

# RECLAMATION

*Managing Water in the West*

## **Final Environmental Assessment for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County**



U.S. Department of the Interior  
Bureau of Reclamation  
Phoenix Area Office  
Glendale, AZ 85306

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## **Mission Statements**

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

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**

<b>Acronym</b>	<b>Explanation</b>
ADWR	Arizona Department of Water Resources
AFA	Acre Feet Annually or Per Year
AGFD	Arizona Game and Fish Department
ANWRF	Agua Nueva Water Reclamation Facility
AWSA	Arizona Water Settlements Act
AZDEQ	Arizona Department of Environmental Quality
CAP	Central Arizona Project
CEQ	President's Council on Environmental Quality
CFR	Code of Federal Regulations
CMID	Cortaro-Marana Irrigation District
CWA	Clean Water Act
DOI	Department of Interior
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FWS or USFWS	U.S. Fish and Wildlife Service
GIS	Geographical Information Systems
GSF	Groundwater Savings Facility
IGA	Intergovernmental Agreement
ITA	Indian Trust Assets
LTSC	Long Term Storage Credit
MBTA	Migratory Bird Treaty Act
MDWID or Metro Water	Pima County and Metropolitan Domestic Water Improvement District
mg/L	milligrams per liter
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources and Conservation Service
P.L.	Public Law
Reclamation	Bureau of Reclamation
SAWRSA	Southern Arizona Water Rights Settlement Act
SCR	Santa Cruz River
Secretary	Secretary of the Interior
TES	Threatened and Endangered Species
TRWRF	Tres Rios Water Reclamation Facility
TSS	Total Suspended Solids
USGS	United States Geological Survey
WRF	Water Reclamation Facility
WRRC	Water Resources Research Center
YBC	Yellow-Billed Cuckoo



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## 1.0 Introduction

The Bureau of Reclamation (Reclamation) has prepared an Environmental Assessment (EA) to analyze the potential environmental impacts associated with the construction of a temporary project would reuse up to 7,000 acre-feet annually (AFA) of effluent from Pima County's Tres Rios Water Reclamation Facility (WRF) to a Groundwater Savings Facility (GSF). The temporary project would deliver an initial quantity of 2,200 AF with a maximum delivery of 7,000 AF of effluent annually through 1100 linear feet of new pipeline and an existing CMID pipeline to the GSF. Reclamation would receive Long Term Storage Credits (LTSC) from the Arizona Department of Water Resources (ADWR) for each acre-foot of effluent delivered through the temporary project. The project includes approximately 1100 linear feet of new pipeline which would be covered with soil. The EA also evaluates the impacts of several inter-governmental agreements and partnerships needed to implement the project. The Proposed Action is a temporary project that will assist Reclamation in meeting some of its obligations under current water settlement laws.

The Secretary of the Interior (Secretary) and the City of Tucson entered into a contract to provide for delivery of 28,200 AFA of reclaimed water in October 1983 as part of SAWRSA (307(a)(1)(A)). This effluent is a resource available to the Secretary to use in implementing the SAWRSA. To date, the primary use of the effluent has been storage and accrual of State issued LTSC, which can be utilized for Firming, or be sold to support the Cooperative Fund. The contract is the basis for the Secretary to meet firming obligations

In order to meet legal obligations Reclamation must examine a full range of projects and alternatives. A permanent solution will be developed in the future so that Reclamation can meet its firming requirements. However, the scope and timing of any future project has not yet been determined. Any proposal for a permanent reuse of effluent must comply with the National Environmental Policy Act (NEPA).

This EA was prepared in accordance with the NEPA, Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508), and Department of the Interior (DOI) NEPA regulations (43 CFR 46). Reclamation is the lead Federal agency as defined in 43 CFR 46.225-46.230.

### 1.1 Background

In 1982, Congress passed the Southern Arizona Water Rights Settlements Act (P.L. 93-293, as amended) (SAWRSA), then in 2004 the Arizona Water Settlement Act (P.L. 108-451) (AWSA) which restated and amended the original settlement. As a result, the SAWRSA and the AWSA require Reclamation to finance the annual delivery of up to 66,000 AFA of Central Arizona Project (CAP) water to the Tohono O'odham Nation (Nation) and to "firm" 28,200 AFA of CAP Non-Indian Agricultural priority water.

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Through the settlements the Cooperative Fund, which finances CAP deliveries to the Nation, was authorized and established.

Under Arizona’s groundwater code, there are various methods to store water underground and accrue LTSC:

- A Managed Underground Storage Facility (USF) allows for water to be discharged to a naturally water-transmissive area such as a streambed that allows the water to percolate into the aquifer without the assistance of a constructed device. Effluent stored at a Managed Underground Storage Facility currently receives credit for 50% for what is recharged.
- A Constructed (USF) allows for water to be stored in an aquifer by using some type of constructed device, such as an injection well or percolation basin. Effluent stored at a Constructed Underground Storage Facility currently receives credit for 100% of what is recharged
- A Groundwater Savings Facility (GSF) is the direct delivery of water to crops on an existing farm instead of pumping groundwater (ADWR 2015). Effluent stored at a GSF currently receives credit for 100% of “in lieu” water used.

The “Firming Program” is described in Section 105 of the AWSA. The program ensures that 60,648 AFA of the non-Indian agricultural priority water, including 28,200 AFA to the Nation, will be delivered during water shortages in the same manner as CAP Municipal and Industrial priority water. Firming is defined as long term storage that may be used to mitigate the impacts of Colorado River shortages. Storing effluent in a GSF is one example of a method that can be used to meet these obligations. Currently the primary method employed for firming is managed underground storage and accrual of State issued LTSC. The stored water (credits) can be recovered and delivered during a shortage. Additional mechanisms being evaluated by Reclamation in the development of a comprehensive firming program include, but are not limited to; LTSC exchange rather than water delivery, fallowing options, lease or lease options of higher priority water for delivery during shortage or dry-year lease options of NIA water to be firming as well as acquisition of supplies not subject to shortage.

Reclamation obtained a permit (No. 73-545943.0200) to store about 4,650 acre-feet a year into the Upper Santa Cruz River Managed USF. The Lower Santa Cruz River Managed Recharge Project USF (Permit No.71-591928.0000). These managed Underground Storage Facilities are contiguous sections of the Santa Cruz River, where Reclamation and others recharge effluent to earn LTSC. Reclamation could earn up to 50% credits for effluent recharge at these managed facilities, however due to low infiltration rates recent credit accrual has been less.

Reclamation has obtained a permit in 2014 for of storing the water in a GSF (No. 73-538100.0800), and would earn 100% long term storage credit for the GSF water since it’s used ‘in lieu’ of pumping groundwater.

The State of Arizona has grown rapidly in recent decades, with most of that growth concentrated in the Sun Corridor which connects Tucson, Phoenix, and central Yavapai County. Current projections suggest that Pima County will grow by approximately 1.3 million by 2035 with expectations that most of the growth will be within the City of Tucson and the Towns of Marana and Sahuarita (Pima County 2014). With growth brings land and road developments and greater demands for water that will result in future loss, degradation, and fragmentation of wildlife habitat. Water resources within the southwest U.S. continue to be stressed at record levels, and other non-federal entities within the Tucson area are currently evaluating the reuse of their effluent within the Santa Cruz River

Reclamation will need to continue to pursue ways to firm the required 28,200 AFA non-Indian Agriculture water to be delivered in accordance with the SAWRSA and the AWSA. Currently, Reclamation has no planned projects to remove any more of its effluent from the Tres Rios WRF. However, since the legal obligations remain, a future project could be needed to effectively comply. If such an event were to occur, it would be necessary to conduct appropriate NEPA as part of the planning and decision making process.

## **1.2 Purpose and Need for the Proposed Action**

The purpose of the Proposed Action is to construct a temporary project to obtain 100% long term storage credit to meet Reclamation’s firming obligations. The credits could also be sold to provide revenue for the Cooperative Fund set up by the AWSA to provide for water deliveries. The credits could also be used for recovery purposes.

The project is needed because Reclamation is required to meet firming obligations under SAWRSA and the AWSA. Reclamation must continue to find new ways to efficiently meet its firming obligations; and obtaining 100% credit for its effluent is one way to accomplish this.

## **1.3 Project Location**

The Proposed Action is located at the Tres Rios WRF in Pima County near Interstate 10 and Ina Road. Instead of discharging to the Santa Cruz River, the effluent would leave the facility on the northwest side using the temporary pipeline and connect to an existing manhole South of Ina Road. The manhole connects to an existing pipeline that leads to the Cortaro-Marana Irrigation District (CMID) canal, and ultimately to the GSF. The water would cross Ina Road and flow toward Interstate 10 where it crosses the highway near West Massingale Road and discharges into the canal. Figures 1.1 and 1.2 show the Project Location and construction areas.



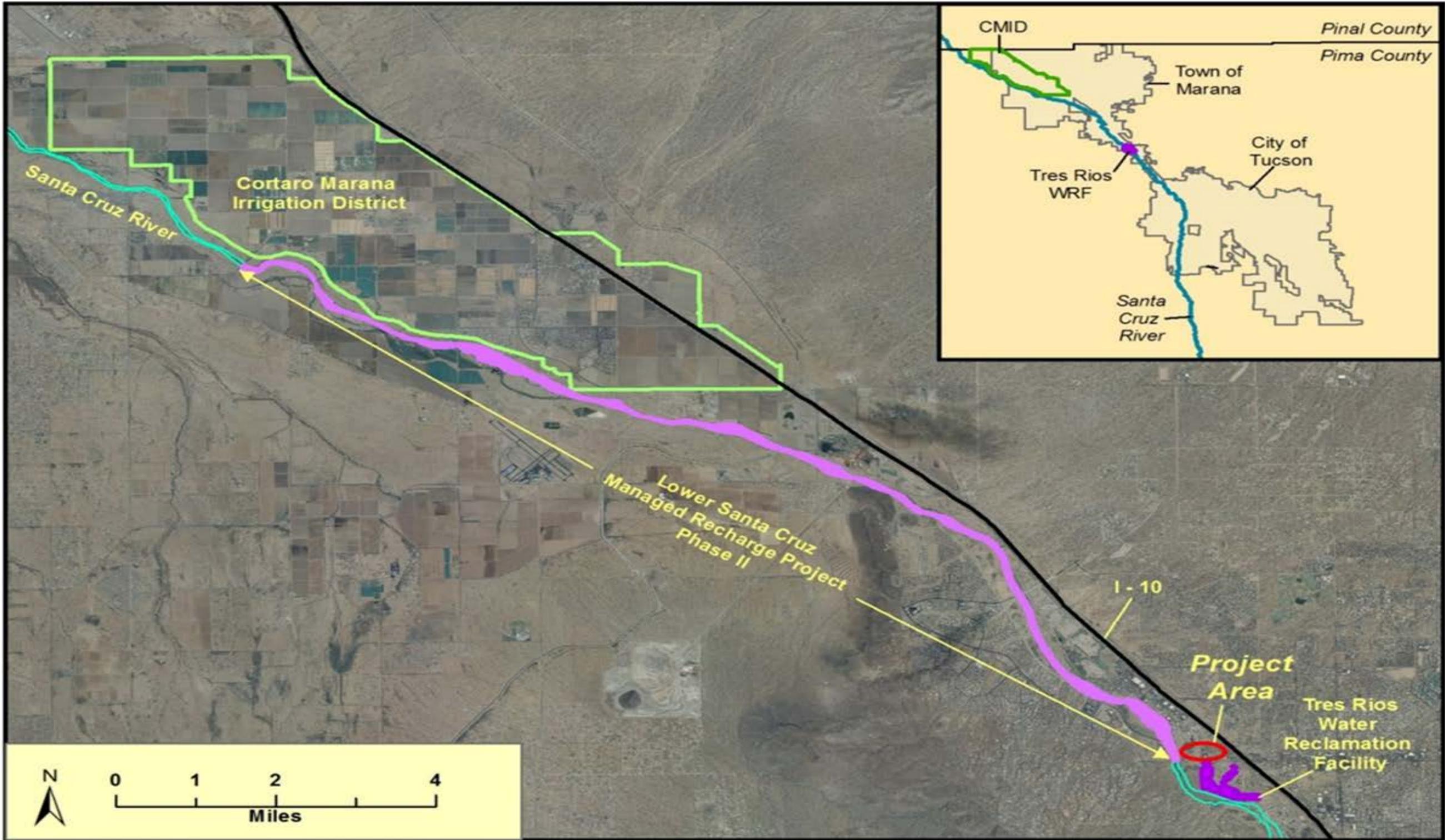


Figure 1.1 Project Location

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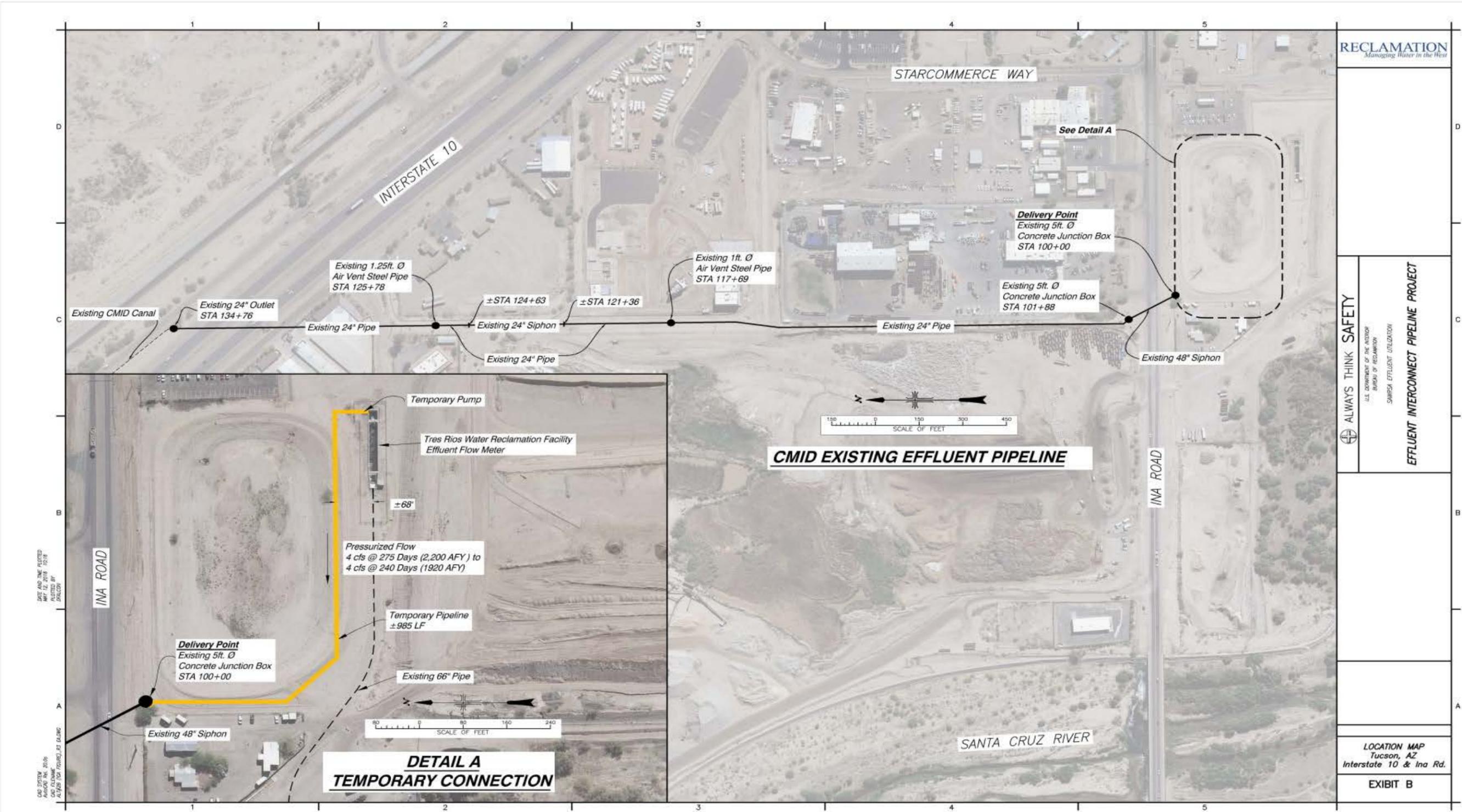


Figure 1.2 Proposed Construction Area

## **2.0 Description of the Proposed Action and Alternatives**

### **2.1 Proposed Action**

Reclamation proposes to enter into Inter-Governmental Agreements (IGAs) with CMID, Pima County, and Metro Water as a partnership to provide effluent to a GSF. The temporary project would begin delivering approximately 2,200 AFA and which may eventually be increased to 7,000 AFA to CMID. The temporary project would last no longer than 5 years. The effluent is currently discharged into the Santa Cruz River but the proposal would divert it directly from the Tres Rios WRF, and deliver it to a GSF north of the water reclamation facility.

The IGAs include cost sharing, operation, and maintenance responsibilities for the construction of approximately 1,100 linear feet of pipeline to deliver the effluent from the WRF to an existing manhole. In consultation with Pima County regarding the proposed pipeline, the County expressed concerns that the pipeline would be vandalized if left exposed on the surface. They proposed that Reclamation cover the pipeline using material (soil) they would be removing from Emergency Overflow Basin #4 as part of an independent County project to reline the basin. Because the material from Emergency Overflow Basin #4 was generated from storm events and sheet wash there would be no new excavation below the existing depth of the retention basin.

The 1100 feet of new pipe will connect to an irrigation pipeline that flows to the CMID canal and directly to the GSF. Reclamation has obtained a permit (No. 73-538100.0800) from ADWR to store the water at the GSF. The Facility Permit authorizes CMID to accept effluent in lieu of pumping groundwater on a gallon-for-gallon substitute pursuant to A.R.S. § 45-852. Reclamation would obtain LTSCs using its established account (LTS #70-411200.0000). The IGAs designate who amongst the Parties would provide Operation and Maintenance, and describes the responsibilities of all parties involved. Reclamation would need to decide upon the best course of action to meet legal requirements under SAWRSA and AWSA. It is possible that planning for a future project to uphold our legal commitments would need to occur. At this time no project has been identified. Therefore, this EA is written with the caveat that future projects could occur and appropriate NEPA analysis would be required to plan and execute them.

### **2.2 No Action Alternative**

Under the No Action Alternative, the temporary project would not be implemented. All of the effluent in the proposed action would continue to discharge to the Santa Cruz River. There would be no construction of a pipeline, Reclamation would continue to receive 50% LTSC for managed recharge, to be used for water deliveries or sold to obtain money for the Cooperative Fund. Reclamation would have substantially less

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money for the Fund. Further, Reclamation could fail to meet its legal requirements under SAWRSA and the ASWA. Also under the no action alternative, Metro Water and Pima County could construct the project without assistance from Reclamation, and the same impacts would occur.

## **3.0 Affected Environment, Environmental Consequences and Cumulative Effects**

The Council on Environmental Quality regulations provides direction on conducting the NEPA process. The regulations require that all Federal actions are examined within the context of past, present, and foreseeable future actions to determine overall impacts to the human environment. This directive can be found in 40 CFR 1508.7, 1508.25, and the DOI regulation 43 CFR part 46.115, and Reclamation 516 Departmental Manual 14.

### **3.1 Resources Eliminated from Further Study**

Some resources were eliminated from further study in this EA because they were not present or there were no impacts to them as a result of the implementation of the proposed action. Those resources and the reason for elimination are detailed below and include Socio-Economics, Indian Trust Assets, and Wild and Scenic Rivers.

#### **Socio-Economics and Environmental Justice**

Executive Order 12898 provides protection to low income and minority populations against disproportionately high and adverse human health or environmental effects of Federal actions. The proposed action would not take place in areas where minorities and low-income populations and communities could realize disproportionate health or environmental effects. Therefore, this topic has been eliminated from further analysis.

#### **Indian Trust Assets**

Indian Trust Assets (ITAs) are legal interests in assets held in trust by the U.S. Government for Native American tribes or individual Native Americans. These assets can be real property or intangible rights including but not limited to lands, minerals, water rights, hunting rights, money and other natural resources. The trust responsibility is that all Federal agencies take actions reasonably necessary to protect ITAs. There are no known ITAs within the Proposed Action area. Therefore, ITAs have been eliminated from further study in this EA.

#### **Wild and Scenic Rivers**

The Wild and Scenic Rivers Act of 1968 (P.L. 90-542) designated the initial components of the National Wild and Scenic River System and established procedures for including other rivers or reaches that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values and preserve them in a free-flowing condition. The Act applies to waters designated, or eligible for designation as wild and scenic. The Santa Cruz River is an effluent dominated ephemeral stream and is not designated as a Wild and Scenic River. Therefore, the resource was eliminated from further study in this EA.

### **Wetlands**

Executive order 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. Within this EA wetlands are categorized as a different biological community known as riparian habitat, which are identified by the National Wetlands Inventory as Freshwater Forested/Shrub Wetlands. Impacts to riparian habitat are evaluated and discussed starting under Section 3.3.2.

