

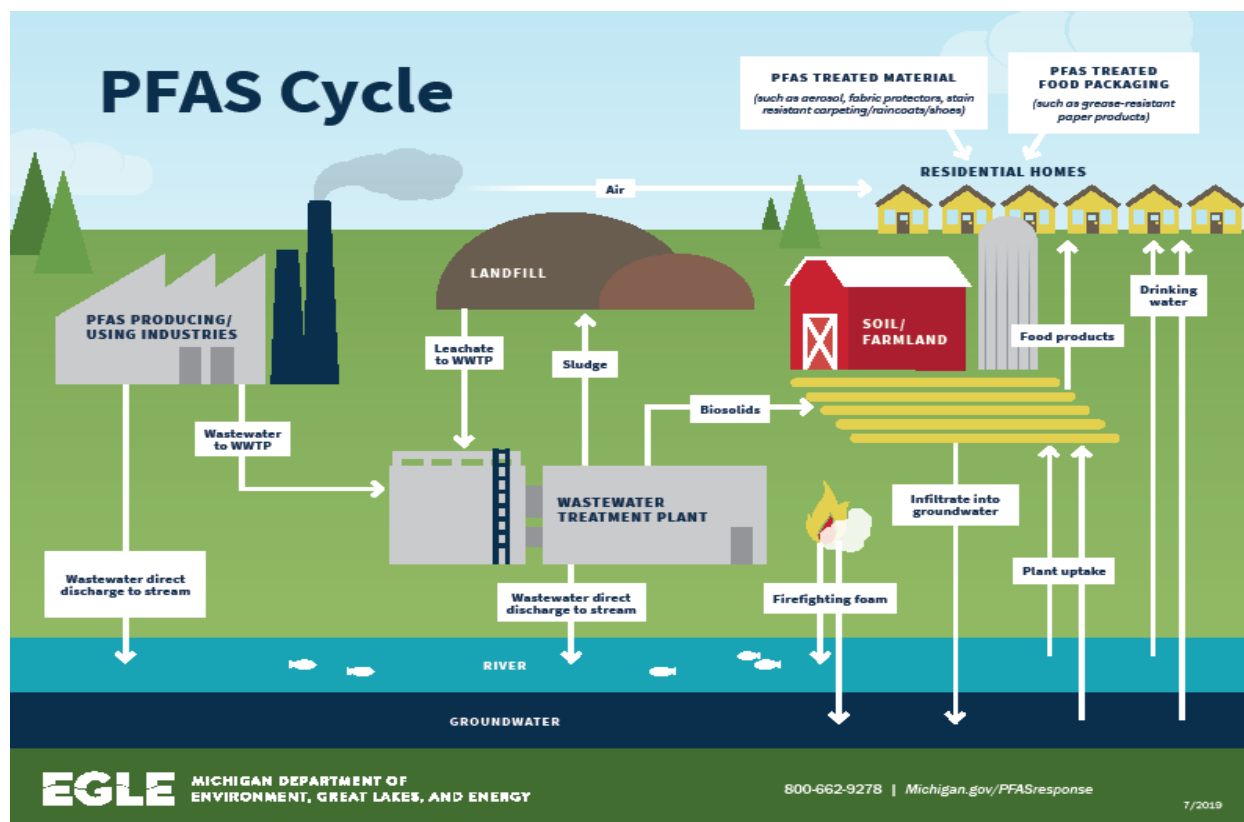
**Michigan PFAS Action Response
Team (MPART) Fiscal Year 2019
Accomplishments Report**

December 2019

MPART Executive Director's Forward

Michigan is recognized nationally for its leadership in identifying and reducing exposures to per- and polyfluoroalkyl substances (PFAS) contamination. That leadership stems from our unique, multiagency approach organized under the Michigan PFAS Action Response Team (MPART).

PFAS are a class of man-made compounds with a carbon-fluorine bond. This is one of the strongest bonds in chemistry, making PFAS compounds highly stable and heat resistant. PFAS compounds have been used for decades in consumer goods, industrial processing, and even firefighting foam. That resistance to breaking down and ubiquitous nature of their use means we see PFAS compounds constantly recycling through the global ecosystem.



The body of evidence identifying adverse health effects associated with PFAS, which is known to bioaccumulate in people and animals, is mounting. Our challenge is to understand the occurrence of PFAS throughout Michigan so we can work to prevent this exposure cycle and protect public health. This fiscal year-end report highlights what has been done to meet that challenge and respond under Governor Gretchen Whitmer's Executive Order 2019-03 directing MPART to formalize its mission within the Michigan Department of Environment, Great Lakes, and Energy and address PFAS contamination in a very deliberate and transparent way.

From investigations and response activities, to the development of drinking water standards to protect the public, MPART's data-driven and science-based approach has been widely acknowledged as the most advanced and comprehensive in the nation. This report outlines MPART's priorities for the coming year, established from what MPART has learned over the past years and governed by the science and data that underpin MPART's proactive and deliberate approach to PFAS contamination.

In closing, I extend my thanks to the many individuals who have supported MPART this year. This diverse and bipartisan group of stakeholders has included hardworking civil servants in several state and federal agencies, local health officials, leadership and residents of impacted communities, Michigan's Governor, and our state and federal legislators.



Steve Sliver, Executive Director
Michigan PFAS Action Response Team

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MPART Fiscal Year 2019 Accomplishments

Executive Summary

On February 4, 2019, Governor Gretchen Whitmer signed Executive Order 2019-03 that established the Michigan PFAS Action Response Team (MPART)¹ as an enduring body within the Michigan Department of Environment, Great Lakes, and Energy (EGLE). MPART was established to address the threat of per- and polyfluoroalkyl substances (PFAS) contamination in Michigan, protect public health, and ensure the safety of Michigan's land, air, and water, while facilitating interagency coordination, increasing transparency, and requiring clear standards to ensure accountability.

MPART consists of the following state departments:

- EGLE, formerly Michigan Department of Environmental Quality
- Michigan Department of Agriculture and Rural Development (MDARD)
- Michigan Department of Health and Human Services (MDHHS)
- Michigan Department of Military and Veterans Affairs (DMVA)
- Michigan Department of Natural Resources (MDNR)
- Michigan Department of Transportation (MDOT)
- Michigan Department of Licensing and Regulatory Affairs (LARA)

Charges to MPART

The Executive Order charged MPART with providing recommendations to the EGLE Director and the heads of other departments or agencies and coordinating activities among departments. Specific tasks required of MPART in the Executive Order are:

1. **Identify impacted locations and implement an action plan to assist state and local authorities to ensure the safety of Michigan's land, air, and water.**
In fiscal year 2019 EGLE identified 37 new sites that exceed the groundwater cleanup criteria of having one or more groundwater monitoring wells equal to or greater than 70 parts per trillion (ppt) PFOS + PFOA. These new sites affected 65 legislative districts throughout the state. Action plans were developed and implemented for all sites. As part of these actions:
 - 881 noncommunity public water supplies were tested, bringing the total number of public water supplies tested under MPART to approximately 2,500.
 - More than 4,000 residential wells were tested adjacent to known PFAS sources.
 - The MDHHS worked with local health departments to distribute alternate water, including 644 filters and replacement filters and 6,495 water coolers and replacement water jugs.
 - The MDHHS conducted an exposure assessment in Kent County involving 425 individuals.

¹ MPART was initially established under Executive Directive 2017-4 by former Governor Rick Snyder to ensure a comprehensive, cohesive, and timely response to the continued mitigation of PFAS across Michigan.

- The MDHHS continued to provide analysis of PFAS samples taken for health investigation purposes, including the Kent County Exposure Assessment.
 - The EGLE Environmental Laboratory developed the capacity to analyze 20 drinking water samples per day for PFAS.
 - Through a statewide survey of 780 fire departments conducted by LARA, 38,122 gallons of aqueous film forming foam (AFFF) were identified at fire departments and commercial airports. Near the end of the fiscal year, a contract was signed with US Ecology to pick up and dispose of this foam in fiscal year 2020.
 - At the end of the fiscal year, fire stations in 65 counties had been delivered AFFF best practices posters.
 - 17 commercial airports had worked with MDOT to purchase eco-friendly AFFF testing equipment. Two more had funding to complete purchases in early fiscal year 2020.
 - 95 wastewater treatment plants and 42 wastewater treatment plant biosolids were tested, resulting in 29 plants being identified as needing to reduce perfluorooctanesulfonic acid (PFOS) discharges.
 - 24 solid waste landfill sites were investigated, and 31 hazardous waste sites were investigated (which includes hazardous waste landfills and other places where hazardous waste is generated or stored).
 - 680 fish and 148 deer were analyzed for PFAS by MDHHS.
 - 478 samples were collected from Michigan lakes and streams.
2. **Assess the status of any PFAS contaminated site and develop individualized response strategies.** MPART continues to assess the status of all sites that exceed the groundwater cleanup criteria and continues to implement response strategies. MPART was overseeing the response at 66 sites as of October 1, 2019.
 3. **Continue to develop environmental response protocols and health protocols for all positively identified sites, as well as specialized site plans.** By the start of fiscal year 2019, most response protocols had been developed to address issues encountered at public water supplies and sites of contamination that exceeded cleanup standards. In late 2019, a protocol was drafted to help prioritize investigation areas where public water supplies were found to exceed 10 ppt total PFAS but not the 70 ppt PFOA + PFOS action level. MPART conducted quarterly monitoring at those supplies during fiscal year 2019 and will now begin looking for potentially impacted private wells near them. This protocol will be finished in early fiscal year 2020.
 4. **Develop routine communication and information-sharing protocols between all members and stakeholders.** Communication in fiscal year 2019 across MPART agencies consisted of:
 - Three formal MPART meetings of department directors or their designees were called by the chairperson to make key decisions on the development of drinking water standards and formation of the Citizens Advisory Workgroup.

These were well-publicized open meetings that were broadcast on the Internet as well.

- Twice weekly calls or in-person meetings of MPART representatives.
- Twice weekly email updates on investigation and MPART efforts across the state.
- 5 in-person meetings with EGLE site leads and regional leads and various other staff working on PFAS.
- 27 “situational reports” that summarized recent and upcoming presentations and outreach, including legislative outreach.
- In addition, in late fiscal year 2019, weekly legislative calls were reinitiated, as were weekly calls amongst the MPART Public Information Officers.

5. **Perform outreach to ensure all stakeholders in impacted areas are informed, educated, and empowered.** MPART staff led or participated in 39 public meetings with local officials and residents, in addition to 8 meetings held in the Rockford area in various small neighborhoods. Tribal governments were included in the implementation of the public water supply sampling program, as well as any site investigations of interest to the local tribe. Project teams are formed for each project where there is an active investigation, and that project team, led by EGLE, consists of staff from the MDHHS, as well as other pertinent MPART partners, including local officials in most cases. In addition, a Citizens Advisory Workgroup was formed that includes representatives in communities affected by PFAS. This group finalized its charter in fiscal year 2019 and will begin to meet regularly starting in early fiscal year 2020.

6. **Perform outreach to ensure the general public is informed about PFAS contamination and the work of MPART.** In fiscal year 2019 MPART representatives performed outreach throughout Michigan and in other states, including:

- Conducting presentations at environmental- and health-related association meetings or annual conferences.
- Providing testimonies at the state or federal level. The MPART Executive Director provided testimony at the United States House of Representatives Committee on Natural Resources Subcommittee on Water, Oceans, and Wildlife, and the United States House of Representatives Committee on Oversight Subcommittee on Environment. The MPART Executive Director and other directors within MPART provided testimony at Michigan legislative hearings.
- Meeting or holding conference calls to help other states as they pursue PFAS investigations.
- Continually updating the MPART Web site to provide fresh content and maintain transparency. Site summaries are updated monthly, Areas of Interest are created as warranted, and a lot of other new content was added throughout the fiscal year, much of which was guided by Google analytics.

- On June 17, 2019, EGLE launched an MPART GovDelivery listserv, which was sent to 216 people. By September 30, 2019, the listserv had grown to 671 subscribers.

7. Identify avenues of funding for PFAS identification and remediation efforts.

MPART has been very fortunate to have had the support of the Michigan Legislature in addressing PFAS. In fiscal year 2019 the Legislature allocated \$30.6 million to address PFAS. Four drinking water remediation grants were awarded, and several more were awarded with grant contracts pending (for completion in fiscal year 2020).

8. Create measurable goals and objectives along an established timeline.

Goals and objectives are established every year by MPART agencies addressing PFAS. Timelines are established for all work in varying detail.

9. Recommend changes in Michigan law. MPART staff worked to respond to several bills that address PFAS. Several bill packages related to PFAS contamination were introduced during the 2019 Legislative Session. Notably, a package of three bills dealing with PFAS in relation to firefighting were passed out of the House and received testimony in the Senate Environmental Quality Committee:

- House Bill 4389, introduced by Representative Sue Allor, would require fire departments to submit a report to EGLE within 48 hours of using firefighting foams that contain the PFAS chemical class, require EGLE to create a collection program, and allow EGLE to issue fines if the law is not followed.
- House Bill 4390, introduced by Representative Jeff Yaroach, would ban the use of firefighting foam during fire training exercises and would establish a training program for firefighters who work with the foam on how to handle, dispose of, and store firefighting foams containing PFAS.
- House Bill 4391, also introduced by Representative Yaroach, requires the EGLE Director to promulgate rules regarding firefighter's use of firefighting foam containing PFAS.

While no bills came to fruition in fiscal year 2019, staff will continue to provide whatever support is needed on proposed bills in fiscal year 2020.

