Potomac River Basin Drinking Water Source Protection Partnership

ANNUAL REPORT 2007

"For Life, For Health, Clean Water"

The Potomac River Basin Drinking Water Source Protection Partnership

Our mission is to serve as a cooperative and voluntary partnership working towards the goal of improved source water protection of the Potomac River in recognition of the vital role of the river in supplying drinking water to millions of people within the Potomac watershed and in support of the multi-barrier approach to safeguarding the drinking water supply for public health.

About the Partnership

The Potomac River Basin Drinking Water Source Protection Partnership (DWSPP) is a unique regional organization formed to help ensure that the basin's public drinking water sources, serving more than five million people, are protected from contamination that could adversely affect the health of consumers. The Partnership was formalized through a signing ceremony held on September 24, 2004 at Black Hill Regional Park in Boyds, Maryland, adjacent to Little Seneca Reservoir, a crucial element of the Washington Metropolitan Area water supply. At the present time, 19 drinking water utilities and government agencies from throughout the Potomac River Basin are signatory members of DWSPP.

Through technical work groups, activities, and participation at Partnership meetings, the DWSPP is implementing a strategy for carrying forward source water protection as recommended by source water assessments that were prepared throughout the Potomac basin. The goals of the Partnership are to:

- ***Identify regional priorities for source water protection efforts.***
- ***Coordinate, where appropriate, source water and drinking water protection efforts to benefit multiple water systems.***
- ***Establish and maintain a coordinated dialogue between water suppliers and government agencies involved in drinking water source protection within the Potomac River Watershed.***
- ***Establish and maintain a coordinated dialogue between the Partnership agencies and other groups working towards watershed protection within the Potomac River Watershed.***
- ***Promote information sharing among groups working on, and affected by, safe drinking water issues.***
- ***Enhance coordinated approaches to water supply protection measures in the Potomac basin, especially for boundary waters and for project planning that impacts interstate waterways.***
- ***Develop new initiatives within the drinking water community and with partners that will fill program voids ensuring higher quality drinking water supplies.***

Partners

City of Frederick, Md.; City of Hagerstown, Md.; City of Rockville, Md.; Fairfax Water; Frederick County, Md.; Interstate Commission on the Potomac River Basin; Md. Department of the Environment; Pa. Department of Environmental Protection; Town of Leesburg, Va.; United States Environmental Protection Agency, Region 3; United States Geological Survey; Va. Department of Environmental Quality; Va. Department of Health; Washington Aqueduct, U.S. Army Corps of Engineers; Washington County, Md.; District of Columbia Department of the Environment; Washington Suburban Sanitary Commission; W.Va. Department of Health and Human Resources; W.Va. Department of Environmental Protection

Cover Photo: The Potomac River just upstream of Harpers Ferry, W. Va. (Photo: J. Palmer)

LETTER FROM THE CO-CHAIRS

The Potomac Drinking Water Source Protection Partnership (DWSPP) is a voluntary alliance of water suppliers and state, regional, and Federal agencies working to protect drinking water sources in the Potomac River basin. Since its establishment in 2004, 19 organizations have formally joined the Partnership, and many others have participated in Partnership meetings, workshops, and activities. Key Partnership priorities include:

- Improving our understanding of the impact on drinking water of emerging contaminants, pathogens, and disinfection by-product precursors,
- Improving our understanding of the sources of these contaminants, and
- Developing source water protection strategies for the Potomac River basin.

We are pleased to report continued progress during the Partnership's third year of activities. Thanks to the time and effort contributed this year by members, preliminary results are now available from the Cryptosporidium Source Tracking Study (see article below). This study is being conducted jointly by the Partnership and the Centers for Disease Control (CDC), with funding from an EPA Regional Applied Research Effort (RARE) grant and in-kind support by water utilities.

The sampling for the project was completed in February 2008, and the final report should be available by late spring or early summer 2008.