### **Floodplain and Floodplain Management**

Executive Order (EO) 13690 which replaced EO 11988 requires Federal agencies to avoid development in floodplain where practicable alternatives are available. Federal agencies are required to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare, restore, and preserve the natural and beneficial values served by floodplains. Within this EA floodplains are categorized as riparian habitat, which are identified and discussed in Section 3.3.2.

## **3.2 Air Quality**

Congress established much of the basic structure of the Clean Air Act in 1970, and made major revisions to the Act in 1977 and again in 1990. As a result of the law, the Environmental Protection Agency established the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The EPA issued a draft plan for revising the NAAQS on April 19, 2016, soliciting comments that are due June 23, 2016.

### ***3.2.1 Air Quality Current Conditions***

The project area is considered non-attainment on some days for large particulate matter called PM<sub>10</sub>. PM<sub>10</sub> refers to particulates that are larger than ten microns, but can still be inhaled into the respiratory system causing harm to humans and animals; an example is dust. The Proposed Action is expected to have some ground disturbance, and require an air permit.

### ***3.2.2 Air Quality Environmental Consequence***

As part of the IGAs with all the Parties, the contract will be administered by Metro Water, and Reclamation has reviewed the specifications for the contract and provided input. The contractor would be responsible for obtaining all permits necessary, including an air permit for PM<sub>10</sub> if required. Best management practices would need to be put into place in accordance with the permit requirements, in order to minimize air quality impacts. A typical best management to improve air quality is to have a water truck keep the soils damp, so they stay in place, and lessen impacts to the surrounding air. However, it should be noted that the contractor would have to conform to whatever the permit requires.

### ***3.2.3 Air Quality No Action Alternative***

Under the No Action Alternative, other projects in the direct vicinity would continue to take place, and Reclamation would not accrue 100% LTSCs for the temporary project. Further, Metro Water and Pima County could construct the project without Reclamation involvement, and the impacts to air quality would be the same. Therefore, the no action alternative does not meet the purpose and need of the proposed action.

## **3.3 Climate Change**

CEQ released revised draft guidance for public comment that describes how Federal departments and agencies should consider the effects of greenhouse gas emissions and climate change in their NEPA reviews on December 18, 2014. The revised draft guidance emphasizes that agency analyses should be commensurate with projected greenhouse gas emissions and climate impacts, and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public, and the decision-making process in distinguishing between alternatives and mitigations. It recommends that agencies consider 25,000 metric tons of carbon dioxide equivalent emissions on an annual basis as a reference point for quantitative analysis of greenhouse gas. The proposed temporary project would not exceed the 25,000 metric tons of carbon dioxide.

### ***3.3.1 Climate Change Current Condition***

The Bureau of Reclamation's mission is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Climate change poses a fundamental challenge to Reclamation's mission. Changes occurring now are altering the historical weather and streamflow patterns that framed the development of water and power systems across the west. Communities across the west are facing increasing problems with water availability and drought, flooding, and increased risks of forest fires (Reclamation 2014). As a result of the SAWRSA and the AWSA, Reclamation is charged with firming water supplies in order to manage water resources for future use.

### ***3.3.2 Climate Change Environmental Consequence***

The Proposed Action would assist Reclamation keep diversity and flexibility in its water management capabilities, while capitalizing on the reuse of effluent and successful partnerships to increase the longevity and security of water resources. Therefore, while difficult to actually quantify the effects of the removal up to 7,000 acre-feet annually from the Santa Cruz River on overarching climate change, the reuse of effluent has been identified by Reclamation as a reliable method of sustaining water resources for the future. The proposed action would not measurably contribute to overall greenhouse gas emissions or climate change.

### **3.3.3 Climate Change – No Action Alternative**

Under the No Action Alternative, the water would remain in the Santa Cruz River, which is an effluent driven ephemeral river. It is also likely that the other Parties to the IGAs would construct the project without Reclamation, and the impacts would be the same, however Reclamation would not receive any of the LTSCs and could become unable to meet its legal obligations under SAWRSA and the AWSA.

## **3.4 Biological Resources - Vegetation**

The proposed project would begin at 2,200 AFA, and could reuse up to 7,000 AFA of treated effluent currently discharged into the Lower Santa Cruz River which supports and provides habitat for a variety of wildlife and plant species. The effluent-dependent reach is dominated by cottonwood-willow and sustains roughly 300 acres of riparian woodland. Open water, weedy fields, and abundant natural vegetation make this part of the river an important stop-over for migrating birds, including waterfowl and raptors, and provides habitat for bird species that have declined in other parts of Pima County due to past land-use change.

### **3.4.1 Vegetation Current Conditions**

The Project Area encompasses three primary vegetation communities: a) Arizona Upland Subdivision Sonoran Desertscrub; b) Lower Colorado River Subdivision Sonoran Desertscrub; and c) riparian habitats. Descriptions are provided below and follow Brown (1994) and other sources. Pima County uses a variation of Brown's (1994) biotic communities where some of the names are different and the vegetation mapping is more refined (Novak Environmental, Inc. 2001).

#### **Arizona Upland Subdivision of the Sonoran Desertscrub**

The Arizona Upland Subdivision of the Sonoran Desert is also known as the Arizona Desert, Paloverde Cacti Desert, and *Cercidium-Opuntia* Desert. Approximately 90% of the Arizona Upland Subdivision is on slopes, broken ground, and multi-dissected sloping planes (Brown 1994). Average annual precipitation ranges between 7 and 16 inches. Summer rainfall accounts for 30 to 60 percent of the annual total. Winter precipitation ranges from 10 to 40 percent of the annual total. The vegetation of the Arizona Upland Subdivision most often takes on the appearance of a scrubland or low woodland of leguminous trees with intervening spaces held by one to several open layers of shrubs and perennial succulents and columnar cacti (Brown 1994). Vegetation within the subdivision includes its characteristic trees: foothill palo verde (*Cercidium microphyllum*), blue palo verde (*Parkensonia florida*), mesquite (*Prosopis* spp.), and catclaw acacia (*Acacia greggii*). Cacti in this subdivision include several species of cholla (*Opuntia* spp.), saguaro (*Canegiea gigantean*), and pincushion (*Mammillaria* spp.), to name a few.

#### **Lower Colorado River Subdivision of the Sonoran Desertscrub**

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The Lower Colorado River Subdivision is the largest and most arid of the Sonoran Desert subdivisions, but it also makes contact with the remaining subdivisions as well as the Mohave Desert and with California coastal scrub. Average annual precipitation ranges between 1.4 to 11.3 inches (Brown 1994). The combination of high temperature and low precipitation creates intense competition between plants for scarce water resources. Plant growth is typically both open and simple and is often found scattered along drainages. The numerous and irregular shaped drainages often give an illusion of trees and shrubs forming a homogeneous community (Brown 1994). Commonly found species include western honey mesquite (*Prosopis glandulosa* var. *torreyana*), blue palo verde, ironwood (*Olneya tesota*), and desert willow (*Chilopsis linearis*). Species in more arid parts of the subdivision include creosotebush (*Larrea tridentate*), ocotillo (*Fouquieria splendens*), brittlebush (*Encelia farinose*) and white bursage (*Ambrosia dumosa*).

**Riparian Communities**

Portions of the project area fall within and alongside the Santa Cruz River which is categorized by Pima County as an Important Riparian Area (Pima County 2011). Most of the river is categorized as ephemeral with a few reaches exhibiting perennial characteristics because of effluent releases at various locations. Desert riparian communities are found along perennial stream and river systems; and are considered the most productive ecosystem in North America (Zaimes et al. 2007). In the southwest United States, they are found on less than 2% of the total land area with only an estimated 113,000 hectares found in Arizona (Pase and Layser 1977; Ffolloitt et al. 2004). While they cover such a small portion of the landscape, 80% of all vertebrates rely on riparian ecosystems at some stage of their life (DeBano et al. 2003). They serve a variety of important roles such as: 1) act as movement corridors and habitat for wildlife, 2) enhance fish habitat, 3) filter and retain sediments and nutrients from runoff and floods, 4) stabilize stream banks, 5) store water and recharge subsurface aquifers, and 6) reduce runoff (DeBano et al. 2003; Zaimes et al. 2007).

Xeroriparian communities are similar but are associated with ephemeral streams and rivers. Ephemeral systems only flow in response to storm events but function in a manner similar to perennial systems (Zaimes et al. 2007). Xeroriparian communities typically contain species found in adjacent upland habitats, but they are larger and occur at higher densities. Pima County categorizes xeroriparian habitat into classifications A, B, C, and D which is based on the total volume of vegetation; Xeroriparian A has the greatest volume (Pima County 2011).

**Santa Cruz River Area – Riparian Vegetation**

Historically, the Santa Cruz River functioned as a natural ephemeral and perennial system that is now perennial at various reaches due to discharges of treated effluent from three treatment plants within the US and Mexico. A study by Harris Environmental Group, Inc. (2013) evaluated herbaceous and woody vegetation along the lower Santa Cruz River to determine baseline conditions prior to sewage treatment improvements. Surveys spanned 40-kilometers (25-miles) from a reach adjacent to Columbus Park to

just south of Trico-Marana Road. Through the study area the width of the main channel ranged from 8-10 meters (26-66 feet) with a floodplain that spans 80-500+ m (262-1640+ ft.) wide. Embankments are found at various locations along the river and were typically constructed of man-made soil cement that constricts the width of the floodplain to approximately 100 m (HEG 2013).

### **Results of Site Visits July 2-14, 2015**

During site visits in July 2015, growth of cottonwood-willow riparian vegetation along with forbs and grasses showed a noticeable improvement in their condition near Ina Road. Prior to improvements in water quality, vegetation structure was approximately 10% forest and 90% open (HEG 2013). A follow up survey of the area some time later may yield different results with open areas being replaced by grasslands, shrublands, and woodlands. It is believed that infiltration improved growing conditions at that location by making water more accessible by saturating the soil. Existing riparian habitat and other areas suitable for growing are primarily close to the channel because infiltration of effluent percolates down into the aquifer rather than out into the floodplain.

Among the eight sites that were surveyed, an average of 18.88 species were documented per site during streamside herbaceous surveys, 10.96 per transect, and 3.49 per quadrant (HEG 2013). Species richness varied across all sites with the least observed at the Columbus Dry site (Control Site) and the most at the Sunset Road site. If the Columbus Dry site is excluded then species richness ranges from 11 to 12.67 species per transect. The Columbus Dry site was selected as the control site because it is not influenced by treated wastewater. Within woody belt-transects a total of 13 herbaceous species were observed, including five species not observed in streamside surveys (HEG 2013). The average Wetland Indicator Status (WIS) for all sites was 3.38. The Tangerine Road site had the lowest WIS at 2.67 while the Columbus Dry site had the highest at 4.93. A low WIS indicates a higher number of species adapted to wetland conditions were observed. The Columbus Dry site which is not influenced by effluent had the most upland species present (HEG 2013).

The depth to ground water along the river from Ina Road to Trico Road varies but has recorded depths that currently range from 107 to 208 ft., which is too deep for trees and other vegetation. Typical ground water depth for cottonwood-willow systems are less than 5 meters (16.4 feet) while saltcedar can reach a depth of 9 meters (30 feet) (Stromberg 1993; USDA 2012). Existing riparian vegetation along portions of the river channel may remain stable and possibly improve or even become established in open areas as long as adequate soil moisture is within 5 meters of the surface, particularly during the growing season

When analyzing for woody species, Goodding's willow (*Salix gooddingii*) was observed having the highest average plant and stem density of all species across all sites with estimates of just under 5,000 plants/ha and just over 5,000 stems/ha. The observed data collected on the site visits indicate the density could be somewhat misleading because it was a result of hundreds of 6-inch tall single stemmed saplings observed at the Sunset

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Road site, many which will never reach maturity (HEG 2013). The second highest was saltcedar (*Tamarix ramosissima*) with estimates of approximately 300 plants/ha and >1000 stems/ha. The singlewhorl burrorbush (*Hymenoclea monogyra*) was found to have the highest density of shrubby plants with 825 plants/ha (HEG 2013). When data was analyzed by functional groups, the highest density observed was by upland and facultative wetland species with estimates of 1473 and 1426 plants/ha. By stem density, facultative wetland species had the highest with 1550 stems/ha followed by upland species with 1250 stems/ha (HEG 2013).

Gooding's willow was observed to have the greatest basal area at 3.7 m<sup>2</sup>/ha followed by saltcedar with 1.2 m<sup>2</sup>/ha. Saltcedar also had the greatest dead species basal area with 0.04 m<sup>2</sup>/ha followed by Gooding's willow with 0.03 m<sup>2</sup>/ha. By functional groups, facultative wetland species had the greatest basal area with 3.9 m<sup>2</sup>/ha while facultative upland species had the least with 0.9 m<sup>2</sup>/ha (HEG 2013).

Across all sites the highest average percent of canopy closure was by Athel tamarix (*Tamarix aphylla*) with 6.1%, followed by Gooding's willow and *T. ramosissima* with 4.04 and 3.69% (HEG 2013). When analyzing the data by strata, open areas covered 68.4% of the total survey area, followed by shrublands with 17.5%, grasslands with 9.1%, woodlands with 3.8%, and forests with 1.3%. Open areas had the highest percent structure type at all but one site, while forest cover was only observed at the Ina Road site (HEG 2013).

The reported results vary across all sites and some may not provide a clear picture of conditions through the study area, and the influence of effluent discharge on plant diversity, stem density, and basal area. By evaluating the results and understanding that it is an effluent dominated system, it is not surprising to see that riparian habitat along the river is highly fragmented (non-contiguous) and variable. At times there are locations along the river where vegetation is either absent or extremely sparse, which was observed along the 25-mile study area (HEG 2013). That can be a result of various factors such as water quality, topography, flow, and ground infiltration.

**3.4.2 Vegetation - Environmental Consequences and Cumulative Effects**

Most of the pipeline alignment from the water treatment facility to the existing manhole occurs on previously disturbed areas and/or a dedicated Right-of-Way with little to no vegetation that is beneficial to wildlife. Directing up to 7,000 AFA of effluent for LTSC to a GSF and not discharged into the Santa Cruz River would shift the volume of water in the river. The volume of water within the river has already shifted significantly in recent years since the quality of effluent has substantially improved (Table 3.1) (Galyean 1996; ACE 2010; Pima County 2012).

In 2014, the approximate volume of effluent recorded at the Cortaro Road and Trico Road gauge stations was 40,500 and 10,000 AFA. In early March 2014, the Trico Road gauge started recording a decline in surface flow that quickly transitioned to a complete absence of flow (0 CFS/Cubic Feet Per Second)(Figure 3.1). Since then, surface flow has become periodic with the last steady flow concluding at the end of January 2015. Recent

flows recorded at the Trico Road gauge have primarily been the result of storm events. Data from 2013 was excluded because facility upgrades that changed the quality and volume of discharged effluent made it unreliable.

The 2014 effluent flow distance estimates (Table 3.2) were generated by comparing annual and monthly average infiltration rates. The various infiltration rates were calculated by dividing the amount of effluent that had infiltrated between the Ina Road and Trico Road gage by the estimated distance of 17.9 miles. When flows did not reach the Trico Road stream gage, the calculated infiltration rate was lower than the actual infiltration rate. Without frequent and accurate records of flow distances a precise calculation of the infiltration rate is not possible.

There are no expected differences in flow distance for January, November, and December because no effluent deliveries are anticipated to be made during those months. Flow distance slightly varies for the remaining nine months with an average base flow distance of 20.4 miles and an average decrease in distance of approximately 5.04 miles if the full 7,000 AFA is diverted. This EA evaluates the maximum capacity of the pipeline in order to record the maximum impact possible to the environment. In order to evaluate impacts as best as possible under natural conditions, a surface flow end point recorded approximately 14.65 miles downstream of the Tres Rios WRF during June 2015 was selected. The end point was chosen after surveying the river and recording the front of the surface flow and a transition between healthy to dead riparian vegetation. Selecting an end point further up or downstream would not provide a realistic analysis of potential impacts. Riparian vegetation north of the selected end point was not included in the analysis because it was already dead.

The riparian vegetation along the Santa Cruz River was mapped (Figure 3.2) from the Tres Rios WRF to the selected endpoint. Riparian vegetation was only mapped if it was: 1) within 30 feet of primary and secondary channels, and 2) was part of a continuous tract of riparian vegetation that started within 30 feet of a channel. Riparian vegetation that was mapped mostly includes cottonwood, willow, saltcedar, and mesquite. The total area of riparian vegetation along the effluent dominated reach was calculated to be approximately 141.5 acres. That reach of the river can be broken up into two parts, the 5-mile Impact Zone which was calculated to contain 78.8 acres of riparian habitat and the Upstream Intact Zone which contains 62.7 acres. The Impact Zone identifies the area expected to be impacted from the reuse of effluent. The Upstream Intact Zone is the area expected to remain intact after the effluent is reused.

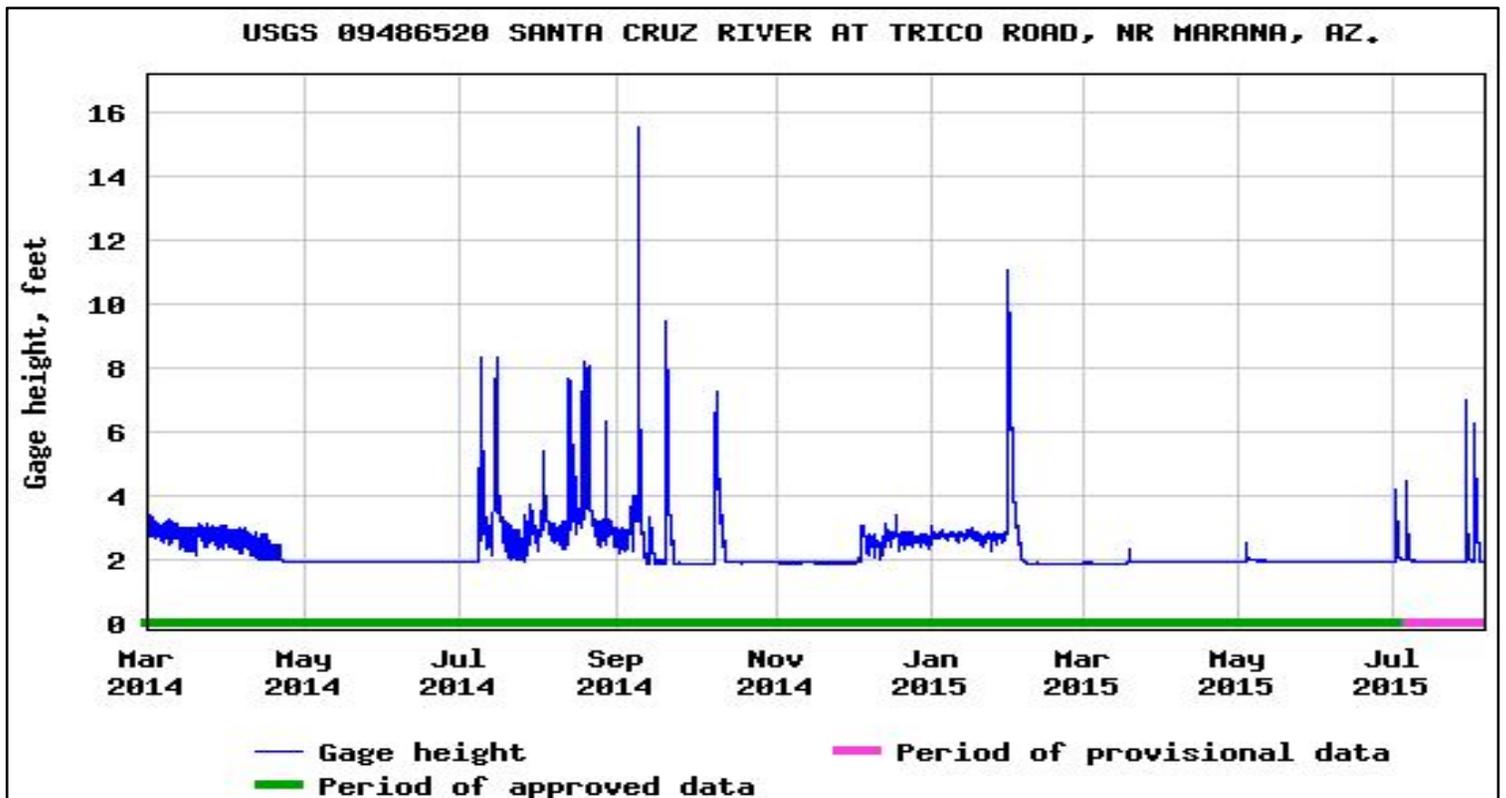
While the impact zone is only approximately 5.04 miles in length, it contains 57% of riparian habitat along the 14.65 mile effluent dominated reach of the river. The Impact Zone contains broad channels that support continuous wide patches of habitat. Along the Upstream Impact Zone, habitat is more narrow and patchy with 3.75 miles of the river almost void of tall woody vegetation. It is unknown why that reach of the river does not support as much riparian habitat since the channel morphology appears to be similar. Historically it may have had lower rates of infiltration when compared to the Impact Zone, or the soils are in some way less suitable for growth.

