



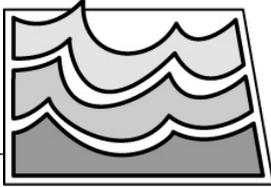
NORTH DAKOTA
State Water Commission
AND
Office of the State Engineer



BIENNIAL REPORT
for the period July 1, 2005 to June 30, 2007

Governor John Hoeven
Chairman

Dale L. Frink, P.E.
Secretary and State Engineer



North Dakota State Water Commission

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December 1, 2007

Governor John Hoeven
600 East Boulevard Ave.
Bismarck, ND 58505-0001

Secretary of State Al Jaeger
600 East Boulevard Ave.
Bismarck, ND 58505-0001

RE: 2005-2007 Biennial Report, N.D.C.C. § 54-06-03; N.D.C.C. § 54-06-04; and
other applicable law

Dear Governor Hoeven and Secretary of State Jaeger:

It is with great pride in the State Water Commission and the Office of the State Engineer that we present our Biennial Report for July 1, 2005, through June 30, 2007. This report highlights the events and activities of the State Water Commission and the State Engineer during that timeframe for your information and consideration.

Respectfully submitted,

Dale L. Frink
State Engineer

DLF:pf
Enclosure

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NORTH DAKOTA STATE WATER COMMISSION



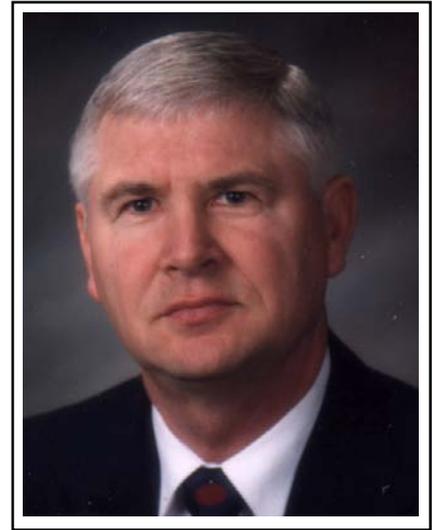
GOVERNOR JOHN HOEVEN
Chairman

Mission

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.

Philosophy and Values

In the delivery of services to the citizens of North Dakota, we the employees of the State Water Commission and the Office of the State Engineer value fairness, objectivity, accountability, responsiveness, and credibility. We pledge to use professional and scientific methods to maintain only the highest of standards in our delivery of services to our constituents.



DALE L. FRINK, P.E.
Secretary & State Engineer

Agency Goals

- 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.

Organization

The State Water Commission consists of the Governor as chairman, the Commissioner of Agriculture as an ex-officio member, and seven members who are appointed by the Governor to serve terms of six years each. The terms of office for appointees are arranged such that two terms and not more than three terms shall expire on the first day of July of each odd numbered year. The Commission appoints a Secretary (the State Engineer) as its executive officer, who employs

a staff as needed to carry out the work of the Commission.

The State Water Commission is located primarily in the State Office Building near the State Capitol in Bismarck, North Dakota. In addition, the Commission has a field office in West Fargo.

History and Mandates

The Office of the State Engineer was created in 1905 to regulate and administer matters concerning allocation of the state's water and

related land resources in compliance with article XI, § 3 of the North Dakota Constitution, which declares all waters to be property of the state for public use. In 1937, additional duties were added to this office when the State Engineer was designated Chief Engineer and Secretary to the Commission.

The State Water Commission was created by legislative action in 1937, as a result of the drought of the 1930s, for the specific purpose of fostering and promoting water resources development throughout the state.

Agency Policies

The State Water Commission and the State Engineer have developed procedures and policies based upon the comprehensive legislation contained in Title 61 of North Dakota's Century Code to:

- Administer the water laws of the state.
- Prepare and maintain a comprehensive plan for future growth and development, and to direct project development in accordance with that plan.
- Conduct studies to determine availability and occurrence of the ground and surface waters of the

state for the purposes of allocation and management.

- Assist local entities of government in the development and construction of water resource projects.
- Assist local entities of government in management and maintenance of water resource projects.
- Assist in the organization of various legal entities through which water resource projects can be sponsored and operated.
- Administer water information/education programs to enhance understanding of the state's water resources.

- Coordinate with federal, state, and local entities in water resources management and development.

- Represent the interests of the state in water resources matters in national, state, regional, and international forums.

Many of the policies in effect have evolved as a result of the agency's financial participation in project development along with local government sponsors. The amount of financial participation varies with the project's purpose.

Principal Agency Activities

- Develop Missouri River water in ways that will secure North Dakota's share of Missouri River flows for our current and future needs, as reflected in comprehensive water management planning documents and the Pick-Sloan Plan.

- Implement plans for the distribution of Missouri River water

through regional water supply systems such as the Southwest Pipeline project, the Northwest Area Water Supply project, and the Red River Valley Water Supply project.

- Manage and develop North Dakota's water resources to facilitate economic development and improve quality of life for current and future generations.

- Promote and provide water supplies needed for the expansion and diversification of North Dakota's agricultural industry.

- Work to implement all aspects of the Dakota Water Resources Act of 2000 to provide a reliable source of good-quality water throughout North Dakota in return for the sacrifices made under the Pick-Sloan Plan.

- Complete detailed studies and research that more precisely define the nature and occurrence of water to optimize its conservation and development throughout the state.

- Maintain a water project inventory and water management plan to promote efficiency in meeting North Dakota's future water development and funding needs.

- Refine legislation and policies for administering the Water Development Trust Fund and the Resources Trust Fund through which critical water facilities can be constructed.

- Continue to implement the



The Missouri River

state's three-pronged approach (including an outlet to the Sheyenne River, infrastructure protection, and upper-basin management) to solving the Devils Lake area flooding problems.

- Develop policies and initiatives that will stimulate progress toward developing flood control measures along the Sheyenne, Pembina, and Red Rivers, and Devils Lake.

- Pursue cooperative efforts with neighboring states and provinces to plan for beneficial water management of shared water resources.

- Cooperate with agencies that have regulatory authority over North Dakota's waters to protect and enhance the quality of North Dakota's water resources and related ecosystems.

- Enforce weather modification standards, conduct research, and supervise operational cloud seeding programs for hail suppression and rainfall enhancement.

- Provide water education for North Dakota's teachers, youth, and general public.

- Promote expanded development of North Dakota's water-based recreation resources, especially the Missouri River, Lake Oahe, Lake Sakakawea, and Devils Lake.

- Collect water resource data for the purpose of identifying the location, condition, and temporal changes of the water resources of the state.

- Disseminate water resource information to the general public, businesses, and government agencies.

- Manage the water resource database so that it is available and accessible to interested parties.

- Manage state water resources and sovereign lands within the framework of North Dakota's Century and Administrative Codes.

2007 Water Resources Legislation

Senate Bill 2020 is the Commission's 2007-2009 appropriation bill. It provides the agency's funding within two special line items, the Administrative and Support Services line item and the Water and Atmospheric Resources line item; and it totaled slightly over \$176 million. The bill includes approximately \$13.9 million from the general fund, with \$3 million of that amount identified as one time funding for the Red River Valley Water Supply Project. The balance of the funding is provided from the Water Development Trust Fund; the Resources Trust Fund; and federal, state, and local governmental sources. The bill also contains language allowing the City of Grand Forks to access all remaining funds up to its \$52 million cap, addresses eligibility for the drought livestock water assistance program, requires a study of the impacts of tile drainage, and establishes legislative intent that the Commission provide funding for the Sweetbriar Dam project.

Senate Bill 2096 amended subsection 1 of North Dakota Century Code (NDCC) §20.1-02-15.1 to clarify that the North Dakota Game and Fish Department can enforce state laws and rules on sovereign lands. NDCC §61-03-21.3 was amended to include dangers on all navigable "waters" rather than just navigable lakes. NDCC §61-33-05 was amended to allow the State Engineer to enter into agreements with law enforcement entities already patrolling sovereign lands to enforce the laws and rules associated with NDCC ch. 61-33. Additionally, the bill created NDCC §61-33-10 providing that a person who

violates NDCC 61-33 or any rule implementing the chapter is guilty of a class B misdemeanor unless a lesser penalty is indicated.

Senate Concurrent Resolution 4016 urged Congress to direct the United States Corps of Engineers to address and rectify the problems caused by accumulation of sediment in the Missouri River main stem reservoirs.

House Bill 1215 amended NDCC §61-34-04 providing that Drought Disaster Livestock Water Supply Assistance Program maximum payments are limited to three projects per applicant. It also added language that allowed landowners with projects on Indian Reservations to be eligible for assistance.

House Bill 1513 created NDCC §61-02-77 establishing an emergency municipal, tribal, and rural water assistance program for municipalities, tribes, and rural water systems, whose primary source of water is the Missouri River, Lake Sakakawea, or Lake Oahe. The purpose of the program is to provide emergency grant funds to municipalities, tribes, and rural water systems facing a critical need or health risk because of the inability of the water intake system to supply adequate quantity and/or quality water to the people served by the municipal, tribal, or rural water system.

Legal Actions

In May 1999, approximately 100 individuals who own land around Devils Lake sued the State of North Dakota, the North Dakota State Water Commission, the State Engineer, and nine water resource districts (collectively referred to as 'defendants'). They alleged that water projects in the upper Devils Lake basin—designed, constructed, funded, and/or maintained by the defendants—caused Devils Lake to flood their property. The landowners sought monetary damages in excess of \$10 million, an injunction, and an order directing the defendants to initiate condemnation proceedings. Ultimately, after eight years of litigation and 17 days of trial, on October 25, 2007, the court issued its decision in favor of the defendants, concluding that the plaintiffs failed to establish that any of the alleged projects were the cause for the harm and damages to their properties. The court ordered that the claims be dismissed with Prejudice, meaning the plaintiffs cannot sue on the same grounds in the future.

In a suit filed in 2002, the state challenged the manner in which the Corps of Engineers manages the Missouri River. It also sought an order requiring that the Corps issue a revised Master Manual (the document governing its management of the river that had been under review for over 14 years). The District Court granted the state's request for an order preventing the Corps from reducing Lake Sakakawea's level during the 2002 spring fish spawn. The Corps appealed the District Court's decision to the Eighth Circuit Court of Appeals. The Eighth Circuit agreed with the state that the Corps' river management decisions are reviewable. It disagreed with the state about the propriety of the District Court's injunction, overturning the injunction

primarily on the grounds that the state did not prove the likelihood of success on the merits because it found that the 1944 Flood Control Act gives navigation a preference. The state filed a petition for rehearing with the Eighth Circuit asking it to reconsider its decision and clarify certain issues. The petition was denied. The state then asked the U.S. Supreme Court to review the Eighth Circuit's decision, but it declined to do so.

Other lawsuits were filed against the Corps in 2002 as well as an additional suit by North Dakota in 2003. The state's 2003 suit asked the court to rule that the Clean Water Act required the Corps to comply with the state's water quality requirements. The suit resulted in a temporary injunction that prevented the Corps from reducing Lake Sakakawea's level during the spring 2003 fish spawn. Also, in 2003, all of the Missouri River litigation was consolidated before the District Court for the District of Minnesota. That court ordered the Corps to issue a new Master Manual, which it did in 2004. The revised Master Manual gives upstream interests greater consideration. Downstream interests challenged the new Master Manual but the Minnesota District Court upheld the Manual. The District Court also stated that while the Corps has significant discretion in managing the Missouri River, downstream navigation interests are not entitled to a priority over upstream interests. In its decision, the District Court also dismissed the state's 2003 Clean Water Act suit.

The state appealed this decision to the Eighth Circuit of Appeals, but the appellate court upheld the District Court's decision. Downstream interests, as well as environmental organizations, also appealed aspects of the District Court's decision to the Eighth Circuit Court of Appeals. The Appel-

late Court, however, rejected these appeals but in doing so made statements that could be read to give the Corps authority to prefer downstream navigation over upstream interests. North Dakota asked the United States Supreme Court to review this part of the Eighth Circuit's decision, but it declined to do so.

On August 30, 2002, the State Water Commission applied to the Department of Health (Department) for a North Dakota Pollutant Discharge Elimination System (NDPDES) permit to discharge Devils Lake water into the Sheyenne River. The Department issued an NDPDES permit to the Commission in August 2003. (C.R. 395-410). In March 2004 opponents of the outlet, including the Province of Manitoba, appealed the permit decision. (C.R. 3236-64). The District Court affirmed the Department's decision to grant the permit, and dismissed the appeals. Outlet opponents appealed the District Court decision to the North Dakota Supreme Court in December 2004. The Supreme Court affirmed the District Court's decision and upheld the Department's NDPDES permit. In 2006, the Commission sought to modify the NDPDES permit based upon new information. The Department formally approved the modification in August 2006. Outlet opponents, including the Province of Manitoba, again appealed the Department's decision to the District Court and the Court upheld the Department's modification of the NDPDES permit. Opponents of the outlet currently have an appeal pending with the North Dakota Supreme Court.

Also in 2002, the State Water Commission began construction of the Devils Lake Outlet. During the first phase of construction, the Commission was forced to condemn six parcels of property. Five of the landowners challenged the compensation awarded by the

Commission and appealed the condemnations to the District Court. Two of the cases have settled and three are pending.

In *Manitoba v. Norton*, Manitoba asserts that the U.S. Bureau of Reclamation violated NEPA by failing to prepare an Environmental Impact Statement for the Northwest Area Water Supply (NAWS) project. Manitoba is concerned that the project will bring Missouri River basin biota to the Hudson Bay basin, causing harm to the environment. North Dakota intervened in the lawsuit to protect the state's interests. North Dakota, as well as the Bureau, filed motions to dismiss the case on the ground that because the dispute concerns

the relations of the United States with another country, and relations governed by a treaty, the judiciary is without jurisdiction over the dispute. The District Court for the District of Columbia rejected the motions. All parties then filed summary judgment motions. The court denied the state's motion and the Bureau's motion but granted in part Manitoba's ruling that NEPA requires the Bureau to complete additional environmental analysis. The Bureau and state appealed this decision to the Court of Appeals for the District of Columbia, but dismissed their appeals after the Bureau decided to go ahead with additional environmental review. That work is still in progress. Thus

far, the suit has not interrupted project construction as the court has allowed the continued construction of certain project features.

In September 2006, the State Water Commission, Pembina County Water Resource District, Cavalier County Water Resource District, Pembina County, the Townships of Pembina, Neche, Felson, St. Joseph, and Walhalla were sued in a Manitoba court by the Rural Municipality of Rhineland. The suit contends that water management practices, including drainage and dikes in North Dakota, caused damage north of the border. A hearing will be scheduled to address whether Rhineland's claims are time-barred under Canadian law.

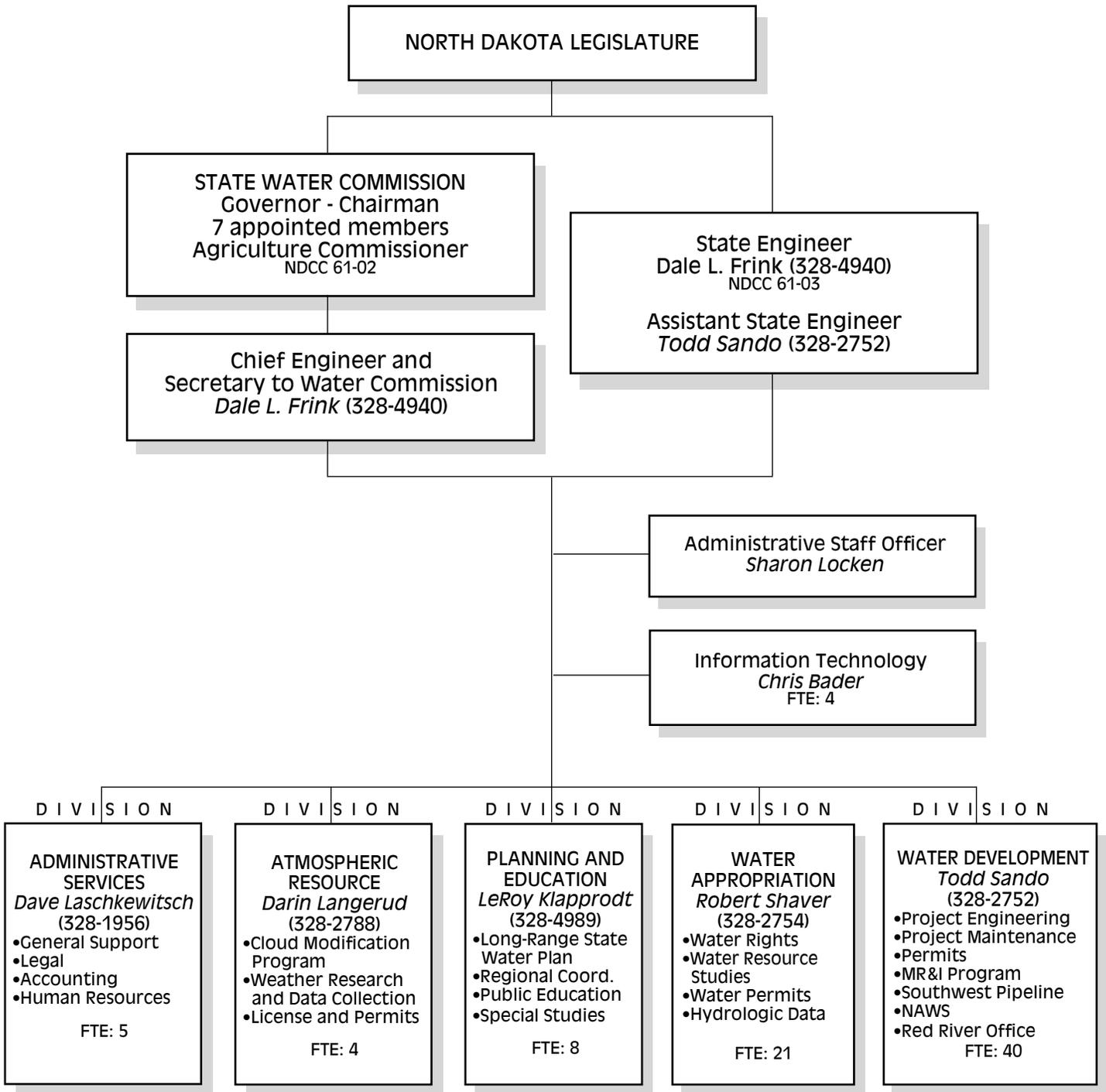
State Water Commission Members as of June 30, 2007

