

**TEXAS STATE SOIL AND WATER CONSERVATION BOARD
NONPOINT SOURCE SUMMARY PAGE
FY 01-21 CWA §319(h)**

1. **Title of Project:** Maintaining Sediment Prevention through Repair of Floodwater-retarding structures in McCulloch County.
2. **Project Goals/Objectives:** (1) To provide coordinated assessment between the TSSWCB, the McCulloch SWCD, and USDA-NRCS, with respect to implementation, and restoration of water quality in the Brady Creek and Deep Creek Watersheds located within McCulloch County. (2) Repair floodwater-retarding structures in McCulloch County. (3) To compile information on the repair success concerning the floodwater-retarding structures.
3. **Project Tasks:** (1) Program Coordination with Project Participants, (2) Development of a Quality Assurance Project Plan (3) Completion of inspections, for principal spillways, with robot camera, (4) Conduct a sedimentation survey on selected detention basins to determine sedimentation rate (5) Collection and analysis of sediment core samples to assess amount and type of constituents in deposited sediment, (6) Repair of floodwater retarding structures.
4. **Measures of Success:** Repair of floodwater retarding structures within the Brady Creek and Deep Creek Reservoir watersheds in the McCulloch SWCD; Reduction of sediment loss on repaired sites.
5. **Project Type:** Statewide (); Watershed (x); Demonstration ()
6. **Waterbody Type:** River (); Groundwater (); Other (x)
7. **Project Location:** McCulloch County, Texas

HUC8	Segment
12090106	1410
12090110	1416 A
12090109	1416
8. **NPS Management Program Reference:** State of Texas Agricultural/Silvicultural Nonpoint Source Management Program approved December 15, 2005.
9. **NPS Assessment Report Status:** Impaired (); Impacted (); Threatened (); Other (x)
10. **Key Project Activities:** Hire Staff (); Monitoring (); Regulatory Assistance (); Technical Assistance (x); Education (); Implementation (x); Demonstration (); Other ()
11. **NPS Management Program Elements:** Milestones from the “2005 Texas Nonpoint Source Management Program”, include: (1) Assessment of NPS pollutant problems via review of land use data and known stressors influencing water quality. (2) Determine origin and distribution of NPS pollution. (3) Implement appropriate actions in the watershed to effectively abate the NPS pollution
12. **Project Costs:** Federal (\$338,398); Non-Federal Match (\$22,790); Total Project (\$361,188)
13. **Project Management:** Texas State Soil and Water Conservation Board
14. **Cooperating Entities:** TSSWCB NPS Team; McCulloch SWCD #249; United States Department of Agriculture–Natural Resources Conservation Service (NRCS); Baylor University (BU).
15. **Project Period:** Two years.

**Maintaining Sediment Prevention through Repair of Floodwater-retarding structures in McCulloch County
Texas State Soil and Water Conservation Board
FY01 CWA §319(h)**

WORKPLAN

Problem/Need Statement:

The Flood Control Act of 1944 (PL 78-534) gave the USDA responsibility in selected watersheds across the U.S for planning and installing measures to reduce runoff, erosion and stream flow. One of the selected watersheds was the Middle Colorado River. In 1951, floodwater-retarding structures were installed along Brady Creek (BC), Deep Creek (DC), Lower San Saba River (LSSR), and Southwest Laterals (SWL) in McCulloch County. These structures served well in the protection of prime farmland, and in agricultural production, by keeping the most fertile topsoil in place. Unfortunately, after fifty-five years of benefit, flood-retarding structures in McCulloch County have reached or are rapidly approaching the end of their serviceable lives. As critical components of these structures continue to deteriorate, there will be adverse environmental impacts in downstream floodplains, ecosystems and reservoirs. Brady Creek Reservoir, which is the primary drinking water supply for the City of Brady and surrounding communities, is located downstream of numerous flood retarding structures in McCulloch County. Significant rainfall within a short time span could potentially devastate the Brady Creek reservoir, depriving approximately five thousand people of a reliable water supply.