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Pima County and Tucson Water are evaluating the feasibility of diverting 6,000 AFA of effluent from the Agua Nueva WRF to an artificial recharge facility. Utilizing a recharge facility would allow the continuation of well pumping to meet peak demand while banking their water resources for future system needs. This action could adversely affect vegetation along the river by decreasing the amount of available water and contributing to a reduction in the density of vegetation.

**Table 3.1 Effluent flow and losses from reuse, infiltration, evapotranspiration, and diversions**

	Tres Rios WRF	Trico Road Outflow
<b>2012</b>	42,750 AFA	19,500 AFA
<b>2014</b>	40,500 AFA	10,000 AFA
<b>2015</b>	36,000 AFA	0 AFA



**Figure 3.1 Recorded surface flows at the USGS gauge at Trico Road**

**Table 3.2 Average length of surface flow past Ina Road in 2014 and an estimated difference when 7,000 AFA is diverted elsewhere**

	2014 Estimate (mi)	7,000 AFA Diversion (mi)	Difference (mi)
January	37.85	37.85	0.00
February	31.26	26.16	5.11
March	25.35	20.41	4.94
April	19.35	14.54	4.81
May	15.94	10.78	5.16
June	16.28	11.37	4.91
July	19.68	14.52	5.16
August	21.11	15.38	5.73
September	17.97	12.91	5.06
October	17.09	12.57	4.52
November	16.35	16.35	0.00
December	18.85	18.85	0.00

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Figure 3.2 Riparian vegetation recorded from the outlet of the Tres Rios WRF to the surface flow end point



### **3.4.3 No Action Alternative Vegetation**

Under the No Action alternative, Reclamation would not remove up to 7,000 AFA and the vegetation would likely stay the same. Other owners of effluent on coming from the WRF would remove their portions and cause the same impacts as Reclamation's Proposed Action. Therefore, impacts to vegetation would occur with or without the temporary project.

## **3.5 Biological Resources - Fish and Wildlife**

### **3.5.1 Wildlife Current Conditions**

Common bird species that may occur in the Project area include the mourning dove (*Zenaida macroura*), red-winged blackbird (*Agelaius phoeniceus*), killdeer (*Charadrius vociferus*), yellow warbler (*Setophaga petechia*), song sparrow (*Melospiza melodia*), and cooper's hawk (*Accipiter cooperii*). In addition to resident species, the Sonoran Desert provides wintering and migratory habitat for various bird species including the lazuli bunting (*Passerina amoena*), western kingbird (*Tyrannus verticalis*), and orange-crowned warbler (*Oreothlypis celata*).

The Sonoran Desert also exhibits a wide diversity of mammal species. Three rabbit species occur throughout this region: the desert cottontail (*Sylvilagus audubonii*), blacktailed jackrabbit (*Lepus californicus*), and antelope jackrabbit (*Lepus alleni*). Other typical desert mammals include the highly desert-adapted Merriam's kangaroo rat (*Dipodomys merriami*), ubiquitous white-throated woodrat (*Neotoma albigula*), coyote (*Canis latrans*), and collared peccary (*Pecari tajacu*).

Common lizards in the Project area include the zebra-tailed lizard (*Callisaurus draconoides*), tiger whiptail (*Aspidozelis tigris*) and side-blotched lizard (*Uta stansburiana*). The variety of small mammals provides an abundant prey source for snakes including the coachwhip (*Masticophis flagellum picues*), western diamond-back rattlesnake (*Crotalus atrox*), and gophersnake (*Pituophis catenifer*). Amphibians known to the area include the western spadefoot toad (*Spea hammondi*), bullfrog (*Rana catesbeiana*), and Colorado River toad (*Bufo alvarius*).

### **Wildlife Movement Corridors and Linkages**

As a result of population growth and development in Arizona, identifying and preserving wildlife movement corridors have become a priority. In 2011, the Pima County Wildlife Connectivity Workgroup held a workshop where stakeholders and experts in wildlife management and land-use planning mapped important wildlife linkages and areas of known wildlife movement (AGFD 2012). Data acquired from the workshop was used to develop The Pima County Wildlife Connectivity Assessment: Report on Stakeholder Input (AGFD 2012). This report identified the Santa Cruz River as a riparian movement area for bats, birds, bobcats (*Lynx rufus*), mountain lions (*Puma concolor*), raccoons (*Procyon lotor*), and deer (*Odocoileus hemionus*). This movement area also provides

suitable habitat and migratory movements for many other species. Current and future threats include agriculture, exotic species, residential development, and lining the river with concrete (AGFD 2012).

### **Santa Cruz River Area – Aquatic Macroinvertebrate Community**

A study by Aquatic Consulting and Testing (ACT 2013) evaluated the structure and function of the aquatic macroinvertebrate community within the lower Santa Cruz River prior to sewage treatment improvements. Four monitoring sites were selected to assess a variety of conditions such as stream and habitat characterization, the Hilsenhoff Biotic Index, water quality, and periphyton community diversity (ACT 2013). The channel stability of all four sites was characterized as good, but they had a habitat rating that ranged from 11.5 to 18.54 indicating impaired conditions. Periphyton community diversity was categorized as low with only seven genera of algae found at three of the four monitoring sites. The Hilsenhoff Biotic Index was extremely high at all sites indicating severe organic pollution and the Biological Integrity Index also indicated impaired conditions (ACT 2013).

#### ***3.5.2 Environmental Consequences and Cumulative Effects to Fish and Wildlife***

The reuse of 7,000 AFY of effluent is expected to impact existing riparian vegetation and the resident and migratory wildlife that rely on it. Birds and other species that are capable of migrating long distances would be impacted the least because they can attempt to find suitable habitat elsewhere. Populations of species that are less mobile such as small mammals, reptiles, and amphibians will be impacted the greatest and will substantially decline or disappear.

While not protected under the ESA, there is a colony of 7,000 to 20,000 cave myotis (*Myotis velifer*) and Mexican free-tailed bats (*Tadarida brasiliensis*) that roost under the Ina Road Bridge. The bridge is scheduled to be replaced in 2016 by an ADOT/FHA project because it is structurally unsound. The new bridge will incorporate bat boxes that will provide the same roosting conditions that are found in the existing bridge. To temporarily mitigate the loss of roosting habitat, two bat boxes will be installed under the nearby Cortaro Road Bridge.

Both bat species are insectivorous and a loss of riparian habitat further downstream may result in a decline of available food. That loss may be compensated by foraging in neighboring washes, residential areas, golf courses, parks, or the agricultural fields found further north and west. Mexican free-tailed bats are known to travel 25 km in an evening to forage (McWilliams 2005). It is not known how far cave myotis will travel to forage, but individuals of a large colony may have to travel long distances because of competition for daily food (Kunz 1974).

The proposed temporary project is expected to cause minor and not significant impacts to wildlife and their habitat. Its contribution to cumulative impacts will be minimal but incremental to greater impacts brought on by current and future population growth and development. Human development and disturbance can impact wildlife by causing direct

loss or degradation of habitat. Those impacts will be compounded with current and future water demands, and climate change is anticipated to make things worse. There could be indirect or cumulative affects due to foreseeable future projects and other agencies removing water from the Santa Cruz River.

### ***3.5.3 No Action Alternative Fish and Wildlife***

Under the No Action Alternative Reclamation would not remove up to 7,000 AFA from the Santa Cruz River. Effluent would continue to be discharged into the Santa Cruz River and fish and wildlife and riparian vegetation would continue to benefit. If the No Action Alternative was chosen, there would be no direct impacts to migratory birds and other wildlife by Reclamation. However, it is possible that other owners of Tres Rios WRF effluent could remove their portions and cause impacts to wildlife.

## **3.6 Biological Resources-Threatened and Endangered Species (TES)**

When Congress passed the Endangered Species Act (ESA) in 1973, the purpose was to protect and recover imperiled species. There are recognized TES within the project area. The yellow-billed cuckoo is the only species covered by ESA that has been found where Ina Road crosses the lower Santa Cruz River, but recently detected individuals were recorded as migratory and not residents.

### ***3.6.1 TES Current Conditions***

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

A compilation of federally listed, proposed, and candidate species that occur in Pima County (Table 3.3) was retrieved from the U.S. Fish and Wildlife Service (FWS 2015). Pima County lists 19 species as endangered or threatened, 1 candidate, and 2 which have Conservation Agreements. Section 7 of the ESA requires consideration of only listed and proposed species.

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**Table 3.3 - Federally listed, proposed and candidate TES**

<b>Species</b>	<b>Federal Status</b>	<b>Habitat</b>	<b>Determination of Presence of Suitable Habitat in Project Area</b>
<b>MAMMALS</b>			
Jaguar ( <i>Panthera onca</i> )	E	Found in Sonoran deserts scrub up through subalpine conifer forest.	Unlikely to occur. The project area does not provide suitable habitat and appropriate prey densities.
Lesser long-nosed bat ( <i>Leptonycteris curasoae yerbabuena</i> )	E	Desert scrub habitat with agave and columnar cacti present as food plants.	Unlikely to occur. Project area does not support columnar cacti and agave. The closest foraging area is approximately 6-miles east.
Ocelot ( <i>Leopardus pardalis</i> )	E	Desert scrub in Arizona. Humid tropical and subtropical forests, and savannahs in areas south of the U.S.	Unlikely to occur. The species is extremely rare and the project area does not provide suitable habitat.
Sonoran pronghorn ( <i>Antilocapra americana sonoriensis</i> )	E	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	Unlikely to occur. The project area does not provide suitable habitat and is well outside of its current range.
<b>BIRDS</b>			
California least tern ( <i>Sterna antillarum browni</i> )	E	Open, bare or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems.	Unlikely to occur. The project area is within an ephemeral river that does not provide suitable habitat.
Masked bobwhite ( <i>Colinus virginianus ridgewayi</i> )	E	Desert grasslands with diversity of dense native grasses, forbs, and brush.	Unlikely to occur. The project area does not fall within desert grasslands.
Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	T	Nests in canyons and dense forests with multilayered foliage structure.	Unlikely to occur. The project area is not within a canyon or dense old growth forests.
Southwestern willow flycatcher ( <i>Empidonax traillii extimus</i> )	E	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	May occur. There is no large block of dense riparian vegetation consisting of cottonwood, willow, or saltcedar. Closest breeding population is 37-miles away on the San Pedro River.
Yellow-billed Cuckoo ( <i>Coccyzus americanus</i> )	T	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	May occur. Individuals were recorded 5.5 and 8-miles north and 4 to 13-miles south of the project area.
<b>FISH</b>			
Desert pupfish ( <i>Cyprinodon macularius</i> )	E	Shallow springs, small streams, and marshes.	Unlikely to occur. There are no springs or other suitable water sources in the project area.

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<b>Species</b>	<b>Federal Status</b>	<b>Habitat</b>	<b>Determination of Presence of Suitable Habitat in Project Area</b>
		Tolerates saline and warm water.	
Gila chub ( <i>Gila intermedia</i> )	E	Pools, springs, cienegas, and streams.	Unlikely to occur. There are no springs or other suitable water sources in the project area.
Gila topminnow ( <i>Poeciliopsis occidentalis occidentalis</i> )	E	Small streams, springs, and cienegas vegetated shallows.	Unlikely to occur. There are no springs or other suitable water sources in the project area.
<b>AMPHIBIANS and REPTILES</b>			
Chiricahua leopard frog ( <i>Lithobates chiricahuensis</i> )	T	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists.	Unlikely to occur. There are no springs or other reliable water sources free from nonnative predators.
Northern Mexican Gartersnake ( <i>Thamnophis eques megalops</i> )	T	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Unlikely to occur. There are no springs or large-river riparian woodlands and adjacent areas have been heavily disturbed or developed. The last record on the Santa Cruz River near the project area was in 1912.
Sonoyta mud turtle ( <i>Kinosternon sonoriense longifemorale</i> )	C	Ponds and streams.	Unlikely to occur. They depend on permanent water and the nearest population is in Organ Pipe Cactus National Monument.
<b>PLANTS</b>			
Acuna cactus ( <i>Echinomastus erectocentrus</i> var. <i>acunensis</i> )	E	Well drained knolls and gravel ridges in Sonoran desertscrub.	Unlikely to occur. Primarily found associated with palo-verdes and saguos on slopes up to 30%.
Huachuca water Umbel ( <i>Lilaeopsis schaffneriana</i> ssp. <i>recurva</i> )	E	Cienegas, perennial low gradient streams, wetlands.	Unlikely to occur. No springs are found within or near the project area
Kearney's blue star ( <i>Amsonia kearneyana</i> )	E	West-facing drainages in the Baboquivari Mountains.	Unlikely to occur. Found in the Baboquivari Mountains on the Tohono O'odam Nation.
Nichol Turk's head cactus ( <i>Echinocactus horizonthalonius</i> var. <i>nicholii</i> )	E	Unshaded microsites in Sonoran desertscrub on dissected alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountain sides.	Unlikely to occur. Historically found along the Vekol and Waterman Mountains.

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<b>Species</b>	<b>Federal Status</b>	<b>Habitat</b>	<b>Determination of Presence of Suitable Habitat in Project Area</b>
Pima pineapple Cactus ( <i>Coryphantha scheeri</i> var. <i>robustispina</i> )	E	Sonoran desertscrub or semi-desert grassland communities.	Unlikely to occur. Mostly found on flat ridgetops and areas with less than 10-15% slope. Hilly areas, drainages, and riparian areas are considered unsuitable habitat.
Gooddings onion ( <i>Allium gooddingii</i> )	CA	Shaded sites on north trending drainages, on slopes, or in narrow canyons, within mixed conifer and spruce fir forests.	Unlikely to occur. The project area is not found within or near a conifer and spruce-fir zone.
<b>INVERTEBRATES</b>			
San Xavier Talussnail ( <i>Sonorella eremita</i> )	CA	Inhabits a deep, northwest facing limestone rockslide.	Unlikely to be occur. Known to only be found on a single hill called Mineral Hills in Pima County.
<b>CRITICAL HABITAT</b>			
Southwestern willow flycatcher	E		No critical habitat for the SWFL is found within the action area. Critical habitat is found further south on the Santa Cruz River in Santa Cruz County.
Yellow-billed Cuckoo	T		No critical habitat has been designated. The closest proposed critical habitat on the Santa Cruz River is approximately 51 miles south in Santa Cruz County.

**CA:** Conservation Agreement. To implement the means for protection and long-term viability through a proactive conservation program.

**C:** Candidate. Plant and animal taxa considered for possible addition to the List of Endangered and Threatened Species. These are taxa for which the Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions.

**E:** Endangered. Any species which is in danger of extinction throughout all or a significant portion of its range.

**T:** Threatened. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

**3.6.2 Yellow-billed Cuckoo (YBC) Current Conditions**

The YBC was listed as Threatened on October 3, 2014 (79 FR 59991) by the U.S. Fish and Wildlife Service. It is a medium-sized bird about 30 cm in length, and weighing about 60 grams. It has a slender, long-tailed profile, with a fairly stout and slightly down-curved bill, which is blue-black with yellow on the basal half of the lower mandible (FWS 2001). Plumage is grayish-brown above and white below, with rufous primary flight feathers. The tail feathers are boldly patterned with black and white below. The legs are short and bluish-gray, and adults have a narrow, yellow eye-ring. Juveniles

resemble adults, except the tail patterning is less distinct, and the lower bill may have little or no yellow. Males and females differ slightly, as males tend to have a slightly larger bill (FWS 2001).

They are riparian obligates that nest primarily in willows and prefer to forage in cottonwoods but also utilize stands of saltcedar. Along the lower Colorado River and the Bill Williams River, cuckoos preferred habitat patches in excess of 120-m in width and 10-ha in area with dense understory foliage and high humidity (Gaines and Laymon 1984). In Arizona cuckoos are generally found along lowland drainages that support a combination of cottonwood, willow, velvet ash, Arizona walnut, mesquite, and saltcedar that form multi-structured woodlands (Corman 2005).

Their historic range extended from southern British Columbia to the Rio Grande River in northern Mexico, and east to the Rocky Mountains. They migrate north in late June and early July after wintering in South America from Venezuela to Argentina. Like other riparian obligate species, their range has severely been reduced during the past 80 years, and is extirpated from British Columbia, Washington, Oregon, and possibly Nevada (Reclamation 2008).

Current threats to the cuckoo are the continued loss, degradation, and fragmentation of riparian habitat in the western United States (FWS 2001). It is estimated that 90-95% of riparian habitat in Arizona has been lost, 90% in New Mexico, 90-99% in California, and more than 70% nationwide (FWS 2001). Individuals were recorded in 2002, 2007, 2010, and 2011 at distances of 5.5 and 8 miles north of the project area and 4.0, 4.3, and 13.3 miles south, but riparian vegetation at those locations and nearby do not meet the minimum criteria for suitable breeding habitat. Records indicate they were likely migrating through the area (Sabra Tonn, Arizona Game and Fish Department [AGFD], pers. comm. 2014; and Susan Sferra, U.S. Fish and Wildlife Service [FWS], pers. comm. 2015).

### ***3.6.3 Yellow-billed Cuckoo - Environmental Consequences and Cumulative Effects***

The YBC is known to have utilized two locations within the action area as migratory stop over habitat. The proposed project which would divert up to 7,000 AFA of effluent would cause the loss of 78.8 acres of riparian habitat along a distance of approximately 5.04 miles. While dead trees along that stretch of the river would remain in place for a number of years, they would still provide migratory habitat for YBCs and other species, but it would be poor quality habitat until succession by upland vegetation occurs. Until that happens, YBCs migrating through the proposed project area would either use the area briefly or avoid it altogether.

The action area is not found within proposed critical habitat, and therefore will not adversely affect any proposed critical habitat. Construction activities associated with the project will be located away from the river and will not result in any physical harm to YBCs. Therefore, Reclamation has determined that the proposed project may affect, but will not likely adversely affect the YBC. A Biological Assessment (BA) was submitted to

the USFWS to request concurrence with this determination. The BA has been analyzed and results of the consultation are available before in Appendix C of this document.

#### ***3.6.4 Southwestern Willow Flycatcher – Current Conditions***

The southwestern subspecies of the willow flycatcher (SWFL) was listed as endangered, effective March 29, 1995 (60 FR 10694). Critical Habitat designation was made on July 22, 1997 (62 FR 39129), with a correction on August 20, 1997 (62 FR 44228). On May 11, 2001, the 10th Circuit Court of Appeals set aside designated Critical Habitat. In 2003, the 10th Circuit Court ruled that USFWS must re-propose critical habitat within a year and complete a final designation by September 30, 2005 (Memorandum Opinion, U.S. District Court, New Mexico, September 2003). Critical Habitat was re-proposed on October 12, 2004 (69 FR 60706), with comments due by May 31, 2005. Critical habitat was designated on October 19, 2005 (70 FR 60886). There is no critical habitat in the project area.

The SWFL is a neotropical migrant that breeds in the southwestern United States and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948; Stiles and Skutch 1989; Ridgely and Tudor 1994; Howell and Webb 1995). Declines in the distribution and abundance of flycatchers in the Southwest are attributed to habitat loss and modification caused by impacts of dams and reservoirs, stream diversions and groundwater pumping, channelization and bank stabilization, riparian vegetation control, livestock grazing, agricultural development, urbanization, and recreation (USFWS 2002).

In Arizona, the historical range of the willow flycatcher included all major watersheds. Recent surveys have documented SWFLs along the Big Sandy, Bill Williams, Colorado, Gila, Hassayampa, Little Colorado, Salt, San Francisco, San Pedro, Santa Cruz, Santa Maria, Tonto Creek, and Verde River systems (FWS 2002).

The SWFL breeds in riparian habitats along rivers, streams, or other wetlands, where patchy to dense trees and shrubs are established, usually near or adjacent to surface water or saturated soil (USFWS 2002). Plant species composition and height vary across the geographical range of this species, but occupied habitat usually consists of a mosaic of dense patches of vegetation, often interspersed with small openings, open water, or shorter/sparser vegetation. Dense vegetation usually occurs within the first 10 to 13 feet above ground. Willow flycatchers can occupy habitat within 3 to 5 years of a flood event (Paradzick and Woodward 2003). Periodic flooding and habitat regeneration are important to the recovery of this species.

In Arizona, SWFLs now nest predominantly in saltcedar. Saltcedar-dominated stands mimic the riparian woodlands structure of willow in many areas where willow has declined (FWS 2002). Ninety percent of SWFL nests found between 1993 and 2000 in Arizona were in saltcedar (Paradzick and Woodward 2003). Of 462 willow flycatcher nests monitored in Arizona in 2004, 298 were in saltcedar, 129 were in Goodding willow, 24 were in Fremont cottonwood, and the remaining nests were in other tree species (Munzer et al. 2005).

