RECLAMATION

Managing Water in the West

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Draft Environmental Assessment

O'Donnell Canyon Dam Stabilization and Fish Barrier Project

Santa Cruz County, Arizona

U.S. Department of the Interior
Bureau of Reclamation
Phoenix Area Office

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Mission Statements

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
ADEQ	Arizona Department of Environmental Quality
BA	Biological Assessment
BLM	Bureau of Land Management
BO	Biological Opinion
CAA	Clean Air Act
CAP	Central Arizona Project
CE	Conservation Easement
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	Cubic feet per second
cm	Centimeter
CMA	Cooperative Management Area
CNF	Coronado National Forest
DPS	Distinct Population Segment
USACE	U.S. Army Corps of Engineers
CWA	Clean Water Act
cy	Cubic yard
DOI	Department of the Interior
EA	Environmental Assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FR	Forest Road
FWCA	Fish and Wildlife Coordination Act
GHG	Greenhouse gas
km^2	Square kilometer
MBTA	Migratory Bird Treaty Act
mm	millimeter
NAAQS	National Ambient Air Quality Standards
NCA	National Conservation Area
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OHV	Off-highway vehicle
PL	Public Law
$PM_{2.5}$	Particulate matter with a diameter of 2.5 microns or less
PM_{10}	Particulate matter with a diameter less than 10 microns
PCE	Primary constituent elements
Reclamation	Bureau of Reclamation
RMP	Resource Management Plan
SHPO	State Historic Preservation Office
TNC	The Nature Conservancy
USFWS	U.S. Fish and Wildlife Service

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CHAPTER 1 - PURPOSE AND NEED

1.1 INTRODUCTION

The Bureau of Reclamation (Reclamation), Phoenix Area Office, has prepared this environmental assessment (EA) to analyze the potential environmental effects resulting from a dam stabilization/fish barrier project on O'Donnell Canyon in Santa Cruz County, Arizona (Figure 1). The action would be implemented pursuant to sections 7(a)(1) and 7(a)(2) of the Endangered Species Act (ESA) (Public Law 93-205, as amended) and funded under the Colorado River Basin Project Act (Public Law 90-537, as amended).

The EA was prepared in accordance with the National Environmental Policy Act (NEPA) (Public Law 91-90, as amended), Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500-1508), and Department of the Interior (DOI) NEPA regulations (43 CFR Part 46). Reclamation is the lead Federal agency and the Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (USFWS) are cooperating agencies as defined in 43 CFR §§ 46.225 and 46.230.

1.2 BACKGROUND

The proposed O'Donnell Canyon dam stabilization/fish barrier project complements other conservation measures being implemented by Reclamation to assist with recovery and conservation of federally listed fish and amphibian species in the Gila River Basin. These measures are mandated by biological opinions issued by the USFWS in 1994, 2001, and 2008 on impacts of Central Arizona Project (CAP) water transfers to the Gila River Basin.[1] A key conservation measure of these opinions requires the construction of fish barriers to "prevent or hinder upstream movements of nonindigenous fish and other [nonnative] aquatic organisms into high-value native fish and amphibian habitats" of the Gila River Basin during the 100-year life of the CAP. Fish barrier sites were selected primarily "to protect existing populations of listed fishes or facilitate the repatriation and stocking of native fishes" into suitable habitat to achieve enhanced status toward recovery (USFWS 2008a).

Human induced changes in aquatic habitat and interaction with nonnative species have had a profound impact on native fishes in Arizona. Native fish populations have deteriorated significantly over the past century and a half to the point that 11 of the 19 fishes native to the Gila River basin are now listed under the ESA, two are candidates for listing, and one is recently extinct. Seven species have been extirpated from the basin, although one (desert pupfish [*Cyprinodon macularius*]) has been repatriated successfully into a several restricted habitats.

Many of the Gila basin's native amphibian populations and semi-aquatic reptiles are also declining. The Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*), Chiricahua

[1] The 1994, 2001, and 2008 biological opinions on CAP water transfers to the Gila River Basin are available at http://www.fws.gov/southwest/es/arizona/biological.htm.

leopard frog (*Lithobates chiricahuensis*), northern Mexican gartersnake (*Thamnophis eques megalops*), and narrow-headed gartersnake (*T. rufipunctatus*) are federally listed, and Arizona treefrog (*Hyla wrightorum*) is a candidate for listing. Eighteen species of native amphibians and semi-aquatic reptiles are listed by the State of Arizona as vulnerable species with the greatest conservation need (AZGFD 2010).

Habitat destruction and alteration were the principal causes for declines of natives prior to the mid-1900s; however, in the past several decades, it has become apparent that the presence of nonnative fishes precludes or negates benefits from habitat protection and restoration (e.g., Rosen and Schwalbe 2002, Marks et al. 2010). Avenues of impact to native fishes include predation, competitive exclusion, niche displacement, hybridization, and pathogen transmission (Mooney and Cleland 2001, Strauss et al. 2006). Introduction and spread of nonnative fishes now are considered the most consequential factors preventing sustenance and recovery of imperiled native fishes in the Gila River Basin and other drainages of the southwest (Moyle et al. 1986, Minckley 1991, Clarkson et al. 2005, 2012, USFWS 2007a, 2013a, Minckley and Marsh 2009). The cumulative impact of physical and biological stressors to aquatic habitats and native biota, especially in mainstem rivers, has fostered a pattern where native species now persist primarily as remnant populations confined to the upper reaches of tributary drainages. Consequently, the segregation of native and nonnative fishes in these tributary systems (or isolation management; Novinger and Rahel 2003) via emplacement of fish barriers to prevent mixing of the two kinds has become a primary management tool to assist with recovery of native fishes.

Reclamation's fish barrier construction program emphasizes streams that can be secured to prevent extinction and stabilize existing rare stocks of native fishes. O'Donnell Canyon is considered important for the conservation and recovery of the federally-endangered Gila chub (*Gila intermedia*) and Gila topminnow (*Poeciliopsis occidentalis*), two fish species whose habitat has been significantly degraded or destroyed range-wide. In addition, isolation management is expected to benefit federally-threatened northern Mexican gartersnake (*Thamnophis eques megalops*), a species found near the project area that is similarly negatively impacted by nonnative fishes (USFWS 2002a, 2013a).

1.3 PURPOSE AND NEED FOR ACTION

O'Donnell Canyon is currently protected against upstream fish incursion by two (upper and lower) BLM dams that were constructed in 1959 to provide catchments for livestock watering. These dams are separated by a 450-foot reach of stream. Both dams are in danger of failing because of headcut erosion of earthen material at the abutments. Failure of both dams would remove the only assured impediment to invasion of nonnative fishes that reside in downstream tributaries of O'Donnell Canyon such as Turkey Creek and Post Canyon.

The purpose of the proposed project is to preserve the fish barrier function of the upper BLM dam by preventing erosion-induced failure of its right abutment. This action would satisfy a key conservation measure of the 2008 CAP biological opinion which requires

Reclamation to construct a fish barrier in O'Donnell Canyon "to protect existing populations of Gila chub [and] Gila Topminnow" (USFWS 2008a).

1.4 PROJECT LOCATION

O'Donnell Canyon is located in southeastern Arizona near the town of Elgin in Santa Cruz County (Figure 1). The study area for the proposed project encompasses the upper BLM dam, a pedestrian access route across BLM land, and a roadside staging area on Coronado National Forest (CNF) land adjacent to the BLM/CNF boundary (Figure 2).

The upper BLM dam is situated in the southeast quarter of Section 28, Township 21 South, Range 18 East, Gila and Salt River Base Line and Meridian, at an elevation of approximately 4,825 feet above mean sea level. This site is within the boundary of the Las Cienegas National Conservation Area (NCA) and Appleton-Whittell Research Ranch (Research Ranch).

1.5 DECISION FRAMEWORK

The Responsible Official for Reclamation (Manager of the Phoenix Area Office) must make a determination regarding the environmental effects associated with implementation of the proposed action and no action alternatives. If the environmental analysis demonstrates that there are no significant environmental effects associated with implementation of the proposed action, and that action is chosen as the best alternative to meet the purpose and need of the project, with consideration of the potential impacts, then the Area Manager would record this determination in a Finding of No Significant Impact (FONSI). Based upon a consideration of public input, the EA, and the FONSI (if determined appropriate), the Area Manager would approve the expenditure of funds to implement the proposed action. Reclamation's FONSI would be made available at www.usbr.gov/lc/phoenix.

The Responsible Official for the BLM (Manager of the Tucson Field Office) would consider the environmental effects associated with implementation of the proposed action and no action alternatives. If the environmental analysis demonstrates that there are no significant environmental effects associated with implementation of the proposed action, and that action is chosen as the best alternative to meet the purpose and need of the project with consideration of the potential impacts, then the Manager would record this determination in a FONSI. Based upon a consideration of public input, the EA, and the FONSI (if determined appropriate), the Manager would prepare a Decision Record approving the use of BLM land with stipulati**o**ns and mitigation related to the implementation of the proposed action.

1.6 CONSISTENCY WITH BLM RESOURCE MANAGEMENT PLANS

The BLM manages the Las Cienegas NCA in accordance with the Las Cienegas National Conservation Area Act of 2000 (Public Law 106-538), the *Las Cienegas Resource Management Plan* (RMP, 2003) and other national policies, including BLM Manual

section 1601 – Land Use Planning. Management of the Appleton-Whittell Research Area of Critical Environmental Concern (ACEC) unit of the Las Cienegas NCA is also guided by the 1986 Cooperative Agreement between the BLM and the National Audubon Society. Management actions prescribed in the Las Cienegas RMP include mitigation to protect listed species and management of habitat for the recovery or reestablishment of native populations. The proposed action would be consistent with these BLM management objectives.

1.7 PUBLIC INVOLVEMENT

Scope of Issues and Public Comment. The Council on Environmental Quality defines scoping as "…an early and open process for determining the scope of issues to be addressed and for identifying significant issues related to a proposed action" (40 CFR § 1501.7). Scoping is an important underpinning of the NEPA process that encourages public input and helps focus the environmental impact analysis on relevant issues. Distribution of scoping information typically heralds the beginning of the public component of the NEPA process.

On October 25, 2013, Reclamation posted a scoping notice on the Phoenix Area Office website (www.usbr.gov/lc/phoenix) and mailed scoping information on the proposal to potentially interested individuals, organizations, and agencies. Reclamation also submitted news releases to the *Arizona Republic* and 7 other news media outlets covering southern Arizona.

During scoping, the following environmental resources were identified by the interdisciplinary team and the public as being potentially affected by the project.

- Biological resources including special status species. See section 3.4.
- Cultural resources. See section 3.5.
- Invasive weeds. See section 3.4.
- Erosion and sedimentation. See section 3.2.
- Stream hydrology and sediment transport. See section 3.3.
- Research. See section 3.1.

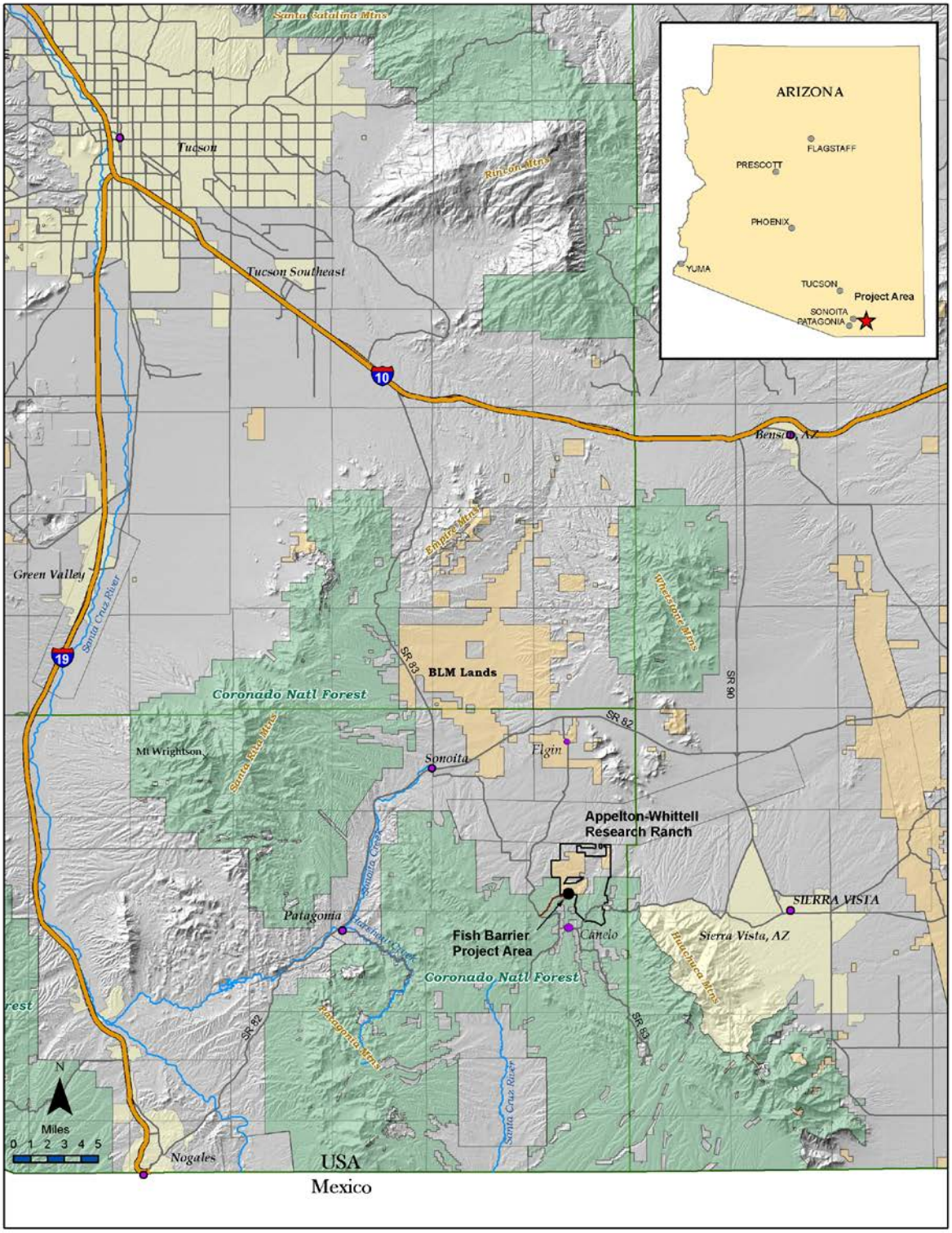

Figure 1. Project location map.

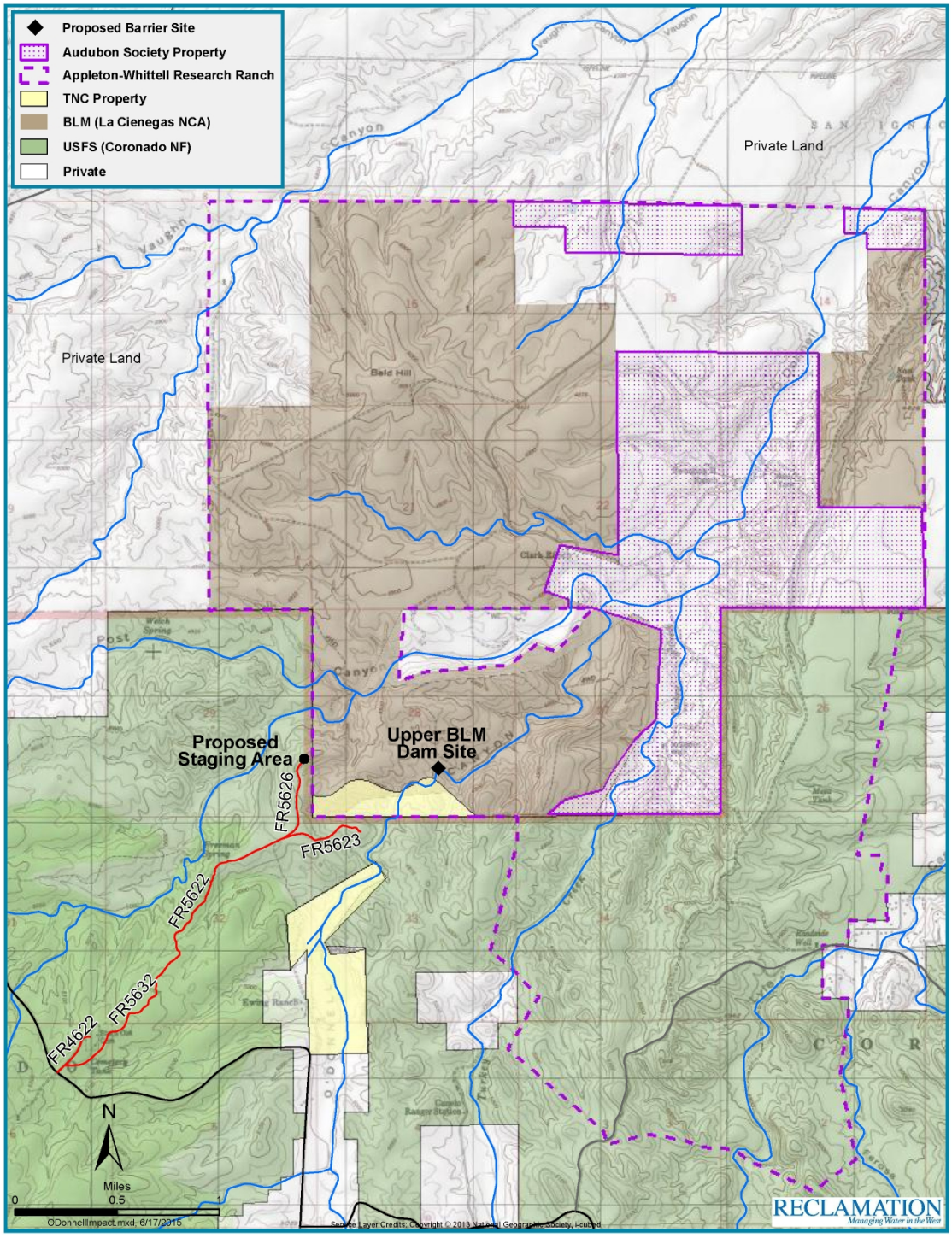

Figure 2. Upper BLM dam location and proposed staging area.

CHAPTER 2 -- DESCRIPTION OF THE ALTERNATIVES

This chapter describes the alternatives considered for the restoration project in greater detail. It includes one action alternative and no action.

2.1 NO ACTION ALTERNATIVE

Section 102(2)(E) of NEPA requires that no action must be considered as an alternative in an environmental review whenever there are unresolved conflicts about the proposed action with respect to alternative uses of available resources. A description of no action is also customarily used in an EA to provide the baseline for comparison of environmental effects of the action alternatives against reasonably foreseeable future conditions that are representative of the status quo. If no action is taken, Reclamation would not implement the proposed action.

2.2 PROPOSED ACTION (UPPER BLM DAM ABUTMENT STABILIZATION)

Existing Structure. The upper BLM dam is a 5-foot high, 40-foot long concrete arch that ties to the bedrock embankment along the left abutment and a smaller surficial bedrock feature near the right abutment. Base flows pass over the crest of the dam. A concrete wing wall angles upstream from the right abutment partway through an earthen terrace. The wing wall is 3.3 feet higher than the dam and appears to have been built to redirect minor overbank flood flows away from the terrace to the crest of the dam. However, higher level flood flows have eroded a headcut from the downstream channel partway through the terrace and slightly beyond the end of the wing wall. At present, the knickpoint of the headcut is approximately 40 feet from the stream channel. Continued headcutting of earthen material would eventually shift the stream channel around the right abutment, enabling nonnative fish to bypass the dam and move upstream.

Construction. Stabilization of the right abutment would require an extension of the existing wing wall with a reinforced concrete wall that would tie into a rock outcrop at the far right bank, a distance of approximately 57 feet (Figures 3 and 4). Emplacement of the extension wall would prevent further upstream migration of the headcut into the terrace and preserve the functional utility of the dam as a fish barrier. The crest elevation of the extension wall would generally correspond to the existing ground surface of the terrace outside the headcut (Figure 4).

Access for construction vehicles would be provided by Highway 83 and Forest Roads (FR) 5632, 5622, and 5626 (Figure 2). A turnaround at the end of FR 5626 would be used for staging of construction equipment and materials. Staging activities include short-term storage of materials and supplies, and daily parking. The staging area would not exceed 0.1 acre in size. Use of the FR 5626 turnaround for construction staging may require a Special Use Permit from CNF. A construction crew of 2 to 5 personnel would hike from the staging area to the work site. Crew size on any given day would vary depending on the phase of construction being performed. The proposed hiking route crosses approximately 3,300 feet of BLM land (Figure 5).

