

# **2018 Progress Report**

## **Watershed Approach to Toxics Assessment and Restoration (WATAR) Program**

### **Delaware Department of Natural Resources and Environmental Control (DNREC)**

**April 29, 2019**

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**Introduction:** The Watershed Approach to Toxics Assessment and Restoration (WATAR) was conceived by DNREC in 2012 with the intention of building a bridge between the surface water toxics program and the site investigation and restoration program in Delaware. The focus of the WATAR program is surface waters, sediments, fish and other aquatic life impacted by toxics, the health of fish and shellfish consumers, and the link to the sources/sites responsible for those impacts. The concept was officially endorsed by DNREC leadership in the fall of 2012 following a series of briefings and the completion of a 5-year work plan. Data and information collected in conjunction with this plan will be used to document progress toward implementing Total Maximum Daily Loads (TMDLs) for PCBs in the Delaware Estuary and its tributaries. The data and information collected will also be used to identify other contaminants that may need TMDLs or other clean up actions in order to restore water quality.

The second WATAR 5-year work plan (2018-2022) identifies nineteen (19) specific activities for 2018. Those 19 activities are listed below with a status report on each. In addition to the 19 items, there were numerous additional activities that arose during 2018 in which the WATAR team became involved. Those activities are also listed and discussed in this progress report.

Of note during this reporting period, on April 1, 2018, Dr. Richard Greene retired from the State of Delaware's DNREC. Dr. Greene managed many aspects of the WATAR program, and his depth of knowledge about Delaware's surface waters and Delaware's fish advisory program will be missed. To date, and due to hiring restrictions, Dr. Greene's position within the Watershed Assessment and Management Section of DNREC has not been filled. Until such time that the position is filled and the incumbent is "brought up to speed" on WATAR related issues and projects, there may be a slight lag in completion of some planned activities. This is not to say that the items won't be addressed; only that

some lower priority items will be pushed further down the 5-year schedule of planned activities. WATAR Annual Reports, including this report, will serve to document items that have been put on hold, or cancelled altogether, with accompanying rationale and schedule adjustment.

**1. Begin data compilation and summary for 2013 – 2017 WATAR sampling**

**Status: On Hold**

**Discussion:** Due to the retirement of key personnel in early 2018, and redistribution of tasks outlined in the WATAR workplan, this action item has not been completed. However, when time and personnel allow, this action will result in the summarizing of sampling performed during the first five years of the WATAR program at the results that were drawn from the data collected. It is anticipated that results will be presented by watershed, analyte and media. The results from the 2013 – 2017 period will also be compared to readily available data collected prior to 2013 with fish consumption advisories as the indicator, so that trends can be assessed. Areas of concern (AOCs) will be noted along with known or suspected sources and sites. Please note that extensive data evaluation occurred during each of the first five years, and actions were taken, as necessary, to address pressing issues.

**2. Provide data supporting listings and de-listings for toxics for the 2018 Clean Water Act 303(d) List**

**Status: Completed**

**Discussion:** Toxic chemicals remaining on Delaware’s 303(d) list are largely associated with contaminants in fish tissue. The WATAR team has placed these contaminants into 1 of 3 categories based on a comprehensive review of current and historic data. The three categories are i) the contaminant has dropped below a level of concern in the fish and can be delisted; ii) contaminant shows long-term downward trend and is expected to drop below the level of concern within the next 5 - 10 years; or iii) contaminant remains elevated and is not expected to drop below a level of concern in the next 5 - 10 years. Contaminants in the second category will be monitored to verify continued improvement and their drop below a level of concern. These contaminants/stream segments will not likely need a TMDL or any other specific action as they are already on a trajectory of being eliminated as a concern in the near-term. A TMDL provides little value for these cases and actually draws limited resources away from more severe cases within the third category. Contaminants in the third category will be retained for possible TMDL development or other priority regulatory action(s) that would be expected to result in the contaminant dropping below a level of concern.

