

**2007/2008 STATUS REPORT ON MITIGATION ACTIVITIES FOR CWA 404 PERMITS
CONDUCTED BY TUCSON AUDUBON SOCIETY
September 2008**

1. NORTH SIMPSON PROJECT SITE – HABITAT MITIGATION ACTIVITIES

The Tucson Audubon Society's Santa Cruz River Habitat Project—North Simpson Site is located on land owned by the City of Tucson in northern Avra Valley, Pima County, Arizona in Township 10E, Range 11S, Section 15. The 640-acre area where restoration is concentrated is a part of part of a parcel totaling 1700 acres owned by the City of Tucson north and south of the Santa Cruz River, and is accessed by Tucson Audubon through a Right of Entry agreement that extends through the year 2100.

Much of the environment at the site is categorized as Important Riparian Area by Pima County. The site is bisected by a 1.5-mile reach of the Santa Cruz River. Effluent released from the Pima County Wastewater Treatment Plants at Roger and Ina Roads flows downstream about 20 miles to the North Simpson Site and supports hydriparian vegetation along the river corridor.

The goal of restoration work at the North Simpson Site is to preserve, enhance and diversify habitat while stabilizing disturbed land. Restoration activities at the site have been funded by several entities including in-lieu mitigation funds, Arizona Water Protection Fund grants, and US Fish and Wildlife grants.

Activity acreages summarized in the table below apply only to the activities conducted in areas of the site earmarked for in-lieu mitigation activities. Restoration activities funded through in-lieu mitigation funds to date are as follows:

Restoration Activity	Acreage completed prior to FY 07/08 (maintenance ongoing)	Acreage receiving restoration in FY 07/08 (ongoing in FY 08/09)	Total acreage receiving restoration to date	Tentative additional acreage planned for FY 08/09
Planting of native seedlings in water harvesting basins and depressions and cottonwood and willow poles (approximately 100-150 plants per acre)	77	20	97	10
Distribution of native seed using imprinting technique and hand distribution (12 – 15 lbs per acres of native seed)	140	2	142	0
Concentrated erosion control	2	--	2	--

Additional activities include removal of exotic invasive plant species, irrigation, maintenance and replanting as needed in existing and new planting areas. We also add protection around some plants against small mammals that are serious predators of transplants. Snags are erected where available to provide perches for raptors. Avian and photographic monitoring is performed regularly to monitor progress.

Evaluation of restoration efforts to date

Since the commencement of planting and seeding activities in early 2001, trees, shrubs and grasses have recolonized restoration areas at the North Simpson site. While there has been natural recruitment of

some plants, particular some velvet mesquites (*Prosopis velutina*), plants installed via restoration work have contributed most of the revegetation. Also contributing are plants that have sprouted from seeds we have distributed, plus seeds produced by newly installed vegetation. Water harvesting basins support both installed seedlings and native plants that “volunteer” in the favorable microclimates created in the basins.

In 2007/2008 very significant effort was expended to control Russian thistle (*Salsola kali*) in the current 20-acre active restoration area before most of the native plant installation occurred. We believe this strategy will aid in plant survival and more successfully allow native restoration plants to compete in coming warm seasons with the fast-growing, invasive thistle.

As a result of fencing to exclude cattle, a more robust cottonwood/willow gallery forest has developed immediately along the river thalweg than has developed in less protected reaches of the river. Scouring river flows contribute by inducing seed germination. Restoration pole planting has added to the numbers of cottonwoods and willows in the riverside forest.

Bird surveys continue to document the diversity and number of birds using habitat at the site. Yellow-billed cuckoo (*Coccyzus americanus*), a candidate species for listing as threatened or endangered under the Endangered Species Act, were detected in the Goodding’s willow canopy along the river briefly in 2002 and then consistently in the summers of 2004, 2005, 2006 and 2007.

2. MARTIN FARM PROJECT SITE—HABITAT MITIGATION ACTIVITIES

The Martin Farm Restoration Site is located on land owned by the City of Tucson (COT) in northern Avra Valley, Pima County, Arizona. Thirty acres of riparian area are available for restoration at the site along the south side of the Santa Cruz River (Figure 2). The site is located in Township 11S, Range 10E, Section 24, immediately west of the incorporated area of the Town of Marana along the Santa Cruz River.

