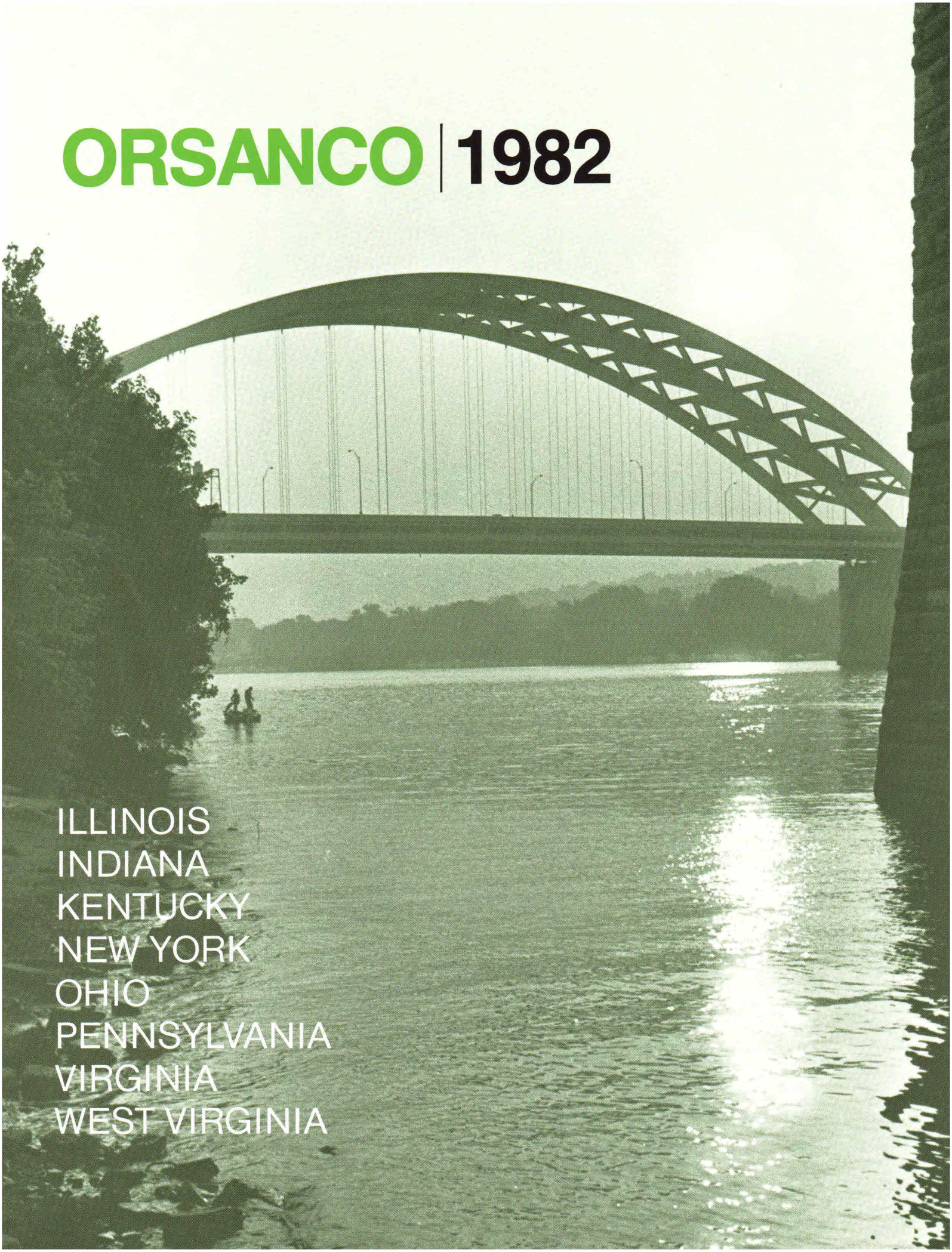
# ORSANCO | 1982



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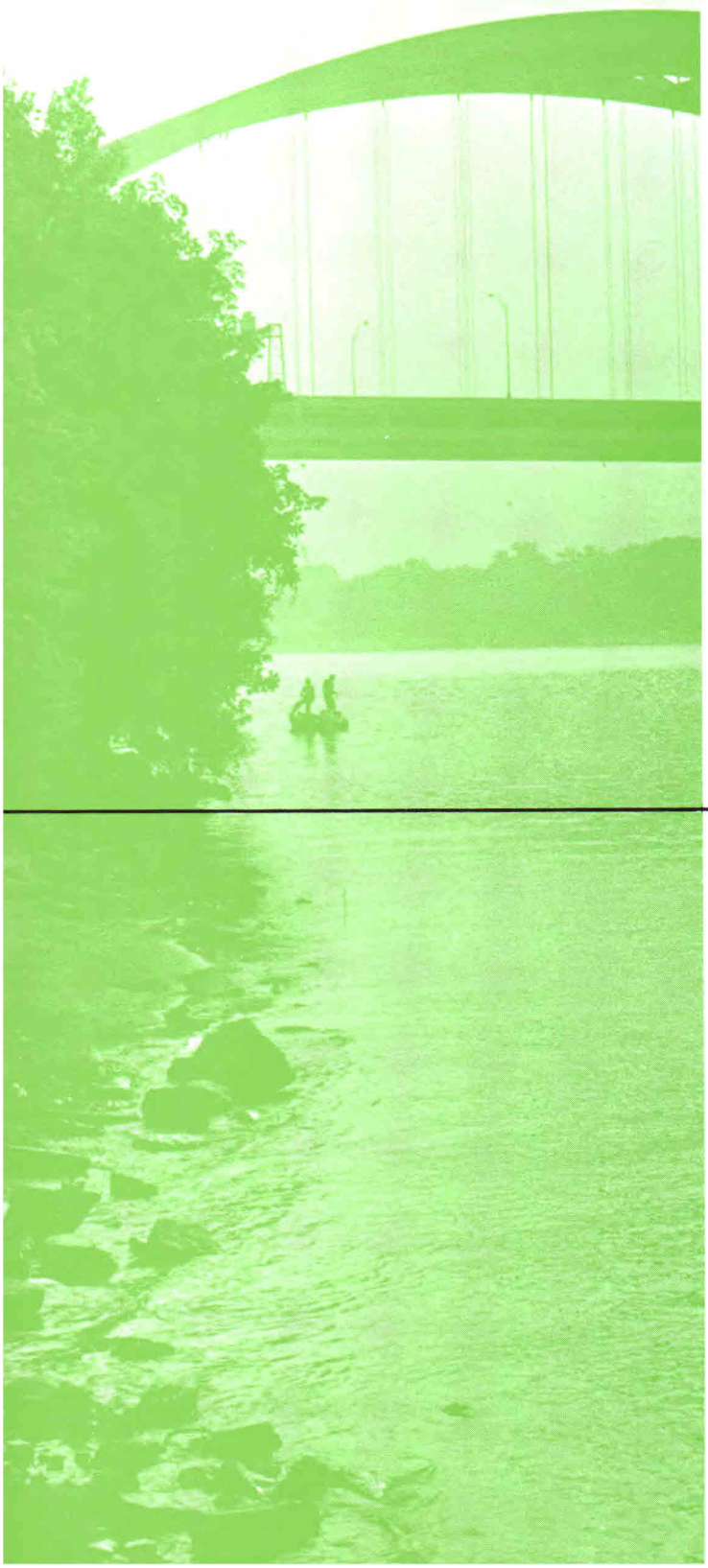
*as of March 31, 1983



*Cover photo courtesy of the Bass Anglers Sportsmen's Society*



**TO:**

**The Honorable James R. Thompson**
*Governor of Illinois*

**The Honorable Robert D. Orr**
*Governor of Indiana*

**The Honorable John Y. Brown, Jr.**
*Governor of Kentucky*

**The Honorable Mario Cuomo**
*Governor of New York*

**The Honorable Richard F. Celeste**
*Governor of Ohio*

**The Honorable Richard L. Thornburgh**
*Governor of Pennsylvania*

**The Honorable Charles S. Robb**
*Governor of Virginia*

**The Honorable John D. Rockefeller, IV**
*Governor of West Virginia*

The Commissioners of the Ohio River Valley Water Sanitation Commission — an interstate compact agency created jointly in 1948 by

the State of Illinois, the State of Indiana, the Commonwealth of Kentucky, the State of New York, the State of Ohio, the Commonwealth of Pennsylvania, the Commonwealth of Virginia and the State of West Virginia

with the approval of the Congress of the United States — respectfully submit a review of the Commission's activities in 1982.

# Chairman's Message...

Water is the miracle of life and we at the commission are charged with its protection by controlling and abating pollution in the streams of the Ohio Valley. The first people to consider the purification of their water supply were the ancient Romans who constructed a vast system of aqueducts to bring clean waters into their city, and settling basins and filters along these mains to insure the clarity of the water. Today, we continue to deal with the same problems of insuring safe waters for our citizens.

In challenging times — or difficult ones, depending upon your point of view — it is important to remember that clean water is to life as profits are to business; you cannot have one without the other. Municipalities, concerned citizens and industries of the Ohio Valley are to be commended for their support and achievements in cleaning up our streams and rivers. However, not all of our problems are solved and the issues facing the future generations must be resolved today if we are to survive. New improvements in industrial technology require increasingly sophisticated surveillance for water pollution control. Happenstance belongs to the past. The future must be thought about, and plans made for the maintenance of the health of our waters. As sure as we study the history of the past to better understand the future, the future belongs to those who care about the legacy we will bequeath.

The streams that water the Ohio Valley brought new settlers to start cities and establish commerce; the rivers were once the passageway of least resistance to travellers and shippers of goods and materials. Today, ports on the Ohio River handle almost 800 million tons of commodity materials annually, especially coal. At the same time, pleasure boating on the Ohio and the tributaries has become increasingly popular. Fishing from boats, piers, bridges and public landings is commonplace. Unseen by most people, water treatment plant intakes and discharge pipes from wastewater treatment plants, industries and power facilities are mute evidence of some of the major uses of the Ohio Valley's waters. Agriculture and fish and wildlife propagation are still others. The Ohio River has many uses; it simultaneously meets all these needs. The protection of these uses is the Commission's basic purpose.

But today new challenges are in the offing. Plans are already being implemented for the generation of electricity at all of the dams on the Ohio River by hydropower. Hydrogeneration is a use of the Ohio's waters, with its own potential effects on water quality, particularly during periods of low flow. The only way to prevent these potential problems is to plan for them — and we are, in cooperation with the US Army Corps of Engineers

and the holders of the hydropower permits.

Concern also continues about the operation of a number of the major municipal wastewater treatment plants in the Valley. Build when energy costs were relatively minor, these plants are troubled with design and operational inefficiencies and budget shortfalls. The result is that some of them cannot meet Commission or federal secondary treatment effluent requirements. Attention must be focused on needed modifications and the necessary funds allocated to make the plants work properly.

