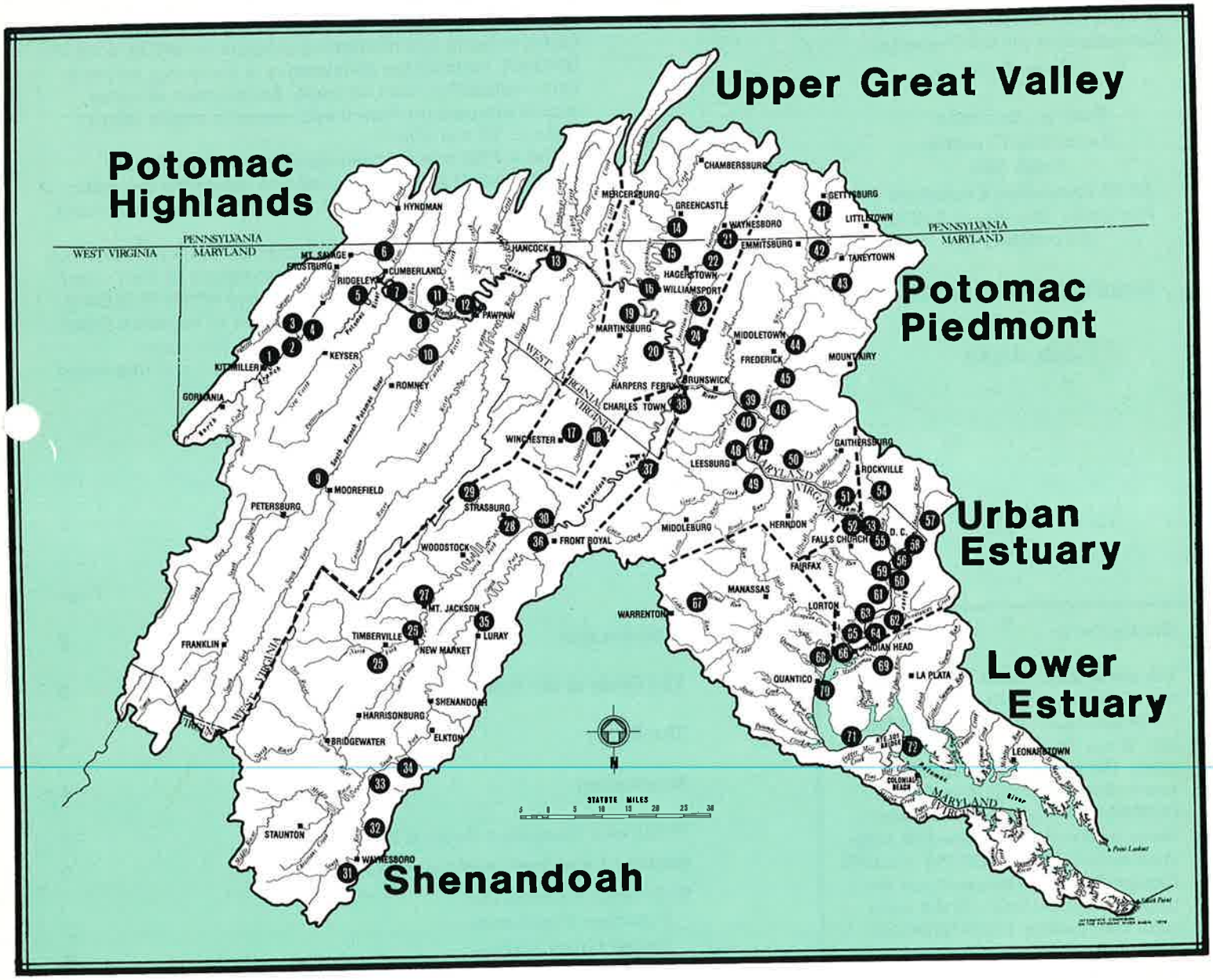
ICP-171

POTOMAC RIVER BASIN WATER QUALITY

82-83



INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

POTOMAC RIVER BASIN WATER QUALITY 82-83

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On the Cover:

The cover map shows the location of the 72 stations in the Potomac River basin that make up the ICPRB Baseline Water Quality Monitoring Network. The basin is divided into six sub-basins. These include the POTOMAC HIGHLANDS: Fairfax Stone to the Great Valley (158 main stem miles); UPPER GREAT VALLEY: Conococheague, Opequon and Antietam Creek watersheds (54 main stem river miles); SHENANDOAH RIVER BASIN: Tributaries and main stem (20 main stem river miles); POTOMAC PIEDMONT: (53 main stem river miles); POTOMAC URBAN ESTUARY: (43 main stem river miles); LOWER POTOMAC ESTUARY: (75 main stem river miles).

INTRODUCTION

The Interstate Commission on the Potomac River Basin (ICPRB), has since 1940, the mandate to enhance and protect the water quality and water environment of the approximately 15,000 square miles of Potomac River drainage. Periodically ICPRB disseminates water quality assessments of the Potomac's water and related land resources. Since 1974, these assessments have been based on data from the Baseline Water Quality Monitoring Network (BWQMN). The network is composed of 72 stations strategically located to provide information for basin-wide water quality appraisals.

Over the last five years, data collection has improved, partially as a result of the U.S. Environmental Protection Agency (EPA) "CORE" sampling network. The nationwide CORE network is a monitoring program which, as does the BWQMN, emphasizes consistency in sampling, so better data comparisons can be made. Assessment of water quality information from these networks allows priority areas to be identified.

The ICPRB reports (biennial since 1977) represent evaluations of water quality data to determine the status of the Potomac River and its tributaries. This report looks at the river as a whole.

ICPRB publishes these reports so as to be of assistance to the Potomac Basin states in preparation of their water quality inventory reports Section 305(b) of the 1972 Clean Water Act. The Commission continues to reassess these reports in terms of their usefulness to the states' legislatures and administrators, scientists, and interested public.

Paul W. Eastman
Executive Director

CONTENTS

THE STATE OF THE BASIN

This report assesses water quality information gathered in the Potomac River basin during 1982-1983, and evaluates in practical terms the status at 72 specific monitoring stations, six sub-stations, and the basin as a whole. The assessments found that water quality throughout the Potomac River basin is generally Good over-all, but ranges from Poor to Good-Excellent. In a few areas, water quality is stressed, and in two areas the water quality is described as Poor. With these two exceptions, Potomac River basin water quality is generally suitable for the maintenance of aquatic life resources, recreation, water supply and other uses.

The major pollution problems in the basin are the result of acid coal mine drainage, urban and agricultural runoff, and residual nutrients in discharges after advanced treatment in the Washington metropolitan area, together with nutrients in estuary bottom sediments. Except for some municipal dischargers still awaiting funding for improvements and the special problems noted above in the Washington area, point sources of pollution no longer severely impact basin water quality. It is generally agreed that nonpoint sources of pollution are now responsible for many of the negative impacts on water quality.

Other pollution problems are caused by raw sewage discharges, failing septic systems, and combined sewer overflows.

We have divided the basin into six subdivisions: Potomac Highlands, Upper Great Valley, Shenandoah, Potomac Piedmont, Potomac Urban Estuary, and Lower Potomac Estuary.

POTOMAC HIGHLANDS

In the headwaters of the Potomac, the water quality is Poor, because of acid drainage from abandoned and inactive coal mines in the North Branch Potomac River drainage. Almost half of the North Branch (about 50 miles) and approximately 700 miles of its tributary streams remain affected and are unsuited for aquatic life. Although municipalities in the area are improving their treatment facilities, most notably in the Georges Creek area of Maryland, water quality still depends on levels of acid mine runoff. The construction of Bloomington Reservoir has had a beneficial effect on North Branch water quality downstream of the dam. South Branch Potomac River water quality is Good, with only some localized problems from agricultural and dairy farm runoff.

UPPER GREAT VALLEY

This sub-division includes portions of southern Pennsylvania, Maryland, Virginia and West Virginia. The water quality of Conococheague, Opequon, and Antietam creeks are generally Fair. Nonpoint source pollution such as sediments, nutrients, and bacteria that enter streams during storm runoff is the major influence on water quality. This region is extensively farmed, and agricultural runoff during storms affects the entire region. Water quality of a few specific streams ranges from Poor-Fair to Good.

