

REPORTER

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Interstate Commission on the Potomac River Basin

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C. Dalpra

The Potomac River Ramblers get underway at Town Creek. More than 40 paddlers explored the Paw Paw Bends ecology, history, and culture. See story inside.

Through Huge Changes, Many Challenges Remain 70 Years Ago: ICPRB and the Potomac River

The Interstate Commission on the Potomac River Basin (ICPRB) turned 70 on July 11, when in 1940 Congress approved a compact that allowed the Potomac basin states and the District of Columbia to establish the Potomac Valley Conservancy District and form ICPRB. Virginia signed the agreement in 1940, followed by Maryland, the District, and West Virginia in 1941, and Pennsylvania in 1945. The commission was formed without regulatory authority, and was meant to be a fact-finding and coordinating agency that would help guide a program of pollution abatement for the basin.

The ICPRB was, and remains a unique experiment in promoting sound scientific actions that rely on the cooperation of the jurisdictions, rather than regulatory authority.

Its genesis can be traced to conditions on the "Nation's River" that were so

deplorable that each of the jurisdictions realized that their separate efforts would be inadequate to the task. A Special Advisory Committee on Water Pollution of the Natural Resources Committee recommended in 1935 the establishment of a Potomac River Conservancy District to stimulate coordinated pollution control efforts. The Washington Board of Trade pushed the ball forward the following year, recommending a special body be created to work toward the elimination of pollution from the Potomac River. The ensuing Potomac Valley Joint Conference on River Pollution drafted a compact for review by the states. With the assistance of the Council of State Governments, a compact was drafted in 1938 that would be approved two years later.

The daunting task before the commission was to get the jurisdictions to work together to tackle the water pollution throughout the basin. Before that could happen, ICPRB

Our mission is to enhance, protect, and conserve the water and associated land resources of the Potomac River and its tributaries through regional and interstate cooperation.

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would need to assess existing conditions. The exercise would take several years, compiling information from the state and federal governments, while conducting its own basic research on conditions. What they confirmed was a heavily polluted river, one that in many ways was vastly degraded compared to the river today. Despite the many hard-won improvements, the jurisdictions are today dealing with many of the same problems, as well as some new ones. Some of the ICPRB's earlier successes, such as greatly improved sewage treatment, served to unmask the scope of other problems, such as stormwater runoff.

In the early 1940s, the sanitary engineers and other professionals engaged in the effort had much simpler tools and much less knowledge of the watershed than exists today. Their first step toward reducing pollution was to get the best assessment of its status. The ICPRB issued its "Preliminary Report on Existing Conditions in the Potomac River Basin" in 1943, followed by a second report, "The Potomac River Basin, An Introductory Report," in 1945. The collection of existing data throughout the basin, along with research performed for the reports served as the basis for the first attempts at watershed-based management in the Potomac.

The reports were a best attempt to document water use and quality in the basin, hampered by a lack of detailed information. Without permitting or registration data, the report authors had to in some instances collect information by sending questionnaires through the mail, as it did in trying to determine water usage by some major industries along the river. Information on the discharges from military installations was unavailable due to the war effort.

In any case, the information they were able to collect painted a picture of the basin that in some ways would be hard to imagine today.

The report begins with some basics, which are stunning when viewed from a distance of 70 years. The basin in 1940 was home to a mere 1.7-million people, of which half lived in the Washington metropolitan area. Currently, the basin population of about 6.1 million represents an increase of nearly 360 percent in those 70 years.

Strong concerns about population growth and the inability of sewer and treatment systems to keep pace were voiced in the report, although those increases were blamed on the war, and "much of the increased population is undoubtedly temporary in character."