10. Recommend structural changes necessary to address other threats to the environment, public health, and safety, which MPART identifies while performing its duties.

No specific structural changes were proposed in fiscal year 2019, though additional MPART support was deemed necessary and was well in the works as of late in the fiscal year.

11. Perform other duties as requested by the EGLE Director or the Governor.

On March 26, 2019, Governor Whitmer directed MPART to form a science advisory workgroup to review existing and proposed health-based drinking water standards from around the nation to inform the rulemaking process for drinking

water standards by July 1, 2019. MPART accepted the recommendations from the workgroup on June 27, 2019 and forwarded them to EGLE for consideration by stakeholders during the rule drafting process. EGLE submitted the draft rules to the Governor on October 1, 2019. The rule package was then submitted to the Michigan Office of Administrative Hearings and Rules on October 11, 2019, and will continue making its way through the process, with the goal of having final rules promulgated in the spring of 2020.

The Executive Order also outlined a set of operations for MPART to help complete the above charges, including establish workgroups; initiate studies, investigations, hearings, and public comment; consult with outside experts; and hire/retain contractors. Much like the charges, MPART made significant progress at utilizing all the resources available to it.

MPART established 17 workgroups, several sub-workgroups, and consulted with 33 experts. These experts include ten tribal governments, nine states, six federal agencies, seven universities, and one other country. Studies on individuals, fish, deer, and bodies of water were initiated during the fiscal year in areas where PFAS was found. MPART also signed contracts for updating private well records in Wellogic and implementing a statewide soil survey.

Following this Executive Summary are two attachments:

- Attachment 1 is an MPART Executive Order Fiscal Year 2019 Fast Facts.
- Attachment 2 is a summary of all the Workgroup reports for fiscal year 2019.

Attachment 1

MPART EXECUTIVE ORDER FISCAL YEAR 2019 FAST FACTS

The **Michigan PFAS Action Response Team (MPART)** was created as an advisory body within the Michigan Department of Environment, Great Lakes, and Energy by the Governor's office under Executive Order (EO) 2019-03. The EO established MPART as an enduring body to address the threat of per- and polyfluoroalkyl substance (PFAS) contamination in Michigan, protect public health, and ensure the safety of Michigan's land, air, and water, while facilitating interagency coordination, increasing transparency, and requiring clear standards to ensure accountability. Below are actions taken in fiscal year (FY) 2019.

\$30.6 million

total dollars appropriated from the Legislature for PFAS in FY 2019

37 sites identified

19 workgroups established

27 situation reports sent to the Governor

2 congressional testimonies

78 MPART calls

39 public meetings

65 legislative districts affected

33 experts consulted

10 tribal governments

6 federal agencies

9 states

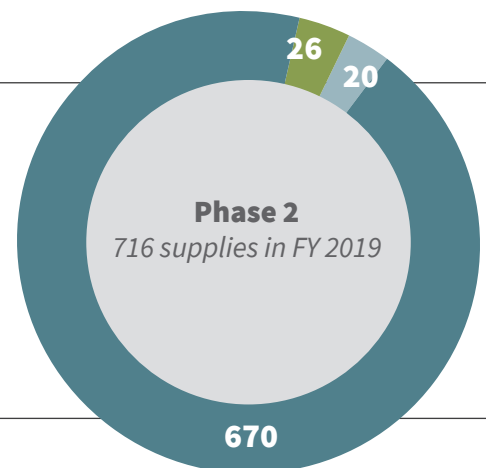
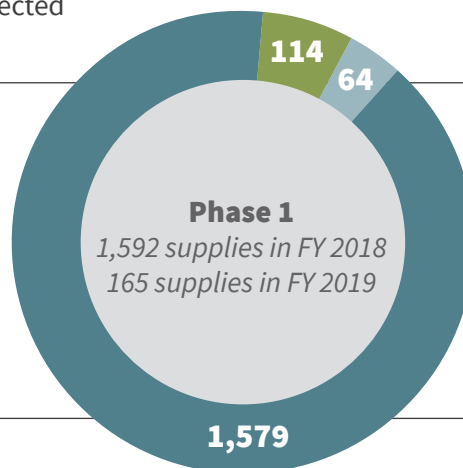
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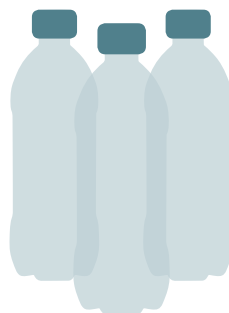


Public Water Supply Total PFAS Tested

- Non-detect
- < 10 ppt
- ≥ 10 ppt



> 4,000
residential wells sampled
(cumulative, sampled to date)



Alternate water sources distributed

67 homes provided bottled water

259 filters

385 replacement filters

6,495 water coolers & replacement water jugs



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

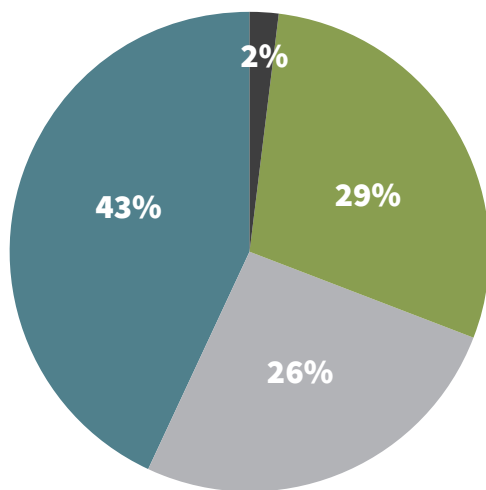
EGLE environmental laboratory developed the capacity to analyze **~20 drinking water samples per day** for PFAS

425 individuals tested for exposure (*Kent County*)

680 fish analyzed for PFAS by the Michigan Department of Health and Human Services (MDHHS)

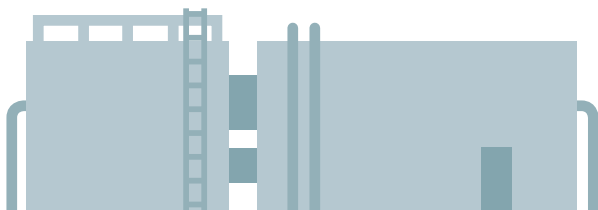
148 deer analyzed for PFAS by MDHHS

478 samples collected from lakes and streams



Current PFOS Compliance Status of 95 Wastewater Treatment Plants (WWTPs) with Industrial Pretreatment Programs

- WWTP discharge does not meet water quality standard (WQS)
- WWTP discharge meets WQS, but sources found
- No sources found
- Undetermined/under review



95 WWTPs tested

29 WWTPs identified that need to reduce perfluorooctanesulfonic acid (PFOS) discharges

42 WWTP biosolids tested

31 hazardous waste sites investigated

24 solid waste landfill sites investigated

4 drinking water remediation grants awarded

780 fire departments surveyed

38,122 gallons of Aqueous Film Forming Foam (AFFF) identified

65 counties shipped AFFF best practices poster

17 commercial service airports bought ecological AFFF testing equipment

Contracts signed for FY 2020 Projects

- ★ AFFF pickup and disposal program
- ★ Updating Wellogic (well records)
- ★ Statewide soil survey

Attachment 2

Air Quality Workgroup

The mission of the Air Quality Workgroup is to review and share the current state of science for PFAS in air, identify PFAS use and potential releases of sources, and identify PFAS use and regulate where authorized within established time frames for permitting and inspection activities.

Successes:

In fiscal year 2019 the Air Quality Workgroup members, including representatives of both the Michigan Department of Environment, Great Lakes, and Energy (EGLE) and the Michigan Department of Health and Human Services (MDHHS):

- Shared the current state of science information on PFAS with both internal and external partners.
- Developed a Frequently Asked Questions (FAQ) document that is posted on the Michigan PFAS Action Response Team (MPART) Web page (www.michigan.gov/pfasresponse).
- Via the development of the FAQ, the Air Quality Workgroup conducted a literature review of the volatility of some PFAS. Moreover, the Air Quality Workgroup has been able to develop an initial list of the PFAS most likely to volatilize and/or pose concern for inhalation exposure.
- Established knowledgeable contacts in other air programs, including in the states of New Hampshire, New York, New Jersey, Vermont, North Carolina, and Minnesota.
- Held formal and informal meetings/conference calls with colleagues at EGLE and the MDHHS as well as other states, the United States Environmental Protection Agency (USEPA), and the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR) to discuss a variety of topics related to PFAS and potential air sources of PFAS.
- Gave the following presentations/talks in fiscal year 2019:
 - Quarterly USEPA Region 5 Air Toxics conference calls/meetings throughout the year
 - ATSDR's Partnership to Promote Local Efforts to Reduce Environmental Exposure conference calls throughout the year (monthly)
 - Lake Michigan Air Directors Consortium (LADCO) – April 25, 2019
 - Auto Suppliers Partnership for the Environment with the USEPA – July 17, 2019
 - Wisconsin Department of Natural Resources – July 31 and August 1, 2019
 - Automotive Industry Action Group (AIAG) with USEPA – September 25, 2019
- Mapped regulated chrome plating sources and have tracked sources identified via permitting, exemption, and inspection activities as possibly using/emitting PFAS.
- Sampled and analyzed a Teflon coating material in use at an industrial facility. Data was compared to values reported by colleagues in the New Jersey Department of Environmental Protection; the Michigan sample was 1,000 times below the New Jersey value.
- Coordinated and correlated EGLE's Air Quality Division (AQD) inspections and EGLE's Water Resources Division (WRD) Industrial Pretreatment Program (IPP) results.

- Developed external relationships with other states, the USEPA, and the CDC on PFAS air quality issues.
- Utilized college interns to assist in source mapping, data management, PFAS chemical structure review, identification of existing screening levels for PFAS, and current, topical research.
- Developed a Briefing Report on the gaps in the Part 2 Rules (promulgated pursuant to Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended) through air permitting.

The mission for 2018 was to: “Identify PFAS use and potential air releases at known regulated chrome plating facilities within Michigan by September 30, 2018. Regulate PFAS where authorized within established time frames for permitting and inspection activities.” The Air Quality Workgroup initiated efforts with the chrome plating sector because this sector is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 63 Subpart N) regulation that limits the use of fume suppressants to less than 1% PFOS by weight. In 2018 Michigan’s air quality field staff inspected all 58 NESHAP subject facilities and found that all sources (100%) were in compliance with the NESHAP provision that no PFOS-based fume suppressant be added to any affected chrome electroplating tanks. However, 28 chrome platers reportedly continue to use other PFAS as a fume suppressant. In 2019 the Air Quality Workgroup generalized and broadened the scope to potential air sources beyond chrome plating.

The Air Quality Workgroup anticipates the mission will be updated in 2020, as appropriate. The Air Quality Workgroup may be able to include more specific items, including outreach efforts to specific sectors and/or development of additional partnerships with people within and outside of Michigan. Additionally, the Air Quality Workgroup expects to facilitate any changes requested by EGLE with respect to PFAS and the Part 2 Rules.

The Air Quality Workgroup will help the department integrate any testing/monitoring/air modeling/control developments as methods are approved and technology matures.

Partnerships:

The Air Quality Workgroup has been networking successfully with MPART members, other states, the CDC/ATSDR, the Michigan Manufacturers Association, the Suppliers Partnership for the Environment, the USEPA Region 5, and the AIAG. In the future, the Air Quality Workgroup would like to expand partnerships to the Environmental Council of the States; Interstate Technology and Regulatory Council; National Association of Clean Air Agencies; International Joint Commission; Michigan Chemistry Council; Ontario Ministry of the Environment, National Institute of Environmental Health Sciences; and other countries.

Challenges:

- At the federal level, there are currently no USEPA-approved methods for source (stack) testing or ambient/deposition sampling.

- No funding has been allocated for PFAS air quality-related work/research.
- The science is immature, methods do not exist, and there is a dearth of PFAS air data.
- Better inhalation toxicology studies for deriving PFAS health risk standards are needed.
- Within the state, the current air permitting and toxics rules do not adequately address PFAS chemicals. For example, Rule 226, Table 20, identifies “High Concern Toxic Air Contaminants”; PFAS are not included. This class of compounds should be included in this list. Also, existing exemptions from permitting review are not effective at regulating emissions at the low levels at which PFAS are a potential threat to the environment.
- To address such gaps in the Part 2 Rules, a “Briefing Report for AQD – Air Quality Division’s Part 2 Rules and PFAS” was developed. As of the date of this report, the path to meaningful, effective changes to these rules remains uncertain. Additional management discussions are necessary to vet potential strategies.

The Air Quality Workgroup continues to communicate about these challenges to the AQD, EGLE, MPART, and external partners. In addition, participation in national quarterly USEPA Hazardous Waste Combustor discussions has kept us apprised of the ongoing efforts to develop a USEPA-approved source testing methodology and informed MPART’s decision on proper disposal of collected aqueous film forming foam (AFFF) materials. The Air Quality Workgroup also keeps apprised of peer reviewed published literature on sampling methodologies.

Airport Workgroup

The Airport Workgroup is guided by the following mission statement: Identify impacted airports throughout the state; coordinate with appropriate federal, state, and local agencies; and support community engagement activities as requested. The Airport Workgroup consists of staff from the Michigan Department of Transportation (MDOT); Michigan Department of Licensing and Regulatory Affairs (LARA); and EGLE.