Results of this assessment are summarized in An Evaluation of Clean Water Act Section 303(d) Listings of Delaware Waters Affected by Fish Consumption Advisories, Delaware DNREC, March 1, 2018.

**3. Re-evaluate SOPs for WATAR Sampling (sediment, surface water, fish)**

**Status: On Hold**

**Discussion:** Current SOPs are relevant and adequate for the sampling that was conducted in 2018. The WATAR Team will move this action item to 2019, and update the SOPs prior to any planned sampling activities during the calendar year.

**4. Little Mill Creek/Meco Ditch post-remediation sampling**

**Status: Postponed**

**Discussion:** The Little Mill Creek Flood Risk Mitigation Project was completed in the summer of 2015. This project, spearheaded by the US Army Corps of Engineers (USACE), the New Castle

Conservation District (NCCD), DNREC, and New Castle County, commenced in 2014. The project involved excavation and removal of bank soils and creek sediments to increase hydraulic storage capacity and decrease flooding of nearby properties. In 2017, DNREC completed a sampling and analysis report detailing the expedited sampling methodology, risk-based approach to analysis of the data obtained and the final disposition of the bank-side soil that was excavated to complete the flood risk mitigation project in LMC. The project partners responded to unanticipated contaminant conditions using methods employed by the WATAR team. The WATAR team drafted a sampling and analysis plan (SAP) to assess changes in Meco Ditch and Little Mill Creek following completion of the construction phase of the Little Mill Creek Flood Mitigation Project and Meco Ditch Remediation Project. The team did not complete the first round of monitoring in 2017 due to inclement weather and extreme temperatures. Following this time frame of inclement weather and extreme temperatures, the team discovered an ongoing release of petroleum from one of the storm-water pipes that flows to Little Mill Creek. The corrugated steel pipe had mailed between the storm grate and the discharge due to the pipe sitting in free-phase petroleum. Free phase petroleum is associated with the historic filling on several industrial park areas surrounding Little Mill Creek. DNREC- SIRS has initiated an investigation to determine volumes of soil for disposal surrounding the pipe with the goal of replacement and remediation to stop the flow of petroleum to Little Mill Creek. Following the successful completion of the pipe project, DNREC will initial the first round of remediation complete monitoring.

**5. Fort DuPont post-remediation sampling;**

**Status: Ongoing**

**Discussion:** USEPA and DNREC – WATAR coordinated on an emergency removal action along the shore of the Delaware River at Fort DuPont. The removal would excavate a portion of a landfill that was eroding into the river, and pieces of lead, other waste, and contaminated sediments were exposed at the surface. In 2013, the EPA began a time critical removal action of the debris and contaminated sediments along the river. DNREC chose at that time to proactively place a permeable reactive barrier (i.e. a trench of apatite-fish bones) to capture metals dissolved in the shallow upgradient groundwater prior to discharging to the river. A series of monitoring wells were installed on either side of the apatite trench to monitor the results not only of the removal action but also to determine if the apatite II was an effective barrier to lead leaching into the Delaware River. This first round of groundwater monitoring was completed in late 2018 with data currently under evaluation.

**6. Red Clay Creek zinc TMDL/NVF Yorklyn post-remediation sampling**

**Status: Ongoing**

**Discussion:** During the summer/fall of 2017, DNREC-SIRS completed a comprehensive source removal action at the NVF-Yorklyn site that resulted in the removal and disposal of approximately 170 tons of zinc from the soil matrix. This soil source served as an ongoing groundwater source, which for almost a decade was captured to remove dissolved zinc prior to reaching the Red Clay Creek. In December 2017, and as part of the post remediation monitoring, the zinc groundwater treatment system was taken offline. The Red Clay Creek was monitored monthly through 2018 to evaluate the effectiveness of source removal on loading of dissolved zinc through groundwater discharge. Since the source removal, DNREC has documented zero exceedances of the Delaware

surface water quality criterion for dissolved zinc, and only two exceedances of the waste load allocation assigned in the Red Clay Creek Zink TMDL (both of which were sampled during higher flow events with higher total suspended solids). As such, and as time allows, DNREC will formally document the monitoring results and will take the necessary steps to delist zinc as a contaminant of concern in the Red Clay Creek in Delaware.

