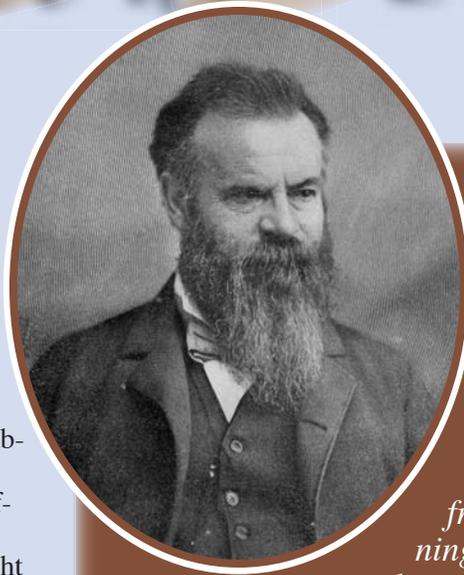


# The 100-Year Anniversary of the Office of State Engineer

## A Tour Through

By: Patrick Fridgen



### The Foundation of the Office

Before the North Dakota Office of State Engineer was officially established in 1905, a series of events set the stage for what still makes the Office much of what it is today. Those events shaped the way people thought about water, and developed a mindset that recognized the importance of water for North Dakotans then, and generations to come.

In the summer of 1889, the first North Dakota Constitutional Convention was in session, laying the foundation for what would officially become the State of North Dakota later that fall. On the minds of the delegates in attendance was the future of a fledgling state that would undoubtedly rely heavily on agriculture if it were to prosper. As such, it was also apparent that the long-term success of agriculture in a northern plains state could only be achieved with certain safeguards in place – particularly irrigation.

On August 5, 1889, Major John Wesley Powell, Director of the United States Geological Survey, delivered a speech before the Constitutional

### Major John Wesley Powell

“...All other wealth falls into insignificance compared with that which is to come from these lands from the pouring on them of the running streams of this country. Don't let these streams get out of the possession of the people. If you fail in making a constitution in any other respect, fail not in this one. Take lessons from California and Colorado. Fix it in your constitution that no corporation – no body of men – no capital can get possession and right to your waters. Hold the waters in the hands of the people. Think of a condition of affairs in which your agriculture – which you will have to depend on largely – depending on irrigation, is at the mercy of twenty companies who own all the water. They would laugh at the ownership of land. What is the ownership of land when the value is in the water? You should provide in this constitution that you are making that the water which falls from the heavens and rolls to the sea, down your great rivers – that water should be under the control of the people subject always to the will of the people; that property in water should be impossible for individuals to possess. You should forbid the right to acquire property in water. The property should be in the land, and the right to the water should inhere in the land, and no company or individual should have property in the running streams. Such a provision will prevent your great agricultural resources from falling into the hands of the few.”

August 5, 1889

# Time



Convention regarding, foremost, the importance of irrigation. In that speech, Powell not only set the stage for North Dakota's future irrigation development, but also for all water management and development that would evolve over the course of the state's history. In what have proven to be prophetic remarks, Powell reminded the convention delegates of the volatile nature of North Dakota's climate, and stressed the importance of water in any equation for future success. Most importantly, Powell urged the convention delegates to retain ownership of the state's water resources for the good of the people.

Heeding Major Powell's advice, members of the Constitutional Convention adopted a constitutional provision (Section 210) with regard to the state's water resources, which says, "All flowing streams and natural water courses shall forever remain the property of the state for mining, irrigation, and manufacturing purposes."

## *The First "Unofficial" State Engineer*

As North Dakota began to grow as a new state, so did the agricultural industry and the need for irrigation development. Following a recommendation from the Executive Committee

## *100 Years of State Engineers*

*1904-1905: E.F. Chandler*

*1905-1907: A.L. Fellows*

*1907-1913: T.R. Atkinson*

*1913-1918: Jay W. Bliss*

*1918-1923: W.H. Robinson*

*1924-1925: W.G. Black*

*1925-1927: H.C. Frahm*

*1927-1935: Robert E. Kennedy*

*1935-1939: E.J. Thomas*

*1939-1940: H.F. McColly*

*1941-1946: John T. Tucker*

*1946-1954: J.J. Walsh*

*1954-1973: Milo W. Hoisveen*

*1973-1989: Vernon Fahy*

*1989-2000: David A. Sprynczynatyk*

*2001-Present: Dale L. Frink*

of the State Irrigation Association, the then Governor, Frank K. White, appointed Professor E.F. Chandler as the first State Engineer July 7, 1904. However, at that time, no legislation had been passed concerning the Office or the associated duties.