Sewage Treatment

The Blue Plains sewage treatment plant, which served Washington, D.C.,



Library of Congress

The Tidal Basin in Washington was a popular recreation spot in 1945.

performed primary treatment (mechanical screening/settling and disinfection), handling 130 million gallons per day (mgd) of wastes. A much smaller plant in Bladensburg on the Anacostia River served about 100,000 residents. The overloaded sewage plant performed primary treatment on about half of its flow, the other half discharged raw to the river. Across the river, the City of Alexandria, with a population of 50,000, discharged untreated sewage through a number of sewer outlets along the river front and Hunting Creek, according to the report. Neighboring Arlington County was completely sewered, although its primary treatment plant bypassed about one-third of the flow because of a lack of capacity.

Today, the Blue Plains plant, which handles the majority of sanitary flows in the metro area, is the largest advanced treatment (screening, biological treatment, and nutrient reduction) plant in the world, with a flow of about 308 mgd and a capacity of up to 370 mgd.

The 1945 report noted that there were 154 communities in the basin with populations greater than 500 people. Of those 154 communities, 53 had no public sewer system; 39 had more-or-less complete sewer systems but discharged raw waste; 27 communities had primary treatment; and 35 used both primary and secondary (biological breakdown of contaminants). Put another way, the report noted that about 190 mgd of sewage was generated from the basin's urban areas, with 20 mgd receiving no treatment, 153 mgd with primary treatment, and 17 mgd with both primary and secondary.

The report added that treatment levels should be considered in the context of the receiving stream. "A community which has primary treatment, may, because of the size of the stream, the amount of polluting water and other conditions, be giving ample treatment to its wastes, while a similar town, giving secondary treatment for its wastes, because of the characteristics of the stream...may not be treating its wastes sufficiently and may affect downstream users to a very much greater degree."

To gage the level of industrial waste, the commission sent out questionnaires to known industries and gathered information from the state health departments. The researchers cautioned that although they had captured data from major industries, the information was far from complete. The report noted 98 industries that discharged liquid wastes. Of the total, 48 treated their effluent in some manner, with an estimated discharge of about 32 mgd. Fifty industries did not treat at all, and discharged about 21 mgd.

Despite the permits required to take or discharge water and wastes into the river, getting a handle on quantities today remains difficult. In the early 1940s, ICPRB was faced with a huge lack of information. Today, massive amounts of information exist, but the different jurisdictions report in different ways and different levels of detail, making a thorough and accurate basin-wide tally difficult. Close examination of the data shows omissions or other problems. Some of the data is not available online.

With those caveats, total waste discharged in the basin today is about 685 mgd. Of that total, about 45 percent comes from Blue Plains. About 85 percent of the total flow comes from the 20 largest permitted facilities in the watershed. Seven of those facilities are in the Washington metropolitan area.

Despite the roughness of the numbers, and the fact that most sewage today is treated to a high degree, the volume of treated sewage has risen roughly in proportion to the population.

Water Supplies

The report noted that its estimates for water use were suspect, based on a lack of complete information. The report compiled information on 184 developed water supplies in the basin, serving both municipalities and industries, taken from streams, springs, and wells. The total included 131 public water supplies, which were estimated to use about 595 mgd.

Today, an average of approximately 700 mgd of water is taken from surface and groundwater sources for municipal supply in the basin. About 489 mgd is withdrawn daily in the Washington area for water supply. During the heat of summer water use can rise by several hundred million gallons. Almost 86 percent of the basin's population receives its drinking water from public surface water supplies; about 13 percent use well water.

Sediment Pollution

The report refers to sediment as silt, and pointed to poor agricultural practices as the major contributor. Based on readings of average turbidity and research performed by

the U.S. Army Corps of Engineers, the report estimated that approximately 200,000 cubic yards are deposited annually at the head of tide. The report noted that the figure was similar to the amount of dredging done by the engineers between Alexandria and Washington.

Current estimates of sediment loads are by weight, rather than volume, so again, time and methodology get in the way of meaningful comparison. According to the U.S. Geological Survey, sediment deposition at Little Falls, near the head of tide, averages about 141.9 kilograms per month, although sediment loads, linked closely to flow levels, are highly variable. No trends have been noted.

