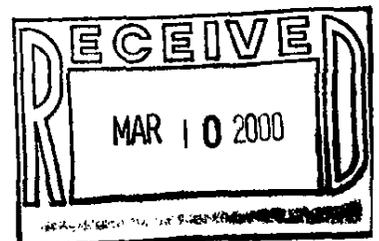


**FINAL REPORT**  
**Bayou Dorcheat Water Quality Demonstration Project**

**March 6, 2000**



**Sponsored by**  
**Dorcheat Soil and Water Conservation District**



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## INTRODUCTION

In FY 1995, the Dorcheat Soil and Water Conservation District, with assistance from the USDA's Natural Resources Conservation Service (NRCS), submitted a request to the Louisiana Department of Environmental Quality for a Section 319 Clean Water Act grant to reclaim an abandoned surface mine for educational/demonstration purposes.

Approximately 30 operating units, averaging 100 acres each, contributed to the degradation of the water quality in the proposed project area. Typical soils in the area are highly erodible in nature and have slopes of from 3 to 8 percent. Soil is lost at rates exceeding 50 tons per acre following clearing and excavation activities.

To support the request, the Dorcheat District reported that the site to be addressed was located at Yellow Pine community south of Minden in Webster Parish, Louisiana. It consisted of an abandoned gravel pit of approximately 20 acres that had not been actively used in five years. Severe erosion problems resulted. No improvements of any kind had been made to the area since abandonment and water quality was extremely compromised by active erosion.

Water quality downstream, in the area designated as water quality basin 1005 and sub-basin 100502, was being effected. The project area was located 0.5 miles from Lake Bistineau which is used for recreational purposes, including fishing, boating, camping, skiing, swimming, and other outdoor activities. Many permanent residences surround the lake.

Lake Bistineau presently meets its full degree of support. Bayou Dorcheat, a scenic stream, from the Arkansas state boundary to Lake Bistineau partially meets its degree of support. One of the suspected sources of impact is surface mining, as cited by the 1992 Water Quality Inventory, Section 305 (b). Information afforded by the installation of a water quality demonstration project was expected to be useful in effectively treating similar situations throughout the sub-basin.

## **PROBLEM STATEMENT**

**The Nonpoint Source Assessment Report shows that surface mining covers about 777,355 acres in northwest Louisiana approximately 30 miles south and southeast of Shreveport. Water quality subsegments 100501 and 100601 describing Bayou Dorcheat and Bayou Pierre are only partially meeting their designated uses. DEQ has shown that surface mining is one of the suspected landuses in the area that contributes to these water quality problems.**

**Bayou Dorcheat originates in Arkansas and flows southward through Webster Parish, emptying into Lake Bistineau. It is designated as a scenic stream having a channel length of 46 miles. Elevations along the scenic reach range from 141 to 185 feet above mean sea level. The gradient is variable along this area, but the mean gradient is 1 foot per mile. The total drainage area is 1,442.8 square miles and the drainage area within Louisiana is 634 square miles. River discharges near Springhill and Minden, located within the scenic reach, average 548 cubic feet per second and 1,111 cubic feet per second, respectively. Mean annual precipitation is 49 inches, with a mean annual runoff of 13.75 inches, as measured at Minden.**

**Surface mining in the proposed project area is still an active industry and has a potential for expansion to new sites. Acceptably high water quality in the lakes and streams located in the area are threatened by the potential increase in siltation and suspended solids.**

## OBJECTIVES

The 20-acre abandoned surface mine site would be treated to reduce active erosion. Improvements would be planned that would reduce impairment to water quality, including water control structures and vegetative plantings and coverings to improve water quality and to facilitate management for wildlife habitat.

Installed improvements will be used to demonstrate improvement to water quality, increase wildlife habitat, and protect the resource base. Local governmental units, forest industries, and educational units, as well as civic groups and interested individuals will be invited to use the demonstration site. They will be encouraged to use the information obtained from the demonstration project for treatment of similar sites throughout the sub-basin.

Conservation measures applied at the site were:

Critical area planting.....	5 acres
Diversions.....	900 feet
Grade stabilization structure.....	2
Grassed waterways.....	0.5 acres
Mulching.....	5 acres
Wetland restoration and development.....	15 acres
Wildlife wetland habitat management.....	3 acres

These practices, as well as administrative duties, timekeeping, and project representation, were cost-shared by Louisiana Department of Environmental Quality, Environmental Protection Agency, and the Dorcheat Soil and Water Conservation District at a 40% - 60% responsibility ratio. In-kind services were provided by the District.

