



**US Army Corps of Engineers  
Los Angeles District**

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**Santa Cruz River, Paseo de las Iglesias  
Pima County, Arizona**

**PROJECT SUMMARY**

U.S. Army Corps of Engineers  
January 2006

TABLE OF CONTENTS

1.0 STUDY INFORMATION.....1  
2.0 STUDY OBJECTIVES.....3  
3.0 ALTERNATIVES.....4  
4.0 EXPECTED PROJECT PERFORMANCE.....7  
5.0 STATE & AGENCY REVIEW RESULTS .....11  
6.0 SIGNIFICANT IDEPENDENT TECHNICAL REVIEW COMMENTS.....11  
7.0 SIGNIFICANT HQ POLICY REVIEW COMMENTS .....12  
8.0 HQUSACE POLICY COMPLIANCE REVIEW TEAM .....12  
9.0 MILESTONES.....13

ATTACHMENTS

EXHIBIT 1.0.....LOCATION MAP  
EXHIBIT 1.1.....STUDY AREA MAP

**SANTA CRUZ RIVER, PASEO DE LAS IGLESIAS  
PIMA COUNTY, ARIZONA**

**1.0 STUDY INFORMATION**

**A. Study Authority.** The Santa Cruz River, Paseo de las Iglesias, Pima County, Arizona, Feasibility Study was specifically authorized by section 212 of the Water Resources and Development Act of 1999, Pub. L. No. 106-53, 33 U.S.C. 2332. Section 2332(a) states:

*The Secretary [of the Army] may undertake a program for the purpose of conducting projects to reduce flood control hazards and restore the natural functions and values of rivers throughout the United States.*

Subsection (b)(1), 33 U.S.C. 2332(b)(1), provides authority to conduct specific studies “to identify appropriate flood damage reduction, conservation, and restoration measures.” Subsection (c), 33 U.S.C. 2332(c), states the cost-sharing requirement applicable to studies and project conducted pursuant to section 2332. Subsection (e), 33 U.S.C. 2332(e), identifies priority areas. It states in pertinent part:

*In carrying out this section, the Secretary shall examine appropriate locations, including - - (1) Pima County, Arizona, at Paseo de las Iglesias and Rillito River;  
....*

**B. Study Sponsor.** The non-Federal sponsor for the feasibility study and plan implementation is Pima County, Arizona. Project administration is provided by the Pima County Regional Flood Control District.

**C. Study Purpose and Scope.** This feasibility study provides an interim response to the study authority. The purpose of this study is to define environmental degradation and water resource related problems and to investigate the feasibility of providing solutions to these problems. The scope of this study consists of: a) the identification of problems and opportunities associated with loss of riparian habitat and related water resource concerns; b) the formulation of alternative measures for environmental restoration, incidental reduction of future flood damages, and maximization of National Environmental Restoration (NER) and National Economic Development (NED) benefits; and c) the identification of the opportunity and the role for Corps participation in environmental restoration and related water resources planning.

**D. Project Location/Congressional District.** Project Location. The study area is located in the City of Tucson, and Pima County, Arizona, approximately 110 miles southeast of Phoenix (see Figures 1.0). The study area boundary encompasses an area of approximately 5,005 acres and seven miles long varying from 0.5 miles to 1.6 miles wide (see Figure 1.1).

Congressional District(s). Congressional interests are Senator John McCain, Senator Jon Kyl, Rep. Raul Grijalva - D (AZ-07), and Rep. Jim Kolbe – R (AZ-08).

**E. Prior Reports and Existing Water Projects.** There are no existing Federal water resource projects within the study area. Important prior studies, reports, and species surveys relevant to this feasibility study include:

<b>Report</b>	<b>Organization</b>
<i>Gila River, Santa Cruz River Watershed, Pima County Arizona – Final Feasibility Report</i> (August, 2001)	U.S. Army Corps of Engineers Los Angeles District
<i>Paseo de las Iglesias, Pima County, Arizona - Reconnaissance Phase Study, 905(b) Analysis</i> (1999)	Pima County, Arizona
<i>Sonoran Desert Conservation Plan: Relationships Between Land and People –The Cultural Landscapes Approach in Archaeology and History</i> (May, 2000)	Pima County, Arizona
<i>Sonoran Desert Conservation Plan: Pygmy Owl Update</i> (November, 1999)	Pima County, Arizona
<i>Sonoran Desert Conservation Plan: Mountain Parks</i> (August, 1999)	Pima County, Arizona
<i>Sonoran Desert Conservation Plan Update – Focus on Riparian Areas</i> (July, 1999)	Pima County, Arizona
<i>Sonoran Desert Conservation Plan Draft Report</i> (October, 1998)	Pima County, Arizona
<i>Preserving Cultural and Historic Resources – A Conservation Objective of the Sonoran Desert Conservation Plan, (May 1999)</i>	Pima County, Arizona
<i>San Xavier to San Augstin, An Overview of Cultural Resources for the Paseo de las Iglesias Feasibility</i> (2002)	Prepared by Scott O’Mack and Eric Klucas, Statistical Research Inc., for Pima County, Arizona
<i>Master Plan for Pima County, Arizona Segment, Juan Bautista de Anza National Historic Trail</i> (2002)	McGann & Associates
<i>Final Documentation October, 1993 Flood Damage Report</i>	Pima County Department of Transportation and Flood Control District
<i>Pima County Flood Control District Comprehensive Program</i> (December, 1990)	Pima County Department of Transportation and Flood Control District
<i>Pima County Flood Control District Comprehensive Program Report FY1990-91-FY1995-96</i> (January, 1997)	Pima County Department of Transportation and Flood Control District, Planning and Development Division
<i>Santa Cruz River Alignment Recharge Study - Final Report</i> (July, 1986)	Prepared by Pima Association of Governments for City of Tucson
<i>Existing Conditions Hydrologic Modeling for the Tucson Stormwater Management Study (TSMS), Phase II, Stormwater Master Plan, Task 7, Subtask 7A3</i>	Prepared by Simons, LI & Associates, Inc. for the City of Tucson, November, 1995
<i>Landfills and Waste Disposal Sites along the Lower Santa Cruz River - Final Report</i> (February, 1995)	Prepared by Pima Association of Governments for Pima County Flood Control District
<i>Landfills Along the Santa Cruz River in Tucson and Avra Valley – Final Report, Arizona</i> (May, 1995)	Prepared by Pima Association of Governments for City of Tucson Office of Environmental Management
<i>Arizona Stream Navigability Study for the Santa Cruz River (Gila River Confluence to the Headwaters) Final Report</i>	Prepared by SFC Engineering Company for the Arizona State Land Department
<i>Pima County River Parks Master Plan</i> (December, 1996)	Prepared by Planners Ink for Pima County Department of Transportation and Flood Control District
<i>Paseo de las Iglesias – Restoring Cultural and Natural Resources in the Context of the Sonoran Desert Conservation Plan</i> (April, 1999)	Pima County, Arizona

**F. Federal Interest.** The primary Federal interest is contribution to National Ecosystem Restoration (NER) through restoration of degraded ecosystem structure, function, and dynamic processes to a less degraded, more natural condition. Based on the results of environmental, hydrologic/hydraulic, and economic analyses, flood damage reduction, as a project purpose could not be justified. To insure recommendation of an efficient plan, the alternative environmental restoration plans were evaluated using functional assessment, cost effectiveness, and incremental analysis techniques. The cost of the recommended environmental restoration features are justified by the restoration of about 454 average annual functional capacity units and provides for achieving ecosystem function increases in the most cost effective manner.

## **2.0 STUDY OBJECTIVES**

**A. Problems and Opportunities.** Problems. Key problems within the study area, although interrelated, are severe ecosystem degradation, water supply, and infrequent flood damage. Originally comprising approximately 1% of the landscape historically, over 95% of this rare riparian habitat has been lost in Arizona.

Opportunities. Opportunities to address key problems are restoration of critical riparian habitat, water resource management, recreation, flood damage reduction, and groundwater recharge.

**B. Planning Objectives.** The Federal planning objective for ecosystem restoration studies is to contribute to National Ecosystem Restoration (NER) through increasing the net quality and/or quantity of desired ecosystem resources. The specific objectives for environmental restoration within the Study Area have been identified as follows:

- Increase the acreage of functional riparian and floodplain habitat within the Study Area.
- Increase wildlife habitat diversity by providing a mix of riparian habitats with an emphasis on restoration of riparian forests within the river corridor, riparian fringe and historic floodplain.
- Provide passive recreation opportunities.
- Provide flood damage reduction benefits, reduced bank erosion and sedimentation, and improved surface water quality consistent with ecosystem restoration goal.
- Integrate desires of local stakeholders consistent with Federal policy and local planning efforts.