A scope of work was created for habitat restoration at the Martin Farm site. Permits were acquired for the site including right-of-entry and water use agreements with the City of Tucson, a Pima County Floodplain Use Permit, and archaeological clearance.

In the 2006-07 fiscal year a large irrigation system was designed and installed by Earthwise, a subcontractor. Over 3,500 trees, shrubs and grasses were planted. Over 200 pounds of native seed were sown at the site.

On the southwest portion of the site on a bank overlooking the floodplain, scores of planting microbasins were installed both to provide harvested rainwater for plants, and to reduce water flowing the on the eroding slope down to the floodplain. Extensive vegetative gabions were installed on this slope as well, to mitigate erosion.

Monitoring consists of avian point counts, photo monitoring, and measurement of plant survival and growth. Monitoring protocols were set up and baseline data were collected. Since then additional data have been collected to monitor growth and survival of plants installed, changes in avian populations using the site, and visual changes through repeat photos. Monitoring data are being analyzed.

Restoration Activity	Acreage completed prior to FY 07/08 (maintenance ongoing)	Acreage receiving restoration in FY 07/08 (ongoing in FY 08/09)	Total acreage receiving restoration to date	Additional acreage planned for FY 08/09
Planting of native seedlings in water harvesting basins and depressions (over 100 plants per acre)	27	3	30	0
Distribution of native seed using imprinting technique and hand distribution (12 – 15 lbs per acres of native seed)	27	3	30	0
Concentrated erosion control	2.1		2.1	--

Evaluation of restoration efforts to date

High labor inputs were necessary to maintain the irrigation system, which requires drip emitter maintenance and flushing of main lines due to buildup of sediments and organic materials. Irrigation was suspended for much of August 2007 due to regular summer rains and flooding damage to a main PVC distribution pipe. Irrigation began again after summer rains stopped and continued through May 2008. River flows then decreased substantially and irrigation was no longer possible. However, plants fared well and summer rains began shortly thereafter. Plants are judged to be mature enough at this point that they will not require additional irrigation.

The baseline round of plant survival monitoring was performed in April 2007, after planting in the previous months. The following rounds were performed semiannually in October 2007 and April 2008. At the writing of this report, the October 2008 round has not yet been completed however casual observation indicates little to no increase in plant mortality from the April 2008 round. For the purposes of evaluating plant survival, the site was divided into seven zones based on topography, surface hydrology and soil texture. As of April 2008, survival is shown to be highest in the zones of the upper floodplain at 81% to 90%. The edge of the upper floodplain above the lower floodplain, where the soil is highly compacted compared to the rest of the upper floodplain, survival is at 70%. Survival is greatly reduced on the upper creosote flat at 51%. This reduction may be the result of increased predation, less water retention in the soil, or possibly the overall unsuitability of soil in this area for many of these plants. Survival is lowest in the lower floodplain at 41%. This is very likely the result of increased flood water intensity, which appears to have scoured out or buried most plantings. Most of the survivors in this zone are along the southern edge of this floodplain, which is slightly elevated from the rest of the floodplain. The results from this monitoring will assist in future restoration plans on this site and others and help us decide which areas to concentrate restoration efforts for greatest efficacy.

It is too early to see long-term results via bird surveys. Surveys are ongoing and may show significant progress within a few years.

Photo monitoring shows that in some areas we have strongly augmented vegetative density and diversity. Photos are taken semiannually, once in winter and once in late summer near the end of the growing season. Results appear most striking on the upper floodplain area where plant survival has been good and plants were installed densely along drip irrigation lines. Figure 1 shows one such area. The first photo shows dried annual vegetation with planned planting areas indicated by the black irrigation lines. The photo from August 2007 shows extensive new growth both from planted perennials and annuals that grew from heavy summer rains that year. In the final two photos, the perennials continue to grow although less summer precipitation led to a decrease in annuals. While the perennials in the final photo appear drier, casual observation by crew members indicates they are all still alive..



Figure 1. Repeat photo M8b

3. COCHIE SPRING PROJECT SITE, TORTOLITA MOUNTAINS

The Cochie Spring Restoration Project site is located in southern Pinal County on Pima County-owned land, and is managed by Pima County Natural Resources Parks & Recreation as part of Tortolita Mountain Park. The site is located in Township 10S, Range 12E, Section 35, at the western edge of the Tortolita Mountains and approximately 0.75 miles north of the Pima/Pinal County line. The current project site constitutes approximately 12 acres of the 200 acres owned by Pima County.

