

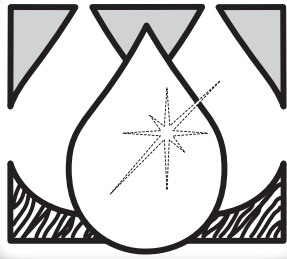
EXECUTIVE SUMMARY

2009

# State Water Management Plan



North Dakota State Water Commission



# 2009 State Water Management Plan

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## ***EXECUTIVE SUMMARY***

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## ***A MESSAGE FROM THE STATE ENGINEER***

*I am pleased to present the 2009 State Water Management Plan to the citizens of North Dakota. This new plan comes at a time of rapid pace changes across the state. Expansion of energy development and changes in agri-business are creating many business opportunities and new jobs that will help secure the state's prosperity. However, these changes are creating unprecedented demands on our most precious natural resource – water.*

*North Dakota will be challenged in the future with population shifts, increased oil and gas production, expansion of the alternative fuels industry, new value added agricultural processing, and increased agricultural production. All of which will have a significant impact on our surface and ground water resources. The 2009 State Water Management Plan identifies needs that exist across North Dakota and the infrastructure investments that will be required in the next biennium and the next decade. Investments must be made today to provide quality water supplies as well as relief from flood damages in the future.*

*While this plan is not a strict blue print it does provide important guidance for decision making at all levels. Our goal is to provide the maximum amount of benefit from North Dakota's water resources to meet today's needs while protecting the resource for future generations.*

*Now, at the beginning of the 21st Century, we must make wise choices that will create the best possible quality of life for our children and future generations.*

*Dale L. Frink*

*Dale L. Frink, P.E.  
North Dakota State Engineer*

# INTRODUCTION

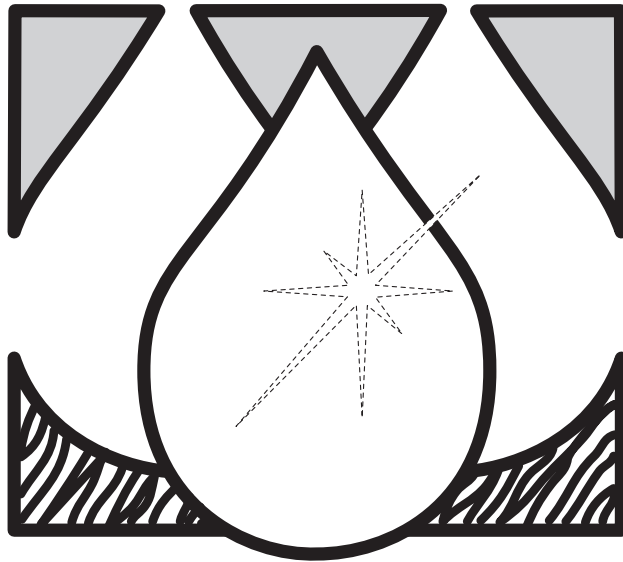
**W**ater is, without question, North Dakota's most precious natural resource. Water is not only critical for life but is required in every human enterprise. North Dakota water law established the foundation for the wise management and development of this precious resource.

The State Legislature has given this very important responsibility to the State Water Commission (SWC or Commission). It is the responsibility of the Commission to develop, protect, and conserve the state's water resources for the benefit of current and future generations of North Dakotans. Part of this responsibility involves facing water resource management challenges with thoughtful insight, determination, and persistence; yet always being mindful of the necessity of the sound stewardship of our most treasured resource. . . water!

## *Purpose*

The purpose of the 2009 State Water Management Plan is to:  
1) provide information regard-

ing 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 re-



source 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; and 7) broadly identify water resource management and development opportunities and challenges, and provide recommendations to address them.

One of the most important components of this 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 on the brink of becoming fully appropriated; meaning that much of the state's available water resources have already been permitted for municipal, agricultural, industrial, and recreational purposes. This report will provide general information and assist development interests in identifying potential water sources when locating facilities. It will assist development interests in the very early planning stages of project development.

Thus avoiding unnecessary expense and delay in project implementation. Developers should determine early in the planning process that a reliable, quality water source is available close to their proposed project facility. In areas of short supply, the Commission should be contacted early in the planning stages of project development to obtain more detailed information regarding the availability of water in a specific area.



# GOALS AND OBJECTIVES

**T**he purpose of the following goals and objectives is to more clearly define where North Dakota's long-term water management and development efforts will be directed in the future. By pursuing and implementing these goals and objectives, North Dakota will meet many of the currently unmet water management and development needs across the state.

## **GOAL:**

**To regulate the use of water resources for the future welfare and prosperity of the people of North Dakota.**

## **OBJECTIVES:**

- Encourage the most efficient use of water by all users.
- Appropriate water resources with consideration of its availability and impacts to exiting permit holders.
- Maintain comprehensive water rights records to ensure that appropriations are based on the best available information.

## **GOAL:**

**To develop water resources for the future welfare and prosperity of the people of North Dakota.**

## **OBJECTIVES:**

- Implement the Dakota Water Resources Act of 2000 to meet water supply needs of people throughout North Dakota.

- Complete the Northwest Area Water Supply, the Southwest Pipeline, the Red River Valley Water Supply, and other water distribution systems.
- Support the development of structural flood control projects in communities, where appropriate.
- Support the development of ring dikes for farmstead protection.
- Support irrigation development to encourage growth and diversification in the agricultural industry.
- Develop systems to provide sufficient quantities of Missouri River water to meet North Dakota's future demands, and secure water rights to protect those uses.
- Develop small dams where appropriate to retain water for use in times of scarcity.
- Support development of riparian buffer zones where applicable.
- Assist communities and rural water associations in funding and developing water supplies.

## **GOAL:**

**To manage water resources for the future welfare and prosperity of the people of North Dakota.**

## **OBJECTIVES:**

- Recognize long-term sustainable use of available water resources.
- Encourage best land management practices.

- Coordinate with and assist other state agencies in the protection of water quality.
- Assist the ND Department of Health (Department of Health) in monitoring water quality and well-head protection.
- Support increased monitoring of water quality to detect pollution sources.
- Encourage and implement a balance of structural and non-structural techniques for reducing flood damages.
- Ensure all cloud seeding projects are conducted in a scientifically sound and environmentally safe manner.
- Develop/refine watershed models and techniques.
- Encourage and assist with the development of a comprehensive state drought mitigation plan.
- Maintain channel flow capacity of rivers and streams.
- Coordinate bank stabilization efforts on public lands.
- Coordinate with federal, state, and local entities to reduce high sediment loads on the Missouri River and other river systems.
- Encourage the recognition of downstream environmental and economic effects of flooding through more comprehensive floodplain management planning.

- Encourage the consideration of water quality in floodplain management and emergency planning.
- Assist communities with technical evaluations of potential floodplain development.
- Improve coordination and communication between state agencies and local entities to improve management of rural flood control issues.
- Coordinate the development of new Digital Flood Insurance Rate Maps (DFIRMS).

**GOAL:**  
**To educate the public regarding the nature and occurrence of North Dakota's water resources.**

**OBJECTIVES:**

- Continue support of the Water Education for Teachers (WET) program.
- Continue public information/education regarding our atmosphere and how it works, and the capabilities and limitations of cloud seeding.
- Encourage floodplain management efforts in counties and communities.
- Provide incentives through voluntary education programs to encourage private landowners to maintain or enhance environmental quality.
- Enhance public information/education programs on floodplain management.
- Improve training opportunities for floodplain managers.
- Encourage the implementation of land treatment methods to help

control runoff during spring snowmelts.

- Encourage communities and counties to enroll in the National Flood Insurance Program.
- Encourage public knowledge concerning the location of floodways.
- Encourage reuse, reclamation, and conservation of water.
- Continue public information/education programs on irrigation opportunities.
- Encourage research, best management practices, and high-tech agricultural practices for more efficient application of agricultural chemicals and fertilizers.
- Improve public information/education efforts regarding sovereign lands of the State of North Dakota.
- Improve public information/education efforts on tile drainage.

**GOAL:**  
**To collect, manage, and distribute information to facilitate improved management of North Dakota's water resources.**

**OBJECTIVES:**

- Evaluate quality and quantity of surface and ground water resources and provide public inventories of water availability.
- Continue and improve the state-wide observation well network used to gather water level and water quality data.
- Ensure that adequate records are kept of all cloud seeding operations.
- Continue and improve the state-wide growing season precipitation

reporting network.

- Continue the dissemination of project weather radar and precipitation data via the Internet.
- Continue to implement the Commission's Web-based Map Service.
- Continue to provide and improve the Commission's Web-based Water Resources Information Management Systems.
- Maintain and improve the existing precipitation monitoring network to aid in flood forecasting.
- Maintain or enlarge the existing stream gauge system, particularly in areas subject to overland flooding and around smaller streams in cooperation with the U.S. Geological Survey.
- Support research to determine how, when, and at what rates water can be applied to various soil types and crops to arrive at long-term cost-effective, efficient use of water.

**GOAL:**  
**To conduct research into the processes affecting the hydrologic cycle to improve the management of North Dakota's water resources.**

