



Opportunities and Initiatives for Sustainability: Energy, Water and the Environment

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Pima County Regional Wastewater Reclamation Department

MAG Greening Water and Wastewater Infrastructure Workshop
January 12, 2010

Framework for Integrated Sustainability Planning in Pima County

Pima County

Smart Growth Legislation

State requirements to plan for and address:

- (1) Land Use, (2) Environmental Planning,
- (3) Water Resources, (4) Energy, (5) Transportation, (6) Cost of Development, (7) Open Space, and (8) Growth Areas

Sonoran Desert
Conservation
Plan

Pima County
Comprehensive
Land Use
Planning

Conservation Lands
System

Pima County Sustainability
Program

Community Planning

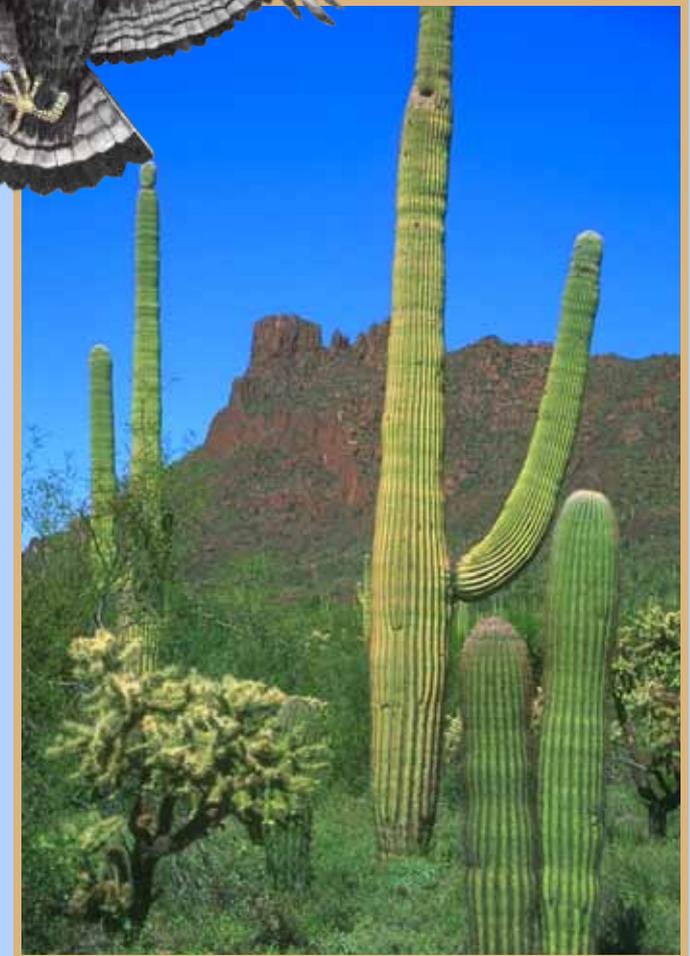
Arid West
Water Quality
Research
Project

