

The Oxbow

FROM THE NORTH DAKOTA STATE WATER COMMISSION

SWC Funds Water for Oil in McKenzie Co.

By Patrick Fridgen

At its March 11 meeting in Bismarck, the State Water Commission approved a 50 percent grant (\$3.5 million) to cost-share in a water supply main transmission line from the Williston Regional Water Treatment Facility to northern McKenzie County. Initially, the line will be used to support water supplies for oil development, but will later support hundreds of domestic users.

What prompted this project is the fact that along with the oil boom in western North Dakota has come a boom in the demand for water resources – both for the domestic needs of a growing workforce, and for industrial needs to support drilling operations. In response, the McKenzie County Water Resource District (MCWRD) is planning to expand its regional water service with water from Williston.

Through a study sponsored by the Garrison Diversion Conservancy District, the MCWRD and the city of Williston have been working cooperatively on a study to evaluate the feasibility of bringing water from the Williston Regional Water Treatment Plant to McKenzie County.

Initially, the plan was to deliver 3 million gallons per day (mgd) to serve the northern tier of the county, including: MCWRD's Watford City, Alexander, and Keene service areas. However, an additional alternative evaluated – a 4 mgd option to provide additional water to meet the

needs of the oil industry, proved to make more sense.

Currently, oil development in the northwest part of the state has caused great strain on groundwater resources. This in turn has caused a fair amount of controversy between oil developers, and the farmers and ranchers that have relied on those water sources for many years.

To put the amount of water required for drilling operations into perspective, it is estimated that non-Bakken formation drilling can require as much as 100,000 gallons of water per well. Bakken formation wells, however, use a great deal more water as part of their drilling process, requiring as much as 1 million

gallons of fresh water per well. With 98 drilling rigs currently operating in western North Dakota, and with groundwater resources being fairly limited in the west to begin with, this obviously has become a cause for concern among area residents.

One of the benefits of this newly proposed project is that it will bring water to McKenzie County from Williston, which draws its water from the Missouri River system – the state's most abundant surface water source. MCWRD will then initially supply water depots to be used for bulk water sales to the oil industry. Then, the revenue generated will be used to fund the local share of the previously mentioned regional water system expansions in the Watford City, Alexander, and Keene service areas. Thus, another positive is that the project will address some of the conflict between oil development interests and domestic water users.

The cost of all of the expansion projects for the 4 mgd option is about \$24.3 million. The first project, which includes the main transmission line from Williston to McKenzie County, will cost about \$7 million.

According to the U.S. Geological Survey, Bakken drilling requires substantially more water because it is a relatively tight formation consisting of low porosity and permeability rock, from which oil flows only with difficulty. To overcome this problem, wells are drilled horizontally, at depth, into the Bakken and then water and other materials (like sand) are pumped downhole at high pressure (called hydrofracturing) to create open fractures, creating artificial permeability in the tight rocks. The oil can then flow more easily out of these fractures and tight pores, and be pumped to the surface.



PHOTO: ND OIL & GAS DIVISION

ELEMENTS OF THE DEVILS LAKE OUTLET EXPANSION

The State Water Commission's efforts to expand the Devils Lake outlet from a maximum operating capacity of 100 cubic feet per second (cfs) to 250 cfs continued to move forward throughout the latter part of winter.

Work has proceeded nearly on schedule since it was initiated in January, despite the uncertainties that often go along with winter construction projects. A tentative goal has been set to have enough of the construction work completed by May 1 to allow the existing pumps to operate. The new pumps are expected to be operational by the first part of June.

This map details the five key areas where changes are being implemented as part of the expansion project.

Intake Structure

A permanent intake is being added to replace the previous pontoon intake that had to be removed each fall before freeze-up. The new permanent intake will be concrete, with stainless steel screens.

Round Lake Pump Station

Two 75 cfs electric pumps are being added at the Round Lake Pump Station, increasing the capacity by 150 cfs. Those two pumps, along with the existing two 50 cfs pumps, will increase the total pumping capacity to the desired 250 cfs. Forty-two inch pipe will also be installed from each of the new pumps into the existing standpipe.

