The Potomac River Basin Drinking Water Source Protection Partnership

Quarterly Meeting Summary held via webinar on May 5, 2021

Attendees

Water Suppliers

Berkeley County PSWD:
Steve DeRidder

DC Water:
Salil Kharkar
Matt Ries

Fairfax Water:
Nicki Bellezza
Jojean Bolton
Jamie Hedges
Gregory Prelewicz
Niffy Saji
Joel Thompson

Loudoun Water:
Thomas Barrack
Pam Kenel
Mark Peterson

Town of Leesburg:
Russell Chambers

Washington Aqueduct:
Rudy Chow
Anne Spiesman

Washington County:
Davina Yutzy

WSSC Water:
Martin Chandler
Robin Forte
Nicole Horvath
Robert Hsu
Jin Shin
Priscilla To

State and Local Agencies

DOEE:
George Onyullo
Joshua Rodriguez

MDE:
John Anthony
Greg Busch
Jonathan Leiman
Robert Peoples
Rebecca Warns

PA DEP:
Lisa Daniels

VA DEQ:
Sara Jordan

VDH:
Raven Jarvis
Dwayne Roadcap
Tony Singh

WV DEP:
John Wirts

WV DHHR:
Monica Whyte

Federal and Regional Agencies

EPA Region 3:
Heather Arvanaghi
Michelle Audie
Virginia Vasalotti

ICPRB:
Renee Bourassa
Claire Buchanan
Rikke Jepsen
DeeDee Hunter
Heidi Moltz
Andrea Nagel
Michael Nardolilli

MWCOG:
Steve Bieber
Lisa Ragain

USGS:
Mary Kay Foley

Business Meeting

Due to government-mandated social distancing requirements resulting from the coronavirus pandemic, the May 5, 2021 Quarterly Meeting was held via webinar. There were 49 attendees, including the moderator and presenters.

A recording of the webinar is available on the ICPRB YouTube page.

Presentations

Co-managing CECs and Nutrients for a Much Healthier Potomac Watershed
Dr. Erik Rosenfeldt, Hazen and Sawyer (presentation)

Dr. Rosenfeldt provided an overview of the unique collaboration and history of this research project. The initial drivers for the research program were the discovery of intersex fish in the Potomac and the relationship between intersex fish and land use or endocrine-disrupting compound (EDC) inputs. The continuum of land use from a very forested region upstream through the agricultural belt and then into the urban DC metro area provided the research team with the opportunity to see how pollutants or constituents correlated to different land uses.

The research approach focused on both point sources and nonpoint source pollution. Researchers applied a number of analytical methods, examining a range of typical water quality parameters and expanding to advanced geochemical tracing, organic carbon characterization, and bioassays. The research objectives were to examine the fate of both nutrients and EDCs subjected to select point and non-point source control strategies. The approach allowed the researchers to zero in on hot spots or hot moments, especially for contaminants associated with runoff. The end objective was the development of a prioritization framework for future management of nutrients and some emerging contaminant (CEC) sources.

The initial investigation's objectives were to evaluate upstream and downstream impacts from nutrient control, agriculture management, stormwater management and wastewater treatment plant (WWTP) strategies and to evaluate the impacts of estrogenic compounds (EEDCs) in receiving waters attributed to point versus non-point sources. Researchers sampled paired forested, agricultural, and urban sites with and without best management practices (BMPs) every other month for a year. An additional set of samples were taken during a rain event. Samples were analyzed for hormones and metabolites (LCMS); bioactivity (yeast estrogen assay); advanced natural organic matter (NOM) characterization (fluorometry) and nitrate isotopes for source tracking using the University of Maryland's ability to link heavy oxygen and heavy nitrogen to nutrient sources. Results revealed that estrogen and nitrogen concentrations were significantly lower in sub-watersheds with BMPs. Wastewater tertiary effluent also had lower concentrations than secondary effluent. Comparing the relative contributions of EDCs from WWTPs to other sources, the researchers found that agricultural nonpoint and urban nonpoint sources contributed the greatest fractions of EEDCs, nitrogen, and dissolved organic carbon (DOC), whereas WWTPs with nutrient removal contributed minimal amounts. The conclusions

of the initial investigation included findings that nonpoint sources accounted for over 80% of the EDC load to the Potomac vs. less than 3% of the load contributed from Blue Plains WWTP. Furthermore, significant reductions in EEDC inputs to the Potomac Aquifer were associated with agricultural BMPs (e.g., restricting livestock access to streams, planting grasses for shading and bank stability), urban BMPs (e.g., maintaining shaded habitat, reducing impervious area, restoring stream habitat, creating wetlands), and advanced nitrogen control at Blue Plains.