SHENANDOAH

This sub-division drains portions of Virginia and West Virginia, which include the North and South Forks that form the Shenandoah River proper. Water quality ranges from Fair-Good to Good-Excellent. Water quality is gradually improving, but nonpoint sources affect some areas. In addition, the mercury contamination of the South River and South Fork waters and its bottom sediment will remain a problem for many years to come.

POTOMAC PIEDMONT

This sub-division includes the area from Harpers Ferry to Little Falls, the area just above metropolitan Washington. Water quality varies from Fair to Good-Excellent. Although water quality has improved as a result of upgraded treatment facilities, problems remain from a few overloaded municipal treatment plants, urban and agricultural runoff, and localized septic system failures.

POTOMAC URBAN ESTUARY

This sub-division includes the metropolitan Washington segment of the Potomac, where more than $1 billion and a great deal of effort has resulted in significant improvement in water quality over the last 10 years. Water quality can be Poor (during summer low flows), but generally is Fair to Good the rest of the year.

The effort and money in the Potomac cleanup focused mainly on point sources (primarily discharges of pollutants from sanitary sewers) of pollution. The remaining problem of nonpoint source pollution (storm runoff) is widespread and more costly to solve, and is typical of urban waterways. The Anacostia River, which exhibits Poor water quality, is the main urban Potomac tributary in this reach. It has long been neglected and has been a longstanding victim of combined storm and sanitary sewer overflows and other urban runoff. A pact between Maryland and the District has focused on the need to clean up the Anacostia, and future help should be on its way.

In 1983, algae blooms painted the Potomac in this reach a bright green for about 30 miles below Washington during hot summer months, prompting an increase in monitoring and the convening of a panel of experts to identify the cause and suggest possible remedies.

Also in 1983, submerged aquatic vegetation (SAV)—missing for 15 years in this reach — began to return. This was heralded as a beneficial sign of water quality improvement, because SAV like to grow in healthy water environments. Another member of the SAV group, *Hydrilla* also appeared in this reach. Considered by many to be a noxious weed with the ability to multiply at an alarming rate and crowd out desirable SAV, *Hydrilla* is being monitored carefully. The U.S. Army Corps of Engineers has started a research and demonstration program to see what controls on the plant may be feasible.

LOWER POTOMAC ESTUARY

This sub-division extends from Indian Head, Md. to the mouth of the Potomac at Point Lookout. The water quality varies from Good to Good-Excellent and the lower portion is influenced primarily by the water quality of Chesapeake Bay because of tidal action. The upper portion of this segment is impacted by the water quality of the urban metropolitan area. Also, local areas of poor water quality below inadequate sewage treatment plants, plus storm water runoff create some problems.

THE BASIN

The Potomac River and its tributaries drain 14,670 square miles, which includes parts of Maryland, Virginia, West Virginia, Pennsylvania, and the entire District of Columbia. Approximately four million people call the basin home, and three-quarters of them live in the metropolitan Washington area.

The Potomac flows 383 miles from its source at Fairfax Stone in West Virginia, to its mouth at Point Lookout, Md., where it enters the Chesapeake Bay. The Potomac transects six distinct physiographic regions on its journey to the bay, including the Allegheny Plateau, the Ridge and Valley Province, the Great Valley, the Blue Ridge, the Piedmont, and the Coastal Plain.

The river is free flowing, with only one major dam at Bloomington, Md. Below Little Falls, the Potomac changes gradually from fresh to salty in a long estuary.

One of the Potomac's characteristics in its "flashiness" — Potomac flows have reached as high as 200 billion gallons per day, but drought flows have been recorded of only 380 million gallons per day.

The Potomac provides public drinking water supplies, commercial fishing opportunities, power plant cooling water, river related recreation, and waste transport.

MONITORING

In the Potomac River basin, each of the five states maintains a monitoring network to assess water quality. Samples are taken for physical, chemical, bacteriological and biological parameters.

Prior to 1974, independent state sampling often was not coordinated. This resulted in poor basin-wide comparability. In 1974, ICPRB conceived the Baseline Water Quality Monitoring Network (BWQMN), which identified the need for comparable basin-wide information. With the initiation of the EPA "CORE" network, this comparability increased nation-wide. Thus, the data base for water quality assessments has progressively improved.

A coordinated monitoring and reporting program has been initiated by Maryland, Virginia, and the District, with the cooperation and assistance of the Metropolitan Washington Council of Governments (COG), ICPRB, and the Occoquan Monitoring Laboratory of Virginia Polytechnic and State University. This effort further improved the quality of information in the metropolitan Washington area.

POINT AND NONPOINT SOURCE POLLUTION

There are two broad categories of pollution sources — point and nonpoint. Point sources discharge to a receiving water body from a definite outlet such as a pipe, tunnel or channel. These outlets primarily include wastewater treatment plant (WWTP) discharges, industrial discharges, cooling water discharges, and combined storm and sanitary sewer overflows (CSOs).

Nonpoint pollution sources do not discharge from a clearly identifiable point, but originate over a broad area, and are often intermittent over time. Potomac nonpoint examples are storm water runoff from the land — suburban (construction sites in particular), agricultural, and forested; leachates from failing septic tanks and landfills; acid mine drainage; illegal sewage connections to storm drains; and sewer leaks and toxic metal and nutrient releases from bottom sediments. Nationally, as well as in the Potomac River basin, initial efforts to improve water quality were directed at point sources of pollution and are being addressed by the implementation of the Clean Water Act.

It is now apparent that in some situations, such as in the Potomac River basin, even if all municipal and industrial point source discharges were treated to some advanced degree, water quality problems would still remain. The persistence of these water quality problems is mainly a result of huge quantities of nonpoint pollution that never receive treatment before reaching waterways. The concentration of pollutants in flows from nonpoint sources is often dilute; however, the total discharge of pollutants from these sources can be quite significant because of the huge flows involved. Increased attention is now being given to nonpoint pollution sources, which is difficult and more-expensive to control.

The Blue Plains regional wastewater treatment plant is the basin's largest point source.

Potomac River basin WWTPs have continued to improve their operations and treatment processes over the past 10 years. Increasingly stringent discharge permit limitations are imposed on them, and many have been unable to maintain the cleanup pace.

In an attempt to accelerate the improvements of treatment plants, the states and the U.S. Environmental Protection Agency take legal action against chronic violators if immediate plans are not followed to correct the plant violations. Even though some WWTPs are in violation of their current permits, the discharge quality continues to improve and is measurably better than in previous years.

MAJOR WATER QUALITY CONCERNS

The water quality of the nearly 15,000 square-mile Potomac River basin is generally Good and improving. With the exception of localized problems — all being dealt with at the county or state level — five major water quality concerns continually surface. These are in the nonpoint source pollution category, and are the most difficult and the most expensive to manage and control.

The major nonpoint source pollution problems in the Potomac River basin are acid mine drainage, sedimentation, nutrient enrichment, combined sewer overflows (CSOs), and urban runoff.

Acid drainage from abandoned mines pollutes a large portion of the Potomac River basin headwaters.

Sedimentation, caused by runoff from land that has been disturbed by agriculture, construction, or other activity, causes the river to turn brown following heavy rain storms.

Nutrient enrichment is usually the addition of nitrogen and phosphorus to a water body. This is related to sedimentation because much of the phosphorus is bound to sediment particles. Nutrient enrichment is characteristic of farmland and suburban runoff because of fertilizer applications. Nutrient enriched waters are believed responsible for algal blooms and possibily for disappearance of submerged aquatic vegetation (SAVS).

An intermittent but serious problem exists in the District of Columbia, Alexandria, Va., and other areas that have combined sewer overflows. During heavy storms, combined sewers collect rainwater runoff as well as wastewater, and much of the mixture overflows directly to the Potomac or its tributaries. This causes bacterial levels to rise and makes swimming hygienically unsafe for several days following storms.

Most urban runoff is storm water runoff from streets and parking lots is collected and discharged by separate storm sewers. It is a problem in any urban area, and includes oil, grease, hubcaps, and mufflers from automobiles, pet animal wastes, cigarette and cigar butts, styrofoam fast food containers, and errant tennis and golf balls.

