



Water Resources Research Center

College of Agriculture and Life Sciences, The University of Arizona

A Look at Ecosystem Restoration in Arizona

Water Resources Research Center 2005 Water Conference

Water and the Environment: The Role of Ecosystem Restoration

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Ecosystem Restoration Studies

- Funded by the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation
- **Goal:** To foster understanding of environmental enhancement projects in order to assist decision makers, professionals, and the public as they consider future investments and means to utilize water in a way that meets multiple public objectives.
- **Environmental Enhancement:** Improves the environment compared to what it would be if no project were undertaken.



U.S. Army Corps of Engineers Study

- 11 projects studied
- **Information collected includes:**
 - Project Title and Location
 - Sponsors and Contacts (Federal and Local)
 - History
 - Authority
 - Planning Objectives
 - Phases/Current Phase
 - Recommended Plan, Cost, Water Source
 - Public Outreach
- Showcase projects and consider “lessons learned”
- **Status:** Almost completed



US Army Corps of Engineers: Civil Works (Water Resource) Mission ENVIRONMENTAL RESTORATION

Authorizations

Individually Authorized Studies and Programs
(General Investigation/ GI)
Congressionally Authorized: No Federal Cost Limitations

Continuing Authority Programs (CAP)
WRDA Section 1135 & 206
Federal Cost Limited to \$5 million

PROJECT PHASES

Reconnaissance: determine if further studies needed or continued Federal interest to proceed to the feasibility phase. Time ~ 10-12 months. 100% Federal Cost (limited to \$100,000)

- *905(b) Analysis*
- *Project Management Plan (PMP)*
- *Feasibility Cost Sharing Agreement (FSCA)*
- *Letter of Intent from Sponsor*

Feasibility: analyze water resource problems and select a recommended plan. Time ~ 2-3yrs. 50% Federal & 50% non-Federal Cost

- *Chief of Engineers Report*
- *Environmental Impact Statement (EIS)*
- *Congressional Authorization*

Pre-engineered and Design (PED): design, construction specs, and studies needed to begin construction. Time ~ 2yrs. 65% Federal & 35% non-Federal Cost

- *Project Cooperation Agreement (PCA) signed*

Construction: project is constructed. Time Varies with Project. 65% Federal & 35% non-Federal Cost

- *Operation & Maintenance Manual (O&M)*

Operation and Maintenance: day to day maintenance to make sure the project is operational. Time - As long as project remains Authorized. 100% non-Federal Cost.

WATER RESOURCES DEVELOPMENT ACTS

• Sec. 1135 WRDA of 1986: **Project Modification for Improvement of the Environment.** Total project modifications costs: 75% Federal & 25% non-Federal. 80% of non-Federal share as work-in-kind services.

• Sec. 206 WRDA of 1996: **Aquatic Ecosystem Restoration.** Total project modification costs: 65% Federal & 35 % non-Federal. 100% of non-Federal share as work-in-kind services.

PROJECT PHASES

Preliminary Restoration Plan (PRP): scope and nature of proposed project. 100% Federal Cost (limited to \$10,000)

Feasibility Phase (if Federal Cost exceeds \$1 million): study project and select a plan for approval. Project cost is initially funded by Federal Gov., but if project approved for implementation then non-federal sponsor is responsible for total project modifications costs, depending on the WRDA.