The second project, Improving Reuse for a Healthier Potomac, was funded with an EPA STAR grant and completed between 2016 and 2020. The project objectives included:

1) Use of multiple analytical, biological activity, isotopic, and fluorescence tracers to identify and track spatial and temporal variability hot spots of EDC and nutrient sources at a large watershed scale,
2) Use of case studies to examine impacts of advanced wastewater reclamation, stormwater reuse, and agricultural best management practices on source controls of nutrient and EDCs
3) Utilizing a sustainable approach to quantitatively analyze the costs, impact, and benefits of the reuse and management strategies for achieving human and ecological health improvement.

The researchers sampled every major tributary and the mainstem at the tributaries. Hot spot and hot moment analyses for nutrients and estrogens provided the ability to visualize and correlate land use patterns and contributions. Researchers found that while most of the water in the basin comes from the forested sub-watersheds, agricultural nonpoint sources contributed the greatest fraction of N and P, while urban and agricultural nonpoint sources contributed similar loadings of DOC. Agricultural BMPs did not effectively reduce pesticides and herbicides. Urban BMPs yielded reductions in soluble P, DOC, and pesticides and herbicides. Examining point source impacts from water reclamation facilities (WRFs), the authors found that certain pesticide concentrations from WRF effluent exceeded background levels in the Potomac. Advanced WWTPs gave very high removals of CECs. All of the CECs detected in the study were well below ecological or human health levels of concern.

Upon completion of the analyses, the researchers used the data to develop a cost-benefit analysis for assessing the impact of different co-management strategies on EDCs and nutrients. Regional stakeholders participated in workshops to determine criteria and weighting factors for the analysis of strategies for co-managing nutrients and EDCs. As a result, the scores heavily favored implementation of agricultural BMPs to reduce future nutrient and EDC loads.

In the second project, investigators concluded that agriculture inputs of nutrients and CECs dominated the watershed inputs. “Paired” watershed analysis of BMP effectiveness indicated the following:

1) Agricultural BMPs: variable but effective for nutrient control and moderately effective for CEC control
2) Urban BMPs: variable and less effective for nutrient control and moderately effective for CEC control

3) Point sources: very effective for nutrient control; enhanced nutrient removal (ENR) less effective for CEC control, advanced waste treatment (AWT) very effective for CEC control

The multi-criteria decision analysis (MCDA) indicated that implementing agricultural BMPs was the preferred option for cost-effective, equitable, high performing co-management of nutrients and CECs in the Potomac watershed.

Dr. Rosenfeldt also commented on PFAS in the Potomac. In the course of this project, investigators analyzed for a broad range of PFAS and found very low occurrence.

Understanding and Managing Per- and Polyfluoroalkyl Substances in Maryland
Rebecca Warns, Maryland Department of the Environment (presentation)

Ms. Warns provided an overview of PFAS materials, chemistry, and PFAS treatment techniques.

Early PFAS initiatives in Maryland were driven by federal programs, such as UCMR3. Between 2012 and 2015, one Maryland sample had a measurable level of PFOA, but the concentration was below the EPA's Health Advisory Level for PFOA+PFOS. Since late 2019, MDE has taken major strides to assess the presence of PFAS in the State's drinking water sources, including implementation of MDE's multi-phased public water system (PWS) study.

