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NORTH DAKOTA
State Water Commission

BIENNIAL REPORT
FOR THE PERIOD
July 1, 1989 to June 30, 1991

TC824.N9 A32 B1E



Office of the State Engineer

December 1, 1991


**The Honorable George A. Sinner
Governor of North Dakota
State Capitol
Bismarck, ND 58505**

RE: 1989-1991 Biennial Report

Dear Governor Sinner:

In compliance with North Dakota laws, we transmit for your information and consideration the Biennial Report of the State Engineer and State Water Commission for the period July 1, 1989, to June 30, 1991.

Respectively submitted,

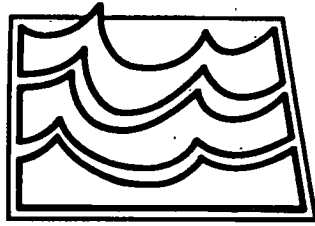

**David A. Sprynczywatyk
Secretary and State Engineer**

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NORTH DAKOTA STATE WATER COMMISSION

Mission

The mission of the State Water Commission and the State Engineer is to strengthen the quality of life and the economy of North Dakota by managing the water resources of the state for the benefit of its people.

Agency Goals

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

Organization

The State Water Commission is located in the old State Office Building near the State Capitol in Bismarck, North Dakota. The Commission consists of the Governor as chairman, the Commissioner of Agriculture as an ex-officio member, and seven members who are appointed by the chairman to serve terms of six years each. The terms of office for appointees are so arranged that two terms and not more than three terms shall expire on the first day of July of each odd numbered year. Executive Order 1987-6 allows for the Lieutenant Governor to serve as chairman of the Commission in the absence of the Governor or as otherwise directed. The Commission appoints a Secretary-State Engineer as their executive officer and who employs a staff as may be needed.

Statutory Mandates

The State Water Commission was created by legislative action in 1937 as a result of the depres-

sion of the 1930s for the specific purpose of fostering and promoting water resources development throughout the state.

The Office of 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 technical advisor of the Commission. Subsequently, in the years following the State Engineer was assigned responsibilities for regulation of drainage, control of dikes and dams, and management of development in the floodplains of 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 the North Dakota Century Code to:

- Administer the water laws of the state and its interest in federal and international waters.
- Prepare and maintain a comprehensive plan for future growth and development of the state, 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.
- Prepare and maintain a state-wide communications plan which identifies communication deficiencies with regard to water resources management and to assist in water information/education programs to overcome these deficiencies.
- Coordinate activities of federal, state, and local entities in water resources development.
- Represent the interests of the state in water resources matters in national, state, 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 purposes. The contract fund is the source of funds for assistance to local sponsors and is controlled by the Commission.

Principal Agency Activities

- Implementing the procedures for claiming this state's share of the flows of the Missouri River for our future needs as reflected in comprehensive water management planning documents and the Pick-Sloan Plan.
- Continued efforts for funding of the Garrison

Diversion Project to provide for water distribution throughout much of North Dakota in return for the land given up for early development of the Pick-Sloan Plan.

- Implementing plans for the distribution of Missouri River water through regional water supply systems such as the Southwest Pipeline Project and the Northwest Area Water Supply Project (Na chiin Huun - Dakota Project).
- Planning for the delivery of Missouri River water to stabilize Devils Lake.
- Developing international flood control with the Province of Saskatchewan and Canada for solving the flood problems along the Souris River.
- Refining legislation and policies for administering the constitutional Resources Trust Fund through which needed water facilities such as the Southwest Pipeline can be constructed.
- Continued discussions with Indian representation regarding tribal water rights in North Dakota. The intent being to negotiate water rights to avoid litigation.
- Developing policies and initiatives that will stimulate progress in solving flooding problems along the Sheyenne, Pembina, and Red Rivers.
- Joint administration with the Garrison Conservancy District of the federally authorized municipal, rural and industrial (MR&I) water supply program of the 1986 Garrison Diversion Reformulation Act.
- Continued funding by the legislature for advanced water resource studies. Completion of detailed studies that more precisely define the nature and occurrence of the resource is essential in order to optimize its development.
- Pursuing cooperative efforts with neighboring states and provinces for planning for mutual beneficial water management on shared water resources.
- Enforcing weather modification standards, conducting research, and supervising operational cloud seeding programs for hail suppression and rainfall enhancement.
- Continued efforts to expand the Water Education for Teachers (WET) and North Dakota Watercourse programs based upon the information gathered from the Commission's Communications Planning Process.

Water Commission Members as of June 30, 1991

NAME	POSITION	TERM ENDS
George A. Sinner	Governor-Chairman	
Sarah Vogel	Department of Agriculture	
Lorry Kramer	Member from Minot	July 1, 1991
William Lardy	Member from Dickinson	July 1, 1991
Joyce Byerly	Member from Watford City	July 1, 1993
Daniel Narlock	Member from Oslo, MN	July 1, 1993
Norman Rudel	Member from Fessenden	July 1, 1993
Jacob Gust	Member from West Fargo	July 1, 1995
Jerome Spaeth	Member from Bismarck	July 1, 1995

Water Commission Meetings July 1, 1989 through June 30, 1991

DATE	LOCATION
July 7, 1989	Devils Lake, ND
August 24, 1989	Bismarck, ND
October 20, 1989	West Fargo, ND
December 6, 1989	Grand Forks, ND
January 25, 1990	Bismarck, ND
March 19, 1990	Fargo, ND
May 7, 1990	(Telephone Conference Call)
July 5, 1990	Bismarck, ND
July 6, 1990	Carrington, ND
.....	(Joint Meeting of State Water Commission and Garrison Diversion Conservancy District)
October 1, 1990	Carrington, ND
December 3, 1990	Bismarck, ND
January 15, 1991	Bismarck, ND
March 13, 1991	Bismarck, ND
May 3, 1991	Bismarck, ND
June 24, 1991	Bismarck, ND

