

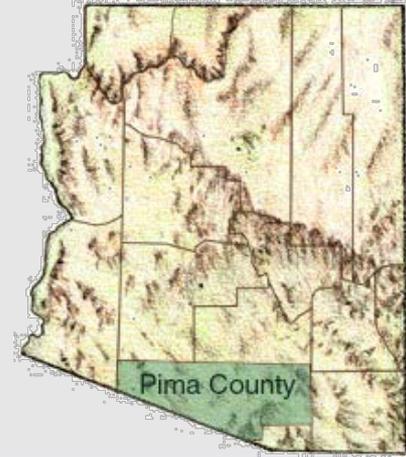
Santa Cruz River: Tucson's Green Infrastructure



Julia Fonseca

**Pima County Office of
Sustainability and
Conservation**

SANTA CRUZ RIVER BASIN



MARICOPA COUNTY

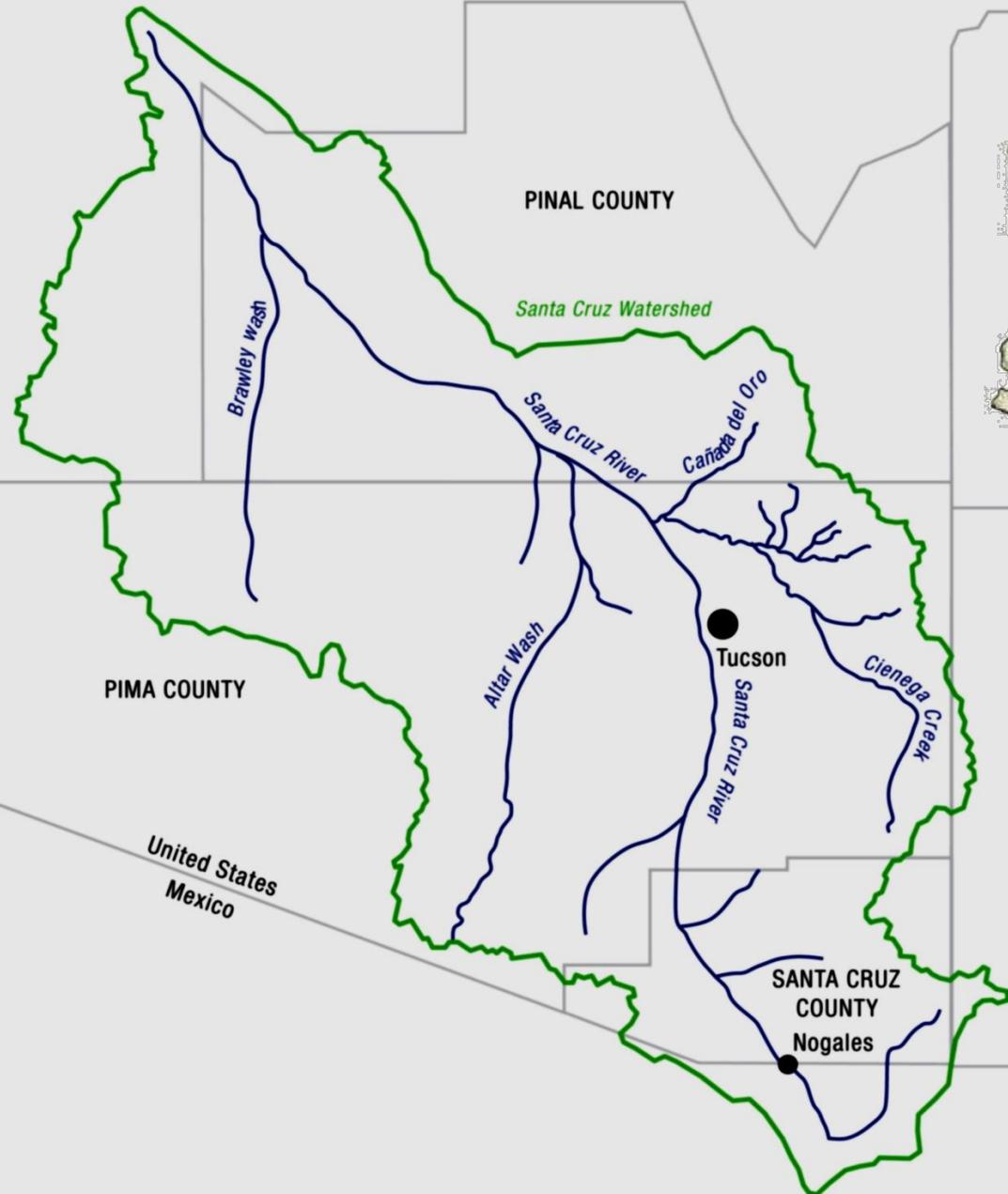
PINAL COUNTY

PIMA COUNTY

COCHISE COUNTY

United States
Mexico

SANTA CRUZ COUNTY
Nogales



Santa Cruz Watershed

Brawley Wash

Santa Cruz River

Cañada del Oro

