



Healing A River **THE POTOMAC:** **1940-1990**

Interstate Commission
on the Potomac River Basin

The formation of the Interstate Commission on the Potomac River Basin resulted after years of effort. In 1935, the Special Advisory Committee on Water Pollution of the National Resources Committee recommended establishment of a Potomac River Conservancy District as a demonstration unit for basin-wide study, coordination and stimulation of pollution control. The following year, the Rivers and Harbors Committee of the Washington Board of Trade suggested that a special body be created "to give publicity to, and aid in," the elimination of pollution from the Potomac River. As a result, the Potomac Valley Joint Conference on River Pollution was organized. The joint conference drafted a compact in late 1938 for submission for review by the respective state commissions. The Council of State Governments assisted, and agreement was reached in early 1939. The compact was then approved by the state legislatures, and was submitted to the Congress.

From the very beginning, the Commission has had no police powers. It was never intended to carry out pollution abatement, but was meant to be a fact-finding and coordinating agency for the basin. Crucial to its success has been the development

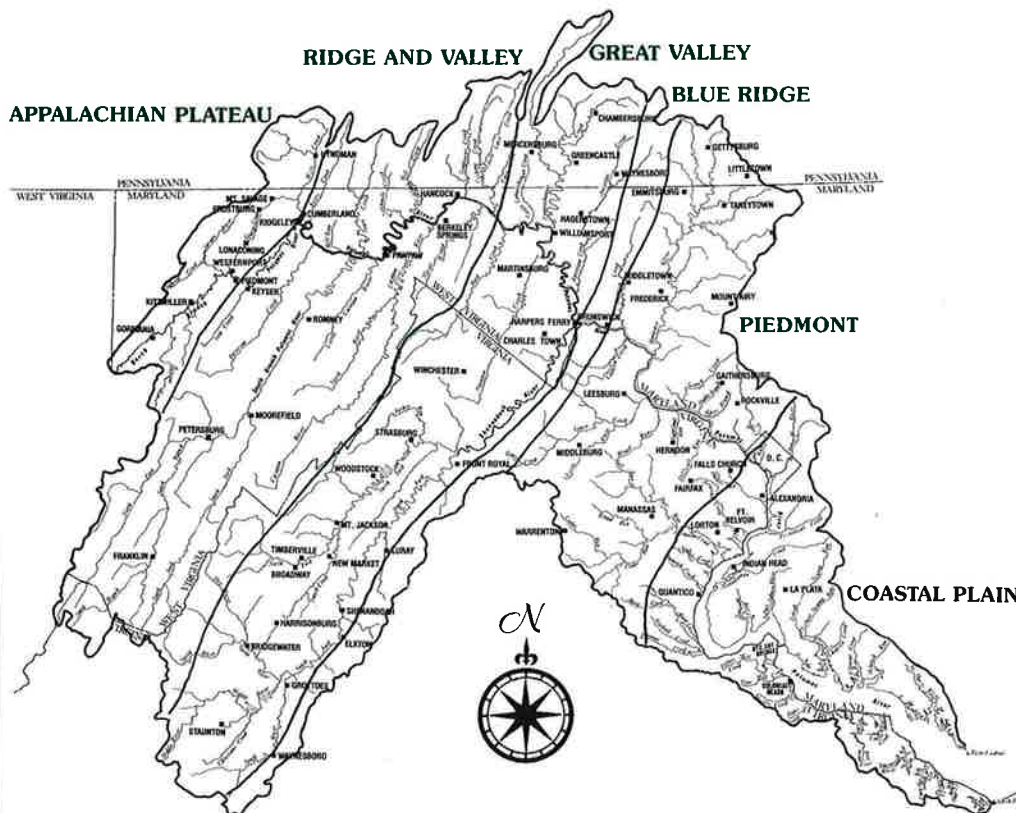
of close relationships with the pertinent state agencies, as well with the public. Its fundamental philosophy was clearly revealed in the early 1940s, when there was much discussion about valley authorities for all of the nation's river basins. ICPRB took the position then in opposition to centralized planning and control, a position it has maintained: "This Commission is of the belief that . . . local, state, and federal agencies can best develop a river basin through cooperative efforts, providing there is some coordinating body for the basin."

It's obvious to say that much has changed since 1940: The basin's population has grown from 1.7 to 4.6 million; floods, droughts, and issues have come and gone; we've gone from the lean times of a nation at war to an affluent society; public attitudes have gone from accepting the rivers as the "logical place for [waste] disposal" to a clean water commitment; and our understanding of the ecosystem of the basin has grown enormously, accelerated with the help of new technology. With all of these changes, the purpose of the Commission to serve, and to help create a national showcase of the Potomac River has remained the same.

The Interstate Commission on the Potomac River Basin was established under interstate compact and by an Act of Congress in 1940. Members of the Commission are the signatories to the Compact (District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia) and the federal government.

ICPRB's mission was expanded in 1970 to include all water and related land resources in the basin, as well as water quality. The Commission assumes the following roles and functions:

- Interstate and basin-wide coordination;
- Stimulation of federal and state action;
- Basin-wide water-quality monitoring evaluation, and conduct of other water-related studies;
- Meaningful liaison with citizen and government groups;
- Dissemination of information about the Potomac; and
- Provision of unique services and technical support to the Compact members.



THE BASIN: Drainage area includes 14,670 square miles in four states: Maryland (3,818 sq.mi.); Pennsylvania (1,570 sq.mi.); Virginia (5,723 sq.mi.); West Virginia (3,490 sq.mi.); and the District of Columbia (69 sq. mi.).

LENGTH: 383 miles from Fairfax Stone (W. Va.) to Point Lookout (Md.).

MAJOR TRIBUTARIES:

Shenandoah, South Branch, Monocacy, Savage, Cacapon, and Occoquan Rivers; Antietam and Conococheague Creeks.

MAJOR CITIES:

Gettysburg, Pa.; Rockville, Cumberland, Hagerstown, and Frederick, Md.; Alexandria, Front Royal, and Harrisonburg, Va.; Harpers Ferry and Martinsburg, W.Va.; Washington, D.C.

POPULATION: Approximately 4.6 million; 3.7 million in Metropolitan Washington Area.

The Interstate Commission on the Potomac River Basin (ICPRB) represents the foresight of those who realized that to provide for the protection and use of a river that drains parts of five political jurisdictions, a coordinated effort by the basin states and the federal government was needed. The Commission was one of the first organizations in the nation established to coordinate and stimulate water resources efforts on a regional scale. For 50 years, ICPRB has worked on the Potomac's problems from a basin-wide perspective.

After years of coordinated effort by the jurisdictions comprising the Commission and the spending of \$1.6 billion for wastewater treatment plant construction alone, the results have been significant. In addition to quenching the thirst of over three million residents in the metropolitan area, the river has rebounded to provide recreational opportunities such as boating, fishing, and other pleasures all along its course. The estuary also supports commercial fisheries.

Since the formation of the Commission, there has been a revolution in the attitudes of citizens and their governments with respect to the Potomac's waters. An increased public demand for clean waters, and responsive signatories who gained the necessary resources and expertise to protect the environment, allow the commemoration of the river's resurgence this year. Great progress has been achieved, but the efforts of the Commission are far from over. New problems for the river emerge as the population continues to grow. In concert with the states, the Commission will continue to try to help solve these problems, which are also the challenges of the Chesapeake Bay restoration.

PHYLLIS M. COLE
Chairman, 1989-90

Paraphrasing Tennyson, people may come and people may go, but the Potomac River flows on forever. The theme of the Commission's commemorative publication is the story of healing of the river over the last 50 years. The Commission played a significant role in this story that is one of cooperation, coordination, hard work, dedication, and above all, commitment by the signatories of the 1940 Interstate Compact.

We would wish that when the Commission hits the century mark, the waters of the Potomac are running clear and clean, and teeming with fishes. If the lessons of the past half-century are not forgotten, there are no barriers against restoring the Potomac on a par with Captain John Smith's observations.

The Interstate Commission on the Potomac River Basin is prepared to meet this challenge.

LEE ZENI
Executive Director



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1940s

On July 11, 1940, the U.S. Congress gave its consent to the compact that allowed the states of the Potomac River Basin with a "common interest; common responsibility" to create the Potomac Valley Conservancy District and establish the Interstate Commission on the Potomac River Basin (ICPRB). Virginia was the first to sign the compact in 1940, followed by Maryland, the District of Columbia, and West Virginia in 1941, and Pennsylvania in 1945. While an interstate instrument, the compact reflected the need for federal government guiding principles and financial assistance.

In 1940, the basin's population was 1.7 million, approximately half of which were living in or near the vicinity of Washington D.C. In the first comprehensive survey of the Potomac basin's water resources, the Commission stated in 1943 that only nine percent of that population was served by complete (secondary) sewage treatment plants, 80 percent was served by primary treatment plants, and about eleven percent was without any treatment facilities.

Serious water-quality problems were apparent in all of the basin's fifteen major cities, but the three main trouble spots were the Luke-Cumberland, Md. area, along the Shenandoah River where development had recently begun, and in Washington, D.C.

Most of the basin's residents, however, were dependent on the Potomac and its tributaries for their daily water supply. The Commission's mid-decade findings revealed that 184 supplies were taken from surface streams, 131 of these were public water systems, and the balance served industries.

The wastewater treatment plant located within the District of Columbia at Blue Plains was a primary plant, designed basically to settle solids from 130 million gallons per day (mgd) of combined storm and sanitary sewer waters before discharging them to the river. Its capacity had been planned for 650,000 people and was believed

to be adequate until 1950, but the plant was overloaded soon after it began operating in 1938, and the wartime population explosion would stress its capacity still further. By 1943, the District population had swollen to 1.3 million. The plant had to be expanded to 175 mgd in 1949, but its capacity was still running behind loadings, and the resulting sludge from the Blue Plains plant was becoming a problem itself.

The other smaller existing plants in the metropolitan Washington area also were woefully inadequate. The Bladensburg, Md. plant, for example, received the sewage of 100,000 people, partially treating half and discharging the other half raw into the Anacostia.

In the upper basin, an estimated 173,000 pounds of acid from abandoned coal mines were added daily to sewage burdens, and many North Branch Potomac streams were left barren and devoid of aquatic life.

There was considerable siltation resulting from poor farming practices above the Nation's Capital, particularly in the Monocacy and Goose Creek watersheds, and silt-producing tobacco farming was still the principal crop in the lower Potomac. By 1949, the annual "mud load" into the Potomac would be put at well over 1.7 million tons.

Since the 1920s, the Potomac at the Nation's Capital had experienced a series of nuisance plant infestations dominated by the water chestnut. In the 1940s, the latter was replaced with Eurasian water milfoil and a small incidence of blue-green algae. Complaints about mosquito-filled mudflats and swamps below the District increased; attempts were made to cover them with oil or simply fill them in.

It was found that almost all areas depended to some extent on water for recreation, and fishing popularity grew steadily during this decade. Commercial fishing was carried on in the lower portion of the tidal Potomac and its tributaries, but was steadily

declining. The decline was compounded by political conflict over Maryland and Virginia fishing rights.