Successes:

In fiscal year 2019 the Airport Workgroup met the initial intent of the mission statement by:

- Completing a full inventory of AFFF information for commercial service airports in Michigan.
- Engaging federal partners to explore the feasibility of adjusting existing federal rules requiring commercial service airports to dispense foam as part of their federal certification. Through outreach to the United States Department of Transportation and Federal Aviation Administration, regulatory relief from the traditional foam testing requirement was achieved through the Airport Workgroup. This relief came in the form of new guidance that permits new foam testing equipment to be employed in place of more traditional methods of dispensing foam onto the ground.

Upon notification by our federal partners that new testing methods could be employed at the state's commercial service airports, the Airport Subgroup collaborated with its partners to explore options for bringing this new testing equipment to the state as quickly as possible. These discussions, in conjunction with supplemental legislative appropriations for PFAS response, led to the Airport Foam Testing Equipment Grant Program. This program allocated nearly \$25,000 for each of 19 commercial service airports in the state to acquire these more environmentally friendly foam testing systems. By the end of the fiscal year, 17 airports had purchased their testing systems through this grant program, and the remaining 2 were poised to purchase equipment in early 2020. The Airport Workgroup believes that the grant program illustrates the effectiveness of the MPART topical workgroup arrangement.



Partnerships:

We have had a strong participation from Airport Workgroup members and partnered with the Federal Aviation Administration staff.

Challenges:

Attendance from external airport partners invited to participate in group discussions have, at times, been a challenge.

Next Steps:

Now that initial exposure pathways have been eliminated under the grant program, the Airport Workgroup has begun to explore options to push forward the development of fluorine-free firefighting foams that still meet applicable airport regulatory requirements and are effective in fighting aircraft-related fires. Additionally, the Airport Workgroup intends to explore additional action on potential grant programs to support the acquisition of these new foams once they receive federal approval.

Biosolids Workgroup

The mission of the Biosolids Workgroup is to:

- Expand knowledge of PFAS and biosolids within wastewater collection and treatment systems to develop guidance for municipal wastewater treatment plants (WWTPs) regarding land application of biosolids containing PFAS.
- Establish a durable process to evaluate biosolids land application sites.
- In conjunction with Michigan IPP Initiative efforts, reach equilibrium in program status that allows the majority of WWTPs to maintain the option to land apply biosolids. This is contingent on identifying and controlling sources within wastewater collection systems and on the ability to develop the guidance above.

The Biosolids Workgroup members consisted of staff from EGLE, MDHHS, and Michigan Department of Agriculture and Rural Development (MDARD).

Successes:

In fiscal year 2019 the Biosolids Workgroup made significant progress. Highlights of efforts over the past year are summarized below:

- Statewide WWTP and Biosolids/Sludge PFAS Study. MPART initially contracted with AECOM Technical Services Inc. (AECOM) to perform the Lapeer Biosolids PFAS Investigation in late 2017/early 2018. Reports summarizing investigations of the Lapeer WWTP and associated biosolids fields were finalized and posted on the MPART Web site in late 2018. In addition to these investigations and information gained from the implementation of the IPP PFAS Initiative, the Biosolids Workgroup conducted a review of available research to better understand the prevalence of PFAS in biosolids.
- The Biosolids Workgroup expanded the Lapeer Biosolids PFAS Investigation to a Statewide Biosolids and WWTP PFAS Study in order to further our knowledge of the prevalence of PFAS in municipal WWTP effluents and solids in Michigan today and to evaluate the fate and transport of PFAS when land applied with biosolids.



Building on the investigations conducted earlier of the WWTP and land application fields in Lapeer, the Statewide Study consisted of the following tasks:

- Collecting samples of effluent, influent, and biosolids/sludge from WWTPs across Michigan.
- Collecting samples from fields that received biosolids with high concentrations of PFAS.
- Collecting samples from fields that received biosolids with “typical” PFAS concentrations.

- Collecting crop samples from the Lapeer field CL01 for analysis by Michigan State University and resample permanent monitoring wells installed at the field the previous spring.
- Identifying data gaps.

The Biosolids Workgroup completed all of these activities, as well as:

- Installed monitoring wells to better define contamination found on certain fields identified during the above study.
- Conducted residential well sampling around the Palo biosolids fields.
- Participated in discussions with staff in other divisions and agencies regarding the soil sampling done in the Otsego area.
- Procedures and processes developed under the Lapeer investigation, as well as lessons learned, were fully utilized during the statewide WWTP biosolids and field study.
- Developed partnerships with MDHHS, MDARD, stakeholders, and the agriculture community, which has allowed the continuation of work on this issue in a systematic manner that follows the science rather than reacting out of fear.

Partnerships:

- MPART Workgroups: Wastewater Workgroup and Treatment Technology Workgroup
- Associations: Michigan Water Environment Association, Biosolids and PFAS Committees, Michigan Rural Water Association, Michigan Waste and Recycling Association, Michigan Farm Bureau, and North East Biosolids & Residuals Association
- United States Food and Drug Administration, which is assisting in interpreting results from corn sampling done in Lapeer and animal health and food safety issues

Challenges:

- Imposed financial hardships on both municipalities and industrial users. WWTPS are reporting that the costs for disposal of industrially impacted sludge can be 10 to 20 times higher than conventional land application costs.
- Municipal solid waste landfills unwillingness to accept sludge associated with PFAS significantly increases disposal costs.
- Lack of current data available nationally.
- Lack of federal PFAS criteria for biosolids and guidance from the USEPA on this issue.
- Difficulty in managing the volume and complexities of work.

Next Steps:

- Biosolids and Sludge PFAS Sampling Guidance – Finalization is expected to occur within the next few weeks. The guidance was written by AECOM for EGLE based on information learned over the past year in Lapeer and as part of the statewide municipal WWTP and biosolids study.

- Municipal Biosolids Land Application Guidance – The Biosolids Workgroup continues to work to gather information that would support development of interim guidance on PFAS in biosolids to be land applied. A review of models used by researchers and other states is underway. A systematic approach, like the IPP PFAS Initiative will be taken to ensure that WWTPs with sources are prioritized over those with no industrial sources and to ensure that resources are not overwhelmed. The second stakeholder meeting was scheduled for October 7, 2019.

Longer Term:

- Develop and implement a PFAS biosolids strategy in Michigan that takes a thoughtful data driven science-based approach to the issue of PFAS in municipal biosolids until such time as federal criteria is developed by the USEPA.
- Evaluate biosolids land application sites and associated risks as necessary.
- Continue to build upon and expand our knowledge concerning PFAS in municipal biosolids and at land application sites.
- Expand the Biosolids Workgroup to ensure consistency of implementation with other land application programs such as Beneficial Use.
- In conjunction with IPP Initiative efforts, reach equilibrium in program status that allows the majority of WWTPs to maintain the option to land apply biosolids. This is contingent on identifying and controlling sources within wastewater collection systems and on the ability to develop the guidance above.

Drinking Water Workgroup

The mission of the Drinking Water Workgroup is to identify and quantify public exposure to PFAS compounds in public drinking water systems. The Drinking Water Workgroup consists of staff from EGLE's Drinking Water and Environmental Health Division and Remediation and Redevelopment Division (RRD), as well as the MDHHS and MDARD.

Successes:

In fiscal year 2019 the Drinking Water Workgroup was involved in:

- Sampling 881 noncommunity public water supplies, bringing the total number to approximately 2,500 public water supplies as of mid-September 2019. This represents drinking water for approximately 3/4 of Michigan's residents and has provided our state with an unrivaled picture of the incidence of PFAS in our public drinking water supply. The interagency makeup of the Drinking Water Workgroup has been invaluable in how we assess the effect of these results on environmental quality, public health, and food safety and access to safe drinking water. The collective skillset and knowledge base of the Drinking Water Workgroup has been regularly drawn upon during the statewide survey of public water supplies.
- Developing a communication strategy for reporting the results of this statewide sampling, as well as providing recommendations to those supplies and related agencies, with input from the American Water Works Association, the Southeast Michigan Council of Governments, local health departments, and other partners. This strategy continues to be refined, based on the availability of new science, PFAS data, and information.
- Other efforts included:
 - Providing ongoing guidance and support to water supplies outside of the statewide sampling effort affected by PFAS in their drinking water.
 - Working with supplies and local health departments on communication plans for notifying/educating their stakeholders on PFAS in their drinking water.
 - Remaining abreast of new and evolving information regarding PFAS from the USEPA, ATSDR, other states, and others conducting research on these compounds.
 - Providing input to keep the MPART Web site current, including results reporting, communications toolkits, and FAQs.
 - Working with our partners in EGLE, MDHHS, and MDARD, as well as our contractor, AECOM, to continue developing PFAS drinking water sample collection guidance documents for internal staff, consultants, and public/private water system owners. The goal of these publications is to supply an effective set of instructions to allow samplers to avoid pitfalls and missteps during collection and, ultimately, to increase the accessibility of PFAS sampling for drinking water across our state.

Findings from the public water supply sampling effort are being used to inform how this initiative evolves and will continue meeting the mission of the Drinking Water Workgroup. The statewide survey was expanded on two occasions:

- November 2018 to include childcare providers on their own well.

- April 2019 to include additional non-community supplies serving sensitive populations.

As analytical results and new information have become available, additional sampling has occurred. This has included both large-scale monitoring programs (monthly sampling of supplies with surface water sources, quarterly sampling of supplies with PFAS detections of 10 parts per trillion [ppt] or greater) and targeted sampling around PFAS investigations/areas of interest.

Other Successes:

- Published the final report for the 2018 PFAS Sampling of Drinking Water Supplies in Michigan.
- Expanded the statewide survey to include additional public water supplies. This identified elevated PFAS in a number of supplies, including one where the USEPA Lifetime Health Advisory level was exceeded.
- Initiated a monthly monitoring program for all community water supplies in Michigan that use surface water as a source, such as the Great Lakes or a river. This program was designed to assess potential variability in PFAS levels for these systems, which are more “open to the elements” than those solely using groundwater as a source. This program has led to the identification of at least one abnormally high PFAS level in Michigan’s surface water.

Taking into account the findings of our own work and those of other workgroups within MPART, the scope of statewide drinking water sampling efforts will continue to evolve in real time. The effect that Michigan’s upcoming maximum contaminant levels (MCLs) will have on how we approach sampling statewide will likely be significant. The new rule may contain provisions for required sampling based on PFAS levels in public water supplies, which contrasts with the voluntary nature of the current initiative.

Partnerships:

- Within the Drinking Water Workgroup are multiple divisions of EGLE, MDARD, and the MDHHS. This interagency makeup allows a cross-sectional approach to problem solving and a large collective knowledge and resource base. Outside of the Drinking Water Workgroup, we work closely with Michigan’s local health departments – without their assistance this statewide survey would not be as successful and the Drinking Water Workgroup would have had difficulty achieving its mission.
- Facilitated collaboration with the other workgroups of MPART would be beneficial. This would be easier with the implementation of an enterprise database system to share all our findings. As other states/provinces continue to follow Michigan’s lead with testing for PFAS, collaborations with those groups will be beneficial as well.

Challenges:

Data consolidation into the EQulS enterprise database did not proceed as far as planned, and the lack of an enterprise database system added a significant workload. In light of the interdisciplinary/interagency nature of MPART, ease in data-sharing goes

a long way toward increased efficiency and better collaboration. Ultimately, this allows quicker and clearer communication of results.

Next Steps:

Before the end of the calendar year:

- Monthly monitoring for supplies using surface water sources was completed in September 2019.
- Phase II sampling of Type II supplies has been completed.
- Three of four scheduled quarterly sampling events were completed for supplies with PFAS detections of 10 ppt or greater. (The fourth quarterly sampling event is scheduled for December 2019.)
- MCLs were drafted per the October 1, 2019, deadline in the Governor's Executive Order (EO). The next steps of the rulemaking process will occur in fiscal year 2020. Per the EO, the rules should be finished as early as April 2020.
- Investigations in Frenchtown, Monroe, and Wyandotte, Michigan, will continue into fiscal year 2020. EGLE 2019 monthly monitoring results indicated unexpected elevations of PFAS detections in raw water sources for these systems, and staff from across MPART mobilized to investigate in each case.
- Remaining data will continue to come in from the Phase II sampling of Type II systems, the monthly monitoring program for supplies using surface water sources, and the quarterly monitoring program for supplies with results ≥ 10 ppt. Results will be reported per standard prioritization protocols (high- and middle-tier results will move to the front of the queue).

Plan for Next Year/Five-Year Plan:

The Drinking Water Workgroup will complete the following tasks to continue its mission:

- October 2019 – April 2020: Establish the MCL for PFAS compounds in Michigan.
- By June 2020: Plan, coordinate, and potentially host four to six PFAS sampling training events for drinking water supply operators, sanitarians, and environmental consultants. Prepare readily accessible online resources for interested entities.
- By September 2020:
 - Assist in implementation of an enterprise database.
 - Evaluate data from the 2018 and 2019 statewide drinking water sampling efforts.
 - Migrate data set into the enterprise database.
 - Tie spatial locations to analytical values in the database.
 - Make data accessible for other agency divisions, outside research entities, etc.
- October 2019 – September 2022: Continue to develop and implement the action plan for follow-up testing and investigation based on results of the 2018 and 2019 statewide sampling efforts.
- September 2020 – September 2025: Continue coordination with Plainfield, Michigan, PFAS treatment pilot study.
- By September 2021: Provide education and outreach for Type II and Type III public water supplies.

Fire Station Workgroup

The mission of the Fire Station Workgroup is to be a liaison between MPART, EGLE, and LARA to keep the fire service across Michigan informed.

