# DIVISION OF WATER

**Sherman L. Frost**

## THE FORMATIVE YEARS, 1787-1949

In the Northwest Ordinance of 1787, water received special attention. Article IV stated:

> The navigable waters leading into the Mississippi and St. Lawrence, and the carrying places between the same, shall be common highways and forever free, as well as to the inhabitants of said territory as to the citizens of the United States, and those of other states that may be admitted into the confederacy, without any tax, impost, or duty therefor.

Two years later, Ohio's first dam (Fig. 9.1) was built on Wolf Creek near Marietta when Ohio was still part of the Northwest Territory. More than 2000 mill dams followed which were used primarily for power to grind grain and to saw lumber. Many of the dams came into conflict with the concept of free waterways in that they impeded navigation. In some instances, efforts were even made to collect tolls from the stream traffic, and laws were soon enacted to regulate these dams.

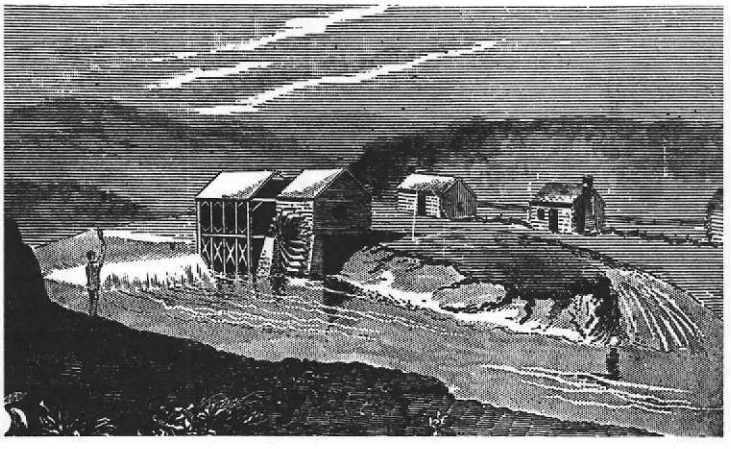


*Figure 9.1. The first mill dam in Ohio was built on Wolf Creek near Marietta in 1789. This print is from: Howe, Henry L., 1900,* Historical Collections of Ohio, Vol. II, *p. 800. Courtesy of Ohio Historical Society.*

In 1813, the Ohio General Assembly passed a law declaring the navigability of the Muskingum River and many of its tributaries. Obstruction of navigation with dams or by felling trees into these streams was declared unlawful. To avoid this problem, owners of dams constructed "slopes" so that boats and barges could be towed around the ends of the dams. Later laws specified the size and slope of these bypasses. Other early laws even required owners of dams to construct slopes so fish could have free passage—the forerunner of the modern fish ladder. The fine for noncompliance was $200 to go for use of the common schools in the county of the offense.

In 1822, the General Assembly created the Ohio Canal Commission to plan and build a system of canals in the state. In a sense, it was Ohio's first water agency. The Commission made the first streamflow measurement of record in the nation in 1823 on the Sandusky River. Construction of the Ohio and Erie Canal was started at Newark on 4 July 1825 and the Miami and Erie Canal at Middletown


*Figure 9.2. Montgomery County Courthouse, Dayton, March 1963, commemorating the 50th anniversary of the March 1913 flood. This flood triggered not only the collection of a large disaster relief fund but also the enactment of the Ohio Conservancy District Act in 1914 which led to creation of the Miami Conservancy District to bring flood control to the Miami valley. Photo courtesy of the Miami Conservancy District.*

on 21 July 1825; upon completion, the two canals provided a 1000-mile waterway transportation system. Part of the cost of building the Miami and Erie Canal was financed from the sale of almost one million acres of public domain land deeded to the State of Ohio by the federal government for canal purposes. The canals united divergent groups into a new Buckeye loyalty, gave growth to many communities and cities, and made possible the first major prospering of Ohio's agricultural heritage.

Out of the canal projects came Ohio's first reservoirs—Licking Reservoir in 1826, our first public reservoir; Grand Lake St. Marys, still Ohio's biggest inland lake and at one time the world's largest artificial lake; Indian Lake; Lake Loramie; Guilford Lake; and Summit Lake—totaling together almost 32,000 acres.

In 1894, the General Assembly dedicated Licking Reservoir forever as a public lake park and changed its name to Buckeye Lake in 1896 with authority for its control in the State Board of Public Works and Commissioners of Fish and Game. All of the canal lakes were dedicated as public parks in 1902. Authority over the lakes was transferred to the Agriculture Commissioner in 1913, back to Public Works in 1917, to the Division of Conservation in the Department of Agriculture in 1930, and finally to the new Ohio Department of Natural Resources in 1949. The operation and maintenance of the hydraulic works aspects and water supply sales remained with Public Works (now the Ohio Department of Administrative Services) until July 1989 when legislation transferred these responsibilities to the Division of Water and all canal lands and waters to ODNR.

Assistance from the United States Army Corps of Engineers started in 1824 when Congress passed the General Survey Act to authorize federal studies for water transportation improvements. From this work, improvements were started on the Ohio River and several Lake Erie harbors.

Floods were an early tragedy to Ohioans—and still are. The State authorized bonds for levees along rivers as early as 1867. The Corps of Engineers built the first concrete floodwall at Zanesville in 1884. State flood-relief laws were passed as early as 1884.

The 1913 flood, which caused great damage and loss of life, especially at Dayton, brought the first law for river basin flood control—the Ohio Conservancy District Act in 1914 (Fig. 9.2). It was drafted by Dayton leaders and authorized local areas to organize, plan, and construct flood protection improvements through local assessments. The Upper Scioto (27 February 1915) and the Miami (28 June 1915) Conservancy Districts were the first two created under the new law. The Miami Conservancy District became the first river basin flood control system in the nation financed with local assessments. It has prevented several hundred million dollars in flood damages in the ensuing years. The famous Muskingum Watershed Conservancy District (MWCD) was created in 1933. It provided multipurpose benefits of flood control, water supply, recreation, and land conservation. It too, has prevented millions of dollars in flood losses. Today there are 20 conservancy districts in Ohio, all much smaller than the Miami and Muskingum districts.

The Corps of Engineers made many studies of the 1913 flood and constructed the flood protection works for the MWCD starting in 1933 with special public works relief appropriations. By 1936, Congress passed the first Omnibus Flood Control Act which authorized full cooperation of the Corps of Engineers to the states and local communities for flood protection. This became the springboard for a far-reaching federal flood control program, which has given Ohio many new lakes for State Parks, water recreation, and water supply, in addition to flood control.

Studies of other phases of Ohio's water resources

*Figure 9.3. **David C. Warner**, Executive Secretary of the State Water Conservation Board of Ohio created in 1931. He has been called the "Father of Water Conservation in Ohio."*

emerged in the late 1800's through the cooperative effort of the Ohio Board of Health, The Ohio State University (OSU), and the United States Geological Survey (USGS). These were carried out in a number of river basins.

The first cooperative stream gauge was installed at Columbus in 1898 by OSU and USGS. By 1900, Ohioans knew little yet about their water resources, and concern of shortages had also begun to be felt. In 1915, C.E. Sherman, Professor of Engineering at OSU, published a 115-page report on the need for the State to study professionally its water resources. The General Assembly did appropriate funds to OSU to expand the cooperative stream-gauging effort and also to make studies of ground water.

In 1931, the General Assembly, by joint resolution, authorized the Governor to create a nine-member State Water Conservation Board of Ohio to survey and report on Ohio's water resources. David H. DeArmond of Hamilton was named Chair, and David C. Warner of Columbus was the Executive Secretary. This agency didn't last long, but it issued two annual reports and left the legacy of Dave Warner (Fig. 9.3), whose great energy and belief in water conservation earned him the title, "Father of Water Conservation in Ohio." The Division of Water's roots can be traced directly to David C. Warner.

By 1939, concern about continued water shortages expressed by business and industrial interests, led the General Assembly to authorize creation of the Ohio Water Supply Board. Governor John W. Bricker appointed Wilbur Stout, State Geologist, as Chair with other State department and OSU officials as members, and a five-member technical advisory committee. David H. Harker was hired as engineer and Ralph J. Bernhagen as geologist. The Board was not well financed, but it expanded the observation-well program with OSU and USGS, made several special studies assisted by private grants, held several hearings, and issued several reports. The first observation well with a recorder was installed in the City of Wyoming in Hamilton County on 30 June 1938 and is still in operation.

In 1945, the Water Supply Board was transferred to the Ohio Department of Public Works, and its name changed to the Ohio Water Resources Board. Governor Frank J. Lausche reappointed Wilbur Stout as Chair. In August 1945, C.V. Youngquist, a professional engineer with USGS, was hired as Chief Engineer when David Harker resigned. Youngquist became the "architect" of Ohio's new water program and continued to serve the state for a quarter of a century.

The powers of the Ohio Water Resources Board were expanded in 1945, including State contracting authority to plan water supply storage in federal reservoirs with the Corps of Engineers, study flood control, and collect well logs. The latter was authorized by a separate act of the General Assembly which made it mandatory for water well drillers to file a log of each well with the Board. From this information, the Board's knowledge of ground water in the state became substantially enhanced.

Hearings on wells were held and regulations were adopted for their construction, maintenance, and abandonment. In 1945, county reports on ground-water supply started coming from the Board. Test-well drilling equipment was being leased. Chair Stout expressed concern about problems of recharging ground-water supplies. The problem of saltwater contamination in abandoned oil wells was of such significance that the Board felt the problem might need to be controlled with new laws. Industrial water supplies were getting increased studies; and to help push its water investigations in northern Ohio, the Board opened a branch office with the Mahoning Valley Sanitary District at Youngstown. The comprehensive survey in the Mahoning River basin was augmented with contributions from industry and public bodies. The Ohio Cooperative Extension Service at OSU was cooperating in a statewide volunteer well water level (or water table) survey. The Board recommended that laws for the drilling and abandonment of oil and gas wells be extended statewide and worked with personnel of the Division of Mines on the language of a new law.