**C. Planning Constraints.** Planning constraints were identified as availability of water for irrigation, maintenance of floodway capacity, proximity of existing recreation facilities to restoration, threatened and endangered species, and proximity of existing landfills and/or HTRW sites.

### 3.0 ALTERNATIVES

**A. Plan Formulation Rationale.** Alternatives were formulated to address a comprehensive Federal project for ecosystem restoration intended to:

- a. Comply with NEPA and other environmental laws and regulations;
- b. Restore a variety of riparian and associated floodplain fringe habitats to a less degraded more natural state;
- c. Provide an acceptable means of capturing and conveying storm water into restored habitat areas;
- d. Maintain or improve conveyance of peak discharges and ensure that the system of storm water collection would not increase flood surface elevations or worsen flooding conditions upstream or downstream in the existing developed areas;
- e. Provide flood damage reduction benefits where justified;
- f. Produce NER benefits while positively contributing to the National Economic Development (NED) account (if applicable), Regional Economic Development (RED), and the Other Social Effects (OSE);
- g. Provide decision makers with information that could be utilized to help determine the balance between construction costs, real estate costs, and social issues;
- h. Provide a framework for responding to future urban development in the floodplain, consistent with Executive Order 11988; and
- i. Match existing and proposed improvements where possible to take advantage of local improvements and to be consistent with the future master planning efforts of the local community.

**B. Management Measures and Alternative Plans.** Measures. Restoration measures were developed based upon those identified in the Reconnaissance Phase of the study. Additional potential measures were then added based upon the results of public involvement efforts, the physical characteristics of the reach of the river being studied, and upon other similar studies or projects in the region. Those included:

- Utilize Natural Water Sources Through Water Harvesting
- Establish Perennial Low Flow Channel
- Lay Back Banks/Widen Channel
- Terracing of Banks
- Stabilizing and Planting Islands/Sand Bars/Oasis (place clay lenses)
- Modify Confluence/Distribute Incoming Flows
- In Channel, Bank and Floodplain Vegetation
- Soil Cement Removal
- Palisades/Fence Jetties/Root Wad Revetments
- Drop Structures/Weirs Aligned With Existing or New Grade Control Structures
- Elements Conducive to Wildlife/Fish Measure

Measures were organized into grouped actions aligned with the following areas of the habitat that could be restored within the ecosystem: active channel, terraces/banks, historic over bank floodplain, and the Old West Branch tributary.

Alternative Plans. Conceptual alternative strategy was developed by varying the volumes of water that could be supplied, the area of land utilized, and the restoration measures that might be constructed within a carefully selected area of land adjacent to the Santa Cruz River and its major tributaries. Measures were grouped into three categories based on the amount of water required for implementation, then assigned to one or more of three existing hydro-geomorphic settings (river channel, terrace, and/or historic floodplain). A matrix of grouped restoration measures was created that allowed initial consideration of potential measure combinations (including “no action”) and hydro-geomorphic settings to create 47 potential alternatives.

*First Array.* Screening of these alternatives was accomplished by applying three factors that embodied the planning objectives and constraints identified in the early stages of the study. Alternatives that were not consistent with natural vegetation patterns (i.e., they create habitat inappropriate for their geomorphic position), that failed to produce sufficient habitat diversity and lacked community interspersion, or that reduced conveyance of flood waters were eliminated, leaving 14 alternatives to be considered in more detail.

*Second and Third Arrays.* Two alternatives (2A and 4F) were identified and carried forward based on the incremental analyses of the alternatives in the first array. It was at this point in the planning process that the non-Federal Sponsor, having considered types and quantities of habitat that might be restored with a full range of potential water budgets, determined that the maximum volume of water it could commit to ecosystem restoration in the Paseo de las Iglesias area was 2,000 acre-feet per year. In order to properly address the planning constraint introduced by this determination the first array of alternatives was reviewed and all alternatives requiring more than 2,000 acre-feet or irrigation water per year were eliminated. Two alternatives (2A and 3E) were then carried forward into the final array from which the recommended plan was selected.