EPRI Retreat
Project

Water and Wastewater
Infrastructure Supply and
Planning Study

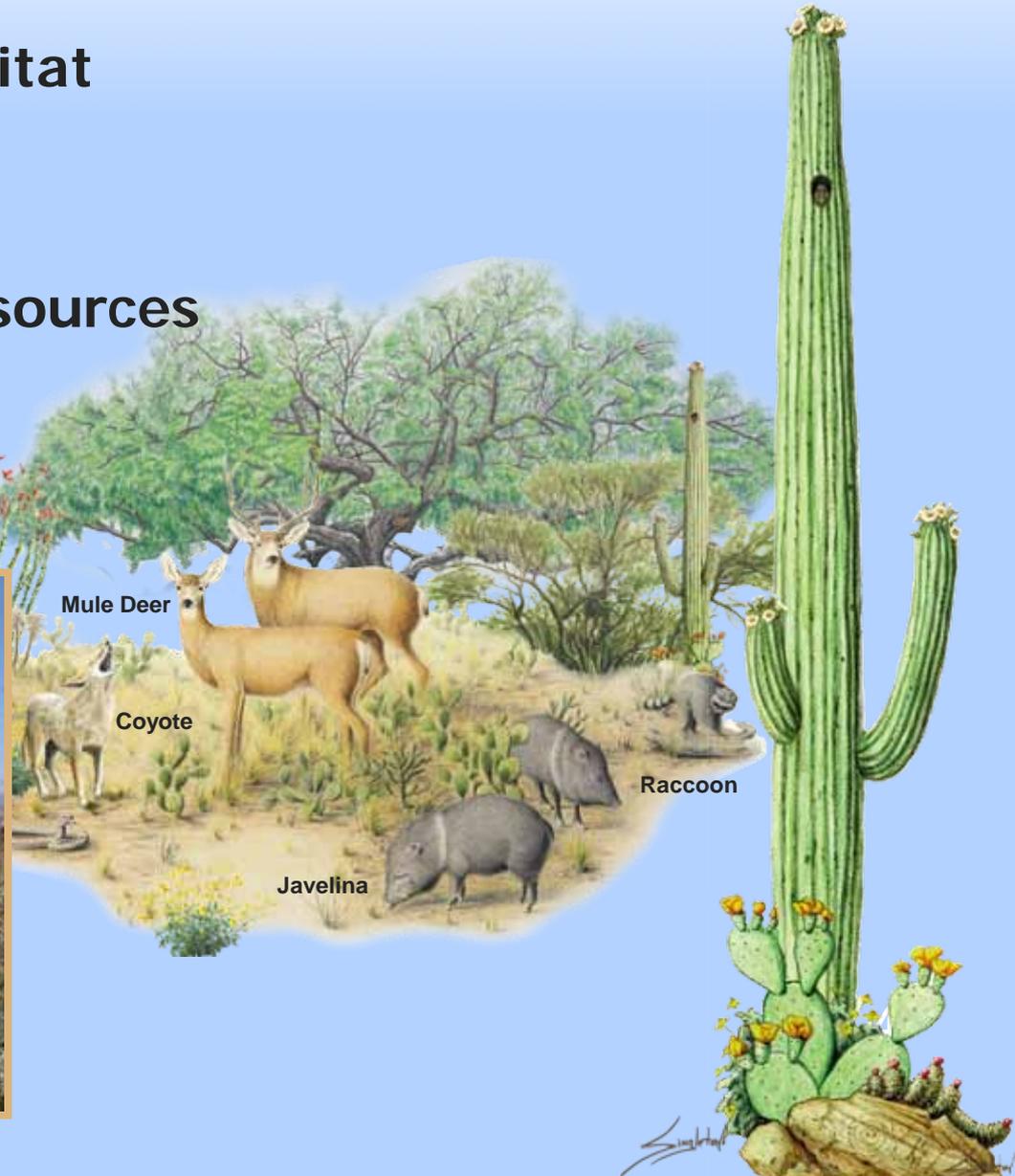
Sonoran Desert Conservation Plan – Goals

- § Preserve and restore unique desert environment and wildlife
- § Maintain wildlife habitat in the face of urban development