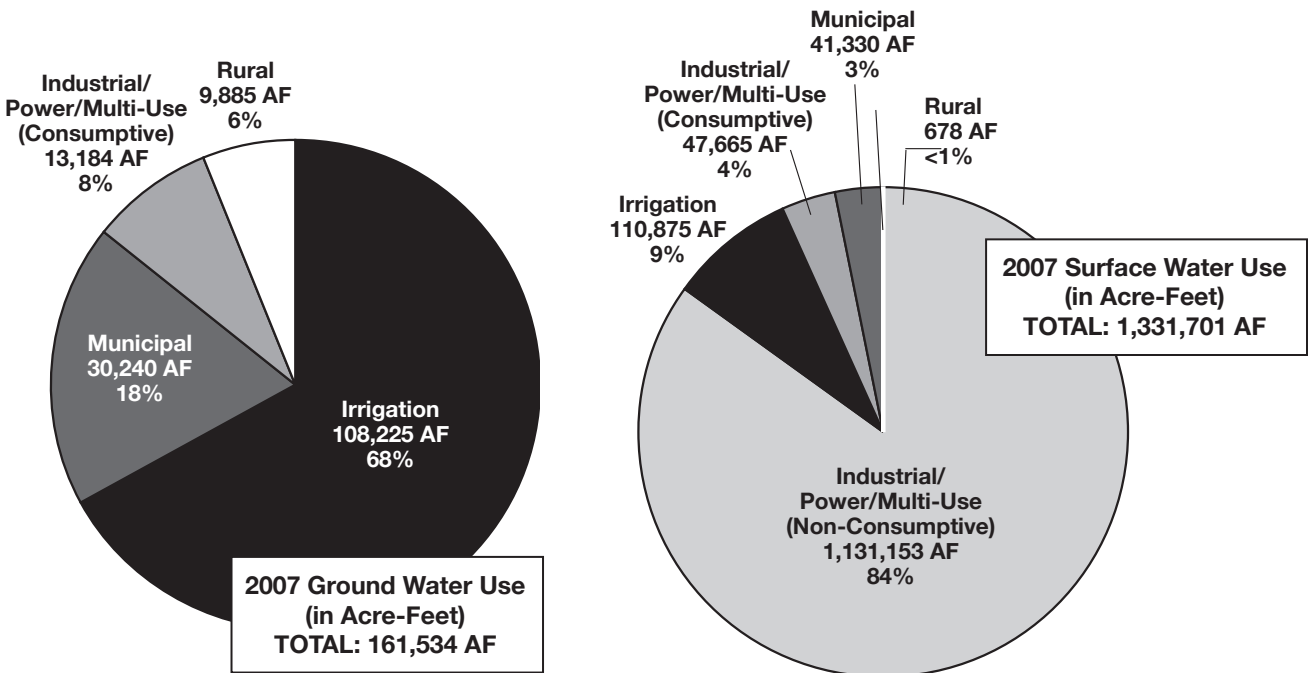
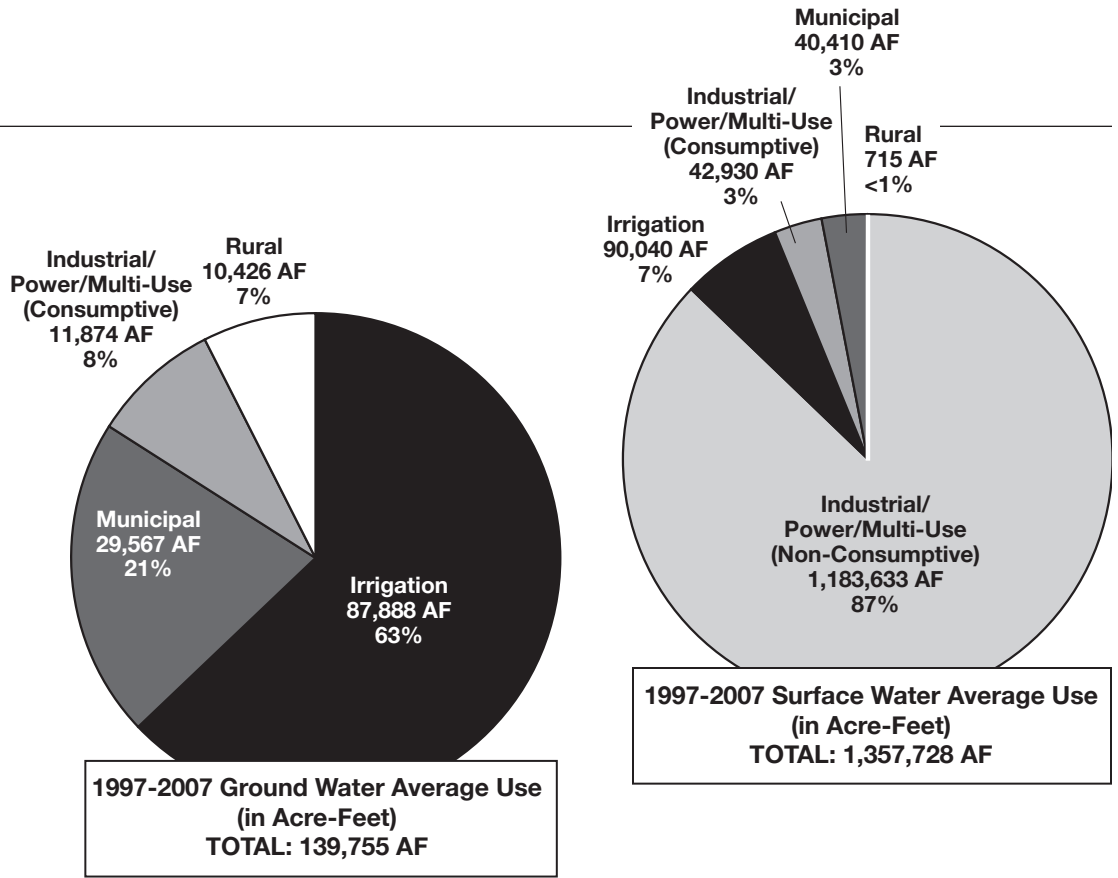
**OBJECTIVES:**

- Conduct studies of the nature and occurrence of water to optimize its conservation and development throughout the state.
- Evaluate the impacts of cloud seeding on precipitation patterns and the environment.
- Define hail climatology for North Dakota.
- Conduct basic storm research in cooperation with universities and federal agencies.

# WATER USE NEEDS AND TRENDS

## Current Water Use

Water in North Dakota is used in a variety of ways. While the traditional uses of “mining, irrigating, and manufacturing” found in the North Dakota Constitution in Article XI, Section 3 still remain prevalent, new diverse uses and needs are continually being created.





## Future Water Needs

North Dakota's future water needs and trends will be influenced by a number of factors. Most importantly, we can expect future trends to be driven primarily by population patterns, and current

and expected economic development opportunities. However, it is difficult to predict all of the factors that may lead to the next population shift in our state, or to identify where the next industrial boom might occur, and what it might involve.

## Water Use Estimates

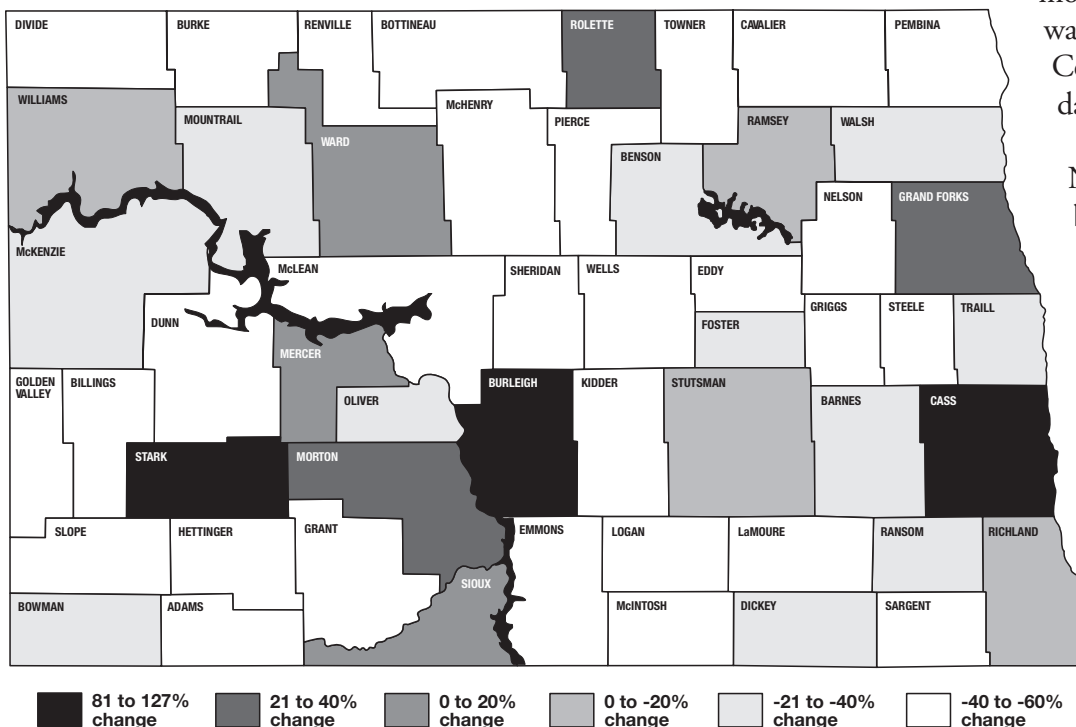
For future estimates, the year 2020 was used for all water use projections, since this was the most futuristic population projection available for North Dakota from the U.S. Census Bureau. In addition to using population data for making predictions of human consumption of water, the year 2020 was used in making estimates for irrigation, industrial, and thermoelectric water use needs. Mining and aquaculture account for relatively small amounts of water use in North Dakota, so they were grouped within the industrial use category. Livestock water use is not monitored by the SWC, but a general description of current and future trends will be provided in later sections using U.S. Department of Agriculture statistics. Domestic water use is also not monitored by the SWC, but was estimated using U.S. Census Bureau population data.

Numerous studies have been undertaken to evaluate future water needs in North Dakota. The most recent study was completed by the Bureau of Reclamation (BOR) for the Red River Valley Water Supply Project. The BOR study evaluated the water needs for 13 counties within the Red River Valley port-

**Population Trends:  
North Dakota's Ten Largest Cities**

RANK	CITY	1960 CENSUS	2006 ESTIMATE	CHANGE	% CHANGE 1960-2006
1	Fargo	46,662	90,056	43,394	93%
2	Bismarck	27,670	58,333	30,663	111%
3	Grand Forks	34,451	50,372	15,921	46%
4	Minot	30,604	34,745	4,141	14%
5	West Fargo	3,328	21,508	18,180	546%
6	Mandan	10,525	17,449	6,924	66%
7	Dickinson	9,971	15,636	5,665	57%
8	Jamestown	15,163	14,813	-350	-2%
9	Williston	11,866	12,303	437	4%
10	Wahpeton	5,876	7,907	2,031	35%

**Percent Change in Population by County,  
North Dakota, 1960 to 2007**



tion of North Dakota (and the communities of Breckenridge, Moorhead, and East Grand Forks in Minnesota). The BOR report estimated that by the year 2050 there would be an annual water use demand of 68,168 acre-feet for municipal purposes, and 23,890 acre-feet for industrial purposes. The actual municipal water use for all 13 counties peaked in 1991 at 33,000 acre-feet. Based on census data for 2020, the population for the 13 counties in the BOR study would see a 4 percent increase, or 27,000 people, while the central and western 40 counties would experience a 4 percent decrease, or 17,000 people.

The following water use estimates use the BOR’s population segmentation of North Dakota as shown in the map below. The eastern 13 counties were grouped as one water use and population entity, and the remaining 40 central and

western counties were grouped as the other water use and population entity.

### Public and Domestic Water Use

When historic water use trends for the eastern 13 counties are examined, it is evident that municipal water use for the last 15 years has been fairly constant, between 30,000 to 33,000 acre-feet. Rural water use has increased slightly, from 5,000 acre-feet to 6,500 acre-feet. One of the contributing factors to this trend is that small towns are moving their use to rural water systems to meet new EPA water quality requirements. Using population data, along with historic water use, projections were estimated based on an 8 percent multiplier for human use. This results in an estimated municipal and rural use of 42,600 acre-feet

per year (38 MG/Day) by the year 2020 for the 13 Red River Valley counties.

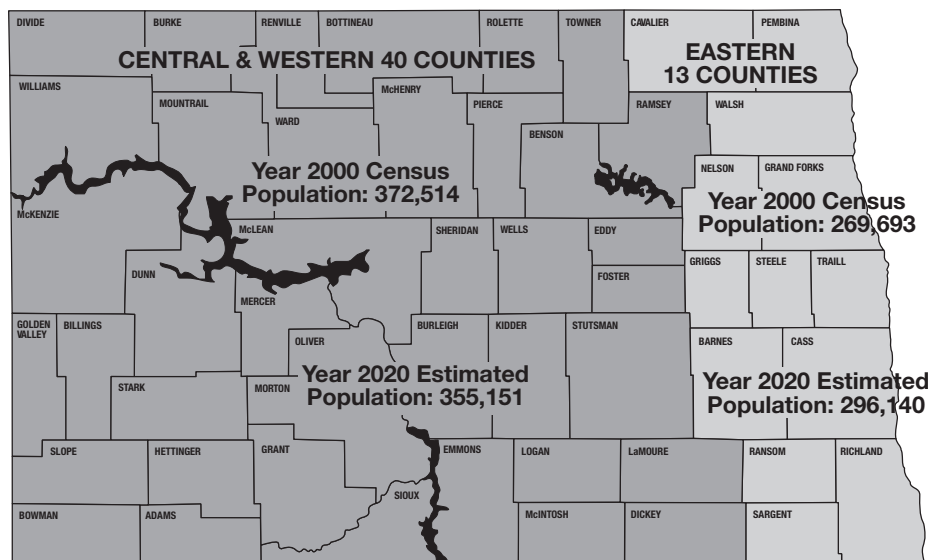
When historic water use trends for the central and western 40 counties are examined, it is evident that municipal water use for the last 15 years has been fairly constant, ranging from 36,000 to 40,400 acre-feet. Rural water use increased by 1,200 acre-feet from 1990 to 1995, and then stabilized at around 4,600 acre-feet. Using population data, along with historic water use, projections were estimated based on a 4 percent multiplier for human use. This results in an estimated municipal and rural use of 46,800 acre-feet per year (41.8 MG/Day) by the year 2020 for these 40 counties.

