

FUNDING SOURCES

A major portion of the funding for this project (60%) was provided by the Environmental Protection Agency (EPA) through the Arizona Department of Environmental Quality (ADEQ) with a Water Quality Improvement Grant. This Water Quality Improvement Grant focused on reducing the amount of sediment, a non-point source pollutant that was degrading water quality in the San Simon River of the Gila River system.

*Federal partners in this project included the Bureau of Land Management (BLM) and the Natural Resources Conservation Service (NRCS). Although their contributions were significant, they will not be focused on in this report and **were not** used as part of the matching contributions required on this grant.*

Non-federal contributions came from a variety of sources including: Tucson Electric Power, Arizona Department of Transportation (ADOT), The Desert Technologies Engineering, The Gila Watershed Partnership, Hackberry Ranch, Graham County, various individuals and the grantee, Coronado RC&D)

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I. ABSTRACT

The San Simon River is a tributary of the Gila River in southeastern Arizona. The Valley of the San Simon is used primarily for grazing, hunting and recreation. It was intensely over grazed in the early 1900's leading to erosion that has created a fragile ecosystem that has been a rehabilitation and management concern since.

The San Simon River was once a perennial stream but now only runs during times of heavy precipitation events. During these events, areas in the uplands that have never recovered fully from the early 1900's condition have little vegetation or soil structure to allow moisture to penetrate or halt erosion. Water flowing off of these areas in storm events begins as sheet erosion and rapidly gathers in rills that lead to large gullies near the river. This erosion cycle creates the dynamics that are a continual cycle that makes natural recovery of the ecosystem an extremely long process.

This project focused on a road adjacent to the San Simon River that was an extreme trouble spot that was contributing significantly to the erosion and sediment problems of the area. This fourteen-mile stretch of road runs parallel to the San Simon River and is separated from it by a single railroad track. Under these tracks are five trestles that funnel and concentrate stormwater runoff into the river. The road is heavily used for recreation in the area and is a utility road for the Hackberry Ranch. Heavy use and erosion caused by runoff from the uplands rendered the road impassable causing recreational users to begin creating wild cat roads by driving across the uplands which in turn destroyed vegetation and created more channels for run off.

To address the erosion problems and increased sediment production in the area, a project team was formed. Pete Brawley of the Hackberry Ranch, staff from BLM and NRCS, Jerry Matlock, PE, and members of Coronado RC&D, Graham County and the local watershed group met to address the issue. They developed a plan that included the rehabilitation of the road by installing gabions that would stabilize gully erosion that was cutting through the road. In addition, they would resurface the road to discourage off road travel and reduce sediment produced by the road itself. Upland management would be increased by the use of cattle guards to eliminate the concern with recreation users leaving gates open.

The project was funded with an EPA/ADEQ Water Quality Improvement Grant in February of 2001. Dave Henson, Thatcher High School Biology Instructor was contracted to monitor the effectiveness of the practices installed and work began.

Jerry Matlock of Desert Technologies provided the engineering. Pete Brawley performed the site supervision. The grant funding was used for materials, a portion of the labor and equipment rental. Gabion construction which consists of constructing wire baskets, filling them with rocks and placing them in eroded sites is labor intensive. At the conclusion, forty-three gabions were installed. While gabions were being installed, fourteen miles of road was being resurfaced with gravel provided by Graham County and the Bureau of Land Management and cattle guards provided by the Arizona Department of Transportation were being installed. At the conclusion of the project, the road is stable and producing less sediment as reporting in the monitoring appendix of this report.

II. PROJECT GOALS/OBJECTIVES AND METHODOLOGY

A. PROJECT GOALS

The primary goal of this project was to reduce sediment entering the San Simon River

B. OBJECTIVES

In order to reach the goal of reducing sediment reaching the San Simon River, the project team decided to focus on a fourteen mile stretch of road parallel to the River that eroded significantly with each rainfall event. The objectives and actions they identified are as follows:

1. Reduce gully erosion by stabilizing channels that cross the road with gabions.
2. Reduce sediment produced by the road itself by resurfacing it, reducing the amounts of small particles available to erode with run off.
3. Reduce erosion on the uplands by reducing wild cat roads through stabilizing the road and making it passable.
4. Improve upland pasture management through the installation of cattle guards that allow recreation users to pass without dealing with gates.
5. Monitor the cost and effectiveness of these practices to control non-point source pollution.

C. METHODS

Permits, Clearances, and Authorizations

The project area was located entirely on Bureau of Land Management (BLM) land. BLM staff did the required archeological survey for all areas that were to be disturbed by project activity. This consisted of the roadway itself and a forty-foot strip on either side. No significant sites were found in this area.