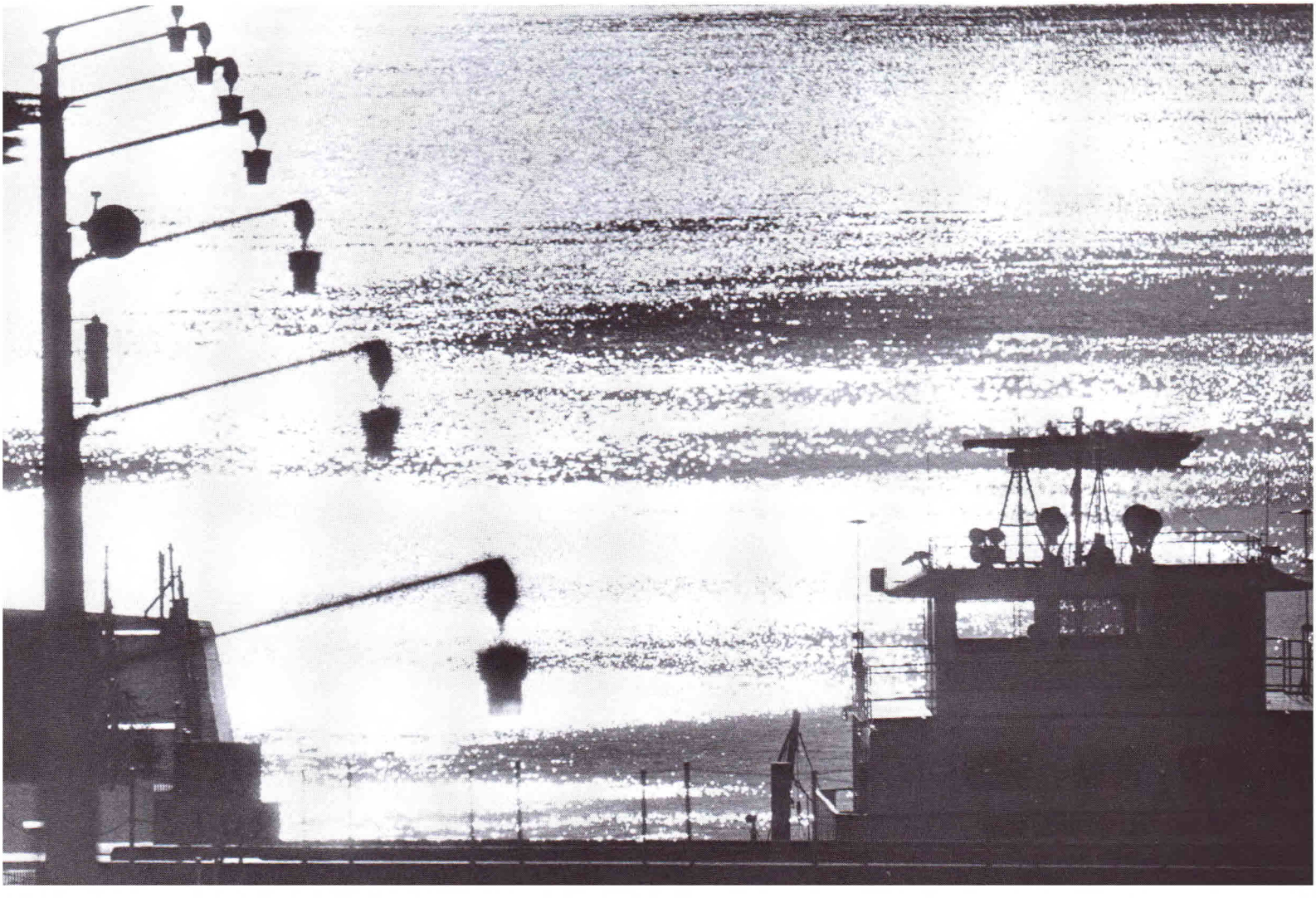
To protect the waters of the Ohio Valley, the Commission promulgates and enforces discharge standards, coordinates the work of the member states in resolving conflicts in criteria and standards, operates and maintains a comprehensive sophisticated monitoring program, sponsors a number of landmark studies from which new, more effective methods of water pollution control emerge, and coordinates intensive surveys on specific biological organisms and chemical substances. All this is done with the participation, support and encouragement of the eight Ohio Valley member states of the Commission. A number of Commission advisory committees representing various interest groups in the Valley also contribute their knowledge and expertise to the development and implementation of Commission programs.

The Commission is, in essence, an instrument for the people of its member states. It represents their focused concern for the protection of Ohio Valley waters. It also reflects the federal government's concern, as there are federal representatives on the Commission, appointed by the President. The Commission is a vehicle for cooperative and coordinated action in water pollution control. This is where its strength lies. And this is how the health of the streams of the Ohio Valley can truly be protected and in so doing, the health of the Valley's citizens.

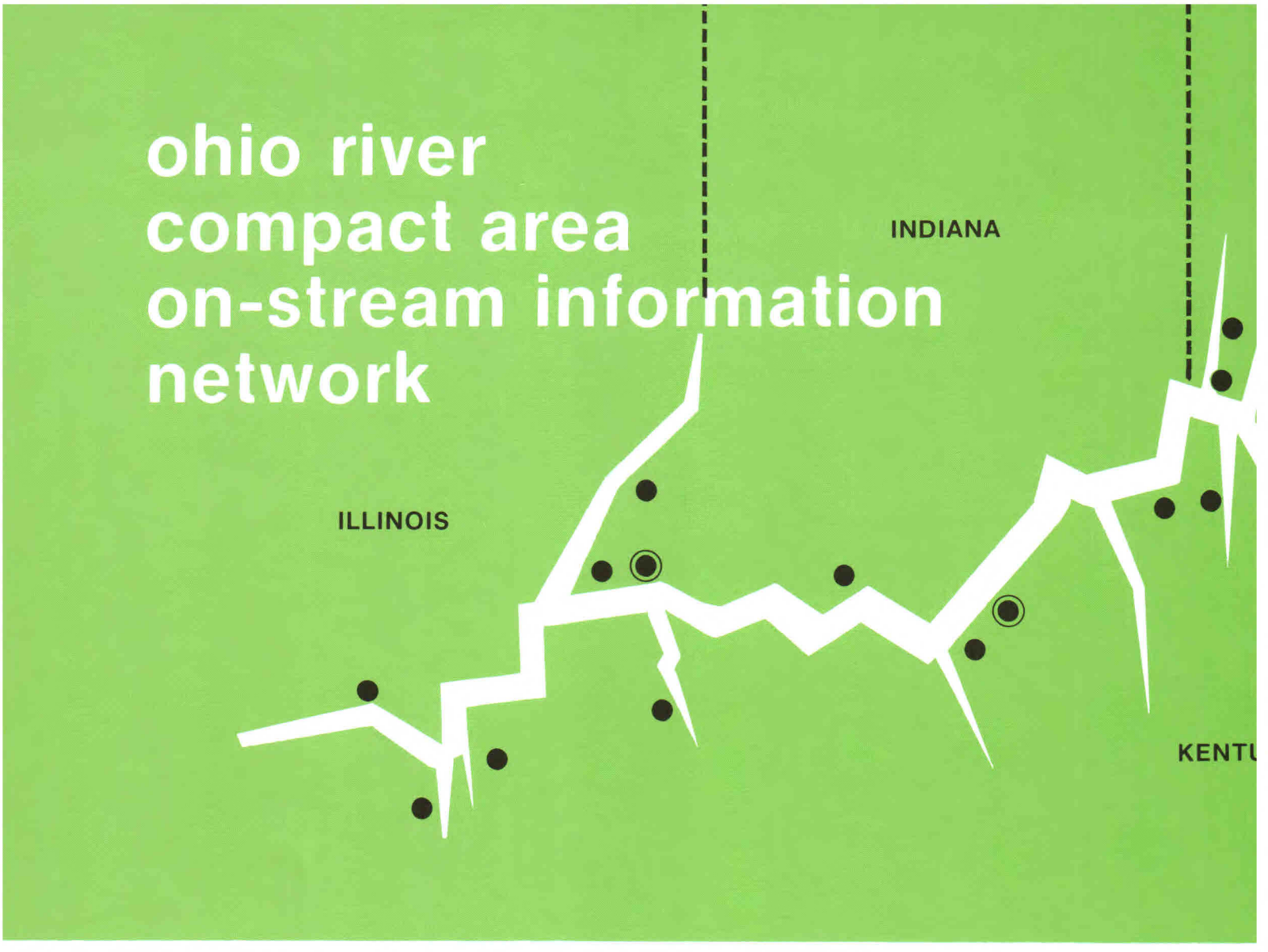
Lloyd N. Clausing

*Sunrise on an Ohio River towboat*

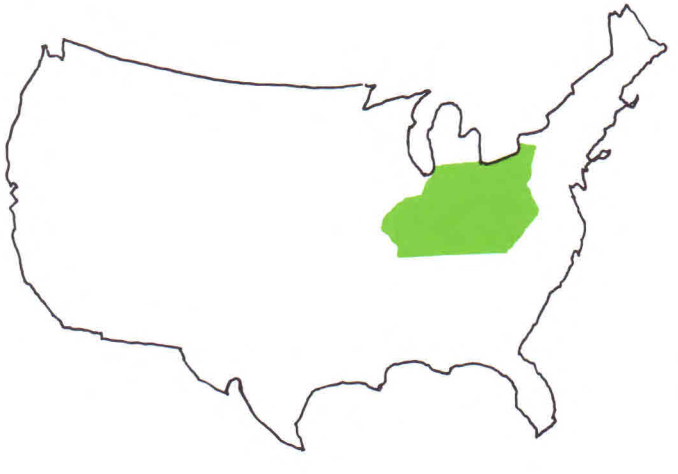
*Photo courtesy the Cincinnati Enquirer*