In fiscal year 2019 the Fire Station Workgroup met this mission by:

- Attempting to communicate with all 1,035 fire departments across the state.
- Engaging other groups and associations to reach the fire service, such as fire station membership groups.
- Becoming much more involved in working with other MPART agencies.
- Developing a best management practice poster for fire stations.
- Distributing posters to every fire station in the state about: NOT training with Class B AFFF, when to use legacy Class B AFFF, and calling the PEAS hotline to report the use of Class B AFFF that has PFAS. As of the end of September 2019, posters only needed to be distributed to a few remaining counties.
- Working with EGLE to plan the pickup and proper disposal of over 33,000 gallons of Class B AFFF.² This contract started in September 2019, with an end date as soon as March 2020 (though we expect a short extension may be needed, as this is the first of its type in the country).



The Fire Station Workgroup also began reaching out to organizations outside the Michigan fire service, groups such as emergency management, law enforcement, and 911 dispatch associations to determine options fire departments have to replace their 8-chain Class B AFFF. This effort began in fiscal year 2019 and will continue into the next fiscal year. Our goal is to get the makers of foam to assure Michigan fire chiefs that their replacement Class B AFFF is PFOS/PFOA-free and help the fire service make a transition to a Class B AFFF that is both effective in suppressing class B fires and has no negative effect on the environment.

² While the survey of fire stations resulted in finding 38,122 gallons of AFFF at fire stations and commercial airports, some entities disposed of their AFFF before the statewide pickup and disposal began.

Food Safety and Animal Health Workgroup

The mission of the Food Safety and Animal Health Workgroup is to assure food and feed safety and assure health of pets and livestock. During fiscal year 2019, the Food Safety and Animal Health Workgroup advanced relationships with the United States Department of Agriculture (USDA) and United States Food and Drug Administration (FDA) as new situations were encountered that affected food safety and animal health.

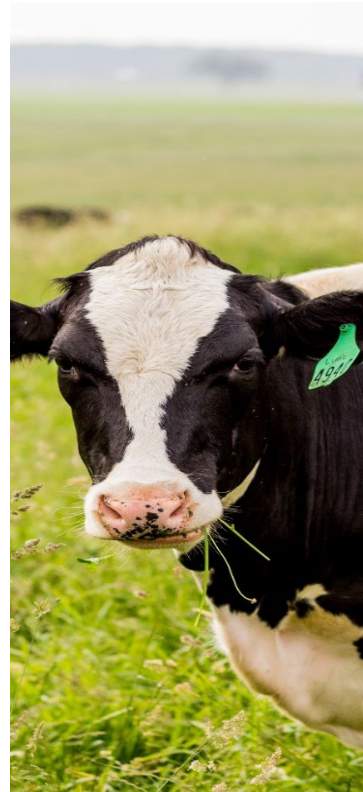
MPART looks for PFAS through groundwater, surface water, wastewater, soil, and public drinking water supply testing. When a site is identified, MDARD looks to see if there are any food or agriculture establishments in close proximity. This includes anywhere that food, feed, or animals are commercially grown, processed, or sold. Other facilities that MDARD can identify include migrant labor housing, animal shelters, and pet shops.

When a commercial food or agricultural establishment that may be impacted is identified, MDARD reviews groundwater, surface water, and soil sample results as part of its investigation and assistance efforts. When necessary, MDARD works with the FDA and/or USDA for guidance on any additional sampling needs and data interpretation.

Successes:

Actions taken in fiscal year 2019 included:

- Summarizing past investigations nationally and globally to serve as a reference for situations encountered in Michigan.
- Mailing a letter on October 23, 2018, to the USDA and FDA requesting food safety PFAS guidance.
- Receiving a response to the October 23, 2018, letter from the USDA and FDA on February 14, 2019, offering assistance. (Note that both letters were posted on the MPART Web site.)
- Developing a working relationship with the USDA and FDA to assist and consult on active sites where there are agricultural questions.
- Developing a sampling plan for a farm associated with one of the MPART PFAS sites and sharing the plan with the USDA for input.
- Routing new site summaries throughout MDARD when new sites are identified, and working collaboratively with MPART partners on sites involving food safety and animal health.



In addition, the FDA began national food sampling for PFAS. The FDA is testing food collected for another survey on a regional rotating basis. The first results were released, and as of the end of the fiscal year, a summary FAQ was posted on the

MPART Web site. Generally, PFAS is being found in 15% of food tested but not at a level expected to cause health impacts.

The Food Safety and Animal Health Workgroup benefited from having good surveillance from EGLE to help identify agricultural-related sites through public water testing, biosolids sampling, and general site identification. The Food Safety and Animal Health Workgroup participates on conference calls about soil sampling, such as the extensive sampling that occurred around Otsego and the proposed statewide soil survey.

Partnerships:

The Food Safety and Animal Health Workgroup has partnerships with:

- FDA
- USDA
- Michigan agriculture industry stakeholders
- MPART members
- National Association of State Departments of Agriculture
- Michigan State University
- Michigan veterinarians

In the future, the Food Safety and Animal Health Workgroup would like to interact with:

- Other states in a coordinated manner
- The European Union to learn more about their advances and investigations

Challenges:

While the FDA and USDA are assisting Michigan directly and on a case-by-case basis, working on animal health and food safety is challenging because of:

- The need for a more proactive, coordinated federal response.
- The lack of federal standards or screening levels for food.
- The lack of models to predict how PFAS will move from water to soil to plants to animals and people.

Next Steps:

In fiscal year 2019 the Food Safety and Animal Health Workgroup developed a soil and feed testing plan for a farm near one MPART site. We received comments from the FDA in late September 2019 and will implement the plan in the fall when crops are harvested. Testing will consist of corn silage, haylage, earlage, alfalfa, plastic bags used to store the feed, the mixed food, and the water cattle are drinking.

On September 9, 2019, MDARD asked for assistance from the FDA on two other locations where PFAS had been detected in the soil due to biosolids applications: one in Livingston County, the other in Lapeer. Both locations had industrial-impacted wastewater going to a WWTP that resulted in high strength biosolids being repeatedly applied to farm fields. The sources have been greatly reduced, but the historical applications created an accumulation in the soil. The Food Safety and Animal Health Workgroup will coordinate assistance to those farmers in cooperation with our partners in fiscal year 2020.

The Food Safety and Animal Health Workgroup will also ensure corn and soil samples collected from agricultural sites are analyzed and interpreted. This effort is being coordinated with Michigan State University, the MDHHS, EGLE, and a contract laboratory. As with other similar testing, the Food Safety and Animal Health Workgroup will make use of the partnership with the FDA to interpret the results.

In fiscal year 2020 the Food Safety and Animal Health Workgroup anticipates:

- Streamlining FDA and USDA assistance requests into a systematic, faster, and more efficient process to assist Michigan and also serve as a national model.
- Possible additional FDA assistance requests.
- The use of Geographic Information Systems (GIS) to map MDARD facilities near identified sites.
- Using test results and interpretation from FDA assistance requests to add to other national investigations. This will expand reference framework to allow new sites to be more accurately screened for investigation prioritization.
- Continuing to identify all agriculture PFAS-related sites and determine potential health concerns.
- Continuing to monitor and summarize national food safety testing conducted by the FDA.
- Continuing to learn from other out-of-state site investigations being conducted. Reports on a New Mexico investigation are expected in 2020.
- Improving our FAQs on home gardening, working in conjunction with the MDHHS Human Health Workgroup.

Over the next five years, the Food Safety and Animal Health Workgroup anticipates:

- Food supply being tested nationally for PFAS and the safety of the overall food supply determined.
- Specific Michigan PFAS sources identified and controlled to limit PFAS entering the food supply.
- Federal standards or screening levels developed for PFAS, including additional compounds in the PFAS family.

Groundwater Workgroup

The mission of the Groundwater Workgroup is to determine the nature and extent of PFAS contamination at sites where groundwater is known or suspected to be contaminated and oversee responsible parties or obtain state funds to conduct investigation of exposure.

Successes:

In fiscal year 2019 the Groundwater Workgroup made progress in determining the nature and extent of PFAS groundwater contamination across the state and implemented a few innovative studies. (At right, EGLE staff collecting pore water samples from the Au Sable River)



The Groundwater Workgroup commissioned three studies from AECOM:

- A PFAS Groundwater Study Report to evaluate monitor well groundwater data compared to residential drinking water data. The report used data from three separate study areas: Grayling Area PFAS (Crawford County, Michigan), North Kent Area PFAS (Kent County, Michigan), and North 34th Street, former Production Plated Plastics, PFAS site (Kalamazoo County, Michigan). The primary objectives of the study were to determine if data collected during groundwater investigations accurately reflect PFAS footprint, plume behavior, aquifer conditions, and drinking water risks and to determine if PFAS concentrations behave differently than traditional target contaminants of concerns.
- The study conclusions were:
 - A significant difference in median PFBA concentration in residential wells versus monitoring wells was determined at the North Kent Area.
 - Higher apparent median residential well concentrations of PFBS, PFHpA, PFOS, and PFPeA were found in the North Kent Area; however, these compounds did not show significant difference using Wilcoxon-Mann-Whitney rank-sum tests.
 - Higher apparent median residential well concentrations of PFBA, PFPeA, PFHxA, PFHxS, PFHpA, and PFOS were found in the Grayling Area; however, these compounds did not show significant difference using Wilcoxon-Mann-Whitney rank-sum tests.
 - Higher median residential well concentration of PFOS was found in the Richland study area; however, the number of samples did not allow for Wilcoxon-Mann-Whitney rank-sum testing.
- Perfluorobutane Sulfonic Acid (PFBS) Chemistry, Production, Uses, and Environmental Fate in Michigan – This study was commissioned to look at PFBS chemistry, uses, and sources after numerous wells in the municipal water study were found to contain PFBS, and in some cases, it was the only PFAS compound found. During the 2018 Statewide PFAS Sampling Program, a total of 108 drinking

water supplies had PFBS detections, out of which 36 locations only detected PFBS and no other PFAS. PFBS had the highest detection frequency of 5.4% out of the 14 PFAS compounds that were sampled during the 2018 Statewide PFAS Sampling Program.

- The objective of this report was to:
 - Perform a review of PFBS production, physical, and chemical properties; environmental fate and transport; and potential primary sources to the environment that could be present in Michigan.
 - Evaluate the PFBS detections in the public water supplies in order to potentially identify the PFAS sources and whether it could be associated with any industry or particular consumer products.
- A worldwide literature search was performed on the topic of septic tanks and PFAS in groundwater. There is very little information available on septic tanks and releases of PFAS from them. The best study found was from Cape Cod, Massachusetts, for which there were six references, including published papers. However, some of the reports on Cape Cod do not have PFAS results.

The takeaway from these papers is the fact that impacted groundwater or surface water from septic tanks contains other inorganic or organic pollutants. As a result, it would be hard to attribute any PFAS detections as a result of septic tank infiltration if other chemicals of concern are not detected. Some of the other papers sent list some of the most common detected chemical compounds that you would find due to septic tank impact. One of the most interesting compounds associated with septic tank impact is artificial sweeteners. The Groundwater Workgroup will be determining if artificial sweeteners can be used as a tracer of septic tank field liquids.

In fiscal year 2019 the Groundwater Workgroup also:

- Developed a PFAS priority ranking sheet. This helps EGLE staff understand the steps that need to be taken to determine how to handle PFAS detections and investigations.
- Developed a new site recommendation form. This form standardizes the collection of information so that reviewers across MPART receive the same data for recommending new sites for listing. It also ensures that all required information is submitted the first time for review.
- Researched the pesticide Sulfluramid as a potential PFAS source as the chemical uses PFOS in its manufacture.
- Provided technical support to assist with finalizing the standard operating procedures for sampling PFAS in various media. (See [MPART Web site](#): Technical Guidance – By Media). The Groundwater Workgroup chair was also a member of the Surface Water, Treatment Technology, Airport, Military Installations, and Wildlife Workgroups and assisted other workgroups as needed.
- Made use of the contract with Michigan Geological Survey to create triage packages for new sites. Triage packages consist of groundwater elevation data, well data, regional groundwater maps, and other information that help determine groundwater flow direction and guide off-site sampling. Such packages are received within one week of the request to Michigan Geological Survey. In fiscal year 2019, 11 triage

packages were developed to support PFAS groundwater investigations at sites in Michigan. The triage packages have given staff groundwater and geological data for areas where such data was not readily available, saving staff hours of time.

Partnerships:

The Groundwater Workgroup's partnerships with contractors have helped in the success of the program. As groundwater and surface water does not respect state boundaries, it would be helpful to continue to reach out to other states on Michigan's borders to share information and resources.

Challenges:

Michigan is a large state with an abundance of groundwater resources used for drinking water, agriculture, and industry. Data exists in various databases and with varying degrees of accuracy, so determining information about groundwater can be challenging.



In addition to having a contractor for triage packages, EGLE also had a contractor available to work statewide and assign projects to, such as sampling, development of standard operating procedures, assisting in finding sources of PFAS, doing research, and performing literature searches. Addressing groundwater issues would have been hard to do without this type of assistance. This part of MPART needs to continue to meet the current challenges and needs and any future problems that might arise.

An ongoing challenge is the need to be able to identify and measure more PFAS analytes. There are estimated to be over 4,000 PFAS chemicals in the environment, but we currently are only able to measure 20-40 of them.

The challenge of determining sources of PFAS in isolated areas (also known as the “middle bucket” rural issue) will continue. To help, additional work is needed on the issue of potential self-contamination from other sources (e.g., septic tanks). MPART will continue to coordinate across divisions and departments to address PFAS in a science-based, coordinated approach.

Next Steps:

- The Groundwater Workgroup will continue to use interns to determine potential sources and locations of PFAS (i.e., old Part 307 lists of contaminated sites). Students are a valuable resource in doing research because they are skilled in using the Internet and various search engines.

