

**WATER QUALITY MANAGEMENT PLAN  
IMPLEMENTATION ASSISTANCE IN THE  
FALCON LAKE RESERVIOR DRAINAGE AREA  
ZAPATA COUNTY**

CLEAN WATER ACT, SECTION 319(H) NON-POINT SOURCE GRANT  
CONTRACT # 04-8



***ZAPATA COUNTY  
SOIL & WATER CONSERVATION DISTRICT***



**ASSISTED BY:**

**USDA-NATURAL RESOURCES CONSERVATION SERVICES  
ZAPATA COUNTY, TEXAS**

**TSSWCB REGIONAL OFFICE  
HARLINGEN, TEXAS**

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## **Introduction**

### **Falcon International Reservoir**

International Falcon Reservoir is located on the Rio Grande bounded by Starr and Zapata counties, Texas, and city of Nueva Ciudad Guerrero, Tamaulipas, Mexico. The dam and reservoir provide for water conservation, flood control, hydroelectric energy, and recreation. The project is owned, authorized, and operated by the United States and Mexico through the International Boundary and Water Commission. The project is named for the relocated town of Falcon, which in turn was renamed in 1915 after the wife of founder Jose Eugenio Ramirez, Maria Rita de la Garza Falcon.

The idea of a dam six miles east of the present site began about 1935, and the lake was approved by treaty at its present location in the late 1940s. Work began in 1951, and deliberate impoundment started on August 25, 1953. The reservoir was dedicated by presidents Dwight D. Eisenhower and Adolfo Ruiz Cortines on October 19, 1953. The five-mile-long rolled earth fill and concrete embankment was completed on April 8, 1954. The first power was generated. The dam is 150 feet above the riverbed, with a crest elevation of 323 feet above sea level. Almost two miles of the dam is in the United States, and nearly three miles is in Mexico. Flood-control benefits to the United States had totaled \$130 million by January 1, 1986.

All lands on the United States side, except for Falcon State Park, are privately owned above 307 feet. The area of the lake varies from 87,000 acres at elevation 301.2 feet to 115,400 acres at the maximum elevation of 314.2 feet. The reservoir has a summer storage capacity of 2,371,220 acre-feet.

Zapata County has light-colored loamy soils over reddish or mottled clay subsoil; limestone lies in places within forty inches of the surface. The flora includes thorny shrubs, grasses, mesquite, and cacti. Less than 1 percent of the county is considered prime farmland. Natural resources include caliche, lignite coal, sand, gravel, oil, and gas. Natural gas production was 317,586,100 thousand cubic feet, which made Zapata County the top Natural Gas producing county in the state of Texas for the year 2000. Average Elevation (Zapata County) is 404 feet. Zapata County area is approximately 1,058 square miles (997sq.miles of land and 61 sq. miles of water).

There is an estimated 600 thousand acres in South Texas that are affected by saline and alkaline conditions. Many of these acres are damaged by past oil field activity. These sites are characterized by soils with high salinity, little soil structure, lack of vegetation and excessive erosion. Roadways, especially those associated with oil field activity, have created many critical and highly erodible sites. These sites generally have exposed subsoil, are low in soil fertility, have poor water holding capacity with a lack of adequate vegetative cover. Furthermore, degradation of water quality has occurred through contaminants and excessive soil erosion from saline, alkaline and other mineralized soils.

In August 2004, the Zapata County SWCD executed an agreement with the Texas State Soil and Water Conservation Board to develop conservation plan (Water Quality Management Plans – WQMP) development in the drainage area. The WQMP's utilize Best Management Practices (BMPs) to reduce siltation deposits in Falcon Reservoir.

A goal was set to develop thirty (30) WQMP's with producers in the drainage area. Cost-share funds of \$293,000.00 were allocated to assist the producers to install BMPs. These BMP's include practices such as critical area planting, range planting, brush management, terraces, diversions, cross fencing, and ponds. Applications were ranked by priority of high, medium, and low priority:

High Priority - Little to no cover, gullies and creeks over 8 ft. deep

Medium Priority – Saline soils with 40 to 60 % of cover, gullies and creeks over 4 ft. deep but less than 8 ft. deep

Low Priority – gullies and creeks less than over 2 ft. deep but less than 4 ft. deep, flat saline sites available for range planting