The measure of success for the project included reduction in the impairment of water bodies contingent to the project site, improved wildlife habitat, and use of the site for educational conservation tours. Included will be qualitative estimates on the reduced nonpoint source loadings from the best management practices utilized in the demonstration project and results of BMP implementations as a result of the conservation tours. The results of the project will be determined by Louisiana Department of Environmental Quality, the USDA Natural Resources Conservation Service, and Dorcheat Soil and Water Conservation District. Quarterly reports, photographs, and progress reports were submitted by the Dorcheat District.

## METHODS

Technical assistance obtained by the Dorcheat District from USDA Natural Resource Conservation Service produced a demonstration project that would implement best management practices on a 20-acre plot of land which has been abandoned for 5 years and has extensive erosion problems. No improvements had been made to stabilize the active erosion which contributes to the sedimentation problems in the bayous and in Lake Bistineau.

The abandoned surface mined area was treated to reduce to reduce active erosion that was occurring. The actual drainage area was approximately 27 acres, including 7 acres of pasture upstream of the surface mined area and 20 acres in the surface mined area. The drainage area was divided into 5 parts to ease erosion and delivery calculations. They include:

1. 7 acres of pasture on a Malbis, fine sandy loam, 1-3 percent slopes.
2. 12.3 acres of gravel pit bottom on a Gore, silt loam, 5-12 percent slopes, subsoil exposed.
3. 2.0 acres of gravel pit bottom on a Gore, silt loam, 5-12 percent slopes, subsoil exposed, permanently covered by water.
4. 5.5 acres of top bank area on a Gore, silt loam, 1-5 percent slopes, subsoil exposed.
5. 2,500 linear feet of classic gully, averaging 10 feet in depth and sloughing off at a rate of 4 feet per year along its entire length. This area is approximately 0.2 acres in size and is also on a Gore, silt loam subsoil varying slope percentage.

By applying the USLE to the first four areas listed above, calculations of sheet and rill erosion rates in ton per acre per year can be made. The USLE is expressed as  $A=RKLS\overline{C}P$  where:

A=soil loss in tons per acre

R=rainfall factor

K=soil erodibility factor

L=length of slope

S=slope steepness factor

C=cover factor

P=support practice factor

Estimating erosion along the gullied area was done by calculating the weight of the volume of soil lost annually along the face of the gully. This was done by multiplying the volume of soil (ft<sup>3</sup>) by the known weight of the soil (lbs/ft<sup>3</sup>). The total amount of soil being eroded on the 27-acre drainage area at the time (before treatment) was approximately 4,470 tons annually. By applying the sediment delivery ratio for a watershed of that size (0.33 for 0.5 mi<sup>2</sup>), it is estimated that 1,475 tons of sediment will be delivered off-site. It is approximately 3000 feet along an intermittent creek branch from the point where sediment leaves the surface mined site to Brushy Creek. Brushy Creek joins Bayou Dorcheat and Lake Bistineau approximately 1 mile west of the site.

Best management practices were implemented to reduce the rate of sediment delivered to Brushy Creek. Water control structures and vegetative plantings were installed to improve water quality and to facilitate management for wildlife habitat. Vegetative plantings included species conducive to wildlife management and native plant species. Installed improvements were used to demonstrate improvement in water quality, increase wildlife habitat, and protect the resource base. Information from this demonstration project will be used in treatment of similar sites within this watershed and other watersheds in the Red River Basin which have surface mining problems similar to these.

Structural practices used in controlling erosion at the site were:

**Critical area planting**—planting vegetation such as trees, shrubs, vines, grasses, or legumes on highly erodible or critically eroding areas. The purpose of critical area planting is to stabilize the soil to reduce damage from sediment and runoff to downstream areas, and to improve wildlife habitat and aesthetic resources.

**Grassed waterways**—a natural or constructed channel that is shaped or graded to required dimensions and established to suitable vegetation for the stable conveyance of runoff. The purpose of grassed waterways is to convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.

**Grade stabilization structure**—a structure used to control the grade and head cutting in natural or artificial channels. The purpose of grade stabilization structures is to control erosion in natural or artificial channels, to prevent the formation or advance of gullies, and to enhance environmental quality and reduce hazards.