As a professor of Geology at the State University in Grand Forks, and as the District Hydrographer for the United States Geological Survey; Chandler recognized that detailed stream measurements and discharge calculations were critical pieces of information that needed immediate attention if North Dakota was to proceed with productive plans for future water development. Chandler said in a report to the Governor, "without a long continued series of stream flow records, sufficient to show clearly what flow may ordinarily be expected, plans can be made only blindly."

However, through his efforts as District Hydrographer for the federal government, Chandler was already pursuing those types of duties. Thus, he turned most of his attention to seeking out potential locations for suitable irrigation areas – mostly along the Cannonball and Knife Rivers. And, he began the process of developing the state's first irrigation code, which officially established the Office of State Engineer a year later, in 1905.

In developing the state's first irrigation code, Chandler looked to Wyoming, Oregon and Washington law as templates; making changes that would serve North Dakota more appropriately, but keeping the overall ideals in line with those of other western states. In addition, Chandler was of the opinion that Major Powell's remarks to the Constitutional Convention should serve as the primary foundation for the state's irrigation code.

During Chandler's term as State Engineer, the idea of North Dakota becoming a Prior Appropriation state began to take root. In the first Biennial Report of the State Engineer to the Governor, Chandler wrote, "Some means must be provided by which the man who has by his enterprise and industry developed and applied to beneficial use the waters of any stream may have thereafter a fixed right so long as he continues that use. Otherwise his success might encourage later settlers to go higher up the same stream and appropriate its waters even to the utmost, when he would be deprived of all the benefits from the stream whose use he was the first to develop." By incorporating those ideals into the state's first irrigation code, North Dakota would later

embrace the concept of "first in time, first in right," or the law of Prior Appropriation, with the code's passage a year later.

## *The Office of State Engineer Is Created*

On March 1, 1905, the Irrigation Code of North Dakota was approved, officially creating the Office of State Engineer. On that same day, Governor Elmore Sarles appointed A.L. Fellows as the first official State Engineer.

Before Fellows could even begin the regular business of North Dakota's newest agency, he had to first address some house-keeping issues, literally speaking. In his report to Governor Sarles, Fellows wrote, "No rooms having as yet been provided, the first duty of the State Engineer upon assuming the office was to secure the necessary rooms and provide them with suitable furniture. The new part of the capitol

having been recently furnished and a number of the old rooms having thus been vacated, several were available, and those formerly occupied by the Commissioner of Agriculture were first selected, these being exchanged later for the old office of the Commissioner of State Lands."

With appropriate office space and furniture in place, Fellows then went about the business of hiring Miss Laura Conner, as the first State Engineer's Administrative Assistant (or Stenographer), and the first Assistant State Engineer, T.R. Atkinson. Additional employees, including engineering aids and other assistants for irrigation and drainage surveys were also hired throughout the first year of the Office.

Home-made pumping plant on the Knife River. (Circa 1905.)



1905: Office of State Engineer officially established.

1905: State Engineer became first official City Engineer for Bismarck.



1907: Legislature appointed State Engineer as Ex-officio State Coal Mine Inspector.

1909: State Engineer made custodian of U.S. Land Office plats.

1909: Lower Yellowstone Irrigation Project, North Dakota's first major irrigation development, began to operate.

1913: State Engineer appointed to serve as Chief Engineer and Secretary to newly-created Highway Commission.

1916: Office of State Engineer developed and published first state highway map.



1922: North Dakota portion of Lower Yellowstone project essentially completed.

1919: State Engineer became Ex-officio member of Flood Control Board.

1922: North Dakota Irrigation Association formed.

1 0 0      Y E A R S      T I M E L I N E

Regarding official business, State Engineer Fellows divided his staff time into thirds, with one-third spent on drainage, and the other two-thirds spent on irrigation. He also saw fit as a professional engineer, though not his duty, to report on the status of the state's road system, which in his opinion was in terrible shape and ill planned. He made the comment that a traveler may find their way through a series of back roads and never find their way out again.

Under the direction of the newly approved irrigation code, in Senate Bill 1, it was necessary to develop various forms that would be used by the Office – particularly forms regarding the acquisition of water rights. The process of developing a fee schedule for services and permits requested from the Office was also an important task from the onset. With all of these activities underway and with a staff on-hand, the Office of State Engineer was officially in business.

ditional duties were added to the Office, such as floodplain and sovereign land management, and some more non-traditional, like State Coal Mine Inspector, Bismarck City Engineer, and Chief Engineer and Secretary to the first Highway Commission. The following is an overview of those duties.