### Industrial Water Use

Industrial water use in the eastern 13 counties more than doubled in the last 15 years, from 1,500 acre-feet in 1990, to 3,200 acre-feet in 2005. Industrial water use for the 13 counties in eastern North Dakota is estimated to be approximately 12,200 acre-feet per year (10.9 MG/Day) by the year 2020.

Industrial water use in the central and western 40 counties nearly doubled in the last 15 years, increasing from 12,000 acre-feet in 1990, to 22,000 acre-feet in 2005. Industrial water use for the 40 counties in the central and western counties of North Dakota is estimated to be approximately 26,000 acre-feet per year (23.2

**Bureau of Reclamation’s Population Segmentation of North Dakota Counties**



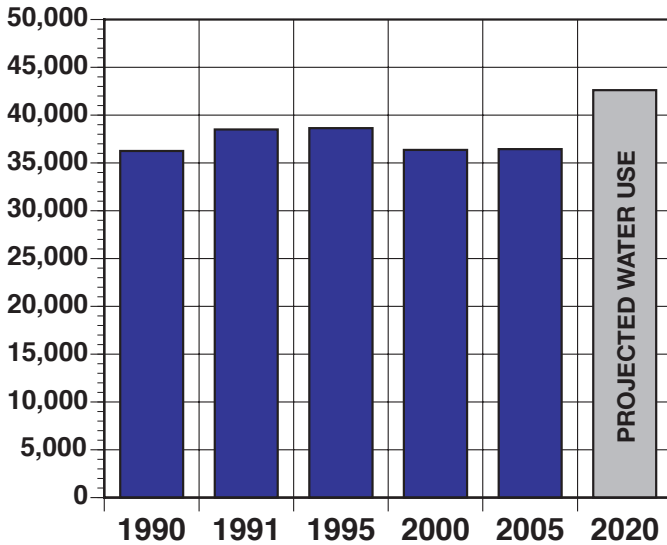
MG/Day) by the year 2020.

Potential changes within the agricultural processing industry that will have the greatest impact on future water development and appropriation include commodity

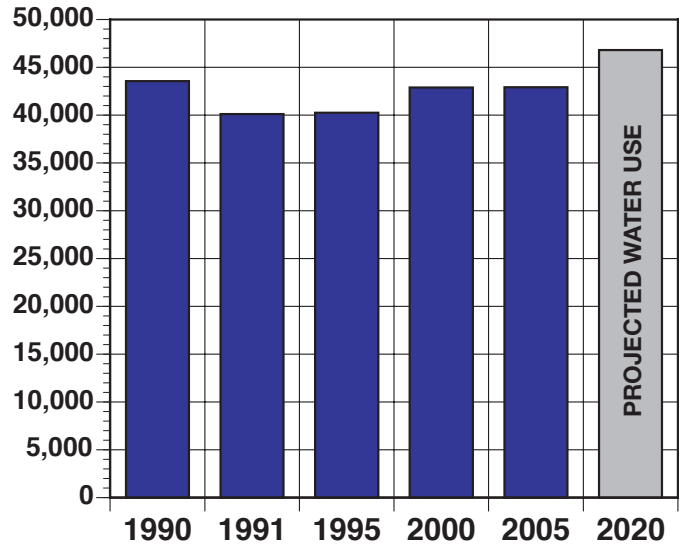
prices, changes in the Conservation Reserve Program (CRP), and the push for increased ethanol production. Closely related will be potential impacts to future irrigation water use, which is addressed in a separate section.

In terms of ethanol development, it should be noted that in 2007, two industrial permits for 6,200 acre-feet were issued for ethanol plants in southeast North Dakota, which have yet to put water to beneficial use. It is anticipated that

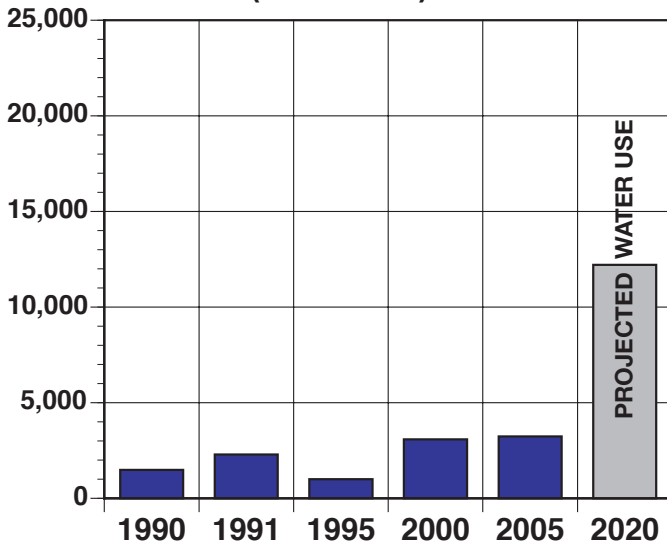
**Reported and Projected MUNICIPAL & RURAL WATER USE, Eastern 13 Counties in North Dakota (in acre-feet)**



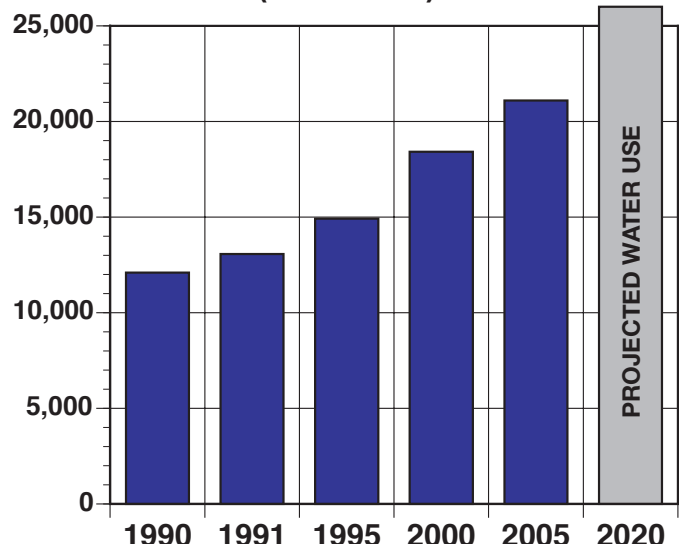
**Reported and Projected MUNICIPAL & RURAL WATER USE, Central & Western 40 Counties in North Dakota (in acre-feet)**



**Reported and Projected INDUSTRIAL WATER USE, Eastern 13 Counties in North Dakota (in acre-feet)**



**Reported and Projected INDUSTRIAL WATER USE, Central & Western 40 Counties in North Dakota (in acre-feet)**



### Water Needed For ETHANOL PRODUCTION

- 3 to 6 gals. of water are needed to produce 1 gal. of ethanol
- 100 Mgal plant requires 900 to 1,850 AF of water
- That's equal to 8 to 16, 135-acre center pivot irrigation systems (based on 10-in. annual application)
- Water use for an average 100 Mgal plant is equal to Devils Lake or Wahpeton's annual water use

by 2020 there will be two more ethanol plants needing a total of 2,800 acre-feet of water per year in the Red River Valley. In western North Dakota, two ethanol plants were built and began putting water to beneficial use during 2007. Each plant has a water permit for nearly 750 acre-feet. It is anticipated that by 2020 there will be two more new ethanol plants, needing

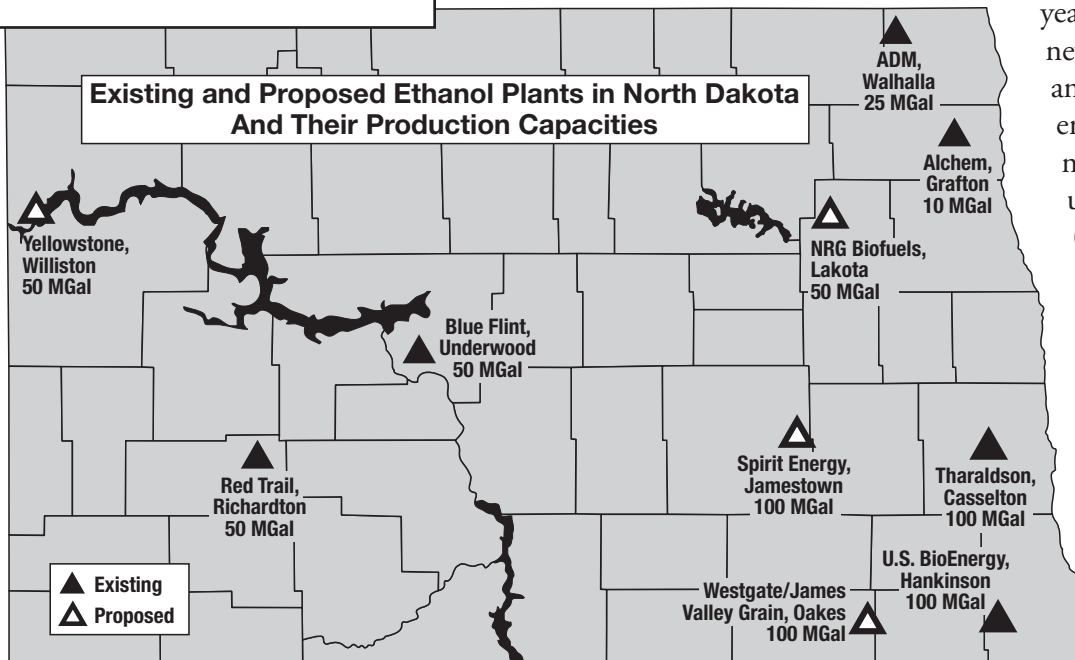
a total of 3,400 acre-feet of water per year.

Another important industrial water use that will have an influence on future appropriation is oil well development. According to the North Dakota Department of Mineral Resources' (DMR), Division of Oil and Gas, 15 non-Bakken drilling rigs are expected to drill 10 wells each per year (for a total of 150 new non-Bakken wells annually) for the next several years. Rigs drilling in non-Bakken formations use up to 0.3 acre-feet (100,000 gallons) per well. Therefore, non-Bakken drilling could require as much as 45 acre-feet (15 million gallons) of new water per year.

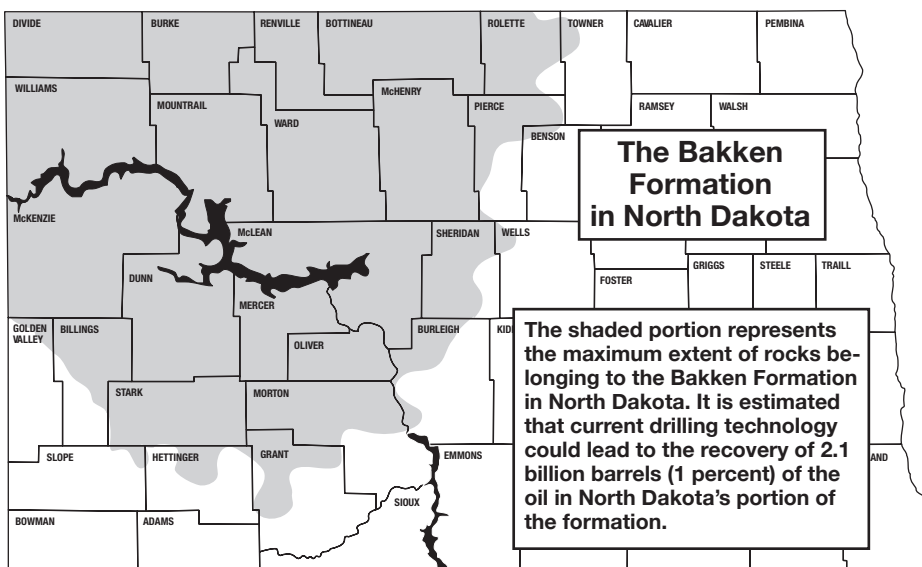
Bakken wells, however, use a great deal more water as part of the drilling process, requiring

just over 3 acre-feet (1 million gallons) of fresh water to drill a single well. According to the DMR, they estimate about 800 new Bakken wells will be drilled from June 2008 to June 2009; 4,600 new wells (2,300 per year) from June 2009 to June 2011; and then 11,200 new wells (1,400 per year) through 2019. If this estimate is accurate, new Bakken wells could require as much as 50,936 acre-feet (16.6 billion gallons) of fresh water through 2019.

