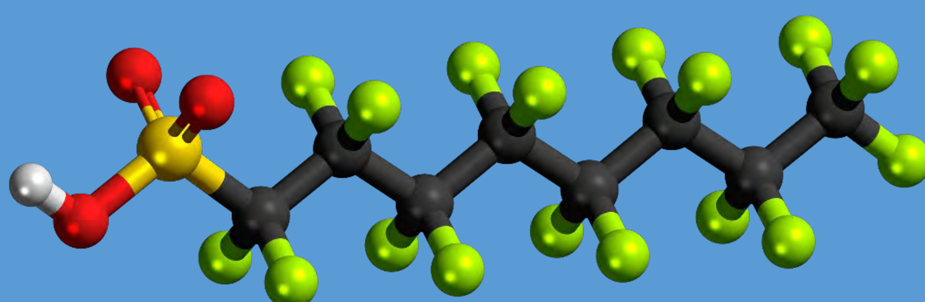
EXHIBIT 1

SCIENTIFIC EVIDENCE AND RECOMMENDATIONS FOR MANAGING PFAS CONTAMINATION IN MICHIGAN



Michigan PFAS Science Advisory Panel

Dr. Scott Bartell
Dr. Jennifer Field
Dr. Dan Jones
Dr. Christopher Lau
Dr. Susan Masten
Dr. David Savitz (Chair)

December 7, 2018

GOVERNOR'S FOREWORD

As governor of the State of Michigan, I have committed to a proactive approach to identifying and defining the extent of per and poly-fluoroalkyl substances (PFAS) contamination in our state. When that contamination has been discovered, the state and local partners act immediately to protect public health.

Significant partnerships have been formed with federal agencies, academia, and stakeholders to help Michigan address the nationally emerging PFAS threat. As part of this initiative, I directed the formation of a PFAS Science Advisory Panel to provide guidance to the state from some of the top minds addressing this issue nationally. As we moved forward, we quickly found that Michigan is leading the nation in many ways and should be used as a model for other states as they begin to address this national problem.

I appreciate the time and generosity of the outstanding scientists who developed this report. I know their work will serve to inform the people of Michigan and others across the nation as the United States comes to grip with a growing contaminant for which the science continues to emerge.

Rick Snyder,
Governor

Scientific Evidence and Recommendations for Managing PFAS Contamination in Michigan

Michigan PFAS Science Advisory Panel

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Report developed for the Michigan PFAS Action Response Team (MPART), Lansing, MI
December 7, 2018

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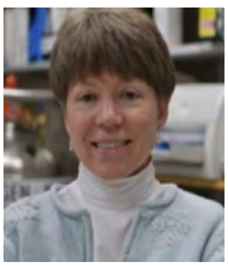
THE MICHIGAN PFAS SCIENCE ADVISORY PANEL

Dr. Scott M. Bartell - Dr. Bartell is an Associate Professor in Public Health, Statistics, and Epidemiology at the University of California, Irvine. His research interest is environmental health methodology, with an emphasis on environmental epidemiology, exposure science, and risk assessment. For the C8 Health Project/C8 Science Panel Studies, Dr. Bartell has worked on linking fate and transport models and a pharmacokinetic model for perfluorooctanoic acid (PFOA, or "C8") with individual-level residential histories and health outcomes. He has also developed formal statistical methods for biomarker-based exposure estimation and for estimating the biological half-life from observational data in the presence of ongoing exposures. He has served on scientific advisory committees for the National Research Council, the U.S. Environmental Protection Agency, the Centers for Disease Control and Prevention, the National Institute of Environmental Health Sciences, the U.S. Department of Energy, and the International Agency for Research on Cancer.



Dr. Jennifer Field – Jennifer Field is a Professor in the Department of Environmental and Molecular Toxicology, College of Agriculture Studies at Oregon State University. Dr. Field's current research focuses on the development and application of quantitative analytical methods for organic micropollutants and their transformation products in natural and engineered systems. Early in her career, she focused on field-based research to investigate the fate and transport of surfactants in groundwater and wastewater treatment systems. She participated in interdisciplinary research with hydrologists and engineers in order to develop 'push-pull' tracer test methods for determining *in-situ* rates of reductive dechlorination and anaerobic biodegradation of aromatic hydrocarbons. She was a pioneer in the area of fluorochemical occurrence and behavior, with a focus on groundwater contaminated by fire-fighting foams, municipal wastewater treatment systems, and in municipal landfill leachates. Her current research in the area of environmental analytical chemistry concentrates on the use of large-volume injections with liquid chromatography/mass spectrometry as a quantitative yet cost and time-saving approach for the analysis of aqueous environmental samples. Applications of the large-volume injection technique include measurements of illicit drugs in municipal wastewater as an alternative indicator of community drug use; components of the Corexit oil dispersant in seawater, and newly-identified fluorochemicals in groundwater and landfill leachate. She serves as an Associate Editor for *Environmental Science and Technology* and was an editor for *Water Research* from 2004-2008.

Dr. A. Daniel (Dan) Jones is a Professor in the Department of Biochemistry and Molecular Biology and the Department of Chemistry at Michigan State University, where he also has served as Director of the MSU Mass Spectrometry and Metabolomics Core since 2005. For the past 34 years, his research has focused on development and application of mass spectrometry and chromatographic separations for global metabolite analysis, analysis of protein modification by reactive metabolites of drugs, toxins, and endogenous xenobiotic compounds, and analytical chemistry in clinical, environmental, agricultural, and bioenergy applications. His current research centers on development and application of rapid, sensitive, and information-rich mass spectrometry techniques for large-scale profiling and localization of metabolites (metabolomics), elucidating metabolite structures, and measuring exposures to xenobiotic substances. He currently serves as Secretary and Member of the Board of Directors of the Metabolomics Association of North America.

Dr. Christopher Lau – Christopher Lau is Chief of Developmental Toxicology Branch in Toxicity Assessment Division, National Health and Environmental Effects Research Laboratory in the Office of Research and Development at U.S. Environmental Protection Agency. He also holds appointments of Adjunct Assistant Professor at Duke University in the Department of Pharmacology and Cancer Biology, and Adjunct Professor at North Carolina State University the Department of Molecular Biomedical Sciences, College of Veterinary Medicine. He also serves as Associate Editor for *Toxicology, Reproductive Toxicology,* and *PPAR Research*. His research focuses on characterizing the chemically induced developmental toxicity during embryonic and perinatal life stages, understanding their modes of action, and applying such information to human health risk assessment. He has led a team of investigators on PFAS toxicological research for over a decade and published extensively on this topic.

Dr. Susan Masten – Susan Masten is a Professor in the College of Engineering at Michigan State University. Dr. Masten's research involves the use of chemical oxidants for the remediation of soils, water, and leachates contaminated with hazardous organic chemicals. She has conducted research on the *in-situ* use of gaseous ozone to oxidize residual contaminants in saturated soils using ozone sparging and in unsaturated soils using soil venting. Dr. Masten has evaluated the toxicity of the by-products of chemical oxidation processes as measured by gap junction intercellular communication. Her work focused on the ozonation and chlorination of several pesticides, including atrazine, alachlor, and lindane and on the PAHs, especially pyrene. Dr. Masten has also conducted research on the use of ozone-ceramic membrane filtration for the treatment of drinking waters containing organic matter and emerging contaminants. Her current work is focused on the development of treatment technologies to mitigate lead and arsenic in drinking water.

Dr. David Savitz – David Savitz is a Professor of Epidemiology in School of Public Health, at Brown University, he also servs as Associate Dean for Research, and he holds joint appointments in Obstetrics and Gynecology and Pediatrics in the Alpert Medical School. His epidemiological research has addressed a wide range of many important public health issues including environmental hazards in the workplace and community, reproductive health outcomes, and environmental influences on cancer. He has done extensive work on health effects of nonionizing radiation, pesticides, drinking water treatment by-products, and perfluorinated compounds. He is the author of nearly 350 papers in professional journals and editor or author of three books. He was President of the Society for Epidemiologic Research and the Society for Pediatric and Perinatal Epidemiologic Research and North American Regional Councilor for the International Epidemiological Association. Dr. Savitz is a member of the National Academy of Sciences Institute of Medicine. From 2013-2017 he served as Vice President for Research at Brown University.

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Executive Summary

In November 2017, after finding per- and polyfluoroalkyl substances (PFAS) in several locations in Michigan, Governor Rick Snyder issued an Executive Directive that established the Michigan PFAS Action Response Team (MPART). The purpose of MPART is to ensure a comprehensive, cohesive and timely response to the continued mitigation of PFAS across Michigan. Since its inception, MPART has worked to address 34 sites of PFAS groundwater and surface water contamination across the state of Michigan.

The U.S. Environmental Protection Agency (USEPA) classifies PFAS as an emerging contaminant on the national level. Used for more than 50 years, PFAS are a suite of chemicals used in thousands of applications throughout manufacturing, food, and textile industries. Many PFAS are stable chemicals, and thus break down very slowly in the environment, further they are highly soluble and thus easily move from soil into groundwater or surface water. PFAS have been used in many Class B firefighting foams, food packaging, Teflon pans and cleaning products. They have also been used by industries such as electroplating, tanneries, furniture and clothing manufacturing where waterproofing or protective films are required.

<u>Need for Science Advisory Panel</u>

To protect public health and the environment for the people of Michigan, MPART and the Legislature have asked for guidance, based on the most contemporary science available, to address aspects of PFAS, specifically perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) Health Advisory Levels, Adverse Health Outcomes, Remediation and Mitigation, and Environmental Exposure Pathways. Additionally, MPART and the Legislature also requested information on other potentially harmful PFAS other than PFOS and PFOA. This report, produced by a Science Advisory Panel (Panel) of experts from throughout the United States, provides a general understanding of human health risks associated with PFAS in the environment and evidence-based recommendations to Michigan. The state may choose to use this information, in addition to other regulatory and regional considerations and with any federal guidance, to chart a pathway forward, to protect the health and well-being of the citizens of Michigan. While this document discusses environmental pathways for PFAS contamination, its scope is directed towards human health as a first priority.

The Panel met in East Lansing, Michigan in June 2018 to obtain information from State of Michigan agency staff regarding the status of Michigan PFAS issues and the ongoing state efforts to understand the scope of PFAS as a threat to public health. The Panel worked together through email and conference calls for 6 months to the completion of its work. **This report represents the independent work and expert professional judgement from the Panel authors and does not reflect the opinions of their respective employers or the State of Michigan.**

PFAS Types and Environmental Exposure Pathways for Human Risk

Although the range of PFAS in current or recent commercial use is extensive, the most monitored and studied PFAS are small synthetic molecules known for their oil- and water-repellent properties and remarkable chemical stability, even at high temperatures. Their resistance to chemical breakdown comes largely from the strong bond between carbon and fluorine atoms. While some PFAS are large polymer molecules, these are not measured, nor have they been well-studied in terms of environmental fate and transport or toxicity. In addition, new information about environmental contamination by polyfluorinated replacements (such as GenX, ADONA and F-53B) and production byproducts has recently emerged and very little is known about their potential human and ecological health impacts. **As a result, the discussion in this report focuses more on smaller non-polymeric PFAS, as more information is available about their transport and health effects.**

A preponderance of evidence shows that PFAS are transported through water, soil, and the atmosphere and can be found in drinking water, foods, consumer products, and indoor dust. Prior studies suggest that when PFAS levels in drinking water are high, consumption of drinking water is the major route of human PFAS uptake, whereas foods are the dominant source when levels in drinking water are lower. Food contamination may arise from routes including consumption of seafood (primarily fish) and food that has been in contact with PFAS-treated packaging materials and uptake from contaminated waters and biosolids into food products.

The relative contributions of each route of transport remain largely unknown. The impact of the application of contaminated biosolids (sewage sludge) to farm fields and subsequent PFAS transport into foods also has large knowledge gaps. Given the global sources of foods consumed in Michigan and the persistence of perfluorinated chemicals in the environment, management of human exposures to PFAS in foods requires more knowledge about food contamination and biomonitoring (measuring the amount of PFAS in people) to assess exposures. **Despite specific findings of high PFAS levels in some foods such as fish from contaminated waters, surveys have yet to establish strong correlations between food consumption and PFAS levels in blood to suggest that consumption of specific kinds of foods should be generally avoided. Monitoring of PFAS levels in specific foods can guide health advisories.**

Other pathways such as inhalation and dermal exposure have also been noted. Inhalation of house dust represents an additional path of exposure, but there are uncertainties about its contribution to human exposure. Risks associated with dermal exposures, either through direct contact with PFAS-containing materials such as carpets, or bathing/swimming in waters contaminated with PFAS at typical levels, remain largely unknown although the information available suggests that environmental conditions for dermal exposure may not make this a major contributor to overall exposure.

Health Effects, Toxicology and Epidemiology

The health effects of PFAS have been addressed in several assessments, starting with the C8 Science Panel study (c8sciencepanel.org) and continuing with the Agency for Toxic Substances and Disease Registry's (ATSDR) draft Toxicologic Profile report in 2018. Based on those reports, ATSDR has indicated in its *Overview of Perfluoroalkyl and Polyfluoroalkyl Substances and Interim Guidance for Clinicians Responding to Patient Exposure Concerns revised in May 2018* (ATSDR Guide for Clinicians) that there is an array of health outcomes most likely to be associated with elevated exposures to PFAS, based mostly on studies of PFOA and PFOS, which the Panel has evaluated in relation to the scientific evidence. However, causality between a PFAS chemical and a specific health outcome in humans has not been established in the current scientific literature.

There is extensive toxicologic literature that addresses specific chemicals and associated health outcomes which allows for some broader conclusions. In animal studies, the toxic effects of PFAS can vary widely based on their perfluoroalkyl chain lengths and functional groups, as well as the species and sex differences of the animal models. The hepatotoxic and metabolic effects, immunotoxicity and developmental toxicity of PFAS are supported by the strongest weight of evidence, but their effects are subtle at low doses that are most relevant to environmental exposure. Carcinogenic effects of PFAS and their relevance to human health risks are less certain. Studies of cancer are limited, but the C8 Health Project evidence supported an association of PFAS environmental exposure with kidney and testicular cancer outcomes. PFAS are not known to be genotoxic or mutagenic, but both PFOA and PFOS have been shown to induce tumors in rodents and fish. The International Agency for Research on Cancer recently reviewed the scientific literature on PFOA and cancer and concluded that PFOA is "possibly carcinogenic to humans" based on "limited evidence" in humans, "limited evidence" in experimental animals, and "moderate evidence" for mechanisms of carcinogenicity that are relevant to humans. Combining the evidence from toxicology and epidemiology, the evidence supports the carcinogenicity of PFAS, but cancer may not be the most sensitive health outcome to guide regulation for the protection of public health.

As noted by the National Institutes of Health, immunologic effects of PFAS are supported by epidemiologic studies indicating suppression of children's immunologic reactions to vaccines at low exposure levels and supported by toxicologic evidence of adverse effects on the immune system in laboratory animals. While adverse reproductive and developmental effects are clear from toxicology studies, the human epidemiologic studies suggest a reduction in birth weight.

Toxicologic evidence indicates adverse liver and kidney effects in laboratory animals, with limited human epidemiologic support, and there is mixed evidence regarding endocrine effects (particularly thyroid), neurodevelopment, and obesogenicity (obesity). Future epidemiologic studies that address clinical health outcomes (not just subclinical biomarkers) and toxicologic studies that provide guidance on the full array of PFAS, are most likely to directly impact environmental regulation.

The Panel agrees with the assessment reflected in the ATSDR Guide for Clinicians with regard to associations of PFAS exposure to alterations of thyroid function, high cholesterol, ulcerative colitis, testicular cancer, kidney cancer, pregnancy-induced hypertension, and elevated liver enzymes but have some differing views on specific areas of concern. For example, because elevated serum uric acid could well be a correlate rather than consequence of elevated blood levels of PFAS, the Panel might eliminate that from the list of potential health outcomes due to PFAS. The Panel would add immunologic effects to the list of health condition of concern, particularly those that arise during prenatal exposure and childhood, and reduced birthweight should also be added, based on strong toxicologic findings and supporting epidemiologic evidence.

PFAS health impacts are based on a person's total exposure to PFAS from many sources. However, based on current knowledge, drinking water is the predominant source of exposure for many people consuming contaminated water, so it remains the focus for health-based regulation, despite potential contributions from consumer products, crops, and other pathways. The USEPA, ATSDR, and a variety of states have determined advisory levels ranging from around 13 to 70 ppt (parts per trillion) for PFOA, PFOS, or the sum of PFOA and PFOS in drinking water, based on immunological, developmental, and other toxicity studies in laboratory animals. The differences in these recommended limits reflect selection of different health outcome, or different assumptions regarding water consumption rates or lactational (breast milk) transfer in toxicologic models that can estimate human risk. The pharmacokinetic models used to link serum concentrations in these animal studies to human doses can also be used to determine the serum concentration expected to result in humans. For example, consumption of 70 ppt PFOA in drinking water over a period of several years is expected to result in an average serum PFOA concentration of about 10 ng/ml in adults, and about 16.5 ng/ml among those with higher rates of water consumption. These serum concentrations fall above the average range of PFOA values reported for a representative sample of the US population in serial National Health and Nutrition Examination studies (NHANES), and within the second or third quartile of exposure categories in several published epidemiological studies in highly exposed populations such as the C8 Science Panel Studies. Increases in ulcerative colitis, some cancers, and other health effects have been reported for these exposure categories. Therefore, **if one accepts the probable links between PFOA exposure and adverse health effects detected in the epidemiological literature as critical effects for health risk assessment, then 70 ppt in drinking water might not be sufficiently protective for PFOA, and possibly by extrapolation to PFOS.**

Based on the available evidence for PFOA, in particular, the combined evidence from toxicology and epidemiology the Panel concludes that the research supports the potential for health effects resulting from long-term exposure to drinking water with concentrations below 70 ppt. The epidemiologic evidence that supports health effects from the serum levels produced by long-term exposure to 70 ppt pertains to developmental immunologic outcomes as well as adult diseases evaluated by the C8 Science Panel and are further supported by the toxicologic studies reviewed as noted in this report.

At present there are no Federal drinking water standards for PFOA, PFOS, perfluorononanoic acid (PFNA) or any of this class of compounds. However, the USEPA has established a health advisory of 70 ppt for lifetime exposure, a Lifetime Health Advisory (LHA) for the sum of PFOS and PFOA. While there is some empirical qualitative evidence supporting an approach that adds together specific forms of PFAS to set health-based limits, there is not yet a firm, quantitative basis for combining them because information is lacking about health effects of exposures to other PFAS compounds, either individually or in mixtures.

Mitigation, Remediation, and Other PFAS

There are no known natural environmental processes in water and soil that can completely destroy perfluorinated chemicals, though aerobic processes often convert polyfluorinated chemicals to other shorter perfluorinated substances that persist and may migrate between environmental media such as soil and water. Complete destruction of PFAS to compounds that are not PFAS requires high-energy remediation processes such as high-temperature incineration.

Regarding mitigation and treatment, anion exchange and granular activated carbon show promise for the removal of PFAS from drinking water supplies. Reverse osmosis also has significant potential however, as with anion exchange and granular activated carbon, the efficacy of removal of short-chain PFAS chemicals is less than that obtained for the longer-chain compounds. Laboratory-scale and pilot-scale studies are recommended before the implementation of any treatment process since the efficacy of removal varies significantly with the type of PFAS and the pH, temperature, organic matter content, and other properties of the water. Anion exchange, granular activated carbon, and reverse osmosis treatments will result in the production of waste streams that contain PFAS that would need to be further treated before release. For private drinking water supplies, certified point-of-use filters are commercially available for the removal of PFOA and PFOS.

Anion exchange, granular activated carbon, and reverse osmosis can also be used to remove PFAS from wastewater effluent and landfill leachate. However, the presence of organic matter, inorganic chemicals, and particulates will reduce removal efficacy of PFAS as compared to what is typically achievable in drinking waters. High temperature incineration is one of few treatment options that can break down PFAS released from solid material, including granular activated carbon filters, and convert the contaminants to chemicals no longer considered to be PFAS. Although research on new technologies for PFAS destruction in underway, all remediation technologies should be evaluated at laboratory bench and pilot scales to determine the efficiency of destruction and to close the mass balance of organic fluorine from the original waste stream.

Many stakeholders, including those in Michigan, recognize that PFAS contamination is comprised of more than just the two most well-known PFAS, PFOS and PFOA. Analytical methods are being developed to capture perfluorocarboxylic acids (PFCAs), perfluorosulfonic acids (PFSAs), and sulfonamido acetic acids using USEPA Method 537 but soon will also include newer PFAS (e.g., GenX) as high-quality analytical standards become available. Using analytical methods that offer data for a wide range of individual PFAS and the Total Oxidizable Precursor (TOP) assay are likely to aid in characterizing and differentiating sources and for evaluating treatment technologies. At present, USEPA methods do not capture gas-phase PFAS that are known to occur in municipal wastewater and landfill leachates. Additional methods including Particle-induced Gamma Ray Emission (PIGE), total absorbable organic fluorine, and high mass accuracy mass spectrometry offer advantages and limitations but are not yet available in commercial testing laboratories. Forensic approaches for PFAS are under development but it will likely be years before the techniques are fully validated. As fingerprinting capabilities become available, indicator PFAS are likely to be identified and pushed into analytical methods in the commercial market.
The proprietary nature of the PFAS composition of products and goods in the marketplace is problematic for states like Michigan as it impedes the ability to monitor and plan mitigation of human exposure where needed. While concealing the identity of PFAS and other components in products may be important to protect intellectual property and patents, it is problematic when chemicals like PFAS end up in the environment, impacting soil, water, food quality, and ultimately the ecosystem and human health. In order to understand the composition of products (e.g., aqueous film-forming foam) released into the environment and their potential human and ecotoxicological effects, extensive effort is required to identify the different chemicals, although chemical manufacturers and product producers already know the chemical composition of their products. Many PFAS were discovered serendipitously and, recently, some were discovered through a concerted, multi-year, team-based 'reverse engineering' efforts. Such 'reverse engineering', using modern 'non-target' mass spectrometric approaches, incurs a significant financial burden to support the human expertise and instrumentation needed to put together pieces of a complex puzzle. The result is an incomplete patchwork of understanding of the type, number, and

potential effects of PFAS now circulating in the marketplace, the environment, and in humans. States such as California and Washington have restricted the use of various chemical classes; Michigan could consider adopting policies put in place by other states but should consider monitoring for such chemicals independent of the restrictions.

Recommendations for Michigan

The Panel makes the following recommendations specifically for consideration by the State of Michigan:

1. Identification of drinking water supplies with high PFAS levels, and the implementation of PFAS removal treatment from highly-contaminated supplies should be a top priority to minimize risks to human health.

2. When high levels of PFAS contamination are detected at sources of drinking water, a biomonitoring case study should be conducted with volunteer residents to determine if their body burdens exceed those reported by the national survey (NHANES).

3. The Panel recommends that Michigan gather information to understand the extent of PFAS contamination in biosolids and encourage research to assess the fate and transport of PFAS from contaminated biosolids into crop plants and groundwater. Such information will provide guidance regarding when biosolids should not be applied in agriculture (or determine appropriate times between application and planting times) and consider site restrictions, crop harvesting restrictions, monitoring, record-keeping, and reporting requirements where PFAS contamination is a concern.

4. The Panel recommends that the State of Michigan consider both animal and human data for quantification of risk for PFOA and PFOS. Newer advisory levels have been proposed for additional PFAS, for which there are fewer epidemiological studies but sufficient toxicological evidence indicating some common modes of action.

5. For PFAS other than PFOA and PFOS, since there is limited epidemiological evidence and a less firm scientific basis for defining a specific level of drinking water as acceptable or unacceptable, inferences from toxicologic studies with appropriate margins of safety may provide the only basis for making judgments. Nonetheless, the Panel also recommends that the State of Michigan consider setting advisory limits for these additional PFAS in light of their similar chemical structures and toxicity.

6. The options for drinking water standards that we recommend the State of Michigan consider are: (a) adopting one of the advisory values developed by various agencies that are based on toxicological outcome exclusively; (b) adopting a more novel approach and developing an advisory value solely based on epidemiological findings (such as one described in this report) and one used by European Food Safety Authority (EFSA draft document to be released by the end of 2018); or, preferably, (c) developing a new set of values based on weight of evidence and convergence of toxicological and epidemiological data.

7. Given our incomplete understanding but quickly evolving scientific literature on the health effects of specific forms of PFAS, the Panel recommends that all judgments regarding acceptable levels in drinking water should be subject to periodic re-evaluation, with the potential for adopting more or less stringent criteria based on new insights.

8. Water systems facing PFAS contamination should be required to evaluate all possible remedial approaches, including the use of alternative non-contaminated sources. Once several options are chosen, then these choices will need to be tested at the bench and pilot scale using the contaminated water. Numerous factors, including initial concentrations of PFAS, specific PFAS present, background organic and inorganic concentrations, and pH will need to be considered in the design. In addition, operation and maintenance costs, ease of operation, ability to treat multiple compounds, and disposal options need to be considered. Based on these tests, full-scale options can be implemented on a case-by-case basis.

9. When regenerating PFAS-loaded activated carbon, the off-gases should be treated by high temperature incineration to capture and destroy any PFAS in the stack gases and to prevent the release of PFAS and/or partially oxidized byproducts to the atmosphere.

10. The use of NSF International certified filters is recommended where well water is contaminated with PFOA and PFOS and an alternative water source is unavailable.

11. Laboratory-scale and pilot-scale studies are recommended before implementation of treatment technologies to remediate landfill leachate and wastewater effluent contaminated with PFAS. The efficacy of treatment technologies should be evaluated based on the efficiency of destruction and completeness of converting PFAS chemicals to nonhazardous substances.

12. As anion exchange, granular activated carbon, and reverse osmosis result in the production of waste streams that contain PFAS, it is recommended that these streams be treated prior to discharge.

13. Detection of PFAS should move beyond the legacy chemicals of PFOS and PFOA, to include a suite of other PFSAs and PFCAs (Table 1), as well as replacement chemicals (such as GenX) and constituents of aqueous film forming foam (AFFF) that are being identified, when sensitive analytical methods are feasible.

14. For initial waste or site characterization, the Panel recommends use of analytical methods that measure the greatest number of PFAS as well as quantify the branched and linear PFSAs and PFCAs.

15. In cases where water is being treated for use as a drinking water source, the Panel recommends use of analytical methods that quantify short-chain PFAS because they are more difficult to remove under traditional methodologies.

16. The Total Oxidizable Precursor (TOP) assay is commercially available methodology and should be used by analytical laboratories to characterize environmental media including groundwater, wastewater, sediment, soils, and biosolids. This assay signals the presence of precursors, which is useful information when designing and evaluating remedial systems.

17. Agency staff in Michigan should keep abreast of progress in the area of PFAS forensics as techniques undergo validation for stakeholder use.

Recommendations for Research or Monitoring to Address Information Gaps

The Panel recommends the following action as a matter of research and information needed that could be pursued by Michigan or in concert with other state and federal agencies:

1. Biomonitoring of blood PFAS levels in human populations should be conducted in conjunction with measurements of contaminant levels in drinking water to assess the importance of drinking water exposure in relation to potential food, inhalation, or dermal exposures.

2. Research is needed to provide greater understanding of the potential health effects of a broader array of PFAS, not just the legacy compounds. This might include toxicology research to help in developing indices of toxicity or at least inform decisions about which specific forms of PFAS should be combined for regulatory decisions.

3. Toxicologic studies on modes of action are needed to help guide the development of indices of toxicity that would apply across a range of PFAS.

4. Epidemiologic studies of clinical outcomes are needed to build on the extensive body of research addressing biomarkers of health. While the latter can be suggested of likely health effects, direct documentation of clinical disease in relation to quantified PFAS levels is needed.

5. Health outcomes of continued interest that warrant further study include consequences of endocrine disruption, including developmental outcomes and thyroid disorders, consequences of immunologic effects, including autoimmune diseases and infectious diseases, consequences of metabolic effects, and cancer.

6. Research on the development of techniques to effectively remediate water, landfill leachate, wastewater, and biosolids should be conducted.

7. Michigan staff should collaborate with risk assessors from other health and regulatory agencies to develop models and strategies to provide an overall health risk assessment of PFAS *mixtures* that are detected at specific contaminated locales as well as in drinking water.

The Panel recognizes the importance and complexity of the issues facing Michigan and has strived to provide a clear description of the available evidence. **Michigan leadership should be commended for their efforts to address environmental and health concerns with PFAS conscientiously by developing policies that do justice to the current state of knowledge. The questions posed to the Panel are the appropriate for drawing out the information needed to make sound, evidence-based policy decisions. However, by asking these pointed, critical questions, they have also obligated us to reveal how far short the scientific evidence is in providing clear answers to many of them.** The Panel believes that it is beneficial to make use of the evidence that is available, even when it is incomplete, tentative, and subject to change as more research is done on PFAS. It is also important for the many stakeholders concerned with these issues to appreciate that even after assembling and providing a full description of current knowledge, which we have strived to do, the gaps in that knowledge require informed judgment regarding regulation and mitigation. The research does not provide direct indications of the "right" choices but with continuing progress, the uncertainties will be reduced enabling more informed decisions in the future. Although the evidence is still evolving and weak in some important areas, there is sufficient evidence from the toxicologic and epidemiologic findings to justify regulatory efforts to manage exposure for protecting human health. As scientists, the Panel welcomes the opportunity to share our understanding and insights in the service of guiding these critical policy decisions facing the State of Michigan.

SECTION 1 Introduction

In November 2017, after finding per- and polyfluoroalkyl substances (PFAS) in several locations in Michigan, Governor Rick Snyder issued an Executive Directive that established the Michigan PFAS Action Response Team (MPART). The purpose of MPART is to ensure a comprehensive, cohesive and timely response to the continued mitigation of PFAS across Michigan. Through the Executive Directive, MPART is tasked with enhancing cooperation and coordination among local, state and federal agencies charged with identifying, communicating and addressing the potential effects of PFAS in Michigan and protecting public health. The team is chaired by former Michigan Chief Deputy Attorney General Carol Isaacs, who has been authorized by the Governor to coordinate action taken on environmental, public health and public information fronts. Agencies on the team include representatives from the Michigan Departments of Environmental Quality (MDEQ), Health and Human Services (MDHHS), Military and Veterans Affairs (DMVA), Agriculture and Rural Development (MDARD), Natural Resources (MDNR), Licensing and Regulatory Affairs (LARA), and Transportation (MDOT). The team receives additional support from Michigan Departments of State Police (MSP), Technology, Management and Budget (DTMB), Treasury, and Education. MPART also coordinates with the National Guard Bureau, United States Environmental Protection Agency (USEPA), Agency for Toxic Substance and Disease Registry (ATSDR), local health departments, and municipal leaders on PFAS contaminant issues.

Since its inception, MPART has worked to address 34 sites of PFAS groundwater and surface water contamination across the state of Michigan (Figure 1). The identified PFAS sources include current and former Department of Defense sites, chrome electroplating operations, landfills, a shoe manufacturer, a former paper mill, and others. Importantly, MPART's initial response to each site has been to ensure that public health and well-being is protected. Interim response activities have included coordinating the distribution of bottled water to affected residents, installation of water filters, establishing new municipal water supplies, conducting groundwater investigations, and working with responsible parties to clean up these sites of environmental contamination.

The State of Michigan seeks to understand the best mechanisms to protect the public by locating significant PFAS contamination sites and through prevention or mitigation of people's exposure to elevated levels of PFAS. This methodological approach to investigating and defining exposure has resulted in Michigan proactively:

1. Sampling all public water systems, including any system serving more than 25 people. This is the most extensive survey of drinking water ever done within the nation and will cover 75% of the residents in Michigan, with the remaining 25% using private wells;

2. Sampling private wells when there is reason to believe the surrounding ground water may be contaminated with elevated levels of PFAS;

3. Testing waste water treatment plant effluent to determine levels of PFAS discharging into rivers or surface waters and the corresponding need for action;

4. Testing industrial effluent, landfill leachate, and military base water runoff to ensure they are not discharging elevated levels of PFAS into rivers or other surface waters;

5. Testing fish and deer to determine consumption guidance related to PFAS content; and

6. Testing biosolids (treated sewage sludge that is a beneficial resource, containing essential plant nutrients and organic matter as a fertilizer and soil amendment) which may be land applied for PFAS content.