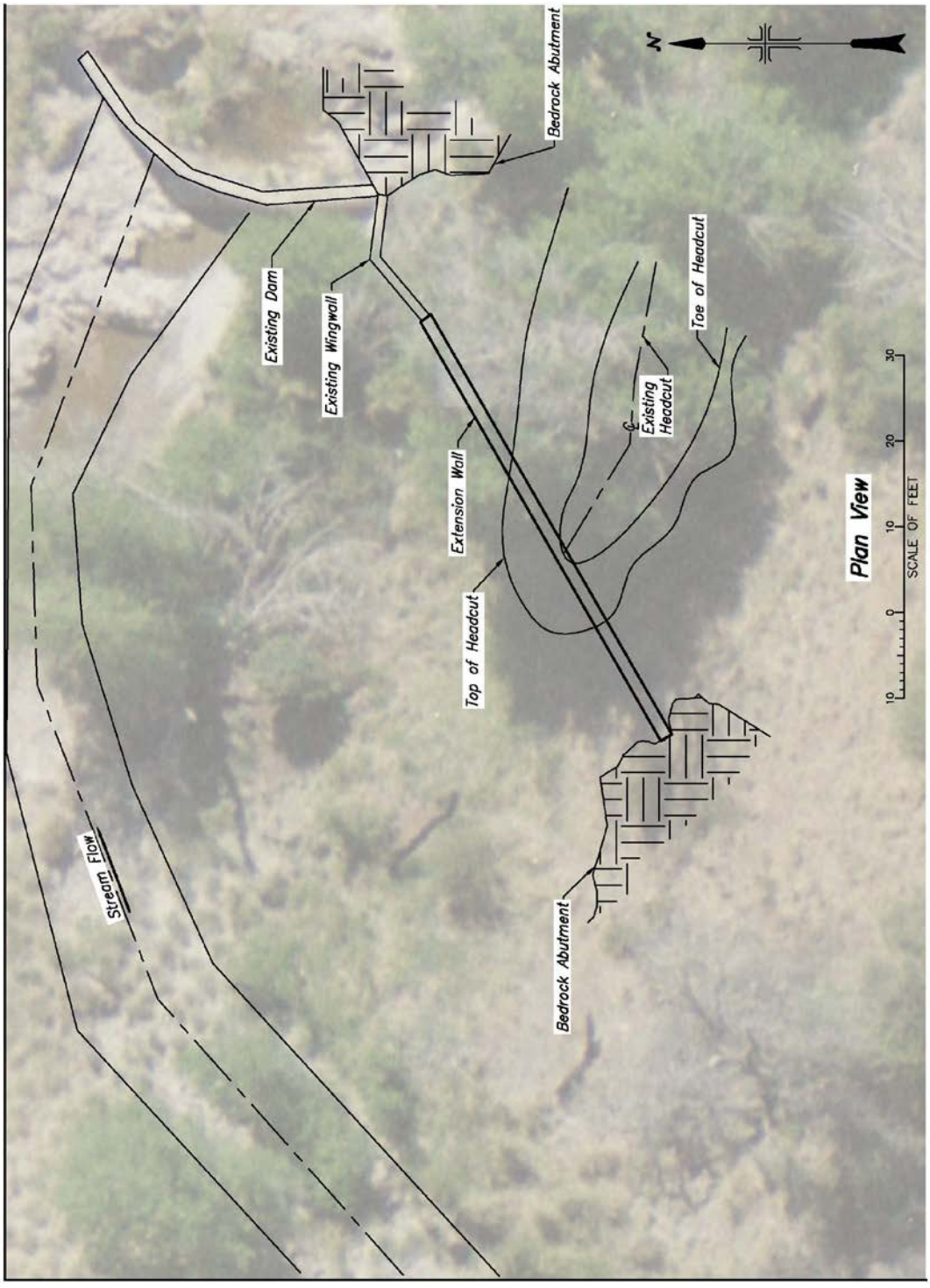

Figure 3. Plan view of proposed wing wall extension at upper BLM dam.

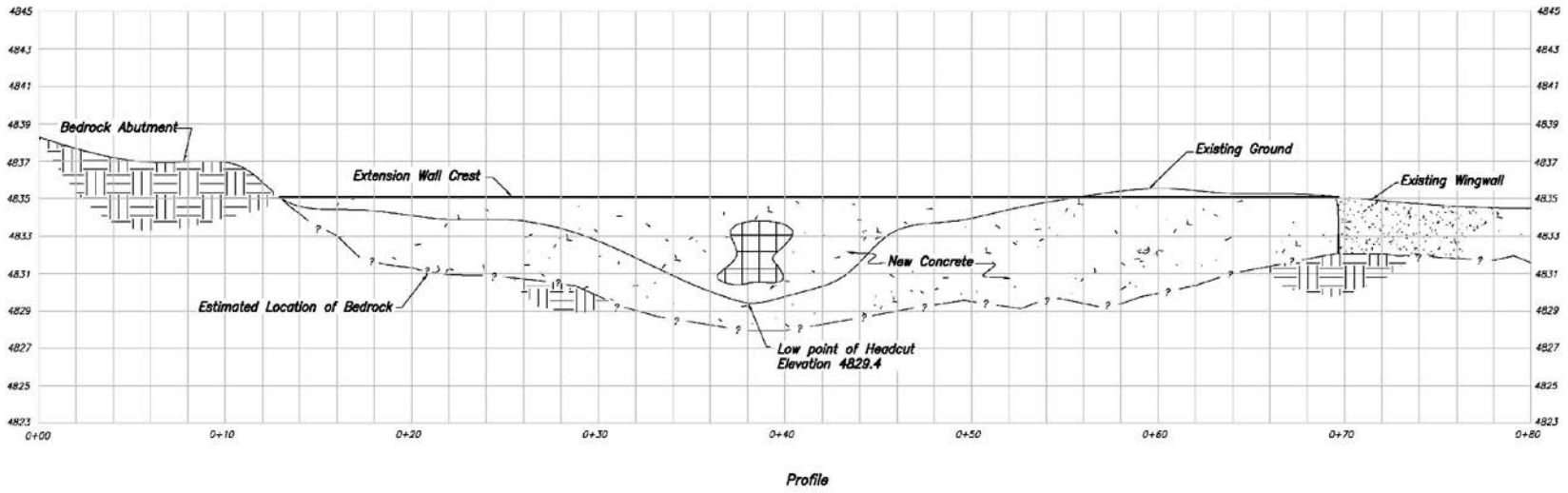

Figure 4. Profile view of proposed wing wall extension at upper BLM dam.

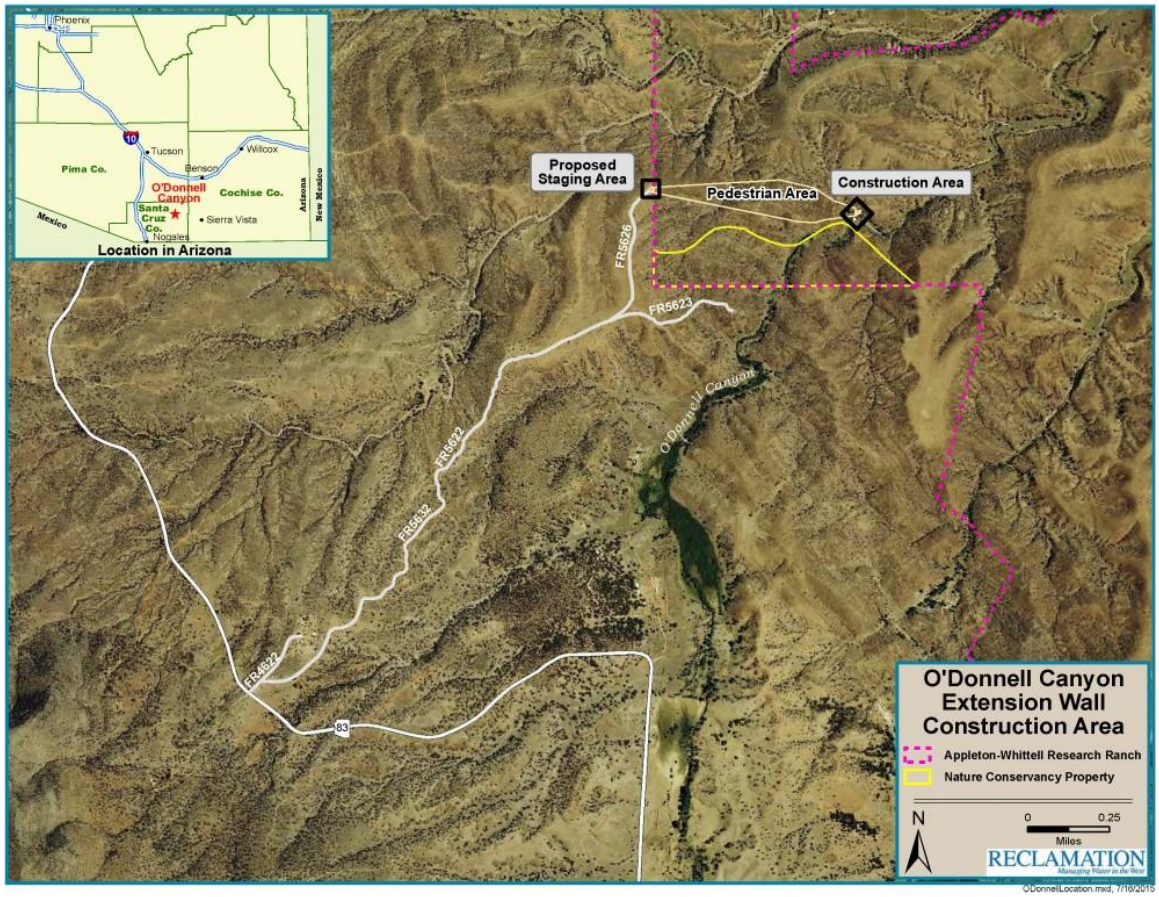

Figure 5. Proposed pedestrian access route.

Onsite work would include excavation of a 57-foot long foundation trench for placement of formwork, reinforcing/anchor bars, and wet concrete. Excavation would be performed using hand tools. The 1.5-foot thick extension wall would be anchored to bedrock along its foundation. The maximum depth to bedrock from the surface of the terrace is approximately 7 feet at the knickpoint of the headcut channel. Excavated material would be stockpiled adjacent to the trench on a tarpaulin to both prevent burial of vegetation and further disturbance to the vegetation when backfilling the material into the trench following curing of the extension wall concrete.

Batched concrete would be delivered by commercial mixer trucks to the staging area, where it would be transferred to a helicopter sling-load bucket for air transport to the work site. Concrete would be placed directly from the sling-load bucket into the formwork of the extension wall. Helicopter transport would also be used for delivery of other material or equipment that cannot be hand-carried from the staging area to the work site (e.g. power generator, compressor, compressed air hammer/drill, steel reinforcing bar, and formwork). Material and equipment would be delivered to a designated laydown area adjacent to the construction zone (Figure 6). No construction would take place in the stream. The existing dam and wing wall would not be modified.

Construction would commence on approximately December 1 and conclude in 45days or less depending on weather.

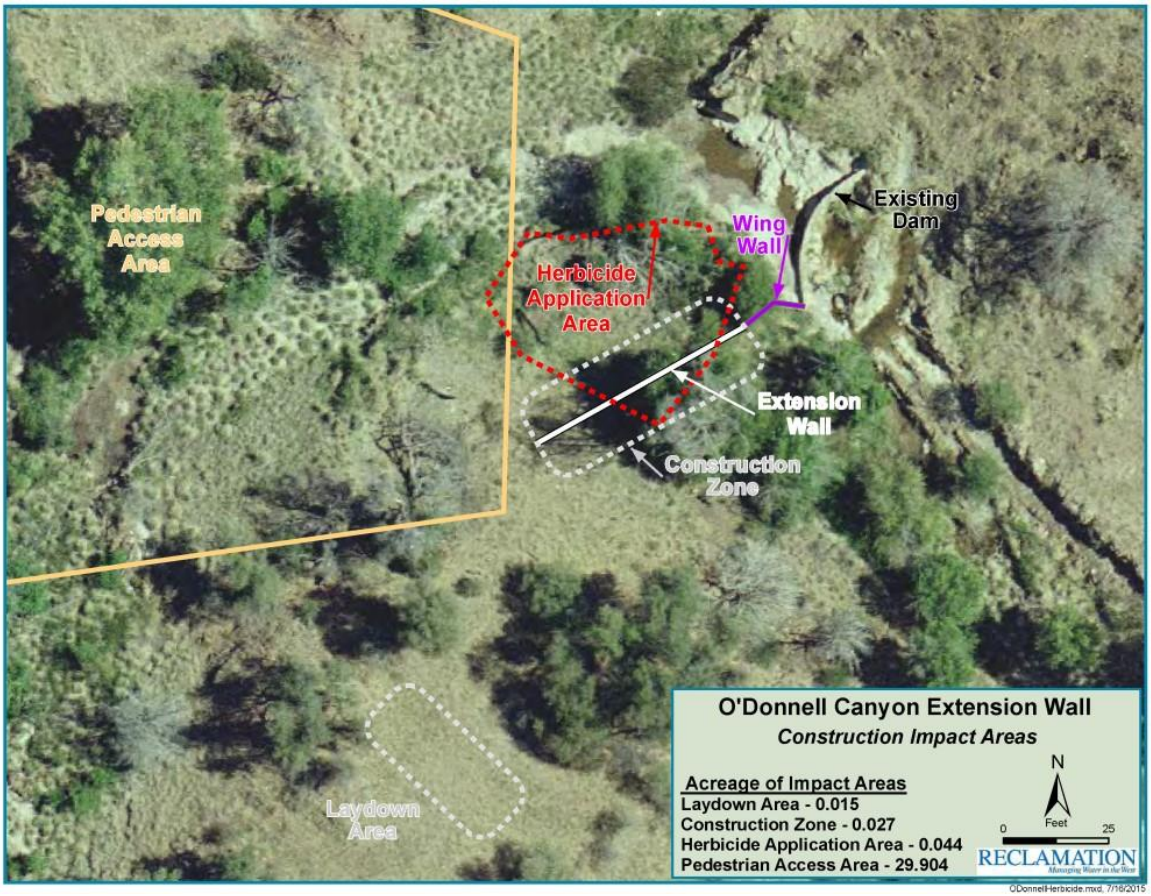

Figure 6. Potential construction impact areas at the upper BLM dam.

Operation and Maintenance. The wing wall extension would become a feature of the CAP. Inspection and maintenance would be performed by the Central Arizona Water Conservation District. Operation of the structure would require annual inspections and inspections after major flood events (5-year frequency or greater). Inspectors would hike to the site from the turnaround on FR 5626. Any substantial maintenance or repair requiring materials and equipment that could not be carried to the site would be performed using measures and techniques that are similar to those described in the above section for construction.

Fish Community Monitoring. A 5-year monitoring program would be established after the wing wall extension is constructed to detect any incursion of new nonnative fishes and to monitor success of prior native fish repatriations. This monitoring would be funded by Reclamation and developed in cooperation with BLM, Arizona Game and Fish Department (AZGFD), and USFWS. Monitoring by the cooperating agencies would likely continue for the foreseeable future.

2.3 ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

The following potential fish barrier sites and construction access routes were considered and eliminated from further evaluation during the planning process.

Lower BLM Dam (Within Administrative Boundary of the Research Ranch). The lower dam is a 7-foot high, 35-foot long concrete arch that ties into the bedrock embankment along the right abutment and a smaller bedrock feature near the center of the stream channel. To the left of the left abutment is a 7-foot deep, 60-foot wide headcut channel that has eroded partway through a terrace along the toe of a locally exposed outcrop of bedrock. This bedrock forms the far left embankment of the floodplain. Base flow and higher-level flows within the low-flow channel pass over the crest of the dam and a shallow bedrock saddle at the left abutment before plunging approximately 7 vertical feet to the lower stream channel. However, flows associated with relatively minor floods overtop the left bank of the stream, spill onto the terrace and discharge into the headcut channel. Water falling over the headcut has gradually eroded the face of the overfall and moved the knickpoint to within 8 feet of the stream channel on the upstream side of the dam. Continued headcutting will eventually shift the stream channel around the left abutment, enabling fish to bypass the dam and move upstream.

Corrective action at this site would have consisted of constructing a 60-foot long reinforced concrete wall from the bedrock feature at the left abutment of the dam across the headcut to a bedrock outcrop at the dam's left abutment, and placing a 1- to 2-foot high concrete plug in a small bedrock saddle at the left abutment. The maximum height of the cutoff wall at the invert of the headcut channel would have been 11 feet or approximately 1 foot higher than the surface of the adjoining terrace. Construction at this site would require substantial excavation and use of mechanized equipment such as a backhoe and/or excavator. A small wetland at the toe of the left abutment would likely be substantially degraded. This alternative was eliminated from further consideration because it would have been logistically more complicated and expensive to construct, with greater onsite impacts than the proposed action.

TNC Site (Within Administrative Boundary of the Research Ranch). Reclamation considered the feasibility of constructing a 4-foot high reinforced concrete fish barrier on O'Donnell Canyon within the northern unit of the TNC Canelo Hills Preserve administered by the Research Ranch, approximately 375 feet upstream of the upper BLM dam (and 125 feet upstream of the Las Cienegas NCA boundary). The structure would have consisted of a concrete wall that filled the gaps between the spines of a basalt intrusion that crosses the stream channel. This site was withdrawn from further consideration by TNC.

Research Road Crossing (Within Administrative Boundary of the Research Ranch). A short reach of O'Donnell Canyon immediately downstream of Research Road was identified by the manager of the Research Ranch as a possible study area for emplacement of a fish barrier. Research Road crosses O'Donnell Canyon approximately 2.7 miles downstream of the upper BLM dam. After review of potential avenues for fish

movement within the watershed, Reclamation determined that a fish barrier at the Research Road location would not preclude incursion of nonnative green sunfish and largemouth bass from Post Canyon (BLM land) and Turkey Creek (private land). Permission to remove nonnative fish within the Turkey Creek drainage was not granted by the land owners.

Coronado National Forest Site. A site on CNF approximately 2,350 feet upstream of the upper BLM dam was evaluated for emplacement of a fish barrier. This site is situated on an outcrop of bedrock that bisects and constricts the stream channel. A fish barrier constructed on this site would tie directly into bedrock along its entire axis. Construction would entail minor reshaping of some of the rock attachment points, installing formwork and steel reinforcing bars/anchors, and placing wet concrete. Reclamation considered temporarily reopening a 700-foot section of road that led to the stream in order to provide direct access to construction vehicles and obviate the need for helicopter transport of equipment and material. Emplacement of a fish barrier at this site would affect stream hydrology, sediment transport, and result in aggradation of the stream channel for approximately 1,500 feet upstream. Aggradation would displace several permanent pools within the stream. In addition, the barrier could affect populations of endangered Huachuca water umbel (*Lilaeopsis schaffneriana recurva*) and endangered Canelo Hills ladies-tresses (*Spiranthes delitescens*) that have been reported in O'Donnell Canyon immediately upstream of the CNF site. This site was withdrawn from further consideration by CNF.

Construction Access. Reclamation requested permission from the Research Ranch to use an existing two-track road that traverses their property and BLM land to within 250 feet of the upper dam site. The road could be used to transport construction materials (including concrete) and personnel. Concrete could be pumped from the road to the construction site. This was the preferred access option (and least expensive) and would have resulted in limited pedestrian travel. The Research Ranch did not grant permission to use this road.

Reclamation also considered transporting construction materials and equipment, including a backhoe and concrete, along an off-road route from the staging area to the construction site, using specialized off-highway vehicles (OHVs). Repeated trips by the OHVs would be required. The route is approximately 3,300 feet in length and is situated on BLM land within the Research Ranch administrative boundary. This option presents the most environmental impact among all of the access options considered and was not favored by BLM. In addition, management prescriptions for the Appleton-Whittall ACEC limit motorized vehicles to designated roads and trails.

CHAPTER 3 – ENVIRONMENTAL CONSEQUENCES

This chapter presents the existing conditions in the study area and the environmental consequences that would result from no action and the action alternatives. The description of the affected environment and the impact analyses that follow are based on the best information available.

3.1 LAND USE

3.1.1 Affected Environment

BLM Land. The upper BLM dam is situated within the extreme southern end of the 3,141 acre Appleton-Whittell Research ACEC unit of the Las Cienegas NCA administered by the BLM.[2] The Las Cienegas NCA was established by the Las Cienegas National Conservation Area Act of 2000 to conserve, protect, and enhance the unique aquatic, wildlife, vegetative, cultural, historical, archaeological, riparian, scenic and other specified values of the area. Management of the Appleton-Whittell Research ACEC is guided by the Las Cienegas RMP, the Las Cienegas National Conservation Area Act, and applicable provisions of the Federal Land Policy and Management Act of 1997. The Appleton-Whittell Research ACEC is also part of the 8,000-acre Research Ranch managed by the National Audubon Society. Established in 1969 by Ariel and Frank Appleton, the goals of the Research Ranch are to promote conservation, education, and ecological research associated with native grassland and riparian habitats. Public access to the Research Ranch, including the Appleton-Whittell ACEC portion, is controlled by the Audubon Society to protect the research, education and conservation values of the area. No livestock grazing or horseback riding is permitted within the boundaries of the Research Ranch. A 1986 Memorandum of Agreement between the National Audubon Society and BLM gives limited autonomy to the Audubon Society for day-to-day management of the Appleton-Whittell Research ACEC portion of the Research Ranch; however, the final authority for administration of the ACEC lies with the BLM. Land uses specified by BLM for the ACEC include recreational activities that are compatible with a Zone 3[3] designation, with restrictions (allows hiking and mountain bike use on established trails, hunting, and primitive camping), and management actions for the recovery or reestablishment of native plant and animal populations in collaboration with Federal and state agencies, user groups, and other interested parties. There are no developed recreation sites on the ACEC.

[2] On June 12, 1962, the land encompassing the upper and lower BLM dams was patented to Frank Appleton under the Forest Service General Exchange Act (42 Stat. 465). Prior to that time it was Federal land under the jurisdiction of BLM. In 1979, Frances Appleton, founder of the Appleton Research Ranch, recognized the inherent value of the two former BLM dams when he filed a water right claim to the impounded waters for the purposes of research and wildlife habitat conservation. BLM reacquired this land in 1988 and filed a water right claim for the BLM-owned segment of O'Donnell Canyon, which included the dam sites, for the beneficial use of wildlife and native fish.

