# Building Strong Collaborative Relationships for a Sustainable Water Resources Future:

## STATE OF NORTH DAKOTA

SUMMARY OF STATE WATER PLANNING

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The findings contained in this report are based on the information collected from the literature search and interviews for this initiative and should not be construed as an official Department of the Army position, policy or decision unless so designated by other official documentation.

# STATE OF NORTH DAKOTA


**Figure 1. Major Watersheds in North Dakota (SWMP, 2009)**

## 1. RESPONSIBLE STATE AGENCIES/REGIONAL ENTITIES

The North Dakota State Water Commission (SWC) is the state's lead water resources planning and management agency. The Commission is chaired by the Governor and includes seven members appointed by the Governor and the Agriculture Commissioner (North Dakota Century Code (NDCC) §61-02). The State Engineer serves as the Chief Engineer and Secretary to the Commission. The SWC has five major divisions: Administrative Services, Atmospheric Resources, Planning and Education, Water Appropriation, and Water Development.

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## 2. STATE/REGIONAL WATER PLANNING STATUS

The SWC is required to develop and maintain a comprehensive water plan, the State Water Management Plan (SWMP) per NDCC §61-01-26 and §61-02-14 (SWMP, 2009). The first SWMP was published in 1968 and was updated in 1983, 1992, 1999, and most recently in 2009.

The 1999 SWMP was updated biennially by four Water Development Reports: 2001to 2003, 2003 to 2005, 2005 to 2007, and 2007 to 2009. The purpose of these Water Development Reports is to (SWC, 2006):

- Serve as a supplement to the SWMP.
- Provide up-to-date information regarding North Dakota's current and future priority water development project needs.
- Provide current information regarding North Dakota's revenue sources for water development.
- Serve as a formal request for funding from the Resources Trust Fund.
- Provide updated information regarding the Commission's cost-share policies.

Priority water projects for the 2009 to 2011 biennium are found in the 2009 SWMP. Like the 1999 SWMP, the current SWMP will also be updated by future biennial Water Development Reports. The SWC's Planning and Education Division develops both the SWMP and Water Development Reports.

Although it considers water supply for multiple uses, the SWMP does not place significant emphasis on water quality, which is the responsibility of the Environmental Health Section's (EHS) Division of Water Quality (DWQ), within the Department of Health (DOH). DWQ enforces state and federal environmental laws through various permitting, inspection, and monitoring activities, and conducts the state's groundwater protection program, surface water protection program, and waste water program (DOH, 2009).

## 3. WATER MANAGEMENT VISION AND GOALS

The mission of the SWC is "to improve the quality of life and strengthen the economy of North Dakota by managing the water resources of the state for the benefit of its people (SWC, 2009)." The vision of the SWC and for the SWMP is (SWC, 2009; SWMP, 2009):

> *Present and future generations of North Dakotans will enjoy an adequate supply of good quality water for people, agriculture, industry, and fish and wildlife; Missouri River water will be put to beneficial use through its distribution across the state to meet ever increasing water supply and quality needs; and successful management and development of North Dakota's water resources will ensure health, safety, and prosperity, and balance the needs of generations to come.*

The SWC has six agency goals (SWMP, 2009):

- *To regulate the use of water resources for the future welfare and prosperity of the people of North Dakota.*
- *To develop water resources for the future welfare and prosperity of the people of North Dakota.*
- *To manage water resources for the future welfare and prosperity of the people of North Dakota.*
- *To educate the public regarding the nature and occurrence of North Dakota's water resources.*
- *To collect, manage, and distribute information to facilitate improved management of North Dakota's water resources.*
- *To conduct research into the processes affecting the hydrologic cycle to improve the management of North Dakota's water resources.*

The SWC's agency goals are reiterated in the "North Dakota State Water Commission and Office of the State Engineer Strategic Plan 2009 to 2011." The Strategic Plan lists one or more focus projects and programs for each of its five divisions. For each program, the Strategic Plan provides an overview, its relationship to achieving SWC goals, an action plan, including tasks and target deadlines, objectives, and assumptions and perceived obstacles.

The purpose of the 2009 State Water Management Plan is to:

1. Provide information regarding current and projected water use.
2. Identify areas where water is generally available for new beneficial uses.
3. Identify goals and objectives for water resource management and development.
4. Identify potential water resource management and development projects and programs.
5. Provide current information regarding North Dakota's revenue sources for water resource management and development.
6. Serve as a formal request for funding from the resources trust fund.
7. Broadly identify water resource management and development opportunities and challenges, and provide recommendations to address them.