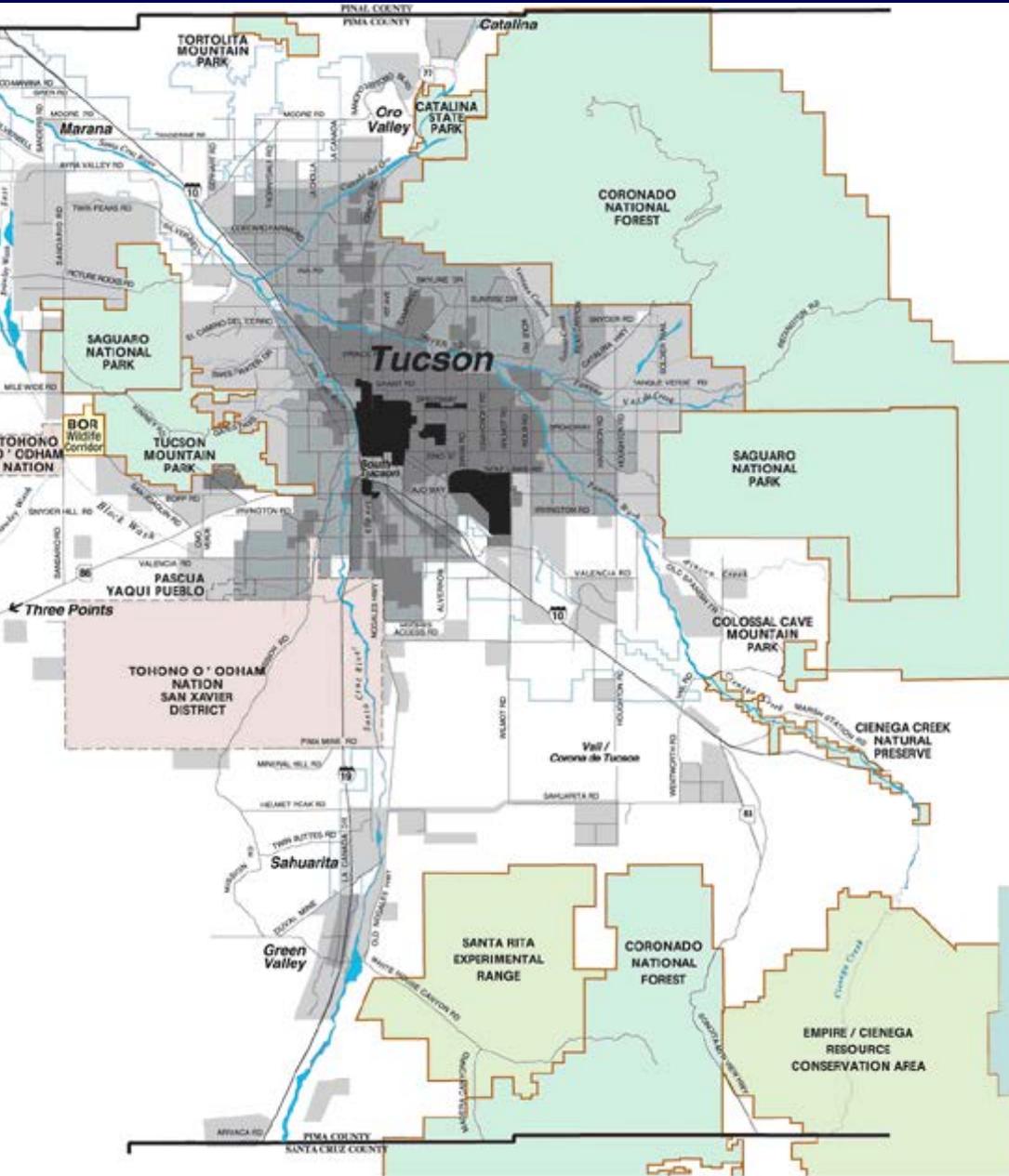
Altar Wash

Santa Cruz River

Cienega Creek

Tucson

Nogales



Urban Expansion in the Metropolitan Tucson Area

1940 1960 1985 1990

Flooding and Erosion



Public Access



Floodprone Land Acquisition



Development Planning



Sand and Gravel Mining



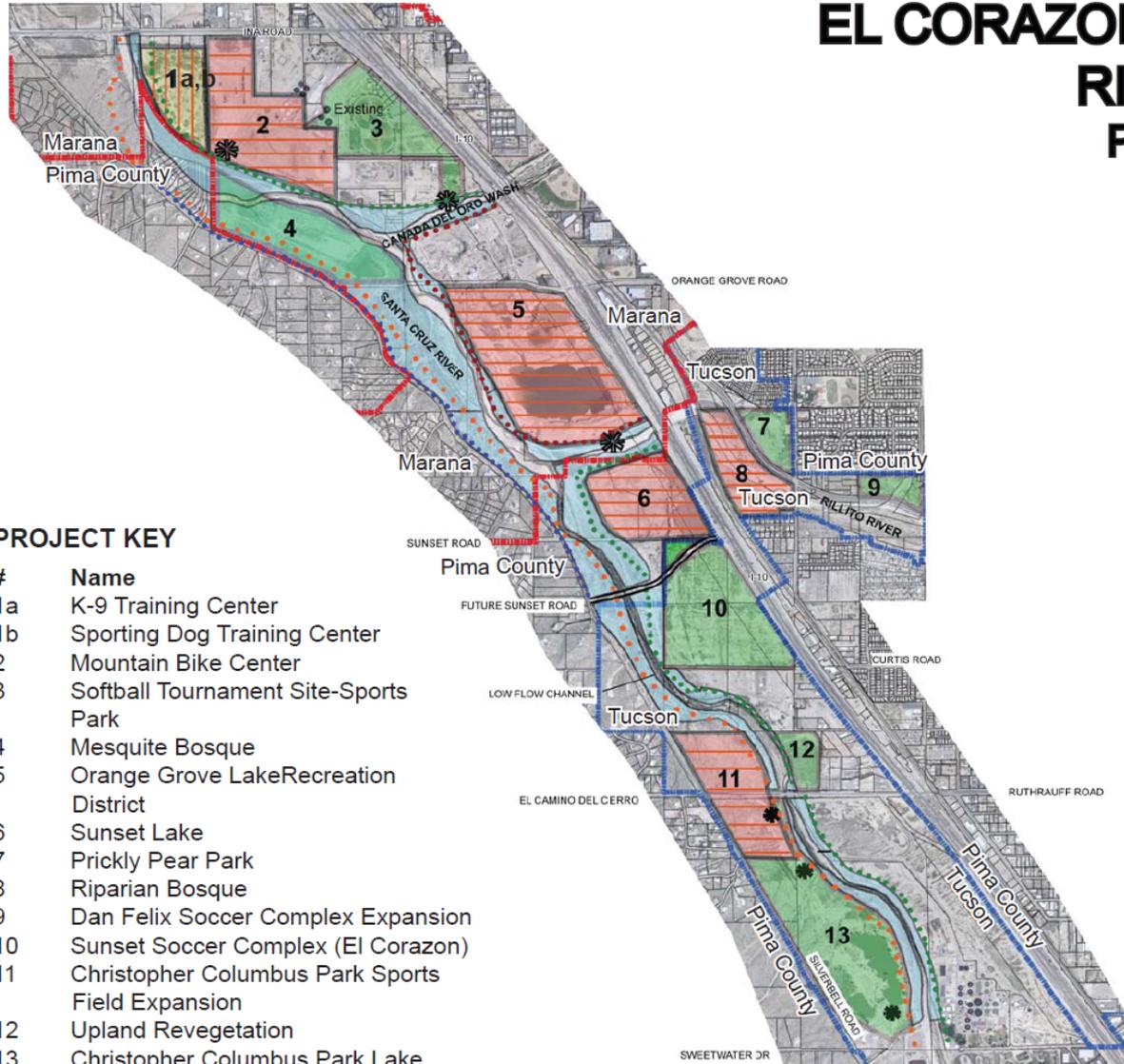
EL CORAZON DE LOS TRES RIOS DEL NORTE PROJECT KEY MAP

LEGEND