**7. Red Clay Creek per- and polyfluorinated substances (PFAS) investigation**

**Status: Ongoing**

**Discussion:** The WATAR team initiated several rounds of sampling for per and poly-fluorinated substances (PFAS) in Red Clay Creek in New Castle County. Following multiple detections and models concerning potential source areas, the team conducted detailed surface water sampling in the lower Red Clay Creek below Kirkwood Highway (Route 2). The multiple lines of evidence included sample detections from a private water purveyor from the Unregulated Contaminant Monitoring Rule Phase 3 (UCMR3), groundwater detections from a site regulated under the Resource Conservation Recovery Act (RCRA) as administered by the DNREC Solid and Hazardous Waste Management Section Corrective Action group along with both dry and wet weather surface water sampling events. PFOA and PFOS are both listed as Hazardous Substances in Delaware through the Hazardous Substance Cleanup Act and therefore can be the only contaminants detected at a source therefore creating a new site. At this time, DNREC has combined the data collected via UCMR3 and subsequent monitoring of surface water, the DNREC dry and wet weather trackback sampling along with SHWMS site and creek sampling data to determine a series of properties that are the potential source of PFAS to the Red Clay Creek. The ambient signature of PFAS detected using EPA Method 537M created a challenge in determining the potential source areas with the greatest concentrations but employing the WATAR trackback methods DNREC has focused their investigation and has sent several request for information letters.

**8. Finalize Cleanup Plan for the Amtrak Wilmington Former Fueling Facility (including sediments within the Eastern Drainage Ditch);**

**Status: Ongoing**

**Discussion:** A Proposed Plan of Remedial Action (PPRA) has been drafted by DNREC for the Amtrak Former Fueling Facility site based upon many years of data collection and analysis, and based upon a remedial plan presented to DNREC and USEPA by Amtrak and their consultants. However, the upland soil portion of the comprehensive remedial proposal is under the jurisdiction of the USEPA R3 Toxic Substance Control Act (TSCA) program due to elevated PCB concentrations in soil at the site. TSCA personnel are actively working on their review and evaluation of the proposed remedial action. It is anticipated that an agreement will be reached soon and that the PPRA will be issued for public comment during the summer of 2019.

**9. Finalize Cleanup Plans for remaining CitiSteel (former EVRAZ-Claymont Steel) Operable Units, and remedial design plans for closure of PCB impacted cooling water pond (Operable Unit #4);**

**Status: Complete**

**Discussion:** As of December 2018, Final Plans of Remedial Action were in place for each of the seven (7) Operable Units associated with the 420-acre former steel mill. In addition, DNREC has approved Phase I of the remedial action plan to permanently close the 12-acre process cooling water pond associated with former steel production activities. PCBs and metals are the primary

contaminants of concern at the site. Remediation will nearly eliminate any PCB loading from the site to the Delaware River.

**10. Second Year of Chesapeake Drainage Toxics Sampling (includes, among other items, analysis of sediment core slices and analysis of fish samples from selected public ponds);**

**Status: Complete**

**Discussion:** The EPA Chesapeake Bay Program is placing greater emphasis on characterizing and mitigating the effect of toxic chemicals in waters of the Chesapeake Bay, including tributary watersheds. To that end, the DNREC-WATAR team developed a multi-year plan to assess and address toxics in the portion of Delaware that flows to the Chesapeake Bay. Preliminary planning was conducted in 2016, field reconnaissance was conducted in early-mid 2017, a compilation of existing toxics data was completed in June 2017, development of a QAPP was completed in July 2017, collection of year 1 samples was completed in November 2017, and collection of year 2 samples was completed in October 2018.