## Irrigation Development

From the time of the first Constitutional Convention in 1889, it was known that there would be a future for irrigation in North Dakota, and without irrigation, the future of agriculture would be far less promising. As such, the development of irrigation was one of the most important duties of the State Engineer when the Office began.

In the early years of irrigation development in western North Dakota, most survey work and project development actually occurred through the United States Reclamation Service, with the Office of State Engineer working in cooperation. In fact, before the Office of State Engineer even came to be, the Reclamation Service had already pursued several irrigation projects throughout the west and in North Dakota.

At the time of statehood in 1889, records indicate that there were only about 445 irrigated acres in the



Ervin Bourgois well, Burleigh County, ND. (Circa 1950s.)

## Official Duties

When the Office was established in 1905, the duties of the State Engineer primarily involved: promoting and contributing toward the development of irrigation; rural flood control, or drainage; and the appropriation of water and water rights. Over time, ad-

Pumping from a well on the A.L. Maxwell farm, Turtle Lake, ND. First well project developed by the State Water Commission. (1937.)



STATE HISTORICAL SOCIETY OF NORTH DAKOTA 0096-0159

### CONSERVE WATER

#### DAM IT!

PUT A SMALL DAM ACROSS THAT NEARBY STREAM OR COULEE AND SAVE THE WATER THAT OTHERWISE RUNS AWAY.

BY DOING SO YOU MAY BE ABLE TO PROVIDE:

1. WATER FOR SWIMMING, BOATING, FISHING AND SKATING.
2. WATER FOR FARM PURPOSES.
3. MORE GROUND WATER.
4. MORE WATER SURFACE FOR EVAPORATION.
5. WATER FOWL BREEDING AREAS.

A SMALL EARTH DAM OR ROCK-FILL DAM PROPERLY LOCATED AND CONSTRUCTED COSTS LITTLE MORE THAN THE LABOR AND WILL FREQUENTLY GIVE SATISFACTORY SERVICE FOR YEARS.

SEND PROBLEMS ABOUT YOUR DAM TO STATE ENGINEER DEPARTMENT BISMARCK, N. DAK.

1932: The widely popular "Conserve Water, Dam It!" program initiated by State Engineer to encourage water conservation and storage.

1937: State Water Conservation Commission created by Legislature.

1944: Flood Control Act authorized the Pick-Sloan plan, prompting construction of Missouri River mainstem dams.

1 0 0      Y E A R S      T I M E L I N E



Control gates on main canal of Lewis & Clark Irrigation District, near Williston. (Circa 1945.)



Harvesting potatoes in McKenzie County, Lewis & Clark Irrigation District. (1943.)

state. In years thereafter, acreage increased slowly at a rate of 50 to 100 acres per year up until about 1910 when the massive Lower Yellowstone Project began. By 1936, there were 16,014 irrigated acres in North Dakota, and all but 2,000 of those acres were part of the Lower Yellowstone project in McKenzie County.

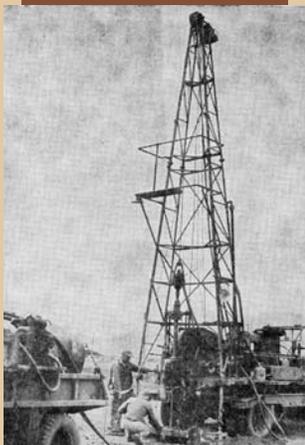
By 1937, when the North Dakota State Water Conservation Commission was organized, the number of

irrigated acres increased dramatically again to 26,500 acres by 1940, with the state's development of the Lewis and Clark and Sioux projects. In years thereafter, several other large-scale projects and irrigation districts came online throughout the state. And today, 100 years later, there are about 245,000 acres of irrigated land in North Dakota.

### *Appropriating the Waters of the State*

Since the passage of the North Dakota Irrigation Code in 1905, the State Engineer has been responsible for appropriating the waters of the state, and managing water rights in the best interest of the people of North Dakota.

Over the course of the State Engineer's 100 years of monitoring the state's water resources, a staggering amount of information has been collected. Today, the state's water resource database contains about 1.5 million water-level measurements, 31,000 site locations, 50,000



1945: North Dakota ground-water survey program initiated in cooperation with the U.S. Geological Survey.