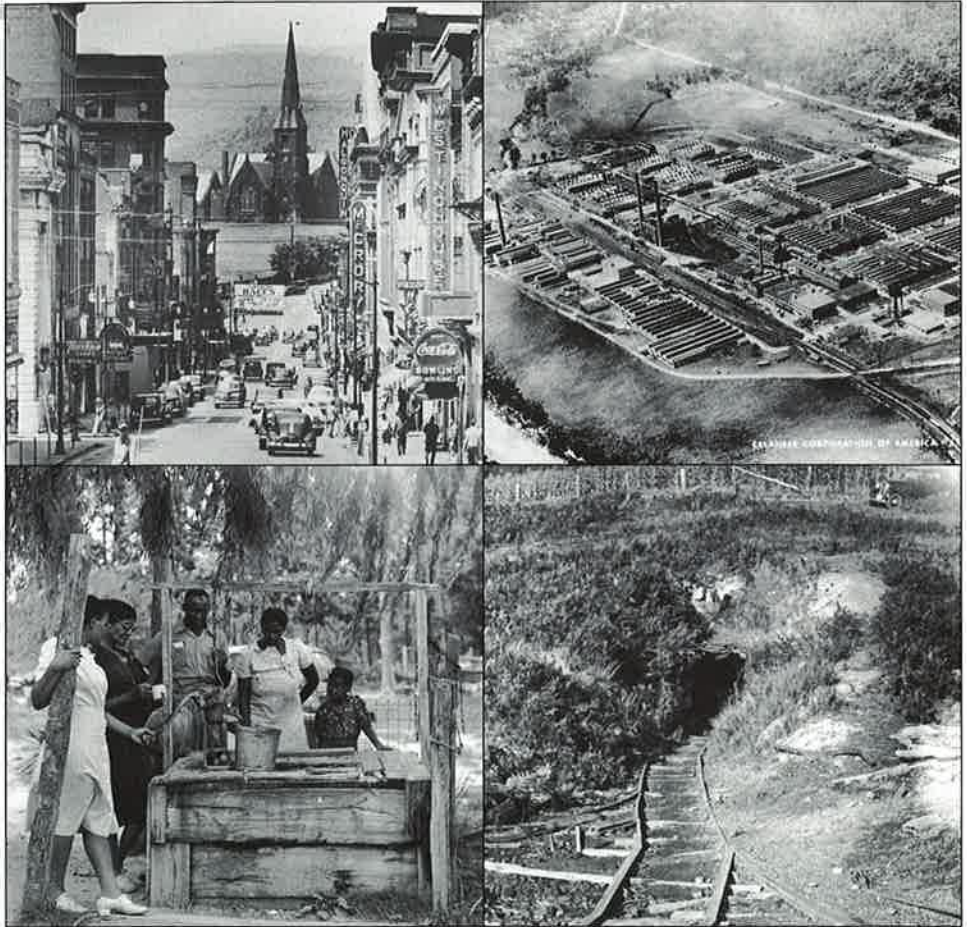
The Commission worked to help solve these problems. A range of basin state professionals participated in ICPRB's first and fundamental step to identify and map the basin's conditions, and to amass sparse data, particularly from industries. The next major step was its proposed water-quality criteria and "standards map," adopted by the states in 1946. Because of the lack of good information on the basin streams, the Commission initiated a cooperative water-quality sampling program in 1947.

The ICPRB reviewed pollution legislation throughout the basin states, and the District of Columbia, and encouraged improved laws. The new legislative initiatives began to reflect not only increased coordination and cooperation, but the concern for the effects of pollution on aquatic life and the public's general welfare in addition to public health.

The Commission also advocated regional planning groups, stimulated cooperative sewerage resolutions, brought together groups interested in the conservation of the commercial fishing industry (an effort that eventually led to the establishment of the bi-state Potomac River Fisheries Commission), issued warnings about filling in the river's "shallows," continued to promote the federal government's completion of the Savage River Dam, and supported federal financial assistance for sewage treatment plant construction while emphasizing state enforcement.

During its first decade, the Commission gathered basic Potomac River data with a new basin-wide perspective, and began bringing basin people together to talk about their shared water-pollution problems. It laid the groundwork for pollution abatement in the Potomac's basin, and defined clean-up goals for the Potomac in 1949.

Clockwise:
 Cumberland, Md., around 1945. The
 Celanese Corporation of America plant was
 typical of North Branch industrial development
 in the 1940s. The entrance of an old
 abandoned mine in Garrett County, Md.
 A southern Maryland family considers
 the health hazard of a shallow well in 1941.



“Intractable” has long been the best description of acid mine drainage in the Potomac River Basin. A legacy of more than 150 years of coal mining, it is a problem shared by West Virginia and Maryland, and the consequence of pyritic rock materials

exposed to air and water by the mining process and the formation of sulfuric acid. A related product, “yellow boy,” is a slimy iron oxide deposit that smothers plant and animal life.

Acid mine drainage begins its lethal work a few miles from Fairfax Stone, which marks the source of the Potomac River. An estimated daily loading of over 100,000 pounds of acid mine drainage has rendered about half of the main stem North Branch Potomac, and several hundred miles of tributaries unsuitable for fish and other aquatic life. Practically no natural biological communities exist upstream of Kitzmiller, Md.

Virtually nothing will live in severely acid waters, not even bacteria that cleanse water under normal conditions. The most important measurement of water's acidity is its “pH.” Neutral pH is 7. “Acid” is pH below 7.0, and organisms begin to run into trouble at a pH below 6.0. The productivity of aquatic ecosystems and recreational use is considerably reduced in waters with a pH value below 5.0. That part of the North Branch affected by acid mine drainage has values as low as 3.0 or below.

Abatement of acid mine drainage is complex, with challenging technical, legal, and socio-economic aspects. While surface and deep mines both have contributed to the problem, 75-85% of the acid loadings come from abandoned deep mines, and this is a

major element in the problem. These underground mines have been very difficult to locate, let alone permit an understanding of their character, estimates of their loadings, and a determination of abatement potential.

During the 1930s, a federally assisted program was undertaken by Maryland to seal abandoned mine entrances, which met with some success. The real long-range, comprehensive efforts, however, did not start until the 1970s when an Army Corps of Engineers study used more modern techniques to ascertain the extent of the problem.

The Surface Mining Control and Reclamation Act of 1977, which resulted in an abandoned mine land program in the Department of the Interior has been a source of optimism for the future. Unlike previous legislation which focused solely on research and development, this federal law provides for funding for abatement, and funding is crucial since “armchair estimates” have set abatement at around \$30 billion. The hope is that this legislation, up for renewal in 1992, will add environmental quality to the current health and safety priority funding criteria.

The institutional mechanisms are in place. Bi-state cooperation between West Virginia and Maryland has resulted in a comprehensive plan for an investment in abatement. The plan is based on the possibilities of the renewed federal legislation and adequate funding, new technologies and innovative techniques. Public support is essential. The prospects are good that the long-time indifference of area residents to the badly abused stream will end, and that there will be a new vision of a life-sustaining and attractive North Branch Potomac.

1950s

The Potomac paid heavily in the 1950s for post-war growth. As the decade opened, the chairman of ICPRB put it bluntly, "The water of the Potomac River throughout its length is unsuitable for drinking without treatment. At and above Great Falls, the river is questionably safe for swimming. From Hains Point to Key Bridge, the river is questionably safe for recreation. The Anacostia River below Bladensburg and the Potomac River from Hains Point to Fort Foote are unsuitable for any purpose." The Potomac was believed to be second only to the port of Houston as a delivery system of pollution.

The lower river generally was in good condition despite excessive turbidity. The upper and middle portions of the river, and several spots along the Potomac's main tributaries such as the Shenandoah, however, were forced to cope with wastes well beyond their assimilative capacity. In 1950, there were 87 sewage treatment plants in the basin, with only about half considered adequate.

The river in the upper basin was receiving mostly untreated waste discharges from over 100 industrial plants in addition to municipal wastes. Here the river also was subject to acid mine drainage. The six-mile segment that flowed within the metropolitan Washington area from Hains Point to Fort Foote was referred to as an "open sewer." It received the sewage from the District of Columbia, Montgomery and Prince George's counties, Arlington, Alexandria, and Fairfax county. In that portion of the Potomac, algal blooms and fish kills dominated the summer months (and would do so until 1977). In the late 1950s, observed dissolved oxygen levels were sometimes less than 1 part per million in the area between Giesboro Point and Ft. Foote.

The Commission had determined that the metropolitan river could assimilate a pollu-

tion load equivalent to 475,000 people, but by 1950, the area's population was 1.5 million, and the Blue Plains plant could remove only 20 percent of the pollution. In 1957, the U.S. Public Health Service (USPHS) declared the Potomac River in the District of Columbia "unsafe for swimming."

Other issues loomed. There were not enough disposal sites for thousands of tons of sludge generated by improved treatment. In addition, it was calculated that, if the upper basin erosion rate were to continue unchecked, the Potomac from Chain Bridge to Fort Foote would be filled in 50 years. And, the water demand was not only growing, it was multiplying, and had become a serious concern by mid-decade; a basin water resources study was initiated by the Army Corps of Engineers (ACE) at the end of the decade. The river was being used as a dumping ground; recreation facilities were inadequate; there was a lack of trained water pollution control personnel as well as adequate financing for the overtaxed sewerage system; and, in the face of all these problems, there was a recognized lack of coordination among the dozens of agencies concerned with basin water resources. As if the river did not have enough problems, shoot-outs between Maryland's oyster police and watermen, and between watermen who were harvesting its riches by illegal dredging, had continued into the 1950s.

The larger basin municipalities and the metropolitan Virginia counties committed themselves to the expansion of their waste treatment facilities. The Blue Plains capability was expanded, first with chlorination and sludge drying, and then with secondary treatment in 1959. A study of the metropolitan Washington area's sewerage was initiated, but unlike two prior efforts, this time the perspective was regional, and the

inter-jurisdictional agreements accomplished by the end of this decade would set the course for the eventual cleanup of the metropolitan Washington river from "point-sources."

The Commission was committed to its goals, and used its committees on water, industry, land, recreation and wildlife, local governments, and public relations to further its aims by persuasion. The Commission saw the success of its efforts with the construction of the Savage River Dam, and public recognition of its role in reducing the industrial pollution by half in the upper basin between 1947 and 1953. It was looked to for leadership in the inter-jurisdictional cooperation that resulted in the District's accepting wastewaters from Maryland and Virginia, and encouraged the construction of treatment plants in smaller municipalities. The Commission's 1954 "Report on Water Pollution in the Washington Area" resulted in the USPHS declaration and was instrumental in gaining the authorization and appropriations for the crucial District public works and sewerage expansion program.

In addition, the Commission accelerated its stimulation of local regional planning activities, and encouraged soil conservation efforts in the upper basin. ICPRB offered support to solve the bi-state troubles over oysters on the lower river that would be resolved in 1958. The Commission set about to produce "extraordinary publicity" for the Potomac and public support for treatment plant construction, and public interest in water supply and recreation.

The Commission had proven its value in promoting cooperation in solving the basin's narrower problems on water pollution. An expanded role for the Commission in "the full development of the potentialities" of the river was under review at the end of the decade.

