activities associated with the project would require irreversible and irretrievable commitment of labor, fossil fuels, water, raw material, and financial expenditures.

Minor losses of "in situ" cultural resources are an anticipated consequence of the project. Loss of cultural material due to construction impacts are considered irreversible and irretrievable. The losses would be mitigated through surveys and data recovery.

Allottee use of the barrier sites on Indian Trust Allotment 013736 would be irretrievable and irreversibly lost. Due to the project's 100-year life span, the barriers are considered permanent features of the land.

Irretrievable losses of existing desert and riparian wildlife habitat would be attributable to construction-related disturbances and the long-term presence of the barriers. The displacement of habitat is not irreversible as mitigation efforts and natural processes would revegetate disturbed sites.

L. Mitigation Measures

The following section is a comprehensive listing of the mitigation measures incorporated into this EA. These mitigation measures will be implemented as part of the proposed action.

Biological Resources

1. Reclamation would select one of two mitigation options to compensate for impacts to riparian areas: (a) acquire 5 acres of riparian habitat on the San Pedro River or Aravaipa Creek which shall be managed by an appropriate agency, or (b) acquire a Conservation Easement on riparian habitat on Aravaipa Creek.

2. If any federally-listed species (other than fish) are identified in the project area, construction activities would be halted until appropriate officials from FWS and Reclamation are notified and actions taken.

3. All construction areas not required for permanent facilities would be scarified and recontoured to facilitate natural revegetation.

4. All barrel and cholla cacti in the contractor use area would be stockpiled and replanted at the end of construction.

5. All saguaro cactus in contractor use area would be avoided.

6. The staging area would be scarified, recontoured, and revegetated with native species.

7. All construction personnel will be instructed not to collect, disturb, or molest wildlife species during construction.

8. Contractor will be instructed to exercise care to preserve the natural landscape and conduct operations so as to prevent unnecessary destruction, scaring, or defacing of the natural surroundings in the vicinity of the work.

9. Contractor will be directed to comply with the statutes of the Arizona Native Plant law.

Land Use

1. Reclamation would compensate affected tribal members for impacts caused by construction and operation of the barriers. Easements would be purchased for the barrier sites, temporary construction areas, and lands potentially affected by project-related flooding. Reclamation would also attempt to acquire flowage easements for upstream properties potentially affected by project-related flooding.

2. Reclamation would install heavy-duty gates, and other barriers as deemed necessary, to limit unauthorized vehicle access to allotted land adjacent to and upstream of the barriers.

3. Sections of Aravaipa Road on Allotment 013736 would be modified to minimize potential project-related flood impacts.

4. Reclamation would include a diversion feature in the lower barrier to allow for diversion of a percentage of stream flow by tribal members.

Cultural Resources

1. Because of the presence of a TCP in the project area, traditional elders of the San Carlos Apache Tribe will be consulted on a continuing basis regarding the specific siting of the contractor use area. The TCP would be fenced or otherwise protected from any potential disturbance from the contractor use area. Approval of any mitigation measure would be required by the allottee owners, and concurred with by tribal elders. Concurrence of the State Historic Preservation Office (SHPO) and BIA would also be obtained.

2. The TCP will be assigned an appropriate site number, and it will be accurately mapped using a total station. Surface transects will be made to identify and record all surface artifacts and features. No artifact collections will be made. A previously unsurveyed area that could provide an alternative location for a contractor use area will also be surveyed and mapped.

3. Consultation with the SHPO as required by section 106 of the NHPA will be completed prior to commencement of any land disturbing activities. Appropriate mitigation measures will be developed in consultation with the SHPO, the San Carlos Apache Tribe, and the BIA.

4. If previously unidentified cultural resources, especially human remains or burials, are encountered during construction, work shall cease immediately at the location, and personnel from Reclamation's Cultural Resource Branch would be notified.

Project Design

1. The final project design will be reviewed by an independent architect engineer as promised during the scoping meeting in Winkelman on June 27, 1998.

M. List of Related Environmental and Cultural Resources Laws and Directives

National Environmental Policy Act (42 U.S.C 4321, et seq.) - This law requires Federal agencies to evaluate the potential environmental consequences of major Federal actions. NEPA also requires full public disclosure about the proposed action, accompanying alternatives, impacts, and mitigation.

This draft EA was prepared in accordance with the requirements of NEPA. The EA addresses the potential environmental impacts of implementing the proposed construction and operation of two fish barriers on Aravaipa Creek, Arizona. Public involvement associated with development of this EA included a public scoping meeting and bus tour of the project area. The draft EA was mailed to 84 individuals, agencies, and organizations for a 31-day public review period. In addition, public notices were published in newspapers serving the

communities of Winkelman and Mammoth, Arizona regarding the availability of the draft EA. News releases were also sent to various other news media regarding the draft EA. Twelve entities provided written comments (see Appendix F).