Between October 23, 2018 and October 29, 2018, all samples specified for collection during year 2 in the QAPP were done so successfully, including sediment, surface water, and fish tissue from select locations. Personnel from four separate DNREC Divisions were involved in the effort: the Division of Watershed Stewardship (DWS); the Division of Waste and Hazardous Substances (DWHS); the Division of Water (DW); the Division of Fish and Wildlife (DFW). All samples were submitted to various specialty laboratories for analysis, including WATAR's usual targets of PCBs, DxF, OC pesticides, PAHs and metals in water, sediment and fish (2017). Since much of the area that flows into the Chesapeake is dominated by agriculture, the WATAR Team expanded the target list of analytes to include contemporary herbicides, insecticides and some other ag-related compounds in 2018.

Following receipt of all remaining data, detailed assessments will be performed, including: i) an assessment of current conditions; ii) an assessment of long-term trends (as data permit); iii) a determination whether fish consumption advisories may be needed; iv) identification of areas of concern with regard to contaminants in sediments; and v) identification of linkages between upland sources and in-stream impacts.

- **Sediment Coring Study from the Tidal Nanticoke River:** As part of the 2017 WATAR-Chesapeake Drainage Sampling, DNREC contracted its partners at the University of Delaware to collect and radiodate sediment cores at two strategic locations in the Nanticoke River (one at the DE/MD state line and another near Seaford). The objective was to establish the relationship between sediment depth and age and to characterize the associated pollution history of the Nanticoke River over a period from approximately WWII until present. By the end of 2017, the sediment cores had been collected; the cores had been sectioned into 2-centimeter intervals; subsamples for contaminant analyses had been collected/archived; and preliminary radiodating had been performed. Based on the final results of the radiodating (which were submitted to DNREC in late Summer 2018), DNREC shipped archived samples to its contract laboratory for contaminant analyses, including PCBs, DxF, PAHs, and MRES with ON pesticides.

Summary results of the coring study will be incorporated into the final report referenced above, and will include a review of major contaminant trends through time for the area of the

Nanticoke River around Seaford, Delaware and for the area of the Nanticoke River in proximity to the Delaware/Maryland state line.

**11. Coordinate with Christina Conservancy on bathymetric, sedimentological and subsurface mapping survey of the tidal Christina and tidal Brandywine;**

**Status: Complete**

**Discussion:** Beginning in 2017, DNREC's WATAR Team coordinated with the Christina Conservancy to scope a high-resolution bathymetric survey of the lower Christina River and lower Brandywine Creek, where previous sampling of sediment, water and fish tissue has shown the most impact from chemical contaminants. A specific objective of the study was to create a comprehensive map of sedimentary environments with respect to bottom morphology and sediment type that can later be used as a baseline for development of a Feasibility Study of options to remediate contaminated sediments within the area of interest. The survey fieldwork was completed in late 2017, and data was presented in April 2018. Core samples were collected in early 2018 to ground truth geophysical data, and duplicate cores were shared with DNREC for contaminant analysis. Upon release to the Christina Conservancy, the survey data was loaded into the NOAA ERMA database for viewing. DNREC is currently working with NOAA to overlay fish, sediment and water data collected in the same general area.

**12. Coordinate with the City of Wilmington on the A Street Ditch and South Wilmington Wetlands site remediation.**

**Status: Ongoing**

**Discussion:** The City of Wilmington was finalizing all preliminary planning, including all necessary actions required by DNREC-SIRS for contaminated properties associated with the project, at the end of 2018. These actions include the requirement to remove PCB contaminated sediments from the A Street Ditch for disposal at a permitted facility. It is anticipated that the fully designed wetland remediation project will be out for public bid in early 2019, and that construction will begin on the project during the summer of 2019. The DNREC-SIRS project oversight manager is also a WATAR Team member.