Clockwise:

Senator Wayne Morse holds his nose as a boat takes him past Georgetown in the 1950s. Undaunted sailors raced in polluted waters near the Nation's Capital in 1953. DDT being sprayed in Virginia. Before it was banned in 1972, it would kill countless numbers of birds and destroy vast amounts of stream life. Thousands of commuters from Virginia daily jammed the Arlington Memorial Bridge on their way to work in the Nation's Capital. By 1950, the population of Washington, D.C., and its surrounding area was almost half again that of 1940, and by the end of the decade it would be double.



Monitoring means many things to many people. One definition is that water-quality "monitoring is an intricate yet systematic process designed to reveal the dynamics" of a stream or body of water.

Water-quality monitoring involves the measurement and analysis of variable physical, chemical, and biological characteristics. These characteristics include temperature, turbidity, dissolved oxygen, and aquatic life, etc.

Monitoring information can provide a picture of the current condition of a free-flowing river or estuary, can be used to compare two locations (upstream and downstream), before and after (prior to an industrial plant, and after), or to compare against a standard (in relation to the standard level of dissolved oxygen required by fish).

Monitoring for a sufficiently long time can indicate trends that tell us about progressive declines as the result of pollution, or tell us how well clean-up efforts are succeeding. The interpretation of monitoring information can be complicated because water quality is the result of both man-made and natural environmental (e.g. weather) influences.

Monitoring in the Potomac has a long history, beginning in the late 19th century. The length of record for many variables is good and the data gathered has helped solve many immediate problems. The problem that Potomac River cleanup managers and scientists have faced is that much of the earlier data cannot be compared. For many years, data were gathered in different ways, using different methods, presenting analysts with "apples and oranges," and consistency and accuracy of that information could not always be verified.

In 1947, ICPRB initiated the first Potomac River basin water-

quality network with the cooperation of the municipalities, state health departments, and industry. From 1947 to 1958, the water-quality data were used for reference but not published. In the late 1950s, the Commission reorganized its surface water-quality monitoring network, and in that same year, the Potomac River Water Quality Network was published as the first of a continuing series. The network grew from a few stations to over 100 in 1973. The information gathered was tabulated in Commission publications.

In 1974, in an attempt to answer the need for basin-wide information that could be compared, ICPRB conceived the Baseline Water Quality Monitoring Network (BWQMN). In 1975, the Commission published its first report on trends, "The Potomac River Basin Water Quality Status and Trend Assessment 1962-1973." This important publication was followed in 1976 by "The Potomac Estuary Biological Resources—Trends and Options."

Data collection by the states has expanded considerably since the early 1970s, largely as a result of the 1972 Clean Water Act requirements. Complementing increases in state programs, new efforts to coordinate monitoring on a regional basis began in the 1980s. In 1982, the Metropolitan Washington Council of Governments (COG) initiated an upper Potomac Estuary network composed of existing state monitoring supplemented by additional monitoring on the lower Potomac and at the head of tide. The U.S. Environmental Protection Agency and the states participating in the Chesapeake Bay program began coordinated monitoring and data management for the Bay, of which the Potomac is a part, in 1984. COG established the Coordinated Anacostia Monitoring Program (CAMP) in 1985. The Commission participates in all of these regional programs.

1960s

In the upper basin, cleanup efforts had paid off by early 1962, when it was reported that “there are now only 18 raw sewage sources above Washington’s water supply intakes . . . [with a] total population [of] no more than 25,000.” By this date, only one major industry did not provide for waste treatment, but had construction underway. The acid mine drainage in that area increased, however, as mining activities escalated. In one creek alone, the acid load increased more than 100% from 1968 to 1973, almost entirely due to strip mining.

The main focal point during this decade was the Metropolitan Washington Area (MWA) where, by 1960, there were more than two million people who would produce a “roaring suburban tide” that would drain the central city and pave 500,000 acres of farmland with houses. Stately monuments of the nation’s capital looked out on a “national disgrace,” a river that was a tangle of logs, trash, and frequently raw sewage. During the summer and early fall, mats of blue-green algae extended for some 50 miles below the city, blocking sunlight and reducing the life-giving oxygen supply in the water. The sight of thousands of dead fish belly up, rotting in the river was common.

Eating fish caught along Washington’s shores was prohibited, and so was swimming. The Commission’s monitoring of water quality showed that in 1965 coliform bacteria levels in the area were 500 times greater than the permissible body-contact limit for swimmable waters. All the while, the demand for water-related recreation was growing.

Water supply problems became acute in 1966 when a five-year drought reduced the river’s daily flow to an all-time low of 388 million gallons, nearly matching the year’s highest daily water intake. Sediment from the agricultural upper basin and the suburbanizing mid-basin continued to pour into

the river. Sediment studies would accelerate throughout the 1960s, with increasing attention given to urbanizing as well as agricultural areas. The results of the U.S. Geological Survey’s [USGS] basin-wide study requested by ICPRB in 1960 revealed that the average sediment load to the Potomac River was about 2.5 million tons, most of it discharged over a few days each year, and that areas undergoing urbanization in the metropolitan Washington area had the highest sediment yields.

Comprehensive river basin planning was the buzzword of the 1960s, and most important, was the thrust of the federal government into water resources management. This thrust would significantly benefit the Potomac. In 1961, President John F. Kennedy urged the establishment of river basin commissions (a proposal that would lead to the Water Resources Research Act of 1965). Also in 1961, amendments to the Federal Water Pollution Control Act increasing enforcement authority and funds for wastewater treatment plant construction and research signaled a more solidified congressional interest in water quality. In 1963, the comprehensive Potomac basin plan recommended by the Army Corps of Engineers would spark years of water supply controversy, to which President Johnson responded by appointing an inter-agency task force. In his 1965 State of the Union speech to Congress, Johnson pledged to clean up the nation’s rivers and urged that the Potomac become a “model of beauty and recreation for the entire country.” His administration was committed to using “new conservation concepts . . . and patterns of cooperation.” In this climate, the Water Quality Act was passed in 1965, establishing a Federal Water Pollution Control Agency and requiring water-quality standards.

The condition of the Potomac River in the MWA could not respond quickly to the spate of federal legislation and institutional

changes, the feverish wastewater treatment plant construction efforts, the improved technology that brought new efficiencies and advanced treatment, a public newly aroused and incensed by the condition of the Potomac, and a new sense for many that it was the “Nation’s River.” By 1969, the cleanup goals for the Potomac seemed more elusive than ever, and the Potomac Enforcement Conference was recalled, fulfilling the 1966 request of ICPRB. The condition of the river was summarized at that conference: “The Potomac [is] a severe threat to the health of anyone coming in contact with it . . . [and] is ‘grossly polluted.’ ”

The Commission’s work was reflected in the almost 50 publications it produced during the decade. Its two publications on sediment issued in 1963 provided an impetus for the pioneering sediment control programs established in the area: the USGS study described the problem, stating that 50 million tons of soil eroded annually in the basin; a subsequent report offered a sediment control proposal. The Commission continued to be a player in interagency planning for the expansion of area treatment plants, commented on proposed legislation and the new national standards (it had itself made Potomac standards recommendations in 1946 and in the 1950s). The Commission continued to reach out to an increasingly committed public sensitized by Rachel Carson’s “Silent Spring” (1962) and one that it, too, had helped create. In addition to its publications, its regular newsletter, public meetings, and “go-see” trips organized throughout the basin each year helped keep the issues and the facts before the public. It was asked by the Potomac Enforcement Conference to play an active role in carrying out the 1969 recommendations, and, with broadened investigatory and coordination authority approved by its signatories, was prepared to do so.

Streams are renewable resources capable of absorbing organic pollution—bacteria in water break down decomposable waste in a process that consumes oxygen. Too much organic waste can deplete stream oxygen levels to the point that there is not enough available for fish and other aquatic life. The lack of oxygen can essentially choke a river to death. To protect water quality and aquatic life, the level of organic pollution discharged into a river must stay at or below its absorption limit. As the population and the amount of organic waste generated increases, higher levels of wastewater treatment are required.

PRIMARY TREATMENT: is basically a first-stage treatment, a mechanical process using screens and a settling tank(s). Screens remove the floating objects; settling tanks remove heavy suspended materials. Typically it removes 25 percent of organic matter.

SECONDARY TREATMENT: follows primary treatment in most wastewater treatment systems. In this step, bacteria and oxygen are introduced to the process through trickling filters or in activated sludge to break down the organic parts of the wastes. Typically it removes 80 percent of organic matter.

ADVANCED TREATMENT: refers to a variety of chemical, biological, and mechanical processes, which increase organic matter removal efficiencies to 95-98 percent, and which can remove significant portions of the nutrient load.

SLUDGE: is a residue of treating wastewater by all of the above processes. Untreated, it consists largely of water (as much as 99 percent) and must be dried before disposal. A higher level of wastewater treatment results in a greater amount of sludge. Sludge requires some form of land disposal or incineration.

To stop pollution from entering Potomac streams from pipes, the public made a major financial investment. In the Potomac basin, \$1.6 billion was spent on wastewater treatment plant (WWTP) construction in the 1970s, with the major portion spent in the Metropolitan Washington area. About 75 percent of the construction costs were borne by the federal government, with the balance coming from local governments.

In the 1940s, sewage from 154 urban communities was entering the basin. After treatment, the pollution loading on regional streams was equivalent to untreated wastes from approximately 1,500,000 people, according to ICPRB's first publication. In the 1940s, the Commission had determined that under summer conditions and average minimum flow, the MWA could absorb pollution from about 475,000 persons, which became a goal. The loadings, however, already were well above this number. In 1950, the loadings were even higher, because the area's four overloaded primary plants were able to remove only 20 percent of the pollution, instead of the 68 percent removal needed to meet the loadings goal.

In spite of expansions, new plants, and improved treatment, for several decades WWTP managers along the Potomac played catch-up to the ever-growing population. Constructed in 1938, The District's Blue Plains plant 130 mgd capacity had to be expanded to 175 mgd and then to 240 mgd in the 1950s, and in spite of improved levels of treatment, was again overloaded by 1971. To meet the needs of continued growth, the plant was expanded to the level of advanced treatment and to handle an average flow of 309 mgd in 1980. At the end of the decade, plans were underway to further expand its capacity to 370 mgd by the mid-1990s.

Today, a few basin communities face the need to expand their facilities while confronted with severely reduced funding opportunities, but the trend has been toward progress. By 1980, secondary treatment was achieved at all major local MWA WWTPs, and by 1986 all had some form of advanced treatment. The last major raw sewage discharge (Ridgeley, West Va.) in the Potomac River Basin ended in 1989. After decades of feverish construction and substantial financial commitment, disagreements and even lawsuits, anguish over local control versus regional consensus, and the struggle between new problems and the state of knowledge, the result has been significant progress. The Potomac accomplishment of cooperation and coordination now serves as a model for the nation and abroad.

Clockwise:

"Polluted Water" signs were frequent throughout the basin. In some areas, residents were dependent on unhealthy streams for their water supply. The cleaning up of fouled waters required stopping pollution from entering streams through pipes. The role of the federal government in water-quality issues grew significantly in the 1960s. In 1965, President Lyndon B. Johnson pledged to clean up the nation's rivers, and urged that the Potomac become a "model of beauty and recreation." The active commitment of basin citizens was crucial in restoration efforts.