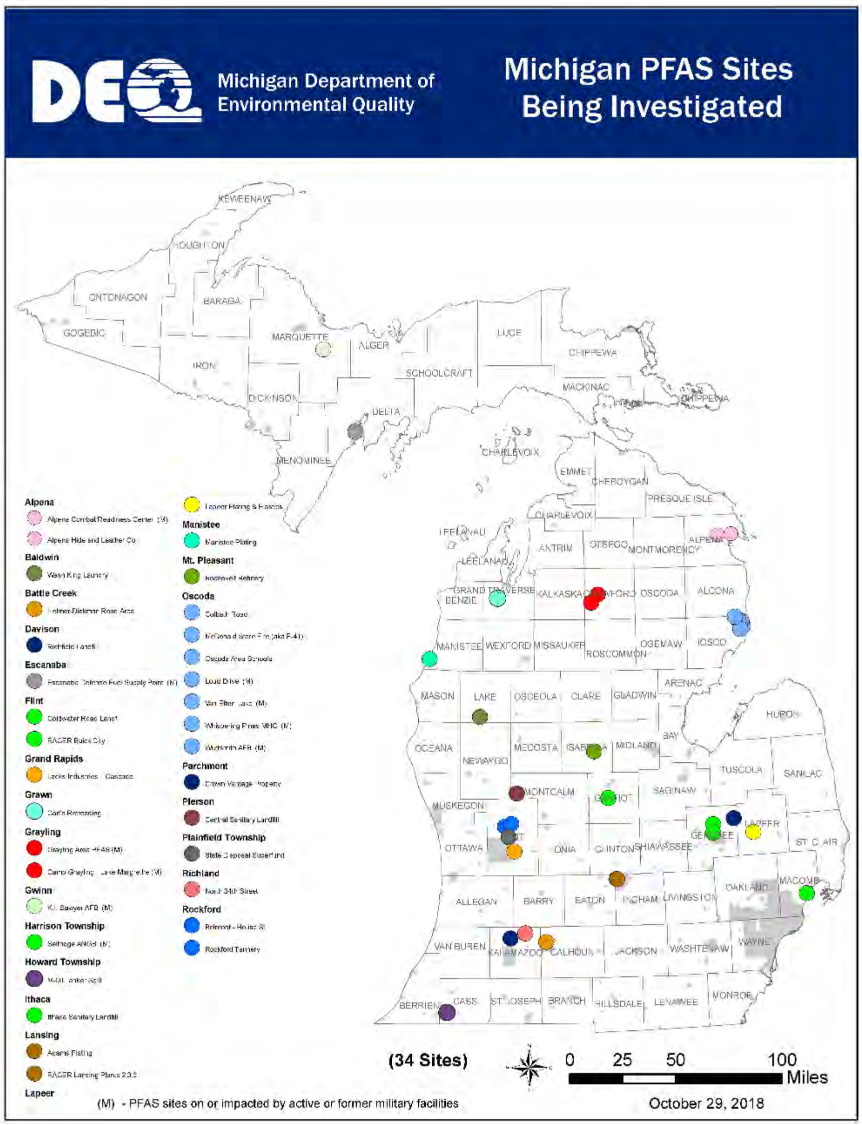


Figure 1. PFAS groundwater and surface water sites under investigation in Michigan, October 29, 2018.

Brief Background on PFAS

The USEPA classifies PFAS as an emerging contaminant on the national level. Used for more than 50 years, PFAS are a suite of chemicals that were used in thousands of applications throughout the industrial, food, and textile industries. They are stable, breaking down very slowly in the environment, and they are highly soluble, easily transferring from the soil to groundwater or surface water. PFAS have been used in many Class B firefighting foams, food packaging, and cleaning products and also used by industries such as plating, tanneries, furniture or clothing manufacturing where waterproofing or protective films are required.

Thousands of chemicals are in the PFAS family including perfluorooctanoic acid (PFOA), perfluoroctane sulfonate (PFOS), and GenX. Most information known about toxicity and environmental pathways is for PFOS and PFOA which have eight carbons (C8) and are also known as long chain PFAS. The USEPA created a Lifetime Health Advisory for PFOS and PFOA, combined, of 70 parts-per-trillion (ppt). In addition to PFOS and PFOA, perfluorohexane sulfonic acid (PFHxS), and perfluorononanoic acid (PFNA) along with a few other PFAS were reviewed in the *ATSDR Toxicological Profile for Perfluoroalkyls, Draft for Public Comment*, released June 20, 2018 (ATSDR 2018).

PFAS that are or could be transformed or broken down to PFOA and/or PFOS should no longer be manufactured in the U.S. under a voluntary agreement by industry with the EPA (https://www.gpo.gov/fdsys/pkg/FR-2007-10-09/pdf/E7-19828.pdf; https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-and-polyfluoroalkyl-substances-pfass). However, these chemicals continue to be a threat to public health because they break down slowly, are persistent in the environment, and they may build up in fish, wildlife, and humans with continued exposure (a.k.a. bioaccumulate).

The Center for Disease Control and Prevention (CDC) has tested U.S. residents' blood for a select number of PFAS. CDC's National Health and Nutrition Examination Surveys has quantified four PFAS (PFOS, PFOA, PFHxS, PFNA) in almost every person's blood sample (CDC 2017). This is likely because of the long half-life within the human body for PFAS, averaging from 2.3 to 12 years based on the type of PFAS (ATSDR 2018), and the historical proliferation and distribution of the PFAS chemicals. The CDC has further demonstrated that PFOS levels declined markedly from 2000 to 2014 in the U.S. population, which coincides with declining PFOS use in the U.S. (Figure 2).

ATSDR, is assisting local, territorial, tribal, state, and federal partners in addressing the public health concern due to human PFAS exposure. While the science surrounding potential human health effects from PFAS contamination is still evolving, available information has increased rapidly over the last decade. Thus, the State of Michigan has asked for advice and counsel from national leading PFAS scientists, in the form of a Scientific Advisory Panel (Panel) related to public health and exposures to PFAS.

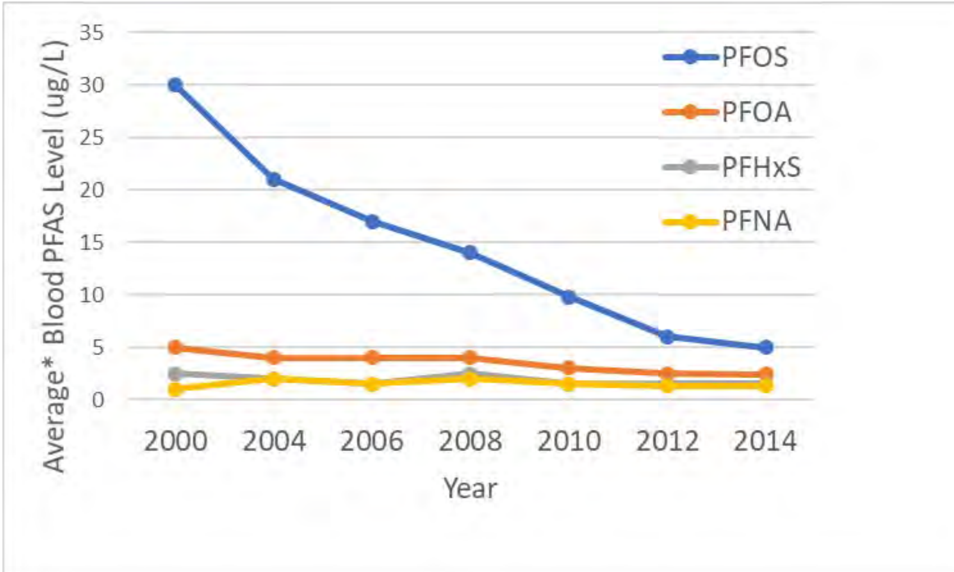


Figure 2. Average (*geometric mean) of blood levels of four PFAS detected in most people in the United States 2000-2014 (CDC 2017).

Charge to the Science Advisory Panel

To protect public health and the environment for the people of Michigan, MPART and the Legislature have asked for guidance, based on the most contemporary science available, to address aspects of PFAS, specifically PFOS and PFOA Health Advisory Levels, Adverse Health Outcomes, Remediation and Mitigation, Environmental Pathways, and PFAS other than PFOS and PFOA. This report, produced by a Science Advisory Panel (Panel) of experts from throughout the United States, will provide recommendations for an evidence-based approach towards the regulation of PFAS and a general understanding of risk to human health associated with PFAS in the environment and the resulting regulation of PFAS. The state may choose to use this information, in addition to other regulatory and regional considerations and with any federal guidance, to chart a pathway forward, to protect the health and well-being of the citizens of Michigan. While this document discusses pathways in the environment for PFAS contamination, its scope was directed towards human health as a first priority.

To help frame the work of the Panel, MPART developed a list of questions, categorized by larger theme areas. The role of the Panel was to provide information and recommendations for each of these questions and provide information regarding key risks and uncertainties associated with the information used to develop the recommendations. Other questions or revisions of these questions and areas could be addressed by the Panel as they determined appropriate. The questions were organized by topic areas and included:

1. Health Advisory Recommendations

- After a review of the basis for the recommendation and all relevant evidence, does the 70 parts per trillion USEPA Lifetime Health Advisory for PFOS and PFOA, individually or in combination, represent a level below which the risk of harm is likely to be minimal?

- After review of the applicable current PFAS research is there a substantial scientific basis to suggest that the standard for Michigan's groundwater should be more restrictive than the current 70 ppt combined for PFOS and PFOA?

2. Health Outcomes Knowledge and Guidance

- Other than the health outcomes listed on the ATSDR interim guidance for clinicians responding to patient exposure concerns (https://www.atsdr.cdc.gov/pfas/docs/pfas_clinician_fact_sheet_508.pdf), are there additional health outcomes more recently identified or associated with PFAS other than PFOS and PFOA that have a similar weight of evidence as those included on the list?
- Given the chemical-physical, toxicity, and dermal absorption information on PFAS are there any levels in water or soil that would create dermal contact concerns?
- Has the USEPA determined whether PFAS is a carcinogen?
- What types of epidemiologic studies of PFAS exposure and health outcomes would have a meaningful impact on the recommended standard for drinking water limits?

3. Remediation and Mitigation

- What are the best degradation techniques to destroy fluorochemicals in the environment? How does this strategy relate to point of service filters and whole house filters to mitigate exposure?

4. Environmental Pathways for Contamination

- Please advise on the application of biosolids that contain PFAS when those biosolids are used on farm fields.
- Are there food products that should be avoided if grown in PFAS- contaminated water or ground?

5. PFAS Chemicals other than PFOS and PFOA

- Is there sufficient information on other PFAS to guide whether or not they should be included with PFOA and PFOS in the 70 ppt standard to be health protective?
- Does sufficient research exist to allow the State of Michigan to consider regulation of other PFAS?
- Are new generation PFAS likely to be less toxic than original longer chain chemicals?

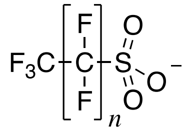
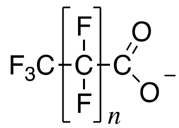
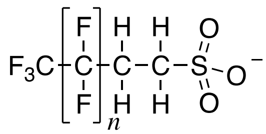
The Panel met in East Lansing, Michigan in June 2018 to obtain information from State of Michigan agency staff regarding the status of PFAS in Michigan and the work that Michigan was conducting to understand the scope of PFAS as a threat to public health. The Panel worked together through email and conference calls over the next five months to complete the report. **This report represents the independent work and expert professional judgement from the Science Advisory Panel authors and does not reflect the opinions of their respective employers or those of the State of Michigan.**

SECTION 2 Types or Classes of PFAS

Though the range of PFAS in current or recent commercial use is extensive, the most monitored and studied PFAS are small synthetic molecules renowned for their oil- and water-repellent properties and remarkable chemical stability, particularly at high temperatures. Their resistance to chemical breakdown comes largely from the strong bond between carbon and fluorine atoms. Though some PFAS are large polymer molecules, these are not routinely measured, nor have they been well-studied in terms of environmental fate and transport or toxicity. As a result, the discussion in this report focuses more on smaller non-polymer PFAS, as more information is available about their transport and health effects.

Most information about PFAS contamination pertains to substances consisting of a chain of carbon atoms, with most attached only to fluorine atoms, other carbon atoms, or a polar group that has attraction to water. These PFAS can be first distinguished by whether they are completely per-fluorinated, meaning that no carbon atoms are attached to hydrogen atoms. The primary classes of perfluorinated chemicals include perfluoroalkylsulfonates (PFSA, of which the 8-carbon compound PFOS is an example) and perfluorocarboxylates (PFCA, e.g. 8-carbon analog PFOA) that include substances varying in carbon chain length. PFSA and PFCA are resistant to oxidative breakdown (or environmental degradation) because they lack carbon-hydrogen bonds. Other PFAS contain carbon atoms (often two carbons, each with two attached hydrogen atoms), with attachments to various polar groups. Since these are still extensively, but not completely fluorinated compounds, they are termed <u>poly</u>-fluorinated chemicals. More recent processes for production of PFAS use a process known as telomerization that involves building of the carbon chain, often two carbon atoms at a time. The two-carbon building blocks may be completely fluorinated or may have hydrogen atoms in place of fluorines. As a result, many are termed fluorotelomer derivatives, annotated by the lengths of the perfluorinated and hydrogen-containing chains (e.g. 6:2 FtS has six perfluorinated carbon atoms and two carbon atoms that bear only hydrogen atoms; Table 1). The distinction between completely (perfluorinated) and partially fluorinated (polyfluorinated) PFAS chemicals is relevant later in the report, in that most perfluorinated chemicals are very resistant to degradation, whereas polyfluorinated chemicals can be aerobically broken down to PFCA.

Table 1. Categories and examples of common PFAS.

Compound class	Features of chemical structure	Classification	Examples
Perfluoroalkylsulfonates (PFSA)		Perfluorinated	PFOS (n = 7) PFHxS (n = 5) PFBS (n = 3)
Perfluoroalkylcarboxylates (PFCA)		Perfluorinated	PFNA (n = 7) PFOA (n = 6) PFHpA (n = 5) PFHxA (n = 4) PFBA (n = 2)
Fluorotelomer sulfonates (FTSA)		Polyfluorinated	6:2 FtS (n = 5) 8:2 FtS (n = 7)

SECTION 3 Pathways of Human Exposure to PFAS

PFAS are found in all indoor and outdoor environments across the globe (Blum et al. 2015). The range of PFAS exhibit properties that allow some to migrate through groundwater and surface water (rivers, streams, and lakes), be released into the atmosphere and returned in precipitation, and adsorbed by soil. Some PFAS are taken up and may bioaccumulate into food crops, livestock, wildlife, and the tissues and bodily fluids of humans through consumption of contaminated foods, drinking water, and direct contact with various consumer products (Figure 3). Each transport process has potential for differential fractionation of individual PFAS, including bioaccumulation which enhances levels relative to the surrounding environment.

PFAS vary in how they partition between water and particles, with shorter chain compounds mainly distributed in water and longer chain compounds primarily associated with particles (Ahrens and Bundschuh 2014). The lower solubility of longer chain PFAS in water drives their partitioning into particles and biomass to a greater extent than shorter-chain substances. This variation influences how individual PFAS chemicals are transported through the environment and taken up by living organisms including humans. The implication is that dominant routes of human exposure are not uniform for all types of PFAS.

Large amounts of point-source PFAS releases have occurred at industrial, military, and firefighting operations, and in lesser quantities at individual (non-point) sites when they migrate from consumer products into the environment and/or from deposition from the atmosphere. Their remarkable resistance to natural degradation processes that break down many other pollutants enables their transport across the globe and contributes to multiple pathways of exposure to PFAS in all human populations.

One particularly relevant report, published in 2012 by the Minnesota Pollution Control Agency (MPCA), followed PFAS contamination in the vicinity of the 3M Company's PFAS manufacturing site (Oliaei et al. 2013). Discharges from this facility led to widespread contamination of surface and groundwater including drinking wells, with the more mobile perfluorobutanoic acid (PFBA) reaching levels of 1,170,000 ppt (1.17 mg/L) in downgradient groundwater. Contaminated water was addressed through installation of water treatment systems, connection to alternative water supplies, and excavation and removal of contaminated soils.

The key take-away point from these investigations is that most environmental and treatment process do not completely destroy (or mineralize) PFAS, and at best, convert one PFAS form to another. Such is the case with the polyfluorinated compounds which are often converted to perfluorocarboxylates (PFCAs) that are resistant to further oxidative degradation.

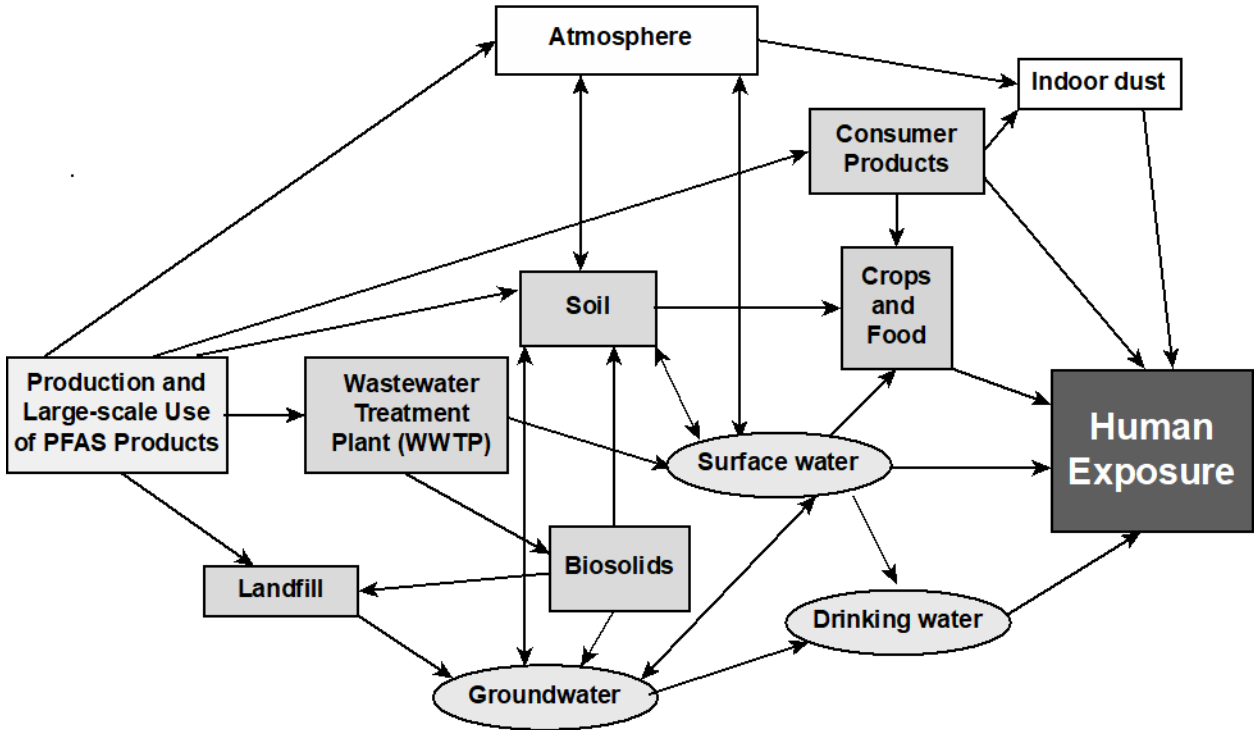


Figure 3. Environmental transport of PFAS in the context of pathways to human exposure. Figure adapted from (Ahrens and Bundschuh 2014).

PFAS contaminants in landfill and wastewater leachates and in wastewater treatment

When PFAS-containing products reach the end of their usefulness, the remainder commonly ends up in landfills, where constituents may leach from the landfill. The leachate from such point sources may be treated on-site or at a wastewater treatment plant, but the effectiveness of these processes in reducing PFAS levels or sequestering them remains in doubt (Benskin et al. 2012).

Removal and destruction of hazardous substances are principal functions of water treatment processes. Detection and remediation of hazardous substances in water are inextricably linked (Shannon et al. 2008), and numerous PFAS are present in both influent and effluent streams of wastewater treatment plants (Field and Seow 2017). Monitoring of levels of a wide range of PFAS substances at ppt (nanograms per liter = parts per trillion or ppt) levels can be costly but it is essential for assessing the fate of PFAS following treatment. Wastewater treatment plants have been recognized as a significant point of release of PFAS into natural waters and for PFAS accumulation into biosolids, particularly when industrial water releases are processed. In addition to removing nutrients and pathogens, many wastewater treatment plant processes often result in destruction of hazardous substances. However, perfluorinated compounds are notoriously recalcitrant to biodegradation, leaving their separation from water by adsorption or accumulation into biosolids as a central goal. Preferential accumulation of longer chain PFAS into biosolids has been reported (Sinclair and Kannan 2006), but PFAS are often released in wastewater treatment plant discharges. Levels of one PFAS compound (PFOA) discharged into effluent waters by six wastewater treatment plants in New York were on the order of 100 ppt, comparable to the 70 ppt EPA advisory level (Sinclair and Kannan 2006).

Although perfluorinated compounds are extremely resistant to biodegradation, some polyfluorinated compounds, most notably fluorotelomer alcohols, may undergo aerobic degradation during wastewater treatment. However, these substances are primarily converted to polyfluoroalkyl carboxylates (PFCAs) which are resistant to further degradation (Butt 2014, Chen 2017). The chemical identities of many PFAS have yet to be defined.

Direct exposures to PFAS through drinking water, foods, and consumer products

Although human exposures to PFAS occur worldwide, the contributions of specific pathways of exposure may vary across the range of PFAS, and also differ across human populations due to a person's specific use and consumption of contaminated foods and/or water, as well as their exposure to household dust, other consumer products, and in occupational settings.

PFAS occurrence in foods has been attributed to two primary sources: their bioaccumulation in aquatic and terrestrial food chains and the leaching of PFAS from food packaging materials (Schaider et al. 2017; Vestergren and Cousins 2013). Several investigations have assessed PFAS levels in foods, including a 2007 study that measured PFAS in food composite samples from the Canadian Total Diet Study. The authors estimated that mean dietary intake of Canadians for total PFCAs varied with age and gender and fell into the range of 100-480 ng PFCAs per person per day (Tittlemier et al. 2007). The report concluded that foods accounted for 61% of human PFAS exposures among these Canadian participants. Similar estimates of dietary intakes have been reported for other countries including the United States (Schecter et al. 2010), Sweden (Gebbink et al. 2015), the United Kingdom (Clarke et al. 2010), Korea (Heo et al. 2014), Denmark (Danish Ministry of the Environment 2015) and China (Zhang et al. 2011). A 2017 review of worldwide PFAS intake levels commented that regional differences may be associated with varied consumption of fish and other seafood, in which PFAS have been detected at higher levels (Domingo and Nadal 2017). A Danish report that studied only PFOA (Danish Ministry of the Environment 2015) reported a median human intake of PFOA of 2.9 ng/kg body weight/day, with fruits and fruit products being the most important contributors to PFOA exposure, followed by fish and other seafood. As stated above, they conclude that variation is substantial due to differences in diets.

Understanding of the extent of uptake of PFAS into the food chain is more limited, but several publications have explored PFAS content in foods. Vestergren and Cousins (2009) proposed scenarios for PFAS intake by humans that illustrate vast differences in contributions of various pathways of exposure. In situations characterized by background (1.3 ppt) or elevated (40 ppt) levels of PFAS in drinking water, PFAS from the diet, and not drinking water, dominated human intake. For a third scenario representing high (519 ppt) levels of PFAS in drinking water that was contaminated from a polluted point source, drinking water provided more than 75% of the estimated PFAS intake. In the C8 Science Panel Studies, PFOA in drinking water dominated total estimated human intake for water systems with PFOA concentrations above 100 ppt (Shin et al., 2011a, 2011b). For legacy PFAS with declining human serum concentrations, such as PFOA and PFOS, the relative contribution of contaminated drinking water to the total intake of those PFAS is likely higher now than it was in that past. For example, the pharmacokinetic model for PFOA described later in this report indicates that at a water concentration of 19 ppt or higher, drinking water would provide more than 50% of the estimated PFOA intake. Ghisi et al. (2018) reported low accumulations of PFOA and PFOS in peeled potatoes and cereal seeds, while short-chain compounds were found to accumulate at high levels in leafy vegetables and fruits. Contaminated drinking water also presents an indirect route of exposure through uptake of contaminants into home-grown produce (Scher et al. 2018), particularly for short-chain PFAS.

Biosolids (sewage sludge) are a product of the wastewater treatment process. Approximately 50% of biosolids produced through this process are recycled by applying them to fields, and thus they present another means of PFAS transport into foods and drinking water (USEPA 2018) Arvaniti & Stasinakis (2015) reviewed the literature on PFAS concentrations in sewage sludge (biosolids) and reported PFOA concentrations that ranged from ~0.7 to 241 ng/g dry weight in the United States. The PFOS concentrations ranged up to 110 ng/g dry weight. Additional data for biosolids levels in Europe and Asia demonstrates the ubiquitous nature of PFAS, with biosolids containing a wide range of PFAS from PFBA at the lower molecular range to N-ethyl-perfluorooctanesulfonamide (N-EtFOSA) at the higher range. A municipal wastewater treatment plant in Decatur, Alabama processed effluent from industrial PFAS manufacturers, and the resulting biosolids were applied to agricultural fields as soil amendments over a period of 12 years. The findings demonstrated that application of PFAS-contaminated biosolids led to the contamination of ground and surface waters, particularly by the more mobile short chain PFAS (e.g. PFBA at greater than 1000 ppt), whereas the longer chain compounds remained in soil (Lindstrom et al. 2011). A complementary study reported that amended soils with biosolids derived from paper fiber processing and wastewater treatment and showed uptake of polyfluorinated phosphate esters (PAPs) and PFCAs, which are products of PAP biotransformation, into the legume *Medicago truncatula* (a clover like plant that is a model for alfalfa) in greenhouse experiments and pumpkins in field experiments (Lee et al. 2014). PAPs are not routinely measured in most circumstances, and their uptake into pumpkin fruit (to 8 ng/g) has implications for human exposure through foods grown on contaminated soils.

PFAS transport to drinking water is of particular concern when high levels of PFAS from industrial and military sites leach into groundwater or surface water. Both groundwater and surface water are used for drinking water supplies throughout Michigan. Background levels in surface waters in remote areas and groundwater levels in contaminated areas provide a range for context and understanding the levels that are found through Michigan. PFOA and PFOS levels in surface waters collected from 79 fresh water sites across Japan ranging from about 0.1 ppt in remote areas to greater than 400 ppt in a site near Osaka (Saito et al. 2004). The highest levels were observed in water near an industrial wastewater disposal site (67,000 ppt PFOA), which discharges water into a river that is the source of drinking water for Osaka city. Levels of PFOA in Osaka drinking water were significantly higher (40 ppt) than in other regions of Japan. Rayne and Forest (2009) summarized results from dozens of studies reporting the presence of PFAS chemicals in lakes, rivers, and groundwaters. The levels were highly variable, from non-detect to 2,210,000 ppt in the Etobicoke River (Ontario, Canada). The PFCA and perfluoroalkyl sulfonates (PFSA) compounds found most often were the C7 PFCAs and C8 PFSA. The highest groundwater levels reported were near military bases (e.g., Naval Air Station, Fallon, NV: 6,570,000 ppt (6.5 mg/L) C7 PFCA, 380,000 ppt C8 PFSA).

Exposure through the skin, or dermal exposure, is also a pathway for consideration. Substantial levels of PFAS in house dust and soils present the potential for exposure through dermal contact, although the uptake of PFAS through the skin has only been explored for a limited range of compounds. A meta-analysis of exposure to consumer product chemicals in indoor dust relied on the assumption that PFAS intake was largely through ingestion (Mitro et al. 2016.) *In vitro* experiments reported by DuPont have suggested that under certain experimental conditions PFOA can permeate through the skin (Fasano et al. 2005; Franko et al. 2012), and a single *in vivo* study at NIOSH documented dose-dependent uptake of dermally applied PFOA, under experimental and not environmental conditions, into serum of mice (Franko et al. 2012). The PAPs, which are fluorotelomer-based chemicals, have also not been as widely investigated, but their levels in house dust samples from numerous countries were described by Eriksson and Karrman (2015). PAP levels in house dust reached as high as 692 ng/g and exceeded levels of other PFAS classes. PAPs may undergo biodegradation to form PFCAs and reactive electrophiles with potential toxicity (Rand and Mabury 2017), and as such may present a route of indirect exposure to PFCAs through ingestion.

Dermal uptake of PFOS and PFOA from water is expected to be minimal under environmental conditions where both substances exist in negatively-charged ionic forms. The laboratory conditions for the dust exposure work (Fasano et al. 2005 and Frako et al. 2012) were very different than those found in the environment and thus the results may not be directly translatable for conclusions about swimming or bathing. Information about dermal uptake of PFOA and PFOS is quite limited and understanding of uptake of shorter chain PFAS substances remains even more scarce.

The phenomenon of "foam" developing in surface waters contaminated by PFAS has been observed in Michigan and is distinguished from other naturally generated foams by its physical characteristics and brilliant whiteness in appearance. Generally, the composition and concentrations in the foam vary by the groundwater contamination source at each location, but the concentration of PFAS in the foam is markedly high (Michael Jury, MDEQ personal communication). Little to no information exists for understanding the conditions of when the foam forms as foam events are inconsistent on the surface waters where they appear. Appropriate health advisories against contact or ingestion of the foam are advised due to the significance of the PFAS levels in the foam while actual risk is determined through further investigations.

Biomonitoring of PFAS levels in human populations

Biomonitoring (the measurement of the body's concentration of a toxic chemical) of PFAS levels in blood provides important information about human exposures and the source materials to which human populations are exposed. Longitudinal surveys of populations provide evidence when exposures change. The 2003-2004 National Health and Nutrition Examination Survey (NHANES) measured target PFSA and PFCA substances of chain lengths from C6-C12, detecting PFOS, PFOA, PFHxS, and PFNA in 98% of 2094 blood samples from across the U.S., with geometric mean levels in the low µg/L (or parts-per-billion (ppb)) range(Calafat, Wong et al. 2007). More recent measurements showed a gradual decrease relative to the 1999-2000 survey, consistent with the end of electrochemical PFAS production in 2002. Concentrations of PFOA in human serum samples collected from around the world have been interpreted to suggest that background exposures explain serum levels in the 1-10 µg/L range, with higher levels in individuals with higher occupational or point-source exposures (Vestergren and Cousins 2009). Such background levels of PFOA in blood have been attributed to foods as the likely route of exposure, but the relative contributions of food packaging materials versus bioaccumulation in fruits, fish, plant crops, and meats arising from environmental transport have not been firmly established. Residents near point-sources of contamination often exhibit substantially higher serum levels, and contrasts between serum background and hot-spot levels have been reviewed (IARC, 2017) The C8 Health Project (Frisbee et al., 2009) measured elevated serum PFOA levels (geometric mean of 33 µg/L) in the Ohio River valley region, near a large Teflon production facility and landfill used to dispose of PFAS chemicals, with serum PFOA reaching age- and sex-adjusted mean of 228 µg/L in one water district.

PFAS levels in human milk complement measurements of blood levels and aid interpretation of biomonitoring data for assessment of a child's exposures from breastfeeding. A 2010 report found PFAS in human milk, finding PFOA levels in human milk consistent with biomonitoring data in adult blood, ranging from > 900 ppt to undetected and PFOS ranging from 865 ppt to undetected. Similar levels of PFOA and PFOS were found in powdered infant formula reconstituted in purified water (Llorca et al. 2010), with profiles suggesting contamination from packaging and/or production processes.

Current knowledge gaps and areas for future development

The pathways and processes that lead to human exposures to PFAS are numerous and complex. All human populations have measurable levels of PFAS in their blood, demonstrating that everyone has experienced exposure to PFAS, but the contributions of different pathways of exposure often remain unclear and deserve more investigation. In some cases, particularly for polyfluorinated chemicals, there is limited information about the relative importance of different routes of human exposures, *in vivo* half-lives (Field and Seow 2017), and the importance of *in vivo* biotransformations which have been suggested in the context of "indirect exposures" to PFCA which form by metabolic transformation of other precursors (D'Eon and Mabury 2011). Very little information exists in the literature regarding the importance of dermal absorption of the range of PFAS present in the context of indoor or environmental exposures.

Conclusions and Recommendations

<u>Conclusions</u>

While PFAS are used directly in some consumer products, the preponderance of literature evidence suggests that these PFAS chemicals are transported through water, soil, and the atmosphere and end up in drinking water, foods, consumer products, and indoor dust to which people are exposed. No environmental processes are known to completely destroy perfluorinated chemicals, though aerobic processes often convert polyfluorinated chemicals to shorter perfluorinated substances that persist and may migrate between environmental media. Prior studies suggest that when PFAS levels in drinking water are high consumption of drinking water is the major route of human PFAS uptake, whereas foods are the dominant source when levels in drinking water are lower. Food contamination may arise from other routes including contact with packaging materials and bioaccumulation from contaminated waters and biosolids into food products, but the contributions of each route remain largely unknown. The role of contaminated biosolid land applications to PFAS transport into foods also has large knowledge gaps. Given the global sources of foods consumed in Michigan and the persistence of perfluorinated chemicals in the environment, management of human exposures to PFAS in foods requires more knowledge about food contamination and biomonitoring to assess exposures. Despite specific findings of high PFAS levels in some foods including fish from contaminated waters, surveys have yet to establish strong correlations between food consumption and PFOA or PFOS levels in blood and thus cannot provide guidance on specific kinds of foods that should be generally avoided. Hoever, monitoring of levels in specific foods could provide the information needed to guide health advisories. Inhalation of house dust represents an additional path of exposure, but there are uncertainties about its contribution to human exposure because many abundant PFAS chemicals in house dust are not routinely measured. Risks associated with dermal exposures, either through direct contact with PFAS-containing materials such as carpets, or bathing/swimming in waters contaminated with PFAS at typical levels, remain largely unknown.

<u>Recommendations</u>

1. Identification of drinking water supplies with high PFAS levels, and the implementation of PFAS removal treatment from highly-contaminated supplies should be a top priority to minimize risks to human health.

2. When high levels of PFAS contamination are detected at sources of drinking water, a biomonitoring study, or Exposure Assessment, should be conducted with volunteered residents to determine if their body burdens exceed those reported by the national survey (NHANES).

3. The Panel recommends that Michigan gather information to understand the extent of PFAS contamination in biosolids and encourage research to assess the fate and transport of PFAS from contaminated biosolids into crop plants and groundwater. Such information will provide guidance regarding when biosolids should not be applied in agriculture (or determine appropriate times between application and planting times) and consider site restrictions, crop harvesting restrictions, monitoring, record-keeping, and reporting requirements where PFAS contamination is a concern.

4. Biomonitoring of blood PFAS levels in human populations should be conducted in conjunction with measurements of contaminant levels in drinking water to assess the importance of drinking water exposure in relation to potential food, inhalation, or dermal exposures.