These are all problems that are well understood by the local governmental jurisdictions, and as funding allows, solutions are being implemented.

SUMMARY

Water quality in the Potomac River basin is generally Good overall and is suited for the maintenance of aquatic life resources, recreation, water supply, and other uses. A summary of the status terms at the 72 BWQMN stations showed that 4 stations (6%) were rated Poor, 3 stations were rated Poor-Fair (4%), 17 stations were rated Fair (24%) 13 stations were rated Fair-Good (18%), 29 stations were rated Good (40%), and 6 stations were rated Good-Excellent (8%). Thus, 48 stations or 66% (⅔) were rated as having Fair-Good or better water quality. Based upon a 10 year trend scan, Potomac River basin water quality shows no evidence of degradation, and gradual improvements are being demonstrated. There is ample evidence that the water quality of the Potomac is improving. An excellent largemouth bass sport fishery has developed in the Washington Metropolitan Area to the point of sustaining fishing guides who fish the Metropolitan Washington waterfront. Two national sporting magazines ran articles which raved about "D.C. Bass" and "D.C. Shad," and a larger variety of fish are again making the Potomac their home.

Washington area yacht clubs report increased nesting of waterfowl, and marina owners claim the river clarify is as good if not better than they can remember. Although two serious problem areas remain (the North Branch Potomac basin, including Georges Creek, and the Anacostia River in Maryland and the District), the overall water quality problems are becoming less serious and are of a more general nature mainly related to nonpoint source pollution. With current or increased funding and continuing effort, gradual but steady improvement is anticipated over the years to come.

Many types of submerged aquatic vegetation are growing in the Potomac River, including *Hydrilla,* shown here in Dyke Marsh below Washington. Photo: D. Loveland

STATUS EVALUATION RATIONALE

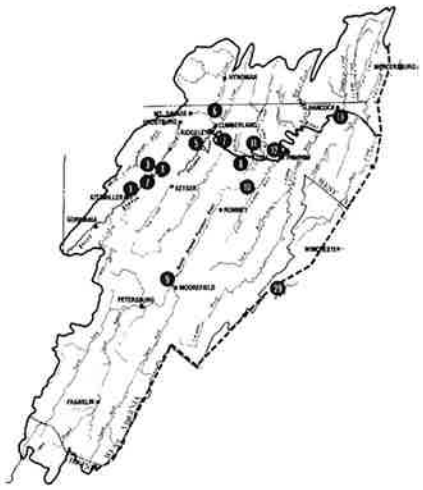
The water quality status terms used are "Excellent," "Good," "Fair," and "Poor." Data results from each of the 72 BWQMN stations listed on Page 6 were evaluated. The mean yearly values for common water quality parameters were examined. The status term for the station was determined by the degree of deviation of the parameter from normally accepted values considered necessary for fishable and swimmable waters, and the opinions of water quality biologists. The table on Page 6 indicates the ICPRB station number, the waterway name, the location of the station, and the status term that best describes the water quality at the station.

Potomac River Basin Monitoring Station Locations and Status

Waterway	Station No.	Location	Status
North Branch Potomac	1	Kitzmiller, Md.	P
	2	Bloomington, Md.	P
Savage River	3	Bloomington, Md.	G-E
Georges Creek	4	Franklin, Md.	P
North Branch	5	Pinto, Md.	F
Wills Creek	6	Cumberland, Md.	G
North Branch	7	Cumberland, Md.	F
	8	Oldtown, Md.	F-G
South Branch Potomac	9	Moorefield, W.Va.	G
	10	Springfield, W.Va.	G-E
Town Creek	11	Oldtown, Md.	G
Potomac River	12	Paw Paw, W.Va.	G-E
	13	Hancock, Md.	G
Conococheague Creek	14	Franklin City, Pa.	G
	15	Fairview, Md.	F-G
	16	Williamsport, Md.	F-G
Abrams Creek	17	Winchester, Va.	P-F
Opequon Creek	18	Winchester, Va.	F
	19	Bedington, W.Va.	F-G
Potomac River	20	Shepherdstown, W.Va.	G
Antietam Creek East Branch	21	Washington Township, Pa.	G
Antietam Creek	22	Rocky Forge, Md.	F
	23	Funkstown, Md.	F
	24	Sharpsburg, Md.	G
North Fork Shenandoah	25	Cootes Store, Va.	G-E
	26	New Market, Va.	G
	27	Mt. Jackson, Va.	G
	28	Strasburg, Va.	G
Cedar Creek	29	Rt. 628 Bridge	G-E
North Fork Shenandoah	30	Front Royal, Va.	G
South River	31	Waynesboro, Va.	G
	32	Crimora, Va.	F-G
	33	Port Republic, Va.	G
South Fork Shenandoah	34	Lynwood, Va.	G
	35	Luray, Va.	G
	36	Front Royal, Va.	G
Shenandoah River Main Stem	37	Berryville, Va.	G
	38	Bolivar, W.Va.	G
Potomac River	39	Point of Rocks, Md.	G
	40	Point of Rocks, Va.	G
Rock Creek	41	Gerrysburg, Pa.	F
Monocacy River	42	Bridgeport, Md.	G
Big Pike Creek	43	Bruceville, Md.	F-G
Monocacy River	44	Frederick, Md.	G
	45	Frederick, Md.	F
	46	Dickerson, Md.	F-G
Potomac River	47	Whites Ferry, Md.	F-G
	48	Whites Ferry, Va.	F
Goose Creek	49	Leesburg, Va.	G
Seneca Creek	50	River Road, Md.	F-G
Cabin John Creek	51	MacArthur Blvd., Md.	F-G
Potomac River	52	Little Falls, Md.	F
	53	Canal Rd., D.C.	G
Rock Creek	54	Bethesda, Md.	P-F
	55	Wash., D.C.	P-F
Potomac River	56	Hains Point, D.C.	F-G
Anacostia River	57	Bladensburg, Md.	F
	58	S. Capitol St., D.C.	P
Four Mile Run	59	Arlington, Va.	F
Potomac River	60	Wilson Bridge, D.C.	F
Hunting Creek	61	Alexandria, Va.	F
Piscataway Creek	62	Piscataway, Md.	F-G
Little Hunting Creek	63	Fairfax City, Va.	F
Potomac River	64	Marshall Hall, Md.	F-G
Pohick Creek	65	Ft. Belvoir, Va.	F
Potomac River	66	Indian Head, Md.	F
Occoquan Creek	67	Woodbridge, Va.	G
South Run	68	Vint Hill, Va.	F
Mattawoman Creek	69	Mason Springs, Md.	G
Potomac River	70	Moss Point, Md.	G
	71	Maryland Point, Md.	G
	72	Morgantown, Md.	G-E

POTOMAC HIGHLANDS

Area: From Fairfax Stone, W. Va., 158 river miles to the eastern crest of the Appalachians.
Major Tributaries: North and South branches Potomac, Savage River, Georges and Town creeks
Water Quality: Poor-Fair
Problems: Acidified water drainage from abandoned mines, some industrial waste, runoff. Improvement from Bloomington Reservoir, increased and improved wastewater treatment



POTOMAC HIGHLANDS

The North Branch begins as a small spring in West Virginia and after flowing for 100 miles, meets the South Branch to form the Potomac River. The North Branch watershed has rugged terrain, steep mountains, and deep valleys. It has been polluted by acid mine drainage for 150 years.

Acid mine drainage from abandoned/inactive mines is the major pollution source. About 50 miles of the North Branch and 700 miles of its tributaries are unable to support recreation and aquatic life.

A water quality improvement in this area is the Bloomington Dam and Reservoir, located eight miles upstream from the North Branch Potomac and Savage River confluence, between Garrett County, Md., and Mineral County, W.Va. The dam has improved water quality conditions. In 1982, schools of smallmouth bass were sighted in the reservoir, showing that the water quality has improved more than expected.