**Diversion**—a channel constructed across the slope with supporting ridge on the lower side. The purpose of a diversion is to divert excess water from one area for use or safe disposal in other areas.

**Mulching**—the use of loose organic materials such as leaves, hay, straw, or chips around disturbed soils and plants. The purpose of mulching is to prevent

**evaporation of moisture, stabilize slopes, and slow the erosive effects of water on soils.**

**In addition to implementation of best management practices, the Dorcheat SWCD conducted, and will continue to conduct, educational tours of the project site. It is expected that the use of BMP's into other areas of that have water quality problems associated with surface mining will be encouraged.**

**The Louisiana Department of Environmental Quality has three water quality monitoring stations in Bayou Dorcheat and Bayou Pierre which can be used to determine if water quality improvements are sufficient to determine sources of existing water quality problems and improvements because of project implementation. Post-project evaluations will also be conducted to calculate the actual reductions in levels of sediment delivered to the Brushy Creek because of best management practice implementation.**

## RESULTS

Dorcheat Soil and Water Conservation District recognized a need for addressing the problem of abandoned surface mines in its Webster Parish area. Approximately 10,000 acres of the parish have been mined and abandoned to date. These mines adversely impact the water quality of the area, and the District wanted to provide an example of the feasibility of repairing, maintaining, and utilizing lands formerly unproductive and detrimental to water quality.

Ms. Cindy Beard, a landowner located at Yellow Pine community within the District, agreed to having her 20-acre abandoned gravel pit used as the demonstration site. Ms. Beard is an employee of the Natural Resources Conservation Service.

Ms. Jan Boydston of the Louisiana Department of Environmental Quality was shown the site selected for reclamation on August 9, 1995 by Mr. Kenneth Beatty, Dorcheat SWCD's Project Representative and Jeff Anders, District Technician. Dating from 1995 to 1996, several visits to the site were made by engineering specialists with the NRCS, the District's conservation partners. A draft plan of work for the project was submitted to DEQ prior to April, 1996.

On December 2, 1996, the Dorcheat Soil and Water Conservation District received copies of a contract between the Louisiana State Department of Environmental Quality, acting as agent for the Environmental Protection Agency, and the District for implementing Resource Extraction Demonstration Project CFMS# 513455.

Funds granted for the project totaled \$27,375.60. The Dorcheat District was to provide \$18,250.64 in-kind services to the project, which, as stated in the contract was to commence on January 15, 1997 and terminate on July 1, 1998.

Soil samples were taken at the site on May 16, 1997 and sent to LSU's soil testing lab to determine soil amendments needed and the nature and capabilities of the soils located at the work site. The sampling was overseen by Wayne Kilpatrick, Resource Soil Scientist and Steve Nipper, Water Quality Specialist with Natural Resources Conservation Service.

Mr. Wayne Laraway and Mr. Jimmy Lyles visited the District's board of supervisors in November and December, 1997, respectively. Mr. Laraway's company offered materials to be used as fill material at the site, while Mr. Lyles offered his company's expertise in working with other such sites. Both offers were refused by the landowner due to cost.

After some lengthy delay due to increased workload from the EQIP, CRP, and various other federal programs administered by the NRCS, technical work was begun in earnest on many facets of the project. Randy Thomas, NRCS Soil Conservation Technician and Leslie Hollis, District Conservationist initiated the engineering concerns with Danny Martin, NRCS Civil Engineer. Mr. Martin prepared schematics for installation of the diversion area and for the spillway and pipe installation at the new levee site.

In the office, Twyla Moore, the District's office manager, who was formerly a draftsman and commercial artist, prepared engineering maps and schematics and painted the sign denoting sponsoring agencies as required in the District's contract. The official placement of the sign on March 24, 1998 provided an opportunity for news releases explaining the project to the public. Twyla was responsible for all news releases and media publications, and had been taking archive photographs of the site since February 21, 1995.

Twyla prepared timekeeping and reporting documents for those engaged in working on the project through the District. She created computer forms and kept up with hours spent in planning and communications, as well as other work on the project. She prepared all invoicing documents and quarterly reports for approval by the District's board of supervisors.

Preparation of the District's contract bid packets was begun in December, 1998 in anticipation of suitable spring or summer weather for beginning construction at the site. Twyla prepared the contract and the individual bid packets and submitted the bid advertisement to the local media upon its approval by the board of supervisors in early April, 1998. An extension of the DEQ/District contract was requested and granted that month also.