Josephine Pump Station

Two 75 cfs electric pumps are being added at the Josephine Pump Station, increasing the capacity by 150 cfs. Those two pumps, along with the existing two 50 cfs pumps, will increase the total pumping capacity to the desired 250 cfs. Forty-two inch pipe will also be installed from each of the new pumps into the existing standpipe.

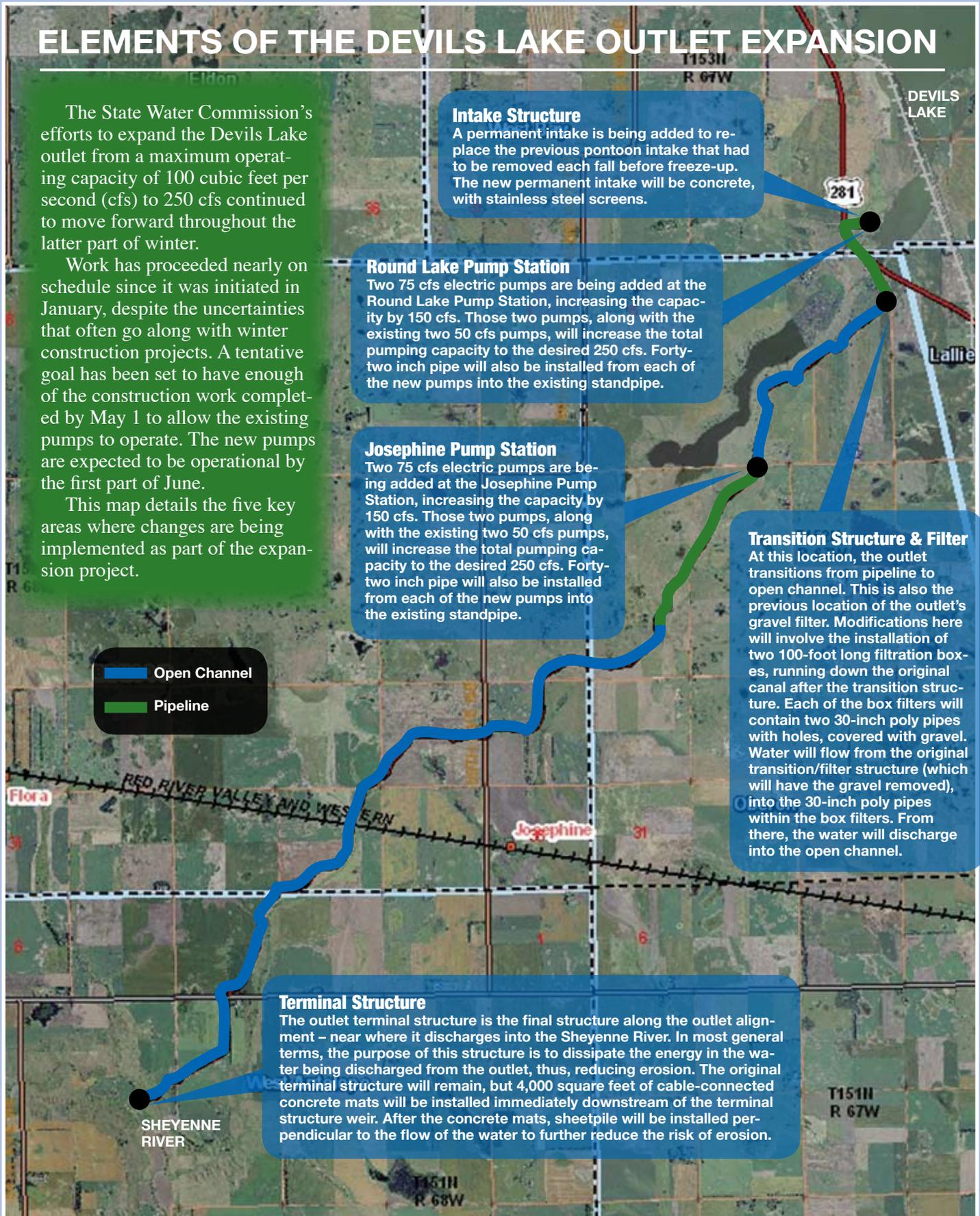
Transition Structure & Filter

At this location, the outlet transitions from pipeline to open channel. This is also the previous location of the outlet's gravel filter. Modifications here will involve the installation of two 100-foot long filtration boxes, running down the original canal after the transition structure. Each of the box filters will contain two 30-inch poly pipes with holes, covered with gravel. Water will flow from the original transition/filter structure (which will have the gravel removed), into the 30-inch poly pipes within the box filters. From there, the water will discharge into the open channel.

Terminal Structure

The outlet terminal structure is the final structure along the outlet alignment – near where it discharges into the Sheyenne River. In most general terms, the purpose of this structure is to dissipate the energy in the water being discharged from the outlet, thus, reducing erosion. The original terminal structure will remain, but 4,000 square feet of cable-connected concrete mats will be installed immediately downstream of the terminal structure weir. After the concrete mats, sheetpile will be installed perpendicular to the flow of the water to further reduce the risk of erosion.

— Open Channel
— Pipeline



Explore Your Watershed Presents. . . The Central Missouri River Institute

The focus of this year's Explore Your Watershed Institute will be North Dakota's central Missouri River watershed. The 2010 Institute will be geared toward educators, youth leaders, and natural resource personnel, and it will be held July 18-23 at Bismarck State College. The Institute will be worth four graduate credits (from Minot State, UND, or NDSU).