UPPER NORTH BRANCH POTOMAC Station Nos. 1, 2

The Upper North Branch Potomac watershed is mostly forest, with some agriculture and a few small towns. Water quality is Poor, from acid mine drainage, agricultural runoff, and raw sewage discharges. The effects of domestic wastes from Kitzmiller, Gorman, and other small towns are masked by the acid waters of the North Branch. Westvaco, a large pulp and paper mill in Luke, Md., is the largest industrial facility in the North Branch watershed.

SAVAGE RIVER Station No. 3

The Savage River watershed is mountainous and mostly forested, and is 25 miles long. Being outside of the geological coal seam, the water quality is Good-Excellent. The reservoir and its tributaries provide excellent fishing.

Scheduled water releases from the reservoir allow for whitewater rafting and canoeing, and the Savage River has been selected as the site of the 1989 World Whitewater Championships by the International Canoe Federation.

GEORGES CREEK Station No. 4

The Georges Creek watershed is mountainous with small towns along its 17-mile length. It is heavily mined for coal.

From Barton to the mouth of Georges Creek, water quality is Poor. Georges Creek is a sluiceway for abandoned mine drainage and raw sewage.

In addition to mine drainage, Midland, Lonaconing, and Barton discharge raw and diluted wastewaters directly into Georges Creek. A wastewater treatment plant (WWTP) to serve 2,300 residents of the three towns was completed in 1984, and although it will eliminate the pollution from raw sewage sources it will do little to remedy the effects of acid mine drainage.

LOWER NORTH BRANCH POTOMAC Station Nos. 5, 7, 8

The lower North Branch Potomac area varies from agricultural to urban land use. It has several large industries located along its 52 miles and Cumberland, Md. at the downstream end. Water quality is only Fair, mainly from abandoned mine drainage.

The Cumberland WWTP has a capacity of 15 million gallons per day (mgd), and also serves Frostburg and LaVale. Overflows from combined sewers occur during heavy storms.

WILLS CREEK Station No. 6

Wills Creek is 27 miles long and has its headwaters in Pennsylvania. The lower portion flows through Cumberland. Water quality is Good, except in areas affected by acid mine drainage.

SOUTH BRANCH POTOMAC Station Nos. 9, 10

The South Branch is a major tributary that joins the North Branch to form the Potomac River at Green Spring, W.Va. The South Branch flows northeast for 131 miles, and drains West Virginia and Virginia. Population

centers are Franklin, Petersburg, Moorefield, Romney, and Springfield.

Many fishermen rate the South Branch as the best smallmouth bass stream in West Virginia, and it is well-suited to float-fishing.

The water quality is Good in the South Branch, although some localized problems exist. In 1982, a new WWTP was constructed in Romney, and improved industrial treatment has occurred at a number of plants along the South Branch.

POTOMAC RIVER MAIN STEM Station Nos. 12, 13

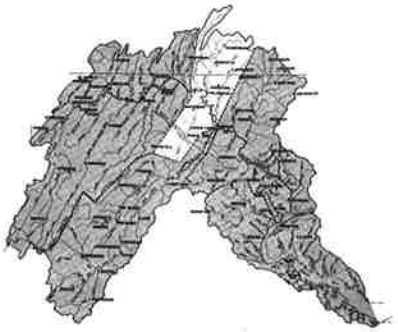
The main stem flows from upstream forested land to downstream agricultural land.

Good water quality is characteristic of the South Branch, but the Poor water quality of the North Branch dominates for several miles below the junction of these two rivers. Treated industrial, domestic, and agricultural wastes, as well as soil erosion are the main sources of pollution.

A small WWTP was completed for Flintstone and Gilpin in 1981.

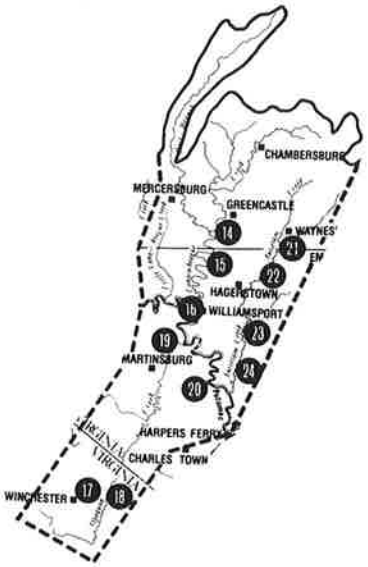
TOWN CREEK Station No. 11

Town Creek is 28 miles long and flows into the Potomac River three miles below the confluence of the North and South Branches. The watershed is mostly forested, with some farmland. Water quality is Good-Excellent and its tributaries are classified as natural trout waters by the State of Maryland. Runoff from farm animals affects water quality to a limited degree.



UPPER GREAT VALLEY

Area: 54 main stem Potomac miles from the eastern crest of the Appalachians to the Shenandoah River.
Major Tributaries: Conococheague, Opequon, Abrams, and Antietam creeks.
Water Quality: Fair
Problems: Inadequate municipal and industrial wastewater treatment, agricultural runoff, failing septic systems, toxic chemicals.
Slight improvement from improved wastewater treatment; nonpoint pollution remains the major influence on water quality.



UPPER GREAT VALLEY

CONOCOCHEAGUE CREEK Station Nos. 14, 15, 16

Conococheague Creek is formed by several shallow, meandering creeks near Chambersburg, Pa., and then flows south through Maryland, where it meets the Potomac at Williamsport. A large majority (nearly 500 square miles) of the drainage comes from Pennsylvania, and 66 square miles of the drainage is in Maryland. Land use in the stream valley is primarily agricultural, with small portions of either forest or developed land. Water quality is Good, except for the lower two miles, which are rated Fair-Good and are affected by agricultural and forest runoff. In Pennsylvania, industrial discharges from a paper mill and a tannery are the main forms of industrial pollution. A wastewater treatment plant has been completed in Chambersburg, Pa., but the river is still affected by urban and agricultural runoff.

OPEQUON CREEK Station Nos. 17, 18, 19

The Opequon Creek watershed, with its three major tributaries (Abrams Creek and Wrights and Redbud runs), drains east from the highlands west of Winchester, Va., and lies almost entirely in Frederick County, Va. Opequon Creek then flows north to the Potomac, crossing the eastern panhandle of West Virginia. Opequon Creek is a shallow, slow-moving stream whose tributaries seldom are more than 10 feet wide or three feet deep. The majority of the watershed is rural, with orchards north, west and southwest of Winchester and pasturelands east of the city.

Before joining Opequon Creek, Abrams Creek flows through the City of Winchester. There it receives the discharges from the 5 million gallon per day (mgd) Winchester WWTP and the small (0.5 mgd) Abrams Creek WWTP.

The Opequon Creek watershed has a large potential for affecting water quality from orchard and agricultural runoff. Past monitoring, in 1973 and 1974, detected pesticides in a variety of Opequon Creeks' aquatic life, water, and sediments. The pesticide levels were attributed to past, long-term use of insecticides to protect orchard crops. Recent monitoring (1979 & 1980), however, did not detect pesticides in the water or in fish.

The water quality of Abrams Creek is Poor-Fair, and Opequon Creek water quality is only Fair-Good because of inadequately treated municipal wastewater. Large pollution loads from apple processing operations are now diverted to land treat-

ment, and this is benefiting treatment plant performance.

ANTIETAM CREEK Station Nos. 20, 21, 22, 23, 24

Antietam Creek is 37 miles long, with most of its drainage in Maryland (187 square miles) and 105 square miles in Pennsylvania. It enters the Potomac main stem below Shepherdstown, W.Va., about 80 miles upstream of Washington, D.C. Land use is largely agricultural, with some forest and developed land.

Suspended solids and naturally high water temperatures stress the fisheries of Antietam Creek. Erosion from construction sites and agricultural areas are mainly responsible for the heavy sediment load.

Polychlorinated Biphenyls (PCBs) are a class of organic compounds that are used primarily as thermal insulating fluids in electrical equipment such as capacitors and transformers. They find their way into the environment through carelessness, damage, or improper disposal. PCBs have been shown to interfere with the growth and reproduction of aquatic plants and animals, and are regarded as a potential carcinogenic hazard to humans. Relatively high levels of PCBs were detected in the sediment of Antietam Creek by the U.S. Geological Survey in 1972. Follow up studies showed the levels were too small to be of concern.