The work of the Board continued to expand into more and more fields. By 1947, Youngquist reported on 25 different programs in which the Board was involved, including industrial water supplies, area water studies, floods, streamflow, well-gauging, test drilling, artificial

*Figure 9.4. State water agencies have made many pumping tests searching for ground water. This well was tested in cooperation with the City of Greenfield in Highland County on 21 June 1949. Division of Water file photo.*

*Figure 9.5. C.V. Youngquist, first Chief of the Division of Water, 1949-1970.*

recharge, and reservoir sedimentation. Cooperative funds from USGS amounted to $79,000 for the year. Cooperation with the Corps of Engineers had resulted in modified plans for reservoirs being planned near Delaware and Glouster (Burr Oak) to provide more sustained streamflow and water supplies.

The year 1948 saw more regional investigations, more pumping tests (Fig. 9.4), and a request from the Division of Conservation which sought advice on the problem of sedimentation in State lakes. A pumpage investigator was hired to collect water-use data from industries.

By 1949, Ohio had had three water agencies in the space of 18 years. Part of this agency turnover happened because concerns for water resources were scattered; staff involvement from a single agency was new; there were different crises to confront; funds were limited; there were few water professionals; and the interwoven relationship of water with other natural resources had not fully surfaced. It is appropriate to note that the Ohio Water Resources Board and its predecessors (as separate agencies) had made several significant contributions to water knowledge in Ohio, publishing over 33 reports.

The water "drama" since 1787 was an unfolding pattern of continual legislative response to changing needs and problems in a growing state. Crisis triggered change. Concerned citizens were strong motivating forces. USGS, the Corps of Engineers, the conservancy districts, and OSU were major factors. OSU provided more than quality professional support; it also graduated engineers and geologists whose careers were to mean much to Ohio and the nation in the passing years.

There had been no rush to build great water agencies; budgets were meager at the start; staffs were small, but they were professionally competent in every way. Ohio water administration was feeling its way. The hours were long because there were many who sought help and few to give it, but the challenge was strong because it was all "new territory." We can be thankful for those who set their sights high. They molded the foundation of state water resources management that was to play an exciting role in Ohio's future.

## THE CREATION OF A NEW WATER AGENCY, 1949-1957

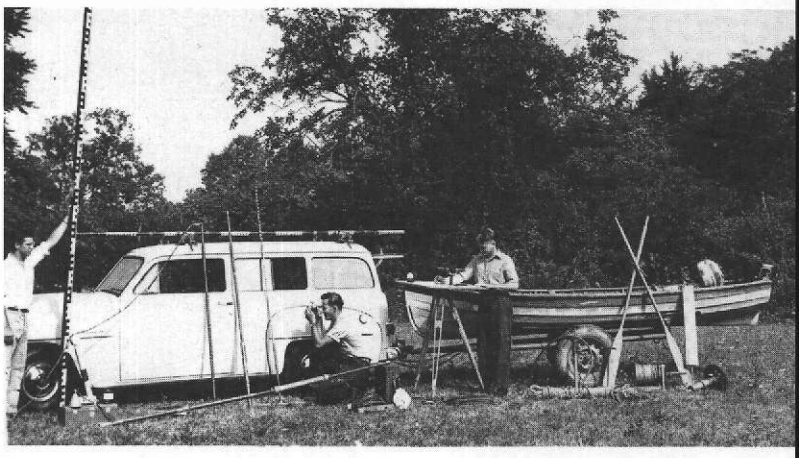
Between 1941 and 1949, the State had been able to build a nucleus of professional and regulatory expertise in water. It already had staff, policy, advisors, cooperators, and budgets. Upon the passage of Amended Senate Bill 13 in 1949, all of these assets were transferred to a new agency, the Division of Water, and a new home in the Ohio Department of Natural Resources, where the opportunity to relate to other resources and an overall resource-based philosophy was greatly enhanced.

C.V. Youngquist, the professional water engineer of the Water Resources Board, was named Chief (Fig. 9.5). The Division of Water included the Ohio Water Resources Board, with ODNR Director Marion as Chair, and the Board's Advisory Committee, with Kenneth M. Lloyd of Youngstown as Chair. Both the Water Resources Board and Advisory Committee became important overviewers of water policy and advisors to the Division of Water.

The Division was empowered to collect data on water resources, perform stream gauging, furnish information to the public, assist and advise public entities and agencies, and accept gifts. The Division could collect well logs, and prescribe rules and regulations for drilling and abandoning wells. It required plans for dams, but could review them only with respect to the overall use of water resources. The

*Figure 9.6. Clouse Lake in Perry County was created in 1947 by construction of a bridge dam on Ohio Route 668, three miles south of Somerset. Photo by Art Woldorf, September 1959.*

*Figure 9.7. Sediment studies of several lakes were conducted by the Division of Water in the early 1950's. **Charles L. Hahn** (right) with field crew demonstrates some of the equipment, in 1951. Division of Water file photo.*



Division had only reviewing authority for dams, not enforcement.

Some new duties transferred to the Division of Water from the Department of Public Works gave the Chief authority to construct dams, levees, and other water-related works, and to issue bonds to finance such improvements. This authority did not include the canal system which remained under the control of Public Works until 1989. The Chief was expressly restricted from studying water transportation or hydroelectric power.

Another duty shifted from the Department of Public Works was the authority to request state, county, township, or municipal road builders to construct dams at bridges for water conservation purposes. The first bridge dam built under this law was Lake White in Pike County in 1935. Kiser Lake, Champaign County, in 1939; Clouse Lake, Perry County, in 1947 (Fig. 9.6); and Winchester Lake, Adams County in 1951 were the only other bridge dams constructed under this law.

Another responsibility transferred to the Chief from the Department of Agriculture's Division of Conservation (now Division of Wildlife in ODNR) was authority to recommend that the landowner building a dam be granted a reduction in assessed property valuation of $40 per acre-foot of storage for creating a water impoundment. The Chief was required to review and approve the plans, and certify completion of the dam and its storage capacity to the local County Auditor.

The Division of Water received a new assignment in 1949 to make a study of pollution along Ohio's Lake Erie waters. The study was a first and years ahead of concerted effort to clean up Lake Erie. It showed that large quantities of silt, sewage, and other wastes were polluting the lake along the Ohio shore and tributary streams. The 98th General Assembly also gave the Division of Water funds to help set up a program of industrial waste treatment research at OSU at what is now the Water Resources Center. Another pollution control effort came in 1951 when the Division of Water assisted drafting language for a bill to help prevent pollution of ground water from oil and gas wells.

In that same period, the Division made its first regional ground-water reconnaissance survey in cooperation with the Maumee Watershed Conservancy District. By 1951, water levels in wells were being measured in 63 counties, and a program of pumping wells to determine safe yields of water was started. Surveys of glacial deposits for water-bearing information were made by a number of cooperating geologists.

The State-owned, 160-acre lake dam on a tributary of Wolf Creek in Morgan County failed, and the Division became involved in determining damages to help settle a number of lawsuits. Early pre-Division research on lake sedimentation was extended in 1951 to 66 lakes, related to soil region and land use areas (Fig. 9.7). The Soil Conservation Service (SCS) of the United States Department of Agriculture duplicated the special equipment technology developed by the Division of Water for use in several other states.

Gauges were installed to measure Lake Erie water fluctuations as an aid in determining shore erosion protection needs (Fig. 9.8). Weather data were placed on micro-

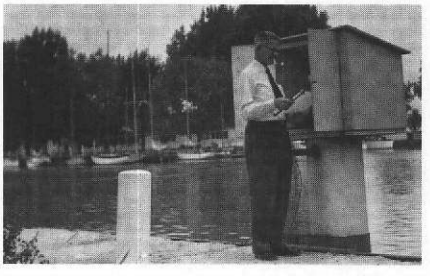


*Figure 9.8. Fluctuations in the water levels of Lake Erie are recorded on gauges such as this one being examined by **Paul Kaser** on Catawba Island, Ottawa County. Photo by Art Woldorf, September 1959.*

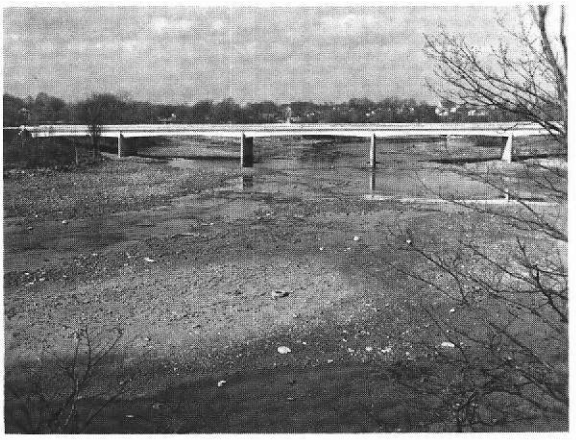


*Figure 9.9. O'Shaughnessy Reservoir and the United States Route 42 bridge on the Scioto River at Bellepoint in Delaware County during the drought of 1952. Photo by Ray White, 11 November 1952.*

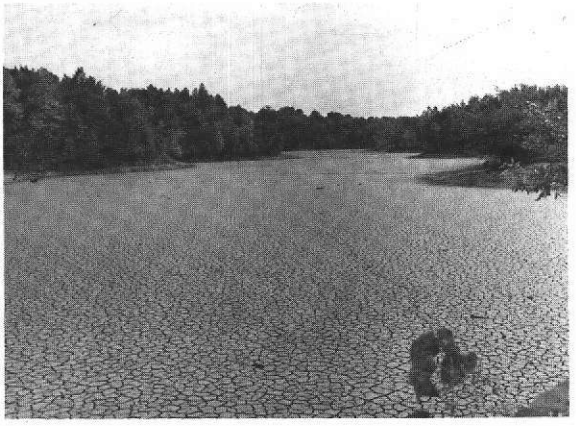


*Figure 9.10. The drought in 1952 dried up a portion of the Auglaize River and Eagle Creek in Defiance County. Photo by Ray White, circa October 1952.*

film in 1951. A monthly index of water levels and hydrologic conditions affecting water supplies for the state was first published in 1954. This report is still published as the "Monthly Water Inventory Report for Ohio." A popular stream map and gazetteer of Ohio streams were introduced and have been updated and reprinted several times.