**13. Obtain funding and start planning stages of A-Street Mouth/Christina River Pilot Study (Sedimite™ with inoculant);**

**Status: Completed**

**Discussion:** Funding for the innovative PCB destroying technology was awarded by DNREC-SIRS in June 2018. The workplan for site work was received by DNREC's WATAR Team in December 2018. Prior to remedial action, baseline sampling of sediments using traditional techniques and more innovative passive sampling techniques (time integrated) has been scheduled for early 2019. Construction/implementation will be coordinated with other activities associated with the South Wilmington Wetland Project in the summer of 2019.

**14. Coordinate with EPA on Saint Jones River sediment assessment and potential remediation (associated with former Dover Gas Light site);**

**Status: Waiting for Correspondence from USEPA**

**Discussion:** DNREC personnel met with USEPA's Environmental Response Team (ERT) and R3 personnel in May 2018 to discuss findings from their independent assessment of PAHs in sediments of the Saint Jones River in the area of interest. At that meeting, DNREC identified a potential

mathematical error in USEPA's evaluation, which was later confirmed, and which changed the overall evaluation results and potential steps forward. DNREC has not yet received a final report with recommended actions from USEPA R3 personnel, but has requested an update ASAP.

**15. Coordinate with the DRBC and USEPA on Stage 2 PCB TMDL for Delaware Estuary;**

**Status: Ongoing**

**Discussion:** The last meeting related to the Stage 2 PCB TMDL for the Delaware Estuary was held at DRBC on August 1, 2018. At that time, presentations were given regarding NPDES program implementation of the TMDL. Further, States raised a concern at that meeting that there was no implementation strategies for MS4 or waste site loads within the draft document. To date, no other meetings related to the Stage 2 PCB TMDL have occurred with State Co-Regulators. DNREC will continue its coordination with DRBC and neighboring states to finalize the Stage 2 TMDL.

**16. Provide technical assistance to the City of Wilmington and New Castle County Special Serves on the City of Wilmington's PCB trackback monitoring and implementation, and coordinate with DRBC;**

**Status: Ongoing**

**Discussion:** In an ongoing fashion, the WATAR team has worked with the City of Wilmington and New Castle County as well as the DRBC to better understand, isolate and control sources of PCBs in the City and County's sewer system, which flows to the City's 100 MGD regional wastewater treatment plant. Discharge from the plant, in turn, discharges to the Delaware River. Through source identification studies and subsequent remedial actions, the City of Wilmington has achieved an approximate 90% reduction of PCB loading from their wastewater treatment plant effluent over the 10-year period 2005 – 2015. The ongoing trackback program has also identified that legacy solids within the sewer system are a substantial secondary source of PCBs to water within the system. Driven by results of trackback studies, targeted removal of these secondary sources to eliminate the load from the sewershed are occurring. The City and County continue to plan and execute trackback studies and corrective actions per their NPDES permits. The WATAR Team continues to offer technical assistance, as necessary, and reviews annual pollution minimization reports when submitted to DNREC and DRBC.

**17. Provide technical assistance to New Castle County Special Services and DelDOT on their MS4 PCB PMP trackback and implementation, and coordinate with the DRBC.**

**Status: Ongoing**

**Discussion:** The WATAR team has previously worked with New Castle County Special Services and the Delaware Department of Transportation in the design and implementation of a sampling plan for analysis of PCBs in regulated stormwater discharges. This work was purposefully designed to complement sampling of receiving waters performed by the WATAR team within watersheds known to be impacted by PCBs. Results of the sampling events are reported to DNREC and DRBC as required by their MS4 permits. In 2018, the WATAR team continued its efforts to improve source tracking of PCBs to the Delaware River by assisting DNREC's MS4 group with updates to permit language that mimics that which is already being incorporated into NPDES permits that requires trackback studies and corrective actions to mitigate larger stormwater PCB loads in impacted waterways. This work is ongoing, and will be coordinated with USEPA and DRBC, as necessary.