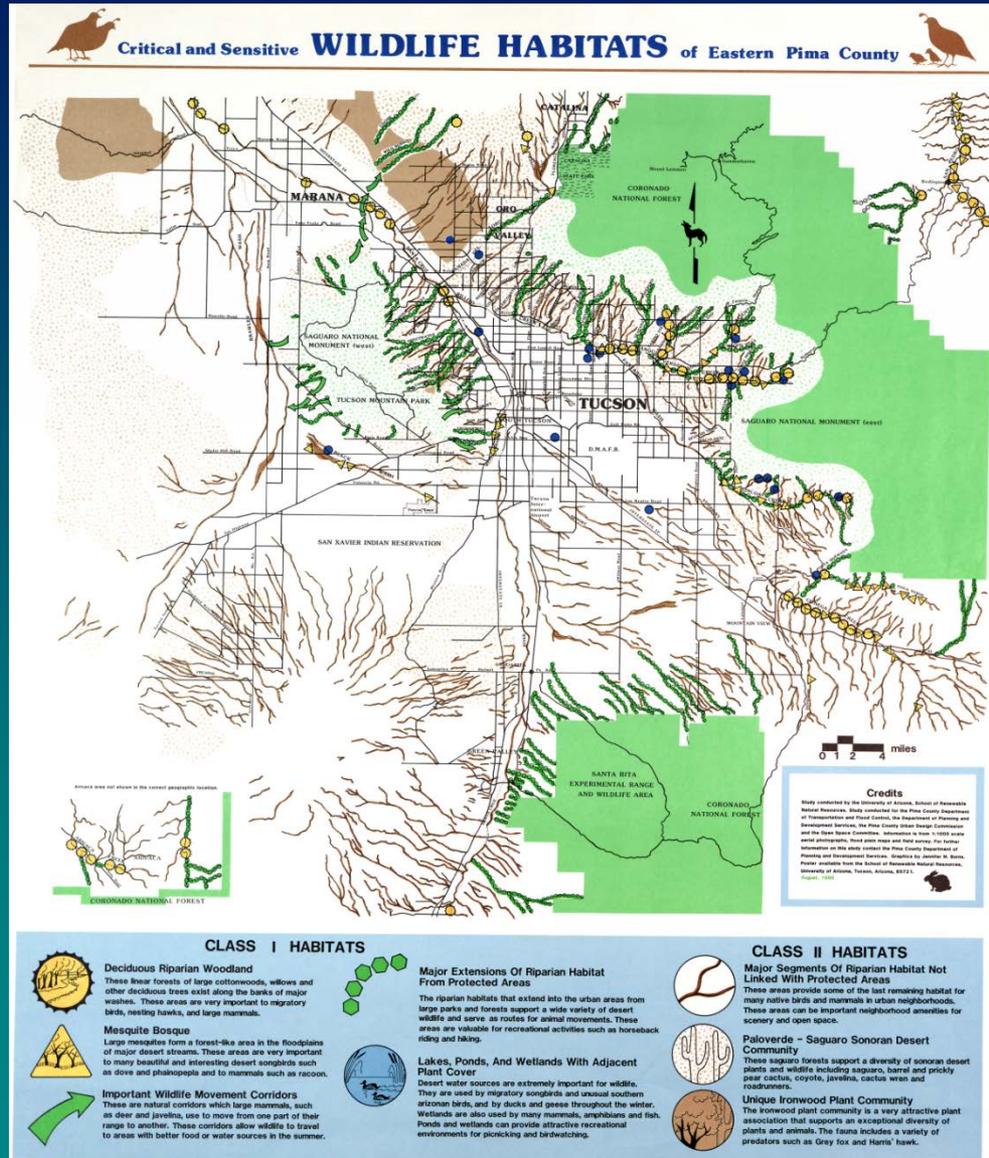
-  5-Year Projects
-  10-Year Projects
-  15-Year Projects
-  Waterways
-  Marana Boundary
-  Tucson Boundary
-  Sunset Alignment
-  Proposed Bridge Crossing (5-Year)
-  Completed Bridge Crossing
-  Project A: 5-Year Anza Trail West Bank
-  Project B: 5-Year River Park (East Bank)
-  Project C: 10-Year Orange Grove Pit Bank Protection w/ River Park
-  Future Silverbell Road Pathway