- Ideally, there should be a quick response Triage Unit that could install monitor wells, perform borings, and take samples at sites across the state. This program would be similar to the very successful program that the RRD has for performing investigations at petroleum sites across Michigan. This program could be a part of the RRD's Geological Services Section or be bid out to the current environmental contractors.

Human Health Workgroup

The mission of the Human Health Workgroup is to evaluate the public health implications associated with environmental releases of PFAS, make public health determinations, and provide impacted communities with public health information in a way that is science-based, equitable, and protective of everyone in Michigan, including the most vulnerable and sensitive individuals of Michigan's population.

Successes:

The Human Health Workgroup reviewed and discussed the North Kent County Exposure Assessment protocol prior to implementation. This assessment included sampling blood and drinking water near the time of blood collection and questionnaire data from participants who have PFAS in their private drinking water wells.

Results were used to:

- Compare to PFAS exposure in the United States population (NHANES) where possible.
 - Identify factors that can affect how much PFAS is in people's blood, including comparisons of serum PFAS between strata, age groups, sexes, and occupational groupings.
- Participants are protected within this study by:
 - Institutional Review Board (IRB) protocol, application, review, and approval
 - Medical Research Project (MRP) designation
- There were 14 clinic dates from December 8, 2018 to June 20, 2019. Over 400 people participated in this study.

Once the data analysis and preliminary and final reports are drafted, the Human Health Workgroup will review and provide input on the documents.

The Human Health Workgroup also developed PFAS drinking water public health screening levels (PHSL) for PFOA, PFOS, PFHxS, PFNA, and PFBS based on the best available science. The PHSLs were reviewed by the Human Health Workgroup and approved by MPART in April 2019. The PFAS PHSLs help the MDHHS determine if public health investigations and/or actions are necessary. This task built on the work of the Human Health Workgroup from fiscal year 2018 that included conducting a literature review and comparison of available state, federal, and other agencies health-based values for PFAS chemicals and the basis of those values. The Human Health Workgroup will continue to evaluate the evolving science on PFAS chemicals for developing additional PHSLs, reevaluating existing screening levels, and evaluating available data for qualitative assessment, with priority for chemicals that frequently impact drinking water in Michigan. The Human Health Workgroup is also developing communication tools for these and other health-based values.

Because careful communication of potential human health risks is critical for outreach to PFAS-impacted communities, the Human Health Workgroup is also currently working on an evaluation of the published epidemiology literature available for PFAS. The results of this evaluation will help us communicate what is known about risks associated with the PHSLs and other health-based or regulatory levels. This evaluation will also serve to communicate results for the North Kent County Exposure Assessment and help communicate additional biomonitoring, exposure, and health studies currently in the planning stages.

A literature review was done in fiscal year 2019 to identify available information related to home-raised foods. A sub-workgroup was formed to evaluate and prioritize the available literature and determine next steps. This work informed an inquiry on concern for morel mushrooms in the Parchment area – no scientific literature is currently available and the subgroup determined the need for data collection next spring for PFAS levels in soil and mushrooms, with the assistance of a local resident. Additional literature review identifying other data gaps (e.g., other foods of concern to agencies and the public) is underway in coordination with the Animal Health and Food Safety Workgroup. Other opportunities to fill gaps are being pursued (e.g., corn and soil from biosolids fields coordination among the MDHHS laboratory, MDARD, EGLE, the Human Health Workgroup, and an MSU researcher) as they become available.



The health consultations for PFAS concentrations in surface water and foam on Van Etten Lake were reviewed and commented on by the Human Health Workgroup. This work and previous high concentration of PFAS in foam from the Rogue River (an evaluation for which was provided in a separate health consultation) and in the Thornapple River lead to a foam advisory for lakes and streams known to have PFAS contamination and identified on the MPART Web site.

The Human Health Workgroup also developed a technical report and citizen's guide for different reasons residential wells are sampled and different analytical methods used. As of mid-September, the citizen's guide was being reviewed by MPART prior to publishing on the MPART Web site.

As of mid-September 2019, the Human Health Workgroup was working with the Drinking Water Workgroup to determine how to prioritize public water supplies above 10 ppt total PFAS and below 70 ppt PFOA plus PFOS and how to document

recommendations and actions. This will help staff prioritize which “middle bucket” supplies to work on and assist in identifying appropriate recommendations and further evaluation of surrounding drinking water wells, with special consideration for those above the PHSLS and health-based values.

A multiyear study of PFAS exposure and health effects is in the planning stages and will include Parchment, Cooper Township, and North Kent County. The initial protocol was submitted to the Institutional Review Board on July 26, 2019, for approval to ensure all protections for human subjects. The protocol is now being revised to incorporate a multiyear approach. The MDHHS’s study team is further rounding out the design and logistical planning for this effort as they plan for the first year of data collection in 2020.

In addition to the State General Funds provided for this purpose, the MDHHS also was awarded a competitive federal grant from the CDC/ATSDR in September 2019. The MDHHS was one of seven awardees nationwide selected to participate in this national PFAS health study coordinated by the CDC. This federal funding will allow the MDHHS to expand their data collection abilities in concert with the already ongoing MDHHS efforts in 2021 and 2022.

In the summer of 2019, the MDHHS’s Division of Environmental Health and MDHHS’s Bureau of Laboratories, Division of Chemistry and Toxicology, Analytical Chemistry Section, were awarded a \$4 million CDC grant to expand state biomonitoring capacity. Funding started October 1, 2019. The first year is for planning and data collection to start in 2021. The funding will support two programs:

- A statewide biomonitoring program that will measure PFAS (and other chemicals of concern) in a statewide representative sample of Michigan adults to establish reference levels for the state.
- A targeted investigation of occupational PFAS exposure among Michigan municipal firefighters. The MDHHS will rely on the Human Health Workgroup as one of the partners for development of protocols for these studies.

Partnerships:

The Human Health Workgroup is also coordinating with:

- Academic researchers on human exposure and health research by coordinating with the Michigan PFAS and Health Research Consortium (MiPHRC). Roles include:
 - Discussing strategies and making recommendations to the MDHHS regarding its current and planned PFAS research activities.
 - Reviewing the scientific merit and relevance of MDHHS PFAS research programs and implementation strategies.
 - Informing the MDHHS regarding emerging science, issues, and trends regarding PFAS and health.
 - Informing the MDHHS on emergency and short-notice scientific issues of immediate concern related to PFAS and health.
 - Reviewing and making recommendations regarding the dissemination of MDHHS PFAS research findings.

The Human Health Workgroup is one of the valued partners for input, review, and support of this work.

At this time there are two co-chairs who have agreed to be part of MiPHRC, Nigel Paneth and David Savitz. Nigel Paneth is a professor of epidemiology and pediatrics at the College of Human Medicine at Michigan State University. David Savitz is a professor of epidemiology at the School of Public Health at Brown University. Additional researchers are currently being recruited for this partnership:

- Other states (e.g., Wisconsin, Minnesota, Ohio, Indiana, and Illinois) and federal agencies on PFAS human health and exposure assessments
- The Wildlife Workgroup on the following topics of interest to both:
 - The need for a waterfowl assessment
 - Priorities for fish and wildlife collection in 2019
- MDARD by reviewing and providing comments on the Food Safety and Animal Health Workgroup FAQ document

Next Steps:

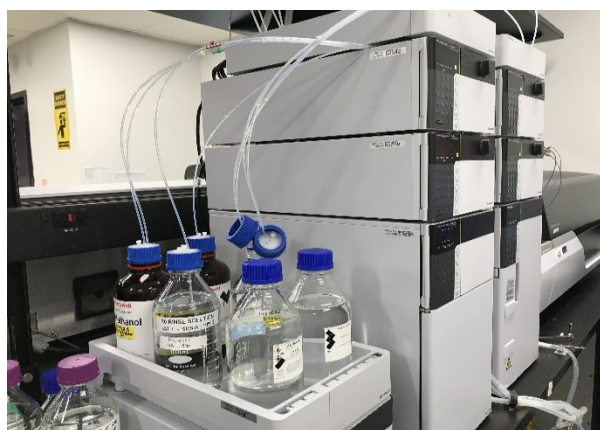
Most of this work will continue in fiscal year 2020. Many of these projects are expected to continue for the next three to six years.

Laboratory Standards Workgroup

The mission of the Laboratory Standards Workgroup is to provide guidance and testing standards to laboratories performing PFAS analysis for the State of Michigan.

The Laboratory Standards Workgroup met its mission in fiscal year 2019 by reviewing and providing input on sampling and laboratory analysis guidance documents before posting on the MPART Web site. As the fiscal year evolved, the Laboratory Standards Workgroup's mission changed from reviewing guidance documents and laboratory reports within a specified period of time, to providing guidance and testing standards to laboratories performing PFAS analysis for the State of Michigan.

Successes:



- Developed a checklist of critical elements for a PFAS drinking water laboratory report.
- Developed an example drinking water laboratory results report format.
- Developed a public facing [FAQ](#) that is on the MPART Web site.
- Conducted a method comparison review of USEPA Method 537 Rev. 1.1 and Method 537.1.
- Reviewed draft USEPA Method SW-846 8327.

Partnerships:

The Laboratory Standards Workgroup is working with all parts of the MPART team by providing review and input on laboratory data and laboratory and sampling guidance documentation. The Laboratory Standards Workgroup also works with the USEPA and private laboratories.

Challenges:

The Laboratory Standards Workgroup consists of members from both EGLE and MDHHS laboratories and found it difficult to meet on a regular basis due to the workloads of the laboratories. In addition, the limited number or lack of published reference testing methods using best practices and the lack of federal or state regulation, hindered the Laboratory Standards Workgroup's ability to develop or recommend consistent standards that laboratories can use.

Next Steps:

The Laboratory Standards Workgroup would like to see additional reference testing methods using best practices, published or drafted by the USEPA or others, to review.

In fiscal year 2020 the Laboratory Standards Workgroup will continue to develop testing capabilities at the EGLE and MDHHS laboratories. With the implementation of MCLs in

the State of Michigan on the horizon, the Laboratory Standards Workgroup will help advise EGLE's Laboratory Certification Program in developing protocols for certifying drinking water laboratories in Michigan wanting to perform PFAS testing by April 2020. Over the next year or more, the Laboratory Standards Workgroup will determine how expanding the group to include members from other laboratories that can benefit the MPART team.

Landfill Workgroup

The mission of the Landfill Workgroup is to protect human health and the environment by using a collaborative and forward thinking process to expand the limited information that is available on the concentrations of PFAS in Michigan landfill leachates and use that expanded information to ensure that the PFAS component of landfill leachate is effectively managed and not transferred to other media at unacceptable levels.

Responsible management of high level PFAS-containing products and wastes and environmental media contaminated by PFAS is a necessary and important part of addressing the PFAS issue at the state and federal level. Some Michigan landfills are not accepting concentrated new PFAS waste due to concerns about leachate disposal, even though it is likely to be already present in their existing leachate.

Successes:

- In a collaborative study with the MWRA, PFAS samples were collected from 32 active municipal solid waste landfills throughout the state. Although the data set was limited, it appears to show that, in most cases, landfill leachate is not a major contributor of PFAS to municipal wastewater treatment plants. There are important exceptions.
- In a systematic and prioritized manner, EGLE's Materials Management Division (MMD) began coordinating with solid waste landfills, hazardous waste landfills, and corrective action facilities to sample priority sites by the end of calendar year 2019. This included 48 solid waste landfills and approximately 40 hazardous waste sites. Of the 48 solid waste sites identified as high priority for PFAS sampling, as of the end of fiscal year 2019, 40 sites had agreed to sample for PFAS and samples have been collected at 21 sites.
- Initiated a project with the landfill industry and wastewater treatment associations to establish best management practices for leachate and other materials known to be impacted with PFAS (e.g., biosolids) that are no longer deemed suitable for land application.
- Drafted a sampling guidance document for PFAS leachate sampling.
- Initiated public health protective actions at and proximal to facilities where high priority sampling identified the potential for human exposure.
- Coordinated meetings among EGLE, the MWRA, and the MWEA to address biosolids disposal options.



- Other successes included:
 - Partnering with industry groups.
 - Prioritizing PFAS sites based on established conceptual site models and the presence of receptors.
 - Standardizing process for coordinating with responsible parties, local units of government, MDHHS, local public health, and potentially impacted residents.
 - Holding routine and informal “office hours” in communities where residents have or may be impacted by PFAS contamination.

Partnerships:

The Landfill Workgroup partnered with:

- Michigan Waste and Recycling Association(MWRA)
- Michigan Water Environment Association (MWEA)
- Revitalizing Auto Communities Environmental Response Trust
- Hazardous Waste Treatment, Storage and Disposal Facilities
- State agencies, including MDHHS, MDARD, and MDOT, and local health departments

In the future, the Landfill Workgroup would like to develop partnerships with:

- USEPA
- Interstate Technology & Regulatory Council
- University researchers
- United States Department of Defense

Challenges:

- There is a need to develop treatment technologies to address unacceptable levels of PFAS in landfill leachate.
- There is a recognition that methodologies need to be developed to stabilize PFAS-impacted biosolids, both chemically and physically, so they can be safely landfilled or otherwise managed in an environmentally responsible manner.
- Lack of a USEPA-approved analytical method for environmental media.
- Complexity in determining how to apply and communicate to the regulated community and general public the various numbers in play related to PFAS (e.g., MDHHS screening levels, groundwater cleanup criteria, health-based values, etc.).

