Pima County Receives A+ for ROMP Upgrades

2015 Arizona WateReuse Symposium

Jerry Bish PE, BCEE

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Pima County, Arizona

- Regional Water Reclamation Department
 - Serves Nearly 1,000,000 Customers
 - 700 Square Mile Service Area
 - 7 Water Reclamation Facilities
 - Two major facilities (Tres Rios WRF
 - & Agua Nueva WRF)
 - 5 Sub-Regional WRFs
 - Treats 55 to 60 mgd of Wastewater
 - Discharges To:
 - Percolation Basins
 - Reclaimed Water Distribution System (Tucson Water)
 - Lower Santa Cruz River



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TUCSOI

Regional Optimization Master Plan

- County-wide Looked at Wastewater Infrastructure Needs
- Addressed Current / Future Regulatory Requirements
- Examined Current / Future Water Reuse Needs
- Defined a Program to Achieve Objectives / Goals



ROMP

ROMP Objectives

- Upgrade/Rehabilitate Aging Treatment Works Infrastructure
- Expand Facilities to Meet Future Population Flows
- Utilize Modern Treatment Technologies
- Meet Effluent Nitrogen Limits
 - TKN Less than 8 mg/L
 - Ammonia less than 1.75 mg/L
 - Meet Class A+ Discharge
- Keep Water in Pima County



Bardenpho (Agua Nueva WRF & Tres Rios WRF)



Tres Rios WRF





Pre-ROMP

Post-ROMP



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Agua Nueva WRF



Pre-ROMP



Post-ROMP



Effluent Discharge Quality

Constituent	Influent	Effluent	
	Characteristics Typical	Pre-ROMP Upgrades (Before 2013)	Post-Construction (After 2014)
BOD5, mg/L	230	10	<3
TSS, mg/L	280	13	<1
TKN, mg/L	45	24	6
Ammonia, mg/L	33	19	1.75
Phosphorus, mg/L	7	4	<2



Reclaimed Water



Santa Cruz River

- 184 miles Long
- Attracted People 12,000 Years Ago
- Source of Irrigation Water for Native Tribes
- River Water Course
 - Originates Southeast Arizona High Grasslands
 - Runs South to Mexico
 - Turns North Through Tucson
 - Northwest to Gila River
 - West to Colorado River
 - South to Gulf of California
- Once a Perennial Stream
 - Dried up From Ground Water Pumping



Santa Cruz River System



Lower Santa Cruz River (Pima County)



Ancient Irrigation Ditches





Irrigation System (1,200 B.C.)







Lower Santa Cruz Flow Extent

- Flow Extent = Visible Flow
- Effluent Dependency
 River Flow: 2013
 - W: <u>2013</u> ^{3%} ^{3%} ^{97%} ⁸ ⁸ ⁸ ^{28%} ^{28%} ^{72%} ^{72%}
- Annual Rainfall: 6.6 inches

9.7 inches



Flow Stretch is Shorter

- Flow extend decreased from 2013 to 2014.
- 2% to 3% evaporation / plant uptake
- 2013 -- No dry days at end of reach
- 2014 -- 94 dry days at end of reach
 - More flow diverted (223 AF/month)
 - Reclaimed Water
 - Irrigation
- 2013 -- 33% as recharge
- 2014 -- 45% as recharge





Water Clarity

- 2013 Generally Cloudy (NTU = 46)
- 2014 Marked Decline in Turbidity (NTU=15)
 - Less Fines in Water
 Column
 - Less Solids to Seal River Bottom



2013

2014



2013 2014 GREELEY AND HANSEN

Nutrient Pollution

	<u>2013</u>	<u>2014</u>
• TDS	684	652
• NH₄ , mg/L	5	0
• DO , mg/L	5.7	8.2
 BOD₅, mg/L 	18	3
 Metals 	*	*

* Ar, Cd, Cr, Co, Pb, Hg, Se, Zn: below levels to protect aquatic wildlife



Wildlife Along Lower Santa Cruz River

- Habitat Created Along 23 Mile Reach of Lower Santa Cruz River
- Birds 215 Species Observed





Aquatic Wildlife

- Fish Western Mosquito Fish / Catfish
- Invertebrates Midges / Mayflies









Aquatic Wildlife (Cont'd.)

- Aquatic Wildlife (2014) Some Improvement
 - Amphibians / Reptiles: Leopard Frogs, Sonora Mud Turtle, Mexican Gartersnake, Couch's Spade Foot Toad, American Bullfrog, ...





Riparian Vegetation

- 2014 Wetland Plants Increased
- Still Abundance of High-Nitrogen Tolerant Plants
- Community Planting of Thousands of Mesquites and Palo Verde Trees, and Shrubs Along Lower Santa Cruz River







Social Impacts / River Benefits

- Seven Parks Associated or Adjacent River
 - Loop Recreational Path Along the River
- Odor from Wastewater Treatment Facilities Are Gone or Barely Noticeable
- Youth Program Introduces Importance of Water in Community
- Ramp-up of Appreciation for a Vital Resource





Youth Painting & Poetry Program



Community Awareness









Living River Celebration Saturday, April 4, 2015 Wheeler Taft Abbett 5r, Branch Library, 7800 N. Schister

8:30 – 10:00 a.m. & Birding on the Santa Cruz River Bring the whole family for a guided birding walk to spot coots and mallards and a wide variety of birds that are attracted to the mature willows and continuous river flow. Binoculars are available for use.

9:00 a.m. Living River of Words Youth Poetry and Art Exhibit Opens

9:00 a.m. – 1:00 p.m. & Living River Project Meet with staff of Sonoran Institute and Pima County Regional Flood Control to pick up information and learn about the Living River Projec

11:00 a.m. – 12:00 p.m. & Living River of Words Awards Ceremony Youth poets and artists receive awards.

100m peets new total 1:00 – 2:00 p.m. & Exploring Aquatic Life Join Pima County naturalists to take a close look at life in a flowing section of the Santa Cruz River and learn how students and scientists monitor river health.

For information contact eeducation@pima.gov or 520-615-7855 Made possible with a grant from U.S. Environmental Protection Agency





Notable Findings

- Water Clarity Improvement
- Water Quality Improvement
- Nutrient Pollution Decline



- Flow Extent Decline (more recharge / reuse)
- Aquatic Wildlife Observed Signs of Improvement
- Pima County Scores A+