The Central Missouri River Watershed Institute will give participants knowledge and skills to teach about issues facing this watershed, and how area citizens, government agencies, and other decision-makers are meeting the challenges of managing water resources in this region of North Dakota. Through hands-on activities, presentations, discussions, field tours, an environmental investigation, and many demonstrations; attendees will experience North Dakota's central Missouri River watershed like no other opportunity can provide.

In addition, participants in the institute will see, hear, live, and feel the pulse of this remarkable watershed through some of the region's foremost experts on watershed science and social issues. More specifically, areas of interest highlighted in the 2010 institute include: best management practices, water treatment, wastewater treatment, stream water quality investigations, industrial water use, riparian development, endangered and threatened species, sport fisheries and enforcement, sovereign land management, Lake Sakakawea and Missouri River mainstem management, up/downstream issues outside of North Dakota, Missouri River water use and distribution, mining, energy development and transmission, and habitat restoration.

The cost of the Central Missouri River Watershed Institute is \$250. If credit is desired, a \$200 check made payable to MSU, UND, or NDSU will be taken at registration on the first day of the Institute. The \$250 registration fee may be reimbursed to educators through their local county water resource district or soil conservation district after the institute is completed. Local school development funds are sometimes also used to reimburse educators.

Applications will be accepted through June 25. Any educators who are interested should contact Bill Sharff, director of North Dakota's Project WET, at 701-328-4833 or email bsharff@nd.gov.

PHOTO: ND GAME & FISH DEPARTMENT



Missouri River riparian development (top), threatened and endangered species (bottom left), and energy production (bottom right) are only a few of the many topics to be covered at the 2010 institute.

SCHEDULED INSTITUTE TOURS:

Garrison Dam National Fish Hatchery
Garrison Dam Hydroelectric Plant
Falkirk Coal Mine
Coal Creek Power Plant
Blue Flint Ethanol Plant
Tesoro Oil Refinery
Bismarck Water Treatment Plant
Mandan Wastewater Treatment Plant
Harmon Lake Recreation Area and Dam
Burleigh Co. Restoration Demonstration
Lewis and Clark Riverboat Tour
Stream Environmental Investigations



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