**WQMP Implementation Assistance in the Falcon Reservoir Drainage Area  
in Zapata County.  
Texas State Soil and Water Conservation Board  
FY04 CWA Section 319**

<b>PROGRAM DEVELOPMENT</b>
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A reduction in Non-Point Source (NPS) pollution loadings in the drainage area of Falcon Reservoir in Zapata County will have a positive impact on the quality of the water and storage capacity of Falcon Reservoir. The International Boundary and Water Commission estimate that siltation has reduced the storage capacity of Falcon Reservoir by about 189,000 acre/feet. In essence, Falcon Reservoir is the "life blood" for Rio Grande Valley agriculture that is highly dependent on irrigation. The successful implementation of best management practices (BMP) that abate rangeland erosion should result in lower NPS pollution loadings into this water body.

On August 2004, Texas State Soil and Water Conservation Board (TSSWCB) representatives met with the Zapata Soil and Water Conservation District (SWCD) board to discuss a plan of action for the Implementation Assistance in the Falcon Reservoir Drainage Area in Zapata County Project. The Zapata SWCD was awarded the 319(h) Program to begin with the implementation of the program.

The project consisted of the TSSWCB working cooperatively with the Zapata SWCD #335 in the Falcon Reservoir drainage area to provide technical and financial assistance to landowners in the implementation of water quality management plans (WQMPs). The primary focus of the 319(h) program is to provide funds to States to implement best management practices to abate or reduce NPS pollution.

Technical assistance was provided by the Zapata SWCD #335 and the TSSWCB Harlingen Regional Office to landowners within the Falcon Reservoir drainage area to develop and implement 27 WQMPs within the watershed. A planner was hired by the Zapata SWCD in October 2004. Due to the planner getting another job, another planner was hired in February 2006 to provide 100% effort in developing and implementing WQMPs.

To assist with further fundings, the Zapata SWCD sent a letter to the International Boundary and Water Commission (IBWC) requesting funds to help producers with other source of funding to implement the best management practices. The IBWC, formed in 1944, was charged with the planning, construction, and operation of Falcon Dam, as well as additional hydroelectric-power and flood-control projects to benefit both countries, Mexico and United States.

**WQMP Implementation Assistance in the Falcon Reservoir Drainage Area  
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FY04 CWA Section 319**

<b>PROJECT ACCOMPLISHMENTS</b>
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There is an estimated 600 thousand acres in South Texas that are affected by saline and alkaline conditions. Many of these acres are damaged by past oil field activity. These sites are characterized by soils with high salinity, little soil structure, lack of vegetation and excessive erosion. Roadways, especially those associated with oil field activity, have created many critical and highly erodible sites. These sites generally have exposed subsoil, are low in soil fertility, have poor water holding capacity with a lack of adequate vegetative cover. Furthermore, degradation of water quality has occurred through contaminants and excessive soil erosion from saline, alkaline and other mineralized soils.

Adapted plant varieties and tested technology are needed to address the erosion problems on these critical sites. Revegetation strategies should have quick seed germination and emergence, have salinity and drought tolerance, be adaptable to diverse sites and have erosion control qualities. Consequently, the establishment of permanent vegetative cover will be difficult and challenging.

The objective of WQMP implementation is to achieve a level of pollution prevention or abatement determined by the State Board in consultation with the local SWCD to be consistent with State water quality standards. Local SWCD determined which landowners received technical and financial assistance based on proximity to the impaired segment, as well as the most cost effective and needed pollution abatement practices.

The SWCD offered a sign-up for the implementation assistance. To obtain a WQMP, landowners and operators submitted a request for implementation assistance to the local SWCD. A total of 27 applications were received thru December 2007. Twenty two applications were approved and implemented thru April 2008. Five applications were either cancelled by the owner or did not meet pre-qualifications. A total of 22,951.20 Acres were treated for erosion control.

The Kika De La Garza Plant Materials Center was utilized to provide expertise and seed materials for the revegetation of treated rangeland sites. Some of the revegetation efforts were used as demonstrations for technology transfer purposes. Four sites were studied to determine the soil texture, seed mix and seeding rate for Zapata County. The seed mix and seeding rate recommended by the Plant Material Center were 3lbs/acre of plains bristlegrass, 1lbs/acre of green sprangletop and 1lbs/acre of alkali sacaton.