The Partnership also devoted time this year to the issue of emerging contaminants, including endocrine disrupting compounds (EDCs).

Episodic fish kills and reports of intersex characteristics in several species in the Potomac basin are suspected by some scientists to be related to the presence of these contaminants. Although no direct adverse impact on human health has been established from consuming drinking water treated to current EPA standards, and human exposure to these chemicals via water supply is very different from fish exposure to them, the presence of trace chemicals in the source waters used for drinking water supply has caused some concern. A mini-workshop was held by the Partnership in May to explore alternative approaches available to address this problem, including the European Union's new Regulation, Evaluation, Authorization and Restriction of Chemical substances (REACH) program.

The Partnership worked to make EDCs and pharmaceuticals and personal care products (PPCP) issues a strong focus of the American Water Works Association Research Foundation (AwwaRF) program. AwwaRF agreed to make the EDC-PPCP issue a "strategic topic" with $5 million funding for a 5-year cycle. Partnership members participated in a workshop sponsored by the AwwaRF, focusing on the emerging challenge related to EDCs and PPCPs in source waters and shared the Partnership's views for developing a national consensus on an interim strategy by which water utilities can address this challenge until more is known about the issue.

To complement this year's focus on source water protection, the Partnership developed a plan to take a more detailed look at perchlorate levels in the Potomac River. That project was initiated in October 2007. Additionally, the Partnership engaged in a dialogue to initiate development of a watershed strategy for source water protection for several Potomac basin sub-watersheds.

A Federal Interagency meeting was held in late May to introduce several Federal Departments and their respective agencies to Partnership activities and solicit their input and participation in various Partnership activities that involve source water protection.

We are proud of the role that the Partnership is playing in protecting our drinking water sources in the Potomac River basin, and we appreciate the commitment and hard work of our members. We extend an invitation to other water utilities and government agencies to join us in this important effort.

C. Dalpra

Thomas Jacobus shares the chairman's gavel with Jon Capacasa (right).

Potomac River Basin Drinking Water Source Protection Partnership 2007 Co-Chairmen

Jon M. Capacasa
Director, Water Protection Division, US Environmental Protection Agency, Region III

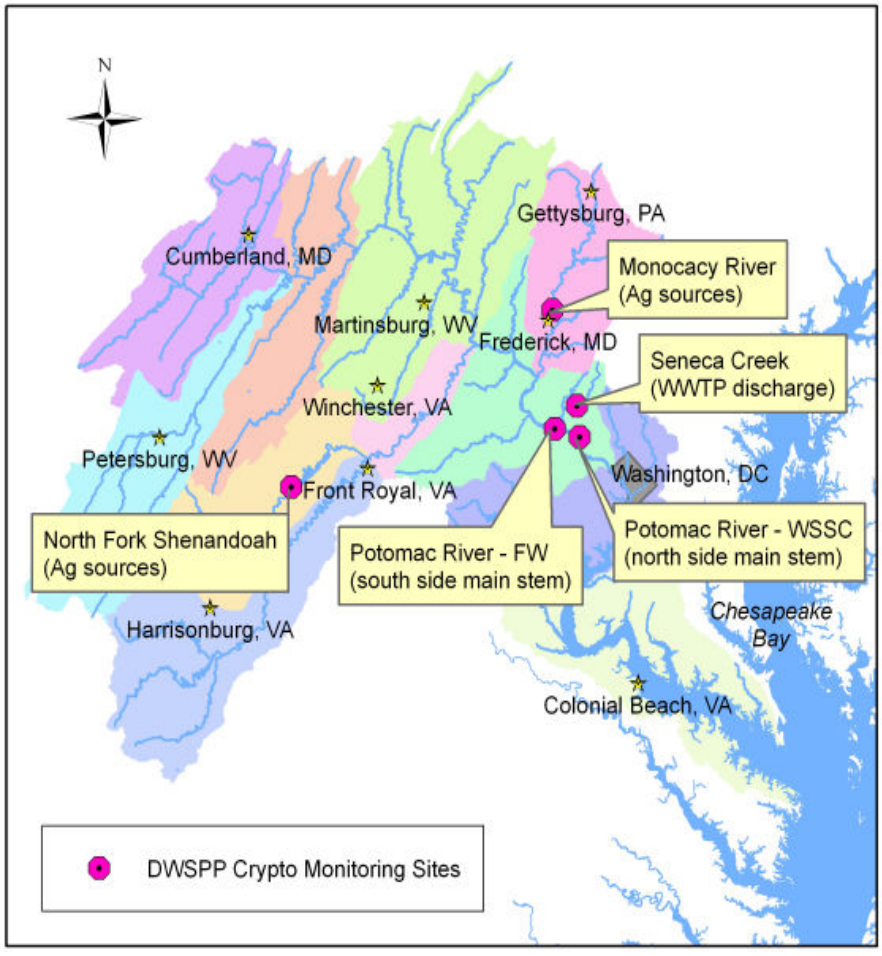
Thomas Jacobus
General Manager, Washington Aqueduct

