

REPORTER

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Interstate Commission on the Potomac River Basin

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C. Dalpra

Participants applaud the Potomac after performing the annual Lower Potomac Tributary Team Wade-In at the Mirant Power Plant in Morgantown, Md., in June. This year, the waders could still see their sneakers 27 inches down, about average since the wade-in at the site began in 1999. Clarity has ranged from 21 to 31 inches. More-scientific assessments also show no trend for that area of the Potomac, although downstream areas are becoming murkier.

ICPRB 2010 Water Supply Demand Study

Increasing Demand Could Tax Current Metropolitan Water Supply by 2040

A recently completed assessment forecasts that the Washington metropolitan area system is adequate to meet projected demands without restrictions up to 2030, but by 2040, a severe drought (similar to the drought of record in 1930) could cause water use restrictions and deplete storage in reservoirs.

The report was completed by the Interstate Commission on the Potomac River Basin's Section for Cooperative Water Supply Operations on the Potomac (CO-OP) for the region's major water suppliers, which have agreed to assess system reliability and future demands every five years. The periodic assessment

of supplies and future demands is just one part of the comprehensive regional planning that has ensured a safe, reliable supply of drinking water for the metropolitan area's growing population.

The report found that per capita water use has leveled off after previous per capita reductions had helped to make up for increasing populations. Use of water supplies for suburban lawn watering may be increasing in some areas of metropolitan Washington, offsetting the benefits from the use of more efficient indoor plumbing fixtures and appliances. An added concern is that sedimentation in the Jennings Randolph reservoir on the North Branch Potomac is decreasing its storage capacity

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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at a higher rate than previously estimated by water managers.

The report suggests that the region continue to evaluate alternatives, including the potential for new sources of supply, to find the best and most cost-effective ways to meet future resource demands, including ways that existing sources can be managed to get the greatest benefit from them.

Those existing sources include Jennings Randolph Reservoir and two smaller impoundments, Savage Reservoir and Little Seneca lake in Montgomery County, Md. Jennings Randolph should be assessed to measure its current storage capacity, and the report notes that surveys of the other two may be warranted as well. In addition, the report recommends that watershed protection efforts that could reduce erosion upstream of the reservoirs (which helps fill the reservoirs with sediment) should be considered. Those practices also would bring water quality benefits to the streams and the Potomac estuary as well. Assessing the region's outdoor water use can also provide valuable data on rates of usage and how they might be lowered.

The recently completed demand study is designed to inform the water utilities and their customers about the reliability of raw water supply sources, especially important since development of new water sources can take decades.

The metropolitan area is served by three major water providers: Fairfax Water serves the Virginia suburbs; the Washington Suburban Sanitary Commission (WSSC), the Maryland suburbs; and the Washington Aqueduct Division of the U.S. Army Corps of Engineers provides water to Washington, D.C., and a small portion of Virginia. Washington Aqueduct wholesales its water to the District's Water and Sewer Authority (now known as D.C. Water), with the other two utilities also serving some other water utilities. The Potomac River provides about 78 percent of the water delivered by the three utilities, which together provide the water for about 4.3-million people. The utilities also pay into the capital and operating costs for the Randolph Reservoir and Seneca Lake, which hold water storage reserved for drought operations.

The Potomac is a flashy river, and although its flow near Washington averages about seven billion gallons per day, instantaneous flows can vary greatly. Historical low flow of the river occurred in 1966, at about 388 million gallons. Current demand from the river on peak summer days can be more than 600 million gallons.

Although the river has gotten nowhere near that low flow since 1966, the record low flow sparked the region into planning for the future. Both Jennings Randolph and Seneca filled in the 1980s, and that



C. Dalpra

Little Falls Dam upstream of Washington. Sophisticated drought operations ensures adequate flows downstream of intakes.

dedicated storage, along with work led by CO-OP in how to optimize the existing storage, has kept the metropolitan area able to rely on an adequate water supply. Getting the most of the available storage was facilitated by a series of agreements among the utilities and CO-OP that bind the normally independently operating utilities into a coordinated unit during severe droughts. During drought conditions, the water utilities share information and coordinate operations to share the stored water released from the reservoirs. The agreements also ensure that enough water flows past the intakes to protect the river's downstream ecology while sustaining flow in the entire Potomac River.

The study noted that efforts at conservation, such as low-flow appliances and plumbing, have paid off. During the last two decades, water use in the metropolitan area has held relatively steady, even with a 10 percent growth in population.

The latest growth projections, however, estimates a 24 percent growth rate for the next 30 years, particularly in suburban Virginia.