[3] Zone 3 (back country) affords a low concentration of visitors and a predominately natural environment, variable access that is likely to be difficult, low to no visitor facilities, limited signs, and dispersed low-impact recreational opportunities.

TNC Land. The Canelo Hills Preserve occupies two disjunct segments of O'Donnell Canyon between the Appleton-Whittell Research ACEC and Highway 83. The preserve was established to protect riparian values including a rare cienega wetland associated with O'Donnell Canyon. The two TNC parcels that constitute the Canelo Hills Preserve are south (upstream) of the project area. The northern unit of the Canelo Hills Preserve is managed by the Research Ranch in accordance with an agreement between the Audubon Society and TNC. The proposed project would avoid TNC land.

CNF Land. The CNF mission is to sustain the unique native biodiversity of the sky island ecosystem and provide high quality visitor opportunities. Management of land within CNF is governed by the Land and Resource Management Plan, which encourages protection of resource values such as habitat for populations of threatened and endangered species. Predominant land use in the O'Donnell Canyon watershed includes dispersed recreational activities such as hunting, hiking, sightseeing, and horseback riding. Substantial portions of the watershed are also open to livestock grazing. Road access (FR 5632, 5622, and 5626) and construction staging for the proposed action would be situated on CNF land outside the Research Ranch boundary.

3.1.2 Environmental Consequences

No Action

Under the no action alternative, it is assumed that existing land use and ownership would persist in the foreseeable future. Land resource values associated with the native aquatic and semi-aquatic biota in O'Donnell Canyon would be degraded if existing populations of Gila chub and Gila topminnow could not be sustained because of upstream incursion of nonnative fishes.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Under the proposed action, construction would be coordinated with the BLM and the director of the Research Ranch to reduce conflicts with any proposed or on-going research within the action area of the project. Potential impacts to research could arise from disturbances caused by human activity and equipment operation during construction, trampling of vegetation, and inadvertent introduction of nonnative plant seeds. Physical disturbances would be limited to the construction site, laydown area, staging area, and pedestrian access route.

Implementation of the proposed action would have no effect on public use of CNF or BLM lands. The upper dam is situated in a remote area with no direct access to public roads, recreational sites, or recreational trails. Pedestrian access is controlled by the Audubon Society, and signs placed on the CNF/BLM boundary fence instruct users to secure permission from the Research Ranch before entering the ACEC. FR 5622 is a dirt road that ends at the CNF/BLM boundary and receives limited visitor use. Temporary use of the road terminus for construction staging would have minimal impact on public access or use.

Stabilization of the upper dam would help preserve the biological diversity of the native aquatic community in perennial reaches of O'Donnell Canyon by obviating a potential future route of nonnative fish invasion. Implementation of the project would yield benefits toward conservation and recovery of endangered fish species and would enhance future land resource values associated with long-term protection of native aquatic and semi-aquatic species in O'Donnell Canyon. Protection of the native aquatic community could provide opportunities for future research and would be consistent with BLM land management objectives established in the Las Cienegas RMP.

Cumulative Effects

The benefit of the proposed action to the native aquatic resource value would be cumulative to past, present, and reasonably foreseeable future land use actions that impact O'Donnell Canyon. Protection afforded by the Canelo Hills Preserve and exclusion of livestock from segments of O'Donnell Canyon on Forest Service and BLM lands have helped sustain the land use value connected with this important aquatic resource. Conservation of the extant native fish assemblage through implementation of the proposed action would complement ongoing actions taken to protect the aquatic and semi-aquatic land resource values associated with O'Donnell Canyon. The project would be consistent with the fish and wildlife management land use allocation authorized for BLM land by the Las Cienegas RMP and Record of Decision.

3.2 GEOLOGY AND SOILS

3.2.1 Affected Environment

The O'Donnell Canyon watershed lies within the Basin and Range physiographic province. Characteristic of this province are elongate northwest-trending fault-block mountain ranges separated by broad alluvial valleys that were produced by a Miocene extensional collapse. Moderately sloping hills confine the stream within the study area. Geologic units within this area include surficial alluvium, volcanics, and sedimentary rock.

Upland soils within the project area are grouped within the Faraway-Rock Outcrop (approximately 3%), Bernardino-Hathaway (approximately 17%), and White House gravelly loan (approximately 80%) associations (NRCS 2015). Surface soils generally consist of gravelly loam, gravelly sandy loam, or gravelly clay loam formed on hillsides. Potential erosion hazard by water or wind is slight to moderate. Substrates in the ephemeral washes along the proposed pedestrian access route consist of surficial bedrock, boulders, cobbles, and sand.

Alluvial deposits eroded from the surrounding uplands fill the channel of O'Donnell Canyon and form the terraces and narrow floodplain that define the stream corridor. The streambed alluvium consists of sand, gravel, and cobbles. Surficial bedrock crosses the stream in several places and provides limited grade control. Bedrock also forms the

channel bottom of O'Donnell Canyon immediately downstream of the upper dam (Figure 7). Terrace soils generally consist of gravelly loam to sandy clay loam (Figure 8).

Figure 7. View of bedrock in the channel downstream of the upper BLM dam.

Figure 8. View of headcut erosion in the terrace near the right abutment of the dam.

3.2.2 Environmental Consequences

No Action

If no action is taken, failure of the right abutment would result in degradation of the terrace and stream bank for a short distance upstream of the upper BLM dam. Release of sediment stored in the terrace would contribute to sedimentation downstream.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Earth-moving activity would directly affect approximately 0.027 acre (1,200 square feet) of terrace substrates. Excavation for the wall foundation would temporarily displace an estimated 150 cubic yards of terrace soils, which would be replaced by approximately 16 cubic yards of concrete and 150 cubic yards of excavated soil used as backfill. Backfill would be used to fill the existing headcut channel and shaped to conform to the existing contour of the terrace. Soil disturbances in the construction area would increase the risk of erosion on exposed soils until vegetation becomes reestablished. Appropriate post-construction stabilization such as emplacement of wattles and reseeding would be implemented to promote recovery of vegetation and minimize potential erosion of terrace soils. Emplacement of the wall would prevent long-term degradation of the terrace that otherwise would result from continued headcut erosion.

Construction staging would affect approximately 0.1 acre of upland soils at the FR 5626 turnaround. This site consists mostly of disturbed road surface and adjoining areas that have been used by the public for parking.

Dispersed pedestrian traffic between the dam and staging area would have a low impact on soils, which generally are coarse in texture, well drained, and anchored by ground cover.

Cumulative Effects – Geology and Soils

The effects of project activities on soils and sedimentation would be cumulative to historic and ongoing land uses within the watershed. During the past century, grazing by livestock, trails, and roads were the primary human-induced causes of soil erosion and sedimentation. Recreational use was and is a minor contributor to sedimentation. Changes in grazing practices have reduced erosion on grazing allotments in upper portions of the watershed. Grazing is not permitted on the Research Ranch and TNC properties.

The proposed action would not add substantially to the cumulative impacts of other past, present, or reasonably foreseeable future actions on soils because of the limited scope of the proposal (short implementation duration and relatively small area impacted) and use of existing roads for conveyance of construction vehicles and material.

3.3 WATER RESOURCES

3.3.1 Affected Environment

Mean annual precipitation in the upper O'Donnell Canyon watershed is approximately 18 inches (DRI 2014). At the Research Ranch, mean annual precipitation for the period 1968-2014 was 16.5 inches, with a trend toward less precipitation in the winter. Generally, precipitation follows a bimodal pattern of winter and summer storms. More than 80% of the area's precipitation occurs during the summer monsoon and winter.

O'Donnell Canyon is a tributary of the Babocomari River which flows into the San Pedro River. The watershed upstream of the upper BLM dam is approximately 3.5 miles wide and 7.5 miles long, and encompasses 15.3 square miles. Elevations range from 4,825 feet at the upper dam to 6,171 feet at Lookout Knoll near the southern end of the watershed.

O'Donnell Canyon is approximately 4.3 miles in length from its point of origin at the confluence of Western and Pauline canyons to the upper BLM dam. Approximately 5.8 miles of stream separate the upper dam from the Bobocomari River. The watershed supports a network of named and unnamed drainages among moderately to steeply sloping ridges. There are three major named tributaries that contribute ephemeral flow upstream of the action area: Western, Middle, and Pauline canyons. Post Canyon and Turkey Creek flow into O'Donnell Canyon approximately 1.5 and 1.9 miles downstream of the upper BLM dam, respectively.

The 1.5-mile reach of O'Donnell Canyon between the upper BLM dam and the perennial headwaters consists of a complex of cienega pools separated by dry reaches or shallow runs, with stable silt banks supporting grasses and woody vegetation. Stability of this reach is aided by the presence of the bedrock intrusions, the two BLM dams, and a grade control structure on TNC land approximately 1.2 miles upstream of the upper dam. A large cienega immediately upstream of the grade control structure is a prominent feature of the stream and forms the nucleus of TNC's Canelo Hills Preserve. The cienega is fed by several springs emerging on the Preserve adjacent to O'Donnell Canyon. Although there is no discharge gage in O'Donnell Canyon, anecdotal evidence suggest that recent drought has reduced mean stream flow. Flow is ephemeral upstream and downstream of the Canelo Hills Preserve. Between the two BLM dams, stream flow can be describeded as intermittent and is typically absent from late March to mid-July, with other no flow events occurring sporadically throughout the balance of the year.

Mean flow is estimated to be 1.3 cubic feet per second (cfs), based on limited data collected by TNC between October 1988 and March 2002. Intense but brief and localized monsoonal storms can produce large volumes of runoff that generate flashy flows and flooding. Floods of relatively short duration likely inundate the floodplain at least once every year. Flood flows tend to be quite turbid because of erosion from exposed slopes and channel instability in washes of the upper watershed.

The flood frequencies in Table 1 were estimated by Reclamation using the regression equations from "Methods for Estimating Magnitude and Frequency Floods in Arizona" (Arizona Department of Transportation 1978).

Table 1. Estimated instantaneous peak flood flow at the upper BLM dam.

Recurrence Interval	Flow (cfs)
2 year	495
5 year	1,746
10 year	3,068
25 year	5,453
50 year	7,970
100 year	10,969

3.3.2 Environmental Consequences

No Action

If no action is taken, eventual migration of the stream around the right abutment would result in permanent loss of seasonal lentic habitat associated with impounded water at the dam.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Emplacement of the extension wall would not affect the base flow channel. After construction, flood flows that overtop the terrace would spill over the crest of the extension wall, follow the head-cut channel and re-enter the main channel immediately downstream of the upper dam. This spillage pattern would be consistent with the pre-project condition. Because the extension wall crest generally would be flush with the ground surface outside the headcut, there would be no substantial change to flow hydraulics associated with flood waters that pass over the terrace. The extension wall would not impound water, impede sediment transport, or reduce the capacity of the channel to carry flood flows. There would be no change to the flow gradient within the stream or to flow hydraulics at the dam or downstream of the dam.

Cumulative Effects – Water Resources

The proposed project would not have a cumulative impact on water quality, water quantity, and stream hydraulics.

3.4 BIOLOGICAL RESOURCES

3.4.1 Affected Environment - Vegetation

The Research Ranch encompasses about 8,000 acres of semi-desert grassland with patches of oak woodland and ephemeral riparian habitats (AWRR 2015a). The project area lies in the northern foothills of the Huachuca Mountains and Canelo Hills. The

biomes that are represented within the project area are Madrean Mixed-Grass Prairie as described by Bock and Bock (2000) and Interior Riparian Deciduous Forests and Woodland by Brown (1994). The grasslands depicted within the project area are best described as "Madrean Mixed-Grass Prairie" rather than "Plains and Great Basin Grasslands" as characterized by Brown and Lowe (1994) because of its close floristic relationship with the grasslands of northern Mexico (McLaughlin et al. 2001). The grassland is along the ridge crests and mesa tops and Madrean Evergreen Woodland leads down into the canyon bottoms. O'Donnell Canyon, a narrow channel that is vegetated by Interior Riparian Deciduous Forest, bisects the foothills.

Madrean Mixed-Grass Prairie is the biome that is represented within the pedestrian access area. The composition of the Madrean evergreen woodland within O'Donnell Canyon consists predominately of Emory oak (*Quercus emoryi*), alligator juniper (*Juniperus deppeana*), one-seed juniper (*J. monopsperma*), and Palmer agave (*Agave palmerii*). The grasslands are dominated by blue grama (*Bouteloua gracilis*), hairy grama (*B. hirsuta*), sprucetop gama (*B. curtipendula*), sideoats grama (*B. curtipendula*), plains lovegrass (*Eragrostis intermedia*), tanglehead (*Heteropogon contortus*), Western wheatgrass or bluestem (*Elymus smithii*), deergrass (*Muhlenbergia rigens*), giant sacaton (*Sporobolus wrightii*), Arizona cottontop (*Dactylis glomerata*), green sprangletop (*Leptochloa dubia*), bullgrass (*Muhlenbergia emersleyi*), vine mesquite (*Panicum obtusum*), and plains bristlegrass (*Setaria leucopila*).

The second biotic community occurs along the creek bottom, where the dam abutment stabilization activities would occur. The mixed broadleaf series of the Interior Riparian Deciduous Forest and Woodland is commonly referred to as riparian. This community consists primarily of streamside vegetation such as Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix goodingii*), and velvet ash (*Fraxinus velutina*). However, in the project area the riparian vegetation also includes big sacaton (*Sporobolus wrightii*), lemonade bush (*Rhus trilobata*), and a patch of Johnson grass (*Sorghum halepense*). The riparian community varies from wide, moderately dense stands of trees to narrow stringers along O'Donnell Canyon. Within the immediate project area, the riparian vegetation forms a relatively narrow ribbon.

3.4.2 Environmental Consequences - Vegetation

No Action

Under the no action alternative, there would be no direct impact to vegetation, since no project would be constructed. Major disturbances to vegetation along O'Donnell Canyon would be the result of natural flood-induced scour.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Effects to vegetation were substantially reduced through modifications to the project. Up to 30.09 acres of floodplain and adjacent habitat could be affected (both directly and

indirectly) by staging activities, construction, and pedestrian access; however only 0.002 acres would be permanently affected by the project (Table 2).

Materials would be transported from the staging area to the construction site via helicopter. The staging area occupies 0.1 acres of previously disturbed Madrean Mixed-Grass Prairie that acts as the turnaround at the end of FR 5626. Pedestrian access to the construction site would be restricted to the corridor shown in Figure 5. The total area of Madrean Mixed-Grass Prairie that exists within the pedestrian access corridor is 29.9 acres. This area is sufficiently broad to minimize potential soil and vegetation disturbances that could arise from concentrated trampling along a single route. The pedestrian access area would dissipate the immediate effects of foot traffic to vegetation over the approximate 6-week timeframe by allowing for a wider range of alternative routes to and from the staging area to the construction site. Within the pedestrian access area, all agaves would be flagged and avoided and the northern and southern boundaries would be clearly marked. No ripping and reseeding of areas disturbed by pedestrian traffic is recommend due to the relatively minor impact of dispersed foot traffic on predominately dormant native grasses. Exposure of bare ground through ripping might also encourage spread of non-native plants such as Lehmann lovegrass (*Eragrostis lehmanniana*).

Earth moving activities would temporarily affect 0.027 acres of moderately dense riparian habitat. Ancillary activities such as construction staging would affect up to 0.1 acre of previously disturbed habitat at the FR 5626 turnaround. Approximately 0.002 acres of habitat would be permanently impacted by emplacement of the extension wall. Vegetation removal within the construction area would be limited to non-native grass removal and a few immature Goodding willow and possibly ash trees. Big sacaton and lemonade bush would be fenced off adjacent to the construction area. A small pocket of primarily Goodding willow trees (and associated habitat) would be permanently lost within the footprint of the extension wall. The riparian habitat would be temporarily affected by construction activities associated with excavation of the extension wall foundation trench. It is anticipated that riparian vegetation would quickly re-establish within the disturbed areas following construction. No further impacts upstream or downstream from the dam stabilization work are anticipated from the construction.

The contractor would have a use area on a small grassland bench located just south of the barrier site. The contractor use area would consist of a laydown yard for construction materials such as formwork and reinforcing bar. Approximately 0.015 acres consisting predominantly of dormant native grasses would be affected by these activities (Table 2). A pedestrian path from the construction zone to the contractor use area is anticipated.

Overall, the primary construction effects to the vegetation would be the trampling of dormant grasses and the permanent removal of a few, immature deciduous trees. The effect on plant diversity and density is relatively minor. Though disturbances can result in the introduction of non-natives, the impact would be nominal and should not result in substantial disturbance to the vegetation.

Table 2. Vegetation impacts (acres) from proposed action.

Impact	Madrean Mixed-Grass Prairie	Riparian	Existing Disturbed	Total Acres
Permanent				
Extension Wall	0	0.002	0	0.002
Temporary				
Construction Zone		0.027		0.027
Staging Area	0	0	0.100	0.100
Pedestrian Access Area	29.904*	0	0	29.904
Herbicide Application Area	0	0.044	0	0.044
Contractor Use Area	0.015	0	0	0.015
Total Acres (Temporary)	29.919	0.071	0.100	

* Total size of pedestrian access area. Actual area of disturbance from dispersed foot traffic would be substantially less.

Appropriate mitigation measures would be implemented to minimize impacts to native vegetation. Those measures are enumerated in Chapter 4.

Cumulative Effects - Vegetation

The Appleton-Whittell ACEC is the public land portion of the Research Ranch managed by the National Audubon Society. It encompasses 3,141 acres of BLM-administered lands. The ACEC is part of a unique laboratory guided by the Research Ranch for studying the effects of non-grazing on desert grasslands. Through an agreement between the Audubon Society and BLM biological research on the Appleton-Whittell ACEC has occurred since 1986. Thus, any long-term research projects that may occur within the project area may be impacted either temporarily or permanently depending on the nature of the research.

From an historical perspective, natural and anthropogenic actions that have affected vegetation in the project area include wildfire, drought, flooding, and grazing. The long-term effect of the proposed project on vegetation, when incrementally combined with other natural or human-induced impacts, would be minor and limited to the construction site. Any long-term effect, outside of the footprint of the wingwall extension, would be rendered largely undetectable due to natural regeneration. Overall, the project would not affect the regional vegetation cover, nor would it result in a reduction to the local abundance of native plant species.

3.4.3 Affected Environment - Invasive Weeds

BLM defines a weed as a non-native plant that disrupts or has the potential to disrupt or alter the natural ecosystem function, composition, and diversity of the site it occupies. Weed infestations may also interfere with management objectives for a particular site. The term “noxious weed” or “invasive weed” are often used interchangeably. According to BLM policy, a “noxious” weed refers to those plant species which have been legally designated as unwanted or undesirable. An invasive weed is one that grows and spreads

rapidly, replacing desired plants. Invasive species may require a concerted effort (manpower and resources) to remove them from sites of infestation, if they can be removed at all.

It is DOI policy to control undesirable plants on the lands, waters, or facilities under its jurisdiction, to the extent economically practicable and as needed for resource/environmental protection and enhancement, as well as the accomplishment of resource management objectives. The DOI Manual, Part 609 Weed Control Program (609 DM 1), requires the implementation of Integrated Pest Management (IPM) for the control of noxious weeds. The authorities for this requirement are contained in numerous public laws, Executive Orders, and Federal regulations; the most significant of which are the Plant Protection Act of 2000 (Public Law 106-224) and Executive Order 13112 (Invasive Species). Under the DOI Manual, Part 609 Weed Control Program, it is directed that DOI would coordinate their IPM activities concerning weed control operations, with related programs and goals of private, local, State, and other Federal agencies where such cooperation is feasible and mutually advantageous.

According to a study performed on the Research Ranch, 7.4% of the flora represented is nonnative; that is a total of 38 species out of 473 species identified (McLaughlin et al. 2001). On October 16, 2014, BLM and Reclamation surveyed the project area for the occurrence of invasive weed species. The staging area and pedestrian access area had a mixture of native and nonnative vegetation, including Lehmann lovegrass. Originally seeded on the Santa Rita Experimental Range in 1937, Lehmann lovegrass, a grass of South Africa, has many factors that have been attributed to its ability to persist within southeastern Arizona. First, the species is able to retain seed viability even during long, dry periods (Abbot and Roundy2003). It prefers loamy sand and sandy loam soils (Cox et al. 1988). Also during its active growth period, it would self-seed and spread in areas where rainfall is 150 to 220 mm (5.9 to 8.7 inches); it would persist but not spread with approximately 100 mm (3.9 inches) of rainfall during its active growth period; and established stands would die if the rainfall ranges from 70 to 85 mm (2.7 to 3.3 inches) during its active growth period (Cox et al. 1988). Though the Research Ranch is protected from livestock grazing, natives are not replacing Lehmann lovegrass, which exemplifies the African grasses ability to invade areas undisturbed (Bock and Bock 1996). However, Angelland McClaran (2001), suggest that lengthy occupation by Lehmann lovegrass has no influence over the dynamics of native grasses and that any decline in native grasses began before the increase in Lehmann lovegrass; it is thought that Lehmann lovegrass simply replaces dead native grasses rather than helping kill them.

Johnson grass occurs within and immediately adjacent to the footprint of the construction area. It is commonly found in disturbed areas, forming monocultures and out-competing many native plant species. Johnson grass is a tall, leafy, introduced perennial which spreads by seeds and by an extensive system of underground rhizomes (Parker 1972). These underground roots extend up to a meter underground, and seeds may lie dormant for many years, thus making eradication very difficult.