PROJECT KEY

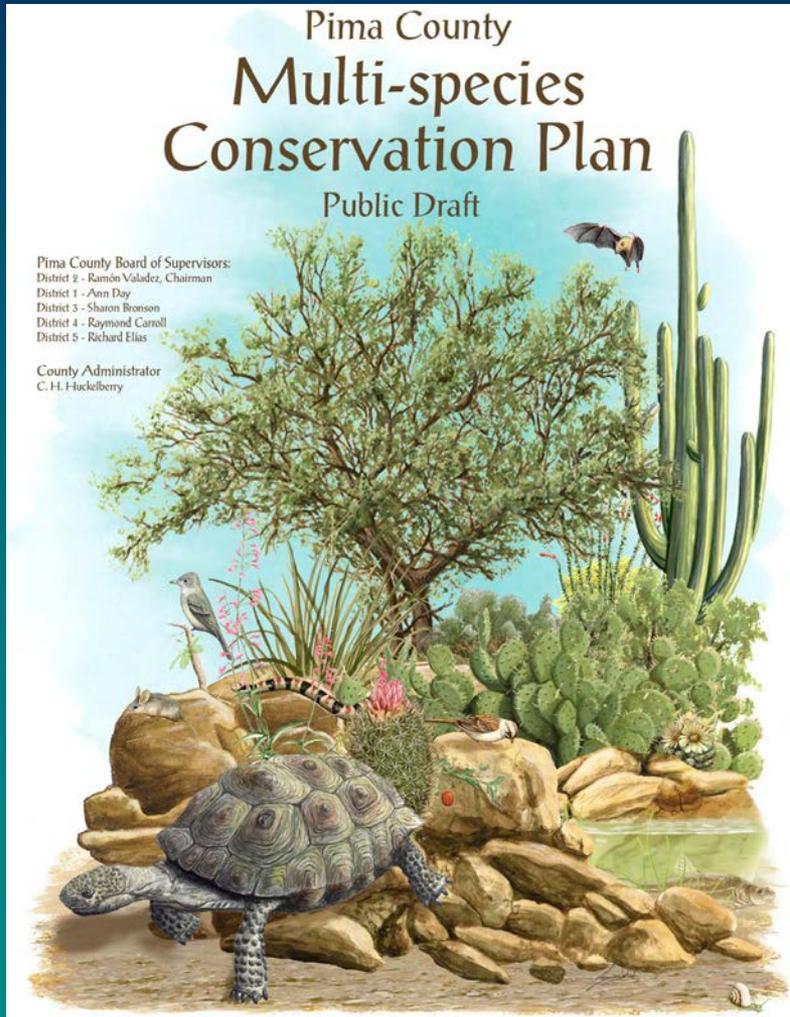
#	Name
1a	K-9 Training Center
1b	Sporting Dog Training Center
2	Mountain Bike Center
3	Softball Tournament Site-Sports Park
4	Mesquite Bosque
5	Orange Grove Lake Recreation District
6	Sunset Lake
7	Prickly Pear Park
8	Riparian Bosque
9	Dan Felix Soccer Complex Expansion
10	Sunset Soccer Complex (El Corazon)
11	Christopher Columbus Park Sports Field Expansion
12	Upland Revegetation
13	Christopher Columbus Park Lake Improvements



Wildlife Habitat Values



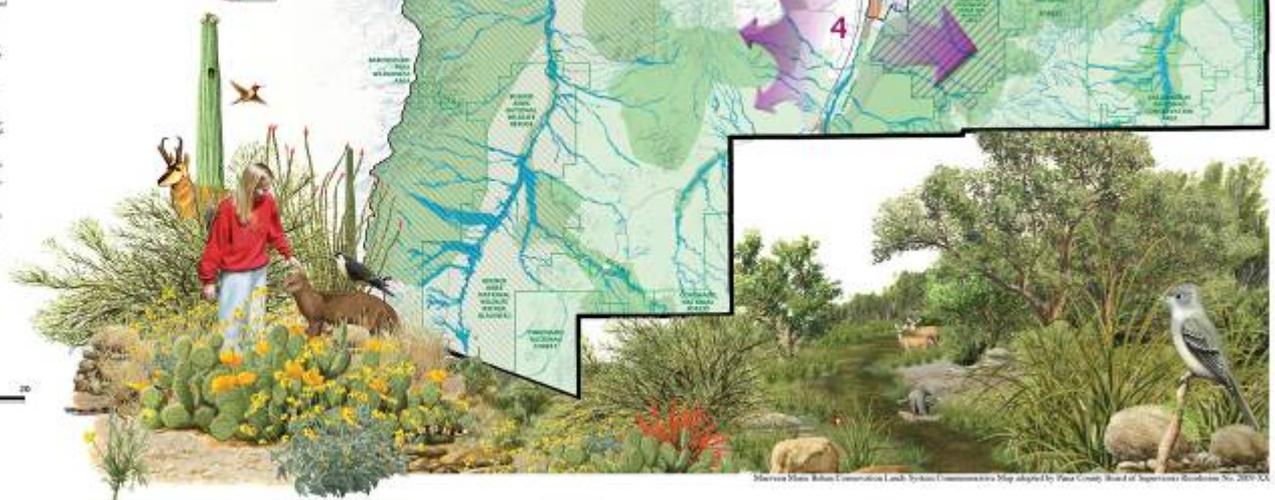
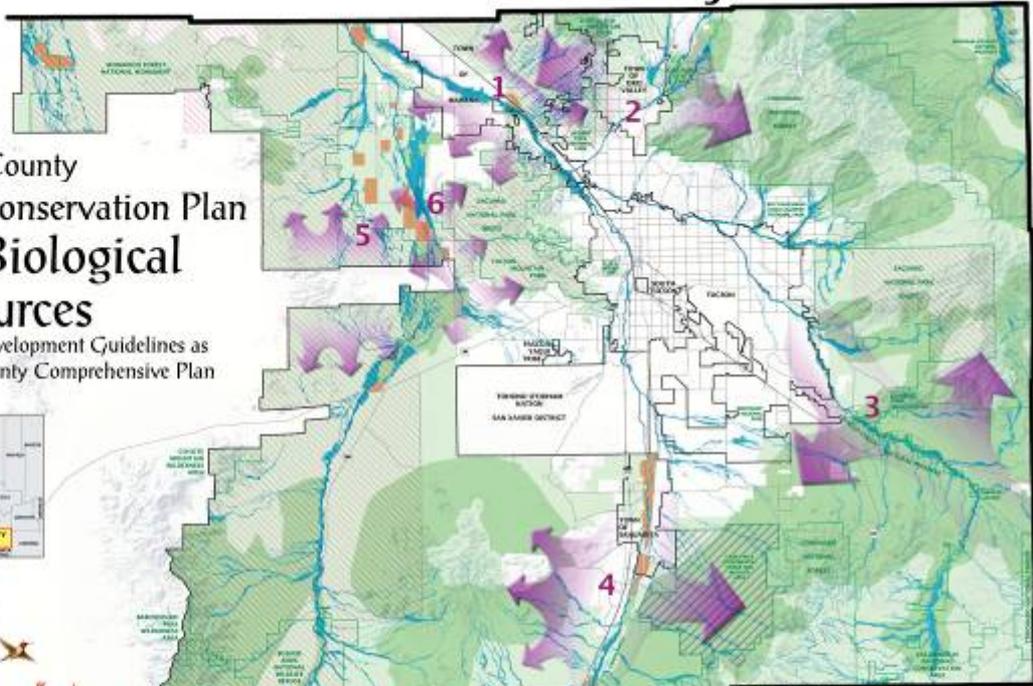
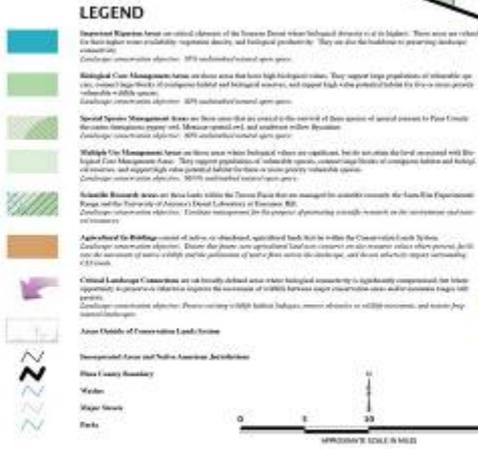
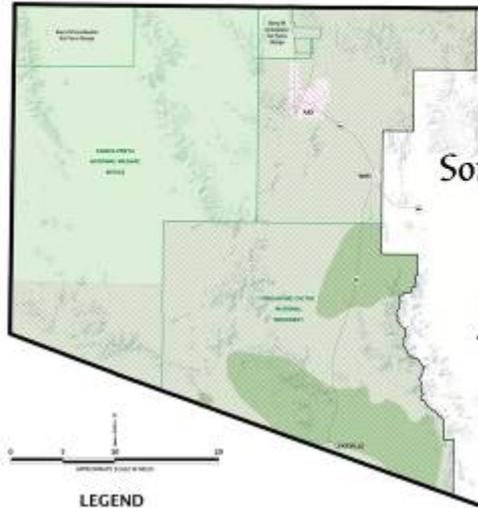
Endangered Species Act