# ohio river compact area on-stream information network

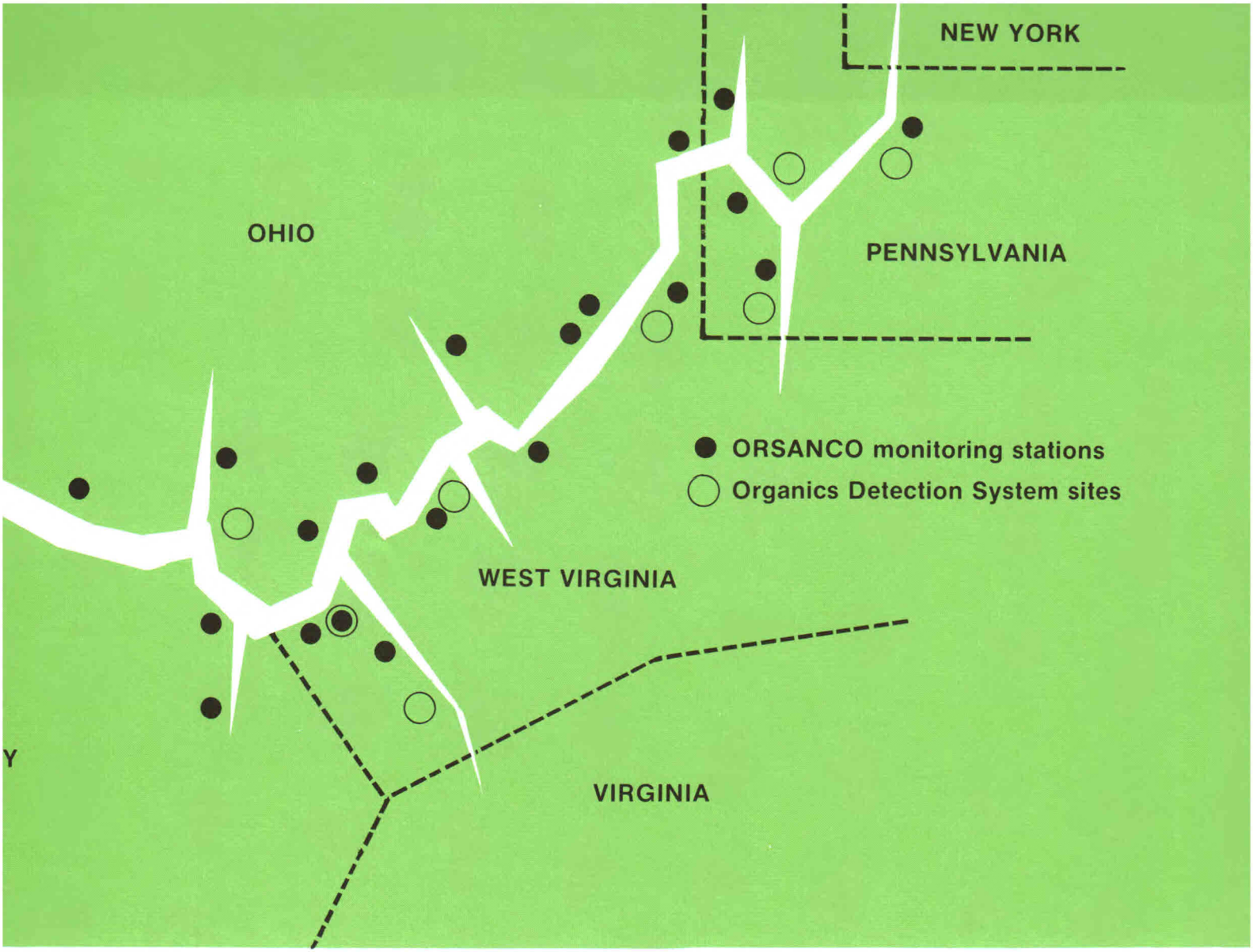



# THE OHIO RIVER



Perhaps nowhere else is the link between a healthy environment and economic strength more apparent than in the valley of a working river system, such as the Ohio River Basin. Abundant water is essential for the growth and development of an area; assurance that the water is safe and protected from contamination increases its attractiveness. To prosper, an economy needs environmental protection.

Such was the attitude of the people who, in the 1930's, initiated the movement for a regional approach to water pollution control in the Ohio Valley. These people were largely businessmen and civic leaders — a committee of the Cincinnati Chamber of Commerce. They readily grasped the fact that Ohio River pollution could be prevented only if the Valley states acted in concert.



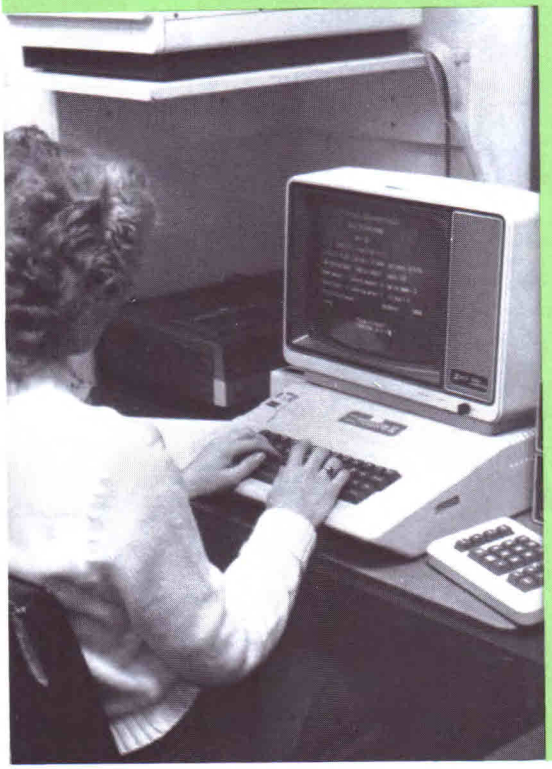

# BASIN... *The Heartland of America*

Effective clean-up would happen only if all the states using the Ohio River and its major tributaries acted simultaneously.

After several years of planning, interrupted by World War II, the Ohio River Valley Water Sanitation Compact was signed by the governors of eight Ohio Valley states. In it, the governors pledged "faithful cooperation" to abate current and prevent future pollution from contaminating interstate streams. At the same time, they established the Ohio River Valley Water Sanitation Commission (ORSANCO) to carry out the purposes of the Compact. This action had the approval of the US Congress. Today, as then, federal representatives join the three gubernatorially appointed representatives from each of the eight Compact member states on the Commission.

The Compact authorizes the Commission to adopt rules, regulations and standards and to study and report upon the pollution problems of the Compact District, along with recommendations for the reduction of such pollution. To this end, the Commission sponsors or coordinates a number of cooperative studies and programs concerning water quality, safeguarding water supplies and monitoring biological, physical and chemical characteristics of the Valley's waters. The Commission serves its members states as a mechanism for the development, organization and implementation of projects that prevent conflicts in pollution control requirements, eliminate duplications of effort and resources and insure improvements in water quality.

Commission photo by Thea Teich Townsend



*Data entry through microcomputer terminals at Commission headquarters*

# Collecting the Data - How and Why

Monitoring programs provide information indicating success of programs or problem areas needing attention. The eight member states and the federal agencies have delegated monitoring of the Ohio River and lower reaches of its major tributaries to the Commission. This monitoring is done in a number of ways: using Electronic Monitors; by a Manual Sampling Program, Fish Population Surveys and by an Organics Detection System; and by receiving data from water users, such as water utilities. The first two will be reviewed here; the others in later pages.

The Electronic Monitors provide continuous measurements of four parameters: temperature, dissolved oxygen, specific conductance (dissolved solids) and pH (a measure of the acid-alkaline balance). At any time, an Electronic Monitor can be interrogated to determine current conditions by simply dialing a number on a special telephone. Every night, hourly readouts from the Monitors are sent over telephone lines to a terminal at Commission headquarters in Cincinnati, Ohio. The next work day, a terminal operator activates the system which generates the "morning report" of current conditions. Daily maximum and minimum values are recorded and averages calculated based on the hourly readouts. The report also includes flow forecast data from the River Forecast Center of the National Oceanic and Atmospheric Administration. Flow information is critical in calculating pollution loads and rate of flow between points on the river.

In the Manual Sampling Program, water samples

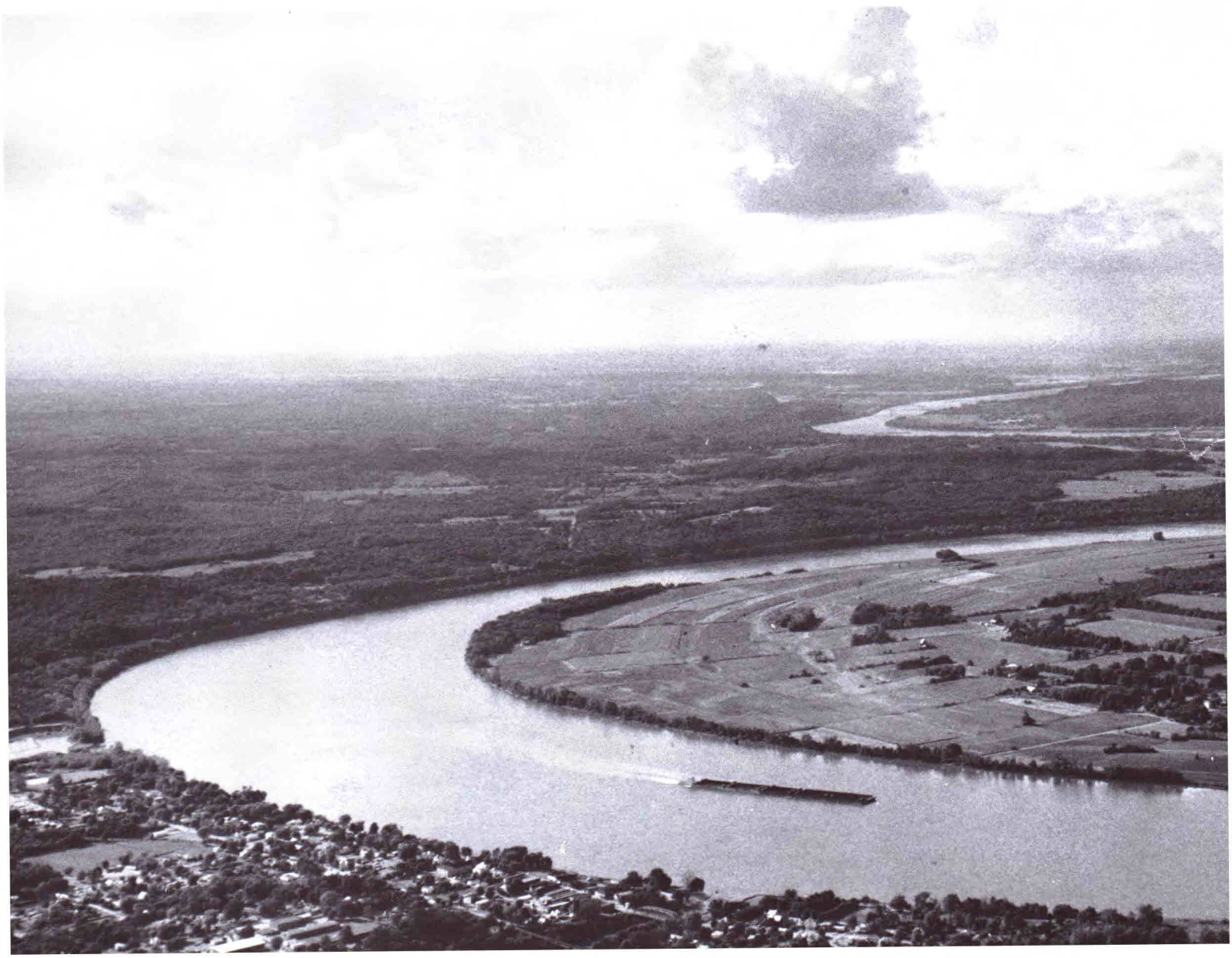
are collected monthly by Surveillance personnel. These samples are analyzed for a wide range of bacteriological, chemical and physical characteristics, including fecal coliform bacteria, nutrients, heavy metals, biochemical oxygen demand (BOD) and certain organics.