One of the most important components of the plan is identifying where water may be available for new development and use. The State Engineer appropriates water for beneficial use in North Dakota. Some aquifers and streams in North Dakota are becoming fully appropriated; meaning that much of the state's available water resources have already been permitted for municipal, agricultural, industrial, and recreational purposes. The SWMP provides general information on

water availability to assist development interests in identifying potential water sources when locating facilities.

EHS' goal is "to safeguard the quality of North Dakota's air, land and water resources (DOH, 2009)." EHS coordinates communications with the USEPA regarding state programs and related environmental issues. EHS also monitors and enforces compliance with federal and state environmental laws and provides environmental chemical analyses (DOH, 2009).

EHS' water-related priorities include (DOH, 2009):

- Implementing strategies to address environmental impacts and problems associated with new developments.
- Administering a water quality management program for the cleanup of targeted lakes and rivers.
- Protecting groundwater and drinking water aquifers.

DWQ's "North Dakota's Water Quality Monitoring Strategy for Surface Waters 2005 to 2014," lists the following as the state's monitoring and assessment goal: "to develop and implement monitoring and assessment programs that will provide representative data of sufficient spatial coverage and of known precision and accuracy that will permit the assessment, restoration and protection of the quality of all the state's waters." Monitoring and assessment objectives are:

- Provide data to establish, review, and revise water quality standards.
- Assess water quality status and trends.
- Determine beneficial use support status.
- Identify impaired waters.
- Identify causes and sources of water quality impairments.
- Provide support for the implementation of new water management programs and for the modification of existing programs.
- Identify and characterize existing and emerging problems.
- Evaluate program effectiveness.
- Respond to complaints and emergencies.
- Identify and characterize reference conditions.

## 4. SCOPE OF WATER RESOURCES PLANNING AND MANAGEMENT

Although the SWC does not conduct regional or watershed planning and management, for the purposes of the SWMP, the state is divided into five major watersheds (Figure 1) that are part of two major drainage basins: the Missouri River and the Hudson Bay. The Missouri and Hudson Bay Basins are separated by the Continental Divide.

Both droughts and floods have affected the state in the last century. Flooding typically occurs in the eastern region of the state, which generally averages more annual precipitation than the western half. Severe flooding occurred in 1997 in the Red River Valley when record-breaking snow and a major spring ice storm resulted in several ice jams that greatly impacted the city of Grand Forks.

Water levels in Devils Lake have risen over 23 feet since 1992. The lake is a terminal lake, so water leaves through evapotranspiration or by overflowing the basin's boundaries, which has not occurred for thousands of years. Some of the challenges associated with Devils Lake's flooding situation include tens of thousands of acres of flooded agricultural land, and the relocation of houses, roads, and structures, such as the City of Devils Lake's water supply line.

Flooding associated with aging dams is also a concern for North Dakota. The SWC's Dam Safety Program inspects 109 high and medium hazard dams in the state on a rotational basis. Each dam is fully inspected at least once every 10 years, and high-hazard dams are inspected once every four years. Many of the state's dams were constructed over 50 years ago and are now nearing or have surpassed their estimated life expectancy.

Despite the negative impacts of droughts that have occurred throughout the state's history, North Dakota currently does not have a published statewide drought mitigation plan. Emergency planning is the responsibility of the state's Department of Emergency Services (DES). DES' Division of Homeland Security outlines step-by-step actions for city, county and tribal governments in the "North Dakota Disaster Procedures Guide (2006)." This is a response only plan and does not consider mitigation strategies.

Like most of the western states, North Dakota must share its water resources with surrounding states. Currently, North Dakota has two apportionment agreements: one between the U.S. and Canadian governments over the distribution of water from the Souris River, and another with Montana and Wyoming as part of the Yellowstone River Compact. Within the state, tribal reserved water rights issues are open-ended and unsettled. Under North Dakota law, tribal water rights are unclear. Future tribal claims will alter water availability and allocation (SWMP, 2009).