Maeveen Marie Behan Conservation Lands System

Pima County Sonoran Desert Conservation Plan Priority Biological Resources

Providing Sustainable Development Guidelines as
Adopted in the Pima County Comprehensive Plan



Maeveen Marie Behan Conservation Lands System Commission Report adopted by Pima County Board of Supervisors Resolution No. 2020-00



Santa Cruz River, downstream of Tucson. Pima County Regional Flood Control District

Allocated 10,000 af/yr effluent for riparian restoration in Tucson area.

Additionally: 584 af/yr of County effluent

Saltbush Community (*Atriplex*)



Linking Protection to Clean Water Act

Section 404 Mitigation



U.S. Army Corps

Environmental Restoration: Rillito Riparian (2007/2010)

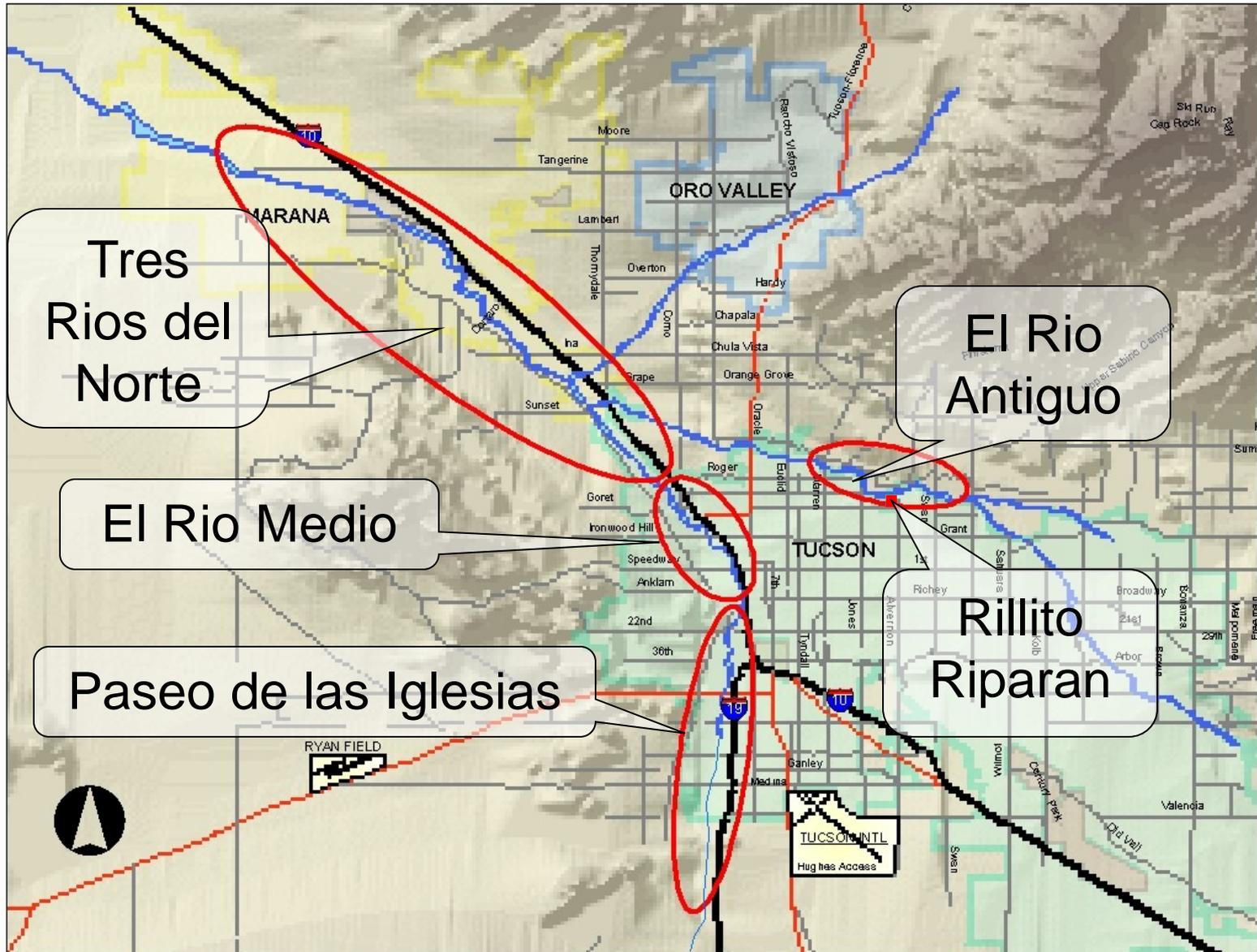


U.S. Army Corps

Environmental Restoration: Kino Project (2001/2011)