3.4.4 Environmental Consequences - Invasive Weeds

No Action

Under the no action alternative, there would be no direct impact to non-native vegetation, since no project would be constructed. Introduction of weed species from increased pedestrian access or from equipment would not occur; nor would IPM measures be employed at the upper BLM dam to eradicate weeds.

The expansion of invasive weeds, such as Lehmann lovegrass and Johnson grass, would still be expected to occur through natural processes and other anthropogenic influences. Natural seed dispersal methods that would be expected to occur include wind, water and animal transference. A major source of non-native invasive plant species is found on grazing allotments upstream of the BLM/CNF boundary. Pedestrian traffic and vehicular travel, though limited within the Research Ranch, could also result in dispersal of invasive seeds. The Research Ranch has employed IPM in the past to control weeds within some areas and in other areas have taken a more observational approach.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Primary issues associated with the proposed action related to non-native invasive plant species include direct and indirect impacts. Direct impacts include establishment of infestation areas and the loss or degradation of native vegetation communities. Potential indirect impacts may include loss of wildlife habitat due to the diminished native vegetation communities and soil erosion due to shorter-lived annual species invasions. Left untreated, infestations of non-native invasive plant sites would increase, potentially eliminating the native vegetation and replacing the plant regime with an undesirable plant community.

Under the proposed action, ground-disturbance associated with pedestrian traffic may encourage nonnative species to establish. However, the pedestrian access area allows for the traffic to be dissipated amongst a larger area to discourage path development and minimize impacts to native plants. Dispersion of foot traffic should obviate the need for site restoration or post-construction weed treatments along the pedestrian route.

An existing stand of Johnson grass within the riparian area would be impacted by construction and would therefore be managed by BLM's IPM program in the summer prior to construction. The area identified in Figure 6 would be treated with an herbicide. This proposed action is expected to control the density and expansion of the Johnson grass in the area. The IPM program is anticipated to result in controlling invasive weeds within the construction impact area and would aid in the maintenance of native plant biodiversity along this portion of O'Donnell Canyon.

Chemical (low volume foliar) treatments with backpack sprayers and/or hand held bottle sprayers would be utilized for initial treatment of Johnson grass and for treatment of re-sprouts. Herbicide application would occur from less than two feet away in order to

minimize drift. Application would only be used when herbicide effect to vegetation species beneath the individual target plant is acceptable and wind speeds do not exceed 10 mph during application.

Chemical treatment methods would use one of two herbicides approved for use in Arizona: glyphosate or isopropylamine salt of imazapyr (approved for aquatic use) at strengths ranging from 1 - 2% solution with handheld equipment, or 2-5 quarts/acre or 4-6 pints/acre for broadcast spray of isopropylamine salt of imazapyr and glyphosate, respectively. Only label-approved, spray adjuvant would be used. Colored dye may be added to the herbicide mixture to temporarily identify treated plants. Optimum time for application is late summer or fall after flowering when air temperatures are less than 85° F (to minimize volatilization of herbicide and increase plant uptake of the applied herbicide).

Future use of alternate chemicals as approved under BLM's 2007 Programmatic Environmental Impact Statement: "Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States," may be necessary pending results of initial treatments. All treatments utilizing chemical agents would be under current Pesticide Use Proposals specific to the area targeted, chemical to be used and sensitive areas. All treatments would be under the supervision of an Arizona Department of Agriculture certified pesticide applicator and herbicide application would be made according to label directions and restrictions.

Glyphosate is a liquid herbicide that mixes readily with water and nonionic surfactants to be applied as a foliar spray for the control of many herbaceous and woody plants. Glyphosate is intended for control of annual and perennial weeds and woody plants in and around aquatic and other non-crop sites. It is also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression. The active ingredient in glyphosate moves through the plant from the point of contact to and into the root system.

Isopropylamine salt of imazapyr is an herbicide for aquatic and vegetation control that inhibits a plant specific enzyme (acetohydroxyacid synthase, AHAS) that causes the plant to stop growing and slowly die as its food and energy reserves are exhausted. This enzyme is not found in animals or humans. Isopropylamine salt of imazapyr is aqueous (water-based) solution, nonvolatile, and has a low vapor pressure, thus it would not readily move from the application site to harm off-target plants via volatilization in the air. Isopropylamine salt of imazapyr dissipates rapidly in aquatic systems with very little dissipation into the sediment.

Cumulative Effects – Invasive Weeds

The cumulative effect of previous grazing and anthropogenic activity in the general project area resulted in ground surface disturbances and seed transport mechanisms that encouraged the establishment of non-native invasive plant species. IPM measures employed by the Research Ranch have slowed that trend on lands it administers. On a localized basis, weed control measures adopted under the proposed action would further

that trend by reducing the density and distribution of non-native invasive plant species at the upper BLM dam.

As indicated earlier, long term research projects that may occur within the footprint of project may be impacted either temporarily or permanently depending on the nature of the research. However, human-induced disturbances to vegetation by the proposed action would be relatively minor.

Stipulations Associated With Herbicide Application

- Only federally registered and BLM approved herbicides would be used.

- Herbicides and adjuvant would be used only in accordance with product labeling and the respective Material Safety Data Sheet (MSDS). Herbicide application would be under the direct supervision of Arizona Department of Agriculture certified Commercial Applicator. A Bureau of Land Management Pesticide Use Proposal (PUP) document would be approved for each herbicide before beginning application. In the event of a spill, BLM and/or the contractor would remove the contaminated soil and place the soil in plastic containers. The contaminated soil would be taken to an appropriate hazardous materials facility for disposal. Spill site location, size of spill, and disposal site would be documented and monitored.

- All individuals associated with the handling or application of pesticides on public lands would be familiar with the herbicides used and emergency procedures to be used in case of pesticide spill.

- The intake operation of water for mixing would be arranged so that an air gap or reservoir would be placed between the live water intake and the mixing tank to prevent back flow or siphoning of pesticide into the water source.

- Pesticide containers would be disposed of as required by the U.S. Environmental Protection Agency (EPA).

- Herbicide treatments would not occur within fifteen meters of any documented populations of Huachuca water umbel. Existing populations have been mapped and would be avoided. All employees responsible for implementing Johnson grass control via chemical means would be capable of identifying Huachuca water umbel to ensure existing populations are not impacted and to document occurrence of new populations (if any).

- Potential for drift of herbicide during application would be minimized by using spray pressures no greater than required to obtain adequate coverage of each target plant individually, and with nozzle tips sized to produce large droplets. Herbicide application would occur from less than two feet away in order to minimize drift. Herbicide application would not occur during precipitation, if there is an impending threat of precipitation, and/or when wind velocity (greater

than 10 mph) could carry herbicide beyond each target plant. Herbicide application would also not occur when air temperatures equal or exceed 85° F.

- Annual monitoring by BLM Tucson Field Office (San Pedro Office) staff would provide data for determining the success rate of naturally reoccurring native plants. Photo points would be established from select treatment areas at the time of treatment. Annual monitoring and repeat photography of these sites would document herbicide effectiveness, non-target plant mortality, and regeneration. If monitoring results indicate the need to stimulate native riparian regeneration, BLM would plant desirable riparian species, (e.g. willows and cottonwoods) to mitigate soil erosion in treated areas that contain only undesirable plant species.

- During preparation of the Pesticide Use Proposal, the project area would be reviewed for known populations of plant species of special concern or their potential habitats. BLM would inventory potential habitat and confirm absence of sensitive plants prior to any herbicide use. Documented populations of plant species of special concern would be monitored following chemical treatment to assess the health and condition of existing populations.

- All herbicide solutions would be mixed and made ready for transport at the Tucson Field Office (San Pedro Office) or Las Cienegas Storage Shed. Herbicide would be poured into leak proof, high-impact plastic backpack sprayers, hand-held spray bottles, or wand applicators then placed into sealable dry boxes ready for transportation to treatment areas.

Safeguard Measures:

Prior to implementation of the approved proposed action, a Job Hazard Analysis would be conducted to plan for the safety of all employees who participate in the herbicide application.

Necessary safety precautions for noise, eye, and hand protection as outlined by BLM safety protocol would be followed.

All individuals associated with the handling or application of herbicides on public lands would be familiar with the pesticides used and emergency procedures to be used in case of herbicide spill. Safe use of herbicides includes precautionary measures to prevent accidental spills. The following written precautions describe measures that shall be used to reduce the chance of such accidents.

- Applicable Federal regulations concerning the storage and disposal of herbicides and herbicide containers would be followed. These are described in the EPA's "Regulations for Acceptance and Procedures for Disposal and Storage" Federal Register notices as amended.

- It is essential to prevent damage to containers so that leaks do not develop; care would be exercised so that containers would not be punctured or ruptured, and so that the lids or caps would not be loosened.

- Precautions would be taken when loading pesticide containers in transport vehicles to assure that containers are secured and will not tip over in transport.

- Open containers would not be transported. Partially used containers would be securely resealed before transportation.

- Each day after returning to the project office, all herbicide containers would be inspected for damage and leaks, and the vehicle would be examined for contamination.

3.4.5 Affected Environment - Terrestrial Wildlife

The biomes represented in O'Donnell Canyon provide habitat for a variety of native wildlife. Large- to medium-sized mammal species found in the area include white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), collared peccary (*Tayassu tajacu*), black bear (*Ursus americanus*), mountain lion (*Puma concolor*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Felis rufus*), coatimundi (*Nasua narica*), striped skunk (*Mephitis mephitis*), hooded skunk (*Mephitis macroura),* spotted skunk (*Spilogale gracilis*), raccoon (*Procyon lotor*), badger (*Taxidea taxus*), and ringtail (*Bassariscus astutus*) (AZGFD 2013, USFS 2007, AWRR 2007). Small mammalian species that are typical of the area are the eastern cottontail (*Sylvilagus floridanus*), yellow-nosed cotton rat (*Sigmodon ochrognathus*), pocket gopher (*Thomomys bottae*) and various bat species (Big brown bat [*Eptesicus fuscus*], Mexican free-tailed bat [*Tadarida brasiliensis*], lesser long-nosed bat [*Leptonycteris curasoae*]) (Brown 1994, USFS 2007, AWRR 2007). Avian fauna represented within the project area include Mearns' quail (*Cytonyx Montezuma*), mourning dove (*Zenaida macroura*), Cooper's hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), Gould's turkey (*Meleagris gallopavo mexicana*), Botteri sparrow (*Peucaea botterii*), grasshopper sparrow (*Ammodramus savannarum*), bushtit (*Psaltriparus minimus*), acorn woodpecker (*Melanerpes formicivorus*), western screech owl (*Megascops kennicottii*), and eastern and western meadowlark (*Sturnella magna* and *S. neglecta*) (USFS 2007, Brown 1994, AWRR 2014). Terrestrial reptiles, such as Sonoran spotted whiptail (*Aspidoscelis sonorae*), desert grassland whiptail (*Aspidoscelis uniparens*), Clark's spiny lizard (*Sceloporus clarkii*), Slevin's bunchgrass lizard (*Sceloporus slevini*), great plains skink (*Plestiodon obsoletus*), black-tailed rattlesnake (*Crotalus molossus*) and rock rattlesnake (*Crotalus lepidus*), are indicative of these biomes as well (Brown 1994, AWRR 2013).

The Research Ranch is included in the National Audubon Society's Important Bird Areas (IBAs) Program. As the U.S. partner for Birdlife International, the National Audubon Society identifies and works to conserve a network of IBAs throughout the U.S. (AWRR 2015b). Grasslands have been designated priority habitat by the Arizona Partners in Flight Conservation Plan (AWRR 2015b). The Research Ranch IBA contains the

following grassland species of special conservation status: Botteri's sparrow (*Peucaea botterii*; breeding), Baird's sparrow (*Ammodramus bairdii*; wintering), Cassin's sparrow (*Peucaea cassinii*; breeding), grasshopper sparrow (*Ammodramus savannarum*; resident), Mearns' quail (*Cytonyx montezuma*; resident), black-chinned sparrow (*Spizella atrogularis*; wintering), Brewer's sparrow (*Spizella breweri*; wintering), Sprague's pipit (*Anthus spragueii*; fall migrant), sage sparrow (*Artemisiospiza nevadensis*; wintering), eastern bluebird (*Sialia sialis*; resident), burrowing owl (*Athene cunicularia*; resident), and northern harrier (*Circus cyaneus*; wintering). Non-grassland species of special conservation status include: band-tailed pigeon (*Patagioenas fasciata*; fall migrant), southwest willow flycatcher (*Empidonax traillii extimus*; summer visitor), Lucy's warbler (*Oreothlypis luciae*; breeding), Virginia's warbler (*Oreothlypis virginiae*; breeding), yellow-billed cuckoo (*Coccyzus americanus*; summer visitor), black-throated gray warbler (*Setophaga nigrescens*; breeding), cordilleran flycatcher (*Empidonax occidentalis*; breeding), gray flycatcher (*Empidonax wrightii*;breeding), and MacGillivray's warbler (*Geothlypis tolmiei*; fall migrant).

3.4.6 Environmental Consequences - Terrestrial Wildlife

No Action

Under the no action alternative, there would be no direct impact to terrestrial wildlife, since no project would be constructed or implemented. Effects to terrestrial species would be limited to those occurring from natural flood events, fire and minor disturbances from uses within the grasslands or along the river that are permitted by BLM and/or the Research Ranch.

Proposed Action (Upper BLM Dam Abutment Stabilization)

There would be temporary noise-related disturbances to local wildlife from operation of equipment (power generator and air compressor) and infrequent use of a helicopter during construction. The timing of construction (December and January) would preclude impacts to reptiles and breeding birds. Use of hand tools rather than heavy equipment to construct the extension wall would minimize impacts to small mammals. The permanent loss of 0.002 acres of mostly understory riparian habitat that may be occupied by small mammals and reptiles would have little impact on the overall local populations. Avian species and medium sized to large mammals would be capable of avoiding the construction area; habitat loss for these species would be negligible.

Cumulative Effects – Terrestrial Wildlife

Existing wildlife impacts are limited to fire and potential disturbances associated with biological research on the Research Ranch. The incremental effect of the proposed action on the local wildlife would be predominately short term and minimal.

3.4.7 Affected Environment – Fish and Aquatic Wildlife

O'Donnell Canyon was chemically renovated in 2001 to remove nonnative green sunfish (*Lepomis cyanellus*) that became established and was threatening the continued persistence of Gila chub and other native fishes. Native fishes that resided in the stream were captured and held alive off-site prior to the treatment of the stream with the piscicide antimycin A. After it was determined the renovation successfully eliminated green sunfish, the salvaged native species were repatriated back to the stream. Today the native fish assemblage in O'Donnell Canyon consists of longfin dace (*Agosia chrysogaster*), Sonora sucker (*Catostomus insignis*), Gila topminnow, and Gila chub. The nonnative western mosquitofish (*Gambusia affinis*) recently has been detected in the uppermost drainage, and is expected to move downstream into habitats occupied by native fishes in the future. Presence of mosquitofish upstream of the fish barrier has the potential to negatively impact the persistence of Gila topminnow, but likely not the other native species.

Amphibians and semi-aquatic reptiles that may inhabit O'Donnell Canyon near the project area include the federally-threatened northern Mexican gartersnake, Sonora mud turtle (*Kinosternon sonoriense*), and likely other amphibians such as red-spotted toad (*Anaxyrus punctatus*), canyon treefrog (*Hyla arenicolor*), and Sonoran Desert toad (*Incilius alvarius*). The nonnative American bullfrog (*Lithobates catesbeianus*) has been widely introduced within the Gila River basin, and is found in the O'Donnell Canyon drainage.

3.4.8 Environmental Consequences – Fish and Aquatic Wildlife

No Action

Under the no action alternative, there would be no direct impact to fish and aquatic wildlife, since no project would be constructed. Continued headcutting of embankment material at the dams could eventually allow nonnative fishes such as those now routinely found at the base of the lower BLM dam (green sunfish, largemouth bass [*Micropterus salmoides*]) to move upstream into perennial portions of O'Donnell Canyon. If that occurred, expansion of nonnative populations would suppress native populations of fish, amphibians, and semi-aquatic reptiles. In the long term, the potential for extirpation of one of the few remaining populations of Gila chub, northern Mexican gartersnake, and other native aquatic species would increase. The no action alternative would allow ongoing and increasing adverse impacts that could contribute to an increased need for Federal listing of unlisted species and increase the likelihood of continued decline of listed species.

The upper and lower BLM dams affect gene flow among native fish populations by preventing native fish from lower portions of the drainage or other nearby stream systems to move upstream of the dams. However, the reach of O'Donnell Canyon below the BLM dams is intermittent, and Gila topminnow is the only native fish that has been detected in that downstream reach. The dams, however, only affect movements of fishes

and amphibian larvae; other species or life stages have the ability to move past the dams over land. Although some fishes and amphibian larvae above the dams may get flushed downstream during flood flows, they likely naturally would be lost as flows diminish and disappear, and thus only insignificant genetic effects to the resident upstream populations likely occur (see following discussion under Proposed Action).

Proposed Action (Upper BLM Dam Abutment Stabilization)

The proposed action is expected to have substantial, positive benefits to native fish and other aquatic and semi-aquatic vertebrate populations by maintaining the fish barrier function of the upper BLM dam and preventing upstream invasions of nonnative fishes and other undesirable nonindigenous aquatic biota into perennial reaches of O'Donnell Canyon. As previously discussed, nonnative fishes have been documented to negatively impact a host of aquatic and semi-aquatic native species, including fish, amphibians, and reptiles (Miller 1961, Moyle et al. 1986, Minckley 1991, Rosen et al. 1995, Rosen and Fernandez 1996, Rosen and Schwalbe 2002, Carpenter and Terrell 2005, Clarkson et al. 2005, 2012, Minckley and Marsh 2009, USFWS 2002a, 2013a).

At the species level, the upper BLM dam would continue to prevent integration of genetic variability of native fishes derived from other nearby stream systems to O'Donnell Canyon populations upstream of the structure. Genetic communication among diverse populations is desirable to maintain long-term (100s of generations) genetic health of a species by allowing influx of novel genes that may better enable a species to adapt to changing environments (reviewed in Hughes et al. 2008, Frankham 2010). Without such variability, local and range-wide probabilities of extinction increase (Frankham 2005). However, the condition of stream systems within the Gila River basin over the past century has deteriorated to the point that little communication among tributary fish populations occurs through connecting mainstem river corridors (Minckley 1999, Fagan et al. 2002, Clarkson et al. 2012). Presence of an array of nonnative fish predators near tributary mouths and especially in mainstem rivers like the Babocomari and San Pedro rivers, coupled with fragmentation of river drainages via stream diversions, channelization, groundwater pumping, reservoirs, etc., render long-distance movements of fishes among streams within a drainage unlikely (Fagan et al. 2002). If genetic variability issues arise, human-assisted transfers of fish among local populations can be made. The dire status of native fishes today makes the need to protect remaining populations more immediate than ensuring that longer-term evolutionary needs are met. If obstacles presented by the presence of nonnatives can be removed in the future, the need for the barrier would be eliminated, and it would be breached.

As the stream at the project area is intermittent, and the proposed stabilization of the existing BLM dam would not affect instream flow conditions, the proposed project would not affect downstream drift of native fish or amphibian larvae, nor would it affect downstream transport of older life stage fishes. Movement patterns of terrestrially-mobile adult frogs, gartersnakes, or Sonora mud turtle similarly would not be affected by the proposed project.

There would be no impacts to instream habitats upstream or downstream of the stabilized dam because the project will not affect channel hydraulics or sediment transport characteristics. The project only maintains existing channel conditions.

The proposed action would support fish and wildlife management objective number 11 as incorporated into the Las Cienegas RMP by controlling nonnative species to obviate threats to native species.

Cumulative Effects – Fish and Aquatic Wildlife

The O'Donnell Canyon watershed has been affected by a variety of historical and ongoing land-use practices including timber harvest, livestock grazing, agriculture, and road building. Although many of these historical land uses continue today, they are managed more effectively, their impacts to the watershed and stream corridor have been lessened, and conditions are improving. Forestry practices have been mitigated to reduce impacts to soils and vegetation, as have cattle grazing and road building. Riparian vegetation and instream habitat diversity are responding positively.

In addition to physical alterations of the stream channel resulting primarily from historical land use practices, introductions of nonnative fishes to O'Donnell Canyon have negatively impacted native species. Invasion by green sunfish in the 1990s compelled a chemical renovation of the stream in 2001, which necessitated salvage of natives but nonetheless killed many individuals that could not be salvaged. Although the native fish fauna has since mostly rebounded, the potential for nonnative mosquitofish to expand their population and impact native species, especially Gila topminnow, remains high. Large-scale future negative impacts to O'Donnell Canyon appear improbable due to the majority of the upper watershed being in federal land ownership, with many of the private parcels being managed by non-governmental organizations for environmental stewardship goals (e.g., TNC, Research Ranch).

The proposed project would have a positive cumulative effect by preventing future invasions of nonnative fishes that otherwise would suppress the native fish community in O'Donnell Canyon. Such benefits would also accrue to native amphibians and semi-aquatic reptiles.

3.4.9 Affected Environment - Federally Listed Species

Table 3 presents the USFWS listed, proposed, and candidate species that occur within three miles of the project area as determined by the AZGFD Online Environmental Review Tool. Listed and proposed species are afforded protection under the ESA. Candidate species are those for which USFWS has sufficient information to propose them for listing as endangered or threatened, but for which listing is precluded due to other higher priority listings. Candidate species are not afforded protection under the ESA.

Table 3. Federally-listed and candidate species extant within three miles of the project area.