Over the years, dam failures, in general, have caused several billion dollars of property damage in the United States. More than 200 dam failures have been documented nationwide resulting in four deaths and countless injuries. In contrast, properly repaired, maintained and functioning floodwater-retarding structures work to slow stream flow, reduce soil erosion and provide economic protection from floodwaters. In early September 2005, fifty properly maintained and functioning floodwater-retarding structures prevented flooding and related damage from a 500-year rain event that struck north central Kansas. The predominantly agricultural region was inundated by approximately 13 inches of rain within a 12 hour period causing flash flood conditions on all streams. Much of the excessive runoff was attenuated by the floodwater-retarding structures. On average, well-maintained floodwater retarding structures provide an estimated \$2 million per year in flood protection.

The successful repair of the floodwater-retarding structures in McCulloch County within the Brady Creek and Deep Creek watershed would result in lower NPS pollution loading by abating rangeland and cropland soil erosion and will have a positive impact on the quality of the soil and water in the area while also reducing channel and bank erosion along the streams. Flood-retarding structures have many beneficial impacts on the environment and habitat; this includes a wetlands effect that these structures facilitate around riparian zones, as well as the fact that flows are attenuated and water is released over a long period of time. This process is central to the transformation of many streams from an interment to perennial flow, which greatly enhances riparian ecosystems.

There are 30 floodwater-retarding structures in McCulloch County, located in 4 adjoining watersheds: 21 in the Brady Creek Watershed, 6 in the Deep Creek Watershed, 1 in the Lower San Saba River Watershed, and 2 in the Southwest Laterals Watershed. (Figure – 1)

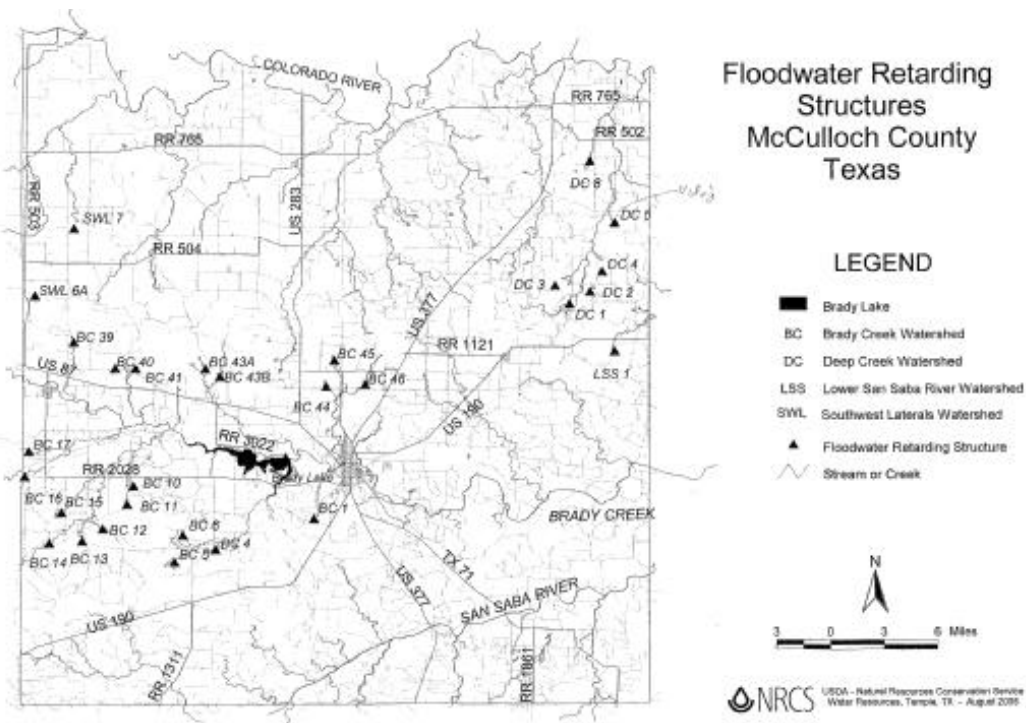


Figure - 1

Of these 30 floodwater-retarding structures, 20 have extensive damage to principal spillway pipes. Damage to spillway pipes can result in internal erosion caused by embankment leakage, foundation leakage and deterioration of pertinent edifices appended to the structures. As the floodwater-retarding structures deteriorate and fill with sediment, inadequate spillway capacity may cause the occurrence of overtopping, ultimately leading to structural failure. A structural failure would result in the release of built-up sediment directly into the watershed.