Severe droughts prevailed in Ohio in 1952, 1953, and 1954 (Figs. 9.9 and 9.10). A Governor's Committee on Water was established and coordinated by the Division of Water to recommend action. The Ohio Forestry Association mounted a strong citizen action campaign and published its report, "Valleys of Opportunity," to show needs for water conservation in major watersheds. The Division of Water published two pilot reports for the Black River and White Oak Creek watersheds. These examples served as a basis for new law in 1955 which gave the Division responsibility for preparing inventories of water resources in all watersheds, a task which was to take more than a decade. The Division's continuing cooperative water-gauging programs with USGS became valuable sources of data for the new inventory program. Streamflow was being gauged at 192 stations in the state, and ground water was being recorded at about 140 observation wells. To aid in this new water inventory effort, the General Assembly increased the Division's appropriations by 35 percent.

Through all its first eight years, the Division of Water had been called on to face new crises while continuing to serve many individual requests for assistance and help from other agencies and other Divisions in ODNR.

## 1957-1963

In 1957, the General Assembly gave the Division of Water its first specific authority to plan a reservoir on Salt Fork in Guernsey County, to make nine other lake studies, and to design a system to supply water from Burr Oak Reservoir near Glouster in Athens County. The plans for Salt Fork were completed in 1958, land acquisition started in 1959, and construction started in 1961. The lake would cover 2900 acres and be Ohio's largest inland lake constructed since the canal reservoirs.

The federal lock and dam system on the Muskingum River was turned back to the State of Ohio in 1958 to be repaired and administered by the Division of Water for recreational boating (Fig. 9.11). The first of the Division's drought-motivated, long-range water inventory plans was issued for the Cuyahoga-Chagrin River

*Figure 9.11. Muskingum River Lock and Dam No. 1 at Marietta (now removed) United States Army Corps of Engineers returned the Muskingum River locks and dams to the State of Ohio in 1958. The Division of Water was soon given responsibility for maintenance and repairs of this system which had been initiated by the State of Ohio in 1837. Photo by Sherman L. Frost, September 1959.*

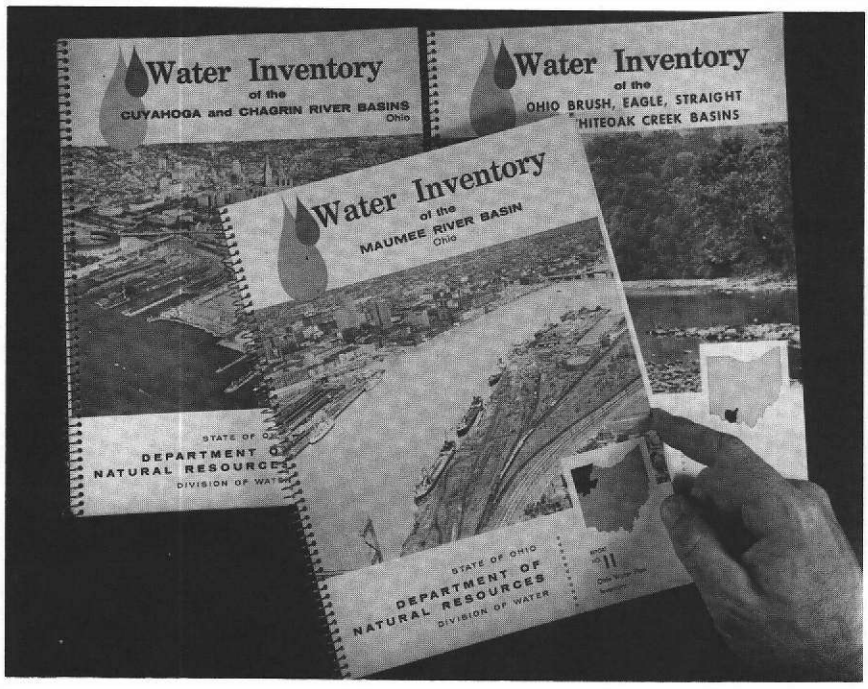



*Figure 9.12. The first three water inventory plans produced by the Division of Water were published in the late 1950's.*

*Figure 9.13. Fremont was flooded by waters of the Sandusky River in January 1959. Division of Water file photo.*

*Figure 9.14. The January 1959 flood on the Scioto River in northwestern Columbus near Trabue Road. Photo by Art Woldorf, 22 January 1959.*

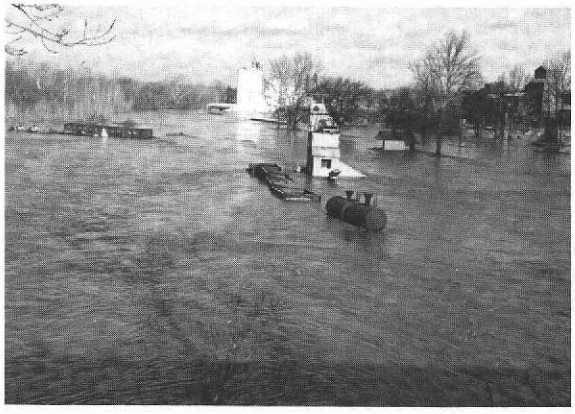


*Figure 9.15. This drilling rig was used by the Division of Water in its search for ground water in the early 1960's. **Henry Prée** (left) and **Red Bailey** operated the rig at Wilberforce in Greene County, 27 June 1961. Division of Water file photo.*

basins also in 1958 (Fig. 9.12). It was followed by reports for the Maumee, Ohio Brush-White Oak, Mahoning-Grand, and Scioto River basins. Then came the January 1959 floods causing $100-million damages (Figs. 9.13 and 9.14), and the Division of Water was thrust into the problems of too much water. The Division issued a number of reports and cooperated with USGS in a flood causation study which was the first major report of a major flood done as a cooperative effort. The Ohio Water Commission was created in 1960 and worked closely with the Division (see page 136).

During this period, the Division started a statewide system of rain gauges to help measure storms on smaller watersheds. There were more floods in 1961 in 38 Ohio counties. In 1961, the Division of Water received new authority to study floods and their control, and also to assist counties in mapping watershed districts for local control. The latter law was little used. In the case of floodplains, the answer was different. A Floodplain Unit was started in the Division. The great damages in floodplains led to authorization for the federal agencies to map floodplains and issue warnings against continued building along river bottoms. Division employees consulted with many communities and obtained flood profiles on almost 300 miles of streams. The Corps of Engineers studied 350 miles of floodplains in 1961 involving 60 communities. Flood inundation maps were made by USGS.

Also in 1961, a long-range plan for use of the Muskingum River locks and dams was issued; and the Division of Water placed an engineer in Defiance in a field office to cooperate with the Maumee Watershed Conservancy District. By 1962 and 1963, maps of ground-water availability in 108 watersheds had been completed (Fig. 9.15). When assembled, they made an impressive map twelve feet square. Also coming from the water inventory effort was the completion of locating some potential 6000 reservoir sites in the state, an inventory of existing lakes,

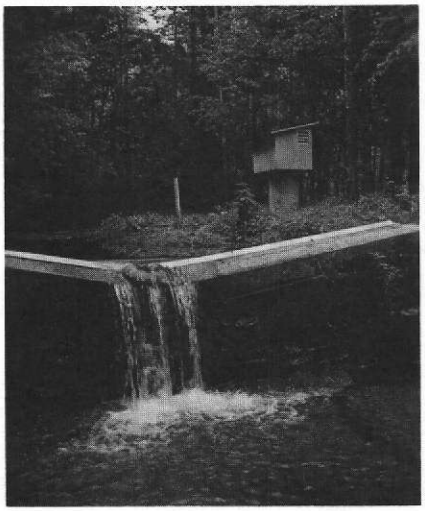


Figure 9.16. Streamflow on a small watershed is measured by a gauge and weir in Tar Hollow State Park in Ross County. Photo by Art Woldorf, 26 June 1961.

and special reports on water uses. The cooperative water-measuring program with USGS was being carried out at 194 stream sites (Fig. 9.16), 132 wells (Fig. 9.17), 13 inland lakes (Fig. 9.18), and 9 Lake Erie gauges.

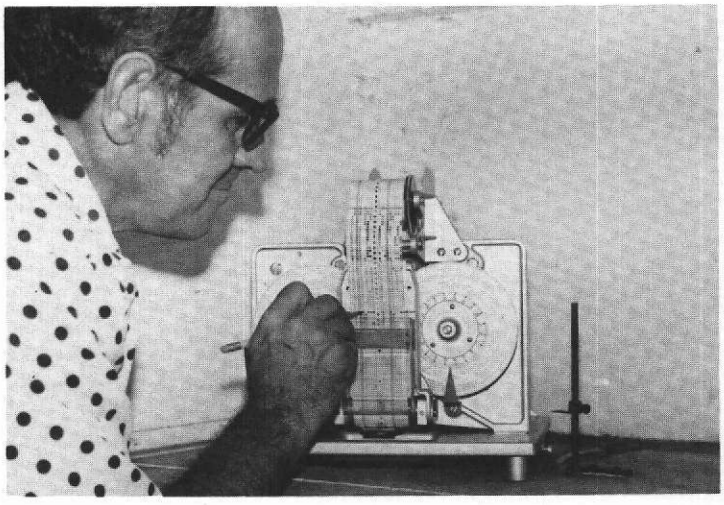


Figure 9.17. Hydrologist **Leonard J. Harstine** servicing a digital water level gauge at an observation well. Photo by John A. Dobos, September 1976.