Common Name	Scientific Name	Status
Arizona treefrog, Huachuca/Canelo DPS	*Hyla wrightorum*	Candidate
Canelo Hills ladies'-tresses	*Spiranthes delitescens*	Endangered
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened
Desert pupfish	*Cyprinodon macularius*	Endangered
Gila chub	*Gila intermedia*	Endangered
Gila topminnow	*Poeciliopsis occidentalis*	Endangered
Huachuca springsnail	*Pyrgulopsis thompsoni*	Candidate
Huachuca water umbel	*Lilaeopsis schaffneriana* spp. *recurva*	Endangered
Jaguar	*Panthera onca*	Endangered
Lesser long-nosed bat	*Leptonycteris curasoae yerbahuenae*	Endangered
Mexican gray wolf	*Canis lupus baileyi*	Endangered
Mexican spotted owl	*Streix occidentalis lucida*	Threatened
Northern Mexican gartersnake	*Thamnophis eques megalops*	Threatened
Ocelot	*Leopardus pardalis sonoriensis*	Endangered
Southwestern willow flycatcher	*Empidonax trallii extimus*	Endangered
Sprague's pipit	*Anthus spragueii*	Candidate
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened

Due to the lack of suitable habitat in the project area and/or because the current range for the species is outside of the project area, we have determined that Chiricahua leopard frog, desert pupfish, Huachuca springsnail, and Mexican gray wolf do not occur in the project area and are not considered further. In addition, the 2008 CAP BO addressed impacts to listed fishes for barrier construction and determined that further Section 7 consultation on federally-listed fishes and their critical habitats was not required for fish barrier construction. Consequently, Gila chub and its critical habitat needs and Gila topminnow are discussed below but are not considered in the Biological Assessment that was prepared for this project. The USFWS determined that Reclamation is not required to make any decision on the effects of our barriers within newly proposed critical habitat (e.g., northern Mexican gartersnake) for streams until the rule is finalized. At that time, Reclamation will reinitiate consultation so the USFWS can document that they considered the effects of our barriers to new critical habitats (Doug Duncan, USFWS, pers. comm.). The remaining federally-protected species listed in Table 3 are further discussed below.

Arizona treefrog. The Canelo Hills Distinct Population Segment (DPS) of Arizona treefrog was published as a candidate-for-listing on December 6, 2007 (USFWS 2007). The Canelo Hills DPS is geographically, ecologically, and genetically discrete from the Mogollon Rim and Sierra Madre Occidental populations of the species found to the north and south, respectively, and loss of the population segment would result in a significant gap in the species' range. This DPS is isolated to the Huachuca Mountains and the nearby Canelo Hills in southeastern Arizona, at elevations above 5,000 feet (Stebbins 1985). Active frogs have been observed only in April through October, and little is known of their overwintering habits. The Canelo Hills populations breed in shallow, temporary, rain-filled pools in June through August (Gergus et al. 2005). In Mogollon

Rim populations, metamorphs were observed in September and October (Sredl and Collins 1992). Very little additional life history information is available for the DPS.

Primary threats to the DPS include habitat loss or degradation, wildfire, drought and floods, and predation by introduced species including American bullfrog (*Lithobates catesbeianus*) and crayfish (Holm and Lowe 1995, USFWS 2008b). Land uses including cattle grazing and off-highway vehicle use have potential to impact populations. The small population sizes and low genetic diversity typical of the Canelo Hills DPS increase the probabilities of stochastic population losses (USFWS 2008b).

Although the project site (~4,825 feet) is just below the reported elevational range of the DPS (5,000 feet), two Arizona treefrogs were reported from the Research Ranch for the first time in April 2015 (Jeff Simms, BLM, pers. comm.). These records from disparate localities downstream of the project site expand both the known elevation for the species downward as well as the period of activity earlier into the year. It is not known if the records represent the presence of a breeding population(s).

Gila chub. Gila chub was formally listed as endangered with critical habitat (including Spring Creek) on November 2, 2005 (USFWS 2005). Endemic to the Gila River basin, the species is currently found in fewer than 30 mostly isolated waters (Weedman et al. 1996, Clarkson et al. 2012), a loss of approximately 85-90% of its former range (USFWS 2005). Only remnant populations restricted to tributaries persist today (DeMarais 1986, Clarkson et al. 2012). A recovery plan for Gila chub has not yet been finalized.

The species primarily inhabits deep pools in small to middle-sized streams, springs, and cienegas at intermediate elevations (Minckley and DeMarais 2000). Gila chub is highly secretive, typically found in association with woody debris, undercut banks, or scoured pools near obstructions. Larvae are found in shallow, quiet, nearshore areas. Juveniles enter swifter waters before returning to pools when large (Minckley 1973). Females achieve lengths of 250 mm, whereas males seldom exceed 150 mm (Minckley and Rinne 1991). No information on longevity is available, but individuals up to 4 years have been estimated from scale analysis (Griffith and Tiersch 1989). Few life history data are available (Weedman et al. 1996), but reproduction takes place throughout much of the year except the coldest months, and young are found from early spring through autumn (Minckley and Rinne 1991). Gila chub is omnivorous with a significant component of the diet comprised of aquatic insects (Griffith and Tiersch 1989).

Primary threats to the species' existence include effects from nonnative fishes (Dudley and Matter 2000, Clarkson et al. 2012) and other aquatic organisms, fire, residential water development, and grazing (USFWS 2005). A few populations have recently been protected from nonnative threats by construction of barriers and/or chemical renovations (e.g., Sabino Canyon, Bonita Creek, O'Donnell Canyon), and several new populations have been established (Larry Creek, Lousy Canyon, Romero Canyon). However, remnant populations continue to dwindle in number, and the overall outlook for the future status of the species is tentative without continued active conservation management. The species is extant within O'Donnell Canyon, although none have been captured as far

downstream as the project area.

Gila topminnow. Gila topminnow was federally listed as endangered on March 11, 1967 (32 FR 4001). No critical habitat has been designated. This small (<50 mm) live-bearing fish historically was one of the most common species at lower elevations in its endemic distribution within the Gila River Basin, where it inhabited springs, streams, cienegas, and margins of mainstem rivers (Hubbs and Miller 1941, Minckley 1973). The species began to experience loss of range in the basin early in the 20th century due to lowering water tables and arroyo cutting (Hendrickson and Minckley 1984). Introduction of nonnative fishes, particularly western mosquitofish (*Gambusia affinis)*, in the 1930-40s significantly accelerated decline of the species and is the primary reason for its endangerment today (Meffe 1985, Marsh and Minckley 1990). Less than one dozen natural populations remain, with all but one confined to the Santa Cruz River subbasin.

Longevity of Gila topminnow is usually less than 1 year (Schoenherr 1974). It feeds on a variety of small plants and macroinvertebrates. Reproduction may occur year-round when water temperatures are suitable but is typically in spring through summer. Females can store spermatozoa for several months and are capable of superfetation, where two or more groups of embryos develop simultaneously at different developmental stages at the same time, with births occurring at 21-day intervals. Broods can consist of 14-49 embryos (Schoenherr 1977). They can become sexually-mature as early as 2 months and can produce up to ten broods per year under laboratory conditions (Schultz 1961).

Hundreds of natural and artificial habitats have been stocked with this species in an attempt to recover it, with mixed success. A state-wide Safe Harbor Agreement to facilitate repatriations has been developed, but a much-needed recovery plan revision has been stalled for many years. Gila topminnow was stocked into O'Donnell Canyon in 1974 and persisted there for an undetermined period of time. In 2003 (after the 2002 chemical renovation of the stream to remove green sunfish), topminnow were again detected despite there being no official stocking records. These fish appear to be of different genetic stock from the source used for the 1974 stocking, so it is unlikely they survived the renovation. Gila topminnow persists in O'Donnell Canyon today.

Northern Mexican gartersnake. This subspecies was listing as threatened on July 8, 2014 (USFWS 2014a). A proposed rule to designate critical habitat in 14 subunits in central and southern Arizona and southwestern New Mexico, including O'Donnell Canyon through the Research Ranch, has not been finalized (USFWS 2013b). Seventy to eighty percent of its range is in Mexico in the Sierra Madre Occidental and Mexican Plateau south to Oaxaca. Northern Mexican gartersnake typically is found along well-vegetated margins of cienegas, springs, streams, rivers, lakes, and ponds at elevations ranging from 130 to 6,150 feet. Presently, more than 80% of the known localities in the U.S. are considered extirpated or likely not viable due to low population densities (USFWS 2014a). Northern Mexican gartersnake is diurnally active, and feeds mostly on native leopard frogs and fishes, but also toads, treefrogs, earthworms, deer mice, lizards, and leeches (summarized in USFWS 2014a). Onset of sexual maturity of this viviparous species occurs at 2-3 years (Rosen and Schwalbe 1988); longevity is unknown. Mating

usually occurs in late spring, with birth of between 7 and 38 newborns in July and August (Rosen and Schwalbe 1988, Nowak and Boyarski 2012).

The primary cause of decline of northern Mexican gartersnake appears to be replacement of soft-rayed native fish prey with spiny-rayed nonnative fishes that create a choking hazard (USFWS 2014a). The introduced bullfrog also is a major predator on Mexican gartersnake, and has been suspected to be the primary cause for its extirpation from some areas (Rosen and Schwalbe 1988).

Capture records of northern Mexican gartersnake from the vicinity of the project area (O'Donnell Canyon upstream to the ciénega, downstream past the confluence of Turkey Creek to Finley Tank, and along Post Canyon and Turkey Creek immediately to the south and east, respectively) were numerous prior to 1988 (Rosen and Schwalbe 1988), but Rosen et al. (2001) noted a decline in captures from 1995-2000. The estimated population size at Finley Tank in 2009 (d'Orgeix 2011) was similar to the estimate made by Rosen et al. (2001). Studies of northern Mexican gartersnake in the O'Donnell Canyon area suggest the species is capable of persisting around temporary waters and that their food habits are more variable and less dependent on vertebrate prey than previously reported (d'Orgeix 2011, d'Orgeix et al. 2013).

Jaguar. In 1972, the jaguar was listed as endangered (USFWS 1972) under the Endangered Species Conservation Act of 1969 (ESCA), a precursor to the ESA. It wasn't until July 22, 1997, that the species was formally listed under the ESA (USFWS 1997b). Jaguar critical habitat was designated on March 5, 2014, but does not include the O'Donnell Canyon area (USFWS 2014a). The species historically ranged from southern California eastward through Texas and possibly into Louisiana, and southward into southern South America. Sightings of jaguar in the past 100 years in the U.S. have included only southern Arizona and southwestern New Mexico (USFWS 2014b). Jaguar has been documented from a variety of habitat types across this range, but the more open, dry habitat of the southwestern U.S. has been characterized as marginal in terms of water, cover, and prey densities (Rabinowitz 1999). This large, muscular cat (Family Felidae) can occupy a home range of up to 100-200 km^2 (Rosas-Rosas and Bender 2012). Javelina and white-tailed deer are thought to be the mainstays in the diet of jaguars in the U.S. and Mexico borderlands (Brown and López-González 2001).

Illegal killing of jaguars and habitat destruction and modification are the most significant threats to the conservation and recovery of jaguar (Nowell and Jackson 1996). In addition to the numerous anthropogenic threats affecting jaguars, the species has a number of intrinsic biological factors that limit its recovery, including being a K-selected species (i.e., species with large body size, long life expectancy, and few offspring that require extensive parental care until they mature) and having large spatial requirements. Small and isolated jaguar populations do not appear to be highly persistent unless they are connected to other populations via protected corridors (Haag et al. 2010, Rabinowitz and Zeller 2010).

Suitable habitat exists for jaguar on the Research Ranch and in adjacent areas, but none have been detected within the action area. Jaguar has recently been detected in the Santa Rita and Whetstone Mountains, and may have traveled through the neighboring Huachuca Mountains to arrive at the Whetstones. Also, two jaguars have been recently documented in Sonora about 48 km (30 miles) southeast of Nogales (i.e., nearly directly south of the Huachuca Mountains).

Ocelot. Ocelot was listed as endangered in 1972 under the Endangered Species Conservation Act of 1969 (USFWS 1972) and was "grandfathered" into the ESA in 1974 (USFWS 1974), but the U.S. population was not formally listed until July 21, 1982 (USFWS 1982). A draft recovery plan was made available for public comment in 2010 (USFWS 2010b), but it has not been finalized. The Arizona/Sonora ocelot subspecies occurs in southern Arizona and northwestern Mexico, but breeding populations occur only in Sonora and northern Sinaloa (USFWS 2010b). Almost no life history information specific to this subspecies is available (Grigione et al. 2007), but information from other subspecies (mostly from tropical forests) indicates that activity is mostly nocturnal or crepuscular, and prey is primarily small mammals, especially rodents (Emmons 1987, Ludlow and Sunquist 1987, Crawshaw 1995, Fernandez 2002). Home range sizes vary by sex and habitat type, varying between 2-38 km^2 (Ludlow and Sunquist, 1987, Crawshaw and Quigley 1989, Konecny 1989, Crawshaw 1995, Fernandez 2002). Most records of ocelot in Sonora were associated with tropical and subtropical thornscrub or tropical deciduous forest in the mountainous Sierra region; those closer to the Sonoran desert biome were typically near riparian areas (Lopez Gonzalez et al. 2003). Four ocelots recorded in southeastern Arizona since 2010 occupied Madrean evergreen woodland and plains and Great Basin grasslands.

Primary threats include habitat loss and fragmentation due to increased human development, agriculture, and cattle grazing; illegal killing (e.g., retaliatory killing due to depredation of poultry); and illegal pet and pelt trade (Fernandez 2002, Caso et al. 2008, USFWS 2010b). Connectivity among ocelot populations or colonization of new habitats is inhibited by the proliferation of highways via increased road mortality among dispersing ocelots, and by erection of fences along the U.S.-Mexico border (Marris 2006).

The proposed action falls within the range of the Sonora subspecies as well as within the Arizona/Sonora Management Unit as defined in the draft revised ocelot recovery plan (USFWS 2010b). The nearest known occurrence record for ocelot is approximately 13 miles southeast of the project area.

Lesser long-nosed bat. Lesser long-nosed bat was listed as endangered on September 30, 1988 (USFWS 1988), and as of September 9, 2013, the species is being considered for downlisting to threatened status under the ESA (USFWS 2013c). Critical habitat has not been designated, but a recovery plan has been in place since 1994 (USFWS 1994). Lesser long-nosed bat is found in desert grassland and shrubland biomes up to the oak transition zone. In Arizona, the species is found from the Picacho Mountains to the Agua Dulce Mountains in the southwest and the Galiuro and Chiricahua mountains in the

southeast (Hinman and Snow 2003). Lesser long-nosed bat cannot tolerate prolonged exposure to cold, and spends winters in Mexico, but does not hibernate. Daytime and maternity roosts are located in caves and abandoned mines. The species is known to fly long distances (up to 40 miles or more) from roost sites to foraging sites (USFWS 1994). Roosts in Arizona are occupied from late April to September (Cockrum and Petryszyn 1991). The species consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti.

Threats to this species include disturbance of roost sites, loss of food resources through over-harvesting of agaves in Mexico, spread of agriculture, and livestock grazing (USFWS 1994).

The project site is approximately two miles north and two miles south of known occupied roost sites (AZGFD 2013), and is within a reasonable foraging range of bats occupying those roosts. The species' presence in the Research Ranch has not been confirmed (AWRR 2007).

Mexican spotted owl. Mexican spotted owl was listed as threatened on March 16, 1993 (USFWS 1993), with critical habitat designated on August 31, 2004 (USFWS 2004). No critical habitat has been designated within the O'Donnell Canyon watershed. A recovery plan for the species was first published in 1995 (USFWS 1995), with a revised recovery plan issued in 2012 (USFWS 2012). Mexican spotted owl occurs in forested mountains and canyonlands throughout the southwestern U.S. and Mexico, with an affinity for older, uneven-aged forests (Gutiérrez et al. 1995). Owls generally are year-round residents within an area, although some migrate to lower elevations during winter (Ganey et al. 1998, Ganey and Balda 1989). Incubation of eggs in springtime is by the female, while the male does most of the hunting (Ganey 1988). Young (typically only a single offspring per mating pair per season) fledge in late June and disperse September- October (Ganey 1988). Foods are primarily small and medium-sized rodents.

Direct threats to Mexican spotted owl include predation, starvation, accidents, disease, and parasites. Detrimental anthropogenic impacts to owl habitat include domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. Uncharacteristic, high-severity, stand-replacing wildland fire is another threat to Mexican spotted owl; landscape-level wildland fires have resulted in the loss of tens of thousands of acres of occupied and potential owl habitat across significant portions of its range (USFWS 2004).

The nearest critical habitat to the project area is approximately 3.7 miles, and the nearest Protected Activity Center is approximately seven miles from the project area. O'Donnell Canyon, in the area of the upper BLM dam does not contain suitable primary constituent elements (PCEs) necessary to support breeding Mexican spotted owl.

Southwestern willow flycatcher. Southwestern willow flycatcher was listed as endangered on March 29, 1995 (USFWS 1995b). Critical habitat was designated on January 2, 2013, after several previous designations were remanded under Court order

(USFWS 2013d). Critical habitat does not include the project area. A recovery plan was released on March 5, 2003 (USFWS 2002b). The flycatcher is a small neotropical migratory insectivore that breeds and forages along dense or patchy riparian areas and wetlands in the American southwest and winters in Mexico (USFWS 2002b). Breeders arrive in Arizona in late April/early May and begin nest construction in mid- to late-May. Egg laying and incubation begins in early June; fledging can occur from late June through early August, with birds departing for migration between August and mid-September (Sogge et al. 2010).

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, diversions and groundwater pumping, channelization and bank stabilization, phreatophyte control, livestock grazing, recreation, fire, agriculture development, and urbanization (USFWS 2002b). Other factors include brood parasitism by brown-headed cowbirds, dominance of tamarisk, vulnerability inherently associated with small populations, and stresses associated with long-distance migrations (USFWS 2002b).

Riparian habitat within the project area is relatively sparse and narrow, and is not suitable for flycatcher breeding. However, it may be utilized as stop-over habitat during migration. The closest known flycatcher territory is within Cienega Creek, approximately15 miles northwest of the project area (Greg Beatty, USFWS, pers. comm., AZGFD 2013). To date, there are no known records of migrants or breeding within the project area.

Sprague's pipit. In September 2010, USFWS determined that Sprague's pipit was warranted for listing under the ESA but was precluded by other listing priorities (USFWS 2010c). The species is also protected by the Migratory Bird Treaty Act. Sprague's pipit is a small passerine endemic to North American grasslands, where it both breeds and winters. Breeding occurs in parts of Montana, North Dakota, South Dakota, and Minnesota, and wintering range includes parts of Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and northern Mexico. In Arizona, the species is considered rare but is a regular winter migrant in southeastern Arizona from mid-October to March (USFWS 2010d).

Breeding bird surveys suggest that the species is in steep decline (Peterjohn and Sauer 1999) with an 80 percent decrease from 1966 through 2007 in U.S and Canadian breeding range (Sauer et al. 2008). The decline of pipit is associated with the loss of native prairie habitat as a result of conversion of the land to agriculture, invasion of non-native plant species, poor livestock grazing practices especially in drought-prone areas, encroachment of woody vegetation, fire suppression, and urban development (USFWS 2010d). While improper grazing and mowing can impact Sprague's pipit, overall habitat fragmentation from conversion of native prairie to other uses is likely the most significant threat to the species (USFWS 2010c).

Sprague's pipit has been documented within the Research Ranch approximately two miles northeast of the project area (AZGFD 2013).

Yellow-billed cuckoo. The western DPS of yellow-billed cuckoo was listed as threatened on October 3, 2014 (USFWS 2014c); critical habitat was proposed on August 15, 2014. This Neotropical migrant bird winters in South American and breeds in North America. It is an uncommon to fairly common breeder in riparian habitats in western, central and southeastern Arizona along perennial drainages below 5000 feet elevation (Corman 2005). As most of the literature on this DPS is unpublished, the following life history information has been summarized from USFWS (2013b); see that publication for original citations. Most birds arrive on breeding grounds in June, and begin their southward migration near the end of August. They are able to produce up to three broods a season if the prey base is adequate, and clutch size ranges from 2-5 eggs. Breeding site fidelity is variable. Western yellow-billed cuckoo requires large patches of dense riparian habitat for breeding, typically in excess of 50 acres in size. Home ranges typically are in excess of 100 acres. Little is known of their wintering habitat usage.

The primary threat to this species is riparian habitat destruction, modification, and degradation resulting from dams and diversions, streamflow alterations, channelization, land use conversion, and wildfire, which leads to habitat fragmentation and population decline (USFWS 2013b). Pesticide use on the wintering grounds also may result in direct mortality of individual birds and cause eggshell thinning (Latta et al. 1999). The cuckoo is primarily an insectivore, and pesticide use may reduce the availability of insect prey (Latta et al. 1999).

Currently, cuckoo can be found along O'Donnell Canyon and is suspected to use the drier drainages and Madrean evergreen woodlands (Susan Sferra, USFWS, pers.comm.). Three occurrence localities are no farther than 1.6 miles from the project area. The nearest occurrence is approximately 0.8 miles southwest on O'Donnell Canyon.

***Canelo Hills ladies'-tresses*.** The Canelo Hills ladies'-tresses, a member of the orchid family, was listed as endangered on January 6, 1997 (USFWS 1997a). No critical habitat has been designated. Populations of this species are known to exist in only four ciénegas in southern Arizona, including the ciénega along O'Donnell Canyon. All populations of Canelo Hills ladies'-tresses occur in ciénega habitats where scouring floods are very unlikely (Newman 1991). Soils supporting the populations are finely grained, highly organic, and seasonally or perennially saturated. It is found intermixed with tall grasses and sedges at about 5,000 feet in elevation. Springs are the primary water source, but a creek near one locality contributes near-surface groundwater (McClaran and Sundt 1992). Canelo Hills ladies'-tresses, like many species in the genus, shows an affinity for habitats with sparse herbaceous cover (McClaran and Sundt 1992).