**C. Final Array of Alternatives.** Two action alternatives (Alternatives 2A and 3E) and the No-action alternative were carried forward into the final array. The action alternatives were carried forward based on the incremental cost analysis of the alternatives in the third array.

*Alternative 2A:* This alternative focuses on water harvesting including soil amendment, surface grading, a low flow diversion and construction of subsurface water harvesting basins. Implementation of these measures will allow creation of new vegetative cover types as well as enhancement of existing cover types with plantings in Mesquite, Scrubshrub, and Riverbottom. The alternative would require establishment irrigation and periodic irrigation during periods of prolonged drought.

*Alternative 3E:* This alternative builds on 2A by providing irrigation to the subsurface water harvesting basins in addition to water harvesting, soil amendment, surface grading, and irrigation of the lower reaches of the Old West Branch. Implementation of these measures will allow creation of new cover types, as well as supplemental Cottonwood-Willow, Mesquite, Scrubshrub, and Riverbottom plantings.

**D. Comparison of Alternatives.** Ecosystem benefits were evaluated with a functional assessment model which was designed to evaluate the future changes in quantity (acres) and quality (functional capacity) of riverine, wetland, and riparian ecosystems. Model outputs are compared in Average Annual Functional Capacity Units (AAFCU's) for each alternative. The NER plan was identified by examining the net AAFCU's for each alternative versus the net average annual costs for the alternative.

Both alternatives would restore similarly large areas of habitat. However, Alternative 3E would possess the greatest diversity of habitat and would restore extensive areas of mesquite and areas of rare Cottonwood-willow vegetation. Alternative 3E would have the greatest potential benefits to the greatest number of wildlife species in the study area, especially to species that are regionally rare or declining. After consideration of the National Objectives and other associated evaluation criteria Alternative 3E is selected as the recommended plan.

**E. Key Assumptions.** The primary key assumption identified for the Without-Project Condition is the river's corridor will have lost any remaining natural resource value due to construction of structural bank protection and development of all remaining undeveloped lands within the study area. The plan formulation process initially assumed that sufficient volumes of water, to support a full range of riparian communities, could be made available to ensure that a full range of alternatives were evaluated. This approach allowed decision makers to weigh the relative cost of the markedly different biologic outputs resulting from the commitment of various volumes of water. Land was presumed to be available within the study area, particularly near the tributary larger stream channels within the study area.

**F. Recommended Plan.** The recommended plan, Alternative 3E, is characterized by irrigated plantings of mesquite and riparian shrub on terraces above the low flow channel and in the historic floodplain with smaller areas of emergent marsh and cottonwood-willow habitat located at water harvesting features scattered throughout the project. Alternative 3E would restore approximately 718 acres of mesquite bosque (forest), 356 acres of riparian shrub, 18 acres of cottonwood-willow, and 6 acres of emergent marsh. The recommended plan would restore a significant ecosystem resource along the Pacific Flyway for neo-tropical birds, reconnect wildlife corridors, restore wildlife habitat for species significant to Pima County, provide potential habitat for threatened and endangered species, and restore threatened plant communities of cottonwood/willow riparian forest and Mesquite Bosque. The ecosystem function increase would be fourteen (14) times greater than the expected future without project degraded condition. The recommended plan also provides recreation benefits, incidental flood damage reduction benefits, and incidental groundwater recharge benefits.

**G. Systems / Watershed Context.** The Paseo de las Iglesias reach of the Santa Cruz River was identified for ecosystem restoration under the recommendations in the Gila River, Santa Cruz River Watershed Feasibility Study (USACE 2001). Two additional studies are being conducted by USACE downstream covering 30 contiguous river miles. The non-Federal sponsor's Sonoran Desert Conservation Plan and the Pima County

Comprehensive Plan. Resource agencies that participated in the planning process are the U.S. Fish and Wildlife Service, the Arizona Game and Fish Department, and the U.S. Department of Interior (National Park Service). The recreation component of the recommended plan was developed in accordance with the Master Plan for the Juan Batista de Anza National Historic Trail.