The data are compared to stream criteria which the Commission has recommended and/or standards promulgated by the member states. Stream criteria are numerical limits for the various characteristics and substances which have been found in the river. Criteria limits are set to protect designated uses of the river. For a given characteristic or substance, different limits may exist for uses such as drinking water, protection of aquatic life or swimming. The most stringent limit is usually applied as the criterion for that characteristic or substance. For example, more stringent dissolved oxygen criteria are required to protect aquatic life while more stringent phenolics criteria are needed to protect drinking water supplies. The most stringent limitations for fecal coliform bacteria result from protection for body contact recreation such as swimming. It is, therefore, necessary to consider a wide range of characteristics and substances in a river to determine whether the river can support all uses. Data from water utilities are used extensively for this purpose.

The data collected are also compared to previously gathered data to determine changes in water quality. The data are published in the monthly ORSANCO *Quality Monitor.* Otherwise, they are used as the basis of reports to the member states, the federal government and the general public on the condition of the Ohio River and its major tributaries.

*Aerial view of the lower river*

*Photo courtesy the Louisville Courier-Journal*



# The Findings for 1982

The Commission has adopted criteria for 20 characteristics and substances in river water. For the Ohio River and the lower reaches of its major tributaries, 16 of these remained within the criteria limits during all of 1982. These parameters were temperature, dissolved solids (measured as specific conductance), un-ionized ammonia, nitrate nitrogen, nitrite plus nitrate nitrogen, arsenic, barium, cadmium, selenium, silver, hexavalent chromium, dissolved lead, chloride, sulfate, fluoride and cyanide.*

The decrease in *cyanide* levels on the Ohio River has been dramatic since 1977. The year 1982 marked the first time that the cyanide criterion was not violated since the Manual Sampling Program began in 1975. It can be speculated that decreased industrial discharges, as well as control programs, have had a significant impact on these levels. Substantial decreases in *lead* levels have been noted over this time period, as well.

The remaining four parameters, phenolics, fecal coliform bacteria, mercury and dissolved oxygen, are reviewed more fully below.

*Temperature and dissolved solids levels based upon hourly measurements from Electronic Monitors. All others based upon a total of 444 samples taken monthly from 37 locations.

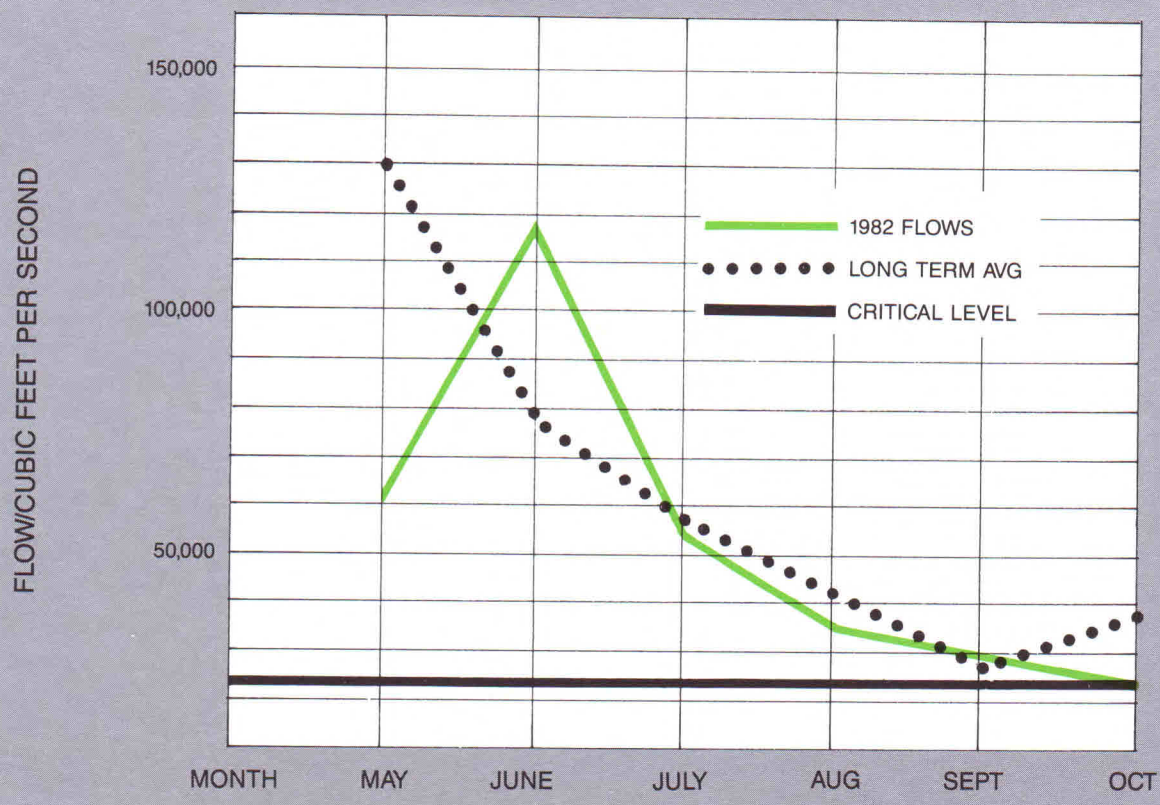
Several quality control studies on *phenolics* sampling methods and analysis were done during 1982. By the end of the year, the Commission had approved an intensive survey for phenolics in the upper river to take place in 1983. In addition, an investigation into the behavior and characteristics of both phenolics and cyanide was also approved. This study will review existing data for trends, sources and other information that will assist the Commission in making decisions regarding control of these substances.

A major investigation into *fecal coliform* levels was also authorized in 1982 and will continue into 1983. Levels of fecal coliform in 1982 continued to be above the criterion for contact recreation most of the time at sampling locations on the upper 100 miles of the Ohio River and at locations below urban areas (Parkersburg, WV; Huntington, WV; Cincinnati, OH; Louisville, KY) on the rest of the river. Levels were generally below the public water supply criterion on the lower 800 miles of the river, except at a monitoring location just below Cincinnati. The water supply criterion is less stringent than the recreational criterion because water taken for drinking water supplies is treated prior to distribution to consumers. The investigation will utilize existing data from the Commission and state and local agencies to determine the distinction between point and non-point sources and the effectiveness of the disinfection process currently used in wastewater treatment.

An intensive survey for *mercury* was also approved in 1982 to take place in 1983. Since 1979, the number of samples violating the mercury criterion has been nearly cut in half. But still, in 1982, 42 out of 444 samples, or nearly 10 percent, did not meet criteria limits. Most of these violations were from sampling sites below Cincinnati.

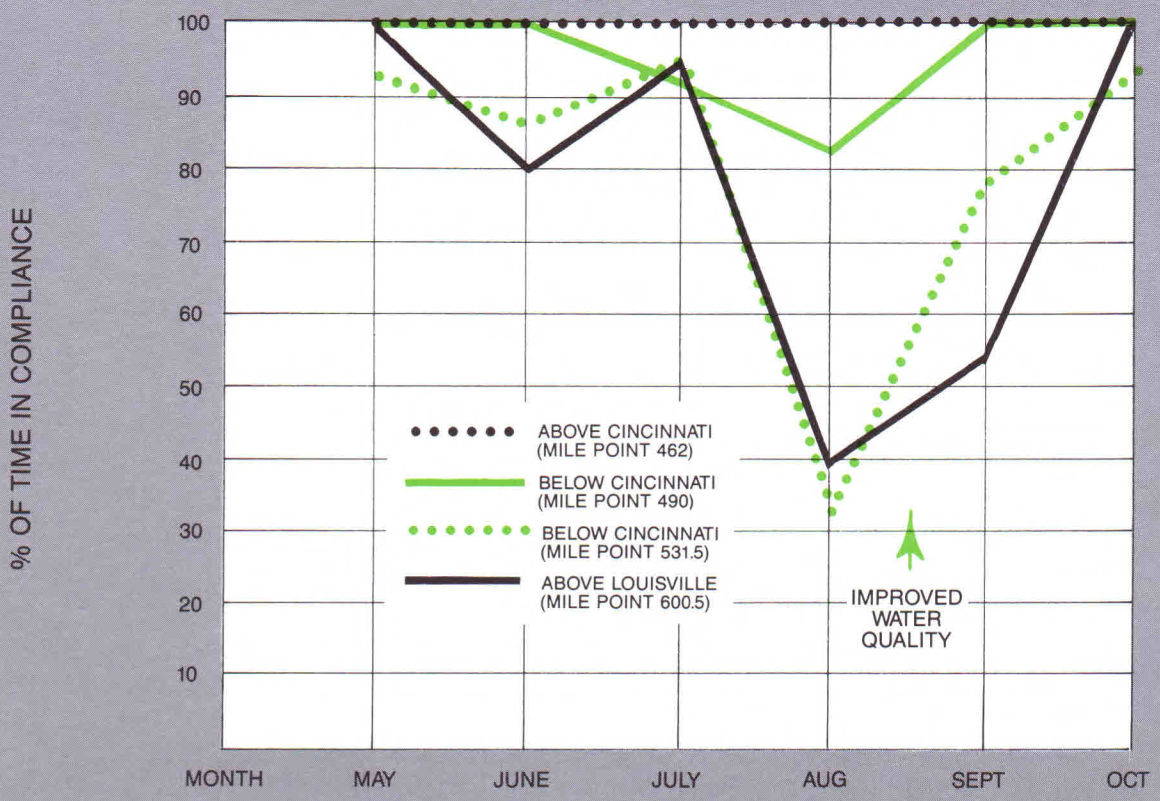
Dissolved oxygen conditions were more difficult to evaluate in 1982 because of the influence and variations in stream flow and temperature. Dissolved oxygen levels are normally lowest during the low flow, high temperature months of July, August and September. In 1982, however, flow was unusually low and temperatures relatively high in May. This caused dissolved oxygen levels to fall below Commission-recommended stream criteria in May. These conditions continued into June; then, heavy rains brought above normal flows and more moderate temperatures. Flow declined again in July and August, and this combined with seasonally warm temperatures to depress dissolved oxygen levels again. Continued low flows in September and October were offset somewhat by cooler temperatures. Overall, dissolved oxygen conditions showed slight improvement below Louisville, KY, but were significantly poorer below Cincinnati, OH, in 1982 than in previous years. This was due in part to low flow conditions, but the currently inadequate wastewater treatment in the Cincinnati area also contributed to the low dissolved oxygen levels. No fish kills were reported on the Ohio River mainstem during this period, however.