Phase 1 of the PWS study focused on data collection and analysis to identify source waters potentially at risk for PFAS. MDE collected geospatial information for over 2000 potential sources of PFAS through the state, including fire training areas, fire stations, military installations, and brownfields. The proximity of these potential sources of contamination to drinking water source protection areas was assessed . This information was used to develop a relative risk ranking system. Relative risk has been defined as a combination of the estimated degree of threat (i.e. PFAS source type and proximity to drinking water sources), vulnerability (i.e. source waters from surface water or groundwater in unconfined or semi-confined aquifers) and the frequency at which a system's customers receive their drinking water (i.e. customers receiving water from the same CWS every day). Ms. Warns noted that the database of potential contamination sources is not complete, and MDE is unable to confirm PFAS current or historical use at these sites.

Upon completing the relative risk rankings, MDE prioritized its first round of sampling. Phase 1 considered drinking water from groundwater sources in unconfined and semi-confined aquifers or surface waters as having potentially higher relative risk than drinking water sources withdrawing from confined aquifers. Phase 1 also prioritized community water systems (CWS) due to concerns about human health effects from chronic exposure to the compounds, if present in drinking water. The sampling schedule was consolidated around water treatment plants (WTPs) and yielded 129 CWS-WTPs to be sample alongside 11 reference CWS-WTPs. Reference sites were located in HUC12 watersheds with at least 75% forested cover with no potential PFAS sources in close proximity to their source water protection areas. Phase 1 focused on collecting finished water samples first. MDE coordinated with the Maryland Department of Health Laboratories Administration for analysis using EPA Method 537.1. Project-specific

action levels for total PFOA and PFOS were set to determine whether additional sampling or remedial work would be required.

Phase 1 was completed in February 2021, and the report is due to be completed in June 2021. PFAS were not detected at any of the 11 reference CWS WTPs but were detected intermittently throughout the investigative sites at about 90% of the WTPs that were sampled. Only two CWS WTPs—one treating water for the City of Westminster and one serving the Town of Hampstead—had levels of PFOA + PFOS exceeding EPA's Health Advisory Level. In those cases, MDE coordinated with the CWS to shut down the affected WTPs, release Tier 2 public notifications, and conduct follow up sampling. Ms. Warns noted that MDE sampled from seven WTPs treating water from the mainstem of the Potomac and found that finished water concentrations of Total PFOA + PFOS typically remained below 10 ppt. PFAS in Maryland seems to be primarily a groundwater/legacy contamination concern, but more investigation is needed to support this.

The current Phase 2 study uses the same general approach but expands the PFAS search radius from 1000 ft to 1 mile and considers raw water sources instead of finished water samples. The Phase 2 focus continues to remain on groundwater from semi-confined or unconfined aquifers. MDE has identified 167 sources in 65 CWSs for Phase 2 sampling.

MDE's previous commitments to understanding, managing, and communicating the occurrence of PFAS throughout the State include:

- St. Mary's Pilot Study – an approach to measuring PFAS in surface water and oyster tissue was developed
- Fish tissue monitoring – integration of PFAS analysis into MDE's existing 5-year fish tissue plan
- MDE-UMCES PFAS Roundtable- cohosted with the University of Maryland Center for Environmental Sciences (UMCES) to discuss state of PFAS science, current data gaps, and solicit recommendations from PFAS experts
- PFAS spill response protocol
- Increased web presence through publication of reports
- Legislative efforts, for example the 10/1/2021 ban on the use of PFAS foams for training and testing

Future MDE work is planned to include:

- Continued sampling of drinking water sources (Phases 2 and 3)
- Adjusting fish tissue sampling stations to be more reflective of potential sources of PFAS
- Multi-phased WWTP study to understand the occurrence of PFAS throughout the wastewater treatment process
- Developing water quality criteria for PFOA and PFOS (preliminary)
- Developing outreach documents for firefighters
- Formation of Chesapeake Bay States PFAS Workgroup

Regulatory Status Updates on Per- and Polyfluoroalkyl Substances (PFAS) in Virginia Drinking Water
Dr. Tony Singh, Virginia Department of Health (presentation)

During UCMR3 sampling in Virginia, there were two systems that reported PFAS concentrations above the reporting limit. Most effort in Virginia stems from two pieces of legislation passed in late 2020. House Bill 586 required the State Health Commissioner to convene a PFAS workgroup, conduct a literature review, survey of other states' actions, conduct a PFAS occurrence survey at not more than 50 waterworks and source waters, and potentially recommend maximum contaminant level (MCL) guidelines. House Bill 1257 requires VDH to develop MCLs for PFOA, PFOS, and other PFAS compounds, in addition to 1,4-dioxane and chromium (VI). Reports for both pieces of legislation are due in October 2021 and December 2021, but no funding was associated with the mandates.