- *Detailed Project Report (DPR)*
- *Environmental Assessment (EA)*

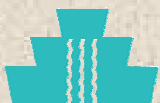
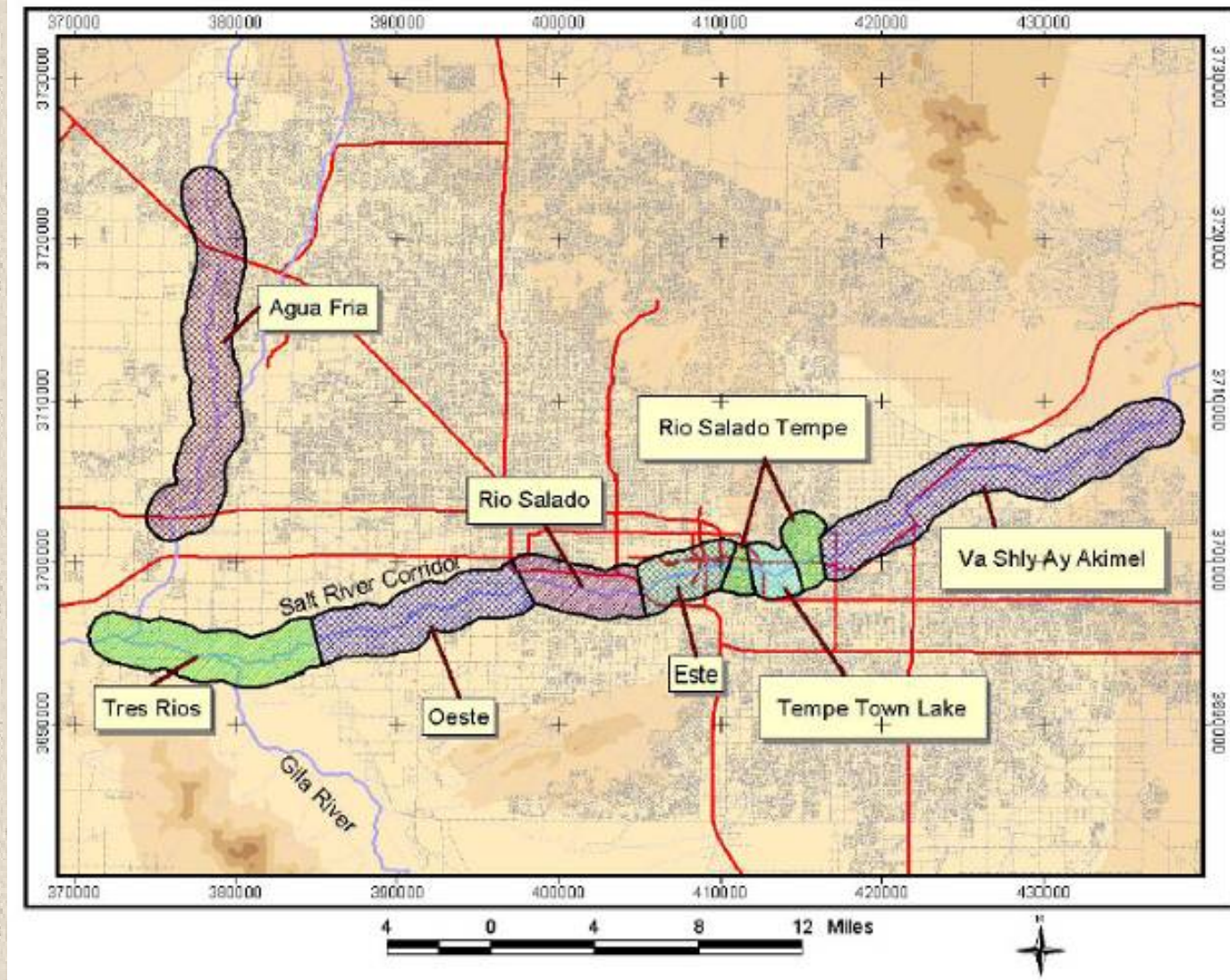
Plans and Specs: design and construction specs of project

Construction: project is constructed

Operation and Maintenance: day to day maintenance to make sure project is operational. 100% non-Federal costs.