NAME	POSITION	APPOINTED	TERM ENDS
John Hoeven	Governor-Chairman		
Roger Johnson.....	Department of Agriculture		
Elmer Hillesland	Member from Grand Forks	July 1, 2001	June 30, 2007
Robert Thompson.....	Member from Page	July 1, 2001	June 30, 2007
Jack Olin	Member from Dickinson.....	July 1, 2001	June 30, 2009
Harley Swenson	Member from Bismarck	July 1, 2001	June 30, 2009
Arne Berg	Member from Devils Lake.....	December 7, 2006	June 30, 2011
Maurice Foley	Member from Minot	December 8, 2006	June 30, 2011
Larry Hanson.....	Member from Williston	July 1, 2001	June 30, 2011

State Water Commission Meetings July 1, 2005 through June 30, 2007

DATE	LOCATION	DATE	LOCATION
August 11, 2005..... (conference call)	Bismarck	October 12, 2006	Bismarck
August 30, 2005	Bismarck	November 14, 2006... (conference call)	Bismarck
November 1, 2005..... (conference call)	Bismarck	December 6, 2006..... (work session)	Bismarck
December 9, 2005.....	Bismarck	December 8, 2006.....	Bismarck
March 22, 2006	Bismarck	February 15, 2007 (conference call)	Bismarck
May 22, 2006	Bismarck	April 12, 2007	Bismarck
June 28, 2006.....	Bismarck	May 9, 2007	Bismarck
July 20, 2006	Bismarck		

North Dakota State Water Commission Organizational Chart



June 30, 2007

State Water Commission Employees as of June 30, 2007

ADMINISTRATIVE SERVICES DIVISION

State Engineer: Dale L. Frink
Administrative Staff Officer: Sharon Locken
Accounting Manager: David Laschkewitsch
Account/Budget Specialist: Pam Jahner
Human Resource Officer: Amy Klein
Paralegal: Rosemary Pedersen
Administrative Assistant: Karen Heinert
IT Administrator: Christopher Bader
Hydrologist: Paul Moen
Data Processing Coordinator: Travis Stramer
GIS Specialist: Rodney Bassler

ATMOSPHERIC RESOURCE BOARD

Division Director: Darin Langerud
Executive Staff Officer: LeNor Dollinger
Environmental Sciences Administrator: Mark Schneider
Environmental Scientist: Daniel Brothers

WATER APPROPRIATION DIVISION

Division Director: Robert Shaver
Administrative Assistant: Marlene Backman
Hydrologist Managers: Royce Cline, Jon Patch, Steve Pusc, William Schuh, Alan Wanek
Hydrologists: Rex Honeyman, Andrew Nygren, Scott Parkin, Gordon Sturgeon
Water Resource Engineer: Daniel Farrell, Robert White
Water Resource Senior Manager: Michael Hove
Water Resource Project Manager: James MacArthur
Engineering Technicians: Jeffrey Berger, Kelvin Kunz, Albert Lachenmeier, Merlyn Skaley
Rotary Drill Operator: Gary Calheim
Equipment Operator: Neil Martwick

PLANNING AND EDUCATION DIVISION

Division Director: LeRoy Klapprodt
Office Assistant: Dawn Schock
Water Resource Education Program Manager: Bill Sharff
Water Resource Planners: Michael Noone, Linda Weispfenning
Natural Resource Economist: Patrick Fridgen
Research Analyst: Larry Knudtson
Graphic Artist: Brenda Hove

WATER DEVELOPMENT DIVISION

Division Director/Asst. State Engineer: Todd Sando
Administrative Assistant: Melissa Behm
Water Resource Engineer Managers: Bruce Engelhardt, J. Tim Fay, Timothy Freije, Randy Gjestvang, Karen Goff, Jonathan Kelsch, Michelle Klose, Jeffrey Mattern, John Paczkowski, Julie Prescott, Ronald Swanson
Water Resource Engineers: Laura Ackerman, Dwight Comfort, Erwin Curry, James Lindseth, Sindhuja Subramania Pillai
Engineering Technicians: Daniel Bahm, Robert Buchholz, Theodore DeWall, John Edwards, Tom Engberg, Edward Gall, Waylon Thomas
GIS Specialist: Leland Krein
Water Resource Project Managers: Darron Nichols, Daniel Sauter
Water Resource Program Administrator: Jeffrey Klein, Bruce Lange, Carolyn Merbach
Account Technician: Winston Enyart
Administrative Officer: Cindy Graff
Realty Officer: Roger Kolling
Water Resource Senior Managers: Allen Balliet, Perry Weiner

Administrative Services Division

The Administrative Services Division provides the overall direction of agency powers and duties as described in the state's water laws. The activities include both the State Engineer and Water Commission's operations, as well as accounting, information technology, records, and support services for all agency programs.

Budget and fiscal control work is accomplished within the provi-

sions of statutory law and principles or rules of that law. Agency accounting consists of keeping accurate financial records, preparation of financial statements and reports, project or program cost accounting, preparation of budgets, and proper control of various funds appropriated by the state legislature.

A considerable portion of time is spent on coordination of water

resource programs with federal agencies and other state and local entities. The division works with contracts and agreements necessary to carry out investigations, planning, and cooperation with various other agencies in water resources development. A close liaison is maintained with irrigation districts, water resource districts, and the Garrison Diversion Conservancy District.

The State Engineer serves as North Dakota's representative on various boards and associations. Presently the State Engineer is the United States Co-chairman of the International Souris River Board, executive council member of the Western States Water Council, North Dakota co-director to the Missouri River Association of States and Tribes' Board of Directors, member of the National Water Resource Association, board of directors ex-officio member of the North Dakota Water Users Association, board of directors member of the North Dakota Water Education Foundation, member of the Association of Western States Engineers, and state representative to the Red River Basin Commission.

Information Technology (IT) Section

The State Water Commission utilizes information technology in almost all aspects of water resource management. The primary responsibility of the IT section is to provide the technology support required to fulfill the array of agency functions.

Over the past decade, the agency has developed considerable technology infrastructure for data storage and analysis required to meet the agency's water resource management responsibilities. However, the increasing demands associated with water management have resulted in changes in both the type of data collection efforts, and the types of tools required to perform the necessary analysis. The agency has made significant changes to its IT infrastructure, including enhancements to data storage, desktop computing, production equipment, and training for agency staff, as a result of the changing data and analysis requirements.

The agency's IT infrastructure was initially restructured during the 2001-2003 biennium to build a framework to meet the challenges

that were anticipated over the next decade and beyond. While many solutions for addressing water resource management are available commercially, there are significant resources available through open source. During the 2005-2007 biennium, the agency's IT infrastructure was enhanced to leverage open source solutions to provide an open and flexible framework to accommodate both commercial and open source technology solutions.

With the increasing emphasis on spatial relationships, geographic information systems (GIS) and related technologies will continue to play an expanding role in managing North Dakota's water resources. Initial efforts focused on ground water and atmospheric data management programs. Preliminary tools that provide basic integration of the data with the GIS infrastructure have been completed. Internal integration, web based mapping services have been completed for these areas and are available via the agency Internet map service (<http://mapservice.swc.state.nd.us/>). With the integration of much of the agency data within base GIS systems, development efforts are mov-

ing forward to enhance and evolve the current "tool-base" required to perform many of the basic hydrologic requirements for managing the state's water resources.

The agency has completed the scanning and digitization of much of the paper and aerial photographs to provide greater utilization of these resources, and to preserve them for long-term archival. These include approximately 2,800 Government Land Office (GLO) plat maps, representing the original state-wide government survey of North Dakota, and more than 28,000 color infrared aerial photographs owned by the agency. The agency is also currently exploring the digitization of archived Air Force photos from the early 1960s. In addition to scanning the color and black and white aerial photographs, initial work is currently underway to mosaic and integrate these images into a seamless photo base to be used in conjunction with all of the other spatial assets available to the agency for water management and resource assessment. Once completed, the composite mosaic scenes generated from these photographs will also be made available on the state GIS hub.

Atmospheric Resource Board

The Atmospheric Resource Board (ARB) is a quasi-judicial, quasi-legislative advisory and rule-making board under the supervision of the State Water Commission. ARB staff are co-located with the SWC, and function as a division of the Commission.

The Atmospheric Resource Board is comprised of ten members. Seven are appointed by the Governor, and ex-officio members include the State Engineer, the Director of the State Aeronautics Commission, and a representative of the Environmental Section of the Department of Health.

The primary functions of the ARB are to:

- Carry out administrative procedures required for the licensing of weather modification contractors and the permitting of cloud seeding operations and research activities;
- Develop and maintain a system for the collection of data and records of all operational weather modification activities;
- Conduct research into atmospheric precipitation processes to assess and improve the effectiveness of cloud seeding technology;

- Promulgate rules and regulations governing cloud seeding activities to ensure environmental and public safety;
- Monitor and evaluate cloud seeding activities and report back to sponsoring entities; and
- Monitor, collect, and disseminate accurate climate and precipitation data.

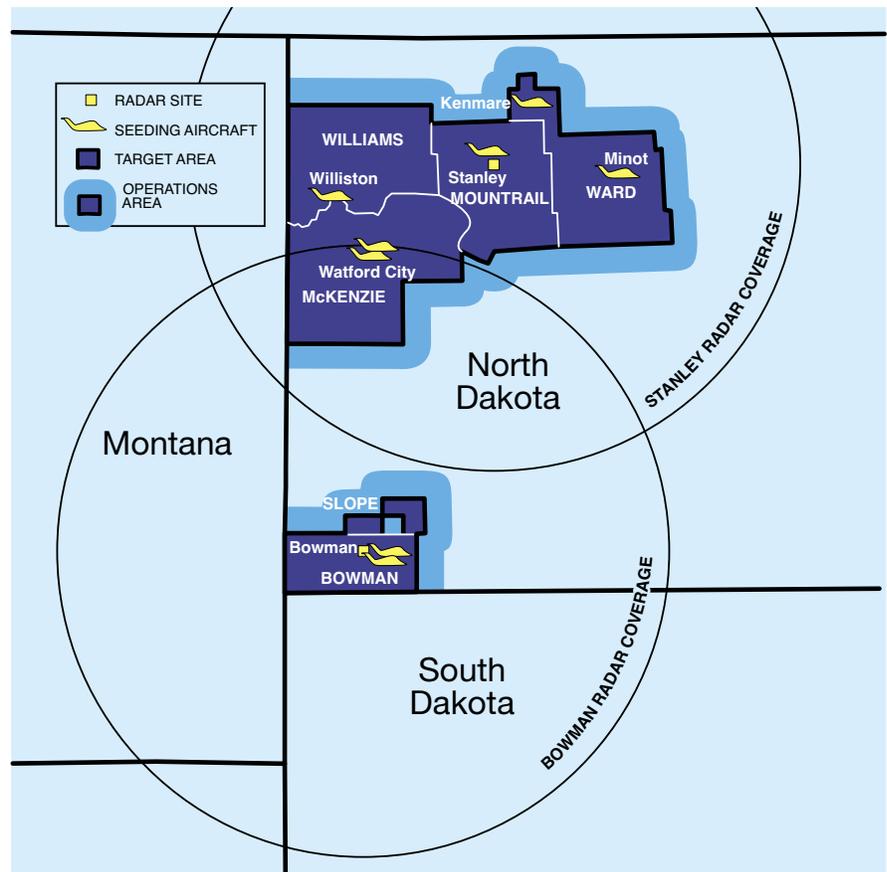
North Dakota Cloud Modification Program

The North Dakota Cloud Modification Project (NDCMP) served six western counties during the 2005-2007 biennium. These were Bowman, McKenzie, Mountrail, Ward, Williams, and part of Slope. At the conclusion of the biennium, the project target area covered 6.7 million acres of western North Dakota.

The NDCMP has two goals: 1) the suppression of damaging hail; and 2) the enhancement of rainfall. However, hail suppression continues to be the primary motivation of the sponsoring counties.

Suitable clouds over two multi-county operational districts were treated during June, July, and August of each summer of the biennium. Eight twin-engine aircraft operated by Weather Modification Inc. of Fargo, were deployed under contract to the ARB and participating counties. Operations were directed by project meteorologists from radar operations centers based in Bowman and Stanley, North Dakota.

The most recent evaluations of the program indicate a 45 percent reduction in crop-hail losses, a 6 percent increase in wheat yields, and up to a 10 percent increase in rainfall. The latest economic analysis suggests a total benefit to cost ratio greater than 35 to 1 in the target counties.



North Dakota Cloud Modification Project (NDCMP) target areas.

Student Intern Programs Continue

Eighteen intern copilots from the University of North Dakota's John D. Odegaard School of Aerospace Sciences participated in the NDCMP during the last biennium. All were trained at UND for a full academic year prior to their participation. Since the board's inception in 1975, approximately 300 intern pilots have logged more than 20,000 hours of flight time in the conduct of cloud seeding operations in North Dakota's skies. In addition to recording the time, location, duration, and meteorological conditions during all seeding and reconnaissance missions, the pilots are fully qualified to fly the aircraft, providing an additional safety margin. Because of the experience they gain, many intern copilots have returned to the NDCMP as Pilots in Command (PICs) in subsequent years.

The weather modification pilot training program is the only one of its kind in the United States and provides a significant number of qualified cloud seeding pilots for projects elsewhere in the U.S. and around the world.

Pilot intern status was changed from the unpaid volunteer status they filled in the 2003-05 biennium to one of paid temps. The previously unpaid positions were an impediment to some student's involvement in the program due to the cost of relocation, housing, and expenses during the program. Thanks to support from the Governor and Legislature, interns are now paid an hourly wage and are considered temporary employees of ARB during the summers.

ARB also retained undergraduate students majoring in atmospheric science as intern meteorologists during the 2005-2007 biennium. The four student interns

assisted NDCMP field meteorologists at radar-equipped operations centers. Like the intern pilots, intern meteorologists continue to demonstrate their enthusiasm and dedication to the NDCMP and provide a pool of better qualified persons to serve future projects as radar meteorologists.

Research in Hygroscopic Seeding

Research during the 2005-07 biennium focused on a cooperative program between ARB and the University of North Dakota's Atmospheric Science Department. The Polarimetric Cloud Analysis and Seeding Test, or POLCAST, began in June 2005 and involved collection and analysis of radar data with the UND polarimetric C-band Doppler radar in Grand Forks. The polarimetric parameters allow the radar to discriminate between liquid and ice-phase hydrometeors in clouds and should prove to be a tremendous research tool for weather modification.

From July 10 through August 5, 2006, ARB contracted with Weather Modification, Inc. to seed clouds in North Dakota within 100 km of the UND radar with hygroscopic flares, which generate large numbers of small salt particles. The flares were produced and provided free of charge by Ice Crystal Engineering of Davenport, ND. Results of the experiment indicate that seeded clouds contained higher liquid water contents, persisted longer, and produced more rainfall than their unseeded counterparts. While the initial results are promising, definitive conclusions cannot be drawn, as there were few cases during the short duration of the program.

This initial baseline study may open the door to additional, more elaborate research where questions regarding raindrop coalescence and ice-phase change processes may



Hygroscopic flare seeding during the POLCAST experiment.

be more fully explored and understood than ever before, providing for the improvement of cloud seeding operations and evaluations.

Weather Radar Operations

The ARB continued to operate two WSR-74C weather radars during the last biennium. Radars were located in facilities at the Bowman and Stanley airports and continued to operate at approximately one-quarter the cost of previously leased systems.

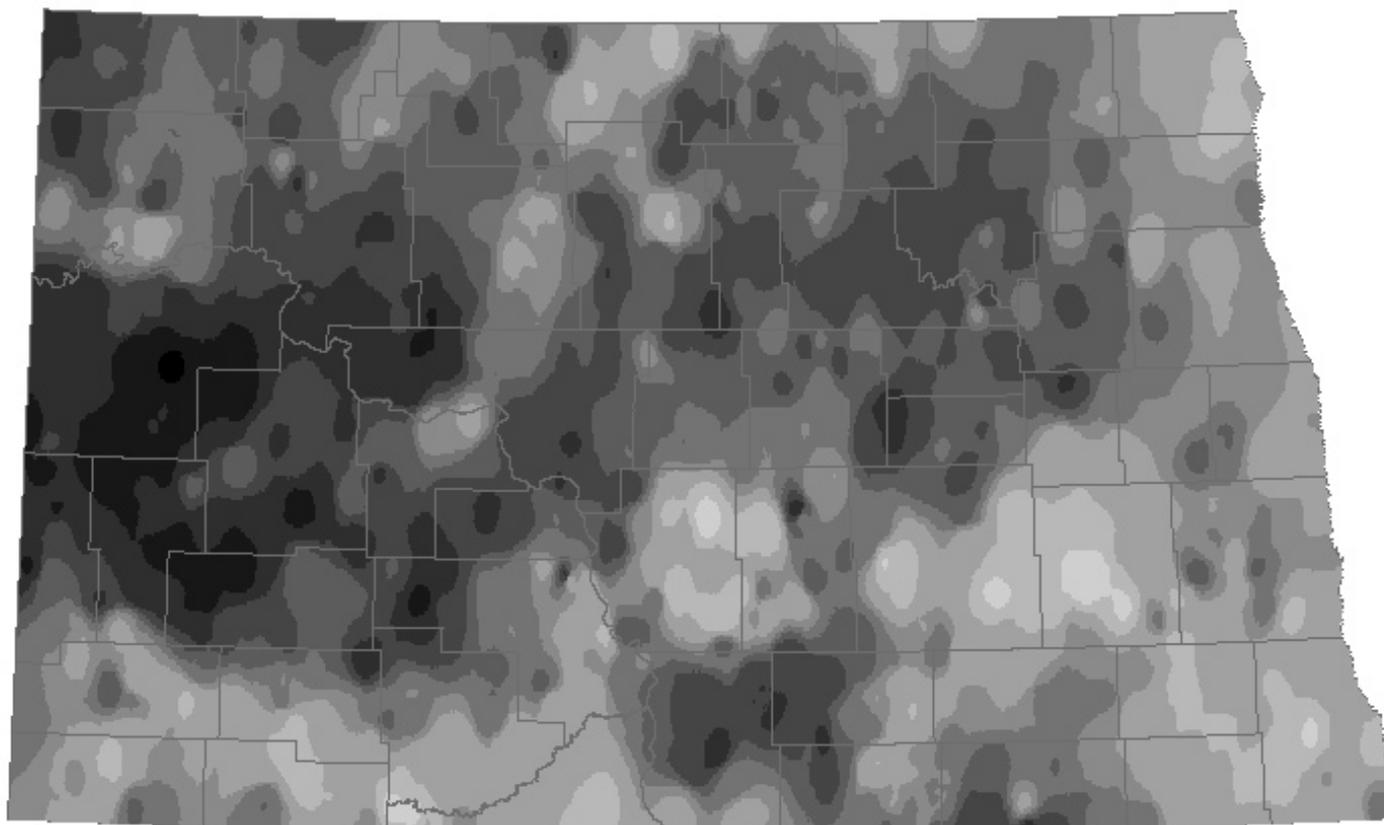
The Stanley radar is sited roughly midway between the National Weather Service (NWS) radar at Williston and the Minot Air Force Base radar near Deering, which makes it a good backup if either of the NWS sets should fail. The Bowman radar is sited at the coverage limits of the NWS radars located at Bismarck, Billings, Glasgow, Rapid City, and Williston, and thus provides low atmosphere coverage of southwestern North Dakota, southeastern Montana, and northwestern South Dakota, not available from NWS radars. Images from both radars are available and updated every five minutes on the

SWC website during the operational season.