### ***3.6.5 Southwestern Willow Flycatcher – Environmental Consequences and Cumulative Effects***

There have been no detections of SWFLs on the Santa Cruz River near the project area. The closest known breeding population is 37-miles away on the San Pedro River (Sabra Tonn, Arizona Game and Fish Department [AGFD], pers. comm. 2014). While riparian vegetation on the river does not provide ideal conditions, it is considered good migratory habitat for SWFLs. When the existing riparian vegetation dies it will end up becoming poor quality habitat, but still usable for migrating individuals. Eventual succession by upland vegetation will be slow but it will provide migratory habitat of a reasonable quality.

Construction activities will not occur near the river channel or any riparian habitat. The action area is not within critical habitat and there will be no adverse effect or potential for physical harm to SWFLs. Therefore, Reclamation has determined that the proposed project may affect, but will not likely adversely affect the SWFL. The SWFL was included in the consultation with the USFWS and a response is expected by final publication of this EA. Cumulative effects could include other Tucson Water projects and general housing developments in the action area.

### ***3.6.6 No Action Alternative***

Under the No Action Alternative, the beneficial effects of effluent discharge into the Santa Cruz River would continue. There would not be a reduction in effluent discharged into the Santa Cruz River that would result in the decline and degradation of riparian habitat by Reclamation. However, other owners of Tres Rios WRF effluent could remove their portions of effluent, causing effects to TES. Section 7 or 10 consultation would have to occur should that become a reality.

## **3.7 Land Use and Soils**

### ***3.7.1 Land use Current Conditions***

The Santa Cruz River has perennial and intermittent stream flow for more than 22 miles through 3,500 acres of hydro-mesori-riparian habitat, a deciduous riparian forest, and a mesquite bosque. The project area is effluent dominated, receiving discharges from both the Agua Nueva WRF and the Tres Rios WRF.

The river is associated with a wide variety of land uses which include grazing, mining, urbanization, and groundwater pumping (Weedman, 1996). Land uses around the Santa Cruz River from Avra Valley Road to Trico Road include a major transportation corridor, Interstate 10 and the railroad, an active and a closed landfill, industrial area and agriculture. In addition, a number of facilities, both upstream and downstream from Tucson, have NPDES permits allowing discharges into the Santa Cruz River (Pima Assoc of Governments, 2002).

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Much of the Santa Cruz River is also channelized and bank protected, and is crossed by numerous bridges. Future plans for this resource should take into consideration that other demands for this water, such as increased reuse, may decrease the amount available for additional proposed uses (Pima Assc. Of Governments, 2002).

**3.7.2 Land Use Environmental Consequences and Cumulative Effects**

The Proposed Action will capture water from the water reclamation facility in order to deliver it to a GSF to be used on existing agricultural fields in lieu of groundwater. The land use associated with the property will not change. The Proposed Action could result in riparian habitat loss, adversely affecting the quality of recreation, such as wildlife and bird watching activities.

**3.7.3 Land Use No Action Alternative**

If the No Action Alternative is chosen there would be no change in land use. Groundwater pumping in the area would not be offset. Subsequent impacts as a result of the No Action Alternative could lower ground water levels to an unattainable depth, and could also increase subsidence in the area.

**3.7.4 Soils Current Conditions**

The Tucson basin is a broad alluvial valley bounded by mountain ranges. Regional topography is dominated by basin-margin mountains and alluvial fans which have developed along their boundaries. The higher alluvium areas grade gradually into flat lands as they near the center of the basin. The Project is in the proximity of the Santa Cruz River, which lies east of the Tucson Mountains at the base of an adjoining alluvial fan, and continues northwesterly along the center of the basin.

The term soil is used to describe material on the ‘thin skin of the Earth’s crust and that has been under the influence of certain physical and biological processes’ (Hindricks, 1985). Soils have four main constituents: “mineral and organic matter, air and water” (Hindricks, 1985).

In his book, *Arizona Soils*, Hindricks discusses soil classifications, and indicates that the United States Department of Agriculture Soil Conservation Service developed soil surveys between 1951 and 1975. This classification system is now used universally across the United States because “expanding soil survey programs demanded more precise definitions of soil properties than were possible with previous soil classification systems” (Hindricks, 1985). Since the time of the first soil surveys, the National Conservation Resource Service (NRCS) has expanded and provided much more detail and a publically accessible web soil survey database. This EA used the online web soil survey to classify and evaluate soils. The Geographical Information Systems (GIS) database can be found:

<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

The Custom Soil Resource Report for the Tucson-Avra Valley Area, Arizona Proposed Construction Site can be found in its entirety in the administrative record and is available upon request. Soil surveys are made to provide information about the soils in specific areas to aid in the planning of projects in the area. Soil scientists conducted the reviews and observed steepness, length and shape of slopes, patterns of drainages; the kinds of crops and native plants and the types of bedrock. The proposed project construction site delineated 3 separate soil types. Brazito sandy loam (Bt) makes up 1.2% of the area, Comoro sandy loam (Cm) makes up 3.3% of the project area, and Grabe loam (Gh) accounts for 95.4% of the construction area. Grabe loam, is by far the dominant soil found in the proposed project construction area. This soil is typically found on flood plains, is moderately alkaline, well drained and considered by be good farmland if irrigated and either protected from flooding or not frequently flooded during the grown season. A map of the soil types is below in figures 3.3.

### ***3.7.5 Soils Environmental Consequences and Cumulative Effects***

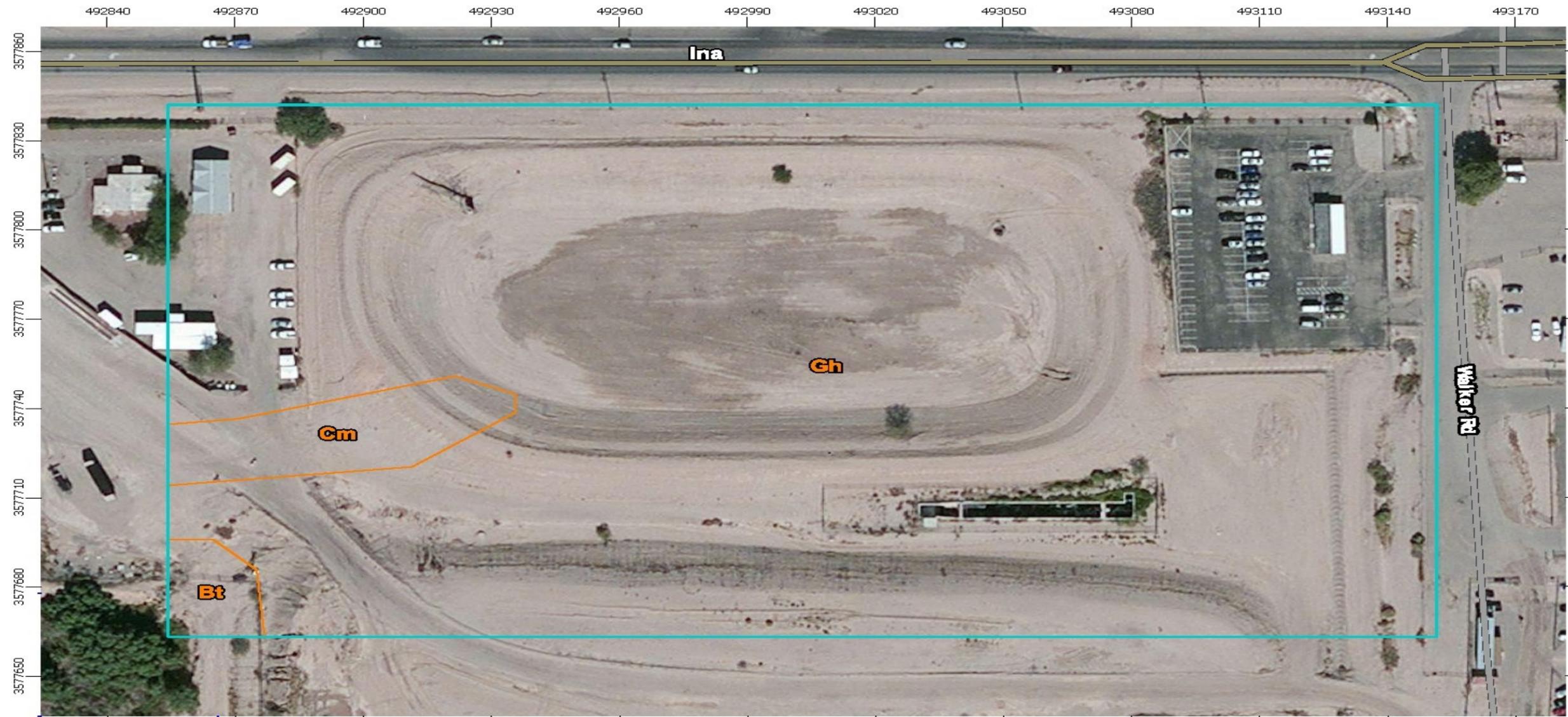
In consultation with Pima County regarding the proposed pipeline, the County expressed concerns that the pipeline would be vandalized if left exposed on the surface. They proposed that Reclamation cover the pipeline using material (soil) they would be removing from Emergency Overflow Basin #4 as part of an independent County project to reline the basin. Because the material from Emergency Overflow Basin #4 was generated from storm events and sheet wash there would be no new excavation below the existing depth of the retention basin would occur. There will be no adverse effects to any soils as a result of removing this material and transporting it for use on the project, since it is already sitting on the surface, it would be a reuse of material.

A small portion of soil would come from a commercial source for stabilization. It is anticipated that some grading or smoothing of areas and the built up of others to ensure proper flow of the water through the pipeline would be necessary, but these effects would be temporary and short term. A Storm Water Pollution Prevention Plan and implementation of the plan to prevent soil storm water runoff would be required. The plan would require best management practices that prevent soils from escaping the project area and the site. An example of a common best management practice is the use of silt fencing prior to soil movement to ensure that soils do not escape from the area. Therefore, no significant environmental impacts to soil are expected as a result of the proposed action.

### ***3.7.6 Soils No Action Alternative***

Under the no action alternative, no soil would be disturbed, and therefore there would be no impacts to soils. However, it is possible that other owners of Tres Rios WRF effluent would implement the same project. Soil disturbance in the project area would continue to occur from the WRF operations, ADOT construction, and Pima County maintenance activity for the site. Impacts to soil would be the same with or without the temporary project. However, with the No Action alternative, Reclamation could fail to meet its legal requirements under SAWRSA and the AWSA.





Map Unit Symbol	Map Unit Name	Tucson-Avra Valley Area,	
		Acres in AOI	Percent of AOI
Bt	Brazito sandy loam	0.2	1.2%
Cm	Comoro sandy loam	0.4	3.3%
Gh	Grabe loam	12.6	95.4%
<b>Totals for Area of Interest</b>		<b>13.2</b>	<b>100.0%</b>

Figure 3.3 - Map of Project Area (NRCS 2014)

### **3.8 Water Resources**

The Santa Cruz River (SCR) is located in southern Arizona and northern Mexico within the Basin and Range Province. Its headwaters originate in the San Rafael Valley between the Coronado National Forest's Canelo Hills to the north, the Patagonia Mountains to the west and the Huachuca Mountains to the east. The Santa Cruz River flows south for approximately 14 miles to the Mexico border near Lochiel, Arizona. After entering Mexico the river continues south, but then turns 180 degrees to the north, and re-enters the United States 5 miles east of Nogales. The river continues on a northerly route to its confluence with the Gila River, just northwest of Maricopa, Arizona (AZDEQ/EPA, 2014).

Historically, portions of the SCR flowed perennially or year round. Agricultural surface water diversions, associated erosion, and groundwater pumping ultimately dried up the SCR in the Tucson region making it an ephemeral stream, flowing in response to storm events. In the Tucson region, ADEQ designates the SCR as an effluent dependent river. SCR surface water flows and habitat are heavily dependent on treated effluent discharges from the Agua Nueva and the Tres Rios WRFs. Wastewater treatment is regulated by ADEQ and treated effluent must meet established standards prior to discharge to the river.

The U.S. Geological Survey (USGS) maintains two stream gages that measure flow on the SCR in the vicinity of the proposed project. The USGS 09486500 SCR at Cortaro, Arizona stream gage is located upstream from the WRF and the USGS 09486520 SCR at Trico Road, near Marana, Arizona stream gage is located downstream. Over the past 10 years, annual average SCR stream flows at the Cortaro gage ranged from 74 cfs to 139 cfs. SCR flow is dependent on treated effluent releases from the WRFs and flow rates fluctuate diurnally based on regional water use.

### **3.8.1 Water Quality Current Conditions**

The Clean Water Act (P.L. 92-500) passed in 1970 established the basic structure for regulating discharges of pollutants into the Nation's rivers, lakes, estuaries, and coastal waters. Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the U.S. including wetlands. There will be no discharges and the transfer and storage of the effluent will use existing infrastructure. Effluent is being diverted directly from the WRF, therefore the Clean Water Act and compliance under section 404 is not required.

Approximately 30 days of water quality data was acquired before and after the Tres Rios and Agua Nueva WRFs underwent upgrades (Tom Berry, Pima County Regional Wastewater Reclamation Department, pers. comm 2014). It is difficult to compare differences in parameter results because of changes in testing requirements and changes the facilities underwent. A notable parameter that can be compared is total suspended solids (TSS) which is the entire amount of organic and inorganic particles dispersed in water. The Tres Rios WRF recorded a TSS monthly mean of 5.72 mg/L before upgrades and 0.56 mg/L after. While the Agua Nueva WRF recorded a TSS monthly mean of 8.89 mg/L and 0.77 mg/L before and after upgrades. Total Suspended Solids can include various materials such as silt, decaying plant and animal matter, industrial wastes, and sewage. High TSS can impact aquatic environments by reducing clarity, clogging pores, reducing photosynthesis, clogging gills of aquatic organisms, and rapidly absorbing and holding heat. The reduction in TSS shows a significant improvement in effluent that is discharged into the Santa Cruz River.

Quality of treated effluent discharged into the Santa Cruz River was evaluated because of its possible association with reducing infiltration of surface water by clogging channel sediments. This is a problem that has been seen and remedied in artificial recharge basins and injection wells where clogging was caused by: 1) suspended particles becoming lodged in interstitial pore spaces, 2) the dense growth of macrophytes enhancing accumulation of fine sediments (Wharton et al. 2006), or 3) the growth of biofilms produced by microorganisms (Wharton et al. 2006). Clogging results in low-hydraulic conductivity which indicates that infiltration of surface water is being impeded.

The surface of saturated sediments can accumulate and promote the growth of microorganisms such as algae and bacteria (Case 2012). Their buildup can result in the accumulation of cell biomass, extracellular polysaccharides (biofilms), and metabolic waste products that reduce permeability of the surface layer. Biofilms develop when bacteria and other microorganisms attach to the surface by building an extracellular polysaccharide matrix, which can form continuous impenetrable layers and/or fill interstitial spaces within sediment (Baveye and Valocchi 1989; Case 2012). Their growth, composition, and activity are influenced by environmental factors such as dissolved oxygen, organic carbon, nutrients, and ions (Storey et al. 1999).

As part of a Master's Thesis, a study by Case (2012) found that reaches of the Santa Cruz River with low nutrient concentrations were shown to have conductivity that was 1.4-3.1

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times higher than reaches with elevated concentrations, and that infiltration rates increased further away from treatment plants. Observations attributed the clogging to microbial/biofilm growth, physiochemical properties, and accumulation of fine sediments in interstitial spaces. The strongest correlation to clogging was percent fine sediment, but improved water quality would also help infiltration (Case 2012).

Under ordinary conditions, flows along the Santa Cruz River near Tucson have been approximately 40-km long, but only 6-km long following storm events (Lacher 1996). The sudden infiltration following storm events is likely a result of high velocity and turbid flows that scour the surface and disrupt clogged sediments. Scouring of the surface and drought helps improve infiltration but clogging can quickly resume once normal effluent flows return (Eisenmann et al. 1999). An impact believed to be related to clogging along the river was a multi-species tree die-off in 2005 (Case 2012). While little is known about the die-off, the lack of infiltration during the hot summer months along with drought may have deprived the trees of much needed water.

Poor water quality and reduced infiltration is what led to the establishment of over 20 miles of discontinuous riparian habitat. Since water quality improved, there has been a die off from the USGS gauge at Trico Road to the current flow end point found northwest of North Sanders Road. While water quality has improved, there will continue to be events where infiltration is reduced and surface flows travel further downstream, but those events will likely be much shorter and more infrequent. Improved infiltration where surface water is present may help offset habitat losses further downstream by stimulating growth of new riparian vegetation where it is marginally present or absent.

**3.8.2 Water Quality Environmental Consequences and Cumulative Effects**

The Arizona Department of Water Resources (ADWR) encourages the use of renewable water supplies, particularly Arizona's entitlement to Colorado River water, instead of groundwater through a flexible and effective regulatory program for the underground storage, savings and replenishment of water. Using renewable supplies helps reduce groundwater pumping which has significantly depleted some aquifers. The recharge program restricts the type of direct reuse of reclaimed water based on its class. Class A reclaimed water can have a direct reuse for various practices such as irrigating food crops, recreational impoundments, and fire protection systems. Class B reclaimed water can be used for surface irrigation on an orchard or vineyard, golf course irrigation, and dust control. Pima County received an Aquifer Protection Permit that reclassified the Class B+ effluent at the Tres Rios WRF to Class A+ on June 15, 2016 and is approved to last the life of the project. This will allow the effluent to be used on any crop, including food crops. The effluent could not be used on any food crop if the quality testing fails. Therefore, there would be no change to water quality as a result of the proposed project.

### ***3.8.3 Water Quality - No Action Alternative***

Under the No Action Alternative, there would be no impacts to water quality and the water would continue to discharge from the Tres Rios WRF to the Santa Cruz River. However, Metro Water and Pima County could complete the project without Reclamation, and we would continue to receive 50% LTSC for managed recharge, to be used for water deliveries or sold to obtain money for the Cooperative Fund.

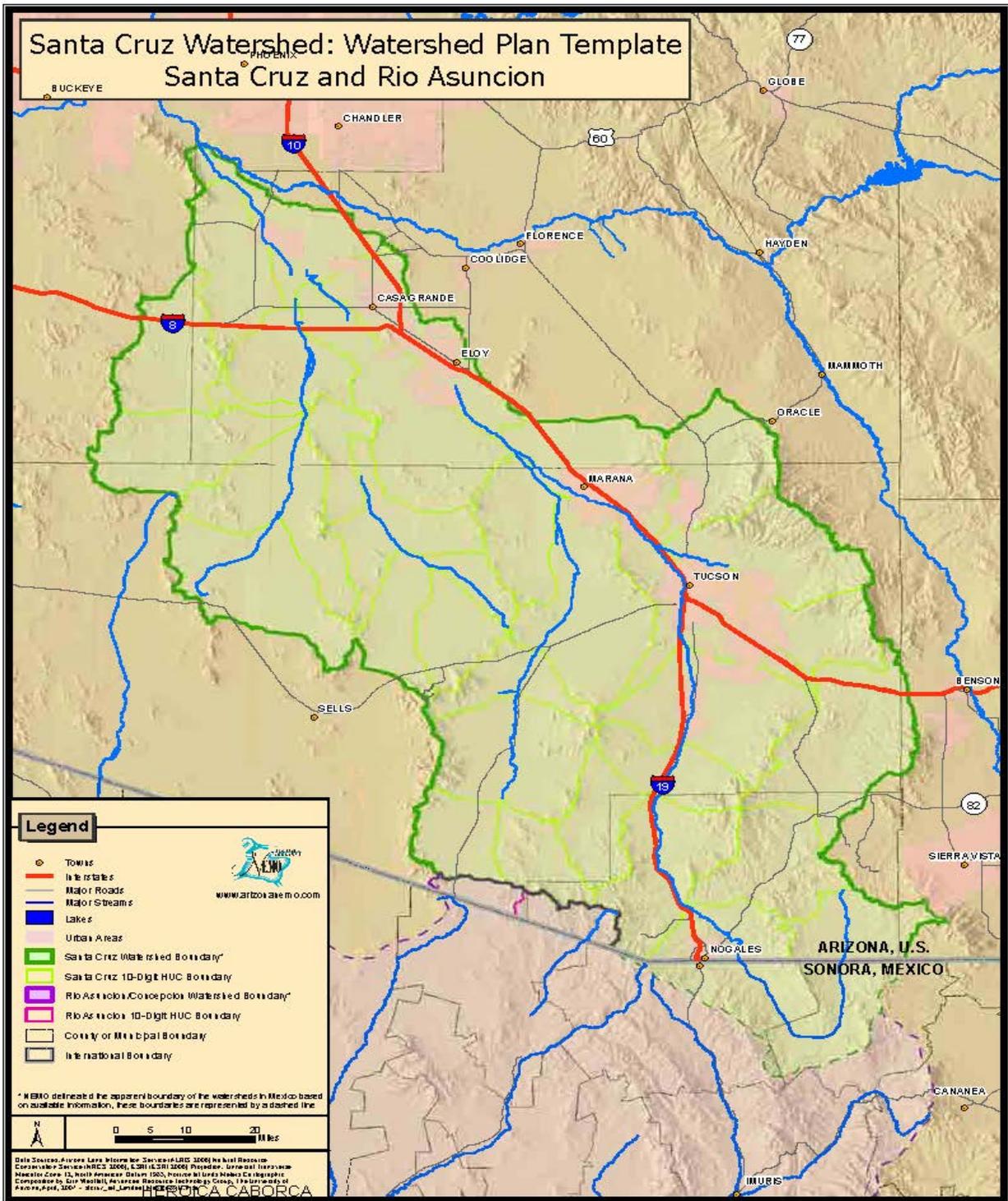


Figure 3.4 - Map of Santa Cruz Watershed

<http://www.epa.gov/region9/water/watershed/pdf/map-santa-cruz.pdf>

### **3.9 Hydrology Current Condition**

This section characterizes the hydrology conditions of the lower Santa Cruz River. The information below is based primarily on a report titled “Water in the Tucson Area: Seeking Sustainability” prepared by the Water Resources Research Center (WRRC 1999) of the University of Arizona and several reports prepared by the Pima Association of Governments for the Pima County Comprehensive Plan (Pima County 2014) and the Sonoran Desert Conservation Plan (Pima County 2001).