## 1963-1971

A statewide bond issue in 1963 provided $25 million for water planning and for parks. It brought a new urgency to completing plans. That same year saw enactment of House Bill 415 to authorize Ohio's participation in the Great Lakes Basin Compact, a water policy forum coordinated by the Great Lakes Commission.

The weather also kept the Division of Water busy in 1963 answering requests for help when 48 days without rain and a 14-inch rainfall deficiency saw 20 Ohio counties designated as drought disaster areas—a record drought in many parts of the state. That same year and in 1964, the Hocking River valley had near record damaging floods. Then in 1964, a $30-million flood hit the Ohio River basin, and President Lyndon B. Johnson authorized federal funds for flood relief victims. "A region of glorious enterprise with golden hope," as had been portrayed much earlier by Washington Irving, was being sorely tested. In 1966, the Division of Water became the official receiver for SCS of applications for flood protection in small watersheds.

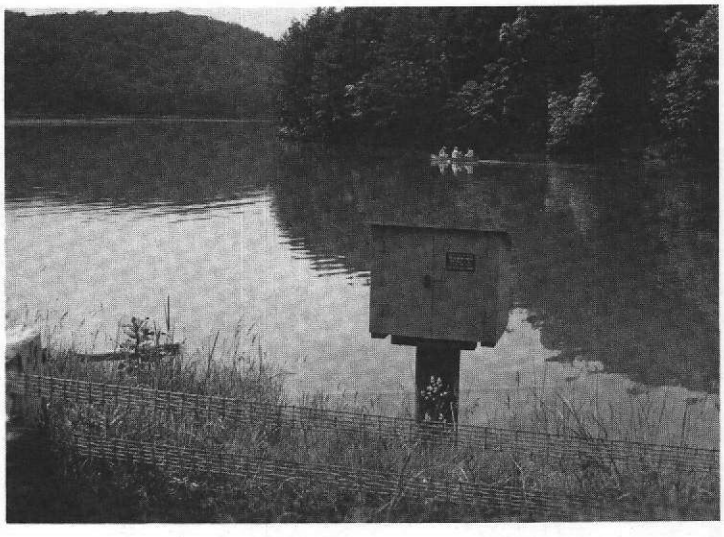


Figure 9.18. Lake level gauge at Lake Hope in Vinton County. Photo by Art Woldorf, 26 June 1961.

Figure 9.19. Failures of dams such as this one in Greene County in 1963 stimulated the General Assembly to pass legislation requiring a permit and inspection during construction of new dams over ten feet high. Photo by Art Woldorf.

The floods also helped stimulate new legislation. The General Assembly strengthened the law to require permits for building dams over ten feet high (Fig. 9.19). Inspection during construction of new dams over ten feet high was authorized by Senate Bill 330 in 1967. In that same year,

*Figure 9.20. Hydrogeologists **Jim Schmidt** (left) and **Al Walker** inspect drilling results by use of a geologic peg-model of a test well, 9 July 1970. Division of Water file photo.*

new legislation required Ohio agencies to consult with the Division before construction of public facilities in floodplains; and authorization was given to place markers on public buildings to show the heights of historic floods.

*The Northwest Ohio Water Development Plan,* prepared by the Ohio Water Commission in 1967, recommended a drilling and testing program to evaluate the quantity and quality of ground water in northwestern Ohio. A total of 76 wells were drilled into the limestone and dolomite bedrock, and the water was tested and analyzed forming the basis for a 2.5-year study. In 1968, another statewide bond issue passed from which $20 million had been allocated to the Division of Water to help implement other regional water plan projects. The Southwest Ohio Water Plan was started and the Legislative Service Commission completed a study on water rights. House Bill 314 added new duties to the Division on floodplains and research. Water planning and water development sections were organized, and a Deputy Director for water was appointed.

In May 1968, another flood caused large damages in 27 southern Ohio counties. In July 1969, a $60-million flood in north-central Ohio caused 41 deaths and damaged 292 bridges. The General Assembly in 1969 passed Amended Senate Bill 224 to authorize the Division of Water periodically to inspect existing dams, dikes, and levees.

By 1970, a program of drilling test wells similar to the 1967 effort in northwestern Ohio had been initiated to evaluate ground water in the rest of the state (Fig. 9.20). An experimental telemetry center was installed by USGS and the Division of Water at Division headquarters in Columbus to bring instantaneous readings on water flow rates and quality from a number of recording stations on several of Ohio's rivers (Fig. 9.21). The Division also started cooperating with the Corps of Engineers and local governments on finding suitable containment sites for dredging material from Ohio's Lake Erie harbors. Concern with water quality also led the Division to monitor water wells near several solid and liquid waste disposal sites.

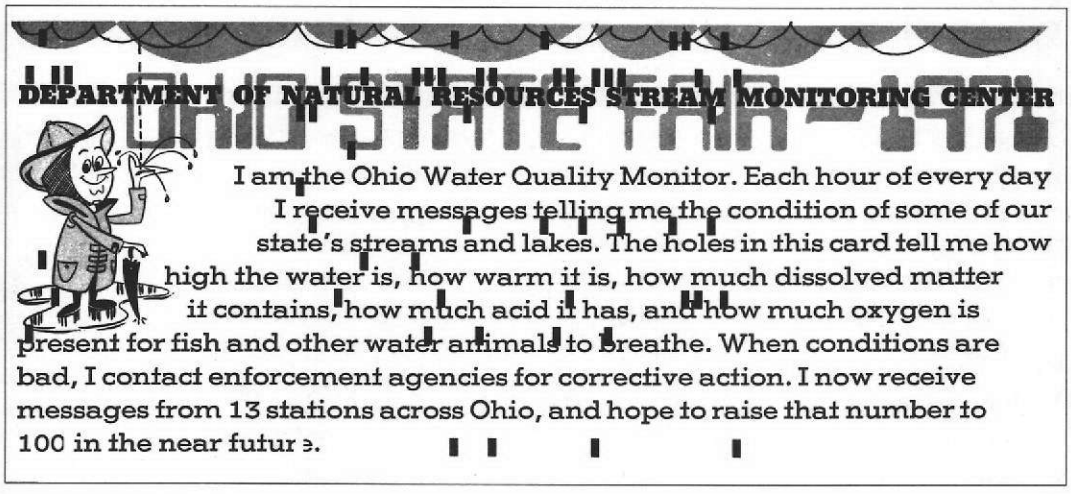



*Figure 9.21. This data-collection technique was developed by the Division of Water and the United States Geological Survey in the late 1960's as a research project on development of an electronic stream monitoring system. Data were transmitted from monitoring stations in northwestern Ohio to a display station in Columbus to alert scientists concerning stream water quantity and quality. Division of Water file photo.*

In 1970, the Ohio section of the American Water Resources Association sponsored its first water conference in Columbus with ODNR presenting information about water planning and associated water management fields. About 150 registered in attendance. Also in 1970, C.V. Youngquist retired after 21 years as Chief, and Roy Winkle was named Acting Chief. In January 1971, President Richard M. Nixon, upon petition of the Governors, created the Ohio River Basin

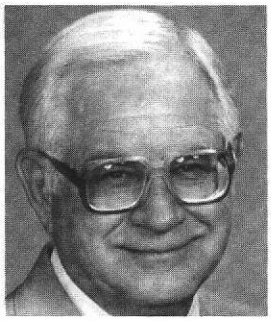


*Figure 9.22. **Roy Winkle**, second Chief of the Division of Water, 1972-1975.*

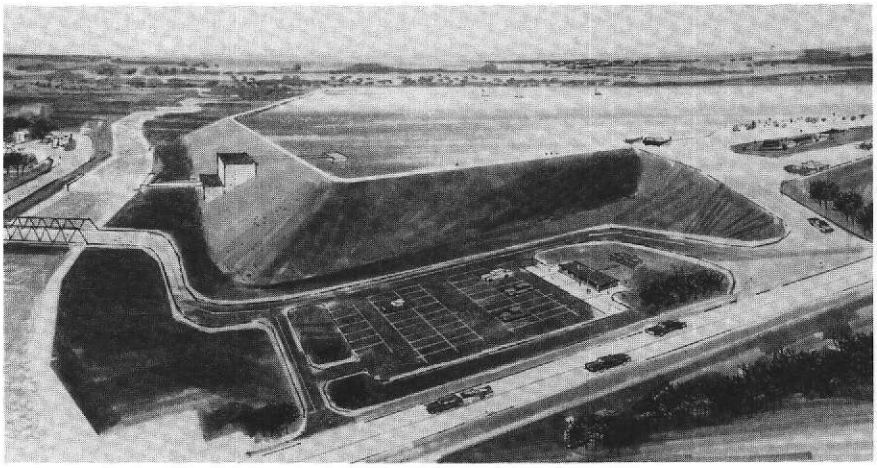


*Figure 9.23. An artistic sketch of one of the upground reservoirs which were proposed by the Ohio Water Commission in the late 1960's in a plan for water management in northwestern Ohio (see also Fig. 9.31).*

Commission at Cincinnati; and former ODNR Director Morr served as Chair from 1971-1978.

## 1971-1975

Environmental reorganization had become a national issue by 1971. In Ohio, Colonel John H. Glenn, Jr. headed a committee appointed by Governor John J. Gilligan to consider needs for a separate agency in Ohio. A Stanford Research Institute study funded by the United States Environmental Protection Agency (USEPA) also looked at Ohio's environmental structure. Both groups concluded that a separate agency could best serve the state, although there was some feeling to combine the environmental programs with ODNR.