USDA-NRCS Brady Service Center performed a reservoir sediment study in 1951, 1966, and 1972 on two floodwater-retarding structures in McCulloch County, specifically DC 8 and DC 3 as indicated in Figure-1 above. The analysis showed that from 1951 to 1972 a total of 188 tons of sediment was deposited into DC 8, equating to an average annual storage loss of 0.92%. The analysis on DC 3 from 1953 to 1971 revealed that a total of 2,903 tons of sediment was deposited resulting in an average annual storage loss of 1.25%. Presuming the sedimentation rate in DC 8 and DC 3 has remained constant to 2005, the two structures, combined have trapped 8,870 tons of sediment. The 30 floodwater-retarding structures in McCulloch County have prevented significant amounts of sediment from being deposited in the Colorado River and Lake Buchanan. Intensive monitoring by the Texas Institute for Applied Environmental Research (TIAER), in 1993, showed that floodwater-retarding structures directly reduce NPS sediment loading, excessive nutrients, bacteria, and pesticides.

The majority of the floodwater-retarding structures in McCulloch County are on streams draining into Brady Creek, which feeds Brady Creek Reservoir. Owned and operated by the City of Brady, Brady Creek Reservoir is a municipal and industrial water supply. Brady Creek (segment 1416A) is listed for depressed dissolved oxygen on the draft 2004-303(d) list. Additionally, Brady Creek is listed for excessive algal growth and nutrient enrichment (nitrate + nitrite N, ortho-P, total P) on the draft 2004 Water Quality Concerns List. Deep Creek and Southwest Laterals both flow into Colorado River below O.H. Ivie Reservoir (segment 1416) which is listed for chloride on the draft 2004 Water Quality Concerns List. San Saba River (segment 1410) is currently not listed for any impairment. All four watersheds of interest (Brady Creek, Deep Creek, Lower San Saba River, and Southwest Laterals) subsequently drain to Lake Buchanan (segment 1408).

The Upper Colorado River Authority (UCRA), collaborating with the City of Brady and the Lower Colorado River Authority (LCRA), have been conducting an urban nonpoint source abatement project on Brady Creek since July 2001 funded with CWA 319(h) grant funds through the Texas Commission on Environmental Quality (TCEQ). The goal is to improve water quality within Brady Creek from Brady Lake Dam to a point immediately upstream of the high quality wastewater discharge to the extent that fish kills are eliminated and aesthetic conditions do not detract from recreational use. Historically, the absence of scouring and perennial stream flows have resulted in the stream functioning primarily as a series of storm water ponds with intermittent stream flows. As a result, the stream often displays the characteristics of a eutrophic stream with prolific algae blooms, odors and a generally unpleasant appearance. Fish kills, investigated by the Texas Parks and Wildlife Department (TPWD) and TCEQ, have been attributed to urban nonpoint source runoff. Under Phase I of the project, which ended in August 2003, a Citizen Advisory Committee developed a Master Plan that identified feasible structural and non-structural BMPs, estimated implementation costs, and established implementation priorities. Additionally, a public education and outreach program designed to enhance awareness of urban nonpoint source pollution issues was developed and has been implemented. Currently, under Phase II of the project, anticipated to end in August 2007, a high priority structural BMP, from the Master Plan, is being designed and will be constructed. Water quality monitoring will be performed to evaluate the effectiveness of the constructed BMP in treating stormwater and improving water quality. The Citizen Advisory Committee also continues to implement the public education and outreach program under Phase II.