1947: Construction began on Garrison Dam.

1950: Heart Butte, Homme, and Baldhill Dams completed.

1953: Garrison Dam dedicated by President Dwight D. Eisenhower.

1954: Jamestown Reservoir completed.



1955: Legislature created Garrison Diversion Conservancy District.

1958: First major Grand Forks levee and floodwall system completed.

1959: North Dakota Water Users Association formed.

1962: Fargo levee project completed.

water quality analyses, and 17,000 sites with lithologic descriptions. As a result of these efforts, North Dakota has become a leader in water resource monitoring, particularly regarding knowledge about the state's groundwater resources. In fact, North Dakota was the first state of the union to complete the County Ground Water Survey Program in 1985.

Regarding water rights, there are currently about 2,850 water permit holders in the state, some of which date back to the establishment of the Office and the passage of the irrigation code 100 years ago.

## The Regulation of Drainage

In the first years following the establishment of the Office of State Engineer, the primary focus of rural flood control or drainage survey work was limited to the eastern part of the state, specifically, areas along the Red River. At that time, it is interesting to note that the total cost to survey a 24-mile wide strip west of the Red River for all of Pembina County was \$2,700, with the State Engineer contributing \$400. As drainage development continued to improve

the productivity of agricultural land, particularly in the eastern part of the state, the Office of State Engineer was relied upon to review plans and provide technical assistance as needed to ensure that drains were being constructed properly. That was an important role of the State Engineer then and it continues to be to this day.

Regarding regulation, it wasn't until 1957 that the North Dakota Legislature enacted a requirement making landowners who wished to drain their property, acquire a permit from the appropriate entity. Since then, the state has changed drainage law a number of times, with the last changes occurring in 1995. Today, North Dakota law requires that "any person draining a pond, slough, lake, or sheetwater, or series thereof, which has a watershed comprising eighty acres or more, shall first secure a permit," which all require review by the Office of State Engineer. Permits with only local significance can be turned back to local water boards for action, but those with inter-jurisdictional significance require State Engineer approval.

In addition, the State Engineer has authority over the regulation of illegal drains and maintenance of any previously permitted drain.



Drainage excavator. (Circa 1905.)

1965: Garrison Diversion Unit authorized by Congress.

1967: Permit granted by State Engineer to divert 3.1 MAF of water annually to operate Garrison Diversion project.

1968: In *Baeth vs Hoisveen*, ND Supreme Court made a landmark decision upholding the constitutionality of requiring a permit from the State Engineer to appropriate water.

1968: Major revision of State Water Plan completed.



1970: Grand Forks-Trail is first rural water system constructed in the state.

1971: West River Diversion Study initiated.

1981: International Coalition created to address Red River Basin water management issues.

1981: Legislature created Resources Trust Fund, which has provided millions toward water development.

1981: Legislature authorized Southwest Pipeline.

1981: Atmospheric Resource Board became a division of the Water Commission.

1983: Major revision of State Water Plan completed.

1 0 0 Y E A R S T I M E L I N E

## Coal Mine Inspector

In 1907, the Legislature enacted a provision making the State Engineer the ex-officio State Coal Mine Inspector. As part of that responsibility, the State Engineer was to identify coal bearing state lands throughout the state, and report various coal-related statistics, such as: tons mined, number of workers, accidents, and fatalities. By 1918, State Engineer, Jay W. Bliss, reported to the Governor that “at the present time, the work for which the [Office] was originally created has become of secondary importance.” He then went on to indicate that his duties as mine inspector were taking up the majority of his time. Because of this growing responsibility, the Legislature responded by creating a separate State Coal Mine Inspector office in 1919, which relieved the State Engineer of most coal-related duties.

## Chief Engineer and Secretary, State Highway Commission

As mentioned previously, the first State Engineers couldn't help but to make anecdotal observations about the state's ill-planned road system. It wasn't until 1911, that the State Engineer's involvement with the state's roadways became more formal. It was at that time that the Legislature required the State Engineer to provide technical advice to county highway superintendents, including guidance for new road and bridge constructions as well as maintenance. This essentially marked the beginning of the Department of Transportation as we know it today.

By the end of the 1913 Legislative Session, the State Engineer's responsibilities toward the state's roadways greatly increased. A State Highway Commission was formed, consisting of the Governor, one other appointed member, and the State Engineer as Chief Engineer and Secretary. As part of the new duties assigned, the State Engineer was to prepare, what would amount to the state's first official roadmap, which was published in 1916. In addition, the State Engineer was to develop plans and specifications for bridges, roads and culverts, and to report on the condition of existing structures throughout the state.