Clockwise:

The flood of 1942 was an historic flood that carried down more than 300,000 tons of silt. It put Hains Point in Washington, D.C. under water. The Peace Cross in Bladensburg, Md., shown here in 1947, was frequently subject to Anacostia watershed flooding. A USGS hydrologist compares a photo of "Drought Rock" taken during the low flow period of the Potomac in 1930 with the rock as it appeared in the 1964 low flow period. Damage from the 1985 flood was extensive. Shown here, damage on the North Fork of the Potomac's South Branch in West Virginia.

The Potomac is the second largest contributor to the Chesapeake Bay; its average annual flow is exceeded only by that of the Susquehanna.

Its flows have been measured at Point of Rocks, Md. (about midway down the river) since 1895 and downriver at Little Falls (just above the northwestern border of the District of Columbia) since 1930. The long-term average discharge (1986) of the Potomac at Point of Rocks is about 9,410 cfs, and 11,520 cfs at Little Falls.

The Potomac is a "flashy" river; its fluctuations between peak and low flows are greater than any other major river in the east. Its flow will rapidly reflect meteorological conditions in the basin since it has only one major structure (Bloomington Dam) to control its discharge. The lowest one-day flow of 530 cfs occurred at Point of Rocks in September, 1966; a high of 484,000 cfs in 1936 was calculated.

Seasonal fluctuations in flow are significant in terms of pollution problems and the health of the Potomac's aquatic life. The Potomac estuary, which begins at Little Falls, is particularly sensitive. Freshwater flows influence water circulation and stratification of the estuary and add sediments, nutrients, and other pollutants. Summer river flows are highly variable, but are usually less than half of the winter and spring flows, with the result that the assimilative capacity of the river can be seriously reduced.

The question of what constitutes an adequate minimum flow in a given river for water quality reasons has never been resolved, but Maryland's Potomac River Environmental Flow-By Study recommended a minimum daily environmental flow-by of 100 mgd below Little Falls dam to protect the smallmouth bass fisheries, which would be most adversely affected. The degree of salinity is a dominant variable in the life and health of the lower estuary, and is crucial for the health of oysters. The Potomac's freshwater flows can cause the low brackish zone to shift as much as 20 nautical miles.

There have been two major droughts in the Potomac: one extended from 1930 to about 1932; the other, from about 1962 to 1966. There were additional droughts that extended over a couple of years in the 1960s and 1970s. The 1978 Potomac River Low Flow Allocation Agreement created a mechanism for the allocation of water among the various Potomac water suppliers during critical low flow. There is concern when the Potomac flow (Point of Rocks) reaches 2,000 cfs. When it drops to 1,100 cfs, ICPRB's CO-OP Section analyzes the situation to determine if releases from the Jennings Randolph and Little Seneca reservoirs are needed.

There have been several major floods in the basin over the past 50 years: 1942, 1949, 1954, 1972, and 1985. The floods have produced peaks 15 to 20 feet above normal levels, and have inundated urban areas to a depth of 10 feet. The duration of flood peaks has usually been 12 to 36 hours. The devastating November, 1985 flood caused severe damage in 29 counties in West Virginia, plus sections of Pennsylvania, Maryland, Virginia, and Washington, D.C. Considered the worst flood since 1936, it left some 43 people dead and damages estimated at over \$900 million.

Concerned about both flood control and water supply, the Commission made a sustained commitment to get Savage Dam constructed in 1952. ICPRB did not endorse the Army Corps of Engineers' 1963 recommendation of 16 reservoirs, but did play a key role in developing and implementing non-structural alternatives for water supply management. The Commission helped analyze the risks associated with the continuation of the 1977 drought. In response to the flood of 1985, ICPRB participated in a Congressionally sponsored study to examine flood control measures for the South Branch of the Potomac River, where some of the most serious damage occurred. ICPRB developed a flow monitoring system as a C&O Canal National Historical Park visitor safety management strategy for the National Park Service.

The Potomac and its tributaries are important sources of water for several towns and industries throughout the Potomac River basin, but for over 2.5 million people in the metropolitan Washington area, the main stem of the river supplies their water.

The inability to assure these people that water would always be available from their tap was the biggest water management problem in the basin for some 25 years prior to the 1982 Water Supply Coordination Agreement.

Between 1930 and 1960, when comprehensive water and related resources planning recommendations by the Army Corps of Engineers began to be released, the Potomac basin's population had doubled from about 1.4 to 3 million, and the MWA population grew from about 670,000 to more than 2 million during the same period. The burgeoning population was increasing and multiplying its water demands. By 1956, after many decades of little concern for quantity, too little water in the Potomac was becoming as much of a threat as a major flood. In that year, Congress requested the ACE to prepare a comprehensive basin plan to include water supply.

The plan, released in 1963, proposed 16 major and 418 smaller headwater reservoirs to meet the anticipated difference between future demands and dependable flow. The heated public opposition to dams that followed was unexpected, and resulted in the initial list being chopped down to six by 1969. By 1974, public resistance had hacked the list to three and Congress directed the Corps to study the possibility of tapping the fresh water between Little Falls and the Blue Plains wastewater treatment plant. The legal rights to water was becoming an increasing concern, and ICPRB held a conference to address that issue in 1976.

1977 was a significant year for the WMA water supply for two reasons: a severe drought and an ICPRB-led effort to analyze the

risks of drought in the Occoquan Reservoir, the sole water supply source for 650,000 residents in Northern Virginia. The drought heightened the urgency to solve the water supply problems and was the catalyst for the multi-jurisdiction Potomac River Low Flow Allocation Agreement (1978) and the Washington Water Supply Emergency Agreement (1979); the Commission's pioneering risk analysis laid the groundwork for solving the area's water supply problem into the next century.

During its risk analysis efforts, the Commission first realized that altering operations of existing water supply facilities had not been adequately considered in previous regional studies. ICPRB staff teamed up with Johns Hopkins University researchers and, applying stochastic (probabilistic) hydrology developed since 1963, proposed that existing water resources could meet the demand well into the future through regional cooperation and use of the Bloomington (now Jennings Randolph) Reservoir, scheduled for completion in 1981, and a smaller proposed Little Seneca Reservoir together with existing local reservoirs and distribution systems.

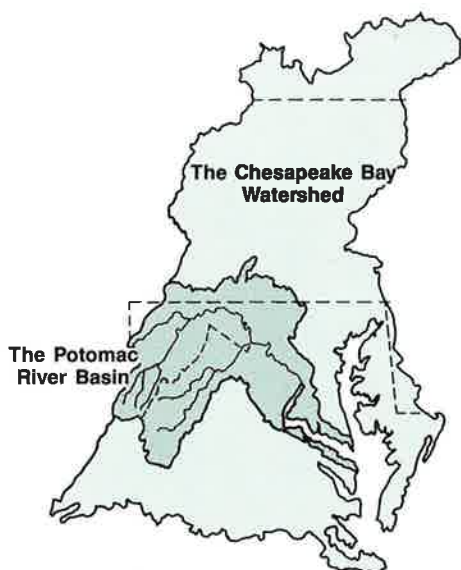
Cooperative agreements were signed in 1982 by the ACE, the Fairfax County Water Authority, the Washington Suburban Sanitary Commission, the District of Columbia, and ICPRB, and ratified by local governments. These agreements define cooperative operations and assure the region adequate water through the foreseeable future and they have saved an estimated quarter of a billion dollars in construction funds. The agreements provide for the ICPRB Section for Co-operative Water Supply Operations on the Potomac (CO-OP) as the coordinator of water resources during times of low flow. Today CO-OP has a range of activities: water demand forecasting, water resource yield analyses, flow monitoring, drought management, reallocation studies, water supply impacts on fisheries, recreational releases, water taste and odor problems, and consumptive use regulation.



Clockwise:

There were hints of the metropolitan Washington area water supply demand of the future in the 1940s, but the explosive growth of the 1950s and 1960s was not fully anticipated.

The removal of river debris has long been a year-round need. The drought of 1977, clearly visible here at Great Falls, heightened efforts to ensure a stable water supply. The Interstate Commission has played an important role in Potomac monitoring efforts since the 1940s. A staffer samples for biological indicators in 1974.



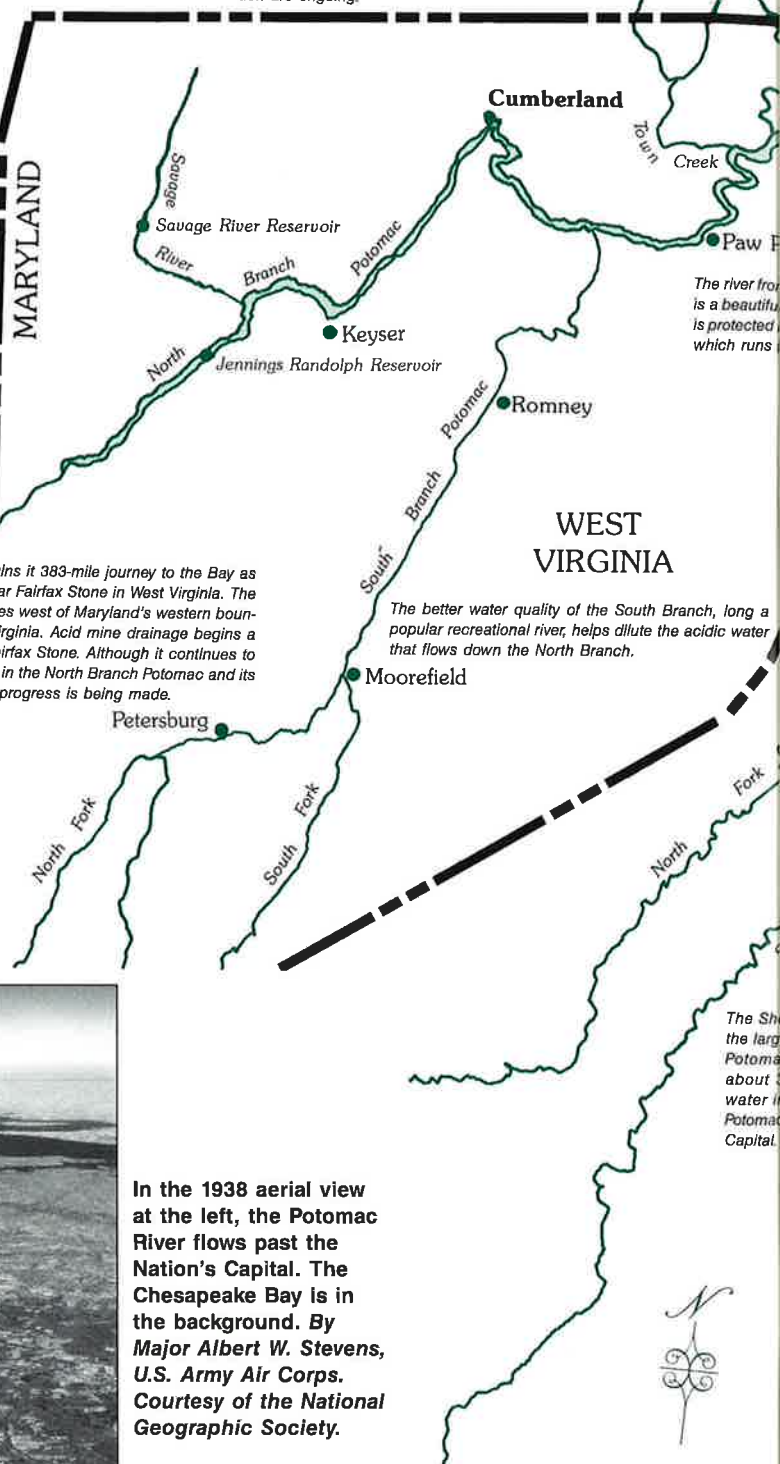
The Potomac is the second largest contributor (after the Susquehanna) to the Chesapeake Bay.