## MONTHLY FLOW AT CINCINNATI MAY–OCTOBER 1982 MP 460




## COMPLIANCE WITH DISSOLVED OXYGEN CRITERION

MIDDLE RIVER



# The Fish – Testimony to Clean Water

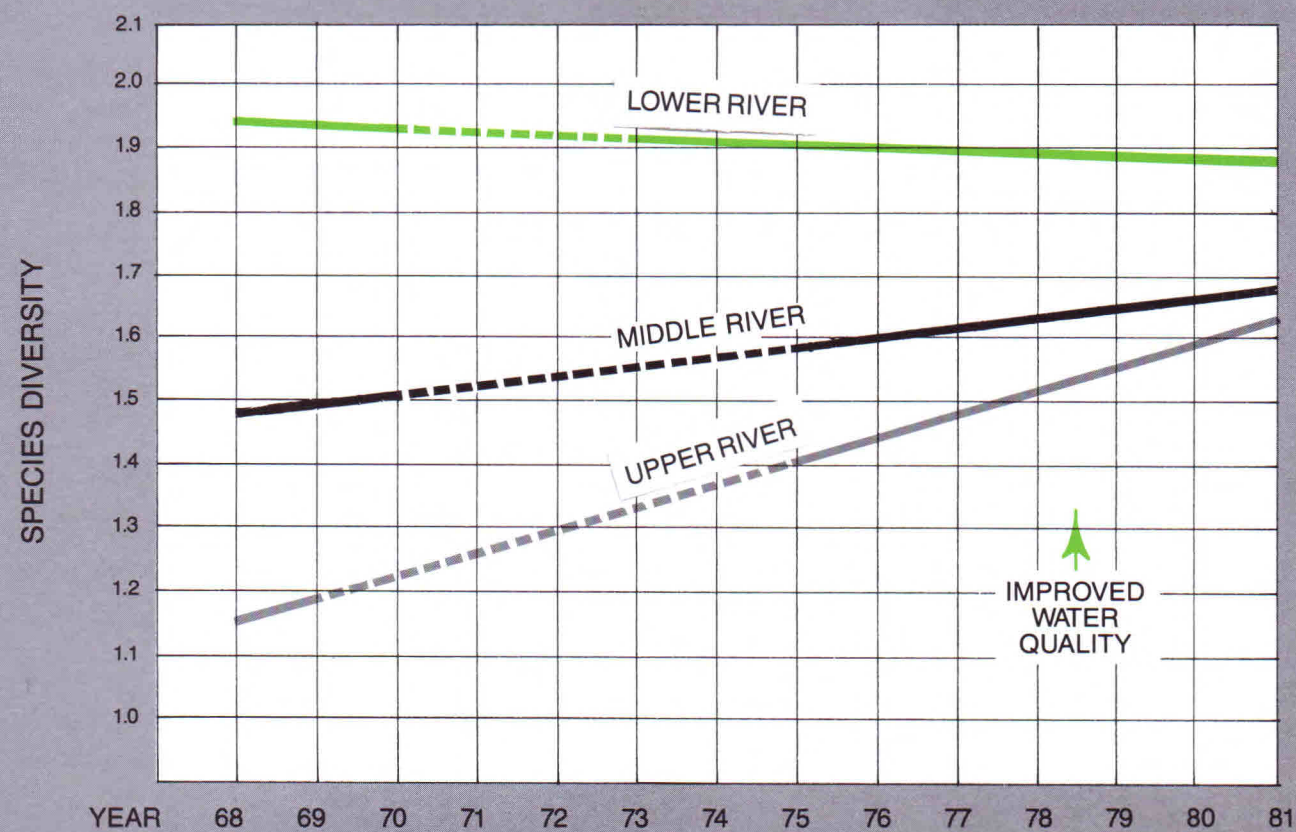
For many people in the Ohio Valley, clean water means good fishing.

A biennial Fish Population Survey provides most of the information used by the Commission to ascertain the effects of water quality on aquatic organisms. During this program, natural resources and environmental protection personnel from the states bordering the mainstem and federal agencies, working cooperatively with Commission staff, collect fish in Ohio River lockchambers, and identify, count and weigh them. The data thus collected are used to calculate the diversity of the fish found in the lockchambers in the upper, middle and lower segments of the Ohio River. Diversity is a measurement which accounts for both the number of species of fish present and the distribution of the fish over those species.

As shown by the graph, significant increases in the diversity of fish in the upper Ohio River have occurred since 1968. The rate of improvement has been greater in the upper river than in the other segments, as can be seen by the steepness of the upper river line. The diversity of the upper river fish community in recent years is now similar to that of the middle river. The middle river's diversity has also improved, but not as dramatically. The lower river's diversity has remained relatively constant and higher than that of the other segments.

The upper river however, presents the greatest potential for a highly diverse fish population, provided water quality conditions are supportive. The Ohio River in the upper segment and the tributaries there have relatively steeper gradients, faster moving waters and cooler water temperatures. These conditions are preferred by sport fish species.

Indeed, 11 more species of fish were found in the upper river lockchambers than in the other two segments according to the 1981 Fish Population Survey.




Dashed lines indicate years when Fish Population Surveys were not performed at certain sites.

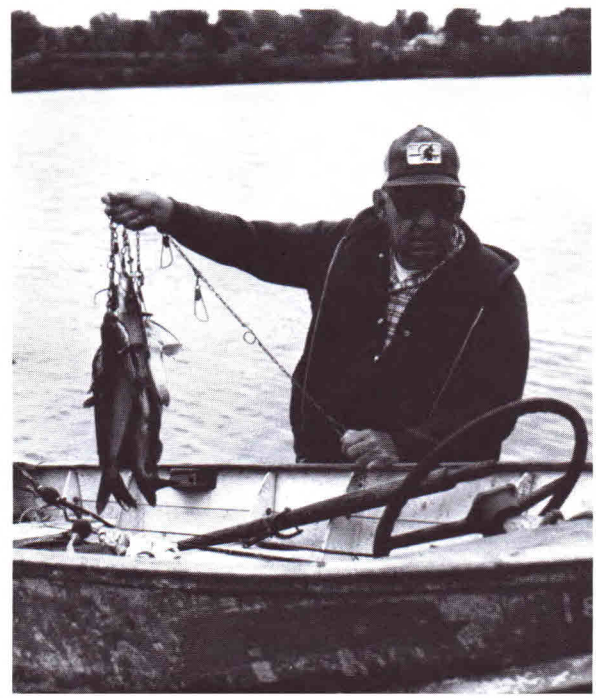
Species diversity calculated as described in Kaesler, R.L., et al., Use of indices of diversity in hierarchical diversity in stream surveys, in Dickson, et al., *Biological Data in Water Pollution Assessment*, ASTM, 1982.

Weighing in the catch at the National Bass Champs Cincinnati Invitational Contest, July, 1982

Photo courtesy Bass Anglers Sportsmen's Society

Some of these fish were Muskellunge and Tiger Musky, Troutperch, Banded Killifish and Stonecat. However, technically, the lower river segment retains a higher calculated diversity than the upper because of the distribution of the fish over the species present. In the lower river, the total number of fish are spread more evenly over the various species than in the other segments.

Photo by Bernard Dowler, West Virginia Dept. of Natural Resources



The fishing is great in West Virginia on the Ohio River

# The Organics Detection System...

## PROTECTING VITAL WATER SUPPLIES

In 1978, a unique system to protect Ohio Valley water supplies from the threat posed by chemical spills was unveiled. In 1982, the Organics Detection System (ODS) consisted of 11 stations, spaced strategically along the Ohio River and three of its major tributaries: the Allegheny, Monongahela and Kanawha Rivers. Daily samples from these sites are analyzed and data about certain organic contaminents are telecopied to Commission headquarters in Cincinnati, OH. If unusually high concentrations are found, state and federal agencies and downstream water utilities are notified in the time it takes to make a telephone call. An "early warning" system is thus in place; the three million Ohio Valley residents dependent upon the Ohio River for water supply can turn on their taps with substantially more confidence in the safety of their water. All this has been obtained for less than 17 cents per person using these supplies per year.

Each station can detect levels of halogenated purgeable organic compounds in river water in extremely minute amounts. These compounds include chloroform, carbon tetrachloride and a variety of industrial solvents commonly used in the Ohio Valley. At two of the stations, special detectors for purgeable aromatic compounds such as benzene and toluene are being tested. In addition, a monthly sampling program for 46 base-neutral compounds, such as the phthalates, takes place at each ODS site.

Besides providing an "early warning" to downstream water utilities and other users in the case of an unreported spill or accidental discharge, the ODS also supplements spill notification and response procedures in use by Valley state, local and federal agencies. When spills of chemicals detectable by the ODS are reported to these agencies, their movement in the rivers can be traced. "Time-of-travel" information needed by water utilities to institute measures to protect their supplies is thus provided.

Daily sampling at 11 sites in the Valley has resulted in the compilation of an extensive database on background levels of the compounds detected. These levels are almost always minute: out of the more than 3,000 samples taken in 1982, 90 percent contained organic chemical concentrations of less than one part per billion (one part per billion roughly corresponds to one second in 32 years). Only 23 samples contained more than 10 parts per billion.

In the period 1979 through 1982, six compounds were detected most frequently in the daily ODS sampling at the 11 sites. The average annual concentrations of these compounds have generally decreased over this period. The compounds are: Carbon tetrachloride; 1,1,1-Trichloroethane; Chloroform, Methylene chloride; Trichloroethylene; and Tetrachloroethylene.

In general, these chemicals are used as industrial solvents and all are suspected potential carcinogens, although the toxicity of each varies. The US Environmental Protection Agency (US EPA) has published ranges of potential hazard for each of these compounds. These ranges are based upon the probability of contracting cancer from exposure to these chemicals at various risk levels.

Summaries of these ranges are referenced below the graphs of the annual average concentrations of these six chemicals from all the ODS sites. Only those values above the detection limits of the ODS were included in the calculation of these averages.

*Carbon tetrachloride* has been found in decreasing amounts in the Ohio River and its tributaries. The average annual concentration of this chemical at the ODS sites in 1982 was almost *eight times less* than that found in 1979. St. Albans, West Virginia, on the Kanawha River, was where the highest levels of carbon tet were found. In 1982, the largest amount of this chemical detected at this station was below 10 parts per billion, however. Carbon tet has been severely restricted in permissable uses by various regulations.