Population estimates for North Dakota indicate that overall population is expected to increase slightly. As shown in Figure 2 the population in the western portion of the state is expected to decrease slightly from 2000 to 2020 while the population in the eastern portion of the state is expected to increase. Overall, the estimates from the U.S. Census Bureau show North Dakota's population increasing by about 1.5 percent from 642,207 in the year 2000 to 651,291 in the year 2020 (SWMP, 2009). Since the 1980s, there has been a shift in population from rural to urban centers. Currently, the Red River Valley supports the highest population in the state, where despite its susceptibility to flooding, has also experienced periodic droughts.

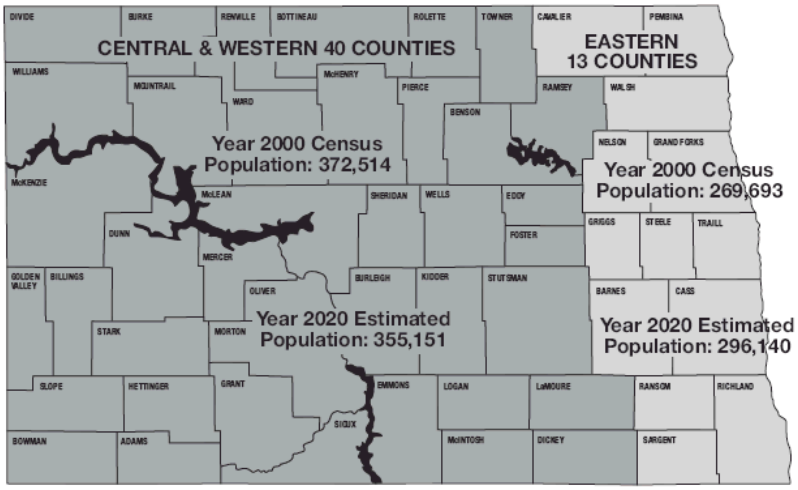


**Figure 2. The Bureau of Reclamation's Population Segmentation of North Dakota Counties (SWMP, 2009)**

To address future water supply challenges, the SWMP estimates water demand for municipal, rural, and industrial uses in 2020 (Figure 3) for the central and western counties, and eastern counties. This division is based on the Bureau of Reclamation's population segmentation (Figure 2). While the SWMP provides estimates of the state's total water availability, it does not include a regional or county-based estimate of this availability or a gap analysis to identify areas of future water scarcity.

In addition to shifting population concentrations, the number of industrial and agricultural developments has increased and is projected to continue increasing across the state (Figure 3). As a result, both the state's groundwater and surface water resources are becoming more fully appropriated. For example, gaining energy independence is one of the six pillars of Governor John Hoeven's administration initiatives and policies. Since 2001, the state has invested over $2 billion into renewable energy production, which includes increasing energy produced by ethanol, biodiesel, coal, wind, and oil and gas. Future development and expansion of ethanol production plants as well as oil drilling into non-Bakken and Bakken Formations will amount to increased water demand in the industrial sector. Estimates on increases in water demand for renewable energy production is provided in the SWMP.

To address its vision and goals, the 2009 SWMP provides a series of water development projects for the 2009 to 2011 biennium. These projects are grouped into seven categories based on SWC cost-share policies:

1. Flood control
2. Rural flood control
3. Snagging and clearing
4. Irrigation
5. Studies and planning
6. Multi-purpose
7. Water supply projects