**H. Environmental Operating Principles.** The recommended plan strongly supports the USACE Environmental Operating Principles as outlined below:

1. Environmental Sustainability. The project was designed for minimum OMRR&R, local attenuation of flood flows, and harvesting of storm water to increase sustainability of the riparian areas.
2. Consider Environmental Consequences. The project was designed to achieve a system that is more natural that will support riparian life.
3. Seek Balance and Synergy. This project will provide a wildlife corridor and ecosystem benefits within the urban areas. Recreation plan developed to keep recreational users out of restored areas.
4. Accept Corporate Responsibility. Project was designed for full compliance with National Environmental Policy and Endangered Species Acts.
5. Mitigate Impacts. Project was designed to minimize impacts during construction. Long term impacts are positive by restoring the environment.
6. Understand the Environment. A multi-stakeholder, scientific and economic approach was used to obtain information for the study and develop the recommended plan.
7. Respect Other Views. The study team solicited, listened to, and incorporated the views of others through public workshops and monthly team meetings.

**I. Independent Technical Review.** Independent Technical Review (ITR) was performed by the USACE Albuquerque District. Substantive comments involved the evaluation, presentation, and subsequent elimination of flood damage reduction (FDR) as a project purpose. To address this issue, FDR measures and plans were developed for economic evaluation. After evaluation of both structural and non-structural alternatives, the feasibility report was revised to explicitly present the analytic process through which flood damage reduction was screened out as a project purpose based on limited damages or other constraints such as environmental impacts and public acceptability. A combined NER/NED plan was therefore not developed.

#### **4.0 EXPECTED PROJECT PERFORMANCE**

**A. Project Costs.** Project first costs are identified in Table 1.

**Table 1**  
**Recommended Plan First Costs**  
**Santa Cruz River, Paseo de las Iglesias, AZ**  
(October 2004 Price Levels)

<b>Cost Type</b>	<b>Amount</b>
Construction - Restoration	\$46,586,265
Construction - Recreation	\$854,566
LERRDs	\$26,242,106
Adaptive Management	\$1,870,205
Monitoring	\$623,304
Contingency	\$7,116,125
Engineering & Design	\$5,219,773
Construction Management	\$3,546,202
<b>Total First Costs</b>	<b>\$92,058,546</b>

**B. Equivalent Annual Costs and Benefits.** Annualized project costs are presented in Table 3.

**Table 2**  
**Equivalent Annual Costs and Benefits**  
**Santa Cruz River, Paseo de las Iglesias, AZ**  
(October 2004 Price Levels, 50-Year Period of Analysis, 5.625% Discount Rate))

<b>Cost Type</b>	<b>Amount</b>
Investment Costs:	
Total Project Costs	\$92,058,546
Interest During Construction	\$4,954,162
<b>Total Investment Cost</b>	<b>\$97,012,708</b>
Average Annual Costs	\$5,835,161
OMRR&R	\$807,046
Water	\$1,099,175
<b>Total Average Annual Costs</b>	<b>\$7,741,382</b>
Functional Capacity Units	454
<b>Average Annual Cost per FCU</b>	<b>\$12,598</b>

**C. Cost Sharing.** In accordance with the cost sharing provisions of the Water Resources Development Act (WRDA) of 1986, as amended, the ecosystem restoration portion of the project would be cost shared 65-percent Federal and 35-percent non-Federal. Recreational features would be cost shared 50 percent Federal and 50 percent non-Federal. There is no current or future work planned or in construction which is part of the Recommended Plan, or which would be eligible for Section 104 credit. Estimated cost apportionments are provided in Table 3.

**Table 3**  
**Cost Apportionment**  
**Santa Cruz River, Paseo de las Iglesias, AZ**  
(Costs x \$1000)

Item	Apportionment		
	Federal	Non-Federal	Total
Construction* (Construction, S&A, PED/EDC, Contingency)	\$59,096	\$5,579	\$64,675
Construction LERRDs* (Lands and credits, easements, rights-of-way, relocations and disposal sites)	\$0	\$26,242	\$26,242
Total First Cost (Percentage of total cost)	\$59,096 (65)	\$31,821 (35)	\$90,917
Recreation Costs	\$571	\$571	\$1,142
<b>Total First Costs</b>	<b>\$59,667</b>	<b>\$32,392</b>	<b>\$92,059</b>

\* Does not include IDC or annual O&M, the latter of which is fully a non-Federal Cost

**D. Project Implementation.** The non-Federal sponsor for project implementation is Pima County, Arizona (Pima County Regional Flood Control District). No additional partners have been identified. The Monitoring and Adaptive Management Plan covers monitoring and adaptive management actions during the first 5 years after initial construction. After the first 5 years, monitoring and adaptive management will become the responsibility of the non-Federal Sponsor.