Cryptosporidium Source Tracking in the Potomac River Watershed

Cryptosporidium (Crypto), a protozoan parasite commonly found in most drinking water sources, has been identified by the Potomac DWSPP as a public health concern for the water utilities in the Potomac River watershed. Crypto oocysts (the dormant form of the organism) are resistant to disinfection by chlorination and cause significant gastrointestinal illness and in some cases death. To provide critical information to better inform source water protection efforts targeting Crypto, the Partnership, in cooperation with the USEPA Office of Research and Development (ORD) and the U.S. Centers for Disease Control and Prevention (CDC), began a monitoring research project within the Potomac watershed in October 2006 as part of a jointly funded project to identify the specific source of Crypto oocysts found in local drinking water source waters. The suspected sources of Crypto in the Potomac River watershed include agricultural activities/ animal operations, combined sewer overflows or wastewater treatment discharges, wild animals, and storm water runoff.

The project is building on previous work to provide both quantitative and qualitative information on Crypto in the watershed. In particular, this project is using recent advances in molecular genotyping methods to identify and track specific Crypto sources in the Potomac watershed, which could not be done with the standard quantitative analytical method (EPA Method 1623). This is important because only some genotypes/species of Crypto are human infectious, but Method 1623 was not developed to distinguish between human-infectious and nonhuman-infectious oocysts. Thus, with the addition of a qualitative genotyping method, a better assessment of human health risks from Crypto in the Potomac source waters can be made. The project was also designed to improve the understanding of the relationships between land use, hydrologic conditions, and oocyst sources versus oocyst occurrence.

The study involved collecting 12 monthly base-flow samples and up to six storm-flow samples from each of five sites within the watershed. Raw water samples have been collected from two water treatment plant intake sites: Washington Suburban Sanitary Commission's (WSSC) Potomac Water Filtration Plant and Fairfax Water's (FW) Corbalis Water Treatment Plant. Samples were also collected at three sub-watershed locations: Seneca Creek in Maryland, the Monocacy River in Maryland and the North Fork Shenandoah River northeast of Edinburg, Virginia. These last three locations are upstream of either WSSC or FW's water



Map of the Potomac River basin showing location of monitoring sites.

treatment plant (WTP) intakes and respectively represent three types of land uses potentially contributing Crypto to the raw water at the plant intakes: urban/wastewater treatment plant (WWTP) discharge, agricultural (cattle)/wastewater, and agricultural (cattle).

The monitoring was intended to reflect seasonal and hydrologic variations in Crypto occurrence and source contributions. The base-flow samples were single grab samples while the storm-flow samples were flow-weighted (based on the nearest hydrograph data) composite samples of hourly grab samples collected over an eight-hour period targeting the first-flush from significant suspected sources. Local meteorological forecasts from various NOAA/NWS web-based products were utilized to identify potential storm events (minimum of 0.5" local rainfall preceded by at least 4 days without significant precipitation) for sampling in each of the locations. Because local storm conditions can vary significantly from location to location, the dates and times of storm samples from the various sites did not necessarily coincide. Also, because of the recent watershed wide drought, only five storm samples were collected at the Seneca site and four samples at the North Fork Shenandoah site.