While the 1943 report viewed siltation as an impediment to the river, researchers today understand that sediment loads also are linked to nutrient pollution in the river, and have modeled its impacts as a step toward control. A number of total maximum daily load (TMDL) plans (which identify a pollution "diet" for a stream and ways to remove the contamination) have been written to address sediment pollution for some Potomac basin watersheds. As part of the Chesapeake Bay cleanup, the U.S. Environmental Protection Agency and the basin states are writing the bay-wide TMDL that set mandatory reductions in sediment loads for every bay subwatershed.

Acid Mine Drainage

In the early 1940s, many coal mines were still active in the western part of the basin, concentrated in the George's Creek and North Branch Potomac watersheds. The report noted that "Drainage from active and abandoned mines pollutes the streams of the area to such a degree that many of them are left barren and are devoid of any fish or plant life." The problem, according to the report, was due to a lack of foresight. "The mining of coal in the past has been carried on without thought of reducing this acid drainage but only with the thought of draining the water from these mines," the report noted. The report noted that sealing abandoned mines was the best answer. Sealing the mines did not eliminate the flow of water, but keeping oxygen out of the mines reduced the acid production of the water.

After mine activity ceased, the report added, an aggressive program of mine sealing could reduce acid drainage by half, although the effort would take many years. The report's authors noted that the data for the claims was unproven, and lamented the fact that there was little data that compared stream acidity both before and after the sealing projects that had already occurred.

An interesting part of the report relates the pollution from a large paper mill on the North Branch Potomac with the acid mine

drainage problem. The West Virginia Pulp and Paper Company mill at Luke, Md., was at that time a significant source of pollution (The plant still operates today).

The report describes the North Branch as it approaches Luke as having a yellow and orange river bed because of the metals and salts that precipitate out of the acidic waters, and no fish or plants lived in the river segment, where pH was measured at about 4.5. The report noted that the discharges from the paper mill were "alkaline in character, with an average pollutorial loading of 110,000 persons. These alkaline wastes neutralize the acid mine waters, raising the pH value to 9.0 on many days." The report added that the acidic waters flowing downstream also precipitated out much of the waste from the paper mill effluent, which was left as a sludge along the bank. "In this way, these two wastes tend to treat each other to a certain extent. This would be especially true if it were possible to remove the sludge deposits," the report opined. A reader is left wondering how this explanation would fare in today's environment.

The report also touches on several other problems in the watershed. A brief section notes that the river is flood prone in areas, and that plans are being devised for the most vulnerable areas. The threat of malaria was real enough to be noted under its own heading in the report, noting that certain areas were a particular nuisance that were being dealt with by "attempting to drain or cover with an oil film the places where malaria bearing mosquitoes breed." Another short section deals with the infestation of water chestnut in the metropolitan area of the river. An aggressive harvesting effort of the floating plants by the Corps of Engineers soon brought relief to the area.

In conclusion, the report highlights how useful the river has been and will be to basin residents, with an *"abundance of good farm land, many undeveloped natural resources, a large potential supply of hydroelectric power and a well-developed transportation system that offers excellent opportunities for expansion to industrialist, farmer, and recreation seeker. But the river must be used wisely and the importance of a planned program for pollution control and the development of the watershed cannot be overemphasized. The river, like others, has natural ability to absorb and purify wastes, but if it is polluted excessively it may not recover, and the water will be rendered unsuitable for domestic or industrial purposes, fish life will become impossible, bathing dangerous, boating undesirable, and real estate values decline...It is this commission's intention to consider carefully all of the factors involved, and to plan and promote through established state agencies that program for*

pollution control and abatement which will be an asset to the Potomac basin as a whole. Thus all agencies and persons will benefit alike, not one at the expense of any others."

Since that time, there have been many successes. Many of the original challenges remain, and new concerns have emerged as demands on the river have increased. The conclusions of those early ICPRB reports remain as a guidepost for what needs to be done.