Water quality of Antietam Creek varies from Fair in the upper creek to Good at Sharpsburg. The main pollution problems are failing septic systems and agricultural and construction runoff. The Hagerstown WWTP has been upgraded and continues to improve, but violations occur.

SHENANDOAH RIVER BASIN

Area: North and South forks of the Shenandoah meet at Front Royal, Va. Main stem Shenandoah meets the Potomac near Harpers Ferry, W. Va.
Major Tributaries: North and South forks and main stem Shenandoah, Cedar Creek, South River.
Water Quality: Good-Excellent
Problems: Localized degradation from municipal wastewater discharges, agricultural and urban runoff, mercury contamination of the South River and South Fork.

Water quality improvements continue, nonpoint source contributions evidenced by bacterial concentrations remain a problem

SHENANDOAH RIVER BASIN

Coined from the Indian word meaning "Daughter of the Stars," the Shenandoah is the largest tributary to the Potomac and drains 21 percent of the basin. The Shenandoah is formed by the North and South forks, which flow northeast and meet at Front Royal, Va.

Land within the watershed is primarily agricultural and forest, and the Shenandoah Valley is noted for its beautiful natural resources and unique limestone caverns.

The limestone streams in the Shenandoah Valley provide good fishing for smallmouth bass and channel catfish. A portion of the Shenandoah River in Clarke County has been designated as a scenic river.

Water quality in the Shenandoah is Good or Good-Excellent. At several areas downstream of larger cities, water quality is degraded by discharges of municipal wastewater and agricultural and urban/suburban runoff.

In 1977, sediment and fish were discovered to have high levels of mercury in the South River and South Fork of the Shenandoah below Waynesboro. Virginia issued a ban on the eating of fish caught from Waynesboro to the Page-Warren county line, a distance of 102 miles. After a change in allowable mercury limits by the U.S. Food and Drug Administration, the ban was replaced by an advisory stating that consumption of fish containing mercury may be dangerous. The advisory recommends eating no more than half a pound per week of fish from these waters and that small children and pregnant women should not eat fish containing mercury. The source of the mercury was the DuPont manufacturing plant at Waynesboro, although DuPont has not used mercury in its manufacturing processes since 1950.

Virginia immediately began a comprehensive toxic metal survey in the Shenandoah. A study completed in 1982 found it would not be feasible to dredge the mercury pollution from the rivers. Dupont will monitor the South Fork and South River for mercury contamination, and will set up a trust account to monitor the rivers for mercury for the next 100 years.

NORTH FORK Station Nos. 25, 26, 27, 28, 30

The North Fork of the Shenandoah River, smaller of the two Shenandoah forks, contributes 40 percent of the

water to the Shenandoah. The North Fork is 117 miles long, and its tributary streams are Smith, Stoney, Cedar, and Passage creeks.

The middle North Fork receives treated discharges from Rockingham Poultry Marketing Co-Op, Shen-Valley Meat Packers, National Fruit, and the towns of Broadway, Timberville, and New Market. Separate treatment of poultry processing wastes has remedied the overload problem at New Market. Broadway and Timberville have received a planning grant to upgrade their treatment facilities.

The lower North Fork includes the area below the influence of the Broadway-Timberville-New Market area. Strasburg and Mt. Jackson have constructed new treatment facilities that have improved the quality of the lower North Fork.

Water quality varies from Fair-Good in the upper North Fork to Good from below Strasburg to the Shenandoah confluence.

The North Fork offers trout fishing in its upper tributaries and smallmouth and panfish in its main stem. Several small dams exist in the Woodstock area.

CEDAR CREEK
Station No. 29

Cedar Creek is near Winchester in Frederick County, Va., and is 38 miles long. Land use is primarily national forest and agricultural land, and water quality is Good-Excellent.

SOUTH RIVER OF THE SOUTH FORK
Station Nos. 31, 32, 33

The South River rises in the Blue Ridge Mountains, and is 52 miles long. The upper segment includes the forested and agricultural areas upstream of Waynesboro. Water quality in this segment is Good.

The middle segment is the area downstream of Waynesboro to seven miles upstream from the confluence with the North River. Water quality in the middle segment is Fair. This is the degradation zone from the municipal wastewater discharges from Waynesboro, but there are plans to upgrade its treatment plant. Efforts by the major industrial dischargers have been effective in improving water quality, and along with anticipated improvements at the Waynesboro plant, are expected to eliminate water quality problems.

The South River below Crimora, about 20 miles below Waynesboro, has historically been the most severely impacted segment in the Shenandoah River. Improvements in the treatment of municipal and industrial discharges have improved water quality.

SOUTH FORK
Station Nos. 34, 35, 36

The South Fork is 151 miles long, and is formed by three major tributaries, the North, Middle, and South rivers, which converge at Port Republic, Va. The water quality varies from Good at Lynwood to Fair-Good below Elkton, Luray, and Front Royal.

SHENANDOAH MAIN STEM
Station Nos. 37, 38

The Shenandoah main stem is formed where the North and South forks meet at Luray, and flows for 20 miles to Harpers Ferry, W. Va. The Shenandoah receives wastewater discharges from Stephens City and Frederick County's Stephens Run WWTP. Some areas in Frederick County are rapidly becoming urbanized.

The rich limestone substrate of the Shenandoah provides good smallmouth bass fishing from Riverton to Harpers Ferry. In both the Virginia and West Virginia portions, Shenandoah River water quality is Good to Good-Excellent.

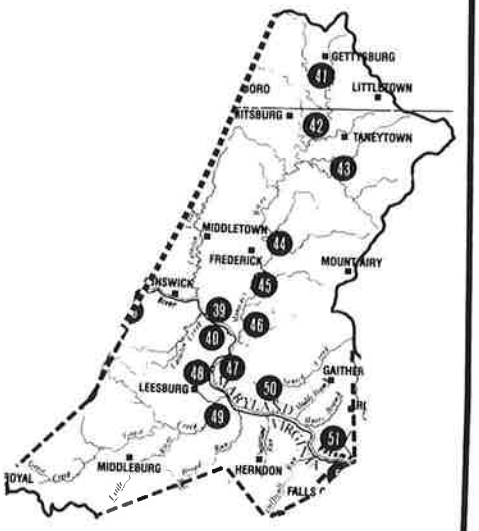
POTOMAC PIEDMONT

Area: 53 main stem Potomac miles, from Harpers Ferry, W. Va. to Little Falls, just above Washington

Major Tributaries: Rock Creek, Pa./Md., Middle, Friends, Owens, Big Hunting, Little Hunting, Fishing, Cabin John, and Catoctin creeks, Monocacy River, Md., Catoctin, Goose, and Tuscarora creeks, Va.

Water Quality: Fair-Good

Problems: Urban and agricultural runoff, poor effluent quality from some wastewater treatment plants, localized septic system failure. Improved quality from new treatment facilities, nonpoint sources responsible for major problems



POTOMAC PIEDMONT

The Potomac Piedmont subdivision extends from Harpers Ferry, W.Va., to Little Falls, Md., a distance of 53 miles. It is generally rolling land, with the Monocacy Valley centrally located on the Maryland side, and the "Fox Hunt Country" of Northern Virginia to the south. Included in this sub-division are Montgomery County, Md., and Fairfax County, Va., the suburban expansion of Washington, D.C., and the "fringe" expansion in the more rural counties of Carroll, Washington, and Frederick counties, Md., and Loudoun, Va. Rapid urbanization is occurring in Frederick,

Md. Other land uses include agriculture and forestland.

Fishing, boating, and hunting are the major recreational uses in the area. In the Catoctin Mountains of Md., several streams are stocked with trout. The Monocacy River is fished extensively for warm water species such as smallmouth bass and channel catfish.

Catoctin Creek lies in the southwestern section of Frederick County, Md. Its headwaters arise on South Mountain north of Wolfsville, Md. Below the town of Myersville, the valley is characterized by rolling hills and farmland.

POTOMAC RIVER MAIN STEM Station Nos. 39, 40

Water quality of the Potomac River downstream from Harpers Ferry is Good. At the Route 15 bridge at Point of Rocks, Md., the water quality is affected by agricultural runoff and faulty septic systems.