Several test plots were done to by the Plant Material Center to study the effect of several PMC seeds on saline sites. Two flower trichloris, Arizona cottontop and hooded windmillgrass were

planted on two different sites and studied throughout the 319 project program. The results; the species were unable to produce any foliage on these grounds.

Vegetative barriers were done on several projects to reduce erosion. The plant material center brought close to 500 plants with Falfurrias Germplasm big sacaton. As a result, after a year or so, the big sacaton seems to survive the saline clay areas.

In the effort to make the 319 Program Project a successful one, Zapata County SWCD educated landowners on the effectiveness of such practices and allowed them to participate by contributing more than what was cost-shared. Landowners, overwhelmed by the outcome of the bmp's, bought extra seed and fenced critical areas, vacated cattle from treated areas and increased practices by approximately 50%.

Zapata County SWCD received contributions from the International Boundary and Water Commission (IBWC) to assist in the implementation of BMP's. Each year the Zapata SWCD would submit a progress report and a letter for contribution to the IBWC requesting funds to aid landowners with price increase in material and labor used for the BMP's. A total of \$50,000 was received and utilized in the 319 Program.

Another accomplishment met by this program was the recognition of several ranchers by the TSSWCB. Every year the board has nominees in several categories. In the course of the 319 Program, four ranchers were awarded with excellence in conservation for their great work in there land. Ranchers are eager to reapply for further funding in the 319 Erosion Program. They have been satisfied with the outcome seeing better land on their ranches. They have become members of the Zapata SWCD and contribute with monetary gifts to help the district continue its goal of land conservation.

**WQMP Implementation Assistance in the Falcon Reservoir Drainage Area  
in Zapata County.  
Texas State Soil and Water Conservation Board  
FY04 CWA Section 319**

**PROJECT ACCOMPLISHMENTS BY TASKS**

***TASK 1: Program Coordination with project Participants***

**Objective:** To foster coordinated technical assistance activities in the Falcon Reservoir drainage area in Zapata County between agencies and groups to efficiently and effectively achieve project goals.

**Subtask 1.1** The Zapata SWCD will hire a planner who will coordinate and carry out the project. The TSSWCB Harlingen Regional Office will train the planner.

- The Zapata SWCD hired a planner to coordinate and carry out the project. The TSSWCB Harlingen Regional Office trained the planner. A new planner was hired due to first planner moving to another job.

**Subtask 1.2:** Conduct semi-annual meetings with project participants and TSSWCB project manager to discuss technical assistance activities.

- The program planner met regularly with project participants to review technical assistance and cost-share practices.

**Subtask 1.3:** Coordinate with other agencies and programs providing landowners incentives for adopting Best Management Practices.

- Coordinated with NRCS with providing landowners incentives for adopting Best Management Practices.

**Subtask 1.4:** Prepare quarterly reports and a final report for submittal to the TSSWCB.

- Program Planner has completed all quarterly reports and submitted to the TSSWCB.

***TASK 2: Development and Implementation of WQMPs***

**Objective:** To provide technical assistance to landowners in developing and implementing WQMPs within the Falcon Reservoir drainage area in Zapata County.



**Subtask 2.1:** The SWCD planner will develop approximately 30 WQMPs within the Falcon Reservoir drainage area. The SWCD planner will complete all WQMPs with assistance from the NRCS as needed.

- SWCD planner developed 27 WQMPs within the Falcon Reservoir area with the assistance from NRCS. Twenty-two applications were approved and implemented. Two were approved but cancelled due to time frame; three were cancelled either by producer or by Zapata SWCD.

**Subtask 2.2:** The SWCD planner will send out notifications announcing the availability of assistance for implementing WQMPs, and will assist the Harlingen Regional Office and Zapata SWCD in accepting and prioritizing the WQMP applications.

- Announced availability of assistance for implementing WQMPs in the Zapata County News and the access channel.
- Assisted in accepting and prioritize the WQMP applications.

**Subtask 2.3:** The planner, with assistance from NRCS and the TSSWCB Harlingen Regional Office, will provide landowners with information on appropriate best management practices and will work with landowners in developing and implementing WQMPs within the Falcon Reservoir drainage area in Zapata County.

Planner, in cooperation with NRCS and TSSWCB Harlingen Regional Office, provided landowners information and worked on developing and implementing WQMPs.