Existing and Proposed Ethanol Plants in North Dakota And Their Production Capacities



### The Bakken Formation in North Dakota



## Electric Power Water Use

There are currently ten water permits issued for thermoelectric power in North Dakota. The SWC requires reporting of both consumptive water use and non-consumptive water use for this purpose. Consumptive water use for thermoelectric power refers mostly to water that is not returned to its original source because of evaporative losses as part of the power plants' cooling processes. Non-consumptive use for this purpose means power plants are piping water through facilities for cooling purposes or using it to spin turbines, and then all of the water is returned to the original source. According to SWC records, consumptive use ranged from 28,682 acre-feet in 1997, to 38,580 in 2006. Non-consumptive use averages approximately 1,000,000 acre-feet annually.

The SWC estimates a 2020 future water use need of 56,000 acre-feet

(50 MG/Day) of consumptive use, and 1,100,000 acre-feet (982 MG/Day) of non-consumptive use for thermoelectric power.

## Agricultural Water Use

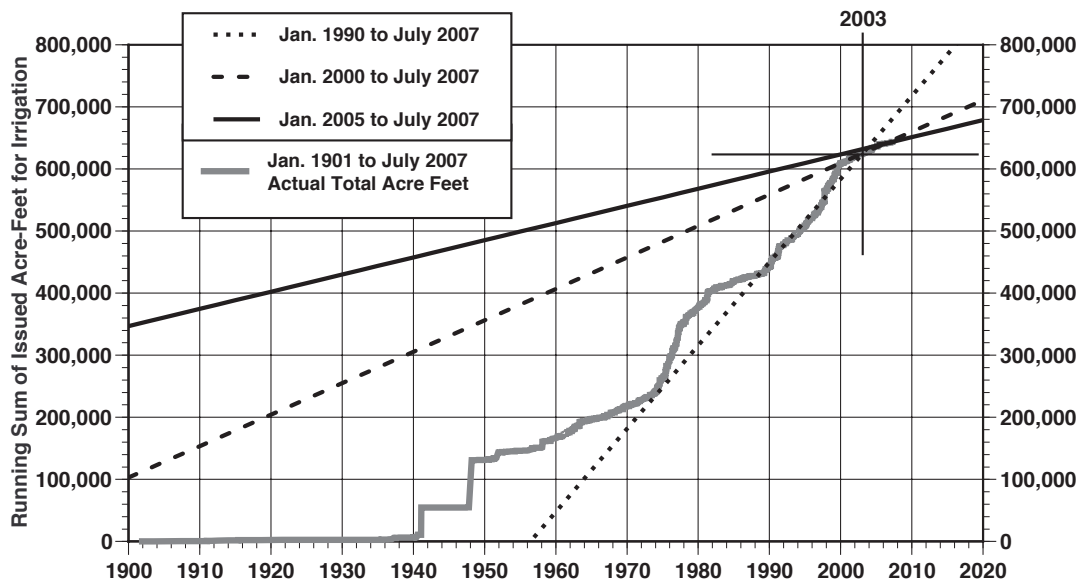
As mentioned previously, economic factors and development opportunities will greatly influence future water use and availability. And in North Dakota, there is no greater economic driving force than agriculture, with one-quarter of the state's economic base derived from agriculture. In 2006, North Dakota farmers and ranchers produced more than \$4 billion in farm commodities, once again making it the state's leading industry. And as of 2007, almost 90 percent of the state's land was dedicated to agriculture, either through cropland or grazing.

Through an analysis of more regionalized climatic factors, the SWC estimates that there will be

approximately 55,000 acre-feet of water needed for irrigation development by the year 2020. Previous work at the SWC has shown an approximate 70 percent utilization rate between granted acre-feet of water and consumed acre-feet of water. Based on these numbers, it is estimated that there will be a demand for an additional 35,300 acre-feet of water (34 MG/Day). This results in a total of 264,394 acre-feet of water per year (236 MG/Day) for irrigation water use by 2020.

With regard to livestock, the SWC does not monitor livestock water consumption, however, there is extensive livestock-related data available from the U.S. Department of Agriculture, including their associated water needs. Using this data, the SWC made an estimate of livestock water use for North Dakota. It is estimated that approximately 29,340 acre-feet of water is used for livestock each year (26.2 MG/Day).

**Issued Acre-Feet for Irrigation in North Dakota - Past and Projected**



## Fish, Wildlife, and Recreation

Water use for fish, wildlife, and recreation are generally part of larger multi-purpose projects, such as dams and reservoirs. Although independent uses for these purposes do exist in North Dakota, they are generally small and account for less than 1 percent of

total water use. For that reason, no future water use projections were developed for this current planning effort.

## ***Water Availability***

Shifting population concentrations, and increasing numbers of industrial and agricultural developments across the state have resulted in a situation where North Dakota's ground and surface water resources are becoming more fully appropriated. Thus, the presence or absence of water has become one of the primary factors in locating industrial plants, or any other developments requiring large amounts of water. The following section provides an overview of the availability of North Dakota's surface and ground water resources – including a color-coded map of potential future ground water development areas.

## **Surface Water Resources**

North Dakota is a land of extreme climate. This fact is reflected in its water resources, where surface water supplies are linked to the region's highly variable precipitation patterns. During wet years, and throughout much of the 1990s, North Dakota experienced a wet cycle that had rivers flow bank full, and lakes rising to record levels. As was experienced during the 1930s and even more recently, droughts have caused rivers to go dry, and lake beds to become salt flats.

In North Dakota, the Missouri River contains approximately 96 percent of the state's surface water, and Lake Sakakawea and Lake Oahe account for approximately 97 percent of all available water storage. However, the greatest concentration of population in the state is situated in the Red River Valley, where surface water resources have been historically limited during periodic droughts. The reliable availability of surface water is an issue that is currently confronting the state, and will likely drive water management in the future.

## **Ground Water Resources**

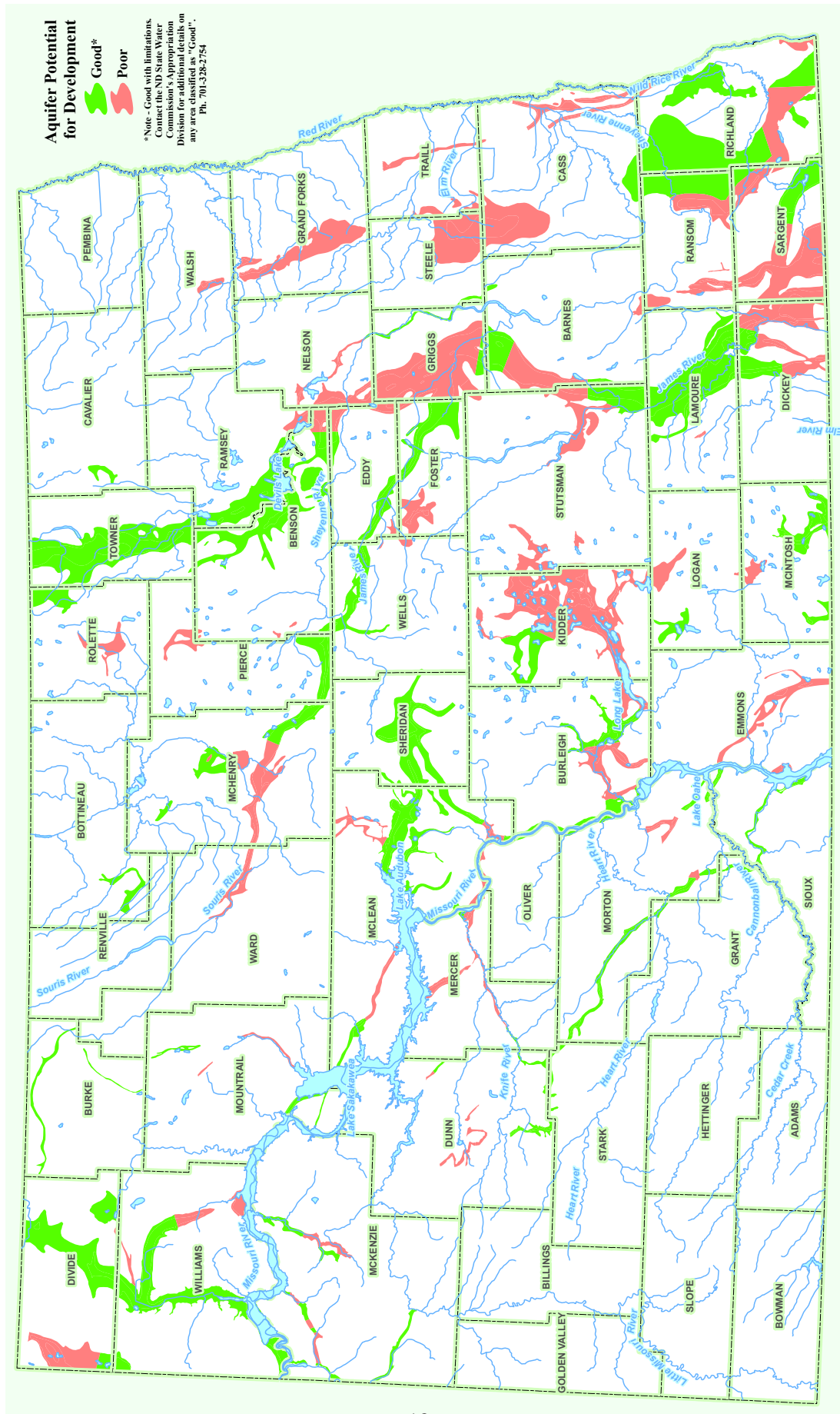
The major glacial drift aquifers in North Dakota are outlined in the Ground Water Availability map on the following page. In addition, the map shows areas in these aquifers where the potential for additional ground water development is good (areas shown in green) or poor (areas shown in red). This map was developed to provide a preliminary basis for considering sites for developing relatively large-scale ground water supplies. The areas in the glacial drift aquifers where the potential for ground water development is poor are characterized by existing large-scale ground water development. These areas are at, or near, full appropriation.

The areas in the glacial drift aquifers where the potential for additional large-scale ground water development is good are generally

characterized by little to moderate or no existing ground water development. It is important to understand that in the areas where the potential for additional ground water development is good there may exist complex aquifer geometries and /or poor water quality characteristics that could restrict sustained large-scale ground water withdrawals for a particular use. For example, several areas of the state likely could yield large quantities of ground water where the water quality is unsuitable for irrigating the heavy textured overlying soils. The water quality may be acceptable for other uses. Given the above, this map should be used only as a preliminary guide to identify potentially suitable ground water supplies. Individuals interested in developing a relatively large-scale ground water supply should contact hydrologists in the Water Appropriation Division of the SWC to further identify sites that may meet their specific needs.

Hydrologic data to assess the potential for developing a ground water supply in the form of descriptive geologic logs from test holes, water levels, and water quality analyses can be accessed on the Commission website at [www.swc.nd.gov](http://www.swc.nd.gov), by clicking on the "Map and Data Resources" link. In addition, scanned versions of reports in the form of County Ground-Water Studies, Water Resource Investigations, and City Ground-Water Studies can be accessed on the same website by clicking the "Reports and Publications" link.