ARB began a discussion with the NWS in the fall of 2006 regarding the possibility of operating ARB's radars beyond the existing three-month summer season. Thus far the NWS has expressed interest, but many details remain to be worked out prior to any future agreement.

Statewide Growing-Season Precipitation Observations

In 2006, the ARB Cooperative Observer Network (ARBCON) celebrated its 30th year of observing North Dakota growing-season precipitation. ARBCON observers numbered about 780 volunteers statewide, building on a database dating back to 1977. Rain and hail reports were recorded daily and sent in to ARB offices at the end of each month. In the event more than one inch of rain was received in any 24-hour period, observers also called in their rainfall report directly to the National Weather Service offices, where the data were used by hydrologists for short-term forecasting, and if necessary, in



JUNE 2007 PERECNT OF NORMAL RAINFALL, ARB COOPERATIVE OBSERVER NETWORK



the issuance of flood watches and warnings. Since the gage type employed by the network is not suitable for measuring snow, snowfall measurements are not attempted.

New to the network during the biennium was the capability for reporting via the Internet. Observers can enter their daily reports directly through the SWC website after logging in with a unique username and password. Currently about 10 percent of observers are utilizing the feature, a number which we hope to consistently grow in future years.

Rain and hail data, as well as monthly and growing season precipitation maps can be publicly accessed and downloaded directly through the SWC website. As a 30-year database now exists, a new

product offered depicts precipitation departure from normal. These maps are created by comparing the month or season of interest to the average precipitation for the previous 30-year period. Additional improvements in data accessibility and utility were made during the biennium. The data have proven to be very helpful in the assessment of excess rainfall and attendant flooding, as well as in the monitoring and delineation of drought.

Collaboration with State and National Organizations

The ARB is an active member of many state, national, and international organizations with mutual interests. During the last biennium, ARB staff worked with these groups to forward the goals and objectives of the board.

In North Dakota, ARB has worked toward water supply and weather damage mitigation goals with the North Dakota Water Coalition, North Dakota Weather Modification Association, and the North Dakota Water Education Foundation. Nationally, the ARB has been active in the Weather Modification Association and the North American Interstate Weather Modification Council. Both national organizations are supporting Congressional legislation that would create a federal weather mitigation advisory board and provide up to \$10 million per year for weather modification research.

Planning and Education Division

The primary responsibility of the Planning and Education Division is to maintain and update the statewide Water Management Plan for the State of North Dakota. Division staff members also participate in numerous regional, state, local, and inter-office planning activities; manage the agency's water education programs; manage the Drought Disaster Livestock Water Supply Project Assistance Program; and coordinate environmental reviews.

Specific staff responsibilities include:

- Maintaining a water project inventory and water management plan to promote efficiency in meeting North Dakota's future water development and funding needs;
- Leading or participating in special studies that result in water resource and related land management plans, such as the North Dakota Sovereign Land Management Plan;
- Monitoring water resource issues and advising decision makers on possible impacts to North Dakota's water management objectives;
- Representing the State Engineer and State Water Commission on regional, national, and international natural resource planning bodies such as the Red River Water Resources Council, Pembina River Basin Advisory Board, International Water Institute, and Red River Basin Commission, to name a few;
- Assisting joint water resource management boards to develop watershed management plans;
- Providing opportunities for adults and students to increase their understanding about North Dakota's water resources and how these resources are managed;

- Reviewing applications and meeting with applicants to determine eligibility for cost-share under the Drought Disaster Livestock Water Supply Project Assistance Program; and
- Coordinating and managing interagency project reviews.

2007-2009 Water Development Report

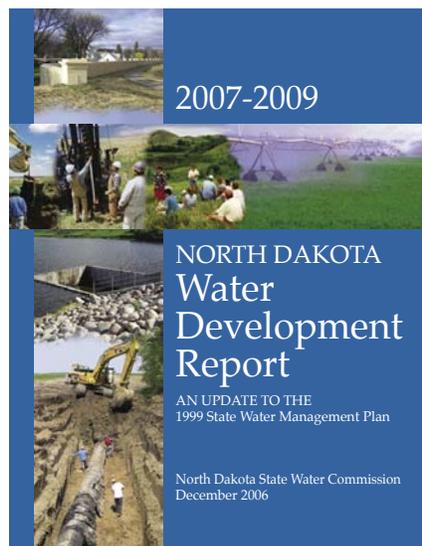
By virtue of North Dakota Century Code, Section 61-02-14, Powers and Duties of the Commission; and Section 61-02-26, Duties of State Agencies Concerned with Intrastate Use of Disposition of Waters, the Commission is required to develop and maintain a comprehensive water plan for the sound management of North Dakota's water resources.

In December 2006, the Planning and Education Division completed the 2007-2009 Water Development Report (WDR). The purpose of the 2007-2009 WDR is: to serve as a supplement to the 1999 State Water Management Plan (SWMP); to provide up-to-date information regarding North Dakota's current

and future water development project needs; to provide current information regarding North Dakota's ability to fund those water development needs; and to serve as a formal request for funding from the Resources Trust Fund during the 2007 Legislative Session.

Sovereign Land Management Planning

The state began the sovereign land management planning process in the summer of 2005 in response to an Attorney General's opinion (2005-L-01) that among other things, required the Office of the State Engineer to make sovereign land-related permitting decisions in consideration of a sovereign land management plan. At that time, no such plan existed. And, recognizing the need for such a document, the Office of the State Engineer brought together representatives from the state's Sovereign Land Advisory



2007-2009 Water Development Report.



Sovereign Land Management Plan.

Board, as well as other pertinent agencies, to provide technical expertise in the crafting of a first-ever North Dakota Sovereign Land Management Plan.

The plan was completed in January 2007, and its overall purpose is to: 1) continue to fulfill the State Engineer's duty to manage sovereign land pursuant to the Public Trust Doctrine; 2) satisfy requirements outlined in North Dakota Attorney General Opinion 2005-L-01; 3) provide improved consistency in the management of sovereign lands and administration of regulations; 4) serve as a complement to North Dakota's Administrative Code, Chapter 89-10-01 concerning sovereign land management; and 5) generally improve management of the state's sovereign lands for present and future generations.

Each of the above are intended to help the Office of the State Engineer achieve a sovereign land management goal, which is: to manage, operate, and supervise North Dakota's sovereign land, for multiple uses, that are consistent with the Public Trust Doctrine, and are in the best interest of present and future generations.

To facilitate public involvement in the planning process and to encourage public comment on proposed management changes, a series of six open house public meetings were held in Williston, Minot, Bismarck, Fargo, Valley City, and Lakota. The meetings were held from Sept. 27 through Oct. 10, 2006. Comments received from the general public at the meetings, and from letters and e-mails, were considered in drafting the final version of the plan.

The plan includes 19 recommendations, as well as several corresponding action strategies that are intended to provide direction for improved sovereign land management. Some of the management

recommendations pertain to cultural and historic resources, water quality, motor vehicle use, littering, noxious weeds, hunting, boating, and camping.

Devils Lake Basin Planning Efforts

Planning and Education Division staff played an integral role in assisting the Devils Lake Basin Joint Water Resource Board in their efforts to review and update the Devils Lake Basin Water Management Plan (DLBWMP) – initially completed in 1995. This plan is a critical component of the state's multi-pronged approach to solving flooding problems in the Devils Lake basin.

The 2006 update of the DLBWMP has two main objectives:

1) To involve local citizenry for their experience and expertise. Through that process, four subject committees (agriculture, economic development, recreation, and wildlife and fisheries) were created to represent the four broad areas of interest in the basin.

2) To develop a list of specific goals that reflect the more general objectives developed in the DLBWMP, and to track progress on those goals prior to the next update of the plan in 2008. The goals identify areas of the highest priority as defined by each of the subject committees.

As part of this process, the Planning and Education Division provided technical planning assistance, as well as staff resources for re-writing and publishing the document and associated website.

Upper Sheyenne River Basin Planning Efforts

Planning and Education Division staff have guided the development of a joint water board in the watershed above Lake Ashtabula—similar to the Devils Lake board.

Accomplishments have included the inclusion of all 12 counties in the joint board (Barnes, Benson, Eddy, Foster, Griggs, McHenry, Nelson, Pierce, Sheridan, Steele, Stutsman, and Wells); the development of a conceptual water management plan that identifies water resource development needs, and focuses resources towards achieving specific objectives; and a website to facilitate the dissemination of information about the board's activities.

The board is currently working on several projects, including the rehabilitation of existing water retention structures along the Sheyenne River, and developing monitoring programs on water quality in the river. In 2007, the board will begin updating the conceptual plan, with completion to come in 2008.

Extended Storage Acreage Program (ESAP)

During the 2005-2007 biennium, the ESAP continued to be administered. Under ESAP, contacts for floodwater retention are arranged for ten-year periods. There are currently nine landowners participating in the ESAP program in the Devils Lake basin. In 2006, additional storage of 150 acre-feet was added to one of the ESAP sites, taking the total 400 acres under contract to an available storage of 985 acre-feet annually.

Red River Basin Planning Efforts

Throughout the 2005-2007 biennium, Planning and Education Division staff members continued to actively contribute to the RRBC's planning and education advancements through involvement on several committees. In recent years, planning staff members have served on the RRBC's Plan Implementation and Communications Committees, as well as other RRBC sub-committees.

The RRBC is regarded as the primary facilitator in advocating and resolving water and land management issues from a basin-wide inter-jurisdictional perspective. The Commission supports efforts that promote basin-wide goals and objectives that result in cooperation and coordination among varied water management organizations and interests.

In addition, Planning and Education Division staff provided technical assistance to the Red River Joint Water Resource District to help them develop a 2007-2009 Water Management Strategy. The general concept of the joint board's water management strategy is modeled after the Water Commission's water development reports in that it, among other things, identifies projects and programs to be pursued, and timeframes for completion.

Red River Valley Water Supply Studies

As directed by the Dakota Water Resources Act, the State Water Commission provided technical assistance and participated in the review of a Red River Valley water supply study, which included the development of a Needs and Options Report and an Environmental Impact Statement. The Red River Valley Needs and Options Study and Environmental Impact Statement include a comprehensive analysis of all reasonable alternatives to meet the municipal, rural, and industrial water supply needs of the Red River Valley. All proposed alternatives were examined equally. As part of this effort, Planning and Education Division and other agency staff provided technical assistance as members of the study technical team. The technical team is responsible for day-to-day operations of the studies or tasks and for the evaluation, analysis,

and detailed review of technical material and data developed during the course of the various tasks.

Missouri River Management

The Planning Division also provided support toward the U.S. Army Corps' development of spring rise scenarios that are being designed to recover the endangered Pallid Sturgeon, and toward the Corps' revision of the Lake Sakakawea Resource Management Master Plan. In another important Missouri River management effort, Planning staff provided technical assistance toward creation and initial task identification for the newly formed Missouri River Joint Water Board.

Interagency Project Reviews

Planning and Education Division staff continue to conduct and coordinate interagency environmental reviews involving projects associated with Community Development Block Grants and Loans, highway improvements, airport improvements, dike/levee projects, water storage impoundments, municipal water supply projects, and various federal and state water, land, and wildlife management plans, studies, Environmental Assessments and Environmental Impact Statements. On average, 21 inter-agency environmental reviews were conducted monthly during the 2005-2007 biennium.

Environmental review comments address compliance requirements involving State Engineer and State Water Commission regulatory responsibilities in issuing permits pertaining to water appropriation, floodplain management, sovereign lands, and the construction of dikes, levees, dams, drains, and water holding ponds. Staff members also provide information concerning the location of wells and benchmarks.

Project WET

The North Dakota Project WET (Water Education for Teachers) program began in 1984 and became the pattern for a national and international WET program that now involves all 50 states and 23 foreign countries. Growth of the national program has provided new education tools that have enhanced teacher and student learning. North Dakota Project WET has had extensive involvement in the expansion of this learning as part of the Publications and Products Team of the national Project WET program. Since 1997, North Dakota Project WET has also enhanced its scope and vision with the innovative *Explore Your Watershed* extension of WET.

National WET program materials and resources along with new programs and materials developed by division staff for North Dakota are aimed toward preschool, day-care, grades K-12 students, formal educators, pre-service teachers, youth group leaders (i.e. Boy Scouts and 4H), natural resources education specialists, and other non-formal K-12 educators.

The *Explore Your Watershed* program promotes an interdisciplinary teaching and learning approach requiring significant staff coordination with specialists from several facets of public school education and natural resource management. *Explore Your Watershed* has greatly expanded its traditional teacher workshop offerings and developed innovative water festivals, intensive teacher watershed institutes, and youth and community programs.

Graduate credit and non-credit teacher offerings were made available throughout the biennium as well as many opportunities for youth and community members. Training during the biennium reached 406 K-12 teachers, 15,431 K-12 students, 24 pre-service teachers, 2,262 community members, and 28 non-formal teachers and natural resource managers.



4H youth are participating in a water chemistry activity at a Project WET event on Painted Woods Creek.

North Dakota Water Magazine

Since 1993, various water interests in North Dakota have pooled resources through the North Dakota Water Education Foundation to publish a magazine titled *North Dakota Water*. This magazine provides a broad spectrum of high quality information about the state's water resources to the widest possible audience. Over the course of the 2005-2007 biennium, average monthly distribution of the magazine was approximately 11,200. Readers include the general public, local, state, and federal agencies, and elected officials.

The Planning and Education Division develops the State Water Commission's contribution—a three-page section called *The Oxbow* with a feature section titled *The Water Primer*. The former is designed to inform readers about the State Water Commission's projects and programs as well as local, state, and national water management issues. The latter highlights interesting or little known facts about water and related land resources.

Drought Disaster Livestock Water Supply Project Assistance Program

The Drought Disaster Livestock Water Supply Project Assistance Program (Program) provides cost-share assistance to producers living in, and adjacent to, those counties identified by the Governor as "drought emergency areas." The Program was originally created in 1991 in response to a severe statewide drought, but it was only administered for a short period of time.

In the summer of 2002, the Program was reactivated, with a Commission allocation of \$385,000, following a Drought Emergency Proclamation issued by Governor John Hoeven. At that time, only select counties throughout the state that were experiencing severe drought conditions were eligible for Program funding. But, as the drought continued to persist in subsequent years, nearly all corners of North Dakota were affected, and a statewide drought proclamation

made livestock producers in all of the state's 53 counties eligible for assistance.

After the Program was reactivated once again in June 2006, the state made its largest single year investment in the Program by far, with Water Commission allocations totaling \$1.2 million by year's end. By the end of the biennium, the Commission had received about 550 applications with 82 percent being approved. Of those, about 340 producers were reimbursed approximately \$1.1 million, with an average reimbursement of \$3,300 per producer.

Other Governmental and Non-governmental Organization Involvement

The Planning and Education Division also participated, to varying degrees, on several other governmental and non-governmental organizations, providing input from the State Engineer and State Water Commission's perspectives. During the previous biennium, staff were involved with the Army Corps-sponsored Fargo-Moorhead and Upstream Feasibility Study and Missouri River Spring Rise committees, the Grand Forks/East Grand Forks Greenway Alliance, the International Water Institute, Greenway on the Red, Red River Water Resources Council, Souris River Board of Control, Little Missouri Scenic River Commission, Voices for Oahe, Devils Lake Outlet Advisory Committee, Aquatic Nuisance Species Task Force, the Governor's Lewis and Clark Advisory Committee, and Friends of Lake Sakakawea.

Water Appropriation Division

The Water Appropriation Division is responsible for the appropriation and management of the state's water resources in accordance with Article XI of the North Dakota Constitution and Chapter 61 of the North Dakota Century Code. The laws are based on the Doctrine of Prior Appropriation. The following principal activities fulfill these responsibilities:

- Identify the availability and chemical quality of the state's water resources;
- Assist municipalities and other public entities in developing solutions to particular water supply problems;
- Assess the impacts of existing water use on ground-water levels, streamflow, and chemical quality of water for purposes of future allocation and management;
- Collect, store, and disseminate data on stream flow, spring flow, ground-water and lake levels, water quality, and water use;
- Carry out the administrative procedures required for water permit applications, water permits, and water rights;
- Conduct analyses and provide recommended decisions to the State Engineer on water permit applications;
- Develop and maintain a system for the storage and retrieval of water permit records;
- Monitor the utilization of each conditional and perfected water permit through annual water use reports, and maintain a permanent record; and
- Participate in committees and task forces pertaining to water quantity and/or quality issues as required.

Major Activities (2005-2007)

Ongoing exploration for ground-water resources as well as monitoring and regulation of known aquifer systems require test-drilling and monitoring well installation. During the biennium, 24,457 feet of test drilling was completed, 128 new observation wells were installed, and an additional 44 test holes were drilled where no well was installed. As part of our ongoing well maintenance program, 15 existing monitoring wells were rehabilitated, and 220 older wells were properly plugged and abandoned.