Next Steps:

Shorter term, the Landfill Workgroup and MMD will:

- Coordinate with the Treatment Technology Workgroup to find viable leachate treatment technologies and stabilization technologies to ensure PFAS waste that is landfilled does not create a future problem.
- Continue to evaluate and investigate landfills and coordinate with the MWRA and WRD to develop and implement management strategies for leachate and WWTP solids.
- Continue sampling at high-priority sites.

- Finalize the design for the inventory of PFAS in soils throughout Michigan and implement the study. This project is anticipated to be complete by the end of 2020.
- Finalize the PFAS sampling guidance document for landfills.

Longer term:

- Continue to manage public health protection efforts and cleanup of identified high priority sites that have the potential for unacceptable human exposure to PFAS.
- Begin sampling and addressing public health protection and cleanup at medium priority sites.
- Implement the industrial sludge sampling and PFAS survey/inventory study. The schedule and funding for the industrial sludge sampling study is in the process of being developed.

Military Installations Workgroup

The mission of the Military Installations Workgroup is to facilitate communications and coordination between the United States Department of Defense and state and local agencies at active military sites throughout the state and support community engagement activities as requested. The Military Installations Workgroup has supported the Michigan National Guard's (MING's) ongoing efforts to maintain open and cooperative communication with our state and local partners through group-wide dialogue that takes place during and between teleconference meetings.

Successes:

In fiscal year 2019 the Military Installations Workgroup:

- Participated in teleconference calls to provide our state and local partners with updates on the status of investigation activities currently taking place at the MING PFAS sites and plans for future site work.
- Established the Restoration Advisory Board (RAB) for the Camp Grayling site. This process involved extensive cooperation and coordination with our state and local partners at EGLE, RRD Gaylord District Office, MDHHS's toxicology group, the Michigan Department of Natural Resources (MDNR), and the local health department. As of the end of fiscal year 2019, one RAB meeting had been held and operating procedures and guidelines were being developed.
- Coordinated with state and local partners to sample private wells near the Camp Grayling Maneuver Area Training Equipment Sites (MATES) facility, working with the local health department to communicate and explain the resulting data to homeowners.
- Coordinated with state and local partners to provide bottled water to residents whose well exceeded criteria near the Grayling Army Airfield.
- Had open discussions with EGLE regarding the occurrence of, and potential/possible response actions for, foam on Lake Margrethe.
- Implemented effective coordination, preplanning, and execution of multiple public meetings in Grayling.
- Worked closely with EGLE to coordinate ongoing Site Investigation (SI) and Remedial Investigation (RI) activities that are being conducted simultaneously by EGLE and the Michigan Army National Guard (MIARNG) at Camp Grayling. The MIARNG authorized and coordinated EGLE access to Camp Grayling on-post locations as requested by EGLE.
- At the Grand Ledge Army Aviation Support Facility (AASF), a Preliminary Assessment (PA) was finalized; the SI contracting and planning were completed; and SI Phase 1 was completed. As of the end of fiscal year 2019, Phase 2 of the SI had begun.
- Maintained open dialogue with regulators who manage the district in which the Grand Ledge AASF resides, regarding SI results and necessary next steps.
- Coordinated and obtained consensus for the initiation of the Plumestop Pilot Study initiated in the fall of 2018 at the Grayling Army Airfield, to demonstrate in-situ treatment of PFAS in groundwater.

- Completed permitting, startup, and normal operation of the full-scale Granulated Activated Filter system at Belmont Armory. Began standard operation, including monitoring and maintenance.
- At the Fort Custer Training Center, completed the PA and began developing the PA report.
- At the Alpena Combat Readiness Training Center, the PA, SI, and additional SI for the proposed new aircraft hangar was completed.
- At the Battle Creek 110th Wing, completed the PA and SI. The SI will be implemented in fiscal year 2020 after comments are received from EGLE on the final draft.
- At the Selfridge 127th Wing:
 - SI Report was submitted to EGLE.
 - Final Short-Term Storm Water Characterization Study (STSWCS) Plan was submitted to EGLE and STSWCS field activities were completed.
 - Draft Final STSWCS Report was submitted to EGLE.
 - Final Storm Water PFAS Study (SWPS) Quality Assurance Project Plan was submitted to EGLE.
 - SWPS field activities are ongoing. SWPS results received were submitted to EGLE. Ongoing monitoring of Selfridge Air National Guard Base's National Pollutant Discharge Elimination System (NPDES) permitted outfalls will be conducted.

Partnerships:

The MIARNG has an excellent working relationship with the EGLE Gaylord District Office RRD staff, MDHHS personnel assigned to the Camp Grayling project, and District Health Department #10. The MIARNG has also benefited from working closely with EGLE staff experienced in the process of RAB formation and PFAS foam.

Challenges:

- It is sometimes difficult to generate full participation of, and spirited two-way communication with, group members when members are participating remotely (via telephone).
- Lack of well-demonstrated, full-scale remedial alternatives for treating PFAS in soil and groundwater in-situ.
- Long-term planning for site response actions in an uncertain and changing regulatory environment.

Next Steps:

- Investigative SI/RI field efforts will begin at Grayling Army Airfield, Camp Grayling Cantonment Area, and Grand Ledge AASF/Armory.
- As of mid-September 2019, the Military Installations Workgroup was expecting latest results/reports from field investigations at the Camp Grayling Cantonment Area and Camp Grayling MATES within the next few months.

- A demonstration project at Grayling Army Airfield involving an Environmental Security Technology Certification Program (ESTCP) PFAS Mobile Laboratory demonstration began in October 2019. (Photo of the laboratory is at right). The ESTCP is the United States Department of Defense's environmental technology demonstration and validation program. The project will demonstrate the viability of rapid turnaround PFAS analyses in the field.
- Continuing periodic groundwater sampling and analyses to monitor the ongoing/long-term success of Plumestop technology for the in-situ treatment of PFAS in groundwater at the Grayling Army Airfield.
- At the Selfridge 127th Wing, additional sampling at various locations in the storm water conveyance system and soil, groundwater, and water sampling activities is scheduled. The review of options for control measures to reduce PFAS loading within the storm water system is occurring based on water, soil, and groundwater sampling results. A design and procurement of a control measure will be ongoing through the end of calendar year 2019.
- Continued open communication and cooperation with state and local agencies as the MING moves through the CERCLA process at the various facilities.
- Continued movement through the CERCLA process at each of the sites currently active in this process. This will include successful PFAS impact delineation and risk determinations for each site, resulting in successful and long-term remediation of any identified risks to human health or the environment.



Pollution Prevention Workgroup

The mission of the Pollution Prevention Workgroup is to develop preventative educational and outreach material for distribution and deliver technical assistance to industries of interest on an as-needed basis.

Successes:

In fiscal year 2019 the Pollution Prevention Workgroup:

- Provided products research to district staff who encountered the historical use of a product, by tracking down Safety Data Sheets and working with EGLE toxicologists, the Toxic Substances Control Act chemical inventory staff, or companies to determine if the product contained PFAS.
- Assisted with the analysis of House Bill (HB) 4389 and HB 6373.
- Analyzed HB 6373 with AQD, RRD, WRD, and MDHHS.
- Performed a data pull for all wastes described as having “fluor-” in the description for identifying possible PFAS use in industry for assistance in replacement chemicals.
- Drafted recommendations for fire suppression system installers concerning hauling and disposal of PFAS-containing AFFF material and PFAS-contaminated AFFF material.

Partnerships:

The Pollution Prevention Workgroup has partnerships with:

- EGLE District Office staff
- United States Coast Guard
- Australia Environmental Protection Agency
- A national group organized by the Interstate Chemical Clearinghouse to share information about PFAS-containing products and materials in use by industry and consumers
- Ecology Center

We would like to engage more closely with manufacturers, retailers, and the business community.

Challenges:

- Trying to change the mindset from a “cleanup” focus to a “prevention” focus to mitigate the need for future cleanups.
- Safety Data Sheets do not disclose PFAS or other chemicals of interest, which makes it complicated to identify products containing PFAS.

Next Steps:

Shorter term activities that will be implemented by the Pollution Prevention Workgroup include:

- Continuing to identify Class B Foam through the United States Coast Guard.
- Developing a plan to encourage industries to advertise products as “PFAS-free.”
- Continuing to work with the USEPA to identify Michigan companies reporting quantities of PFAS compounds.

- Continuing to reach out to the Australia Environmental Protection Agency to learn more about PFAS Pollution Prevention efforts.



Longer-term activities that will be implemented by the Pollution Prevention Workgroup include:

- Drafting a policy proposal to eliminate sources of PFAS chemicals.
- Developing an FAQ document.
- Eliminating PFAS from consumer products.
- Working to develop model legislation to set up a system to identify chemicals of concern and identify consumer products that contain those chemicals. Then work with manufacturers to remove those chemicals from their products.
- Ongoing internal technical education for the products and chemicals of concern.

Continued external engagement with the community, key stakeholders, and businesses.

Surface Water Workgroup

The mission of the Surface Water Workgroup is to collect surface water and fish tissue samples for PFAS analysis by a certified laboratory. Results are shared across MPART and used to identify PFAS problems and sources and to inform the need for public health fish consumption advisories.

The Surface Water Workgroup consists of representatives from the RRD and WRD, as well as two representatives from the MDHHS.

Successes:

- Successfully completed follow-up sampling and additional sampling as requested during the year.
- Collected 478 surface water samples for PFAS.
- Developed and began implementing a Lake Huron monitoring plan to determine whether the Oscoda area is a source of PFAS contamination in the Tawas area.
- Gave several presentations describing the state's fish and surface water monitoring strategy to facilitate the development of monitoring by other states. Also presented monitoring results to the United States Fish and Wildlife Service (USFWS).
- Successfully collected/analyzed wildlife



and forage fish samples from select Areas of Concern as part of a USFWS Great Lakes Restoration Initiative grant.

- The Foam subgroup:
 - Addressed complaints that came in from the Pollution Emergency Alerting System (PEAS) related to foam. This ranged from informing citizens about the difference between PFAS foam and naturally occurring foam to actual foam sampling.
 - Worked with a contractor to have ice at Van Etten Lake analyzed for PFAS and learned the surface layer had higher concentrations than the middle or lower layers.
 - Worked on a foam response plan for Van Etten Lake, which started as a response that would involve hydrovac units as far away as southeast Michigan and evolved into a local response involving smaller vac systems operated out of trucks. The local approach had numerous hurdles, however, including insurance issues.
 - Drafted a questionnaire related to foam to better document foam inquiries submitted through PEAS.
 - Provided content to update the foam page on the MPART Web site.

- Began working on an online form for EGLE staff, as well as the public, to report foam sightings. This information will be used in developing surface water monitoring activities intended to identify sources of foam.
- Also commissioned a Surface Water Foam Study with the following deliverables:
 - Development of a Conceptual Site Model on surface water foam generation
 - Discussion of key findings and EGLE goals
 - Graphical comparisons of surface water and foam data
 - Surface water foam sampling guidance documents

Partnerships:

- Strong relationships were developed with district staff to tap their knowledge about potential sites where PFAS may be a problem. A district staff person was also included as an author on the monitoring reports to make sure that point source data were summarized properly.
- The PFAS monitoring coordinator also developed a strong partnership with MDHHS toxicologists and laboratory personnel.
- Had discussions with researchers at Purdue University regarding their planned monitoring projects in Clark's Marsh and elsewhere.

Challenges:

- Surface water sampling of PFAS can be highly variable depending on the source of the contamination, environmental conditions, etc. To help overcome this challenge, approval was obtained to use recently developed sampling technology involving passive samplers to monitor for PFAS over an extended time period.
- A challenge that arose early on was the need to make sure key district staff were given the opportunity to provide input on monitoring plans. It was also challenging to make sure everyone received sample results in a timely manner. District staff now provide input on all sampling plans, and we have a wide distribution list of people receiving monitoring results.
- A subgroup dealing with the presence of PFAS foam in surface waters was established to overcome the complexity of dealing with foam issues.

Next Steps:

- Complete the sampling of priority waterbodies listed in the "2019 WRD PFAS Surface Water & Fish Tissue Sampling Plan" by the end of the calendar year.
- Finalize a fish and surface water quality monitoring plan for the 2020 field season by the end of the calendar year.
- Develop plans to use passive samplers at additional sites in fiscal year 2020. Passive samplers (shown left) will continue to be used to locate sources of PFAS to surface waters and to potentially provide evidence of improvements.



- Resample fish downstream of past significant point sources of PFAS where corrective measures have been put in place to determine whether levels of PFAS have decreased. Sites to be examined will include Kent Lake (downstream of Wixom Plating), Holloway Reservoir (downstream of Lapeer Plating), and others.
- Finalize a PFAS report summarizing the results of wildlife sampling conducted as part of a USFWS Great Lakes Restoration Initiative grant.
- Finalize instructions to staff on dealing with foam complaints and the form to better document complaints submitted through PEAS.

Treatment Technology Workgroup

The mission of the Treatment Technology Workgroup is to continue to track treatment technology and share data and information among members.

Successes:

The Treatment Technology Workgroup meets consistently and shares knowledge, updates fellow members on treatment technology, and helps programmatic experts share information freely. In fiscal year 2019 the Treatment Technology Workgroup successfully studied and tracked available PFAS treatment technology. There was a lot of work to do because the science and analytical methods are rapidly changing and advancing.