State Engineer

Water Permit Summary July 1, 1989 Through June 30, 1991

Total Applications Filed: 375

Irrigation

Applications filed: 270

Water granted (includes backlog)	65,479.0	acre-feet
Ground water	30,679.6	acre-feet
Surface water	34,799.4	acre-feet
Acres requested	52,610.5	
Acres granted (includes backlog)	31,356.5	

Flood Control

Applications filed: 0

Industrial

Applications filed: 34

Water granted (includes backlog)	3,677.7	acre-feet
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Livestock

Applications filed: 5

Storage granted (includes backlog)	180.1	acre-feet
Annual use granted (includes backlog)	30.4	acre-feet

Municipal

Applications filed: 12

Water granted (includes backlog)	2,473.9	acre-feet
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Recreation, Fish, and Wildlife

Applications filed: 46

Storage granted (includes backlog)	29,983.0	acre-feet
Annual use granted (includes backlog)	4,772.2	acre-feet

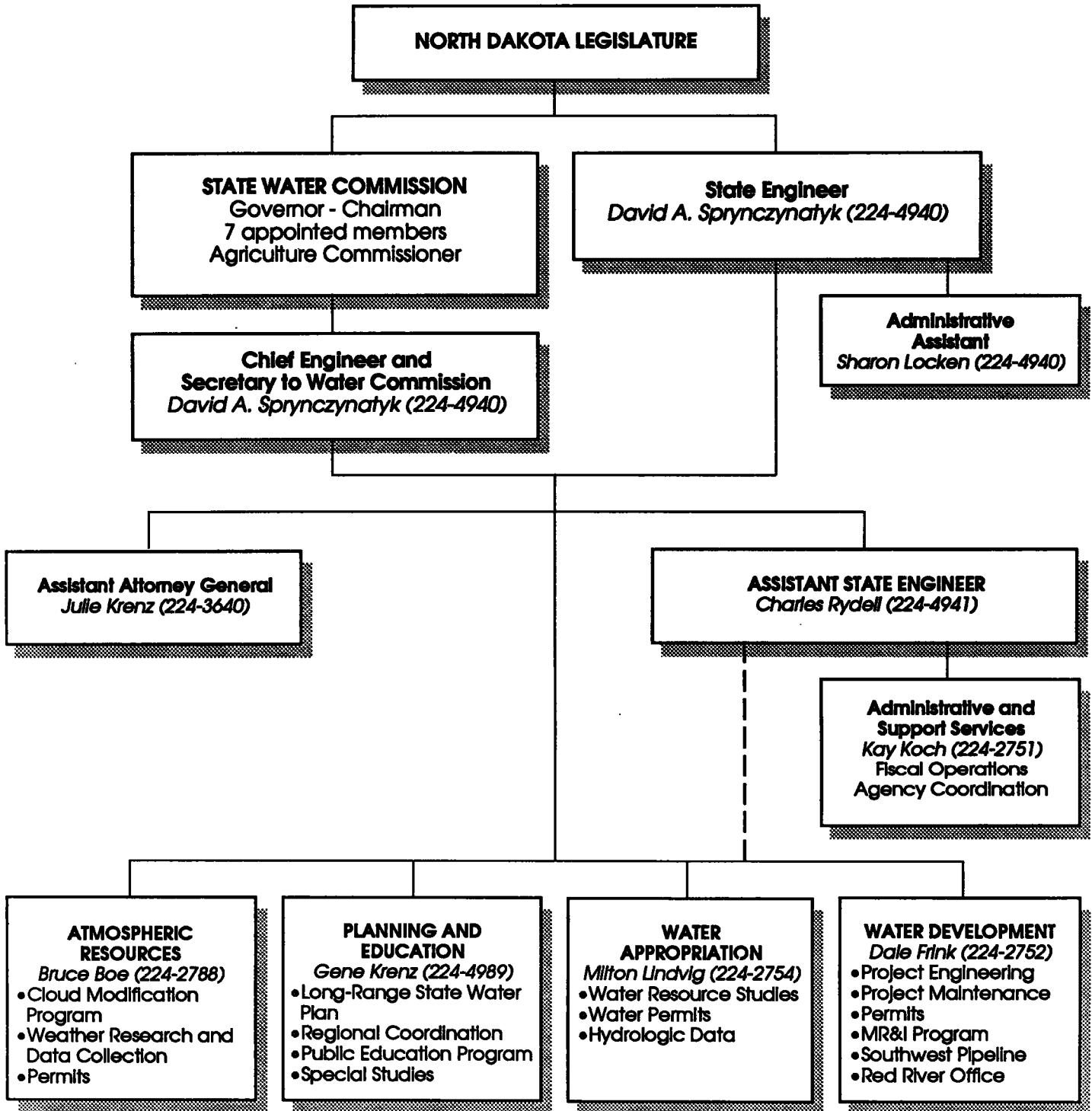
Rural Domestic

Applications filed: 8

Water granted (includes backlog)	1,405.0	acre-feet
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Note: Backlog includes permits applied for in previous bienniums.

**North Dakota
State Water Commission
Organizational Chart**



TOTAL FULL TIME EQUIVALENTS OF 82.5 PERSONNEL

State Water Commission Employees as of June 30, 1991

ADMINISTRATION DIVISION

State Engineer: David A. Sprynczynatyk
Assistant State Engineer: Charles Rydell
Administrative Assistant: Sharon Locken
Accountant: Kay Koch
Legal Assistant: Rosemary Pedersen
Administrative Clerk: Karen Heinert
General Office Clerk: Roy Putz
Temporary: Laurie Backman

ATMOSPHERIC RESOURCE BOARD

Director: Bruce Boe
Business Manager: LeNor Dollinger
Environmental Scientist: Mark Schultz
Temporary: Donna Klein, Kelli Schroeder, Matthew Strahan

PLANNING AND EDUCATION DIVISION

Division Director: Gene Krenz
Water Resource Planners: LeRoy Klapprodt, Preston Schutt, Bill Sharff
Environmental Scientist: Linda Weispfenning
Research Analyst: Larry Knudtson
Graphic Artist: Brenda Bosworth
Word Processing Operator: Julie Small