**18. Tech Transfer: DNREC Leadership & staff, DNERR, USEPA, ASTSWMO, ITRC, DENIN, etc;**

**Status:** Ongoing

**Discussion:** An original goal of the WATAR program was to communicate and partner with others within and outside of DNREC to raise awareness and identify synergies leading to accelerated improvement of water quality in Delaware. Due to its success, the WATAR team continues to accomplish that goal by making presentations at local, regional and national meetings; preparing videos highlighting various projects; and preparing annual reports describing work accomplished. The WATAR approach has been noticed and sought out by government agencies at all levels; non-governmental organizations (NGOs) such as the Partnership for the Delaware Estuary, the Delaware Nature Society, the William Penn Foundation, the Christina Conservancy, and the Center for the Inland Bays; academia and the private sector. Specific presentations given in 2018 are listed below. In addition, but more difficult to document, the WATAR team gathers on a regular basis to provide insight from lessons learned on projects amongst technical peers as well as newly hired staff within DNREC. These meetings are part of the technical and policy mentoring that the WATAR team has implemented through its overall plan.

**19. Progress Report**

**Status:** Completed

**Discussion:** This document represents the Progress Report for 2018.

**Ongoing/Unfinished Work from Previous Years**

- **Continue data compilation**

**Status:** Ongoing

**Discussion:** As of December 31, 2018, all WATAR data reported during calendar year 2017 was successfully entered into the EQUiS database. Additional data from samples collected from Delaware's Chesapeake Basin drainages at the end of 2018 will be entered into the EQUiS database as it is received. Further, data collected at other sites where the high-resolution WATAR sampling approach was followed have been imported into EQUiS as part of the overall data compilation effort.

- **HSCA Sediment Guidance**

**Status:** Not completed/On hold

**Discussion:** An overarching framework/technical guidance document for assessing contaminated sediments has not been completed. However, an initial outline of the document was completed in 2015/2016. Furthermore, the WATAR team has documented several of its sediment quality screening assessment procedures and data evaluation methods based on previous site-specific assessments. That documentation will eventually become part of a guidance document. Due to personnel changes and competing priorities in 2018, work towards sediment guidance development has been put on hold; however, the WATAR team intends to increase attention to this task moving forward, and as personnel time and project schedules allow.

- **Roll out pilot web-based mapping utility**

**Status:** Not completed

**Discussion:** As indicated in the WATAR 2015 and 2016 Summary Report, evaluation of a web-based mapping utility by the WATAR team between 2014 and 2015 resulted in the conclusion that it would be best to wait until we have a more substantial data set to justify the cost associated with third



party utility development. However, just recently, the EQUIs Enterprise utility was configured to allow some basic data mapping, by location and concentration, to occur. DNREC is continually working to expand data import/export capabilities utilizing the software that is already owned by the Department. As work continues to progress with the EQUIs database, a re-evaluation and cost/benefit analysis will be completed for a comprehensive and user-friendly third party web-based mapping utility. In the interim, DNREC is conducting a pilot of data sharing and mapping with the USDOC National Oceanographic and Atmospheric Administration (NOAA) through their Environmental Response Management Application (ERMA) platform. Currently, development of an output from DNREC's EQUIs database to the ERMA platform is underway between NOAA, USEPA R2 and DNREC.