The chemical that can substitute for cabon tet in many cases, *1,1,1-Trichloroethane,* is much less toxic. The average annual concentration of this chemical has remained relatively constant at the ODS sites over the last five years and, if detected, is usually found at concentrations of one part per billion or less. However, significantly high levels have been found on rare occasions in various places along the Ohio River: at Huntington, West Virginia, in 1979; Portsmouth, Ohio, in 1980; and St. Albans, West Virginia and Louisville, Kentucky, in 1981. The highest concentration found in 1982 was 12 parts per billion at St. Albans, West Virginia.

Levels of *Chloroform,* a very common organic chemical with both municipal and industrial sources, were found in 1982 at less than *one-sixth* of their average annual concentration in 1979. The average annual concentration for 1982 was 0.16 parts per billion. However, individual samples containing 16.9 and 18.5 parts per billion chloroform were taken in 1982 at St. Albans and Huntington, West Virginia, respectively.

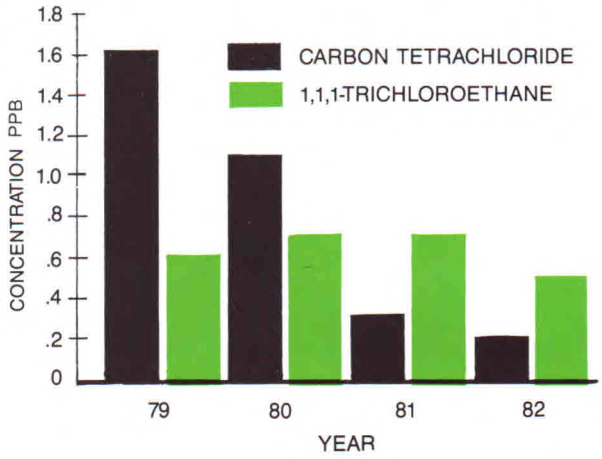
Average levels of *Methylene chloride,* a close relative of chloroform, were minute in 1979, rose significantly in 1980 and 1981, particularly at Parkersburg and St. Albans, West Virginia, and decreased somewhat in 1982. One-time maximum values above 10 parts per

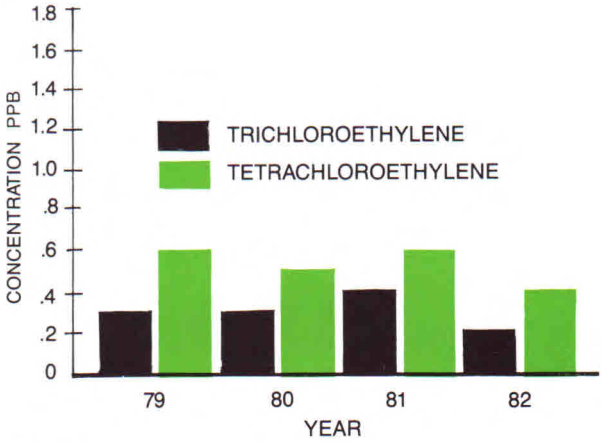
billion were found at West View, Pennsylvania, and Parkersburg, West Virginia, during 1982. Six other ODS sites reported maximum concentrations of this compound of between 1.0 and 10 parts per billion during 1982. The other three stations reported maximum values of less than one part per billion for this chemical.

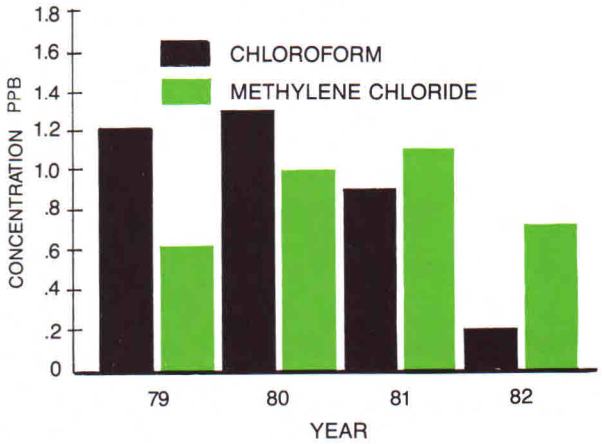
The two remaining compounds, *Trichloroethylene* and *Tetrachloroethylene,* have been found at average annual concentrations of less than one part per billion since the ODS began taking samples. In 1982, the maximum levels of these compounds reported were less than 10 parts per billion.

The Organics Detection System has been the subject of queries from all over the United States, as well as from Canada, Japan, China, New Zealand and several countries in Europe and South America. Visitors from many of these places have observed operations at ODS sites. It is a unique system, providing water supply protection through networking and interstate cooperation.

## AVERAGE ANNUAL CONCENTRATIONS AT ORGANICS DETECTION SYSTEM SITES




*The US Environmental Protection Agency has published ambient water quality criteria for these compounds as follows,*

*"for the maximum protection of human health from the potential carcinogenic effects due to exposure of [these chemicals] through ingestion of contaminated water and contaminated aquatic organisms, the ambient water concentrations should be zero based on the non-threshold assumption for these chemicals. However, zero level may not be attainable at the present time. Therefore, the levels which may result in incremental increase of cancer risk over the lifetime are estimated at $10^{-5}$, $10^{-6}$, and $10^{-7}$" (or, one in 100,000, one in one million and one in ten million, respectively).**

*For the compounds of interest, the US EPA provides the corresponding ranges of potential hazard as follows:*

| Compound* | Recommended Concentration at Specified Risk Level * | | |
|---|---|---|---|
| | $10^{-5}$ | $10^{-6}$ | $10^{-7}$ |
| Carbon tetrachloride | 4.0 ppb | 0.4 ppb | 0.04 ppb |
| 1,1,1-Trichloroethane | 18.4 parts per million (no other levels given) | | |
| Chloroform** | 1.9 ppb | 0.19 ppb | 0.019 ppb |
| Methylene chloride (Chloromethane) | 1.9 ppb | 0.19 ppb | 0.019 ppb |
| Trichloroethylene | 27.0 ppb | 2.70 ppb | 0.27 ppb |
| Tetrachloroethylene | 8.0 ppb | 0.80 ppb | 0.08 ppb |

*Documents # EPA 440/5-80-026; EPA 440/5-80-029; EPA 440/5-80-033; EPA 440/5-80-051; EPA 440/5-80-077; and EPA 440/5-80-073, respectively, all dated October, 1980.
**Chloroform is a trihalomethane and present US EPA requirements for drinking water permit up to 100 ppb of trihalomethanes.

## RECORD OF UNUSUAL EVENTS DETECTED BY ODS, 1978-82

| | | | |
|---|---|---|---|
| 1978: | Wheeling, WV | May 23 | Chlorinated ethanes and ethylenes |
| | St. Albans, WV | May | Chloroform,<br>Carbon tetrachloride |
| | Pittsburgh, PA | June | Phthlate esters |
| | St. Albans, WV | Nov. 27-28, | Chloroform,<br>Carbon tetrachloride,<br>Other chlorinated ethanes and ethylenes |
| 1979: | St. Albans, WV | Feb. 12-19 | Dichloroethane<br>Chloroform<br>Carbon tetrachloride |
| | Pittsburgh, PA | February 20-24 | Tetrachloroethylene<br>1,1,1-Trichloroethane<br>Other chlorinated ethanes and ethylenes |
| 1980: | Wheeling, WV | February 8 | Tetrachloroethylene<br>Chloroform |
| | St. Albans, WV | June 11-12 | Chloroform |
| | St. Albans, WV | August 11 | Chloroform |
| 1981: | No Unusual Events Detected | | |
| 1982: | No Unusual Events Detected | | |

# *Wastewater Treatment —*

## OHIO RIVER MAINSTEM

More than 430 municipalities and industries have permits to discharge their treated wastes to the Ohio River. The Commission's Wastewater Treatment Status List tracks 269 of these.* Of these plants, 139 are industrial and 130 are municipal wastewater treatment plants.

The most recent update of the Status List (1981) indicated that 50, or 39 percent, of the 130 municipal plants need upgrading to secondary treatment, as required by Commission and federal regulations. Currently, these plants are providing primary (settling) or some intermediate form of treatment to their communities. When these plants are upgraded to secondary treatment, an estimated load on the river of approximately 58,000 pounds per day of biological oxygen demand (BOD) will be removed.**

Industrial plants requiring upgrading number 8, or 6 percent of the 139 plants included in the Status List. Industrial wastewater facilities are relatively flexible in the manner by which they may comply with their wastewater discharge requirements. Sometimes, only a minor change in industrial processes is necessary to solve a problem.

Upgrading or meeting discharge requirements from municipal wastewater treatment facilities is usually far more difficult. Municipalities are placed on a state priority list for receiving funds under the federal Construction

Grants Program. To qualify for such funds, municipalities must also follow a stepwise program of developing wastewater treatment plant studies, followed by designs and finally, construction of the facility. This series of steps can take up to 10 years depending upon the availability of funds.

Two-thirds of the 50 municipal plants currently needing upgrading are only in the earliest stages of the studies phase of the Construction Grants Program. The remaining one-third are in either the design or construction phase; the facilities currently under construction will serve about 250,000 people.

When secondary treatment is effective, 85 percent or more of the biological oxygen demand (BOD) is removed from the wastewater handled by the treatment plant. Basically, BOD is a measure of the oxygen requirements of microorganisms in metabolizing or breaking down organic material. Thus, by removing most of the BOD from wastewater, a treatment plant cleanses the water — or removes most of the organic material. If the wastewater is returned to the river with excessive organic matter remaining in it, microorganisms will utilize the matter as food and use oxygen dissolved in the water in the process of metabolism. This can deplete the dissolved oxygen, which can result in stress on other aquatic organisms, including fish. This is why effective secondary treatment is so essential and important in improving water quality. Secondary treatment is also effective in removing a substantial portion of the toxic material in wastewater.

As mentioned earlier in this report, during times of high temperature and low river flow, pollutants can concentrate and low dissolved oxygen result. Areas of the river below cities can and have experienced dissolved oxygen levels below criteria limits. A contributing factor to this is lack of, incomplete or ineffective treatment at municipal treatment plants.

*Criteria for inclusion:
- Facility treats domestic sewage in amounts over 40,000 gal/day;
- *Or* facility is industrially owned or operated and treats wastes in amounts of more than 40,000 gal/day;
- *And* the facility is treating for more than temperature adjustment;
- *And* the facility is not related to coal preparation.

**The estimated load is based upon the estimated population served by the plants; the average figure of 0.2 pounds of BOD contributed to the waste flow per person per day; and the difference in BOD removal between secondary and primary treatment.