In 1972, the General Assembly created the Ohio Environmental Protection Agency (OEPA). The Act called for abolishment of the Ohio Water Pollution Control Board and the Ohio Water Commission. It named OEPA as the principal water quality agency and transferred all of the Division of Water's long-range regional water planning programs and the 27-year-old program of collecting well logs to the new agency.

In 1972, the remnants of Hurricane Agnes brought heavy rains to northeastern Ohio and high waves and flooding along the Lake Erie shoreline. A 1971 report had called for a State program of floodplain management. The Division of Water formulated guidelines for use in local floodplain management and handled more than 660 requests for local assistance in one year. The federal government offered floodplain insurance in communities that had zoned their floodplains; and by 1972, more than 40 Ohio communities had adopted floodplain regulations.

The year 1972 saw the collapse of a mine waste dam on Buffalo Creek in West Virginia, causing loss of life and heavy damage and leading to establishment of the National Dam Safety Inspection Program under jurisdiction of the Corps of Engineers. A total of 52 mine waste dams were inspected in Ohio as a result that same year. It had been just a few days before the Buffalo Creek disaster that Ohio had held hearings on regulations pertaining to dam construction in the state. In 1973, the Corps of Engineers contracted with the Division to inventory some 4500 nonfederal dams in Ohio as part of the dam safety program.

Roy Winkle was named the second Chief of the Division of Water in 1972 (Fig. 9.22). In 1971, ODNR reorganization had created a new administrative unit for planning and research headed by a Deputy Director, that included the Division of Water. In late 1972, at the time of transfer of Division of Water's planning functions to OEPA, part of the ground-water staff also went to the new agency, but ground-water inventory and mapping went to ODNR's Division of Geological Survey.

In 1973, surveys had been started along the Lake Erie shoreline as part of a coastal zone management program to fit with a new federal coastal zone law. Also, using new computer technology and the vast amount of natural resource data in various ODNR Divisions, county land-use capability mapping had started as a new program. The Division extended help to the Corps of Engineers in a wastewater management demonstration study for Lake Erie, a wastewater study for the Cleveland-Akron area, and a study to restore the quality of the Cuyahoga River.

The environmental push also had the Division involved in the State withdrawing support on Corps of Engineers reservoirs under construction—about a $200-million program. The ban didn't last, but new on-stream reservoirs faced stiffer opposition as scenic river preservation and floodplain zoning increased in popularity.

Not all water development effort was stopped, however. Water management was actually expanded in the Division to provide assistance to local governments in a program of constructing upground (offstream) reservoirs (Fig. 9.23) as part of the Northwest Ohio Water Plan. It also

assisted in the coordination of a program of flood protection in the lower Mill Creek valley in Hamilton County with the Millcreek Valley Conservancy District and Corps of Engineers, in a water supply contract on federal Alum Creek Reservoir near Columbus, and in guiding the Burr Oak water supply program near Athens (see page 251).

## 1975-1983

In 1975, Wayne S. Nichols became the third Chief of the Division of Water (Fig. 9.24). The ODNR Division of Planning was discontinued and several of its functions transferred back to their original home in the Division of Water. At the same time, the ground-water staff which had been transferred to Geological Survey in 1973 returned to the Division of Water. It also became the center for the Ohio Capability Analysis Program (OCAP), the Shoreland Management Unit, a Technical Services Unit to prepare maps and advise local governments, a Computer Services Unit (the data processing arm of this whole effort), and a Remote Sensing Unit to collect aerial photographs and satellite information. The combination of new units became the Resource Analysis Section in 1976. This whole program, with the exception of Shoreland Management, was transferred to the Division of Soil and Water Conservation in 1982.

Shoreland Management became a Section in the Division of Water in 1976. It then had seven local committees and a State agency committee to help coordinate the entire Lake Erie shoreline program. It conducted special land-use studies and many other resource studies, held meetings, circulated a newsletter, and kept Ohio's coastal area concerns continuously before the public. Ohio received several federal grants to help complete a coastal plan, start new studies, and draft proposed legislation which was considered by the 113th General Assembly.

In 1976, by agreement of the Directors of OEPA and ODNR, the regional water planning program, which had been transferred to OEPA upon its creation in 1972, came back to the Division of Water. The Southwest Ohio Water Plan was completed and issued that year, and plans for central and southeastern Ohio restarted. By 1980, regional water plans had been completed for all five regions of the state, and an updating of the 1967 plan for Northwest Ohio was started. In 1977, the General Assembly transferred the collection of well logs from OEPA back to the Division of Water. Collection of well logs from water well drillers was actively enforced, and a project was started to microfilm some 374,000 existing well logs in the Division. In 1978, the Division published a manual of guidelines for land use management in critical ground-water areas. In 1977, mapping ground water by county began, a new series to update the earlier basin maps.

In 1979, John H. Cousins became the fourth Chief of the Division of Water (Fig. 9.25) when Wayne Nichols was appointed a Deputy Director for ODNR. By 1981, eight upground reservoirs had been completed as part of the Northwest Ohio Water Plan program. Local officials estimated that the assurance of sustained water supply had been responsible for new economic growth adding 12,000 new jobs, over 25 billion gallons of water, and new recreational opportunities.

A federal clean lakes program came into being in 1981 to provide funds to the states to improve water quality in lakes in cooperation with local entities. The program consisted of dredging, pollution, erosion and sediment

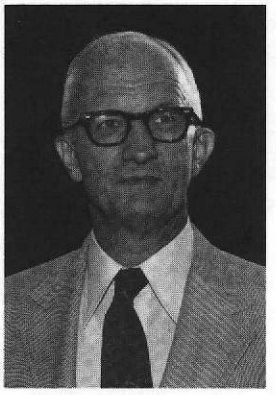


*Figure 9.24. **Wayne S. Nichols**, third Chief of the Division of Water, 1975-1979.*

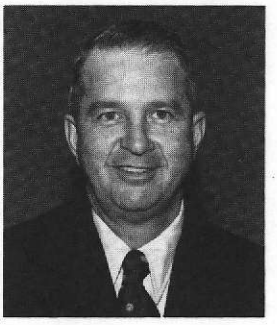


*Figure 9.25. **John H. Cousins**, fourth Chief of the Division of Water, 1979-1983.*

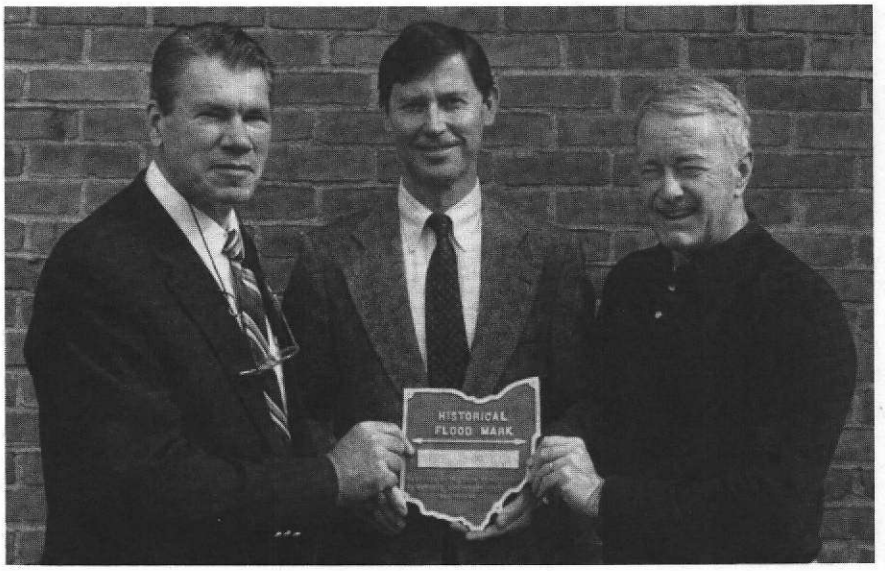



*Figure 9.26. The Division of Water has provided flood height markers to be placed on public buildings throughout the state. Shown in 1989 holding such a plaque prior to its placement are from left to right: **Arthur F. Woldorf**, Supervisor, Water Planning Unit (retired in 1988); **Peter G. Finke**, Supervisor, Floodplain Management Unit; and **Dr. William G. Mattox**, Assistant Chief. Division of Water file photo.*

control, and shoreline management. The Division of Water, working with OEPA, started work on a number of lakes.

The program to mark flood heights on public buildings had been enhanced with a specially designed metal emblem (Fig. 9.26). Four hundred of these were manufactured with help from federal funds. By 1982, more than 300 of these markers had been installed in Ohio communities.

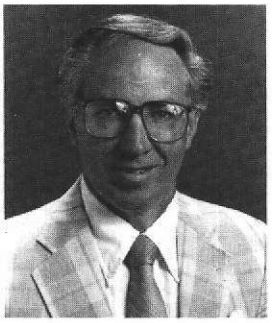


*Figure 9.27. **Robert L. Goettemoeller**, fifth Chief of the Division of Water, 1984 to the present.*

## 1983-1989

Robert L. Goettemoeller became Acting Chief in 1983 and the Division of Water's fifth Chief in 1984 (Fig. 9.27). The Division provided information for the development of Governor Richard F. Celeste's "Strategic Plan for Ohio's Natural and Physical Environments." It looked beyond today to define the state's future water management initiatives. In 1984, it cooperated with USGS in publishing the report, "Water Use in Ohio." The thirsty state was requiring about 14 billion gallons daily for all purposes.