The program for collecting water resource data involves several aspects. The major components of the program are the collection of samples for water quality analyses from surface and ground waters, the collection of water level data from surface and ground waters, the acquisition of water use data from surface and ground waters, and the monitoring of surface water flows.

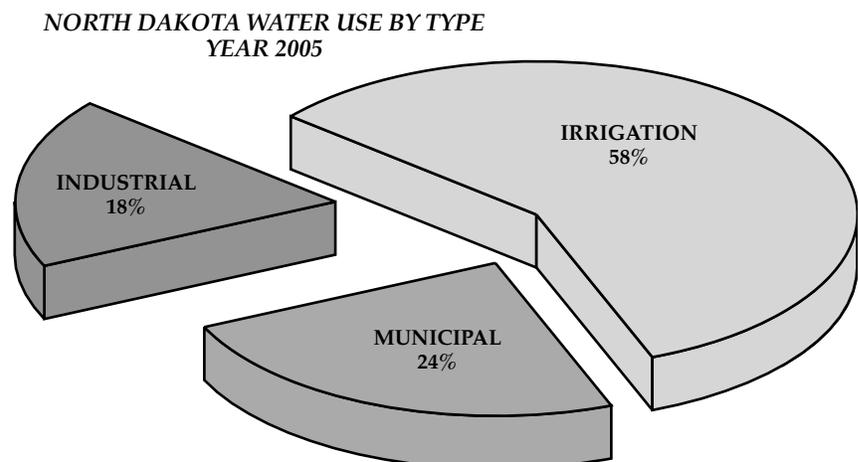
During the biennium, 4,673 water samples were analyzed for chemical constituents. These samples were collected from streams at gage stations, selected observation wells and production wells, and selected surface

water bodies. These data are used to determine the suitability of the chemical quality for beneficial use, to interpret areal hydrology, and to assess changes in the quality resulting from the stresses of both man-induced processes like pumping, and natural processes caused by climatic variations.

Over 3,900 wells and surface water bodies are measured for water levels. These are predominantly observation wells, but some lakes, sloughs and production wells are measured. These data reflect the changes in the surface and ground waters resulting from natural climatic variations and from pumping for beneficial use. These data are essential for making decisions on water permit applications and overall water management, present and future.

The agency supports the operation of 42 streamflow gages as part of the cooperative program with the U.S. Geological Survey (USGS). The cost of these gages is, for the most part, shared equally by the State Water Commission and the USGS. Additionally, at about ten sites distributed around the state, stream or spring flows are measured for specific studies.

Water use information is submitted annually from more than



3,000 water permit holders. Approximately 600 additional permits have the associated water use estimated, based upon evaporative losses from reservoirs. This information is essential for evaluating the impacts of withdrawals authorized by water permits on ground-water levels and stream flow, and making decisions on water permit applications. The pie chart on page 16 shows the relative volume of use by the major categories in 2005. The bar graphs on this page show the trend for the last 11 years for each of the three major categories of use (irrigation, municipal, and industrial).

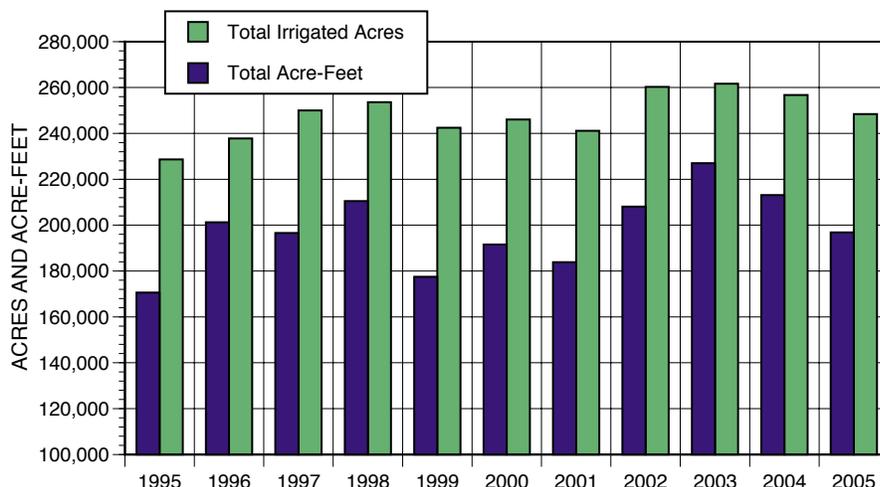
Water permit applications for the 2005-2007 biennium and a summary of the actions taken on them are listed in the table on page 18.

There were 48 conditional water permits perfected during the biennium. These water permits had been approved earlier, and had been fully developed. After being inspected, reports on these inspections were written and the permits were perfected.

There were 465 temporary water permits issued by the State Engineer during the 2005-2007 biennium. The total volume of water allocated was 19,088 acre-feet. Fifty-six temporary permits were from ground-water sources, with a total volume of 3,827 acre-feet, and 409 temporary permits were from surface water sources, with a total volume of 15,261 acre-feet.

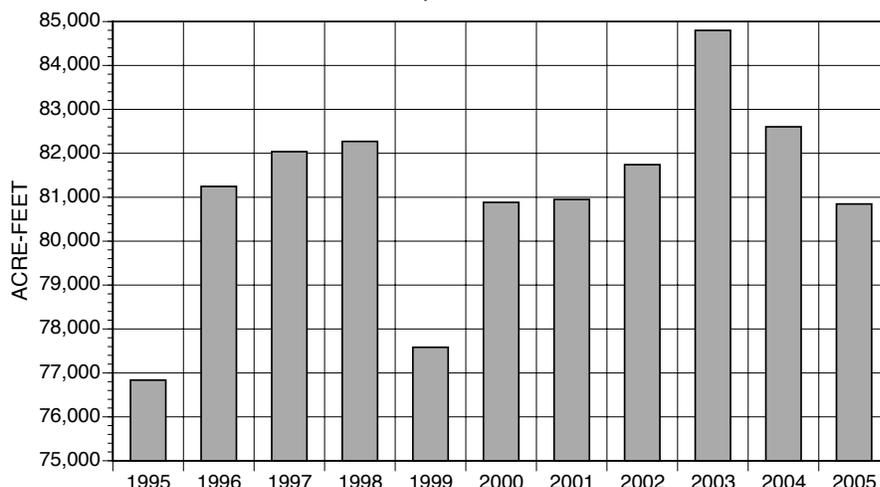
The management of surficial, unconfined aquifers often requires the development of ground-water flow models. Recharge, evapotranspiration, and irrigation water use are required inputs for both model calibration and simulating aquifer responses and are a function of climate. Software has been developed to read and combine various climate data sets (NOAA, NDAWN, and ARBCON data) for input to the Versatile Soil Moisture Budget model (VB2000). The aquifer model

IRRIGATED ACREAGE and ASSOCIATED WATER USE* (1995-2005)



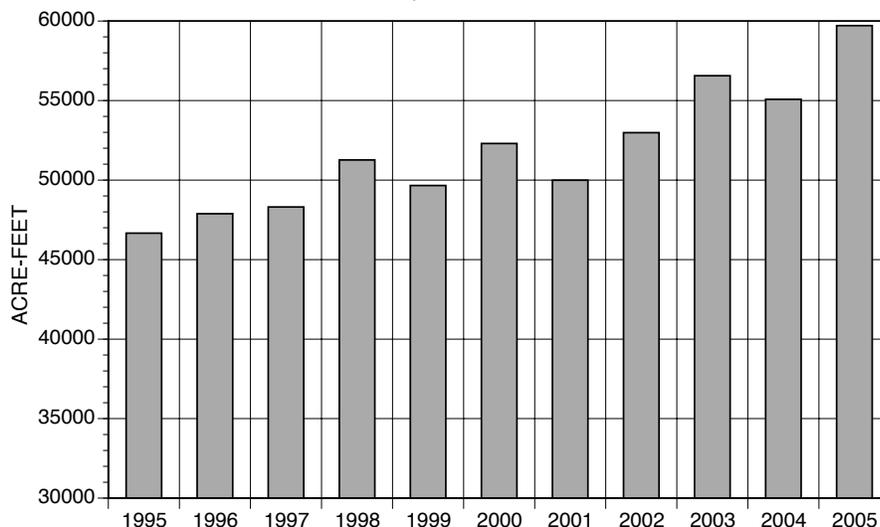
*Includes irrigated acres and associated water use from Montana POD and Oakes Irrigation Test Site.

REPORTED WATER USE* for MUNICIPAL PERMITS (1995-2005)



*Includes water use from Minnesota points of diversion, which supply water to Grand Forks.

REPORTED WATER USE for INDUSTRIAL PERMITS (1995-2005)



Water Permit Summary July 1, 2005 - June 30, 2007

WATER USE	ACRE-FEET
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Irrigation

Applications filed: 56

Acres requested: 15,858

Acres granted: 8,696

Water granted (23 permits)*4,043

Ground water2,873
(2,105 acres)

Surface water1,170
(713 acres)

Flood Control

Applications filed: 0

Industrial

Applications filed: 44

Water granted (30 permits)* .. 16,588

Livestock

Applications filed: 0

Water granted (5 permits)*178

Storage granted (5 permits)* 922**

Municipal

Applications filed: 8

Water granted (5 permits)*4,715

Recreation, Fish, and Wildlife

Applications filed: 27

Storage granted (13 permits)*.. 606**

Water granted (13 permits)*268

TOTAL Applications Filed: 135

TOTAL Water Granted25,791

*Includes backlog—permits applied for in previous bienniums.

**Stored water is not included in the number for "TOTAL Water Granted" because it is non-consumptive water use.

is calibrated against one or more climatic data sets that are considered representative of the climate overlying the aquifer by adjusting soil parameters. Initial testing of the model has been successfully completed in the Trappers Coulee aquifer study.

The Water Appropriation Division was also asked to assist and advise the public on the availability of water for all purposes of use. Considerable time and resources were expended in 2006 and 2007 to provide technical assistance for the development of water supplies for ethanol plants. Study areas included the Oakes, Hankinson, Milnor Channel, Sheyenne Delta, Spiritwood, and Buford-Trenton aquifers.

During the 2005-2007 biennium, the division was involved in several studies that are in progress. Descriptions of these studies follow:

- Trappers Coulee Aquifer Study – A computer model of the Trappers Coulee aquifer has been developed to evaluate pending ground-water irrigation permits. The report is in editorial review and will be published in 2007 as, *Hydrogeology and Modeling of the Trappers Coulee Aquifer*, (Water Resource Investigation No. 41).

- Oakes Aquifer Study – During the spring of 2007, a ground-water modeling study of the Oakes aquifer was initiated to evaluate pending irrigation and industrial (ethanol production) water permit applications in the Oakes aquifer. Data verification and data entry into the 4-D database has been completed. A report will be prepared during the winter of 2007-2008.

- Spiritwood Aquifer Study – During the spring of 2007, a ground-water modeling study of the Spiritwood aquifer (Grand Rapids to Oakes reach) was initi-

ated to evaluate pending industrial (ethanol production) water permit applications. Data verification, cross sections, and lithofacies maps were also completed. A report will be prepared in 2008.

- Sheyenne Delta Aquifer Study – The SWC participated in a cooperative ground-water study with Cass Rural Water Users to evaluate the potential for a large industrial (ethanol production) ground-water withdrawal from the Sheyenne Delta aquifer south of Leonard. Fieldwork was completed during the winter of 2006-2007. A North Dakota Ground Water Studies report will be prepared in late 2007.

- North Kidder Aquifer Complex Study – A comprehensive ground-water investigation of the north Kidder aquifer complex was initiated in 2006. The investigation includes a modeling phase. The purpose of the study is to provide a basis for action on pending water permits for irrigation. It is anticipated that the study will be completed and recommendations on the pending water permits will be made by the spring of 2008.

- Hankinson Ethanol Plant Water Permits – A comprehensive investigation of the interaction between the Brightwood, Milnor Channel, and Hankinson aquifers was initiated in 2006 to assess the availability and quality of ground water in the Hankinson area. Applications for the appropriation of large amounts of water for the proposed ethanol plant required a more complete understanding of the interaction of these aquifers through the construction and implementation of a computer ground-water flow model. A particle tracking and capture zone analysis was implemented to address concerns with regard to potential changes in water quality that could occur in the future. The model will also be used to predict potential drawdown effects and

time of travel in the ground-water flow system. Ultimately, the model results will provide the basis for preparing a recommended decision for the industrial water permit applications.

- A site specific ground-water investigation of the proposed new well-field for the City of Devils Lake was continued during the 2005-2007 biennium. The investigation is part of a cooperative agreement with the city, which involved the installation of nested piezometers at strategic locations where both water level and water chemistry data were collected. An aquifer test was performed at the site and will assist the city in the design of the wellfield that will provide the water supply from the Spiritwood aquifer west of Tolna. Water chemistry data collected will provide a better understanding of the origin of the low TDS and hardness water that occurs in this area, and the potential for water quality change in the future after the city begins pumping.

- Annual reviews of nitrogen occurrence in the Karlsruhe aquifer were made in the fall of 2005 and 2006. Reports were submitted to the State Health Department.

- The SWC allocated a one-year matching fund of up to \$13,850 in 2006-2007 for North Dakota university research that is federally funded through the North Dakota Water Resource Research Institute. Matching funds were for research focused on water resource issues. They were to be used for funding graduate student stipends and for research supplies and equipment.

- In 2006, the International Joint Commission (IJC) amalgamated the Souris River Bi-lateral Water Quality Monitoring Group into the International Souris River Board (ISRB). This expanded the board from six to 12 members. The State Engineer was appointed by the IJC

to serve as Co-chairman from the United States.

The IJC directed the ISRB to prepare a draft directive that encompasses a watershed approach to its responsibilities. This new directive was approved January 22, 2007. In addition, the ISRB's 2006 annual report represented the first time water quality and quantity were combined into one single publication. The ISRB appointed a hydrologist from the Water Appropriation Division to be Co-secretary to the ISRB and to prepare the ISRB annual report to the IJC.

- The ISRB assigned the Natural Flow Methods Committee (NFMCC) to examine methods to determine the diversion of flow at Rafferty and Alameda Reservoirs, and to recommend a preferred method to the ISRB. The Water Appropriation Division is representing the State Engineer on the NFMCC. This project is ongoing.

- A focused sampling regime of the major public water supplies from ground water in Grand Forks County was continued during the 2005-2007 biennium. The four major public water supplies (Grand Forks-Traill Rural Water, Tri-County Rural Water, Agassiz Rural Water, and the City of Larimore) obtain their water from the Inkster and Elk Valley aquifers. Twenty-five wells were sampled three times per year for an in-depth monitoring program, which began several years ago. This was done to detect any seasonal or long-term trends with respect to water quality changes—specifically nitrate.

- Monitoring the Forest River Colony Artificial Recharge Project was continued during the 2005-2007 biennium. The project involves pumping water from the Forest River during high flow times in the spring into a basin overlying the Inkster aquifer. Water is withdrawn later in the season for irrigation purposes. Without artificial recharge, the aquifer would not be

able to support the number of acres being irrigated. Mandatory sampling and water level monitoring protocols are given to the permit holder each year before artificial recharge begins.

The Appropriation Division published several reports during the 2005-2007 biennium. They include the following:

- Phase II and Phase III of the Traill Rural Water District water supply expansion were completed in 2006. Phase II involved drilling test holes and the construction, installation, and monitoring of observation wells to further define the movement of ground water. Phase III involved the construction and analysis of a test well to define aquifer hydraulic properties and sustained well yields and to provide a basis for well design. It was concluded from these studies that the northern part of the Page/Galesburg aquifer is capable of sustaining the water supply expansion proposed by Traill Rural Water District. The study was published as: *Evaluation of the Potential for Expansion of the Traill Rural Water Districts Ground Water Supply in the Northern Part of the Page/Galesburg Aquifer: Phase II and III – Exploration, Monitoring, and Aquifer Test Analysis (North Dakota Ground Water Studies No. 116)*, by Rex Honeyman. This report is available at the SWC website under Reports and Publications - Other Ground Water Studies.

- Three Water Resource Investigations associated with the on-going monitoring of pressure head declines in the Fox Hills-Hell Creek aquifer were completed in 2007. Many stockman, domestic users, municipalities, and industrial users are dependent on this aquifer in western North Dakota. The Fox Hills-Hell Creek aquifer is under pressure, which forces the water level in wells far above the top of the aquifer. In low-lying areas,

the water level can extend above the land surface, allowing wells to flow. It was concluded from the investigations, that if the current trend continues, a majority of the flowing wells within the aquifer will stop flowing by the end of this century. In an effort to promote water conservation, a news release was submitted to the local newspapers and an informational brochure was submitted to local government agencies for distribution to the public. The reports were developed by Rex Honeyman and are entitled: *Pressure Head Fluctuations of the Fox Hills-Hell Creek Aquifer in Billings, Golden Valley, and Slope Counties, North Dakota (Water Resources Investigation No. 42)*; *Pressure Head Fluctuations of the Fox Hills-Hell Creek Aquifer in McKenzie County, North Dakota, (Water Resources Investigation No. 43)*; and *Pressure Head Fluctuations of the Fox Hills-Hell Creek Aquifer in the Knife River Basin, North Dakota, (Water Resources Investigation No. 44)*. All three are available from the SWC website under Reports and Publications – Water Resource Investigations.

- A comprehensive ground water study was initiated to provide a

basis for action on 21 water permit applications for industrial use in the Forman Butte oilfield in McKenzie County. Monitoring wells were completed in the permit area to measure water levels and determine water quality. A well registration program was initiated in the study area to inventory existing wells and springs. Water samples were collected for chemical analysis from the registered wells and springs. Based on the analysis of the hydrogeologic data, as presented in: *Office of the State Engineer Recommended Decision – Zynergy Water Permit Applications*, by Alan Wanek, approval was granted by the State Engineer on the 20 water permit applications.

- Analysis of the Camp Grafton South ground-water sampling was completed in 2006, and a full report was prepared and presented to the National Guard. The report was published in May 2007 as: *Review of Water Quality Assessments for the North Dakota National Guard Camp Grafton (South Unit), Eddy County, North Dakota: 1986 through 2006 (Water Resources Investigation No. 40)*, by W.M. Schuh. The report is available from the SWC website

under Reports and Publications – Water Resource Investigations.