For each base-flow or storm flow sample, the samples were split into two aliquots, one for analysis by Method 1623 (quantitative enumeration), and one for a CDC-developed molecular method for identifying specific genotypes/hosts of Crypto present in the sample. The CDC genotyping method is a polymerase chain reaction (PCR) based method targeting genetic sequences on the SSU rRNA and GP60 genes of Crypto, and it is very sensitive to even low concentrations of oocysts. Although this genotyping method is not quantitative, it provides a means, in conjunction with a well designed monitoring program, for identifying the most significant sources of Crypto to be targeted for source protection efforts.

ICPRB

ICPRB Researcher Jan Ducnuigeen prepares a probe for monitoring.

Results to Date

Laboratory analyses have been completed for about 90 percent of the samples. Based on the available analytical results, the following preliminary observations can be made:

1) There have been very few Crypto positive samples using EPA 1623 (only four detects out of 63 baseflow samples and three detects out of 25 storm samples);

2) In contrast, there have been frequent detects of bovine (cattle) Crypto genotypes in WTP intake and agricultural samples for both baseflow (44%) and storm (70%) samples. There has also been good correspondence in genotypes between the upstream agricultural source sample sites and the associated WTP intake water sample sites. Although this is suggestive of upstream cattle operations being a major contributor of Crypto to the WTP intakes, no human infectious genotypes have been observed in any samples (only *C. andersoni*, a strain not known to be human infectious).

3) There have been a few detects of wildlife Crypto genotypes (unknown host origin, not known to be human infectious), mainly in the urban/wastewater samples and in WTP intake samples.

This preliminary data suggests that much of the Crypto that is present in the WTP source waters may not be a significant human health risk, although the fact that there appears to be significant cattle contribution also suggests that it is quite possible that human infectious Crypto are present during periods when such genotypes (e.g., *C. parvum*) proliferate, such as the spring calving season.

Thus, the most beneficial approach to reducing human health risks from Crypto in the Potomac watershed may be to target cattle/dairy operations for protection measures. However, completion of sample analysis and evaluation is required before conclusions can be drawn. A final report on the findings with conclusions and recommendations is expected to be ready by late spring or early summer 2008.

Emerging Contaminants Workgroup 2007 Activities

C. Dalpra

Suzanne Rudzinski, EPA Office of Science and Technology, speaks about emerging contaminants at the DWSPP 2007 Annual Meeting held at the Washington Aqueduct Dalecarlia facility.

Mini-Workshop on Emerging Contaminant Challenges – Alternative Approaches for Water Utilities

Water utilities continue to be faced with pressures from customers and political leaders for "solutions" to perceived health risks posed by micro-constituents detected in their raw waters. At a Congressional hearing in October 2006, local water utility managers called for federal action and more funding to answer basic questions about risks to human health. The Partnership is pursuing an approach that focuses less on regulation of individual chemicals and instead emphasizes contaminant source controls within the broader goal of source water protection. In keeping with this approach, the Partnership's meeting on May 7, 2007 featured presentations by three experts, who offered alternative approaches for water utilities faced with emerging contaminant challenges. This mini-workshop was convened as a timely follow-up to the one-day Emerging Contaminants Workshop held in September 2005. The following is a summary of the mini-workshop presentations.