Threats to Canelo Hills ladies'-tresses include groundwater pumping, water diversions, sand and gravel mining, recreation impacts, illegal collection, and invasion of ciénega habitats by nonnative plant species such as Johnson grass and Bermuda grass (*Cynodon dactylon*)(USFWS 1997a). Limited numbers of populations and individuals threaten this taxon with extinction as a result of stochastic events that are often exacerbated by habitat disturbance. For instance, the restriction of the species to a relatively small area in

southeastern Arizona increases the chance that a single environmental catastrophe such as a severe storm or drought could eliminate a population or cause extinction.

O'Donnell Canyon is within the historic range of the Canelo Hills ladies'-tresses and two known populations occur upstream of the project area. The plant is not known to occur within the Research Ranch.

Huachuca water umbel. Huachuca water umbel was listed as endangered on January 6, 1997 (USFWS 1997a). Critical habitat was designated on July 12, 1999 for 51.7 miles of streams or rivers in southeastern Arizona; none occurs along O'Donnell Canyon (USFWS 1999). All occupied sites are between 2,533-6,500 feet in elevation. In addition, several sites have been established or augmented on Fort Huachuca and the Research Ranch (Titus and Titus 2008). Huachuca water umbel grows in wetland communities often surrounded by relatively arid environments (USFWS 1997a). The species can grow in saturated soils or as an emergent in water depths up to about 10 in (25 cm). The umbel is an herbaceous, perennial plant with slender, erect leaves that grow from creeping rhizomes. The species reproduces sexually through flowering and asexually from rhizomes, the latter probably being the primary reproductive mode. An additional dispersal opportunity occurs as a result of the dislodging of clumps of plants that then may reroot in a different site along aquatic systems (USFWS 1997a).

Habitat alteration is the primary threat to Huachuca water umbel. Improper livestock grazing, mining, hay and timber harvesting, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and ciénegas when above-average precipitation and flooding occurred in the late 1800s and early 1900s (Bahre 1991, Bryan 1925, Dobyns 1981, Hastings and Turner 1980, Hendrickson and Minckley 1984, Hereford 1993). These events contributed to long-term or permanent degradation and loss of ciénega and riparian habitats throughout southern Arizona. Wetland degradation and losses continue today.

O'Donnell Canyon is within the historic range of the Huachuca water umbel and a known population exists 0.5 miles upstream of the project area within a CNF grazing exclosure where water persists in deep pools year round. In 2003, the umbel was also reintroduced to a spring fed impoundment (Finley Tank) on the Research Ranch through transplant plugs. This population is approximately 2.8 miles from the project area. Umbel is not known to occur elsewhere within the Research Ranch.

3.4.10 Environmental Consequences – Federally Listed Species

No Action

Under the no action alternative, there would be no direct impact to federally-listed species, since no project would be constructed. However, without emplacement of the wing wall extension, nonnative fishes such as those now routinely found at the base of the lower BLM dam (green sunfish, largemouth bass (*Micropterus salmoides*) could move upstream into perennial portions of O'Donnell Canyon if the BLM dams fail. If

that occurred, expansion of nonnative populations would suppress native populations of fish, amphibians, and semi-aquatic reptiles. In the long term, the potential for extirpation of one of the few remaining populations of Gila chub, northern Mexican gartersnake, and other native aquatic species would increase. The no action alternative would allow ongoing and increasing adverse impacts that could contribute to an increased need for Federal listing of unlisted species and increase the likelihood of continued decline of listed species.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Arizona treefrog. Arizona treefrog very recently has been detected near the project area, and therefore its presence at the project site cannot be discounted. However, the proposed project would be implemented outside the period when the Arizona treefrog is active. The proposed action would have no effect to Arizona treefrog.

Gila chub. The proposed action is expected to have substantial, positive long-term benefits to Gila chub and its critical habitat by preventing upstream invasions of nonnative fishes and other undesirable aquatic biota into upper reaches of O'Donnell Canyon. There is a remote possibility there would be short-term impacts to Gila chub as a result of temporary disturbance to stream habitats in the construction area, but Gila chub have never been detected near the upper BLM dam. If they were present during construction, Gila chub would either be forced to move upstream or downstream from the construction site, and some direct mortality is possible. Because this reach of stream goes dry on an annual basis, chub near the project site would likely perish, making mortality from the project of little biologic importance. No loss of habitat would occur within the footprint of the proposed project. In addition, in the 2008 biological opinion, USFWS determined that fish barriers were not likely to destroy or adversely modify critical habitat of Gila chub,

Gila topminnow. If Gila topminnow was present at the proposed project site during construction, it would either be forced to move upstream or downstream during actual construction, and some direct mortality is possible. Because this reach of stream goes dry on an annual basis, chub near the project site would likely perish, making mortality from the project of little biologic importance. In the longer term, however, the project would prevent predation and competition impacts from nonnative species and provide added protection for Gila topminnow throughout the stream system, providing overall positive benefits to the species.

Northern Mexican gartersnake. There are numerous occurrence records for northern Mexican gartersnake surrounding the project area, and O'Donnell Canyon and the Research Ranch have been proposed as critical habitat. By delaying the onset of construction activities until after December 1, employing hand tools to dig the extension wall trench, using a helicopter to deliver concrete directly into the extension wall forms, and conducting a pre-construction gartersnake survey, the probability of impacting active gartersnakes would be extremely unlikely, and therefore can be considered discountable. There would be only a remote chance of impacting undocumented hibernaculae.

Reclamation determined the proposed project may affect, but is not likely to adversely affect, northern Mexican gartersnake, nor would the project adversely modify proposed critical habitat. Once the project is completed, effects to northern Mexican gartersnake are expected to be beneficial by preventing invasions of nonnative fishes.

Mexican spotted owl. Mexican spotted owl has not been detected near the project area, and habitat at the project site does not contain suitable PCEs for breeding owls. Construction would be restricted to daylight hours, precluding potential disturbances to foraging owls, if present. The proposed action would have no effect to Mexican spotted owl.

Jaguar. Photographs and other evidence document jaguar presence in southeastern Arizona; however, their occurrence is extremely rare, and project impacts would not be detrimental to jaguar habitat. Reclamation determined the proposed project would have no effect to jaguar.

Ocelot. Photographs and other evidence document ocelot presence in southeastern Arizona; however, their occurrence is extremely rare, and project impacts would not be detrimental to ocelot habitat. Reclamation determined the proposed project would have no effect to ocelot.

Lesser long-nosed bat. No known lesser long-nosed bat roosts would be affected by the proposed action, and no bats are expected to be present during the proposed post-December 1 construction period as they would be on their wintering grounds in Mexico. All agaves would be identified, flagged and avoided within the project area to protect foraging plants. Reclamation determined the proposed action would have no effect to lesser long-nosed bat.

Mexican spotted owl. Mexican spotted owl has not been detected near the project area, and habitat at the project site does not contain suitable PCEs for breeding owls. Reclamation determined the proposed action would have no effect to Mexican spotted owl.

Southwestern willow flycatcher. The current conditions in O'Donnell Canyon are not conducive to nesting willow flycatchers. However, O'Donnell Canyon does provide habitat for migratory and dispersing willow flycatchers. Only extremely minor habitat modifications would occur within the riparian habitat at the project site, and all construction activities would occur outside the breeding season. Reclamation determined the proposed project would have no effect to southwestern willow flycatcher.

Sprague's pipit. Sprague's pipit winters in the grasslands of southeastern Arizona and has been documented on the Research Ranch within 2 miles of the project area. Pedestrian traffic could disrupt use of the pedestrian access area by overwinting Sprague's pipit. However, there is abundant grassland habitat in surrounding areas and the region for pipits diplaced from the project area. Impact to Sprague's pipit would be negligible and discountable.

Yellow-billed cuckoo. Although O'Donnell Canyon is occupied by yellow-billed cuckoo during summer, all construction activities would occur outside the breeding season when cuckoo is not present. In addition, only minor habitat modifications would occur that would not significantly degrade cuckoo habitat. Reclamation determined the proposed project would have no effect to yellow-billed cuckoo.

Canelo Hills ladies'-tresses. Canelo Hills ladies'-tresses has not been detected in the project area nor is it likely to occur due to the ephemeral nature of O'Donnell Canyon at the project site. Consequently, Reclamation determined the proposed action would have no effect to Canelo Hills ladies'-tresses.

Huachuca water umbel. Huachuca water umbel has not been documented at the project site, although it is known from 0.5 miles upstream in a complex of permanent pools. Proposed herbicide treatments for control of invasive plants at the construction site would not occur within 50 feet of any known populations, and application techniques would minimize the potential for herbicide drift into the ephemeral stream channel. Reclamation determined the proposed action would have no effect to Huachuca water umbel.

Cumulative Effects – Federally Listed Species

Cumulative effects to aquatic species were previously described under section 3.4.6 (Environmental Consequences: Fish and Aquatic Resources). The prevention of invasive, nonnative aquatic species from perennial portions of this stream would constitute tangible progress towards the incremental recovery of Gila chub, Gila topminnow, and northern Mexican gartersnake. This in conjunction with other recovery actions for these species may have the cumulative effect of improving their biological status or recovering them to the point where these populations and others meet recovery goals. There would be no cumulative effect to other species listed in Table 3.

3.4.11 Affected Environment - BLM Sensitive Species

BLM Tucson Field Office's sensitive animals and plants are listed in Appendix A. Placement on the sensitive list is determined by concern for population viability because of significant current or predicted downward trends in population numbers or density and downward trends in habitat capability that would reduce a species' distribution. For species on the list that are thought to be rare, particularly plants and invertebrates, there is little information and limited surveys to accurately determine status. Only those species which have the potential to occur in the project area and be impacted by the proposed project are discussed below. Otherwise, the species' range occurs outside of the project area or there is no suitable habitat within the project area for the species. The sensitive species considered for the analysis under this project are discussed below.

Sonora sucker. Sonora sucker is a member of the Family Catostomidae, and is endemic to the Gila and Bill Williams river drainages of Arizona, New Mexico, and Sonora,

Mexico (Minckley 1973). The species remains common in many tributary streams throughout its range, but has disappeared from most of the mainstem rivers it formerly inhabited. It once was a Candidate species under the ESA, but policy redefinition of candidate status resulted in removal of a large category of species, including Sonora sucker.

Sonora sucker is large and robust (to 800 mm and 2 kilograms), and tends to frequent larger, mid-elevation streams where it primarily consumes a variety of benthic invertebrates from both slow- and swift-flowing habitats (Schreiber and Minckley 1981, Clarkson and Minckley 1988). Spawning occurs in gravelly riffles in late winter or early spring, similar to desert sucker with which it occasionally hybridizes (Clarkson and Minckley 1988). Spawning consists of two or more males and a larger female swimming in a tight circle until all individuals pause and emit gametes. Release of eggs and sperm is usually accompanied by agitation of the substrate by the spawner's fins, which may serve to clean the gravel and bury eggs within the substrate (Reighard 1920, Minckley 1981). Larvae of Sonora sucker comprise a major component of stream drift in Gila River Basin waters (Bestgen et al. 1985, Remington 2002). The species was used extensively in prehistoric times as food by humans (Minckley and Alger 1968, Minckley 1973).

Sonora sucker maintains a small (or at least difficult to capture in large numbers) population in O'Donnell Canyon, but the species has never been detected as far downstream as the proposed barrier site.

Longfin dace. Longfin dace is one of the most common native fishes in lower-elevation streams of the Gila River Basin (Minckley 1973, Minckley 1999, Marsh and Kesner 2004, Minckley and Marsh 2009). Its native range also includes the Bill Williams River and the closed Hualapai (Red) Lake drainages of Arizona. A closely-related morphotype inhabits several Mexican drainages that discharge to the Gulf of California (Hendrickson 1987). Longfin dace has disappeared from many stream segments in Arizona (especially mainstem rivers), and it once was a Candidate species for listing under the ESA, but policy redefinition of candidate status resulted in removal of a large category of species.

Longfin dace is a small (to about 75 mm) and short-lived (~3 years) species. The species has the unusual habit of migrating upstream into formerly dry reaches of stream during flood events where mortality is likely the typical result, but occasionally the behavior results in establishment of new populations (Minckley and Barber 1971, Minckley 1973). Its tolerance of sandy-bottomed, shallow, hot streams allows it to persist in areas where most other species (native or nonnative) do not. Longfin dace is omnivorous in its food habits, consuming both algae and aquatic invertebrates according to availability (Schreiber and Minckley 1981, Fisher et al. 1981). Reproduction primarily occurs during spring and late summer in sandy-bottomed, slack-water areas along the margins of streams where it excavates saucer-shaped depressions into which eggs are deposited and newly hatched young remain for a brief period until their yolk sacs are absorbed. Reproduction has been recorded throughout the year but is most pronounced in spring

and early summer (Minckley and Barber 1971, Kepner 1982). Longfin dace is common in O'Donnell Canyon, but it has not been detected at the proposed barrier site.

Dalhouse spleenwort. Dalhouse spleenwort (*Asplenium* [=*Ceterach*] *dalhousiae*) is a perennial fern that grows in shady, rocky ravines in moist soil within Madrean oak woodlands at elevations ranging between 4,000 and 6,000 feet (Arizona Rare Plant Committee 2000). The species appears to be restricted to granitic substrates in southern Arizona (AZGFD 2004).

This rare fern can be found in southern Arizona (Cochise and Pima Counties) and northern Mexico. The nearest known occurrence is approximately 33 miles southeast of the project area in the Mule Mountains (AZGFD 2004, 2013a). Dalhouse spleenwort was not detected in the 2001 study of the flora of the Research Ranch (McLaughlin et al. 2001). The project area lacks suitable ecological and edaphic conditions to support this species.

Giant sedge. Arizona giant sedge (*Carex ultra*) is an herbaceous perennial that occurs on moist soil near perennially wet springs and streams in riparian woodland or oak-pinyon woodland at elevations ranging from 2,040 to 6,000 feet in Pima, Cochise, Pinal, Graham, Santa Cruz, and Yavapai Counties in Arizona, extreme southwest New Mexico (Hidalgo County), and Sonora and Cahila inMexico (AZGFD 2000).

Arizona giant sedge is ranked by NatureServe as G3 (Globally Vulnerable), N3 (Nationally Vulnerable), and S2 (Imperiled) in the State of Arizona. The typically small, isolated, and widely separated populations of this plant are vulnerable to local disturbance of aquatic habitat (AZGFD 2000).

A species-specific survey targeting Arizona giant sedge has not been conducted within the Research Ranch. It was not recorded in the 2001 flora inventory of the Research Ranch (McLaughlin et al 2001). The nearest known occurrence to the project area is approximately 8.5 miles to the north in upper Cienega Creek (AZGFD 2013; AZGFD 2012; BLM 2012).

Huachuca golden aster. This species (*Heterotheca rutteri*) occurs in level, open grasslands and oak savannas at elevations between 3,560 and 6,500 feet (AZGFD 2001a), and is known only from 11 localities in Cochise, Pima, and Santa Cruz counties in Arizona (Arizona Rare Plant Committee 2000), and from limited areas within Sonora, Mexico (AZGFD 2001a). It is ranked by NatureServe as Imperiled globally, nationally, and in the state of Arizona. Threats are not well documented and the species' limited distribution is not well understood, but it is likely vulnerable to disturbance of grassland habitat (AZGFD 2001a). The species appears to tolerate some disturbance as it grows adjacent to State Route 82 near Sonoita (USFS 2007). It is also found in areas that historically have burned at a high frequency (USFS 2007).

The nearest historic population is approximately 7.5 miles east of the project area and 9 miles southwest of project area (AZGFD 2013). As of 2001, Huachuca golden aster has not been recorded within the Research Ranch (McLaughlin et al 2001).

Arizona myotis. Arizona myotis (*Myotis [Lucifugus] occultus*) is generally found at higher elevations in ponderosa pine and oak-pine woodland habitat up to 8,620 feet elevation, but also occurs along permanent water or in riparian forests in lower elevations down to 150 feet elevation (Hoffmeister 1986, Hinman and Snow 2003, AZGFD 2011). Most records are from the Mogollon Rim (Alpine to Flagstaff) and along the lower Colorado and Verde rivers (AZGFD 2011). The winter range is unknown (Hinman and Snow 2003). This species hunts low over water foraging on flying insects (Hinman and Snow 2003).

In Arizona, Arizona myotis selects roosts that are safe from predators and close to foraging grounds (Bat Conservation International 2011). At lower elevations, roost snags are close to water (AZGFD 2013). Day roosts are found in tree cavities and crevices. Nursery colonies choose larger than average snags, located on slopes with more exposure to solar heating (AZGFD 2013). They may use tree cavities, mines or possibly caves for winter hibernation (AZGFD 2013). Available water seems to be a consistent feature near all occurrences (AZGFD 2013).

The closest site record is located approximately 50 miles to the northwest of the project area near Santa Catalina Mountains (AZGFD 2013). The species is not suspected to occur within the Research Ranch (AWRR 2007).

Cave myotis. Cave myotis (*Myotis velifer*) occurs in Arizona, California, Nevada, New Mexico, Texas, Kansas, Oklahoma, and south through Mexico and into Central America. In Arizona, the species predominately inhabits elevations below 6,000 feet in the summer in desertscrub habitat where creosote, brittlebush, paloverde, and cacti are present, but it typically migrates to pine-oak communities up to 8,800 feet in the winter (AZGFD 2002a). They roost in caves, tunnels, mine shafts, under bridges, and in buildings within a few miles of water (AZGFD 2002a). Some evidence indicates that populations in Arizona have home ranges of hundreds of square kilometers during non-migratory times of the year (Hayward 1970).

Cave myotis is ranked by NatureServe as G5 (Globally Secure), N4 (Nationally Apparently Secure), and S3–S4 (Vulnerable to Apparently Secure) in Arizona. Primary threats are habitat loss resulting from development. Maternity sites are particularly vulnerable because of the congregation of large numbers in one place. This species is also threatened by recreational caving, mine closures, and the loss of foraging habitat in riparian zones (AZGFD 2002a).

The nearest non-historical population is a maternity roost and a diurnal roost approximately 4 miles from project area (AZGFD 2013). Cave myotis likely uses O'Donnell Canyon when foraging for insects. Therefore, the species is suspected to occur within the Research Ranch but has not yet been confirmed (AWRR 2007).

Greater western mastiff bat. The largest bat in the United States, the greater western mastiff bat (*Eumops perotis californicus*) has been found in California, Nevada, Texas, and Mexico and in most Arizona counties at elevations between 240 and 8,475 feet (AZGFD 2002b; Hinman and Snow 2003). The species is typically found in lower and upper Sonoran desertscrub near cliffs, preferring rugged rocky canyons with abundant crevices. Colonies prefer to crowd into tight crevices a foot or more deep and two inches or more wide. Due to their large body and narrow wings that makes it difficult to take flight from the ground, roosts are typically located at vertical drops of 10 or more feet (Barbour and Davis 1969). The species feeds primarily on bees, wasps, ants and sawflies but also on other insects (e.g., moths, crickets, grasshoppers, dragonflies, leaf bugs, true bugs, beetles) (AZGFD 2002b).

The species is considered to be a year-round resident in Arizona, based on collections or calls heard during every month except for January (AZGFD 2002b). It is not clear if greater western mastiff bat hibernates during winter. There is limited evidence that suggests the species enters torpor every day during winter months, but arouses and leaves the roost to forage at night when temperatures at dusk are above 5° C (AZGFD 2002b).

The greater western mastiff bat is ranked by NatureServe as G5–T4 (Globally Apparently Secure), N3 (Nationally Vulnerable), and S3 (Vulnerable) in the state of Arizona. This species is mostly threatened by urban/suburban expansion and activities that destroy or disturb cliff habitat. The main threats relate to the vulnerability of maternity colonies from decreases in available drinking water, urbanization, recreational climbing, activities that destroy cliff habitat, grazing, and pest control (AZGFD 2002b).

The species is suspected to forage within the Research Ranch but has not yet been confirmed (AWRR 2007). However, based on habitat requirements, it is unlikely this species roosts within the project area.

Banner-tailed kangaroo rat. In Arizona, banner-tailed kangaroo rat occurs in portions of Apache County and the southeastern portion of the State including all of Santa Cruz County. The species is nocturnal, and prefers desert grasslands and desertscrub with scattered shrubs between 3,500 and 4,000 feet elevation (Hoffmeister 1986). Burrows have large mounds that are often near or under shrubs.

Occurrence of the species on the Research Ranch is suspected but not confirmed (AWRR 2007). There are no banner-tailed kangaroo rat burrows in the staging area or construction impact area. Habitat conditions in portions of the pedestrian access area may be suitable for this species.

American peregrine falcon. Peregrine falcon (*Falco peregrinus anatum*) was removed from the endangered species list on August 25, 1999 (USFWS 1999b). Peregrine falcon breeds from Canada and Alaska south into Baja, California, central Mexican highlands and northwest Mexico. In Arizona, they inhabit desertscrub up through areas of Rocky Mountain and Madrean montane conifer forest at elevations between 400 and 9,000 feet.

Nesting sites (eyries) usually consist of a shallow depression scraped into a ledge on a south-facing cliff in excess of 200 feet in height (USFWS 1984, AZGFD 2002c). The species breeds wherever sufficient avian or bat prey is available near steep, sheer cliffs overlooking woodlands and riparian areas. The presence of an open expanse is critical (Glinski 1998). In Arizona, falcons return to breeding areas from mid-February to mid-March, although year-round resident birds are not uncommon.