#### **The Tucson Basin and the Santa Cruz River**

Nearly all of the city of Tucson and its surrounding communities are located within the Tucson Basin. This broad valley is ringed by a number of mountain ranges that provide the origins for the numerous watercourses that transect the basin. Many of these rivers, creeks, and washes become tributaries that lead to the Santa Cruz River. Originating in Mexico and entering the state of Arizona approximately 65 miles south of downtown Tucson near the city of Nogales, the Santa Cruz River is one of the few rivers in the region that flows in generally a south to north direction. The water of the river has long served as a vital source of life for people, wildlife, and a robust riparian plant community. This green ribbon that traverses the Sonoran Desert has historically been the primary artery for sustaining life and economic development in the Tucson Basin. Located in the eastern portion of the Tucson Basin, Pantano Wash originates as Rincon Creek draining the Rincon Mountains. Tanque Verde Creek runs westward through the valley that separates the Rincon Mountains and the Santa Catalina Mountains. Pantano Wash and Tanque Verde Creek join near Craycroft Road to form the Rillito River, one of the largest tributaries of the Santa Cruz River. The Rillito River connects with the Santa Cruz River inside the study area, near Orange Grove Road. An additional waterway, the Canada del Oro Wash also joins the Santa Cruz River slightly further to the north. The Santa Cruz River, the Rillito River, and the Canada del Oro Wash combine to drain a majority of the flows within the Tucson Basin.

The Santa Cruz River is now an ephemeral stream that flows mainly as a result of seasonal storm events. Occasionally, during years of heavy precipitation, some water in the Santa Cruz River can flow north to reach the Gila River west of Phoenix, then continue to the Colorado River and the Gulf of California. As the Santa Cruz River flows past the study area to north, the channel gradient diminishes somewhat, with the channel eventually becoming a series of braided and discontinuous channels. As a result, during most years, flood flows spread out and deposit sediments before reaching the Gila River. Two water treatment facilities are located on the Santa Cruz River within the study area, the Agua Nuevo WRF and the Tres Rios WRF. The Agua Nueva WRF was established in 1951 and serves the urban Tucson area that lies southerly of the Rillito Creek. The Tres Rios WRF was established in 1977 and serves the northern parts of the Tucson metropolitan area, Oro Valley, and a major portion of the Town of Marana. Effluent released from the facilities provides a perennial source of flow in a portion of the Santa Cruz River.

### **Effluent Conditions and Losses**

Infiltration rates for 2012 and 2014 were determined as a function of reach length in miles to be approximately 4.0 af/mile/day (ACE 2010), while evaporation was estimated by multiplying the average annual evaporation rate of 6.3 feet/year by the open water surface area (Galyean 1996). Consumptive use was based on the area of existing cottonwood-willow and riverbottom wetland areas by consumptive rates of 8.0 feet/year and 6.0 feet/year respectively. Total infiltration rate for 2012 and 2014 was 25,500 af and 31,000 af at approximately 52% and 68% (Figure 3.5 and 3.6). The total infiltration rate for 2015 is estimated to be up around 89% at approximately 7af/mi/day.

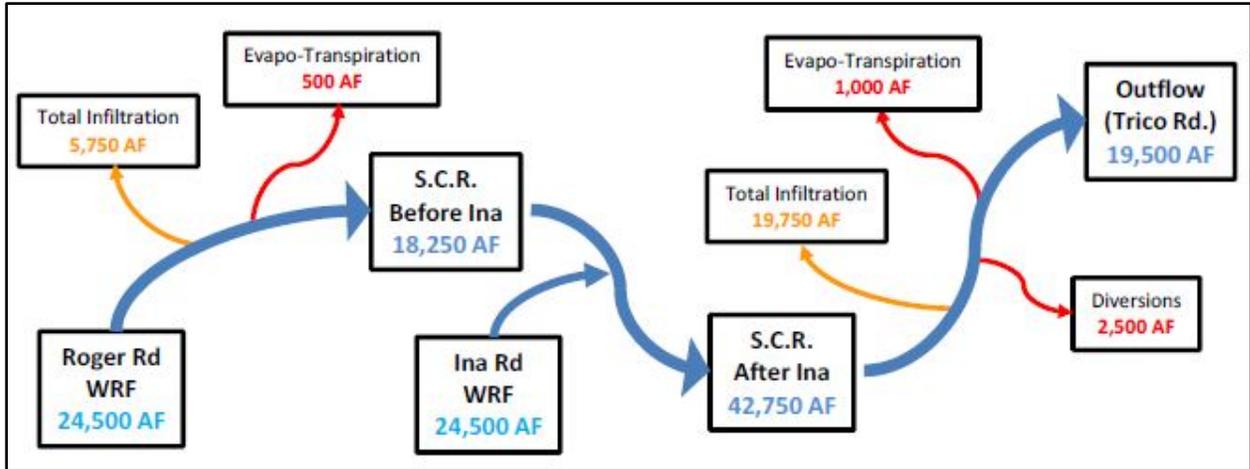
In 2012 effluent discharges at the Agua Nueva and Tres Rios WRFs were approximately 24,500 AFA each (Pima County 2012). Both WRFs recently underwent upgrades and expansion to improve effluent quality while changing treatment capacity at Tres Rios to 50 million gallons a day (from 37.5 mgd) and to 32 mgd (from 41 mgd) at Agua Nueva. A plant interconnect pipeline was constructed between both facilities allowing transfer of effluent to Tres Rios where sufficient excess capacity exists. The plant interconnect will also be used to transfer raw sludge to Tres Rios for treatment.

Other entities evaluating the withdrawal of their effluent from the Santa Cruz River present a foreseeable impact to wildlife and their habitat. The extent of that impact depends on how much effluent they can reuse and what will be left in the river to maintain habitat. Currently Pima County and Tucson Water are evaluating the feasibility of diverting 6,000 AFA of effluent from the Agua Nueva WRF to an artificial recharge facility. Utilizing a recharge facility will allow them to continue their current management practices of using well pumping to meet peak demand while banking their water resources for future system needs. Effluent from the Agua Nueva WRF now only makes it to the Cortaro Road gage during January, February, and December with an approximate flow of 10.2 af/day. The remainder of the year the flow stops approximately 5.03 miles downstream from the Agua Nueva WRF, which is 0.56 miles upstream of the Ina Road Bridge. Future discharges from that water reclamation facility will continue to maintain the 5.03 miles of surface flow. Currently Pima County and Tucson water only plan to remove the 6,000 AFY of effluent when there is excess above that base flow, expecting to maintain the existing 35.9 acres of riparian habitat along that reach of the river (Figure 3.7). However, there is no agreement that guarantees the existing surface flow will be maintained within the river. Future conditions may change causing Pima County and Tucson Water to divert more effluent away from the river. If that would happen the quantity and quality of riparian habitat between the Agua Nueva WRF would decrease.

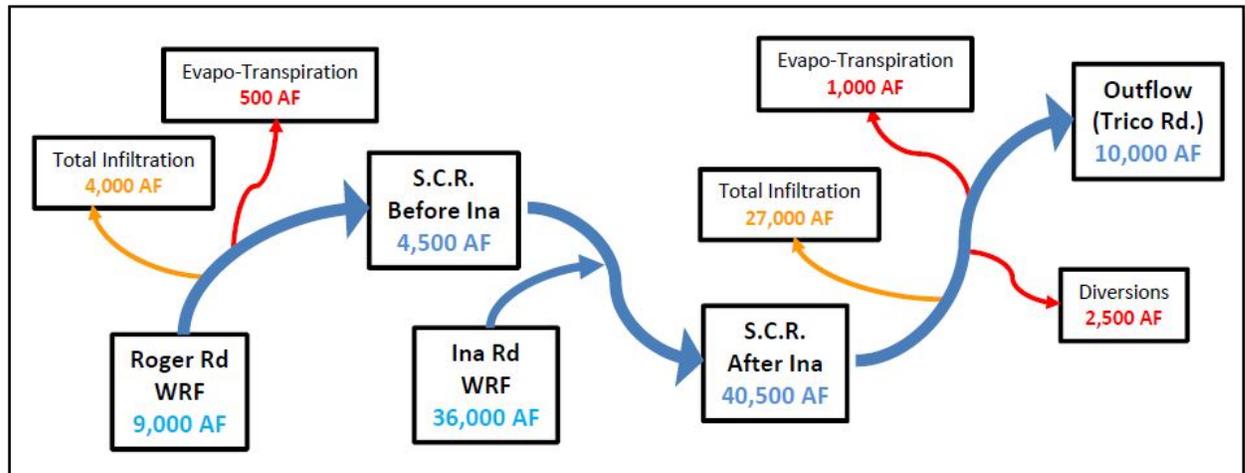
The planned reuse of effluent would actually make some positive impact because it would replace groundwater pumping. Unfortunately, that small positive impact is outweighed by the inevitable loss of riparian habitat. While that reach of the Santa Cruz River functions as a non-natural perennial system, the discharge of effluent into the river for the past several decades has created hundreds of acres of quality riparian habitat.

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Resident and migratory wildlife that utilize those areas will either be forced elsewhere or they will eventually decline or disappear. Over time as the lack of water takes its toll, biotic conditions along the impacted areas would transition to an upland community as was seen at the non-effluent dependent Columbus Dry site (HEG 2013).

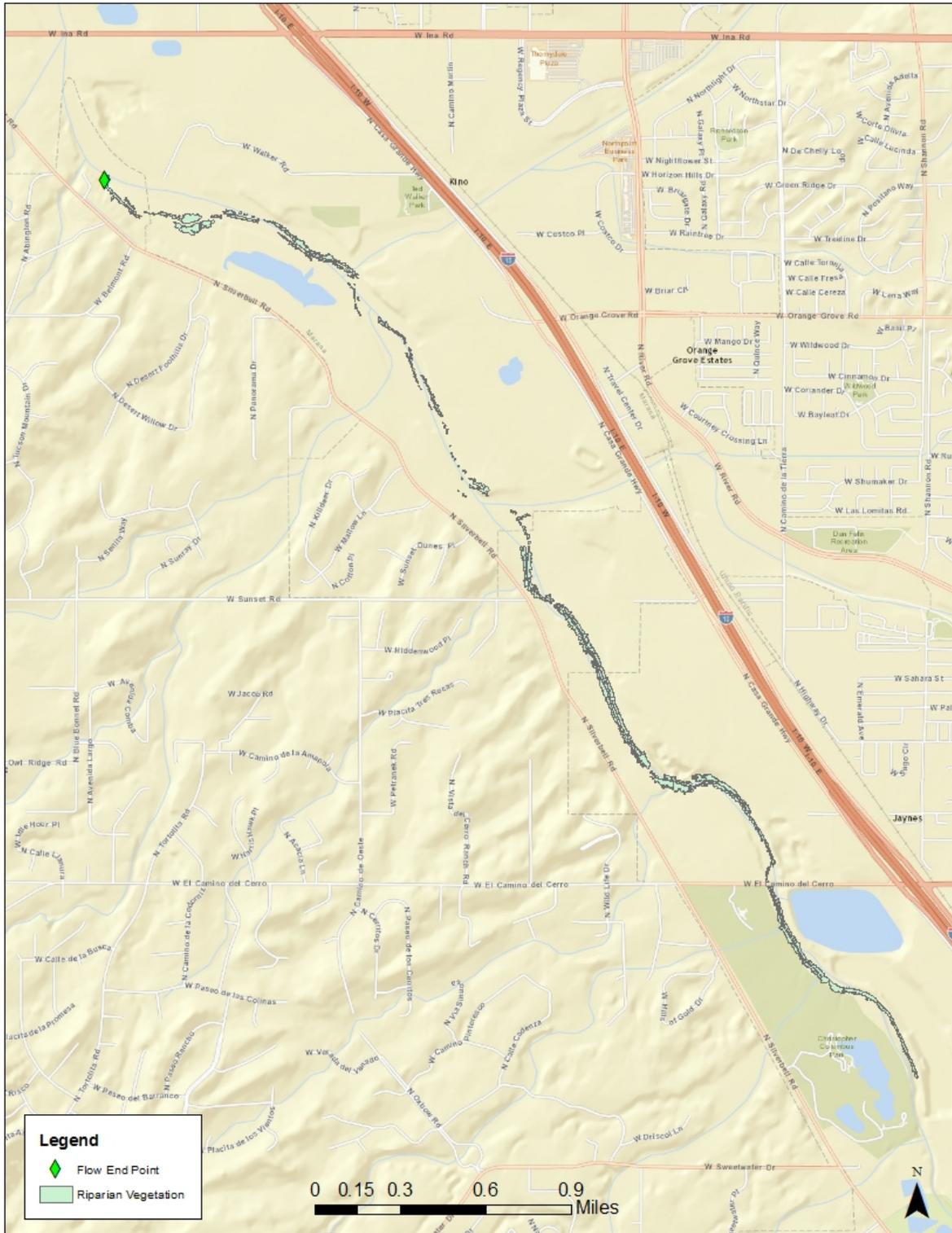


**Figure 3.5 Flow conditions and losses along the lower Santa Cruz River in 2012**



**Figure 3.6 - Flow conditions and losses along the lower Santa Cruz River in 2014**

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**Figure 3.7 - Riparian vegetation recorded from the outlet of the Agua Nueva WRF to the surface flow end point.**

### **Groundwater Aquifers**

The Tucson Basin can be divided into four geologic units, the Pantano Formation, Tinaja Beds, Fort Lowell Formation, and recent surficial deposits. These four units are hydrologically connected to varying degrees and are the units that form the main aquifer in the Tucson Basin. Surficial deposits consist of clay, sand, and rock that have washed from the surrounding mountains and accumulated over the past several thousands of years. Groundwater is stored in the open spaces between the particles of sand and rock within these formations. The alluvial basin fill deposits contain the groundwater supply throughout the region. It is this groundwater aquifer that supplies the metropolitan and rural water needs in the area including domestic, industrial, and agricultural water demands.

Surficial alluvial deposits in the river along Ina Road consist of unconsolidated sand, sandy gravel, and gravel that generally reach a depth of less than 100 feet. In channel deposits serve as infiltration paths for storm water flows to recharge the deeper basin-fill units. Areas outside of the main river channel typically consist of over-bank flood deposits made of silty-clayey to gravelly sandy loams. These over-bank flood deposits generally range from 10 to 20 feet thick. Over-bank flood deposits adjacent to the river channel contribute little to the infiltration and recharge of the basin fill units. The hydraulic characteristics of these surficial alluvial deposits are important for any potential recharge and habitat restoration efforts. The Fort Lowell Formation consists of unconsolidated to moderately consolidated silty sands to clayey silts that are 300 to 400 feet thick throughout most of the basin. These deposits thin towards the margins of the basin. No outcrops of this formation are found within the study area. The Fort Lowell Formation is a highly permeable unit which supplies most of the groundwater used in the Santa Cruz River Basin. Well yields from this formation typically range from 500 to 1,500 gallons per minute. The Tinaja Beds form a major part of the aquifer in the Santa Cruz River Basin and range from sandstones and conglomerates to clayey siltstones and mudstones. At the edges of the basin the Tinaja Beds range from several hundred feet to at least 2,000 feet thick. In the center of the basin, the beds may be as much as 5,000 feet thick. Well yields from within this formation range from less than 100 gallons per minute in the finer-grained layers to over 600 gallons per minute from the more permeable coarse-grained layers.

The Pantano Formation consists of well- to poorly consolidated sandstones, conglomerates, silty sandstones, mudstones, and gypsiferous mudstones in the Santa Cruz River Basin. Because of the great depth to this formation in the center of the basin as well as relatively low well yields, the Pantano Formation is not widely used as a source of groundwater. Those wells that have been completed within the Pantano Formation typically yield several hundred gallons per minute. The distance from land surface to the water table is termed “depth to water.” The present depth to water in the Tucson area ranges from less than 50 feet to more than 700 feet. In certain parts of the Tucson Mountains, it is as much as 900 feet. Groundwater movement in the subbasin is from the mountain-front recharge areas towards the central axis of the valley, continuing on

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towards the north and northwest, parallel to the Santa Cruz River flow channel. The flow rate is on average only about a few hundred feet per year, or a foot or two per day.

Since 1940, groundwater levels have declined more than 200 feet in portions of the Tucson Basin. Groundwater levels have declined over 150 feet in the southern Avra Valley, near the northern portion of the Tres Rios del Norte study area. Groundwater levels continue to decline at a rate of four to five feet per year in some portions of the basin. Water levels near Ina Road currently range from approximately 100 to 250 feet below the land surface, but are shallowest south of Avra Valley Road and deepest further north. Extensive groundwater pumpage for irrigation and municipal uses has caused long-term groundwater-level declines throughout much of the Santa Cruz River Basin. Recently, replacement of agricultural pumping with Central Arizona Project (CAP) water has resulted in water level rises north of Avra Valley Road. However, when compared to historic data, the water table has shown a net decline. These long-term water-level declines have resulted in aquifer compaction and associated land subsidence of up to 0.5 feet in the Santa Cruz River Basin.

***3.9.1 Hydrology and Water Resources Environmental Consequences and Cumulative Effects***

As mentioned previously, the Santa Cruz River is perennial at various reaches due to discharge of treated effluent from two treatment plants. The factors that have the greatest influence on flow within those reaches are the locations of wastewater reclamation facilities and their discharge, infiltration of effluent within the river, vegetation consumption use, and evapotranspiration. The diversion of additional effluent would decrease the volume of water and the extent of surface flows. This would not only lead to the loss of riparian vegetation that is reliant on those flows, but the wildlife that is also dependent on that habitat.

***3.9.2 Hydrology and Water Resources No Action Alternative***

Under the No Action Alternative, no additional effluent would be diverted from the river. However, there are other owners of effluent discharged from the Tres Rios WRF, and Reclamation could lose an opportunity to assist with meeting our firming obligations under the SAWRSA and AWSA.

**3.10 Cultural Resources**

The Natural Historic Preservation Act (NHPA) (P.L. 89-665) of 1966, as amended, establishes a program for the preservation of historic properties throughout the United States. It preserves our Nation's historic heritage and cultural foundations. Section 106 of the NHPA stipulates that agencies must take into account the effect of any proposed Federal or federally assisted undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places.

### ***3.10.1 Cultural Resources Current Conditions***

Reclamation conducted a Class I literature review of to identify previous projects and recorded cultural resources within a half mile of the proposed project area (Jelinek 2015). The literature review identified 57 archaeological projects and 27 archaeological sites within a half-mile of the proposed project. Two archaeological sites were identified within the boundary of the project area, the Costello-King Site (AZ AA:12:503[ASM]) and Las Capas (AZ AA:12:111[ASM]).

The Costello-King Site is described as a prehistoric agricultural site dating primarily to the San Pedro phase of the Late Archaic period (ca. 1200-800 B.C.). The site consists of numerous deeply buried pits, hearths, and canals. In addition, human remains have been previously recorded at the site. The Costello-King Site has been determined eligible for inclusion in the National Register of Historic Places under Criterion D.

In 1998 and 1999, Statistical Research conducted Phase I data testing and Phase II data recovery in the main portion of the site north of Ina Road, frequently called the Ina-Trico locus or parcel. Statistical Research excavated 1,180 m of trench and identified 17 features during Phase I data testing excavations (Riggs 1998). During Phase II data recovery, Statistical Research investigated a channel feature and excavated an additional two trenches, identifying ten more features (Riggs et al. 2000).

The pipeline for this proposed project is situated partly within the western leg of the Costello-King Site. It begins at an existing manhole south of Ina road and runs 65 ft to the end of the site's southern boundary. This portion of the site has been heavily disturbed by the construction and widening of Ina Road, as well as continued urban development.