FAIRFAX STONE

The Potomac begins its 383-mile journey to the Bay as a small spring near Fairfax Stone in West Virginia. The stone is a few miles west of Maryland's western boundary with West Virginia. Acid mine drainage begins a few miles from Fairfax Stone. Although it continues to inhibit aquatic life in the North Branch Potomac and its tributaries, some progress is being made.

The four percent of Pennsylvania that is within the basin is largely agricultural land, primarily orchards, dairies, and cornfields. Efforts to reduce agricultural water pollution are ongoing.

WEST VIRGINIA
MARYLAND



The river from is a beautiful, is protected which runs

WEST VIRGINIA

The better water quality of the South Branch, long a popular recreational river, helps dilute the acidic water that flows down the North Branch.

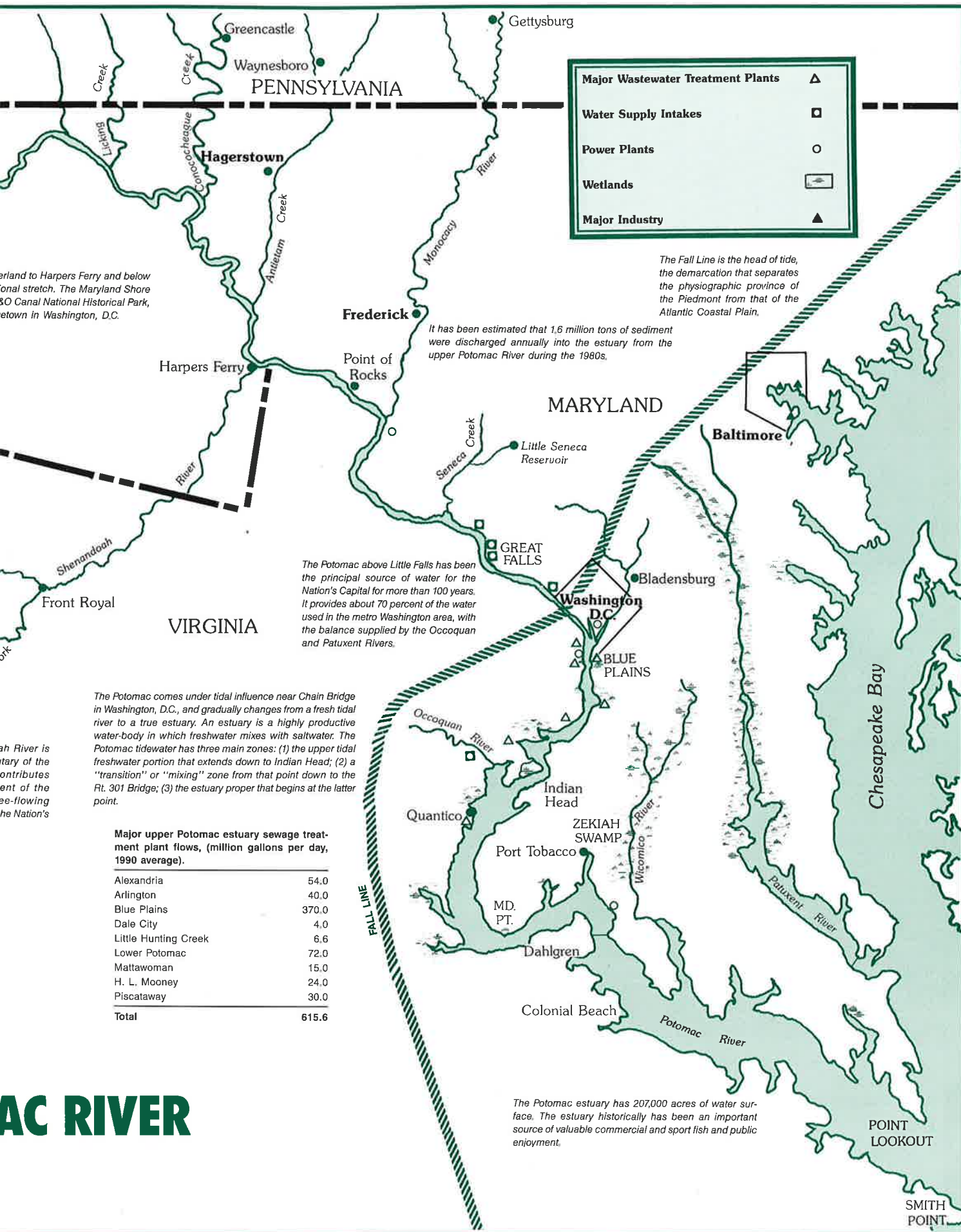
The Sh the larg Potoma about water i Potoma Capital.



In the 1938 aerial view at the left, the Potomac River flows past the Nation's Capital. The Chesapeake Bay is in the background. By Major Albert W. Stevens, U.S. Army Air Corps. Courtesy of the National Geographic Society.



THE POTOMAC



POTOMAC RIVER

1970s

For a decade that had a happy ending, it did not begin auspiciously.

Acid mine drainage had increased in the upper basin as a result of a mining revival, and there were other trouble spots, but the magnitude of the problems in the MWA made it the main focus of attention. Local treatment plants were overloaded, poorly constructed sewer lines were leaking, a sewer pipe gap along Georgetown spewed between 15 and 25 million gallons of raw sewage a day until 1972, "one-fifth of the mud in the Potomac River" now came from the developing area around the Nation's Capital, and almost no submerged aquatic plants were present in the river. In 1972, fear of cholera and other aerosol-borne diseases helped turn off the floating fountain donated as part of Lady Bird Johnson's beautification efforts. And in the late 1970s, arsenic (Alexandria, Va.) and mercury (Shenandoah River) heightened the concern about toxics. In 1972 Hurricane Agnes added a brutal blow to manmade problems, flooding the lower river with fresh water to within 12 miles of the mouth and accelerating the already serious decline in the Potomac's oyster production.

In spite of good signs evident by mid-decade—algal mats in the upper Potomac estuary were occurring later in the summer and were thinner by 1973—ICPRB concluded in 1975 that, of 23 key Potomac River basin segments, only 5 had improved and 18 had remained the same or had deteriorated since 1962. The trends made reaching the 1983 goal of "swimmable, fishable" waters unlikely.

These bad times for the river were further complicated by constraints not anticipated at the 1969 Conference: incineration of sludge, accumulating at the rate of nearly 1,300 tons a day by the end of the decade, was now not a viable option, and the '70s energy crisis and inflation made earlier pollution control cost projections obsolete.

On the water supply scene, in 1975 it was

projected that the MWA would see shortages by 1980, and no resolution was in sight. A massive pump failure plus a drought in 1977 left almost two million people in Virginia and Maryland with the fear of dry faucets.

The lack of visible signs of improvement in the river in the face of ongoing treatment plant construction, the threat of a lack of a dependable source of water, and nature's own threats galvanized the public in the MWA throughout decade.

In spite of the 1970 Memorandum of Agreement signed by local governments for the purpose of meeting the lofty 1969 goals, there was little agreement through the better part of the decade on any front. Disagreement was rife, particularly over nutrient control strategies, among local and state water-quality managers and federal enforcement officials. Everyone seemed to blame others for river conditions. Most of the decade was marked by proposals, rejections of proposals, counter proposals, lawsuits, moratoriums, and meetings that left significant problems unresolved and attitudes bitter. Regional efforts fared better in the outer basin than in the MWA, where local autonomy was fiercely guarded until the end of the decade.

The heat of the struggle cooled in the last couple of years of the 1970s. Spurred on—by a committed public, the media spotlight, strengthened institutional arrangements, new legislative initiatives (especially sediment and stormwater control laws and regulations), planning processes (among them the "208" planning effort initiated by the 1972 federal law), and technological improvements along with innovative applications—government agencies found solutions through cooperation. The Low Flow Allocation Agreement* (1978) and the formation of the ICPRB Section for Cooperative Water Supply Operations on the Potomac (CO-OP)* (1979), reflected new attitudes and approaches.

By the end of the decade, the MWA could boast not only of cooperation, but the completion of ambitious treatment plant improvements, the rediscovery of the MWA Potomac by pleasure boaters as well as large-mouth bass, annual raft races, fishing tournaments, and even full-time fishing guides. And there were statistical signs of progress 1979: decreases in phosphorus and organic carbon (by at least 50%), nitrogen and biochemical oxygen demand (37%), and chlorophyll a (29%); and an increase in dissolved oxygen (10%)**.

The broadening of the Commission's responsibilities in 1970 accelerated its activities: a series of water-quality monitoring reports and regular public meetings kept the status of the basin's waters before the public; over 70 published reports, many resulting from special ICPRB technical studies; a newsletter circulation that grew to 7,000. ICPRB helped sponsor 17 public meetings on water supply throughout the basin, constructed a public opinion survey on water supply issues, and laid the analytical groundwork for solving the water supply problem; held a conference in 1974 to summarize the status of water-quality management efforts; held symposiums in 1975 and 1977 representing the first attempts to bring together biologists and managers for a comprehensive look at the Potomac's biological resources; organized two intensive river-length trips (1975-76) in which basin-state students, representatives from conservation and recreational organizations, and 40 local, state and federal agency officials learned about the Potomac. It examined legal rights and options (water use) in the basin. It helped sponsor the Thames/Potomac Seminars in Washington, D.C. and London, England in 1978 to pool the experience and knowledge of the similar rivers for mutual benefit.

*See "Chronology"

**A Decade of Progress, GKY and Associates, Inc., 1981

Clockwise:
 Fun in a Potomac riffle. Basin industries have made substantial pollution abatement commitments. A full-time fishing guide began working the Potomac in 1978. West Virginia coal cars. In the 1970s, improved legislation and inter-governmental cooperation resulted in optimism that the acid mine drainage problem could be solved.



The adoption of adequate water pollution control legislation at both the state and federal levels has always been a major concern of the Commission.

Its first task was a review of existing basin state water pollution legislation, and concluded that it existed in all of the states except Virginia. As a result, the agency was instrumental in the creation of the Virginia Water Control Board in 1946. The Commission's efforts affected the other jurisdictions as well. Maryland, Pennsylvania, and West Virginia took steps to strengthen their existing laws. State water pollution control legislation would improve consistently throughout the five decades; these improvements were largely driven by the evolution of water quality as a national resource issue and the increased federal role, particularly after 1965. The condition of the Potomac was a key catalyst for, as well as beneficiary of federal legislation.

After some 10 years of debate, in 1948 President Harry S. Truman signed into law the first bill designed to reduce water pollution on a national scale. It provided loan financing for construction of wastewater treatment plants. The law prohibited the federal government from taking action to enforce a cleanup on an interstate stream unless all the states concerned granted their consent to such action, including the offending state. It was considered a limited federal effort in terms of both the size of funding appropriations and cleanup enforcement, but was a first step.