SECTION 4 Potential Toxicity and Health Effects

This chapter begins with an overview of the epidemiologic and toxicologic evidence regarding potential health effects of PFAS. This is followed by a discussion of specific health outcomes of greatest interest, first presenting the epidemiologic evidence then the toxicologic studies, with particular attention to immunologic effects, reproductive/developmental effects, carcinogenicity, liver disease, and thyroid disorders. These outcomes are emphasized for specific reasons: immunologic effects and reproductive/developmental effects because these are the health outcomes for which there is the most convergence of the toxicology and epidemiology, and cancer, because of the high level of public concern and since it is frequently (but not always) the most sensitive outcomes for long-term exposure. There is also substantial evidence pertaining to liver disease and thyroid disease from toxicology and limited epidemiologic research. Next, there is a brief section on the interpretation of subclinical outcomes which are common in human studies of PFAS. Finally, we consider what types of toxicologic and epidemiologic research could have the greatest impact in guiding regulation of PFAS in drinking water, both toxicology and epidemiology studies.

Multiple assessments have been made of health outcomes potentially associated with exposure to PFAS, largely based on PFOA and PFOS with some literature on PFHxS and PFNA as well (Hekster et al. 2003, Rapazzo et al. 2017, ATSDR 2018). Perhaps the first was the report of the C8 Science Panel charged with evaluating the evidence of a "probable link" between PFOA exposure and health outcomes in the Mid-Ohio Valley. Their review and evaluation identified six health conditions thought to be linked to PFOA with the criterion being "more probable than not": kidney cancer, testicular cancer, ulcerative colitis, thyroid disease, elevated cholesterol, and pregnancy-induced hypertension (http://www.c8sciencepanel.org/). The most comprehensive and recent review is the one developed as a draft Toxicological Profile by the Agency for Toxic Substances and Disease Registries (ATSDR 2018) which methodically tabulates all relevant epidemiology and toxicology studies. Other committees and researchers have evaluated the evidence pertaining to such outcomes as developmental disorders (most notably fetal growth and preterm birth), obesity, immune response, liver and kidney disease, cancer (Benbrahim-Taliaa et al. 2014), and a range of other health conditions.

The Panel is not attempting to conduct a review of the many reviews let alone the hundreds of original papers on which they were based but focus instead on a summary of the recommended guidelines from ATSDR for informing clinicians as a distillation of the evidence that is intended for practical application (ATSDR 2018). In that report, designed to help clinicians respond to inquiries, they indicate a set of diseases for which they believe there is sufficient evidence of a potential effect of PFAS to be suitable for consideration and discussion: thyroid function, high cholesterol, ulcerative colitis, testicular cancer, kidney cancer, pregnancy-induced hypertension, elevated liver enzymes, and high uric acid. This list overlaps with the assessment of the C8 Science Panel and adds two markers of disease risk, elevated liver enzymes and high uric acid. We will consider the evidence that bears on these recommendations. As noted by ATSDR in their guidance document and an important point to emphasize, the research is at a very early stage and quite incomplete in terms of PFAS that have been studied and the volume of informative, high quality epidemiologic studies.

In addition to the list generated by ATSDR, the Panel believes that there is sufficient evidence to consider potential immunologic effects and a range of developmental conditions related to prenatal exposure including reduced fetal growth, preterm birth, obesogenicity (obesity), and neurodevelopmental disorders, as well as developmental immunologic effects. The Panel also notes some of the concerns that may call into question whether the assessment of PFAS being causally related to certain diseases in humans is accurate given the potential for reverse causality. Because PFAS exposure is often measured as a biomarker in blood, and the health condition may also be based on a blood biomarker (e.g., serum uric acid, liver enzymes), in some cases, there is the potential for the biomarker of PFAS to be influenced by the underlying health problem rather than the PFAS causing the health problem, i.e., the health condition affecting the measured serum PFAS levels.

Toxicologic Evidence Indicative of Specific Diseases of Concern

The toxicological effects of PFAS in laboratory animals have been described by several comprehensive reviews (Lau et al. 2007, Lau 2012, DeWitt 2015, Lilienthal et al. 2017, Li et al. 2017) and summarized in great details in recent risk assessment documents (USEPA, 2016(a), (b), NJ DWQI 2015, 2017, 2018, ATSDR 2018, EFSA 2018). Most of the research focuses on PFOA and PFOS, although a few reports on other perfluorocarboxylates (PFCA, such as PFNA, PFHxA and PFBA) and perfluoroalkyl sulfonates (PFSA, such as PFHxS and PFBS) are also available. In general, the PFCA and PFSA examined are well absorbed after oral ingestion, are not metabolized, and are excreted primarily in urine and to a lesser extent in feces. These chemicals have a high affinity for protein binding (e.g. serum albumin, fatty acid binding proteins). In animal studies and a couple of human surveys, PFAS are found to be distributed broadly among tissues, but with the exception of the short chain chemicals (such as C4), they are taken up and stored preferentially in the liver. In fact, liver, kidney and blood compartments can account for greater than half of the body burden of PFAS. During pregnancy, these chemicals can cross the placental barrier readily in both laboratory animals and humans, although the maternal levels of PFAS tend to be higher than those in the fetus. After birth, lactational transfer of PFAS to the offspring has been well documented.

In animal studies, the toxic effects of PFAS can vary widely based on their perfluoroalkyl chain lengths and functional groups, as well as species and sex differences of the animal models (Lau et al. 2007, Lau 2012, 2015). Two prominent issues must be considered to account for this variability: differential pharmacokinetic disposition and varying potency among the homologues of these chemicals. The serum elimination half-lives of PFAS can vary greatly, from hours to years (Table 2). Typically, chemicals with long perfluoroalkyl chain lengths (greater than C4 for PFSAs and greater than C6 for PFCAs) are much more persistent in the body; half-lives tend to increase from rodents (hours-days) to monkeys (days-months) and to humans (months-years),

Table 2. Serum half-life estimates of some perfluoroalkyl substances (adapted from Lau 2015).

		Rat	Mouse	Monkey	Humans
PFBS (C4)	Female	4.0 hours	2.1 hours	3.5 days	28 days
	Male	4.5 hours	3.3 hours	4.0 days	
PFHxS (C6)	Female	1.8 days	25 -27 days	87 days	5.3 - 8.5 years
	Male	6.8 days	28 - 30 days	141 days	
PFOS (C8)	Female	62 - 71 days	31 - 38 days	110 days	3.4 - 5.0 years
	Male	38 - 41 days	36 - 43 days	132 days	
PFBA (C4)	Female	1.0 - 1.8 hours	3 hours	1.7 days	3 days
	Male	6 - 9 hours	12 hours		
PFHxA (C6)	Female	0.4 - 0.6 hours	~1.2 hours	2.4 hours	32 days
	Male	1.0 - 1.6 hours	~1.6 hours	5.3 hours	
PFHpA (C7)	Female	2.4 hours			1.2 - 1.5 years
	Male	1.2 hours			
PFOA (C8)	Female	2 - 4 hours	16 days	30 days	2.1 - 3.8 years
	Male	4 - 6 days	22 days	21days	
PFNA (C9)	Female	1.4 days	26 – 28 days		
	Male	30.6 days	34 – 69 days		
PFDA (C10)	Female	58.6 days			
	Male	39.9 days			
F-53B	Female				15.3 years
	Male				
GenX	Female	2.8 days	1.0 day	3.3 days	
	Male	3.0 days	1.5 days	2.7 days	

and are slightly longer in males than in females (with the exceptions of PFOA, PFNA and PFHxS in rats where tremendous differences in half-life between males and females were seen). Differential renal reabsorption involving organic anion transporters likely contributes to these varying pharmacokinetic profiles of PFAS. The response potency of individual PFAS can also vary significantly among chain lengths, between functional groups and target species (Wolf et al. 2012). For instance, based on peroxisome proliferator-activated receptor-alpha (PPARα) activation in cultured transfected COS-1 cells (where the pharmacokinetic issue of PFAS can be bypassed), it was noted that (a) PFAS of increasing chain lengths produced increasing activity of the mouse and human PPARα, (b) PFCA were stronger activators than PFSA, and (c) the mouse PPARα appeared to be more sensitive to PFAS than the human PPARα. Hence, only nominal adverse effects were seen with PFBA in rodents, in part because of the faster clearance rate of this homologue (hours vs. days) and the weaker potency in its effects. However, possible variations in potency ranking for other responses remains to be elucidated. Thus, extrapolation of PFAS data from animal studies to human health risk assessment must take into consideration the species differences resulting vastly disparate rate of elimination (reflecting biological persistence) and variable potencies relating to chemical structure.

Because multiple PFAS (potentially up to ~5,000 variants) are found in the environment, humans and wildlife, their cumulative risks and potential interactions must be considered. Several *in vitro* studies have addressed the "mixture" effects of selected PFAS. In general, binary combinations of PFCA and PFSA behave additively at low and moderate concentrations. Further investigation with a diverse set of PFAS (different chain lengths and functional groups, as well as the novel polyfluorinated substances) and confirmation of the *in vitro* findings with *in vivo* studies are needed to clarify this key issue. This additivity assumption may afford modeling of a total PFAS effect with attendant "toxic equivalent" approaches (based on persistence and potency) for environmental risk assessment, but the basis for doing so across the full range of compounds has not yet been established.

To date, activation of PPARα (a type of metabolic sensor) is the only established mechanism of action for PFAS. Other putative mechanisms for PFAS include gap junctional inhibition to disrupt cell-cell communication, mitochondrial dysfunction, interference of protein binding, partitioning into lipid bilayers, oxidative stress, altered calcium homeostasis, and inappropriate activation of molecular signals that control cell functions. However, these alternative candidates lack robust evidence to support a pathophysiological role in the multi-faceted effects of PFAS. A better characterization of the modes of action for PFAS toxicities remains an important area of future investigation, and a necessity to improve our understanding of the impacts of these pollutants on human health.

Integrating Evidence from Epidemiology and Toxicology

Seven types of toxicological effects associated with PFOA and PFOS exposure (as well as other related PFAS, but to a lesser extent) have been identified using laboratory animal models: hepatic and metabolic toxicity, developmental toxicity, immunotoxicity, tumor induction, endocrine disruption, neurotoxicity, and obesogenicity. While these outcomes overlap considerably with the epidemiologic evidence, the evidence from toxicology does not provide a definitive connection between the adverse health effects found in animal studies and specific diseases in humans. This is due both to relative scarcity of studies overall but also an inherent limitation in the ability to connect small studies of animals with high levels of controlled exposure to large studies of human populations with very low levels of uncontrolled exposure. Some of the toxicological effects appear to be of human relevance in regard to some pathways, for example PFOA and PFOS have been shown to reduce serum cholesterol and triglycerides in rodents, whereas in humans PFOA is associated with higher, not lower, levels of cholesterol in most studies (Convertino 2018). Immunosuppressive effects have been reported in both in rodent and epidemiological studies. Adverse effects on growth and development seen in rodent studies are consistent with observations of reduced birth weight and delayed onset of puberty found in some epidemiological studies. Finally, increases in Leydig cell tumor incidence observed in PFOA-treated rodent are in line with a positive association between increases of testicular tumor incidence and elevated PFOA exposure in the C8 Study.

Weighing and combining toxicity evidence from human studies, animal studies, and mechanistic studies is always difficult. Ideally, these studies would use similar biologically effective doses and directly comparable health outcome, with clear supporting information regarding the mode of action for toxicity in each species. In practice, animal studies typically use higher doses than those experienced by humans, identical outcome are often unavailable or impractical to measure in both humans and animals, and it is difficult to ascertain whether a suspected or identified mode of action such as PPARα signaling is the only relevant mechanism for a particular health outcome, or whether other mechanisms may contribute (ATSDR 2018). Rather than expecting concordance of specific study outcomes across animals and humans, risk assessors typically group related outcomes by organ or system, and then compare evidence streams to determine whether similar organs are affected. For example, liver toxicity is a hallmark of PFAS exposure in multiple species (ATSDR 2018), increasing confidence that the liver enzyme changes observed in human studies may have been caused by PFAS exposures.

Immunologic Effects

The developing immune system is especially sensitive to environmental stressors (DeWitt and Keil 2017). Several human studies of immune function in children (up to age 19) have reported associations between PFOA or PFOS serum concentrations and decreased antibody production after vaccination for rubella, diphtheria, mumps, measles, and/or tetanus (Grandjean et al. 2012, Granum et al. 2013, Mogensen et al. 2015, Stein et al. 2016). In two of these studies PFOA and PFOS measurements were obtained from mothers at or near the time of birth, serving as a measure of prenatal exposure (Grandjean et al. 2012, Granum et al. 2013). Disruption of immune development is likely to have broader impacts than the antibody changes that are directly measured in these studies and may have long lasting consequences (DeWitt and Keil 2017) though few studies have addressed clinical health outcomes that might result from changes in immune function. In two studies where mothers were contacted periodically to ask about their children's recent illnesses, the investigators reported associations between PFOA or PFOS and increased frequency of fever, common colds, and gastroenteritis (Granum et al. 2013, Dalsager et al. 2016).

At least two studies have investigated PFOA and PFOS exposure and antibody response in adults after vaccination for influenza, diphtheria, and/or tetanus (Looker et al. 2014, Kielsen 2016). Although some decreases in antibody production were reported for higher levels of PFOA or PFOS exposure, effect sizes were small, and some antibodies were increased rather than decreased, suggesting that effects in children may be stronger or more readily measured. Ulcerative colitis is an immune disorder that has been associated with PFOA exposure in humans (Steenland et al. 2013, Steenland et al. 2018).

In animal studies, a number of long-chain PFAS (PFOS, PFOA, PFNA and PFDA) have been shown to suppress adaptive (acquired) immunity in rodents and non-human primates by reducing thymus and spleen weights, as well as their immune cell populations (Corsini et al. 2014). Immunologic responses by activation of T cell (natural killer cell activity) and B cell (production of antigen-specific immunoglobulins) functions were attenuated. Subchronic exposure to PFOA and PFOS in mice also led to suppression of innate immunity by lowering the number of circulating white blood cells, involving lymphopenia, and reduction of macrophages in bone marrow.

Combining the toxicology and epidemiology research, there is substantial evidence that exposure to PFOA or PFOS may have adverse effects on the immune system. The National Toxicology Program recently conducted a systematic review of 153 published animal, human, and mechanistic studies for PFOA and PFOS, concluding that both chemicals are "presumed to be an immune hazard to humans" due to evidence of suppressed antibody response, with a "high level of evidence" in animals and a "moderate level of evidence" in humans (NTP 2016). The National Toxicology Program report also noted some evidence of increased autoimmune disease and hypersensitivity with PFOA exposure, suppressed natural killer cell activity with PFOS exposure, and reduced infectious disease resistance for both chemicals. Nonetheless, we note that some reviewers conclude the available evidence is insufficient to reach a conclusion regarding a causal effect of PFOA or PFOS on immunological outcomes (Chang et al. 2016).

Reproductive and Developmental Health Outcomes

The body of research addressing fetal exposure and subsequent health outcomes has expanded markedly through studies of maternal levels of PFAS and infant and child health. These include studies of immunologic response in the child (described in the above section) as well as studies of birth weight, preterm birth, obesogenicity, and neurodevelopmental outcomes. Perhaps the most consistency has been found for elevated PFAS being associated with a small decrement in birth weight, though the causal significance of the findings in humans is subject to some uncertainty (Negri et al. 2017 and Steenland et al. 2018). The array of findings on infant development have been quite mixed regarding effects on the rate of growth, obesogenicity, and neurodevelopment with varying associations across timing of PFAS measurement (prenatally or postnatally) and whether there are sex-specific effects. Given the inherent vulnerability of the fetus to environmental insults and epidemiologic evidence that generally supports an association between PFOA and reduced birthweight, there is evidence supporting the potential for adverse effects of PFAS on fetal growth, particularly when combined with the toxicology.

In laboratory studies, profound developmental toxicity has been described with gestational and lactational exposure to PFOS, PFOA and PFNA in mice. Neonatal morbidity and mortality were seen with exposure to high doses of these chemicals, while growth deficits and developmental delays were noted in offspring exposed to lower doses. Deficits of mammary gland development were also observed in mouse offspring exposed to PFOA during gestation, which persisted into adulthood, although these histological abnormalities did not appear to impede milk production function and neonatal growth of offspring (F1 mice). Systematic reviews of available data also support a relationship between *in utero* exposure to PFOA and PFOS and fetal growth in animals and humans (Koustas et al. 2014 and Bach et al. 2015).

Cancer

The volume of research directly addressing cancer in human populations in relation to PFAS exposure is quite limited, largely because of the low incidence of these diseases (rates are typically expressed "per 100,000") and the resulting requirement of very large studies to produce meaningful results. Among the types of cancer studied, the strongest support for an association with PFAS is for kidney and testicular cancer based largely on the work of the C8 Science Panel. Even without replication in other populations, the evidence linking PFOA with these diseases was clear and consistent and deemed sufficient to warrant the probable link findings. Other cancers with some suggestive evidence include prostate cancer based on early occupational studies and two general population studies (Eriksen et al. 2009 and Hardell et al. 2014) and ovarian cancer based on a registry-based case control study (Vieira et al. 2013). Overall, there is limited research on cancer in relation to PFOA and PFOS, with far less evidence for other PFAS.

PFAS are not known to be genotoxic or mutagenic, but both PFOA and PFOS have been shown to induce tumors in rodents and fish. Indeed, liver adenomas, pancreatic acinar cell tumors and testicular Leydig cell adenomas have been detected in rats treated with PFOA chronically. This "tumor triad" profile is typically associated with the PPARα-mediated molecular signaling pathway. Interestingly, liver tumors involving this mode of action have been considered not to be relevant to humans (Corton et al. 2018), although the human relevance for the PPARα-induced pancreatic and testicular tumors remains to be determined. Induction of liver tumors mediated by estrogen receptor activation has also been reported in fish.

The International Agency for Research on Cancer (IARC 2017) recently reviewed the scientific literature on PFOA and cancer concluded that PFOA is "possibly carcinogenic to humans" based on "limited evidence" in humans, "limited evidence" in experimental animals, and "moderate evidence" for mechanisms of carcinogenicity that are relevant to humans. According to USEPA's *Guidelines for Carcinogen Risk Assessment* (USEPA 2015), coupled with findings for Leydig cell testicular tumors in rats and a probable link to testicular and renal tumors in the C8 Health Project, the Agency concluded that there is "Suggestive Evidence" of Carcinogenic Potential of PFOA in humans. Similarly, USEPA also considered that there is "Suggestive Evidence" of Carcinogenic Potential of PFOS in humans based on the liver and thyroid adenomas observed in the chronic rat bioassays. The human studies included studies of exposed workers, studies of communities exposed to contaminated drinking water (the C8 Health Project/C8 Science Panel study population), and studies of the general population. Some of these studies found higher rates of prostate, kidney, testicular, or thyroid cancer among people with more PFOA exposure. Little additional evidence has been produced since then to clarify the potential carcinogenicity of PFOA exposure in humans, other than registry-based ecological studies of exposed communities (e.g. health department reports in New Hampshire and Minnesota). It should also be noted that some reviewers interpret the existing evidence differently, finding that the "epidemiologic evidence does not support the hypothesis of a causal association between PFOA or PFOS exposure and cancer in humans" (Chang et al. 2014), whereas we share the perspective offered by the detailed review by IARC of PFOA being "possibly carcinogenic to humans."

Although cancer often receives more attention than other potential adverse health effects that may result from a toxicant exposure, based in part on the presumption that it is the most sensitive outcome, this is not always the case. Indeed, for PFOA and PFOS, developmental and immune effects seem to be among the most sensitive in both animal and human studies and may be more important for setting advisory and regulatory limits on exposure. Developmental, immune, and liver effects were often drivers for determining the recent advisory levels of PFOA and PFOS from EPA, ATSDR, and state agencies.

Liver Disease

Epidemiologic evidence regarding liver disease in relation to PFAS exposure is quite limited and largely unsupportive of an association, though there are a number of studies suggesting reasonably consistent effects on liver enzymes (C8 Science Panel, ATSDR 2018). In contrast, there is extensive toxicologic evidence that hepatic effects are sensitive to both legacy and novel PFAS. Based on their structural resemblance to fatty acids (in fact, PFAS were called perfluorinated fatty acids), a wealth of literature dating back to 1980s has described induction of liver enzymes by PFAS (particularly PFCA) through activation of PPARα. In rodent studies, dose-dependent increases in liver weight, hepatic hypertrophy associated with vacuole formation, and increases in peroxisome proliferation have typically been observed when a significant body burden of these chemicals is reached, especially for the more persistent and potent long-chain homologues. An increase in hepatocyte proliferation and necrosis were also noted at high doses. Correspondingly, transcriptional activation of mouse and human PPARα-related genes in the liver is routinely detected; while activation of other nuclear receptors such as PPARγ, constitutive androstane receptor (CAR) and pregnane X-receptor (PXR) has also been reported. These nuclear receptors are metabolic sensors that regulate lipid and glucose metabolism and transport, as well as inflammation. Indeed, these proteins have been targeted for therapeutic intervention against various metabolic diseases (such as obesity and diabetes), although potency of the pharmaceuticals are typically much higher than those noted for PFAS. Hepatosteatosis (fatty liver) is also a common feature of chronic exposure to PFAS in rodents. Most of these findings are confirmed in a transgenic mouse model where PPARα is "knocked-out". Many of these effects are reversible upon cessation of PFAS treatment, and this observation has been interpreted by some as "adaptive" responses to the exposure. However, this reversibility is not particularly relevant to environmental PFAS exposure from drinking water, because exposure persists until such chemical contamination is remediated.

Thyroid Disease

The C8 Science Panel concluded that there was a probable link between PFOA and thyroid disease despite some anomalous findings that differed between males and females. Despite a much more extensive body of research over the past decade, with a number of suggestive associations, there is not a clear, consistent pattern of specific effects on thyroid hormone levels in human populations (Ballesteros et al. 2016). Nonetheless, endocrine disruption is of some interest as toxicologic evidence that PFAS as induces hypothyroxinemia and reduction of serum testosterone in rats. It should be noted that the PFAS effects on thyroid hormone economy detected in animal studies are different from the classical hypothyroidism in that reduction of circulating thyroxine (T4) is not accompanied by a compensatory increase thyroid-stimulating hormone (TSH). A possible mechanism of this effect may be related to the propensity of protein binding of PFAS, which displaces T4 binding to its carrier proteins (transthyretin and thyroxine-binding globulin).

Neurotoxicity

Epidemiologic evidence for an adverse effect of PFAS on neurological outcomes is not generally supportive of an association with clinical outcomes such as Attention Deficit Hyperactivity Disorder (Liew et al. 2015) or autism (Lyall et al. 2018). While there are reports of isolated findings of influences on subtle measures of neurobehavioral function (Vuong et al. 2018a, 2018b, Harris et al. 2018), other studies provide evidence against an effect on similar outcomes or possibly a beneficial effect (Stein et al. 2013, 2014). None of the specific associations have been replicated, there is inconsistency regarding which specific PFAS manifests associations, and thus they do not collectively provide substantial support for any influence of environmental levels of PFAS on neurobehavioral outcomes (Braun 2017, Liew et al. 2018). The potential adverse effects of PFAS on the nervous system and functions have not been widely investigated. A few studies have reported neurotoxicity of PFOS, PFHxS and PFOA in cell culture systems, as well as altered behavioral responses and deficits in learning and memory ability in rodents (Slotkin et al. 2008, Johansson et al. 2008, Sato et al. 2009, Mariussen 2012, Wang et al. 2015). In contrast, no significant developmental neurotoxic effects were seen from prenatal exposure to PFOS or PFHxA in USEPA guideline-based studies with rats (Butenhoff et al. 2009).

Interpretation of Subclinical Changes in Biomarkers

The literature on PFAS and human health includes many studies of biomarkers of health relevance, including cholesterol levels, thyroid hormones, liver enzymes, measures of kidney function, immunologic markers, and others. While none of these are diseases per se, they are considered diseases when a threshold is exceeded and are predictive of other more severe health outcomes. These studies are much more extensive than those of clinical health outcomes such as heart disease, cancer, or infection in part because these studies are much easier to conduct. In the biomarker studies, the PFAS levels and the biomarker of health are generally obtained from the same blood sample, with an opportunity to assess a panel of biomarkers in a cost-effective manner to generate an array of findings. The use of biomarkers as continuous measures of health outcome, e.g., liver enzyme levels, allows for smaller studies with statistically precise results in contrast to studies of the actual clinical disease of concern, e.g., chronic liver disease. Both studies have value, but some general points are worth noting about the studies based solely on biomarkers since they are dominant.

First, the simultaneous measurement of PFAS levels and health biomarkers allows for the possibility of reverse causality, in which the health problem alters the measured serum levels through changes in uptake or excretion of PFAS. Presuming that it is chronic exposure that may contribute to the risk of disease, studies that can examine the temporal pattern of exposure and health longitudinally are more informative than cross-sectional studies. Second, the relationship between health-related biomarkers and actual disease is often modest in magnitude and so the connection of PFAS to clinical health problems may remain unresolved even with high quality studies of biomarkers. For example, even though PFAS exposure elevates cholesterol levels, there is no direct evidence that PFAS increases the incidence of heart disease despite the well-recognized relationship between elevated cholesterol and heart disease. Third, the vast majority of studies relating biomarkers of PFAS exposure to biomarkers of effect were conducted in settings in which the levels of PFAS were in the background range, e.g., from the National Health and Nutrition Examination Surveys, not from populations with notably elevated exposures. In these circumstances, variation in measured PFAS levels may reflect in part physiologic differences and thus not reflect a causal effect of PFAS exposure on health indicators. Many of the epidemiology studies conducted by the C8 Science Panel relied on modelled, rather than measured, serum PFAS concentrations; studies using modelled serum PFAS concentrations are influenced by the accuracy of the exposure model but are not as susceptible to misinterpretation by reverse causation or physiological confounding (Watkins et al. 2013).

For example, key measures of kidney function including serum uric acid and estimated glomerular filtration rate (eGFR) have been associated with measured serum PFOA and PFOS concentrations in cross-sectional studies (Steenland et al. 2010, Shankar et al. 2011, Watkins et al. 2013, and Kataria et al. 2015). However, because PFAS are excreted primarily through the kidneys, impaired kidney function is expected to result in decreased excretion and higher serum PFAS concentrations—inducing an association due to reverse causation. Indeed, studies of eGFR using modelled serum PFAS concentrations have not found any associations, suggesting that the associations of measured serum PFAS with kidney function in cross-sectional studies might be due solely to reverse causation (Watkins et al. 2013 and Dhingra et al. 2017).

That being said, associations of PFAS with biomarkers or other subclinical outcomes in carefully designed epidemiological studies can be informative, especially when similar biomarkers are associated with PFAS exposure in controlled experiments using laboratory animals or *in vitro* systems. Observation of effects on the same biological systems across species in multiple studies provides stronger support for causal interpretation of those effects, which may be important as early indicators of disease development even if they are not overt diseases.

Research that Would Change the Recommended Standard for PFAS in Drinking Water

Toxicologic Studies

Seven types of toxicological effects associated with PFOA and PFOS (as well as other related PFAS, but to a less extent) exposure have been described with laboratory animal models: hepatic and metabolic toxicity, developmental toxicity, immunotoxicity, tumor induction, endocrine disruption, neurotoxicity, and obesogenicity. The weight of evidence is in descending order (i.e., liver effects are most robust, and obesogencity is most equivocal). These findings are based on well-controlled laboratory experiments, with wide dose ranges (but typically in orders of magnitude higher than human exposure) and sometimes multiple species. Some of the phenotypic findings are supported by in vitro mechanistic evaluations and/or molecular queries. Our understanding of the toxicologic properties of PFAS other than PFOA and PFOS is notably less advanced and in the case of some variants, completely unexplored.

The typical risk assessment practice is to select one most sensitive outcome from a dose-response study, based on the lowest benchmark dose (BMD), no or lowest observable level (LOAL/NOAEL), in conjunction with expert opinions on the biological plausibility or relevance of that particular outcome. The decision is seldom made based on the preponderance of evidence (drawn from multiple concurring studies) or convergence of findings from animal studies and epidemiological examinations. In fact, epidemiological findings alone have seldom been used as critical effects for regulatory decision and rulemaking, though some have argued for doing so for PFAS (Grandjean and Clapp 2015, Budtz-Jorgensen and Grandjean 2018).

Epidemiologic Studies

Epidemiologic research that would be capable of justifying a change in recommended drinking water standards would have to provide substantial improvements on the current literature. Much of the ongoing research addresses background levels of PFAS rather than populations that include more highly elevated exposures. Longitudinal studies of clinical outcomes in more highly exposed populations would allow for more definitive health assessments by increasing the statistical power of the studies and reducing concerns with the possibility of physiological confounding or reverse causality. Triangulation using both prospective exposure biomarkers and careful external dosimetry would further strengthen these study findings. Such studies of large, highly exposed populations could corroborate or challenge the findings of the C8 Science Panel and other epidemiological research which forms the basis for current thinking with regard to clinical disease.

Many of the studies of PFAS and health are addressing subclinical indicators of health concern (e.g., liver enzymes, immunologic markers) and few are addressing clinically significant disease (e.g., chronic liver disease, infection). Many published studies are cross-sectional with biomarkers of PFAS and indicators of health measured at the same point in time rather than longitudinally, a less informative approach than relating exposure at one time to disease at a later time. One or more of these fundamental features would need to be addressed to have a significant impact on the overall body of evidence from epidemiologic studies.

Using these improved methods, there would also be a need for identifying health effects with a quantitative measure of exposure levels and some form of a dose-response gradient. The identification of blood levels associated with elevated disease risk would allow for the calculation of steady-state drinking water levels of concern based on assumptions about consumption of water and pharmacokinetics of PFAS. It is likely that building this sort of evidence to markedly strengthen the case for a causal impact of quantified levels of PFAS on clinically significant health outcomes would require not one but rather a series of studies with convergent evidence.

Another important way in which epidemiologic research might be sufficiently informative to change drinking water standards would be to address PFAS in some collective manner to provide some guidance on how to address the mixture of chemicals. If research could begin to determine empirically how these mixtures of compounds act independently or together to affect health it would change the views of what to regulate, i.e., what specific chemicals need to be added together to provide an accurate assessment of the health risks, and whether they should be weighted according to some measure of relative potency such as that recently proposed by Gomis et al. (2018). Research on potential additivity or synergy of PFAS chemical mixtures would be of direct relevance for assessing health risks from PFAS in the environment.

Conclusions and Recommendations

The health effects of PFAS have been addressed in a number of assessments, starting with the C8 Science Panel and continuing with the ATSDR comprehensive draft report in 2018. Based on those reports, ATSDR has indicated in its *Guide for Clinicians* an array of health outcomes most likely to be related to elevated exposure to PFAS, based mostly on studies of PFOA and PFOS, which we have evaluated in relation to the scientific evidence.

There is an extensive amount of toxicology literature that addresses specific chemicals and outcomes and allows for some broader conclusions. In animal studies, the toxic effects of PFAS can vary widely based on their perfluoroalkyl chain lengths and functional groups, as well as species and sex differences of the animal models. The hepatotoxic and metabolic effects, immunotoxicity and developmental toxicity of PFAS are supported by the strongest weight of evidence, but their effects are subtle at low doses that are most relevant to environmental exposure. Carcinogenic effects of PFAS and their relevance to human health risks are less certain. To date, activation of PPARα is the only established mechanism of action for PFAS. Studies of cancer are limited, but the C8 Health Project evidence supported an association with kidney and testicular cancer. PFAS are not known to be genotoxic or mutagenic, but both PFOA and PFOS have been shown to induce tumors in rodents and fish. The International Agency for Research on Cancer (IARC 2017) recently reviewed the scientific literature on PFOA and cancer and concluded that PFOA is "possibly carcinogenic to humans" based "limited evidence" in humans, "limited evidence" in experimental animals, and "moderate evidence" for mechanisms of carcinogenicity that are relevant to humans. As noted by the National Institutes of Health, immunologic effects of PFAS are supported by epidemiologic studies indicating suppression of children's immunologic reactions to vaccines at low exposure levels and supported by toxicologic evidence of adverse effects on the immune system. While adverse reproductive effects are clear from toxicology studies, the epidemiologic studies suggest a reduction in birth weight. Toxicologic evidence indicates adverse hepatic and renal effects, with limited epidemiologic support, and there is mixed evidence regarding endocrine effects (particularly thyroid), neurodevelopment, and obesogenicity. Future epidemiologic studies that address clinical health outcomes, not just subclinical biomarkers, and toxicologic and epidemiologic studies that provide guidance on the full array of PFAS, are most likely to directly impact environmental regulation.

Conclusions

The Panel agrees with the assessment reflected in the ATSDR guidance document about associations of PFAS exposure to health outcomes such as thyroid function, high cholesterol, ulcerative colitis, testicular cancer, kidney cancer, pregnancy-induced hypertension, and elevated liver enzymes but have some differing views on specific areas of concern. Because elevated serum uric acid could well be a correlate rather than consequence of elevated blood levels of PFAS, the Panel recommends eliminating this from the list. The Panel recommends adding immunologic effects to the list of health condition of concern, particularly those that arise during prenatal exposure and childhood, and reduced birthweight, based on strong toxicology findings and supporting epidemiologic evidence.

Health concerns are based on the total exposure to PFAS across many sources, but because drinking water is the predominant source of exposure for many people consuming contaminated water, it remains the focus for health-based regulation based on current knowledge, despite potential contributions from consumer products, crops, and other pathways.

Combining the evidence from toxicology and epidemiology, the evidence supports the carcinogenicity of PFAS, but cancer may not be the most sensitive health outcome to guide regulation.

While there is some empirical evidence supporting an approach that assesses the combined effects of exposure to multiple PFAS to set health-based limits, there is not yet a firm, quantitative basis for doing so.

Recommendations

1. Research is needed to provide greater understanding of the potential health effects of a broader array of PFAS, not just the legacy compounds. This might include toxicology research to help in developing indices of toxicity or at least inform decisions about which specific forms of PFAS should be combined for regulatory decisions.