The Treatment Technology Workgroup was originally intended to track, study, and document available PFAS treatment methods. This mission was largely aimed at facilities regulated by laws implemented by EGLE. Once successful treatment options were shared, vendors were very interested in sharing their products and services, which changed the expectations of the Treatment Technology Workgroup. We maintained our original mission but also interacted with vendors and answered questions as experts. The mission further evolved with the inception of a stakeholder Treatment Technology Roundtable concept. EGLE ran the roundtable, provided water samples for bench studies, filled data requests, and started planning the upcoming (October 2020) Treatment Technology Conference.

The Treatment Technology Workgroup has successfully studied the treatment technology and engineering requirements to determine that, if necessary, publicly-owned WWTPs can feasibly utilize powdered activated carbon to treat PFOS to meet water quality standards (WQSs). (Shown right: the North 34th Street Pump and Treat System)



In fiscal year 2019 the Treatment Technology Workgroup:

- Developed a systematic way to handle a high volume of vendor contacts, including a form to document vendor technology information, along with a process to review and document the data for future use by both external and internal parties. This is expected to result in a curated database that could be used for tracking and documenting these technologies.
- Developed a summary of various technologies available for PFAS treatment based on the review of available literature and site tours (see below).
- Held roundtable meetings with members from industry, academia, state and federal agencies, public stakeholders, etc.

- May 10, 2019 – First roundtable meeting at Michigan State University. This meeting generated a list of research needs to address the PFAS problem within the state and the country.
- June 28, 2019 – Second roundtable meeting, webinar, the Health Based Screening Levels disseminated, and research needs revisited.
- August 14, 2019 – Third roundtable meeting; Ypsilanti, Michigan. During this meeting, the participants identified key criteria to prioritize research and identified top research priorities to address PFAS problems in Michigan.
- Worked toward a standalone conference for PFAS in Michigan to be held in October 2020.
- Members participated in site tours and treatment conferences, specifically:
 - November 2018:
 - Michigan State University-Fraunhofer USA – diamond technology for treatment of PFAS-contaminated water.
 - With the Drinking Water Workgroup chair, researchers from the interdepartmental research group at Michigan Technological University looking at PFAS.
 - December 2018: The Lapeer Wastewater Treatment Plant, in conjunction with the Industrial Pretreatment Workgroup and a site visit/meeting with Lapeer Plating and Plastics.
 - Interstate Technology and Regulatory Council (ITRC) Training – Managing PFAS Contamination at Your Sites: Site Characterization, Sampling, Fate and Transport, Remedial Alternatives; Grand Valley State University, Grand Rapids, Michigan.
 - April 2019:
 - Yost Brothers, LLC, on their research and pilot testing for use of electrochemical oxidation for destruction of PFAS.
 - June 2019:
 - University of Michigan to meet with researchers and tour PFAS laboratories.
 - August 2019:
 - Tour of the City of Ann Arbor Water Treatment Plant, which is using GAC to treat for PFAS.

Partnerships:

- The Treatment Technology Workgroup developed partnerships with different EGLE divisions, other state agencies, industry, the USEPA, academics, and researchers.
- The Treatment Technology Workgroup meets with the Wastewater Workgroup to ensure alignment between NPDES Permits and industrial pretreatment and assists in implementing regulatory requirements and activities to reduce sources of PFAS to surface waters.
- The Treatment Technology Workgroup aims to expand partnerships to include more proactive work with USEPA counterparts and other states, making time and money available for involvement with the ITRC PFAS Team and other agencies seeking PFAS solutions.

Challenges:

- Involving multiple groups with no size limits.
- Time constraints for planning meetings and events.
- Changing needs and broad directions as the scope of the mission changed.
- Limitations within the laws under our purview. For example, the WRD does not dictate the type of treatment utilized at industrial facilities or groundwater remediation sites. The law requires that we specify the limitations that must be met to protect water quality, not the treatment used.
- The need to increase the conversation for pollution prevention and media transfer of pollutants.

Tools implemented to address an evolving mission included:

- Providing essential information and concise instructions for follow up to help members prioritize expectations and deadlines.
- Delegating work to roundtable members, taking the help of the team members to help navigate the directions given, and working to bring clarity by identifying achievable goals.

Next Steps:

Moving forward, the Treatment Technology Workgroup will be:

- Publishing the vendor form online in October 2019 and begin compiling information in a database.
- Involving the roundtable and various subgroups in addition to the internal workgroup.
- Identifying meaningful deliverables for this group and the roundtable group.
- Managing three subgroups.
- Organizing and holding a PFAS conference (planned for October 2020).
- Participating in the ITRC PFAS Team and knowledge sharing between other agencies.
- Discussing permitting, particularly treatment of PFAS, and identifying any gaps in terms of permitting requirements between divisions. This will include identifying how to work and be protective within the limitations of the law.
- Continuing regular meetings with roundtable members.
- Continuing regular meetings with the Treatment Technology Workgroup.
- Seeking more internal involvement from management to accomplish meaningful goals.
- Continuing and improving multiagency collaboration.
- Growing a well-developed database for not just PFAS but emerging contaminants.
- Working toward proactive instead of response ("R" in MPART).
- Promoting a dedicated resource for this effort.

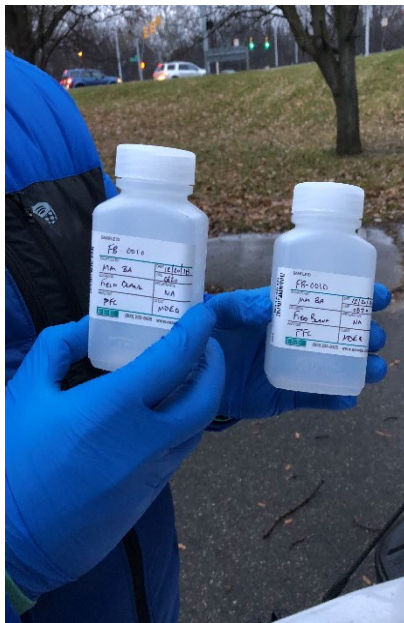
Wastewater Workgroup

The mission of the Wastewater Workgroup is to investigate sources of PFAS in wastewater that discharge to surface water or groundwater and implement source control through existing regulatory programs. Wastewater Workgroup members included WRD staff from the Field Operations Section, IPP, Point Source Monitoring (PSM) Program, Permit Section, Surface Water Assessment Section, and Biosolids Program.

Successes:

In fiscal year 2019 the Wastewater Workgroup worked diligently to identify and control sources of PFAS (primarily PFOS) being discharged to waters of the state of Michigan. Sources of PFAS to surface water include NPDES-permitted discharges from Publicly-Owned Treatment Works (POTW) that receive wastewater from Significant Industrial Users (SIU), Industrial Direct Discharges, Industrial Storm Water (ISW), contaminated groundwater discharged pursuant to a remediation system, and unpermitted discharges (including groundwater venting). Key components to this effort include:

- Source tracking based on ambient surface water monitoring for PFAS.
- PSM of PFAS at permitted (and unpermitted) NPDES discharges.
- Implementing the PFAS Industrial Pretreatment Initiative.
- Developing an NPDES Permitting Strategy.
- Screening ISW Permittees based on the IPP Initiative, monitoring results at certain SIUs, and Implementing an ISW Inspection protocol.
- Coordinating closely with the Biosolids Workgroup on sampling conducted at POTWs pursuant to the Statewide Biosolids Study.



Point Source Monitoring:

As of the end of fiscal year 2019, WRD PSM Program staff have collected effluent samples from over 70 point source NPDES discharges as an enhancement to scheduled compliance monitoring sampling events or in support of source tracking events triggered by ambient surface water sample results. These efforts, in combination with other effluent sampling conducted by WRD contractors, have helped us focus on sources of PFAS to surface waters and understand the prevalence of PFAS (PFOS primarily) in POTW discharges. For example, after finding elevated levels of PFOS in the Flint River, PSM at several POTWs helped us identify the

Lapeer Wastewater Treatment Plant as a significant source of PFOS entering the Flint River. Subsequent

Michigan has WQSs for PFOS and PFOA. The WQS for PFOS in surface waters used as drinking water is 11 ppt and in non-drinking water is 12 ppt. PFOS is 420 ppt and 12,000 ppt, respectively. Most surface water investigations are due to exceedances in PFOS.

PSM sampling within the Lapeer collection system helped to identify a large metal plating operation as the source to the Lapeer WWTP.

During regular Wastewater Workgroup meetings, which include PSM Program staff, we frequently discuss how PSM could help assist our source tracking and compliance efforts. This is a critical tool in our ability to identify sources and monitor progress toward eliminating PFOS in waters of the state of Michigan.

IPP PFAS Initiative:

The primary focus of the Wastewater Workgroup has been implementing the PFAS IPP Initiative. In February 2018 the WRD launched the IPP PFAS Initiative because municipally-operated WWTPs that are required by federal and/or state regulations to implement IPP programs have the highest potential to receive discharges from industrial facilities or contaminated sites that used/may have used/received PFAS-containing products/wastes in the past. As a result, these WWTPs have the potential to pass PFAS through conventional wastewater treatment processes to lakes and streams in concentrations that could violate state WQSs and potentially cause or contribute to fish consumption advisories or pollute drinking water supplies. In addition, the potential for accumulation of elevated concentrations of PFAS in sludge or biosolids generated at these WWTPs may impact the management of the solids and continue the cycling of these contaminants in groundwater, soils, and surface waters associated with biosolids land application sites.

Summary of IPP PFAS Requirements:

The 95 municipally-owned WWTPs required to implement IPPs had to:

- Identify industrial users to their system that were potential sources of PFAS.
- Identify which of the potential sources were probable sources of PFAS due to historical or current use of PFAS products at the facility/site. This was accomplished through surveys, interviews, review of documents (i.e., Safety Data Sheets), and site visits.
- Sample probable sources.
- Sample their WWTP discharge (effluent) if sources were above screening criteria (12 ppt PFOS).
- Require source reductions at sources identified above screening criteria. This is being accomplished through pollutant minimization plans, equipment/tank change out/clean outs, product replacements, and installation of treatment to remove PFAS, specifically PFOS, prior to discharge (pretreatment).
- Monitor compliance of industrial users with local IPP PFAS requirements.
- Submit required reports and effluent results as required by the WRD.

As a part of this effort, the WRD developed numerous products to help with outreach, including an FAQ document, Wastewater PFAS Sampling Guidance, and screening guidance, among many others. A listing of documents produced or made available through that effort can be found at: https://www.michigan.gov/egle/0,9429,7-135-3313_71618_3682_3683_3721---,00.html.

Status – February 2018 through August 2019:

A little over a year after implementation, significant progress has been made in identifying sources of PFAS, specifically PFOS, to sanitary sewer systems and reducing levels of the contaminant that were being released to the environment.

Some key observations the WRD has made during the first year of implementation:

- Implementation of the IPP PFAS Initiative, which requires identification, reduction, and control at the source, is an effective and comprehensive method of reducing PFAS levels at municipal WWTPs.
- 66 out of 95 (or 69%) WWTPs with IPPs have no sources or have sources but currently have effluent discharges in compliance with the PFOS WQS.
- 93 out of 95 WWTPs were able to complete the initial screening of their industrial users within one year of implementation of the initiative. Most were able to complete within six months.
- Low concentrations of PFOS (in the approximate range of 3 ppt to 7 ppt) were detected in sanitary wastewater, even when no significant industrial sources were present. This suggests that anthropogenic “background” levels of PFAS from residential/commercial areas may be found in most communities.
- 29 WWTPs have had effluent exceedances of the WQS for PFOS. Source reduction efforts have resulted in substantial drops in PFOS concentrations at the WWTPs (See Table 1).

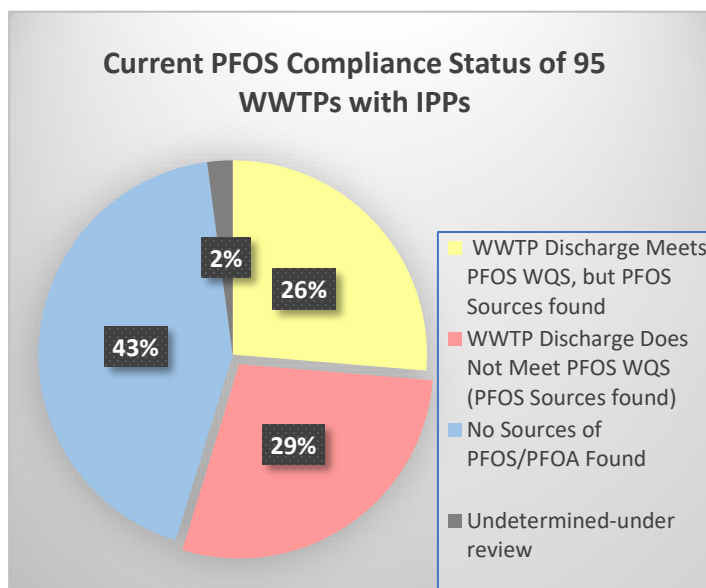


Table 1. Substantial PFOS Reduction at WWTPs with Exceedances:

Municipal WWTP	PFOS, Effluent (ppt, most recent**)	PFOS Reduction in Effluent (highest to most recent)	Actions Taken to Reduce PFOS (as of August 2019)
Lapeer	18*	99%	Treatment (GAC) at source (1)
Wixom	31*	99%	Treatment (GAC) at source (1)
Ionia	8.2	98%	Treatment (GAC) at source (1)
Howell	6	95%	Treatment (GAC/resin) at source (1)

Municipal WWTP	PFOS, Effluent (ppt, most recent**)	PFOS Reduction in Effluent (highest to most recent)	Actions Taken to Reduce PFOS (as of August 2019)
Bronson	13*	96%	Treatment (GAC) at source (1)
Kalamazoo	3.09	92%	Treatment (GAC) at sources (2); change water supply
K. I. Sawyer	39*	83%	Eliminate leak AFFF; some cleaning
GLWA (Detroit)	5.7	62%	Treatment (GAC) at sources (8)
Belding	7.2	49%	Restricted landfill leachate quantity accepted

*Effluent exceeds WQS of 12 ng/L or ppt.