# Ground Water Availability in North Dakota Glacial Drift Aquifers



# VISION FOR THE 21<sup>ST</sup> CENTURY

*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.*

**N**orth Dakota's water management vision for the 21st century provides direction for water management and development across the state. It builds on successes of the past, and more importantly, it calls on water managers, decision makers, and members of the general public alike, to seize future opportunities. However, in order to achieve this vision, the state must address several critical water management and development issues, including developing Missouri River water, developing adequate water supplies for eastern North Dakota, financing future water development, and balancing public trust obligations.

## ***Priority Project Updates***

Since the completion of the 1999 State Water Management Plan, the State of North Dakota, through the Commission, has seen tremendous progress made in water development in all parts of the state. What is also important to recognize is that many of the state's large-scale water projects progressed despite the many obstacles

that often face projects today. The following summary provides an update of progress that has been made, and milestones that have been met on several of the state's priority water development efforts over the course of the last five bienniums.

### **Grand Forks Flood Control**

Since the devastating flood of 1997, the city of Grand Forks has worked in cooperation with the federal government and the State of North Dakota to develop one of the largest flood control projects the state has ever seen. As a result of that cooperation, the Grand Forks flood control project has been completed, and it is recognized as a permanent flood protection feature by the Federal Emergency Management Agency.

The Grand Forks flood control project consists of levees and a floodwall set back from the Red River. In addition, stabilization of an existing dam, removal of a former railroad bridge, interior flood control features, numerous road and railroad closures, extension and expansion of an existing diver-

sion channel, and construction of a new diversion channel with associated structural features, are all part of the project.

### **Wahpeton Flood Control**

Like Grand Forks, the city of Wahpeton was hit hard by the flood of 1997, and as a result, sought a permanent flood protection project that would better protect the community from a 1997-type event. The Wahpeton flood control project consists of a permanent levee system to protect the city, and a flood easement to keep breakout flows from being blocked in the future.

Phase I construction has been completed, which includes interior pumping stations, detention ponds, and other interior flood control features. Phase II plans and specifications for a portion of the in-town levees was also completed, and construction began in 2008. Phase III plans and specifications, which are for the second of three in-town levee reaches, have been initiated. Both Phase II and Phase III levee construction efforts must be completed in concert with levee



constructions on the Breckenridge, Minnesota side of the Red River to avoid project induced impacts.

## **Maple River Dam**

Construction on Maple River Dam began in the fall of 2004, and it was deemed operational only two years later in the fall of 2006. All aspects of construction were officially completed in 2007.

Maple River Dam is located in southeast North Dakota, approximately eight miles north of Enderlin. This dry dam is a 70-foot high earthen embankment, capable of temporarily retaining up to 60,000 acre-feet of floodwater. Maple River Dam is designed to provide flood protection along the Maple, Sheyenne, and Red Rivers, and it was the fourth phase completed as part of the Sheyenne River flood control project. The other completed phases are the West Fargo Sheyenne River Diversion, the Horace to West Fargo Sheyenne River Diversion, and the five-foot flood pool raise at Baldhill Dam.

## **Southwest Pipeline (SWPP)**

Since the development of the 1999 State Water Management Plan, a tremendous amount of progress has been made on the Southwest Pipeline Project. From 1999 to 2009, the number of rural water users will have increased from just under 1,600 to about 3,700. And, the number of cities and other bulk water users will go from 25

to 53 during that same time period. In addition, by the end of the 2007-2009 biennium, it is estimated that the total population served by the SWPP will be about 35,000.

The SWPP also recently contributed to North Dakota's energy development efforts by providing water to Red Trail Energy, an ethanol plant located in Richardton. And because of the high quality water provided by the SWPP, Red Trail was able to amend its contract to reduce their maximum annual usage from 315 million gallons per year, to 252 million gallons per year. With Red Trail's need for that much water, they have become the second largest water user on the SWPP, behind only the city of Dickinson. In comparison, Dickinson currently uses just over 600 million gallons of Missouri River water per year.

## **Northwest Area Water Supply (NAWS)**

In the spring of 2002, construction began on the long-awaited Northwest Area Water Supply project. Since that time, construction on the 45 miles of pipeline between Minot and Lake Sakakawea has been completed.

In August 2008, construction was also completed on 24 miles of pipeline, four pump stations, and two storage reservoirs that provide water service to Berthold, Minot's South Hill region, and North Prairie Rural Water District, with an interim supply from Minot's water

treatment plant. In fall 2008, the Kenmare-Upper Souris contract was awarded for completion of 53 miles of pipeline and a pump station to address arsenic issues in Kenmare, and provide additional water supply to the Upper Souris Water Users rural water system.

Additional project components that will be constructed along the main transmission line include an intake at Lake Sakakawea, some level of treatment facility at Max, a control structure at the basin divide, and a three million gallon raw water storage reservoir. However, these future facilities along the main transmission line will require completion of the EIS and federal funding.

The EIS was pursued due to the 2002 lawsuit filed by the Province of Manitoba, which argued that NAWS could increase the risk of transferring non-native biota between the Missouri River and Hudson Bay drainage basins, and the project should have additional environmental review. As a result, project construction has been delayed on features between Minot and Lake Sakakawea that affect treatment decisions, however the federal court has allowed construction on the northern tier to proceed.

When completed, NAWS will provide up to 26 million gallons of Missouri River water per day to at least 63,000 citizens in North Dakota. With additional rural development, NAWS could serve as many as 81,000.

## **Red River Valley Water Supply (RRVWS)**

The Commission has worked in cooperation with the Garrison Diversion Conservancy District, and the U.S. BOR toward the completion of an EIS for the Red River Valley Water Supply Project. The purpose of the EIS, which was completed in December 2007, is to evaluate alternatives to meet the long-term water needs of the Red River Valley in North Dakota, and the cities of East Grand Forks, Moorhead, and Breckenridge in Minnesota.

As part of the Final EIS, the BOR, and the State of North Dakota, identified the Garrison Diversion Unit Import to the Sheyenne River Alternative as the preferred alternative. As the State of North Dakota and the federal government pursue the development of the preferred alternative, the SWC will continue to provide technical and financial assistance toward project completion.

## **Municipal, Rural and Industrial (MR&I) Water Supply Program**

Because of North Dakota's Municipal, Rural and Industrial Water Supply Program, regional and rural water systems have continued to expand throughout the state. As a result of this added assistance, there are now 32 regional water systems in North Dakota providing quality drinking water. Over 160,000 residents

are served by regional water systems, including 312 cities, and over 90,000 rural residents. Currently, all or part of 47 of North Dakota's 53 counties are served by regional water systems, and most have plans to expand to cover additional areas.

Just since 1999, MR&I projects have been completed for several water supply systems across the state, including: All Seasons Water Users District, Glenfield, LaMoure, Langdon Rural Water, McKenzie County Rural Water, Minot (NAWS), North Valley Water District, Park River, Ramsey County Rural Water, Ransom Sargent Rural Water, Rugby (NAWS), South Central Regional Water District, Stutsman Rural Water District, Tri-County Water District, Underwood, Walsh Rural Water District, Williams Rural Water, and Williston.

Several water supply systems also have projects under construction, including: All Seasons Water Users District, Berthold (NAWS), Devils Lake, Minot (NAWS), North Central Rural Water Consortium, Parshall, South Central Regional Water District, Southwest Pipeline Project, Traill Rural Water District, Tri-County Rural Water, and Wimbledon.

In addition, studies were completed to develop improved water supplies at Carrington, McLean Sheridan Rural Water, Mountrail Rural Water, North Central Rural Water Consortium, South Central Regional Water District,

Southeast Water District, Traill Rural Water District, and Williams Rural Water.

## **Devils Lake Flood Control**

Since the early 1990s, flooding in the Devils Lake region has persisted, with an unpredictable future ahead. In response, the state of North Dakota and the SWC have determined that there is no single solution to the flooding problems in that region. Rather, a three-pronged approach, including infrastructure protection, upper-basin water management, and an outlet to the Sheyenne River, together, are the only means of providing some relief.

A great deal of progress has been made on all three fronts. In recent years, the state has provided assistance to the Devils Lake Joint Water Resource Board to help with the implementation of an irrigation test project that is aimed at utilizing upper basin waters for value-added agriculture, while helping to reduce inflow into Devils Lake. At the same time, the Commission has continued to fund the Extended Storage Acreage Program to store floodwater in the upper portions of the basin.

In addition, the Commission completed an outlet to the Sheyenne River in the summer of 2005. Outlet operation has been limited due to low flows and poor water quality in the Sheyenne River.

In infrastructure protection ef-

forts, the levee protecting the city of Devils Lake has provided adequate protection for the community thus far. But, because the threat of increasing lake levels still exists, the city has been working with the U.S. Army Corps of Engineers to identify potential flood protection alternatives, should the lake continue to rise. Because of the tremendous costs that would be involved in any type of levee raise and extension, Devils Lake will likely be looking to the state for cost-share assistance.

In other infrastructure protection efforts, certain Devils Lake area roads are currently acting as dikes, though they were not originally designed for that purpose. As such, a number of solutions are being proposed to minimize future risks.

## **Devils Lake Water Supply**

As Devils Lake continued its infamous rise, it covered six miles of the city of Devils Lake's water supply line with up to 40 feet of water. To make matters worse, the city was also facing new federal Safe Drinking Water Act regulations for arsenic that came into effect in January 2006. With arsenic levels at over three times the allowable concentration under the new regulations, the city was only given an exemption through January 2009. And, because of Devils Lake's population, the Department of Health was not able to grant an exemption beyond that timeframe.

In response, the city of Devils Lake has been working in cooperation with the SWC and the federal government to develop a new water supply.

With regard to project progress, the city's new waterline portion of the project has been completed, and water is expected to be flowing from a new wellfield by spring 2009. Construction on the new water treatment plant is expected to begin during the summer of 2009, with operation starting a year later.

## **General Water Management**

Though larger, higher profile projects get most of the attention across the state, the Water Commission is also constantly cooperating with local sponsors to complete smaller water development efforts. General water management projects include rural flood control projects, snagging and clearing, channel improvements, recreational projects, planning efforts, and special studies. Just since the completion of the 1999 State Water Management Plan, dozens of these projects have been completed each year. And through cooperative efforts with water resource districts and other local entities, the Water Commission will continue to strive to develop relationships and agreements to pursue the development of smaller projects that have big impacts to the communities and regions they benefit.

## ***State Water Development Program***

This section will briefly describe the inventory process used by the SWC Planning and Education Division to identify future water project and program funding needs. A discussion will also be provided of current water development activities, as well as project needs for the 2009-2011 biennium and beyond.

### **The Inventory Process**

As part of the SWC's water planning efforts, the Planning and Education Division once again solicited project and program information from potential project sponsors. The results provide the SWC with an updated inventory of water projects and programs that are expected to come forward for SWC cost-share in the upcoming 2009-2011 biennium and beyond. As in the past, the product of this effort becomes the foundation that supports the State Water Commission's budget request to the Governor and Legislature.

To obtain updated and new project and program information from sponsors, the Planning and Education Division sent project information forms to county water boards, joint boards, and communities. The managers of major water projects, including the Municipal, Rural, and Industrial Program; Northwest Area Water Supply Project; and Southwest Pipeline Project, were also sur-

veyed. Information requested on the forms included general project descriptions, location, permit information, and identification of potential obstacles, among other basic aspects of the projects.

More importantly, sponsors were asked to assign the most realistic start dates possible to projects they expected to present to the SWC for cost-share consideration - particularly during the 2009-2011 and later bienniums. As part of that effort, project sponsors needed to take into consideration when a funding commitment from the SWC will be needed, and to identify when state dollars will be necessary for projects or programs to proceed.