**Other significant activities of the WATAR Team during 2018 are presented below.**

- **Former Dupont Edgemoor dredging data review** – The former Dupont Edgemoor facility in northern New Castle County Delaware was operated as a titanium dioxide manufacturing facility from approximately 1930 until 2015. In 2016, Diamond State Port Corporation, who plans to develop the site into a containerized cargo port, purchased the facility. In order for ships to be able to approach from the main channel of the Delaware River and dock at the site, approximately 3.7 million cubic yards of sediment will need to be removed and a new docking structure constructed. DNREC's WATAR Team has been engaged by the environmental consultant on the project to provide comments to their evaluation of sediments for dredging and storage in a confined disposal facility. The WATAR Team provided initial comments on the draft evaluation of chemical contaminants in sediment in September 2018, and will continue to provide technical support to the permitting groups in DNREC as the project progresses.
- **Calculation of Delaware Specific Bioaccumulation Factors for Delaware:** In 2016, the WATAR Team reported that Delaware specific BAFs may be much lower than some of the BAFs used by USEPA to derive national recommended human health water quality criteria (specifically for B[a]P). This evaluation was based upon Delaware's unique set of WATAR data. Based on the strength of the analysis, EPA has agreed to consider a Delaware proposal to adopt Delaware-specific human health criteria using Delaware-specific BAFs. Compilation of data necessary to complete BAF calculations from Delaware's robust data set was partially completed in 2017, and was ongoing through 2018. It is anticipated that Delaware's comprehensive evaluation of State-specific BAFs, and possibly BSAFs will be completed in 2019.
- **Dam Removal Sediment Evaluations:** In late 2018, DNREC's WATAR Team was contacted by representatives from Delaware Senator Chris Coons' office and a representative from the University of Delaware to discuss the removal of dams in the Brandywine Creek and the potential impacts from contaminated sediments that reside behind them. Since that time, a group called Brandywine Shad 2020 has successfully obtained a National Fish and Wildlife grant to evaluate removal of the dams. The WATAR Team will remain engaged with this group as plans are carried forward, and will provide technical assistance for the characterization and disposition of trapped sediments prior to any dam removal activities.
- **Interface between WATAR Team and Delaware's Toxics in Biota Committee (Fish Advisories):** The WATAR team, in accordance with its 5-year plans, collect fish tissue samples from 303(d) toxics-listed Delaware watersheds. The Delaware Toxics in Biota Committee reviews these data and makes recommendations to the Secretary of DNREC and the Secretary of the Department of Health and Social Services (DHSS) when new or revised fish consumption advisories may be needed. Based

on fish tissue data that the WATAR team collected in 2017 and 2018, fish consumption advisories for Delaware's Chesapeake drainages (C&D West watershed, Bohemia River watershed, Sassafrass River watershed, Chester River watershed, Choptank River watershed, Marshyhope Creek watershed, Nanticoke River watershed, Broad Creek watershed and Pokomoke River watershed) are not necessary. Additional sampling of fish tissue in the Saint Jones River, C&D Canal east, and Red Lion Creek will be conducted in 2019.

- **Amtrak West Yard:** The Amtrak West Yard site is located west of Wilmington in close proximity to Little Mill Creek and the Peterson Wildlife Area. Cleanup of this site is being overseen by DNREC-SIRS through its Voluntary Cleanup Program. Sampling of Little Mill Creek in anticipation of the Meco Drive ditch remediation and the Little Mill Creek flood risk mitigation project identified the Amtrak West Yards as a probable source of PCB loading to Little Mill Creek and the Christina River. These data along with data collected as part of a USACE project to restore wetlands on the site indicated significant levels of PCBs in site soils directly adjacent to the wetlands. Amtrak submitted a remedial investigation work plan that included all existing data points along with a plan to collect additional soil, sediment, and groundwater samples across the site. DNREC-SIRS approved the work plan at the end of 2016. The work to investigate and evaluate the site began in spring 2017 with the report pending in early 2019.

