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AWPCA 2006 Water Reuse Project of the Year

Salt River Pima-Maricopa Indian Community Section 319 Non-Point Source Pollution Wetland/Riparian Demonstration Project – Phase II

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What began as a non-point source (NPS) best management practice for the Salt River Pima Maricopa Indian Community (SRPMIC) has become a unique water reuse amenity for the community.

The Community is located in eastern Maricopa County, Arizona and is approximately 52,675 acres bordered by the McDowell Mountains to the north, and the Verde River and Salt River channel along the east and southeast. The cities of Mesa, Tempe, and Scottsdale, including the Fort McDowell Yavapai Nation to the northeast, comprise the remaining borders. Much of the Community lands are agricultural fields with networks of canals to irrigate crops and to collect tail water. The land naturally slopes towards the Salt River channel so that these agricultural and storm waters tend to drain into the Salt River channel creating vegetated NPS outfalls.

Innovative Application of Techniques

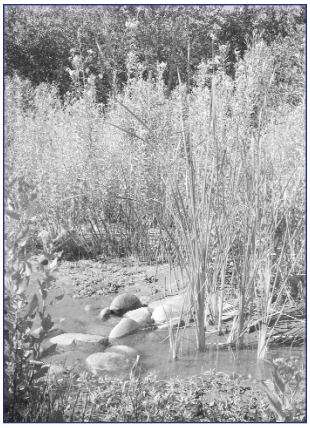
In the spring of 2003, one half acre outfall was targeted for a U.S. Environmental Protection Agency Clean Water Act Section 319(h) project to become a treatment wetland to improve the water quality of the NPS flows. The wetland was designed to improve the NPS flows by settling out many of the particulate pollutants that are typically associated with agricultural flows and storm water runoff. The wetland objectives are to settle out as much of the solids as possible, to provide additional soil stabilization which in turn reduces erosion, and to provide some retention time to allow biochemical reactions to improve overall water quality.

Construction consisted of the removal of the invasive salt cedar, and the stabilization of slopes with native trees, shrubs, and grasses. A channel was excavated to create the main flow path for the wetland. Cobbles were added to stabilize the bottom of the wetland in high energy locations. Emergent wetland and floating aquatics were planted in the active wetland channel. Pole plantings (branches cut from live, dormant trees) and nursery grown cottonwood and willow trees were planted. These native trees provide the canopy and understory that is crucial for a well balanced wetland ecosystem.

Over the duration of the first year, any new salt cedar growth was manually removed by personnel charged with vegetation maintenance activities. This was minimal effort during the start up period, for

such optimal project results. Today, the areas planted with native vegetation are free of salt cedar and will likely stay that way as new growth will not be able to compete with the cottonwoods and willows that are maturing in the area.

Since construction almost three years ago, this wetland has become a project success for several reasons. First and foremost, the non-point source pollution control and water quality improvement occur as is typical of constructed wetlands. A secondary success was the constructed wetlands became a water reuse application resulting in numerous benefits to the both the Community and the environment. Due to the success of the initial construction and treatment system, Phase II was implemented in 2005 to expand on the water reuse opportunities of the project.



Restored channel of riparian plants.

The Phase II activities included stabilizing eroded areas, instrumentation for water quality and quantity measurements, installation of a trail system to accommodate increasing number of visitors, and retrofitting the outlet to allow for some depth control.

This demonstration wetland had also been so successful in restoring the channel back to native vegetation, and keeping the salt cedar at bay, that similar salt cedar removal and native plantings were implemented in Phase II.

Increased Benefits for the Community and the Environment

A number of benefits provide simultaneous value to both the Community and the environment. The Community is comprised of two Native American tribes, the Pima or "Akimel Au-Authm" (River People) and the Maricopa or "Xalychidon Piipaash" (people who live toward the water). As their names imply, the river is of great cultural importance in the Community. The removal of the exotic vegetation allowed the establishment of several culturally significant riparian and wetland species.

During Phase II an extensive trail system was installed to improve the safety and welfare of the visitors and wetland operations personnel. Additionally, an outdoor 'classroom' was created to serve as a platform for educating school children on culturally significant plants and their uses. Further, the site can be visited by members who can see vegetation that may not be present elsewhere in the Community. These visitors can also enjoy viewing numerous birds, both local and migratory, and wildlife that frequent the wetlands.

The wetland provides the Community a unique educational opportunity. Not only are there signs and brochures to educate about the treatment ability of wetlands, what NPS flows are and what can be done to reduce pollution, but there are unique plant

EPA visitors hike trail before completion.

Completed trail area.

signs placed throughout the demonstration site. These plant signs include the scientific name, the common name, and the name in two of the tribes' native languages, O'Odham and Piipaash. In addition to improving the water quality of the NPS flows, this demonstration wetland provides an opportunity to restore a riparian ecosystem, and to continue a tradition.

Complexity

This demonstration wetland is a true wetland in the sense that it experiences variable flows and fluctuating water levels due to the cycle of irrigating agricultural fields. Thus, the plants that survive are finding the appropriate location and water depth for successful growth. Today, the demonstration wetland is thriving with a diverse vegetative community. However, this flow variability created a challenge during the Phase II construction, as irrigation of the agricultural fields continued throughout the construction phase. The construction effort persevered through periods of high water levels and used that challenge to its advantage. The high water levels guided the trail design, placement of culverts and crossing structures, and indicted areas that could be hazardous to visitors' physical safety.

Meeting and Exceeding Owners Needs

To date the project has exceeded the original goal of stabilizing the channel and improving water quality. In part, due to the success of this project, the Community has applied for additional EPA funding to support a similar project at another outfall to the Salt River. Many findings and lessons learned can be used in future projects throughout the Community. Solutions to design and operational constraints can be implemented in future treatment wetlands and planned restoration wetlands. Finally, another transferable finding from this project suggests that after three years, the native riparian and wetland vegetation has kept the area free from re-infestation by Salt Cedar.

This demonstration wetland has been a success in reusing agricultural tail water and storm water in a riparian habitat. The wetland continues to generate interest from the Community and is regularly visited during school field trips, cultural and environmental outreach programs, and was a part of the 2006 Earth Week celebrations.

Finally, in the age of multi-million dollar projects, this demonstration wetland went a long way with its budget. Phase I costs were about $110,000 with an additional $60,000 for the Phase II efforts. At these price tags, the project values and benefits far exceed the costs.

Outdoor classroom area.