In 1984, the Division handled some 6000 requests for ground-water information, provided analysis of ground water for all new surface mining permits for the Division of Reclamation, handled almost 1800 requests for floodplain data, and assisted 154 communities in their floodplain management programs. It was involved with 206 dam permit actions, with more than 200 dam inspections, with a computerized inventory of dams, and with plans to repair a number of State dams. It sponsored a seminar on "Inspection, Evaluation and Rehabilitation of Existing Dams," and issued a manual on dam operation, maintenance, and inspection.

The General Assembly in 1984 authorized appointment by the Governor of a seven-member Ohio Water Advisory Council to advise the Chief of the Division of Water and to recommend policy and legislation as well as to review plans and programs for water management in Ohio. Bayliss L. Prater of Willard became the first Chair.

Updating the public water use section of the Northwest Ohio Water Plan (first issued in 1967) started in 1984, with completion in 1986. In 1984, the use of ground water was challenged in a case, *Cline* v. *American Aggregates Corporation*, in which the Ohio Supreme Court set forth conditions for reasonable use of ground water. Amended Senate Bill 360 became law in 1984 and regulated interbasin diversion of water from Lake Erie and the Ohio River basins. On 11 February 1985, the Great Lakes Governors and Canadian Premiers signed the Great Lakes Charter to protect Great Lakes waters from diversion.

Although computers were actively incorporated into the Division's engineering programs in the early 1970's, minimal use was employed in other programs until the mid-1980's when personal computers, word processing, and other automated systems were introduced throughout the Division.

A new approach to flooding and drainage problems received attention in 1986 with the publication of *Ohio Stream Management Guide*. The Division of Water cosponsored a conference to encourage farmers and engineers to adopt new technologies caring for streams to reduce flood losses (see Plate 9). That same year the Division assisted in the preparation of the "Ohio Ground Water Protection and Management Strategy." Continued concern with water withdrawals in Ohio and the Supreme Court case in 1984

led to the enactment of House Bill 662 which required registration of all surface and ground-water facilities with the capacity to withdraw over 100,000 gallons daily. It also required permits for new consumptive uses over two million gallons daily and amended the law requiring a permit for water diversions between the Lake Erie and Ohio River basins. The Division of Water was charged to prepare a long-range water resources plan for Ohio's Lake Erie basin by 1994.

In 1987, the 117th General Assembly strengthened the dam safety laws by improving statutory requirements for existing dams, exempting additional smaller nonhazardous dams from State jurisdiction, clarifying legal responsibilities of dam owners, authorizing Division of Water control of emergency situations at dams, increasing fees for construction permits based on project cost, implementing annual fees for existing dams, and improving legal recourses for enforcement actions.

An initiative in the Governor's Strategic Plan (June 1985) called for the design and implementation of "a dynamic water planning process, including establishment of a computerized multi-agency water information system." In an agreement with ODNR in September 1987, the Ohio Water Development Authority granted $500,000 to ODNR to begin design work for the water information system.

The year 1987 was the tenth driest year in Ohio since rainfall records were first established in 1882, and 1988 was the eleventh driest, culminating in a nine-inch rainfall deficiency. The 1988 rainfall was only 5.22 inches below normal, but June was the driest month of record, and the period April through June the driest on record. This extreme dry spell, coming in the growing season, had a severe impact on agriculture as well as on water supplies. Over the three-year period 1985-1988, rainfall was not uniform over the state. The greatest deficiency was in south-central Ohio with almost 24 inches below normal, while northeastern Ohio had rainfall three inches above normal.

For the state as a whole in 1988, streamflow was 60 percent below normal creating problems with filling some reservoirs. Unlike the 1930's, however, Ohio now has some 60,000 ponds, lakes, and reservoirs, most of which were nearly full on 1 July 1988. Public water supplies depending essentially on daily streamflow were nearly out of business by mid-July. Even the mighty Maumee River was practically dry between Providence Dam and Lake Erie. The Division noted that water shortages in many cities were due to massive watering of lawns, and water distribution systems were unable to deliver the amount of water demanded for uses. Water conservation programs involving restriction on lawn sprinkling and other unnecessary uses of water helped to relieve problems in many communities. More than a third of the 140 observation wells in Ohio reached record low water levels in 1988. The drought became of such magnitude that Governor Celeste set up a Drought Emergency Operation Center in the Ohio Emergency Management Agency (OEMA) with a special task force headed by the Lieutenant Governor, and the Division of Water became actively involved.

The Division of Water authorized farmers and villages to draw water from State lakes for emergency stock watering, fire fighting, and emergency domestic supplies. The Division coordinated drought response requests in ODNR, issued a weekly report, and gave technical advice to OEMA. It handled many calls on complaints and rights to use water, receiving over 200 calls daily for six weeks on wells and other drought-related water concerns. In addition, the Governor issued a ban on outdoor burning in unincorporated areas and issued a drought appendix to the State of Ohio Emergency Operations Plan.

The drought pointed up the problem of community water shortages being the result of failure to implement water supply plans. It also raised many questions about water rights. In 1988, the Division of Water in cooperation with the Water Management Association of Ohio published a circular on water rights giving an overview of Ohio water law. A new project to develop county pollution potential maps for ground water also started in 1988.

For 15 years the Division had spearheaded Ohio's coastal management effort on Lake Erie. The Coastal Management Act, Senate Bill 70, established the Ohio Coastal Management Program in law in 1989, created a Coastal Resources Advisory Council to advise the ODNR

Director on coastal issues, and addressed the issues of flooding, erosion, public access, and leasing of submerged lands. Senate Bill 70 established State floodplain standards along the Lake Erie shoreline and estuaries. Also, 30-year erosion hazard areas were to be delineated in which building was discouraged. The Division of Water staff and the Ohio Water Advisory Council were the primary proponents to see this legislation through the General Assembly.

On 1 July 1989, administration and management of State-owned portions of the canal system were transferred to ODNR from the Department of Administrative Services (formerly Public Works). The Division of Water was given responsibility for water sales and operation and maintenance of the canal hydraulic works at Grand Lake St. Marys and the Portage Lakes. Interestingly, portions of Ohio's first water agency, the Ohio Canal Commission of 1822, have now been integrated into Ohio's primary water agency, the Division of Water.

## 1931-1989, A SUMMARY

Almost 60 years have passed since the State Water Conservation Board of Ohio gave David C. Warner opportunity to develop a focus on Ohio's water resources. Over 50 years have passed since the Ohio Water Supply Board assembled its first small staff of water experts. This staff confronted a future literally swamped with needs for water information and a data base almost bare of facts. Now we have initiated a new computer technology to store and retrieve readily our water facts which the prodigious effort of a half-century has accumulated.

We have networked our streams with gauges and pierced our landscape with observation wells. Day in and day out, we measure the ebb and flow and quality of Ohio's water resources. We measure silt in streams and reservoirs as a barometer of erosion. We have collected hundreds of thousands of well logs and have mapped the ground-water resources for the entire state, explored for buried river valleys, test-pumped many wells to determine yields, set gauges in Lake Erie and other lakes, surveyed over 6000 reservoir sites, and collected large files of water uses. Our water data are affecting decisions in the lives of Ohioans every day.

The streamflow data document flood and drought frequencies, help us plan surface water supplies and flood protection facilities, and identify floodplains and flood hazards. With the data, we have planned reservoirs, farm ponds, recreation lakes, and housing development lakes, as well as determined farm irrigation, sewage treatment and pollution abatement needs, and canoeing and fishing resources. This information has been of immeasurable value for determining new industrial locations, and, as time has gone on, for water reuse and conservation planning. It has been the crux for the design of highway bridges, culverts, and ditches. Streamflow characteristics have been closely related to soil types, geology, and land use in watersheds. Analyses of streamflow data have provided the keystone to reservoir construction and dam safety. Through the passing years, Ohio's ground-water data have become important for determining industrial and community growth, expected yields from wells for farmers and homeowners, the most efficient well spacing, the best pump sizes and rates of pumping, vulnerability to pollution, safe locations for solid and hazardous waste disposal sites, and much more.

These vast data banks of information have been an insurance policy for Ohio's future. They have become a focal point for many important economic, social, and health decisions in Ohio's future. Engineers, geologists, hydrologists, consultants, planners, educators, researchers, soil scientists, contractors, foreign developers, and many others have sought the data's wealth.

The Division of Water pioneered Ohio's first study of pollution along Lake Erie's coast, a decade before a great public effort was aroused to clean up the lake. It helped pioneer pilot wastewater research programs at OSU to study industrial pollution. From this early effort grew OSU's prestigious Water Resources Center, which today coordinates a statewide program of water research. With USGS, the Division of Water started electronic modeling of water resources, set up a pilot remote-control regional stream monitoring center, and helped develop the first well field to augment drought deficient streamflow.

From the smashing floods of 1959, the Division made the most comprehensive statewide study of flood problems, controls, and needs in Ohio's history. In follow-up, it worked with the Corps of Engineers, SCS, and conservancy districts to construct more flood control projects. From these efforts too, the Division pushed a program of flood-plain mapping, community zoning, and federal flood insurance ultimately to reach over 600 communities. It also initiated a new stream management strategy seeking to avert drastic change in stream channels for flood protection.

The surge of floods also caused dam failures. From new Ohio and federal laws, the Division of Water surveyed and inspected hundreds of dams, required some to be modified or removed, and approved plans for new dams—a safety precaution for which Ohioans have been given comforting assurances.

The droughts of the 1950's launched the Division of Water on a far-reaching inventory of the water and related resources in each river basin in a measure not approached at the time by any other state. From this effort, state and local planners started to see Ohio's regional water resources and management needs in new and challenging ways. From the inventory came a new long-range water planning program.

The Division has helped communities secure emergency water supplies required by droughts. It started a unique program of financing regional reservoirs as part of its water plans, and securing water supplies in federal reservoirs. Its program of water development has brought new employment opportunities to many communities.