While reporting on the inventory of the state's road system, the State Engineer warned that counties were planning and building roads and bridges as cheaply as possible. In his report to the Governor, State Engineer, Jay W. Bliss, remarked that “competent engineers are available and there is no necessity of building roads and bridges by guess.” He went on to say, “it is the exception rather than the rule to find a county that places this work in the hands of an engineer.” This situation obviously created a number of hazards, where bridge failures were almost commonplace throughout the state.

By 1922, even coal mine inspections had taken a back seat to the State Engineer's roadway-related



View of the powerhouse at the Wilton Coal Mine, Wilton, ND. (Circa 1916.)

1985: North Dakota became first state to complete County Ground Water Survey program.

1986: Garrison Diversion Reformation Act signed into law — created MR&I program.

1986: Construction began on Southwest Pipeline Project.



1989: Agreement signed between U.S. and Canada to complete Souris River Flood Control Project.



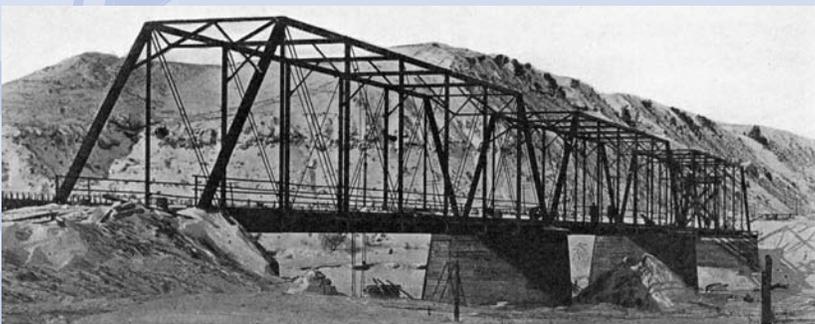
1991: Southwest Pipeline delivered water to Dickinson.



1992: Shyenne River Diversion completed.

1993: North Dakota Water Coalition and Water Education Foundations formed.

1 0 0 Y E A R S T I M E L I N E



Burleigh County road outfit working near Wing, 1915.

Top: Common highway maintenance equipment from the 1920s.  
 Middle: The caption on this photo from the 1916 State Engineer Biennial Report read, "A short span bridge in Ward County. A result of a saving of engineering expense. Waterway was insufficient and piling was not securely driven."  
 Bottom: Bridge over the Little Missouri River at Medora, designed by the State Engineer's Office. Total cost \$20,000. (Circa 1916.)



2003: Lake Agassiz Water Authority created by the Legislature.

2002: Construction began on Devils Lake outlet.



2002: Construction began on Northwest Area Water Supply Project.

2004: Missouri River Master Water Control Manual revision completed.

2004: Southwest Pipeline Project delivered water to Beach; the final city under the original contract.

2005: Devils Lake outlet completed.

1997: Red River Basin Board formed in response to devastating 1997 flood.

1999: Several legislative revisions made to floodplain management program.

1999: Major revision of State Water Management Plan completed.

1999: Senate Bill 2188 passed, authorizing use of tobacco settlement funds for water projects.

1999: Water Development Trust Fund created.



2000: Construction began on Grand Forks flood control project.

2000: Dakota Water Resources Act passed.

1 0 0 Y E A R S T I M E L I N E

duties, and once again water management was regarded as a secondary concern to be dealt with by the Assistant State Engineer. It was even reported that the State Engineer's budget had been so stressed by Highway Commission projects that there was only one engineer left to handle the irrigation development needs of the state. It wasn't until the late 1920s that the State Engineer was relieved of transportation-related duties and the attention of the Office gravitated back to water management.

### *Chief Engineer and Secretary, State Water Commission*

Before 1937, the responsibility of administering the water laws of the state rested solely with the State Engineer. In addition, it was also required by law that the Office provide technical assistance in almost all matters related to the water bodies of the state. But then, following the drought of the 1930s, it became apparent that there was a need for a state agency with broader powers and responsibility in water project development. More specifically, the state was reminded of the volatile nature of North Dakota's water resources during the dust bowl years, which prompted a heightened awareness for the need to conserve water and to develop more reliable supplies for all North Dakotans. As a result, the Legislature officially established the North Dakota State Water Conservation Commission (today the State Water Commission), March 23, 1937. This new agency was given the authority to investigate, plan, construct and develop much-needed water projects, and it provided a convenient mechanism to fund those efforts throughout North Dakota.