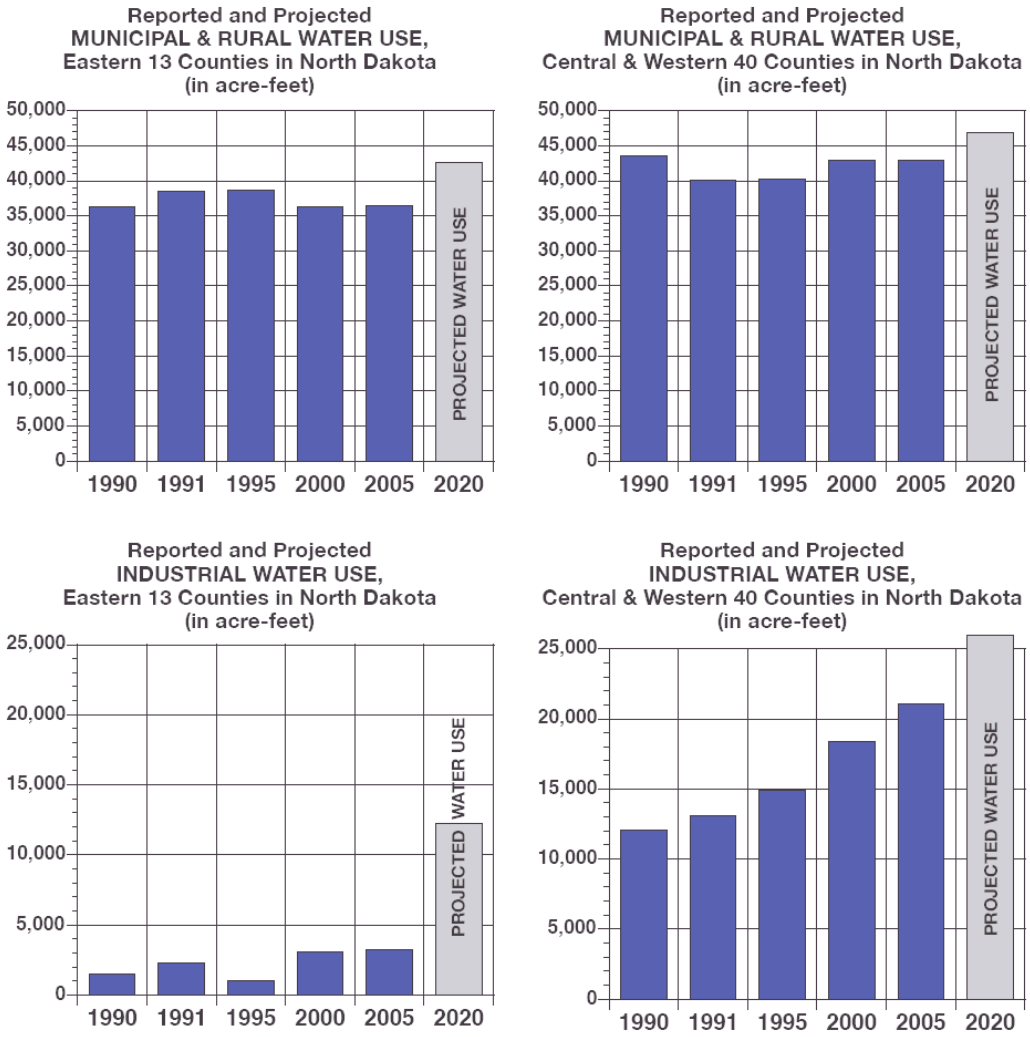


**Figure 3. Reported and Projected Water Use for Multiple Use Types (SWMP, 2009)**

For each project, the SWMP lists the affected county; watershed; federal, state, and local contribution; and the total project cost. Priority water development projects for the 2009 to 2011 biennium are listed in Figure 4. Some of the state's on-going priority projects include (SWMP, 2009; Strategic Plan, 2009):

- Southwest Pipeline Project—Draws water from Lake Sakakawea and currently provides high quality water to a population of ~35,000 in southwest North Dakota. Supplies an ethanol plant, Red Trail Energy, in Richardton.
- Northwest Area Water Supply—Will divert water from Lake Sakakawea to Minot through 45 miles of pipeline, where it will then be distributed to areas throughout northwest North Dakota.
- Red River Valley Water Supply—Develop a sustainable water supply for the Red River Valley in North Dakota and the cities of East Grand Forks, Moorhead, and Breckenridge in Minnesota.
- Devils Lake Flood Control—Program includes upper-basin water management, infrastructure protection, and construction of a outlet to the Sheyenne River.

- Municipal, Rural and Industrial Water Supply Program—Supports the development of MR&I water supply systems.

**2009-2011 Water Development Priorities**

| PRIORITY PROJECTS | 2009-2011 (MILLIONS) |
|---|---|
| Cloud Modification | 0.7 |
| Devils Lake Outlet | 2.0 |
| Fargo Southside Flood Control | 20.0 |
| General Water Management | 11.3 |
| Irrigation | 1.0 |
| MR&I | 10.0 |
| Northwest Area Water Supply | 12.0 |
| Northwest Oil Impact MR&I | 5.0 |
| Red River Valley Water Supply | 30.0 |
| Southwest Pipeline Project | 12.0 |
| EXPENDITURE TOTAL | 104.0 |

**Figure 4. 2009 to 2011 Water Development Priorities (SWMP, 2009)**

The SWC funds the majority of the state's water projects. Funding comes from several sources including the state's General Fund, the Dakota Water Resources Act, the Municipal, Rural, and Industrial (MR&I) Water Supply Program, the Resources Trust Fund, and the Water Development Trust Fund. In addition to these sources, the SWC also issues revenue bonds for water projects, and the SWC has shared control of the Drinking Water State Revolving Loan Fund.

