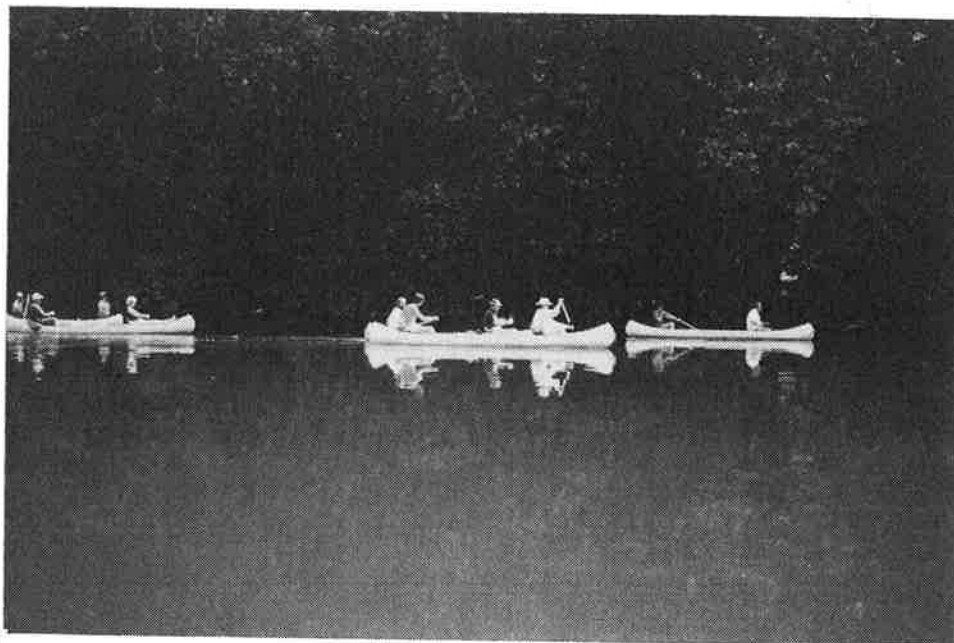


Potomac River Expedition '87 Report
Interstate Commission on the
Potomac River Basin



September 23, 1987

ICPRB Report 87-5

September 17, 1987

Dear Potomac River Basin Admirer:

It is with considerable pleasure that the Interstate Commission on the Potomac River Basin is distributing the Potomac River Expedition '87 Report. The Report addresses a magnificent resource touching the lives of hosts of people in the Baltimore/Washington/Richmond/Pittsburg megalopolis in many ways. It provides to the admirers and managers of the River's wealth a framework for viewing the Resource without computer printouts and data analyses.

The Report is the result of a unique experience and adventure by Commission members and staff. They canoed from Cumberland, Maryland to Washington, D.C., approximately 197 miles and 82,000 paddle strokes, in 12 consecutive days during late May and early June. The attached Report synthesizes nine individual trip reports.

The ICPRB Executive Committee reached the conclusion that the Report could be informative and valuable to people concerned with the health and welfare of the Potomac River Basin. The Executive Committee believes the Report contains a message beyond the purely technical aspects of water quality and water supply.

The Interstate Commission on the Potomac River Basin sincerely hopes that all readers find the same message.

Sincerely,



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INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN



Potomac River Expedition '87 Report

I. INTRODUCTION

The Potomac River Expedition '87 (PRE '87) was born from discussions between ICPRB Commissioner Rockwood Foster and C&O Canal National Historical Park Superintendent Richard Stanton in 1986. A 12-day canoe trip down the Potomac from Cumberland, Md., to Washington, D.C., starting on May 22, 1987, would serve as a vehicle for ICPRB and Park Service staff to accomplish a number of goals. First, staff would gain a first-hand familiarity with approximately 200 miles of the free-flowing Potomac that could not be simulated in an office. While paddling and camping each night, staff from both agencies, each with important and interrelated responsibilities for the river and adjacent land, would have the opportunity to interact. The trip also would provide information regarding the general water quality, recreational, and aesthetic values of the resource through observation and discussion with people met along the way.

The Park Service arranged for trip planning sessions, canoe lessons, transportation of personnel and gear, provision of canoes and ancillary equipment, and trip reception.