WATER APPROPRIATION DIVISION

Division Director: Milton Lindvig
Administrative Secretary: Marlene Backman
Hydrologist Managers: Royce Cline, David Ripley, William Schuh, Robert Shaver
Hydrologists: Christopher Bader, Jon Patch, Steve Pusc, Alan Wanek

Water Resource Engineers: Craig Odenbach, Robert White
Water Resource Project Engineer: Gordon Baesler
Engineering Technicians: Michael Hove, Kelvin Kunz, James MacArthur, Merlyn Skaley
Chemist: Garvin Muri
Laboratory Technician: Mary Osborn
Rotary Drill Operator: Gary Calheim
Equipment Operator: Albert Lachenmeier
Temporary: Robert King, John Knell, Robert Koch, Philip Randich, Lloyd Waddingham

WATER DEVELOPMENT DIVISION

Division Director: Dale Frink
Administrative Secretary: Darlene Mund
Water Resource Engineer Managers: Cary Backstrand, James Fay, Randy Gjestvang, Arland Grunseth, James Lennington, Jeffrey Mattern, Todd Sando, Ronald Swanson
Water Resource Engineers: Bradley Benson, Dwight Comfort, Bruce Engelhardt, Stan Hanson, James Lindseth, Edgar Schmidt, Gregg Thielman
Engineering Technicians: Marty Babel, Allen Balliet, Robert Bucholz, Kurt Kunz, Leland Krein, Terrence McCann, Raymond Oliger, Thomas Palanuk, Eugene Sackman, Daniel Sauter
Water Resource Project Managers: Gary McDowell, Lloyd Scott
Water Resource Senior Manager: Ray Christensen
Realty Officer: Frank Johnson
Planners: Jeffrey Klein, Krislyn Thompson
Temporary: Dean Schneider, Armon Weiss

Administration Division

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

Budget and fiscal control work is carried on within the provisions of statutory law and principles or rules of that law. Agency accounting consists of keeping adequate 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 in 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 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 of Control, Vice-Chairman of the Missouri Basin States Association, Executive Council Member of the Western States Water Council, Board of Directors Member of the National Water Resource Association, Board of Directors Ex Officio Member of the North Dakota Water Users Association, member of the Red River Water Resource Council, and member of the Association of Western State Engineers.

During the 1989-1991 Biennium the activities of the Missouri Basin States Association increased considerably over previous bienniums because of drought in the Missouri River Basin. The Association became involved in the annual preparation for the Corps of Engineers operating plans for the Missouri River, and the Association worked closely with the Corps on the revision of the Missouri River Master Manual. During the

biennium the Association decided to re-instate dues from the eight member states because of increased activities. The North Dakota State Water Commission decided to once again pay dues because of the importance of the Association is working toward protecting North Dakota's Missouri River water right.

Atmospheric Resource Board

The Atmospheric Resource Board has been a division of the State Water Commission since 1981. Although under the direction and supervision of the Water Commission, the Board is a quasi-judicial, quasi-legislative, advisory and rule-making department. In the 1989-1991 biennium and before, the Board's budget and appropriations legislation were adopted by legislative action independent of that of the Water Commission. In the 1991 legislative session, the Board's appropriation was combined with that of the Water Commission, and treated essentially as another division.

The primary function of the Atmospheric Resource Board is to protect the rights of the public concerning the effects of planned weather modification (cloud seeding) programs. The Board is also responsible for record keeping for all such operations, as well for licensing and permitting. Research to assess and improve cloud seeding technology is also mandated by law. The Board's rules and regulations governing weather modification are periodically reviewed and updated to ensure environmental and public safety, and that the operation program remains at the forefront of the technology. The rules and regulations define the qualifications, procedures, and conditions required for the issuance of licenses and permits.

The Atmospheric Resource Board is comprised of 10 members. Seven are appointed by the Governor; the other three are ex-officio and include the State Engineer, the Director of the Aeronautics Commission, and a representative from the Department of Health and Consolidated Laboratories.

Five western counties continue to participate annually in the North Dakota Cloud Modification Program, an operational, dual-purpose cloud seeding program designed to mitigate hailfall and enhance rainfall. Independent, long-term analyses of crop hail insurance data show an average 43.5 percent reduction in crop damage in the participating counties, which translates to an increase of \$2.21 per acre in gross income (NDSU Agricultural Economics Report #247, 1989).

Research conducted by the Board includes participation in the National Oceanic and Atmospheric Administration Federal-State Cooperative Program in Atmospheric Modification Research. The North Dakota Thunderstorm Project, conducted in central North Dakota, brought scientists representing 12 universities and 15 federal, state, and local agencies to the Bismarck area in an intensive study of summer clouds and thunderstorms.

North Dakota remains a recognized national leader in application of weather modification technology and in the convective (summertime) cloud research. Anyone requiring additional information about the recent activities of the Board is encouraged to read the complete 1989-1991 Biennium Report from the Board.

Planning and Education Division

The Planning and Education Division performs a number of functions, including the development and maintenance of a State Water Management Plan. The division staff is responsible for:

- participation in and/or coordination of studies leading to completion of local, state, regional, and national water resource and related land management plans;
- monitoring of water resource issues to determine possible impacts on North Dakota's water resources;
- representing the State Water Commission on regional and national planning bodies such as the Missouri Basin States Association and the Red

River Water Resources Council; and

- providing opportunities for adults and students to learn about North Dakota's water resources through a program that involves workshops, displays, and a variety of publications.

State Water Management Plan Update

NDCC §61-01-26 (4) provides that it is North Dakota's policy to attain benefits from the use of the state's water resources "... through the development, execution, and periodic updating of comprehensive, coordinated, and well-balanced short-term and long-term plans and programs..." Specific power and authority to plan for the development of the state's water resources is provided for under the general powers and duties vested with the State Water Commission under NDCC §61-02-14.