## 5. PARTNERSHIPS, STAKEHOLDER, AND PUBLIC INVOLVEMENT

Numerous local, state, federal, and non-governmental entities often collaborate through partnerships with the SWC in efforts to resolve the state's water resource management and development problems and issues. The SWC is committed to pursuing partnerships that will use and protect water resources for North Dakota citizens, not only for today, but also for future generations.

North Dakota's federal partners include USACE, the Bureau of Reclamation, and the USEPA. At the state level, the SWC partners with DOH, the Department of Mineral Resources, the Department of Agriculture, and Game and Fish Department. Through its apportionment agreements and its membership in the Missouri River Association of States and Tribes, North Dakota partners with Wyoming, Montana, South Dakota, Nebraska, Iowa, Kansas, and Canada (Manitoba).

The state also partners with numerous regional entities including the Devils Lake Basin Joint Water Resources Board, Missouri River Joint Water Board, Souris River Basin Joint Board, Upper Sheyenne River Joint Water Resources Board, Red River Joint Water Resource District, **Garrison Diversion Conservancy District,** ND Water Coalition, ND Water Education Foundation, ND Water Users Association, ND Irrigation Association, Red River Basin Commission, Red River Water Resources Council, Upper Missouri River Water Users Association, and the Western States Water Council (WSWC).

## 6. PLAN IMPLEMENTATION STRATEGY

North Dakota implements actions through its various priority programs and projects. SWC programs and projects are incorporated in the SWC's Strategic Plan, the SWMP, and the biennial Water Development Plans that update the SWMP.

The 2009 SWMP also provides a series of recommendations that "all require future study and are intended to serve as a starting point to address long-term water management issues." These recommendations include:

- Funds must be secured to address dam safety issues and dam repairs.
- The SWC should consider changing the cost-share policy to provide local governments with more state cost-share to either fix or demolish unwanted dams.
- Drought planning, including monitoring, impact assessment, and mitigation planning efforts must be implemented.
- The state must be diligent in solving the water supply shortage that exists during drought in eastern North Dakota.
- Conservation measures must be evaluated and implemented so that water requirements for all water users and interests can be met.
- The State Engineer will continue to study and collect water resource data that is essential in identifying available water sources for agricultural and industrial users; for meeting municipal demand; and for fish and wildlife and recreation purposes.
- The state must continue to protect and preserve North Dakota's right to use Missouri River water now and for future generations.
- Climate change and the possible effect it may have on the state's water resources is an unknown factor that will have to be monitored and assessed closely in the future.
- The state must continue to work to address the flooding crisis involving the rise of Devils Lake.
- The SWC should study the ability-to-pay concept to determine if a more equable cost-share policy can be developed and implemented for local entities that have difficulty in coming up with their cost-share requirement based upon current policy.
- New partnerships involving cooperative and collaborative efforts must be sought to resolve water management problems and issues.
- Water resources managers at all levels are encouraged to partner in efforts not only to educate the public about the potential problems involving aquatic nuisance species (ANS), but also to monitor and mitigate for the occurrence of ANS in North Dakota's waters.
- The Commission should continue to educate potential future industrial water users about the quality and availability of North Dakota's surface and ground water resources.
- A Summer Advanced Watershed Applications Workshop (two credits) could be designed through Project WET to provide up to 20 secondary educators per year the tools they would need to connect their classroom students with practicing watershed scientists and scientific methods and techniques.
- A Youth Technology and Career Exploration Program could be designed through Project WET for a select group of Grade 9 to 12 students whose teachers have been involved in the Summer Advanced Watershed Applications Workshop.

- Project WET, with the cooperative effort of many organizations, associations, and government agencies, will develop water and natural resource education programs that involve individuals in their own communities.