The soils in this sub-basin drain poorly and consequently are not well suited for septic tank use.

Wastewater treatment plants have recently been completed for Harpers Ferry and Shepherdstown, W.Va., which have alleviated the former impacts of failing septic systems in those areas.

ROCK CREEK (MONOCACY RIVER TRIBUTARY) Station No. 41

Rock Creek is the major tributary to the Monocacy River, which drains about 200 square miles of Pennsylvania, and about 750 square miles of Maryland. It is located in the north central portion of the Potomac basin, and drains the south central edge of Pennsylvania prior to flowing through Maryland.

Water quality of the Rock Creek tributary to the Monocacy River in Pennsylvania is Fair. Pollution problems are mainly from inadequately treated sewage discharges in the Gettysburg area. Agricultural runoff and failing septic systems cause additional problems, and waters in the creek seldom meet federal or state water quality standards.

A regional sewage treatment plant for Gettysburg and Cumberland townships in Adams County has been proposed for some time. Progress has been extremely slow because of controversy regarding the effect that construction might have on the Gettysburg National Military Park. After lengthy delays, Gettysburg has finally received a construction grant to upgrade and expand its treatment facility.

The Soil Conservation Service has developed a draft Watershed Plan for the Rock Creek watershed in Pennsylvania. The Plan should accelerate the implementation of best land management practices and agricultural waste treatment.

MONOCACY RIVER Station Nos. 42, 43, 44, 45, 46

The Monocacy River is 58 miles long and is located mainly in Frederick and Carroll counties, Md. Land use is mostly agricultural, and includes dairy and cattle farms.

Water quality of the Monocacy River varies from Fair in localized sections, to Good overall, and is suited for aquatic life and recreational uses. Pollution problems are caused by municipal discharges, failing septic systems, and poor agricultural practices. The highly erodible soils, combined with poor soil conservation practices, result in large amounts of lost top soil. As a result, water quality is degraded by high and persistent turbidity.

Water quality in the upper sections of streams in the Catoctin Mountains is Good-Excellent, and these tributaries support a good sport fishery.

In the summer of 1982, Maryland initiated a basin-wide effort to assess and quantify the nutrient, sediment, and animal waste contributions to the Monocacy.

The Monocacy River, and the Double Pipe Creek Watershed, in particular, have been targeted by the state of Maryland as critical areas for the potential release of agricultural nonpoint nutrients (phosphorus and nitrogen) to the Potomac estuary and Chesapeake Bay. The Rural Clean Water Project has helped institute the use of best management practices in the Double Pipe Creek watershed. It is expected that Maryland's cost-share policy should continue this work, which encourages farmers to control erosion and runoff. As of August 1, 1984, over $150,000 has been committed to the effort to reduce runoff in the Monocacy sub-basin.

METROPOLITAN WASHINGTON MAIN STEM Station Nos. 47, 48

The Metropolitan Washington main stem sub-basin is used as the water supply source for approximately 75 percent of the three million people in the Washington Metropolitan Area. Principal tributaries include Seneca, Cabin John, and Goose Creeks. Half of this area is developed, and the other half is divided fairly evenly between forest and agriculture. The watershed above Washington is ruggedly picturesque and provides excellent rafting, canoeing and kayaking for **experienced** boaters. The river is treacherous, and drownings occur each year, particularly between Great Falls and Little Falls.

The Great Falls of the Potomac is the most spectacular landscape feature of the Washington Metropolitan Area. Here the river drops about 40 feet over a 600 foot length and is channeled into the narrow, rock-walled Mather Gorge, less than 80 feet wide in places.

Water quality in the main stem varies from Fair to Good, and is impacted by both urban and suburban runoff which results in high sediment levels.

GOOSE CREEK Station No. 49

Goose Creek empties into the Potomac River about 35 miles upstream from Washington, D.C., after leaving Loudoun County, Va. The drainage is principally rural, and water quality generally is Good. Goose Creek is the receiving stream for the Leesburg, Va. WWTP.

SENECA CREEK Station No. 50

This watershed, the largest in Montgomery County, Md., is 23 miles long. Population centers are Poolesville, Damascus, Germantown, and Gaithersburg. Urban development is placing pressure on water quality. Tributaries to Great Seneca Creek include Dry Seneca Creek, Little Seneca Creek, Long Draught Branch, Gunners Branch and Whetstone Run.

The Seneca Creek watershed is typical of the rolling and hilly topography of the Piedmont Province. The riverscapes associated with the streams of the watershed are characteristic of the region and include pools, riffles, torrents, and gorges. While many stretches of the stream show no influence of man's activities, others exhibit severe stream channel erosion, stormwater outfalls, sanitary sewer crossings, unsightly litter, and other types of pollution.

The construction of Little Seneca Reservoir was begun in 1982, with completion scheduled in 1984. The 505-acre, 4.2-billion-gallon reservoir will be about halfway-up Little Seneca Creek. The lake will be the largest impoundment in Montgomery County, and was mainly designed to serve as an emergency back-up water supply for portions of Maryland, Virginia, and the District of Columbia. Other benefits will include erosion control (which will improve downstream water quality), flood control, recreation, and wildlife habitat.

The water quality of Seneca Creek varies from Fair to Good. Pollution problems are caused by agricultural and stormwater runoff.

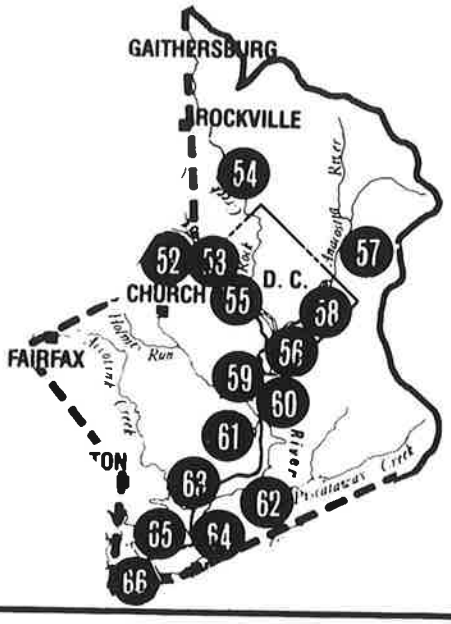
CABIN JOHN CREEK
Station No. 51

Cabin John Creek is located northwest of Washington, D.C., within Montgomery County, Md., and is 21 miles long. Land use is typical of urbanized metropolitan areas, but some undeveloped areas still exist. Most of the undeveloped areas are stream valleys where parklands have been developed to provide for recreational activities.

Water quality also varies from Fair to Good. The watershed is affected by nonpoint source pollutants associated with surface runoff from suburban lands. In the Cabin John watershed, soil loss from construction sites results in serious erosion, along with pollution from leaking sewers, leaking septic systems, and runoff which contains animal wastes. When construction projects are underway, sediment and erosion control regulations must be strictly enforced in the watershed to prevent the degradation of water quality.

POTOMAC URBAN ESTUARY

Area: 43 main stem Potomac miles, from Little Falls Dam above Washington to Indian Head, Md., and includes the major population of the river
Major Tributaries: Anacostia River, Rock and Piscataway creeks, Md., Four Mile Run, Hunting and Pohick creeks, Va.
Water Quality: Fair-Good
Problems: Urban runoff and combined sewer overflows, some localized agricultural runoff
Continued improvement from upgraded treatment plants; urban runoff and upstream contributions will require further attention



POTOMAC URBAN ESTUARY

LITTLE FALLS TO INDIAN HEAD
Station Nos. 52, 53, 56, 60, 64, 66

Estuaries are the meeting place of fresh and salt water, and because of this mixing they are the most biologically productive environments in river systems. This sub-division includes the upper third of the Potomac estuary. Since this upper estuary is completely fresh water, but is still influenced by tides, it is referred to as the tidal Potomac River.

Over 400 mgd of treated wastewater is discharged to the Potomac in this reach, with about 75 percent coming from the Blue Plains wastewater treatment plant (WWTP) just above the Woodrow Wilson Bridge.