Las Capas is described as a prehistoric occupation site dating primarily to the San Pedro phase of the Early Agricultural period (ca. 1200-800 B.C.). The site consists of numerous pithouses, pits, hearths, canal segments, and activity areas. In addition, human remains have been recorded at the site. Las Capas has been determined eligible for inclusion in the National Register of Historic Places under Criterion D.

Las Capas was first recorded in 1979 as part of the Canada del Oro Sewer Project (1976-1.ASM) and has been rerecorded during survey a total of six times. Las Capas also has been subjected to six testing projects, three data recovery projects, and six monitoring projects. Most recently, the site was investigated intensely as part of Pima County's Ina Road Regional Wastewater Reclamation Facility Expansion and Upgrades Project (Vint and Nials 2015; Whitney et al. 2015). Between 2008 and 2009, and again between 2012 and 2013, Desert Archaeology conducted Phase I and Phase II data recovery as Las Capas (Vint and Nials 2015). Excavations across the site resulted in the identification of more than 5,500 features, of which 3,455 were excavated or tested, as well as the recovery of approximately 113,000 artifacts and 7,300 samples.

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The proposed project area is situated partly within the very western portion of Las Capas and runs along the boundary of Locus I, where the retention basin is located. In October 2009, Desert Archaeology excavated eight trenches within Locus I; however, only T303 and T306 yielded any cultural material. A pit (F25002) was identified on the eastern end of T303, with a biface nearby, while flaked stone was recovered in the western edge of the trench (Whitney et al. 2015). A second pit was identified in T306 (F25001).

Following completion of Phase I investigations at Locus I, and consultation with affiliated Tribes and the Arizona State Historic Preservation Office (SHPO), the Pima County archaeologist recommended archaeological monitoring for future excavations within the retention basin (Locus I). Locus I was not subjected to Phase II data recovery (Whitney et al. 2015). In June 2010, Desert Archaeology monitored mechanical excavation of the retention basin (Locus I). Two additional features were identified during this undertaking, a roasting pit (F25003) and a possible canal (F25004) (Whitney et al. 2015).

**3.10.2 Cultural Resources Environmental Consequences and Cumulative Effects**

Because the project is taking place within the boundaries of two known archaeological sites, Reclamation determined that this project will have an adverse effect on historic properties. Given the scale of disturbance at the southern margin of the Costello-King Site, the previous investigations at Las Capas, the limited amount of cultural deposits identified during Phase I investigations in Locus I (the retention basin), the recommendations of the Pima County archaeologist, and the previous concurrence of the Arizona SHPO, Reclamation will require monitoring of all ground disturbing activities in areas where undisturbed soils may be present during the construction of the proposed pipeline.

Monitoring will be conducted following Arizona state guidelines and regulations. A project-specific permit from the Arizona State Museum will be obtained prior to construction, referencing Pima County's repository agreement, as any artifacts recovered during monitoring would be from County land. Given that ground disturbance will be limited; Reclamation does not anticipate that any subsurface deposits will be encountered. However, should cultural remains be identified during construction, ground disturbing activities will be halted until the monitor assesses the discovery and records it. The monitor will notify the Bureau of Reclamation, Pima County, and the Arizona State Museum of the discovery within 24 hours. In the event that the discovery is small, such as an artifact(s), a pit, or a hearth, the monitor shall excavate the discovery entirely and document the results so that construction may proceed. A monitoring report shall be provided to the Bureau of Reclamation, Arizona State Museum, Pima County, Arizona SHPO, and affiliated Tribes following completion of the project.

In the event that human remains are encountered, construction shall cease and Reclamation, Arizona State Museum, and Pima County will be notified so that cultural groups who claim cultural affinity to them can make appropriate arrangements for the disposition and reburial of the remains. The human remains will be removed from the site

by a professional archaeologist pending consultation and review with the Arizona State Museum, Pima County, and affiliated groups.

Reclamation submitted a report to the Arizona SHPO with its preliminary findings and received concurrence on November 13, 2015. Pima County also agreed with these findings in their November 16, 2015 letter. Additionally, Reclamation sent consultation letters regarding its recommendations to the following culturally affiliated Tribes: Ak-Chin Indian Community, Gila River Indian Community, Hopi Tribe, San Carlos Apache Tribe, Salt River Pima-Maricopa Indian Community, Tohono O’odham Nation, White Mountain Apache Tribe, and Pascua Yaqui Tribe. The Tohono O’odham Nation, the Hopi Tribe, and the White Mountain Apache Tribe provided comments and did not object to monitoring.

In consultation with Pima County regarding the proposed pipeline, the County expressed concerns that the pipeline would be vandalized if left exposed on the surface. They proposed that Reclamation cover the pipeline using material (soil) they would be removing from Emergency Overflow Basin #4 as part of an independent County project to reline the basin. Because the material from Emergency Overflow Basin #4 was generated from storm events and sheet wash and no new excavation below the existing depth of the retention basin shall occur, there will be no adverse effects to any cultural resources as a result of removing this material and transporting it for use on the project.

The agreement to bury portions of the pipeline resulted in changes to the project design and expansion of the area that would be excavated within and adjacent to the archaeological sites. Reclamation submitted a revised Class I report for consultation to all parties on February 4, 2016, addressing these changes and requesting monitoring as a mitigation strategy. Reclamation received concurrence with these findings and recommendations from Pima County on February 26, 2016 and positive responses from the Hopi Tribe on February 9, 2016, the White Mountain Apache Tribe and the San Carlos Apache Tribe on February 16, 2016, and the Gila River Indian Community on March 10, 2016. The Arizona SHPO contacted Reclamation to request a revision to their finding of “adverse effect” to “no adverse effect pending the results of archaeological monitoring.” Reclamation complied with this request and received concurrence from the Arizona SHPO on March 16, 2016. Reclamation has retained the services of a cultural resources contractor to conduct archaeological monitoring during project construction.

### ***3.10.3 Cultural Resources No Action Alternative***

If the No Action Alternative is chosen as the best decision, Reclamation would not need to consult with the SHPO or the Tribes, because there would be no ground disturbance and the water would continue to be discharged into the river. No adverse impacts to cultural resources would occur under the No Action alternative.



## 4.0 List of Preparers

Kimberly Musser, Environmental Protection Specialist (NEPA), Department of the Interior, Bureau of Reclamation; Lower Colorado Region, Phoenix Area Office.

Thomas Bommarito, Wildlife Biologist, Department of the Interior, Bureau of Reclamation, Lower Colorado Region, Phoenix Area Office.

Danny Falcon, P.E. Civil Engineer Department of the Interior, Bureau of Reclamation Lower Colorado Region, Phoenix Area

Eve Halper, PhD., Geography, Program Development Division, Department of the Interior, Bureau of Reclamation Lower Colorado Region, Phoenix Area Office

Frank (Eric) Holler, P.E. Civil Engineer, (retired) Program Development Division, Department of the Interior, Bureau of Reclamation Lower Colorado Region, Phoenix Area Office.

Lauren Jelinek, PhD, Archaeologist, Environmental Division, Department of the Interior Bureau of Reclamation

Nathan Lehman, Civil Engineer, Program Development Division, Department of the Interior, Bureau of Reclamation, Lower Colorado Region, Phoenix Area Office

Lawrence Marquez, Program Manager, Native American Affairs, Department of the Interior, Bureau of Reclamation, Phoenix Area Office

Jeff Riley, P.E. Supervisor, Engineering Division, Department of the Interior, Bureau of Reclamation Lower Colorado Region, Phoenix Area Office



## **5.0 Persons and Agencies Consulted**

### **5.1 Persons Consulted:**

John McGlothlen, (retired) Environmental Protection Specialist, Bureau of Reclamation  
Alexander Smith, Deputy Area Manager, Bureau of Reclamation  
Katherine Verburg, (retired) Department of the Interior Solicitor

### **5.2 Agencies Consulted:**

An electronic copy of this final EA and FONSI have been posted for public viewing and comment on reclamation's Phoenix Area Office website at [www.usbr.gov/lc/phoenix](http://www.usbr.gov/lc/phoenix). Emails of the Notice of Availability and EA were distributed to the following entities:

1. Arizona Department of Water Resources
2. Bureau of Indian Affairs
3. Central Arizona Water Conservation District
4. Arizona Game and Fish Department
5. U.S. Fish and Wildlife Service
6. City of Tucson
7. Metropolitan Domestic Water Improvement District
8. Cortaro Marana Irrigation District



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**Effluent Reuse at a Groundwater Savings Facility Final EA**  
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## **Appendix A Summary Environmental, Rules, Regulations, and Instructions Considered**

### **National Environmental Policy Act of 1969, as amended (NEPA) (P.L. 91-190)**

This law requires Federal agencies to evaluate the potential consequences of major Federal actions. An action becomes “Federalized” when it is implemented by a Federal agency, wholly or partially funded with Federal monies, or requires authorization from a Federal agency. The intent of NEPA is to promote consideration of environmental impacts in the planning and decision-making processes prior to project implementation. NEPA also encourages full public disclosure of the proposed action, any action alternatives, potential environmental effects, and mitigation. This EA was made available for public comment and public comments were considered prior to making the decision to issue a Finding of No Significant Impact.

### **Fish and Wildlife Coordination Act (FWCA) (P.L. 85-624)**

The FWCA provides a procedural framework for the consideration of fish and wildlife conservation measures in federal water resource development projects. Coordination with the Fish and Wildlife Service (FWS) is required on all federal water development projects. The effects of the CAP were originally addressed in an amended FWCA report prepared by the FWS in 1989. This proposed project results in no new water diversions or impoundments, nor does it result in development of or diversion of water into a water body. No further coordination pursuant to the FWCA is anticipated.

### **Endangered Species Act of 1973 (ESA) (P.L. 93-205)**

The ESA provides protection for plants and animals that are currently in danger of extinction (endangered) and those that may become extinct in the foreseeable future (threatened). Section 7 of this law requires federal agencies to ensure that all federally associated activities do not have adverse impacts on the continued existence of threatened or endangered species or designated areas (critical habitat) that are important in conserving those species. Reclamation has concluded the Proposed Action would not affect any federally listed species and that a separate Biological Assessment does not need to be prepared.

### **The Migratory Bird Treaty Act (MBTA) of 1918, as amended**

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. The MBTA prohibits the take, possession, import, export, transport, selling, or purchase of any migratory bird, their eggs, parts, or nests. No migratory bird species are anticipated to be affected adversely as part of this action.

**Wild and Scenic Rivers Act of 1968 (P.L. 90-542)**

This law designated the initial components of the National Wild and Scenic River System. It established procedures for including other rivers or reaches of rivers that possess outstanding scenic, recreational, geologic, fish-and-wildlife, historic, cultural, or other similar resources, and preserving these rivers in a free-flowing condition. The Act applies to waters designated, or eligible for designation, as wild and scenic. The Santa Cruz River is not designated as wild and scenic.

**Wilderness Act of 1964 (P.L. 88-577, as amended)**

This act established the National Wilderness Preservation System to be comprised of federally owned areas designated by Congress as “wilderness areas,” to be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and provide for the protection of these areas and preserve the wilderness character. The project area contains no areas that are designated wilderness areas, or are eligible for designation.

**Clean Water Act (CWA) (P.L. 92-500, as amended)**

This law established the basic structure for regulating discharges of pollutants into the nation’s rivers, lakes, estuaries, and coastal waters. Under Section 404 of the CWA, the U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged and/or fill material into waters of the U.S. including wetlands. In addition, a Section 401 water quality certification and 402 Arizona Pollutant Discharge Elimination System permit are required for activities that discharge pollutants to waters of the U.S. The project will not discharge any effluent directly into a water of the U.S., therefore CWA 401 water quality certification and 402 or 404 permits are not required.. Further, there will be no changes to current ongoing agricultural activities which would be subject to compliance under the CWA.

**National Historic Preservation Act of 1966, as amended (NHPA) (P.L. 89-665)**

All areas to be served CAP water as a result of this proposed action already have been subjugated and have been subject to irrigation. The proposed action would not result in changes to existing land use; therefore no effect to cultural resources is expected to occur.

**Farmland Protection Policy Act (P.L. 97-98)**

This law requires identification of proposed actions that would adversely affect any lands classified as prime and unique farmlands and minimizes the unnecessary and irreversible conversion of farmland to nonagricultural uses. The U.S. Department of Agriculture’s Natural Resources and Conservation Service administers this act. There will be no changes to current agricultural activities as a result of this proposed action; therefore, no effect to any lands classified as prime and unique farmlands are expected to occur.

**Executive Order 11988 (Floodplain Management)**

This Presidential directive encourages Federal agencies to avoid, where practicable alternatives exist, the short- and long-term adverse impacts associated with floodplain development. Federal agencies are required to reduce the risk of flood loss and minimize the impacts of floods on human safety, health and welfare; and restore and preserve the natural and beneficial values served by floodplains in carrying out agency responsibility. The proposed action would not affect floodplains or increase the risk of floods.

**Executive Order 12898 (Environmental Justice) (EO 12898)**

This executive order requires Federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of Federal actions on minority and/or low-income populations. Low-income populations include communities or individuals living in proximity to one another and meeting the U.S. Census Bureau statistical thresholds for poverty. Minority populations are identified where the percentage of minorities in the affected area exceeds 50 percent, or where the minority population percentage of the affected area is meaningfully greater than the minority population's percentage of a much broader area. No adverse effects to low income or minority populations are expected as a result of the implementation of the proposed action.

**Executive Order 11990 (Wetlands) (EO 11990)**

EO 11990 requires federal agencies, in carrying out their land management responsibilities, to take action that would minimize the destruction, degradation of wetlands; and take action to preserve and enhance the natural and beneficial values of wetlands. There are no wetlands in the project area that would be affected.

**Department of Interior, Secretarial Order, Indian Trust Assets (ITAs)**

ITAs are legal interests in assets held in trust by the U.S. government for Native American tribes or individuals. These assets can be real property or intangible rights and include water rights, hunting rights, money, lands, minerals, and other natural resources. The trust responsibility requires that all Federal agencies take actions reasonably necessary to protect ITAs. No ITAs are expected to be impacted by the proposed action



## Appendix B SHPO Concurrence



IN REPLY REFER TO:

PXAO-15.00  
ENV-3.00

SHPO - 2015 - 1219 (130024)  
ARIZONA STATE HISTORIC PRESERVATION OFFICE

United States Department of the Interior

BUREAU OF RECLAMATION  
Lower Colorado Region  
Phoenix Area Office  
6150 West Thunderbird Road  
Glendale, AZ 85306-4001

MAR 7 2016

OFFICIAL FILE COPY PHOENIX OFFICE		
ACTION BY: <i>[Signature]</i>		
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<b>MAR 10 2016</b>		
ARIZONA STATE HISTORIC PRESERVATION OFFICE		
CORRDL NO.		
PROJECT		

Dr. James Cogswell  
Archaeologist  
State Historic Preservation Office  
Arizona State Parks  
1100 West Washington Street  
Phoenix, Arizona 85007

Subject: Revised Section 106 Consultation on Effect – Temporary Project to Reuse Effluent  
From Tres Rios' Water Reclamation Facility – Section One (1), Township Thirteen  
(13) South, Range Twelve (12) East of the Gila and Salt River Baseline and Meridian,  
Pima County, Arizona

Dear Dr. Cogswell:

The Bureau of Reclamation, Phoenix Area Office (Reclamation) is submitting a revised consultation letter regarding the potential effects to cultural resources that may result from a proposed temporary project that would divert effluent from the Tres Rios Water Reclamation Facility (WRF) to a Ground Water Savings facility north of the WRF. Reclamation previously consulted on this action in letters to your office dated November 2, 2015 and February 4, 2016.

The project consists of 1,100 linear feet of pipe that runs along the perimeter of a retention basin from the WRF to an existing manhole south of Ina Road. A concrete slab will be placed near the WRF connection for a control station, which will be fenced. In consultation with Pima County, designers expressed concerns about potential vandalism of the pipeline if it was left above-ground, as was originally proposed. Reclamation has agreed to bury most of the pipeline to prevent damage from vandalism. The majority of the pipeline will be buried within the exterior southern and western existing, pre-disturbed, retention basin berms, and covered with clean fill provided by Pima County.

The area of potential effect (APE) has been previously surveyed and found to be partially within the site boundaries of AZ AA:12:111(ASM), also referred to as Las Capas, and AZ AA:12:503(ASM), also known as the Costello-King Site. Both of these sites have been previously determined eligible for inclusion in the National Register of Historic Places under Criterion D.

The APE consists of 1.26 acres. Much of the pipeline will be buried in pre-existing artificial berms where no cultural material is present or placed above-ground and covered with fill. It will be necessary to excavate a portion of the pipeline (91 linear feet) running from the control station to the retention basin berm located immediately south of Las Capas and a portion (35 linear feet) running from the northwest edge of the berm to the existing manhole near Ina Road within the boundary of the Costello-King Site. It will also be necessary to level some soil for the concrete pad and excavate holes for fence posts around the pad south of the Las Capas boundary. A revised map of this undertaking has been enclosed with this

**Effluent Reuse at a Groundwater Savings Facility Final EA  
Appendix B – SHPO Concurrence**

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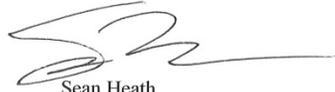
letter. These portions of planned ground disturbance are located in areas that have been heavily disturbed by urban development, the expansion of Ina Road, and construction of the WRF.

Previous Phase I investigations conducted by Desert Archaeology at Las Capas identified limited subsurface deposits within the retention basin (Locus I). In 2009, Pima County, in consultation with the State Historic Preservation Office, determined that the construction could proceed on the retention basin under the supervision of archaeological monitors. Subsequent monitoring projects conducted by Desert Archaeology encountered a few deeply buried deposits within the northern half of the retention basin (Locus I). Given that the proposed project will have limited ground disturbance, not exceeding 6 feet in depth or 126 feet in length, and that the areas of planned disturbance are located south and west from the previously identified features in the retention basin, Reclamation does not anticipate that any intact subsurface deposits will be encountered during this project. Despite these extensive disturbances and previous investigations, it is possible that the proposed project could potentially impact undisturbed soil.

Because a portion of the APE is within the boundaries of Las Capas and the Costello-King Site, Reclamation had previously determined that this project would have an *adverse effect* on cultural resources and recommended archaeological monitoring of construction ground-disturbing activities. However, in a conversation with your office on February 29, 2016, you recommended that Reclamation revise its determination to a conditional determination of *no adverse effect, pending the results of archaeological monitoring*. Reclamation agrees with your recommendation that this is a more appropriate determination given that we do not anticipate that any intact archaeological deposits shall be disturbed during construction. Given the extent of the previous investigations at both the Costello-King Site and Las Capas, and previous recommendations made by Pima County, Reclamation recommends monitoring of all ground disturbing activities into potentially undisturbed soil during construction to ensure intact deposits are not disturbed.

In response to this discussion, Reclamation is submitting this revised letter to your office. Reclamation has conditionally determined that the proposed project shall have *no adverse effect on cultural resources, pending the results of archaeological monitoring*. We seek your concurrence with the findings above. If you have any questions, please contact Dr. Lauren Jelinek, Archaeologist, at 623-773-6263, or via email at [ljelinek@usbr.gov](mailto:ljelinek@usbr.gov).

Sincerely,



Sean Heath  
Chief, Environmental Resource  
Management Division

Enclosure

**CONCUR**



Arizona State Historic Preservation Office

## Appendix C USFWS Consultation



### United States Department of the Interior

Fish and Wildlife Service  
Arizona Ecological Services Office  
9828 North 31st Avenue, C#3  
Phoenix, Arizona 85051

Telephone: (602) 242-0210 Fax: (602) 242-2513

OFFICIAL FILE COPY PHOENIX AREA OFFICE	
ACTION BY:	
RECEIVED:	
JUL 22 '16	
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In Reply Refer to:  
AESO/SE  
02EAAZ00-2016-I-0288

July 14, 2016

#### Memorandum

To: Area Manager, Phoenix Area Office, Bureau of Reclamation, Phoenix, Arizona  
(Attention Leslie A. Meyers)

From: Field Supervisor

Subject: Review and Conference on the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet of Effluent per Year at a Groundwater Savings Facility in Pima County, Arizona

We are in receipt of your request for informal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544 *et seq.*), as amended (Act) on the proposed construction of a temporary project to reuse up to 7,000 acre feet of effluent per year at a groundwater savings facility in Pima County, Arizona (proposed action). Your request was dated February 4, 2016, and was received by us on February 10, 2016.

We have reviewed the *Biological Assessment for Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County* (BA) transmitted with your February 4, 2016, memorandum and concur with your determination that the proposed action may affect, but is not likely to adversely affect, the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat and the threatened yellow-billed cuckoo (*Coccyzus americanus*) (and, in conference, its proposed critical habitat). A brief description of the proposed action appears below, and is followed by our rationale for concurrence.