The 1956 Federal Water Pollution Control Act was signed into law by President Dwight D. Eisenhower. Although it provided only half of the funding originally sought, the funding was considerably more than that provided by the 1948 legislation and was in the form of grants for the first time. Federal pollution control was still limited, but this law gave the federal Public Health Service the authority to call a conference to seek out means under federal and state laws to abate such pollution.

An effort to turn back water pollution control to the states and end federal grants for construction of pollution control works was thwarted, and the 1961 Federal Water Pollution Control Act was signed into law by President John F. Kennedy. These amendments to the 1956 law represented "a fatter wallet, . . . a bigger stick, and . . . higher status in the federal scheme of things." Retained were existing provisions for federal "enforcement conferences" for interstate waters; added was the regulation of streamflow for the purpose of water-quality control.

President Lyndon B. Johnson put his signature on The Water Quality Act of 1965. Finally, water quality was clearly a national issue. Notable was the law's establishment of a Federal Water Pollution Control Agency and the requirement of water-quality standards.

The Federal Water Pollution Control Act Amendments of 1972 represented a major milestone in the nation's war on water pollution. The purpose of this complex, comprehensive law was clear: "restore and maintain the chemical, physical, and biological integrity of the nation's waters." It created a unique water-quality partnership. The federal government was charged with setting national standards and maintaining oversight; the states with managing the water pollution control program on a daily basis; local governments with meeting the requirements of the act and regulating, in some cases, users of their municipal systems. The federal funding commitment was now billions of dollars.

The law's significant provisions included: assigning the prime responsibility for pollution control to the Environmental Protection Agency and the establishment of "effluent limitations," the creation of a National Pollution Discharge Elimination System (NPDES) that required a "permit-to-discharge," and a comprehensive planning section (208) that was innovative in terms of citizen involvement and nonpoint source pollution. This landmark legislation was amended in 1977 and in 1987.

Sediment problems in the Potomac River basin have their origin in the late 18th century.

Mechanized agriculture and the subsequent increase in land clearance caused the period of maximum basin-wide erosion from 1840 to 1920. By the end of the 19th century, close to 6 million tons of sediment are believed to have been deposited annually in the estuary. Soil erosion was declared a national menace in the 1930s, and control practices began. By 1950, however, although 20 soil conservation districts covered 98 percent of the basin, only 8,000 of 9 million basin acres had been "treated" with erosion controls; sediment studies were few in number and limited in scope.

It was not until the late 1950s that "soils pollution" was of "such magnitude that its solution should take precedence over all other pollution control activities" in the metropolitan Washington area. ICPRB's concern about sediment dates from this time. In 1958, it sponsored the first Metropolitan Silt Conference, after which it organized a task force of conservation specialists to develop recommendations for a sediment control program in the Washington region.

ICPRB then sponsored a study with USGS that represented the first effort to determine systematically the basin's sediment sources and transport characteristics. The study results indicated that over 50 million tons of soil eroded annually in the basin and between 2.5 and 2.9 million tons of that sediment found its way into the Potomac estuary. This effort was credited with the response of local jurisdictions to control urban sediment in the mid-1960s. Montgomery County, Md., and Fairfax County, Va., were the first to take such initiatives. Montgomery County's innovative stormwater management and sediment control program led to model local and state legislation that influenced national policies. Silt generated by the metropolitan Washington area's fast-paced construction was a major issue throughout the 1960s.

Sediment controls at the state level came in the next decade. In 1970, Maryland was the first state in the basin to enact a state-wide erosion and sediment control law. The District of Columbia, Pennsylvania, and Virginia followed with statewide erosion and sediment laws in 1972 and 1973. When ICPRB held a 1974 public meeting to review efforts, considerable progress had been made. It then began to assess basin rural sediment and erosion control programs. Regional concern over "non-point" source pollution increased in the late 1970s as (208) planning requirements under the Clean Water Act of 1977 got underway. The term "best management practices" (BMPs) to control erosion and stormwater became known generally, particularly among increasingly interested and active citizens.

By the early 1980s, BMPs (porous pavement, filter strips, etc.) were becoming more evident, and over 3,000 stormwater management structures had been installed in the Washington area. In addition, agriculture in the basin had diminished. It is believed that these factors caused the reduction of the average annual sediment load to the estuary throughout the last decade, which is calculated at 1.6 million tons. While the fear of "walking on the Potomac" abated, the sources, fate, and effects of sediment in the Potomac and the Chesapeake Bay remained critical questions in the 1980s. The 1983 Bay program study indicated that 45 to 50 percent of upper Potomac basin farmers had entered into conservation agreements, but only 15 percent applied BMPs.

In 1984, ICPRB began research on the connection between channel and floodplain storage and subsequent transport of sediment from the Monocacy River. This study concluded that, even though runoff from the land has been reduced, the annual suspended sediment yields to the estuary appear to have increased between 1961 and 1981, and it confirmed the suggestion that the role of channel and floodplain sediment storage had been underestimated. This concern will be on the ICPRB 1990s agenda.



Clockwise:

A one-day Maryland Conservation Field Day project transformed an old, straight-row farm in 1948. This tobacco field near the tidal river was severely damaged by erosion in 1950. Citizens began paying more attention to urban erosion problems in the 1960s. Sediment has been a long-standing concern in the Anacostia River watershed. The problem is clearly evident in this early 1980s photograph of a Bladensburg, Md. marina dock.

Clockwise:
Canoeing in 1951. A sublime moment by the C & O Canal a few decades past. A champion competes on the Savage River. Whitewater rafting on the lower Shenandoah, '80s style.



Water-related recreation is important in the Potomac's basin.

The river is fed by more than 20 major tributaries that account for more than 700 miles and more than 2,600 miles of other, smaller waters. Its estuary has 207,000 acres of water surface for public enjoyment.

The 1950s were the beginning of a strong recreation demand, with a burgeoning metropolitan Washington area population with more leisure time and money. The public was becoming increasingly concerned about the adequacy of recreation facilities, polluted streams, and the threat to available land by the new and proposed highways and dams. The C&O Canal was saved from the threat of a superhighway, and efforts were made to preserve the Cacapon as a "Wild Riverway." Canoers were a small but expanding group, and kayaking was just beginning. The growing number of boaters between Washington, D.C. and Maryland Point had facilities but were forced to brave polluted waters. Recreation on the lower river was somewhat limited by remaining World War II military installations.

The Commission's Recreation and Wildlife Committee recognized the "nearly unlimited" recreation potential, but was concerned about the basin's lack of facilities, of access, and quantity of clean water. It held two meetings in the late 1950s in an attempt to awaken interest in the growing recreational needs, and published an inventory and a recreation booklet.

By 1960, the recreational use of the Potomac had reached an estimated 9.5 million visitor days yearly. Some 60,000 pleasure boats were now navigating Potomac waters. Public concerns focused on pollution and growth, and regional planning was in vogue.

In 1961, the National Capital Regional Planning Council declared that one of the region's most urgent needs was the preservation of large quantities of open space. The National Park Service had launched a long-range program for the "conservation, protection, improvement, and expansion" of its park system. It was one of

many participants in the Federal Interdepartmental Task Force on the Potomac, an ambitious, cooperative effort to lay the groundwork for making the Potomac Valley "a model of scenic beauty and recreation." The concept of the Potomac National River, protected by a corridor on both shores and emphasizing recreational development was born during this period.

During the 1960s, ICPRB concentrated its resources in support of efforts to improve the basin's water quality through expanded wastewater treatment facilities.

When the 1970s began, polluted waters, the diminished fish and wildlife, and problems in the national economy discouraged the public's interest in recreation. During this period, support for comprehensive planning approaches waned. The National River Concept, reintroduced in 1972, emphasized river preservation rather than recreation but would be controversial once again. The mid-decade river improvements, however, resulted in less planning and talk about recreation as fishermen and boaters actually returned to the Potomac. In the late 1970s, the Commission publicized the improvements and encouraged people to use the Potomac. It published its "Potomac River and C&O Canal" strip maps and introduced "River Watch," a radio program aimed at river users.

A Commission poster published in 1982 celebrated the rebirth of the metropolitan river. During that decade, the Commission has played a supporting role in the Potomac's waterfront festivals and riverfests, fishing tournaments, sailing races and kayak and canoe championships. ICPRB began turning its attention to the upper basin recreation potential, working quietly behind the scenes to encourage the optimum recreational development of the Jennings Randolph Reservoir and North Branch streams. Through its staff 12-day 1987 canoe trip from Cumberland, Md. to Washington, D.C., it encouraged attention to the current public use of the free-flowing river. Recreational fishing is an important objective of ICPRB's tasks in the 1987 Anacostia Watershed Restoration Agreement.

1980s

Although there were still a few towns without adequate wastewater treatment facilities, the ambitious effort to provide sufficient treatment throughout the basin was largely achieved by 1980. The concerns then began to shift from “point” (pipe-associated) to “nonpoint” (diffuse) pollution sources. The benefits of the construction efforts seemed less dramatic in this decade, but they were evident in both technical assessments, ecological changes, and perceptions. An ICPRB study of basin status and trends over the 1973-84 period revealed good signs—bacteria, temperature, and turbidity levels were generally down and dissolved oxygen was up at some stations. Acidity remained high in the Potomac’s headwaters and nutrient levels had increased in agricultural areas, however. By 1986, as a result of improved and expanded treatment, pollution discharges from wastewater facilities had declined by more than 90% since 1970.

Other signs of improvement included fish being caught in the North Branch Potomac; there were increasing numbers and diversity of fish as well as submerged aquatic plants (SAV) in the upper Potomac estuary and Anacostia River; and improved water quality, which brought a resurgence of interest in rejuvenating deteriorated urban waterfronts. An estimated 100,000 people celebrated a cleaner, fishable Potomac at “The Awakening” on the Mall, and a decade of waterfront festivals began in 1981. In that same year, the District of Columbia removed “This Water is a Health Hazard” signs, and later installed a facility to substantially reduce pollution from stormwater overflows.

Water-quality successes were paralleled by the MWA water supply story; multi-jurisdictional agreements on how to operate the newly constructed Bloomington and Little Seneca dams, ended drought fears. Bloomington Dam saved an estimated \$113

million in damages from the devastating 1985 flood. The basin received worldwide recognition when the international canoe and kayak competitions were held in 1988 and 1989 on the Savage River.

Remaining problems included acid mine drainage, nutrient removal, sludge disposal, sediment, chlorine, and the decline in some fisheries. The six-year EPA study of the Chesapeake Bay, of which the Potomac is an integral part, found that SAV, oyster spat set, and freshwater-spawning finfish landings had declined; nutrients, depleted oxygen zones, and levels of heavy metals and toxics had increased. The 1983 and 1987 Chesapeake Bay agreements helped to accelerate the Potomac commitment to resolve these issues.

The 1983 upper estuary algal bloom prompted a reappraisal of waste treatment levels, but analysis determined the cause due to natural conditions. Phosphate detergent bans recommended by COG in 1981 and reinforced by the 1983 Bay study, were implemented by Maryland in 1985, then by the District, Virginia, and Pennsylvania.