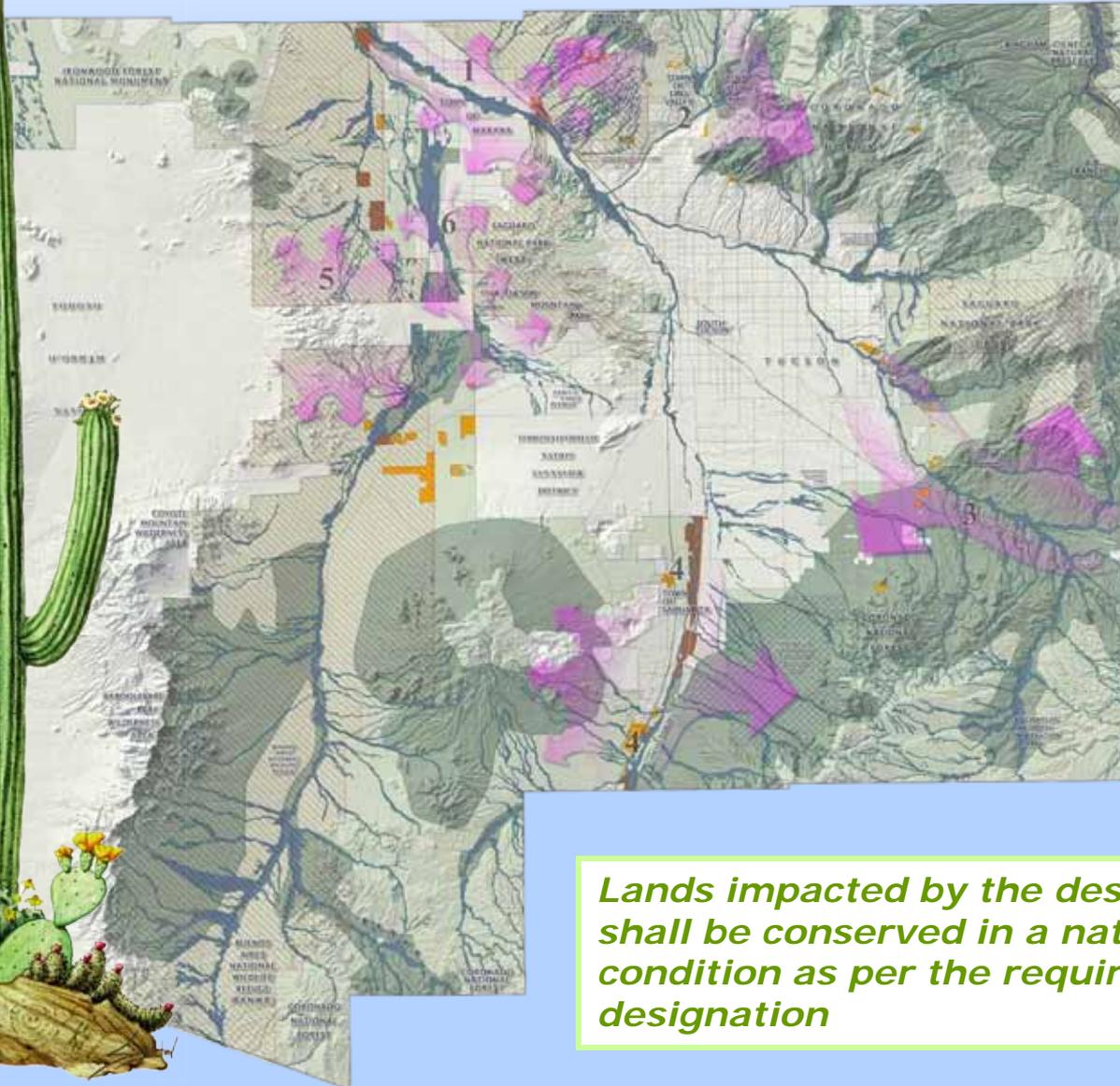


Sonoran Desert Conservation Plan – Elements

- § Critical and sensitive habitat
- § Biological corridors
- § Riparian preservation
- § Historical and cultural resources
- § Mountain parks
- § Ranch conservation



Conservation Lands System



Important Riparian Areas:
95 percent

Biological Core
Management Areas:
80 percent

Multiple Use Management
Areas: 66- $\frac{2}{3}$ percent

Special Species
Management Areas:
80 percent (4 : 1 land
conservation)

Scientific Research Areas

Agriculture In-holdings
within the *Conservation
Lands System*

Critical Landscape
Connections

Lands impacted by the designations listed above shall be conserved in a natural or undisturbed condition as per the requirements of each designation

Pima County Sustainability Action Plan

On May 1, 2007, the Board of Supervisors adopted a resolution for a series of initiatives to promote and advance sustainability in the areas of:

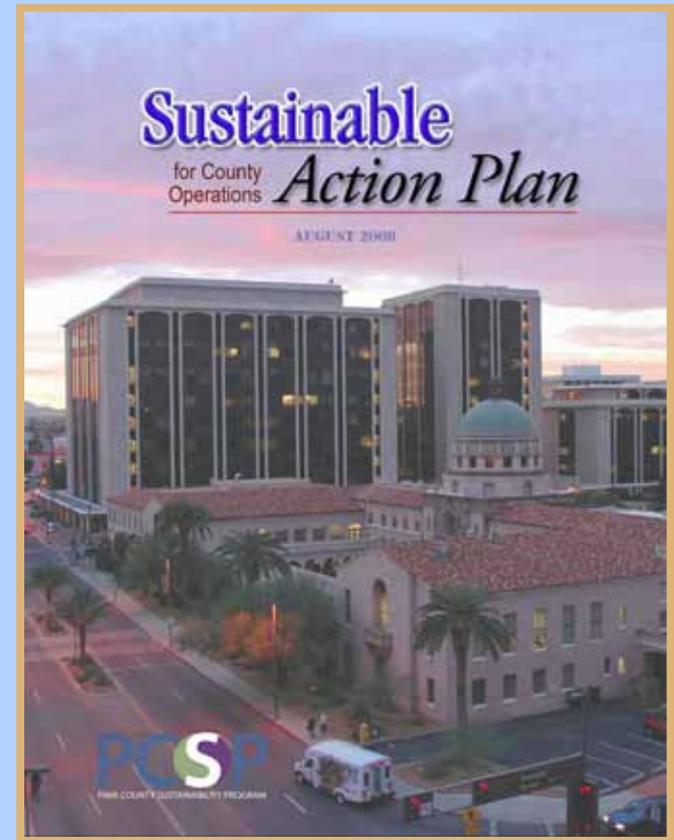


- § Green Building
- § Renewable Energy
- § Alternative Fuels
- § Waste Reduction
- § Green Purchasing
- § Water Conservation and Management
- § Social Well-Being, Opportunity & Equity

Pima County Sustainability Action Plan

Goals

- § Transition to renewable energy sources to meet 15% of the energy needs of County facilities by 2025
- § Maximize methane use to help power County wastewater and landfill operations
- § Maximize county water resource assets, including groundwater rights, surface rights and effluent for natural resource protection
- § Reduce water use in County facilities by 15% by 2025



Arid West Water Quality Research Project (AWWQRP)

§ Project Purpose:

Improve scientific basis for regulation of water quality and protection of species, habitats and uses of effluent-dependent and ephemeral waters in the arid West

§ Funded by the U.S. Environmental Protection Agency

§ Initiated in 1995

§ Completed in 2007



AWWQRP: Stakeholders Working Together

- § Pima County Wastewater Management Department
- § U.S. Environmental Protection Agency
- § Regulatory Working Group of Regional Agencies and Organizations – *Identify regulatory issues that should be addressed by research and develop the Research Agenda*
- § Scientific Advisory Group – *Review proposals received, rank and recommend worthy proposals based on scientific merit and review research products*



AWWQRP: Science and Policy

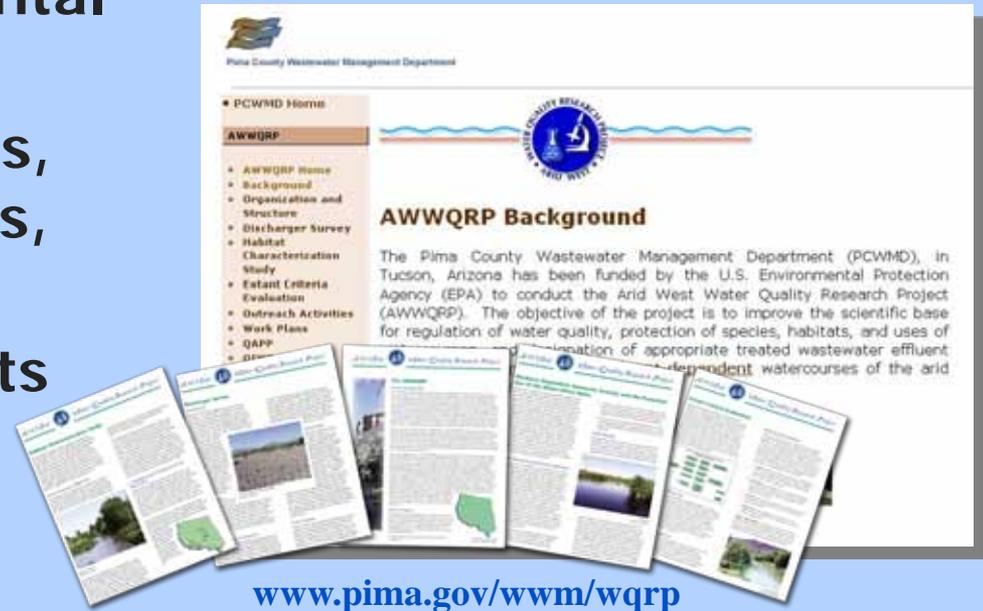
§ Established fact-based foundation to address arid west regulatory and environmental issues

§ Brought together scientists, regulators, agencies, tribes, NGOs

§ Created database of reports and research

- Updated constituent toxicity databases
- Updated species lists for arid west waters
- Updated constituent toxicity databases
- Updated species lists for arid west waters

§ Provided opportunity to discuss critical water supply and quality issues in common forum