This report will first discuss observations of certain aspects of the river and shoreline, and how they are used. The following sections of the report highlight how these uses of the river and adjacent C&O Canal Park impact the river today, and how they may change in the future. Findings and recommendations are given in the final section.

II. GENERAL OBSERVATIONS OF THE RIVER

A.) Water Quality

The primary means for water quality judgements was visual inspection. Some water chemistry analysis was performed with a field kit, and some samples were collected and sent to laboratories. Because we mostly observed conditions, they generally dealt with clarity and sediment loadings, odors, and evidence of living resources.

The river downstream from Cumberland carried a fairly constant load of suspended sediment, and at times algae also were apparent. Color of the mainstem was generally brown to green-brown, usually with no more than a slight, earthy odor. South Branch Potomac water, which joins the North Branch to form the mainstem about 10 miles east of Cumberland, was fairly clear. The Cacapon River and Fifteen Mile Creek also contributed clear water further downstream. Other tributaries were noticeably murkier than the Potomac mainstem. The major dams seem to serve as sediment buffers. Water became progressively clearer as it flowed through slackwaters toward the dams.

In the upper portion of the river, the most apparent sources of sediment were flood damaged shorelines with little vegetation and exposed roots of toppled trees. Downstream, sediment "steps" could be observed on the edges of islands where the water had remained at a certain level, and then declined, leaving a deposit to be scoured when the water again rises. Further, power boats operating in the slackwaters caused wave action on the shore, resulting in soil erosion.

Other pollution appeared to stem from industrial, domestic, and agricultural sources. There is little industry along the Potomac, limiting that source. In some upriver areas with high residential shoreline density, sanitary wastes are reported to be directly discharged and probably stress the river. Agriculturally, livestock was observed in streams and the river. Some farmland is on low islands subject to erosion from high water.

Waterfowl, fish, insects, and emergent and submersed aquatic plants observed indicated that the water quality of river was capable of sustaining a diverse ecology.

The good water quality we observed while on the trip may have been influenced, in part, by the time of year and by the higher than normal flows that we experienced. Water quality problems are generally less noticeable in the spring than in late summer when low flows and high temperatures decrease the ability of the river to cope with pollution loads. At the time we were on the river, the flow was unusually high even for the time of year. Moreover, the high flows were base flow rather than storm flow, with low turbidity. Table 1 shows the flow in the Potomac River at six gages for the day on which the gage was passed. Under the column labelled "Freq" is the percent of days in the historical record, for that month, that the flow is less than the observed flow. For example, on May 24, 1987, the North Branch flow at Cumberland, Md., was 1162 cubic feet per second (cfs). The flow at Cumberland, in May, is lower than this 94.6% of the time.

TABLE 1
Potomac River Flow During PRE '87

Gage Location	Miles to Chain Br.	Date	Stage ft.	Flow cfs	Freq. %
Cumberland	188	May 24	3.5	1162	94.6
Paw Paw	161	May 25	6.5	3100	94.3
Hancock	123	May 28	4.9	3180	91.8
Shepherdstown	68	May 31	3.4	4120	89.0
Point of Rocks	43	June 2	2.8	7400	88.6
Little Falls	1	June 4	4.1	11400	93.9

B.) Character of the River

The Potomac is a rich river in the variety of faces it shows as the regions are traversed. The faces we saw were mostly all at one water level, although on the two final days, storms hit that showed how different a particular area along the river can become over an hour or two of hard rain. The storm on the last day obliterated a trail from the canal leading down to the river above Chain Bridge. The rapidly rising waters kept us from the river and the canoes were towed back up the trail which had become a torrent.

From Cumberland, the river flows between steep slopes over a good gradient, creating a quick flow with few riffles. As the river picks up more water from tributaries, it widens, slows, and becomes less serpentine. The sloping, wooded shoreline of the river also gives way to both residential and agricultural development.