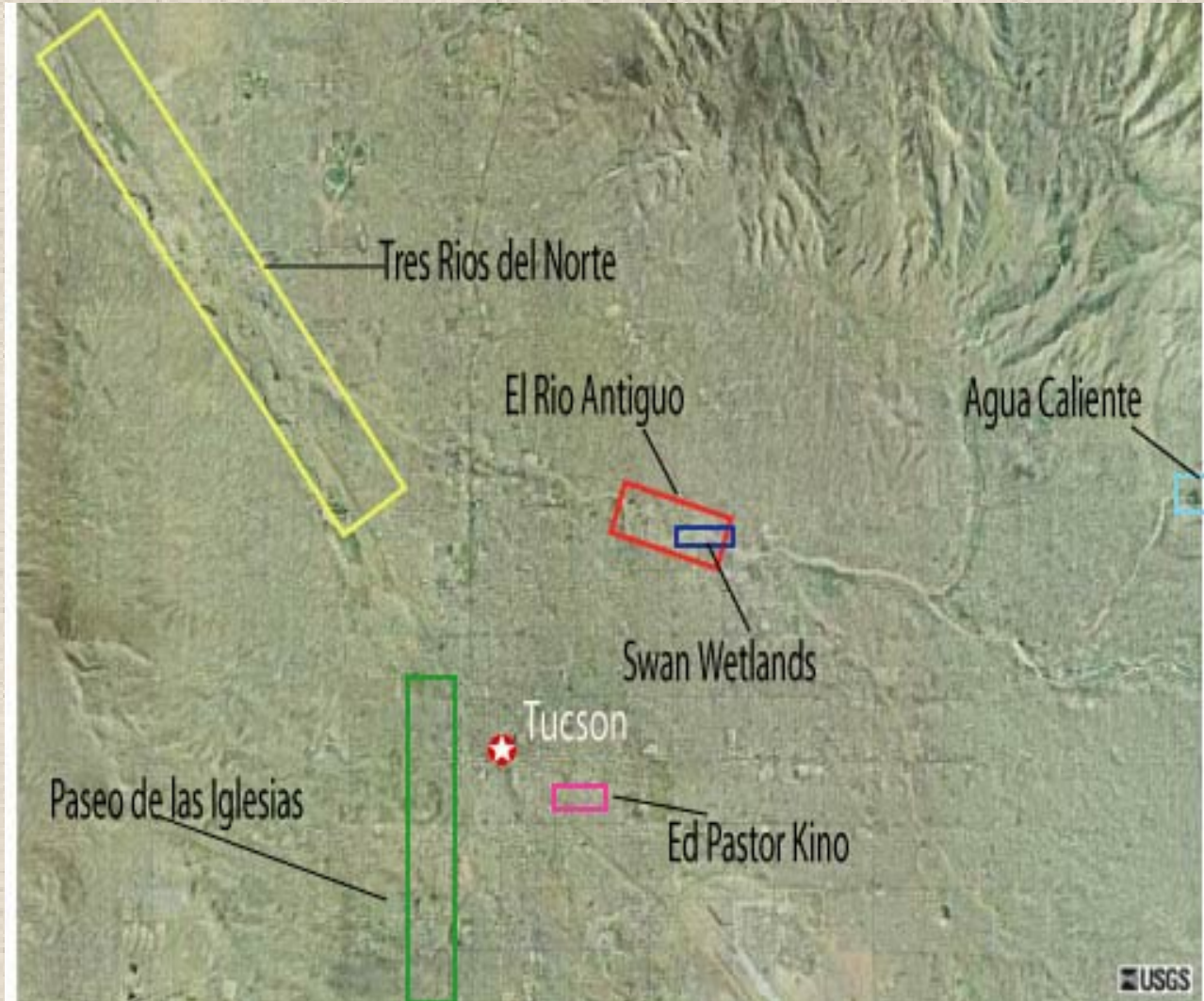
Maricopa County Projects

- Va Shly 'ay Akimel
- Rio Salado - Tempe
- Rio Salado - Phoenix
- Rio Salado - Oeste Reach
- Tres Rios



Pima County Projects

- **Tres Rios del Norte**
- **Paseo de las Iglesias**
- **El Rio Antiguo**
- **Swan Wetlands**
- **Agua Caliente**
- **Ed Pastor Kino Environmental Restoration**



Reclamation Study

- Expanding the Corps study to more sites statewide and types of projects
- Held Stakeholder meetings in October to gather suggestions for projects to include in the study. Will study several projects over the summer. List of projects is still in formation.
- **Purpose:** To study and evaluate environmental enhancement projects, including their costs, water requirements and any water quality improvements, their long-term viability and public benefits. The projects can be in various stages of development.
- **Status:** Finalizing project list. Significant work on sites beginning this May. Sites may overlap with Corps study.