Goal

Develop a vision of the ideal sustainable water infrastructure policies and practices

Objectives

Community-level water sustainability will:

- § Integrate potable water/wastewater/ reclaimed water/stormwater across political, jurisdictional, economic boundaries
- § Provide communities with cascading environmental, societal and economic sustainability benefits

Project Overview

- Recruit two diverse communities
- Recruit diverse group of advisory panelists
- Conduct pre-retreat teleconference to orient and engage
- Develop two community case studies
- Hold 2.5-day retreat to obtain input for a new paradigm for water infrastructure management
- Conduct follow up research
- Prepare final report

Retreat from June 1-3, 2009, in Hebron, Kentucky



Participants

Community Representatives

- § Pima County Regional Wastewater Reclamation Department, Arizona
- § Pima County Flood Control District, Arizona
- § City of Tucson Water Department, Arizona

- § City of Covington, Kentucky
- § Sanitation District No. 1 of Northern Kentucky
- § Northern Kentucky Area Planning Commission
- § Northern Kentucky Water District
- § Kentucky Dept. for Environmental Protection

Researchers & Experts

- § USEPA – Office of Research and Development
- § USEPA – Office of Wetlands, Oceans & Watersheds
- § Tetra Tech
- § CDM
- § Allied Environmental
- § CH2M Hill
- § Inman and Strickler
- § Blake Anderson Consulting
- § East Kentucky Power Cooperative
- § Electric Power Research Institute
- § Carollo Engineers
- § CollinsWoerman
- § Water Environment Research Foundation (WERF)
- § Coalition for Alternative Wastewater Treatment
- § University of Alabama – Tuscaloosa
- § AWWA Water Research Foundation
- § Clean Water Action
- § Electric Power Research Institute

Planning Sustainable Water Infrastructure

Recognize Desired Outcomes

- **Overarching Goals**
 - Environmental
 - Economic
 - Social
- **Specific**
 - Defined by each community

Adopt Sustainable Infrastructure Principles

- Value the resource
- Aspire to higher objectives that spawn better outcomes
- Smart, clean and green
- Integrate water mgmt. decisions with community planning and development
- Recognize true costs and maximize value/benefits
- Adapt and evolve
- Community shares responsibility and risks
- Locally driven and context sensitive at all scales
- Build intellectual infrastructure

Adapt and Integrate Technological Architecture

- Resource recovery and recycling
- Distributed resource management
- Multi-benefit infrastructure solutions
- Emerging technological approaches

Build the Institutional Capacity

- Integrated planning and smart growth
- Watershed scale planning and management
- Full life-cycle costing and market mechanisms
- Modified regulations
- Enhanced community engagement
- Build intellectual capital





Ongoing Sustainability Initiatives and Achievements



Regional Optimization Master Plan (ROMP)



Program Goal

Develop the optimal treatment process and plan to comply with regulatory requirements to reduce total nitrogen concentrations in discharged effluent

ROMP Plan at a Glance

Ü Upgrade and Expand Ina Road WRF to 50 mgd
Centralized solids handling and bio-gas power generation