While the existing system should remain robust for the next two decades, planning for the region's future will continue. Some of the alternatives described in the report include installation of a pumping station near the head of tide (below Little Falls) that could feed the Washington Aqueduct's Dalecarlia Reservoir in the District, a high-tech, reverse osmosis water plant on the Occoquan Reservoir in Virginia, and the use of abandoned quarries that would be filled from the Potomac during normal flows for use during droughts.

The water system also will benefit from continued optimization, which has been continuing through CO-OP led efforts to hone reservoir operating rules and drought operations procedures that are practiced annually by the utilities and CO-OP.

Ongoing efforts also are focused on consumer conservation. The utilities work

together to promote conservation through the "Water: Use It Wisely" campaign, that publicizes and provides water-saving practices for homes and businesses. The ICPRB will continue to grow its rainbarrel and conservation landscaping program, which provides consumers with ways to both save drinking water and reduce stormwater runoff, which threatens the health of our source water supplies.

The full demand study report is available at www.potomacriver.org.

The ICPRB will release a second component of the report, which assesses the potential impact of climate change on the areas water resources later this year.

ICPRB Assists W.Va. in Planning Water Future

The ICPRB has long worked with the water suppliers of the Washington metropolitan area to ensure adequate supplies of drinking water for the region, where 75 percent of the basin's residents live. As growth occurs throughout the watershed and the demand for clean drinking water grows alongside other uses, only careful, long-term planning can ensure that the basin's legacy of abundant water can be passed down to future generations.

The State of West Virginia is the latest to begin a planning process to ensure that legacy. West Virginia's Water Resources Protection and Management Act requires development of a management plan by 2013, and ICPRB water resources staff are holding a series of workshops in the state that will provide a basis for stakeholders to become involved in and influence that process.

Similar to ICPRB efforts conducted in Virginia to complement that state's water planning, the ICPRB workshops cover many topics, including basic concepts in water science, water demand and availability forecasting, drinking water source protection, emergency response planning for droughts and floods, regional water resources planning approaches, and mapping and data management tools.

The first West Virginia workshop, held in Beckley, W.Va., in May, was attended by a diverse group, including county and regional planners, Department of Environmental Protection staff, county officials, and members of watershed and

conservation groups. Because of this diversity, the two-day workshop covered a lot of ground for participants who ranged from water resources professionals to those with little technical knowledge, but deeply concerned about the resource.

Attendees began by learning about the water cycle, how streams, rivers, the groundwater table, and weather events interact to produce the water environment of an area. Building on this information, attendees were introduced to some of the methods and inexpensive tools used to determine the availability of water and the levels of use at which it can be sustained. The workshop also featured exercises that allowed attendees to assess issues that influence the availability of water resources, and methods that can help to develop a cohesive plan to protect the resource while providing for its responsible use.

Attendees also reviewed environmental issues that can impact water resources, and why protection of the sources of their drinking water, such as headwaters streams, is critical to protecting and preserving the resource.

The workshop was successful both for ICPRB staff and workshop attendees. There was much discussion about the problems affecting the local area. Members of watershed groups were concerned with a range of issues, led by the increasing drilling for gas in the state's Marcellus shale area. Deep wells are drilled to reach the trapped gas, which is released by hydraulic fracturing of the rock using millions of gallons of water and solvents under high pressure. The operations can affect both ground and surface waters. Another major concern for all the stakeholders is in how to fund the planning and implementation of protection measures. Groups that had obtained grant funding were able to share their experiences, but money will remain a problem, and how to move forward with limited resources will be a continuing topic of discussion.

While the diversity of the attendees made the workshops challenging to conduct, they provided opportunities to help organize the many interests represented. "The workshops were most immediately valuable in getting these groups of people together and talking to one another," said ICPRB Executive Director Joe Hoffman, who led the staff in conducting the workshop. The exercises conducted during the workshops helped the group to begin a process of critical thinking about their water.

The exercises provided a start to collecting the many water quality and availability concerns of the participants that will need to be arranged to create a comprehensive water plan. The stakeholders were able to network with



each other, and partnerships are being formed that will be valuable to the water resources planning process, noted Senior Water Resources Scientist Heidi Moltz.

More workshops are being held in July in Morgantown and at Moorefield in October. For more information, visit www.potomacriver.org.

The ICPRB also remains active in water resources planning in Pennsylvania and Maryland.

Hot, Dry Weather has Water Managers' Attention

Rainless days and soaring temperatures are affecting more than people's dispositions, as water managers in the metropolitan area begin to eye Potomac river flows more regularly.