Dam No. 4

The river is straddled by several dams, which create large slackwater areas behind them, changing the character of the river. The slackwaters are havens for motor boating and other recreation, and also are the sites for most residential development. Technology has formed the character of the present-day Potomac in another way. The combination of the canal park on one side of the river and the railroad right-of-way on the other has left sections of the river surrounded by a protected ribbon park or buffer strip. This concept has been used in designing other parks in the metropolitan area, and was a recommendation of the President's Council on Americans Outdoors. In other areas, the canal is complemented by a steep

ridge on the other side, which has the same effect as the railway in limiting development. Interstate 70 also runs along the river at a distance from Cumberland to Hagerstown, Md. Although not visible, road noise was at times a reminder of the closeness of civilization. The character of the river is very important in determining uses of the river. When the character is changed through dams or other restrictions or enhancements of the river, use changes as well.

C.) Wildlife

Team members all felt the river and its environs generally held healthy and diverse populations of animals and plants. Plant life was abundant, and was returning to many areas damaged by the flood. Many different species of trees were identified, such as the Paw Paw, yellow birch, silver maple, sycamore, locust, and tulip poplar. The snowy down from cottonwood trees was often seen on the towpath or in patches on the water. Dames Rocket or phlox and multiflora rose lined the banks with patches of small, delicate flowers. Poison ivy was a constant concern, and the river usually seemed to support a heavy algae population.

Insects were everywhere in the form of biting flies and mosquitoes. Hellgrammites, the larvae of the dobson fly, were found under rocks on the shore. Aquatic insects found were usually midges or caddis flies, indicating acceptable water quality. Few stoneflies or mayflies were found, although this may have been a seasonal phenomenon. Cicadas ("17 year locust") were almost intolerable in some areas, yet absent in others.

Fish stocks generally seemed abundant and healthy all the way down the river, judging from expedition fishing efforts and discussions with anglers along the way. Species caught or observed included many smallmouth bass, fallfish (creek chub), bluegill and other sunfish, a few largemouth bass, many minnows, and many "rough fish" such as channel catfish, carp, and suckers.

Although many fish were caught, the majority were juvenile smallmouth bass under legal size. Although the fish were small, they appeared to be very healthy, with no signs of fin rot or lesions. Staff speculated that the November 1985 flood may have reduced adult populations, and that the majority of fish were spawned after the disaster. Later discussions with the Maryland Department of Natural Resources (DNR) revealed that post-flood assessments showed little major damage to the fisheries. A DNR fisheries person noted that we may have been witnessing the prevalence of two very good year-classes of the fish. The years after the flood generally had good conditions for spring spawns, helping recruitment.

Reptiles and amphibians were fairly abundant. A copperhead and some black snakes were seen. Common watersnakes were frequently observed, along with painted and snapping turtles. Small frogs were frequently seen in shallow water, and toads were common along the shore.

Many species of birds were seen, including all sorts of songbirds, woodpeckers, wading birds, raptors, and turkey

vultures. Waders included several species of herons, along with water birds such as wild and domestic geese and ducks, kingfishers and loons. Raptors included osprey and a bald eagle nest with young at Great Falls. A number of owls were seen, and wild turkeys were heard from time to time.



Canadian Geese Near Point of Rocks

Mammal populations seemed small. Many animals that do well close to development were seen, such as squirrels, opossum, raccoons, and mole tunnels were prevalent in some areas. Beaver, muskrat, and some deer were seen. Foxes were heard at camp one evening. Deer and other mammals requiring larger territories were not as common, emphasizing that the wilderness we were in was a fragile ribbon between more developed areas.

D.) Jurisdictional Land Use

Above the confluence with the South Branch, the West Virginia and Maryland shores of the river were very similar in that the steep slopes of the mountains inhibited development. Below the South Branch, the canal dominated Maryland land use except for some in-holdings. The Maryland side remained undeveloped and only where the Park Service provided access through boat ramps, observation points for canal locks, and camp sites along the tow path was there evidence of human impact. On the West Virginia side, where land topography would permit, development was very evident. Some developments housed neat, almost palatial estates. Other areas were ramshackle towns, and much dumped trash was visible from the river.