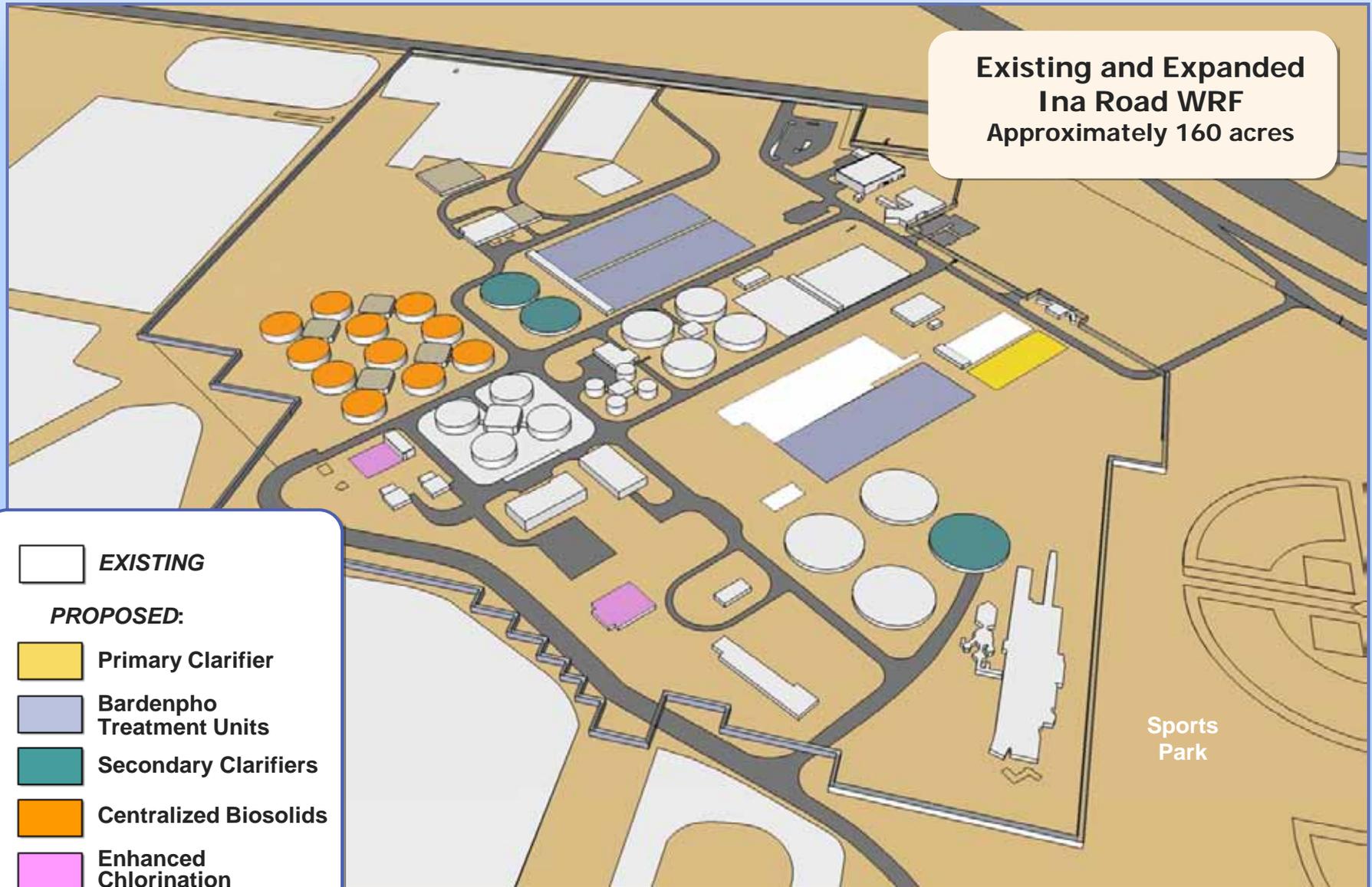
Ü Construct new 32 mgd Water Reclamation Campus
(in vicinity of existing Roger Road WRF)
Regional laboratory and staff facilities

Ü Plant Interconnect – 36 mgd average, 81 mgd peak flow
Major wash crossings and odor control structures

Ü Good neighbor facilities
Odor control, architecturally compatible to local area

Ü Decommission existing 41 mgd Roger Road WRF

ROMP: Ina Road WRF Expansion and Upgrade



Existing and Expanded
Ina Road WRF
Approximately 160 acres

EXISTING

PROPOSED:

- Primary Clarifier
- Bardenpho Treatment Units
- Secondary Clarifiers
- Centralized Biosolids
- Enhanced Chlorination

Sports Park

ROMP: New Water Reclamation Campus

Solar Energy Facility

Compliance laboratory, Compliance and Regulatory Affairs Office facilities, Training center

32 MGD Water Reclamation Facility

Future Sustainability Research and Development Campus



ROMP: New Water Reclamation Campus



Conceptual Plan of the Water Reclamation Campus includes landscaping and water harvesting features

- § Showcase for cultural and biological resources
- § Environmental and aesthetic enhancements: adjacent parks, natural areas and economic development centers
- § Sustainability projects including LEED Silver Certification, solar project, and water harvesting at the Water Reclamation Campus; energy recovery at Ina Road WRF

ROMP: Solar Power at the Water Reclamation Campus



- 1 megawatt (MW) solar facility
- Will produce over 55M Kw/Hr during its 30-year expected life
- Upon completion 45% of the energy needs of the site will come from renewable sources
 - 15% will be from solar energy
 - 30% will be from methane gas



August 2009 – Groundbreaking for the Water Reclamation Campus Solar Energy Facility

