

# NONPOINT SOURCE 319(h) PROJECT PROGRESS REPORT FORM

Version 1.5

Federal Fiscal Year of project:

TODAY'S DATE:

HAS THE WORKPLAN BEEN AMENDED SINCE THE LAST GRTS REPORT?:  Yes  No

**Please select which reporting period.**

MIDYEAR REPORT?:

ANNUAL REPORT?:

QUARTERLY REPORT?:

PROJECT TITLE:

REPORT DATES: FROM:

TO:

STATE NAME:

ADDRESS:

ADDRESS:

CITY:  STATE:  ZIP:

PHONE:  EXT:

FAX:  EMAIL:

PREPARED BY:

**MILESTONES COMPLETED**

<u>BMP</u>	<u>Unit</u>	<u>Total Expected</u>	<u>Total Implemented</u>
<u>Grazing Management</u>	<u>Acres</u> <u>Grazing/Rangeland/Riparian/CRP</u>	<u>9,000</u>	<u>0</u>
<u>Irrigation Water Management</u>	<u>LF Lining</u>	<u>3,200</u>	<u>2,600</u>
<u>Irrigation Water Management</u>	<u>LF Pipelines</u>	<u>4,000</u>	<u>638</u>
<u>Irrigation Water Management</u>	<u>Model</u>	<u>1</u>	<u>0.5</u>
<u>Irrigation Water Management</u>	<u>Real-Time Stage Control Units</u>	<u>25</u>	<u>25</u>
<u>Irrigation Water Management</u>	<u>Sprinkler Systems</u>	<u>10</u>	<u>11</u>
<u>Water Quality Monitoring</u>	<u>None Defined</u>	<u>0</u>	<u>0</u>

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## OVERALL PROJECT ACCOMPLISHMENTS

The Belle Fourche River Watershed Management and Project Implementation Plan Segment III is on task and on budget. Several activities have been implemented to improve the delivery of irrigation water in the Belle Fourche Irrigation District (BFID) (Figure 1). To date in this funding segment, implementation has resulted in the installation of five automated check gates (2 real-time and 3 stand-alone), four automated head gates (4 real-time) (Figure 2), equipment to monitor flow at nine flow measurement structures (9 real-time), and equipment to convert two previously automated stand alone checks to real-time. The stand-alone automated check gates utilize water level sensors and gate actuators in combination with data loggers with programmable algorithms to maintain a constant upstream water level. The desired upstream water level is input through a handheld device by the District personnel on site. The automated gate then moves up and down to respond to the constant fluctuations occurring in the canal in order to sustain the desired head pressure. Maintaining a constant head pressure allows for more efficient delivery of water to farmer turnouts and lateral head gates upstream of the check.

An extensive radio network has been developed across the District to allow selected sites to be monitored and controlled in real-time from the headquarters in Newell, South Dakota, or from anywhere throughout the District via a mobile base station mounted in one of the BFID vehicles. The real-time automated check gates provide the same constant upstream water level control as the stand alone units. The real-time automated lateral head gates work in combination with some of the real-time flow measurement structures located downstream of the head gate in the lateral ditch. Once a desired lateral flow is selected, the lateral head gate adjusts automatically to match the actual with the desired flow based on readings collected from pressure transducers at the flow measurement structures. The remaining real-time flow measurement sites are used to monitor the releases from Orman Dam into the canals and track flows throughout the rest of the canal system.

New automated water order and water billing software was developed. Water orders are collected from the farmers and entered into a database based on amount and timing. The software then calculates the daily total of water to be delivered for each individual section of the canal and also gives a breakdown by farmer of the amounts that are currently being delivered, when future amounts will be delivered, and when deliveries will be shut off. The information from the water orders is then automatically entered into the water billing sheets. The water billing sheets are used to track the amount of water the individual farmers have used and the amount remaining in their accounts. An explanation must be provided if there is any discrepancy between the amount ordered and billed.

Automated dam release calculator software was developed that uses aspects of each of the components described above to provide a report and recommended daily release from Orman Dam, the source of the irrigation district. Included in the report is the recommended release along with readings from the real-time automated gates and flow measurement devices. This

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summary provides District personnel with an overview of the current conditions throughout the entire irrigation delivery system. The daily recommended dam release is determined by totaling the water orders for each given section of canal and then estimating the lag time, or the time it will take the water to travel from the dam to the delivery point. The district personnel can then compare the recommendation to the real-time data that is reported and adjust the actual release to fit current conditions if need be.