The New EU Legislation on Chemicals Management, *by Robert Donkers, Environment Counselor, Delegation of the European Commission to the US*: Mr. Donkers described the difficulties and limitations of testing and regulating individual chemicals, especially high production volume substances and some toxic ones. He contrasted the US approach with the recently enacted EU legislation for the Regulation, Evaluation, Authorization and Restriction of Chemical substances (REACH), which is underpinned by the principles of substitution with safer chemicals, precaution, and laying the burden of proof on manufacturers rather than government. Industries producing new chemicals would not be able to cite proprietary confidentiality and would be required to disclose information about product safety and environmental persistence. REACH will be phased-in over an eleven-year period beginning in 2008, and is expected to have an influence on US regulatory policy by encouraging an overhaul of the Toxic Substances Control Act (TSCA), making more data available about chemical properties, safety and risk, and supporting better risk assessment and management in the US. The cost to industry of meeting the new REACH criteria are not insignificant: Cost-benefit estimates suggest an approximate implementation cost between $4 billion and $8.7 billion over 11 years, but these costs would be offset by health benefits of $72.3 billion over 30 years, prevention of occupational skin and respiratory diseases ($130.2 billion), and environmental benefits (savings of $13 billion from avoidance of environmental restoration).

Endocrine Disruptors and Policy Approaches for Reducing Risks, *by Dr. Lynn Goldman, Bloomberg School of Public Health, Johns Hopkins University*: Dr. Goldman outlined potential health risks from endocrine disruption, noting that several substances exhibiting ED effects (in both humans and wildlife) are considered persistent organic pollutants. As examples, Dr. Goldman pointed to DDT, DDE, PCBs and dioxin, most of which have declined in recent years, while rising trends of PBDE and perfluorinated compounds suggest potential for adverse ED effects. She considers children's health, in particular, to be a critical criterion in future chemical safety standards and chemical regulations, and she advocates a higher burden of proof be placed on the chemical manufacturing industry to demonstrate product safety for children and make information about product toxicity and persistence available to the public. Dr. Goldman expressed concern for the existing TSCA regulatory process, which is driven by legal considerations of "least burdensome" to manufacturers and an "unreasonable risk" standard that includes economic benefit to producers. In contrast, the provisions of the Food Quality Protection Act are held as a better standard for public health protection. A more robust biomonitoring program is needed to support better understanding of

exposure pathways, including both food and drinking water, she noted.

Emerging Contaminants in US Water Resources: Challenges and Potential Solutions, *by Dr. Rolf Halden, Center for Water and Health, Johns Hopkins University*: Dr. Halden contrasted the current state of chemical regulation in drinking water (about 80 substances) to a universe of tens to hundreds of thousands of chemical substances. He advocates a product substitution approach, avoiding persistent organic pollutants (such as many halogenated compounds) and instead producing and using chemicals that have a natural counterpart or origin and which degrade rapidly. To reduce the burden of treating and removing persistent contaminants (from household products) in wastewater, Dr. Halden instead advocates a pollution prevention approach that controls the input of such chemicals into wastewater more tightly. Reducing unnecessary product constituents (such as antimicrobials) could also have a significant environmental benefit. Although current wastewater treatment processes can remove a substantial amount of the contaminants, a more holistic view recognizes that the treated wastewater effluent may be a drinking water source for another community, and that the accumulated contaminants in biosolids when applied to agricultural lands may be dispersed instead in the environment.

Review of USGS Publication
In the past year, the Emerging Contaminants Workgroup reviewed a recent USGS research report containing results of a reconnaissance of emerging contaminants in upstream waters of the Potomac River Basin and in fish plasma. The Workgroup prepared a summary and offered comments on the report, emphasizing its stated intent as a study of contaminant occurrence only; as such it should not be construed as offering findings or conclusions about effects of specific detected compounds on fish or human health via environmental or drinking water exposures, respectively. The study did identify some substances with known or suspected endocrine disrupting effects, as well as some pharmaceuticals and metals from suspected point sources (e.g., treated wastewater effluent, aquaculture operations). However, contaminant distribution and persistence in downstream Potomac River waters, where several of the major municipal drinking water intakes are located, was not examined. The Workgroup recommended further studies to examine contaminant fate and transport, distribution patterns, and human health and ecological health effects.