- The State Water Commission, University of Leeds (United Kingdom), Energy and Environmental Research Center, and University of North Dakota completed a cooperative project assessing sources and processes controlling sulfate, chloride, and nitrate in the Elk Valley aquifer in the spring of 2007. It was published as: *Sources and Processes Affecting the Distribution of Dissolved Sulfate in the Elk Valley Aquifer in Grand Forks County, Eastern North Dakota (Water Resources Investigation No. 38)*, by W.M. Schuh, Simon Bottrell, Scott Korom, John Gallagher, and Jon Patch. The report is available from the SWC website under Reports and Publications – Water Resource Investigations.

- An analysis of the natural sulfate sources affecting the Sheyenne River and their impact on the regulatory framework for the Devils Lake Outlet was completed and published by William Schuh and Michael Hove in the Spring of 2006. It was published as: *Sources and Processes Affecting Dissolved Sulfate Concentrations in the Upper Sheyenne River*. The report is available from the SWC website under Devils Lake publications.

- A contract study of soil salinity along the Devils Lake Outlet channel was completed by Western Plains Consulting and a full report was provided to the Water Commission. In addition, a report assessing the potential use of the report for later reassessment of salinization was prepared and published as: *Methods for Reassessing Potential Soil Salinity Changes Adjacent to the Devils Lake Outlet Channel (Water Resources Investigation No. 39)*, by W.M. Schuh. The report is available from the SWC website under Reports and Publications – Water Resource Investigations.

- A monitoring well network for assessing effects of Stump Lake water levels on water levels and



Flowing well in western North Dakota.

water chemistry in Tolna Coulee was constructed in 2006, and a report was provided to the Devils Lake Joint Board. It was published as *Assessment of Effects of Stump Lake Water Elevation on Ground-Water Elevation, Flow, and Chemistry in Tolna Coulee, Nelson County, North Dakota*, by W.M. Schuh. It is available from the SWC website under Devils Lake Flooding – Studies and Reports – NDSWC.

- A monitoring well network for assessing effects of the Devils Lake Outlet channel on ground water salinization near the outlet was constructed, and a report was published as: *Ground-water Monitoring Plan and Baseline Data for the Devils Lake Outlet Channel*, by W.M. Schuh. The report is available from the SWC website under Devils Lake publications.

The Water Appropriation Division cooperates with the Department of Health in reviewing

ground water aspects of landfill applications and with the State Public Service Commission in reviewing ground water aspects of coal mining permits and revisions. Written responses are provided to the Department of Health regarding the suitability of locations for the proposed landfill uses and to the Public Service Commission regarding the accuracy and completeness of supporting information and ground-water monitoring plans.

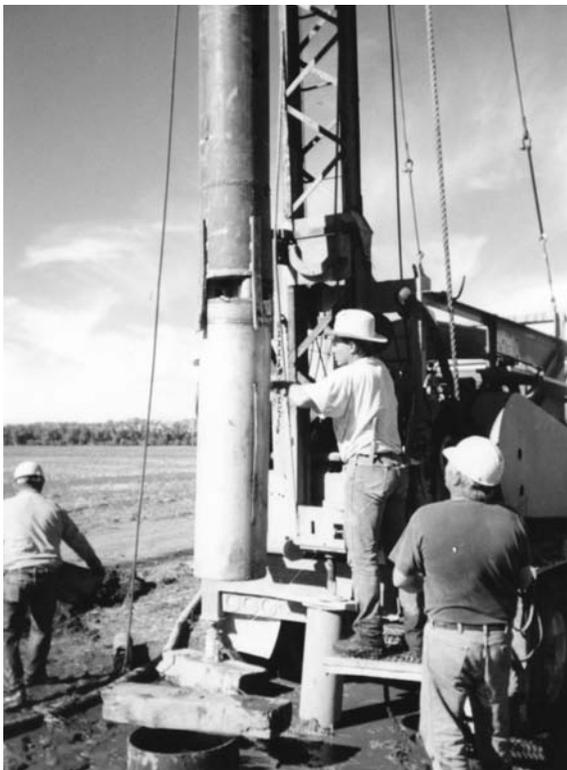
With the large volume of water resource data collected by the agency, management of that data is essential for its efficient use. These management efforts involve processes related to the collection, storage, analysis, and dissemination of a wide range of data which include well inventory information, water levels, water chemistry analyses, water permits, water use, dams, drains, and precipitation. Because of the unique nature of much of the data, the Commission has developed the necessary data management tools internally.

The architecture of the Water Commission's data management structure has evolved into a distributed client-server model that can easily be extended to incorporate new functionality to meet the changing business requirements of the agency. More than a decade ago, the agency extended the functionality of this system to include seamless integration with the Internet to provide external access to the data managed by the agency. During the last two bienniums, the data management infrastructure was expanded

to provide integration with the state GIS hub and other web-based mapping applications. All of the data resources currently maintained by the Commission are available online through the agency website at <http://www.state.nd.us> or through the agency map services at <http://mapservice.swc.state.us>.

The Water Appropriation Division represents the State Engineer and the State Water Commission on state, regional, and national natural resource organizations. Members of the division have provided soils, ground, or surface water assistance in meetings or reviews pertaining to: Section 319 Task Force; Working Committee of the State Pesticide in Ground Water Protection Plan; Technical Committee of the State Pesticide in Ground Water Protection Plan; Energy & Environmental Research Center Red River Water Management Consortium; Energy and Environmental Research Center WAFFLE Project Task Force; North Dakota Board of Water Well Contractors; Midwest Ground Water Conference; North Dakota Water Resources Research Institute; North Dakota Department of Health Water Quality Rules Changes; North Dakota Public Service Commission Mining Plans; North Dakota State University Extension Irrigation Workshops; Red River Valley Water Supply Project; International Red River Basin – Hydrology Committee (for discussion on water appropriations and naturalizing flow of the Red River).

Economic development is a major state initiative. In most instances water is needed to serve new enterprises. Information is provided to the Department of Commerce and local economic development organizations regarding the availability and chemical quality of the water to serve a proposed enterprise. The agency also provided information to Department of Commerce clients on immediate and long-term regulatory issues, which helps in defining capital requirements.



Lako Drilling places cylinders for measuring natural nitrate removal rates in the Elk Valley aquifer, a joint project of the University of ND and the NDSWC.

Water Development Division

The Water Development Division provides technical review and guidance in water management project design and in regulating project construction. The division staff has several responsibilities:

- Preparing engineering and feasibility reports and designs for the construction, maintenance, and major repair of water resource projects;
- Reviewing and making recommendations on permit applications for drains, dikes, dams, and sovereign lands;
- Providing technical assistance to water resource district boards;
- Inspecting and reporting on the safety of dams;
- Assisting communities in practicing floodplain management through the National Flood Insurance Program;
- Administering FEMA's Map Modernization Project;
- Providing joint coordination of the Municipal, Rural, and Industrial Water Supply Program;
- Management and operation of the Devils Lake Outlet project;
- Managing the design, construction, and operation of the Southwest Pipeline Project (SWPP); and
- Managing the design and construction of the Northwest Water Supply Project (NAWS).

The Water Development Division is divided into six sections: 1) Regulatory; 2) Investigations; 3) Design and Construction; 4) Municipal, Rural, and Industrial Water Supply; 5) Red River Office (located in West Fargo); and 6) Southwest Pipeline Project and NAWS. The following is a summary of the biennial activities of each of these sections.

Regulatory

During the 2005-2007 biennium, the Regulatory Section processed 22 applications for permits to construct or modify dams, dikes, diversion ditches, or other water control facilities. The section also processed 82 wetland creations, 107 wetland restorations, 25 sovereign land permit applications, and 96 applications for permits to drain, of which 48 were for tile drain systems. In addition, the engineering staff provided assistance with the environmental reviews coordinated by the Planning Division, addressed several appeals of water resource district decisions, and dealt with numerous water-related complaints from around the state.

Staff members also represented the agency at a variety of technical meetings held by such groups as the: U.S. Army Corps of Engineers, NRCS State Technical Committee, NRCS Interagency Watershed Committee, Association of Soil Conservation Districts, North Dakota Soil Conservation Committee, and the Natural Resources Trust.

Three staff members work with FEMA funded programs within the Regulatory Section. These programs are the Map Modernization Management Support (MMMS) program, the Community Assistance Program (CAP) and the Flood Mitigation Assistance (FMA) program.

The MMMS Coordinator manages another FEMA program called Map Modernization which was initiated in federal Fiscal Year 2005 to update and convert existing Flood Insurance Rate Maps (FIRMs) of the National Flood Insurance Program (NFIP) to a digital, county-wide format (DFIRM) over a five-year timeframe. The MMMS Coordinator oversees the selection

of engineering consultants chosen annually to do the work tasks of FIRM digitization and subsequent contract management. In the first year of Map Modernization, a total of more than \$1.4 million was secured in federal Fiscal Year (FY) 2005 funding to do work in Barnes, Grand Forks, Walsh, Mercer, and Richland Counties. In FY 2006, \$1.38 million was approved by FEMA to Ramsey, Richland, Ransom, Traill, Pembina, Mercer, and Benson Counties. And in FY 2007, \$903,000 was made available for digitizing Ward, McHenry, Bottineau, Rolette, and Stark Counties.

Two staff members work with the 75 percent FEMA funded CAP and FMA programs, which complement the National Flood Insurance Program (NFIP). Through CAP, the floodplain management staff assists over 290 communities with administration of their floodplain management responsibilities. Each community designates an individual as a floodplain administrator to oversee floodplain development within their identified floodplains. State staff work closely with those individuals to provide technical assistance through telephone and correspondence, visits to communities directly, as well as conducting periodic training workshops. The NDCC Chapter 61-16.2 also outlines state minimum floodplain standards related to the NFIP that communities must follow. The FMA provides federal and state cost-share for community flood mitigation planning and subsequent small scale acquisition of chronically flood-prone structures.

Staff also completed 1,017 floodplain determinations for home mortgages under a cooperative agreement with the Bank of North Dakota.

Investigations

The Investigations Section spent a lot of time supporting the Attorney General's Office with lawsuits in the 2005-2007 biennium. Staff spent a great deal of time on the Devils Lake landowners' lawsuit and the Pembina Border dike lawsuit.

Significant flooding has occurred throughout the Devils Lake Basin since 1993. The level of Devils Lake rose over 25 feet from an elevation of 1423.2 feet above mean sea level (amsl) on July 1, 1993 to 1449.1 feet amsl on June 17, 2004. On July 1, 2005, the elevation of Devils Lake was 1448.6 feet amsl, while the elevation of Stump Lake was 1430.1 feet amsl. By the end of the biennium, June 30, 2007, the elevation of Devils Lake was 1447.8 feet amsl, a reduction of 0.8 feet. The elevation of Stump Lake at the end of the biennium, June 30, 2007, was 1447.3 feet amsl, an increase of 17.2 feet. By the end of the biennium, Devils Lake had essentially inundated Stump Lake – resulting in the two becoming one lake. Although the level of Devils Lake dropped over the course of the biennium, the volume of Devils Lake, which includes Stump Lake, increased by 109,000 acre-feet.

Construction of the outlet from Devils Lake to the Sheyenne River was completed, and the outlet was operated in August 2005 and June 2007. The outlet was not operated at other times during the biennium because of low flow and high sulfate in the Sheyenne River. The operation that did occur allowed Investigation Section staff to become familiar with operation of the outlet and water quality sampling requirements, as well as to adjust and refine the physical features and operational procedures of the outlet.

The Water Commission requested a modification of the Water Quality Discharge permit for the outlet, the Health Department approved the modification, and the District Court upheld the modification. The request for modification was based on additional data collected since 2005. The Investigation Section also spent considerable time on the condemnation lawsuits for the outlet.

The Investigation Section also supported the Division of Emergency Services in the monitoring and response to the spring floods in the Red River Basin in 2006 and 2007.

And finally, the Investigation Section provided a great deal of the continuing education required for staff members' registration as Professional Engineers. The section also conducted investigations of Sweetbriar Dam, Billings Lake, Zap Bank Stabilization, Sheyenne Dam Hydraulics, and Pembina County Flood Control.

DAM SAFETY FORMAL INSPECTIONS

Name of Dam	County	Hazard
Armourdale Dam	Towner	Low
Arnegard Dam	McKenzie	Low
Blacktail Dam	Williams	Medium
Camel Butte Dam	Golden Valley	Medium
Clausen Springs Dam	Barnes	High
Cottonwood Creek Dam	LaMoure	Medium
Crown Butte Dam	Morton	Medium
Daub Dam	Oliver	Medium
Davis Fish Dam (Speck Davis)	Slope	Low
Dead Colt Creek Dam	Ransom	Medium
Devils Lake Roads as Dams	Ramsey	NA
Drayton Dam	Pembina	Medium
Epping Dam	Williams	Medium
Grafton Dam	Walsh	Low
Green Lake Outlet Channel	McIntosh	Low
Herzog Dam	Pembina	Medium
Hunter Dam	Cass	High
Indian Creek Dam	Hettinger	Medium
Kota Ray Dam	Williams	Low
McGregor Dam	Williams	High
Mount Carmel Dam	Cavalier	Medium
Queen City Dam	Stark	Medium
Sweetbriar Creek Dam	Morton	Medium
Tioga Dam	Williams	High
Ueland Dam	Griggs	Low
Up. Turtle R. #9 (Larimore)	Grand Forks	High
Vigness Dam	Walsh	Low
White Earth Dam	Mountrail	Medium

Design and Construction

During the 2005-2007 biennium, the State Water Commission's construction crew conducted repairs and modifications to water resource structures throughout the state.

Crown Butte Dam, Morton County - The Water Commission cooperated with other local and state agencies to complete several needed repairs and modifications to Crown Butte Dam, where Interstate 94 serves as the embankment of the dam, ten miles west of Mandan.

In December 2004, State Water Commission and Department of Transportation (DOT) staff inspected Crown Butte Dam and determined that a number of repairs were necessary. Specifically, it was found that the spillway pipe had settled unevenly, which caused fill material to seep through joints where the spillway pipe sections had been connected. In addition, several sinkholes were identified on both sides of the embank-

DAM SAFETY SITE VISITS

Name	County	Hazard	Name	County	Hazard
Antler Creek Dam	Bottineau	Low	Lake Tobiason	Steele	Low
Anton Zablotny Dam	Billings	Low	Lamoure City Dam	Lamoure	Low
Appert Lake Dam	Emmons	Low	Lisbon Dam	Ransom	Medium
Armourdale Dam	Towner	Low	Lynch Dam	Steele	Low
Arnegard Dam	McKenzie	Low	Maple River Dam	Cass	High
Balta Dam	Pierce	Low	Mayville Dam 2	Traill	Low
Baukol-Noonan Dam #1	Divide	Low	McDowell Dam	Burleigh	Medium
Beach Dam	Golden Valley	High	McGregor Dam	Williams	Medium
Beaver Creek Diversion	Steele	Medium	McVile Railroad Dam	Nelson	Medium
Beaver Lake Dam	Logan	Low	Middle Branch Park River #10	Cavalier	Medium
Belfield Dam	Stark	Low	Middle Branch Park River #5	Walsh	Medium
Beulah Flood Control Dam	Mercer	High	Middle Branch Park River #8 (Skyrud)	Walsh	Medium
Big Coulee Dam	Towner	Medium	Middle Branch Park River #9 (Union)	Cavalier	Medium
Blacktail Dam	Williams	Medium	Minot Water Supply Dam	Ward	Medium
Bowman-Haley Dam	Bowman	High	Minto Dam	Walsh	Low
Braddock Dam	Emmons	Low	Mirror Lake Dam	Adams	Medium
Brown Dam	Barnes	Low	Morrison Dam	Pembina	Low
Bucephalia Dam	Foster	Low	Mount Carmel Dam	Cavalier	Medium
Buffalo Lake Diversion Dam	Pierce	Low	Myron Edsrud Dam	Nelson	Medium
Burlington Dam #1	Ward	High	Neideffer Flood Control Dam	Burleigh	Low
Burlington Dam #2	Ward	High	New Rockford Railroad Dam 1	Eddy	Low
Burlington Dam #3	Ward	Low	Niagara Railroad Dam #1	Grand Forks	Low
Burlington Park Dam	Ward	Low	Niagara Township Dam #2	Grand Forks	Low
Camel Butte Dam	Golden Valley	Medium	Nieuwsma Dam	Emmons	Medium
Cat Coulee Dam	Grant	Low	North Lemmon Lake Dam	Adams	Medium
Cedar Lake Dam Gma	Slope	Low	Northgate Dam 2	Burke	Medium
Christine Dam	Richland	Low	Nygren Dam	Morton	Low
Chuck Wallace Jr. Dam 3	Adams	Low	Odland Dam	Golden Valley	Low
Clausen Springs Dam	Barnes	High	Painted Woods Lake	McLean	Low
Coleharbor Water Supply Dam	McLean	Low	Pembina City Dam	Pembina	Medium
Colt Dam	Mercer	Low	Pheasant Lake	Dickey	Medium
Cottonwood Creek Dam	Lamoure	Medium	Pipstem Dam	Stutsman	High
Crown Butte Dam	Morton	Medium	Portland Dam	Traill	Low
Danzig Dam	Morton	Medium	Queen City Dam	Stark	Medium
Daub Dam	Oliver	Medium	Raleigh Dam	Grant	Medium
Davis Fish Dam (Speck Davis)	Slope	Low	Regent Dam	Hettinger	Low
Dead Colt Creek Dam	Ransom	Medium	Renner Dam No. 2	Stark	Low
Dennis Christopherson Dam 1	Grant	Low	Riverside Park Dam	Grand Forks	Medium
Des Lacs City Dam	Ward	Low	Salyer Dam No. 326	McHenry	Low
Drayton Dam	Pembina	Medium	Salyer Dam No. 332	Bottineau	Low
Earl Rundle Dam 1	Slope	Low	Salyer Dam No. 341	Bottineau	Low
East Broadway Dam	Stark	Low	Salyer Dam No. 357	Bottineau	Low
Ellendale Water Supply Dam	Dickey	Medium	Sarnia Dam	Nelson	Low
Elm River Dam #1	Steele	Medium	Scophammer Dam	Renville	Low
Enderlin Park Dam	Ransom	Low	Senator Young Dam	Cavalier	High
English Coulee Dam	Grand Forks	High	Sheep Creek Dam	Grant	Low
Epping Dam	Williams	Medium	Sheyenne River Diversion Dam	Cass	Medium
Erie Dam	Cass	Medium	Short Creek Dam 1	Burke	Medium
Fargo 12th Ave. North Dam	Cass	Low	Silver Creek	Nelson	Medium
Fargo 4th St. South Dam	Cass	Low	Silver Lake Dam	Sargent	Low
Fargo Dam #2 (Country Club)	Cass	Low	Smishek Lake Dam	Burke	Low
Forf Ransom Dam	Ransom	Low	Soldiers Home Dam	Ransom	Low
Froelich Dam	Sioux	Low	Spring Lake Dam	Bowman	Low
Galen Anderson Dam 1	Sioux	Low	Square Butte Creek Dam #5	Oliver	High
Glan Ullin Railroad Dam 2	Morton	Medium	Square Butte Creek Dam #6	Oliver	Medium
Golden Lake Dam	Steele	Low	Stanley Dam	Mountrail	Medium
Grafton Railroad Dam	Walsh	Low	Sussex Dam	Steele	Low
Grand Forks Riverside Park	Grand Forks	Medium	Sweetbriar Creek Dam	Morton	Medium
Green Lake Outlet Control	McIntosh	Low	Sykeston	Wells	Medium
Greenview Dam	Steele	Low	Temvik Dam	Emmons	Low
Gumke Dam	Logan	Low	Tioga Dam	Williams	High
Harvey Dam	Wells	Medium	Tolna Dam No. 1	Nelson	Medium
Hickson Dam (Fargo Dam #3)	Cass	Low	Travis Crickenberger Dam	Dunn	Low
Hillsboro Dam	Traill	Low	Ueland Dam	Griggs	Low
Hoskins Lake Dam	McIntosh	Low	Valley City Mill Dam	Barnes	Medium
Hunter Dam	Cass	High	Vigness Dam	Walsh	Low
Indian Creek Dam	Hettinger	Medium	Wakopa Dam	Rolette	Low
Jackman Coulee Dam 2	Burleigh	High	Warsing Dam	Eddy	Low
Jamestown Ice House Dam	Stutsman	Low	Wayne Hoger Dam 1	Morton	Low
Karey Dam	Hettinger	Low	Wayne Hoger Dam 2	Morton	Low
Kathryn Dam	Barnes	Low	Welk Dam	Emmons	Low
Kellys Slough Upper Pool No. 1	Grand Forks	Low	White Earth Dam	Mountrail	Medium
Kevin Symanowski Dam	Adams	Low	Wild Rice Dam	Cass	Low
Kota Ray Dam	Williams	Low	Williams Creek Dam	Golden Valley	Low
Kulm Edgeley Dam	Lamoure	Low	Wilson Dam	Dickey	Low
Lake Ardoch Dam	Walsh	Low	Wolf Butte Dam	Adams	Low
Lake Darling Dam	Ward	High	Wyard Dam	Foster	Low
Lake Juanita	Foster	Low	Yanktonai Dam	McLean	Medium
Lake Metigoshe	Bottineau	Low			