While the region is not yet in a drought, it is abnormally dry, so managers of the area's water utilities will begin collecting daily information on current and projected demands and reservoir levels so they are prepared to provide water on demand. The ICPRB Section for Cooperative Water Supply Operations on the Potomac (CO-OP) will collect the data to monitor the river's status, and if necessary, direct the release of stored water from upstream reservoirs later in the year.

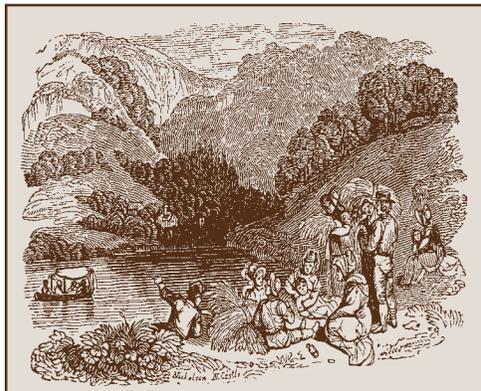
Currently, CO-OP forecasts a 20-27 percent conditional probability that river levels may slip below 600-700 million gallons per day (mgd), at which time water may need to be released to meet water supply demands. Releases of water may occur when the predicted flow is less than the demand plus a required minimum flow-by of 100 mgd downstream of the intakes. Summer drinking water demand ranges from 400-700 mgd during the peak summer months, which also can be the driest.

The increased scrutiny is no cause for alarm, as it is still very likely that releases will not be needed this year. The increased data collection helps keep all the water managers up-to-date, and thinking about the possibility of drought operations. If operations do occur, the normally independent utilities work together and

coordinate withdrawals from the river and their own smaller reservoirs, ensuring that demands are met while leaving adequate water in the river. Withdrawal amounts and sources can change daily, sometimes hourly during actual drought operations.

Rainfall in the basin upstream of Washington has been below normal since April. Groundwater levels, which provide base flow for the basin's river and streams, remain mostly normal but are declining. The high temperatures (this June was one of the hottest on record) increase evaporative loss.

A water supply outlook for the basin is updated monthly at www.potomacriver.org.



Watching the River Flow

A wet winter has given way to a dry spring and early summer, and is reflected in Potomac River flows. Despite early April showers, flow of the Potomac River measured near Washington, D.C., was significantly below average in April and May, according to provisional data from the U.S. Geological Survey. Provisional data has not been reviewed for accuracy.

The April average flow of the Potomac was about 9.2 billion gallons per day (bgd), about 31.1 percent less than the long-term average of 13.3 bgd. The month started out with a daily high flow of about 27.5 bgd on April 1, falling to a low of about 4.9 bgd on April 25. Water taken from the river for metropolitan water supply averaged about 300 million gallons per day (mgd).

May flow remained low, averaging about 4.4 bgd, or about 30 percent less than the long-term average of about 9.7 bgd. The river's flow ranged from a low of about 4.4 bgd on May 11, with some later precipitation bringing the river up to about 16.2 bgd on May 25. Water taken for municipal supply averaged about 300 mgd.

New Smart Buoy Moored in Potomac



NOAA Chesapeake Bay Field Office

A paddler checks out the new buoy just south of Wilson Bridge. The Alexandria, Va., lighthouse is in the background.

Those curious about weather and water quality conditions on the metropolitan Potomac River now have a wealth of information as close as their computer or phone.

The new source is a "smart buoy" located just downstream of the Woodrow Wilson Bridge, the newest in the National Oceanic and Atmospheric Administration (NOAA) Chesapeake Bay Interpretive Buoy System (CBIBS), which provides scientists, recreational users, and others with a wealth of information. The bright yellow buoy, deployed on May 14, joins one placed earlier at the mouth of the Potomac and six others around the Chesapeake Bay.

The buoy collects weather, hydrology, and water quality information that can be accessed by telephone or on the internet, and includes historical and geographical information about the buoy's local area.

The buoys also mark locations important along the Captain John Smith Chesapeake National Historic Trail, an effort to combine the history of Smith's voyage of discovery of the bay in 1608, with opportunities to learn about the region's ecology, how it has changed over the centuries, and recreation and stewardship opportunities.

The solar-powered buoys, which cost more than \$100,000 each, are being used by a variety of organizations that have partnered with NOAA. An early use of the data will be to enhance the National Weather Service's marine forecasting, which will benefit from having real time wind velocity, direction, wave height, and current data to inform their predictions.