USACE Environmental Studies in Pima County



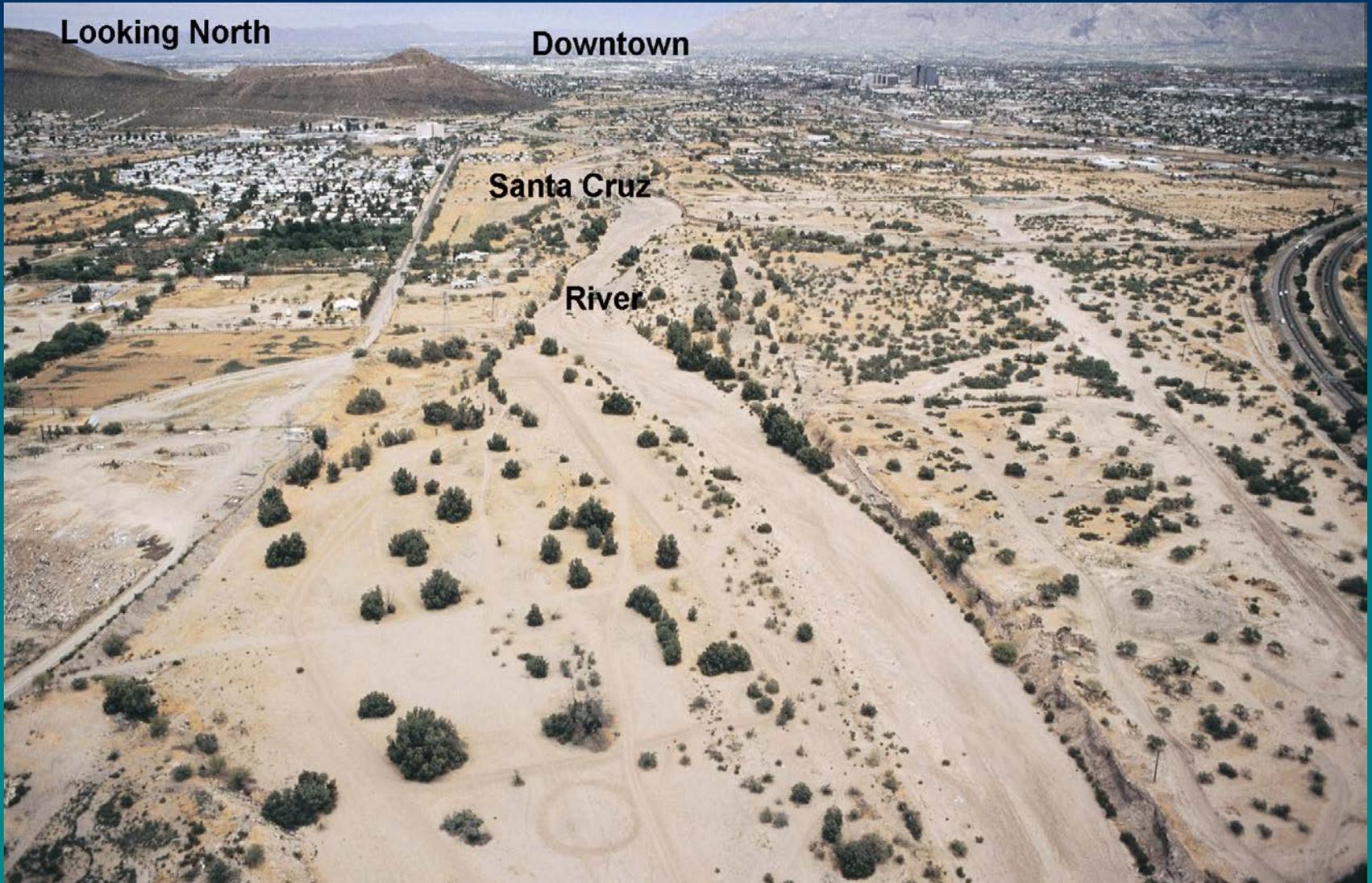
PASEO de LAS IGLESIAS ♦ PHASE I



**MULTI-USE PATH ♦ ECOSYSTEM RESTORATION
BANK PROTECTION**

Coming 2014

Paseo Phase 1

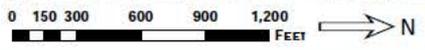
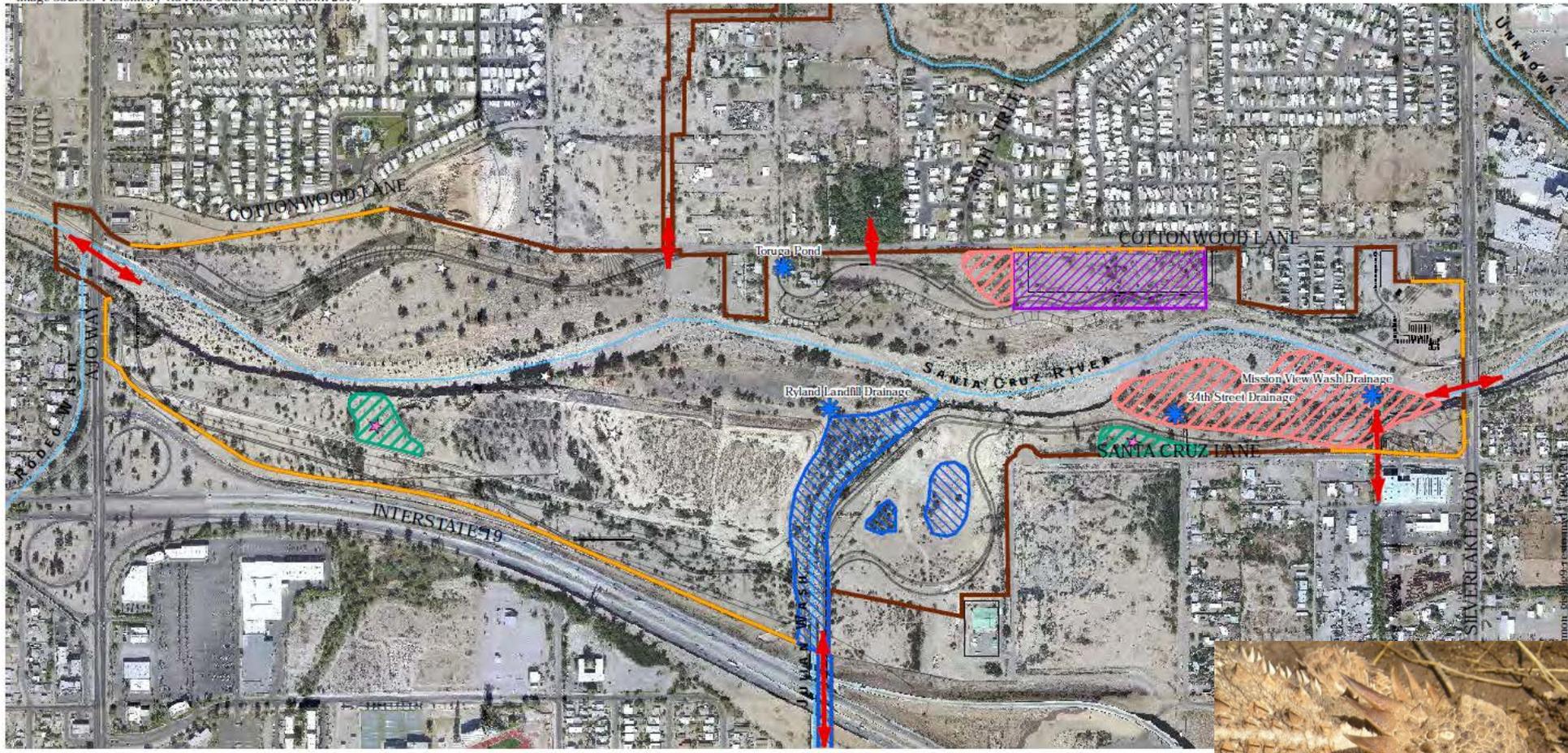