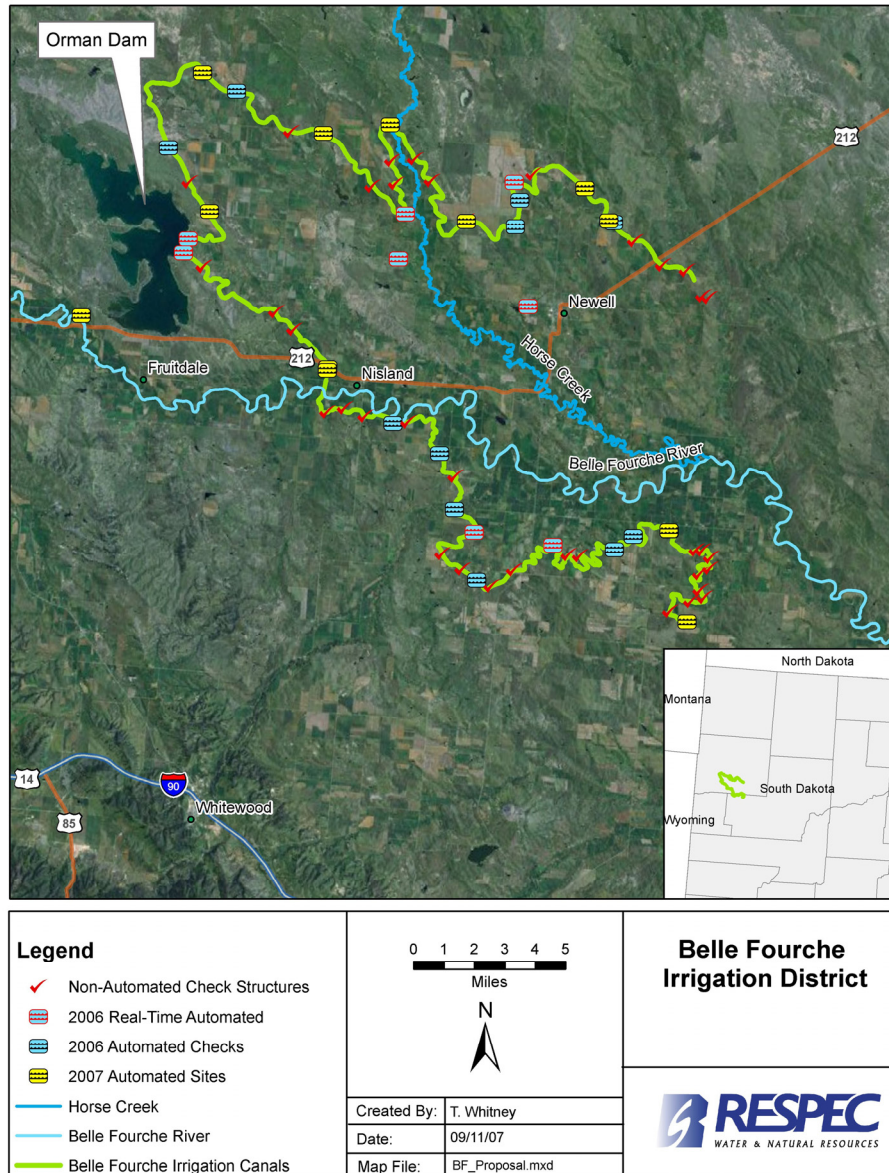


Figure 1. Location of the Belle Fourche Irrigation District.

Prior to the development of this complete water management system, the irrigation district operated the canals manually and performed all calculations to determine water orders, water billing, and dam releases by hand. This was extremely labor intensive and led to inefficiencies in the transport of the water from the Dam to the farmer’s fields. The new water management

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system provides timely information to support the daily decision making process. It allows the District personnel to manage the entire system to better offset fluctuations in deliveries caused by rainfall, heat, or equipment malfunctions. New automated water order and water billing software was also developed. Water orders are collected from the farmers and entered into a database based on amount and timing. The software then calculates the daily total of water to be delivered for each individual section of the canal and also gives a breakdown by farmer of the amounts that are currently being delivered, when future amounts will be delivered, and when deliveries will be shut off. The information from the water orders is then automatically entered into the water billing sheets. The water billing sheets are used to track the amount of water the individual farmers have used and the amount remaining in their accounts. An explanation must be provided if there is any discrepancy between the amount ordered and billed.

The BFID has also installed over 600 feet of pipeline and 2,600 feet of lining on some of the main canals and laterals throughout the District. They are also currently working on lining a portion of the Inlet Canal which supplies water to Orman Dam. This project will result in approximately another 2,500 feet of lining.



Figure 2. Project staff testing the functionality of a newly installed automated head gate on the Sorenson Lateral prior to the 2007 irrigation season.

Phase II of the canal operational model is being developed for the BFID North Canal. The data from installed stage/flow measuring devices, along with the flow automation units and 15 portable stage measuring units, is being used to validate a canal operational model.

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Grazing management practices installed to date have resulted in range improvement on approximately 63,000 acres. Practices completed include 155,836 feet of pipeline, 17 tanks, 3 wells, and 2 pumping stations for off stream water supply along with 14,300 feet of fence for riparian corridor protection and rotational grazing.

The table below outlines the funds budgeted, utilized, and remaining. An amended budget, timeline, and project task list has been submitted to the South Dakota DENR for review by the 319 task force in December 2007.