The river itself seemed to dictate the use of the resource. Where dams created deep slack water there was heavy power boating and water skiing activity. Where the river ran gently among boulders there was fishing and boating, such as canoeing

and the use of very small power boats. Law enforcement officers were seen only in the slack water above Dam 4, where water skiing and fast motor boats were in evidence. In many areas, surrounding land use was difficult to judge because heavy vegetation restricted the view to land immediately adjacent to the river.

E.) Flood Damage

The extent of visible damage almost two years after the November 1985 flood surprised some team members. Evidence of the flood was apparent from near Cumberland, especially in large trees and other debris trapped high in bridges, and large downed trees on the shore and in the river. Many of the felled trees were struggling to put out new foliage. Damage was most apparent at the confluence of the North and South branches (the South Branch sustained the heaviest flows in the Potomac basin). Damage was less visible downstream of the confluence with the Shenandoah River at Harpers Ferry, W.Va.



Flood Debris in Paw Paw Bends

Other observed flood debris included cars and trucks, parts of house trailers, and other collected large items on the shore and in the shallows.

Floods are a natural part of the hydrological cycle. Although spectacular, the effects of a major flood are usually mitigated within a few years. (For example, almost no visual evidence remains today of damage caused by Hurricane Agnes in 1972.) Debris piles evident along much of the river likely will be gone within 10 years. Sediment has been exposed in many places of the river bank. It is interesting to consider the effect(s) of additional exposed banks on the load of sediment passing Little Falls. Previous work at the Commission suggests that there was already an excess of sediment available for transport. Therefore, the amount of sediment carried over

Little Falls should not increase. But will the size distribution and nutrient content of the sediment change? If so, then the 1985 flood may have an impact on the eutrophication status of the upper Potomac Estuary. Within the mainstem channel, there is likely to be considerable reworking of sediment, sand bars forming and moving, banks retreating, etc., until vegetation is reestablished.

III. USE OF THE RIVER

A.) Recreation

The free-flowing Potomac supports, in various areas, all forms of boating (except sail), water skiing, fishing, bird watching, swimming, camping, hiking, bicycling, and sightseeing. The river seems to do an admirable job in regulating recreation with respect to the various uses. The smaller upper river from Cumberland to below Little Orleans has limited access, making the area very nice for canoeing and "wilderness experience" outings. This is aided by the canal park, which has primitive campsites approximately every five miles.

Downstream, the river becomes larger, with greater access opportunities. The ski boats, while annoying to canoeists and fishermen, were suited to the wide, flatwater areas in which they were found. Most of the river was heavily used on weekends, with fair use even in the upper portion. Fishing from boats and the shore was observed much of the time.



Recreation Behind Dam No. 5

Swimming was a common occurrence in many parts of the river. There currently is no regular monitoring of water quality for this purpose, but should be considered in view of public health.

Conversations with recreationists along the way yielded many positive responses about the value of the resource. City officials and others met in Brunswick, Md., were very enthusiastic about increasing use of the river and its environs, and some attributed growth in the area to improvements in water quality.

B.) Water Supply

Water intakes for several communities were visible from the river, noticeably: Paw Paw, W.Va., Hagerstown, Md., Fairfax County (Va.) Water Authority; Washington Aqueduct Division of the U.S. Army Corps of Engineers (District of Columbia and a part of suburban Virginia), Washington Suburban Sanitary Commission (suburban Maryland) treatment plant, and the Washington Low Water Intake. In addition, residential cottage supply lines, PEPCO's Dickerson Power Generating Plant intake, and irrigation for agriculture also were observed.

The vast majority of water withdrawn from the Potomac for potable water supply is consumed by the Washington metropolitan area. Withdrawals by the three major metropolitan area water utilities can exceed 500 million gallons per day (mgd). By comparison, the historical minimum flow of the Potomac is only 400 mgd (September 14, 1966).

In the 1970s, a number of studies on metropolitan water supply concluded that the free-flowing Potomac could not always keep up with the growing demand for water. Proposed solutions invariably included many more dams and reservoirs--an unpopular solution with basin residents. In 1979, a special section of the Commission--Cooperative Water Supply Operations on the Potomac (CO-OP)--brought the metropolitan water utilities together with the U.S. Army Corps of Engineers to agree on sharing the resource. With the help of sophisticated computer modeling and the construction of one major and one minor reservoir, there now exists a reliable metropolitan water supply that will serve well into the next century, especially in times of drought. CO-OP continues to enhance its operations in helping to provide reliable and efficient water delivery to the metropolitan area.