ment. And, it was determined that there were problems with the low-level drawdown valve, as well as the toe drains.

The low-level drawdown valve can be used to lower the reservoir for various reasons, such as to provide increased flows downstream. The toe drain simply collects seepage coming through the dam and disperses it downstream in a more controlled manner.

It was agreed that the best method to make the repairs was to include the work into the reconstruction of Interstate 94, which was already scheduled for completion during the summer of 2005.

With Northern Improvement of Bismarck already reconstructing the west-bound lanes of I-94, they were allowed to sublet the work on Crown Butte Dam to Weisz and Sons, Inc. of Bismarck. Work completed included the installation of a new concrete drop inlet, 28 feet of spillway pipe, a vent pipe, and a portion of a new low-level drawdown system. The Water Commission's construction crew completed the installation of the low-level drawdown, sealed off the old low-level drawdown, installed a new sand collar near the downstream end of the spillway pipe, and repaired the toe drain.

The Morton County Park Board is the owner of Crown Butte Dam, so they agreed to supply the materials for the vent pipe, the low-level drawdown, and the downstream work.

Devils Lake Emergency Outlet, Benson County - The Devils Lake Emergency Outlet Project is a system of canals, pipelines, siphons, and pump stations on the southwest side of Devils Lake in Benson County. The construction crew was utilized to perform work on the project not included in the project contracts, such as installing siphons, culverts, field drains, an intermediate aggregate filter, and

erosion protection. This work was instrumental in getting the project ready to operate, which it did in August 2005. Total work performed by the crew amounted to approximately \$45,000.

In addition, each spring the intake at the Round Lake pump station needs to be put back in the water. Prior to sinking the intake, the construction crew modified the intake-to-pipe connection. Minor modifications were also made to the pump station and erosion areas along the canal were repaired. Work on the emergency outlet totaled \$26,000 and was completed by late April 2006.

Mount Carmel Dam, Cavalier County - Mount Carmel Dam is located in northeast North Dakota in Cavalier County. Work performed by the construction crew in September 2005 included installation of the low-level outlet stop log structure and assistance with inspection of the drain system and stilling basin. The work totaled about \$2,500.

Sweetbriar Creek Dam, Morton County - This dam is located on Interstate 94 west of Bismarck. The construction crew rebuilt the downstream cofferdam and installed a culvert in September 2005 at a cost of nearly \$2,500.

Tioga Dam, Williams County - Tioga Dam is located just north of the City of Tioga. This high hazard dam was designed with a valve on the downstream end of the 12-inch diameter low-level outlet, which current dam design practices discourage, as it keeps the pipe under pressure and has been known to lead to dam failures. To alleviate this problem, the construction crew pumped the pipe full of grout to take it out of service. Cost-share partners on the project included the State Water Commission, the Game and Fish Department, the City of Tioga, and the Williams County Water Resource District. Some minor problems were en-

countered during the initial grouting attempt; therefore, the pipe had to be flushed and was successfully grouted shut on the second attempt. The cost of the project was approximately \$7,500 and it was completed in September 2005.

Northgate Dam, Burke County - Repairs were made to the wet-well intake system, and the 48-inch spillway pipe that was leaking, at Northgate Dam, in northwest North Dakota. The Water Commission, Game and Fish Department, and Burke County Water Resource District shared costs in the \$5,000 project, which wrapped up in September 2005.

Colt Dam, Mercer County - Colt Dam is a concrete channel dam on the Knife River near Beulah. Severe erosion occurred in July 2005 around the north abutment, essentially making the dam fail. In November 2005, the construction crew began work to remove the concrete dam and repair the north abutment erosion. Winter set in before the project could be completed, so the construction crew finished placing rock on the streambanks and performing site clean up in May 2006. Total project costs were \$52,000 and will be shared between the Water Commission, the Game and Fish Department, and the City of Beulah.

Harvey Dam, Wells County - With a big 100th anniversary celebration planned for the City of Harvey in 2006, the Wells County Water Resource District Board expressed a concern for those who would be recreating near the drop inlet to the spillway at Harvey Dam. The dam is located at the south edge of Harvey on the Sheyenne River. Nothing was currently in place to prevent a wayward swimmer from accidentally falling 20 feet down into the drop inlet. A steel tube railing was installed around the inlet and a string of buoys was put up to warn of the impending danger.

The construction crew also removed several trees from the downstream side of the embankment. All of the work was completed by mid-June 2006, just in time for the centennial celebration. The cost of work was approximately \$15,500 and will be shared between the Wells County Water Resource District, the Game and Fish Department, and the Water Commission.

Long Creek Dam, Divide County - Long Creek Dam, also known as Crosby Dam, is located five miles north of Crosby on Long Creek near the Crosby golf course. The dam is a low head channel dam originally built in the 1930s. The dam was repaired in 1957 and again in 1980. In 2003, the Water Commission was contacted about seepage through the dam and the deterioration of the concrete. After several years of planning, discussing design alternatives, and gathering funding sources, the project was started in early July 2006.

A cofferdam was constructed upstream of the dam to divert the flow of the river to one side of the dam, while work was performed on the other side. To address the seepage through the dam, the upstream face of the dam was exposed, cleaned, and the cracks were filled with an epoxy material. A geosynthetic clay liner was then placed against the upstream side of the dam. The liner consists of an expandable bentonite material sandwiched between two pieces of geosynthetic material. If the tough geosynthetic material happens to tear or get punctured, the bentonite material will expand upon contact with water, thus providing a watertight seal. A concrete cap was poured on the upstream side of the dam to tie the geosynthetic clay liner into the dam.

A thin layer of broken concrete on the downstream face of the dam was removed to expose the original dam. The face of the dam was cleaned and many cracks were

sealed. A thin layer of concrete was then sprayed on the downstream face of the dam in a process known as guniting, or shotcreting. As part of this process, a dry sand-cement mix is sent through a hose under pressure where it meets with a spray of water at the nozzle. The construction crew sprayed a three-inch layer of this mixture on the downstream face of the dam in a very dirty and strenuous process. The cofferdam was removed and the project was completed in mid-August 2006. The total cost of the project was approximately \$64,000 and will be shared between the Crosby City Park Board, the Divide County Water Resource District, the Game and Fish Department, and the Water Commission.

Elm River Dam No. 1, Steele County - Elm River Dam No. 1 is an earthen flood control dam located in Steele County that provides flood control benefits for Traill County. The last construction joint on the downstream end of the concrete spillway pipe separated, allowing water to flow out of the pipe and erode a large hole on the downstream side of the dam. Since it was unlikely that the pipe could be pushed back together again, it was decided that the best course of action was to install an expansion band on the inside of the pipe. At the same time, a toe drain pipe was also repaired. The band was installed and the erosion repaired in September 2006 at a cost of \$7,000. Costs were shared between the Red River Joint Board, the Steele and Traill County Water Resources Districts, and the Water Commission.

Larimore Dam, Grand Forks County - Larimore Dam is a large earthen dam located northeast of the City of Larimore on the Turtle River. Water quality concerns downstream of the dam prompted the Game and Fish Department to approach the Water Commission to install a device that would allow water to aerate as it falls down the

inlet. Work was performed by the construction crew in September 2006 at a cost of approximately \$3,000, which will be shared between the two departments.

Chyle Dam and Union Dam, Walsh County - At Chyle Dam, surface runoff enters the river just below the dam and has caused erosion problems for many years. The construction crew removed the existing drop structure and installed a geotextile mat and rock riprap to prevent further erosion at a cost of \$9,000.

An annual inspection of Union Dam revealed a sinkhole above the spillway pipe near the downstream toe of the dam. The construction crew investigated the problem and found nothing of concern. The Walsh County Water Resource District and State Water Commission will split the cost of the projects.

Enderlin Park Dam, Ransom County - Enderlin Park Dam was a rubble masonry dam on the Maple River that washed out in the spring of 2004. Several years of planning resulted in a design for a new dam that would incorporate the passage of fish. This is one of only a few dams in North Dakota off of the main channel of the Red River that allow for fish passage. Projects on the Red River provided a prototype for the design of this dam.

A row of steel sheet piles were driven into the streambed across the Maple River. Loads and loads of rock and waste concrete were hauled into the site. Much of the rock was hauled in by the City of Enderlin from rock piles in nearby fields, providing a cost savings for the project. Low flows on the river allowed the crew to complete the project without having to construct a cofferdam, providing further savings. Minor repairs were made after the 2007 spring runoff and heavy early summer rains.

The City of Enderlin applied for, and received a grant through

Enderlin Park Dam on the Maple River in Ransom County.



the North Dakota Parks and Recreation Department to construct the dam. Other partners in the project include the Ransom County Water Resource District, the Game and Fish Department, and the Water Commission. The approximate cost of the project is \$60,000.

Drayton Dam, Pembina County - Drayton Dam is the last dam on the Red River before it leaves North Dakota. A recent inspection of the dam showed that the concrete apron on the west side of the dam was being undercut and a void was present. This is probably the same mechanism that failed Colt Dam, so action was necessary. A hole was cored in the concrete to reach the void and a pump truck was used to fill the void through the core hole. Fortunately, the void was not large and was filled completely with a concrete mixture.

In addition, the concrete joint near the void had become separated due to movement of the concrete dam. The construction crew repaired this joint and used excess concrete from the void repair to fill in front of the joint. Cost of the project was nearly \$8,000, and will be shared by the City of Drayton and the Water Commission.

Dead Colt Creek Dam, Ransom County - Dead Colt Creek Dam was one of the first sites in North Dakota to become infested with Eurasian water milfoil. To kill

the invasive species, the reservoir lowered significantly during fall months to provoke a hard freeze. During this process, the gate lift system became detached from its supports, creating issues with closing the gate. In addition, the light gage trash rack needed a stronger rack. This project was complete in November 2006. The estimated cost of the repairs was \$3,500 and will be shared between the Ransom County Water Resource District, the Game and Fish Department, and the Water Commission.

Sheep Creek Dam, Grant County - Sheep Creek Dam's stop logs were replaced to seal up leaks.

Nieuwsma Dam, Emmons County - Work at Nieuwsma Dam began in June 2007. Work included a new concrete spillway apron, gunite spillway face, embankment repair, and riprap for the downstream plunge pool. Work was completed in August 2007 at a cost of \$83,000.

USGS Gauging Stations, Statewide - The Water Commission's construction crew repaired several U.S. Geological Survey gauging stations throughout North Dakota. The work involved installation of orifice lines, installation of staff gauges, removal of gauge houses, installation of gauge houses, and repairs to sheet pile control sections.

Municipal, Rural & Industrial Water Supply

In Federal Fiscal Years 2006, and 2007, the Garrison Diversion Municipal, Rural, and Industrial (MR&I) water supply program received \$7.77 million in federal grant funds for the development of water supply facilities in the state. This brought the total received from the federal government to \$201.6 million since the program was authorized in 1986. The State Water Commission and the Garrison Diversion Conservancy District also provided funding toward project development.

Projects that were allocated funds during Federal Fiscal Years 2006 and 2007 included the All Seasons Water Users, North Valley Water District, LaMoure Water Supply, McKenzie Rural Water System III, Northwest Area Water Supply, South Central Regional Water District, Tioga Rural Water, Traill County Water District, Tri-County Water District/Lakota Water Supply, Walsh Rural Water District, Upham Water Supply, Williston Water System, and Wimbeldon Water Supply.

Since the program began, 55 projects costing over \$307 million have been completed, including: Abercrombie, Agassiz Water Users, All Seasons Rural Water System 4 and 5, Burleigh Water Users I and II, Carson, Cavalier, Crown Butte, Dickey Rural Water, Dunn Center, Edgeley, Elgin, Englevale, Fargo Water Treatment, Fingal, Gackle, Garrison Rural Water, Glenfield, Grand Forks Water Treatment, Grand Prairie Estates, Grandin, Gwinner, Hankinson, Hebron, Kindred, Langdon Water System, Langdon Rural Water Phase I, II, IV, Marion, McKenzie County Rural Water System I, McLean-Sheridan Rural Water, Medora, Minto, Missouri West Water Phases I and II, Neche, New Town Water Storage, North Valley Water District, Ramsey Rural Water, Ransom-Sargent Rural

Water, Riverdale, Riverside Park Dam, Riverview Heights, Rugby Phase I and II, Stanley, Stutsman Rural Water, Tolna, Tri-County Rural Water, Underwood, Walhalla, Williams Rural Water Phase III, and Williston Water System.

Eleven additional projects were in design and/or construction phases at the end of the biennium, including: All-Seasons Water System 4 (Upham), City of Devils Lake Water Supply, LaMoure Water Supply, McKenzie County Rural Water System III, Northwest Area Water Supply, South Central Regional Rural Water System, Southwest Pipeline (Oliver, Mercer, Northern Dunn), Park River, Tri-County Water (Lakota), Walsh Rural Water, and Wimbledon Water Supply.

The total estimated cost of the 118 projects is \$880 million. This cost includes \$145 million for the Northwest Area Water Supply Project, and \$150 million for the Southwest Pipeline Project. In addition, the Red River Valley Water Supply Project has an estimated cost of \$700 million.

Red River Office

Located in West Fargo, the Red River office consists of one full-time position. During the 2005-2007 biennium, Red River office personnel coordinated the State Water Commission's activities in eastern North Dakota and provided:

- Technical assistance to the Red River Joint Water Resource District in pursuing flood control projects in the Red River watershed;
- Assistance with reconnaissance level studies of potential dams;
- Service as U.S. representative of International Red River Board
- Assistance to individual water resource boards on 16 drainage problems or other water-related issues;

- Inspections on 30 projects that the State Water Commission had approved for cost-sharing; and

- Technical assistance on various committees that were formed as a result of the Red River basin's flooding problems.

These committees include: 1) the Flood Damage Reduction team for the Red River Basin Commission (RRBC), which serves as a technical committee for the RRBC for the development of various computer models; 2) the hydrology subcommittee for the International Red River Basin Board; 3) the border dike subcommittee for the International Red River Basin Board; 4) the technical committee for Pembina River Basin Advisory Board; and 5) various other groups.

Personnel have also represented the State Water Commission at meetings of the Red River Joint Water Resource Board, Pembina River Basin Advisory Board, Red River Basin Riparian Advisory Board, EERC, Sheyenne River Joint Water Resource Board, and the Upper Sheyenne River Joint Water Resource Board.

Southwest Pipeline Project

At the beginning of the biennium, the Southwest Pipeline Project served as the water supply for Beach, Belfield, Carson, Dickinson, Dodge, Dunn Center, Elgin, Gladstone, Glen Ullin, Golden Valley, Halliday, Hebron, Hettinger, Manning, Medora, Mott, New England, New Hradec, New Leipzig, Reeder, Regent, Richardton, Scranton, Sentinel Butte, South Heart, and Taylor, as well as roughly 2,500 rural water customers.

Construction of the project continued to expand it as a regional water supply system during the 2005-2007 biennium. Work continued on the Medora-Beach regional service area, connecting the City of Golva and 252 rural water users

in the Beach, Golva, and Belfield areas, and 154 in Morton County.