In fulfilling its objective to wisely develop the state's water resources, the State Water Commission has periodically developed comprehensive State Water Plans addressing both surface and ground-water management needs across the state. The most current State Water Plan was published in 1983. Upon completion, the Planning and Education Division developed a computer data base containing the Plan's specific recommendations. This data base facilitated continual updates as formal actions of the State Water Commission dictated. The data base also made it possible to respond to information requests in a more timely fashion. By 1990, the many administrative, economic, and social changes that had occurred in the interim rendered the 1983 Plan badly outdated. In mid-1990, the State Engineer directed the Planning and Education Division to begin development of a new State Water Management Plan.

Work began on updating the State Water Management Plan during the last half of 1990. A work plan was developed to complete the update process by the spring of 1992 deadline stipulated by the State Engineer.

It is the position of the State Water Commission that planning for development of the state's water resources should incorporate ample opportunities for public input. The work plan for updating the State Water Management Plan contained a public involvement process similar to what was used successfully in developing the

1983 State Water Plan. The state was divided into eight public involvement regions which approximate the boundaries of major drainage basins. A citizens advisory board (CAB) was appointed for each region from a list of nominations provided by water resource district boards and other groups interested in water management. These CABs will ultimately dictate which water management projects and programs will be included in the State Water Management Plan. In addition, the priority of each project or program recommendation will be set by the CABs.

During early 1991, the Planning and Education Division conducted two rounds of public meetings with the CABs. The first round was an introductory meeting to inform the CABs and public about the planning process. Regional goals and objectives were developed during the second round.

There will be a total of five public meetings held in each of the eight public involvement regions throughout the course of the planning process. A draft State Water Management Plan will be completed by April 1992.

Information and Education Program

The Commission's public information and education program goal is to help North Dakotans and others better understand the importance of wise water resources management and to encourage them to become involved in the decision-making process as informed citizens. All of the Commission's projects and programs inherently include a public information and education component. The common denominator is water and its relationship to people.

Due to a high degree of interest, the Commission's Planning and Education Division has emphasized the continuation and expansion of the Water Education for Teachers (WET) program. WET is an interdisciplinary and supplemental education program for K-12 teachers and other youth leaders. Classroom-ready teaching aids and other water-related educational materials are provided to participants who attend workshops across the state, usually for graduate college credit. During the current biennium 776 teachers received teaching materials and credit at a WET workshop while learning about the state's water resources and management issues. Another

573 individuals were exposed to WET educational materials at WET inservice and introductory seminars. WET continued its successful outreach efforts to local North Dakota school districts and other youth leader programs, as well as preservice opportunities in the state's colleges and universities. Other types of WET educational offerings were in the planning stages during the biennium.

North Dakota's Water Education for Teachers program has attracted national attention, and efforts to establish a national WET program patterned after the North Dakota program are currently underway.

The Planning and Education Division has also expanded its adult water information and education program. During the period of this report, several additional "waterguides" were developed which describe, in an easy-to-read format, important water management concepts. A grant from the U.S. Environmental Protection Agency has been used to help establish—through information and education—that the cooperative approach is the best means to resolve wetland conflicts at the local and state level.

Working cooperatively with The International Coalition, the Division developed a communications plan for the North Dakota portion of the Red River basin. This plan provides insights into the nature and extent of communication deficiencies and helps allocate funding.

Planning and Education Division staff have participated in many forums, seminars, conferences, and meetings with youth and adults to help educate and inform participants about the state's water resources and how they are managed.

The Oxbow Newsletter

The *Oxbow* newsletter is designed to inform and educate the public about State Water Commission projects and programs as well as local, state, and national water management issues. State and federal government officials and employees, water management professionals, universities, mass media, and private citizens interested in water management comprise the over 1,200 people who receive the *Oxbow* each month.

The Planning and Education Division assumed responsibility for publishing the *Oxbow* in

March of 1984. A full-color, annual magazine edition is published each year. In 1989, a special Centennial magazine issue was published as part of the State Water Commission's contribution to North Dakota's Centennial celebration.

Interbasin Water Transfer Studies Program

This program, instituted in 1986, is designed to undertake the research needed to respond to Canada's concerns about the potential transfer of certain fish species, pathogens, and parasites into Canadian waters through the operation of the Garrison Diversion Project.

To accomplish program objectives, North Dakota has assumed the leadership of a long-term, comprehensive research program involving a dozen or more state and federal agencies, scientists, and researchers from several colleges and universities (including Canadian). As of the end of the biennium, \$410,000 had been committed to research projects, with a total of 10 either completed or underway. Funding is provided through the joint efforts of the State Water Commission, the Garrison Diversion Conservancy District, and the U.S. Bureau of Reclamation. The Division's director serves as coordinator for the program.

If Canadian concerns can be overcome through this and other research, the economic benefits that could accrue to North Dakota would be substantial. Accordingly, the program's objective is to remove Canadian concerns by discovering new knowledge where it is now lacking, by conclusively refuting concepts based on misinformation, and by developing mitigation measures where technical and scientific objections cannot be overcome.

Ninety-six percent of the state's surface water supplies are found in the Missouri River, with approximately 16 million acre-feet flowing past Bismarck on an average annual basis. With less than 4 percent of the state's total surface water supplies, the Souris and Red basins lack the capability to meet the growing demands for water. The key to dealing with this problem is the transfer of water from areas of surplus to areas of shortage. Linkage between basins can be achieved through the distribution system provided by Garrison Diversion, and to achieve that linkage the removal of Canadian concerns is essential.

Special Studies

The Planning and Education Division has participated in several special studies during the biennium. Major special studies include:

Red River Valley Municipal Water Supply Study. The purpose of this study was to identify the long-term water needs of the five major cities located in the valley and to examine potential sources to meet identified needs.

Municipal/Rural Water System Drought Contingency Planning Procedures Report. The purpose of this effort was to develop procedures that could be used by communities and rural water systems to help them in developing drought contingency plans. The drought contingency plan will enable communities and rural water systems to be better prepared in the event they should lose their present water supply because of drought conditions. The procedures were sent to 108 communities with populations of over 500 and to 20 rural water supply systems.