#### Description of the Proposed Action

The detailed description of the proposed appearing in the BA (pages 1-4), is incorporated herein by reference, and is briefly summarized in the following paragraphs.

The Bureau of Reclamation (Reclamation) proposes to deliver up to 7,000 acre feet per annum (AFA) of treated effluent generated at Pima County's Tres Rios Water Reclamation Facility (WRF) to a Groundwater Savings Facility (GSF). Reclamation would receive Long Term

Storage Credits (LTSCs) from the Arizona Department of Water Resources (ADWR) for the amount of effluent that is conveyed to the GSF. Under the proposed action, the effluent would be conveyed to the Cortaro-Marana Irrigation District (CMID) GSF, to be used “in-lieu” of groundwater currently withdrawn by CMID.

The Tres Rios WRF is located in Pima County near Interstate 10 and Ina Road (see Figure 1 in the BA), and currently discharges treated effluent to the Santa Cruz River. Under the proposed action, the effluent generated at the WRF would no longer be discharged to the Santa Cruz River, and would instead leave the facility on the northwest side using a temporary above-ground pipeline connected to an existing manhole south of Ina Road. The manhole already connects to an existing Cortaro-CMID pipeline that discharges to the CMID canal east of I-10, and ultimately to the CMID GSF.

There would be minor construction of about 975 linear feet of pipeline between the Tres Rios WRF and the existing manhole; the pipeline connecting to the CMID canal and GSF is already in place. Approximately 255 linear feet of the pipeline would be buried to an approximate depth of 4 feet under an existing maintenance road. The remaining 720 linear feet of pipeline would be on the surface, but have loose fill laid on top to help hide its placement. The project would be limited to five years due to a planned widening of Interstate 10 that will result in the removal of the CMID pipeline. Reclamation will reevaluate the project at that time.

The action area for the proposed action includes all areas to be directly or indirectly affected by the proposed action, and corresponds to the areas identified as the Project Area and the Lower Santa Cruz Managed Recharge Project, Phase II, in Figure 1 on page 3 of the BA.

### **Background on the Species and Effects of the Proposed Action**

The BA (see pages 10-19) contains a thorough accounting of the proposed action’s impacts to the hydrology of the Santa Cruz River, and the resulting effects to aquatic and riparian habitat. We considered these effects in detail, and they are incorporated herein via reference.

#### Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered, without critical habitat, on February 27, 1995 (FWS 1995). A definitive determination of critical habitat was published on January 3, 2013 (78 FR 344). A complete description of the biology of the southwestern willow flycatcher is contained in the *Southwestern Willow Flycatcher Recovery Plan* (FWS 2002). The content of these documents is incorporated herein via reference. We also incorporate via reference the BA’s detailed description of existing habitat types and their conditions as well as the status of southwestern willow flycatchers within the action area.

No southwestern willow flycatchers have been detected on the Santa Cruz River near the action area. The closest known breeding population is situated approximately 37-miles east on the lower San Pedro River (Sabra Tonn, Arizona Game and Fish Department [AGFD], pers. comm. 2014, as cited in the BA). While riparian habitat on the Santa Cruz River does not provide ideal conditions, it is considered good quality habitat that would at least provide suitable migratory habitat. Surveys organized by the Town of Marana in preparation for replacement of the Ina

Road Bridge (situated in close proximity to the Tres Rios WRF) have not detected any southwestern willow flycatchers (see page 10 in the BA).

The proposed action's diversion of up to 7,000 AFA of effluent from the Santa Cruz River to the CMD USF would cause the loss of 74.9 acres of riparian habitat along a distance of approximately 5.04 miles. The riparian vegetation, which is primarily composed of Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), and tamarisk (*Tamarix* spp.), would exhibit stress and, ultimately, mortality, after the diversion. The eventual ephemeral ecosystem would eventually be colonized and occupied by xeroriparian species, including velvet mesquite (*Prosopis velutina*) and foothill and blue palo verde (*Parkinsonia microphylla* and *P. florida*, respectively).

We concur that the proposed action is not likely to adversely affect the southwestern willow flycatcher for the following reasons:

- We are aware of no detections of southwestern willow flycatcher or documentation of breeding activities in the action area. This renders the effects of the proposed action discountable in that they are unlikely to occur.
- The transition from a mesoriparian plant community to a xeroriparian plant community will still permit the site to function as a stopover site for southwestern willow flycatchers, albeit with a reduced insect prey base precipitated by the loss of surface flows. This renders the effects of the proposed action insignificant in that they are unlikely to reach the scale where take occurs.
- There is no southwestern willow flycatcher critical habitat in the action area; therefore, none will be affected.

#### Yellow-billed Cuckoo

The yellow-billed cuckoo was listed as a threatened species under the ESA on October 3, 2014 (79 FR 59992) (USFWS 2014b). Critical habitat for the yellow-billed cuckoo was proposed on August 15, 2014 (79 FR 48548) (USFWS 2014a). Proposed critical habitat encompasses 546,335 acres across the western United States. A revised proposed rule that may include additional proposed critical habitat is under development. The biology and status of the species are described in our April 28, 2016, *Amended Final Reinitiated Biological and Conference Opinion for the Rosemont Copper Mine, Pima County, Arizona* (File Number 22410-2009-F-0389R1) (Rosemont BCO, pages 224-229). The contents of these documents are incorporated herein by reference.

The BA (page 10) states that yellow-billed cuckoos are likely to migrate through the action area (Sabra Tonn, Arizona Game and Fish Department [AGFD], pers. comm. 2014; Susan Sferra, U.S. Fish and Wildlife Service [FWS], pers. comm. 2015, both as cited in the BA). We are not aware of any data that would indicate that yellow-billed cuckoos breed in the action area.

We concur that the proposed action is not likely to adversely affect the yellow-billed cuckoo for the following reasons:

- We are aware of two detections of the yellow-billed cuckoo in the action area; breeding is not known to occur there. This renders the effects of the proposed action discountable in that

**Effluent Reuse at a Groundwater Savings Facility Final EA  
Appendix C – USFWS Consultation**

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they are unlikely to occur.

- The transition from a mesoriparian plant community to a xeroriparian plant community will still permit the site to function as a stopover site for yellow-billed cuckoos as well as foraging habitat for individuals that may occupy mesoriparian habitat in unaffected areas elsewhere, albeit with a reduced insect prey base precipitated by the loss of surface flows. This renders the effects of the proposed action insignificant in that they are unlikely to reach the scale where take occurs.
- There is no proposed yellow-billed cuckoo critical habitat in the action area; therefore, none will be affected.

This concludes informal consultation for Reclamation's proposed action and further serves as a conference report for the proposed critical habitat for the yellow-billed cuckoo. No further section 7 consultation is required for this project at this time. Should project plans change, or if information on the distribution or abundance of listed species or critical habitat becomes available, our determinations may need to be reconsidered. We note, in particular, there will be a future revision to yellow-billed cuckoo proposed critical habitat followed by the eventual publication of a final critical habitat rule. These future actions may influence the analyses contained in this memorandum of concurrence.

In all future correspondence on this project, please refer to consultation number 02EAAZ00-2016-I-0288. Should you require further assistance or if you have any questions, please contact Jason Douglas at (520) 670-6150 (x226) or Jean Calhoun at (x223).



for Steven L. Spangle

cc (hard copy):

Field Supervisor, Fish and Wildlife Service, Phoenix, Arizona ( 2 copies )  
Jean Calhoun, Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

cc (electronic copy):

Tab Bommarito, Wildlife Biologist, Bureau of Reclamation, Phoenix, AZ

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ (pep@azgfd.gov)  
Raul Vega, Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ

filename: U:\SAWRSA Implementation - Santa Cruz River Effluent Recharge\Draft Santa Cruz River SWARSA Effluent Recharge Project Concurrence.docx

## Appendix D Comments Received

2/3/2016

DEPARTMENT OF THE INTERIOR Mail - Draft EA comments



Musser, Kimberly <kmusser@usbr.gov>

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### Draft EA comments

1 message

**Lewis, Charles** <chip.lewis@bia.gov>

Wed, Feb 3, 2016 at 6:13 AM

To: Kimberly Musser <kmusser@usbr.gov>

Ms. Musser,

The Bureau of Indian Affairs, Western Region, Branch of Environmental Quality Services, has taken a cursory look at the Draft Environmental Assessment (EA) for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County. I have also consulted with our Water Resources Branch. No issues or concerns related to the subject Draft EA were identified. Therefore, BIA Western Region has no comment at this time.

Thank you for the opportunity to participate and comment on Reclamation's Draft EA.

Chip Lewis

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Chip Lewis  
Environmental Protection Specialist  
DOI-BIA/WRO/DOT  
(602) 379-6782

**Effluent Reuse at a Groundwater Savings Facility Final EA  
Appendix D – Comments Received**



**BRIDLE BIT RANCH, LLC**

COMMERCIAL BRANGUS/Angus+ CATTLE

OWNERS: DeSpain, DeSpain & Pina  
12655 N SANDERS ROAD  
PO BOX 475  
MARANA, ARIZONA 85653

MEMBER MANAGERS: C. BRAD & DONNA DESPAIN

Ted & Sandra DeSpain & Raul & Rhonda Pina

TELEPHONE: 520-682-3914

FAX: 520-682-9478

1/27/2016

Ms. Kimberly Musser, Environmental Protection Specialist,  
Environmental Resources management Division ATTN: PXAO-1500  
6150 West Thunderbird Road  
Phoenix Az. 85306  
Ms. Musser

Our Bridle Bit Ranch is located near Sanders Road and the Santa Cruz River (SCR), near the end of where water now flows; therefore, your project will affect us significantly. Like others affected by the subject Groundwater Savings Project we have been using water directly out of the SCR since 1964. And, like other concerned citizens and agencies in the basin we recommend that the water be left in the SCR. As your draft EIS states, the effluent water being discharged provides for a rich riparian area supporting vegetation and animals. So, you might add economic benefits.

We believe it should be made clear in your report that your Project will affect the stretch of the SCR downstream of the Tres Rios Wastewater Plant located at Ina Rd and the SCR and not or minimally affect the river upstream of Ina Road. On page 2, you mention the Santa Cruz Managed Underground Storage Facility but not the recharge project that really matters, the Lower Santa Cruz Managed Recharge Project (yet it is shown on figure 1.1)

We would like to point out that in comments to the Arizona Department of Water Resources from Pima County, dated 12/23/2015, on the Fourth Management Plan, Pima County addresses several factors regarding water in the SCR that we concur with and that should be addressed. First of all, the amount of water being discharged has decreased the last several years due to a decrease in potable demand. Second, because of improved water quality due to treatment plant improvements, the infiltration of effluent water has increased significantly. We have watched the last year as the combination of these factors has drastically affected flows in the vicinity of Sanders Road. The stretch of the river between Avra Valley Road and Sanders Road must be evaluated when you're saying that 7,000 cfs of water will be removed.

Stretches of the river at the limits of flow distance, will bear the brunt of the effects of removing water from the river. In paragraph 3.3.2, your paragraph that describes 'flow distance' and associated table 3.2 suggests that without additional data, infiltration rates cannot be determined. We would like to stress that in summer months when deliveries are being made to the GSF, evaporation rates are also higher and the combination of factors will limit the distance water flows. It looks to us like the 5 mile "impact zone" in your report is merely a guess and note that the true impacts to this critical area have not been specifically addressed in your EIS.

Effluent Reuse at a Groundwater Savings Facility Final EA  
Appendix D- Comments Received

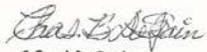
Your report does not provide a seasonal water delivery schedule, only mentioning that no water will be delivered in November, December and January. Please provide a water delivery schedule for the remaining nine months which will allow us to determine when we can expect dry periods.

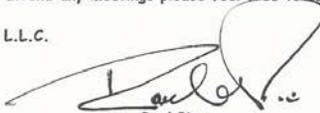
Immediately upstream of our Ranch, Pima County's 'Marana High Plains' recharge project relies on water taken directly from the SCR. We have partnered with and assisted Pima County on this project, removing 7,000 afa is likely to affect this project.

Five years ago, a significant amount of water used to leave our Basin, past Trico Road, as shown on your figures 3.5 and 3.6 Projects that removed water from the River made sense. With the two factors (flow quantity and infiltration) dramatically affecting the flow length, it can no longer be stated the affects will be minimal.

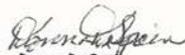
Please give us full consideration of our concerns. We appreciate the opportunity to comment and if you have and questions or we need to attend any meetings please feel free to contact us.

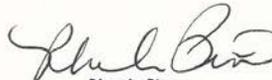
Sincerely, Bridle Bit Ranch, L.L.C.

  
C Brad DeSpain

  
Raul Pina

  
Ted DeSpain

  
Donna DeSpain

  
Rhonda Pina

  
Sandra DeSpain

### **Bridle Bit Ranch:**

**Comment-***We believe it should be made clear in your report that your project will affect the stretch of the SCR downstream of the Tres Rios Wastewater Plant located at Ina Rd and the SCR and not or minimally affect the river upstream of Ina Road.*

**Response-**It was identified in the Draft EA starting on page 15 that this project will impact the stretch of the river downstream of the Tres Rios Water Reclamation Facility. This project will not affect the river upstream of Ina Road because the only location that water is being diverted from is the Tres Rios Water Reclamation Facility (p. 8 Final EA).

**Comment-***The stretch of the river between Avra valley Road and Sanders Road must be evaluated when you're saying that 7,000 afa of water will be removed.*

**Response-**The River starting at the Agua Nueva Water Reclamation Facility to the surface flow end point past North Sanders Road was evaluated. That includes the stretch of the river between Avra valley Road and Sanders Road. Information on that evaluation can be found on Pages 15-19 and Pages 33-39 within the Draft EA.

**Comment-***In paragraph 3.3.2, your paragraph that describes 'flow distance' and associated table 3.2 suggests that without additional data, infiltration rates cannot be determined.*

**Response-**The Draft EA utilized estimated infiltration rates based on recent flow data as stated on Page 15.

**Comment-***Your report does not provide a seasonal water delivery schedule, only mentioning that no water will be delivered in November, December, and January. Please provide a water delivery schedule for the remaining 9 months to determine when we can expect dry periods.*

**Response-**A water delivery schedule was not provided because requested deliveries are unknown at this time and will depend on the needs of the farm.

**Comment-***Five years ago, a significant amount of water used to leave our Basin, past Trico Road, as shown on your figures 3.5 and 3.6. Projects that removed water from the River made sense. With the two factors (flow and quantity of infiltration) dramatically affecting the flow length, it can no longer be stated that the effects will be minimal.*

**Response-**Historically, the Santa Cruz River functioned as a natural ephemeral and perennial system that is now perennial at various reaches due to the discharge of treated effluent. For more information on the evaluated impacts of this proposed project, please see Section 3.4.2.

**Effluent Reuse at a Groundwater Savings Facility Final EA  
Appendix D– Comments Received**

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Bureau of Reclamation  
Environmental Resource Management Division  
6150 West Thunderbird Road, Phoenix, AZ 85306  
Attention: Kimberly Musser, re: PXAO-1500

February 2, 2016

**Coalition Members**

ACE Charter High School  
Center for Biological Diversity  
Cienega Watershed Partnership  
Coalition for Sonoran Desert Protection  
Community Food Bank  
of Southern Arizona  
Desert Watch  
Native Seeds/SEARCH  
Physicians for Social Responsibility  
Primavera Foundation  
Save the Scenic Santa Ritas  
Sierra Club - Rincon Group  
Sky Island Alliance  
Tucson Audubon Society  
Tucson Mountains Association  
Watershed Management Group

**Business Affiliates**

Borderlands Brewing Company  
Crow Communications Group, Inc.  
La Cocina  
Wells Fargo Advisors – Jennifer Mills  
Technicians for Sustainability

Dear Ms. Musser,

The Community Water Coalition urges the Bureau of Reclamation to reconsider the plan to remove 7,000af of effluent from the Santa Cruz River at the Tres Rios water treatment facility. The impacts of even a temporary removal of water will cause enormous damage to the critical riparian area that has been established in the many years of flow supported by effluent discharge in the channel. Our concerns represent the perspectives of diverse interests in the Tucson Basin, including nonprofits, businesses, and individuals with expertise in water and social justice issues, and our objections to this proposal are in line with those of Pima County.

After careful review of the “Draft Environmental Assessment (EA) for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County”, the Coalition has the following concerns:

1. The Draft EA acknowledges that water volume in the river has already been impacted by the changes in water quality following upgrades at the two WTFs that discharge effluent into the Santa Cruz River. Although these are beneficial for improved recharge, flows no longer extend as far as they once did, which has already had documented negative impacts to users and riparian vegetation downstream. Examples of these impacts include:
  - a. Loss of flow to the property owned and farmed by BKW Farms on Sanders Rd in Marana, leading to increased reliance on pumped groundwater.
  - b. Dieback and distress of cottonwood and willow populations at the North Simpson Farm property managed by Tucson Audubon, which provides a preview of the potential impacts to riparian habitat along the stretches of river that will be impacted by this proposed project. Only 13 months since the cessation of perennial flow, they have recorded substantial dieback rates among the large gallery forest trees (Table 1 in attachment, Gallery Forest Conditions). Only 17% of willow trees are not yet showing signs of stress, while 83% are either dead

## Effluent Reuse at a Groundwater Savings Facility Final EA

### Appendix D – Comments Received

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or have had more than 25% structural dieback. Cottonwood trees show rates of dieback and distress that are far lower, but still troubling, 34% dead or stressed. These significant impacts are occurring even in light of substantial rains experienced in the region last winter and this winter.

2. The 5-mile stretch highlighted as impact area in the Draft EA, where base flow would cease for most of the year encompasses the rich riparian habitat of the Santa Cruz River Oxbow which features hydriparian species including willow, cottonwood, and mesquite, and is designated as an Important Riparian Area (IRA) on Pima County's Riparian Classification Maps. This area provides important bird habitat, wildlife connections to Tortolita and Tucson mountains, and nesting and foraging for raptors and large mammals, in addition to a social asset as a site for recreation and birding. The months of November – January, when effluent would not be diverted to the Groundwater Savings Project, would not provide substantial benefit to this area because water is most needed in the hot, dry months of April – June.
3. Loss of riparian vegetation in the Draft EA is underestimated. In addition to the estimated loss of flow along the Oxbow channel and downstream that impacts 74 acres, the Draft EA fails to consider impacts to the Marana High Plains Effluent Recharge Project, in which BoR was an original partner, and the Bridle Bit Ranch. Both areas receive water through the Oxbow channel.
  - a. Loss of water to the Marana High Plains Effluent Recharge Project would impact an additional ~10 acres that supports significant riparian species including willow, mesquite, and others. The recharge pond supports habitat for migrating wading and shore birds, in addition to recharging 600af/yr into the local aquifer.
  - b. Loss of water to Bridle Bit Ranch would impact an additional 63 acres that supports pasture for grazing cattle. This land is supported by Pima County to preserve cultural heritage as endorsed in the Sonoran Desert Conservation Plan.
4. Loss of these critical riparian areas would not only imperil riparian plants, wildlife, and bird species that rely on these effluent-supported stretches of the Santa Cruz River. There would also be significant impacts to community recreation assets and the local economy. Three examples of where an economic impact of loss of riparian habitat can be expected are:
  - a. Birding and wildlife viewing: In the 2013 study conducted by Tucson Audubon Society, *Economic Contributions of Wildlife Viewing to the Arizona Economy: A County-Level Analysis*, they found that Pima County received a benefit of \$304,368,133 at watchable wildlife sites visited in 2011. Loss of riparian habitat in the areas affected by this proposal will result in a decline of quality birding and wildlife viewing opportunities.
  - b. The Loop Bicycle and Pedestrian trail: Pima County's 2013 report, *Economic, Environmental, Community, and Health Impact Study*, was unable to determine a hard dollar amount for annual economic benefit of the Loop to the region. However, they cite benefits to employment, tourism, public health, property values,

and alternative transportation goals that all have a positive impact on the local economy.

- c. Mitigation for habitat loss: Pima County Flood Control District estimates a loss of *at least* 24 acres of hydriparian habitat along the county-owned portion of the Oxbow. Based on Regulated Riparian Habitat Offsite Mitigation Guidelines for Unincorporated Pima County and using a conservative estimate, of \$40,000/acre, the loss of habitat is estimated at \$960,000. (This is in addition to the \$120,000 value of losing 400 – 600af of storage credits at the Marana High Plains facility.)

In light of these impacts, the Community Water Coalition is strongly opposed to the Bureau's project as proposed. We would encourage the Bureau to instead work with local water experts and groups, such as our own, to find projects that utilize effluent to improve, rather than degrade, riparian habitat in the region. The Community Water Coalition would be happy to work with the Bureau on such efforts.

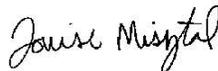
In addition, the Community Water Coalition is eager to work with Bureau of Reclamation and other entities to advance changes to the recharge credit policy that will allow communities like Tucson that are reaching a high threshold of groundwater recharge to receive 100% credit for in-stream (managed) effluent recharge projects.