## 7. OUTCOMES ASSESSMENT PROCESS

The SWC reports on the progress of its strategic plans every two years, with the most recent published report released in 2007 for the 2005 to 2007 biennium. These progress reports reiterate the agency's goals and policies. It then summarizes water resources-related legislation of the past two years and the progress of priority programs and projects within each of the SWC's five divisions. In general, these progress summaries are positive: focusing primarily on achievements rather than any challenges or failures. The progress report concludes with a breakdown of SWC program and project expenditures as well as an overview of the long-term debt associated with water development bonds. A progress report for the 2007 to 2009 biennium is due in 2009.

The SWC does not formally assess the planning process and outcomes of the SWMP and Water Development Reports. Instead, the SWC focuses on the progress of water development projects described in the SWMP or Water Development Reports. In general, the SWMP and Water Development Reports summarize the progress made on on-going water developments and lists projects completed during the previous biennium. If challenges or set backs are encountered (e.g., funding, weather, etc.), they are duly noted in the reports. The priority projects and activities are dynamic and the state has the ability to reprioritize after legislative approval to help ensure that the highest needs are addressed. North Dakota emphasizes a dynamic planning process; when the needs of the state change, the planning changes. Resource availability and needs are assessed each years and then planning is done accordingly. The state also emphasized that water decisions are largely made at local levels and then aggregated across the state. The Water Commission provides critical funding for projects and activities identified at the local level.

According to the 2009 SWMP, significant progress has been made during the last 10 years on priority water development projects that were identified in the 1999 SWMP. Some of these projects have been completed (e.g., Grand Forks Flood Control, Wahpeton Flood Control, and Maple River Dam) while others are still on-going (e.g., Southwest Pipeline, Northwest Area Water Supply, Devils Lake Flood Control, Devils Lake Water Supply, MR&I Water Supply Program).

## 8. NEEDS, CHALLENGES AND CRITICAL PRIORITIES - INTERVIEW INSIGHTS

Maintaining access to and use of the Missouri River is critical for the state's future. The Missouri River is a vital water supply to many rural and regional water suppliers and communities. Many of North Dakota's surface and groundwater systems are reaching a state of full appropriation. Continuing to meet growing water use demands for municipal and industrial purposes is a priority need. The Missouri River is the best available resource to meet the needs especially in the growing energy sector. This included biofuels, coal, and oil and gas (especially in the northwest portion of the state). Drought conditions in the western half of the state has

increased competition for water supplies and caused economic impacts to uses including agriculture and recreation-related industries. Flood damage reduction remains a priority issue in the eastern portion of the state.

Availability of funding through congress has slowed the progress on projects; especially in regard to funding for municipal, industrial and rural water supply facilities which is the agreed to compensation to North Dakota for flooding of Missouri River bottomland when the mainstem reservoirs were constructed.

Litigation and operations of the Missouri River pursuant to the Master Manual has been a focus for well over a decade. Issues associated with both operations for navigation and endangered species issues have impacted reservoir levels which impact both water intakes and recreation. The complexity of federal laws and competing mandates is difficult to plan for and address. Missouri basin states have tried to work collaboratively, but there have been conflicts with Missouri River operations and the needs of other states/navigation/other mandates regarding the operations of the river. It took 10 years to write new master manual for the Missouri River and it has effected water management in North Dakota. Demands from other states for water during droughts, and navigation creates challenges and impacts to North Dakota (project water intakes & recreation impacts from low reservoir levels). The Endangered Species Act has been another big challenge.

The state does not always see significant cooperation between COE & Bureau largely resulting from the differences in manuals/mandates these agencies must go by. In addition, the Corps and Bureau do not seem focused as the state would hope on helping to provide water and water distribution for North Dakota.

Funding is needed for aging dams' especially smaller dams build in the 1930's that require repairs and upgrades. As a result some may have to be breached resulting in lost storage.

Localized flood issues, especially in the east side of state remains an ongoing challenge. Conversely in the west side of state there has been 7 to 8 years of drought in the Missouri River basin resulting in severe impacts to reservoir levels, livestock, and recreation.

Water availability and needs associated with mineral development, and especially oil wells is a challenge in northwest North Dakota.

Finally, the delivery of promised funding for approved federal projects from federal agencies and congress would help improve water planning and management and responsiveness to critical water needs in North Dakota.

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Much of the language and information in this summary comes directly from reports published by the North Dakota State Water Commission.

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