A site-showing was held for bidders on May 22, 1998, as bids were advertised on May 12, 1998, but extended to June 4 to clarify questions from bidders. NRCS technical advisors addressed the questions and a bid was selected by the District on July 1, 1998. The contract was signed by Blazer Construction and the District on July 14, 1998. Work commenced immediately.

Progress photos were taken during the construction at the site for the slide presentation planned in conjunction with the educational tours upon completion of the project and to submit with reports to contract monitors at DEQ. The work was completed, with the exception of planting certain areas, and invoicing submitted on August 10, 1998.

Extensive damage to the project site was incurred in early February, 1999 due to prolonged, heavy rains of about 8-10 inches in a two-day period. A deep gully eroded on the spillway end of the dam site on the newly constructed levee, rendering it useless as a demonstration project. With permission from the DEQ, funds not used in the construction phase of the project were provided to repair the damage.

**Blazer Construction, who did the original construction on the project, completed the repair work satisfactorily in March, but chose not to do the planting prescribed in the contract. Steve Nipper arranged to have East Texas Plant Materials Center provide plants for the project instead. The \$700 allotted in the contract for Blazer's planting was requested as a donation to ETPMC, who provided plants valued in excess of \$1800. District, ETPMC, and NRCS staff members installed the plants on February 18, 1999. News articles were submitted to the local media and DEQ contract monitors.**

**In preparation for the first of the seven required educational tours, a small amount of top soil and fertilizer was purchased for use at the site to fill small gullies and rills and to strengthen the grass cover established on the north slope of the site. The landowner spread the soil and fertilizer and mowed the area. She had also installed culverts in the road at her own expense to make access to the site easier.**

**Early in 1997, Twyla presented an overview of the project to 22 Webster Parish teachers attending a Project WET (Water Education for Teachers) workshop to acquaint them with water quality education resources available in the parish. She also spoke with 28 teachers accompanying the 700-750 students attending Forestry Awareness activities in Webster Parish and 24 teachers accompanying the 500-560 students in Claiborne Parish's Forestry Awareness activities. These teachers were invited to bring students to the demonstration site in conjunction with their water quality education in outdoor classrooms. Contacts were made in two consecutive years, 1998 and 1999.**

**The first educational tour was held on July 18, 1999 for the Claiborne Parish 4-H Junior Leaders. The young people were shown the slide presentation in the NRCS office and taken to the site afterward. The second tour was scheduled for members of the Environmental Science classes of the Northwest Louisiana Vocational Technical School in Minden, at the request of teacher, Mrs. Loretta Powell, for her students pursuing educations in environmental management and consulting fields on October 5. The presentation was shown at the school and students visited the site afterward. A request from Riverdale Academy's second grade teacher whose husband is an adjoining conservation district's supervisor, provided the third tour. The youngsters brought sack lunches on the bus tour that followed the slide presentation and conservation talk given by Twyla Moore and Wayne Kilpatrick at the classroom on October 6. The Area I Resource Management Unit, a group of NRCS specialists convened at the Minden field office on October 15 to see the slide presentation and visit the project site. A video of the site was made at this fourth tour. October 28 was the date for supervisors of surrounding districts and DEQ guests to attend the education tour. The landowner, Cindy Beard was on hand to express her appreciation and satisfaction at the outcome of the project. Mr. Kenneth Beatty, project representative for the Dorcheat SWCD welcomed the guests and gave the program presentation to Twyla Moore and Robert Austin, the NRCS's District Conservationist. A tour of the site ended the fifth tour. The sixth,**

**seventh, and eighth tours were conducted for Mr. Spencer Owens' Central Junior High's seventh and eighth grade science and agriculture classes. Mr. Owens is an excellent environmental science teacher with whom the District has worked for some years. These three classes attended the slide presentation at the school and made separate bus trips to the site. Subsequent tours are planned for the Haynesville Garden Club, the Webster Parish Water Alliance, and others.**

**The project has produced a successful medium for presenting conservation education to the public. It has enhanced the water quality of the area in which it is located, and it has afforded the District with an ally in protecting its natural resource base in working with other agencies, such as the Environmental Protection Agency, Louisiana Department of Environmental Quality, East Texas Plant Materials Center, and our conservation partners, Natural Resource Conservation Service. The project landowner is pleased with the completed product and supportive of the site's use as an educational tool.**