As the project information forms

were received by the SWC, each project is reviewed to determine if the proposed timeframes for project advancement are reasonable and justified by supporting information. After project reviews were completed, the information was transferred into the Planning and Education Division's water project database. This provides the SWC with updated project information for older projects and an accounting of new projects that have developed since the last inventory process, during the 2005-2007 biennium. The result of this inventory process is a comprehensive list of water projects throughout North Dakota that could come forward for new or additional cost-share in future bienniums. As stated earlier, this is an invaluable tool for budget planning purposes both for the

SWC and the Legislature.

In addition to water project information, water managers were also asked to provide information on major water use changes that might be expected within their respective jurisdictions. And, all entities were asked to provide information regarding issues concerning regulations, policies, or legislation that they would like to see the SWC or SE address during future Legislative Assemblies.

### Water Development Funding Needs, 2009-2011 Biennium

This table contains projects that could move forward and request SWC cost-share in the 2009-2011 biennium. This accounting of projects simply represents a non-prioritized list of needs as submitted by water managers. It does not guarantee, in any way, that all of the projects listed will receive funding.

The list is organized into seven categories based on SWC cost-share policies, including: flood control, rural flood control, snagging and clearing, irrigation, studies and planning, multi-purpose, and water supply projects. The total financial need to implement all of the projects in the 2009-2011 inventory is at least \$563 million. The state's share of that total is about \$137 million, based on current cost-share requirements. The federal government and local project sponsors would be responsible to make up the balance.

<b>Currently Active Projects, 2007-2009</b>		
<b>PROJECT OR CATEGORY</b>	<b>BUDGET</b>	<b>SWC/SE APPROVED</b>
GRAND FORKS FLOOD CONTROL	\$2,384,557	\$2,384,557
WAHPETON FLOOD CONTROL	2,492,560	1,337,957
FARGO SOUTHSIDE FLOOD CONTROL	16,650,000	2,584,750
MR&I WATER SUPPLY	24,038,796	24,038,796
IRRIGATION DEVELOPMENT	2,497,982	613,182
GENERAL WATER MANAGEMENT	14,640,445	10,727,894
MISSOURI RIVER MANAGEMENT	100,000	90,000
BALDHILL DAM FLOOD CONTROL	358,811	358,811
RENWICK DAM REHABILITATION	1,148,520	1,148,520
MAPLE RIVER DRY DAM	611,235	611,235
RED RIVER VALLEY WATER SUPPLY	12,090,000	1,800,000
DEVILS LAKE BASIN DEVELOPMENT	135,550	135,550
DEVILS LAKE DIKE	1,624,202	1,624,202
DEVILS LAKE OUTLET	2,465,477	2,465,477
DEVILS LAKE WATER SUPPLY	4,553,000	4,553,000
DEVILS LAKE OUTLET OPERATIONS	2,000,000	2,000,000
NELSON COUNTY FLOOD RELIEF	203,008	203,008
WEATHER MODIFICATION	600,000	525,000
SOUTHWEST PIPELINE PROJECT	13,409,130	13,409,130
NORTHWEST AREA WATER SUPPLY	8,019,857	8,019,857
<b>TOTALS</b>	<b>\$110,023,130</b>	<b>\$78,630,926</b>

It should be recognized that the 2009-2011 totals do not account for projects that may not seek funding in the current 2007-2009 biennium and will carry over to the next biennium. As a result, the actual need for the upcoming biennium has the potential to be greater than portrayed here. In contrast, it should also be noted that water development projects can be delayed as a result of local or federal funding problems, permits, or environmental issues, which can substantially influence the actual need for any given biennium.

### Water Development Funding Needs, Beyond 2009-2011

The potential funding need from the state that was reported by project sponsors beyond the 2009-2011 biennium, through 2017, exceeds \$333 million in total project costs. At least \$260 million of that total can be attributed to water supply projects, including the Red

River Valley Water Supply Project. Projects included in this timeframe were either identified by project sponsors to move ahead beyond June 30, 2011, or they were placed into a later timeframe by SWC staff based on their knowledge of the project.



**Water Development Funding Needs 2009-2011**

RURAL FLOOD CONTROL			Federal	State	Local	Total Cost
County	Watershed	Project Name	2009-2011	2009-2011	2009-2011	
Cass	Red	Cass County Drain #10	\$0	\$700,000	\$1,300,000	\$2,000,000
Cass	Red	Cass County Drain #13	\$0	\$700,000	\$1,300,000	\$2,000,000
Cass	Red	Cass County Drain #14	\$0	\$700,000	\$1,300,000	\$2,000,000
Cass	Red	Cass County Drain #15	\$0	\$175,000	\$325,000	\$500,000
Cass	Red	Cass County Drain #40	\$0	\$350,000	\$650,000	\$1,000,000
Cass	Red	Cass County Drain #53	\$0	\$630,000	\$1,170,000	\$1,800,000
Cass	Red	Lynchburg/Buffalo Channel Imp.	\$0	\$1,575,000	\$2,925,000	\$4,500,000
Cavalier	Red	Cypress Creek Drain #2	\$0	\$45,787	\$85,033	\$130,820
Grand Forks	Red	Cole Creek Channelization	\$0	\$133,000	\$247,000	\$380,000
Pembina	Red	Auger Coulee	\$0	\$245,000	\$455,000	\$700,000
Pembina	Red	Kippen Coulee	\$0	\$105,000	\$195,000	\$300,000
Pembina	Red	Pembina County Drain #42 Reconstruction	\$0	\$71,000	\$133,092	\$204,092
Pembina	Red	Pembina County Drain #66 New Outlet	\$0	\$87,500	\$162,500	\$250,000
Pembina	Red	Pembina County Drain #69	\$0	\$26,250	\$48,750	\$75,000
Pembina	Red	Pembina County Drain #73	\$0	\$122,500	\$227,500	\$350,000
Pembina	Red	Pembina County Drain #75	\$0	\$70,000	\$130,000	\$200,000
Richland	Red	Drain #14 Reconstruction	\$0	\$175,000	\$325,000	\$500,000
Richland	Red	Drain #3 Reconstruction	\$0	\$350,000	\$650,000	\$1,000,000
Walsh	Red	Channel 3 Lower Forest River	\$0	\$94,500	\$175,500	\$270,000
Walsh	Red	Silberger Drain	\$0	\$210,000	\$390,000	\$600,000
Walsh	Red	Walsh County Drain #25	\$0	\$87,500	\$162,500	\$250,000
Walsh	Red	Walsh County Drain #67A	\$0	\$350,000	\$650,000	\$1,000,000
Walsh	Red	Walsh County Drain #70	\$0	\$140,000	\$260,000	\$400,000
Walsh	Red	Walsh County Drain #71	\$0	\$105,000	\$195,000	\$300,000
Walsh	Red	Walsh County Drain #72	\$0	\$61,250	\$113,750	\$175,000
Walsh	Red	Walsh County Drain #73 - Goulet Drain	\$0	\$61,250	\$113,750	\$175,000
Rural Flood Control Total			\$0	\$7,370,537	\$13,689,375	\$21,059,912

**FLOOD CONTROL**

County	Watershed	Project Name	Federal 2009-2011	State 2009-2011	Local 2009-2011	Total Cost
Cass	Red	Fargo Southside Flood Control	\$11,000,000	\$30,000,000	\$30,000,000	\$71,000,000
Cass	Red	Farmstead Ring Dikes	\$0	\$2,000,000	\$3,000,000	\$5,000,000
Cass	Red	Swan Creek Diversion Phase II	\$0	\$1,000,000	\$1,000,000	\$2,000,000
Cass	Red	Upper Maple River Dam	\$0	\$2,500,000	\$2,500,000	\$5,000,000
Cass	Red	Wild Rice R. Floodwater Retention	\$0	\$20,000,000	\$20,000,000	\$40,000,000
Griggs	Red	Uland Dam Repair	\$0	\$75,000	\$75,000	\$150,000
Nelson	Devils Lake	Michigan Spillway	\$0	\$440,000	\$560,000	\$1,000,000
Pembina	Red	Pembina R. Setback Dike System	\$0	\$350,000	\$650,000	\$1,000,000
Richland	Red	Wahpeton Flood Control	\$1,633,150	\$503,950	\$503,950	\$2,641,050
Sargent	Red	Brummard-Lubke Dam Repair	\$0	\$100,000	\$100,000	\$200,000
Statewide	Devils Lake	Devils Lake Outlet Operation	\$0	\$2,000,000	\$0	\$2,000,000
Walsh	Red	Grafton Flood Control	\$2,681,000	\$446,850	\$446,850	\$3,574,700
Williams	Missouri	Sand Creek Drainage	\$0	\$450,500	\$450,500	\$901,000
Flood Control Total			\$15,314,150	\$59,866,300	\$59,286,300	\$134,466,750

**MULTI-PURPOSE**

County	Watershed	Project Name	Federal 2009-2011	State 2009-2011	Local 2009-2011	Total Cost
Benson	Red	Bouret Dam Repair	\$0	\$78,000	\$42,000	\$120,000
Burleigh	Missouri	Missouri River - Prison Farm Bank Stabilization	\$2,970,000	\$0	\$990,000	\$3,960,000
Burleigh	Missouri	Missouri River Protection and Imp. Act of 2000 Projects	\$500,000	\$0	\$167,000	\$667,000
Eddy	Red	Warwick Dam Rehabilitation	\$33,333	\$33,333	\$33,334	\$100,000
Nelson	Red	McVile Dam Repair	\$0	\$50,000	\$50,000	\$100,000
Nelson	Red	Tolna Dam Repair	\$0	\$30,000	\$30,000	\$60,000
Pembina	Red	Cart Creek Improvements	\$0	\$137,500	\$118,750	\$256,250
Pembina	Red	Drayton Dam Upst. Channel Landslide Remediation	\$440,000	\$680,000	\$120,000	\$1,240,000
Multi-County	Missouri/ Souris	ND Cloud Modification	\$0	\$700,000	\$1,421,212	\$2,121,212
Walsh	Red	Bylin Dam Repair	\$0	\$1,300,000	\$700,000	\$2,000,000
Walsh	Red	Matejcek Dam Repair	\$0	\$1,300,000	\$700,000	\$2,000,000
Multi-purpose Total			\$3,943,333	\$4,308,833	\$4,372,296	\$12,624,462

**IRRIGATION**

County	Watershed	Project Name	Federal 2009-2011	State 2009-2011	Local 2009-2011	Total Cost
Multi-county	Devils Lake	Devils Lake Basin Water Utilization Pilot Project	\$1,100,000	\$1,100,000	\$800,000	\$3,000,000
Statewide	Statewide	Irrigation Development	\$0	\$2,000,000	\$3,000,000	\$5,000,000
Irrigation Total			\$1,100,000	\$3,100,000	\$3,800,000	\$8,000,000

**STUDIES AND PLANNING**

County	Watershed	Project Name	Federal 2009-2011	State 2009-2011	Local 2009-2011	Total Cost
Cass	Red	Absaraka Dam Reconstruction	\$0	\$50,000	\$50,000	\$100,000
Cass	Red	Embden Dam Reconstruction	\$0	\$50,000	\$50,000	\$100,000
Cass	Red	Garsteig Dam Reconstruction	\$0	\$50,000	\$50,000	\$100,000
		<b>Studies &amp; Planning Total</b>	<b>\$0</b>	<b>\$150,000</b>	<b>\$150,000</b>	<b>\$300,000</b>