The six analytes in House Bill 586 include PFOA, PFOS, PFBA, PFHpA, PFHxS, and PFNA. Due to schedule and budget limitations, the scope of the Virginia study is limited to source water and drinking water. The VDH Office of Drinking Water (ODW) solicited workgroup members from the Waterworks Advisory Committee (WAC), VA Water/Wastewater Agency Response Network (VA WARN), and other VDH contacts. The resulting workgroup is geographically diverse and includes VA DEQ, PWS representatives, PFAS manufacturers, advocacy groups, subject matter experts, and the general public. Subgroups meet monthly and are dedicated to:

- PFAS Health & Toxicology
- PFAS Occurrence & Monitoring
- PFAS Policy & Regulatory
- PFAS Treatment Technologies

The VA Sampling Study Design is based on available funding, maximizing public health risk reduction, and proximity to potential PFAS contamination. The strategy for selecting sites included GIS analysis to select sites from:

- Group 1: 17 large waterworks serving 4.5 million citizens
- Group 2: 11 high-risk groundwater systems impacted by known or suspected PFAS contamination from sources such as landfills, airports, firefighting foam, and military facilities
- Group 3: 22 source water intakes that are not in Group 1 but are potentially affected by upstream POTW or VPDES discharges

The sampling procedure will require waterworks personnel to collect PFAS samples from entry points to the distribution system, consecutive connections, and intake (raw water sample taps). EPA Method 533 will be used to monitor for 25 analytes. Entry point and groundwater system sampling are slated for Phase 1, while Phase II will focus on source water sampling. VDH is also developing information sharing and communication toolkits. Results will be maintained in a searchable database, but will not be available in SDWIS. ODW expects to have results in June 2021. Reports are due to the VA General Assembly on October 1, 2021.

Agricultural Issues
Pam Kenel, Loudoun Water

The Agricultural Issues workgroup has been working to leverage funds available for watershed protection through the 2018 Farm Bill. Activities included:

- Participated in NRCS State Technical Committee (STC) meetings and Source Water Protection subcommittee meetings in Maryland and Virginia
- Collaborated with NRCS, MDE, and other organizations to move forward on the Frederick and Carroll Counties selection for the NWQI Planning/Readiness Phase funding to prepare updated watershed assessments.
    - ICPRB will prepare watershed assessments needed to advance to the Implementation Phase.
- Participated with EPA, VDH, and NRCS in setting VA priority watersheds for Farm Bill funding
- Initiated meetings with land conservation groups in WV and VA to make the link between the DWSPP land prioritization tool and NRCS needs.

Contaminants of Emerging Concern
Martin Chandler, WSSC Water

Workgroup members have been monitoring the following:

- UCMR4 – EPA recently provided a quarterly update of results in April. Most of the PWSs in the basin have some or all data posted to date. There have been frequent detections of HAAs in the distribution systems and manganese in the entry point samples. No cyanotoxins have been detected in the Potomac PWS to date.

- Microplastics – The workgroup has formed a subcommittee focused on microplastics. The subcommittee has met twice in the past month to formulate a strategic plan. The subcommittee is interested in the studying the non-tidal Potomac and occurrence in drinking water. One idea is to partner with research universities and an extensive outreach effort has already begun. The subcommittee is also planning a microplastics-focused webinar and survey of the DWSPP membership.

- PFAS – It is hoped that another subcommittee will be formed to focus on PFAS, including tracking on State sampling projects.