Sonoran Institute, who in partnership with Pima County, tracks conditions along this stretch of the river as part of the Living River Project, also endorses the comments submitted in this letter.

Sincerely,



Randy Serraglio  
Chair



Louise Misztal  
Secretary



Lisa Shipek  
Treasurer

## Community Water Coalition:

**Comment-***The Community Water Coalition urges the Bureau of Reclamation to reconsider the plan to remove 7,000 AFA of effluent from the Santa Cruz River at the Tres Rios water treatment facility. The impacts of even a temporary removal of water will cause enormous damage to the critical riparian area that has been established in the many years of flow supported by effluent discharge in the channel. Our concerns represent the perspectives of diverse interests in the Tucson Basin, including nonprofits, businesses, and individuals with expertise in water and social justice issues, and our objections to this proposal are in line with those of Pima County.*

**Response-**We understand and evaluated the riparian habitat that would be affected. However, Reclamation has legal obligations it must meet for providing water during shortage and to pay for delivery fees as mandated by law. Reclamation is obligated to find a way to comply with Federal law. To that end, Reclamation as a described need to maximize credits, so we are proposing to reduce our effluent deliveries to the river.

**Comment-***[Impacts include] Loss of flow to the property owned and farmed by BKW Farms on Sanders Rd in Marana, leading to increased reliance on pumped groundwater.*

**Response-** It is anticipated that some water users along the river may have to resort to increased reliance on groundwater. Historically, portions of the Santa Cruz River functioned as a natural ephemeral and perennial system till agricultural surface water diversions, associated erosion, and groundwater pumping ultimately dried up the river in the Tucson region. The portion that runs through Tucson is now perennial due to the discharge of effluent. For more information on the Santa Cruz River, please see Section 3.8.

**Comment-***[Impacts include] Dieback and distress of cottonwood and willow populations at the North Simpson Farm property managed by Tucson Audubon, which provides a preview of the potential impacts to riparian habitat along the stretches of river that will be impacted by this proposed project. Only 13 months since the cessation of perennial flow, they have recorded substantial dieback rates among the large gallery forest trees (Table 1 in attachment, Gallery Forest Conditions). Only 17% of willow trees are not yet showing signs of stress, while 83% are either dead or have had more than 25% structural dieback. Cottonwood trees show rates of dieback and distress that are far lower, but still troubling, 34% dead or stressed. These significant impacts are occurring even in light of substantial rains experienced in the region last winter and this winter.*

**Response-** Due to increased infiltration the surface flow end point was recorded just south of West Marana Road during June 2015. The end point was chosen after surveying the river and recording the front of the surface flow and a transition between healthy to dead riparian vegetation. For more information on the streamside riparian vegetation analysis, please see Section 3.4.2.

**Comment-***The 5-mile stretch highlighted as impact area in the Draft EA, where base flow would cease for most of the year encompasses the rich riparian habitat of the Santa Cruz River Oxbow which features hydri-riparian species including willow, cottonwood, and mesquite, and is designated as an Important Riparian Area (IRA) on Pima County's Riparian Classification Maps. This area provides important bird habitat, wildlife connections to Tortolita and Tucson mountains, and nesting and foraging for raptors and large mammals, in addition to a social asset as a site for recreation and birding. The months of November-January, when effluent would not be diverted to the Groundwater Savings Project, would not provide substantial benefit to this area because water is most needed in the hot, dry months of April-June.*

**Response-** Riparian vegetation is most reliant on water during the hot dry summer months. That is why a surface flow end point was chosen in the month of June to most accurately represent future conditions. For more information see Section 3.4.2.

**Comment-***Loss of riparian vegetation in the Draft EA is underestimated. In addition to the estimated loss of flow along the Oxbow channel and downstream that impacts 74 acres, the Draft EA fails to consider impacts to the Marana High Plains Effluent Recharge Project, in which BoR was an original partner, and the Bridle Bit Ranch. Both areas receive water through the Oxbow channel.*

*Loss of water to the Marana High Plains Effluent Recharge Project would impact an additional ~10 acres that supports significant riparian species including willow, mesquite, and others. The recharge pond supports habitat for migrating wading and shore birds, in addition to recharging 600af/yr into the local aquifer.*

**Response -** Riparian habitat within the Marana High Plains Recharge Project was mapped to be approximately 3.9 acres. That changes the total area of riparian vegetation along the effluent dominated reach to 141.5 acres. The 5-mile Impact Zone changed from 74.9 acres to 78.8 acres. The Upstream Intact Zone will remain 62.7 acres. The impact zone contains 57% of riparian habitat along the effluent dominated reach which is up from the original calculation of 54%.

# Effluent Reuse at a Groundwater Savings Facility Final EA

## Appendix D – Comments Received

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1/26/2016

DEPARTMENT OF THE INTERIOR Mail - please add me to contact list



Musser, Kimberly <kmusser@usbr.gov>

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### please add me to contact list

11 messages

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Mead Mier <mmier@pagnet.org>  
To: kmusser@usbr.gov

Fri, Jan 22, 2016 at 10:58 AM

Ms. Kimberly Musser,

Could you please add me to the list for the EA for the SWARSA Effluent at a Groundwater Savings Facility in Pima County and future notices for other projects in Pima County as well?

My primary comment so far is that I would like to request more time to review this please. I have been calling Even Halper to ask if such a project would be emerging and just found out about this release of documents. It would be helpful to have a local meeting regarding it at PAG that I could host, so I would hope for at least 30 more days to comment, if at all possible.

It is critical for water and habitat planning that this decision considers local concerns regarding use of effluent. For instance, the endangered Gila Top minnow was recently discovered to have repopulated upstream in the Santa Cruz River. For water managers and in stream habitat managers, there may be concerns about pulling water off the river during the critically hot and dry seasons when the river habitat relies on the water most as reclaimed water demands are already simultaneously high by Tucson Water. I haven't had time to review the documents thoroughly but am interested in who would do the maintenance on this new project. There also is much discussion locally that it would be ideal to have increased recharge credits for in stream flows, so we appreciate that this is a temporary project that may help multiple parties to consider collaborative agreements.

**Regarding: The Bureau of Reclamation has issued a Draft Environmental Assessment (DEA) for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually (AFA) of Effluent at a Groundwater Savings Facility in Pima County. (Comments due January 29, 2016).**

- 1) [ISSUANCE MEMO \(.PDF Aprox. 90 KB\)](#)
- 2) [DRAFT EA \(.PDF Aprox. 5.7 MB\)](#)

Thanks so much,

Mead

Mead Mier  
Sustainability Coordinator - Watershed Planning Lead  
Pima Association of Governments  
1 E. Broadway, Tucson, AZ 85705  
Main: 520.792-1093- Direct: 520. 495-1464  
[MMier@PAGregion.com](mailto:MMier@PAGregion.com)  
Clean Water Starts With Me! - [PAGregion.org](http://PAGregion.org)

<https://mail.google.com/mail/u/0/?ui=2&ik=a6a753b161&view=pt&q=topminnow%5C&qs=true&search=query&th=1526a7d27dd8d94d&siml=1526a7d27dd8d94...> 1/4

Effluent Reuse at a Groundwater Savings Facility Final EA  
Appendix D- Comments Received

1/27/2016

DEPARTMENT OF THE INTERIOR Mail - Extension of Public Comment Period



Musser, Kimberly <kmusser@usbr.gov>

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**Extension of Public Comment Period**

3 messages

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**Musser, Kimberly** <kmusser@usbr.gov>  
To: mmier@pagnet.org

Mon, Jan 25, 2016 at 7:19 AM

In response to your request, we have extended the comment period to Feb. 5, 2016. It may take a few days to update the website, but please be assured we will accept your comments.

Thank you for taking time to comment on the Temporary project.

Very respectfully,

--

Kimberly Musser  
Environmental Protection Specialist  
U.S. Department of the Interior, Bureau of Reclamation  
Phoenix Area Office  
6150 West Thunderbird Road  
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**Mead Mier** <mmier@pagnet.org>  
To: "Musser, Kimberly" <kmusser@usbr.gov>

Wed, Jan 27, 2016 at 10:01 AM

Thank you!

Mead Mier  
Sustainability Coordinator- Watershed Planning Lead  
Pima Association of Governments  
1 E. Broadway, Tucson, AZ 85705  
Main: 520.792-1093- Direct: 520. 495-1464  
MMier@PAGregion.com  
Clean Water Starts With Me! - PAGregion.org

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**From:** Musser, Kimberly [mailto:kmusser@usbr.gov]  
**Sent:** Monday, January 25, 2016 7:19 AM  
**To:** mmier@pagnet.org  
**Subject:** Extension of Public Comment Period

[Quoted text hidden]

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**Musser, Kimberly** <kmusser@usbr.gov>  
To: Mead Mier <mmier@pagnet.org>

Wed, Jan 27, 2016 at 11:58 AM

<https://mail.google.com/mail/u/0/?ui=2&ik=a6a753b161&view=pt&earch=inbox&th=15279270a957f29e&siml=15279270a957f29e&siml=1528409863165ecf&si...> 1/2

# Effluent Reuse at a Groundwater Savings Facility Final EA

## Appendix D – Comments Received

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February 5, 2016

Ms. Kimberly Musser, Environmental Protection Specialist  
U.S. Bureau of Reclamation  
Environmental Resource Management Division  
6150 West Thunderbird Road  
Phoenix, AZ 85306

**Attention: PXAO-1500**

**Subject: Draft Environmental Assessment for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County**

Dear Ms. Musser:

We appreciate this opportunity to comment on the *Draft Environmental Assessment (EA) for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County* dated January 2016. We understand the U.S. Bureau of Reclamation's (BOR) desire and need to meet their obligations under the current Southern Arizona Water Rights Settlement Act (SAWRSA) and the purpose of the proposed project to secure 100% credit for recharge of effluent.

The Pima County and the Regional Flood Control District (District) has worked with U.S. Bureau of Reclamation to assist with reclamation of constructed and managed recharge over a period of more than two decades, starting with the Marana High Plains Effluent Recharge Project which was authorized and constructed under the BOR's High Plains Program, and more recently the Effluent Interconnect Pipeline Project for this project and the Lower Santa Cruz River Basin Study. We wish to continue to work with the BOR and to explore ways to optimize the riverine environment for recharge, recreation, riparian and other uses consistent with a multi-benefit approach and the Water Infrastructure Supply and Planning Study Project pursuant to Pima County Board of Supervisors' Resolution 2010-16 and to support the BOR in implementing its obligation under SAWRSA.

Pima County is providing the following comments on the draft EA.

1. On Page 2 of the EA, a reference is made to low infiltration rates in recent years. The draft EA should also report that with the new upgrades to the Agua Nueva Water Reclamation Facility (Agua Nueva) and Tres Rios Water Reclamation Facility (Tres Rios), the cleaner effluent infiltrates at much higher rates and that currently for most of the year effluent flow does not go past Sanders Road, which is approximately 5.5 miles upstream of the flow monitor point at Trico Road. This information is backed up by Figure 3.1 in the EA showing recorded surface flows at Trico Road.
2. The draft EA indicates the project will divert a maximum of 7,000 acre-feet per year; however, the Intergovernmental Agreement signed by Metro Water and the Cortaro-Marana Irrigation District, the project participants, indicates a target of 2,200 acre-feet per year. It is unclear what the actual volume that is being proposed by the project and what impacts there may be since there is a significant difference in volumes and potential impacts.

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Suzanne Shields, P.E., Director

201 N. Stone Ave, 9th Floor, Tucson, Arizona 85701-1207 • Phone: 520-724-4600 • Fax: 520-724-4621

**Effluent Reuse at a Groundwater Savings Facility Final EA  
Appendix D– Comments Received**

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Ms. Kimberly Musser, Environmental Protection Specialist, U.S. Bureau of Reclamation  
**Draft Environmental Assessment for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County**  
February 5, 2016  
Page 2

3. The draft EA incorrectly states on Page 9 that no wetlands are anticipated to be affected by implementing the proposed action. The National Wetlands Inventory coverage for Arizona shows substantial acreage of wetlands along the Lower Santa Cruz River, and the draft EA identified five miles of effluent flow that may be lost. The U.S. Army Corps of Engineers has designated the Santa Cruz River as a Traditionally Navigable Water under the regulatory authority of Section 404 of the Clean Water Act for protection of Waters of the United States.
4. The five-mile impact area where base flow would cease most of the year (Figure 3.2 of the draft EA) would impact at the lush riparian habitat along the Santa Cruz River Oxbow as well as the Marana High Plains Effluent Recharge Project, which received effluent inflow from the oxbow. The recharge project not only recharges 600 acre-feet per year of effluent, the project also provides riparian habitat for wading and shore birds in the pond and has significant riparian trees consisting of willow, mesquite and other obligate riparian species.
5. The draft EA says that the action will not affect floodplains. While there are no direct impacts, reductions in effluent flows will indirectly affect floodplain functions by reducing the quantity and types of riparian vegetation, which provide resistance to flows and induce sediment deposition. Reductions in riparian vegetation can indirectly increase erosion risks.
6. The riparian impacts are substantial. No mitigation is discussed or proposed for the loss of aquatic or riparian habitat, or the potential loss of constructed recharge credits at the Marana High Plains project.
  - a. There isn't any information provided about the seasonality of the proposed effluent use. If it were possible to seasonally reduce effluent sent down the pipeline, adverse effects to riparian vegetation and recharge at Marana High Plains could be reduced. The draft EA should discuss both diurnal and seasonal impacts to determine if some level of intermittent effluent flows in the river could reach the Ox Bow riparian area and Marana High Plains project area during irrigation season even if not in the daylight hours.
  - b. A 2016 report by Harris Environmental Group for *The Living River* shows a decrease in woody tree density, especially Goodding willow and shrub tamarisk occurring in the reaches where effluent flows have been reduced.
  - c. Even if the loss is temporary, the canopy and density of riparian woodlands would take decades to rebuild. Reductions in effluent availability can impair successful recruitment of willow which depends on soil moisture levels not fluctuating greatly with seasons.
  - d. Impacts to wetlands (not analyzed in this draft EA) and the loss of riparian vegetation may cause significant impacts to migratory birds, but no conclusions have been drawn in the draft EA. The BOR has previously sponsored avian studies of the effluent-dependent Santa Cruz River prior to the upgrades, and there is a large body of information about the avian use of the river from other sources.

## Effluent Reuse at a Groundwater Savings Facility Final EA Appendix D – Comments Received

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Ms. Kimberly Musser, Environmental Protection Specialist, U.S. Bureau of Reclamation  
**Draft Environmental Assessment for the Construction of a Temporary Project to Reuse up to 7,000 Acre Feet Annually of Effluent at a Groundwater Savings Facility in Pima County**  
February 5, 2016  
Page 3

7. The draft EA does not address effects to human enjoyment of the riverine environment resulting from loss of flow. A new U.S. Environmental Protection Agency (EPA) study, published in the journal Landscape and Urban Planning (2015, Volume 133, pages 37-52), shows that the water and trees in the Santa Cruz River are important from the perspective of the general public. The study entitled, "Priority River Metrics for Residents of an Urbanized Arid Watershed" is written by EPA researchers Matthew Weber and Paul Ringold.
8. The BOR's action alternative sets a precedent in that its use of the pipeline establishes a requirement for Arizona Department of Transportation (ADOT) to re-build or re-locate the pipeline. Under the No Action alternative, the pipeline would be removed during the Ina Road project by ADOT, and thus would be unavailable for long-term diversion of effluent to agricultural uses. If, under the Action alternative, and as a consequence of this use, the pipeline must be reconstructed by ADOT, then the long-term diversion of effluent should be evaluated.
9. On pages 15 and 16, the draft EA describes the proposed Tucson Water and Pima County recharge project that would divert 6,000 acre-feet per year of effluent. This project, the Southeast Houghton Area Recharge Project, will be permitted for up to 4,000 acre-feet per year. The diversion would be from the Agua Nueva. The impacts are not comparable to the BOR's proposed project because the effluent flow from Agua Nueva is considerably less than at Tres Rios and effluent flow currently terminates approximately one mile downstream from Agua Nueva.
10. The No Action alternative is not completely correct as the proposed project can still proceed with Metro Water District's effluent.

Again, thank you for the opportunity to comment on the draft EA and proposed project. Please contact me at (520) 724-4681 if you have any questions.

Sincerely,



Suzanne Shields, P.E.  
Director and Chief Engineer

SS/tj

- c: John Bernal, Deputy County Administrator – Public Works  
Jackson Jenkins, Director – Regional Wastewater Reclamation Department  
Kathy Chavez, Water Policy Manager – Regional Wastewater Reclamation Department  
Julia Fonseca, Environmental Planning Manager – Regional Wastewater Reclamation Department  
Bill Zimmerman, Deputy Director – Regional Flood Control District  
Eric Shepp, P.E., Deputy Director – Regional Flood Control District  
Joseph Olsen, P.E. General Manager – Metro Water District  
David Bateman, General Manager – Cortaro-Marana Irrigation District

### **Pima County Flood Control:**

**Comment** - *On Page 2 of the EA, a reference is made to low infiltration rates in recent years. The draft EA should also report that with the new upgrades to the Agua Nueva Water Reclamation Facility (Agua Nueva) and Tres Rios Water Reclamation Facility (Tres Rios), the cleaner effluent infiltrates at much higher rates and that currently for most of the year effluent flow does not go past Sanders Road, which is approximately 5.5 miles upstream of the flow monitor point at Trico Road. This information is backed up by Figure 3.1 in the EA showing recorded surface flows at Trico Road.*

**Response** - The Draft EA goes into detail reviewing the high infiltration rates on Pages 15-17, 33-34, and 36-38.

**Comment** - *The draft EA incorrectly states on Page 9 that no wetlands are anticipated to be affected by implementing the proposed action. The National Wetlands Inventory coverage for Arizona shows substantial acreage of wetlands along the Lower Santa Cruz River, and the draft EA identified five miles of effluent flow that may be lost. The U.S. Army Corps of Engineers has designated the Santa Cruz River as a Traditionally Navigable Water under the regulatory authority of Section 404 of the Clean Water Act for protection of Waters of the United States.*

*Impacts to wetlands (not analyzed in this draft EA) and the loss of riparian vegetation may cause significant impacts to migratory birds, but no conclusions have been drawn in the draft EA. The BOR has previously sponsored avian studies of the effluent-dependent Santa Cruz River prior to the upgrades, and there is a large body of information about the avian use of the river from other sources.*

**Response** - Wetlands are not specifically identified within the Draft EA because wetlands can not only be difficult to define but can also be categorized as a different biological community. What is identified on the Santa Cruz River by the National Wetlands Inventory is Freshwater Forested/Shrub Wetlands which in Arizona is also known as a Riparian Community that historically has been primarily composed of cottonwoods and willows. Today saltcedar is also a part of that mix. That riparian community was evaluated in the Draft EA starting in Section 3.3.2.

**Comment** - *The riparian impacts are substantial. No mitigation is discussed or proposed for the loss of aquatic or riparian habitat, or the potential loss of constructed recharge credits at the Marana High Plains project.*

**Response** - No mitigation is discussed because there is no effective way to directly mitigate the impacts of the proposed project, the project is temporary. Modifying the effluent delivery schedule will not send enough water downstream during the growing season to benefit the riparian habitat. Further, there is no critical or proposed critical habitat for endangered species in the proposed project area.

**Effluent Reuse at a Groundwater Savings Facility Final EA**  
**Appendix D – Comments Received**

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**Comment** - *Loss of these critical riparian areas would not only imperil riparian plants, wildlife, and bird species that rely on these effluent-supported stretches of the Santa Cruz River. There would also be significant impacts to community recreation assets and the local economy. Three examples of where an economic impact of loss of riparian habitat can be expected are:*

*Birding and wildlife viewing: In the 2013 study conducted by Tucson Audubon Society, Economic Contributions of Wildlife Viewing to the Arizona Economy: A County-Level Analysis, they found that Pima County received a benefit of \$304,368,133 at watchable wildlife sites visited in 2011. Loss of riparian habitat in the areas affected by this proposal will result in a decline of quality birding and wildlife viewing opportunities.*

**Response** – Wildlife watching could be adversely impacted and has been included in Section 3.7.2. However, Reclamation’s project is also temporary and the 7,000 AFA is the maximum the pipeline will transmit. There is no critical or proposed critical habitat for endangered species within or directly adjacent to the project area.

**Comment** - *The Loop Bicycle and Pedestrian trail: Pima County's 2013 report, Economic, Environmental, Community, and Health Impact Study, was unable to determine a hard dollar amount for annual economic benefit of the Loop to the region. However, they cite benefits to employment, tourism, public health, property values.*

**Response** - There are many sections along the Pima trails already constructed and under construction. However, it must be reiterated again that the reason for the diversion is to obtain 100% Long Term Storage Credits to obtain money for water deliveries and Long Term Storage Credits in order to deliver water if there is a shortage on the Colorado River.