Improvements in wastewater treatment have been significant in cleaning up this stretch of river, but the Blue Plains, Alexandria and Arlington WWTPs still experience problems in meeting their discharge limits.

Sport fishing has greatly improved over the last 5 years, and Washington, D.C., waters are now known as an excellent largemouth bass fishery. Other resident sportfish include smallmouth bass, sunfish, crappie, catfish and carp. In spring, striped bass, yellow and white perch, shad, and herring make their yearly spawning runs.

Fish tissue analyses have shown that District of Columbia fish are safe to eat, provided (as elsewhere) they are properly cooked. In the 1983 fishing derby sponsored by the Washington Area Waterfront Action Group (WAWAG), a world-record 57-pound, 13 ounce carp was caught in the Tidal Basin.

The water quality from Chain Bridge to Key Bridge is Fair to Good and water quality is improving. From Hains Point to Woodrow Wilson Bridge, the water quality is affected by the Anacostia River and varies from Poor to Fair.

In 1984, the District of Columbia completed the Blue Plains Feasibility Study, which looked at future

wastewater treatment needs and water quality protection.

Other on-going or completed studies include a Blue Plains disinfection study, which examined methods of reducing chlorine discharges, and a sludge and solid waste disposal study.

Urban runoff is currently the major degrading factor in water quality. In addition, combined sewer overflows (CSOs) within the District of Columbia continue to cause water quality problems after rains. The CSO issue is being addressed by the D.C. Department of Consumer and Regulatory Affairs.

During dry weather, water quality is Good. Heavy rain storms carry sediment, debris, and combined sewer overflows into the river, making it unsuitable for water contact recreation for several days following storms. District of Columbia health laws prohibit swimming in District waters, but Maryland has no such regulation for the Potomac above or below the District. However, swift under-water currents and a rock and glass-strewn bottom with steep drop-offs make the Potomac far from a model "swimmers' river," and many accidents and drownings occur yearly.

The summer of 1983 was marked by a massive bloom of the blue-green algae *Microcystis aeruginosa* in a 30-mile stretch of the upper Potomac from Alexandria, Va., to Maryland Point for the first time in about a decade. *Microcystis* is a single-cell plant that masses together to form a thick green scum.

State and government agencies responded immediately to the onset of the algal bloom. Sampling was increased from monthly to weekly. The Environmental Protection Agency, with the District, Maryland, and Virginia, assembled an "expert panel" to study the data and attempt to determine the cause of the algae bloom in a report due in early 1985.

Submerged aquatic vegetation (SAV) returned to the upper Potomac estuary in 1983, following an absence in the upper 35 miles of the estuary since the 1950s. A decline in SAV over the past two to three decades coincided with a decline in SAV throughout the entire Chesapeake system. Many different types of submerged aquatics began to reappear in 1983. Small patches of 10 to 12 species were found along the shorelines of the Potomac from Woodrow Wilson Bridge to Quantico.

Because SAV is found in healthy water environments, and because it provides food, cover, and natural aquatic life habitat, the return of SAV is a signal of improving water quality.

The reappearance of submerged aquatic plants was not all good news. *Hydrilla verticillata,* one of the species that has become widely distributed along the Potomac, can be a nuisance plant. *Hydrilla* is a very agressive, quick growing, competitive plant. It is able to reproduce in five different ways, and it can crowd out desirable plants. Consequently, it has the potential to cause problems for navigation and recreation.

Hydrilla was first found on the Potomac in 1981 in Dyke Marsh, a wetland on the Virginia shore 1.5 miles south of Alexandria. During 1982, the area covered by *Hydrilla* increased within Dyke Marsh, but there were no reports of *Hydrilla* in other locations. The infestation of the plant at Dyke Marsh became very thick during 1983, and the plant began to spread to other places along the river. In most instances, the *Hydrilla* found outside of Dyke Marsh occurred amid patches of more desirable native aquatic species.

The potential *Hydrilla* threat has generated a great deal of concern. In 1983, the National Park Service requested that a committee be set up by ICPRB. The result was HYDRAC, the *Hydrilla* Regional Action Committee. In 1984, the US Army Corps of Engineers (COE) also became concerned about the rapid spread of Hydrilla in the Potomac. Reacting to HYDRAC's "Alert Letter," and relying on past experience with *Hydrilla* in Florida and other states, COE developed a contingency plan for *Hydrilla* control and management. The plan outlined a public awareness program, a monitoring program, and considered control and management options. Ultimately, several research demonstration projects were proposed, to be initiated in the fall of 1984, pending federal, state, and public support.

ROCK CREEK
Station Nos. 54, 55

Rock Creek, a major tributary in the Washington area, is 25 miles long, and drains the urbanized section of Montgomery County, Md. and the District. Two dams were constructed in the upper watershed, forming Lakes Needwood and Frank, to improve water quality by trapping sediment, augmenting low stream flows during dry weather periods, and providing recreation.

In the summer of 1983, one-third of Lake Needwood was unusable for recreation because of thick mats of *Hydrilla.* The Maryland National Capital Park and Planning Commission (M-NCPPC) plans to control *Hydrilla* with an herbicide in 1984.

Water quality of Rock Creek is Fair, due to urban/suburban runoff and combined sewer overflows. Following storms, sediment and debris contaminate the stream. The M-NCPPC published a water quality study that found the pollution sources to include leaking sewers and illegal sewage connections to storm drains.

ANACOSTIA RIVER
Station Nos. 57, 58

The slow-moving and shallow Anacostia River is 28 miles long and drains parts of Maryland and Washington, D.C. The Montgomery County portion includes Northwest Branch (the only stream that is stocked with trout within the Capital Beltway), Sligo Creek, and the upper portion of Paint Branch. The Paint Branch tributary to the Anacostia is fed by clean, cold, rapidly flowing springs, making it one of the few streams with a self-sustaining trout population in Montgomery County. Tributaries in Prince George's County include Northwest Branch, Indian Creek, Little Paint Branch, and Beaverdam Creek.

Water quality of the Anacostia River is Poor-Fair. Specific problem areas include the upper reaches of Northwest Branch and Paint Branch because of failing septic systems. In addition, the highly erodible soils, naturally loose river bottom, and runoff from construction sites quickly turns the river brown following rains.

In the tidal Anacostia, water quality is Poor from urban stormwater runoff, combined sewer overflows, excavation, and poor construction practices. The Anacostia River Restoration Plan, recently negotiated between the District and Maryland, should focus attention on this neglected river. Funds have been committed to cure the combined sewer overflow problems in the District, and the erosion,

sedimentation, and leaky sewers in Maryland.

FOUR MILE RUN Station No. 59

Four Mile Run forms the boundary between Arlington and Alexandria in Northern Virginia and empties into the Potomac just below National Airport. The principal tributaries of Four Mile Run are Long Branch, Lucky, Doctors, and Lubber runs. Formerly the most frequently and extensively flooded stream valley in the Washington region, this problem was cured by a $63-million flood control project completed in 1980.

Below the Arlington WWTP discharge, the water quality varies from Poor to Fair. When construction projects are completed at the plant, water quality should improve from more complete nutrient removal of the plant effluent.

HUNTING CREEK Station No. 61

Hunting Creek is an inlet on the Virginia side of the estuary, south of Alexandria. Once a wide tidal estuary, the mouth of Hunting Creek is now only one mile wide. It is an outstanding feeding ground for waterfowl, which winter over in its sheltered waters. The inland part of Hunting Creek is now a narrow channel, filling from siltation.

Water quality varies from Poor to Fair, which is common in urban streams where runoff and WWTP discharges affect waterways. After completion of projects to upgrade WWTP treatment levels, water quality problems should be greatly reduced.

PISCATAWAY CREEK Station No. 62

Piscataway Creek is the major drainage in Prince George's County, Md., southeast of Washington, D.C. It is 17 miles long, and is being developed as a suburban residential area. The Piscataway WWTP discharges 30 million gallons per day of treated sewage into the main stem Potomac.

Water quality is Good, but is impacted by suburban runoff and boat discharges near the marina.