**Subtask 2.4:** TSSWCB will provide technical review and certification of WQMPs.

- Twenty-two (22) WQMPs have been developed. All WQMPs have been reviewed and certified by the TSSWCB.

**Subtask 2.5:** The SWCD planner will conduct status reviews on all WQMPs to ensure BMP implementation schedules are being followed.

- Status Reviews have been conducted.

***TASK 3: Compilations of WQMPs Implemented in the Falcon Reservoir drainage area in Zapata County.***

**Objective:** To compile information on the location and types of BMPs for each WQMP implemented.

**Subtask 3.1:** The planner, with assistance from NRCS, the TSSWCB Harlingen Regional Office and the SWCDs will compile information on the location and types of BMPs for each WQMP implemented within the Falcon Reservoir drainage area.

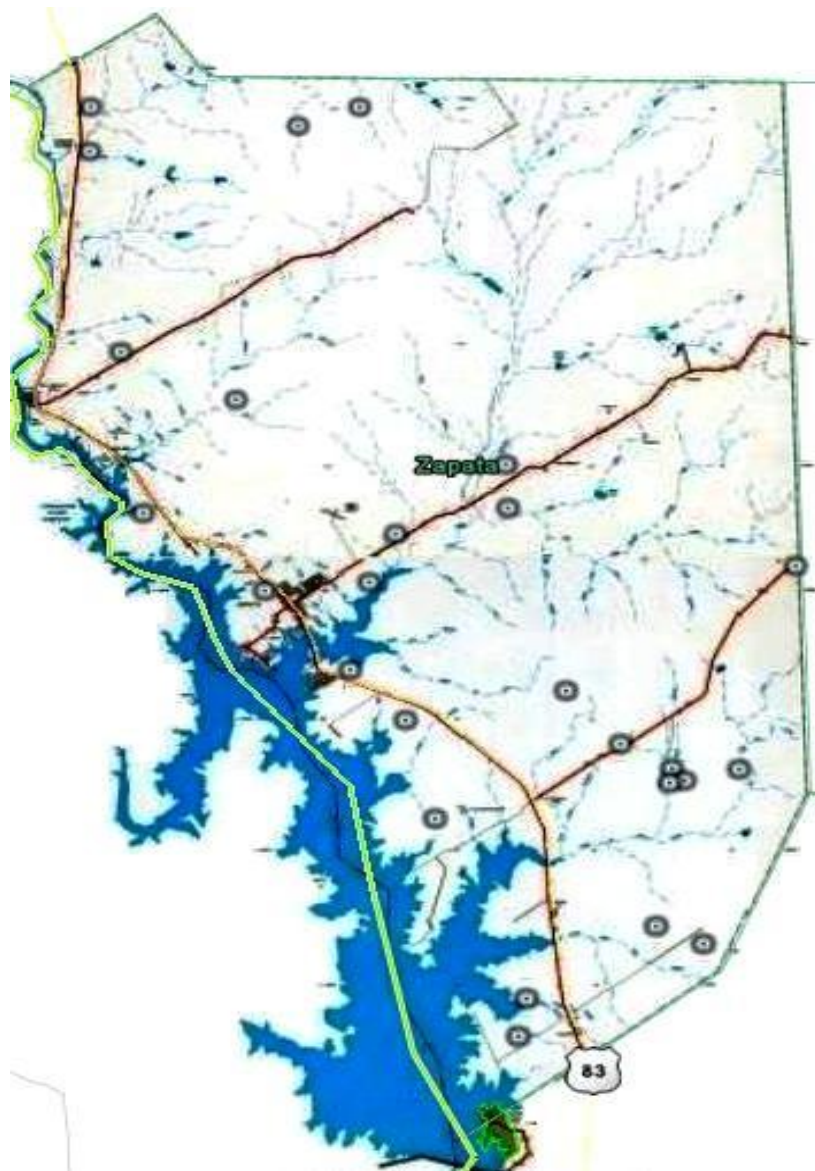
- Planner provided all information pertinent to the proper implementation of WQMPs as needed. A spreadsheet summary report is included.