The Morton County customers are served with water purchased from the Missouri West Water System, which is part of the Southwest Pipeline Project. The City of Zap, along with 60 rural users in the area, are being served by the Southwest Pipeline Project with water purchased from the City of Beulah on an interim basis until potable project water is available in the area.

Rural water user memberships increased from 2,500 to 3,100, and contract users increased from 43 to 48, including two more communities for a total of 28. A total of 35,400 people are now served by the project.

Capital repayment collected from July 2005 to June 2007 was \$3,884,814. Of this amount, \$2,416,542 was paid to the pipeline's trustee, Wells Fargo Bank, NA, to pay bondholders. The remaining \$1,468,271 was deposited in the Resources Trust Fund.

Northwest Area Water Supply

At the start of the biennium, the NAWS Project was in its fourth year of construction on the pipeline between Minot and Lake Sakakawea, which is considered the Minot portion of NAWS. Two construction contracts were completed covering 20 miles of 30- to 36-inch pipe. The third contract was to have another 12 miles of 36-inch pipe pressure tested. And the fourth contract, for 15 miles of 36-inch pipe, is currently being awarded. The Rugby portion of NAWS that was already constructed included treatment plant improvements and a transmission line.



Workers are placing cathodic protection on the pipe for the Northwest Area Water Supply project south of Minot.

In the federal lawsuit with Manitoba, the Judge allowed construction to proceed on the pipeline contracts between Minot and Lake Sakakawea, however she also stated that construction could only proceed on additional features if the government could demonstrate why the proposed additional construction would not influence the decisions concerning the level of biota treatment in the ongoing NEPA review.

By the end of the biennium, \$14.3 million in additional work had been completed, bringing the total to \$46.7 million invested in the NAWS project; including the planning, design, and construction of the Minot and Rugby portions. The third contract covering pipeline between Minot and Lake Sakakawea was completed, and the fourth contract had the 15 miles of pipe in the ground and was being pressure

tested. The State pursued a joint state/federal motion in federal court to allow additional projects to continue. Two new contracts for four miles of 24- to 36-inch pipe in Minot and 20 miles of 10- to 16-inch pipe to Berthold were designed and construction was initiated. Design work was also completed for two reservoirs along the Berthold line in preparation for a bid opening. And, additional design work was underway for the 18 million gallon per day high service pump station and the 2 million gallon storage reservoir in Minot.

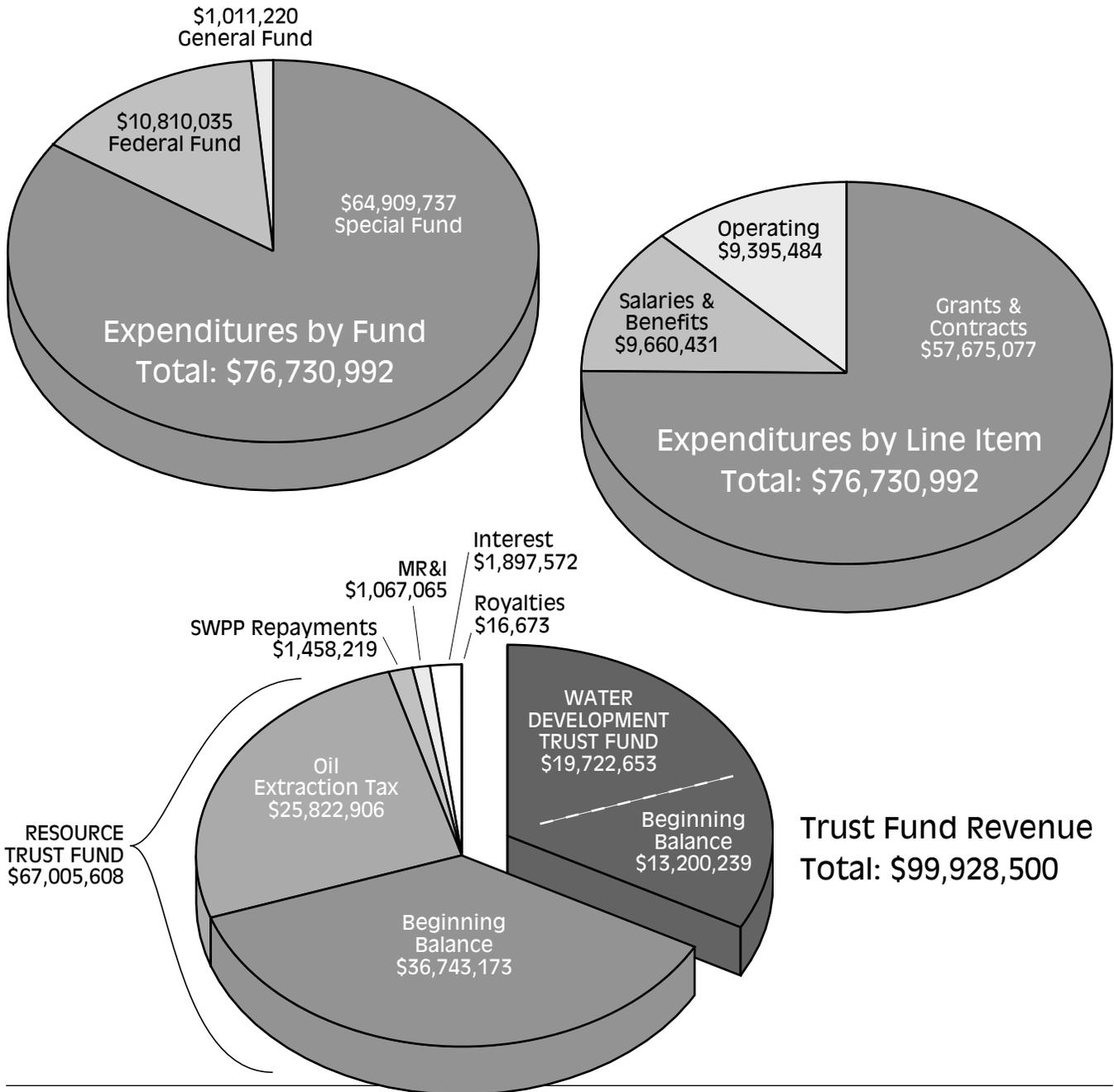
In the federal lawsuit with Manitoba, the Judge allowed construction on these new projects following Reclamation's decision to complete an Environmental Impact Statement to evaluate biota treatment for the project. Reclamation completed initial public scoping in May 2006 for the NAWS EIS, and has been working to provide a final EIS by the end of 2008.

FINANCIAL INFORMATION

The following pages contain financial information summarized in various formats. There are pie charts classifying the agency's expenditures by fund and by line item. There is a chart identifying expenditures by division and line item, and there is a detailed listing by object code.

The trust fund revenue pie chart on this page includes both the Resources Trust Fund and Water Development Trust Fund revenue. The remainder of the report addresses project and program obligations, completed projects, object expenditures, long-term debt, and resources available from the agency.

State Water Commission Appropriations 2005-2007 Biennium



State Water Commission

Program Budget Expenditures for Biennial Period Ending June 30, 2007

AGENCY PROGRAM	SALARIES & BENEFITS	OPERATING EXPENSES	GRANTS & CONTRACTS	PROGRAM TOTALS
ADMINISTRATION				
Allocated	\$1,357,538	\$822,907	\$0	\$2,180,445
Expended	\$1,367,139	\$756,008	\$0	\$2,123,146
Percentage	101%	92%	0%	97%
PLANNING AND EDUCATION				
Allocated	\$880,435	\$169,011	\$99,000	\$1,148,446
Expended	\$878,409	\$138,817	\$167,676	\$1,184,902
Percentage	100%	82%	169%	103%
WATER APPROPRIATION				
Allocated	\$2,527,666	\$454,829	\$970,000	\$3,952,495
Expended	\$2,474,508	\$420,316	\$809,452	\$3,704,276
Percentage	98%	92%	83%	94%
WATER DEVELOPMENT				
Allocated	\$3,919,129	\$2,451,900	\$225,000	\$6,596,029
Expended	\$3,566,767	\$2,538,823	\$522,087	\$6,627,677
Percentage	91%	104%	232%	100%
ATMOSPHERIC RESOURCE				
Allocated	\$707,954	\$708,380	\$4,354,430	\$5,770,764
Expended	\$653,051	\$400,848	\$893,567	\$1,947,466
Percentage	92%	57%	21%	34%
SOUTHWEST PIPELINE				
Allocated	\$255,040	\$606,700	\$1,787,400	\$2,649,140
Expended	\$318,293	\$1,641,452	\$6,373,496	\$8,333,241
Percentage	125%	271%	357%	315%
NORTHWEST AREA WATER SUPPLY				
Allocated	\$399,059	\$1,922,400	\$26,580,000	\$28,901,459
Expended	\$402,264	\$3,499,220	\$10,445,720	\$14,347,205
Percentage	101%	182%	39%	50%
STATEWIDE WATER PROJECTS				
Allocated			\$74,872,160	\$74,872,160
Expended			\$38,463,078	\$38,463,078
Percentage			51%	51%
AGENCY TOTALS				
Allocated	\$10,046,821	\$7,136,127	\$108,887,990	\$126,070,938
Expended	\$9,660,431	\$9,395,484	\$57,675,077	\$76,730,992
Percentage	96%	132%	53%	61%

**State Water Commission - Projects/Grants/Contract Fund - Program Obligations
July 1, 2005 - June 30, 2007**

SWC PROJ. NO.	NAME	INITIAL APPROVAL	AMOUNT APPROVED	PAYMENTS	BALANCE
CITY FLOOD CONTROL					
1907-01	Grand Forks	12/07/01	3,780,375	1,395,818	2,384,557
1907-03	Wahpeton	10/23/01 & 08/16/04	1,492,203	154,246	1,337,957
1907-04	Grafton	08/16/01	500,000	0	500,000
1928	Fargo - Southside Flood Control Prelim. Eng.	03/10/05	500,000	0	500,000
1927	Fargo - Ridgewood Flood Control Project	06/22/05	2,084,750	0	2,084,750
	Subtotal City Flood Control		8,357,328	1,550,064	6,807,264
MR&I					
MRI ADVANCES					
2373-01	Langdon	10/23/01	14,721	14,721	0
2373-02	McKenzie	10/23/01 & 11/03/03	384,125	384,125	0
2373-03	Ramsey	10/23/01	286,866	242,969	43,897
2373-04	Tri-County	10/23/01	97,298	97,298	0
2373-05	City of Underwood	06/22/05	400,000	400,000	0
2373-08	All Seasons Rural Water		200,000	0	200,000
2373-07	City of Williston	12/09/05	5,000,000	3,000,000	2,000,000
MRI GRANTS					
2373-06	City of LaMoure	12/09/05	500,000	100,101	399,899
2373-09	City of Garrison		159,712	0	159,712
	Subtotal MR&I		7,042,721	4,239,214	2,803,507
IRRIGATION DEVELOPMENT					
1389	NDSU Williams County Irrigation Research Site	05/01/02	25,468	19,336	6,132
1389	BND AgPace Program	10/23/01	692,362	169,578	522,784
	ND Irrigation Caucus, Irrigation Development Enhancement	11/03/03	574,500	51,494	523,006
	ND Irrigation Caucus, Irrigation Development Enhancement	12/09/05	100,000	75,000	25,000
	Sioux Irrigation District - McKenzie County	12/06/02	21,060	0	21,060
	Subtotal Irrigation Development		1,413,390	315,408	1,097,982
DEVILS LAKE BASIN DEVELOPMENT					
416-05	Devils Lake Outlet Awareness Manager (2005)	12/01/04	7,622	7,622	0
416-05	Devils Lake Outlet Awareness Manager (2006)	12/09/05 - 12/08/06	22,500	19,527	2,973
416-01	USGS - QW Monitoring Sheyenne & Red Rivers	06/29/04	12,585	0	12,585
416-01	Devils Lake/Twin Lakes Temporary Emergency Outlet	09/11/00	75,000	0	75,000
416-01	E. Devils Lake/Black Slough Outlet Sediment Study (NDGS)	03/21/02	3,979	0	3,979
416-01	Devils Lake Basin Joint Water Resource Manager	12/10/04	12,866	12,866	0
416-01	Devils Lake Basin Joint Water Resource Manager	12/09/05 - 12/08/06	39,000	32,525	6,475
416-01	City of Devils Lake Levee System	12/06/02	1,734,202	110,000	1,624,202
416-02	City of Devils Lake Emergency Water Supply Project	05/09/07	4,140,000	0	4,140,000
416-07	Devils Lake Outlet	02/20/02	5,277,824	2,812,347	2,465,477
416-10	Devils Lake Outlet Operations		2,100,000	590,039	1,509,961
1882-01	ESAP (Extended Storage Acreage Program)	12/21/98	4,000	4,000	0
1882-02	Devils Lake Emergency Response Plan (Ramsey)	11/29/95	7,928	0	7,928
1882-01	Cavanaugh Lake (Ramsey County WRD)	08/26/05	1,250	1,192	58
1882-07	Devils Lake Upper Basin Water Utilization Test Project	08/06/03	195,355	195,355	0
1294	Nelson County Emergency Road Projects	08/11/05	250,000	235,510	14,490
1932	Michigan Spillway Rural Flood Assessment Drain Constr.	08/30/05	150,000	0	150,000
1131	Nelson County Central-Hamlin Rural Flood Control Drain	12/09/05	20,151	11,211	8,940
1131	Nelson County Channel Maintenance & Misc. Projects	03/22/06	79,849	50,271	29,578
416-11	USGS Devils Lake Model Study	12/09/05	100,000	46,450	53,550
	Subtotal Devils Lake		14,234,111	4,128,915	10,105,196
FLOOD CONTROL					
300	Baldhill Dam Flood Pool Raise	04/30/98 & 09/11/00	376,158	17,347	358,811
1878/1344	Maple River Dam Construction Project	02/04/92 & 12/00	13,175,000	12,563,765	611,235
1878	Maple River Dam Engineering & Study		246,692	246,692	0
	Subtotal Flood Control		13,797,850	12,827,804	970,046

**Water Commission - Projects/Grants/Contract Fund - Program Obligations (cont.)
July 1, 2005 - June 30, 2007**

SWC PROJ. NO.	NAME	INITIAL APPROVAL	AMOUNT APPROVED	PAYMENTS	BALANCE
GENERAL WATER MANAGEMENT					
	Hydrologic Investigations				
331	Donna Bliss		923	1,207	-284
331	Monte Dralle		1,508	1,137	371
416	Devils Lake Basin Joint WRB Devils Lake surface water quality monitoring		24,237	0	24,237
818	Judy Hintz		3,494	3,494	0
862	Wade Bjorgen		3,293	3,414	-121
989	ND Department of Health		77,000	77,000	0
1395	Devils Lake Water Quality, USGS 01/01/04 - 09/30/05		28,875	28,875	0
1395	USGS Stream Gages		31,376	0	31,376
1395	USGS Water Resource Investigations		652,574	626,372	26,202
1395	USGS Eaton Irrigation Project on Souris River		14,400	0	14,400
1400	Linda Werner		2,740	3,053	-313
1690	Mary Lou McDaniel		4,230	4,637	-407
1690	University of Waterloo		0	2,708	-2,708
1703	Neil Flaten		4,437	4,245	192
1703	KBM, Inc.		6,320	0	6,320
1707	Neil Flaten		3,053	4,068	-1,015
1714	David Robbins		2,622	1,513	1,109
1715	Fireside Office Plus		5,806	0	5,806
1761	Gloria Roth		1,061	1,274	-213
1761	Fran Dobitz		1,760	2,070	-310
1856	Data Chem		6,960	0	6,960
1856	MVTL		3,330	0	3,330
	Subtotal for Hydrologic Investigations Obligations		880,000	765,067	114,933
	Remaining Hydrologic Investigations Authority		0	0	0
	Hydrologic Investigations Authority Less Payments		0	0	0
	Flood Mitigation Assistance Program				
1896-02	Flood Mitigation Assistance Program (2003) Walsh, Pembina	10/08/02	2,340	1,816	524
	Subtotal for Flood Mitigation Assistance Program		17,417	16,893	524
	General Projects Obligated		7,827,935	3,703,272	4,124,663
	General Projects Completed		2,555,709	2,555,709	0
	Subtotal General Water Management		11,281,061	7,040,941	4,240,120
SOUTHWEST PIPELINE					
1736	Southwest Pipeline Project		6,942,037	6,832,907	109,130
NORTHWEST AREA WATER SUPPLY					
237-04	Northwest Area Water Supply		4,983,554	3,263,697	1,719,857
RED RIVER VALLEY WATER SUPPLY					
1912	Red River Valley Water Supply		90,000	0	90,000
MISSOURI RIVER MANAGEMENT					
322	Missouri River Management	08/30/05	20,000	0	20,000
1943	Missouri River Siltation Assessment Study	10/12/06	70,000	0	70,000
WEATHER MODIFICATION					
	Weather Modification		350,000	350,000	0
TOTAL PROJECTS/GRANTS/CONTRACT FUND - PROGRAM OBLIGATION			68,582,052	40,548,950	28,033,102

Water Commission - Projects/Grants/Contract Fund - Project Obligations (cont.)
July 1, 2005 - June 30, 2007