Financing Options for Water Supply Projects. The purpose of this special study was to investigate options available to finance water supply projects in the state of North Dakota. The study analyzed revenue sources that are currently available, as well as funding options that will allow money to be leveraged to assist the maximum number of people.

Livestock Water Supply Assistance Program. This new program was enacted by the 1991 Legislative Assembly and is administered by the State Water Commission. The legislation was developed to assist livestock producers whose water supply has been affected by drought. Staff assisted an eight-member advisory committee in developing general program criteria, administrative rules, and the State Water Commission application form.

The Red River Water Resources Council. The Red River Water Resources Council is a quasi-governmental, non-profit corporation formed under North Dakota law to facilitate cooperation and coordination on water management issues in the Red River basin involving Minnesota, Manitoba, and numerous federal agencies. The states of North Dakota and Minnesota are the council's formal members, while a

board of directors consisting of three from each state, directs council activities. Administration of the council is accomplished under a chairmanship that rotates annually between the two states.

A major undertaking of the council during the biennium was the development of a 200-page manuscript discussing the evolution of water problems and water management techniques in the basin over time. It is anticipated that the manuscript will be published as a paperback book in 1992.

Funds to continue operation of the Red River Water Resources Council have not been included in the Executive Budget recommendations of either state since July 1, 1982. Board members are reimbursed for their travel expenses by the council, using carryover funds from the Souris-Red-Rainy River Basin Commission.

Water Appropriation Division

Development and management of the state's water resources to serve the needs of present and succeeding generations of North Dakota citizens is the major goal of the Water Appropriation Division. To do so, the following objectives were pursued:

- Identify the availability and quality of the state's water resources.
- Assist municipalities and other public entities in developing solutions to particular water supply problems.
- Assess impacts of existing water-supply development on ground-water levels, streamflow, and water quality for purposes of allocation and management.
- Construction and operation of predictive models that simulate hydrologic conditions for the purpose of developing viable water-management programs and assist in the allocation of the resource.
- Collect, store, and disseminate data on stream flow, ground-water levels, water quality, and water use.
- Provide orderly processing of water permit

applications for water-resource allocations.

- Provide recommendations to the State Engineer on individual water permit applications for the allocation and management of the resources.
- Provide for the storage and retrieval of water permit records.
- Maintain a record of the utilization of each conditional water permit and water right.

Major Activities for 1989-1991

As a result of drought conditions and the expansion of irrigated potato acreage, the level of irrigation development increased significantly from past years. Much of the development occurred in the eastern one-third of the state because it is nearest to the traditional potato producing area in the northern part of the Red River Valley. The remaining development was distributed throughout the western two-thirds of the state. It is estimated that during the biennium irrigated acreage increased by approximately 15,000 acres to a total of 189,000.

In order to provide an interim water supply for the irrigation of the Oakes Test Area under the Reformulated Garrison Diversion Project, the U.S. Bureau of Reclamation contracted with the State Water Commission to construct a series of wells in the Oakes aquifer. The wells were constructed under three separate contracts. Phase I consisted of 32 wells which were completed in 1990. Phase IIA involved the construction of 14 wells and under Phase IIB, 35 wells were constructed, all in 1991. These wells deliver water that has been pumped from the James River and artificially recharged to the Oakes aquifer.

An investigation was completed that quantified the evaporation from Devils Lake, and identified the interaction between the lake and the ground-water system, principally the Spiritwood aquifer. These and other data were used to develop a hydrologic budget for the lake. It was a three-year cooperative project between the U.S. Geological Survey and the State Water Commission. The reports presenting the hydrologic data and interpretation of that data will be published during the following biennium.

The ongoing program for collecting water resource data continued at a relatively constant level. This program consists of four components: streamflow, ground-water levels, chemical

quality, and water use. The agency supports the operation of more than 50 streamflow gages, many of which are a part of the cooperative program with the U.S. Geological Survey. Ground-water levels are measured periodically in approximately 3,000 observation wells completed in the major aquifers throughout the state. Approximately 1,000 water samples for chemical analyses are collected at streamflow gage stations, and from selected observation wells and production wells. The water use data is submitted by holders of approximately 3,000 water permits.

During 1989-1991 the following water supply investigations were undertaken or completed:

- Wellhead protection area delineation and water supply for the city of Towner, McHenry County.
- Wellhead protection area delineation and water supply for the city of Stanley, Mountrail County.
- Assessment of the availability and chemical quality of ground water to serve rural water needs in Wells County.
- Assessment of the availability and chemical quality of ground water to serve the Old Settlers Memorial Park, Nelson County.
- Hydrologic investigation of the ground water resources of the West Fargo aquifer system in Cass County.

The following reports were published during the biennium:

- Hydrogeology of Camp Grafton South, Eddy County, North Dakota.
- An Interim Water Supply for the Oakes Aquifer Test Area of the Garrison Diversion Unit: Evaluation and Selection of Well-Field Sites and Well-Field Design.
- Feasibility of Artificial Recharge to the Oakes Aquifer, Southeastern North Dakota: Hydro-geology of the Oakes Aquifer.
- Unsaturated Soil Hydraulic Properties and Parameters for the Oakes Area, Dickey County, North Dakota.
- Feasibility of Artificial Recharge to the Oakes Aquifer, Southeastern North Dakota: Ground Water Data (two volumes).
- Streamflow Data Collected by the North

Dakota State Water Commission, 1982-1990.

- Hydrologic Assessment and Delineation of Wellhead Protection Areas for the City of Stanley, North Dakota.
- Hydrologic Assessment and Delineation of Wellhead Protection Areas for the City of Towner, North Dakota.