ROMP: Power Generation and Energy Recovery Facility at the Ina Road WRF

Power Generation Facility

§ Facility will use renewable process biogas to:

- Produce 3 to 4 megawatts of electrical power
- Produce thermal energy for:
 - Process heating
 - Space heating and cooling
 - Domestic hot water
- Provide backup thermal energy
- Provide backup electrical energy



Other Sustainability Projects: Santa Cruz Siphon – Solar Odor Control System



Other Sustainability Projects: Ecosystem Restoration

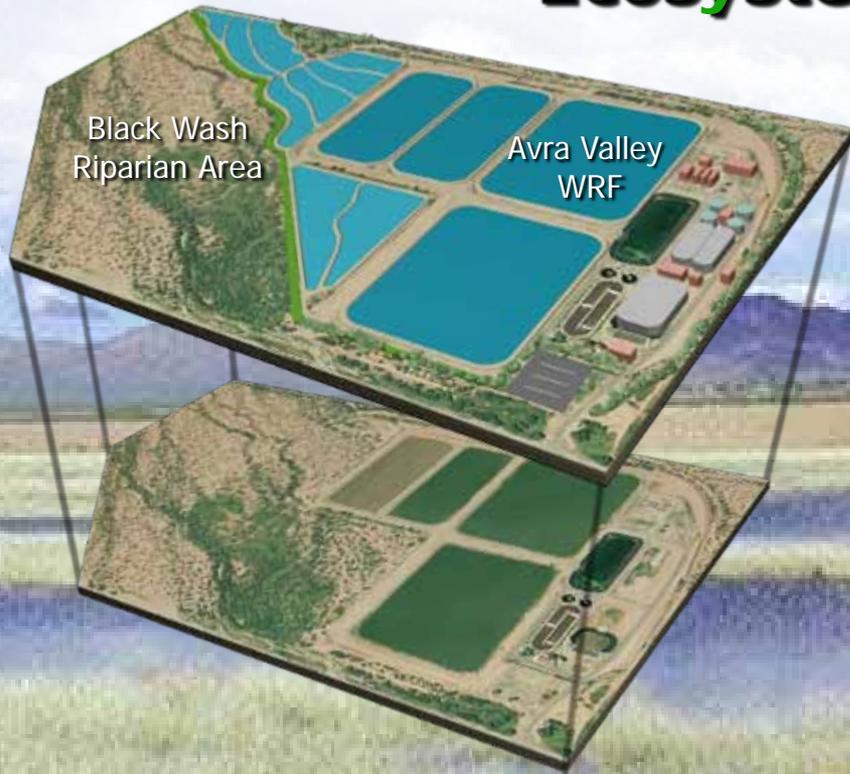
Kino Environmental Restoration Project



**Army Corps of Engineers
Pima County
RWRD & RFCD
City of Tucson**

Other Sustainability Projects: Ecosystem Restoration

Avra/Black Wash Reclamation and Riparian Restoration Project



Bureau of
Reclamation
Pima County
RWRD & RFCD

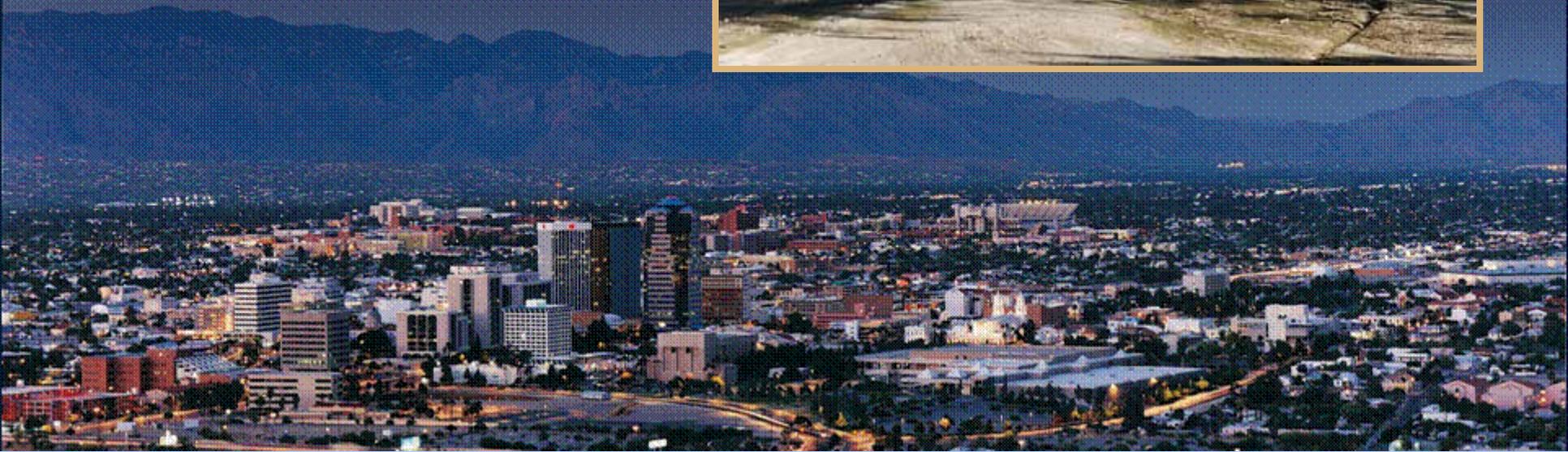


Gambel's Quail

Moving Forward with the Joint City/County Water and Wastewater Infrastructure, Supply and Planning Study

Program Goal:

Define and develop a sustainable water future and a livable region



Water



Infrastructure, Supply & Planning Study
A City of Tucson and Pima County Cooperative Project

Study Overview

Phase 1 Specific Objectives

City/County infrastructure, resources, sustainability and improved cooperation

Phase 2 Specific Objectives

City/County common water and conservation goals

Phases 3-5 General Objective

Conjoin a regional dialogue on these issues to develop a sustainable water future



Water
Matters



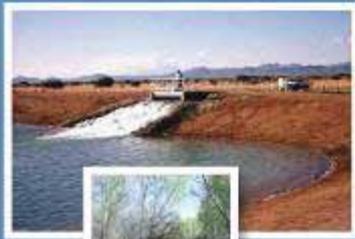
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A City of Tucson
and Pima County
Cooperative Project



Water & Wastewater