**SNAGGING AND CLEARING**

County	Watershed	Project Name	Federal 2009-2011	State 2009-2011	Local 2009-2011	Total Cost
Cass	Red	Sheyenne River Snagging and Clearing	\$0	\$100,000	\$300,000	\$400,000
Cass	Red	Wild Rice River Snagging and Clearing	\$0	\$50,000	\$150,000	\$200,000
Grand Forks	Red	Turtle River Snagging and Clearing	\$0	\$93,750	\$281,250	\$375,000
Nelson	Red	Sheyenne River Snagging and Clearing	\$0	\$8,000	\$24,000	\$32,000
Richland	Red	Antelope Creek Snagging and Clearing	\$0	\$50,000	\$150,000	\$200,000
Richland	Red	Sheyenne River Snagging and Clearing	\$0	\$37,500	\$112,500	\$150,000
Richland	Red	Wild Rice River Snagging and Clearing	\$0	\$50,000	\$150,000	\$200,000
Walsh	Red	North Branch Park River Snagging and Clearing	\$0	\$125,000	\$375,000	\$500,000
		<b>Snagging and Clearing Total</b>	<b>\$0</b>	<b>\$514,250</b>	<b>\$1,542,750</b>	<b>\$2,057,000</b>

**WATER SUPPLY**

County	Watershed	Project Name	Federal 2009-2011	State 2009-2011	Local 2009-2011	Total Cost
Barnes	Red	Valley City Water Treatment Plant Improvements	\$3,081,870	\$0	\$2,521,530	\$5,603,400
Burke, Divide	Souris	BDW Phase II Expansion	\$2,439,500	\$0	\$1,045,500	\$3,485,000
Burke, Divide	Souris	BDW Phase III Expansion	\$722,400	\$0	\$309,600	\$1,032,000
Cass	Red	City of Davenport Water Supply Expansion	\$198,900	\$0	\$107,100	\$306,000
Cass	Red	Fargo Ground Storage Reservoir #1	\$0	\$0	\$8,741,500	\$8,741,500
Cass	Red	Fargo Ground Storage Reservoir #2	\$0	\$0	\$378,974	\$378,974
Cass	Red	Fargo Transmission Pipeline	\$0	\$0	\$21,159,300	\$21,159,300
Cass	Red	Fargo Water Towers	\$0	\$0	\$3,523,660	\$3,523,660
Cass	Red	Fargo Water Treatment Plant Expansion	\$0	\$0	\$154,915	\$154,915
Divide	Souris	Crosby Water Treatment Plant	\$875,283	\$0	\$1,625,525	\$2,500,808
Emmons	Missouri	South Central Rural Water - Emmons County	\$23,520,000	\$0	\$10,080,000	\$33,600,000
Grand Forks	Red	Grand Forks Water Distribution Pipeline Improvements	\$0	\$0	\$2,902,500	\$2,902,500
Grand Forks	Red	Grand Forks Water Distribution Storage Improvements	\$0	\$0	\$886,000	\$886,000

<b>WATER SUPPLY (continued)</b>						
<b>County</b>	<b>Watershed</b>	<b>Project Name</b>	<b>Federal 2009-2011</b>	<b>State 2009-2011</b>	<b>Local 2009-2011</b>	<b>Total Cost</b>
Grand Forks	Red	Grand Forks Water Treatment Facility and Residuals Mgmt	\$0	\$0	\$6,086,000	\$6,086,000
McHenry	Souris	City of Granville Water Storage Tank Replacement	\$75,000	\$0	\$75,000	\$150,000
McKenzie	Missouri	McKenzie County Rural Water: System II	\$3,468,500	\$0	\$1,156,500	\$4,625,000
McKenzie	Missouri	McKenzie County Rural Water: System IV	\$3,669,000	\$0	\$1,224,000	\$4,893,000
McLean	Missouri	City of Garrison Water Storage Improvements	\$2,665,000	\$0	\$1,435,000	\$4,100,000
McLean		City of Max	\$50,000	\$0	\$50,000	\$100,000
McLean		North Central Rural Water Consortium	\$14,280,000	\$0	\$6,120,000	\$20,400,000
McLean	Missouri	Washburn Regional Water Supply	\$3,719,000	\$0	\$2,931,000	\$6,650,000
Morton	Missouri	Mandan South End Reservoir Project	\$0	\$0	\$9,600,000	\$9,600,000
Morton	Missouri	Mandan Water Treatment Plant Optimization	\$0	\$0	\$4,511,900	\$4,511,900
Mountrail	Missouri	Mountrail Rural Water Expansion	\$6,020,000	\$0	\$2,580,000	\$8,600,000
Multi-county	Red	Dakota Rural Water System Improvements	\$883,500	\$0	\$883,500	\$1,767,000
Multi-county	Missouri/ Souris	Northwest Area Water Supply	\$30,000,000	\$16,000,000	\$11,000,000	\$57,000,000
Multi-county	Missouri/ Red	Red River Valley Water Supply Project	\$30,000,000	\$30,000,000	\$30,000,000	\$90,000,000
Multi-county	Missouri	Southwest Pipeline Project	\$16,000,000	\$16,000,000	\$0	\$32,000,000
Pembina	Red	Drayton Dam Section 206 Improvement	\$400,000	\$0	\$0	\$400,000
Pembina	Red	Drayton Water Treatment Plant Clearwell Imp.	\$488,000	\$0	\$262,000	\$750,000
Richland	Red	SEWUD Regional Water Service - East/North	\$0	\$0	\$1,100,000	\$1,100,000
Traill	Red	City of Hillsboro Water Tower	\$735,150	\$0	\$395,850	\$1,131,000
Traill	Red	Traill Rural Water - Regional Water Supply Project	\$13,329,253	\$0	\$5,712,822	\$19,042,075
Walsh	Red	Grafton Intake Improvements (Park River)	\$20,000	\$0	\$11,000	\$31,000
Walsh	Red	Grafton Intake Improvements (Red River)	\$50,000	\$0	\$25,000	\$75,000
Walsh	Red	Grafton Water Treatment Plant Improvements	\$2,949,400	\$0	\$2,142,600	\$5,092,000
Walsh	Red	Park River Water Tower	\$693,875	\$0	\$373,625	\$1,067,500
Williams	Missouri	New Williston Pressure Tank and 11th St. Reservoir	\$4,200,000	\$0	\$0	\$4,200,000
Williams	Missouri	R & T Water Supply Expansion	\$10,503,500	\$0	\$4,501,500	\$15,005,000
Williams	Missouri	Williams Rural Water District Expansion	\$2,029,000	\$0	\$676,000	\$2,705,000
		<b>Water Supply Total</b>	<b>\$177,066,131</b>	<b>\$62,000,000</b>	<b>\$146,289,401</b>	<b>\$385,355,532</b>

**ALL PROJECTS TOTAL            \$197,423,614    \$137,309,920    \$229,130,122    \$563,863,656**



## ***Water Project Funding***

North Dakota funds a majority of its water projects through the SWC. Funding that is funneled through the SWC for water development has come 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 is also authorized to issue revenue bonds for water projects, and the SWC has shared control of the Drinking Water State Revolving Loan Fund. There are also other federal funding sources that will be briefly discussed.

### **General Fund**

The executive budget includes \$11.1 million general fund dollars for agency operations. This is significant for statewide water development efforts because it frees-up other trust fund revenue for projects.

### **Municipal, Rural, and Industrial Water Supply Program**

A major source of grant funding for water supply development in North Dakota is the MR&I Water Supply Program. The program's funding was authorized by Congress through the 1986 Garrison Diversion Unit Reformulation

Act. Federal funding channels through the BOR, to the state's federal fiscal agent, Garrison Diversion Conservancy District. The program is jointly administered by the Garrison Diversion Conservancy District, and the Commission. The federal agency of Rural Development provides funding through the United States Department of Agriculture for a majority of loans to cover the local share of MR&I projects.

The 1986 Garrison Reformulation Act authorized a federal MR&I grant program of \$200 million. All of that funding has been expended. Additional federal funding authorization for the MR&I program resulted from the passage of the Dakota Water Resources Act of 2000. The Act provides resources for general MR&I projects, the Northwest Area Water Supply Project, the Southwest Pipeline Project, and a project to address water supply issues in the Red River Valley. An additional \$600 million, indexed for inflation, was authorized; which includes a \$200 million grant for state MR&I, a \$200 million grant for North Dakota Tribal MR&I, and a \$200 million loan for a Red River Valley Water Supply Project.

Annual MR&I funding is dependent upon U.S. Congressional appropriation, and thus, varying annual appropriations result in project delays. As of September 2008, \$228 million in federal funds had been approved for North Dakota's MR&I program with \$30 million

for Federal Fiscal Years 2007 and 2008.

### **Resources Trust Fund**

Section 57-51.1-07.1 (2) of North Dakota Century Code requires that every legislative bill appropriating monies from the Resources Trust Fund (RTF), pursuant to subsection one, must be accompanied by a Commission report. This report, the 2009 State Water Management Plan, satisfies that requirement for requesting funding from the RTF for the 2009-2011 biennium.

The RTF is funded with 20 percent of the revenues from the oil extraction tax. A percentage of the RTF has been designated by constitutional measure to be used for water-related projects and energy conservation. The SWC budgets money for cost-share based on a forecast of oil extraction tax revenue for the biennium, which is provided by the Office of Management and Budget.

Revenues into the RTF for the 2007-2009 biennium are expected to total \$87.6 million. Future revenues from the oil extraction tax are highly dependent on world oil prices and production, which make it very difficult to predict future funding levels. The Executive budget includes authority based on the November 2008 forecast of \$94.7 million for the 2009-2011 biennium from oil extraction. However, the Executive budget also contains an alternate oil price

forecast for oil extraction revenue that could be as low as \$20 million if a \$40 price per barrel is used through the entire 2009-2011 biennium.

Additional new revenue into the RTF will come from SWPP reimbursements, State Water Commission water supply program loan repayments (which amount to \$1 million per biennium through year 2017), interest, and oil royalties. Therefore, based on the November 2008 projections, RTF revenue available for water development during the 2009-2011 biennium could be \$98.2 million.

## **Water Development Trust Fund**

Senate Bill 2188 (1999) set up a Water Development Trust Fund as a primary means of repaying the bonds it authorized. House Bill 1475 allocated 45 percent of the funds received by the state from the 1998 tobacco settlement into the Water Development Trust Fund.

Revenues into the Water Development Trust Fund for the 2007-2009 biennium are expected to total about \$26.3 million. The Office of Management and Budget estimates revenues of \$19.7 million for the 2009-2011 biennium.

The recent passage of Measure 3 by North Dakota voters will redirect a portion of the tobacco settlement, known as the strategic contribution fund, toward a state-

wide tobacco prevention program. The strategic contribution fund portion of the settlement is North Dakota's compensation for work done by the state's Attorney General in finalizing the national tobacco settlement agreement. It is this increase in the settlement amount that will be used for the tobacco prevention program. The passage of Measure 3 will not change the 45 percent allocation of tobacco settlement funds into the Water Development Trust Fund. However, it will decrease tobacco settlement receipts destined for the Water Development Trust Fund by \$12.4 million per biennium.

Payments into the fund are scheduled through 2025 at a level based on inflation and tobacco consumption.

## **Bonding**

The SWC has bonding authority (NDCC 61-02-46) to issue revenue bonds of up to \$2 million per project. The Legislature must authorize revenue bond authority beyond \$2 million per project. In 1991, the Legislature authorized full revenue bond authority for the Northwest Area Water Supply Project, in 1997 it authorized \$15 million of revenue bonds for the Southwest Pipeline, and in 2001 it raised the Southwest Pipeline authority to \$25 million. As of June 30, 2008 the Commission has outstanding bonds totaling \$18.7 for the Southwest Pipeline project. There are no

outstanding bonds for the NAWS project.

In 1999, the SWC was authorized to issue up to \$84.8 million in appropriation bonds under provisions of Senate Bill 2188. The Legislature's intent was to partially fund flood control projects at Grand Forks, Devils Lake, Wahpeton, and Grafton, and to continue funding for the Southwest Pipeline. In March 2000, the SWC issued bonds generating \$27.5 million, thus reducing available bonding authority to \$57.3 million. Recognizing the need for water development projects in addition to those identified in SB 2188, the 2003 Legislature allowed authority for the unissued \$57.3 million to expire, but then authorized \$60 million of bonding authority for statewide water development projects. In June 2005, the Commission did issue bonds generating \$60 million. As of June 30, 2008, the Commission has outstanding bonds totaling \$87.7 million for other statewide water projects.