**WATAR Related Presentations:** Members of the WATAR team delivered the following presentations during 2018:

- Cargill IV, J.G., 2018. 2017 Chesapeake Drainage Sampling. Presentation given at Delaware DNREC Water Quality Roundtable Meeting, February 7, 2018.
- Cargill IV, J.G., 2018. An Integrated Approach to Revitalizing a Brownfield Site – Achieving Multiple Benefits Through Collaboration – NVF-Yorklyn, Delaware. Presentation given at Association of State Wetland Managers Annual State/Tribal/Federal Coordination Meeting, Silver Spring, MD, April 12, 2018.
- Cargill IV, J.G., 2018. WATAR – What Is It Good For? Presentation given at Delaware Nonpoint Source Advisory Committee Meeting, Lewes, Delaware, May 2, 2018.
- Cargill IV, J.G., 2018. WATAR – 5 Years of Progress. Webinar given to USEPA's Clean Water Act/Superfund Collaboration Team. May 15, 2018.
- Cargill IV, J.G. and Keyser, T.A. – NVF-Yorklyn. Field presentation given to American Association of State Geologists. June 7, 2018.
- Cargill IV, J.G. – Revising Fish Consumption Advisories One Step at a Time. Presentation given at Water Resources Association of the Delaware River Basin Annual Meeting, Bordentown, NJ, November 1, 2018.
- Cargill IV, J.G. and Keyser, T.A. – WATAR Activities in the Christina River Basin. Presentation given at Christina Basin Task Force Meeting, West Chester, PA, December 7, 2018.

**WATAR-Related Awards:** Members of the WATAR team received the following awards in 2018:

- USEPA PISCES Award – NVF Zinc Remediation and Wetland Creation – January 30, 2018
- Governor's Team Excellence Award Finalist – NVF-Yorklyn Project Team – May 7, 2018

**Peer Reviewed Publications:** There were no peer reviewed publications from WATAR Team members in 2018; however, a draft manuscript summarizing the Mirror Lake Remediation and Restoration Project

in Dover, Delaware was prepared by WATAR Team members and their project partners. It is anticipated that the manuscript will be published in 2019.

**Other Publications:**

- Greene, R.W., 2018. An Evaluation of Clean Water Act Section 303(d) Listings of Delaware Waters Affected by Fish Consumption Advisories, Delaware DNREC, March 1, 2018.

**National Organization Involvement:** WATAR team Members played key roles in advancing watershed scale assessment and management of contaminated sediments and fish exposure nationally in 2018:

- ITRC Contaminated Sediments Remediation Team. WATAR team member John Cargill served as co-Team Leader for the group beginning in 2011. Team activities ceased in 2018 after multiple years of web-based training events on the use of the comprehensive technical and regulatory guidance document.
- ASTM International Task Group for Developing a New Standard Guide for Sediment Corrective Action. WATAR team member John Cargill is a former facilitator for the Risk Evaluation Standard subgroup and a current “at large” team member. The standard will apply to the assessment/management and remediation of contaminated sediments. Work is ongoing, with an anticipated standard going to ballot through ASTM by mid-2019.
- Association of State and Territorial Solid Waste Management Officials (ASTSWMO) – WATAR team member Todd Keyser is a member of the ASTSWMO Sediments Focus Group. The focus of the team has been to foster collaboration, innovation and consistency amongst state agencies when determining regulation, policy and innovative approaches to contaminated sediment investigation, analysis and remediation. Team activities ceased in 2018.
- National Fish Exposure Workgroup. WATAR Team member John Cargill represented the State of Delaware at a Fish-Sediment Exposure Workshop that was developed and hosted by the US Army Corps of Engineers and the national Sediment Management Workgroup (SMWG). The meeting included government, academic, industry and consulting experts for the purpose of discussing the assessment of exposure to humans via the consumption of fish impacted with sediment-related contaminants. The workshop was held in May 2018 in Vicksburg, Mississippi.

**Local and Regional Workgroup Involvement:** WATAR team Members played participatory roles in advancing regional and local initiatives in 2018:

- Baltimore Region Toxics Workgroup
- DRBC Toxics Advisory Group
- DRBC Co-Regulators Committee
- Chesapeake Bay Program Toxic Contaminants Workgroup