The River Constantly Changes—Along With How We Look At It

Gleaning information from the past requires more than a comparison of data between then and now. Insights about the environment in which historical fact takes place—why people at the time thought the way they did, and the tools they used to assess problems and take action also are important. A good historian attempts to explain not just facts, but the context in which they were taken.



There is much to ponder in looking back 70 years to the environment that spawned ICPRB.

The Potomac basin was a different place. The country had entered World War II, with the energy and attention of the nation focused across the sea.

The jurisdiction representatives to the commission were sanitary engineers and other officials from public health departments. None of the states had a natural resources or environment department. Concerns about the river's pollution levels focused primarily on public health issues. Wetlands, for example, were considered "poorly drained lands" that harbored mosquitoes that threatened with malaria. Sewage and industrial pollution was not considered a real problem unless it rose to the level of becoming a "nuisance," and in many cases the nuisance was avoided because there were enough river miles between pollution points that allowed the river to assimilate the wastes back to an "acceptable level."

The impacts of industrial waste were not looked at very differently than sanitary flows. To help describe their effect in terms of sanitary pollution, industrial outflows were

put in terms of an "equivalent population loading" for those flows, in which the character of the waste was described in terms of how many people would be expected to cause the same amount of contamination..

The tools of the trade for 1940s sanitary engineers were few. Many assessments were made on the basis of only a few parameters—often just the levels of dissolved oxygen in the water, its biological oxygen demand, a measurement of the oxygen that would be needed in the water for the breakdown (oxidation) of contaminants, and levels of coliform bacteria..

It is tempting to look at those efforts from the viewpoint of today and consider them to be simplistic. After all, researchers know so much more today. A modern view of our ecosystems includes intricate layers of relationships not visible with the tools and the absence of computer-aided modeling in the 1940s. And yet the 1940s began a period of new research on the river that developed new methods, improved tools and greater understanding of the complexity of the ecosystem. It seems likely that the scientists of that time looked back decades from their viewpoint and pondered the limited knowledge and tools of their predecessors.

While the river has in many areas made great strides since those days, many of the basic problems identified in the 1940s remain today. Advancing technology has provided new challenges in the form of thousands of new chemical compounds and pharmaceuticals that enter the environment every year with little research done to determine possible effects. An ever-growing population threatens to overwhelm efforts made to fix these long-term problems.

Perhaps in another 70 years, scientists who study the river and its ecology will look back to today and ponder the simplistic ideas and tools we are using to try to restore the Potomac River and Chesapeake Bay. We should hope so.

In the Paw Paw Bends, Ramblers Meet Each Other and River Residents

The ICPRB's annual float trip on the river, known as the Potomac River Ramble, featured the scenic Paw Paw Bends area, one of the Potomac's paddling treasures. As usual, a dedicated group of newcomers and repeat Ramblers joined with a group of scientists and natural resources managers to intensively experience the Potomac by spending several days paddling on it, swimming in it, and meeting river residents such as fish, turtles, birds, and many varieties of bugs that rely on the waterway

as their home.

The group began the three-day paddle on July 8 at the Town Creek Aqueduct, a hiker/biker site along the C&O Canal National Historic Park. The aqueduct and camp are at the end of a long, dusty dirt road, and slowly cars arrived after an even dustier drive through the neighboring Green Ridge State Forest. As people trickled in for a Thursday evening meet-and-greet picnic, the line of parked cars began to stretch down both sides of the dirt



Watching the River Flow

Potomac River flow continued to fall to well below-normal levels in June and July, according to U.S. Geological Survey provisional data, which has not been reviewed for accuracy.

Measured near Washington, D.C., the June average flow of the Potomac was about 3.6 billion gallons per day (bgd), or about 41.7 percent less than the long-term average of 6.2 bgd. Daily extremes during the month ranged from a high of about 7.2 bgd on June 1, sinking to a low of about 1.8 bgd on June 27. Water taken from the river for metropolitan water supply averaged about 462 million gallons per day (mgd).