MUNICIPAL/PRIVATE DOMESTIC WASTEWATER TREATMENT(1)
ALONG THE OHIO RIVER
*Status of Existing Physical Facilities*

| | IL | IN | KY | OH | PA | WV | TOTAL |
|---|---|---|---|---|---|---|---|
| Existing Municipal and Privately Owned Domestic Facilities | 7(a) (18,000)(b) | 19 (246,000) | 19 (882,000) | 34 (896,000) | 20 (1,190,000) | 31 (335,000) | 130 (3,587,000) |
| Physical Secondary Facilities in Place | 4 (4,000) | 15 (234,000) | 14(2) (829,000) | 14(3) (755,000) | 19(4) (1,189,000) | 14 (47,000) | 80 (3,058,000) |
| Physical Primary Facilities in Place | 3 (14,000) | 4 (12,000) | 5 (53,000) | 20 (141,000) | 1 (1,000) | 17 (308,000) | 50 (529,000) |
| Status of Associated Projects: | | | | | | | |
| • No Action/Preliminary/ Under Study | 1 (6,000) | 3 (11,000) | 1 (9,000) | 15 (88,000) | 1 (1,000) | 12 (109,000) | 33 (224,000) |
| • Designs in Progress | 2 (8,000) | 1 (1,000) | 0 ( - ) | 4 (46,000) | 0 ( - ) | 2 (7,000) | 9 (62,000) |
| • Under Construction | 0 ( - ) | 0 ( - ) | 4 (44,000) | 1 (7,000) | 0 ( - ) | 3 (192,000) | 8 (243,000) |

(a) Number of Facilities
(b) Estimated Population
(1) Source — ORSANCO 1981 Basinwide Wastewater Facilities Survey. Facilities surveyed do not include privately-owned facilities treating flows less than 40,000 gal/day.
(2) This includes Louisville MSD — Morris Forman Plant, which provides service to approximately 500,000 people. Secondary facilities have functioned on a limited basis.
(3) This includes Cincinnati MSD — Mill Creek Plant, which provides service to approximately 500,000 people. Secondary facilities have functioned on a limited basis.
(4) This includes Allegheny County Sanitary Authority, which provides service to approximately 1,000,000 people. Secondary facilities are effective.

# Energy and Water Quality on the Ohio River

## Hydropower on the Ohio

The high lift dams which control the flow on the Ohio River to guarantee year-round navigation can also be utilized for the production of electricity by hydrogeneration. Currently, permits have been issued for the additional construction and operation of such hydropower facilities at each of the dams to various municipalities and power companies. Already, four of these facilities are operating — at Racine, Greenup, Markland and McAlpine Dams.*

The installation of these facilities at Ohio River dams will have an effect upon water quality, particularly during periods of low flow. An *ad hoc* committee of hydropower permit holders, the US Army Corps of Engineers and the Commission has been formed to develop methods of preventing problems. Recommended is the installation of Electronic Monitors at each of the hydropower sites to provide information on dissolved oxygen levels in the river. Provision for re-aeration of the waters after their use for hydropower generation may also be necessary.

The Electronic Monitors would indicate the impact of the hydropower facilities on downstream water quality. Monitors have been installed at Markland and Racine Dams. The goal is for each hydropower facility to be included in the Commission's Electronic Monitor system. Thus, data on dissolved oxygen and temperature would be available from all of these sites on a continuous basis.

## The States and Energy Siting

Energy production has played a major role in the economy of the Ohio Valley for many years. The requirements for energy production are met here: abundant water, extensive transportation systems, proximity to fuel supplies and population centers and trained workforce.

Energy production and the development of energy facilities also carry the potential for adverse environmental impact. These impacts do not necessarily remain within the boundaries of the state in which the energy facility is located, however.

The Commission in 1978 investigated Ohio Valley states' programs in energy facilities siting. Later, in 1981, the Commission received a grant from the New York City-based John A. Hartford Foundation to fund a project investigating methods or institutional mechanisms to deal with environmental issues of regional concern during energy facilities siting.

The Council of State Governments was contracted as principal investigator to carry out the one-year project. The results were published in *The States and Energy Siting.***

The recommendations resulting from the study are:

1. Encourage greater public awareness of the significance of energy development for the states and the region through a regional symposium, bringing together key public officials, industry representatives from all economic sectors and citizens to begin a dialogue on energy development and its implications for the economic well-being and environmental health of the valley states.
2. Establish a central communication channel for policy concerns and technical issues in order to facilitate early and open communication among affected states, developers and citizens.
3. Use the National Environmental Policy Act (NEPA) process as an effective procedural vehicle for solving facility specific/multistate problems. Affected states would participate as cooperating agencies and devote adequate resources for early and active participation.
4. Establish a regional environmental mediation center to facilitate communication and negotiation among industry, public, and governmental disputants on selected multistate siting and other energy and environmental conflicts.
5. Use a multistate forum to encourage identification and continuing discussion of shared regional issues in the valley states that call for individual and cooperative state action.

*near Pomeroy, OH, near Portsmouth, OH, below Cincinnati, OH, and at Louisville, KY, respectively

** *The States and Energy Siting*, vol. 1: Main Report, and vol. 2: Appendices, available for $14 each from The Council of State Governments, Iron Works Pike, Lexington, KY 40578

6. Establish a regional association of state air quality officials to identify and assess shared and long-term air quality concerns and to identify opportunities for coopera tive action.

7. Improve each state's ability to anticipate and address regional issues through development of state policies and goals for energy and natural resource development and through analyses which allow it to identify those broad candidate regions for future energy development and avoidance areas which reflect its particular needs and concerns.

In September, 1982, Commission actions commended the report to the Governors of the member states and approved the establishment of an Energy Roundtable, which would incorporate the purposes of recommendations 2 and 5, as they relate to water quality.

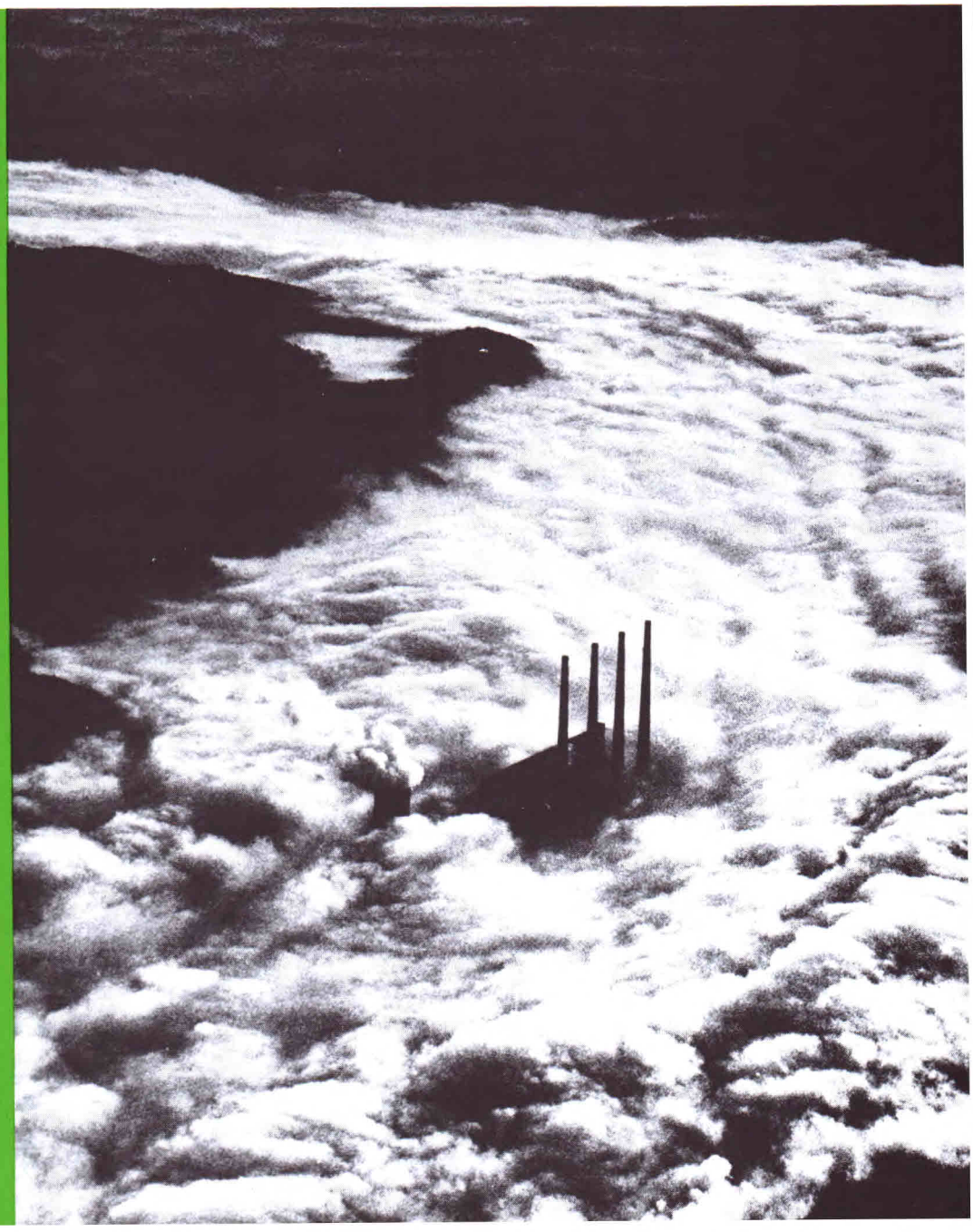
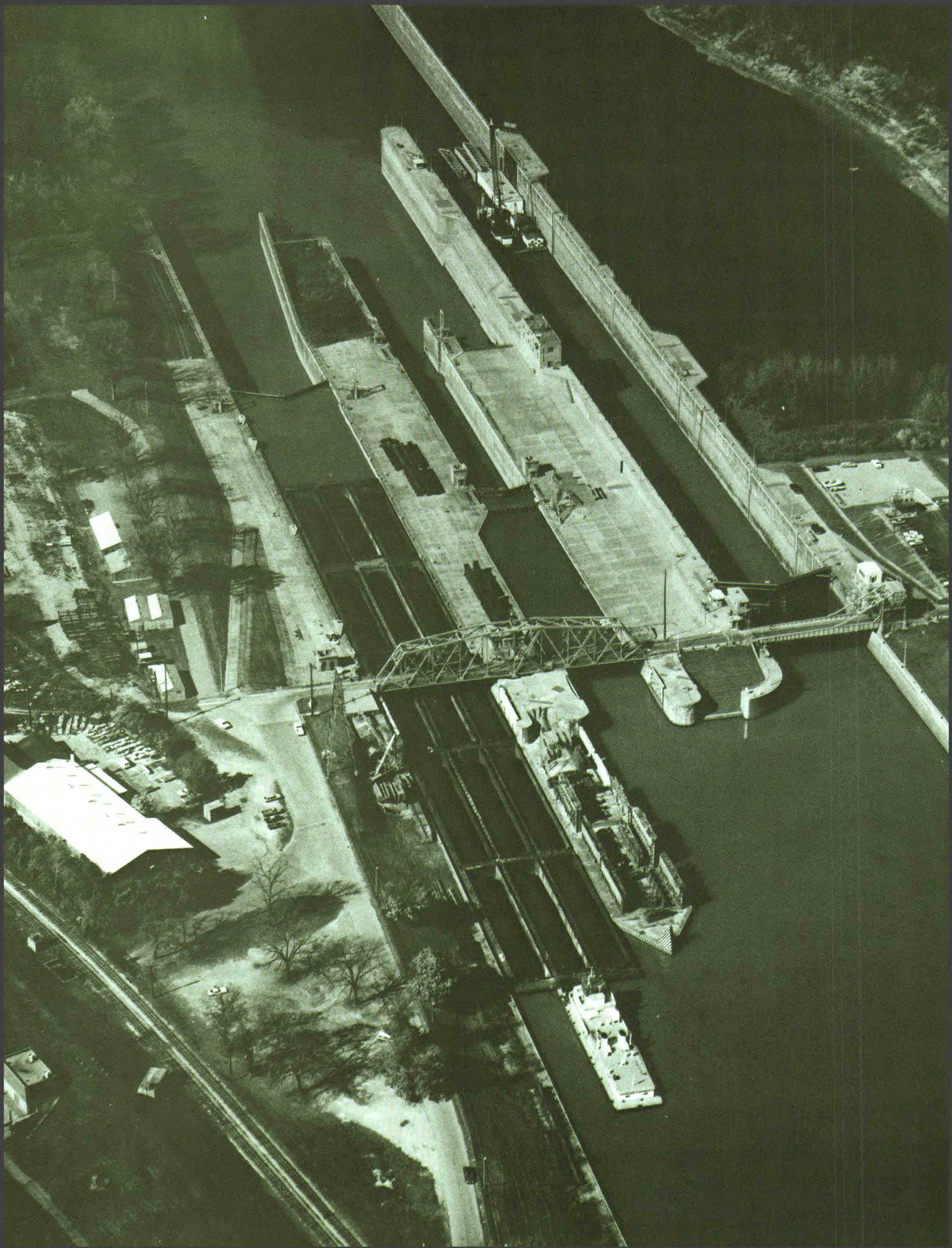