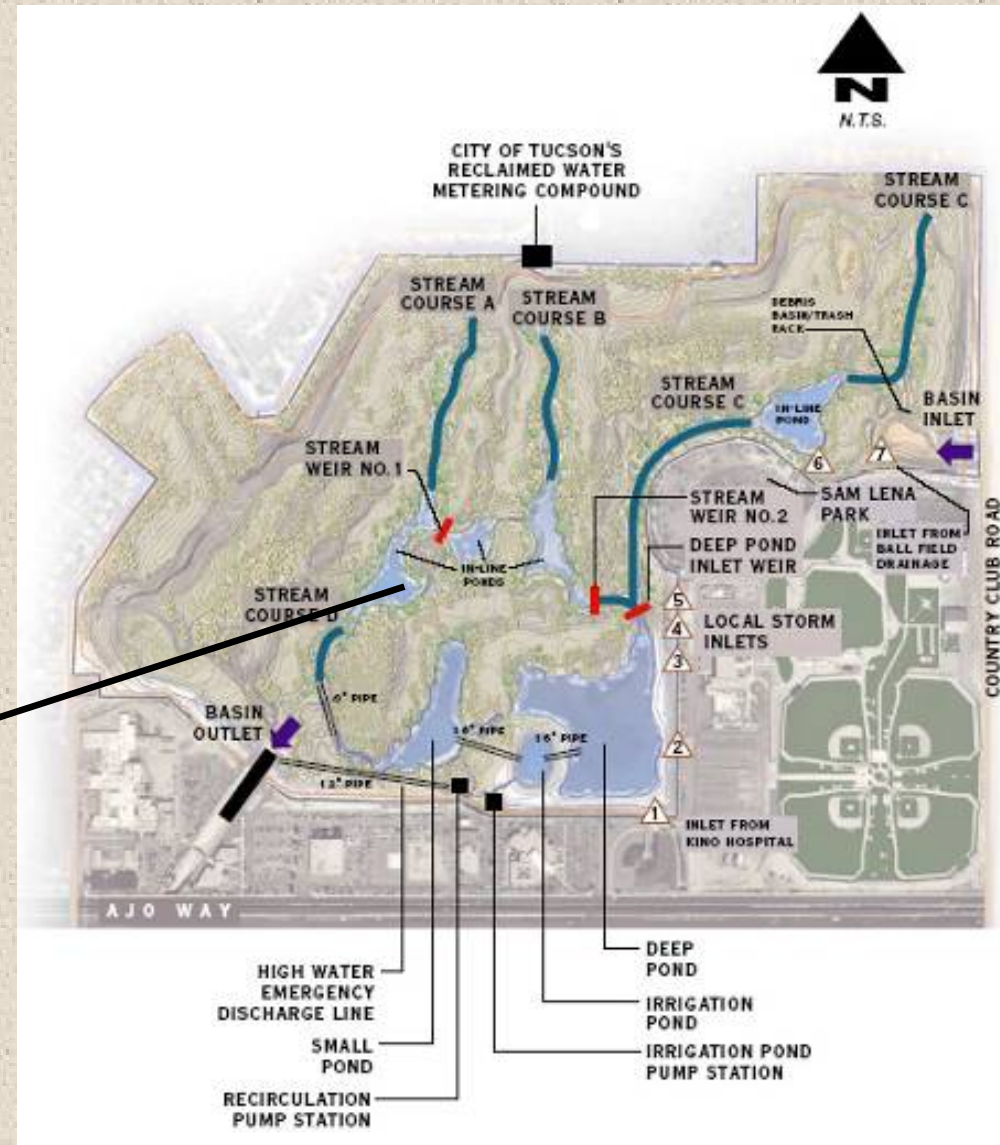


Ed Pastor Kino Env. Restoration Project

Water use related to irrigating ball fields (reclaimed water) and storm water detention



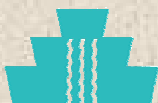
View of Inline Pond looking North – September 2004



Study Area

(USACE Ed Pastor O&M Manual – Jan. 2003)

Unless otherwise noted: Photos by Jennifer Jones, Student



Ed Pastor Kino Env. Restoration Project



Top of Stream Course "C" Looking South
(USACE Ed Pastor Kino O&M Manual – Jan. 2003)



Deep Pond, View looking South – September 2004



View of Inline Pond, looking Northwest – September 2004



El Rio Antiguo

General Study Area in Red Outline



(USACE El Rio Antiguo Feasibility Study – May 2004)