The State Engineer's role with this new agency was to serve as the Commission's Chief Engineer and Secretary. As such, the State Engineer, who was once appointed di-

rectly by the Governor, was now to be appointed by the Water Commission, with the Governor as Chairperson. Today that relationship between the State Engineer and the Water Commission still exists, much as it was originally planned. Together, the two agencies continue to form a partnership to protect the public's interest in water, while enhancing opportunities for social and economic growth.

building and water conservation throughout the state, the State Engineer initiated the "Conserve Water, Dam It!" program. Through that effort, multiple dam locations were identified, and in fact, it was so successful, that several other states and three provinces borrowed the idea. As state law required, the State Engineer's approval of the construction of those dams and for the impoundment



The State Engineer became an ex-officio member of the Atmospheric Resource Board when it was created in 1975. In 1981, the ARB became a division of the Water Commission.

### *Regulating Dams and Encouraging Water Conservation*

Almost all early dam constructions in North Dakota were initiated by the federal government. By the 1930s, a flurry of dam constructions resulted from President Roosevelt's New Deal programs, such as the Civilian Conservation Corps, Civil Works Administration, Works Progress Administration, and Federal Emergency Relief Administration.

At that same time, the State Game and Fish Department was created, which cooperated with the federal government on a number of dam building projects to provide wildlife habitat.

To encourage additional dam

of water was a requirement. That authority still resides with the Office today.

Over time, the number of dam constructions began to slow and maintenance of existing structures began to demand an increasing amount of time. A great deal of that maintenance then fell upon the newly-created Water Conservation Commission, of which the State Engineer served as Chief Engineer and Secretary.

As additional dams; including large-scale efforts such as Garrison, Heart Butte, Jamestown and others progressed, the Office of State Engineer continued to remain involved to a high degree, either through permitting, or through the Office's relationship with the Water Commission. A number of landmark occurrences in North Dakota dam constructions are presented in the timeline.



Rafferty Dam (pictured here under construction in 1989) was built in Saskatchewan through a cooperative agreement between the Souris Basin Development Authority, the State of North Dakota, and the City of Minot. North Dakota's interest in the project was to provide flood control on the Souris River for the City of Minot.

## *Floodplain Management*

To reduce damages from persistent flooding in floodplain areas, the State of North Dakota passed the Floodplain Management Act in 1981. This act essentially sought to encourage the wise development of floodplain areas, to reduce future flood damages. The idea was that the cost of operating that type of program in North Dakota would be minimal compared to the damages caused by flooding. Under the Act, the State Engineer was provided the authority to assist communities with floodplain management activities, as established by the National Flood Insurance Program.

Since the State Engineer began administering a floodplain management program, 292 North Dakota communities have been enrolled in the National Flood Insurance Program.



Floodwaters in northwest section of Grafton, April 1962.

Today, the State Engineer continues to operate as a liaison between the federal government and local communities – getting them involved in floodplain management through educational efforts.

## *Sovereign Lands Management*

In 1989, the responsibility of administering the state's non-mineral interests in navigable waters shifted from the State Land Board, to the State Engineer. At that time, it was

determined that the requirements for management were so minimal, that additional staff and funding were not required.

Today, that has all changed. Anyone planning to build or install anything in or around a navigable stream or water body, are likely required to obtain a sovereign land permit from the State Engineer. With the public's increasing demand for housing and recreational opportunities in and around North Dakota's waters, this responsibility has grown tremendously in recent years.

## *Developing North Dakota's Water Resources*

In the early years of the Office, the focus of water development lay almost entirely on irrigation and drainage. Over time, other efforts, such as dam constructions, water supply efforts, and major flood control projects moved into the limelight.

In the last century, the State Engineer has been involved, in one way or another, with the development of countless water projects. In some instances, the State Engineer coordinated with other agencies, providing technical assistance; often times, projects were required to seek construction or other permits from the Office; or in many cases, the State Engineer's involvement in water development stems from the Office's responsibilities as Chief Engineer and Secretary to the State Water Commission.

Today, as the demands of society on limited water resources continue to grow, and as the need for various water development efforts become increasingly important, the responsibilities of the State Engineer must continue to evolve to meet contemporary water management needs. For a century, the Office of State Engineer has done just that, and will continue to do so for generations to come.