Reaching Out
Lisa Ragain, MWCOG

C. Davis provided the update on behalf of L. Ragain. The workgroup completed the 2020 Annual Report which is available on the DWSPP websites. The workgroup is considering a campaign to promote the DWSPP Land Prioritization Project and is seeking new members.

Water Quality
Niffy Saji, Fairfax Water

N. Saji provided an overview of workgroup activities, including:

- Collecting monitoring data to create a map of locations for salt (sodium, chloride, and surrogates) in the Potomac watershed. The workgroup has also been working to update the HAB monitoring location map and look into SAV monitoring.
- Updating the DWSPP spill response plan, including the communication protocols and lab capabilities. The workgroup is also working to establish protocols for sub-groups, for example, a group focused on the Occoquan.
- In coordination with the Early Warning & Emergency Response workgroup, plan a spills listserv communication exercise.

Land Prioritization
Mike Nardolilli, ICPRB

M. Nardolilli acknowledged and thanked the water suppliers for their part in providing financial and technical support for their land prioritization project. The project has been adopted by the ICPRB as part of its land conservation policy.

In order to begin the implementation process, the ad hoc workgroup was formed and met with 19 participants on March 19, 2021. The workgroup agreed on an objective statement and identified action items:

- Develop a memorandum of understanding (MOU) between ICPRB and the Potomac Conservancy.
- Arrange to transfer the geodatabase fill to interested end users.
- Seek to discuss the project with basin stakeholders.

Since that time, the group has been active on all of those fronts. C. Davis gave a presentation at the EPA Region 3 Source Water Leadership Forum. In April 2021, ICPRB coordinated with the Potomac Conservancy and supplied maps of prioritized parcels of interest to the Potomac Conservancy. M. Nardolilli will continue to work with the Potomac Conservancy to develop an MOU.

Urban and Industrial Issues
Greg Prelewicz, Fairfax Water

On March 24, the workgroup held a meeting to discuss Virginia's Water Quality Standards (WQS) Triennial Review. Fairfax Water submitted comments requesting a sodium WQS for freshwaters designated for public water supply and a PFAS WQS for public water supplies. G. Prelewicz also informed the workgroup that the Arlington County, VA NPDES MS4 renewal includes information on the County's salt strategy. Furthermore, EPA provided Advanced Notice of Proposed Rulemaking (ANPR) for effluent guidelines for PFAS manufacturers and formulators. Comments on the ANPR are due on May 17, 2021.

At the quarter's second workgroup meeting (April 29, 2021), the workgroup reviewed the Ox Paperboard (WV) NPDES permit renewal. The facility discharges to Flowing Springs Run, a tributary of the

Shenandoah River near Harpers Ferry, WV. The facility produces 100% uncoated paper from recycled paperboard. Upon review, the workgroup agreed to track the permit for future renewals for any changes based on expanded flows, use of paper coatings, and updates to future water quality regulations. The MDE-Verso settlement was also discussed at this meeting.

Early Warning & Emergency Response
Joel Thompson, Fairfax Water

The workgroup discussed the three multi-parameter sondes purchased with UASI grants. Upon arrival at Fairfax Water, Leesburg and the USGS picked up equipment for installation. The USGS will install one at an existing Point of Rocks station and the other at the confluence of the Monocacy and the Potomac. Once these are operating, the data will be available on the USGS website. The question of how to leverage this data for early warning is not yet resolved.

J. Thompson is trying to contact a local oil spill response organization (OSRO) to discuss booming strategies with the workgroup.

The workgroup is continuing to work to keep the lab capability parameter alarming updated. C. Davis has contacted the Susquehanna River Basin Commission regarding their early warning network.

Other Updates

Administrative Updates
Christy Davis, ICPRB

C. Davis recognized DWSPP members that have retired or will be retiring between August 2020 and June 2021: Pat Bowling (PA DEP), John Grace (MDE), Scott Powers (Fairfax Water), and Steve Edgemon (Fairfax Water).

A PFAS sampling training presentation developed by EPA Region 3 was made available for download in the webinar handouts. Additionally, C. Davis highlighted an EPA report and upcoming webinar on *Releases to Sources of Drinking Water: National Occurrence and Resources to Identify Risks*.