In a unique situation with regard to these 30 floodwater-retarding structures within McCulloch County, no sponsoring entity with taxing authority exists as a means to provide funds for operation and maintenance. This problem arises from the fact that McCulloch County was chosen as one of the pilot areas in 1951, where this type of conservation practice was to be installed. McCulloch Soil and Water Conservation District (SWCD) took responsibility for the structures by signing an operations & maintenance (O&M) agreement; because this project was the first of its kind, McCulloch SWCD was not properly advised to secure a co-sponsor with taxing authority for assistance in the provision of funds for O&M and repair on the structures. McCulloch County is the only SWCD in Texas that doesn't have an O&M agreement with a taxing entity.

The basis for this project is to enhance the efforts and activities of the Texas State Soil and Water Conservation Board (TSSWCB) and the McCulloch Soil and Water Conservation District (SWCD) #249 with respect to the reduction and/or prevention of nonpoint source (NPS) pollution loadings, primarily sediment, into Brady Creek and Brady Creek Reservoir, Deep Creek, the Colorado River and Lake Buchanan through the restoration of damaged floodwater-retarding structures.

General Project Description:

This project will involve cooperative efforts between the TSSWCB, McCulloch SWCD #249 and the USDA-NRCS in an effort to provide technical and financial assistance for restoration of local floodwater retarding structures. The use of 319(h) funds will greatly enhance the abilities of the local SWCD with regard to repair of the floodwater-retarding structures, resulting in decreased sediment loading within the Colorado River and Lake Buchanan.

A robot camera will be used to visually inspect the principal spillways and tail pipes for identification of potential structural damage. The inspection will indicate which structures have the potential to cause water quality impairments and will allow the SWCD to efficiently prioritize the repairs. Once visual inspections are completed, core samples from representative sites will be taken and analyzed in order to assess the amount and type of constituents in the sediment. A sediment survey will also be conducted by Baylor University (BU) to assess the amount of sediment that has been deposited since impoundment. The sedimentation survey will be used as a tool in determining the volume of sediment being trapped in the floodwater-retarding structures.

McCulloch SWCD in coordination with the USDA-NRCS and the State Board will determine which of the floodwater-retarding structures are in need of restoration, severity of damage incurred, cost effectiveness of appropriate repairs, and prioritization based on proximity to impaired segments. The pollution prevention efforts implemented due to this project will be incorporated into any future watershed planning projects within the affected watersheds.

Task, Objectives, Schedules, and Estimated Costs:

TASK 1: Program Coordination with project Participants

Costs: \$0 (Federal), \$0 (Non-Federal), \$0 (Total)

Objective: Coordination of technical assistance activities in McCulloch County between the TSSWCB, USDA – NRCS, McCulloch SWCD and Baylor University.

Subtask 1.1: The TSSWCB will contract with McCulloch SWCD. The McCulloch SWCD will develop a plan, containing NRCS specifications for restoration and priority status of each floodwater retarding structure. (Start Date: Month 1; Completion Date: Month 18)

Subtask 1.2: The McCulloch SWCD will conduct quarterly meetings with the TSSWCB project manager and semi-annual meetings with project participants to discuss project activities. (Start Date: Month 1; Completion Date: Month 36)

Subtask 1.3: The McCulloch SWCD will prepare quarterly reports and a final report for submittal to the TSSWCB. (Start Date: Month 1; Completion Date: Month 36)

Deliverables:

- Quarterly Reports
- Final report at culmination of project in electronic format
- Copies of agendas, attendance, and minutes from semi-annual meetings
- Plan for the repair of the floodwater-retarding structures

TASK 2: Inspection of Floodwater-retarding structures

Costs: \$0 (Federal), \$0 (Non-Federal), \$0 (Total)

Objective: To inspect all 29 floodwater-retarding structures and pinpoint which structures have deteriorated tail pipes and/or a compromised principal spillway.