View of Rillito River from Dodge Boulevard
(USACE – El Rio Antiguo DEIS – April 2003)



Pedestrian Path along the Rillito River
(USACE – El Rio Antiguo DEIS – April 2003)



El Rio Antiquo

**Water:
Water
harvesting,
temporary
effluent
irrigation
until
vegetation
is
established**



Recommended Plan – Alternative 2H-1

(USACE – El Rio Antiquo Feasibility Study – May 2004)



View of Rillito

(USACE – El Rio Antiquo Feasibility Study – May 2004)



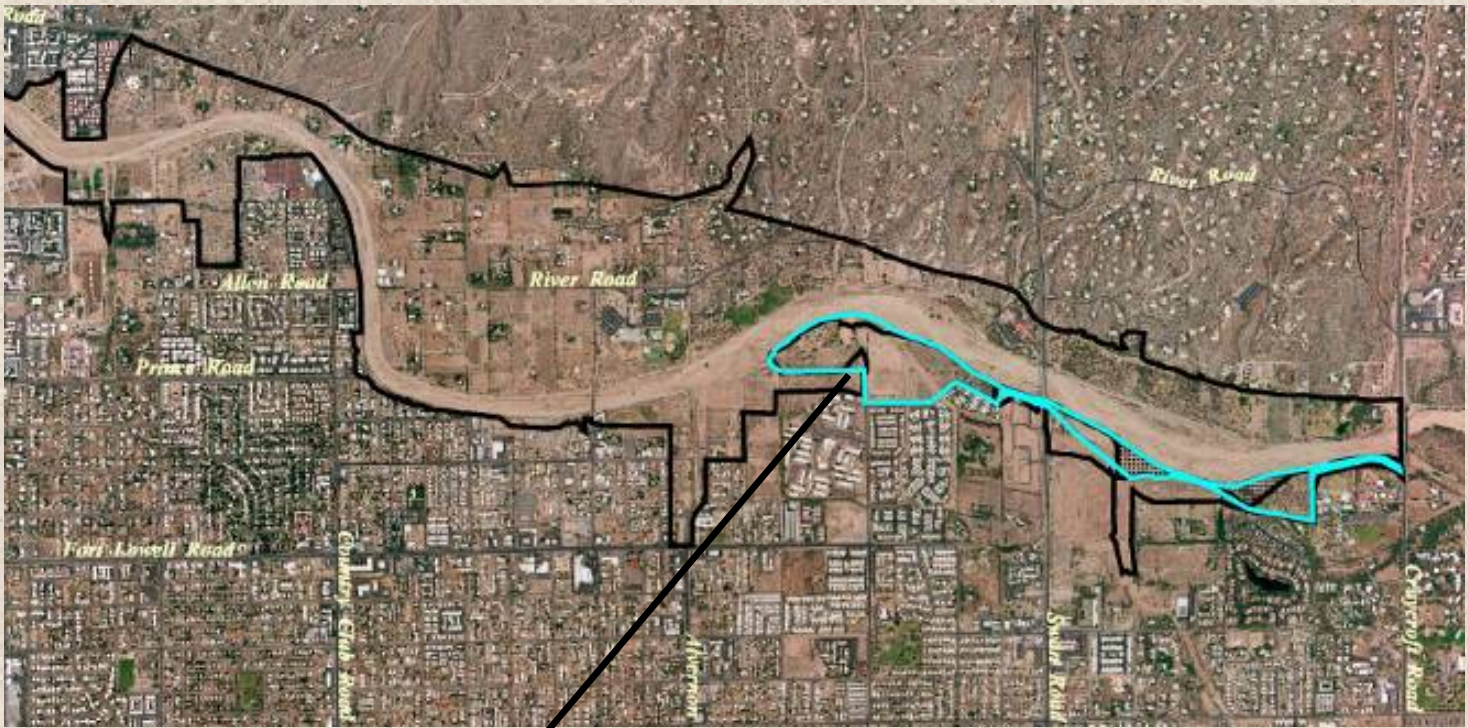
Future with Implementation of Recommended Plan

(USACE – El Rio Antiquo Feasibility Study – May 2004)



Swan Wetlands

General Study Area in Blue Outline (El Rio Antiguo in Black).