2. Toxicologic studies on modes of action are needed to help guide the development of indices of toxicity that would apply across a range of PFAS.

3. Epidemiologic studies of clinical outcomes are needed to build on the extensive body of research addressing biomarkers of health. While the latter can be suggested of likely health effects, direct documentation of clinical disease in relation to quantified PFAS levels is needed.

4. Health outcomes of continued interest that warrant further study include consequences of endocrine disruption, including developmental outcomes and thyroid disorders, consequences of immunologic effects, including autoimmune diseases and infectious diseases, consequences of metabolic effects, and cancer.

SECTION 5 Quantification of Risk from Drinking PFAS in Water

In the past decade, health-based advisories on PFOS and PFOA for drinking water and daily food intake have been issued by various agencies worldwide (Table 3), several of which have recently updated these values. The levels vary widely between chemicals, and among the entities that issued them. For instance, there has been up to a 10-fold difference between advisory levels for PFOS and PFOA, and as much as a 150-fold difference among countries, more if the proposed new European Food Safety Authority values presently being considered are enacted. This variation may in part be related to advancing knowledge about the adverse health effects of PFAS over time (based both in laboratory studies and epidemiological studies), but largely reflect discordant risk assessment principles and practices among regulatory groups. Calls for global collaboration to harmonize the risk assessment and regulatory actions on this class of chemicals has emerged (Ritscher et al. 2018) and if successfully pursued, would ultimately reduce the confusion surrounding this issue resulting from differing recommendations. Nonetheless, such agreement is not imminent.

Within the U.S., similar risk assessment activities on PFAS are being conducted by the federal government and various state health organizations. In particular, USEPA, ATSDR, the New Jersey Department of Environmental Protection (NJDEP) and the Minnesota Department of Health (MDH) have recently issued health advisories on a number of individual and combined PFAS for drinking water (most notably PFOS and PFOA, but some also include PFBS, PFBA, PFHxS, and PFNA) (Table 3). Risk assessment for PFBS, PFBA, PFHxS, PFNA and GenX being conducted by the USEPA Office of Water is expected to be available by end of 2018 (and drafts were released for public comment for PFBS and GenX as this report was finalized). Several states have either adopted the USEPA recommendations (such as NH, ME, VT, IA and CO), or are in the process of developing their own guidelines (e.g., CA, PA). The drinking water values for PFOS and PFOA by USEPA (70 ppt for both chemicals), New Jersey (13 ppt and 14 ppt, respectively) and Minnesota (27 ppt and 35 ppt, respectively) are within reasonable agreement given the different assumptions and different approaches. These differences reflect the specific toxicological outcomes identified as critical driver for derivation of the Reference Dose (RfD) and estimates of daily water intake. The basis for point-of-departure (POD), either LOAEL, NOAEL or $BMDL_{10}$, uncertainty factors (UF) of 300 for PFOA and 30 for PFOS, and relative source contribution (RSC) ranging from 20-50% are fairly consistent among these risk assessments, which are all based on studies in laboratory animals. While differences of this magnitude may have profound implications for identifying water sources that require remediation, it must be recognized that there may be only limited scientific justification for claiming one or the other is “better.” While each is based on well-defined methods and principles, approaches differ across agencies and lead to different recommendations.

Table 3. Examples of world-wide health-based advisories for PFOS and PFOA.

Locales/Sources	Year	Types	PFOS	PFOA
USEPA	2016	Drinking water	70 ppt*	70 ppt*
ATSDR	2018	Drinking water	52 ppt (adult) 14 ppt (child)	78 ppt (adult) 21 ppt (child)
Alaska, Hawaii, Idaho, Indiana, Louisiana, Maine, Nevada, New Mexico, Oregon, Rhode Island, Virginia, West Virginia	2016	Drinking water	70 ppt^	70 ppt^
California	2018	Drinking water	13 ppt[¥]	14 ppt[¥]
Colorado	2018	Drinking water	70 ppt[@]	70 ppt[@]
Massachusetts	2018	Drinking water	70 ppt[#]	70 ppt[#]
Michigan	2015	Surface water	11 ppt	420 ppt
	2018	Drinking water	70 ppt ^	70 ppt ^
Minnesota	2017	Drinking water	27 ppt	35 ppt
New Jersey	2017	Drinking water	13 ppt	14 ppt
Vermont	2016	Drinking water	20 ppt *	20 ppt *
Australia	2017	Drinking water	70 ppt	560 ppt
	2016	Total daily food intake	150 ng/kg/day	1,500 ng/kg/day
Denmark	2015	Drinking water	100 ppt	100 ppt
	2015	Total daily food intake	30 ng/kg/day	100 ng/kg/day
European Union	2005	Total daily food intake	150 ng/kg/day	1,500 ng/kg/day
	2018	Total daily food intake	1.86 ng/kg/day[ǂ]	0.86 ng/kg/day[ǂ]
Germany	2006	Drinking water	300 ppt	300 ppt
	2006	Total daily food intake	100 ng/kg/day	100 ng/kg/day
Italy	2017	Drinking water	--	500 ppt
Netherlands	2011	Drinking water	530 ppt	--
	2011	Total daily food intake	150 ng/kg/day	--
Sweden	2014	Drinking water	90 ppt	--
	2011	Total daily food intake	150 ng/kg/day	300 ng/kg/day
United Kingdom	2009	Drinking water	300 ppt	1,000 ppt
	2006	Total daily food intake	300 ng/kg/day	3,000 ng/kg/day

*Value represents individual or combined PFOS and PFOA levels; ^value adopted from US EPA determination; [@]value reflects sum of PFOS, PFOA and PFHpA levels; [¥]value adopted from New Jersey determination; [#]value reflects combined PFOS, PFOA, PFHxS, PFNA and PFHpA levels; [ǂ]value derived from European Food Safety Authority draft document.

A major challenge in setting standards for human exposure to PFAS arises in extrapolating the exposure doses from laboratory animals to humans due to the profound differences in the rate of elimination of these chemicals between species. There are about 40- to 150-fold differences in serum half-life estimates between rodents and humans for some of the PFAS (Table 2). The exceedingly persistent nature of these chemicals in humans must be taken into consideration for health risk assessment. However, for chronic or subchronic exposure of PFAS, one can assume that both rodents and humans have reached steady state levels. For rodent studies with oral administration of PFOS or PFOA, steady state levels in serum have been observed after 2-3 weeks of daily treatment, depending on administered doses (C. Lau, *personal communication*]. Using slightly different modeling paradigms, USEPA, New Jersey and Minnesota derived a human equivalent dose (HED) from the serum concentrations of PFOS or PFOA in animal studies that corresponded to the critical toxicological effect. Thus, the use of internal dosimetry at steady state (rather than administered doses) allows the risk assessors to bypass the species-specific toxicokinetic issue related to PFAS. The salient features that distinguish among the three risk assessments of PFOS and PFOA will be described.

For PFOS, the USEPA chose reduced rat pup weight after gestational and lactational exposure as an outcome to derive a RfD of 20 ng/kg/day. The choice of this developmental toxicity outcome is reasonable, as a systematic review of a similar chemical (PFOA) supported growth retardation as a consistent adverse effect. A total Uncertainty Factor (UF) of 30 was assigned. To provide additional protection for breastfeeding infants, the risk assessors assumed a more conservative water intake estimate of 0.054 L/kg/day for the lactating mothers, and a RSC of 20%. A Lifetime Health Advisory of 70 ppt was estimated for PFOS. For PFOA, the USEPA selected reduced ossification of fetal mouse phalanges and accelerated onset of puberty in male offspring after gestational and lactational exposure as one of their drivers for RfD derivation. This choice was challenged because reduced bone ossification reflects a developmental delay, rather than an induction of anatomical defect; however, developmental delay can reflect an overall detrimental effect of chemical exposure that lead to growth and developmental deficit in the offspring. The reduced ossification of phalanges in the PFOA-exposed fetuses was accompanied by deficits of postnatal weight gains, delay in eye-opening (another developmental landmark) (Lau et al., 2006; Wolf et al., 2007) and mammary gland development (White et al., 2007) in mice. On the other hand, advanced pubertal maturation was only seen in males and was somewhat inconsistent with a general pattern of developmental delays. However, two other toxicity outcomes evaluated (reduced immunological function in mice, and reduction of body, liver and kidney weights in a 2-generation reproductive toxicity study with rats) yielded an identical RfD (20 ng/kg/day). Although results from the reproductive/developmental toxicity study with rats were confounded by the short half-life of PFOA in female rats (a known gender difference unique to this species), the fact that all three outcomes from different studies produced the same RfD lent confidence to its derivation. A total UF of 300 and a RSC of 20% were assigned. To provide additional protection for breastfeeding infants, the risk assessors assumed a more conservative water intake estimate of 0.054 L/kg/day for lactating mothers. Accordingly, a Lifetime Health Advisory of 70 ppt was estimated for PFOA. Because the similarities of the chemical structure, physicochemical properties and developmental adverse outcomes, the risk assessors considered possible additivity of PFOS and PFOA exposure. Therefore, the sum of PFOS and PFOA concentrations in drinking water is advised by U.S. EPA to not exceed 70 ppt for either long-term consumption or, during pregnancy, short-term consumption (“weeks to months”).

For Minnesota, the driver for RfD derivation for PFOS is identical to that employed by USEPA, but these risk assessors assigned a total UF of 100 (3 times higher than that of USEPA) producing a RfD of 5.1 ng/kg/day (about one-fourth of USEPA value). However, they also assumed both prenatal and postnatal exposure using an additional milk transfer factor and a less conservative RSC of 50%, yielding a health-based value of 27 ppt for PFOS, about 2.5 times lower than that estimated by the USEPA. For PFOA, the driver for RfD derivation, and total UF are identical to those used by USEPA, but because of the additional milk transfer factor and less conservative RSC, a health risk limit of 35 ppt was estimated, lower by half of that issued by USEPA.

New Jersey chose a different toxicological outcome of decreased plaque-forming cell response (an assessment of immune function) in male mice after subchronic (60 days) exposure and a total UF of 30 to derive a RfD of 1.8 ng/kg/day for PFOS (about 10 times lower than that by USEPA). The choice of immunotoxicity is supported by a previously described National Toxicology Program systematic review of PFOA and PFOS, which indicated consistent findings in laboratory animals, as well as several epidemiological studies that reported associations between compromised immune responses with PFAS exposure in humans. The New Jersey risk assessors assumed a water consumption of 0.029 L/kg/day by an average adult (lower than the value used by USEPA), and a RSC of 20% (same as USEPA) to produce a MCL of 13 ppt for PFOS (about 5 times lower than that by USEPA). For PFOA, the New Jersey risk assessors selected yet a different toxicological outcome of increased relative liver weight in male mice after subchronic (2 weeks) exposure, and a total UF of 300 to derive a RfD of 2 ng/kg/day (again 10 times lower than that by USEPA) and a MCL of 14 ppt (about 5 times lower than that by USEPA). Liver hypertrophy is a hallmark response of PFAS (particularly the perfluorocarboxylates such as PFOA) in rodent models; compounded with elevated incidence of fatty liver and necrosis noted at high doses of exposure, hepatotoxic effects of PFOA are reasonably supported. The difference between New Jersey values and the USEPA values is primarily driven by different toxicological outcomes chosen to derive the RfD (the 10-fold difference in RfDs is attenuated by a 2-fold difference in drinking water intake rates, in the opposite direction).

In June 2018, the ATSDR released a draft of "Toxicological Profile for Perfluoroalkyls" for public comments (an update from the 2015 draft) (ATSDR 2018). It provides provisional minimal risk levels (MRLs) for oral exposure to PFOS, PFOA, PFHxS and PFNA. These evaluations employed the same human equivalent dose (HED) assumption (using the USEPA algorithms), NOAEL/LOAEL/BMDL, and UF paradigms as USEPA, New Jersey and Minnesota to derive the MRLs. Minimal risk levels are analogous to reference doses and follow similar derivation procedures. The ATSDR document does not provide any direct guidance on the limits of daily drinking water intake of these chemicals that are comparable to the health-based values issued by the USEPA, New Jersey and Minnesota. Although estimates are
available at: https://www.atsdr.cdc.gov/pfas/mrl_pfas.html.

For PFOS, the ATSDR risk assessors chose a developmental outcome in rat for POD derivation that is identical to the one selected by the USEPA. The ATSDR MRL estimate, 0.0017 µg/kg/d is 10 times lower than the USEPA RfD value simply because of the 10-fold higher UF that includes a modifying factor of 10 due to concern that immunotoxicity (an outcome not selected by ATSDR, but by New Jersey) may be a more sensitive outcome than developmental toxicity. For PFOA, ATSDR derived their MRL value based on a neurobehavioral and a bone morphological outcome in mice after gestational exposure for POD derivation. These critical effects were drawn from the same study. It is noteworthy that these "drivers" (statistically significant findings) were selected among many other potentially analogous outcomes evaluated by the authors that were negative. In addition, only a single dose of PFOA was given to pregnant mice (no dose-response evaluation) and adult offspring were evaluated for motor function at 5-8 weeks of age, and bone morphology at 13 or 17 months (i.e. latent effects of PFOA exposure), and only males (but not females) were affected in the behavioral test [only females were evaluated in the bone morphology study]. The UF assumed by ATSDR is the same as USEPA, Minnesota and New Jersey. With a different critical effect chosen for POD derivation, the MRL estimated for PFOA by ATSDR is similar to the RfD determined by New Jersey, but about 10-fold lower than that provided by USEPA and Minnesota.

Health-based advisories of several PFAS other than PFOS and PFOA, which include PFNA, PFBA, PFHxS and PFBS are also available from different sources. New Jersey chose increased maternal liver weight of mouse dams at term after exposure to PFNA from Gestational day 1-17 as an endpoint, and a total UF of 1000 to derive a target serum level, which is used in place of an RfD, of 4.9 ng/ml. The risk assessors assumed a RSC of 50% (assuming that PFNA from contaminated drinking water is the major source of exposure) and a serum to water ratio of 200:1 to produce a MCL of 13 ppt for PFNA, which closely resembles those for PFOS and PFOA. ATSDR also evaluated the health risk of PFNA based on the same animal study used by New Jersey, but these risk assessors focused on a different endpoint of decreased body weight and developmental delays of the offspring after gestational and lactational exposure. They chose the NOAEL as point of departure and a total UF of 300 to derive a MRL of 3 ng/kg/day. Thus, despite a difference of opinion in endpoint and UF selections, the MRL derived by ATSDR is in fact quite comparable to the RfD calculated by New Jersey.

Health-based values for PFBA and PFBS are only available from Minnesota. The driver for health risk evaluation of PFBA is obtained from a 28-day exposure study using rats, where reductions of serum cholesterol and thyroid hormones were observed, and a total UF of 100 is assigned. A RfD of 3800 ng/kg/day is derived, a water consumption of 0.285 L/kg/day for short-term intake is assumed, and a RSC of 50% is estimated to produce a MCL of 7,000 ppt. By comparison, the outcomes chosen by these risk assessors for PFBS are obtained from a rat study where kidney epithelial and tubular/ductal hyperplasia were noted in a 2-generation reproduction study. A similar UF of 100 is assigned to derive a RfD of 1600ng/kg/day. Adopting identical assumptions of water intake rate and RSC as PFBA, a chronic health-based value of 2,000 ppt is proposed for PFBS. It should be noted that the drinking water value estimates for these short-chain PFAS (C4) are about two orders of magnitude higher than those of their long-chain counterparts (C8 and C9), likely reflecting their shorter half-lives (less persistent biologically) and lower potency (less active) (see Toxicological Study section).

To date, only ATSDR has issued a health-based value for PFHxS. The critical effect of increased incidences of thyroid cell hypertrophy, hyperplasia and damage observed in male rat offspring after gestational and lactational exposure to PFHxS was selected as the driver for risk assessment. NOAEL and a total UF of 300 were used to derive a MRL of 20 ng/kg/day for this C6 chemical, which is about 10-fold lower than those estimated for PFOS, PFOA and PFNA, but also 10-fold higher than those for the C4 (PFBA and PFBS) compounds.

In summary, risk assessment of potential environmental contaminants is an art of practice more than an exact science, largely dependent on expert opinions in the selection of critical effects and uncertainty factors to derive a reference dose, as well as methodological principles regarding assumption of exposure (e.g., food consumption and water intake) and relative source of contribution. As shown above, even based on an identical critical effect that drives the risk evaluation, a different set of drinking water values can be derived from various assessors. Hence, interpretation of a specific numerical drinking water values from various health advisories can be subject for debate, until an enforceable limit is available after formal regulatory determinations by the federal or state government. In that regard, guidance to safeguard public health from PFOS and PFOA contamination in drinking water currently relies on a range of values with a lower bound of 13-14 ppt individually or 27 ppt combined (from New Jersey assuming simple additivity) to an upper bound of 70 ppt (individually or combined, from USEPA). The MRLs derived by ATSDR approximate the RfDs estimated by New Jersey, while the Minnesota drinking water values lie between the New Jersey and USEPA values. Thus, the difference between lower and upper bound estimates for PFOS and PFOA combined amounts to a factor of only 2.5, not a great disparity in the realm of risk assessment practice.

As a completely independent approach to deriving or assessing drinking water values, epidemiological evidence (as opposed to toxicological) evidence may be used for PFOA and PFOS, without a need to extrapolate across modes of administration or species (as opposed to relying solely on toxicological), as described in the next sections. Consideration of the epidemiological findings suggests that human health effects may occur at exposures within this range of drinking water values as discussed later in this report.

Table 4. Summary of federal and state PFAS drinking water determinations.

Source	Chemical	Drinking water values and parameters used for development	Reference Dose (RfD) or Minimal Risk Level (MRL)	RfD or MRL Basis	Total Uncertainty Factor (UF)	Uncertainty Factor Basis	Human Equivalent Dose
EPA, 2016	*PFOA and PFOS individually or in combination*	70 ppt (PFOA individually or in combination with PFOS Drinking water ingestion for lactating woman: 0.054 L/kg-d, RSC=20%	PFOA: 20 ng/kg/day *PFOS 20 ng/kg/day*	PFOA: LOAEL; *Mice*: reduced limb ossification, accelerated male puberty; *Mice:* reduced immunological functional response; *Rat*: reduced F_0 body weight, increased kidney weight PFOS: HED/UF, POD=HED; *Rat: decreased F_0 pup wt (2-gen or 1- gen study)*	PFOA: 300 *PFOS: 30*	PFOA: UF_H: 10, UF_A: 3, UF_L:10; PFOS: UF_H: 10, UF_A: 3;	PFOA: 5,300 ng/kg/day PFOS: 510 ng/kg/day
ATSDR* 2018[1]	*PFOA*	78 ppt (adult) Adult values use a 80 kg body weight and drinking water intake of 3.092 liters per day 21 ppt (child) Child values use a body weight of 7.8 kg (age birth to one year old) and drinking water intake of 1.113 L/day No relative source contribution is included (assumes all exposure is from drinking water)	*3 ng/kg/day*	LOAEL *Mice: Gestation exposure, decreased motor activity (males only); Adult offspring (females) altered bone cell differentiation*	*300*	UF_H: 10, UF_A: 3, UF_L: 10	*820 ng/kg/day*

Table 4. (continued)

Source	Chemical	Drinking water values and parameters used for development	Reference Dose (RfD) or Minimal Risk Level (MRL)	RfD or MRL Basis	Total Uncertainty Factor (UF)	Uncertainty Factor Basis	Human Equivalent Dose
ATSDR* 2018[2]	PFOS	52 ppt (adult) *Adult values use a 80 kg body weight and drinking water intake of 3.092 liters per day* 14 ppt (child) *Child values use a body weight of 7.8 kg (age birth to one year old) and drinking water intake of 1.113 L/day No relative source contribution is included (assumes all exposure is from drinking water)*	2 ng/kg/day	NOAEL *Rat:* delayed eye opening in offspring, lower pup weight	300	UF_H: 10, UF_A: 3, MF: 10	515 ng/kg/day
ATSDR* 2018[3]	PFHxS	517 ppt (adult) *Adult values use 80 kg body weight and drinking water intake of 3.092 liters/ day* 140 ppt (child) *Child values use body weight of 7.8 kg (age birth to one year) and drinking water intake of 1.113 L/day. No relative source contribution is included (assumes all exposure is from drinking water)*	20 ng/kg/day	NOAEL *Rat*: thyroid follicular cell hypertrophy, hyperplasia in offspring (male only); increased liver weight and centrilobular hepatocellular hypertrophy	300	UF_H: 10, UF_A: 3, MF: 10	4,700 ng/kg/day

Table 4. (continued)

Source	Chemical	Drinking water values and parameters used for development	Reference Dose (RfD) or Minimal Risk Level (MRL)	RfD or MRL Basis	Total Uncertainty Factor (UF)	Uncertainty Factor Basis	Human Equivalent Dose
ATSDR* 2018[4]	PFNA	78 ppt (adult) *Adult values use a 80 kg body weight and drinking water intake of 3.092 liters per day* 21 ppt (child) *Child values use a body weight of 7.8 kg (age birth to one year old) and drinking water intake of 1.113 L/day* *No relative source contribution is included (assumes all exposure is from drinking water)*	3 ng/kg/day	NOAEL *Mice*: decreased pup wt and delayed eye opening	300	UF_H: 10, UF_A: 3, MF: 10	100ng/kg/day
NH, ME, 2016	PFOA and PFOS in combination or individually	70 ppt Same as EPA	20 ng/kg/day	Same as EPA			
VT 2016	PFOA PFOS, PFHxS, PFHpA, and PFNA in combination or individually	20 ppt Water ingestion to 0-1 yr old child, 51 approximately. 0.175 L/kg child; RSC= 20%	20 ng/kg/d	Same as EPA			
NJ 2016	PFOA	14 ppt Adult water ingestion (2 L/day) and body weight (70 kg) RSC = 20%	20 ng/kg/d	$BMDL_{10}$ *Mice*: increased relative liver weight	300	UF_H: 10, UF_A: 3, UF_D: 10;	14.5 ng/ml (target human serum level = $BMDL_{10}$/UF)

Table 4. (continued)

Source	Chemical	Drinking water values and parameters used for development	Reference Dose (RfD) or Minimal Risk Level (MRL)	RfD or MRL Basis	Total Uncertainty Factor (UF)	Uncertainty Factor Basis	Human Equivalent Dose
NJ 2017	PFOS	13 ppt Adult water ingestion (2 L/day) and body weight (70 kg) RSC = 20%	18 ng/kg/d	NOAEL *Mice*: decreased plaque-forming cell response (immune)	30	UF_H: 3, UF_A: 10	22.5 ng/ml (target human serum level = serum NOAEL/UF)
NJ 2015	PFNA	13 ppt 200:1 serum to water ratio, which represents a central tendency estimate RSC = 50%	4.9 ng/ml (target human serum level)	$BMDL_{10}$ *Mice*: increased maternal liver weight at GD17	1000	UF_H: 10, UF_A: 3, UF_S: 10; UF_D: 3	4.9 ng/ml (target human serum level)
MN 2017	PFOA	35 ppt The MDH toxicokinetic model included upper percentile water and breastmilk intake rates along with a breast milk transfer factor: 0.052 (of maternal serum); RSC=50%	18 ng/kg/d	*Mice*: reduced limb ossification, accelerated male puberty	300	UF_H: 10, UF_A: 3, UF_L:3; UF_D: 3	5,300 ng/kg/d
MN 2017	PFOS	27 ppt The MDH toxicokinetic model included upper percentile water and breastmilk intake rates along with a breast milk transfer factor: 0.013 (of maternal serum); RSC=50%	5.1 ng/kg/d	*Rat*: decreased F_0 pup weight (2-generation or 1- generation study)	100	UF_H: 10, UF_A: 3, UF_D: 3	510 ng/kg/d

Table 4. (continued)

Source	Chemical	Drinking water values and parameters used for development	Reference Dose (RfD) or Minimal Risk Level (MRL)	RfD or MRL Basis	Total Uncertainty Factor (UF)	Uncertainty Factor Basis	Human Equivalent Dose
MN 2017	PFBS	2 ppb (2,000 ppt; chronic) Chronic water intake rate: 0.044 L/kg/d; RSC=50%	430 ng/kg/day	; *Rat*: kidney epithelial and tubular/ductal hyperplasia	300	UF_H: 10, UF_A: 3, UF_D: 3, UF_S: 3	129,000 ng/kg/day
MN 2017	PFBA	7 ppb (7,000 ppt; short-term, subchronic and chronic values) Short-term intake rate: 0.285 L/kg/d; RSC=50%	3,800 ng/kg/day	*Rat*: 28-day, decreased cholesterol	100	UF_H: 10, UF_A: 3, UF_D: 3	380,000 ng/kg/day

*The ATSDR document is still receiving public comments and has not been finalized, but they have posted their MRLs and drinking water values at https://www.atsdr.cdc.gov/pfas/mrl_pfas.html. Abbreviations: UF_A, animal to human extrapolation for toxicokinetic differences: UF_H, variation in sensitivity among humans; UF_S, subchronic to chronic extrapolation; UF_L, LOAEL to NOAEL extrapolation' UF_D, incomplete database; MF, modifying factor based on expert opinion on scientific uncertainties; RSC, relative source contribution.

[1] Only MRL derived, no D-R (1-dose only), determination in offspring at 5-8 week (increased exploratory activity in dark), 17-month-old (decreased mineral density in tibia but no diff. in other biochemical or biomechanical properties).

[2] Only MRL derived, same driver as EPA: 2-generation study, same UF but RfD 10-times lower

[3] Only MRL derived, NOAEL: 3 g/kg/d (or 143,000 ng/ml PFHxS); thyroid changes likely in response to elevated TSH, but hormones not measured

[4] Only MRL derived, same driver as NJ study but different endpoint

Serum Concentrations Resulting from 70 ppt PFOA in Water

Much of the epidemiological evidence on PFAS health effects uses measured or modelled PFAS serum concentrations rather than exposure dose rates. Several PFAS health studies use "cumulative" serum concentrations, also known as area-under-the-curve (AUC) serum concentrations. The AUC serum concentration is the integral of the serum concentration versus time and represents the cumulative internal dose. It has been used as a chemical exposure metric in assessing risk of cancer or other chronic health conditions.

For interpreting health risks from drinking PFAS contaminated water based on the epidemiological literature with serum-based exposure metrics, it is necessary to determine the PFAS serum concentrations that are expected to result from consumption of contaminated water. Pharmacokinetic models (also called toxicokinetic or biokinetic models) are used to represent the quantitative relationship between specific water concentrations and the resulting human serum concentrations over time. These models require knowledge regarding several key physiological and behavioral characteristics including the excretion half-life of the chemical, the extent to which it is absorbed and distributed among various bodily tissues after ingestion, and the water ingestion rate. Because these characteristics may vary among individuals and are often difficult to measure, the models are most often used to represent the average relationship between environmental concentrations and serum concentrations for populations, rather than making specific predictions for individuals.

Although human half-life estimates are available for a handful of PFAS, based on follow-up of previously exposed populations after exposure ceases (Table 2), most PFAS do not have extensive information available on human pharmacokinetics. For legacy PFAS such as PFOA and PFOS, pharmacokinetic models are available and have predicted human serum concentrations with reasonable accuracy (e.g., Shin et al. 2011). One such model is available for PFOA as an on-line calculator (Bartell 2017); it predicts that chronic ingestion of 70 ppt PFOA in water by adults is expected, on average, to increase serum PFOA concentrations by about 8 ng/Ml above background concentrations that result from food, various consumer products, and general environmental sources. This model uses a one compartment pharmacokinetic model with a 2.3-year serum half-life (Bartell et al. 2010), and 114 steady-state serum to water concentration ratio (Hoffman et al. 2011). The median serum PFOA concentration for adults in the US was 2.07 ng/ml in 2013-2014 as reported in the most recent survey results reported for NHANES (CDC 2018). As less than 50% of the US population is reported to have measurable PFOA in their water supplies (Hu et al. 2016), the median serum concentration is presumably due to exposure sources other than drinking water. The total average serum concentration experienced by a population with both typical background exposures and chronic consumption of 70 ppt PFOA in drinking water is thus expected to be about 10 ng/ml, including contributions to serum from drinking water (8 ng/ml) and from other sources (2.07 ng/ml).

Average serum predictions from these models are based on average water consumption. As noted in the New Jersey report on PFOA (NJDWQI 2017), serum concentrations are expected to be higher for individuals consuming larger amounts of contaminated water. That report includes calculations for "upper percentile water ingestion," at a rate 81% higher than typical water consumption rates. Among these individuals consuming relatively high amounts of water (about 2 L/day) contaminated with 70 ppt PFOA, the expected serum PFOA concentration including background exposures is about 16.5 ng/ml.

Calculation of cumulative serum concentrations (AUC for serum concentration vs. time) is somewhat more complex but can be approximated by computing the expected serum concentration for each year after exposure starts, then summing those values over the exposure duration (i.e., the rectangle method). For example, consider a group of individuals whose mothers drank water with 70 ppt PFOA for years prior to pregnancy, and who subsequently consume 70 ppt PFOA for an average lifespan of 79 years. Because PFOA is passed from the mother to fetus with approximately the same serum concentrations, we might expect these individuals to have an average of about 10 ng/ml serum PFOA through their lifetimes, resulting in an average cumulative serum concentration of about 790 ng/ml—years. For upper percentile water ingestion, the estimated cumulative serum concentration is 1300 ng/ml-years. These calculations ignore an increase in early life exposure due to breastfeeding and assume that background contributions will continue to be about 2 ng/ml throughout the person's lifetime rather than declining, now that PFOA has been phased out of production in the US. Nonetheless, they serve as a first approximation for estimating the cumulative exposure and chronic disease risk faced by people chronically exposed at the EPA limit.

The parameters used for these calculations are somewhat uncertain, but published models appear to differ only slightly in their serum predictions for environmental exposures (NJDWQI 2017). The pharmacokinetic model used in the EPA and New Jersey assessments for PFOA relies on a different parameterization but appears to produce serum predictions that are identical to those from the above model. Nonetheless, if the parameters are wrong then these models may produce estimates that are somewhat too low or too high. For example, several publications have reported human half-lives slightly longer than 2.3 years for PFOA. Because the half-life and other parameters are intertwined, a longer half-life might result in a different estimate of the steady-state serum to water concentration ratio, and slightly different serum predictions. Nonetheless, a close agreement among different models suggests that the calculations can be useful in translating drinking water exposures to serum concentrations for comparison to the epidemiological literature.

Comparison of Epidemiological Study Results with Predicted Serum Concentrations at 70 ppt PFOA or PFOS in Drinking Water Consumption

These serum PFOA predictions for consumption of 70 ppt PFOA in drinking water have important implications. First, the predicted average value of 10 ng/ml serum PFOA exceeds the 90th percentile of measured serum PFOA in every reported survey cycle of NHANES (from 1999-2014) and exceeds the 95th percentile in every cycle since 2007 (CDC 2018). This is important because it indicates that this level of exposure would result in being in the top quartile, quintile, or decile of exposure in epidemiological studies of the general population. Thus, lifetime consumption of 70 ppt PFOA in drinking water is without health consequences only if the general population studies that reported adverse health effects of PFOA exposure among those with serum PFOA concentrations of 10 ng/Ml or higher are not interpreted as indicating a causal effect of exposure. For example, a recent hospital-based case-control study on ulcerative colitis (one of the health conditions reported by the C8 Science Panel as "probably linked" to PFOA exposure) reported a statistically significant increase of 60% in the odds of ulcerative colitis per log unit increase in serum PFOA, with serum PFOA concentrations less than 10 ng/Ml for the vast majority of study participants (Steenland et al. 2018). If the observed increase in the ulcerative colitis was actually caused by PFOA exposure, rather than some other unmeasured or unidentified factor, then consumption of 70 ppt PFOA in drinking water is not safe.

Second, the 25th percentile of measured serum PFOA was 13.4 ng/ml for the large cohort examined by the C8 Health Project/C8 Science Panel studies (https://www.hsc.wvu.edu/media/5354/overall-c8-c8s-results.pdf). Thus, consumption of 70 ppt PFOA in drinking water would place typical people near the top of the first quartile of exposure for that population using measured serum, and the highest water consumers near the bottom of the second quartile of exposure. Thus, in order to judge chronic consumption of 70 ppt of PFOA in drinking water to be likely without an appreciable risk of deleterious effects in the human population (including susceptible subgroups such as those with more water intake), one must also interpret as non-causal all of the C8 Health Project/C8 Science Panel studies that reported an increase in adverse health effects with serum PFOA concentrations above the first quartile.

For some epidemiological studies, cumulative serum concentrations have been used to characterize exposure instead of serum concentrations at a single time point. For example, Barry et al. (2013) investigated cancer incidence in the C8 Science Panel cohort and reported a 23% and 48% increase in kidney cancer incidence for the second quartile and third quartile, respectively, versus the first quartile of cumulative exposure. For testicular cancer, incidence was increased by 4% and 91%, respectively, in the second and third quartiles. These two conditions were judged as having a probable link to PFOA exposure in the C8 Science Panel population. Thyroid cancer was similar elevated, but with less precise effect estimates and weaker evidence of a dose-response relationship. For the lifetime exposure scenario with consumption of 70 ppt PFOA in drinking water that was described in the previous section, cumulative serum PFOA is estimated to be 790 ng/ml-years for typical people and 1300 ng/ml-years for those with upper percentile water ingestion. These cumulative exposures fall near the top of the second quartile or bottom of the third quartile of exposure for the C8 Science Panel cohort; the second quartile was 219-812 ng/Ml-years for kidney cancer and 150-876 ng/ml-years for testicular cancer (http://www.c8sciencepanel.org/prob_link.html). Again, the implication of this comparison is that one must infer that the cancer associations reported in this study (and in the similar study by Vieira et al., 2013) are due to bias or some other error and not indicative of a causal relationship for long term consumption of 70 ppt PFOA in drinking water to be considered free of appreciable health risk.