The American peregrine falcon is ranked by NatureServe as G4–T4 (Globally Apparently Secure), N3 (Nationally Critically Imperiled), and S4 (Apparently Secure) in Arizona. Primary threats to the species are environmental toxins, habitat loss, human disturbance, and illegal take.

The species can be observed on the Research Ranch during the summer months, but there are no known eyries in the project area (AWRR 2014). The closest known eyrie to the proposed project is 10 miles to the southeast in Carr Canyon of the Huachuca Mountains (AZGFD 2013).

Arizona Botteri's sparrow. Botteri's sparrow (*Peucaea botterii arizonae*) is a predominantly Mexican species that reaches the northernmost extreme of its distribution in southeastern Arizona and southern Texas (Webb and Bock 2012). Within Arizona, the sparrow is found in the Sonoita Plains (eastern Santa Cruz County and southwestern Cochise County). Habitats used include healthy semi-desert grassland, particularly areas of giant sacaton grass (*Sporobolus wrightii*) and oak (*Quercus*) woodland. They breed in small, isolated colonies located within these habitat types (Schmierer 2013).

Arizona Botteri's sparrows likely linger later into the fall than previously thought and are probably present in small and decreasing numbers through October (Schmierer 2013). Small numbers remain throughout the winter in at least some of their breeding locations, where they appear to establish territories. Numbers increase again in spring, but they remain uncommon in most areas. The species is difficult to detect except when they are actively territorial (singing or reacting to playbacks)(Schmierer 2013).

The mapped range of this species is within the project area and suitable habitat is present. Research Ranch reports the Arizona Botteri's sparrow to be common and/or breeds in the summertime (AWRR 2014).

Arizona grasshopper sparrow. Arizona grasshopper sparrow (*Ammodramus savannarum ammolegus*) ranges from southeastern Arizona, extreme southwest New Mexico, and adjacent northern Sonora and Chihuahua, Mexico (AZGFD 2010). In Arizona, it is common in grassland habitats between 3,400 and 5,200 feet in elevation. Arizona grasshopper sparrow prefers large expanses of relatively tall grass for nesting. Areas with trees, low grass cover, and high shrub densities appear to be avoided (Strong 1987). Nests are placed on the ground at the base of a grass tuft, forb, or shrub. This sparrow is omnivorous, its diet consisting of mostly insects in summer and grass and weed seeds in winter (AZGFD 2010). Average territory size is small (less than 2 ha) (Pulliam and Mills 1977, cited in Vickery 1996).

Arizona grasshopper sparrow is ranked by NatureServe as unrankable globally, N2 (Nationally Imperiled), and S2 (Imperiled) in the state of Arizona. The primary reason for its decline in North America is attributed to habitat loss, fragmentation, and/or degradation. Greatest threats to the species are from cattle grazing, shrub invasion of grasslands, and development (AZGFD 2010).

Arizona grasshopper sparrow is a permanent resident of the Research Ranch that commonly breeds within the grasslands (AWRR 2014). The closest known breeding location is 1 mile north of the project area (AZGFD 2013). The project area may be used by wintering or migrating individuals or by birds during the breeding season for foraging purposes.

Ferruginous hawk (breeding population only). The range of ferruginous hawk (*Buteo regalis*) is from southwestern Canada south through most of the western United States, and south to north-central Mexico (Bechard and Schmutz 1995, Glinski 1998). The birds are residents in northern Arizona, and many winter in southern Arizona (Glinski 1998). Typical habitats for ferruginous hawks are wide open grasslands, prairies, deserts, and open piñon-juniper woodland. Use of an area tends to be reduced by increased shrubby vegetation (Bechard and Schmutz 1995; Glinski 1998). Ferruginous hawks feed almost exclusively on small mammals, including prairie dogs, ground squirrels, jackrabbits and cottontails, but they also eat snakes, lizards, large insects, and occasionally bats (Ehrlich et al. 1988, Terres 1980). Nests are usually placed in large trees, but they may also nest on cliffs, banks, buttes, slopes, or clay or rock pinnacles (Ehrlich et al. 1992: Mikesic 2008; Terres 1980). Nesting normally occurs in March, with 3-4 white eggs laid between March and May.

Threats to the ferruginous hawk include habitat alteration, fragmentation, or loss, collisions with transmission lines and vehicles on highways, shooting and trapping of birds, and pesticides (AZGFD 2001c; Ehrlich et al. 1992; Terres 1980). Ferruginous hawk is a Wildlife Species of Concern in Arizona, a Species of Great Conservation Need for AZGFD, and a USFWS Bird Species of Conservation Concern (AZGFD 1996; 2006a; BLM 2010; USFWS 2008c).

The nearest occurrence of a breeding ferruginous hawk is approximately 225 miles north of the site near Rincon Basin. However, there is abundant suitable habitat for the ferruginous hawk within a large portion of the project area, and the birds are certain to be present in some areas at least while foraging. The Research Ranch reports the ferruginous hawk as a regular visitor in the winter (AWRR 2014).

Golden eagle. Golden eagle (*Aquila chrysaetos*) has a Holarctic distribution, and in the Americas it ranges from Alaska south to central Mexico. Golden Eagles are most abundant in the western half of North America, but may occur nearly anywhere within the continental United States in winter. It is a year-round resident within Arizona (Kochert et al. 2002). The species is found in a variety of habitats, but prefers open ground or low hills where visibility is good for hunting (Ehrlich et al. 1988, Glinski

1998). They nest on cliffs, large or small trees, and sometimes telephone poles, and prey is primarily rabbits and ground squirrels, but also snakes, birds, and large insects when mammals are unavailable (Ehrlich et al. 1988, Terres 1980, Glinski 1998).

Golden eagles are threatened by habitat loss, poisoning (from consuming carrion of poisoned animals), human disturbance (during nesting and occasionally from shooting), and highway deaths when the birds are attracted to road kills (AZGFD 2002d). Golden eagle is protected under the Bald and Golden Eagle Protection Act and is a Species of Great Conservation Need for AZGFD and Bird Species of Conservation Concern for USFWS (AZGFD 2006, BLM 2010, USFWS 2008c).

Golden eagles are present in low numbers throughout Santa Cruz County, and is a permanent, regular visitor on the Research Ranch (AWRR 2014). The nearest active territory is approximately 22 miles northwest of the project area (AZGFD 2013). Suitable habitat is present within the project area, and the bird may be present in some areas, at least while foraging.

***Northern goshawk*.** Northern goshawk (*Accipiter gentilis*) occurs throughout most of the northern and western United States, most of Canada, in portions of Mexico, and in nearly every county within Arizona. In Arizona, goshawk favors cool forests of tall pine, fir, and spruce, usually above 6,000 feet (AZGFD 2003a, Corman and Wise-Gervais 2005). Dominant prey is mammals (tree squirrels, rock squirrels, and cottontails) and birds (band-tailed pigeons, mourning doves, Stellar's jays, northern flickers, and Montezuma quail). Nests are most common in mature or old growth ponderosa pine forests along the Mogollon Rim, on the Kaibab Plateau, and in the southeastern mountains where they may breed in relatively low elevation oak forests down to 4,900 feet (AZGFD 2003a, Glinski 1998). Habitat requirements during winter are poorly understood (AZGFD 2003a).

Northern goshawk is ranked as G5 (Globally Secure), N4 (Nationally Apparently Secure), and S3 (Vulnerable) in Arizona. The greatest threat to this species is the loss of or decrease in stand density from the impacts of timber harvest. Other threats include fire suppression, grazing, and insect and tree disease outbreaks, resulting in the deterioration or loss of nesting habitat.

Surveys have not been conducted for northern goshawk within the project area, but it is within the known range of the species. However, suitable breeding habitat typically occurs at higher elevations, so it is unlikely that this species occurs within the project area. The Research Ranch reported goshawk as a rare, vagrant or accidental winter visitor (AWRR 2014). The nearest known breeding territory is approximately 6 miles south of the project site.

Western burrowing owl. Western burrowing owl (*Athene cunicularia*) is a grassland specialist distributed across most of western North America. They utilize abandoned underground burrows of small mammals for nesting and escape cover, and often enlarge the holes to suit their needs (Arizona Burrowing Owl Working Group 2009, AZGFD 2001b). In Arizona, burrowing owls live in dry, open, rolling hills, well-drained

grasslands, deserts, and open, bare ground with gullies and arroyos at elevations ranging from 650 to 6,140 feet (AZGFD 2001b). Burrowing owls are opportunistic feeders, and in Arizona they feed primarily on large insects, small mammals, fish, reptiles, amphibians, birds, and even prickly pear cactus seeds (AZGFD 2001b). Foraging microhabitat typically includes short-grass, mowed, or overgrazed pastures. The species is commonly associated with prairie dog colonies. A large proportion of burrowing owls in southern and western Arizona are thought to be nonmigratory.

Current factors that are contributing to the owl's decline include habitat alteration and fragmentation (AZGFD 2001b). No recent surveys for this species have been conducted within the project area. The Research Ranch reported the burrowing owl as a rare, vagrant or accidental visitor to the area (AWRR 2014). Suitable habitat may be present at lower elevations within the pedestrian access area. There are no burrows suitable for burrowing owl nesting or roosting in the staging area or construction impact area.

Sonoran desert tortoise. On December 14, 2010, USFWS determined that listing the Sonoran population of the desert tortoise (*Gopherus morafkai*) was warranted but precluded by higher priority listing actions (USFWS 2010a). However, the USFWS subsequently determined the Sonoran desert tortoise did not warrant endangered or threatened species protection and would be removed from the ESA candidate list (USFWS 2015). The Mohave population of desert tortoise was recently distinguised from *G. morafkai* as a full species (*G. agassizii*). The Sonoran desert tortoise ranges east of the Colorado River across southwestern Arizona (except Cochise County) and southward into Mexico at elevations of 984 to 3,500 feet. The species is found most commonly on rocky, steep slopes and bajadas [lower mountain slopes often formed by the coalescing of several alluvial fans (fan-shaped deposits at the ends of canyons formed when fast flowing streams slow and widen)] and in paloverde-mixed cacti associations (USFWS 2010a). The species is usually inactive from mid-November until February, with peak activity in summer (Averill-Murray et al. 2002). Sonoran desert tortoise eats a variety of plants, including grasses, forbs, succulents, and shrubs (Van Devender et al. 2002). Both exotic and native plant species are consumed. Current threats to Sonoran desert tortoise include loss, modification, and fragmentation of habitat.

The project area is east of the species' known range; no desert tortoise has been documented within the Research Ranch (Cogan 2012). The nearest known occurrence is approximately 23 miles southwest of the project area (AZGFD 2013).

Sonora mud turtle. The Sonora mud turtle (*Kinosternon sonoriense*) occurs in central and southeastern Arizona, southwestern New Mexico, and south into Mexico in the Rio Yaqui watershed and east to the Rio Casas Grandes near Nuevo Casas Grandes, Chihuahua. The species occupies shallow, clear, perennial waters of streams, ponds, springs, and irrigation ditches up to elevations of 6,500 feet; it is known from ephemeral drainages in southern Arizona (Brennan and Holycross 2006, Degenhardt et al. 1996). Sonora mud turtles forage while walking on the bottoms of their aquatic habitat, feeding primarily on a variety of invertebrates, fish, and amphibians, but will consume vegetation when animal foods are not readily available.

Habitat modification and alteration particularly that associated with agricultural water irrigation and diversion may adversely affect the species. The species is susceptible to accumulated pesticides and heavy metal poisoning. American bullfrogs will consume juvenile Sonora mud turtles, and introduced crayfish may affect populations through competition or predation (Rosen 2008, Schwalbe and Rosen 1988). The Sonora mud turtle is an Arizona BLM sensitive species, and a Species of Great Conservation Need in Arizona (AZGFD 2006; BLM 2010).

The Sonora mud turtle occurs on the Research Ranch (AWRR 2013), and individuals have been observed in the pool immediately behind the upper BLM dam (when water has been present). Thus, it is anticipated that the species occurs seasonally (when pools are present) within the project area.

Ornate box turtle. The desert substpecies of ornate box turtle (*Terrapene ornata luteola*) is distributed southeastern Arizona, southern New Mexico, and portions of northern Mexico (Stebbins 1985). Habitat used within Arizona is primarily grassland, and occasionally desert scrub, from 2,000 to 7,100 feet in elevation. Individuals hibernate in the winter and mate upon emerging in the spring and throughout their active season. Females lay one to two clutches a year. Desert ornate box turtle feeds on plant and animal material, including dead mammals, birds and their eggs, toads, grass, cactus fruits, melons, and insects (AZGFD 2008).

The ornate box turtle has been recorded at the Research Ranch (AWRR 2013). According to Cogan (2012), sightings of box turtles within the Research Ranch have been documented near lower O'Donnell Canyon in association with sacaton. It is anticipated that the species occurs within the project area.

Slevin's bunchgrass lizard. Slevin's bunchgrass lizard (*Sceloporus slevini*) is known from southeastern Arizona, southwestern New Mexico, and Mexico. In Arizona, the species is found in Madrean evergreen woodland, Petran montane conifer forest, and Petran subalpine conifer forest communities at elevations from 4,300 to over 9,000 feet (Brennan and Holycross 2006; Brennan 2008, AZGFD 2003b). This lizard preys on a variety of insects and spiders.

The greatest threats to this species appear to be overgrazing by cattle, and drought. (Brennan and Holycross 2006). Slevin's bunchgrass lizard is ranked by NatureServe as G4 (Globally Apparently Secure), N2–N3 (Nationally Vulnerable to Imperiled), and S2 (Imperiled) in the state of Arizona (NatureServe 2013b).

The species has been documented within the boundaries of the Research Ranch (AWRR 2013). The species was once considered abundan, but recent surveys have indicated a drastic decline within the Research Ranch (Cogan 2012). The nearest known occurrence is approximately 1.5 miles north of the project area (AZGFD 2013a). It is possible that this species occurs within the project area.

3.4.12 Environmental Consequences – BLM Sensitive Species

No Action

Under the no action alternative, there would be no direct impact to BLM Sensitive Species, since no project would be constructed. Impacts to sensitive species would be limited to those occurring from natural events such as floods and wildfire, and land management actions authorized by the BLM and the Research Ranch. See the analysis in section 3.4.8 on Fish and Aquatic Wildlife for additional information.

In the long term, the effects of invasive, nonnative species may eventually lead to the listing of BLM aquatic sensitive species.

Proposed Action (Upper BLM Dam Abutment Stabilization)

BLM sensitive fish. Construction-related impacts to longfin dace and Sonora sucker would be similar to those described for Gila chub and Gila topminnow above, with negligible effects in the action area due to the fish not typically inhabiting the area, and long-term beneficial effects due to prevention of invasion of nonnative fishes. (See section 3.4.8 on Fish and Aquatic Wildlife).

BLM sensitive plant species. No BLM sensitive plant species have been reported in the project area. Impacts to sensitive plant species, if present, would most likely be limited to the area affected by earth-moving activity and herbicide application. The short-term trampling effect of dispersed foot traffic on dormant plants is expected to be negligible. The proposed project may impact individual plants, but would not contribute to a trend towards Federal listing or cause a loss of viability to sensitive plant populations or species.

BLM sensitive bat species. The project would have no impact on bat species or individuals. No known caves occur within the project area and potential roosts (exfoliating bark) would not be impacted by construction. There would be either no loss or nominal loss of foraging habitat. Bat foraging activity would not be expected during the proposed late autumn-winter construction period. The proposed project would not contribute to a trend towards Federal listing or cause a loss of viability to sensitive bat populations or species.

BLM terrestrial mammal species. The project would have negligible impact on banner-tailed kangaroo rat, if present. This species forages only at night and resides in its burrow during the day. There is no evidence of banner-tailed kangaroo rat burrows at the proposed staging area or in areas that would be affected by earth-moving activities.

Other species of concern include black-tailed prairie dog (*Cynomys ludovicianus*) and Gunnison's prairie dog (*Cynomys gunnisoni*). Neither species is known to occur on the

research ranch. There is no evidence of prairie activity at the proposed staging area or in areas that would be affected by earth-moving activities.

The proposed project would not contribute to a trend towards Federal listing or cause a loss of viability to terrestrial mammal populations or species.

BLM sensitive avian species. Effects on avian species are expected to be limited and include noise disturbance and localized trampling and/or removal of grass cover and forage. Noise disturbance and human activity may temporarily displace overwintering avian species from the project area. Suitable forage and cover habitat is available in surrounding areas and the region. There would be no effect to the quantity or quality of roost trees or potential nesting habitat. Project construction would occur outside the avian breeding season. The proposed project would not contribute to a trend towards Federal listing or cause a loss of viability to sensitive avian populations or species.

BLM sensitive reptile species. Construction activities would be localized, short-term, and would not meaningfully modify the habitat characteristics within or adjacent to the project area. In addition, construction would coincide with the cold-season dormancy period for most local reptile species. The project area is outside of the current range of the Sonoran desert tortoise; consequently there would be no effect to that species. The proposed project would not contribute to a trend towards Federal listing or cause a loss of viability to sensitive reptile populations or species.

Cumulative Effects

Natural occurrences, such as flood and wildfires, and anthropogenic changes, like land development and livestock grazing, may affect riparian and upland habitat for sensitive species. These events can singularly or cumulatively affect sensitive species through alterations in habitat characteristics. The minor effects of the project when added to past, present, and reasonably foreseeable future impacts would not result in a trend toward Federal listing, change in population size, or loss of viability for special status species. There would be a net cumulative benefit toward conservation of native fishes within O'Donnell Canyon.

3.5 CULTURAL RESOURCES

3.5.1 Affected Environment

Southern Arizona was occupied by small mobile bands of hunter-gathers from the beginning of the Paleoindian period about 11,000 B.C. By the end of the Archaic, pithouse villages were established near agricultural fields along the larger streams, while procurement and camp sites continued to be located away from major river valleys. Probable Archaic sites are represented by lithic scatters and possible camp sites on ridge tops and near water sources.

An agricultural economy, combined with hunting and wild plant collecting, continued to be followed throughout the rest of the Early Agricultural and Ceramic period (ending ca. 1450 A.D.) in southern Arizona. Ceramic period occupation in the O'Donnell Canyon area is indicated by scattered habitation sites along major drainages as well as smaller, probable special use sites. Ceramics and other artifacts from identified sites suggest interaction with the Trincheras Culture to the south as well as the Hohokam to the north.

The O'odham were occupying the area around O'Donnell Canyon and nearby Babocomari River when the Spanish first visited the area in the 1690s. After settling in the Santa Cruz Valley, Spanish settlers also utilized the Canelo area for limited mining, charcoal production, and grazing until increased Apache hostilities forced its abandonment in the mid to late 1700s. The Canelo Hills area was used intermittently by the O'odham, Mexicans, and Americans after the Gadsden Purchase (1854) when southern Arizona became part of the United States. Mining and grazing became better established after Apache hostilities declined in the 1880s, and grazing continues to be the major land use in the area today.

Most archaeological survey that has taken place in the action area has been conducted by the CNF and BLM in association with a number of projects, including fence lines, communication lines, and range allotment management plans. Three previously identified archaeological sites are located within a mile of the upper BLM dam, but none are close enough to be affected by construction or staging activities.

Reclamation conducted a Class III (intensive) archaeological survey of all areas that may be impacted by earth-moving activities and equipment/material staging, including the proposed construction site, temporary laydown area, and staging area. No eligible cultural resources were identified within these areas. A Class I literature search did not identify documented cultural resource sites along the proposed pedestrian route to the construction site. Pedestrian routes were not physically surveyed due to the high density of herbaceous vegetation and poor visibility of the ground surface (see Chapter 7, National Historic Preservation Act, for additional information). Dispersed pedestrian traffic during construction would be expected to have a low impact on cultural resources, if present.

The project scoping notice was sent to 12 Native American tribes with traditional ties to southeastern Arizona (see Chapter 5). The White Mountain Apache Tribe commented that it had no cultural resource or traditional cultural property concerns in the study area. In addition, the Hopi Nation and Gila River Indian Community concurred with Reclamation's determination of no historic properties affected, based on consultation with those tribes. No comment letters were received from the other tribes.

3.5.2 Environmental Consequences

No Action

Under the no action alternative, there would be no direct impact to cultural resources because no project would be implemented. It is assumed that current land use and management practices would continue into the foreseeable future, as would Federal protection to cultural properties.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Ground-disturbing activities mostly would be limited to the construction site and staging area. Construction efforts would include material staging at the FSR 5626 turnaround and laydown of equipment and material on the terrace adjacent to the dam. Equipment and supplies would be flown in by helicopter from established roads, thus avoiding any impact to cultural resources from construction material haulage. Construction personnel would access the work area by parking at the end of FR 5626 and hiking across BLM land to the upper dam. None of the proposed construction or related activities would impact any known eligible historical properties or archaeological sites based on Class I and Class III surveys of the area of potential effect (APE). Findings of "no historic properties affected" were made by Reclamation and submitted to the State Historic Preservation Office on July 2, 2007 (APE ecompassing the construction site and laydown area) and September 26, 2013 (APE encompassing the staging area).

Cumulative Effects

There would be no cumulative effect to cultural resources.