The Arizona Game and Fish Department (AGFD) has been identified to perform baseline ecological assessments of existing biotic conditions within the area of potential affect (APE) as it pertains to the conservation and management of Federally listed threatened and endangered species, wildlife species of concern to the State of Arizona, and their respective riparian habitats. The Corps also intends to retain and directly fund the AGFD in the development and implementation of a Monitoring & Adaptive Management Plan.

Such baseline ecological conditions within the APE will provide a scientific basis for strategically planning restoration measures, elements and features that will provide a framework for achieving a sustainable assemblage of native vegetation associations that will restore ecological processes and functions to degraded riparian habitats along this portion of the Santa Cruz River.

**E. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R).**

In compliance with authorizing legislation and cost-sharing requirements, the non-Federal sponsor must assume responsibility for operation and maintenance of project features for as long as the project remains authorized. Operation and maintenance costs (Table 4) will include periodic channel clearance, control of invasive plant species, pumps and irrigation maintenance, and periodic replanting of habitat areas damaged by flood events.

**Table 4**  
**Operation and Maintenance Costs**  
**Santa Cruz River, Paseo de las Iglesias, AZ**

<b>O&amp;M Activities</b>	<b>Annual Cost</b>
Invasive Species Control	\$64,782
Biological Survey	\$21,120
Vegetation Management	\$4,320
Irrigation System Maintenance	\$175,734
Replace Active Channel Features (YR 25/40)	\$3,687
Replace Terrace Features (YR 25/40)	\$501,143
Subtotal - OMRR&R	\$770,786
Associated Water Costs	\$1,099,175
<b>Total</b>	<b>\$1,869,961</b>

**F. Key Social and Environmental Factors.** The alternatives are forecast to have positive long term impacts when compared to the no action alternative. They could have short term negative impacts due to construction activities; however, these could be mitigated through implementation of Best Management Practices. Environmental analysis detected no notable differences between Alternatives 2A and 3E with respect to impacts on noise, cultural resources, and aesthetics. The proposed ecosystem restoration within the Paseo de las Iglesias would restore important riparian habitat through this reach of the Santa Cruz River, and would provide improved habitat connectivity along the entire main stem. The restoration would be accomplished while causing no increase in predicted flood surface elevations. The detrimental effects of implementing the recommended plan would be primarily construction related as a consequence of very minor increase in traffic to and from the site, fugitive dust emissions, and construction related noise. The positive cumulative effects of the Paseo de las Iglesias ecosystem restoration include benefits from other ecosystem restoration feasibility studies and/or construction projects the Corps of Engineers is performing in the Tucson area in eastern Pima County.

**G. Stakeholder Perspective and Differences.** The non-Federal views and preferences regarding environmental restoration were obtained through coordination with the non-Federal sponsor, various local and regional agencies and organizations, neighborhood associations, and the general public. These coordination efforts consisted of a series of public meetings held during the reconnaissance and feasibility study phases, through surveys, through the maintenance of a ‘point-of-contact’ with whom any interest could discuss matters, website development, and a mailing list by which invitations to public meetings were distributed. Announcements for public meetings were made in local newspapers, including date, time, place, and subject matter.

Formal and informal coordination occurred with a variety of Federal, State, and local agencies in addition to the public involvement efforts described above. Agencies contacted included the United States Fish and Wildlife Service (USFWS), the Arizona

Department of Game and Fish (AGFD), the City of Tucson Parks and Recreation, Tucson Water Department, City of Tucson Department of Transportation, Pima County Department of Transportation, Pima County Cultural Resources, and Pima County Parks and Recreation. In addition to the above, local stakeholders included local Homeowners Associations, Tucson Audubon Society, and Santa Cruz River Alliance.

Representatives from USFWS and AGFD participated in development of the functional assessment model and its application for plan formulation. The USFWS also participated in development of alternatives and their design and has provided a Coordination Act Report for this study.

In general, comments received on the draft report were supportive. No major issues were identified as part of the public comment period. Plan features are consistent with the desires expressed by public involvement work groups. Implementation of the Recommended Plan is supported by the non-Federal Sponsor, USFWS, AGFD, Center for Biological Diversity, Santa Cruz River Alliance, and the Tucson Herpetological Society.