Epidemiological effect estimates for ulcerative colitis at exposures corresponding to long-term consumption of 70 ppt PFOA in drinking water are summarized in the following table. Three such studies appear to be available, showing a remarkable consistency despite different primary exposure pathways, study designs, and methods of exposure quantitation (Table 5). Although the dose-response patterns across exposure categories within each of these studies are more variable, each suggests a trend of increasing risk with increasing PFOA exposure. Because ulcerative colitis is an immune disorder, the evidence of other immune system effects of PFOA in laboratory animals may be viewed as evidence supporting the biological plausibility of causation. However, we are not aware of any direct studies of PFOA and ulcerative colitis in laboratory animals; such studies would better inform the biological plausibility of this association consistently observed in humans.

Table 5. Increased risk of ulcerative colitis with long-term consumption of 70 ppt PFOA in drinking water.

Study	Exposure Source; Quantification	Equivalent Exposure Category for 70 ppt	Effect Estimate (95% Confidence Interval)
Steenland et al. (2013)	Drinking water; modelled exposure	586 to 3,500 ng/ml-years (third quartile)	Rate Ratio = 2.63 (1.56, 4.43)
Steenland et al. (2015)	Occupational; modelled exposure	800 to 3,440 ng/ml-years (second quartile)	Rate Ratio = 3.00 (0.82, 11.0)
Steenland et al. (2018b)	Background; measured serum	> 5 ng/ml (fifth quintile)	Odds Ratio = 2.86 (0.94, 8.75)

These comparisons of serum or cumulative serum categories for consumption of 70 ppt PFOA in drinking water for ulcerative colitis and several cancers are selected examples, and not comprehensive in addressing all of the reported epidemiological associations with PFOA. However, because serum PFOA concentrations are similar across study populations with only background exposures (IARC 2017) and across the various C8 Science Panel Studies, the calculations suggest that chronic consumption of 70 ppt PFOA in drinking water would result in serum concentrations within the observed range of exposures and above the reference category in most of the epidemiological literature.

The limitations in this approach must also be acknowledged, starting with the inherent uncertainty in a limited body of research from a single study population as in the C8 Health Project. Random error and bias were addressed to the extent feasible, but nonetheless, some or all of the associations may not reflect causal effects. The quantification of risk is also subject to uncertainty, with some uncertainty in reconstructing exposure and inferring water consumption levels to derive risk estimates. Nonetheless, even if some of the inferred associations are not reflective of adverse effects of PFAS, this evaluation places those with chronic exposure to 70 ppt or higher levels of PFOA in their drinking water well within the range at which credible associations with health effects were found by the C8 Science Panel studies.

Epidemiological studies of immune system dysfunction in children in a variety of study populations provide additional evidence for associations of PFOA or PFOS with adverse health effects at serum concentrations below those anticipated to result from long-term consumption of water with 70 ppt or higher (Grandjean et al. 2012; Granum et al. 2013; Mogensen et al. 2015; Stein et al. 2016). Benchmark dose modeling was conducted using vaccine titer response data from one of these studies, resulting in $BMDL_{05}$ values of 1.3 ng/ml serum PFOS and 0.3 ng/ml serum PFOA (Grandjean and Budtz-Jorgensen 2015). The authors noted that these serum concentrations are well below current background serum concentrations and imply a limit of about 1 ppt for PFOA in drinking water. Although they did not convert their serum PFOA $BMDL_{05}$ to a drinking water concentration, one could do so using a pharmacokinetic model for PFOS such as that used by the USEPA.

The decision of whether to rely on toxicological dose-response data or epidemiological dose-response data for setting drinking water limits is difficult, as each approach has serious limitations. High quality toxicology experiments use randomized experiments under carefully controlled laboratory conditions, which increases confidence for inferring causation, but laboratory animals are not humans (despite many similarities in mammalian physiology across species). There is no guarantee that quantitative dose-response relationships and safety limits derived from rodent experiments will be relevant to humans, even when known physiological differences such as the large differences in pharmacokinetics of PFAS are accounted for using the best available information.

Epidemiology studies, on the other hand, must rely on natural experiments or other observational data rather than randomized experiments, which makes it much more difficult to rule out confounding or other sources of bias and infer causation. Exposure measurement can also be difficult in epidemiology studies, though this appears to be less a limitation for PFAS than it is for many other chemicals, due to relatively long serum half-lives for PFAS in humans. Hertz-Picciotto (1995) proposed influential guidelines for determining when epidemiological data are sufficient for risk assessment, including criteria for individual-level exposure quantification, limited potential for confounding and other bias, and clearly elevated risk. These criteria appear to be met for some of PFAS epidemiology literature (e.g., PFOA and ulcerative colitis).

Finally, some authors have recommended that animal and human dose-response information be combined quantitatively using formal methods, rather than choosing one or the other, when high quality studies of both types are available (Samet et al. 2014; Bartell et al. 2017). This approach has not yet, to our knowledge, been used to set drinking water limits.

It should also be recognized that, at present, epidemiology-based risk estimates, and inferences apply directly only to PFOA and PFOS, not to other forms of PFAS where high quality epidemiologic evidence is much more limited or simply unavailable.

Conclusions and Recommendations

USEPA, ATSDR, and a variety of states have determined advisory levels equivalent to about 13 to 70 ppt for PFOA, PFOS, or the sum of PFOA and PFOS in drinking water, based on immunological, developmental, and other toxicity studies in laboratory animals. The differences in these recommended limits reflect selection of different health outcomes, or different assumptions regarding water consumption rates or lactational transfer. The pharmacokinetic models used to link serum concentrations in these animal studies to human doses can also be used to determine the serum concentration expected to result in humans. For example, chronic consumption of 70 ppt PFOA in drinking water is expected to result in an average serum PFOA concentration of about 10 ng/ml in adults, and about 16.5 ng/ml among those with high rates of water consumption. These serum concentrations fall above the range of values reported for a representative sample of the US population, and within the second or third quartile of exposure categories in several published epidemiological studies in highly exposed populations such as the

C8 Science Panel Studies. Increases in ulcerative colitis, some cancers, and other health effects have reported for those exposure categories. *If one accepts the probable links between PFOA exposure and adverse health effects detected in the epidemiological literature as critical effects for health risk assessment, then 70 ppt in drinking water might not be sufficiently protective for PFOA.*

<u>Conclusions</u>
Based on the available evidence for PFOA, in particular, the combined evidence from toxicology and epidemiology the Panel concludes that the research supports the potential for health effects resulting from long-term exposure to drinking water with concentrations below 70 ppt. The epidemiologic evidence that supports health effects from the serum levels produced by long-term exposure to 70 ppt pertains to developmental immunologic outcomes as well as adult diseases evaluated by the C8 Science Panel and are supported by the toxicology studies.

<u>Recommendations</u>
1. The panel recommends that the State of Michigan consider both animal and human data for quantification of risk for PFOA and PFOS. Newer advisory levels have been proposed for additional PFAS, for which there are fewer epidemiological studies but sufficient toxicological evidence indicating some common modes of action.

2. For PFAS other than PFOA and PFOS, since there is limited epidemiological evidence and a less firm scientific basis for defining a specific level of drinking water as acceptable or unacceptable, inferences from toxicologic studies with appropriate margins of safety may provide the only basis for making judgments. Nonetheless, the panel also recommends that the State of Michigan consider setting advisory limits for these additional PFAS in light of their similar chemical structures and toxicity.

3. The options for recommending drinking water standards that we recommend the State of Michigan consider are: (a) adopting one of the advisory values developed by various agencies that are based on toxicological outcomes exclusively; (b) adopting a more novel approach and developing the an advisory value solely based on epidemiological findings (such as one described above and one used by EFSA (draft document to be released by end of 2018); or, preferably, (c) developing a new set of values based on weight of evidence and convergence of toxicological and epidemiological data.

4. Given our incomplete understanding but quickly evolving scientific literature on the health effects of specific forms of PFAS, the Panel recommends that all judgments regarding acceptable levels in drinking water should be subject to periodic re-evaluation, with the potential for adopting more or less stringent criteria based on new insights.

SECTION 6 Mitigation/Remediation

PFAS are a class of compounds with widely varying properties (Table 6). While the most common PFAS chemicals contain 4 to 10 carbon atoms, they can contain from a single carbon atom to 16 carbon atoms. Their solubility in water ranges from insoluble at (3 x 10^{-15} mg/L) to being completely dissolvable in water (>2 x 10^{7} mg/L) (Concawe Soil and Groundwater Taskforce (STF/33) 2016). Their vapor pressures range from <0.004 Pa to 5900 Pa (Table 6); chemicals with higher vapor pressures will tend to move from the liquid to air. Their log K_{oc} (organic carbon-water partitioning coefficient) values range from 1 to 230; chemicals with higher K_{oc} values will tend to move into the organic matter on soils and biosolids, whereas compounds with low K_{oc} will have stronger associations with (and will be more mobile in) water. Some of the PFAS are negatively charged, while others are positively charged, and others can be either positively or negatively charged, depending on pH of the water. The charge of the compound is important as it will affect whether it is in air, water, or on a solid surface, how it is transported into an organism, and the efficacy of a remediation strategy. The PFCAs and PFSAs are almost entirely ionized over the pH range encountered in natural waters and therefore have lower vapor pressure when in water-containing media than one would expect for the pure (protonated neutral) compounds. The shorter chain PFAS are typically more mobile owing to their greater solubility in water. There is some debate regarding the extent to which the PFSA compounds are sorbed relative to the PFCA compounds of perfluoroalkyl equivalent chain length. Earlier research (Higgins and Luthy 2006) suggested that PFSA sorption was 1.7-fold greater than PFCA sorption for compounds of the same chain length. However, more recent research suggests that the K_{oc} values for these compounds depend more on chain length than whether the chemical contains sulfonic acid or carboxylic acid groups (Rayne and Forest, 2009). **As a result of these highly variable properties, there is no single method for the treatment of contaminated water that is effective at removing all PFAS, but as is discussed below there are methods that are effective for some PFAS.**

Drinking Water Treatment

There are only a few treatment methods that have been demonstrated to be effective for removing PFAS from drinking water at the field or full-scale (community water system) level. These include sorption by granular activated carbon (GAC) or anion exchange resin (AIX), membrane filtration(M-FIL), reverse osmosis (RO), and coagulation/flocculation/sedimentation (COAG/FLOC/SED). Compounds with a high log K_{oc} (usually those with longer chains) are more effectively removed by adsorption onto activated carbon thank those with a low log K_{oc}. Longer chain compounds (i.e. those with a relatively high molecular weight) can be potentially removed by nanofiltration or reverse osmosis. Charged compounds are more suitable for removal by ion exchange. Oxidation/reduction (OXID) processes show promise; however, none of these have been employed beyond the bench-scale. Few PFAS can be removed by biodegradation. Among the challenges in measuring efficiencies are an inability to quantify these chemicals or to identify their byproducts analytically along with unknown or unmeasurable losses of the chemical to the air and solid. Despite these challenges, the removal efficiencies for field/full scale operation have been quantified (Table 7). The most feasible processes for immediate/rapid deployment are discussed herein.

Table 6. Chemical characteristics of representative PFAS (Reference is ATSDR unless otherwise noted).

Chemical	Aqueous solubility (mg/L) at 25 °C	pKa	Vapor pressures for pure compounds (Pa) at 25 °C (unless noted)	Organic carbon-water partitioning coefficient (log K_{oc})
PFBA (C4)	2.14×10^5, Miscible[©]	0.08[b] 0.4-0.7[d]	5900[a]	1.88[©]
PFHxA (C6)	1.57×10^4	-0.16	457[©]	1.91[©]
PFHpA (C7)	4.37×10^5	-0.15[b]	80; 158[©]	2.19[©]
PFOA (C8)	9.5×10^3	-0.5[d]	2.3 [b]	2.06[f], 17-230
PFDA (C10)	No data	-0.17[b]	0.10	No data
PFBuS (C4)	No data	0.14[b]	631[e]	1.0[©]
PFOS (C8)	5.7×10^2	0.14[b]	3.3×10^{-3}[©]	2.5-3.1[©]
PFOSA (C8)	0.14[b]	6.24[b]	No data	2.5-2.62[©]
Me-PFOSA-AcOH (C11)	No data	3.92[b]	No data	No data
Et- PFOSA-AcOH (C12)	No data	3.92[b]	No data	No data
12:2 diPAP (C14)	3×10^{-15}[d]	No data	0.000[d]	No data
HFPO-DA (Gen X)	No data	<1[g]	No data	1.92[g]

a) at 56 °C; b) estimated; c) at 20 °C; d) (Goss 2008) Ionized form of PFOA; e) (Concawe Soil and Groundwater Taskforce (STF/33) 2016) Data are for the protonated forms of the acid; f) (Danish Ministry of the Environment 2015) Data are for the potassium salt of PFOS and the free acid for PFOA; g) (Xiao 2017) pK_a is predicted using Marvin 15.10.26 and ACD/Labs 12.0; Log K_{oc} is predicted from EPISuite 4.1

Sorption processes involve the attachment of molecules to a solid surface, for example, soil and sediment. There are two broad categories of PFAS sorption treatment: granular activated carbon and ion exchange. In both cases, after the carbon or ion exchange material reaches its capacity for removal, it must be removed and replaced. In larger scale systems this material can be regenerated either on-site or off-site. With granular activated carbon, carbon regeneration using thermal desorption has the potential to release PFAS to the atmosphere unless off-gas treatment is utilized to capture and destroy the released fluorinated products. Regeneration of ion exchange sorbents produces regenerant solutions that will contain high concentrations of PFAS that must be removed prior to discharge. With point-of-use or point-of-entry residential systems, the solid material containing PFAS is typically disposed of to a landfill (Interstate Technology Regulatory Council 2018), which does not destroy PFAS.

Table 7. PFAS Treatment efficiency as measured by percent removal at field or full-scale operation.

Treatment Type	PFOA	PFOS	Other compounds
coagulation/flocculation/sedimentation	1-20%[b]	1-80%[b]	1-5%[b]
Granular Activated Carbon – frequent replacement	>48% - >90%[c]	>89 to >98%[a]	>22% - >90%[c]
Anion Exchange	51-90%[c]	90-99%[a]	Faster breakthrough of shorter chain compounds[b]
Membrane Filtration	0%[b], 10-50%[c]	0-23%[a]	<10% for most compounds
Biological treatment (including slow sand filtration and river bank filtration)	<10%[c]	0-15%[a]	Highly variable, in some cases concentrations increased©
Reverse Osmosis	>90%[c]	93-99%[a]	>90%[c]
Oxidation (ozone)	<10%[c]	0-7%[a]	<10%[c]
Advanced oxidation (UV-TiO_2)	<10%[c]	15%[a]	<10%[c]
Powdered activated carbon	No data	10-97%[a]	No data

a) Speth, et al., 2018; b) Interstate Technology Regulatory Council 2018; c) Dickenson & Higgins, 2016

Granular activated carbon is presently the most commonly used treatment technique for PFAS removal. Removal efficiencies of between 90 and > 99% have been reported in the literature; the lower values are likely due to the inefficient removal of the shorter chain PFAS (Interstate Technology Regulatory Council 2018). In 2007, granular activated carbon was used to remove PFOA from two public water supplies in West Virginia (Dickenson and Higgins, 2016). The system, which is designed with dual filters and is monitored carefully, has been highly effective at removing PFOA. Granular activated carbon has been implemented successfully at several other sites. In Penns Grove, NJ, GAC treatment is achieving PFOA removal to below 40 ppt. At a 3 million gallon per day plant in Oakdale, MN, granular activated carbon treatment is achieving effluent with PFOS levels below 8 ppt (Cummingset al. 2015). As removal efficiencies typically decrease as the length of carbon chain decreases, granular activated carbon may not be amenable to the removal of these compounds. Irrespective of the target PFAS, laboratory and field studies are essential to the proper design and implementation of granular activated carbon treatment systems for community water supplies.

Ion exchange is a process whereby one ion is exchanged for another, similar to that which occurs in a home water softener, where calcium is removed, and sodium is released into the water. Ionized PFAS may be removed using ion exchange, however reported removal efficiencies are highly variable. Additionally, competition with common anions, such as bicarbonate, nitrate, and phosphate, for binding sites on resins can impact effectiveness. Organics, total dissolved solids, minerals can clog resins and reduce efficiency (Cummings, et al. 2015). Anion exchange appears to be more effective for the removal of smaller chain PFAS than granular activated carbon and is being implemented at several sites (Amex et al. 2016 and ect2 2018).

Reverse osmosis and nanofiltration systems have been shown to be effective for the removal of many types of molecules and ions. With reverse osmosis, PFAS are retained in the reject stream on the pressurized side of the membrane, which must be further treated to prevent the release of PFAS back into the environment. Reverse osmosis has been shown to be effective at the flowrates typical of that in community water systems (Interstate Technology Regulatory Council 2018) (Cummings et al 2015); however, reverse osmosis is costly and responsible treatment and disposal of the PFAS-enriched reject stream is necessary. Nanofiltration, which is less expensive than reverse osmosis, as it operates at lower pressures, is still at a developmental stage and has not be used at the pilot or full-scale operation (Interstate Technology Regulatory Council 2018). PFOS removal efficiencies of 93-99% have been reported for reverse osmosis and nanofiltration membranes (Speth et al. 2018). Dickenson and Higgins (2016) reported removals > 90% for PFOA and PFOS and several other PFAS including PFPeA, PFHxA, PFHpA, PFNA, PFDA, PFBS, and PFHxS.

Point-of-use (POU) and point-of-entry (POET) household filters can be used for the removal of PFOA and PFOS. However, it is recommended that only filters certified for such use be employed. The certifying body in the U.S. is NSF International. To date, NSF has certified some point-of-use granular activated carbon and reverse osmosis filters for PFOA and PFOS reduction. A list of filters that have received this certification can be found on the NSF International website (http://www.nsf.org/). The New Hampshire Department of Environmental Services recommends point-of-use systems, over point-of-entry systems where PFAS contamination is an issue as exposure to PFAS is associated with drinking water. All filters are certified to achieve removal of PFOA/PFOS to below 70 ppt. Spent filter cartridges are not considered hazardous waste and can be disposed of with household trash (Michigan Department of Environmental Quality 2017).

Wastewater Treatment

The presence of PFAS in wastewater has been well documented. For example, Xiao et al. (2012) found elevated levels of PFHxA, PFOA and PFOS in wastewater influent in 18 out of 37 Minnesotan wastewater treatment plants (WWTPs). The concentrations of PFHxA and PFOA were observed to increase in 59% of the WWTPs surveyed; further evidence that PFOS and PFOA are generated by biological processes in wastewater treatment (Xiao 2017). Yu et al. (2009) concluded that the mass flows of PFOS and PFOA increase during conventional activated sludge treatment due to the transformation of PFOS, PFOA, and other PFAS. Pan et al. (2016) similarly reported the increase of mass loadings of PFOS and PFOA during biological wastewater treatment. They also reported the production of PFNA, PFDA, PFHxS, PFHxA, and PFUnDA during biological treatment. Dauchy et al. (2017) reported that mass flow of PFCA increased after secondary treatment, likely due to the degradation of polyfluorinated chemicals. Several precursors and transformation products have been identified during wastewater treatment (Table 4).

Arvaniti and Stasinakis (2015) reported that sorption could be an important removal mechanism for PFAS during wastewater treatment, particularly for the longer chain compounds. Dauchy et al. (2017) reported that PFCA adsorbed to flotation sludge. Both studies demonstrate the potential for PFAS to accumulate in the biosolids produced during conventional wastewater treatment.

Table 8. PFAS generated during wastewater treatment.

PFAS Chemicals	Transformation product	Process/Organism	Reference
8:2 FTOH	PFOA	Activated sludge	Wang et al. 2005
6:2 FTOH	Shorter chain PFCAs, including PFPeA, PFHxA	Activated sludge	Zhao et al. 2013
6:2 FTS			Wang, et al. 2011
PFOA	None – biologically inactive	Anaerobic microorganisms	Liou et al. 2010
N-EtFOSE, N-ETFOSAA	PFOS	Activated sludge	Yu et al. 2009
Unknown	PFOS	Activated sludge	Yu et al. 2009

Landfill Transformation and Leachate treatment

The presence of PFAS in landfill leachate is not surprising given the ubiquitous use of these compounds. PFOA has been detected in US landfill leachate at concentrations up to 9.2 µg/L. The levels depend on climate, as precipitation is a major source of infiltration into landfills, waste age, and seasonal variability (Lang et al. 2017). Allred et al. (2014) identified more than 70 PFAS in their study of the leachate from 18 U.S. landfills. The 5:3 fluorotelomer carboxylate was dominant in all 95 samples and concentrations varied with waste age. The C4-C10 PFCAs and C4, C6, and C8 PFSAs were found above detection limits in more than 50% of the samples. Biodegradation of polyfluorinated chemicals in landfills is thought to be significant (Hamid et al. 2018), resulting in the concentration of perfluoroalkyl acids (PFAAs). The mass flow of PFAS in US landfill leachate in 2013 was estimated to be ~600 kg/yr. This estimate is likely an underestimate since it is unclear how many more unidentified PFAS are in landfill leachate. Benskin et al. (2012) monitored landfill leachate and found that PFPeA and PFHxA were the dominant PFAS throughout the year, except for March and April. In March and April, the concentrations of PFOS, PFOA, and numerous PFAA precursors increased by factors of 2-10. They estimated that the single municipal landfill released ~16 kg/yr of PFAS to the wastewater treatment plant.

Hamid et al. (2018) reported that biological leachate treatment results in an increase in PFAA concentrations. Activated carbon treatment was reported to achieve removal efficiencies of 68-99% for the sum of the 43 PFAS measured (Busch et al. 2010). The variability is likely due to differences in the distribution of PFAS found at the three landfill sites, along with differences in the activated carbon utilized and in the characteristics of the landfill leachate. The same authors reported that reverse osmosis and nanofiltration resulted in the lowest concentrations of the PFAS quantified. Both biological treatment and wet air oxidation using ozone resulted in little removal. These processes are discussed in more detail in the section on drinking water treatment.

Soil treatment (including phytoremediation)

At present, the only technologies that are sufficiently mature for the treatment of PFAS-contaminated soils are excavation with off-site disposal in a landfill or incineration, capping or covering and monitoring infiltration, and soil washing (Ross et al. 2018). While the off-site disposal of contaminated soils in a landfill is feasible, it is a less desirable option due to long-term liability and restrictions regarding disposal of PFAS in landfills. The incineration of excavated soils requires temperatures in excess of 1,100 °C and is, therefore, very expensive. Capping of contaminated soils requires long-term monitoring and management. Soil washing of excavated soils results in the creation of highly contaminated leachate, which then requires subsequent, often complex and expensive treatment (Ross et al. 2018).

There are a number of technologies that are in various stages of development. The *in situ* stabilization of contaminated soils involves the mixing of soils with adsorbents to protect groundwater from leached PFAS. Activated carbon, organo-modified clays, and proprietary blends of activated carbon/clay/aluminum hydroxides have been used for lab testing but have not been demonstrated in the field (Ross et al. 2018). *In situ* oxidation using peroxone activated persulfate (OxyZone) was employed at the pilot-scale for the remediation of soils contaminated with chlorinated volatile organic compounds (cVOCs) and PFAAs. Statistically significant decreases in PFAA groundwater concentrations were observed in post-treatment samples (Eberle et al. 2017). The formation of lower molecular weight and more mobile PFAS is of concern (Yao et al. 2015). Phytoremediation of PFAS contaminated soil has been tested at a fire training site at the Stockholm Arlanda airport. PFAS were taken up by several plant species, with the highest concentration of contaminants in the foliage and twigs (Gobelius et al. 2017). However, the amount of PFAS extracted per tree is low (Ross et al. 2018). The only other study of the use of phytoremediation for mitigation of PFAS contaminated soils was conducted at an established wetland and no significant removal of these compounds was achieved (Ross et al. 2018).

Excavated soils and spent granular activated carbon could also be treated by high temperature incineration. However, this treatment technology is costly and consumes large amounts of energy. The Concawe (2016) report recommends incineration temperatures of between 1,000 and 1200°C for complete destruction of PFOS. MDEQ (2018) states that incinerators operating in Michigan function at temperatures between 590 and 980°C. As such, incomplete destruction and the formation of reaction byproducts is likely (Concawe Soil and Groundwater Taskforce 2016) and stack treatment to remove fluorinated chemicals would be required. While GAC has been shown to be effective for the removal of PFOS and PFOA in waters, there are no known studies demonstrating its use for stack gasses. Wet scrubbers are used at three Michigan incinerators. The use of this technology for stack gas treatment has the potential of transferring PFAS and byproducts to wastewater.

Conclusions and Recommendations

Conclusions

Because of the widely varying properties (e.g., persistence, water solubility, polarity, volatility) no one treatment method will be effective for the removal of all PFAS. Anion exchange and granular activated carbon show promise for the removal of PFAS from drinking waters. Reverse osmosis also has significant potential, however, as with anion exchange and granular activated carbon, the efficacy of removal of short-chain PFAS chemicals is less than that obtained for the longer-chain compounds. However, laboratory-scale and pilot-scale studies are recommended before implementation since the efficacy of removal varies significantly with PFAS and matrix. In the case of anion exchange and reverse osmosis, there are concentrated liquid waste streams that must be further treated prior to their discharge. With granular activated carbon, carbon regeneration has the potential to release PFAS to the atmosphere.

Anion exchange, granular activated carbon and reverse osmosis can also be used to remove PFAS from wastewater effluent and landfill leachate. However, the presence organic matter, inorganic chemicals, and particulates will reduce removal efficacy of PFAS as compared to that in most drinking waters.

For private drinking water supplies, certified point-of-use filters are commercially available for the removal of PFOA and PFOS.

High temperature incineration has been used for the oxidation of PFAS from solid material.

Recommendations

1. Water systems facing PFAS contamination should be required to evaluate all possible remedial approaches, including the use of alternative non-contaminated sources. Once potentially suitable options are identified, then these choices will need to be tested at the bench and pilot scale using the contaminated water. Numerous factors, including initial concentrations of PFAS, specific PFAS present, background organic and inorganic concentrations, and pH will need to be considered in the design. In addition, operation and maintenance costs, ease of operation, ability to treat multiple compounds, and disposal options need to be considered. Based on these tests, full-scale options can be implemented on a case- by-case basis.

2. When regenerating PFAS-loaded activated carbon, the off-gases should be treated by high temperature incineration to capture and destroy any PFAS in the stack gases and to prevent the release of PFAS and/or partially oxidized byproducts to the atmosphere.

3. The use of NSF International-certified filters is recommended where private well water is contaminated with PFOA and PFOS and an alternative water source is unavailable.

4. Laboratory-scale and pilot-scale studies are recommended before the implementation of treatment technologies to remediate landfill leachate and wastewater effluent contaminated with PFAS chemicals. The efficacy of treatment technologies should be evaluated based on the efficiency of destruction and completeness of converting PFAS chemicals to nonhazardous substances.

5. As anion exchange, granular activated carbon, and reverse osmosis result in the production of waste streams that contain PFAS, it is recommended that these streams be treated prior to discharge. Additional research is necessary to more effectively destroy the PFAS chemicals and avoid simply transferring them from one medium to another.

SECTION 7 Other Types of PFAS for Consideration

Our awareness of contamination of water, soil, foods, and air by PFAS is emerging now, in part, due to the development of analytical instrumentation capable of detecting and quantifying PFAS in environmental matrices. Most priority pollutants, such as trichloroethene, benzene, toluene, xylenes are volatile contaminants that are detected by gas chromatography/mass spectrometry. However, the majority of PFAS of interest are ionic in nature and are inherently non-volatile; hence, they are not captured when screening groundwater, soil, and sediment for priority pollutants by gas chromatography/mass spectrometry. Until the development of modern liquid chromatography-tandem mass spectrometry now used for PFAS analysis, the only clues we had to suggest high concentrations of PFAS were reports of foaming groundwater and foaming of soil during heavy rains. Modern liquid chromatography-tandem mass spectrometry is ideal for quantifying known and prioritized ionic PFAS and is a commercially available technology now used by contract, state, federal, and academic labs for PFAS analysis. High quality measurements of some of the most common PFAS are obtained using Method 537 now that analytical grade standards, including stable-isotope labeled internal standards are commercially available. However, it is anticipated that the range of PFAS of potential concern may change as new replacement substances are produced when other PFAS are regulated or banned from production.

PFAS (14 going to 24) in USEPA Method 537

Of the thousands of PFAS, 14 of the most studied are currently measured using Method 537 Rev 1.1, including C6-C14 perfluoroalkyl carboxylates (PFCAs); C4, C6, and C8 perfluoroalkyl sulfonates (PFSAs), N-methyl perfluorooctane sulfonamide acetic acid (N-MeFOSAA) and N-ethyl perfluorooctane sulfonamide acetic acid (N-EtFOSAA). Method 537 is a drinking water method modified by labs for analyses of PFAS in other matrices such as groundwater. Because the solid phase extraction sorbent used in Method 537 in its current form does not capture short-chain PFBA and PFPeA, it yields data that lack information about the PFAS that are most readily transported in water.

To address these shortcomings, recent information from EPA indicates that Method 537 will be modified to measure a total of 24 PFAS including C4 and C5 PFCAs and C5, C7, C9, and C10 PFSAs, perfluorooctanesulfonamide (PFOSA), along with 4:2, 6:2, and 8:2 fluorotelomer sulfonates (FTSAs) (Impellitteri et al. 2018). The EPA will also introduce Methods 8327 (direct injection modern liquid chromatography-tandem mass spectrometry, which avoids PFAS capture technologies that are inefficient capturing short chain compounds) and 8328 and will extend the analyte list to include the perfluoropolyethers GenX, Adona, and F53-B (Impellitteri et al. 2018). In addition, there is a proposed American Society for Testing and Materials Method that is likely to include additional PFAS.

The PFAS being added to the current list of 14 PFAS to bring the total to 24 offers the following attributes that may confer advantages when characterizing sites or waste streams:

- Measurements of short chain (e.g., PFBA, PFPeA, and 4:2 FTSA) PFAS are useful for evaluating drinking water treatments because they are the most water soluble PFAS and tend to be the most difficult to remove from water, for example by granular activated carbon (Appleman 2014). They are also those that most readily escape from contaminated sites and are transported in groundwater.
- Odd-carbon chain length PFSAs (e.g., C5, C7, and C9) occur at AFFF sites and contribute significantly to the mass of PFAS (Backe et al. 2013).
- Long-chain PFSAs (e.g., PFNS (unpublished data) and 8:2 FTSA)(Schultz et al. 2004) are also found at aqueous film forming foam-contaminated sites and are expected to more bioaccumulative than PFOS).
- The various telomer sulfonates (4:2, 6:2, and 8:2 FTSAs) are potentially important since they are electroplating substitutes (Fath et al. 2016, Yang et al. 2014, and Wienand et al. 2013) and can occur at concentrations that exceed that of PFOS and PFOA in AFFF-contaminated groundwater (Schultz et al. 2004).
- The 8:2 telomer sulfonate associates with groundwater but also with soil sediment and can transform to PFOA (Harding-Marjanovic et al. 2015) and is found at aqueous film forming foam-contaminated sites.
- GenX and Adona are PFAS not currently found on lists of measured PFAS but, in the case of GenX, it is known to occur in drinking and river water near manufacturing sites (Hopkins et al 2018 and Gebbink et al. 2017).
- FTCAs and FTUCAs are found in relatively high abundance in landfill leachate (Allred et al. 2014) since they are biodegradation intermediates of fluorotelomer precursors, including FTOHs.

Branched and linear isomers of PFSAs and PFCAs

Branched and linear isomers are always potentially present for PFAS produced by electrofluorination. At present, there are analytical-grade branched and linear standards available for PFOS and PFHxS, but not for PFOA. PFCAs can be branched and linear and the presence of branching will depend on the synthesis used to generate the PFCAs and their precursors. For example, PFCAs generated by the 3M electrofluorination reaction are branched (25%) and linear (75%) (Benskin et al. 2010 and 3M 1999). However, PFCAs made by telomerization are only linear and, for this reason, telomer-based precursors will degrade to only linear PFCAs. Unless the branched isomers are correctly identified, they will go unidentified in samples. In that case, the reported concentrations will be lower than the actual concentrations. Technical mixtures are one source of branched and linear isomers that can be used to identify branched isomers until analytical-grade standard are available.

The environmental process of partitioning between sediment/soil and water impacts the apparent branched and linear ratios of PFAS. Branched isomers are more compact and, for this reason, partition less relative to the linear isomers to environmental solids, including biosolids. For example, biosolids are relatively enriched in linear isomers whereas primary effluent of WWTPs are relatively enriched in the branched isomers. Depth profiles in groundwater indicate a greater proportion of branched isomers at depth relative to linear isomers due to the relatively faster transport of branched compared to linear isomers (Jennifer Field, personal communication, unpublished data).

Volatile PFAS

To date, there are no EPA methods that measure volatile PFAS in water or air, which include the fluorotelomer alcohols (FTOHs) and N-methyl perfluorooctane sulfonamido alcohol (N-MeFOSE) and N-ethyl perfluorooctane sulfonamido alcohol (N-EtFOSE). The volatile FTOHs are associated with gas-phase emissions from municipal wastewater treatment plants and landfills (Ahrens et al. 2011). One report of FTOH, N-MeFOSE, and N-EtFOSE in aqueous film forming foam formulations is reported, but to the best of our knowledge, no data are publicly available for these volatile PFAS at aqueous film forming foam-contaminated sites.