3.6 AIR QUALITY

3.6.1 Affected Environment

Air quality is determined by the ambient concentrations of pollutants that are known to have detrimental effects on public health and the environment. In accordance with Section 109 of the Clean Air Act (CAA), the U.S. Environmental Protection Agency has promulgated National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide, nitrogen dioxide, particulate matter (PM_{10} and $PM_{2.5}$), ozone, sulfur dioxide, and lead. Areas with air quality that do not meet the standards are designated as "nonattainment areas." Designation of nonattainment submits an area to regulatory control of pollutant emissions so that attainment of the NAAQS can be achieved within a designated time period. The area encompassing lower O'Donnell Canyon is in attainment for all regulated NAAQS. Air quality is good.

The CAA provides special protection for visibility and other air quality related values in specially designated Class 1 areas where the cleanest and most stringent protection from air quality degradation is considered important. These areas include National Parks and

Wilderness Areas which have been specifically designated Class 1 under Section 162(a) of the CAA. Class 1 designation allows almost no degradation in air quality. The closest Class 1 airshed is associated with the 57,930-acre Saguaro Wilderness Area approximately 35 miles north of the project area.

Executive Order (EO) 13514 directs Federal agencies to promote pollution prevention and reduce emissions of greenhouse gases (GHGs) that result from their actions. The CEQ (2010) defines GHGs as CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Globally, sources of human-induced emissions of GHGs include mainly burning of fossil fuels for power generation and transportation, with significant contributions from clearing of forests, agricultural practices, and other similar activities. In the study area, principal local sources of GHGs include combustion emissions from equipment and light vehicles used in ranching, construction, and personal and commercial transportation. Emission of GHGs is believed by most scientists to affect changes in climate.

3.6.2 Environmental Consequences

No Action

Under the no action alternative, there would be no direct impact to air quality because no project would be implemented. Existing ambient air quality would persist into the foreseeable future.

Proposed Action (Upper BLM Dam Abutment Stabilization)

The release of fugitive dust from construction would have a negligible transient effect on ambient air quality in the project area. Minor amounts of fugitive dust would be emitted from excavation at the construction site and intermittent vehicular travel at slow speeds on FR 5632 and 5622. These emissions would be localized and sporadic, persisting in low levels only during periods of active earth moving and vehicle operation.

Fugitive dust would be generated by helicopter rotor wash when the helicopter is hovering during long-line pick-up and delivery of material and equipment. Dust emissions from flight operations would be localized and transient, persisting only during periods when material and equipment are being transported to the construction site.

The operation of construction vehicles and the helicopter would generate minor amounts of engine combustion products such as nitrogen and nitrous oxides, carbon dioxide, and reactive organic gases. These emissions would not produce measurable changes in ambient concentrations of regulated pollutants or result in a change in attainment status for the air quality region. Emission of GHGs from project implementation actions would be below levels considered relevant to global processes that affect climate change.

Cumulative Effects

Particulate and gaseous exhaust emissions (including GHGs) from the proposed project would be cumulative to pollutants emitted from other natural and anthropogenic sources into the atmosphere. The very small quantities of pollutants released during construction would have a negligible, short-term cumulative effect on local air quality or global processes that lead to climate change. There would be no direct, indirect, or cumulative effect on Class 1 airsheds or nonattainment areas.

3.7 HAZARDOUS MATERIAL AND SOLID WASTE

3.7.1 Affected Environment

No sites contaminated with hazardous or non-hazardous solid wastes are known to occur within the construction and staging areas (http://www.epa.gov/enviro). Use, storage, and disposal of hazardous materials and solid waste associated with construction have the potential to adversely affect the environment if these materials are improperly managed. In general, most potential impacts are associated with the release of these materials to the environment. Direct impacts of such releases would include contamination of soil, water, and vegetation, which could result in indirect impacts to wildlife, aquatic life, and humans.

3.7.2 Environmental Consequences

No Action

Under the no action alternative, there would be no direct impact resulting from the use of hazardous materials because no project would be implemented. Existing conditions would prevail within the action area.

Proposed Action (Upper BLM Dam Abutment Stabilization)

The proposed action would require the short-term use of a small quantity of fuel to operate a power generator. A chemical toilet would also be present at the worksite. No hazardous substances as defined by 40 CFR 355 would be used, produced, stored, transported, or disposed of in amounts above threshold quantities. Spills of fuel would require immediate corrective action and cleanup to minimize any potential adverse effect on sensitive resources. Any soil contaminated by fuel would be removed and transported by the contractor to an appropriately permitted disposal facility.

All solid waste generated by construction would be removed by the contractor and disposed of in accordance with Federal and State regulations.

Cumulative Effects

Appropriate hazardous material management and waste disposal would obviate any cumulative impacts on the environment.

3.8 ENVIRONMENTAL JUSTICE

3.8.1 Affected Environment

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was issued by the President of the United States on February 11, 1994. This order established requirements to address Environmental Justice concerns within the context of agency operations. As part of the NEPA process, agencies are required to identify and address disproportionately high and adverse human health or environmental effect on minority or low-income communities. Federal agencies are directed to ensure that Federal programs or activities do not result, either directly or indirectly, in discrimination on the basis of race, color, or national origin.

The project area consists of undeveloped and uninhabited Federal land. Private lands near the project area are sparsely populated with single family dwellings and ranch properties. The nearest private residence is approximately ¾ mile northeast of the upper BLM dam.

3.8.2 Environmental Consequences

No Action

Existing conditions would prevail into the foreseeable future.

Proposed Action (Upper BLM Dam Abutment Stabilization)

The proposed action would be confined to uninhabited Federal land. There would be no disproportionately high and adverse human health or environmental effect to populations described under EO 12898.

Cumulative Effects

There would be no cumulative effects to EO 12898 populations.

3.9 INDIAN TRUST ASSETS

3.9.1 Affected Environment

Indian trust assets are legal interests in property held in trust by the United States through the Department of the Interior for federally recognized Indian tribes or individual tribal

members. Examples of things that may be trust assets are lands, mineral rights, hunting, fishing, or traditional gathering rights and water rights. The United States, including all of its bureaus and agencies, has a fiduciary responsibility to protect and maintain rights reserved by or granted to Indian tribes or individual tribal members by treaties, statutes, and Executive Orders. This trust responsibility requires that all Federal agencies, including Reclamation, ensure their actions protect trust assets. Secretarial Order 3175 (incorporated into the Departmental Manual at 512 DM 2) requires that when proposed actions of a DOI agency might affect trust assets, the agency must address those potential impacts in planning and decision documents and the agency consult with the tribal government whose trust assets are potentially affected.

The study area is located on uninhabited Federal land. No Indian trust assets have been identified in this area.

3.9.2 Environmental Consequences

No Action

Under the No Action alternative, there would be no impact to Indian trust assets because no project would be implemented.

Proposed Action (Upper BLM Dam Abutment Stabilization)

Information regarding the proposed project was sent to the 12 tribes listed in Chapter 4. The tribes did not comment on the possible occurrence of Indian trust assets in the action area. No impact to Indian trust assets is anticipated.

Cumulative Effects

There would be no cumulative effects to Indian trust assets.

1. Equipment would be washed prior to entering the construction site to prevent incidental spread of weed seeds.

2. Areas of noxious weeds at the construction site would be identified and treated before and after construction using integrated pest management practices approved by BLM.

3. If any federally listed species (other than fish) are identified in the project area, construction activities would be halted until appropriate consultation with the USFWS can be initiated.

4. Contractor would exercise care to preserve the natural landscape and conduct operations so as to prevent unnecessary destruction, trampling, or defacing of the natural surroundings in the vicinity of the work. The amount of land needed for contractor use would be minimized to the extent necessary to implement the project.

5. Project implementation would be coordinated with the Research Ranch.

6. All agave species found within the pedestrian access area would be flagged and avoided.

7. Pedestrian access would be limited to marked boundaries.

8. The big sacaton, lemonade bush and grapevine adjacent to the construction area would be temporarily fenced during construction.

9. The construction site would site would be reseeded with a native plant seed mixture recommended by the Research Ranch.

CHAPTER 5 – CONSULATATION AND COORDINATION

List of Agencies and Persons Contacted

Reclamation submitted scoping information to the following entities during development of the EA. The names of individuals that were notified of the NEPA review and/or submitted comments are part of the administrative record. Those names are available upon request.

Indian Communities:

Ak-Chin Indian Community
Gila River Indian Community
Mescalaro Apache Tribe
Pueblo of Zuni
Salt River Pima-Maricopa Indian Community
San Carlos Apache Tribe
The Hopi Tribe
Tohono O'odham Nation
Pascua Yaqui Tribe
White Mountain Apache Tribe
Fort Sill Apache Tribe
Yavapai-Apache Nation

County Agencies:

Santa Cruz County Board of Supervisors

State Agencies:

Arizona Department of Environmental Quality
Arizona Department of Water Resources
Arizona Game and Fish Department
Arizona State Historic Preservation Office

Federal Agencies:

USDA Forest Service, CNF
Bureau of Land Management – Cooperating Agency
U.S. Fish and Wildlife Service – Cooperating Agency
U.S. Army Corps of Engineers

Conservation and Environmental Organizations:

Audubon Arizona
Center for Biological Diversity
Desert Fishes Council
Sierra Club – Rincon Group
Sky Island Alliance
The Nature Conservancy

Grazing Organizations:

Arizona Cattle Growers Association

Other Organizations

Appleton-Whittell Research Ranch
Patagonia Public Library

CHAPTER 6 - LIST OF PREPARERS

List of Preparers

John McGlothlen, Bureau of Reclamation, NEPA Specialist
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Jami Kuzek, Arizona Game and Fish Department, HDMS Data Specialist
Jeffrey Simms, Bureau of Land Management, Fish Biologist
Marcia Radke, Bureau of Land Management, Wildlife Biologist

CHAPTER 7 - RELATED ENVIRONMENTAL LAWS/DIRECTIVES

The CEQ regulations encourage agencies to "integrate the requirements of NEPA with other planning and environmental review procedures required by law." Coordinating NEPA procedures with those of other Federal environmental statutes and executive orders facilitates NEPA objectives by promoting efficiencies in environmental planning and development of relevant information on which to base agency decisions. This integrative approach to NEPA ensures planning, review and compliance processes run concurrently rather consecutively with procedures required by other environmental laws.

The following is a list of Federal laws, Executive Orders (EOs), and other directives that apply to the proposed project discussed in this EA:

National Environmental Policy Act
NEPA requires Federal agencies to evaluate the potential environmental consequences of major Federal actions. An action becomes "federalized" when it is implemented, wholly or partially funded, or requires authorization by a Federal agency. The intent of NEPA is to promote consideration of environmental impacts in the planning and decision-making process prior to project implementation. NEPA also encourages full public disclosure of the proposed action, accompanying alternatives, potential environmental effects, and mitigation.

Pursuant to NEPA and DOI regulations at 43 CFR Part 46, scoping information and the EA were made available for public review. Comments from the public, organizations, and agencies were considered by the responsible Federal officials during the decision-making process. Input from the public was instrumental in the development of the proposed action.

Fish and Wildlife Coordination Act FWCA
The FWCA provides a procedural framework for the consideration of fish and wildlife conservation measures in Federal water resource projects. Coordination with the USFWS and State wildlife management agencies is required "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States."

The proposed project is not a water resource project under the purview of the FWCA.

Endangered Species Act
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 their activities do not jeopardize the continued existence of threatened or endangered species or adversely modify designated critical habitat.

Implementation of the project is a conservation measure specified by the USFWS in the 2008 biological opinion. The USFWS determined in the biological opinion that further ESA section 7(a)(2) consultation on listed aquatic species covered under the opinion was not required for fish barrier construction. In addition, the USFWS concluded that the proposed fish barrier is likely to enhance the critical habitat of Gila chub and Gila topminnow by reducing threats from nonnative aquatic species. Possible effects to terrestrial and semi-aquatic listed species resulting from project implementation were examined in a BA prepared by Reclamation and submitted to USFWS.

In its BA, Reclamation concluded that the proposed project would have no effect to federally-listed Canelo ladies'-tresses, Huachuca water umbel, jaguar, lesser long-nosed bat, Mexican spotted owl, ocelot, southwestern willow flycatcher, and yellow-billed cuckoo. Arizona tree frog and Sprague's pipit are candidate species and an effects determination is not required. Northern Mexican gartersnake is present near the project area, and Reclamation concluded the proposed project may affect, but is not likely to adversely affect, this species. Reclamation also concluded the project will not adversely modify the gartersnake's proposed critical habitat. Once the project is completed, effects to northern Mexican gartersnake are expected to be beneficial.

Migratory Bird Treaty Act (MBTA)
The MBTA implements various treaties and conventions between the United States and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless permitted by regulation, the MBTA makes it unlawful to pursue, hunt, take, capture, kill, possess, import, export, transport, sell, or purchase any migratory bird, their eggs, parts, or nests.

Construction would be conducted duting late autumn and early winter to avoid the breeding seasons of avian species likely to occur in the project area. There would be no adverse effect to migratory birds as considered under the MBTA.

Clean Air Act
The CAA requires any Federal entity engaged in an activity that may result in the discharge of air pollutants must comply with all applicable air pollution control laws and regulations (Federal, State, or local). It also directs the attainment and maintenance of National Ambient Air Quality Standards (NAAQS) for six different criteria pollutants including carbon monoxide, ozone, particulate matter, sulfur oxides, oxides of nitrogen, and lead. Air quality in the project area is in attainment of NAAQS.

Short-term construction emissions (particulate and gaseous matter) associated with the proposed project would have short-term, localized and minor effects on air quality. The action area is not located in a nonattainment area, maintenance area, or Class I airshed.

Clean Water Act
Waters of the U.S. include various streams, ponds, wetlands, and other water bodies and aquatic features as defined by law and regulations under the Clean Water Act (CWA), Supreme Court rulings, and U.S. Environmental Protection Agency and U.S. Army Corps

of Engineers (USACE) guidance regarding the law, regulations, and rulings. The USACE regulates discharges of fill material to waters of the U.S., pursuant to Section 404 of the CWA, and issues permits for actions proposed within such waters. Jurisdictional, non-tidal waters of the U.S. regulated by the USACE are defined in 33 CFR § 328.4 (c) as those that comprise the area of a water course that extends up to the ordinary high-water mark, in the absence of wetlands. In Arizona, actions that require a CWA 404 permit are also subject to the CWA 401 water quality certification requirements of the Arizona Department of Environmental Quality.

Although a CWA Section 404 permit and Section 401 water quality certification have been issued for the project by the USACE and Arizona Department of Environmental Quality, respectively, the discharge of fill material resulting from construction will be outside waters of the U.S. and not subject to USACE jurisdiction. This determination is based on a delineation of the ordinary high water mark that was performed by Reclamation and submitted to the USACE.

The National Historic Preservation Act (NHPA)
Section 106 of the NHPA requires that Federal agencies evaluate the effects of Federal undertakings on historical, archaeological, and cultural resources and provide opportunities for the Advisory Council on Historic Preservation and the State Historic Preservation Office (SHPO) to comment on the proposed undertaking. The lead agency must examine whether there are feasible alternatives that would avoid such effects. If an effect cannot reasonably be avoided, measures must be taken to minimize or mitigate potential adverse effects.

An archaeologist from Reclamation conducted Class I and Class III surveys of areas that would be subject to ground-disturbing activities under the proposed action. No cultural resources were identified within the area of potential effect, which include the staging and contractor use areas and construction area. Survey reports with findings of no historic properties affected were submitted to the SHPO. The SHPO has concurred with the "no effect" determination.

No survey of the pedestrian access area was completed. BLM and Reclamation agreed that the current vegetation cover along the proposed pedestrian route was too thick to adequately survey the ground surface. In addition, the short-term and dispersed nature of foot traffic is expected to have low impact. Instead, the Reclamation archaeologist would meet the work crews on site the first day of construction (or before) to provide a briefing on access issues and constraints. In the event cultural resources are discovered, the site would be brought to the attention of the Reclamation archaeologist and avoided. A cultural resources report would be completed by Reclamation to document this action. The BLM archaeologist will be notified well in advance of construction, and if available, would also meet the crews on site.

Resource Conservation and Recovery Act (RCRA)
RCRA establishes thresholds and protocols for managing and disposing of solid waste. Solid wastes that exhibit the characteristic of hazardous waste, or are listed by regulation

as hazardous waste, are subject to strict accumulation, treatment, storage, and disposal controls.

The proposed project is not expected to generate hazardous waste as defined and regulated under RCRA. Nonhazardous solid waste would be disposed of in accordance with State and Federal regulations at an approved landfill. Spills and disposal of petroleum contaminated media would be managed in accordance with State and Federal requirements. Vehicles and heavy equipment use would be restricted to existing roads and the road-side staging area.

Executive Order 11988 - Floodplain Management
EO 11988 requires 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. If the only practical alternative involves siting in a floodplain, the agency must minimize potential harm to or in the floodplain and explain why the action is proposed in a flooplain.

The proposed project is necessary for protection of the existing native fish community and potential recovery of listed species. Because the nature of the project requires minor construction in a floodplain, no practicable alternative exists. There would be no reduction in the capacity of the floodplain to convey flood waters, or increased threat to human health, welfare, and safety.

Executive Order 11990 - Wetlands
EO 11990 requires Federal agencies, in carrying out their land management responsibilities, to take action that would minimize the destruction, loss, or degradation of wetlands and take action to preserve and enhance the natural and beneficial values of wetlands.

The proposed project would not impact wetlands.

Executive Order 12898 - Environmental Justice
EO 12898 requires Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income populations. Federal agencies must ensure that their programs or activities do not directly or indirectly result in discrimination on the basis of race, color, or national origin. Federal agencies must provide opportunities for input into the NEPA process by affected communities and must evaluate the potentially significant and adverse environmental effects of proposed action on minority and low-income communities during environmental document preparation.

As described in the Environmental Justice section of this EA, the proposed project would affect unpopulated public lands administered by the BLM and the Forest Service; consequently, there would be no impact to low income or minority populations.

Secretarial Order 3175 (incorporated into Departmental Manual at 512 DM 2)
SO requires DOI agencies to address the effects of their actions on Indian trust assets in planning and decision making and consult with the tribal government whose trust resources are potentially affected by the Federal action.

As described in the Indian Trust Asset section of this EA, the proposed project would affect public lands administered by the BLM and the Forest Service. There would be no impact to Indian trust assets.

CHAPTER 8 – LITERATURE CITED

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Appendix A
Bureau of Land Management's Sensitive Species Listing for the Tucson Field Office (2010)

Common Name	Scientific Name
AMPHIBIANS	
Great Plains Narrow-Mouthed Toad	*Gastrophryne olivacea*
Lowland Leopard Frog	*Rana yavapaiensis*
Northern Leopard Frog	*Rana pipiens*
Plains Leopard Frog	*Rana blairi*
Sonoran Green Toad	*Bufo retiformis*
BIRDS	
American Peregrine Falcon	*Falco peregrinus anatum*
Arizona Botteri's Sparrow	*Peucaea botterii arizonae*
Arizona Grasshopper Sparrow	*Ammodramus savannarum ammolegus*
Cactus Ferruginous Pygmy-Owl	*Glaucidium brasilianum cactorum*
Desert Purple Martin	*Progne subis hesperia*
Ferruginous Hawk (breeding population only)	*Buteo regalis*
Gilded Flicker	*Colaptes chrysoides*
Golden Eagle	*Aquila chrysaetos*
Le Conte's Thrasher	*Toxostoma lecontei*
Northern Goshawk	*Accipiter gentilis atricapillus*
Western Burrowing Owl	*Athene cunicularia hypugaea*
FISH	
Bluehead Sucker	*Catostomus discobolus*
Desert Sucker	*Catostomus clarki*
Little Colorado Sucker	*Catostomus* sp.
Longfin Dace	*Agosia chrysogaster*
Sonora Sucker	*Catostomus insignis*
Speckled Dace	*Rhinichthys osculus*
INVERTEBRATES	
Arizona Cave Amphipod	*Stygobromus arizonensis*
Bylas Springsnail	*Pyrgulopsis arizonae*
Gila Tryonia	*Tryonia gilae*
Hydrobiid Spring Snails	all species in genus *Pyrgulopsis*
REPTILES	
Arizona Striped Whiptail	*Aspidoscelis arizonae*
Slevin's Bunchgrass Lizard	*Sceloporus slevini*
Ornate Box Turtle	*Terrapene ornata*

Sonora Mud Turtle	*Kinosternon sonoriense sonoriense*
Sonoran Desert Tortoise	*Gopherus morafkai*

MAMMALS

Arizona Myotis	*Myotis occultus*
Banner-tailed Kangaroo Rat	*Dipodomys spectabilis*
Black-tailed Prairie Dog	*Cynomys ludovicianus*
California Leaf-nosed Bat	*Macrotus californicus*
Cave Myotis	*Myotis velifer*
Greater Western Mastiff Bat	*Eumops perotis californicus*
Gunnison's Prairie Dog	*Cynomys gunnisoni*

PLANTS

Aravaipa Sage	*Salvia amissa*
Aravaipa Woodfern	*Thelypteris puberula var. sonorensis*
Bartram Stonecrop	*Graptopetalum bartramii*
Clifton Rock Daisy	*Perityle ambrosiifolia*
Dalhouse Spleenwort	*Asplenium* (= *Ceterach*) *dalhousiae*
Fish Creek Fleabane	*Erigeron piscaticus*
Gentry Indigo Bush	*Dalea tentaculoides*
Giant Sedge	*Carex spissa var. ultra*
Huachuca Golden Aster	*Heterotheca rutteri*
Huachuca Milkvetch	*Astragalus hypoxylus*
Pima Indian Mallow	*Abutilon parishii*
Purple-spike Coralroot	*Hexalectris warnockii*
Round-leaf Broom	*Errazurizia rotundata*
San Pedro River Wild Buckwheat	*Eriogonum terrenatum*