Under normal flow conditions, however, the Potomac River is a sufficient water supply source for even the peak metropolitan area water demands. Flow of the Potomac is less than 1,000 mgd for only 18 days per year, on average. During periods demand cannot be met, Potomac flow can be augmented by water released from the Jennings Randolph and Little Seneca reservoirs.

Surprisingly, few communities along the upper Potomac have based their water supply system on Potomac River withdrawals. Historically, smaller communities have used water supply systems based either on groundwater or impoundments on small tributary streams. During the drought of 1986, it became clear that these systems could be unreliable sources of water supply. In the future, communities along the Potomac may look to the river as a reliable source of municipal water.

C.) Waste Disposal

With some exceptions, the river seems to adequately deal with its pollution load. New sewage or industrial outfalls should receive careful consideration in the upper river, which is smaller and more fragile. Fortunately, the river is not extensively used by industry. The major industry, Westvaco paper mill in Luke, Md., has implemented significant pollution control measures. Evidence of the plant's effluent, however is visible for some miles downstream in the form of settling organic particulates. The old Pittsburg Plate Glass dam site, now a fiber processing company, exhibited the next largest impact that we saw personally, with a strong, odiferous effluent.

The group noted primitive sewage disposal facilities along the river in areas where river-side recreation was intense. Local health departments in West Virginia require permits for any residential sewage system (including vacation homes and stationary trailers). The conditions of such permits specify minimum requirements with respect to type of disposal facility, location within lot, and setback from streams. A follow-up phone conversation with a health official indicated that insufficient numbers of personnel limited the degree of enforcement in the area.

D.) Power Generation

Dams 3, 4, and 5 on the Potomac River at one time served to provide the C&O Canal with water. After the canal closed, the dams were modified to provide small-scale hydroelectric power generating stations. (Dam 3, severely breached, is owned by the National Park Service.) As can be seen in Table 2, these facilities are dwarfed in output by more-modern fossil-fuel power plants in the lower river. A by-product of these dams has been to create slackwater areas behind them that are used by large motor boats for water skiing and high-speed cruising.

The fossil fuel plants at Williamsport and Dickerson use the river as a source of cooling water. The heated water discharge from the Dickerson plant was noticeably warm to the touch.

TABLE 2.
Major Hydropower Generation on the Potomac Mainstem

<u>Power Plant</u>	<u>Operator</u>	<u>Production</u>
Dam 5 (near Big Spring, MD)	Potomac Edison Co.	1120kw
Dam 4 (near Shepherdstown, WV)	Potomac Edison Co.	1000kw
Dam 3 (near Harpers Ferry, WV)	Potomac Edison Co.	600kw

Fossil Fueled Power Generation on the Potomac Mainstem

<u>Power Plant</u>	<u>Operator</u>	<u>Water Use</u>	<u>Production</u>
Dickerson (MD)	PEPCO	410mgd	558,000kw
R.P. Smith (Williamsport, MD)	Potomac Edison	104mgd	113,000kw

Fossil Fueled Power Generation on the Potomac Estuary

<u>Power Plant</u>	<u>Operator</u>	<u>Water Use</u>	<u>Production</u>
Possom Point (VA)	VEPCO	224mgd	1,108,000kw
Morgantown (MD)	PEPCO	1,440mgd	1,411,000kw

E.) Residential

As stated several times above, most of the residential use occurred on the West Virginia shores. The residential use appeared to be appropriate to the topography. Many areas seemed well-maintained, and provided considerable recreation access to the river. A few large communities along the river, such as Cumberland, Paw Paw, Harpers Ferry, Brunswick, and Shepherdstown, were an important part of the river. People in these communities seemed proud of their location on the river and took care to maintain the river as a recreational and commercial resource.

F.) Agriculture

There were multiple views on this subject. Some felt it the single greatest stress on the river. Others felt there was not a large, visible problem. Although agriculture was not a significant land use along the river's mainstem, its impacts are probably more visible on the tributaries.