Future Directions: Analytical Methods for Closing PFAS Mass Balance

At present, there is no single methodology for isolating, identifying, and quantifying all PFAS in environmental media. For this reason, it is challenging to close the mass balance on PFAS, but this should be of high priority if we are to understand transport of PFAS in environmental media and the extent of human exposures. What does exist is a number of analytical tools that provide quantitative data on a select number of individual PFAS and PFAS classes (Table 9). Analytical methodology is used by commercial (contract), state, federal, and academic laboratories for generating quantitative data on PFCAs and PFSAs in drinking water (USEPA Method 537), groundwater, surface water, soil, sediment, and biota. However, for classes other than the C4-C14 PFCAs and C4, C6, and C8 PFSAs, methodologies are generally not available outside academic settings. Alternative methods for detecting and quantifying a broader array of PFAS, including 'precursors' that have the potential to degrade to persistent PFCAs and PFSA, are described briefly below with the advantage and limitations. Closing mass balance with high confidence is not yet possible and will depend on the commercial availability of high-quality analytical standards.

Liquid Chromatography-Tandem Mass Spectrometry

As a commercially available tool, liquid chromatography-tandem mass spectrometry is the current industry standard for PFAS quantification in environmental and biological media, including human blood. In many laboratories, liquid chromatography-tandem mass spectrometry can measure target PFAS down to low part-per-trillion levels. Method 537 for drinking water is based on liquid chromatography-tandem mass spectrometry and is used to quantify a discrete number of individual PFAS for which high quality standards and stable-isotope labeled standards are commercially available. Liquid chromatography-tandem mass spectrometry is sensitive and selective, and laboratories are required to perform extensive quality analysis and quality control to provide measurements of high confidence. The instrumentation requires skill to operate and the analyses are typically several hundred US dollars per analysis.

Total Oxidizable Precursor Assay

Precursors are defined as PFAS that can under biotic or abiotic transformation to dead-end PFCAs and PFSAs. The total oxidizable precursor assay is a method whereby precursors are quantified by the net production of PFCAs after oxidation of a sample (Houtz et al. 2013). Hydroxyl radicals are generated under basic conditions using persulfate and the radicals convert polyfluorinated precursors to PFCAs upon oxidation. For the total oxidizable precursor assay, PFCAs are quantified in sample extracts before and after oxidation by LC-MS/MS. The net production of PFCAs is a quantitative estimate of precursors. The total oxidizable precursor assay does not identify individual precursors and the assay does not preserve the precursor's original fluorinated chain. The total oxidizable precursor assay does offer some chain length information in the form of the "n+1 effect." The "n+1 effect" is the observation that the highest PFCA chain length produced (e.g., PFNA), which is typically in only a small fraction of the resulting PFCA distribution after oxidation, is one carbon atom greater than the initial fluorinated chain length (e.g., C8). It is possible to assess whether precursors are branched and/or linear because the oxidation does not rearrange the fluorinated backbone (Robel et al. 2017). The total oxidizable precursor assay was developed for storm water runoff and for aqueous film forming foam-contaminated groundwater, soil, and sediment (Houtz and Sedlak 2012 and Houtz et al. 2013). The assay is now available from several contract laboratories in the US and Canada. Because two liquid chromatography-tandem mass spectrometry analyses and a reaction are required, the total oxidizable precursor assay is more expensive than a conventional single analysis for a given sample. Because the total oxidizable precursor assay relies on the difference between PFCA concentrations before and after oxidation, measures of uncertainty in the two analyses are needed to confidently report a significant difference, which is challenging at low PFAS concentrations if replicate analyses of the total oxidizable precursor assay are not conducted. The total oxidizable precursor assay is unlikely to detect GenX, Adona, and F-53B, which are considered replacement chemicals since the fluorinated chains lengths of the replacement chemicals are typically < C4 (Hopkins et al. 2018) and would likely to oxidized to forms not detected by the total oxidizable precursor assay, which is based on the net production of C4 and greater PFCAs."

The total oxidizable precursor assay is useful for determining whether precursors that are not captured using USEPA and other analytical methods are present. Given that it does not require identities of individual PFAS (e.g. various fluorotelomer-derived compounds) that are oxidized in the assay conditions and can exploit targeted instrument methods that measure PFSAs and PFCAs, the total oxidizable precursor assay is a useful tool for sample and site characterization, as opposed to using it for monitoring.

Total Fluorine by Particle Inducted Gamma Ray Emission

Total fluorine by particle inducted gamma ray emission is an approach for quantifying total fluorine atoms in a solid sample (Ritter 2017). To date, total fluorine by particle inducted gamma ray emission is used for solid materials including food wrappers (Schaider et al. 2017), papers and textiles (Robel et al. 2017). Total fluorine by particle inducted gamma ray emission quantifies fluorine atoms and cannot provide information on individual PFAS, chain length information, or information on the presence or absence of branching. The total fluorine by particle inducted gamma ray emission approach remains under development for water samples and soils/sediments. Water analysis by total fluorine by particle inducted gamma ray emission requires extraction onto a sorbent media, typically in a laboratory environment. Total fluorine by particle inducted gamma ray emission has the promise of being faster and the rate-limiting factor for water analysis, is the extraction/concentration step. At present, total fluorine by particle inducted gamma ray emission has a quantification limit in the low �g/L range, so it is far less sensitive than LC-MS/MS for individual PFAS and less sensitive than the TOP assay. Thus, when PIGE analyses report total fluorine levels below the low limit of quantification, LC-MS/MS is required to avoid false negatives. Another limitation is that PIGE is not yet validated for environmental matrices and is not yet commercialized. Current instrumentation for PIGE is quite large and is not yet field portable. PIGE has promise as a screening tool for groundwater, sediment, and soil which may prove useful in providing feedback to drillers at a site.

Total Fluorine by Other Methods

Other methods for total fluorine include the extractable (EOF) (Yeung et al. 2008) or absorbable (AOF)(Wagner et al. 2013) organic fluorine assays. Both techniques rely on high temperature combustion to convert organic fluorine to fluoride, which is then measured using ion chromatography. Limits of detection are similar to what is achieved with PIGE (low µg/L), far above the low ppt detection of PFAS achieved using liquid chromatography-tandem mass spectrometry. However, these total fluorine methods are not yet available in North America. Both techniques give information on the presence of precursors, but like total fluorine by particle inducted gamma ray emission, do not offer information on the identities of precursors, chain lengths, or information about branching. Due to limited availability, there are limited comparative data at this time.

Liquid Chromatography and High-Resolution Mass Spectrometry

Many PFAS remain unidentified since sophisticated analytical techniques and time are required to identify unknown PFAS and because new PFAS are continually being developed without much information available to the public about their chemistry. Minimal information is available about these new chemicals or their degradation products including levels in drinking water or environmental media. Other types of mass spectrometers can be employed for the analysis of the non-target PFAS and are needed for discovery of unknown PFAS. Mass spectrometers that offer high accuracy mass measurements are used to identify PFAS (e.g., non-target analysis). Quadrupole time-of-flight and orbital trap types of high mass accuracy instruments are commercially available and are in use by academic laboratories, but they are likely to be needed for PFAS analysis in the future by commercial laboratories and regulatory agencies. One advantage of these types of mass spectrometers is the large dataset that can be analyzed now and can be archived for future analysis as more PFAS are identified. The instruments are more expensive and require a higher technical skill for both operation and data interpretation compared to tandem quadrupole mass spectrometers (e.g., liquid chromatography-tandem mass spectrometry). The high mass accuracy instruments are well suited for identifying unknown in microcosm studies of PFAS biodegradation (Yi et al. 2018), characterizing influents to granulated activated carbon treatment system, and for site characterization. A more complete understanding of human exposures to PFAS chemicals would require occasional surveys capable of detecting a broader range of substances than the current and planned targeted methods.

Table 9. Advantages and limitations of various analytical approaches to quantifying individual PFAS and precursors.

Method	Advantages	Limitations
Liquid Chromatography-Tandem Mass Spectrometry LC-MS/MS Method 537 V 1.1	• commercially available • QA/QC extensive • quantifies individual PFAS • UCMR3/Method 537/SW-846 8327&8328/ASTM based on instrument • differentiates branched/linear	• expensive • limited number of PFAS • value for forensics depends on number of PFAS evaluated
Total Oxidizable Precursor (TOP) assay	• commercially available • QA/QC improving • some chain length & branched and linear isomer information • reveals presence of significant precursors in AFFF-contaminated water, sediment, soil, and wastewater • data sets obtained by this methodology are comparable between sites and across states	• twice as expensive • no information on individual PFAS • conservative (lower) estimate • limited comparative data at this time • caution at low levels • limited value for forensics
Suspect screening (LC-HRMS)	• unlimited number of PFAS • stored data can be searched in future • value as a forensics tool	• instruments available but PFAS analysis by LC-HRMS not commercially available in US (research tool) • expensive • no standards for the other PFAS • data are 'screening' level or semi-quantitative • limited comparable data - data obtained on different instruments, ratioing to various internal standards may not be comparable between sites and across states (generates lab-specific data until standardized)
Particle Induced Gamma Ray Emission (PIGE)	• quantifies fluorine • currently captures anionic PFAS, currently being adapted for cationic/zwitterionic PFAS • less expensive • available through only one academic lab that may have a commercial partner	• only quantifies total fluorine (the atom) • no information on individual PFAS • small database (few comparative data) • not as sensitive (yet) as LC-MS/MS or LC-HRMS • limited value for forensics
Total adsorbable organic fluorine	• total adsorbable fluorine (what the title says) • captures broad spectrum of PFAS • can be compared to individual PFAS analysis to determine presence of other PFAS (e.g., precursors)	• measures total fluorine (the atom) • no information on individual PFAS • not commercially available in US (or elsewhere) • must convert total fluorine in units of molar F to equivalents, assuming a specific PFAS to compare measurements • few comparable data

Source Area Characterization

The environmental forensics of PFAS is in its infancy. The analytical tools available from contract laboratories and under development in academic settings are being developed to assist in answering questions about the release histories of PFAS and to identify sources of PFAS contamination in the environment. The application of increasingly sophisticated tools will be useful for reconstructing historical PFAS releases to answer questions about when release events occurred, the chemical nature and amount of PFAS released, and the sources of the PFAS released to the environment. Fingerprinting is an established technique in environmental forensics, but fingerprinting is in its early stages for PFAS. Attempts to characterize sources with a limited number of analytes (e.g., those listed in Method 537) offer limited insight since the suite of PFCAs and PFSAs occur in most environmental media, as has been described earlier in this report. Once developed, fingerprinting approaches can be combined with the growing literature on the fate and transport of PFAS, modeling, site hydrogeological investigation, and existing information on operational practices at sites to reconstruct site history and to explain the disposition of PFAS at sites.

More information is available on the PFAS at AFFF-impacted sites compared to municipal wastewater and landfill leachates. However, existing data for PFAS in wastewater effluent (Gobelius et al. 2018, Schultz et al. 2006, and Loganathan et al. 2007) and landfill leachates (Allred et al. 2014, Benskin et al. 2012, Allred et al. 2015, and Gallen et al. 2017) provides evidence that these various systems have some unique aspects to their PFAS composition. For example, the fluorotelomer acids and short-chain PFCS and PFSAs are abundant in landfill leachates compared to municipal wastewater effluent and AFFF-contaminated groundwater (unpublished data). Groundwater from AFFF-contaminated sites has zwitterionic PFAS, but no data for these species in municipal wastewater effluent and landfill leachate are yet available so it is too premature to determine if cationic and zwitterionic PFAS are unique to AFFF and AFFF-impacted systems. More extensive fingerprinting of various types of sources is needed, including manufacturing sites.

Another 'secondary' level of information that may prove useful in discerning sources of PFCAs is by evaluating their branched and linear isomer ratios. PFCAs produced by 3M are branched (25%) and linear (75%) (Benskin et al. 2010) although the ratio is influenced by environmental processes such as partitioning during transport in aquifers and between solids and liquids during waste water treatment. PFCAs produced by telomerization are only linear such as the degradation of fluorotelomer sulfonates to PFCAs produces only linear PFCAs. Thus, one can potentially distinguish if PFCAs derive from a 3M source, a telomer source, or a combination of the two. For example, PFCAs that are characterized by a low percentage or absence of the branched isomers is potentially indicative of PFCAs that arise from the degradation of telomere precursors. Information on the relative proportions of branched and linear isomers is available from analytical data and obtaining information may be as simple as asking the analytical laboratory for that information.

The proprietary nature of the PFAS composition of products and goods in the marketplace is problematic for states like Michigan in impeding the ability to monitor and plan mitigation of exposure where needed. While concealing the identity of PFAS and other components in products may be important to protect intellectual property and patents, it is problematic when chemicals like PFAS end up in the environment, impacting soil, water, food quality, and ultimately ecosystem and human health. In order to understand the composition of products (e.g., AFFFs) released into the environment and their potential human and ecotoxicological effects, extensive effort is required although chemical manufacturers and product producers already know about the chemical composition of their products. Many PFAS were discovered serendipitously and, recently, some were discovered through a concerted, multi-year, team-based 'reverse engineering' efforts. Such 'reverse engineering', using modern 'non-target' mass spectrometric approaches, incurs a significant financial burden to support the human expertise and instrumentation needed to put together pieces of a complex puzzle. The result is an incomplete patchwork of understanding of the type, number, and potential effects of PFAS now circulating in the marketplace, the environment, and in humans. States such as California and Washington have restricted the use of various chemical classes; Michigan could consider adopting policies put in place by other states but should consider monitoring for such chemicals independent of the restrictions.

Conclusions and Recommendations

Conclusions

Many stakeholders, including those in Michigan, recognize that PFAS contamination is comprised of more than just the two most well-known PFAS, PFOS and PFOA. Analytical methods are being developed to capture PFCAs, PFSAs, and sulfonamide acetic acids from Method 537 but will also include newer PFAS (e.g., GenX) as high-quality analytical standards become available for PFAS. Using analytical methods that offer data for a wide range of individual PFAS and the TOP assay are likely to aid in characterizing and differentiating sources and for evaluating treatment technologies. Knowledge of the branched and linear isomers of PFAS can also offer diagnostic information to differentiate PFCA sources and to interpret the impact of environmental processes (e.g., partitioning) on PFCA and PFSA transport. At present, USEPA methods do not capture gas-phase PFAS that are known to occur in municipal wastewater and landfill leachates. Additional methods including particle induced gamma ray emission, total absorbable organic fluorine, and high mass accuracy mass spectrometry offer advantages and limitations but are not yet commercially available. Forensic approaches for PFAS are under development but it is likely to be years before the techniques are fully validated. As fingerprinting capabilities become available, indicator PFAS are likely to be identified and pushed into analytical methods in the commercial market.

Recommendations

1. Detection of PFAS should move beyond the legacy chemicals of PFOS and PFOA, to include a suite of other PFSAs and PFCAs (p. 24), as well as replacement chemicals (such as GenX) and constituents of aqueous film forming foam (AFFF) that are being identified, when sensitive analytical methods are feasible.

2. For initial waste or site characterization, the Panel recommends use of analytical methods that measure the greatest number of PFAS as well as quantify the branched and linear PFSAs and PFCAs.

3. In cases where water is being treated for use as a drinking water source, the Panel recommends use of analytical methods that quantify short-chain PFAS because they are more difficult to remove under traditional methodologies.

4. The Total Oxidizable Precursor assay is commercially available methodology and should be used by analytical laboratories to characterize environmental media including groundwater, wastewater, sediment, soils, and biosolids. The Total Oxidizable Precursor assay signals the presence of precursors, which is useful information when designing and evaluating remedial systems.

5. Agency staff in Michigan should keep abreast of progress in the area of PFAS forensics as techniques undergo validation for stakeholder use.

Concluding Comments

The Panel recognizes the importance and complexity of the issues facing Michigan and has strived to provide a clear description of the available evidence. **Michigan leadership should be commended for their efforts to address environmental and health concerns with PFAS conscientiously by developing policies that do justice to the current state of knowledge. The questions posed to the Panel are the appropriate for drawing out the information needed to make sound, evidence-based policy decisions. However, by asking these pointed, critical questions, they have also obligated us to reveal how far short the scientific evidence is in providing clear answers to many of them.** The Panel believes that it is beneficial to make use of the evidence that is available, even when it is incomplete, tentative, and subject to change as more research is done on PFAS. It is also important for the many stakeholders concerned with these issues to appreciate that even after assembling and providing a full description of current knowledge, which we have strived to do, the gaps in that knowledge require informed judgment regarding regulation and mitigation. The research does not provide direct indications of the "right" choices but with continuing progress, the uncertainties will be reduced enabling more informed decisions in the future. Although the evidence is still evolving and weak in some important areas, there is sufficient evidence from the toxicologic and epidemiologic findings to justify regulatory efforts to manage exposure for protecting human health. As scientists, the Panel welcomes the opportunity to share our understanding and insights in the service of guiding these critical policy decisions facing the State of Michigan.

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Definitions and Acronyms

Terminology	Definition
Adona	3H-perfluoro-3-[(3-methoxy-propoxy) propanoic acid]
AFFF	Aqueous film forming foam
AIX	Anion Exchange (water purification method)
Anion	A negatively-charged molecule
AOF	Adsorbable organic fluorine assay
Biosolids	Sewage sludge, usually generated by water treatment plants
BMDL	Benchmark dose lower confidence limit
Branched chain	A connection of carbon atoms arranged in a non-linear arrangement (with branching points)
Cation	A positively-charged molecule
Chain length	Number of carbon atoms linked together in a chain
Constitutive Androstane Receptor (CAR)	A nuclear receptor that regulates gene expression and metabolic processes.
diPAP	Polyfluoroalkyl diphosphate esters
EFSA	European Food Safety Authority
Electrofluorination	Older procedure used for PFAS manufacture that can yield both branched and linear chain perfluorinated substances
EOF	Extractable organic fluorine assay
ERK1/2	Extracellular regulated kinases
Estimated glomerular filtration rate (eGFR)	Measure of kidney function
Et-PFOSA-AcOH	2-(*N*-Ethyl-perfluorooctane sulfonamido) acetic acid
FTOH	Fluorotelomer alcohol (a group of chemicals, usually polyfluorinated)
FtS (FTS)	Fluorotelomer sulfonate (a group of chemicals, usually polyfluorinated)
GAC	Granular activated carbon (for water purification)
GenX	2,3,3,3-tetrafluoro-2-(perfluoropropoxy)propanoic acid (also known as HFPO-DA; hexafluoropropylene oxide dimer acid)
Half life	the time required for the concentration of a substance in the body to decrease by half
K_{oc}	Organic carbon-water partitioning coefficient

LC-HRMS	Liquid chromatography-high resolution mass spectrometry
LC-MS/MS	Liquid chromatography-tandem mass spectrometry (an instrumental method for analysis)
LHA	Lifetime Health Advisory
LOAEL	Lowest observed adverse effect level
M-FIL	Membrane filtration
MAPK	Mitogen-activated protein kinase
MCL	Maximum contaminant level
MDEQ	Michigan Department of Environmental Quality
Me-PFOSA-AcOH	2-(*N*-Methyl-perfluorooctanesulfonamido) acetic acid
Method 537	Targeted USEPA analytical method for measuring 14 targeted PFAS chemicals using LC-MS/MS
Methods 8327 and 8328	A draft method under development for targeted measurement of an extended group of PFAS chemicals using LC-MS/MS
mg/L	Milligrams per liter (parts-per-million)
µg/L	Micrograms per liter (parts-per-billion)
MRL	Minimal risk levels
N-EtFOSA	*N*-Ethyl-perfluorooctanesulfonamide
NF-κB	Nuclear Factor kappa-light-chain-enhancer of activated B cells
ppt	Nanograms per liter (parts-per-trillion)
NOAEL	No observed adverse effect level
NSF	NSF International, a product testing, inspection, and certification company based in Ann Arbor, MI
Obesogenicity	Promotion or contributing to obesity
PAPs	Polyfluorinated phosphate esters
PFAA	Perfluorinated aliphatic acids
PFAS	Per- and poly-fluoroalkyl substances
PFBA	Perfluorobutanoic acid (C4; a PFCA)
PFBS	Perfluorobutanesulfonic acid (C4; a PFSA)
PFCA	Perfluorocarboxylic acids (class of compounds)
PFDA	Perfluorodecanoic acid (C10; a PFCA)
PFHpA	Perfluoroheptadecanoic acid (C7; a PFCA)
PFHxA	Perfluorohexanoic acid (C6; a PFCA)

PFHxS	Perfluorohexanesulfonic acid (C6; a PFSA)
PFNA	Perfluorononanoic acid (C9; a PFCA)
PFNS	Perfluorononanesulfonic acid (C9; a PFSA)
PFOA	Perfluorooctanoic acid (C8; a PFCA)
PFOS	Perfluorooctanesulfonic acid (C8; a PFSA)
PFPeA	Perfluoropentanoic acid (C5; a PFCA)
PFSA	Perfluorosulfonic acids (class of compounds)
PIGE	Particle-induced gamma ray emission assay for fluorine
pKa	A measure of acid strength
POET	Point-of-entry treatment
POU	Point-of-use treatment
PPARα	Peroxisome proliferator activated receptor-alpha
ppb	Parts-per-billion (micrograms per liter)
ppm	Parts-per-million (milligrams per liter)
ppt	Parts-per-trillion (nanograms per liter)
QTOF	Quadrupole time-of-flight mass spectrometer
RfD	Reference dose considered to be without adverse effects
RO	Reverse osmosis (water purification)
Telomer	A process for synthesis of linear oligomeric molecules
TOP assay	Total oxidizable precursor assay based on oxidation and LC-MS/MS
Zwitterion	A molecule with both positively-charged and negatively-charged groups

EXHIBIT 2

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Article

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Underestimated burden of per- and polyfluoroalkyl substances in global surface waters and groundwaters

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Check for updates

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Per- and polyfluoroalkyl substances (PFAS) are a class of fluorinated chemicals used widely in consumer and industrial products. Their human toxicity and ecosystem impacts have received extensive public, scientific and regulatory attention. Regulatory PFAS guidance is rapidly evolving, with the inclusion of a wider range of PFAS included in advisories and a continued decrease in what is deemed safe PFAS concentrations. In this study we collated PFAS concentration data for over 45,000 surface and groundwater samples from around the world to assess the global extent of PFAS contamination and their potential future environmental burden. Here we show that a substantial fraction of sampled waters exceeds PFAS drinking water guidance values, with the extent of exceedance depending on the jurisdiction and PFAS source. Additionally, current monitoring practices probably underestimate PFAS in the environment given the limited suite of PFAS that are typically quantified but deemed of regulatory concern. An improved understanding of the range of PFAS embodied in consumer and industrial products is required to assess the environmental burden and develop mitigation measures. While PFAS is the focus of this study, it also highlights society's need to better understand the use, fate and impacts of anthropogenic chemicals.

Per- and polyfluoroalkyl substances (PFAS) constitute a class of over 14,000[1] chemicals extensively used in industrial applications and consumer products because of their distinct water and oil repellent properties and high heat tolerance. PFAS are defined as fluorinated substances that contain at least one fully fluorinated methyl or methylene carbon atom[2]. This includes fluoropolymers (for example, Teflon), some fluorinated insecticides (for example, Fludioxonil) and pharmaceuticals (for example, Bicalutamide)[3]. PFAS are referred to as 'forever chemicals'[4] because of their persistence in the environment. Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), two of the highest-profile PFAS, were added to the Stockholm Convention for the protection of human health and the environment from persistent organic pollutants (POPs)[5] in 2009 and 2019, respectively, limiting their use and production. This also coincided with a shift from 'legacy PFAS' towards novel PFAS[6] (Extended Data Table 1).

Regulators worldwide have proposed or regulated varying concentrations for PFAS in drinking water. One of the most restrictive recommendations for drinking water is Health Canada's, with the sum of all PFAS being less than 30 ng l^{-1} (ref. 7), whereas the European Union recommends the sum off all PFAS being less than 500 ng l^{-1} or the sum of 20 select PFAS being less than 100 ng l^{-1} (ref. 8). It is noted, however, that currently Health Canada only requires quantification of either at least 18 PFAS or using US Environmental Protection Agency (EPA) methods 533 and/or 537.1[9]. The US EPA has proposed drinking water

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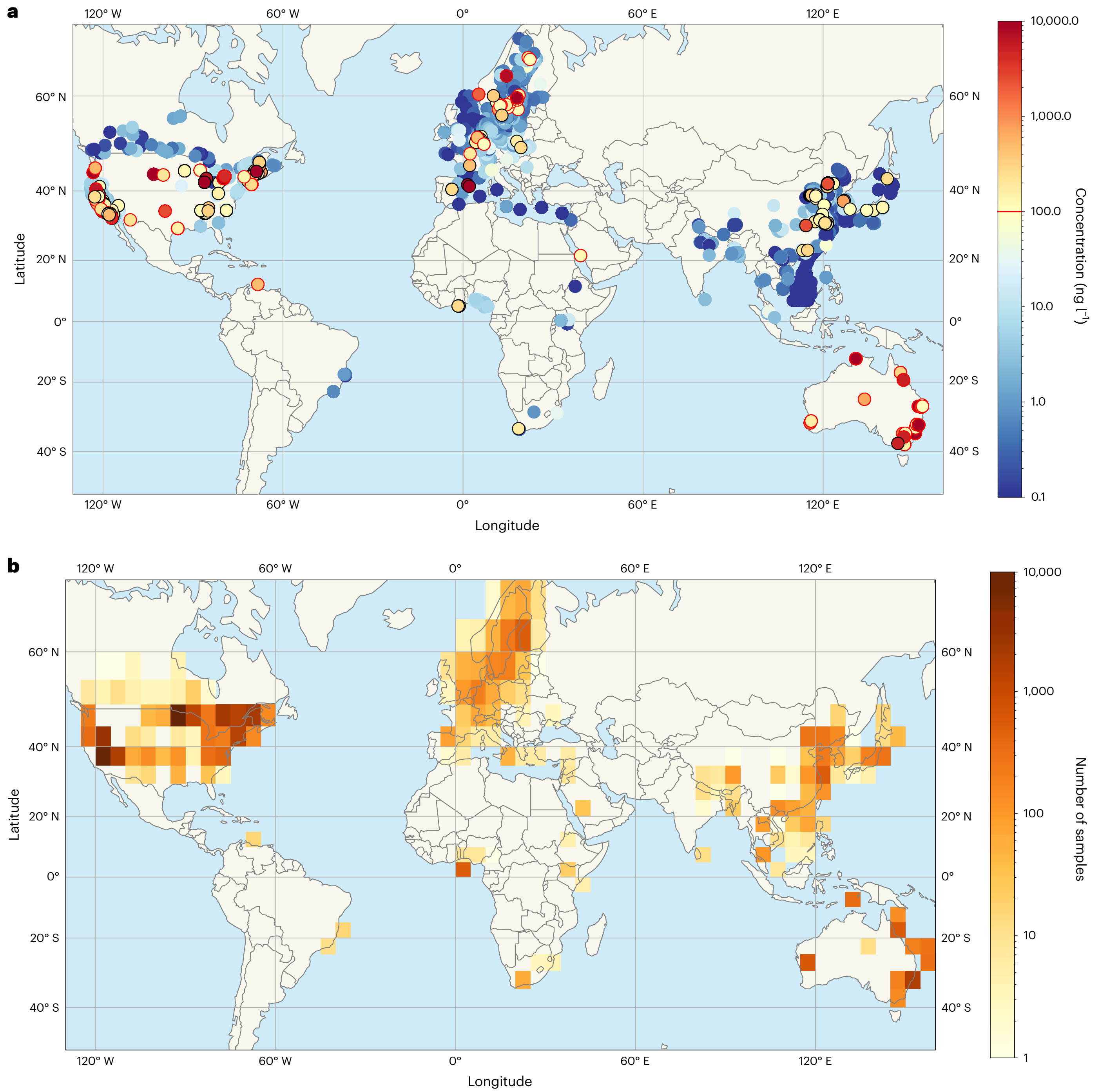

Fig. 1 | Global map of PFAS concentration in water. a, Sum of concentration of 20 PFAS subject to EU guidance in surface water, groundwater and drinking water samples. Those above the EU drinking water limit of 100 ng l^{-1} (marked red on scale bar) are circled in red (for known contamination sources (for example, AFFF or non-AFFF)) or black (unknown sources). **b**, Number of PFAS samples available on a 5° longitude/latitude grid worldwide.

concentration limits of 4 ng l^{-1} for PFOS and PFOA in their National Primary Drinking Water Regulation and limits on perfluorononanoic acid (PFNA), perfluorobutanesulfonic acid (PFBS), perfluorohexanesulfonic acid (PFHxS) and hexafluoropropylene oxide dimer acid (GenX) through the hazard index (HI)[10].

Toxicity concerns increase with fluorinated chain length (FCL), because long-chain PFAS (FCL > 6) usually take longer to be excreted from the body due to their lower water solubility, higher affinity for serum proteins and enterohepatic recirculation, which increase their elimination time from plasma and tissue[11–13]. All perfluoroalkyl carboxylic acids (PFCA) with a FCL ≥ 7 are currently candidates for potential inclusion on the Stockholm Convention for the protection of human health and the environment from POPs[5].

Certain PFAS degrade to terminal perfluoroalkyl carboxylic acids (PFCAs) and perfluoroalkyl sulfonic acids (PFSAs) and are referred to as precursors[14] (Supplementary Table 1 and Supplementary Fig. 1). Precursors are used extensively in the manufacture of consumer products such as cosmetics, surface treated paper, waterproof textiles, insecticides, food packaging and firefighting foams[15]. Whereas there are too many PFAS precursors to list individually, they are generally

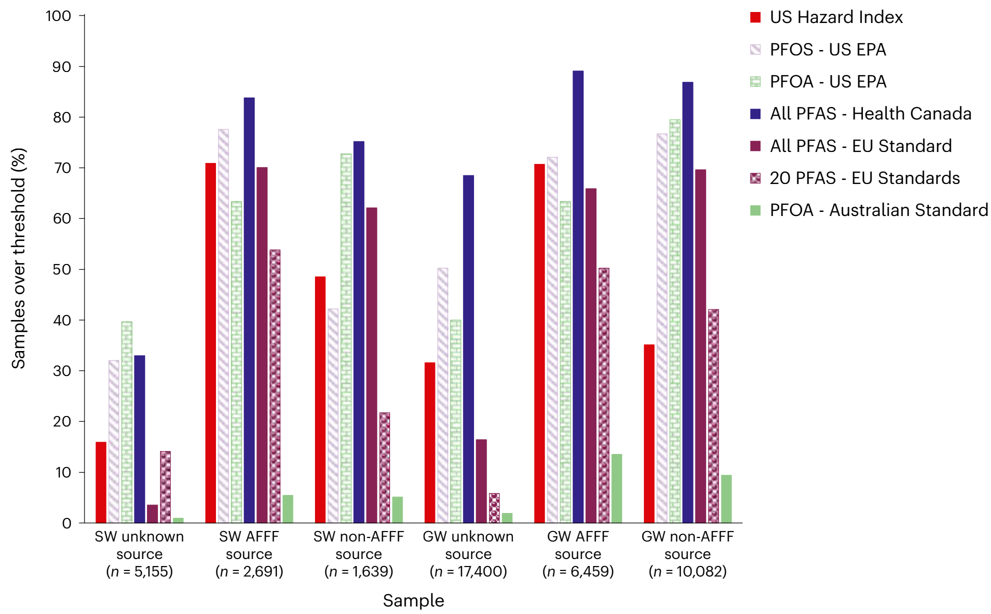

Fig. 2 | Incidence of exceedance of PFAS regulatory standards or advisories. For samples where PFAS concentrations were below detection limits, a PFAS concentration was randomly assigned between zero and the detection limit.

separated into three major groupings: fluorotelomers, sulfonamides and polyfluorinated alkyl phosphate esters (PAPs).

Whereas studies have estimated PFAS production globally[16,17] and quantified PFAS in commercial and industrial products, their fate is still unknown. Numerous studies have investigated PFAS extent in environmental compartments, including one that suggests that four select PFAS exceed the planetary boundary[18]. Studies have also assessed or compared aqueous phase PFAS concentrations in select regions[19,20]. Whereas it is widely acknowledged that PFAS are globally pervasive, the extent of PFAS in global surface (SW) and groundwater (GW) is unknown, as is the extent to which PFAS concentrations exceed proposed or implemented PFAS drinking water guidelines.

Here we investigate the extent and distribution of PFAS surface and groundwater contamination globally. We assess PFAS concentrations with respect to current and proposed PFAS drinking water regulations or advisories. Finally, we investigate the source of PFAS contamination, including the distribution of PFAS used in various consumer products, providing insights into the global pervasiveness of PFAS and the ability to predict the future environmental burden of PFAS.

Extent of global PFAS water contamination

To assess the global extent and importance of PFAS in the environment, an extensive global dataset was developed from 273 environmental studies since 2004, which include data for over 12,000 SW and 33,900 GW samples. As PFAS are not naturally occurring[21], any PFAS found in the environment was introduced from a range of consumer and industrial products.

PFAS are pervasive in SW and GW worldwide (Fig. 1). Note that, while the mapped data suggest Australia, China, Europe and North America are PFAS hotspots relative to the world (Fig. 1a), when comparing against the number of samples collected (Fig. 1b), it implies that these are high-sampling zones, potentially skewing the representation of actual distribution. If research were undertaken in more locations worldwide at sites with high aqueous film forming foam (AFFF) usage, such as major airports, comparable PFAS contamination levels would probably be found. Additionally, high PFAS contamination in Fig. 1a is not limited to areas near manufacturing sites but also high-use areas. For example, Australia has no PFAS manufacturing facilities[22,23] but has highly contaminated PFAS sites from firefighting activities. Furthermore, sampled locations could have higher PFAS concentrations compared to unsampled areas, as research efforts tend to concentrate on locations where PFAS presence is likely. Given this, the occurrence of surface and groundwater with large PFAS concentrations estimated in this study may be high.