Gabion Construction

Gabions were constructed using 14-gauge v mesh wire that was purchased in 165-foot rolls. These rolls were cut into the lengths needed and formed into a narrow rectangular sturdy basket by hand. They were then hauled to the site where a keyway was dug with a backhoe across each of the gullies to be treated. Each keyway was a narrow trench the same width of the wire basket and half the depth of the basket.

The baskets were then placed snugly into the keyway and filled with well graded rock with a 6 inch and under diameter and wired shut with heavy hog rings. Each gabion was back filled around and tamped down to

ensure that there was a stable foundation that would not move with the force of the flowing water.

In addition, the gabions were armored for a distance of three feet downstream to protect against eddying created by water running over the gabion. Brush was placed in channels both upstream and downstream of the gabions to slow water flow and aid in sediment deposition on site.

The labor for making, placing, filling and tying the baskets was all done by hand. Graham County provided the rock and placed it near the gabion sites to minimize hauling and labor. A front-end loader was used to move the rock and place some of the rock in the baskets. A pickup and trailer was used for hauling gabions and larger rocks. Other items of equipment used were heavy gloves, wire cutters, chain saws, and shovels.

Road Resurfacing

Fourteen miles of access road had been badly degraded by erosion and was impassable in some areas causing recreational users to create wild cat roads across the surrounding areas. The road itself had soils that were composed mainly of fine particles giving drivers the concept of driving through talcum powder. These soils moved easily when water flows crossed them, contributing to the sediment problem.

Graham County and the Bureau of Land Management provided gravel to rebuild the base of the road and additional gravel to for the surface. They hauled material to the site and placed it on the road. Pete Brawley of the Hackberry Ranch provided the grader and operated it to bring the road to grade.

Upland Management

The Arizona Department of Transportation and the Arizona Game and Fish Department provided seven cattle guards to aid in livestock management in the watershed. Livestock had been difficult to manage in this area due to the heavy use by recreationists that continually left gates open allowing cattle to move to pastures that were not in their rotation. Cattle guards were installed with financial assistance from Tucson Electric Power and labor from the Hackberry Ranch. These allow access to these lands without interfering with livestock management.

III. RESULTS OF PROJECT

A. Best Management Practices Applied

1. 56 Gabions installed
Gabion installation slowed runoff in main channels allowing sediment to settle out behind them. Using the Revised Universal Soil Loss Equation (RUSLE) for prediction of soil loss due to water erosion, an estimated 2.4 tons of sediment was trapped behind the gabions.

2. 14 miles of road resurfaced

Artesia Road intersects with US Highway 191 ten miles south of Safford, Arizona. This project is located along Artesia road five miles east of this intersection where it turns south and parallels the San Simon River. Concerns for the road condition were trifold. It was heavily traveled by recreational users and conditions had created both an erosion problem and safety concern. In addition, when the road was not passable, users drove across rangeland creating new roads that accelerated erosion. This project addressed the road condition by resurfacing 14 miles of badly degraded road. The project monitoring report included as an appendix gives an analysis of the change in sediment after practice implementation.

3. 7 cattle guards installed

Cattle guards were donated by the Arizona Department of Transportation (ADOT) and installed by the BLM and Hackberry Ranch to aid upland management surrounding the treatment area. The area is BLM land that is heavily used for recreation, which created a management concern with gates that were left open. Cattle guards in place allow access to the area while controlling cattle movement.

B. Outreach

1. 2 field training days for the public conducted
A field day was held for the local watershed group and other partners at the project onset in conjunction with a meeting of the technical team. Participants were able to see the current condition of the road and the impacts of the erosion on the area adjacent to the river. (15 participants)

A follow up field day was held on February 8, 2003 as a follow up to the project completion. The twenty-five participants on this tour learned how gabion sites were selected, how they were

constructed, and were able to see the sediment that had been trapped by each of them.

2. 2 displays developed and used in 5 areas
Coronado RC&D and the Gila Valley NRCD developed two pictorial displays of the project that illustrated the problem, proposed solution and project activities. ADEQ was credited as the funder on all the displays. These displays were used at the Arizona Association of Conservation Districts Annual Conference in Flagstaff, August 2002, the lobby of the USDA building in Safford, Graham and Greenlee County Fairs in 2002 and the US/Mexico Border Coalition Conference in January 2002. (Number of people reached: 950)
3. 1 power point presentation developed and presented 4 times
A power point was developed and submitted with a quarterly report. This presentation was given to the local watershed group, Gila Valley NRCD, Coronado RC&D Council, Graham County, and zone 8 Conservation Districts. (Number of people reached: 46)
4. 12 students trained on field research methods (see monitoring report)
5. 6 newsletter articles developed and circulated
The Coronado RC&D area has a newsletter circulation of 1200 individuals. In addition to the Coronado newsletter, two articles were published in the Gila Valley NRCD newsletter and the Gila Watershed Partnership and one article circulated in Dan Salazar's monthly email watershed report.
6. 2 brochures developed
These were developed and submitted with quarterly reports. These brochures were used as information handouts at watershed, RC&D, Conservation District meetings and County Fairs and field days.