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 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, and dams;
- providing technical assistance to water resource district boards;
- inspecting and reporting on the safety of dams;
- assisting communities in developing floodplain management capabilities pursuant to the National Flood Insurance Program;
- providing joint coordination of the Municipal, Rural, and Industrial Water Supply Program;
- managing the design, construction, and operation of the Southwest Pipeline Project.

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

During the biennium, the Garrison Diversion MR&I water supply program was changed to a 65 percent federal grant and a 35 percent state low interest loan. The change was made in order to extend the federal dollars to more projects and to create a perpetual loan program that would continue to provide MR&I funding after the federal dollars are gone. The loan repayments, including interest, are deposited into the Resources Trust Fund for future water development needs.

The Garrison Diversion MR&I program received \$11 million of federal funds for the development of water supply facilities in the state. This brings the total received from the federal government to over \$38 million since the program was authorized in 1986. A total of 116 applicants have requested assistance through the MR&I program. Of these, 35 projects have been approved for MR&I funding by the Garrison Diversion Conservancy District and the State Water Commission. Ten projects have been completed including: Abercrombie, Englevale, New Town, Riverside Park Dam, Gwinner, Hankinson, Langdon Rural Water Phase I, McLean-Sheridan Rural Water Phase I, Minto, and Rugby. Seven more projects were in the design and construction at the end of the biennium including: Agassiz Rural Water, Grandin, North Valley Rural Water, McLean-Sheridan Phase II, Langdon Rural Water Phase I, Ramsey County Rural Water, and Southwest Pipeline Project.

The total estimated cost of the 116 projects is approximately \$500 million. This cost includes the \$210 million Northwest Area Water Supply System and the \$140 million Southwest Pipeline Project.

Southwest Pipeline Project

Substantial progress was made during the biennium in the Southwest Pipeline Project towards an initial goal of providing water to Dickinson by late 1991. At the end of the biennium, all 84 miles of pipeline between Lake Sakakawea and Dickinson were completed, along with the intake pump station and the Dickinson reservoir. The Dodge and Richardton pump stations were also about 80 percent completed.

The State Water Commission also agreed to utilize Dickinson's existing water treatment plant rather than build a new plant as originally planned in 1982. Reduced population projections for the area delayed the need for a new larger plant at this time. Dickinson's plant, with some modifications, is of adequate capacity to meet the needs of the area for several years.

The Southwest Pipeline Project, when completed, will consist of 324 miles of main transmission line and a rural distribution system. During the biennium, the city of Dunn Center was added to the system increasing the total cities to be served to 20.

Design and Construction Section

During the 1989-91 biennium, contracts were awarded to various North Dakota general contractors to construct the following projects: Golden-Rush Lake Channel Improvement; Spring Creek Bank Stabilization; Lake Hoskins Improvement; and snagging and clearing projects on the Sheyenne River in Richland and Barnes Counties, and on the Wild Rice River in Richland and Cass Counties. The following is a brief description of the larger projects:

Grand Forks Riverside Park Dam. Grand Forks Riverside Park Dam is located on the Red River of the North between East Grand Forks, Minnesota, and Grand Forks, North Dakota. The new dam is located about 1,000 feet downstream of the old rock-filled timber crib structure built in 1925. The new dam is a reinforced concrete baffled-type structure. It is designed to reduce the potential of drowning from dangerous undertow that develop from an ordinary straight weir. The structure is 320 feet in length, 13 feet high, with a 278-foot long weir. The dam serves as a water supply for the city of Grand Forks.

The total cost for the Riverside Park Dam Project was \$1,674,730. Seventy-five (75) percent of this figure was provided in the form of an MR&I grant from the Garrison Diversion Conservancy District. The State Water Commission and the city of Grand Forks provided the nonfederal contribution of \$209,341.29 and \$209,341.28, respectively.

Golden-Rush Lake Project Improvements. Golden Lake is located in Steele County, approximately 15 miles northeast of Finley, North Dakota. Golden Lake, as early as 1985, was defined as hypereutrophic, exhibiting extremely high algae concentration and poor ecological diversity. The lake was undesirable for several types of water-based recreation and was rapidly degrading.

The main purpose of the project was to improve the water quality in Golden Lake by using the Rush Lake wetland as a biological filter to reduce nitrogen and phosphorus levels in the runoff water to Golden Lake.

Total project costs were \$24,573, shared equally by the Steele County Water Resource District, the State Game and Fish Department, and the State Water Commission. Each sponsor's share was \$8,191.

Spring Creek Bank Stabilization. Bank erosion had been a problem along Spring Creek within the city of Zap in Mercer County for several years. High stream flows during spring runoff had caused severe bank erosion along the left channel bank.

Construction of the bank stabilization project began the first part of September 1989, and was completed in October 1989. Operations involved excavation, fill, and placement of rock riprap for about 300 feet downstream from 3rd Avenue Bridge in Zap. Total project costs were \$39,338 with the Mercer County Water Resource District providing 60 percent of the costs and the State Water Commission providing 40 percent.

Lake Hoskins Improvement. Construction of an improvement project for Lake Hoskins, located west of Ashley in McIntosh County, began November 21, 1989. Project work involved the following: excavation of lake sediment from the spillway approach and recreation area(s); clearing reeds, brush, and trees from the aforementioned areas; and rock riprap protection along a portion of the lake shore.

Total project costs were \$47,745, with the McIntosh County Water Resource District, the State Water Commission, and the State Game and Fish Department all providing contributions.

Snagging and Clearing Projects. Six snagging and clearing projects involving 141 river miles were completed during the biennium at a total cost of \$588,160. The State Water Commission typically provides 25 percent of the total cost of snagging and clearing projects, with the county water resource board providing 75 percent of the total cost.