Membership Participates in AwwaRF Workshop for Addressing EDC and PPCP Concerns

Partnership members WSSC and Fairfax Water worked closely with the American Water Works Association Research Foundation (AwwaRF) and pushed for a strong focus on endocrine disrupting compounds – pharmaceuticals and personal care products (EDC-PPCP) issues. AwwaRF agreed with the request and made the EDC-PPCP issue a "strategic topic" with $5 million funding for a 5-year cycle. WSSC participated in an Expert Workshop sponsored by the AwwaRF, focusing on the emerging challenge related to EDCs and PPCPs in source waters. WSSC's main goal was to share the Partnership's views for developing a national consensus on an interim strategy by which water utilities can address this emerging challenge until more is known about the issue. The workshop was the first step by AwwaRF to significantly expand its previous work on EDCs-PPCPs and to embark on the 5-year strategic program to be funded by AwwaRF at $1 million per year. AwwaRF invited 32 people to the workshop, including 11 from water utilities, 5 from government agencies and national organizations and 16 researchers. The attendees had submitted 58 research ideas. The workshop reduced the number to 28 by eliminating some of the ideas and combining some others. Project descriptions, schedules, and estimated budget for each project were developed and projects were prioritized by a dotting process. The output of the workshop will be considered by AwwaRF and its Expert Panel which will finalize the recommendations for consideration and approval by the AwwaRF Board.

C. Dalpra

Some pharmaceuticals, personal care products, pesticides, and other common compounds are being studied to determine their impact on the environment and human health.

The AwwaRF Board will meet in January 2008 and adopt the projects to be pursued. The two ideas proposed by WSSC were focused on the first two years of the five-year cycle and were intended to go together and provide *an interim strategic framework for communication and action* in a short amount of time. This would result in an outline of ideas for follow-up in the next 3 years based on the findings of the interim strategy and consideration

of new developments related to this issue. The workshop focused on the entire 5 years and developed a preliminary and ambitious plan which includes the two ideas proposed by Partnership members. One idea (entitled "Interim Water Utility Strategy Plan for Responding to Emerging Contaminants Challenges" and intended to provide a *framework* for communication and actions) received a very high ranking by participants. The second idea (entitled "Developing Source Water Protection Strategies for Addressing EDCs and PPCPs" and intended to develop *an interim tool for action* commensurate with the framework to be developed with the first project) was ranked much lower by workshop participants. Partnership members intend to continue to press AwwaRF to support development of an interim and practical tool for water utilities to supplement communication messages with some meaningful actions.

An additional item of note related to the EDC-PPCP issue is that Ms. Kim Linton, a Senior Account Manager with AwwaRF, attended our Annual Partnership Meeting in November 2007 and presented in detail AwwaRF's good work on EDCs-PPCPs.

New Garden Graces Dalecarlia Facility

The Washington Aqueduct has begun adding "green" design features to its landscaping. Two drought-tolerant gardens have just been installed outside the gate of its Dalecarlia facility. The gardens include native perennials and shrubs like inkberry, red-twig dogwoods, and dragon's blood sedum. Also in the garden are non-native, non-invasive plants, including yucca, that will add structure and function to the garden. All the plants thrive in harsh environments with poor soil, droughty weather, and sidewalk heat reflection. The native plants will help provide habitat and food for birds and insects. The non-native, non-invasive plants will not out-compete native vegetation for space or resources. These gardens offer more diverse plants than turf and can absorb more stormwater runoff. The prominent display at the Aqueduct may encourage passersby to plant something similar in their own landscape.

C. Dalpra

ICPRB staffer and horticulturist Jen Willoughby explains the benefits of the new garden plantings at the Washington Aqueduct's Dalecarlia facility.

Questions, Comments, Contact

Want to know more about the Partnership? Would your organization like to participate? Have more questions on what the Partnership is doing to help protect drinking water resources? Please contact us.

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