Subtask 2.1: The NRCS will inspect PL-534 floodwater-retarding structures by sending a remote control robot camera into each tail pipe for assessment of damage. (Start Date: Month 1; Completion Date: Month 12)

Subtask 2.2: McCulloch SWCD will obtain an estimation of repair cost for all structures in need of restoration. (Start Date: Month 12; Completion Date: Month 18)

TASK 3: Development of a Quality Assurance Project Plan (QAPP)

Costs: \$3,726 (Federal), \$0 (Non-Federal), \$3,726 (Total)

Objective: To develop a QAPP and submit it for TSSWCB and EPA approval, 60 days prior to the initiation of any sediment sampling.

Subtask 3.1: BU will develop a QAPP, as specified under “EPA Requirements for QAPPs” (QA/R5) detailing sediment core sampling and sedimentation survey activities. (Start Date: Month 1; Completion Date: Month 3)

Deliverables:

- QAPP

TASK 4: Floodwater Retarding Reservoir Watershed Analysis

Costs: \$600 (Federal), \$9,957 (Non-Federal), \$10,557 (Total)

Objective: Selection of four representative watersheds in McCulloch County, for the purpose of conducting volume and sediment surveys. .

Subtask 4.1: McCulloch County SWCD will locate land use maps and NRCS initial design reports for the PL-534 structures.

Subtask 4.2: BU will use resources collected in Subtask 4.1, along with other data pertaining to the basins, provided by the NRCS, to identify those watersheds that are best representative of the 29 watersheds with respect to variety of potential accumulated nutrients, metals, and pesticides (Month 3 to Month 6). BU will contribute two weeks of labor from Dunbar and from Allen to accomplish this task.

TASK 5: Collect core samples

Costs: \$12,826 (Federal), \$9,860 (Non-Federal), \$22,686 (Total)

Objective: Collection of core samples in selected structures for chemical analyses of sediment sub-samples.

Subtask 5.1: Sediment core samples on the four floodwater-retarding structures, selected in Subtask 4.2, will be collected using methods described in an approved QAPP. (Month 6 to Month 18)

Subtask 5.2: Sediment analysis will be performed using methods described in an approved QAPP to characterize the nature of contaminants in selected floodwater-retarding structures (Month 6 to Month 18). BU will contribute two weeks of labor from Dunbar and from Allen to analyze Cesium-137 levels in selected cores.

Deliverables:

- Technical report detailing the nature of sediment contaminants and extrapolation of potential contaminant absorption of sediment in the remaining structures.

TASK 6: Sedimentation Survey

Costs: \$7,694 (Federal), \$0 (Non-Federal), \$7,694 (Total)

Objective: Assessment of the sedimentation rate and determination of sediment volume that has been trapped from the time of impoundment.

Subtask 6.1: BU will perform sedimentation survey on the four selected structures using methods described in an approved QAPP. (Month 3 to Month 18)

Deliverables:

- Technical report detailing sedimentation rate and sediment volume trapped since impoundment of selected floodwater-retarding structures, and coordinating extrapolation to remaining structures.

TASK 7: Repair of floodwater-retarding structures

Costs: \$309,825 (Federal), \$0 (Non-Federal), \$309,825(Total)

Objective: Proper restoration of floodwater-retarding structures in McCulloch County.

Subtask 7.1: McCulloch SWCD, in collaboration with USDA-NRCS, and TSSWCB, will prioritize 29 floodwater-retarding structures for restoration based on visual inspections, sedimentation rate, sediment volume deposited, and characterization of absorbed contaminants.

Subtask 7.2: NRCS will review and approve the initial plans to repair the PL-534 structures. (Month 12 to Month 18)

Subtask 7.3: The McCulloch SWCD will secure contractor bids to make specified repairs according to NRCS practice standards for floodwater-retarding structures. (Month 18 to Month 30)

Subtask 7.4: NRCS will inspect the completed repairs and insure that repairs are within specifications.
(Month 30 to Month 36)

Deliverables:

- Final Report – Information gathered from this project will be provided through a final report to EPA, TSSWCB and appropriate entities.