An array of partners will use the system to further educational and water quality goals, including other government

agencies and private nonprofit groups such as the newly formed Chesapeake Conservancy. The conservancy (a combining of the Friends of the John Smith Chesapeake Trail and the Friends of the Chesapeake Gateways and Watertrails Network groups) is focused on advocating for improved public access and land conservation, and to connect the public to the bay through enhanced recreation and tourism opportunities. Improving the public's access to and appreciation of the

bay and its tributaries is a first step in enhanced public stewardship of natural resources.

The buoy system also provides an additional layer of safety and information for those traveling the bay and river by boat. Accessing the system, boaters can get information about the wind and sea state for areas they are approaching, as well as learning about the history of the area.

You don't need to be on a boat to get access. Armchair mariners can call (877) buoybay, or on the web at www.buoybay.org.

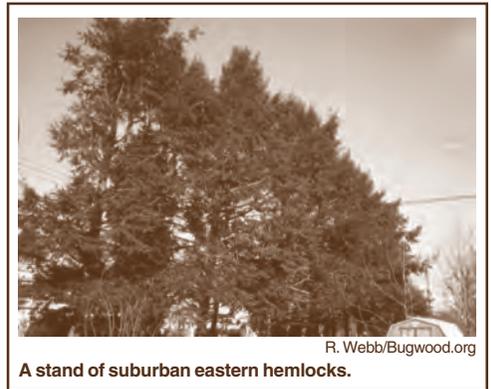
Seeing the River for the Trees

The forests that surround many of the Potomac basin's headwaters streams are the first line of protection for preserving the high quality sources of the region's drinking water. Changes in the forests, both from human and natural causes, can create new water quality challenges.

So it is with the Eastern hemlock (*Tsuga canadensis*), the elder trees of the east, which are battling against the hemlock woolly adelgid (*Adelges tsugae*), an insect that, if populations are high enough, can kill a tree in two years. Intact forests, with their hemlocks and other old-growth trees, will be most affected. Running through them are the most pristine trout streams, attracting fishermen from all over the region. Die-offs of hemlocks disrupts The forest's ecological cycle and can have serious impacts to water quality, fisheries, and wildlife.

Large swaths of intact forest in the Potomac watershed are found in the western counties of Maryland, the Shenandoah region of Virginia, and rural counties of Pennsylvania and West Virginia. The full range of hemlocks runs from southern Maine to Georgia. "Hemlocks are a climax species. The forest goes through succession and finally has the most diverse system when hemlocks come in," said Scott Salom, professor of entomology at Virginia Tech. Hemlocks serve many ecological functions including providing shade for streams, habitat for birds and other wildlife, and a large, stable, and long-lived understory.

The adelgid is a pest from Asia that infests our native hemlock trees, literally sucking the life out of them. But adelgid is not killing all the trees. In some cases, it's weakening them, and in others it kills the entire population. "It's a little hard to predict," said Salom. But it is understood that "adelgids prefer new growth." The pest feeds on new growth, moves on to the next tree, and the hemlock recovers a bit with a flush of new growth. Then, the adelgids find the new shoots and the process starts again, indicated Salom.



A stand of suburban eastern hemlocks.

The old growth forested regions where hemlocks are rooted are home to the few waterways that are able to support native brook trout. Hemlocks tend to live along streams and are one of the few evergreen species that thrive in the shady confines of taller trees, such as oaks and tulip poplars, and provide shade for waterways.

"Hemlocks fill the niche by shading and cooling riparian areas. When sunlight hits the streams, the water warms," said Maryland DNR Forester Larry Maxim. As more hemlocks die, particularly in areas where they are found in vast stands, the region's few remaining trout streams may heat up and become unsuitable for the cold-hardy fish. Even a one or two degree rise in temperature could make a successful trout habitat fail. "Hunting Creek in Cunningham Falls State Park is one of the few remaining brook trout streams in the area," said Maxim. He indicated that the hemlocks were dying throughout the park, except for the few that have been inoculated against the adelgid. Those green hemlocks stand out against their untreated neighbors.

Why, if there is a treatment, aren't all the hemlocks being inoculated? "It's impractical on a forest scale," said Maxim. In the landscape setting, treating a few hemlocks is much different than injecting every hemlock in a forest against the pest. Treatments must be given every two to three years, depending on the method, and

methods vary for different habitats.

Not only do the streams begin to heat with the loss of hemlocks, but invasive trees and shrubs crowd in, taking advantage of the new space. “At Cunningham Falls, as hemlocks die, invasives are crowding in to fill the gaps, but that’s problematic too,” said Maxim. Asian stiltgrass, tree-of-heaven, mile-a-minute weed, garlic mustard, and others are invading the forest. “The loss of hemlocks could flip the ecosystem in the wrong direction,” he said.