(USACE – Swan Wetlands DPR – November 2003)



View to the Catalina Mnts from South Side of Rillito River at the end of Columbus, looking North – March 2004



- Swan Wetlands Recommended Plan: Riparian/Xeroriparian Terrace
 - “The major factor in selection of this alternative was the desire of the local sponsor to not have surface water conditions that may be a liability concern.” November 2003 Report
 - “Using about \$2.8 million in federal money and nearly \$700,000 in county tax dollars, the county and the Army Corps of Engineers plan to plant mesquites, build trails and supply reclaimed water or harvested rainfall along the Rillito.” Arizona Daily Star, February 9, 2005

Water: 349 af per year at ~ \$230 per af = ~\$81,000 per year



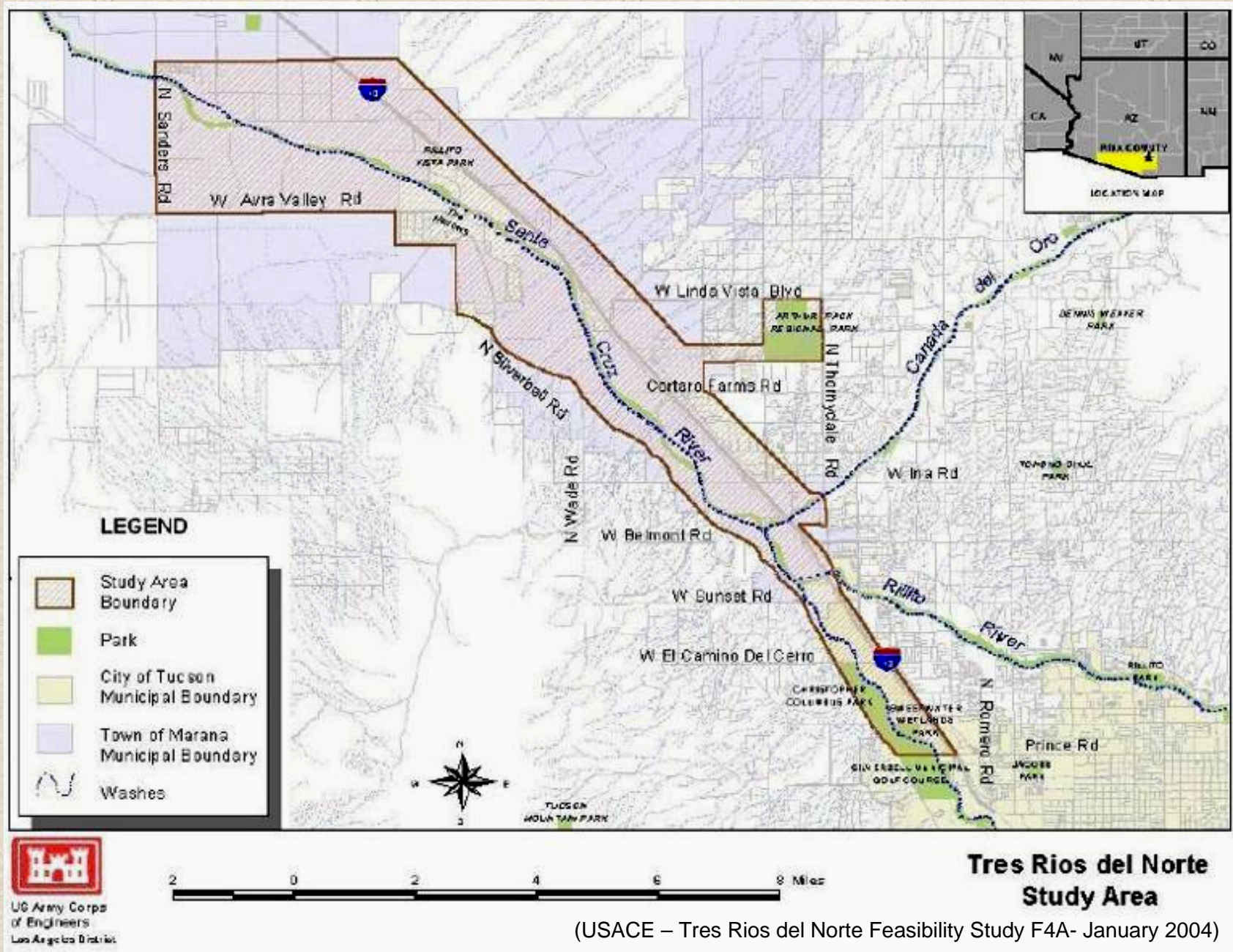
The Importance of Water to the Environment