Athel (*Tamarix aphylla*) Treatments:

1. preserve in place
2. cut stump and salvage wood for raptor perch
3. hack and squirt
4. mechanically remove

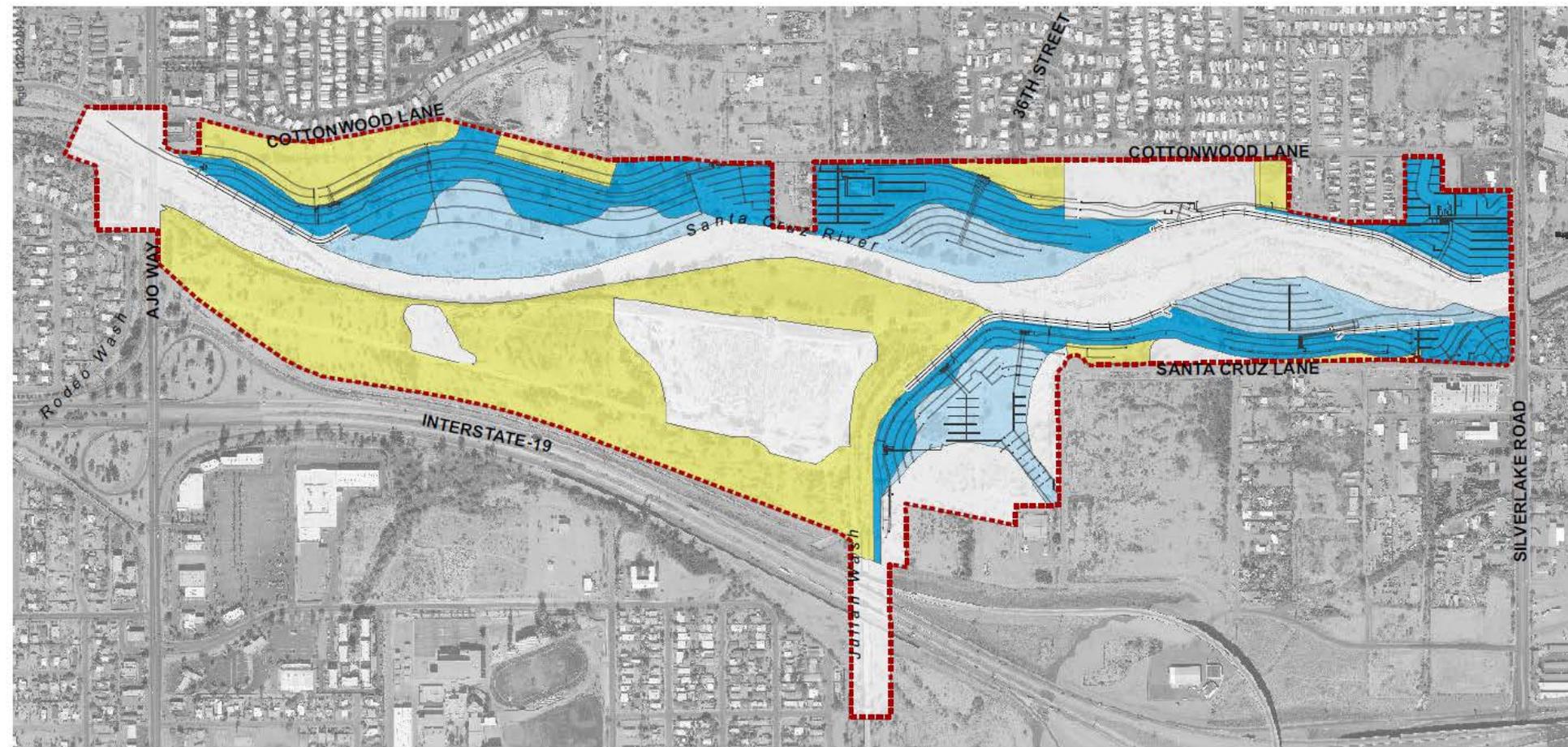
Image source: Pictometry via Pima County 2010. (flown 2010)