Construction-Maintenance Projects. In addition to the aforementioned projects, the Commission's force account crew performed maintenance and minor repairs to the following projects during the biennium:

Project Name	SWC Costs
Blacktail Dam	\$ 1,512
Cedar Lake Dam	8,579
Dead Colt Creek Dam	1,800
Emergency Disaster Operations	16,908
English Coulee Diversion	8,533
Glen Ullin Dam	8,070

Green Lake	5,779
Harvey Dam	4,283
Hillsboro Dam	942
Kathryn Dam	7,631
McVile Dam	1,357
Raleigh Dam Recreation	4,232
Southwest Pipeline	13,110
Spiritwood Lake	3,810
Sweetbriar Dam	1,360
US Geological Survey Stream Gaging Station Improvements	77,004
Valley City Park Dam	7,500
Welk Dam	1,300
Wild Rice Dam	15,086
Wilson Dam	10,459

Dam Safety Inspections. Under the state's dam safety inspection program, a total of 32 dams were inspected and reports prepared.

Name of Dam, County	Hazard Class
Camel Hump, Golden Valley	Medium
Queen City, Stark	Medium
Armourdale, Towner	Low
Wyard (Kiwana), Foster	Low
Green Lake Outlet Control, McIntosh	Low
Grafton, Walsh	Low
Olga (T3-2), Cavalier	Low
Short Creek, Burke	Medium
Kota Ray, Williams	Low
Arnegard, McKenzie	Low
Pipestem Reservoir, Stutsman	High
Odland, Golden Valley	Low
Sweetbriar Creek, Morton	Medium
Speck Davis, Slope	Low
Indian Creek, Hettinger	Medium
North Lemon Lake, Adams	Medium
Blacktail, Williams	Medium
Epping-Springbrook, Williams	Medium
Tioga, Williams	High
White Earth, Mountrail	Medium
Cottonwood Lake, LaMoure	Medium
Lisbon, Ransom	Medium
Daub, Oliver	Medium
Dam #357, Bottineau	Medium
Lake Darling, Ward	High
Minot Country Club, Ward	Low
Bucephalia, Foster	Low
Eaton, McHenry	Low
McVile, Nelson	Medium
Niagara, Grand Forks	Medium
Ypsilanti, Stutsman	Low
Grand Forks Riverside Park, Grand Forks ...	Medium

Twenty-five of the inspections were reinspections of dams previously inspected. All of the reinspections were conducted on dams in which the State Water Commission had previously participated in construction or maintenance. Of the 32 dams, 3 were considered to be high hazard; 16 were medium hazard; and the remaining 13 dams were considered to be low hazard dams.

Regulatory Section

During the 1989-91 biennium, the Regulatory Section processed 196 dam-dike-other device permit applications, and 32 applications to drain. This compares with 106 dam-dike-other device applications and 70 applications to drain in the previous biennium. There were no drainage permit applications of statewide or interdistrict significance in the 1989-91 biennium. The construction permits consist of 101 for fish and wildlife purposes, 18 to prevent flooding of agricultural land, 11 to prevent flooding of municipalities, 23 for surface water and sediment control at surface coal mining operations, 17 for livestock-watering, 4 for irrigation, 6 for recreation, 1 for containment of possible oil spills at a pipeline pump station, 12 for waste water storage, and 2 for commercial fish production.

The Regulatory Section also processed 36 nesting island applications and 20 sovereign lands permit applications. Many of the sovereign lands permit applications were for utility crossings. The Section also processed 7 utility crossings of stream channels which did not involve sovereign lands. The Section also reviewed 3 new mining permits and 33 revisions to existing permits.

With passage of the no net loss of wetlands legislation, the Regulatory Section began processing of wetland restoration and creation permit applications. During the biennium, the Section processed 423 restoration permits and 106 creation permits.

In the past, the State Water Commission was asked to comment on federal section 404 permit applications by the state office of the Corps of Engineers. This practice stopped shortly before the beginning of the biennium, but has once again commenced at our request.

The Regulatory Section is also responsible for floodplain management in the state and

coordination of the National Flood Insurance Program. The floodplain management staff assists 230 communities in the administration of their floodplain management responsibilities. Each community designates an individual as the floodplain administrator to oversee all development. The State Water Commission staff works closely with these individuals in providing technical assistance. The floodplain management staff visits the communities on a predetermined basis of need, and during the 1989-91 biennium, over 100 communities were visited and assisted. Approximately 75 percent of the floodplain management costs are paid through the Community Assistance Program (CAP) developed annually by the State Water Commission and the Federal Emergency Management Agency.

Investigations Section

The Investigations Section completed 11 larger investigations and several smaller studies during the biennium. In April 1990, the Devils Lake Stabilization Briefing Report was completed that provided preliminary information on 28 alternatives for stabilizing water levels in Devils Lake. The investigation involved input from several federal, state, and local agencies and organizations.

In April 1991, a preliminary report on Upper Missouri River Bank Erosion was completed. The report reviewed the history of the development of the Missouri River main stem reservoir system, resulting impacts to bank erosion, itemized several erosion sites and provided a cost estimate for the repair of the sites. The investigation was a joint effort between the Montana Department of Natural Resources and the North Dakota State Water Commission.

Several other preliminary engineering reports were completed during the biennium:

- Hildenbrand Dam - Logan County
- Glen Ullin Dam - Morton County
- Blacktail Dam Modification - Williams County
- Odland Dam Restoration - Golden Valley County
- Fargo North Dam - Cass County
- Dead Colt Creek Dam Improvement - Ransom County
- Elm River Flood Control - Traill County
- Belfield Dam - Stark County