Whereas there generally seemed to be adequate buffers between crop fields and the water, there were instances of livestock in the river, a poor practice.

Members of the Catocin Soil Conservation District met the group in Brunswick and discussed their concerns about best management practices, and requested water quality information specific to their area.

G.) Pipelines

There are some indications of extensive pipeline crossings of the river and burials alongside of the C&O Canal towpath. Further, bridges also are used to carry pipelines and electrical conduit across the river. For example, there are three 20-inch water mains under the Chain Bridge belonging to Arlington County, Va., as well as two 48-inch sewer mains that connect

with the Dulles Interceptor on the towpath side of the river. Alexandria has a 20-inch water main below the bridge, along with an underground storm main and electrical conduit. A number of gas pipelines are known to run under the towpath.

All in all, there is every indication that the potential for damage to the river from pipelines that are located over, under, and alongside the river exist. Apparently, there are permit conditions that are imposed, but it is not clear to ICPRB whether periodic inspections are required. No one has suggested that inspections are carried out. Perhaps it could be of benefit to look into the issue of pipelines and potential pollution through hazardous spills that could threaten the metropolitan area's water supply operations.

IV. RIVER USE AND COMPATIBILITY

As noted earlier, the river above Washington, D.C., currently seems able to host a number of different uses, primarily recreational, without causing too many undue confrontations.

Managing the growth of use of natural resources is a question that the Park Service has dealt with for many years with varying degrees of success. How much use of the resource is possible while maintaining its health? If access to the resource is too easy, the nature of the resource itself often changes significantly. Currently, the river sees moderate to heavy use on weekends and in areas of high population concentration. Further, the less-used areas of the river may serve to buffer the insults the river receives in the areas of heavy use. If the whole river was as populated as the slackwater areas upstream of the dams, water quality and living resources could be quite different.

Some team members felt there was a need for more river access in the form of riverside trails and boat ramps. Others felt that access was adequate. There are approximately 20 public no-charge boat ramps, unevenly spaced, serving the 200 river miles from Cumberland to Georgetown on the Maryland side. This figure does not include public pay ramps or private ramps on either side of the river. The number of craft observed on the river indicated that access, at least for power boats, was probably adequate. The high-powered speed boats observed behind dams 4 and 5 used for water skiing and high-speed cruising create unsafe conditions for other recreational uses. Many of the accidents in this area result from these boats.

The dam areas have been posted by the Park Service and in some cases, local jurisdictions, with large signs on the shore and buoys in the water to warn recreationists of the dangers near the dams. Both the Park Service and Maryland Natural Resources Police patrol the river, although both staffs seem under-manned.

It would not appear that the use of the river for water supply or waste disposal interfered with other river uses such as recreational or residential. Low-head hydroelectric power

generation was compatible with the use of the river by power boats because the dams create large, deep, slackwater areas. Residential use, obviously, provided greater access for recreational purposes up and down the river.

Agricultural use presented some use conflicts, with livestock entering the river. The land use along the river's mainstem for cultivation appeared to be quite compatible in that buffers seemed to be well-maintained. There were no observations made about the impact on the river by the agricultural use of pesticides and herbicides.

V. RIVER AND CANAL

The canal and the river are closely interwoven from the viewpoints of recreation, wildlife, and water quality. The canal provides an outstanding recreational adjunct to the river because the towpath allows access to public camping sites and boat ramps. Further, the canal, because of its designation as a National Historical Park, limits private development along the river on the Maryland side. Such development is occurring on the West Virginia side. This is not to say that those developments are undesirable, but that the canal creates open space recreational opportunities for many citizens through public access. The park has a long-term program for buying land on the Potomac from existing private owners. Lands so acquired are often farmed by the last owners for a number of years, but the park imposes restrictions on farming practices for the protection of wildlife and water quality. For instance, no pesticides are applied within the park borders to protect wildlife and their food sources. No-till plantings are discouraged because of their reliance on herbicides and fertilizers.