## Appendix A

Inventory of Cost-Shared BMP's									
Falcon Reservoir Sediment Reduction Project									
Inventory of Cost-Shared BMP's for Zapata SWCD #332 Project 319									
WQMP#	Wildlife Manage ment	Prescribe Grazing	Critical Area Planting	Terrace	Diversion	Ponds	Fence	Brush Mgt	Range Planting
Units	Acres	Acres	Acres	cu.yd.	cu.yd	no.	feet	Acres	Acres
003	984.60	984.60	3.00				2,055.00	119.00	122.00
005	1,087.60	1,087.60	22.20						22.20
006	3,932.70	3,932.70	-			2.00			
007	341.80	341.80	16.00						16.00
008	897.60	897.60	18.00						18.00
009	1,278.60	1,278.60	-				3,750.00	155.00	
010	1,283.40	1,283.40	16.00	690.00				3.00	19.00
012	1,300.70	1,300.70	18.00						18.50
013	2,210.00	2,210.00	1.00				1,001.00	73.00	74.00
014	2,009.00	2,009.00	12.00					58.00	70.00
015	647.50	647.50	14.00			1.00	3,505.00	72.00	86.00
016	1,989.20	1,989.20	5.00	478.00				150.00	155.00
017	372.00	372.00	14.00				3,318.50		14.00
019	261.00	261.00	11.00	2,847.50					11.00
020	403.00	403.00	-					100.00	140.00
021	147.00	147.00	-					52.00	52.00
022	120.00	120.00	-					80.00	80.00
023	210.00	210.00	-		769.00	1.00			3.00
024	123.00	123.00	12.00						12.00
025	1,900.00	1,900.00	-				2,040.00	192.00	192.00
026	700.00	700.00	-				5,401.00	136.00	136.00
027	752.50	752.50	-					93.00	93.00
<b>Totals</b>	<b>22,951.20</b>	<b>22,951.20</b>	<b>162.20</b>	<b>4,015.50</b>	<b>769.00</b>	<b>4.00</b>	<b>21,070.50</b>	<b>1,283.00</b>	<b>1,333.70</b>

## Appendix B

### WQMPs in the Falcon Lake Reservoir Drainage Area 319 Project Zapata County, Texas



- USA/Mexico Border
- Road/Highway
- Streams
- Falcon Reservoir
- WQMP's

## Appendix C

**BRUSH MANAGEMENT EFFICENCY BY ROOTPLOWING TO RESTORE DESIRED VEGETATIVE COVER TO PROTECT SOILS, CONTROL EROSION, REDUCE SEDIMENT, IMPROVE WATER QUALITY AND ENHANCE STREAM FLOW.**



**Brush Management Before**



**Brush Management After**



**CRITICAL AREA PLANTING/RANGE PLANTING EFFICENCY BY SHAPING CRITICAL AREAS TO STABILIZE AREAS WITH EXISTING OR EXPECTED HIGH RATES OF SOIL EROSION BY WATER, WIND OR THROUGH NORMAL METHODS.**



**Range Planting Before**



**Range Planting After**



**Critical Area Planting Before**



**Critical Area Planting After**



**POND TO IMPOUND WATER BY CONSTRUCTING AN EMBANKMENT OR BY EXCAVATING A PIT TO MAINTAIN OR IMPROVE WATER QUALITY. TERRACES/DIVERSIONS USED TO REDUCE THE OCCURRENCE OF ACTING AND CLASSIC GULLIES ON AREAS DOWN SLOPE OF THE TERRACE/DIVERSION AND TO REDUCE RUNOFF VELOCITY SO SEDIMENTATION OCCUR IN THE CHANNEL.**



**Pond Site Before**



**Pond Site After**



**Critical Area Planting and Terrace Before**



**Critical Area Planting and Terrace After**





**Vegetative barriers  
Big Sacaton**





**Critical Area Planting / Diversion  
Before and After**





**Three Seed Recommendation with Sorghum Almum Mixture**



**Three Seed Recommendation with Wheat Mixture**





**Critical Area Planting  
Before and After**





## Cross-Fencing





## Critical Area Planting Before and After



## References

The Handbook of Texas Online –

<http://www.tsha.utexas.edu/handbook/online/articles/II/roi2.html>

Wikipedia – Falcon International Reservoir –

[http://en.wikipedia.org/wiki/Falcon\\_International\\_Reservoir](http://en.wikipedia.org/wiki/Falcon_International_Reservoir)

The Handbook of Texas Online –

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Kika de la Garza Plant Material Center Progress Report to address revegetation of saline impacted sites in Zapata County – March 2008