C. Monitoring

Actual monitoring results are summarized in a separate report submitted as Appendix A to this final report.

IV. IMPLICATIONS AND RECOMMENDATIONS

This project has had a positive impact on the erosion concerns along this reach of the San Simon River. It is a durable project that should be in place with a minimum amount of maintenance each year. The technology is simple and straight-forward and can be applied by laymen.

However, the project is labor intensive and requires a large commitment in time. If material for constructing gabions is not readily available such as in this case, they will need to be purchased or donated and hauled in. Because of the cost and labor factors, this makes this project more applicable to a smaller area.

Gabions if placed properly should require a minimum of maintenance. If road resurfacing is included as part of the project, costs accelerate due to the requirement for heavy equipment and additional materials that require hauling. Maintenance of road management practices also requires the use of heavy equipment. Landowners that have access to this equipment could more easily handle this phase of a project. Those that do not have access could develop relationships with neighbors and the counties.

A key factor of this project was that it created an awareness of non-point source pollution. During this project, we discovered that most people do not think of the erosion potential of degraded roads and the impacts of sediment. More of a concern was the impassability and safety. Through working with the public, and allowing them to see the project as it moved along, it brought a focus on the need to address these types of non point source pollution.

V. FISCAL SUMMARY

VI. APPENDICES AND ATTACHMENTS

A. MONITORING REPORT

B. PROJECT SITE MAP

C. OUTREACH

Photos from final project tour- February 8, 2003

Materials developed

GILA VALLEY ROAD SEDIMENT CONTROL PROJECT

Coronado RC&D
MATCH REPORTING SCHEDULE-FINAL REPORT
 GRANT AWARD CONTROL # 2-009
 For the Period of: 01/01/03-02/28/03

ADEQ Payments made this period: \$6,934.24

FEDERAL EXPENDITURES - (CASH)

Account Title	BUDGET	CURRENT EXPENDITURES	CUMULATIVE EXPENDITURES	BUDGET REMAINING
Salaries	\$17,548.74	\$0.00	\$ 17,548.74	\$0.00
Fringe Benefits	\$0.00	\$0.00	\$ -	\$0.00
Indirect Costs (10% max)	\$5,200.00	\$433.00	\$ 5,200.00	\$0.00
Travel	\$0.00	\$0.00	\$ -	\$0.00
Mtrl/Supp/Postage	\$8,340.00	\$21.37	\$ 8,340.00	\$0.00
Other svc.	\$30,311.26	\$3,521.08	\$ 30,289.89	\$21.37
SUB-TOTALS	\$61,400.00	\$3,975.45	\$ 61,378.63	\$21.37

Match Expenditures - (CASH & IN-KIND)

Account Title	BUDGET	CURRENT EXPENDITURES	CUMULATIVE EXPENDITURES	BUDGET REMAINING
Salaries	\$ 17,683.00	\$ 4,880.00	\$ 23,818.07	-\$6,135.07
Fringe Benefits	\$ -	\$ -	\$ -	\$0.00
Indirect Costs (10% max)	\$ -	\$ -	\$ -	\$0.00
Travel	\$ 550.00	\$ -	\$ 814.09	-\$264.09
Mtrl/Supp/Postage	\$ 2,650.00	\$ -	\$ 3,560.53	-\$910.53
Other svc.	\$ 20,050.00	\$ 9,935.68	\$ 29,659.64	-\$9,609.64
SUB-TOTALS	\$ 40,933.00	\$ 14,815.68	\$ 57,852.33	-\$16,919.33

TOTAL EXPENDITURES FOR PERIOD:	BUDGET	CURRENT EXPENDITURES	CUMULATIVE EXPENDITURES	BUDGET REMAINING
01/01/03-02/28/03	\$102,333.00	\$ 18,791.13	\$ 119,230.96	-\$16,897.96

I hereby certify that this report is mathematically correct, has not been previously reported, and to the best of my knowledge and belief is a legal and proper claim against the Grant Award. I further certify that back-up documentation (including time sheets, logs, schedules, etc.) is maintained in accordance with instructions contained in the Grant Award.

Signature

Date