It is quite clear, as one travels down the river, that the park is well-used by recreationists, and provides an outstanding opportunity for those pursuits. Some feel that the natural shoreline can be a problem for canoeing in that shore access is difficult. Other views held that a "natural setting" denotes such things. Where the canal is watered, it provides an opportunity for canoers to avoid some of the dangerous spots in the river and, of course, if one were to canoe up river, the best place to go would be in the canal.

VI. RECOMMENDATIONS AND FINDINGS

All participants agree that the river is a fantastic personal, private, and public resource. Generally, the river is neither pristine nor filthy. Greater efforts should be made to reduce suspended sediment, litter, and to remove flood debris. ICPRB and the C&O Canal Park should continue cooperation on these and other matters, such as resource restoration and water use and access.

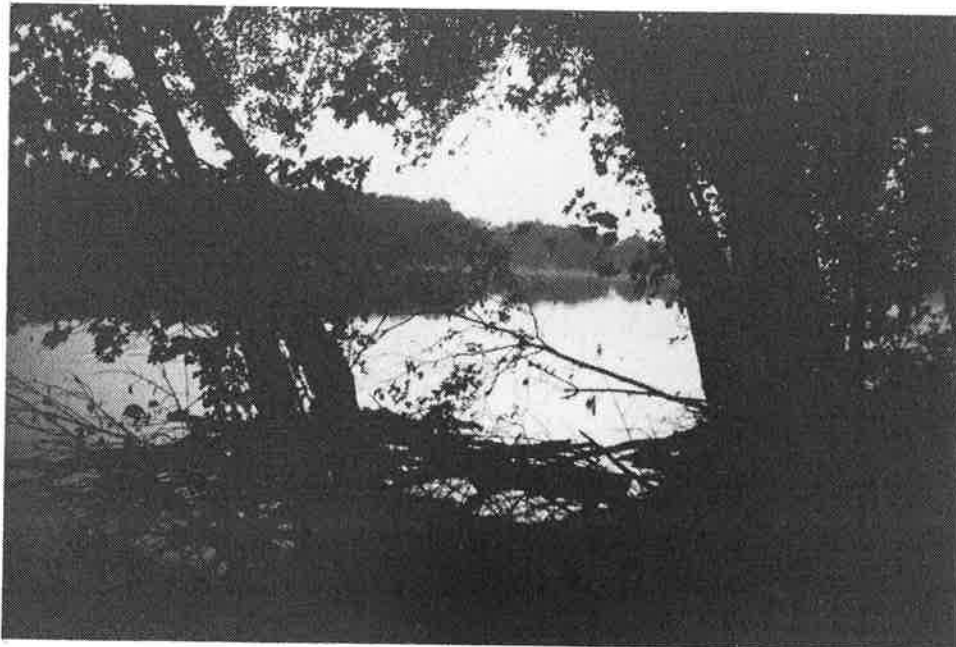
The group is somewhat divided as to questions of access, although these differences reflect different attitudes about the use of the resource and are certainly a healthy part of a decision-making process.

It was found that the river, as previously mentioned, regulates itself fairly well in fostering specific uses for particular areas, such as large powerboats in the big slackwaters behind dams, while many fishermen look for smaller areas with structure in the water. As use grows, these uses will tend to conflict. More study would seem to be indicated on this topic, with a look to increased usage will affect various uses.

The group also felt that there is a need for more water-quality testing around the high-use areas where swimming and other contact is frequent.

In relation to hydroelectric power generation, any additional facilities should be required to operate based on river flow to ensure adequate instream flow for recreation and other uses. Further, any plans to rebuild some of the broken dams or construction of new facilities should be carefully analyzed as to the changes in the river's character and use that will occur. Special attention should be given to preserving recreational opportunities for regional residents who do not own waterfront property.

In summary, The Potomac River Expedition '87 provided the opportunity to know and understand the resources of the river from Cumberland to Washington, D.C. and to allow future analyses to become more objective. There is no doubt that the Commission should do everything possible to ensure that the river survives as a major recreational area. The Commission should support the efforts of the C&O Canal National Historical Park in maintaining public access to the river and the canal for "wilderness" type recreational opportunities.



River at Edward's Ferry

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