## **5.0 STATE & AGENCY REVIEW RESULTS**

**A.** State and Agency review was formally initiated on 18 November 2005. The 30-day review period was extended at the request of the USFWS, until 13 January 2006.

**B.** The State of Arizona responded with no comment, via telephone on 18 January 2006. EPA replied via Federal Register notice dated 16 December 2006, with no comment. The USFWS provided a letter of support dated 13 January 2006. The Department of Interior responded with no comment, via letter dated 17 January 2006. The Department of Agriculture responded with no comment, via e-mail dated 25 January 2006.

## **6.0 SIGNIFICANT INDEPENDENT TECHNICAL REVIEW COMMENTS**

**A. Project Purposes.** The report did not adequately address flood control as a project purpose. The report did not provide an adequate analytical process to describe the decision not to pursue flood control as a project purpose. The issue was resolved by revising the report to explicitly present the analytic process through which flood damage reduction was screened out as a project purpose, based on limited damage potential, environmental impacts, and public acceptability.

**B. Real Estate.** The early review document did not include sufficient real estate information and the real estate appendix was not included in early review documents. There are conflicting regulations regarding this issue. The Real Estate Appendix is formally required for the draft report, not for earlier review documents. However, the draft report does not normally come to HQ for approval prior to public release (public and HQ review are normally concurrent). The immediate issue was resolved by providing an advance copy of the REP to HQ for review prior to release of the report for

public comment. The longer-term issue is that a revision to the guidance by HQ is necessary to resolve this discrepancy.

## **7.0 SIGNIFICANT HQ POLICY REVIEW COMMENTS**

**A. Sustainability.** There was uncertainty that the non-Federal sponsor could guarantee enough water to sustain the implemented project. Water availability for the project might decline below minimum requirements due to water rights issues. The issue was resolved by engaging the non-Federal sponsor to determine the amount of water that could be guaranteed, and developing and evaluating alternatives up to that limit.

**B. Critical Project Constraint.** Alternatives were formulated without regard to water supply needs to sustain the project. After formulation, the non-Federal sponsor expressed concern over the amount of water needed to sustain the best-buy alternatives. Rather than reformulate, the recommended plan was selected from an array of alternatives that met the sponsor's water volume guarantees. The issue was resolved by a more appropriate reformulation to screen out infeasible alternatives, then complete an incremental cost-benefit analysis. Result is that a practicable alternative is recommended.

**C. Clean Water Act Compliance.** The report was not in full compliance with Section 404 requirements. The original intent was to pursue a Section 404-r exemption, but District review indicated the correct process had not been followed, and the Section 404-r exemption discussions were removed from the report. HQ review indicated that if the missing information could be located and presented in the report, the correct process would have been followed, and the exemption discussions should be returned to the report. This issue was resolved by the development of the missing information and the re-insertion of exemption discussions into the report.

**D. Water Costs.** The issue was that water availability and cost, and real estate interests affect the formulation, feasibility and sustainability of alternatives. Regional water issues can vary widely among the alternatives, thereby affecting selection of the recommended plan and total project cost. The issue was resolved by the sponsor providing sufficient information and assurances of water delivery and costs.