SWC PROJ. NO.	NAME	INITIAL APPROVAL	AMOUNT APPROVED	PAYMENTS	BALANCE
GENERAL PROJECT OBLIGATIONS					
322	ND Water: A Century of Challenge	12/10/04	48,800	12,000	36,800
330	Willow Creek Watershed Engineering Services Project		20,000	18,763	1,237
346	Epping Dam Review & Investigation	09/30/04	1,072	0	1,072
568	Sheyenne River Snagging and Clearing	12/10/04	60,000	54,014	5,986
568	2005-06 Sheyenne River Snagging & Clearing	12/09/05	60,000	51,664	8,336
568	Nelson County WRD Sheyenne Rice R. Snagging & Clearing	03/05/07	2,552	0	2,552
576	BOMM Missouri R. Coord. Resource Management Program	03/06/01	39,208	0	39,208
616	McVile Dam Hydraulic Model Study	05/31/05	10,000	0	10,000
841	Upper Maple River Watershed Engineering Feasibility Study	06/19/06	35,000	0	35,000
847	Maple River - Retention Study, Rush River Joint WRD, Swan Creek Watershed Floodwater Retention Site Study	08/15/02	25,000	0	25,000
847	Casselon Township Improvement District No. 64	06/22/05	117,250	90,972	26,278
847	Lower Swan Creek Four-Mi. Improvement Reconstruction	10/12/06	28,000	22,896	5,104
988	SE Cass WRD Antelope Creek Engineering Feasibility Study	10/12/06	40,000	0	40,000
1066	Cass County Drain No. 9 Drop Structure	03/05/03	20,939	14,125	6,814
1069	Cass County Drain No. 13	04/10/00 & 06/12/03	230,451	0	230,451
1070	Cass County Drain No. 14 Reconstruction	03/11/04	88,900	8,976	79,924
1090	Cass County Drain No. 40, Southeast Cass WRD	06/12/03	374,500	294,428	80,072
1093	Cass County Drain No. 45 Extension Construction	05/09/07	179,800	0	179,800
1117	Grand Forks Co. Drain 27A Outlet Improvement	11/01/04	15,750	0	15,750
1140	Pembina Co. Drain No. 11 Outlet Improvement Reconstruct.	12/08/06	53,599	0	53,599
1142	Pembina County Drain No. 16	04/16/04	4,111	0	4,111
1164	Pembina Co. WRD Drain No. 64 Improvement Reconstruct.	10/12/06	27,529	0	27,529
1204	Richland County Drain No. 62 Reconstruction	05/09/07	12,858	0	12,858
1207	Richland County Drain No. 65 Reconstruction & Extention	05/09/07	47,815	0	47,815
1222	Sargent Co. WRD Drain No. 11 Improvement Reconstruct.	10/12/06	34,354	0	34,354
1271	Ring Dikes - Maple River Water Resource District	12/06/02	46,874	0	46,874
1271	Ring Dikes - Southeast Cass Water Resource District	12/06/02	51,084	25,000	26,084
1280	Grand Forks WRD 05-07 Farmstead Ring Dike	10/12/06	50,000	21,515	28,485
1290	City of Garrison, City Intake Water Line Boring	10/12/06	159,711	154,961	4,750
1291	Spring Creek Bank Stabilization	05/09/07	30,000	0	30,000
1293	Mountrail Co. Irrigation Project Feasibility Study	06/09/99	2,681	0	2,681
1294	Trall Co. PL566 Dam Reconstruction Eng. Feasibility Study	12/30/06	15,000	0	15,000
1308	Greenview Dam Removal, Culvert Install. (Steele Co. WRD)	06/20/06	7,729	0	7,729
1334	Trall County Drain No. 38 Reconstruction	03/11/04	222,172	0	222,172
1346	Mount Carmel Dam Incident Consultant	04/28/03	19,499	0	19,499
1346	Mount Carmel Dam Incident	03/11/04	807,551	235,221	572,330
1346	Mount Carmel Dam Engineering Services Project	04/30/04	5,000	0	5,000
1392	Dr. Steven Schultz, Econ Damage Study (Missouri R. lawsuits)	05/08/03	7,600	0	7,600
1401	International Boundary Roadway Dike, Pembina County	03/11/04	425,878	150,257	275,621
1438	Mulberry Creek Drain Six-Mile Improvement Reconstruct.	03/22/06	88,107	0	88,107
1517	City of Hazen Topographic Mapping	03/08/06	20,000	16,348	3,652

Water Commission - Projects/Grants/Contract Fund - Project Obligations (cont.)
July 1, 2005 - June 30, 2007

SWC PROJ. NO.	NAME	INITIAL APPROVAL	AMOUNT APPROVED	PAYMENTS	BALANCE
GENERAL PROJECT OBLIGATIONS (Cont.)					
1572	Burnt Creek Floodway Diversion Channel Reconstruction	05/09/07	177,220	0	177,220
1591	Revision of Handbook - ND Water Managers	04/12/07	14,750	10,543	4,208
1625	High Water Mark Delineation Methods & Guidelines	08/23/06	20,000	18,852	1,148
1667	Steele/Nelson Counties WRD, 2006 Middle Branch Goose River Snagging & Clearing	10/12/06	24,500	18,822	5,678
1705	AMENDED RRB Flood Control Coordinator Position	12/08/06	36,000	8,431	27,569
1742	Engineering Feasibility Study - Steele Co. Sussex Dam Repair	08/30/06	12,500	0	12,500
1751-06	Digital Aerial Survey Map & Engineering Project	06/24/02	17,325	0	17,325
1813	Maple River WRD/Maple River Snagging & Clearing	10/12/06	24,375	13,406	10,969
1851	Drought Disaster Livestock Water Assistance Program	08/15/02	47,969	47,969	0
1851	Drought Disaster Livestock Water Assistance Program (2006)	10/12/06	250,000	250,000	0
1851	Drought Disaster Livestock Water Assistance (06) 06/28/06 & 07/20/06		400,000	400,000	0
1851	Drought Disaster Livestock Water Assistance (06)		550,000	447,250	102,750
1918	Southeast Cass WRD/Normanna Twp. Improvement #60	08/15/02	64,750	61,685	3,065
1919	Steele-Traill Drain No. 17 Construction	06/22/05	101,294	0	101,294
1921	Square Butte Dam No. 6/Harmon Lake	06/12/03 & 12/08/06	730,667	642,408	88,259
1922	Richland Co. WRD, Fargo/Moorhead & Upstream Feasibility Study Phase I	08/15/02	142,680	0	142,680
1926	Steele-Traill County Drain No. 2	03/10/05 & 08/30/05	351,750	202,050	149,700
1931	Walsh County Assessment Drain 4B Construction	06/22/05	97,713	96,677	1,036
1934	Traill Co. WRD Elm River Snagging & Clearing	03/22/06	24,500	15,611	8,889
1934	Steele Co. WRD Elm River Snagging & Clearing	12/04/06	18,000	8,336	9,664
1935	Harwood Twp. District No. 65 Drain Construction	10/12/06	22,750	14,684	8,066
1936	Nash Drain Extension Construction	03/03/06 & 10/12/06	57,683	37,770	19,913
1939	Pembina County Drain #72	03/22/06	62,825	51,441	11,384
1941	Walsh Co. Assessment Drain 4A Construction	06/19/06	81,594	0	81,594
1942	Walsh Co. Assessment Drain 10, 10-1, 10-2 Construction	06/19/06	230,000	0	230,000
1944	Cass County Drain #66 Construction	05/09/07	147,000	0	147,000
1945	2007 Rush River Snagging & Clearing	06/28/07	19,000	0	19,000
1131	Nelson Co. Central-Hamlin Rural FC Drain Construction	12/09/05	47,020	0	47,020
1932	Michigan Spillway Rural Flood Assessment Drain Constr.	08/30/05	311,696	23,591	288,105
642-01	Sweetbriar Creek Dam Engineering Agreement	12/09/05	80,000	75,047	4,953
	Water Education Foundation, Magazine	03/22/06	36,000	36,000	0
	Will and Carlson Consulting Contract	06/27/05	70,000	43,906	26,094
	Missouri River Joint Water Board, Start-up Costs	12/30/05	20,000	7,652	12,348
TOTAL GENERAL PROJECTS			7,827,935	3,703,272	4,124,665

**Water Commission - Projects/Grants/Contract Fund - Completed Projects
July 1, 2005 - June 30, 2007**

SWC PROJ. NO.	NAME	INITIAL APPROVAL	AMOUNT APPROVED	PAYMENTS	BALANCE
COMPLETED GENERAL PROJECTS					
247	Lynch Dam Repair, Steele County WRD	06/28/04	28,000	28,000	0
568	Barnes Co. WRD, Sheyenne River Snagging & Clearing		3,500	1,880	1,620
571	2005 Oak Creek Snagging & Clearing	11/04/05	2,158	2,158	0
571	2005 Oak Creek Snagging & Clearing	08/03/06	1,076	1,076	0
571	2005 Oak Creek Snagging & Clearing	01/28/06	2,500	2,500	0
644	32nd Ave. Fargo South Dam Modification	11/03/03	76,435	76,435	0
713	USGS Discharge Measurements on Oak Creek and Tributaries to Lake Metigoshe	01/25/06	4,250	4,250	0
839	North Cass Elm River Snagging & Clearing	10/04/05	18,125	18,125	0
841	Upper Maple Retention Dam Feasibility Study	11/05/99	20,000	20,000	0
847	Swan Creek Diversion, Cass County	12/06/02 - 03/10/05	68,830	64,726	4,104
847	Swan Creek Tributary Channel Improvements No. 2	06/27/05	16,012	16,012	0
847	Swan Creek Tributary Channel Improvements	06/27/05 & 05/24/06	3,371	3,371	0
847	Lower Swan Creek Channel Improvement	12/10/04	140,000	140,000	0
870	Crown Butte Dam, Morton County	03/10/05	24,000	23,009	991
1070	Cass County Drain No. 14	04/10/00	68,865	68,865	0
1071	Cass County Drain No. 15	06/23/03	7,721	589	7,132
1075	Cass County Drain No. 21C Reconstruction	03/11/04	75,250	49,045	26,205
1075	Cass County Drain No. 21	07/14/00	103,268	67,606	35,662
1077	Cass County Drain No. 24 Erosion Control Measures	09/30/04	7,000	5,674	1,326
1080	Cass County Drain No. 27 Reconstruction	03/11/04	182,481	115,726	66,755
1082	Cass County Drain No. 30	12/05/03	66,850	60,363	6,487
1114	High Flow Diversion Culvert Installation, English Coulee Diversion Channel to Grand Forks County Drain No. 18	06/27/05	16,704	11,498	5,206
1176	Richland County Drain No. 2/Colfax Watershed	12/05/03	205,149	4,775	200,374
1180	Richland County Drain No. 7 Partial Reconstruction	06/20/06	10,034	8,707	1,327
1217	Tri-County Drain No. 6 Improvement Reconstruction	03/22/06	67,172	46,186	20,986
1228	Traill County Drain No. 6	12/06/02	12,485	12,485	0
1232	Traill County Drain No. 13	03/05/03	250,000	250,000	0
1232	Traill County Drain No. 13	08/06/03	89,072	76,094	12,978
1241	Traill County Drain 23-40 Lateral 1 Construction	06/19/06	59,386	38,066	21,320
1247	Traill County Drain No. 30, Brokke Drain	03/05/03	93,535	91,686	1,849
1252	Walsh Co. Drain No. 31 Improvement Reconstruction and Extension	06/12/03	35,559	25,998	9,561
1258	Walsh County Drain No. 27 Improvement Reconstruction	08/30/05	22,744	22,744	0
1271	Ring Dikes, Rush River Water Resource District	12/06/02	25,000	25,000	0
1303	Silver Lake Bank Stabilization, Sargent County	12/10/04	23,338	23,338	0
1303	Silver Lake Bank Stabilization	10/12/06	5,373	5,373	0
1328	Cass County Drain No. 23, North Cass WRD	06/12/03	48,391	0	48,391
1331	Richland County Drain No. 14 Reconstruction	06/28/04	32,710	25,027	7,683
1403	ND Water Resources Research Institute	12/08/06	13,850	13,850	0
1403	ND Water Resources Research Institute	03/22/06	13,850	13,850	0
1420	Traill County WRD Drain No. 9-18-29	05/01/02	39,329	17,893	21,436
1552	Steele County Drain No. 3 Improvement Reconstruction	12/09/05	132,300	0	132,300
1588	Red River Basin Commission Operations (NRFP)	12/10/04	50,000	50,000	0
1625	Burleigh County Purple Loosestrife Weed Control	10/16/06	2,593	2,593	0
1705	Red River Joint WRD Coordinator	12/06/02 & 06/12/03	10,440	10,440	0
1751	Red River Flood Insur. Mapping & Hydraulic Anal. (Fargo)	08/15/02	35,646	35,646	0
1751-06	Red River Flood Insur. Mapping - DAS Phase 4	08/06/03	28,470	28,470	0
1826	ND Natural Resources Trust FY 2006	12/08/06	18,856	18,856	0

Water Commission - Projects/Grants/Contract Fund - Completed Projects (cont.)
July 1, 2005 - June 30, 2007

SWC PROJ. NO.	NAME	INITIAL APPROVAL	AMOUNT APPROVED	PAYMENTS	BALANCE
COMPLETED GENERAL PROJECTS (Cont.)					
1826	ND Natural Resources Trust Cost Share 2005	12/09/05	17,959	17,959	0
1842	Wild Rice Snagging & Clearing	02/20/06	20,000	20,000	0
1842	Wild Rice Snagging & Clearing 2006	03/22/06	4,750	4,750	0
1842	Richland County WRD 2005 Wild Rice Snagging & Clearing	01/31/05	17,000	16,365	635
1842	Richland County WRD Wild Rice River Snagging & Clearing	05/15/06	7,500	6,551	949
1842	Richland County WRD Wild Rice River Snagging & Clearing	01/29/07	22,500	22,403	97
1859	ND Dept. of Health Non-Point Source Pollution, Sec. 319	08/30/05	200,000	200,000	0
1890	Coburn Drain No. 2 Reconstruction	03/11/04	44,546	44,546	0
1890	Coburn Drain No. 2 Improvement Reconstruction	10/12/06	5,485	5,485	0
1916	Salt Cedar/Williams & McKenzie Counties	07/12/02	6,900	2,442	4,458
1916	Salt Cedar, McKenzie County	07/12/02	3,449	3,184	265
1925	Cooper Drain No. 3 Construction, Griggs County	12/10/04	41,764	41,764	0
1929	Kummer Drain Outlet Improvement Reconstruction	04/14/05	1,165	1,165	0
1930	Tyrol Lateral Drain No. 4	06/27/05	7,226	7,226	0
1934	2005 Traill County WRD Elm River Snagging & Clearing	12/09/05	21,875	21,186	689
1935	Southeast Cass WRD Harwood Twp. Drain Construction	12/09/05	70,875	70,875	0
1940	Hay Township Drain 1 Construction	06/19/06	34,756	0	34,756
1401/1905	Cavalier/Pembina Drains 2 & 3 (Manitoba, Canada)	03/06/01	178,500	178,500	0
1588/322	Red River Basin Commission Operations	12/09/05	150,000	150,000	0
1705	Red River Joint Water Resource District Coordinator	12/05/03	16,799	16,799	0
1751-06	Digital Aerial Survey Ph. I & II Hydraulic Anal. & Mapping	06/24/02	45,795	0	45,795
331-1	Hay Creek Flood Insurance & Mapping	04/16/03	15,598	15,598	0
331-1	Hay Creek Flood Insurance & Mapping	03/22/06	10,000	9,926	74
	ARB NDAWN, NDSU Agriculture Dept.		3,000	3,000	0
	Red River Basin Commission Operations (NRFP)	06/27/05	50,000	50,000	0
	Red River Basin Commission Mainstem Modeling		10,000	10,000	0
	Publication: "10th Anniversary Red River Flood" Poster	04/19/07	3,000	3,000	0
	ND Water Education Foundation Tours	03/01/06	2,500	2,500	0
	ND Water Education Foundation Tours	04/03/07	2,500	2,500	0
	Will and Carlson Consulting Contract	12/05/03	27,830	0	27,830
TOTAL COMPLETED PROJECTS			3,304,950	2,555,709	749,241

State Water Commission

Object Expenditures for Biennial Period Ending June 30, 2007

Permanent Salaries.....	\$ 7,014,028.14
Temporary Salaries and Overtime Salaries	319,335.99
Fringe Benefits	2,327,066.86
Travel	795,359.48
Supplies - IT Software	85,593.39
Supplies/Materials - Professional	326,897.11
Food and Clothing	2,393.43
Building, Grounds, Vehicle Supply	111,723.26
Miscellaneous Supplies	44,491.66
Office Supplies.....	23,225.11
Postage.....	34,233.41
Printing.....	21,135.61
IT Equipment under \$5,000	110,922.27
Other Equipment under \$5,000.....	32,971.80
Office Equipment & Furniture - Under \$5,000	9,028.04
Utilities.....	162,680.82
Insurance	5,974.64
Rentals/Leases - Equipment & Other.....	7,248.52
Rentals/Leases - Building/Land	52,461.04
Repairs	17,930.44
IT - Data Processing	136,846.71
IT - Communications.....	72,175.05
IT - Contractual Services and Repairs.....	18,340.27
Professional Development.....	133,640.15
Operating Fees and Services.....	195,127.41
Fees - Professional Services	7,039,647.77
Land and Buildings	656,876.78
Other Capital Payments.....	27,763,465.02
Extraordinary Repairs	217,588.42
Equipment over \$5000.....	151,374.80
Motor Vehicles	7,151.95
IT Equipment/Software over \$5000.....	53,800.03
Grants, Benefits, and Claims	28,333,306.10
Transfers	446,950.30
TOTAL.....	\$76,730,991.78

State Water Commission

LONG-TERM DEBT

The State Water Commission has issued revenue bonds for the Southwest Pipeline Project. The Commission has also issued bonds for statewide water development projects. The following table shows the State Water Commission's long-term debt as of June 30, 2007:

Water Development Bonds

PROJECT	SERIES	AMOUNT
Southwest Pipeline Project	2000 Series A	\$1,125,000
Southwest Pipeline Project	2005 Series A	1,999,000
Southwest Pipeline Project	2005 Series B.....	572,000
Southwest Pipeline Project	2007 Series B.....	13,670,000
Statewide Water Development Projects.....	2000 Series A	5,420,000
Statewide Water Development Projects.....	2005 Series A	21,475,000
Statewide Water Development Projects.....	2005 Series B.....	62,205,000

Resources Available from the Agency

Meeting minutes may be obtained by writing to: **ND State Water Commission
State Office Building Dept 770
900 East Boulevard Avenue
Bismarck, ND 58505-0850**

Or, via the Internet: <http://www.swc.nd.gov>; click on About the SWC, and Commission Meeting Minutes.

Data available for public use:

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| <ul style="list-style-type: none"> • Government Land Office Plats • Survey Horizontal and Vertical Control • Various Ground-Water Studies • Well and Site Location Data • Lithologic Data • Water Chemistry Data • Water Level Data | <ul style="list-style-type: none"> • Growing Season Rainfall & Hail Data • Water Permit Data • Drainage Permit Data • Stream Flow Data • Construction Permit Data • Retention Structure Data • Digital Map Data |
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Additional information about the State Water Commission is available on our web site on the Internet at <http://www.swc.nd.gov>