For a time, the Division of Water administered the resource analysis (OCAP) and remote sensing programs for ODNR. It initiated the first comprehensive coastal resources management program along Lake Erie and organized responsive citizen groups as a part of this effort. The Division made plans for many special lake projects in the state; planned Salt Fork Lake in Guernsey County, the largest new State lake since the canal days; and planned Wolf Run Lake in Noble County and also a water treatment plant at Burr Oak Lake near Athens. It received custody of the abandoned Muskingum River locks and dams system and pioneered their rehabilitation for recreational boating.

The Division of Water cooperated on federal clean lakes restoration studies, on many water quality plans, and in finding environmentally acceptable sites to dispose of harbor dredgings. It made a study of how to save from erosion Cranberry Island, a National Natural Landmark in Buckeye Lake. The Division has been both a participant and planner of many meetings, workshops, and clinics through the years. It has published more than 300 reports or maps from the pens of its own scientists or cooperators. It has advised and consulted with thousands who have come to its doors for water information.

The Division of Water has been an active cooperator with USGS, the Corps of Engineers, SCS, and OSU, and has administered a loan fund for conservancy districts and coordinated the small watershed program of the federal government. Not all the years have been smooth sailing. State funds have been hard to come by at times. Federal matching money has not always met needs, and some federal programs have been eliminated. There have been reorganizations. Deficient budgets have made it difficult to bring in new staff to replace retirees. Despite the rougher parts of its path throughout the years, the many and diverse accomplishments of the Division of Water and its predecessor agencies in almost six decades of public service overshadow the obstacles.

In the early days of the Division of Water, Chief Youngquist said that "lack of understanding of the ways of water is perhaps Ohio's first water problem." Through the intervening years of reports, meetings, personal contacts, and publications, the Division of Water and its many cooperators have made a major effort to clear away the fog about the state's greatest resource. Ohio is truly a water rich state.

No longer is Ohio's water resource "so secret and occult" as a judge wrote in a famous case so many years ago. More recently, the Ohio Supreme Court said that "water is a *sine qua non* of the happiness, health, welfare, and agricultural and industrial progress of the state." (*Sine qua non*—the one thing that is absolutely essential.) The Division of Water has needed no greater purpose.

## THE OHIO WATER COMMISSION

by **James R. Hanson**

The Ohio Water Commission was in existence from 1960 to 1972. It was attached to the Ohio Department of Natural Resources and worked closely with the Division of Water, but it was not part of any State department. Directors of three departments—Natural Resources, Health, and Public Works—were members of the Commission in addition to four members appointed by the Governor. Its establishment gave recognition to the fact that necessary involvement in water management requires a broader base than can be provided by any one department. The Commission was designed to formulate and guide State water policy, and to develop public awareness of problems in order to encourage public participation in water management.

The story of the Ohio Water Commission begins with creation of the Ohio Water Survey Committee in 1957. The 102nd General Assembly established this Committee by Amended Senate Bill 372 "to conduct a comprehensive study of those phases of water conservation and water management as may, in the opinion of the committee, be of major importance to the social and economic development of the state of Ohio and to recommend such action as the committee determines will contribute to such development." The Committee, served by Ralph W. Peters (Fig. 9.28) of Defiance as Executive Director, was chaired by Harry M. Miller of Columbus. Bryce C. Browning, Secretary of the Muskingum Watershed Conservancy District, was Vice Chair, and ODNR Director Eagon was Secretary.

Notable recommendations in the December 1958 report of the Committee included finishing of the water inventory that had been initiated by the Division of Water, organization of the state into watershed districts, and creation of an "Ohio Water Commission" to bring an overall coordinating body into water management in Ohio. The Committee saw the proposed commission, to be composed of members appointed by the Governor and directors of State departments acting ex officio, as a "policy-making and program-building" agency. The 103rd General Assembly created the Ohio Water Commission precisely as contemplated by the Ohio Water Survey Committee in Senate Bill 237 sponsored by Senator Danny D. Johnson of New Philadelphia.

The Commission, "For the purposes of coordinating the water programs in and of the state, to develop water supply, flood control and flood plain zoning programs for all areas of the state, and to obtain the most beneficial use of water resources," was empowered to hold hearings, assist public and private agencies, review water development

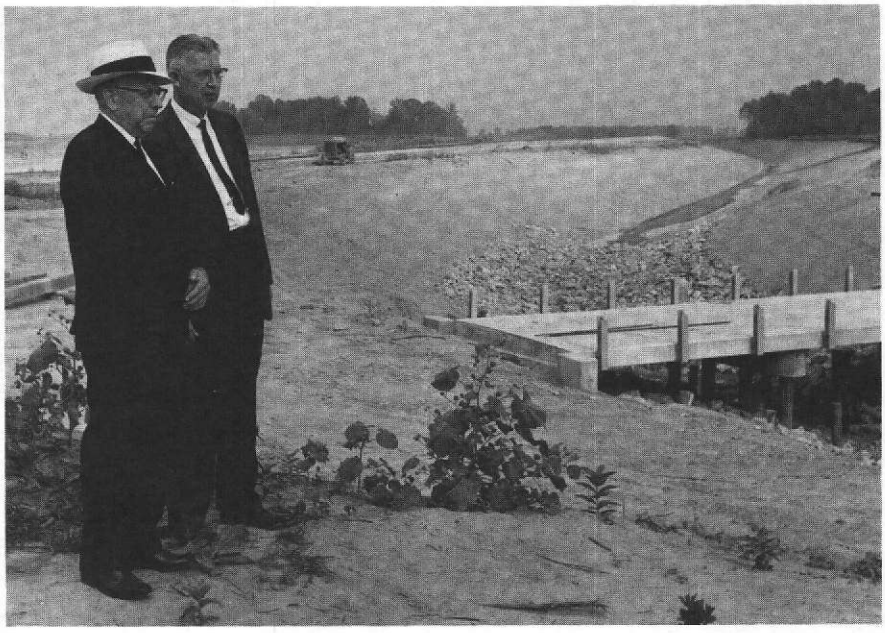


*Figure 9.28. Construction of a drainage diversion on Grassy Creek near Perrysburg in Wood County. This project of the Maumee Watershed Conservancy District is being viewed by* ***Ralph W. Peters*** *(right) of Defiance, Executive Director of the District, and by* ***Leigh E. Eisenhauer*** *of Van Wert, Chair of the Ohio Water Commission. Division of Water file photo.*

*Figure 9.29. The first Ohio Water Commission at a meeting on 21 January 1960. From left to right, seated:* ***ODNR Director Eagon; George E. Miller*** *of Dayton representing commerce and industry;* ***Dr. Ralph E. Dwork****, Director of the Ohio Department of Health;* ***Bryce C. Browning*** *of Dover representing recreation;* ***Theodore J. Kauer****, Director of the Department of Public Works;* ***Wendell R. LaDue*** *of Akron representing public water supplies. Standing:* ***John A. Slipher*** *(Chair) of Columbus representing agriculture;* ***Senator Danny D. Johnson*** *of New Philadelphia (author of the legislation creating the Commission); and* ***Sherman L. Frost****, Executive Secretary of the Commission. Division of Water file photo.*

plans, recommend means to resolve user conflicts, recommend policy and legislation to the Governor and the General Assembly, and appear before any court considering organization of a conservancy district or other type of water management district.

In 1960, the Commission (Fig. 9.29) announced as its objective the development of a comprehensive water program for Ohio. Executive Secretary Sherman L. "Jack" Frost announced a statewide water management conference for December of that year, to be preceded by six public hearings in various parts of the state for the purpose of obtaining public input. The Commission also named advisory councils on various facets of water management. Principal technical officer for the Commission was C.V. Youngquist, Chief of the Division of Water. Staff of the Commission consisted of Frost, Attorney James R. Hanson, and a secretary. The Commission relied on staff services of the Departments of Natural Resources, Health, and Public Works, other agencies, and in particular on the services of Arthur F. Woldorf. The offices of the Commission were housed with the Division of Water at 1562 West First Avenue, Grandview Heights (see Figure 13.7 on page 174), the site which had also served as headquarters for the Ohio Water Survey Committee. Initially, Frost also continued to serve as Assistant Chief of the Division of Water.

The Ohio Water Commission was notable for the dedication of its members. The departmental directors did not send their assistants—they regularly attended monthly meetings of the Commission, and Commission hearings, in person. The Commission was also notable for the insistence of its Executive Secretary that no one be left out of the water management process, and that the technical aspects of water management be made both intelligible and available to all—not only government leaders, legislators, policy makers, and educators, but also all interested citizens.

The statewide conference at the Ohio State Fairgrounds in 1960 typified this thrust. This conference, attended by some 500 people from throughout Ohio, was a status report, an airing of problems, and a look to the future of water management in Ohio. Governor Michael V. DiSalle, addressing the conference, emphasized the need for a statewide program of flood control and floodplain regula-

tion, but he also emphasized the need for local involvement and control. He urged acquisition of reservoir sites to meet future needs for water supply and flood control, and the importance of planning. At the conference, a legislative bill was presented that would permit more effective flood control on a local level. This resulted in legislation in 1961 which permitted creation of watershed districts, as now provided in Chapter 6105 of the Ohio Revised Code, with power to establish floodways in which development is not permitted.

The Commission held three hearings pursuant to its conflict-resolving authority during its early years. In each case, the Division of Water made an investigation and report, and the Commission held a public hearing, with witnesses questioned under oath by an Attorney General's representative, followed by a Commission report and finding, with recommendations. In all cases, doubts and conflicts were resolved, and a productive approach to development of water supply resulted.

