



**AZCV
Habitat
Fund**

**Arizona Conservation Voters
Habitat Fund**

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Lisa Swanson
AZ Dept. of Water Resources
Water Protection Fund
500 N. 3rd Street
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4 November, 1999

Dear Ms. Swanson:

In accordance with our contract you will find enclosed a final report and maps showing both the location of gabions constructed and 4 plots of 30 acres each, seeded with native grass.

By combining sediment building gabions and grass planting we hoped to see significant reversal of erosional downcutting on the Puerto Cito Wash. These effects were almost completely dependent on rainfall. As will be noted below, depending on rainfall, our efforts bore mixed results, however it is only a matter of time before successful results are forthcoming.

GABION CONSTRUCTION AND RESULTS

Siting

The Puerto Cito Wash was reconnoitered by a team of BANWR staff, Habitat Fund Staff, a hydrologist and ecological restoration specialist. Subsequent to this initial survey, sites for the gabions were established by determining the slope of the channel and suitability of the channel width and walls for gabion establishment.

Permitting

Task 1 -complete

A state section 401 Water Quality Certification was obtained from ADEQ and forwarded to the Army Corps of Engineers to obtain a Nationwide Permit number 26 under Section 404 complying with the Clean Water Act. The State Historic Preservation Office then cleared the project, finding compliance.

A special use permit was issued by the BANWR for this project.

Construction and Repairs

Task 2 - complete

Our contract called for the construction of two large gabions on the Puerto Cito Wash within the boundaries of the Buenos Aires National Wildlife Refuge. Additionally, we completed planting four 30-acre areas with native grass seed.

Construction of the two large gabions began on March 8, 1997. The first and largest gabion (approx. 170 feet in length and 9 feet wide at the base) was completed during 5 successive weekends of work by our volunteers. A third tier of gabion baskets was added in the Fall of '97 to increase the height of the structure and add potential sediment deposition potential. Subsequent to the initial construction of the two gabions, we revisited the structures in an effort to further protect them against heavy monsoon rainfalls by "armoring" the walls on the upstream sides of the gabions.

Construction on the second gabion (approx. 70 feet in length) was begun on 5 April and work completed, after 3 weekends, approximately June 1, 1997.

Initial construction involved first excavating a trench then laying a mat of "geo-cloth" to underlie the structure. Gabion baskets of various dimensions were then hand-filled with rip-rap (medium sized rocks) by volunteers and tied together with "hog-rings" using a pneumatic device. A total of 1,000 cubic yards of rock was utilized for both gabions.

Two hundred thirty five volunteers participated over the initial five week period and subsequent additional weekends during total construction, several of these individuals donating more than one weekend of their time. A total of 1,231 person-hours of work was provided by our volunteers in construction of the two gabions.

Results

The objective of gabion construction is to allow sediment to build on the upstream side of the gabion thus contributing to the healing of the down-cut wash. With sediment deposition, vegetation should increase as a result of increased surface water availability.

The largest gabion, located closest to the beginning of the Puerto Cito Wash has received very little deposition due to the relatively lower amounts of flow at the beginning of this watershed. The lower or smaller large gabion received considerable flows and some deposition, although it experienced a "blow-out" in the Summer rains of 1999 as a result of very heavy flows. This gabion would probably have completely filled in with sediment had it not been for the severe damage inflicted by heavy flows. Repairs to the smaller gabion will be done over the winter, including additions to reinforce it against future Summer flows.

Photographs

Large gabion – photographs provided to WPF at the end of April, 1997

Second large gabion – photographs provided with first quarterly report, 20 May, 1997.

NATIVE GRASS PLANTING

Task 3 -complete

Originally, four 30-acre plots were scheduled to be planted as follows: Summer '97, east side of second largest gabion; Fall '97, west side of second largest gabion; Summer '98, east side of largest gabion; and Fall '98, west side of largest gabion. Because the native grass species involved (see below) are all Summer germinators dependent on Summer monsoon rains, we modified this schedule to plant the west side of the largest gabion in the Summer of '99 instead of Fall of '98.

Species Planted and Planting Technique

A large variety of native grass species were utilized in this part of the project. We were able to procure a number of species and believed that this would be beneficial to the project since there was no data to indicate which species would be most successful. Using a large number of species therefore maximized the probability that at least some would gain a foothold. All 30 acre plots were planted by hand broadcasting seed except the first plot which included discing the area with a tractor and discing implement. This technique was abandoned in subsequent plots as too labor intensive for expected marginally increased results.