Coordination, Roles and Responsibilities:

Participating organizations and agencies along with their roles in this project include:

- Texas State Soil & Water Conservation Board - Project Lead - Work with and assist, as needed local SWCD in the repair of the floodwater-retarding structures
- McCulloch SWCD- Responsible for compiling a conservation plan and coordinating the repairs to the floodwater-retarding structures.
- Natural Resources Conservation Service - Work with, and assist, as needed, local SWCD in the review and inspection of the repairs.
- Baylor University – Conduct sedimentation survey and sediment core analysis

Public Participation:

This is an internal TSSWCB project with the McCulloch SWCD, NRCS, and Baylor University. This project will provide financial and technical assistance to repair floodwater-retarding structures in the McCulloch County SWCD.

Measure of Success:

- Successful repair of floodwater-retarding structures.

Reference to Project in the NPS Management Program: (1) Assessment of NPS pollutant problems via review of land use data and known stressors influencing water quality. (2) Determine origin and distribution of NPS pollution. (3) Implement appropriate actions in the watershed to effectively abate the NPS pollution

Category: Agriculture

TSSWCB Project Manager:

Name: TJ Helton
Address: P.O. Box 658
Temple, Texas 76503
Phone #: (254) 773-2250
E-Mail: thelton@tsswcb.state.tx.us
Affiliation: Texas State Soil & Water Conservation Board

BUDGET

Maintaining Sediment Prevention through Repair of Floodwater-retarding structures in McCulloch County

McCulloch SWCD

<u>Object Class Category</u>	<u>Federal Funds</u>	<u>Non-Federal Match</u>	<u>Total Costs</u>
1. *Personnel	\$18,233	\$15,482	\$33,715
2. *Fringe Benefits @ (28%)	\$5,105	\$4,335	\$9,440
3. *Travel	\$725	0	\$725
4. Equipment	0	0	0
5. *Supplies	\$783	0	\$783
6. Contractual	\$309,825	0	\$309,825
7. Construction	0	0	0
8. Other	0	0	0
9. Total Direct Costs	\$334,671	0	\$354,488
10. *Indirect Costs @ (15%)	\$3,727	\$2,973	\$6,700
11. Total Project Costs	\$338,398	\$22,790	\$361,188

***Denotes Baylor University's Budget Categories for Tasks 3 – 6**
Federal \$28,573 Non-Federal \$22,790

Itemized Budget Justification

Salary & Fringe Benefits

Item	Cost
4 weeks of summer salary for Allen at a rate of \$7983/month;	\$7,983
4 weeks of fringe benefits for Allen at 28% of salary	\$2,235
6 weeks of summer salary for Dunbar at a rate of 6,833/month	\$10,250
6 weeks of benefits for Dunbar at 28% of salary	\$2,870

Travel

Item	Cost
Travel: 500 vehicle miles at \$0.405/mi., 4 nights hotel at \$80/night, 8 days meals at \$25/day	\$725

Supplies

Item	Cost
Supplies: 15 core tubes at \$48/tube, 260 sample containers at \$1/each	\$783

Contractual

Watershed Name	Structure Name	Repair Cost 2005 \$
Brady Creek	FRS No. 1	\$12,000
Brady Creek	FRS No. 10	\$16,300
Brady Creek	FRS No. 14	\$27,000
Brady Creek	FRS No. 39	\$25,650
Brady Creek	FRS No. 4	\$25,650
Brady Creek	FRS No. 40	\$24,300
Brady Creek	FRS No. 41	\$13,500
Brady Creek	FRS No. 44	\$13,500
Brady Creek	FRS No. 45	\$27,000
Brady Creek	FRS No. 46	\$13,500
Deep Creek	FRS No. 1	\$13,500
Deep Creek	FRS No. 2	\$24,300
Deep Creek	FRS No. 3	\$12,825
Deep Creek	FRS No. 4	\$24,300
Deep Creek	FRS No. 5	\$23,000
Deep Creek	FRS No. 8	\$13,500
Total		\$309,825