LEGEND

- | | | |
|----------------------------|----------------------------------|-------------------|
| PROJECT BOUNDARY | BURROWING OWL PERCH | WILDLIFE FENCE |
| PLAN LINES | RAPTOR PERCH | WILDLIFE MOVEMENT |
| FOOD BANK COMMUNITY GARDEN | NEW AMPHIBIAN BREEDING AREA | |
| BURROWING OWL AREA | EXISTING AMPHIBIAN BREEDING AREA | |
| REGAL HORNED LIZARD AREA | | |





LEGEND

- PROJECT BOUNDARY
- BANK PROTECTION FEATURES
- IRRIGATION SYSTEM LINES

- IRRIGATION TYPE**
- TRAIL AND RESTORATION IRRIGATION
 - ESTABLISHMENT/DROUGHT CONTINGENCY
 - DRYLAND TECHNIQUES
 - NO IRRIGATION

NOTES

1. IRRIGATION AREA TYPES ARE SUBJECT TO CHANGE.

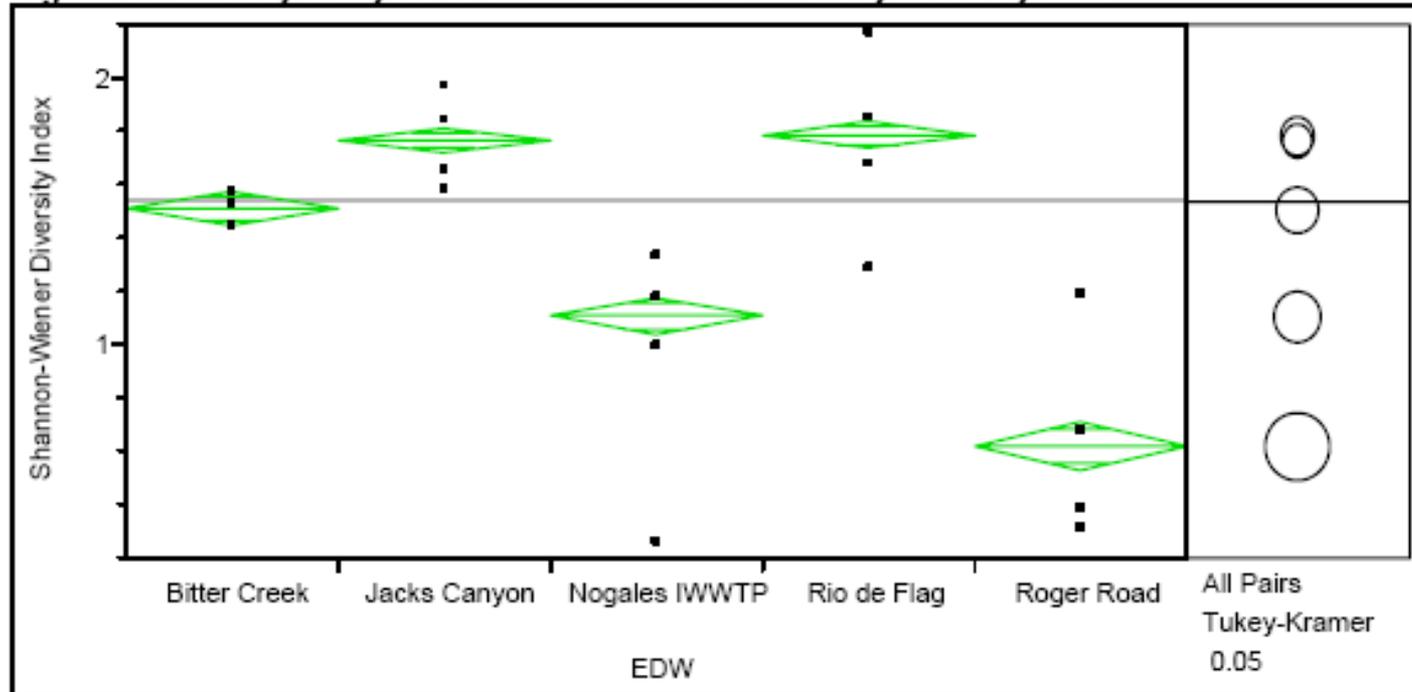
Paseo de las Iglesias
 Santa Cruz River: Ajo to Silverlake

FIGURE 6:
 Irrigation Area Types



Diversity of aquatic invertebrates was the lowest of five EDWs studied in Arizona (Walker et al., 2004)

Figure 1f. Oneway analysis of Shannon-Wiener diversity index by EDW



Nutrient Removal

Improved waste treatment will address high nutrient and carbon loading, and improve dissolved oxygen.



Roger Road discharge



Roger Road Wastewater Treatment Plant

Reclaimed Water Treatment Plant

RB-004

RB-003

RB-002

RB-001

Sweetwater Wetlands

RB-005

RB-006

RB-007

RB-008

Santa Cruz River

Lessons Learned

- Tap into local community values
- Do biological and cultural inventory
- Connect floodplain management objectives to river restoration and recreation
- Leverage gray infrastructure
- Tie to federal programs

Lessons Being Learned

- Connect water allocations to economic benefits

Economic value of riparian estimated at \$67-88 million for effluent-dependent Santa Cruz River (Bark 2011)



Lessons Being Learned

- Habitat preservation for specific species
- Irrigation approaches
- Non-native species management
- Flood- and erosion-control with ecological objectives





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