Following is a list of those species we planted:

- Blue Grama
- Sideoats Grama
- Black Grama
- Sprucetop Grama
- Hairy Grama
- Rothrocks Grama
- Alkalai Sacaton
- Sand Dropseed
- Giant Dropseed
- Plains Lovegrass
- Green Sprangletop
- Arizona Cottontop
- Cane Beardgrass
- Mesquite Vine grass

Results

East Side of Second Largest Gabion

This 30-acre plot was planted between May 10 and July 20, 1997. Altogether, 57 individuals participated for a total of 593 person/hours. Rains for the Summer of 1997 began well and there was sufficient moisture for considerable germination. Subsequent to the first rain or two very little

precipitation was experienced and many of the young seedlings succumbed to drought. Among the species doing the best, actually producing seed were: blug grama, sideoats grama, and Arizona Cottontop. Some of these plants persist to date and are reseeding naturally.

West Side of Second Largest Gabion

This plot was planted in the Fall of '97 and the following Summer's rains produced low germination due to the extended time between planting and natural germination season. It was decided after this to plant only immediately prior to the onset of Summer rains. Twenty three volunteers participated contributing 81 person/hours of time.

East Side of Largest Gabion

The third plot of 30-acres was planted in late June and early July '98 with 39 volunteers participating for a total of 82 person/hours. Because of heavy winter (El Nino) rains soil moisture was higher than usual and summer rains were also heavy resulting in the best germination and survival rate of all plots to date. Large numbers of several species survived to produce seed and persist into future seasons.

West Side of Largest Gabion

The final plot of 30-acres was planted between 26 June and 10 July, 1999. Twenty five volunteers contributed 75 person/hours. Heavy Summer rains again produced a bumper crop of native grass seedlings many reaching maturity to persist and re-seed in future years. Because of the terrain, only Rothrocks Grama and Sideoats grama were planted.

Photographs

Hand broadcasting native grass seed – Photographs with 10th quarterly report, 4 September, 1999.

Baseline Monitoring

Task 4 – complete

Staff at the BANWR have satisfied this task as required.

Post-Construction Monitoring and Data Analysis

Task 5 – complete (with final report from BANWR staff)

Sally Gall, refuge biologist, has taken over this work and replaced Bill Kuvlesky. Report should be imminent.

Post-Construction Maintenance Agreement

Task 6 – complete

Agreement was drafted, signed by BANWR and the Habitat Fund and forwarded to WPF

Quarterly Progress and Final Report

Task 7 – complete

With this report, the final report, task seven has been completed.

CONCLUSION

Overall the project was successful in establishing gabions which will function well now and in the future. While the uppermost (largest) gabion has received little sediment deposition due to low flows, the lower or smaller gabion has received a modest amount of deposition and remains in need of repair due to heavy flows in the Summer of '99.

One of the objectives of the project (in addition to healing the wash) was to increase vegetation on the upstream sides of both gabions. Design of the project did not allow for the length of time needed to “fill-in” the upstream sides with sediment. This is especially true of the uppermost or largest gabion. An exceptionally wet year in the headwaters of the watershed will eventually result in the largest gabion filling in. Because of the length of time needed to accomplish sediment deposition in this desert savannah grassland, vegetation monitoring is of little use until that time, except to establish a baseline for comparison with post-deposition conditions.

Originally, native grass planting was seen as an integral part of the gabion/increased vegetation design. Because of the low rate of sediment deposition it is best viewed as an additional objective, significant on its own and unrelated to gabion/wash restoration, except as a precursor to ensure that increased vegetation, over time, includes native species.

While a project of this dimension necessarily includes numerous small obstacles and problems, only one significant problem was encountered during the entire project. The State Historic Preservation Office has no structured procedure for clearing projects and therefore project leaders are at the mercy of a sometimes capricious system. At the beginning of this project we believed we had procured clearance from SHPO only to find out two days before the project was scheduled to begin (with approx. 50 volunteers scheduled to arrive) that they were not satisfied. In order that the project could go forward as planned (numerous preparations had been made and cancellation would have been disastrous) the U.S. Fish and Wildlife Service had to fly an archaeologist in from Albuquerque, NM on an emergency basis. We strongly recommend to future WPF participants that all conditions of compliance with SHPO be in writing. We had relied on a verbal clearance since SHPO seems not to have any structured procedure whatsoever – a big mistake!

We found the staff at WPF friendly, courteous and always able and willing to help. We sincerely appreciate their attitude of helpfulness and offer our thanks.

Sincerely,

Robert R. Beatson
Director, Arizona Conservation Voters Habitat Fund