July flows were likewise low, with the monthly average of about 1.7 bgd falling to only 50 percent of the long-term average of about 3.5 bgd. The river's flow ranged from a high of about 2.8 bgd on July 14, dropping to a low of about 1.3 bgd on March 28. Water taken for municipal supply averaged about 449 mgd.

The ICPRB Section for Cooperative Water Supply Operations on the Potomac reported that the basin's upstream reservoirs, which boost water levels during drought conditions are close to full. Despite an increased probability of the likelihood of reservoir releases during the year, there are adequate resources to serve the water needs of the metropolitan area.



road. And then the tow truck came down the road, dropping a car off at the end of the line. The car belonged to a fledgling Rambler, who drove from Prince Georges County only to have her car die in Hancock, about 40 miles from the aqueduct. "I planned hard for this trip, and I wasn't about to miss it," she said. "I just had them tow me here, and I'll deal with it later." She was not disappointed.

Some 40 Ramblers made camp, had a picnic, and got to know each other while reviewing the trip itinerary. Some of them had been through the Bends before, and helped others with many questions. Everyone shared their excitement for starting the next day, tempered by comments about how awful the dust was on the miles of dirt forest roads traveled to get to the site.

A bright, sunny morning greeted the Ramblers as camp was slowly broken and the truck bearing the catered breakfast thankfully found its way to camp. After a safety briefing, the trip was underway, and the Ramblers paddled their way down a lazy river bound for Paw Paw.

At a lunch stop, West Virginia Department of Environmental Protection Biologist Doug Wood ate quickly and launched himself into the river to find aquatic life to show the group, a scene that was repeated at many of the stops of the journey. Ramblers met many of the small fish, aquatic insects, and turtles, whose lives were briefly interrupted to serve as teaching tools for the group before being returned to the river. With the help of Wood and other biologists, the creatures helped the Ramblers to understand each one's role in the complex web of life that forms the river. They also learned how each species in the web depends on the others to create a healthy river, and how a disruption of any part of the web can affect the rest. At other times, attention was turned to the sky to identify birds that greeted the group from overhead, including several bald eagles.

The water quality that supports a healthy ecology also was a major subject, and

Ramblers were briefed about general components of healthy river and habitats. Members of the Maryland Department of Natural Resources (DNR) Middle Potomac Tributary Team conducted a wade-in to test water clarity. Wade-ins, where people walk deeper into a waterway until they can no longer see their feet, is a popular event that began in larger tidal rivers as a test of water clarity. The problem with the smaller, free-flowing streams of the upper watershed is that they can be too shallow. That was certainly the case on this day, as the waders walked into the very clear water up to their waist or chest, with their feet still very visible. Undaunted, the wade-in crew loaded a four-foot tube capped at the bottom by a plastic disk with black and white sections for good visibility. The Ramblers learned that even at four feet, the water was extremely clear. While this section of the river is generally in very good shape, the water clarity was undoubtedly increased because of the lack of rain in the recent past, also the reason for the shallow water.

After a few more hours of paddling, swimming, fishing, and taking in the scenery, the group arrived at the C&O Canal Park's Paw Paw Tunnel campground to set up camp and wait for the dinner truck to arrive.

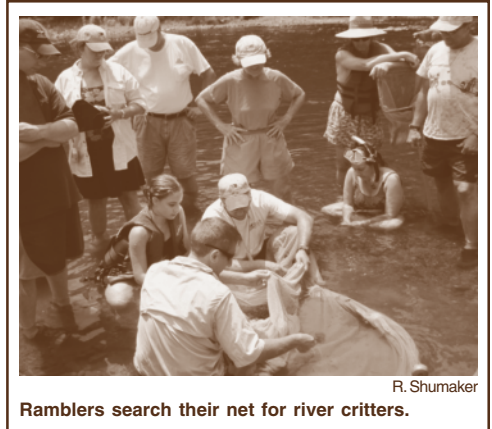
Park Ranger Emily Hager arrived to lead the group up a trail to take in the Paw Paw Tunnel, one of the engineering marvels of the canal. The more than 3,000-foot tunnel was cut through solid rock, and due to technical difficulty, strikes and disease outbreaks, took a decade to complete. Hager told people about the decision to dig the tunnel, the other options being to dam the river or cut the canal into the side of steep cliffs along the river. Because the river downstream of Paw Paw, W.Va., makes a series of large loops or bends, the tunnel and a short stretch of canal bypasses about 6 miles of river.