Photos
courtesy of
Marana and
Jennifer Jones



Tres Rios del Norte

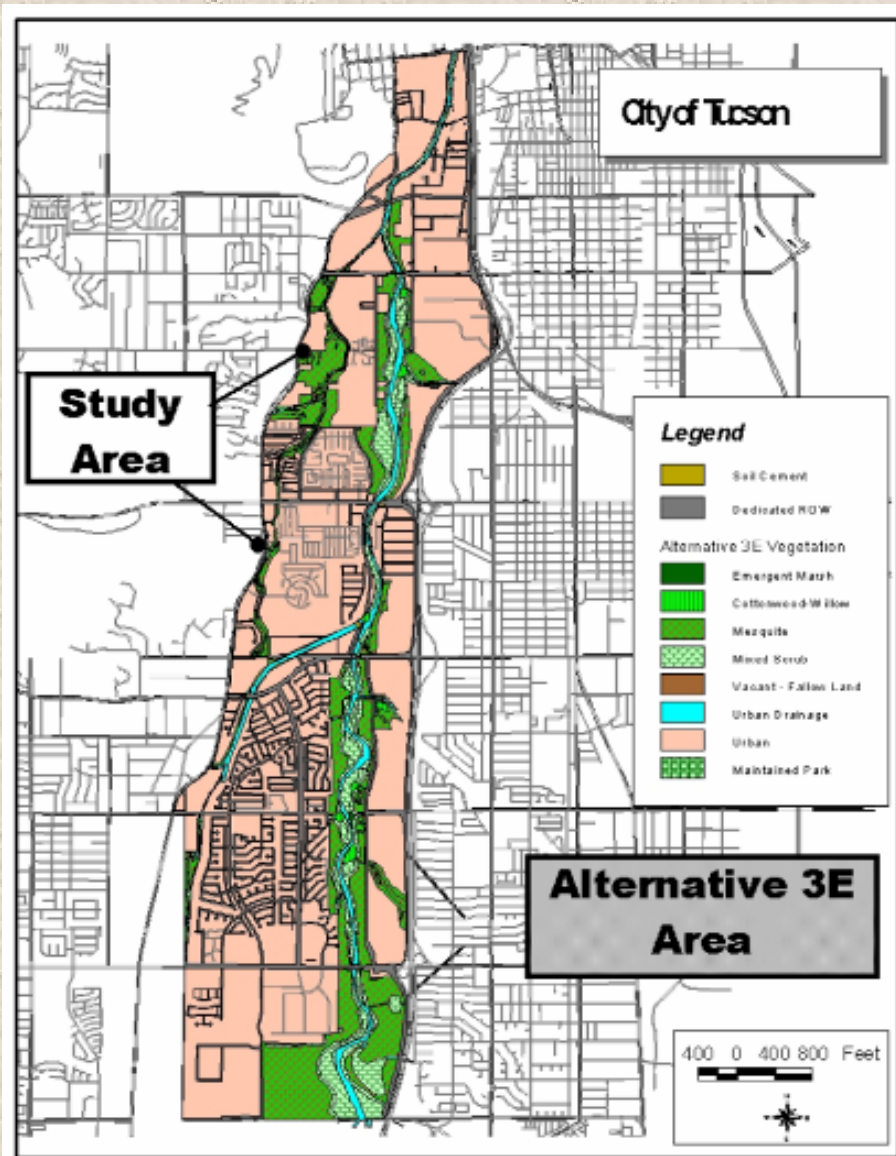


Tres Rios del Norte Overview

- **Project Summary:** Restore nineteen miles of degraded habitat along the Santa Cruz River and its adjacent floodplains, improving mesquite, cottonwood-willow, and emergent wetland habitats to a condition supportive of wildlife.
- **Water Source:** Tertiary reclaimed water and in channel effluent flows. Water use is estimated to be about 9,000 acre-feet per year.
- **Partners:** Corps plus three primary local sponsors. Other projects, such as managed recharge, are related to this project.
- **Current Phase:** Draft Feasibility Report.