**as of August 21, 2019

- As of August 2019, 22 WWTPs remained with discharges that exceed the WQS. Of these 22:
 - All 22 are actively working to reduce discharges and identify sources.
 - 18 have discharges that exceed the WQS by 32 ppt or less.
 - 12 have seen PFOS reductions from their highest sample to their most recent.
 - 6 have seen PFOS reductions of 90% or more.
 - 8 have seen PFOS reductions of 80% or more.
 - Approximately 17 have industrial sources that have installed treatment or have otherwise reduced or eliminated PFOS discharges to their system.
- Six WWTPs with significant concentrations of PFOS in their discharges have seen reductions of 90% or more within months of installation of pretreatment systems at the source and/or elimination of the source of the discharge.
- Small to mid-sized WWTPs (0.5 to 1.5 million gallons per day) were more likely than larger WWTPs to pass through PFOS at concentrations that significantly exceeded WQSs from large significant industrial users to their system.
- Metal finishing industries, specifically those involved with hexavalent chromium plating processes, and discharges associated with aqueous film forming foam (AFFF) use were the sources of the highest concentrations of PFOS to WWTPs. As of the end of fiscal year 2019, an in-depth review of sources was being developed.
- Where significant sources are present, installation of pretreatment systems to remove PFOS from industrial wastewater prior to discharge is an effective method to substantially reduce PFAS levels at the WWTP.
- Two WWTPs with exceedances discharge to surface waters with restrictive fish consumption advisories that are in place for PFOS and are likely, at least in part, due to those municipal WWTP discharges. As of early September 2019, additional data was being collected.

Although there is still work to be done, the early successes of the IPP PFAS Initiative is a result of the substantial efforts and cooperation of the municipal WWTPs and their industrial facilities to take on this complex issue despite limited resources and a lack of available treatment technology expertise for PFAS as an emerging contaminate.

Beyond the PFAS IPP Initiative:

As time has passed and as resources have allowed, the focus of the Wastewater Workgroup has expanded to include identifying direct non-municipal discharges of PFAS to surface waters and developing a strategy to address them. This primarily includes efforts to address both process wastewater discharges and industrial storm water discharges. For these types of direct discharges, including NPDES discharges from remediation “sites,” the WRD will utilize Administrative Consent Orders (ACO) with schedules to meet WQs. The WRD has begun negotiations on several discharges and developed a generic model ACO to address PFAS discharges.

In addition to the ACO process for direct discharges, the WRD’s Permit Section has developed a [PFAS NPDES Permitting Strategy](#). This strategy initially requires monitoring for facilities subject to IPP requirements based on the IPP “bin” system as well as pollution minimization requirements for those POTWs exceeding WQs. Beginning in fiscal year 2022, effluent limits or other appropriate control measures will be included in reissued NPDES Permits. As we move forward into fiscal year 2020, a greater proportion of time will be devoted to both direct dischargers and permit development efforts, while the core IPP and point source monitoring efforts continue.



Members of the Wastewater Workgroup have completed dozens of presentations on Michigan’s approach to PFAS in wastewater, including to many state pollution control agencies, industry associations, and community gatherings. Michigan is recognized for its leadership in the area of identifying and controlling PFAS in wastewater, and the WRD’s strategies are being copied by several other states. Using a very disciplined, step-wise approach based on a clear set of priorities has worked well

for the Wastewater Workgroup. By moving deliberately, we have been able to focus on developing and implementing strategies and programs and then expanding our effort to the next logical priority. There is still a lot of work to be done on all fronts to control sources and identify treatment/reduction strategies for all types of wastewater, including leachate from landfills.

Partnerships:

Outside of the MPART structure, the Wastewater Workgroup has established working relationships with:

- The USEPA's Office of Research and Development National Exposure Research Laboratory (ORD/NERL) to answer the question: "Are current PFAS 'replacement' products contributing to elevated PFOS?" As part of this effort, EGLE sampled 11 chrome platers (effluent and fume suppressants) in July 2019. The USEPA's ORD/NERL will identify PFAS in samples to find out if PFOS and/or precursors are present in fume suppressants and, if so, compare it to PFAS in the associated effluent. Targeted analysis results for 25 PFAS chemicals are expected in early fiscal year 2020, and the non-targeted analysis results, which look at PFAS constituents in a more qualitative manner, are expected by January 2020. The Wastewater Workgroup will share results to assist industry with decisions on product use, cleanup, and treatment.
- MWEA – Presentations at the MWEA meeting, as well as numerous seminars. Wastewater Workgroup staff were members of and participated in MWEA Ad Hoc PFAS, Biosolids, and IPP Committees.
- Michigan Rural Water Association (MRWA) – IPP and biosolids presentations at regional meetings.
- Northeast Biosolids Recycling Association (NEBRA) – Ongoing discussions and cooperation on research surrounding biosolids.
- National Surface Finishers Association (NSFA) – Numerous meetings and discussions to address the most significant industrial source identified through the IPP PFAS Initiative.
- MWRA – Numerous meetings and coordination with statewide leachate sampling and ongoing discussions regarding wastewater sludge disposal.

Through these ongoing relationships, the Wastewater Workgroup has been able to amplify its message on PFAS to many more recipients and engender critical support for our ongoing efforts. In addition, to those groups named above, members of the Wastewater Workgroup have presented to numerous sister pollution control agencies and national organizations interested in PFAS.

Next Steps:

In the near term, all the actions described above will continue into 2020. The Wastewater Workgroup's longer term plan includes the following:

- Continue implementation of the IPP Initiative to identify and control sources in POTWs.
- Assist POTWs to institute sewer use ordinances and pollution minimization/treatment strategies.
- Evaluate other NPDES permittees that were not included in the IPP Initiative to identify and control discharges of PFAS to surface water and groundwater. These include industrial direct dischargers and other POTWs that do not have IPP requirements as well as industrial storm water.

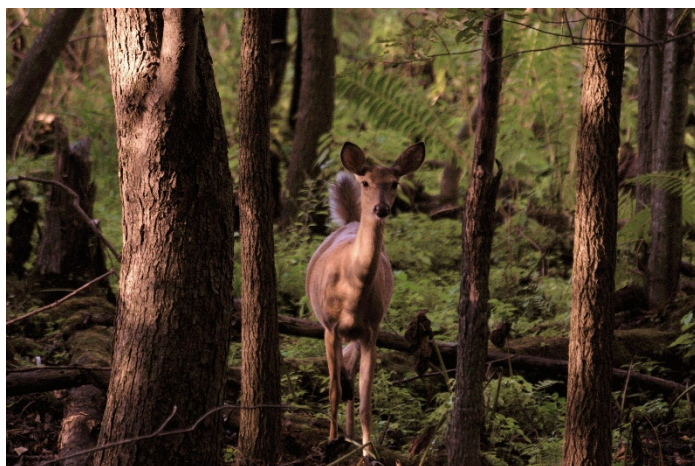
- Incorporate monitoring in NPDES Permits and ultimately (toward the end of the five-year span) institute PFAS effluent limits for those that ultimately need to install treatment or other controls.

The Wastewater Workgroup is on track with implementation of its longer term plan. There continues to be weekly and monthly challenges with treatment issues and source tracking and those areas that are hard to predict, but the Wastewater Workgroup will continue to participate in those efforts and coordinate with other MPART partners.

Wildlife Workgroup

The mission of the Wildlife Workgroup is to evaluate the potential for human health risk from PFAS through the consumption of wild game, particularly deer, and provide stakeholders with public health information to guide consumption choices based on scientific determination of risk. The Wildlife Workgroup includes staff from EGLE, MDNR, and MDHHS.

The Wildlife Workgroup has been together for about a year, and new members were added as interest widened. The Wildlife Workgroup achieved its mission in focusing on deer over the past year and made plans and developed steps to evaluate other species. While the mission has not changed, the Wildlife Workgroup also provided input on the Request for Proposals process that was led by the MDNR to develop ecological risk assessments and understanding of how PFAS moves through the environment in Clark's Marsh and the Huron River Watershed.



We do not anticipate changing our mission and will continue to focus on public health. The MDNR would like to continue to use the Wildlife Workgroup and the Surface Water Workgroup to get expert input on pathways for understanding PFAS cycling as a matter of ecosystem health and function. The hunting and fishing community requested a deeper understanding of PFAS and how it affects their interests.

Successes:

Big accomplishments for fiscal year 2019 included:

- Conducting the first statewide deer testing for PFAS in 2018, which culminated in the first do-not-eat deer advisory of its kind in and around Clark's Marsh in Oscoda Township.
- Follow-up testing for deer in Norton Creek in 2019 after high surface water and fish tissue results led to a standing "Do-not-eat fish" advisory for the entire Huron River watershed.
- Development of sampling plans using local biologists and local stakeholders in Oscoda to sample additional deer in the fall of 2019. As of the end of fiscal year 2019, plans were developed for additional follow up in Clark's Marsh in 2020.
- Informed by the work of the Wildlife Workgroup, MDNR's Fisheries Division developed a Division Directive that helps inform, on a case-by-case basis, how to handle fish stocking and rearing in waters with elevated concentrations of PFAS.

The strength of the Wildlife Workgroup is the dynamic staff that have been asked to work in this workgroup. It is a great group of focused individuals from the MDNR,

EGLE, and MDHHS. We created and are managing a Wildlife Workgroup SharePoint site to serve as a repository for workgroup materials to enhance access to information. We also invited occasional guest speakers who presented on ongoing relevant research.

Partnerships:

The Wildlife Workgroup is currently working with the United States Forest Service on issues pertaining to Clark's Marsh, and as we enter into specific research projects, we will be partnering with Michigan State University, Purdue University, and Western Michigan University to leverage the funding that we have invested in the projects to the maximum amount possible.

The Wildlife Workgroup would like to start a line of communication with other state agencies working on the issues of PFAS and wildlife, particularly as it relates to management of fish and wildlife species and PFAS contamination. There exists grey literature and research in other states that could be used to inform our objectives, questions, and path forward. We have reached out to Wisconsin Department of Natural Resources staff, who came to Michigan to learn about the MPART framework, but would like to identify similar points of contact in other states.

Challenges:

Challenges included time allocation and communication. Most of the Wildlife Workgroup members would like to spend more time on the issue, but all members have competing demands, not unlike all of the other workgroups. We compensated for this by trying to keep work measured between meetings with specific goals, keeping steady progress toward the goal. The public has voiced impatience with our pace, but we believe we are moving as quickly as we can in an effort to be the most efficient and effective with time and resources. Some communication issues arose from MDNR staff expectations that we also were to communicate the most recent information on surface water sampling and fish consumptions advisories to the field offices. This resulted in inefficient communication from field staff to the public. We intend to pursue better communication between the workgroups that have similar charges for more efficient communication in the coming year.

As with other workgroups, the Wildlife Workgroup is challenged because of the lack of scientific data and established methods. The lack of data and methods for sampling wildlife requires the Wildlife Workgroup to create novel frameworks for sampling, analyzing, and translating those results to consumption advisories.

The broader communication issue has been somewhat addressed by the creation of a weekly listserv by MPART that outlines new sites, accomplishments, etc., that gets sent to interested parties. To guide our sampling, the Wildlife Workgroup consulted with subject matter experts (i.e., avian biologists and deer specialists) to learn more about life history strategies, feeding habits, etc. As of the end of fiscal year 2019, we were also in the process of contracting ecological risk assessment and hydrologic studies in the Huron River watershed and Clark's Marsh ecosystem to university partners.

Next Steps:

As of the end of fiscal year 2019:

- The MDNR was in the process of finalizing the contract with Purdue University for an in-depth ecological risk assessment study for Clark's Marsh. Work is anticipated to start after the end of fiscal year 2019 and will help uncover how PFAS is moving through the Clark's Marsh ecosystem and how that relates to human health risk.
- The Wildlife Workgroup was developing the final contracts for two studies in the Huron River Watershed. One study is with Michigan State University for the ecological risk assessment work and the other with Western Michigan University to look in-depth at the hydrology of the groundwater and surface water in the Huron River to better understand PFAS circulation through the watershed.

Short-Term:

- Establishing the priority questions and sampling protocols for PFAS in waterfowl in Michigan.
- Determining priorities for the next species to understand (potentially turkey?).
- There is also interest in creating a Great Lakes states PFAS Wildlife Workgroup for information sharing.
- Releasing the Norton Creek deer sampling results via a press release on October 2, 2019.
- Receiving results from deer testing planned for the 2019 deer season in approximately February 2020.
- Conducting cluster sampling that will be occurring in Clark's Marsh in the spring of 2020. We anticipate that these results will guide consumption advisories for deer hunting season in the fall of 2020.

Plan for Next Year/Five-Year Plan:

Over the next five years, the Wildlife Workgroup will aim to provide and utilize the best available science to determine whether PFAS levels in Michigan's wildlife pose a human health risk and develop a framework to assess and communicate that risk, specifically:

- The Wildlife Workgroup would like to quantify the distribution of PFAS in additional key game species (i.e., waterfowl and turkey) in Michigan and translate these results to consumption advisories.
- Use the results from research in the Huron River Watershed and Clark's Marsh ecosystem to guide the next steps for sampling and to help identify future assessments for consumption advisories.