In 1960, officials of Strasburg, Dover, and New Philadelphia in Tuscarawas County were concerned about the potential effect of the installation by Canton in Stark County of a 20-million gallons-per-day well field 15 miles from that city, in the Sugar Creek aquifer. In its investigation, the Division of Water reported that the aquifer, used by all these cities, was a preglacial buried valley containing sand and gravel to a depth of about 200 feet and that it would yield in excess of 100 million gallons per day, four times the foreseeable use. The Division reported that maximum pumping by Canton would have negligible effect on water levels for the other cities. Canton agreed to make regular reports to the Commission concerning its plans for pumping volume, which it did.

In the same year, residents along the Mad River near Springfield complained that that city would destroy their water supply with ten wells it had installed along the river near Eagle City to pump 20 million gallons per day. The aquifer there is also a preglacial buried valley. Residents feared that their crops would be adversely affected and the aquifer ultimately would be depleted. There, the Division reported that wells had indeed gone dry, but that the lowest level of the ground water below the surface was ordinarily not deeper than twelve feet. The Division's 1962 report to the Commission related that even in the proximity of Springfield's well field there was 100 feet of water-bearing gravel remaining saturated below the water table. Thus, the Commission recommended that the affected residents improve and deepen their wells.

While the Commission here was dealing with "water problems," it is typical that such problems contain a high proportion of anxiety based upon ignorance. The Division of Water studies addressed this by supplying the facts, while the Commission's formal procedures provided both an educational vehicle and the reassurance to anxious residents and city officials that their interests were recognized and respected.

The most complex of the problems examined by Commission hearing was that of the Mill Creek valley near Cincinnati, where levels of ground water had been declining, under heavy industrial and municipal pumping, for many years. The City of Wyoming asked the Commission to hold a hearing because it feared for the future of its water source. The Division of Water reported that the total withdrawal in the aquifer was 11.5 million gallons per day, and recharge was 8.5. Formerly, recharge was about 10 million gallons per day, but it had been reduced over the years because of construction of highways, parking lots, and buildings. The Commission recommended that those dependent upon the aquifer should consider alternate sources, and also should examine possibilities for artificial recharge on a regional basis. The Division of Water subsequently proposed a method to do this.

Whatever role such hearings might have had in arriving at a solution to problems, the reports issued by the Commission, containing a description of the perceived problem, the technical explanation, and the findings and recommendations of the Commission, served as educational documents which enabled people in other situations to see their own problems in a clearer perspective.

Public education and public participation were emphasized by the Commission. It sponsored many citizens' meetings as a means to arouse concern and participation in

developing plans and programs for management of Ohio's water resources. It published numerous materials to explain and interpret these resources and associated problems. In its booklet, "What Water Means to Ohio," the Commission introduced the cartoon character, "$H_2O$ Ohio," as the clarifier of water problems and needs in lay terms (Fig. 9.30). The Commission also produced a half-hour motion picture, *Water: Pattern of Life*, which was Ohio's premier water film for more than 25 years. It won an Award for Excellence from the United States Department of Agriculture in 1962.

The Ohio Water Commission initiated water planning in Ohio. Its first plan was for northwestern Ohio, where initially it had been concerned with a proposal to build a pipeline from Lake Erie to the Lima area. That part of the state is flat, without natural reservoir sites;


*Figure 9.30. "$H_20$ Ohio," a cartoon character created by Jack Glover while employed as an artist at Columbus Art, Inc. and introduced in the 1960's by the Ohio Water Commission to help explain water problems and needs in lay terms.*

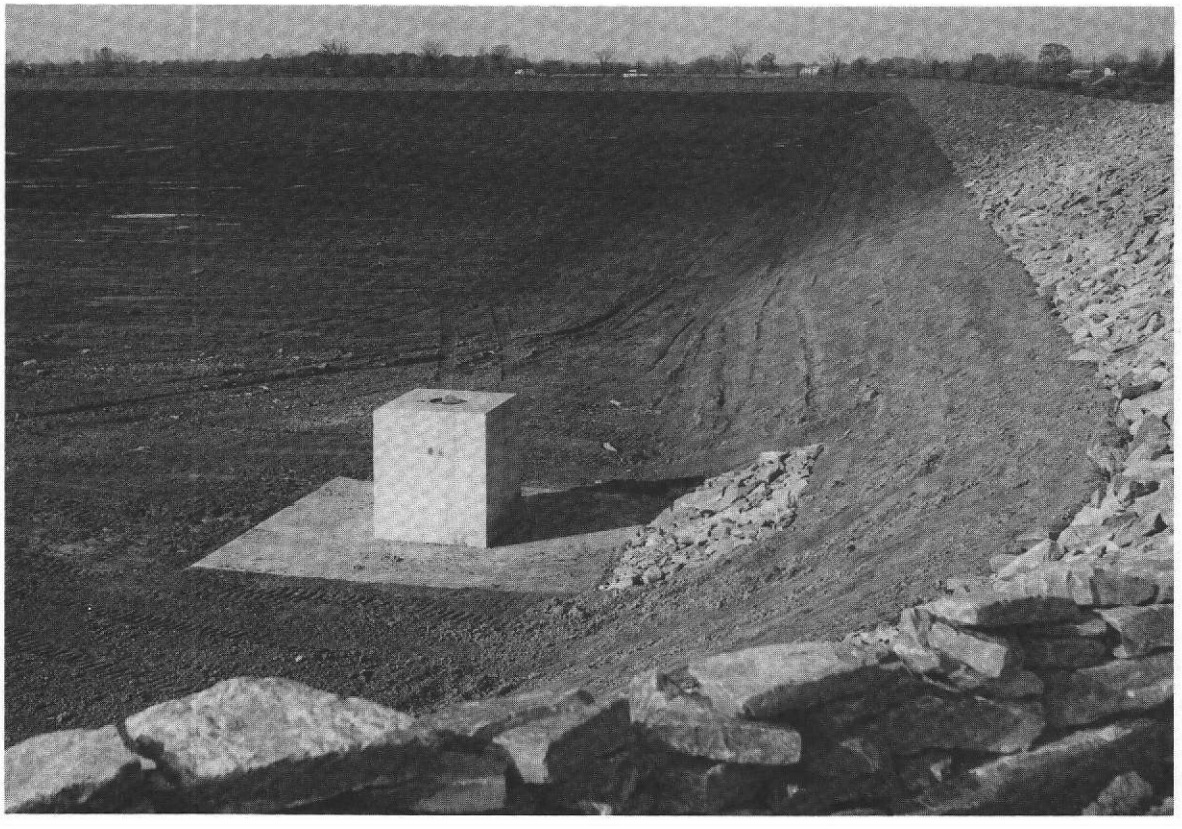


*Figure 9.31. Oberlin Reservoir, an upground reservoir in Lorain County, nearing completion and before filling with water in 1960. Division of Water file photo.*

rainfall is less than in the rest of Ohio, and no "buried valley" aquifers exist there as in the neighboring quarter of the state to the south. Still, when its study was completed, the Commission found that the practical and economical solution was not to pursue the more dramatic project of constructing a pipeline, but rather to construct "upground" reservoirs, simply high dike enclosures (Figs. 9.23 and 9.31) that could be filled from nearby streams at times of high water flow, when the water would ordinarily be of high quality and would otherwise be lost for use. Subsequently, a number of these upground reservoirs have been installed near northwestern Ohio communities.

In 1965, the General Assembly authorized the Commission to develop a water plan for Northwest Ohio. This plan, the first of its magnitude in the United States, was published by the Commission in 1967. The Commission and the Division of Water ultimately studied four other areas of the state: northeast, southwest, central, and southeast. For each, it created an advisory council to work with it in developing the plan. The planning process was an ongoing involvement with these advisory groups, which met frequently with staff and consultants. Part of the Commission's planning process was the drilling of many test wells and conducting of pumping tests to determine safe ground-water yield. In northwestern Ohio alone, 79 test wells were drilled. Because of its official involvement at the top level with other State agencies that had water management concerns, the Commission had easy access for cooperation in planning to include a wide range of water-related subjects such as water pollution, soil erosion, water recreation, water supply, and agricultural water needs.

In 1967, at the request of Governor James A. Rhodes, the Commission prepared and published a report to the Governor and the General Assembly entitled "Guidelines for a Dynamic Water Program for Ohio." The production of this report was notable for the amount of volunteer time that went into it. The mechanism for this was the Water Management Advisory Council that had been created by the Commission some five years earlier to provide the Commission with statewide contacts with major water-using interests and to assist the Commission in matters pertaining to formulation of State water policies. The Council, usually consisting of about 70 people, reviewed water problems and recommended water management proposals. Commission staff made investigatory reports to the Council for its use in making recommendations to the Commission. The Council's first Chair was Richard H. Peake, Jr. of Cincinnati.

Some of the report's recommendations have been carried out—such as creation of a fund and matching grants to local agencies for sewer and water facilities. Voters subsequently approved a $120-million bond issue; the Ohio Water Development Authority was created to administer this fund through a program of federal-state-local financing of sewage and waste disposal systems, a program that has been eminently successful. The recommendation concerning State inspection of dams during construction and operation was adopted, and recommendations concerning water quality were included a few years later within the domain of the newly created Ohio Environmental Protection Agency.

In the later years of its existence, the Commission held various hearings, such as one to determine the best way to allocate storage in the Alum Creek Reservoir at Columbus, a project of the Corps of Engineers, and another regarding stream channelization in northwestern Ohio. The Commission was made the agency to administer the "Conservancy District Loan Fund" for the purpose of enabling new conservancy districts to finance themselves until they had a revenue stream from project construction. The Commission was also given approval authority for federal Public Law 83-566 "small watershed" projects.

When the Ohio Environmental Protection Agency was created by the General Assembly in 1972, the Ohio Water Commission was abolished, evidently under an assumption that creation of a single large "environmental" agency made the Commission no longer relevant. The Commission's final meeting occurred 12 October 1972. In the twelve years of its existence, the Commission filled a role of focusing governmental and public attention to water problems and the future of water in Ohio.