Threshold regulatory PFAS concentration limits are used to benchmark the PFAS global extent in SW and GW (Extended Data Table 2). PFAS sources were divided into three categories: known non-AFFF (for example, production facilities using or producing PFAS, landfills), known AFFF (for example, firefighting training area) or unknown. A higher proportion of samples exceeded threshold limits when associated with a known source of PFAS contamination compared with an unknown source (Fig. 2 and Extended Data Figs. 1–6). For GW samples with known AFFF contamination, 71, 72 and 63% exceeded the proposed US EPA HI ($n = 6{,}312$) or their proposed PFOS ($n = 6{,}442$) and PFOA ($n = 6{,}447$) drinking water regulation, respectively. However, when there was no known source, the incidence of exceedance of these criteria was still elevated (31, 50 and 40% for the US EPA HI ($n = 14{,}905$), PFOS ($n = 15{,}351$) and PFOA ($n = 15{,}499$) drinking water regulation, respectively). Given that guidance on PFAS threshold concentrations vary globally, the proportion of samples that are deemed of concern also varies. Groundwater with no known contamination source exceeded Health Canada's criteria in 69% of samples whereas only 6% of these samples exceeded the EU's sum of all PFAS criteria (500 ng l^{-1}) ($n = 16{,}151$). If the alternate EU sum of 20 PFAS criteria is considered, 16% of groundwater samples with no known contamination source were in exceedance ($n = 16{,}143$). Regardless of the regulatory threshold considered, a large fraction of groundwater samples would be considered unacceptable for drinking water consumption. For known AFFF source SW samples, the proportion exceeding regulatory thresholds is similar to GW samples. However, when there was no known PFAS source, or a known non-AFFF source, the incidence of SW samples exceeding regulatory thresholds was lower. This is expected as residence times in surface waters are lower than for groundwater. For this analysis, samples that were below detection limits (BDL) were randomly assigned a concentration between zero and the detection limit. To assess potential bias, particularly for low-threshold criteria jurisdictions (for example, PFOA < 4 ng l^{-1} US EPA), this analysis was repeated with PFAS concentrations with BDL set to zero (Extended

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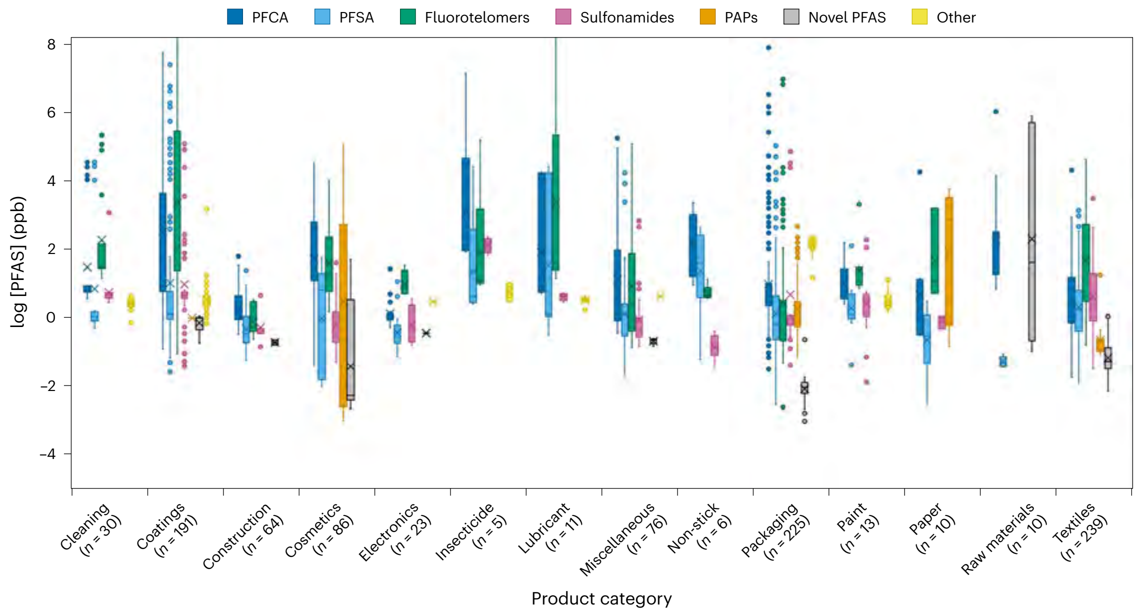

Fig. 3 | Box plot of total PFAS concentration identified in various consumer and industrial product categories. Box dimensions show the span between quartiles 1 and 3 (interquartile range, IQR). Outliers are defined as values greater than 1.5× the IQR. Whiskers extend from these quartiles to the largest (quartile 3) or smallest (quartile 1) non-outlier value (that is, <1.5× the IQR). *Y*-axis units are ng ml^{-1} or μg kg^{-1} equivalent to ppb.

Data Table 3 and Supplementary Figs. 2–8). Whereas assumptions made dealing with detection limits impact results, both approaches conclude that an important fraction of samples exceeds regulatory threshold levels. As method-detection limits continually decrease, the extent of exceedances will be better informed.

Where does PFAS come from

To assess PFAS sources to the environment, consumer and industrial products containing PFAS were divided into those used for AFFF and non-AFFF. AFFF applications typically result in high concentration point sources of PFAS, as do industrial manufacturing sites that synthesize or use PFAS. The latter are considered known (non-AFFF) sources in this study.

Non-AFFF consumer and industrial products

PFAS in 943 non-AFFF consumer products in 15 categories were characterized from 38 literature studies since 2010. In these studies, 113 PFAS were quantified, although at most 60 PFAS were analysed in any given study[24]. Comparison of PFAS classes in consumer products is challenging as the same suite of PFAS are not quantified in each study. For example, at least two PFCAs or PFSAs were measured in 89% and 69% of all non-AFFF product samples, respectively, whereas only 49%, 35%, 20%, 12% and 15% of studies quantified at least two fluorotelomers, sulfonamides, PAPs, novel or other PFAS, respectively. When measured, however, fluorotelomers and traditional PFCAs represented the dominant PFAS subclass in most of the product categories investigated (for example, coatings, cosmetics and textiles) (Fig. 3). Fluorotelomers represented a median of 72% of the total measured PFAS by mass in consumer products, whereas PFCAs represented 25%. PAPs and sulfonamides were also relevant when measured with a median of 14% and 7%, respectively. Interestingly, PFSAs were typically much lower, accounting for a median of 4% of the total quantified PFAS mass.

Different jurisdictions worldwide provide guidance, or regulate, differing ranges of PFAS, with no standard approach to quantify PFAS. For example, the US EPA has three methods to measure PFAS in aqueous samples, methods 533, 537.1 and 8327, with an additional non-drinking aqueous method (1633) in development. EPA method 537 and its revisions have been the most used since 2009, quantifying 14 PFAS. In 2018, this method was revised as 537.1 to include four additional PFAS. All other EPA methods were developed in 2019 or later and quantify a total of 32 PFAS, including seven PFSA, 11 PFCA, three fluorotelomers, three sulfonamides and eight novel PFAS (Extended Data Table 2). In this study, EPA draft method 1633 is used as a benchmark as EPA methods are commonly used globally and method 1633 is the most comprehensive. In doing so, this provides a preliminary assessment of the extent to which the most comprehensive EPA method captures PFAS mass and the extent of unaccounted PFAS.

If only the PFAS listed in draft method 1633 were used to quantify PFAS in consumer products within this dataset, the total embodied PFAS would be substantially underestimated (Fig. 4) and the PFAS distribution would completely change. For example, the median concentration of PFAS regulated in the United States (sum of PFBS, PFHxS, PFOS, PFOA, PFNA and GenX) in textiles ($n = 227$) and coatings ($n = 167$) is two and three orders of magnitude smaller than the median of all PFAS quantified. Across all products, EPA method 1633 suggests a median distribution of 73% PFCA ($n = 781$), 11% PFSA ($n = 750$), 16% fluorotelomers ($n = 353$), 10% sulfonamides ($n = 242$) and 0.1% novel PFAS ($n = 27$), with phosphate-based PFAS not being quantified with this method. This results in the proportion of PFCAs, PFSAs and sulfonamides being overestimated by a factor of 2.8, 2.8 and 4.2, respectively, whereas fluorotelomers would be underestimated by a factor of 25. A median of 4% of the PFAS mass in consumer products is currently subject to the Stockholm Convention ($n = 976$), increasing to 18% with the inclusion of candidate PFAS (PFCAs with FCL ≥ 7) ($n = 976$). The average amount of long-chain PFAS within this dataset, including PFCAs, is 66% ($n = 976$), indicating that long-chain PFAS are dominant in consumer products.

As previously mentioned, fluorotelomers represent the largest contributor to PFAS mass in consumer products. Fluorotelomers are comprised of numerous subgroups including fluorotelomer sulfonates (FTS), fluorotelomer alcohols (FTOH), fluorotelomer iodides, fluorotelomer acrylates, fluorotelomer methacrylates, fluorotelomer mercaptoalkyl phosphate diester, fluorotelomer unsaturated carboxylic acids (FTUCA) and fluorotelomer carboxylic acids (FTCA). FTS represent a median 2% ($n = 338$) of the total PFAS in consumer products when two or more PFAS classes are quantified and are the only fluorotelomers

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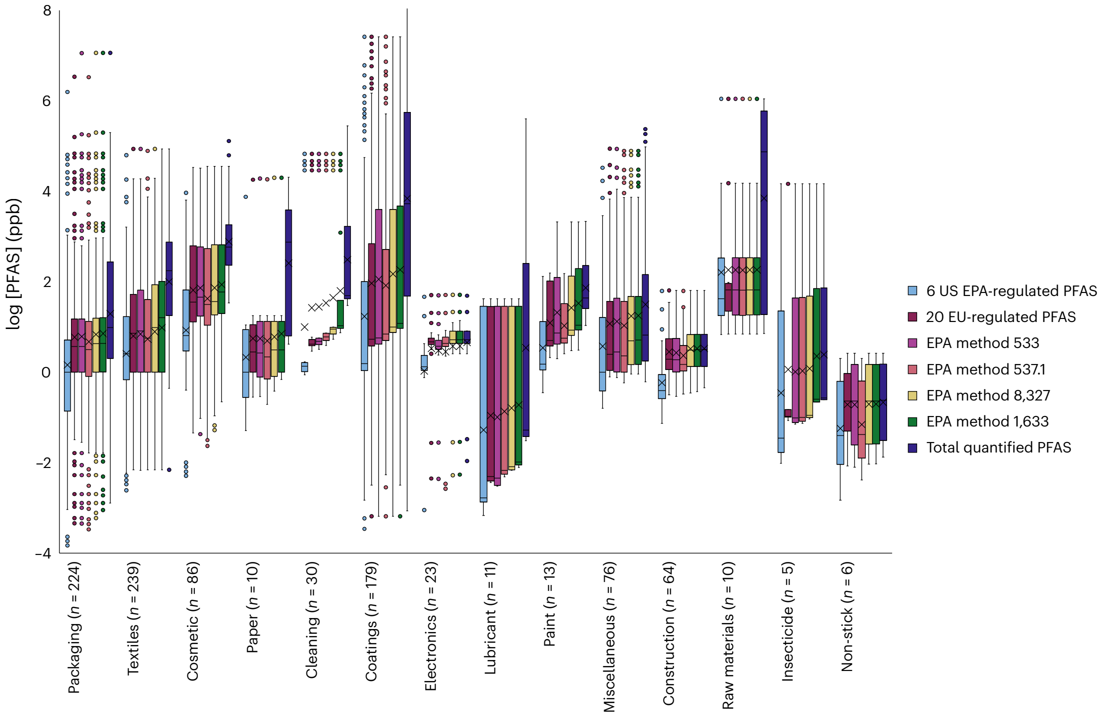

Fig. 4 | Box plot of PFAS in consumer/industrial products that would be quantified with EPA methods or regulated in the US/EU. PFAS concentrations are in ng ml^{-1} or µg kg^{-1} equivalent to ppb. Box dimensions show the span between quartiles 1 and 3 (IQR). Outliers are defined as values greater than 1.5× the IQR. Whiskers extend from these quartiles to the largest (quartile 3) or smallest (quartile 1) non-outlier value (that is, <1.5× the IQR).

quantified using the US EPA methods. FTOH require a different analytical method to most other PFAS and were not often analysed. However, when two or more PFAS in this subclass were quantified, they represented an important proportion (median of 58% (n = 365)) of the total PFAS in consumer products.

Although most PFAS in consumer products may not be currently regulated, many will transform to regulated PFAS in the environment (Supplementary Tables 1 and 2). Studies that have used the total oxidizable precursor (TOP) assay found a notable increase in PFCAs following oxidation. This suggests that traditional EPA-based methods do not adequately capture PFAS embodied in consumer products and their potential environmental burden[24–27].

AFFF

Eleven literature studies characterize PFAS in 148 AFFF samples from different suppliers and synthesis methods sold since 1980. These studies quantified 69 PFAS with a maximum of 40 PFAS being measured in any given study[28]. PFAS for AFFF applications have been synthesized by two synthesis processes: electrochemical fluorination and telomerization[21]. These processes result in a range of products with electrochemical fluorination-producing PFOS and telomerization-producing fluorotelomers[21,29]. Depending on the manufacturer and year produced, AFFF has different formulations (Supplementary Table 3). PFOS represents a median 51% of the PFAS in historic 3M AFFF (n = 14), with other PFSAs and sulfonamides also forming important contributions. All other PFAS in historic 3M AFFF had low concentrations, when measured. Fluorotelomers and PFCAs, were the dominant PFAS in Angus AFFF (n = 28), with a median of 64% and 36%, respectively. Several other AFFF have been investigated, however, the supplier's name was not provided or PFCA and PFSA concentrations were not quantified. In these samples, fluorotelomers represented the dominant PFAS (median = 93%, n = 83). Of these fluorotelomers, important subclasses include FTS (median = 73% of total PFAS, n = 69) and FTOH (median = 10% of total PFAS, n = 38). Comparison of PFAS quantified using EPA method 1633 to the sum of all PFAS quantified suggests that exclusively reporting PFAS quantified using EPA method 1633 underrepresents total PFAS in AFFF by a median factor of 2.8. A median 60% of the PFAS mass in historic 3M AFFF is subject to the Stockholm Convention whereas Angus AFFF has no PFAS subject to the Stockholm Convention. For non-3M AFFF (n = 134), including candidate PFAS, 0.6% of the PFAS mass would be subject to the Stockholm Convention, increasing to 1% if long-chain PFAS are considered. This analysis of AFFF formulations suggests that known PFAS in AFFF presents a large environmental burden, with an important fraction either currently subject to regulatory oversight, or likely in future. However, an undetected fraction of PFAS in AFFF probably exists[30]. It is important to note that many of these studies quantify a limited number of PFAS, similar to non-AFFF product studies. Therefore, it is challenging to predict the AFFF environment burden because not all PFAS are quantified. Furthermore, when the TOP assay is applied to AFFF samples, considerable increases in total PFAS mass has been reported[31,32], as noted in non-AFFF consumer product studies.

Finding the missing piece in FTOH and other under measured PFAS

Across the 33,940 groundwater samples, 57 distinct PFAS were quantified. On average, 16 distinct PFAS (maximum of 38 PFAS) were quantified and an average of 15 PFAS within the suite of proposed US EPA method 1633. PFCAs, PFSAs and sulfonamides were routinely quantified (at least two PFCAs, PFSAs and sulfonamides were quantified in 91%, 89% and 54% of studies, respectively). Whereas at least two fluorotelomers were quantified in 26% of the groundwater studies, this was almost exclusively FTS, with FTCA and FTUCA quantified to a lesser extent and no studies quantifying FTOH. This is despite the fact that FTOH are an important PFAS present in consumer products, when quantified. It is important to note that existing EPA aqueous methods (EPA methods 533, 537, 1633) are liquid chromatography with tandem mass spectrometry (LC-MS/MS) based. Analysis of FTOH requires gas chromatography tandem mass spectrometry (GC-MS/MS), with no US EPA GC/MS/MS methods for aqueous PFAS in existence. With regards to surface water, PFCAs, PFSAs and fluorotelomers were quantified to a similar extent as groundwater samples, with FTS representing the dominant fluorotelomers quantified. Unlike groundwater studies, four of the surface water studies quantified FTOH[33–36], with only two also quantifying PFCAs, PFSAs or both, facilitating an assessment of the relative importance of FTOH. In the 16 urban river samples in China[34] and eight river samples in Bangladesh[33], FTOH represented a median of 53% of the total PFAS (range of 46 to 62%) and 2% (ranging from 0.9 to 34%), respectively. It is difficult to draw definitive conclusions from two studies with relatively few samples, however, coupled with the FTOH prevalence in consumer products, it suggests that FTOH could be an important class of unquantified PFAS. Because only a limited suite of PFAS are typically quantified, any estimate of PFAS environmental burden is likely to be an underestimate, and a broader suite of PFAS needs to be quantified.

Wastewater treatment plants (WWTPs) and landfills are focal point receptors of anthropogenic activity. Hence, representing an opportunity for quantification of the diverse PFAS suite that has or may be dispersed into the environment. Unfortunately, studies investigating WWTP influent and landfill leachate provide limited insights. Whereas landfill leachate studies quantify more PFAS than surface and groundwater studies, they have focused on the same range of PFAS (PFCAs, PFSAs, FTS and select sulfonamides) with no studies directly measuring FTOH[37]. However, studies have reported atmospheric FTOH emissions at landfill sites and WWTPs[38]. One Chinese study reported FTOH represented 8% of the PFAS WWTP influent mass[39]. FTOH could enter the wastewater system through various sources, including laundering of textiles[40].

Studies using the TOP assay to WWTP effluent report a considerable PFAS fraction that go undetected using EPA methods[41,42]. Similarly, studies that oxidized landfill leachate reported minimum to moderate changes in PFAS concentrations, suggesting that unknown PFAS transformed biotically or abiotically in landfill cells[43,44]. Whereas limited studies have applied the TOP assay to surface and groundwater, some report considerable increases in PFAS concentrations, although the increases are not consistent in the literature[41,45,46]. A major drawback of the TOP assay is that not *all* PFAS undergo oxidation to PFCAs or PFSA, particularly the perfluoroether class which transform into unmonitored terminal PFAS[47]. Furthermore, there is no standardized TOP assay method, and results from the variants available can differ greatly, with too harsh conditions leading to mineralization of terminal target PFAS[48]. These findings suggest that TOP assay results may underrepresent future PFAS' environmental burden. Given the relatively limited suite of PFAS that have been quantified in surface and groundwater, it is not possible to reliably discuss the extent to which current PFAS methods adequately capture the range of PFAS and mass in these systems.

Overall, this study suggests that a large fraction of surface and groundwaters globally exceed PFAS international advisories and regulations and that future PFAS environmental burden is likely underestimated. Because PFAS definition continues to evolve, the extent of underestimation will be a function of PFAS definition. Additional work is needed to develop analytical techniques to quantify PFAS in environmental matrices, conduct a more systematic sampling regime of water sources globally and quantify human and ecological impacts of the broad range of PFAS in the environment.

Online content

Any methods, additional references, Nature Portfolio reporting summaries, source data, extended data, supplementary information, acknowledgements, peer review information; details of author contributions and competing interests; and statements of data and code availability are available at https://doi.org/10.1038/s41561-024-01402-8.

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Methods

This study reviewed and collated 48,985 samples from 367 published papers and government websites to build a comprehensive database to determine PFAS global distribution in surface and groundwater (Supplementary Table 4). This study is therefore limited to PFAS tested in previous studies, the analytical instruments and methods used and the locations that were sampled. The data were collated, compared and analysed and statistically validated using Python scripts and MS Excel.

PFAS is reported in ng l^{-1} for aqueous concentrations. When investigating PFAS concentrations in products, all data were converted to parts per billion (ppb) using appropriate area to mass conversions as the data include PFAS from an array of sources in different compartments and measured with different instruments and sample-preparation techniques.

The data available were converted into an Excel file using an online open-source portable document format converter when required. All data was then saved as a comma-separated values or Microsoft Excel spreadsheet document before analysis with Python. To check the data, an initial screening was done using a Python script, followed by manual checks. When analytes were reported as below detection limits (BDL) or not detected, a random value between 0 and the detection limit was assigned using a loop in Python and the detection limit provided in each study. Even though there are specific statistical methods for handling censored data, they assume a specific data distribution not applicable in this case and as there are less than 60% of samples below the detection limit, substitution was suitable[49]. Randomizing the substitution reduces clustering of data around a specific value and biasing of results. To represent data on a map, the latitude and longitude of the sampling location was used. Where no location was specified other than the country, a random major city in that country was assigned to capture the sample's location.

A list of the PFAS analytes, their major PFAS class and fluorinated chain length are included in Supplementary Table 1. The PFAS classes considered include those that form as terminal products, that is, perfluorocarboxylates (PFCA), perfluorosulfonates (PFSA) and precursors to these terminal products. Precursors included are fluorotelomers, sulfonamides and polyfluorinated alkyl phosphate esters (PAPs). Within the fluorotelomer PFAS class subclasses include: alcohols (FTOH), sulfonates (FTS), iodides, n:2 saturated/unsaturated carboxylates (FTCA/FTUCA), acrylates and betaines. Finally, novel PFAS (which predominantly encapsulate the ether PFAS sub-group) were considered.

Data availability

Sources of data used to compile the database are provided in Supplementary Table 4. The data analysed and used to generate the figures and tables in this study are available in the following Zenodo data repository: https://doi.org/10.5281/zenodo.10616840. Source data are provided with this paper.

Code availability

Python scripts used to summarize data will be provided upon request.

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Author contributions

Conceptualization: conceived by D.M.O. and refined by all authors. Methodology: D.A.G., D.G., A.M.J., T.C.G.K. and D.M.O. Data collection: D.A.G., D.G. and J.H. Data analysis: D.A.G., D.G., A.M.J., T.C.G.K. and D.M.O. Validation: D.A.G., D.G. and A.M.J. Supervision: A.M.J., M.J.L. and D.M.O. Writing: D.A.G., A.M.J. and D.M.O. with input from all authors.

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Competing interests

The authors declare no competing interests.

Additional information

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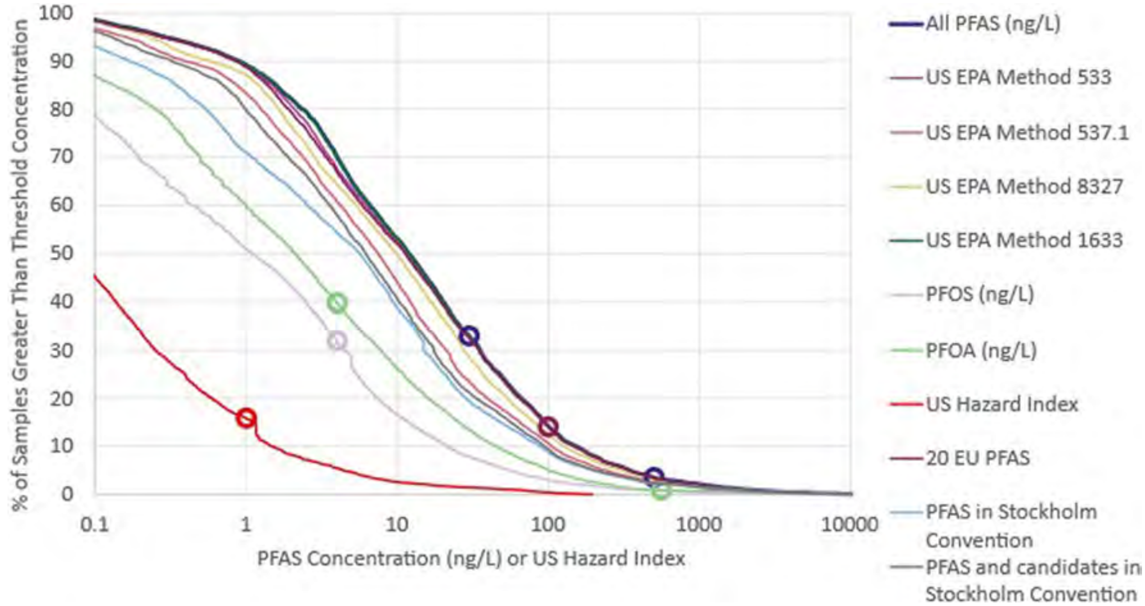

Extended Data Fig. 1 | Cumulative distribution of surface water samples from an unknown source that exceed a given PFAS concentration. Circles indicate relevant PFAS drinking water guidance values. For samples where PFAS concentrations were below detection limits a PFAS concentration was randomly assigned between zero the detection limit.

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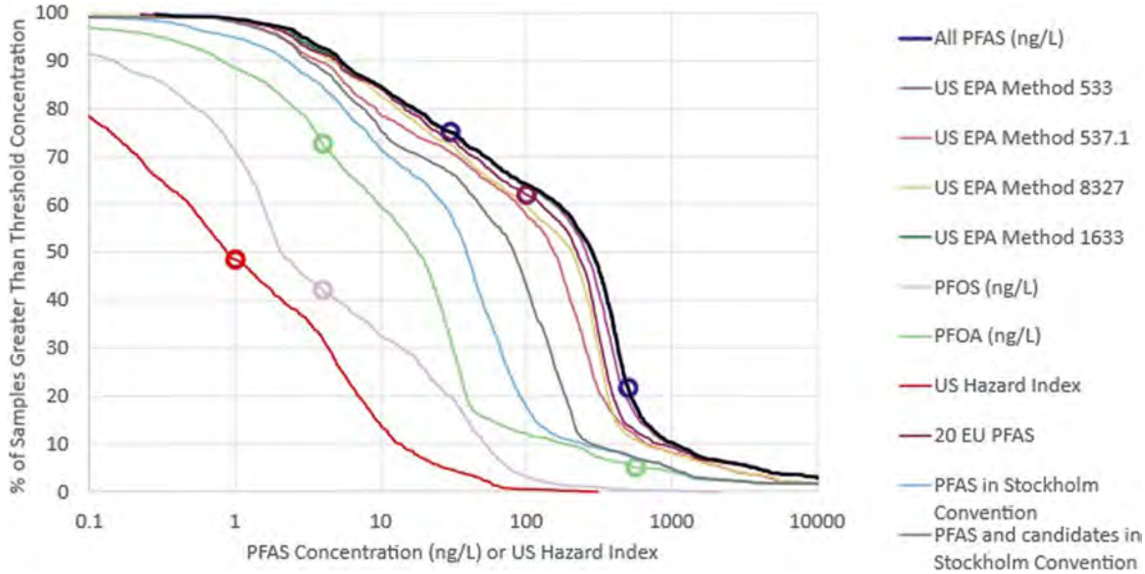

Extended Data Fig. 2 | Cumulative distribution of surface water samples from a known non AFFF source that exceed a given PFAS concentration. Circles indicate relevant PFAS drinking water guidance values. For samples where PFAS concentrations were below detection limits a PFAS concentration was randomly assigned between zero the detection limit.

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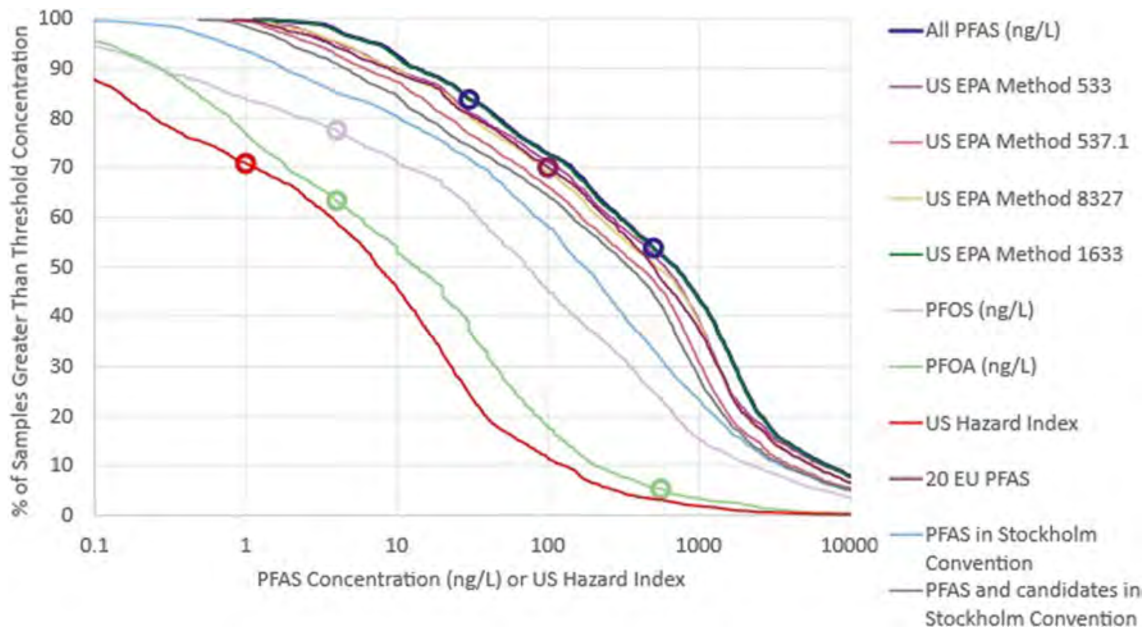
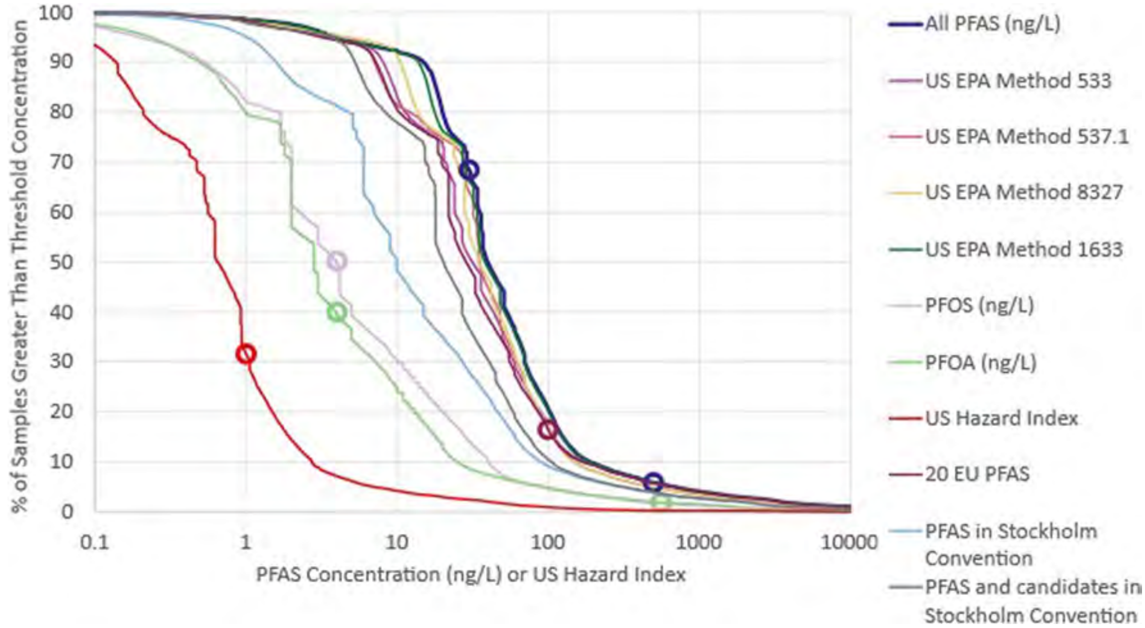


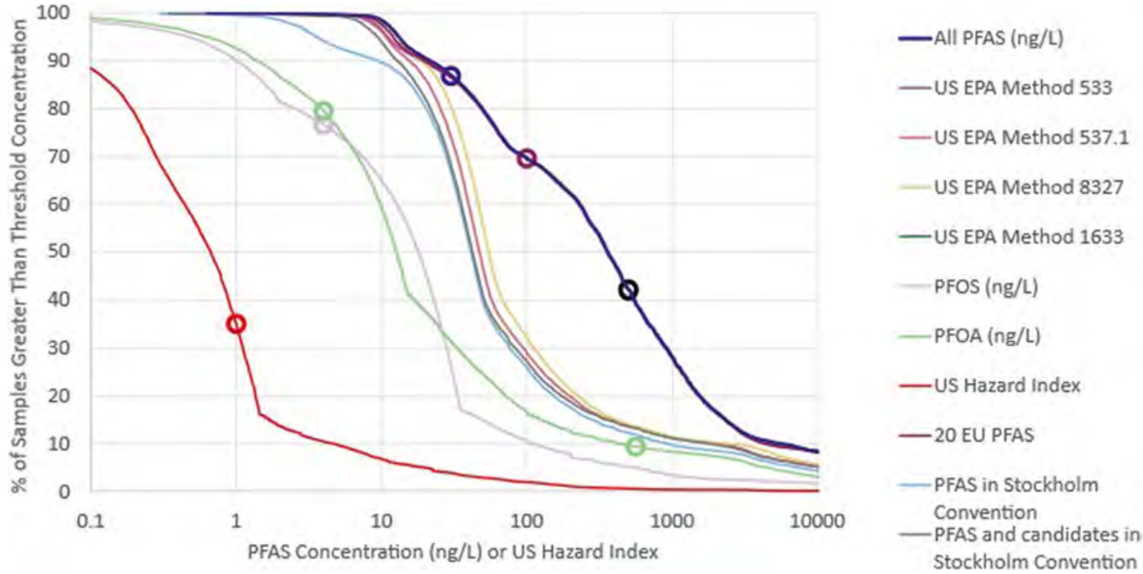
Extended Data Fig. 3 | Cumulative distribution of surface water samples from a known AFFF source that exceed a given PFAS concentration. Circles indicate relevant PFAS drinking water guidance values. For samples where PFAS concentrations were below detection limits a PFAS concentration was randomly assigned between zero the detection limit.

https://doi.org/10.1038/s41561-024-01402-8



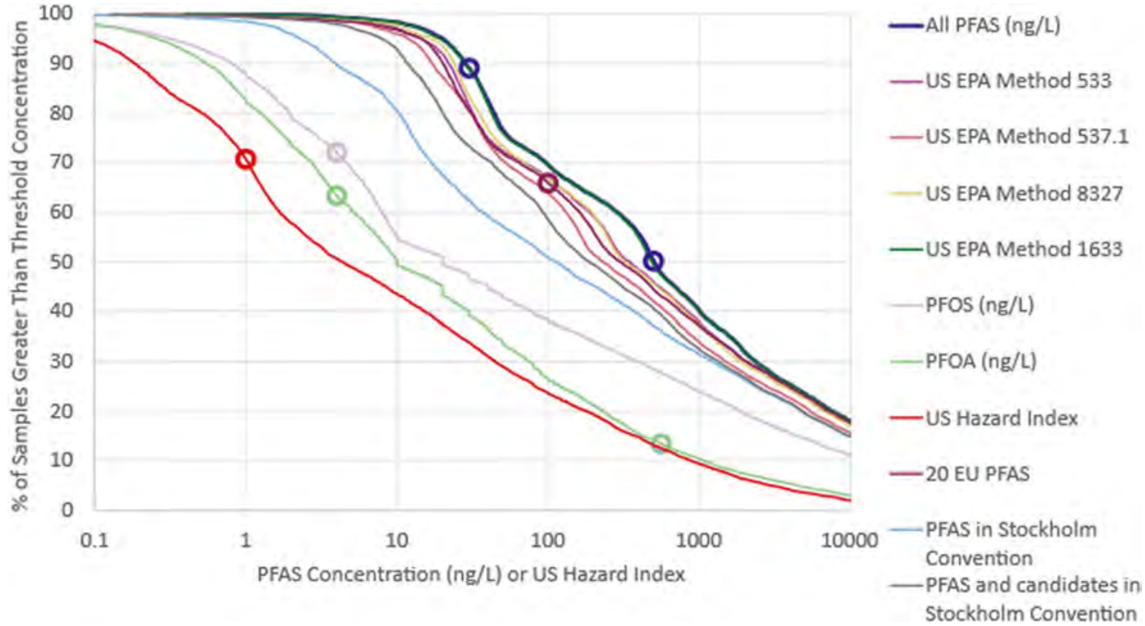
Extended Data Fig. 4 | Cumulative distribution of groundwater samples from an unknown source that exceed a given PFAS concentration. Circles indicate relevant PFAS drinking water guidance values. For samples where PFAS concentrations were below detection limits a PFAS concentration was randomly assigned between zero the detection limit.

https://doi.org/10.1038/s41561-024-01402-8



Extended Data Fig. 5 | Cumulative distribution of groundwater samples from a known non AFFF source that exceed a given PFAS concentration. Circles indicate relevant PFAS drinking water guidance values. For samples where PFAS concentrations were below detection limits a PFAS concentration was randomly assigned between zero the detection limit.

https://doi.org/10.1038/s41561-024-01402-8



Extended Data Fig. 6 | Cumulative distribution of groundwater samples from a known AFFF source that exceed a given PFAS concentration. Circles indicate relevant PFAS drinking water guidance values. For samples where PFAS concentrations were below detection limits a PFAS concentration was randomly assigned between zero the detection limit.