During this period, the basin states followed up their Bay cleanup commitment on sediment by accelerating enforcement at the local level, and by effecting stronger stormwater controls and encouraging Best Management Practices. The ACE made attempts to control hydrilla, the exotic aquatic plant, and also the serious shoreline erosion in the lower Potomac.

Continuing declines in some fish species—shad, striped bass, yellow perch, and large and smallmouth bass—resulted in bans on both recreational and commercial harvesting to reduce fishing pressure. Bans make anglers and watermen unhappy. The latter were pleased, however, when in 1988, Blue Plains added a process for removing residual chlorine, toxic to juvenile fish, from wastewaters before discharge.

Toxics, historically less of a concern due to the lack of industry in the basin, got increasing attention because of upper basin wellwater and fish contamination as other pollution problems abated. Efforts were initiated to address these concerns.

Multi-jurisdictional and multi-agency cooperation were reflected in the 1984 sludge disposal agreement, the 1984 and 1987 Anacostia Watershed Restoration Agreements, the 1985 Metro Potomac safety pact, and the 1987 West Virginia/ Maryland abandoned mine drainage study.

Throughout the decade, ICPRB worked with the federal and state governments to implement the goals of the Chesapeake Bay program within the Potomac. More than 50 reports during the period reflect its strong analytical capability in such areas as groundwater, sediment storage and transport, development and use of receiving water-quality criteria and standards, construction grant priorities, water-quality trends, eutrophication measurement and reduction, nitrogen and phosphorus distribution, monitoring and modeling, flow and flood forecasting, plumbing code impacts, and discharge permit violations. ICPRB also assisted with flood mitigation studies, initiated coordination of hydrilla control efforts, and put increased emphasis on biological resources during this decade.

ICPRB’s Anacostia public education activities (publications and meetings) brought its outreach efforts, including its regular newsletter, to well over 20,000 people. Publications on the state of the Potomac basin, the metropolitan area Potomac, the Potomac and the Chesapeake, and the Anacostia were produced for the general public. Public meetings were held in the North Branch basin, the Great Valley, the MWA, and both sides of the lower Potomac. A Public Opinion Survey of the North Branch was conducted.

Citizen activism has played a key role in the improvement of the Potomac River.

1940s: Although the public attitude towards natural resources had begun to change from exploitation to conservation in the 1930s, World War II and the post-war return to normalcy distracted basin residents from pollution and flooding problems that had been going on for nearly a century. In 1949, the Commission's executive director doubted "if 5% of our population have observed [the Potomac's] foul condition."

1950s: Until the mid-1950s, the public remained largely unaware of the severe pollution of the Potomac. The media (television was in its infancy) "had done little or nothing . . ." to alert people to the river's problems. Between 1954 and 1960, a local TV (WRC-Channel 4) series, "Our Beautiful Potomac," graphically revealed the state of the river to a shocked public. The Rock Creek Watershed Association and the Citizens' Council for a Clean Potomac were both organized in 1956, and initiated strong citizen leadership.

1960s: A memorable example of citizen action was the unexpected but massive resistance to the 1963 recommendation of 16 reservoirs throughout the basin to solve the MWA water supply problem. Civic environmental activism continued to grow, strengthened by national as well as local agendas of such organizations as the League of Women Voters (LWV). The local LWV chapters in the MWA would be pivotal in both publicizing the problems and encouraging government action, working jointly as a Potomac Basin Inter-League Committee. Individuals also played crucial roles—the establishment in 1969 of the Mason Neck National Wildlife Refuge resulted from a two-and-a-half year crusade led by one woman.

1970s: The first Earth Day in 1970 and environmental control legislation passed during this period requiring public participation accelerated citizen involvement. Throughout this decade, volunteers

would organize field trips, conferences, and workshops; they would identify and publicize pollution problems, and find gaps in both pipes and processes. Citizens would attend hearings, lobby for better laws and law enforcement, adequate funding, and promote managed growth. They served on committees such as the effective MWA Citizens Advisory Committee. Many were women ("sewer ladies") who, prior to their mass entry into the job market, were free to research, examine maps, charts, and even sewer pipes.

1980s: Potomac-focused activism took on a lower key character due to several factors—the obvious improvement in the river, the achievement of the significant goals of the 1969 Potomac Enforcement Conference, the mass entry of women volunteers into the job force, and the campaign to reduce regulation (and public participation) from federal projects. Public interest in water quality has been sustained, however, by a variety of groups such as the Piedmont Environmental Council, Friends of the North Fork (Shenandoah), the Cacapon River Committee, the Conservation Council of Virginia, and others.

Public outreach has been a main Commission function for 50 years based on the Compact's directive to "disseminate to the public information [on] . . . stream pollution problems . . ." The Commission stated in 1947 that "Any [pollution abatement] program . . . cannot be successfully carried on unless the public at large is acquainted with the objectives and aims which are proposed and public interest aroused in the work." The ICPRB newsletter was first published in 1945. By 1990, it and a companion publication on the Anacostia were reaching over 20,000 people. One or more public meetings have been held for most of its 50 years. Potomac River Watch, a weekly radio advisory has been produced for 13 years. It maintains a library of almost 4,000 volumes; its publications have averaged six a year, in addition to which it produces technical papers at a steady pace. The Commission has been consistent in its support of citizen activism since its inception.

Clockwise:

A symbol of the Potomac clean-up: the District of Columbia's wastewater treatment plant at Blue Plains. This regional facility treats about 70 percent of the sanitary waste generated by the metropolitan Washington area, and is one of the world's largest plants. The mammoth Bloomington Dam tower overlooks Jennings Randolph Reservoir. An engineering achievement of the Army Corps of Engineers, its construction signaled that the water supply of the metropolitan Washington area was solved well into the 21st century. The District of Columbia celebrated a cleaner Potomac at its Riverfests. The river has been valued by all U.S. Presidents. Here, President George Bush tries his luck at Potomac bass fishing.



The upper basin has long been known for some excellent gamefishing spots and significant potential; the estuary historically has been one of the most productive biological systems in the U.S.

Following are Potomac fisheries highlights of the last fifty years:

1940s: In the upper basin, acid mine drainage (North Branch) and industrial pollution (Shenandoah) had eliminated or severely reduced fish production for lengthy segments. In the tidal river, abundances had declined, but the river's yields were not yet alarming. Shad were now spawning farther downstream. In 1942, after decades of low prices and poor harvests, Virginia and Maryland watermen discovered a big Potomac oyster strike, and by 1947 a mini-oyster boom was in full swing and the "oyster wars" began. In the late 1940s, "Dermo," an oyster parasite, was first observed in the Bay.

1950s: Along the Shenandoah, gamefish rebounded as industrial pollution was reduced. Summer fishkills and massive blooms of blue-green algae in the upper estuary were common (and continued into the early 1970s). An important step was taken by Maryland in 1954 when it initiated the striped bass juvenile indices. Shad commercial catches were still averaging 2 million pounds in 1959.

1960s: A sudden 1964 invasion of nuisance aquatic plants (Eurasian watermilfoil) took place in Potomac embayments below Mount Vernon, Va. even though other desirable SAV had all but disappeared. In order to reduce the massive bacterial densities, chlorination was introduced at metropolitan area wastewater treatment plants in 1968. An oyster peak occurred between 1965 and 1967, with annual average production at 550,000 bushels, but was followed by a continued decline. Good oyster data collection and oyster bar replenishment efforts were initiated by the recently organized Potomac River Fisheries Commission (PRFC).

1970s: Oyster production ranged between a high of 227,515 (1970)

to low of 20,330 bushels (1975) during this period; its decline was accelerated by Tropical Storm Agnes in 1972. The shad catch declined precipitously, dropping to only to 20,000 pounds in 1979. Chlorination was benefiting upper estuary water quality but threatening Potomac fisheries. Even though SAV had virtually disappeared by the end of the decade, water quality was clearly improving. In spite of the late '70s toxics scare along the Shenandoah River, there was good news: in 1976 a largemouth bass was caught in Washington, D.C. Bass tournaments and busy fishing guides were uplifting signs at the end of the decade.

1980s: The serious declines of shad and striped bass yields resulted in state management initiatives. In 1980, Maryland and the bi-state PRFC enacted a shad fishing ban. In 1982, the PRFC began to restrict striped bass fishing and by 1984, had stringent fishing regulations. Oyster yields remained low, but Mother Nature was aided substantially by PRFC, credited with encouraging oyster production by up to 85 percent. In 1980, for the first time in residents' memory, fish were caught in the North Branch, with credit given to water quality improvements resulting from the Jennings Randolph Reservoir. SAV was returning for the first time since the 1960s, bringing back both fish and waterfowl. Basin states initiated efforts to reduce chlorine residuals. A survey of fish in the Washington, D.C. area in the late 1980s found 79 species in the river, nearly as many as were found in the 1911 survey. By the end of the decade, after solving old problems and recognizing new concerns, on balance there was more fishable water throughout the basin.

The Commission had expressed its concern about aquatic life as early as the 1950s. In the 1970s, its two symposiums on the tidal and freshwater Potomac biology in the mid-decade reconfirmed its commitment to the river's fisheries. In 1988, the Commission initiated fisheries restoration efforts in the Anacostia watershed, and began working with the states to promote the integration of biological data with water-quality data.



Clockwise:

Fishing for shad on the lower Potomac near Ragged Point in 1952 when commercial catches were still substantial. Fishkills were common place throughout the 1960s. Netting white perch, a popular sport and food fish, in 1976. Efforts began in the 1980s to protect the striped bass, or rockfish, the "star" of the tidal Potomac and Chesapeake Bay fishery.

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Chronological Highlights

1940s

- 1940** Congress gives its consent to the states of Maryland and West Virginia, the commonwealths of Pennsylvania and Virginia, and the District of Columbia to enter into a Compact providing for the creation of the Interstate Commission on the Potomac River Basin (ICPRB) and the Potomac Valley Conservancy District.
- 1942** ICPRB Advisory Committees are operating with some 70 individuals from both the private and public sectors participating. Construction of Savage River Dam on the North Branch is halted due to World War II. A flood occurs on the Potomac and Shenandoah in October.
- 1943** The Commission publishes its first report on the condition of basin waters.
- 1945** ICPRB adopts a pollution abatement program, and publishes the first edition of its *News Letter*. Pennsylvania passes the nation's first law that puts limits on acid mine drainage pollution to streams.
- 1946** ICPRB defines a set of "Minimum Water Quality Criteria" by which means Potomac streams and waterways may be judged suitable or unsuitable for several principal water uses. Virginia creates a State Water Control Board. The Pennsylvania State Chamber of Commerce forms a Stream Pollution Abatement Committee, and the state begins the planning phase of sewerage construction. ICPRB completes an intensive survey of industrial pollution.
- 1947** Maryland's Water Pollution Control Commission is created.
- 1948** The Congress enacts the first Federal Water Pollution Control Act. Savage Dam construction begins again. ICPRB initiates a continuous water-quality sampling program in the basin. Watermill-foil replaces water chestnut in many areas of the metropolitan Washington river as an aquatic plant nuisance. Industrial wastes have made the Shenandoah River below Front Royal a "biological desert."
- 1949** Conditions on the Shenandoah have "radically" improved since a year ago; credit is given ICPRB for its coordination with local authorities. The Federal Government makes its first appropriation to support the work of the Commission. The Blue Plains treatment plant is expanded. A flash flood does serious damage in the upper basin, particularly the South Branch. The West Virginia Board of Health is created with responsibilities for sewage disposal.