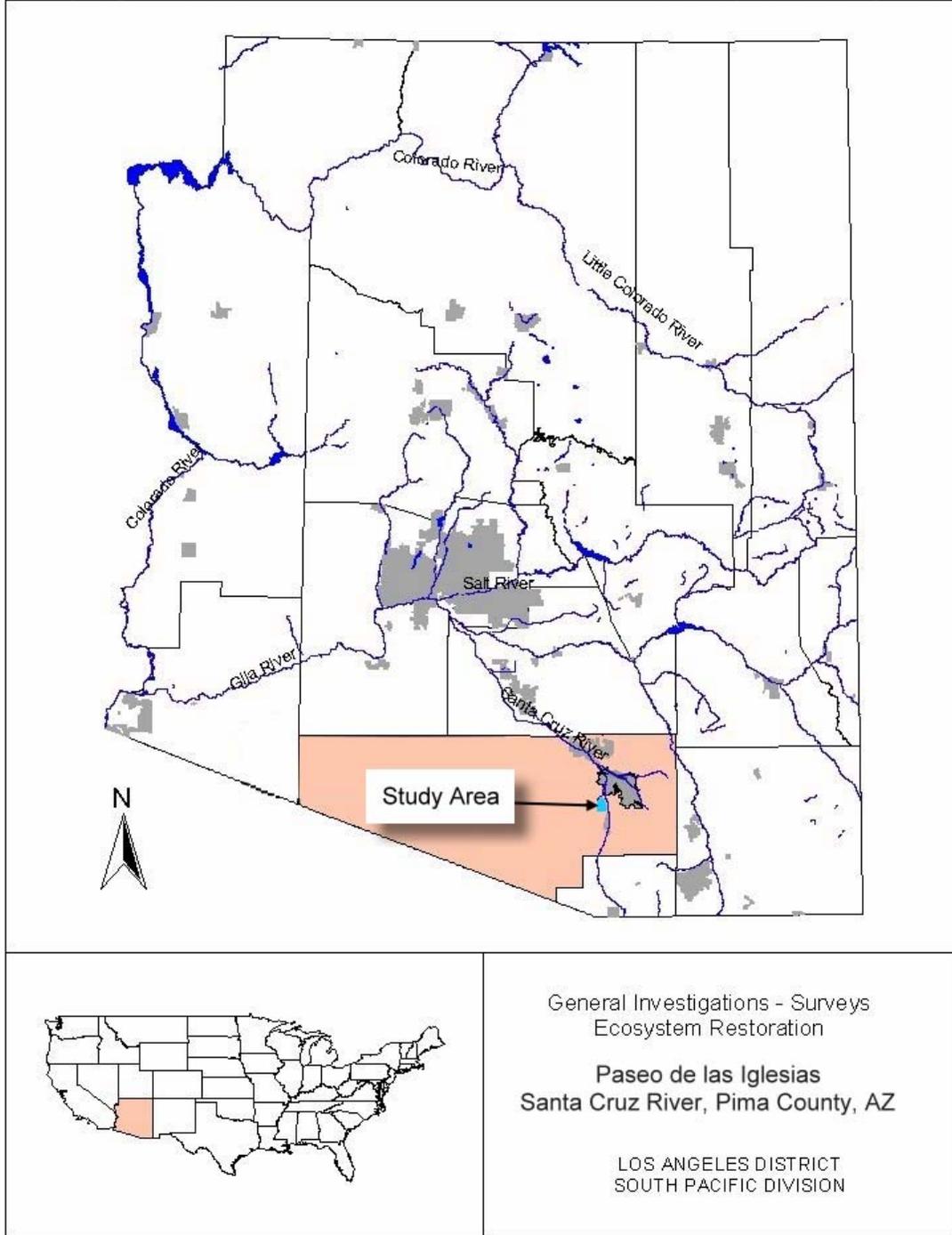
## **8.0 HQUSACE POLICY COMPLIANCE REVIEW TEAM**

CECW-PC, John Furry, Review Manager;  
CECW-PC, Miguel Jumilla;  
CECW-PC, Bruce Carlson;  
CECC, Maureen McAndrew;  
CECC, Aaron Hostyk;  
CEMP-SPD, Jim Leary;  
CEMP-SPD, Ken Zwickl.

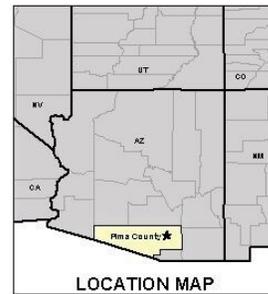
## 9.0 MILESTONES

AFB held:	16 March 2004
AFB PGM dated:	5 May 2004
FRC held:	Waived
FRC PGM dated:	9 September 2005
Final Report Received at CECW:	4 October 2005
CWRB Briefing:	18 October 2005
Start 30-day S&A/FEIS Review:	10 November 2005
Complete 30-day S&A/FEIS Review:	10 December 2005

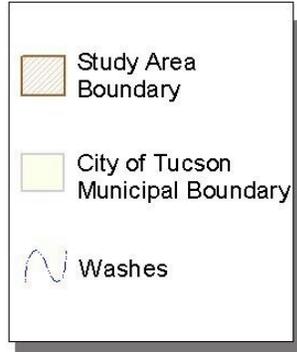
## **ATTACHMENTS**



**Fig. 1.0 General Study Area Location**



### LEGEND



Paseo de las Iglesias  
Pima County, Arizona  
Feasibility Study  
Figure 1.1



US Army Corps  
of Engineers  
Los Angeles District