Endangered Species Act of 1973 (P.L.93-205) - The ESA provides protection for plants and animals that are currently in danger of extinction (endangered) and those that may become so in the foreseeable future (threatened). Section 7 of this law requires Federal agencies to ensure that all federally-associated activities do not have adverse impacts on the continued existence of threatened or endangered species or designated areas (critical habitat) that are important in conserving those species.

A biological assessment (BA) was prepared by Reclamation to evaluate the direct and indirect effects of the project on federally-listed and candidate species (excluding fish), as required by the ESA. The BA was submitted to the FWS on June 19, 1998, and concluded with "no effect" to any proposed or listed species. Native fishes were considered in the final biological opinion on the delivery and use of CAP water to the Gila River Basin, dated April 15, 1994, and no additional consultation was necessary according to Ms. Sally Stefferud, FWS, May, 26, 1998. Some native fishes may indirectly be lost due to the project; however, the 1994 biological opinion included "take" provisions for activities necessary to implement the reasonable and prudent alternatives. No cumulative effects of the project were noted in the BA.

Fish and Wildlife Coordination Act of 1958 (FWCA) (P.L. 85-624) - The objective of this law is to provide that wildlife conservation receive equal consideration and be coordinated with other features of water resource development programs. A Federal agency must consult and coordinate its actions and projects with the FWS and the affected State fish and game agency on any impoundment, diversion, or other water control facility.

Because the fish barrier project is a product of a Section 7 consultation, intensive coordination with the FWS has been ongoing since the project's inception. The FWS, which is also a cooperating agency in the development of this EA, concluded in a letter dated July 27, 1998, "The current level of coordination is sufficient to meet any regulatory needs required by the FWCA and a specific report should not be required."

Clean Water Act (33 U.S.C. 1251 et seq.) - The CWA strives to restore and maintain the chemical, physical, and biological integrity of the nation's waters by controlling discharge of pollutants. The basic means to achieve the goals of the CWA is through a system of water quality standards, discharge limitations, and permits.

Consultation with the COE on the delineation of "jurisdictional" waters within the project area is complete. An individual permit application and mitigation plan was submitted to the COE in September 1998. The COE has requested additional information. It is anticipated a public notice will be issued by the COE before the end of 1998. A CWA Section 404 (dredge

and fill) permit and CWA Section 401 water quality certification will need to be obtained prior to project implementation. Because the project would disturb more than 5 acres of land, a CWA Section 402 NPDES general permit for construction activities would also be required.

National Historic Preservation Act (P.L. 89-665) - This law establishes as Federal policy the protection of historic sites and values in cooperation with states and local governments.

Consultation with SHPO, as required by section 106 of the NHPA, would be completed prior to project implementation. Appropriate mitigation measures would be developed by Reclamation in consultation with the SHPO, the San Carlos Apache Tribe, and the BIA.

Wilderness Act of 1964 (P.L. 88-577) - This Act formally recognizes the values of wilderness and affords protection of wilderness areas through establishment of the National Wilderness Preservation System.

No wilderness areas are immediately proximal to the project area. Aravaipa Canyon Wilderness Area, which is managed by the BLM, is approximately 9 miles upgrade of the proposed upper barrier site. Reclamation anticipates the effects of the project would be confined to Indian Trust Allotment 013736 and three upstream private properties. Project-related impacts to Aravaipa Canyon Wilderness Area are not expected.

Executive Order 11988 (Floodplain Management) - This Presidential directive encourages Federal agencies to avoid, where practicable alternatives exist, the short- and long-term adverse impacts associated with floodplain development. Federal agencies are required to reduce the risk of flood loss, minimize the impacts of floods on human safety, health and welfare, and restore and preserve the natural and beneficial values served by floodplains in carrying out agency responsibility.

The fish barriers would be engineered to minimize possible project-related flood impacts. Adverse effects to properties and natural resources would be mitigated through the execution of measures specified in this EA. Placement of fish barriers on Aravaipa Creek by Reclamation is a required provision of the 1994 biological opinion to avoid jeopardizing the continued existence of spinedace and loach minnow. Therefore, no practicable alternative to the proposed action exists.

Executive Order 12898 (Environmental Justice) - This directive requires that each Federal agency identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

The effects of barrier construction and operation on EJ 12898 populations are discussed in the Environmental Justice section of this EA.