*Photo courtesy the Louisville Courier-Journal*



# The Year in Brief...

At a Commission meeting, Chairman Lloyd N. Clausing reviewed the purpose and heritage of the Commission. His remarks are reprinted here because they succinctly outline the key factors upon which the Commission's authority and programs are based.

"While the eight Ohio Valley member states were blessed with federal permission to form a Compact and the Compact document itself was ratified by the Congress, the Commission's authority is deeply rooted in the member state legislatures. Our purpose as stated in the Compact is the control of existing and abatement of future water pollution in the Compact District. We are directed to assess the pollution problem and report on our activities each year to the member state governors; we are also asked to recommend legislation to the governors. Our regulatory authority . . . is the control of discharges to streams so that discharges from facilities in one state will not impair water use by another state. To do this we work closely with a number of federal agencies: the US Army Corps of Engineers, US Environmental Protection Agency and US Geological Survey. But first and foremost, the Commission is an instrument of the states.

"The need to protect the health and well being of the people of the Ohio River Valley through a cooperatively organized Commission can be traced to the perception of a Cincinnati Chamber of Commerce Committee concerned with environmental cleanup almost 50 years ago. The creation and development of the Commission was, in my view, one of the finest examples of grass-roots public participation and cooperative action to solve an interstate problem in the history of the nation. This effort is continued today by you as commissioners, appointees of the Governors of the eight member states and the President. You Commissioners represent the public intent in implementing the Compact."

## The Commission

Three representatives from each of the member states and three representatives of the federal government are appointed by their respective governors and the President to serve on the Commission. Commissioners participate as a public service and receive only reimbursement for their expenses in performing Commission-related duties.

Lloyd N. Clausing of Ohio was elected Chairman of the Commission for the period July 1, 1982–June 30, 1983. Frank C. Campbell of Kentucky was elected Vice-Chairman. David W. Robinson of West Virginia and Paul Emler, Jr. of Pennsylvania were elected Secretary and Treasurer, respectively.

Watkins M. Abbitt and David H. Miller were appointed by Governor Robb to represent Virginia on the Commission. Cordell McGoy and Joseph H. Harrison were appointed by Governors Thompson and Orr to fill vacancies in representation from Illinois and Indiana, respectively. A vacancy in federal representation was filled by President Reagan's appointment of Charles R. Jeter, Regional Administrator, US EPA, Region IV.

*Locking through in the middle river* *Photo courtesy the Louisville Courier-Journal*

*Governor Orr of Indiana addressed the Commission at its September meeting in Indianapolis*

*Commission photo by Thea Teich Townsend*

## Publications

The following reports were published by the Commission in 1982 and are available from the Commission office:

Annual Report: 1981
The Commission's review of activities during 1981 (20 pages, no charge)

Assessment of Water Quality Conditions: Ohio River Mainstem, 1980-81
A summary of mainstem water quality data (95 pages, $6.00, plus $2.50 postage and handling)

Monitoring Strategy for the Ohio River and Lower Reaches of Major Tributaries
The strategy for Commission monitoring programs in the Ohio Valley ($3.50 plus $2.50 postage and handling)

In Progress
An occasional newsletter on the "Institutional Mechanisms and the Siting of Energy Facilities Along The Ohio River" study. Final issue (no charge).

Quality Monitor
Data from Electronic Monitoring program, published monthly. Manual sampling data included quarterly. (8 pages except January, April, July, and October issues, which are 16 pages, (no charge).

Report and Notification of Spills and Accidental Discharges, revised 1982.
A compilation of instructions on the appropriate agencies to notify when a spill or accidental discharge occurs on the Ohio River or tributary. (8 pages, no charge).

## Staff*

### administration

Leo Weaver, *Executive Director and Chief Engineer*
William L. Klein, *Assistant Executive Director*
Thea Teich Townsend, *Information Specialist*
Richard L. Herd, *Accountant/Office Manager*
Kathi Allender Cobb, *Account Clerk*
Ruth M. Lindemann, Janice Squires, *Secretaries*

### technical services

Gerald P. Brezner, *Manager*
Linda C. Shumway, *Environmental Specialist*
Peter A. Tennant, *Water Resources Engineer*
Alan H. Vicory, Jr., *Environmental Engineer*
Marilyn P. Kavanaugh, *Secretary*

### surveillance

Glenn E. Moore, *Manager*
John L. Keyes, *Senior Surveillance Specialist*
Robert D. Timmerman, Jr., *Surveillance Specialist (Evansville, IN)*
Glenn E. White, *Surveillance Specialist (Moundsville, WV)*
Donna M. Carroll, *Computer Operations Specialist II*
Millie S. Woolwine, *Computer Operations Specialist I*
Janis R. Flick, *Assistant Chemist*
Douglas Adams, *Laboratory Technician (Pittsburgh, PA)*
Daniel Donaldson, *Laboratory Technician (Pittsburgh, PA)*
Lillian G. Revenco, *Secretary*

*as of March 31, 1983

*Art: Ray Loos*

# Financial Report

*The following information relative to revenues, expenses, and statement of resources was extracted from the Annual Auditors Report of Clark Schaeffer Hackett & Co., Certified Public Accountants, for the year ended June 30, 1982.*

## THE OHIO RIVER VALLEY WATER SANITATION COMMISSION

### STATEMENT OF REVENUES AND EXPENSES
### YEAR ENDING JUNE 30, 1982

| | | |
|---|---|---|
| Revenues | | |
| Signatory States: | | |
| State of Illinois | $ 30,240 | |
| State of Indiana | 111,660 | |
| Commonwealth of Kentucky | 124,800 | |
| State of New York | 6,360 | |
| State of Ohio | 153,780 | |
| Commonwealth of Pennsylvania | 87,720 | |
| Commonwealth of Virginia | 20,520 | |
| State of West Virginia | 64,920 | |
| Total—Signatory States | | $ 600,000 |
| U.S. Environmental Protection Agency: | | |
| Water Pollution Control Grant | | 314,142 |
| U.S. Army Corps of Engineers: | | |
| Electronic Monitoring Support | $ 67,500 | |
| Allegheny and Pittsburgh District Support | 51,550 | |
| Total—U.S. Army Corps of Engineers | | 119,050 |
| The John A. Hartford Foundation, Inc. | | 98,155 |
| Water Utilities | | 1,000 |
| Other Revenues | | 18,544 |
| Total Revenues | | $1,150,891 |
| Expenses | | |
| Basic Program | $979,027 | |
| Energy Facility Siting Study | 103,499 | |
| Waste Treatment Plant Discharge Study | 1,000 | |
| Total Expenses | | $1,083,526 |
| Excess of Revenues Over Expenses | | $ 67,365 |

### STATEMENT OF RESOURCES AT JUNE 30, 1982

| | | |
|---|---|---|
| Cash | $110,199 | |
| Deposits | 746 | |
| Accounts Receivable | | |
| Signatory States | 20,520 | |
| U.S. Environmental Protection Agency | 30,930 | |
| Employee Advances | 1,127 | |
| Total Resouces | | $163,522 |
| Less: | | |
| Accounts Payable | $ 29,150 | |
| Accrued Expenses | 5,000 | |
| Deferred Income—States | 30,000 | |
| Total | | 64,150 |
| Available Resources | | $ 99,372 |

## Regulatory Agencies of the Signatory States

### ILLINOIS
Division of Water Pollution Control
Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706
(217)-782-1654

### INDIANA
Stream Pollution Control Board
State Board of Health
1330 West Michigan Street
Indianapolis, Indiana 46206
(317) 633-0700

### KENTUCKY
Division of Water Quality
Department for Natural Resources
and Environmental Protection
18 Reilly Road
Fort Boone Plaza
Frankfort, Kentucky 40601
(502) 564-3410

### NEW YORK
Division of Water
Department of Environmental
Conservation
50 Wolf Road
Albany, New York 12233
(518) 457-6674

### OHIO
Office of Wastewater Pollution Control
Environmental Protection Agency
Post Office Box 1049
Columbus, Ohio 43216
(614) 466-7427

### PENNSYLVANIA
Bureau of Water Quality Management
Department of Environmental Resources
Post Office Box 2063
Harrisburg, Pennsylvania 17120
(717) 787-2666

### VIRGINIA
State Water Control Board
Post Office Box 11143
Richmond, Virginia 23230
(804) 257-0056

### WEST VIRGINIA
Division of Water Resources
Department of Natural Resources
1201 Greenbrier Street
Charleston, West Virginia 25311
(304) 348-2107

OHIO RIVER VALLEY WATER
SANITATION COMMISSION

414 Walnut Street
Cincinnati, Ohio 45202