Because the tobacco settlement dollars were not projected to remain uniform each year, the SWC set up a repayment schedule to correspond with the projected tobacco receipts. Although the repayment amounts are based on the projected receipts, the scheduled repayments must be made regardless of the actual receipts. Payments for existing water development bonds will be \$16.9 million for the 2009-2011 biennium, however funds must be available to make the August 1, 2011 pay-

ment. This payment occurs the second month of the new biennium prior to the receipt of any of that biennium's tobacco settlement dollars. That repayment will be \$8.4 million.

### **Drinking Water State Revolving Loan Fund**

An additional source of funding for water supply development projects is the Drinking Water State Revolving Loan Fund (DWSRLF). Funding is distributed in the form of a loan program through the Environmental Protection Agency and administered by the Department of Health. The DWSRLF provides below market-rate interest loans of 3 percent to public water systems for capital improvements aimed at increasing public health protection and compliance under the federal Safe Drinking Water Act.

The SWC's involvement with the DWSRLF is two-fold. First, the Department of Health must administer and disburse funds with the approval of the SWC. Second, the Department of Health must establish assistance priorities and expend grant funds pursuant to the priority list for the drinking water treatment revolving loan fund, after consulting with and obtaining the SWC's approval.

The process of prioritizing new or modified projects is completed on an annual basis. Each year, the Department of Health provides an Intended Use Plan, which contains

a comprehensive project priority list and a fundable project list. The 2008 comprehensive project priority list includes 91 projects with a cumulative total project funding need of \$326.7 million. The fundable list of 18 projects includes \$36.4 million in loans from the total federal grants of \$100 million for fiscal years 1997 through 2008. Available funding for the DWSRLF program for 2009 is anticipated to be approximately \$8 million.

### **Other Federal Funding**

With regard to other federal funding, the U.S. Army Corps of Engineers provides significant assistance to North Dakota for flood control projects. The Environmental Protection Agency, U.S. Bureau of Reclamation, U.S. Geological Survey, and the Natural Resources Conservation Service also contribute to the state's water development efforts in many different ways, including studies, project design, and project construction.

## ***Funding Priorities, 2009-2011 Biennium***

This section discusses the state's priority water development efforts and funding for the 2009-2011 biennium. It includes one course of action for water development in North Dakota that is subject to change during the 61st Legislative Assembly and the biennium.

### **Water Development Priorities & Descriptions**

North Dakota's prioritized water development funding needs are grouped into several main categories in the following table. Each of those projects and categories is explained hereafter.

#### **Cloud Modification**

State funding in the amount of \$700,000 is budgeted for operational cloud seeding costs with counties participating in the North Dakota Cloud Modification Project. The Atmospheric

<b>2009-2011 Water Development Priorities</b>	
<b>PRIORITY PROJECTS</b>	<b>2009-2011 (MILLIONS)</b>
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
<b>EXPENDITURE TOTAL .....</b>	<b>104.0</b>

Resources Board currently cost-shares approximately 35 percent of operational costs, with participating counties paying the remaining 65 percent. This funding level will allow the program to continue its current level of capability for the 2009-2011 biennium.

### **Devils Lake**

Having completed the Devils Lake outlet in the summer of 2005, it is now necessary for the state to provide funding for the operation and maintenance of the project. It is estimated that these costs will total approximately \$2 million per biennium.

The state outlet is currently sized for 100 cfs, but could be expanded to 300 cfs in the future with additional work if necessary. The outlet consists of: two pumping plants, one on the Round Lake portion of Devils Lake, and the second near Josephine, North Dakota; approximately 4 miles of pipeline; and 10 miles of open channel.

### **Fargo Southside Flood Control**

After narrowly escaping extensive damages during the 1997 flood, the City of Fargo and Cass County have been working toward the development of a flood control project that would protect south Fargo and areas south of the city that have experienced significant flooding in the past.

The alternative that the City of Fargo has selected, known as the Wild Rice River Levee Alternative, includes a continuous series of levees and/or floodwalls that

provide protection from the Red River, Wild Rice River, and to a lesser extent, the Sheyenne River. Channel improvements will also be implemented along the Red River to improve hydraulic efficiency from the confluence of the Wild Rice and Red Rivers north to where Rose Coulee enters the Red. The project will also include internal drain improvements with levees to allow high water breakout flows from the Wild Rice to pass through the protected area in a controlled manner. And, to reduce or eliminate stage increases upstream of Rose Coulee, internal storage will be included in the protected area. In addition, a Wild Rice River mini-diversion, which will be similar to the Sheyenne River diversion, will divert Wild Rice River flows to the south and east to protect rural housing developments along the Wild Rice between Interstate 29 and Highway 81. And finally, a high capacity pump station and closure structure will be constructed on Rose Coulee west of Highway 81.

The total cost of the project is estimated at \$161 million, with a requested state contribution of \$75 million. The Commission has budgeted \$20 million toward the project for the 2009-2011 biennium.

### **General Water Management**

General water management projects include rural flood control, snagging and clearing, channel improvements, recreational projects, dam repairs, planning efforts, and special studies. Funding for dam

repairs is quickly becoming a priority in North Dakota and across the nation, with dams that were constructed during the 1960s approaching their design life, and those that were constructed in the 1930s being well beyond their design life, and in many cases, in serious disrepair.

It is estimated that 15 of the most needed dam repairs in North Dakota could total about \$19.5 million. The \$11.3 million that is budgeted for general water management projects will be used to fund a portion of the state's general projects that are ready to proceed during the 2009-2011 biennium, including some dam repairs. Costs associated with the North Dakota Water Coalition's Missouri River Management project category are also included in this budgeted amount.

### **MR&I**

Because of North Dakota's MR&I water supply program, regional and rural water supply systems have continued to be developed or expand across the state. The \$10 million that is budgeted could be used toward a number of MR&I projects across North Dakota. However, until the amount of federal funding available for MR&I projects is more clearly known, state commitments for the advancement of these projects may vary in response.

### **Northwest Area Water Supply**

The Northwest Area Water Supply (NAWS) project is a regional

water supply project that will eventually supply much of northwestern North Dakota with Missouri River water. The 45-mile main transmission line between Minot and Lake Sakakawea has been completed, and NAWS is now providing water service to Berthold, Minot's South Hill region, and North Prairie Rural Water District with an interim supply from Minot's water treatment plant.

State funding of \$12 million for the NAWS project will go toward: resolution of the 2002 lawsuit following release of the Record of Decision; the initiation of design work on a biota treatment plant and intake; the remaining contracts to move water from Lake Sakakawea to Minot; and completion of the High Service Pump Station, the Kenmare-Upper Souris pipeline, and the Mohall-All Seasons pipeline.

### **Northwest North Dakota Oil Impact MR&I**

As the oil industry continues to grow in the northwest portion of North Dakota, so does the need for water development projects to support that growth. The drilling alone will require a tremendous amount of water resources, as 1 to 1.5 million gallons of water are required to drill a single Bakken Formation well, and 50,000 to 100,000 gallons of water are needed to drill non-oil shale wells. In total, North Dakota's Oil and Gas Division is estimating that as many as 13,250 new oil wells could be drilled by 2019. And, in

addition to the wells themselves, water supply systems in that region will need to provide water to the thousands of workers and their families living in those areas. As such, \$5 million has been set aside to assist water supply systems with their support of the oil industry in northwest North Dakota.

### **Red River Valley Water Supply**

With most of the Red River Valley's population relying on the Red River and its tributaries as their sole source of water, the impacts of a prolonged drought would be devastating to that region. And, as the population and economy of the Red River Valley continue to grow, the need for a more reliable source of quality water has become more important than ever before.

The Final EIS has been completed, and the BOR and the State of North Dakota have identified the Garrison Diversion Unit to Sheyenne River alternative as the preferred alternative. This alternative would supplement existing water supplies to meet future water needs with a combination of Red River, other North Dakota in-basin sources, and imported Missouri River water. The primary feature of this alternative will be a 125-mile, 66-inch (122 cfs) pipeline from the McClusky Canal to Lake Ashtabula.

As this project moves closer to fruition, North Dakota will need to support the Red River Valley Water Supply Project with state funding through the SWC of approximately \$30 million during the

2009-2011 biennium to advance this critical water development effort when it is ready to proceed.

### **Southwest Pipeline Project**

The Southwest Pipeline Project is a regional water supply system that draws water from Lake Sakakawea and serves 35,000 people in southwest North Dakota, including 28 communities, and 3,100 rural hookups – with plans to expand.

The \$12 million budgeted for the Southwest Pipeline Project will be used to complete the main transmission line from Hazen to Stanton, a reservoir at the Zap water treatment plant, and telemetry for the water treatment plant and reservoir. Development of a rural water distribution system in the Zap service area is also a possibility – depending on the availability of funding.

### **Irrigation**

As ethanol plants continue to be developed across the state, the need for increased corn production, supported by irrigation development, will also grow. The \$1 million budgeted for irrigation will provide the necessary funding assistance to advance irrigation efforts in areas of need across North Dakota.

# WATER MANAGEMENT RECOMMENDATIONS

The following recommendations all require future study and are intended to serve as a starting point to addressing long-term water management issues.

- Funds must be secured to address dam safety issues and dam repairs. Throughout the state there are numerous dams in need of major repair or removal if the dam is deemed no longer needed. The SWC should consider changing the cost-share policy to provide local governments with more state cost-share to either fix or demolish unwanted structures.
- Drought planning, including monitoring, impact assessment, and mitigation planning efforts must be implemented. This will require a multi-agency (local, state, and federal) concerted effort. The state currently has a drought reaction plan that addresses mitigating drought impacts to varying degrees. However, the current plan is reactionary and mostly targeted to initiate federal response and assistance to the agricultural sector.
- Providing reliable quality water to eastern North Dakota during drought conditions is of critical importance to the region and the entire state. There are institutional

and funding issues that must be resolved so that this can be accomplished in a timely manner. As such, the state must be diligent in solving the water supply shortage that exists during drought in eastern North Dakota. The consequences of no water supply to this region will result in tremendous social and economic hardship.

- 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 uncertainty of predicting what will happen to the lake levels and the social and environmental consequences associated with some of the measures make this a very difficult issue.

- Some counties simply do not have the revenue or the capability of raising revenue to meet their local cost-share requirements in funding many of the much-needed water development projects. The SWC should study the ability-to-pay concept to determine if a more equitable 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.

- In response to declining water levels in the Fox Hills aquifer, the State Engineer will continue to direct large-scale ground water diversions to other sources.
- 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. This could provide a real world application to science

currently being taught in their classrooms.

- A Youth Technology and Career Exploration Program could be designed through Project WET for a select group of Grade 9-12 students whose teachers have been involved in the Summer Advanced Watershed Applications Workshop. Students could earn a one-half high school ecology credit and also a one-semester hour of college credit. Students would use learning acquired in the classroom on advanced watershed methods and techniques, and apply that learning in the field on a local water body in their own watershed. Data would be collected and shared with other students involved in the

program through distance learning techniques. And, professional scientists would also share career awareness education through the same distance learning techniques.

- 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. This will include increased emphasis on community service learning projects intended to involve educators and students in tackling problems and issues related to water or environmental resources at home, in the school, in the community, or on the farm or ranch.

## CONCLUSION

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**W**hile great progress in water development in North Dakota has been made in the past, much remains to be accomplished now and into the future. The state is faced with ever evolving chal-

lenges including shifting population distribution, changes in agriculture and technology, rapid oil and gas development, infrastructure repair needs and the possible reduction in federal funds for water

development projects. The state has the responsibility to face these new and changing challenges with determination and a commitment to providing a prosperous future for all North Dakotans.