Paseo de las Iglesias



Tentative Recommended Plan – Alternative 3E
(USACE Paseo de las Iglesias Feasibility Study – March 2002)



West Branch of the Santa Cruz River, Current Condition



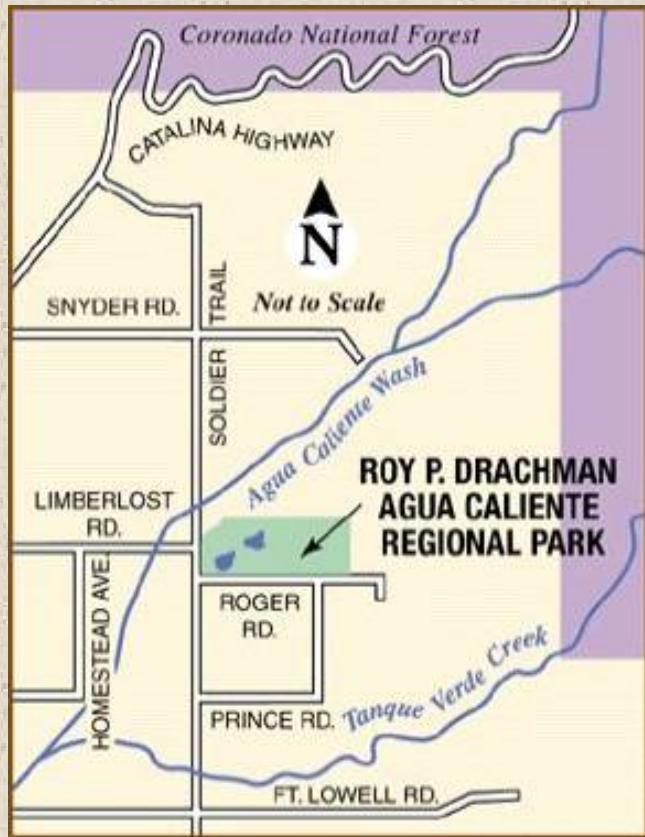
View North to Sentential Peak. Debris, Cut Bank, & Degraded Riparian Habitat along the Santa Cruz River
(USACE Paseo de las Iglesias Feasibility Study – March 2002)



Agua Caliente



Historic Photo of Agua Caliente (<http://www.dot.co.pima.az.us/flood/AguaC/>)



Study Area

(USACE – Agua Caliente DPR - October 2002)



Spring Head at Agua Caliente

(USACE – Agua Caliente DPR - October 2002)



Agua Caliente



Non-Native Fish Species at Agua Caliente - August 2004



Pond 2 - August 2004



Mesquite Bosque, Trail to Pond 2 - August 2004



Pond 2

(USACE – Agua Caliente DPR - October 2002)



Tres Rios - Phoenix



91st WWTP Outfall into Salt River

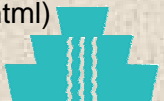


Wildlife at Tres Rios Demonstration Wetland



Tres Rios Demonstration Wetland

Pictures - (<http://phoenix.gov/TRESRIOS/photogalmenu.html>)



Lessons Learned

- These projects can involve major investments
- The development phases take a long time
- Observable results may take time
- They may be multi-purpose projects and/or relate to other infrastructure projects
- The projects often involve multiple partners
- Public input is essential
- The importance of vision



Environmental Restoration Can Change more than Ecology

“Phoenix owes its existence to [the Salt River], but even so it doesn’t seem to hold the Salt in high esteem. On both banks, the floodplain is encroached by industrial parks, trailer parks, RV parks, but no real parks. The flood channel itself has been developed to a degree, playing host to establishments which are, by nature, transient: topless bottomless joints, chop shops, cock-fighting emporia. Paris built its great cathedral by its river, Florence its palaces or art; Phoenix seems to have decided that its river is the proper place to relegate its sin.”

- Reisner, Mark. *Cadillac Desert: The American and Its Disappearing Water*, 1986. pp. 307-308