To help battle the adelgid, predatory ladybird beetles (*Pseudoscymnus tsugae*) native to Japan, have been released in some areas to test their viability as an effective management strategy. Thus far, Salom indicated the beetles have not been successful in significantly reducing the adelgid population and they are expensive, about \$7 per beetle.

Another hopeful biological control is a native fungus that feeds on the adelgid. The fungus has had some success in the field and it is hoped that it, coupled with the beetles may help reduce the adelgid population.

Foresters in Frederick County, Md., are partnering with the Maryland Department of Agriculture to manage the adelgid and search for alternative tree species to replace hemlocks as they may lose the battle against this tiny insect before biological controls catch up with their adelgid populations.

West Virginia Department of Agriculture Forest Entomologist Tim Tomon indicated that there is a similar battle in the Panhandle and other parts of West Virginia. “The hemlocks in the Potomac watershed of West Virginia are largely decimated,” said Tomon. However, he indicated that in the Blackwater Falls area, the adelgid has been present for about 20 years and in some areas there is very little infestation, while entire hemlock stands in other areas are completely dead. While not sure, Tomon says the varying soils of the area may be one indicator about whether hemlocks survive an infestation or succumb to it. In addition, adelgid populations can be controlled in areas that see temperatures well below zero, such as those mountainous forests in West Virginia and western Maryland.

Finding species that can fill the niche that hemlocks do is proving difficult. Foresters and others are planning to plant evergreens that might meet most of the needs. The Maryland DNR Forest Service has proposed to interplant tree species to help fill the hemlock niche at Cunningham Falls State Park. Maxim proposed using white spruce, pitch pine, and Norway spruce, however the Norway spruce was removed from the list because it is not native. The West Virginia Department of Agriculture will plant white pines and red

spruces to help fill the niche in their forests. While each of these has ecological value in the forest none can fill the hemlock niche alone.

The hemlock woolly adelgid is just one more pest in a long line that has changed the face of eastern forests. Gypsy moth, emerald ash borer, and farther in the past, chestnut blight, all have altered eastern forests by opening pockets for invasive species and reducing habitat and food for certain wildlife that depend on specific trees for survival. Specifically linked to hemlocks are native brook trout, a species with an already diminished population due to development pressure. Arguably, the forests will be left with only hardy species such as red maple, but at what cost to wildlife and even humans?

Smith Creek Named Chesapeake Bay Showcase Watershed

Smith Creek, a troubled headwaters stream of the North Fork of the Shenandoah River, will be getting some additional help after being named one of three Chesapeake Bay Showcase Watersheds by the U.S. Department of Agriculture (USDA).

The USDA has committed additional funding and staff to demonstrate water quality improvements through greater outreach efforts to the agricultural community, use of innovative conservation practices, and intensive conservation planning, implementation, and monitoring.

The watershed effort also is supported by a network of watershed groups, and the effort aims to reach out to every agricultural producer in the 67,000-acre watershed. The USDA will leverage funds from several programs, including the Chesapeake Bay Watershed Initiative. The Virginia Department of Environmental Quality and the Friends of the North Fork Shenandoah River will use existing data and citizen monitoring will provide a baseline as well as a way to assess progress in reaching water quality goals and standards. The U.S. Geological Survey also will help in data collection. Collectively, the coalition will operate as the Smith Creek Watershed Partnership.

Smith Creek was added to Virginia’s Impaired Waters List in 1996 because of high loads of sediment and bacteria. The watershed contains many poultry and livestock operations, as well as a small but growing section of urban/suburban land. A total maximum daily load

implementation plan was prepared and released in 2009.

The plan includes both agricultural and urban best management practices, supported by state and federal agencies

and programs, and the application of improved technology such as wastewater treatment systems. For more information, visit www.shenandoahrcd.org/SmithCreekWatershed.htm.



J. Evans/Md. DNR Fisheries

The ICPRB staff exhibited living stream macroinvertebrates to visiting students at the Nation's River Bass Tournament, hosted by the Living Classrooms Foundation of the National Capital Region. The students get very excited at seeing and handling the insects, and learning about their role in water quality. The ICPRB helped sponsor the event, held at National Harbor in May to raise funds and awareness for Living Classrooms, which helps students raise American shad in classrooms as part of ICPRB's shad restoration program.

Celebrating 70 Years of Leadership and Service



Potomac Basin

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