<b>Segment III - EPA 319</b>	<b>Consultant</b>	<b>BFID</b>	<b>Producer</b>	<b>Totals</b>	<b>Funds Utilized</b>	<b>Funds Remaining</b>
<b>Objective 1. Implement BMPs Recommended in the Belle Fourche River Watershed TMDL</b>						
<b>Task 1. Reduce Nonused Water</b>						
1a. 27 Stage Control Automation Projects	\$76,000.00	\$300,000.00		\$376,000.00	\$358,601.40	\$17,398.60
1b. Phase II of Canal Operational Model	\$172,558.00	\$16,900.00		\$189,458.00	\$162,380.94	\$27,077.06
1c. Line and Pipe Open Canals and Laterals						
1d. Install Four Sprinkler Systems			\$100,000.00	\$100,000.00	\$98,361.00	\$1,639.00
<b>Task 2. Complete and Install Riparian Vegetation Improvements</b>						
2. Grazing/Rangeland/Riparian Management	\$172,142.00		\$243,200.00	\$415,342.00	\$267,578.82	\$147,763.18
<b>Objective 2. Conduct Public Outreach, Complete Essential Water Quality Monitoring, and Write Reports</b>						
<b>Task 3. Conduct Public Outreach Program, Monitor Water Quality and Write Reports</b>						
3. Public Education and Outreach, Monitor Water Quality, Write Reports	\$128,000.00			\$128,000.00	\$78,998.91	\$49,001.09
Other Watershed Improvement Projects						
<b>Total</b>	<b>\$548,700.00</b>	<b>\$316,900.00</b>	<b>\$343,200.00</b>	<b>\$1,208,800.00</b>	<b>\$965,921.07</b>	<b>\$242,878.93</b>

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## OBJECTIVES/TASKS ACCOMPLISHMENTS

**OBJECTIVE 1. IMPLEMENT BMPs RECOMMENDED IN THE BELLE FOURCHE RIVER WATERSHED TMDL**

**TASK 1. REDUCE NONUSED WATER - This task is on schedule and will be complete by June 2008.**

To date in this funding segment, implementation on the Belle Fourche Irrigation District has resulted in the installation of five automated check gates (2 real-time and 3 stand alone), four automated head gates (4 real-time), equipment to monitor flow at nine flow measurement structures (9 real-time), and equipment to convert two previously automated stand alone checks to real-time. Funds remaining will be used to install additional sites by June 2008.

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The BFID has also installed over 600 feet of pipeline and 2,600 feet of lining and is currently lining approximately 2,500 feet of the Inlet Canal.

Eleven sprinkler irrigation systems have been installed to replace flood irrigated systems. This has resulted in increased water delivery efficiency and decreased sediment transport on over 1,200 acres.

**TASK 2. COMPLETE AND INSTALL RIPARIAN VEGETATION IMPROVEMENTS - This task is on schedule and will be complete by October 2008.**

Resource inventories for various ranches located throughout the watershed are currently being conducted. Implementation projects installed to date have resulted in range improvement on approximately 63,000 acres. An assessment is currently taking place that will inventory the number of riparian acres that have been impacted. Practices completed include 155,836 feet of pipeline, 17 tanks, 3 wells, and 2 pumping stations for off stream water supply along with 14,300 feet of fence for riparian corridor protection and rotational grazing.

**OBJECTIVE 2. CONDUCT PUBLIC OUTREACH PROGRAM, MONITOR WATER QUALITY, AND WRITE REPORTS**

**TASK 3. PUBLIC EDUCATION AND OUTREACH, MONITOR WATER QUALITY, AND WRITE REPORTS - This task is on schedule and will be complete by October 2008.**

There have been several public outreach activities completed. The Belle Fourche Watershed Partnership Web site is currently being maintained. The Web site is available at <[www.bellefourchewatershed.org](http://www.bellefourchewatershed.org)>. The Partnership has also presented project accomplishments, lessons learned, and plans at the BFID annual meeting, Newell Field and Home Show, Butte/Lawrence County Fair, Eastern South Dakota Water Conference, Black Hills Hydrology Conference, Belle Fourche Capital for a Day, and also in front of the South Dakota Conservation Commission. In addition, there have been quarterly scheduled meetings that are open to the public.

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## CONCLUSIONS

The project is ahead of schedule and on budget.

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Please select the pollutant, and then enter the numerical amount, units, and whether it is a TMDL related pollutant. Click in gray areas for dropdown list.  
**NOTE: If Nitrogen and/or Phosphorus are chosen, units must be lbs/yr. If Sedimentation is chosen, units must be in tons/yr.**

<u>Pollutant Type *</u>	<u>Pollutant Reduction Target</u>	<u>Current Year Pollutant Reduction</u>	<u>Cumulative Pollutant Reduction Achieved (Numerical)</u>	<u>Units</u>	<u>TMDL yes/no</u>
<b>POLLUTANTS:</b>					
<b>ADDITIONAL POLLUTANTS:</b>					
SUSPENDED SOLIDS	29,153	22,422	24,288	Tons	YES

**Wetlands/Streambanks/Shorelines**  
Please select the appropriate item as it relates to the project or task. For this reporting period there should be an actual (when available) positive numerical value for each selection

Wetlands Restored  
 Wetlands Created  
 Streambank and Shoreline Protection  
 Stream Channel Stabilization

Description	Current Year	Cumulative Total	Units
Wetlands Restored			Acres
Wetlands Created			Acres
Streambank and Shoreline Protection			Feet
Stream Cannel Stabilization			Feet