LITTLE HUNTING CREEK Station No. 63

Little Hunting Creek flows in a southeasterly direction from a Virginia storm sewer system to the Potomac River under the George Washington Memorial Parkway at Mount Vernon. From the storm sewer, the creek flows through concrete channels into a wide marsh, where it enters the Potomac. The watershed is almost entirely developed, which has caused water quality problems from urban runoff.

Water quality varies from Fair to Poor. The Little Hunting Creek WWTP provides efficient secondary treatment with phosphorus removal, but the long-term plan calls for phasing it out and diverting the flow to the Lower Potomac WWTP.

POHICK CREEK Station No. 65

Pohick Creek empties into Pohick Bay, and together with Accotink Bay, forms Gunston Cove at the Potomac main stem between Fort Belvoir and Mason Neck, 17 miles below Washington, D.C. The watershed varies from gently rolling to moderately steep lands, and is mostly developed.

Water quality above the Lower Potomac WWTP is Good. Below the discharge, the water quality is Poor — especially in summer — because of low river flow. Water quality should improve as a result of the improvements in the Lower Potomac advanced waste treatment (AWT) plant.

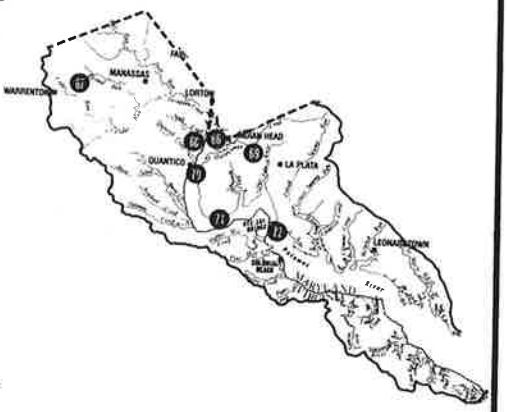
LOWER POTOMAC ESTUARY

Area: 75 main stem Potomac miles, from Occoquan Bay, Va., to Point Lookout, Md., and Smith Point, Va.

Major Tributaries: Occoquan, Aquia and Potomac creeks, Upper and Lower Machodoc rivers, Va.; Mattawoman and Nanjemoy creeks, Port Tobacco, Wicomico, and St. Mary's rivers, Md.

Problems: Localized areas of poor water quality from failing septic systems and some areas around treatment plants not yet meeting effluent limitations, runoff

Water quality remains in the Good-Excellent range, but is highly dependent on water quality in the Chesapeake Bay



THE LOWER POTOMAC ESTUARY

Potomac River Main Stem Station Nos. 66, 77, 71, 72

The Lower Potomac drains mostly farmland and forest from Charles and St. Mary's counties, Md., and Prince William, Stafford, King George, Westmoreland, and Northumberland counties, Va.

At its mouth at Point Lookout, the Potomac discharges flow from the entire 14,670 square-mile basin into Chesapeake Bay.

Estuaries are the meeting place of fresh and salt water, where the salini-

ty and flow of water are constantly influenced by river inflow and tides. This complex aquatic environment makes estuaries extremely difficult to predict and understand — physically, chemically, and biologically. The Potomac estuary is divided into three discrete segments: (1) the tidal Potomac River which is affected by tides but is made up of totally fresh water; (2) the transition zone which is where fresh river water mixes with the brackish (slightly salty) water of the Chesapeake Bay; and (3) the estuary which is almost as salty as Chesapeake Bay and has saltwater marine life. The Lower Potomac Estuary sub-division includes the latter two, namely the transition zone and the estuary proper.

These brackish and salt waters provide excellent sport and commercial fishing, as well as shellfishing for oysters, clams, and crabs. This area is one of the most important spawning grounds for anadromous fish on the Atlantic coast, and in the Potomac, the area near Douglas Point is believed to be the second largest spawning ground for striped bass or rockfish on the entire eastern seaboard. A decline in the number of striped bass (Maryland's state fish) and American shad has been occurring over the last 10 to 15 years, and this has caused serious concern to state natural resources departments, fisheries managers, and commercial and sport fishermen.

In fact, the concern about the decline in striped bass has prompted government action. The federal government has required member states of the Atlantic States Marine Fisheries Commission to reduce their rockfish harvests by 55 percent as of June, 1985, or face the imposition of a total ban on the harvesting of rockfish. The Maryland Department of Natural Resources, fearing that a 55 percent reduction would not be sufficient to protect a sufficient number of spawning stock, has declared rockfish a threatened species and has imposed a ban on the "taking, possession, and sale of Chesapeake Bay striped bass effective January 1, 1985." This ban immediately confused the situation in the lower Potomac, because the Potomac River Fisheries Commission (PRFC) has the regulatory authority to set commercial fishing regulations in the lower Potomac between the State of Maryland and the

In spite of the striped bass and American shad decline, the productive marshlands and ecologically valuable wildlife habitats make the lower estuary a resource of significant value. Commercial harvesting of shellfish — crabs, clams and oysters — will remain the watermens' economic mainstay.

The Potomac estuary is not as well endowed with wetland habitat as other areas of the Chesapeake Bay system, but its shoal waters, marshes, and swamps attract and support substantial numbers of waterfowl. Large numbers of resident and migratory birds and waterfowl inhabit the area. Among the birds are eagles, herons, egrets, owls, osprey, hawks, and gulls, along with songbirds and perching birds. Waterfowl include canvasback ducks, scaup, goldeneye, bufflehead, mallard, widgeon, Canada geese and whistling swans.

Trapping of muskrat, raccoon, and opossum still supplement the diets and incomes of local residents.

Water quality in this segment is generally Good despite the tidal influence of low dissolved oxygen and nutrient rich water from Chesapeake Bay.

OCCOQUAN CREEK
Station Nos. 67, 68

Occoquan Creek drains a major portion of Prince William County, as well as portions of Fairfax, Loudoun, and Fauquier counties, Va. The creek flows into the Occoquan reservoir, which serves as a water supply source for 650,000 residents. In 1978, the Upper Occoquan Sewage Authority (UOSA) began operating a multimillion-dollar wastewater treatment plant that treats 15 million gallons of wastewater per day. UOSA is the most sophisticated advanced waste treatment plant on the East Coast.

Water quality of Occoquan Creek is Good, but nonpoint source runoff is a major contributor of sediment and associated pollutants that impact water quality.

The Occoquan Creek embayment, which lies below the Occoquan Reservoir, receives discharges from the Lorton and Colchester WWTPs, runoff from two landfills, stormwater runoff from I-95, and upstream urban, suburban, and rural runoff. The Lorton WWTP was upgraded in 1982, and this has helped improve the embayment. The use of urban, rural and industrial best management land practices should also help water quality.

MATTAWOMAN CREEK
Station No. 69

Mattawoman Creek is 30 miles long and drains mostly rural land in Maryland, but includes a rapidly developing suburban area in northern Charles County. The Mattawoman WWTP, which serves Prince George's and Charles counties, discharges to the creek. An application for upgrading the plant has been submitted, and if approved, would increase the treated flow from 5 to 12 million gallons per day. It would also upgrade treatment to include phosphorus reduction.

Water quality of Mattawoman Creek is Good. Nontidal upper portions exhibit elevated bacterial levels from localized discharges and agricultural runoff.

VIRGINIA EMBAYMENTS

Although no BWQMN stations are located in Virginia embayments in the lower Potomac, the Virginia State Water Control Board regularly samples these waters and reports on their condition in their 305(b) water quality status reports. At the mouth of Neabsco Creek, water quality was affected by the discharges of the Neabsco Creek and Dale City sewage treatment plants. However, when the old Neabsco Creek plant was retired and the new Mooney advanced treatment plant became operational in 1981, and pollution effects were alleviated.

Aquia Creek, which receives the discharge from the new Aquia Creek treatment plant, experiences pollution problems during summer months. When upgrading of the plant is completed, these problems should be cured.

In Machodoc Creek the upper tidal portions contain shellfish beds which have been closed because of bacterial pollution. Violations of the State Water Control Board's Shellfish Water Bacteria Standards also occasionally occur in Monroe Bay, which receives both nonpoint source runoff and the discharge from the Colonial Beach WWTP. The Colonial Beach WWTP recently received a federal funding grant to upgrade its treatment processes, which should eliminate the bacteria violations.

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