Infrastructure, Supply &
Planning Study



Executive Summary

May 2009

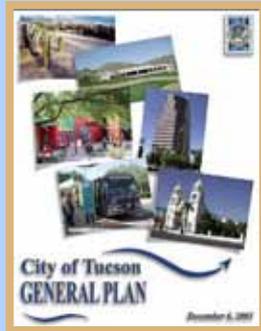
Phase 1 Reports

- § Current State of Water, Wastewater, and Reclaimed Water
- § Water Resource Assessment
- § Critical Factors Associated with Water Sustainability
- § City/County Collaborative Efforts Update
- § Recommendations for Phase 2

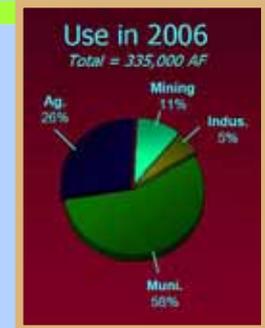


Phase 2 Topics

Integrated Planning



Water Supply



Respect for the Environment



Demand Management



Financial

Pima County Regional Wastewater Reclamation Department

Fiscal Year 2008/2009
Financial Plan

February 2009



Phase 2 Technical Papers

- § Consolidated Drought Planning
- § Reclaimed Water
- § Water Conservation (2)
- § Stormwater Harvesting
- § Riparian Protection
- § Environmental Restoration
- § Location Of Growth, Urban Form And Cost Of Infrastructure
- § Integrating Land Use And Water Resources Planning And Infrastructure
- § Water / Wastewater Cost Of Growth
- § Economic Efficiency And Water Management Decision Making
- § Water Quality
- § Additional Water Resources



Moving Forward

§ Phase 2 Report is complete

- Presented at a joint meeting of the Pima County Board of Supervisors' and the City of Tucson Mayor and Council on January 12, 2010

§ Moving into Phase 3: A regional dialogue to develop a sustainable water future for the entire region

**WORKING FOR A
SUSTAINABLE WATER FUTURE**

Summary: Pima County Sustainability

ISSUES

and

SOLUTIONS



**Sonoran Desert
Conservation Plan**

**Sustainability
Action Plan**

AWWQRP

EPRI

**Regional Optimization
Master Plan**

**Water and Wastewater
Infrastructure
Study**



"Good
Deserts
are hard
to
find"