As the dinner truck arrived, the clouds darkened, and after everyone had a chance to eat, a small drizzle turned into a heavy downpour, sending Ramblers under a large tarp, into the gear truck, or to their tents. People continued to socialize in small groups, but the formal campfire presentations were washed away. The rain and thunder came and went several times during the night. It was to be the only foul weather of the trip, and the group took it happily, if damply, in stride, with a few tents taking on some water.

The sun was again shining on Saturday morning, and the group was joined by DNR Forester Mark Bealls. Bealls works at Green Ridge State Forest, where the group would camp at Bond's Landing. Although it was the longest distance of the trip, Ramblers still had time to swim, scare up some more river creatures, and marvel at

the geology of the area exposed by the bare cliffs along the river's edge. At one of the most interesting outcrops, the group received a quick lesson on the geology of the area, how the deposits were laid and folded, and types of marine fossils present in the rocks.

After the long paddle, the group was happy to arrive at Bond's Landing to set up camp. After settling in, Jen Willoughby, ICPRB's communications specialist and ardent arborist took the group on a walk to identify the trees and other plants in the area. Several of the Ramblers helped with their knowledge of the local plants. The



Ramblers search their net for river critters.

dinner truck again faithfully arrived, and the Ramblers eagerly devoured a wonderful meal.

Forester Mark Bealls, welcomed the group to the forest, and explained how it had once been a huge orchard that failed, with the land eventually bought by the state. He discussed the kinds of trees in the forest, which is a continuing experiment in reverting cultivated land back into forest. The group also learned about invasive plant and insects and the challenges involved in managing the forest.

Bealls then took the group on an "owl prow." The walk down the darkened trail served as an exercise for Ramblers to learn about how animals such as owls use their large eyes to see in limited light. Walking the trail with a blindfold offered Ramblers the chance to explore how humans can accustom their eyes and other senses to better navigate in the dark.

Bealls also did some owl calls, but was unable to get any response. One Rambler noted that he heard a barn owl calling in the distance later that night, and wouldn't have known what it was before participating in the prow.

Around the campfire that night, Doug Wood of West Virginia DEP took off his biologist hat, and donned the clothing and character of Ostenaco, a Cherokee warrior who lived in the 1700s. Ostenaco stood by the fire, telling the group of Rambler "colonists" about his travels that assisted the British during the French and Indian

War, and later answered questions about the presentation. Afterward, the Ramblers largely headed to their tents to dream about the river of long ago while others sat and watched the dying embers of the campfire.

The group ate a hot breakfast from the food truck which again navigated the dirt roads successfully to find the group. The paddle that day was leisurely and short. Paddlers moseyed their way to Little Orleans amid beautiful scenery, occasional swims and water fights. As the group approached the take-out at Little Orleans, a final bald eagle flew across the river to say farewell.

After they arrived, the group piled their gear and prepared for the shuttle ride back to the parked cars. Before they left, the group sang happy birthday to one of the group, and for ICPRB, which reached its seventieth anniversary.

"I never knew this was out here, noted one Rambler. I have to come back." Similar

sentiments were echoed by many in the group. For those on the ICPRB staff that organize the annual paddle, it was the real payoff for organizing the trip. Hopefully, we will not only see Ramble veterans at future events, as well as on the river themselves, and as members of groups that will work to protect and preserve the river.

Thanks to Sponsors/Partners

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Celebrating 70 Years of Leadership and Service



Potomac Basin

REPORTER

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