1950s

- 1950** Twenty Soil Conservation Districts have been established to cover 98 percent of the Potomac watershed.
- 1951** Savage River Dam is completed. The Commission presses for amendments to the Compact that will broaden its powers. Low dissolved oxygen levels kill thousands of fish during the summer; the Washington Post calls the Potomac "an open sewer."
- 1952** The Savage River reservoir goes into operation.
- 1953** Construction of chlorination facilities at Blue Plains begins. The Federal Water Pollution Control Act is extended.
- 1954** ICPRB issues a major report describing the polluted Washington area Potomac and publishes the results of a study it sponsored on North Branch industrial wastes. The regional wastewater treatment plant (wwtp) concept is instituted with the signing of an agreement between the District of Columbia and the WSSC. Hurricane Hazel causes destructive flooding in October. A campaign to save the C&O Canal begins. Maryland initiates the striped bass juvenile indices.
- 1955** Congress directs ACE to study the North Branch. WRC-TV (Washington, D.C.) telecasts the first installment of the "Our Beautiful Potomac" series, which reveals the Potomac's poor condition.
- 1956** Wastes from raw and partially treated sewage of Washington, D.C.'s population is double that of 1932. Federal legislation is passed

that extends and strengthens the Water Pollution Control Act. The new Alexandria, Va., wwtp goes into operation, and is heralded as "the only . . . plant ever built in the Washington metropolitan area that has been adequate at the time of its completion . . ." The Rock Creek Watershed Association is organized. Under the auspices of ICPRB, a group of citizens organizes the Citizens Council for a Clean Potomac. Congress directs ACE to prepare a comprehensive plan for control of floods and development and conservation of the basin's water resources.

- 1957** The U.S. Public Health Service declares the Potomac River unsafe for swimming. The first Potomac Enforcement Conference is called. The first wwtp on the North Branch is completed in Cumberland, Md. ICPRB estimates that on the average, 60 million cubic feet of sediment is deposited annually within the metropolitan Washington reach of the Potomac estuary; it calls for "A Clean Potomac River in the Washington Metropolitan Area." The first National Water Quality Sampling Station is put into operation on the Potomac at Great Falls.
- 1958** The (1957-58) Potomac Federal Enforcement Conference sets goals, among them secondary treatment for Potomac treatment plants. Maryland and Virginia sign the Potomac River Compact of 1958, and establish the Potomac River Fisheries Commission. ICPRB is now gathering and tabulating information from about 85 stream sampling stations operated by cooperating agencies, municipalities and industries. Water supply is a pressing basin problem.
- 1959** ICPRB publishes its first "Potomac River Water Quality Network;" it holds a "first-of-its-kind" silt control conference and sponsors a study of sediment sources in the basin with USGS. The District of Columbia and Fairfax County, Va., sign an agreement for Blue Plains to treat a part of the county's wastes. Secondary treatment is added at Blue Plains. ICPRB proposes Compact changes.

1960s

- 1960** The Metropolitan Washington Regional Sanitary Advisory Board is established. Work begins on a plan to separate D.C.'s combined sewers. The Upper Potomac River Commission treatment plant in Westernport, Md. begins operation; it is designed to clean up pollution in the North Branch Potomac.
- 1961** D.C. installs the first fully automatic stream sampling and recording device on the Potomac.
- 1962** The Potomac River Fisheries Commission begins operations. Congress authorizes Bloomington Dam on the North Branch. A comprehensive metro Washington area sewage disposal report is issued.
- 1963** ICPRB issues two reports on sediment sources and an urban sediment control program. The ACE publishes a comprehensive plan of development for the Potomac, which calls for 16 major dams.
- 1964** The Potomac Interceptor, tying northern Fairfax County and parts of Loudon County, Va., and Montgomery County, Md. to the D.C. Blue Plains plant, is christened with its first sewage flows. ICPRB issues a resolution deploring the absence of any public program to control urban sediment in the Potomac. There is a sudden invasion of watermill-foil.
- 1965** The governors of the basin states and the president of the D.C. Council establishes a Potomac River Basin Advisory Committee to coordinate views on matters affecting the watershed. The Water Quality Act of 1965 passes, establishing a Federal Water Pollution Control Agency and requiring water quality standards. President Lyndon B. Johnson labels the Potomac "a national disgrace," and sets 1975 cleanup goals. Efforts are initiated to preserve Mason Neck.
- 1966** The Federal Inter-Departmental Task Force on the Potomac issues its report to the President. It proposes the Potomac National River

and makes recommendations. September brings the record low flow in the Potomac of 388 mgd*. The Clean Water Restoration Act, increasing grants for research, state programs, and construction of wwtps, passes. Virginia undertakes the task of defining its river basins and planning water resource development and management. Pennsylvania begins long-range sewerage planning.

- 1968** Chlorination of the Washington area wwtp effluent begins. D.C. engages a firm to study Blue Plains development. The ACE issues a new report: six (instead of 16) major reservoirs are proposed.
- 1969** The earlier Enforcement Conference goals have not been met: the river is described as "a severe threat to the health of anyone coming in contact with it." A new Enforcement Conference is called, mandating the degree of treatment, capacity for growth, and regional commitments. The Mason Neck National Wildlife Refuge is established.

1970s

- 1970** ICPRB's Compact is amended, extending its authority to include water supply and water-related land use. D.C. passes erosion control legislation. Maryland enacts a sediment control law, installs the Maryland Environmental Service, creates The Wetlands Act of 1970, and imposes a ban on sewer extensions affecting the five drainage basins under the jurisdiction of the WSSC. Virginia sets up a state construction grant program, imposes a moratorium on new sewer hookups in Fairfax County, and approves a Potomac-Shenandoah water resources plan. Metropolitan Washington local jurisdictions sign a Memorandum of Understanding, agreeing to expand Blue Plains to 309 mgd and allocating additional capacity and local share of costs. The Environmental Protection Agency is established.
- 1971** The D.C. Council prohibits water contact sports in the Potomac, Rock Creek, and Anacostia River. Urban sediment is a major concern. The C&O National Historical Park is created.
- 1972** The Federal Water Pollution Control Act Amendments are passed by Congress, establishing a national goal of "swimmable-fishable" waters. Hurricane Agnes devastates the Potomac basin. Pennsylvania passes a sediment control law.
- 1973** This summer, fewer algae blooms arrive later. A suit is initiated in Federal District Court by the Virginia State Water Control Board against WSSC for overloading the Blue Plains plant. Virginia's Erosion and Sediment Control Law is passed.
- 1974** A Blue Plains agreement allocates flows and sludge disposal responsibilities; a trial program of phosphorus removal begins. The 208 regional planning effort begins.
- 1975** An ICPRB conference focuses on rising dollar and energy costs associated with D.C. metro area sewage treatment. ICPRB organizes a month-long fact-finding trip down the Potomac. Congress authorizes a five-year study of the Chesapeake Bay.
- 1976** Pleasure boaters rediscover the Potomac; largemouth bass reappear in Washington, D.C. There is a noticeable lack of blue-green algae mats that had covered the upper estuary a decade earlier. The Commission conducts a second Potomac River fact-finding trip, and holds a conference on legal rights in Potomac waters.
- 1977** The Federal Surface Mining Control & Reclamation Act is passed. Blue Plains advanced secondary treatment expansion is operational. Mercury is discovered in sediments and fish in the Shenandoah River.
- 1978** ICPRB holds Thames-Potomac Seminars. The first annual Potomac Raft Race is held. A full-time fishing guide begins working the Potomac. The USGS begins annual submerged aquatic vegetation surveys. The Low Flow Allocation Agreement is signed by ACE, Maryland, Virginia, District of Columbia, WSSC, and Fairfax County; it is the first significant example of multi-level co-operation for water resource management in the Washington area.

- 1979** River improvements result in an interest in permitting some water-contact sports in the metro Washington Potomac once again. It is decided that with the construction of Bloomington (later to be named Jennings Randolph) and Little Seneca reservoirs that the Washington, D.C., water needs could be met well into the 21st century. ICPRB forms a Section for Cooperative Water Supply Operations on the Potomac (CO-OP), composed of the three major metro Washington area water utilities.

1980s

- 1980** Secondary treatment is achieved at all local wwtps. Some fish are caught below Keyser, W. Va., indicating improving conditions on the North Branch. A Shad fishing ban is initiated. The Washington Metropolitan Area Water Supply Task Force goes into intense cooperation.
- 1981** Bloomington Dam is dedicated. Approximately 100,000 persons attend "The Awakening," a week-long event celebrating a cleaner, fishable Potomac on the Mall. The first Potomac River Festival in the District of Columbia is held. COG recommends phosphate detergent bans.
- 1982** The Potomac River Basin Consortium is established. SAV begins to return to the tidal Potomac. Striped bass fishing restrictions are initiated. Small beds of hydrilla are discovered in the upper tidal river. The Water Supply Coordination Agreement is entered into by the Army Corps of Engineers, Fairfax County Water Authority, Washington Suburban Sanitary Commission, the District of Columbia, and ICPRB.
- 1983** The EPA Chesapeake Bay Study is completed. A Chesapeake Bay Agreement is signed. ICPRB initiates discussion of hydrilla problem.
- 1984** Northern Virginia wwtps voluntarily impose a phosphorus limit. The Blue Plains Feasibility Study recommends the expansion of Blue Plains. Maryland and the District of Columbia sign the Anacostia Watershed Restoration Strategy Agreement. A metro Washington regional sludge disposal agreement is reached. COG organizes the first coordinated Anacostia watershed monitoring program. The District organizes its first fisheries management program. Virginia passes a dechlorination initiative.
- 1985** Hurricane Juan causes the largest flood on the Potomac in Washington area since Hurricane Agnes in 1972. Maryland initiates a phosphate ban. The Little Seneca Reservoir is completed. Maryland initiates striped bass moratorium. Concern for public safety results in the modification of Little Falls Dam.
- 1986** All major wwtps in the metro Washington area have achieved phosphorus removal. The District initiates a phosphate detergent ban. SAV distribution is now 3,600 acres. Mechanical harvesting of hydrilla is initiated. Avtex on the Shenandoah River is listed as an EPA Superfund site.
- 1987** The Clean Water Act is revised. The second Chesapeake Bay Agreement is signed. A cooperative agreement to develop a plan for acid mine drainage abatement is signed by West Virginia and Maryland. A basin-wide phosphate detergent ban is recommended by ICPRB. D.C. fishing regulations are put in effect. Maryland declares Savage River a *Trophy Trout Stream*.
- 1988** Blue Plains starts removing chlorine. A survey finds 78 species of fish in the metro Washington Potomac. Virginia initiates a phosphate ban. The [second] Anacostia Watershed Restoration Agreement is signed. The First Maryland International Canoe/Kayak Classic is held on Savage River. D.C. issues fishing licenses. The D.C. swirl concentrator is dedicated on the Anacostia.
- 1989** Maryland finds dioxin in North Branch fish. Potomac region has complete striper moratorium. PCBs are found in Shenandoah fish. PCBs and chlordane are found in D.C. fish. Canoe/Kayak World Championships are held on Savage River.