Cochie Spring augments the ephemeral flows collected in the Cochie Creek watershed during seasonal rain events. The spring, as part of a historical range homestead, was encased in a concrete sump to serve as a "well."

The goal of restoration work at the Cochie Spring site is to reverse degradation caused by grazing and erosion and to return normal vegetation to disturbed areas. Restoration activities are focused in and around Cochie Wash. Due to archaeological sensitivity, active planting and erosion control are not being conducted around existing structures, built up terraces, and old corral land.

Activities at the site commenced in fall of 2004. Work completed before the current fiscal year included:

- Completion of the Cultural Resources Survey of the site.
- Construction of wildlife fencing around the 12 acre mitigation area
- Clean up of accumulated recent debris from human occupation and old fencing throughout the fenced area, under the supervision of archaeologists
- Planting and localized erosion control in 3.3 acres of the site specifically delineated for in-lieu mitigation planting
- Construction of irrigation system
- On-going irrigation of plantings
- Monitoring and repairs to irrigation system when needed
- Avian monitoring, photo monitoring, and vegetation survival monitoring
- Replacement planting was conducted following the first round of follow-up plant monitoring, to replace plants that had not survived
- Irrigation of plantings through spring of 2007, when plants were well-established and irrigation ceased

Activities during the 2007-08 fiscal year included:

- Fence inspection
- Ongoing avian monitoring, photo monitoring, and vegetation survival monitoring

Evaluation of restoration efforts to date

Restoration efforts to date have resulted in a spontaneous rebound of native grasses and forbs as a result of cows being fenced out of the site. Six species of native plants were planted along Cochie Wash adjacent to the spring and settlement area. A total of about 340 native restoration plants were planted.

To monitor the survival of plantings at the site, baseline plant monitoring and three further semiannual rounds of plant monitoring have been completed. Approximately 10 individuals of each of 7 species have been monitored. At the annual plant survival monitoring in October 2007, survival of the 7 species of native restoration plants ranged from 0% (graythorn, *Ziziphus obtusifolia*) to 60% (desert hackberry, *Celtis pallida*), with overall survival of the monitored sample at 44%.

It is too early to see significant data on changes in bird populations. Bird monitoring for avian diversity and abundance continues. Monitoring was done in April and July of 2005, April and August 2006, August of 2007, and April and July of 2008. Photo monitoring was done semiannually from November of 2004 to October of 2006 and then annually in October.

TUCSON AUDUBON SOCIETY MITIGATION ACCOUNT
FY 07/08: October 1, 2007 - September 30, 2008

	MITIGATION PROJECTS			Total for all Project Sites
	North Simpson Farm: Habitat Mitigation	Cochie Spring: Habitat Mitigation	Martin Farm: Habitat Mitigation	
FY 07/08 Beginning Balance (October 1, 2007)	\$351,914.49	\$47,399.94	\$287,765.05	\$687,079.48
Total Income from Additional Mit. Funds FY 07/08	\$225,570.00	\$0.00	\$0.00	\$225,570.00
WHM Copper Mountain SPE	\$210,000.00			\$210,000.00
Fidelity National Title Agency	\$7,020.00			\$7,020.00
KB Homes	\$8,550.00			\$8,550.00
Total Expenses FY 07/08	\$155,048.35	\$2,623.02	\$51,692.94	\$209,364.31
5% overhead allowance for new funds received in FY 07/08	\$11,278.50	\$0.00	\$0.00	\$11,278.50
Staff labor	\$118,482.75	\$2,517.50	\$46,047.50	\$167,047.75
Mileage	\$4,217.98	\$105.52	\$1,183.48	\$5,506.98
Equipment/materials/repair	\$19,042.13	\$0.00	\$3,258.38	\$22,300.51
Equipment rental	\$1,218.58	\$0.00	\$1,203.58	\$2,422.16
Fees	\$0.00	\$0.00	\$0.00	\$0.00
Electrical service to irrigation pumps	\$808.41	\$0.00	\$0.00	\$808.41
FY 06/07 Interest From Bank Accounts Prorated to Projects	\$10,261.60	\$1,058.81	\$5,583.40	\$16,903.81
Ending Balance end of FY 07/08 (as of 9/30/08)	\$432,697.74	\$45,835.73	\$241,655.51	\$720,188.98