State Water Commission

**Programs/Projects Authorized
July 1, 1989 - June 30, 1991**

SWC PROJ. NO.	NAME	COUNTY	DATE APPROVED	AMOUNT APPROVED	PAYMENTS	BALANCE
MR&I PROGRAM						
237-3	Remaining Balance		10-1-90	\$ 540	-0-	\$ 540
237-8	Grandin Water Supply	Cass	3-13-91	36,190	-0-	36,190
237-12	Agassiz Rural Water		3-13-91	204,750	-0-	204,750
235-15	North Valley Rural Water		3-13-91	<u>450,520</u>	-0-	<u>450,520</u>
MR&I TOTAL				\$ 692,000	-0-	\$ 692,000
SPECIAL PROJECTS						
1344	Sheyenne River Flood Con.	Cass	12-3-90	\$ 900,000	\$ 900,000	\$ -0-
1736	Southwest Pipeline		3-13-91	<u>2,108,979</u>	<u>502,988</u>	<u>1,605,991</u>
SPECIAL PROJECT TOTAL				\$3,008,979	\$1,402,988	\$1,605,991
CONTRACT FUND						
0001	Remaining Balance		4-30-91	\$1,117,235	\$ -0-	\$1,117,235
237	Water/Wildlife Program		8-24-89	10,000	8,840	-0-
1074	Cass Drain No. 19-1		7-7-89	7,000	4,642	2,358
1188	Richland Drain 26	Richland	3-13-91	37,143	-0-	37,143
1196	Richland Drain No. 37B	Richland	7-7-89	11,670	8,015	3,655
1271	Reile's Acres Flood Study	Cass	7-7-89	10,000	8,881	1,119
1280	Grand Forks Drain 52	Grand Forks	1-15-91	65,566	-0-	65,566
1395	USGS Coop Investigations		10-1-90	629,600	611,607	17,993
1489	No Net Loss Wetlands Coord.		3-13-91	10,000		10,000
1588-1	International Coalition		1-15-91	10,000	7,500	2,500
1702	Hidden Island Coulee		12-3-90	61,000		61,000
1730	Corps of Engineers Sec. 22		1-15-91	10,700	7,200	3,500
1804	Grand Harbor Investigation	Ramsey	3-19-90	5,000		5,000
1815	Sheyenne River Sng/Clr.	Ransom	7-5-90	2,798	2,798	-0-
1816	Sheyenne River Sng/Clr.	Barnes	12-3-90	5,650	4,906	744
1832	Hammer-Sullivan Drain Ph. 1	Ramsey	7-5-90	65,733	27,899	37,834
1840	North Loma Drain 1	Cavalier	7-5-90	15,758	-0-	15,758
1842	Wild Rice Sng/Clr.	Richland	12-3-90	98,131	67,682	30,449
1842-1	Wild Rice Sng/Clr.	Cass	1-15-91	4,125	2,239	1,886
1843	Banner Township Drain 1	Cavalier	7-5-90	3,826	3,826	-0-
1844	Langdon Township Drain 1	Cavalier	7-5-90	11,228	11,228	-0-
1828	GDU Biota Transfer Study		10-1-90	51,900	51,900	-0-
	State Engineer Approvals		11-6-90	<u>42,652</u>	<u>33,906</u>	<u>8,746</u>
CONTRACT FUND TOTAL				\$2,286,715	\$ 863,069	\$1,422,486
ALL FUNDS TOTAL				\$5,987,694	\$2,266,057	\$3,720,477

State Water Commission
Fund Summary
for Biennial Period Ending June 30, 1991

ACCOUNT DESCRIPTION	ORIGINAL APPROPRIATION	ADJUSTED APPROPRIATION	EXPENDITURES OR REVENUES	APPROPRIATION BALANCE
EXPENDITURES				
Salaries and Wages	\$ 5,188,209	\$ 5,010,087	\$ 4,878,453	\$ 131,634
Central Data Processing	62,400	62,400	46,893	15,507
Operating Expenses	1,126,799	1,146,499	1,036,565	109,934
Equipment	217,530	380,830	328,097	52,733
Grants/Contracts	4,802,879	5,981,552	2,277,265	3,704,287
Contract Carryover 87-89	-	7,373,597	5,247,745	2,125,852
Southwest Pipeline	25,991,404	25,991,404	8,507,662	17,483,742
Pipeline Carryover 87-89	1,800,000	3,600,000	2,468,694	1,131,306
TOTAL	\$39,189,221	\$49,546,369	\$24,791,374	\$24,754,995
REVENUE SOURCE				
General Fund	\$ 4,095,715	\$ 3,824,489	\$ 3,674,282	\$ 150,207
Federal Funds	26,068,311	27,623,088	8,643,472	18,979,616
Special Funds	9,025,195	18,098,792	12,473,620	5,625,172
TOTAL	\$39,189,221	\$49,546,369	\$24,791,374	\$24,754,995

NOTE: Carryover from Special Funds appropriation balance: Water Commission Contracts \$ 269,132
Southwest Pipeline Contracts 2,500,000

State Water Commission

Object Expenditures for Biennial Period Ending June 30, 1991

Permanent Salaries	\$ 3,961,980
Temporary Salaries	66,700
Overtime Salaries	98,968
Fringe Benefits	1,088,830
Central Data Processing	46,893
Intergovernmental Services	18,241
Employee Travel	226,531
Payments to State Motor Pool	234,176
Dues and Professional Development	54,185
Utilities	16,787
Lease/Rental	15,476
Postage	26,818
Telephone/Telegraph	72,689
Repair Services - Non-Contract	18,508
Repair Services - Contracts	14,942
Professional Services (Includes Southwest Pipeline)	1,621,700
Operating Fees and Services	30,587
Insurances	4,816
Other Fees	5,618
Office Supplies	22,487
Data Processing Supplies	58,031
Printing	43,963
Resource and Reference Materials	20,211
Scientific Supplies	36,923
Building/Equipment Supplies	134,839
Equipment Maintenance/Other Supplies	7,117
Office Equipment/Furniture	248,234
Scientific Equipment	17,213
Machinery/Other	72,332
Land/Easements/Other	244,268
Contract Payments (Includes Southwest Pipeline)	10,566,846
Water Resources Grants	5,694,465
TOTAL	\$24,791,374

Resources Available from the Agency

Minutes of meetings held may be obtained by writing to:

ND State Water Commission
State Office Building
900 East Boulevard Avenue
Bismarck, ND 58505-0850

Data available for public use includes:

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| <ul style="list-style-type: none"> • Government Land Office Plats • Survey Horizontal and Vertical Control • Various Ground-Water Studies | <ul style="list-style-type: none"> • Water Permit Data • Drainage Permit Data • Stream Flow Data |
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