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Extended Data Table 1 | Summary of all PFAS identified in this study

Abbreviation	Name	CAS number	Class/Sub-class	Fl-Chain Length	Chemical Formula
TFA	Trifluoroacetate	14477-72-6	PFCA	1	$C_2F_3O_2$
PfPrA	Perfluoropropanoicacid	422-64-0	PFCA	2	$C_3HF_5O_2$
PFBA	Perfluorobutanoicacid	375-22-4	PFCA	3	$C_4HF_7O_2$
PFPeA	Perfluoropentanoicacid	2706-90-3	PFCA	4	$C_5HF_9O_2$
PFHxA	Perfluorohexanoicacid	307-24-4	PFCA	5	$C_6HF_{11}O_2$
PFHpA	Perfluoroheptanoicacid	375-85-9	PFCA	6	$C_7HF_{13}O_2$
PFOA	Perfluorooctanoicacid	335-67-1	PFCA	7	$C_8HF_{15}O_2$
PFNA	Perfluorononanoicacid	375-95-1	PFCA	8	$C_9HF_{17}O_2$
ip-PFNA	Perfluoro-7-methyloctanoicacid	15899-31-7	PFCA	7	$C_9HF_{17}O_2$
PFDA	Perfluorodecanoicacid	335-76-2	PFCA	9	$C_{10}HF_{19}O_2$
PFUnDA	Perfluoroundecanoicacid	2058-94-8	PFCA	10	$C_{11}HF_{21}O_2$
PFDoDA	Perfluorododecanoicacid	307-55-1	PFCA	11	$C_{12}HF_{23}O_2$
PFTrDA	Perfluorotridecanoicacid	72629-94-8	PFCA	12	$C_{13}HF_{25}O_2$
PFTeDA	Perfluorotetradecanoicacid	376-06-7	PFCA	13	$C_{14}HF_{27}O_2$
PFPeDA	Perfluoropentadecanoicacid	141074-63-7	PFCA	14	$C_{15}HF_{29}O_2$
PFHxDA	Perfluorohexadecanoicacid	67905-19-5	PFCA	15	$C_{16}HF_{31}O_2$
PFHpDA	Perfluoroheptadecanoicacid	57475-95-3	PFCA	16	$C_{17}HF_{33}O_2$
PFOcDA	Perfluorooctadecanoicacid	16517-11-6	PFCA	17	$C_{18}HF_{35}O_2$
PFNDA	Perfluorononadecanoicacid	133921-38-7	PFCA	18	$C_{19}HF_{37}O_2$
PFCoA	Perfluoroeicosanoicacid	68310-12-3	PFCA	19	$C_{20}HF_{39}O_2$
PFHCoA	Perfluoroheneicosanoicacid	-	PFCA	20	$C_{21}HF_{41}O_2$
PFDoCoA	Perfluorodocosanoicacid	-	PFCA	21	$C_{22}HF_{43}O_2$
PFTRrCoA	Perfluorotricosanoicacid	-	PFCA	22	$C_{23}HF_{45}O_2$
PFTeCoA	Perfluorotetracosanoicacid	-	PFCA	23	$C_{24}HF_{47}O_2$
PFPeCoA	Perfluoropentacosanoicacid	-	PFCA	24	$C_{25}HF_{49}O_2$
TFMS	Trifluoromethanesulfonicacid	1493-13-6	PFSA	1	CHF_3O_3S
PFEtS	Perfluoroethanesulfonate	354-88-1	PFSA	2	$C_2HF_5O_3S$
PFPrS	Perfluoropropanesulfonate	423-41-6	PFSA	3	$C_3HF_7O_3S$
PFBS	perfluorobutanesulfonate	375-73-5	PFSA	4	$C_4HF_9O_3S$
PFPeS	perfluoropentanesulfonate	2706-91-4	PFSA	5	$C_5HF_{11}O_3S$
PFHxS	perfluorohexanesulfonate	355-46-4	PFSA	6	$C_6HF_{13}O_3S$
PFHpS	perfluoroheptanesulfonate	375-92-8	PFSA	7	$C_7HF_{15}O_3S$
PFOS	perfluorooctanesulfonate	1763-23-1	PFSA	8	$C_8HF_{17}O_3S$
PFNS	perfluorononanesulfonate	68259-12-1	PFSA	9	$C_9HF_{19}O_3S$
PFDS	perfluorodecanesulfonate	335-77-3	PFSA	10	$C_{10}HF_{21}O_3S$
PFDoDS	perfluorododecanesulfonate	79780-39-5	PFSA	12	$C_{12}HF_{25}O_3S$
6:2FTA	6:2Fluorotelomeracrylate	17527-29-6	Flurotelomer/FTA	6	$C_{11}H_7F_{13}O_2$
8:2FTA	8:2Fluorotelomeracrylate	27905-45-9	Flurotelomer/FTA	6	$C_{13}H_7F_{17}O_2$
10:2FTA	10:2Fluorotelomeracrylate	17741-60-5	Flurotelomer/FTA	10	$C_{15}H_7F_{21}O_2$
5:1:2FTB	5:1:2Fluorotelomerbetaine	171184-02-4	Flurotelomer/FTB	5	$C_{12}H_{13}F_{12}NO_2$
7:1:2FTB	7:1:2Fluorotelomerbetaine	34455-29-3	Flurotelomer/FTB	7	$C_{14}H_{13}F_{16}NO_2$
9:1:2FTB	9:1:2Fluorotelomerbetaine	171184-04-6	Flurotelomer/FTB	9	$C_{16}H_{13}F_{20}NO_2$
5:3FTB	5:3Fluorotelomerbetaine	171184-14-8	Flurotelomer/FTB	5	$C_{12}H_{14}F_{11}NO_2$
7:3FTB	7:3Fluorotelomerbetaine	278598-45-1	Flurotelomer/FTB	7	$C_{14}H_{14}F_{15}NO_2$
9:3FTB	9:3Fluorotelomerbetaine	171184-16-0	Flurotelomer/FTB	9	$C_{16}H_{14}F_{19}NO_2$
4:2FTCA	4:2fluorotelomercarboxylicacid	70887-89-7	Flurotelomer/FTCA	4	$C_6H_3F_9O_2$
6:2FTCA	6:2fluorotelomercarboxylicacid	53826-12-3	Flurotelomer/FTCA	6	$C_8H_3F_{13}O_2$
8:2FTCA	8:2fluorotelomercarboxylicacid	27854-31-5	Flurotelomer/FTCA	8	$C_{10}H_3F_{17}O_2$
10:2FTCA	10:2fluorotelomercarboxylicacid;	53826-13-4	Flurotelomer/FTCA	10	$C_{12}H_3F_{21}O_2$
3:3FTCA	3:3fluorotelomercarboxylicacid	356-02-5	Flurotelomer/FTCA	3	$C_6H_5F_7O_2$
4:3FTCA	4:3fluorotelomercarboxylicacid	80705-13-1	Flurotelomer/FTCA	4	$C_7H_5F_9O_2$
5:3FTCA	5:3fluorotelomercarboxylicacid	914637-49-3	Flurotelomer/FTCA	5	$C_8H_5F_{11}O_2$
7:3FTCA	7:3fluorotelomercarboxylicacid	812-70-4	Flurotelomer/FTCA	7	$C_{10}H_5F_{15}O_2$
9:3FTCA	9:3fluorotelomercarboxylicacid	-	Flurotelomer/FTCA	9	$C_{12}H_5F_{19}O_2$
4:2FTUCA	4:2fluorotelomerunsaturatedcarboxylicacid	70887-90-0	Flurotelomer/FTUCA	4	$C_6H_2F_8O_2$
6:2FTUCA	6:2fluorotelomerunsaturatedcarboxylicacid	70887-88-6	Flurotelomer/FTUCA	6	$C_8H_2F_{12}O_2$
8:2FTUCA	8:2fluorotelomerunsaturatedcarboxylicacid	70887-84-2	Flurotelomer/FTUCA	8	$C_{10}H_2F_{16}O_2$
10:2FTUCA	10:2fluorotelomerunsaturatedcarboxylicacid	70887-94-4	Flurotelomer/FTUCA	10	$C_{12}H_2F_{20}O_2$
6:2FTI	6:2Fluorotelomeriodide	2043-57-4	Flurotelomer/FTI	6	$C_8H_4F_{13}I$
8:2FTI	8:2Fluorotelomeriodide	2043-53-0	Flurotelomer/FTI	8	$C_{10}H_4F_{17}I$
10:2FTI	10:2Fluorotelomeriodide	2043-54-1	Flurotelomer/FTI	10	$C_{12}H_4F_{21}I$
6:2FTMA	6:2Perfluoroctylmethacrylate	2144-53-8	Flurotelomer/FTMA	6	$C_{12}H_9F_{13}O_2$
8:2FTMA	8:2Perfluoroctylmethacrylate	1996-88-9	Flurotelomer/FTMA	8	$C_{14}H_9F_{17}O_2$
6:2FTMAP	6:2fluorotelomermercaptoalkylphosphatediester	-	Flurotelomer/FTMAP	6	$C_{17}HF_{26}O_3S_2P$
6:2/8:2FTMAP	6:2/8:2fluorotelomermercaptoalkylphosphatediester	-	Flurotelomer/FTMAP	8	$C_{18}HF_{30}OS_2P$
8:2FTMAP	8:2fluorotelomermercaptoalkylphosphatediester	-	Flurotelomer/FTMAP	8	$C_{19}HF_{34}OS_2P$
8:2/10:2FTMAP	8:2/10:2fluorotelomermercaptoalkylphosphatediester	-	Flurotelomer/FTMAP	10	$C_{20}HF_{38}OS_2P$

Extended Data Table 1 (continued) | Summary of all PFAS identified in this study

10:2FTMAP	10:2fluorotelomermercaptoalkylphosphatediester	-	Flurotelomer/FTMAP	10	$C_{21}HF_{42}OS_2P$
6:2FTO	6:2fluorotelomerolefin	25291-17-2	Flurotelomer/FTO	6	$C_8H_3F_{13}$
8:2FTO	8:2fluorotelomerolefin	21652-58-4	Flurotelomer/FTO	8	$C_{10}H_3F_{17}$
10:2FTO	10:2fluorotelomerolefin	30389-25-4	Flurotelomer/FTO	10	$C_{12}H_3F_{21}$
12:2FTO	12:2fluorotelomerolefin	67103-05-3	Flurotelomer/FTO	12	$C_{14}H_3F_{25}$
4:2FTOH	4:2Fluorotelomeralcohol	2043-47-2	Flurotelomer/FTOH	4	$C_6H_5F_9O$
6:2FTOH	6:2Fluorotelomeralcohol	647-42-7	Flurotelomer/FTOH	6	$C_8H_5F_{13}O$
7:2sFTOH	7:2Secondaryfluorotelomeralcohol	24015-83-6	Flurotelomer/FTOH	7	$C_9H_5F_{15}O$
8:2FTOH	8:2Fluorotelomeralcohol	678-39-7	Flurotelomer/FTOH	8	$C_{10}H_5F_{17}O$
10:2FTOH	10:2Fluorotelomeralcohol	865-86-1	Flurotelomer/FTOH	10	$C_{12}H_5F_{21}O$
12:2FTOH	12:2Fluorotelomeralcohol	39239-77-5	Flurotelomer/FTOH	12	$C_{14}H_5F_{25}O$
14:2FTOH	14:2Fluorotelomeralcohol	60699-51-6	Flurotelomer/FTOH	14	$C_{16}H_5F_{29}O$
16:2FTOH	16:2Fluorotelomeralcohol	65104-67-8	Flurotelomer/FTOH	16	$C_{18}H_5F_{33}O$
18:2FTOH	18:2Fluorotelomeralcohol	65104-65-6	Flurotelomer/FTOH	18	$C_{20}H_5F_{37}O$
4:2FTS	4:2Fluorotelomersulfonate	757124-72-4	Flurotelomer/FTSA	4	$C_6H_5F_9O_3S$
6:2FTS	6:2Fluorotelomersulfonate	27619-97-2	Flurotelomer/FTSA	6	$C_8H_5F_{13}O_3S$
8:2FTS	8:2Fluorotelomersulfonate	39108-34-4	Flurotelomer/FTSA	8	$C_{10}H_5F_{17}O_3S$
10:2FTS	10:2Fluorotelomersulfonate	120226-60-0	Flurotelomer/FTSA	10	$C_{12}H_5F_{21}O_3S$
12:2FTS	12:2Fluorotelomersulfonate	149246-64-0	Flurotelomer/FTSA	12	$C_{14}H_5F_{25}O_3S$
14:2FTS	14:2Fluorotelomersulfonate	1377603-17-2	Flurotelomer/FTSA	14	$C_{16}H_5F_{29}O_3S$
6:2FTSaAm	6:2fluorotelomersulfonamidoamine	-	Flurotelomer/FTSaAm	6	$C_{19}H_{17}F_{25}O_2N_2S$
8:2FTSaAm	8:2fluorotelomersulfonamidoamine	-	Flurotelomer/FTSaAm	8	$C_{21}H_{17}F_{29}O_2N_2S$
4:2FTAoS	4:2fluorotelomerthioetheramidosulfonate	-	Flurotelomer/FTAoS	4	$C_{10}H_{14}F_7NO_2$
6:2FTAoS	6:2fluorotelomerthioetheramidosulfonate	171184-14-8	Flurotelomer/FTAoS	6	$C_{12}H_{14}F_{11}NO_2$
8:2FTAoS	8:2fluorotelomerthioetheramidosulfonate	171184-15-9	Flurotelomer/FTAoS	8	$C_{14}H_{14}F_{15}NO_2$
4:2FTSAB	4:2fluorotelomersulfonamidealkylbetaine	34455-27-1	Flurotelomer/FTSAB	4	$C_{13}H_{19}F_9N_2O_4S$
6:2FTSAB	6:2fluorotelomersulfonamidealkylbetaine	34455-29-3	Flurotelomer/FTSAB	6	$C_{15}H_{19}F_{13}N_2O_4S$
8:2FTSAB	8:2fluorotelomersulfonamidealkylbetaine	34455-21-5	Flurotelomer/FTSAB	8	$C_{17}H_{19}F_{17}N_2O_4S$
10:2FTSAB	10:2fluorotelomersulfonamidealkylbetain	34455-35-1	Flurotelomer/FTSAB	10	$C_{19}H_{19}F_{21}N_2O_4S$
12:2FTSAB	20:2fluorotelomersulfonamidealkylbetain	278598-45-1	Flurotelomer/FTSAB	12	$C_{21}H_{19}F_{25}N_2O_4S$
6:2FtTHN	2-hydroxy-N,N,N-trimethyl-3-[(-tridecafluorooctyl)thio]propan-1-aminiumchloride	88992-46-5	Flurotelomer/other	6	$C_{14}H_{19}F_{13}NOS+$
FBSA	Perfluorobutanesulfonamide	30334-69-1	Sulfonamide/PSA	4	$C_4H_2F_9NO_2S$
MeFBSA	n-Methylperfluorobutanesulfonamide	68298-12-4	Sulfonamide/PSA	4	$C_5H_4F_9NO_2S$
FHxSA	perfluorohexanesulfonamide	41997-13-1	Sulfonamide/PSA	6	$C_6H_2F_{13}NO_2S$
FOSA	Perfluorooctanesulfonamide	754-91-6	Sulfonamide/PSA	8	$C_8H_2F_{17}NO_2S$
MeFOSA	n-Methylperfluorooctanesulfonamide	31506-32-8	Sulfonamide/PSA	8	$C_9H_4F_{17}NO_2S$
FBSE	2-(Perfluorobutanesulfonamido)ethanol	34454-99-4	Sulfonamide/PSE	4	$C_6H_6F_9NO_3S$
EtFOSA	n-Ethylperfluorooctanesulfonamide	4151-50-2	Sulfonamide/PSE	8	$C_{10}H_6F_{17}NO_2S$
MeFBSE	n-Methylperfluorobutanesulfonamideethanol	34454-97-2	Sulfonamide/PSE	4	$C_7H_8F_9NO_3S$
EtFBSE	n-Ethylperfluorobutanesulfonamideethanol	34449-89-3	Sulfonamide/PSE	4	$C_8H_{10}F_9NO_3S$
MeFOSE	n-Methylperfluorooctanesulfonamideethanol	24448-09-7	Sulfonamide/PSE	8	$C_{11}H_8F_{17}NO_3S$
EtFOSE	n-Ethylperfluorooctanesulfonamideethanol	1691-99-2	Sulfonamide/PSE	8	$C_{12}H_{10}F_{17}NO_3S$
FBSAA	Perfluorobutanesulfon-amidoaceticacid	347872-22-4	Sulfonamide/PSAA	4	$C_6H_4F_9NO_4S$
FPeSAA	Perfluoropentanesulfonamidoaceticacid	647-43-8	Sulfonamide/PSAA	5	$C_7H_4F_{11}NO_4S$
FHxSAA	Perfluorohexanesulfonamidoaceticacid	1003193-99-4	Sulfonamide/PSAA	6	$C_8H_4F_{13}NO_4S$
FHpSAA	Perfluoroheptanesulfonamidoaceticacid	1003194-00-0	Sulfonamide/PSAA	7	$C_9H_4F_{15}NO_4S$
FOSAA	perfluorooctanesulfonamideaceticacid	2806-24-8	Sulfonamide/PSAA	8	$C_{10}H_4F_{17}NO_4S$
MeFPeSAA	Methylperfluoropentanesulfonamidoaceticacid	1003194-04-4	Sulfonamide/PSAA	5	$C_8H_6F_{11}NO_4S$
MeFHxSAA	Methylperfluorohexanesulfonamidoaceticacid	715646-50-7	Sulfonamide/PSAA	6	$C_9H_6F_{13}NO_4S$
MeFHpSAA	Methylperfluoroheptanesulfonamidoaceticacid	1910057-77-0	Sulfonamide/PSAA	7	$C_{10}H_6F_{15}NO_4S$
MeFOSAA	n-Methylperfluorooctanesulfonamideaceticacid	2355-31-9	Sulfonamide/PSAA	8	$C_{11}H_6F_{17}NO_4S$
EtFBSAA	Ethylperfluorobutanesulfonamidoaceticacid	68957-33-5	Sulfonamide/PSAA	4	$C_8H_8F_9NO_4S$
EtFPeSAA	Ethylperfluoropentanesulfonamidoaceticacid	68957-31-3	Sulfonamide/PSAA	5	$C_9H_8F_{11}NO_4S$
EtFHxSAA	Ethylperfluorohexanesulfonamidoaceticacid	68957-32-4	Sulfonamide/PSAA	6	$C_{10}H_8F_{13}NO_4S$
EtFHpSAA	Ethylperfluoroheptanesulfonamidoaceticacid	68957-63-1	Sulfonamide/PSAA	7	$C_{11}H_8F_{15}NO_4S$
EtFOSAA	n-Ethylperfluorooctanesulfonamideaceticacid	2991-50-6	Sulfonamide/PSAA	8	$C_{12}H_8F_{17}NO_4S$
MeFPrSAA	N-methylperfluoropropanesulfonamidoaceticacid	-	Sulfonamide/PSAA	3	$C_6H_6F_7O_4NS$
MeFBSAA	N-methylperfluorobutanesulfonamidoacetate	159381-10-9	Sulfonamide/PSAA	4	$C_7H_6F_9O_4NS$
N-AP-FHxSA	N-(3-(dimethylaminopropan-1-yl)perfluoro-1-hexanesulfonamide	50598-28-2	Sulfonamide/PSAA	6	$C_{11}H_{13}F_{13}N_2O_2S$
PFBSAm	N-(3-(dimethylamino)propyl)-nonafluorobutane-1-sulfonamide	68555-77-1	Sulfonamide/PSAm	4	$C_9H_{13}F_9N_2O_2S$
PFPeSAm	N-(3-(dimethylamino)propyl)-undecafluoropentane-1-sulfonamide	68555-78-2	Sulfonamide/PSAm	5	$C_{10}H_{13}F_{11}N_2O_2S$
PFHxSAm	N-(3-(dimethylamino)propyl)-tridecafluorohexane-1-sulfonamide	50598-28-2	Sulfonamide/PSAm	6	$C_{11}H_{13}F_{13}N_2O_2S$
PFHpSAm	N-(3-(dimethylamino)propyl)-pentadecafluoroheptane-1-sulfonamide	67584-54-7	Sulfonamide/PSAm	7	$C_{12}H_{13}F_{15}N_2O_2S$
PFOSAm	N-(3-(dimethylamino)propyl)-heptadecafluorooctane-1-sulfonamide	13417-01-1	Sulfonamide/PSAm	8	$C_{13}H_{13}F_{17}N_2O_2S$
PFBSAmA	3-(N-(3-(dimethylamino)propyl)-perfluorobutylsulfonamido)propanoicacid	-	Sulfonamide/PSAmA	4	$C_{10}H_{13}F_9O_4N_2S$
PFPeSAmA	3-(N-(3-(dimethylamino)propyl)-perfluoropentylsulfonamido)propanoicacid	-	Sulfonamide/PSAmA	5	$C_{11}H_{13}F_{11}O_4N_2S$
PFHxSAmA	3-(N-(3-(dimethylamino)propyl)-perfluorohexylsulfonamido)propanoicacid	-	Sulfonamide/PSAmA	6	$C_{12}H_{13}F_{13}O_4N_2S$
PFHpSAmA	3-(N-(3-(dimethylamino)propyl)-perfluorohepylsulfonamido)propanoicacid	-	Sulfonamide/PSAmA	7	$C_{13}H_{13}F_{15}O_4N_2S$
PFOSAmA	3-(N-(3-(dimethylamino)propyl)-perfluorooctylsulfonamido)propanoicacid	-	Sulfonamide/PSAmA	8	$C_{14}H_{13}F_{17}O_4N_2S$

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Extended Data Table 1 (continued) | Summary of all PFAS identified in this study

6:2monoPAP	6:2Fluorotelomerphosphatemonoester	57678-01-0	PAPs	6	$C_8H_6F_{13}O_4P$
8:2monoPAP	8:2Fluorotelomerphosphatemonoester	57678-03-2	PAPs	8	$C_{10}H_6F_{17}O_4P$
4:2diPAP	4:2Polyfluoroalkylphosphoricaciddiesters	135098-69-0	PAPs	4	$C_{12}H_9F_{18}O_4P$
4:2/6:2diPAP	4:2/6:2Polyfluoroalkylphosphoricaciddiesters	-	PAPs	6	$C_{14}H_9F_{30}O_4P$
6:2diPAP	6:2Polyfluoroalkylphosphoricaciddiesters	57677-95-9	PAPs	6	$C_{16}H_9F_{26}O_4P$
6:2/8:2diPAP	6:2/8:2Polyfluoroalkylphosphoricaciddiesters	943913-15-3	PAPs	8	$C_{18}H_9F_{30}O_4P$
6:2/10:2diPAP	6:2/10:2Polyfluoroalkylphosphoricaciddiesters	-	PAPs	10	$C_{20}H_9F_{34}O_4P$
6:2/12:2diPAP	6:2/12:2Polyfluoroalkylphosphoricaciddiesters	68412-69-1	PAPs	12	$C_{22}H_9F_{38}O_4P$
6:2/14:2diPAP	6:2/14:2Ppolyfluoroalkylphosphoricaciddiesters	-	PAPs	14	$C_{24}H_9F_{42}O_4P$
8:2diPAP	8:2Polyfluoroalkylphosphoricaciddiesters	678-41-1	PAPs	8	$C_{20}H_9F_{34}O_4P$
8:2/10:2diPAP	8:2/10:2Polyfluoroalkylphosphoricaciddiesters	1158182-60-5	PAPs	10	$C_{22}H_9F_{38}O_4P$
8:2/12:2diPAP	8:2/12:2Polyfluoroalkylphosphoricaciddiesters	-	PAPs	12	$C_{24}H_9F_{42}O_4P$
10:2diPAP	10:2Polyfluoroalkylphosphoricaciddiesters	1895-26-7	PAPs	10	$C_{24}H_9F_{42}O_4P$
SAmPAP	Bis(2-{ethyl[(perfluorooctyl)sulfonyl]amino}ethyl)hydrogenphosphate	2965-52-8	PAPs	8	$C_{24}H_{19}F_{34}N_2O_8PS_2$
diSAmPAP	perfluorooctanesulfonamidoethanol-basedphosphateester	30381-98-7	PAPs	8	$C_{24}H_{22}F_{34}N_3O_8PS_2$
OBS	perfluorousnonenoxybenzenesulfonate	70829-87-7	NovelPFAS/etherPFAS	3	$C_{15}H_4F_{17}O_4SNa$
4:2Cl-PFESA	4:2Chlorinatedpolyfluoroalkylethersulfonate	-	NovelPFAS/etherPFAS	4	$C_6HClF_{12}O_4S$
6:2Cl-PFESA	6:2Chlorinatedpolyfluoroalkylethersulfonate;F-53B;9-Cl-PF3ONS	73606-19-6	NovelPFAS/etherPFAS	6	$C_8HClF_{16}O_4S$
8:2Cl-PFESA	8:2Chlorinatedpolyfluoroalkylethersulfonate; 11-Cl-PF3OUdS	763051-92-9	NovelPFAS/etherPFAS	8	$C_{10}HClF_{20}O_4S$
10:2Cl-PFESA	10:2Chlorinatedpolyfluoroalkylethersulfonate	-	NovelPFAS/etherPFAS	10	$C_{12}HClF_{24}O_4S$
8Cl-PFOS	Sodium8-chloroperfluoro-1-octanesulfonate	2481740-05-8	NovelPFAS/etherPFAS	8	$C_8HClF_{16}O_3S$
Cl-PFECA(1;0)	7-Cl-dodecafluoro-3,5-dioxadodecanoate	-	NovelPFAS/etherPFAS	3	$C_7ClF_{12}O_4$
Cl-PFECA(0;1)	8-Cl-tetradecafluoro-3,6-dioxanonanoate	-	NovelPFAS/etherPFAS	3	$C_8ClF_{14}O_4$
Cl-PFECA(2;0)	9-Cl-hexadecafluoro-3,5,7-trioxadodecanoate	-	NovelPFAS/etherPFAS	3	$C_9ClF_{16}O_5$
Cl-PFECA(1;1)	10-Cl-dodecafluoro-3,6,8-trioxaundecanoate	-	NovelPFAS/etherPFAS	3	$C_{10}ClF_{18}O_5$
Cl-PFECA(0;2)	11-Cl-eicosanfluoro-3,6,9-trioxapentadecanoate	-	NovelPFAS/etherPFAS	3	$C_{11}ClF_{20}O_5$
Cl-PFECA(3;0)	11-Cl-eicosanfluoro-3,5,7,9-tetraoxadodecanoate	-	NovelPFAS/etherPFAS	3	$C_{11}ClF_{20}O_6$
Cl-PFECA(2;1)	12-Cl-docosanfluoro-3,6,8,10-tetraoxatridecanoate	-	NovelPFAS/etherPFAS	3	$C_{12}ClF_{22}O_6$
Cl-PFECA(1;2)	13-Cl-tetracosanfluoro-3,6,8,11-tetraoxatetradecanoate	-	NovelPFAS/etherPFAS	3	$C_{13}ClF_{24}O_6$
Cl-PFECA(4;0)	13-Cl-tetracosanfluoro-3,5,7,9,11-pentaoxadodecanoate	-	NovelPFAS/etherPFAS	3	$C_{13}ClF_{24}O_7$
Cl-PFECA(0;3)	14-Cl-hexacosanfluoro-3,6,9,12-tetraoxapentadecanoate	-	NovelPFAS/etherPFAS	3	$C_{14}ClF_{26}O_6$
GenX/HFPO-DA	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)-propanoicacid	13252-13-6	NovelPFAS/etherPFAS	3	$C_6HF_{11}O_3$
HFPO-TA	Hexafluoropropyleneoxidetrimeracid	13252-14-7	NovelPFAS/etherPFAS	3	$C_9HF_{17}O_4$
HFPO-TeA	hexafluoropropyleneoxidetetrameracid	51445-02-4	NovelPFAS/etherPFAS	3	$C_{12}H_2F_{23}NO_4$
PFMOAA	Perfluoro-2-methoxyaceticacid	674-13-5	NovelPFAS/etherPFAS	1	$C_3HF_5O_3$
PFO2HxA	Perfluoro-(3,5-dioxahexanoic)acid,	39492-88-1	NovelPFAS/etherPFAS	1	$C_4HF_7O_4$
PFMOPrA	Perfluoro-3-methoxy-propanoicacid	377-73-1	NovelPFAS/etherPFAS	2	$C_4HF_7O_3$
PFO3OA	Perfluoro-(3,5,7-trioxaoctanoic)acid	39492-89-2	NovelPFAS/etherPFAS	1	$C_5HF_9O_5$
PFO4DA	Perfluoro-(3,5,7,9-tetraoxadecanoic)acid	39492-90-5	NovelPFAS/etherPFAS	1	$C_6HF_{11}O_6$
PFO5DoDA	Perfluoro-3,5,7,9,11-pentaoxadodecanoicacid	39492-91-6	NovelPFAS/etherPFAS	1	$C_7HF_{13}O_7$
PFMOBA	Perfluoro-4-methoxy-butanicacid	863090-89-5	NovelPFAS/etherPFAS	3	$C_5HF_9O_3$
NfBP1	NafionByproduct1,C7HF13SO5	29311-67-9	NovelPFAS/etherPFAS	3	$C_7HF_{13}O_5S$
NfBP2	NafionByproduct2,C7H2F14SO5	749836-20-2	NovelPFAS/etherPFAS	3	$C_7H_2F_{14}O_5S$
ADONA	dodecafluoro-3H-48-dioxanonanoate	958445-44-8	NovelPFAS/etherPFAS	3	$C_7H_5F_{12}NO_4$
PFECHS	Perfluoroethylenecyclohexanesulfonate	67584-42-3	NovelPFAS/cylcicPFAS	6	$C_8F_{15}KO_3S$
PFEtCHxS	Perfluoro-4-ethylcyclohexanesulfonicacid	335-24-0	NovelPFAS/cylcicPFAS	6	$C_8H_2F_{15}KO_3S$
7H-PFHpA	7H-Perfluoroheptanoicacid	1546-95-8	NovelPFAS/modifiedPFCA	6	$C_7H_2F_{12}O_2$
BTFBB	1,3-Bis(trifluoromethyl)-5-bromo-benzene	328-70-1	NovelPFAS/cylcicPFAS	6	$C_8H_3BrF_6$
1:2H-PFESA	hexafluoro-4H-3-oxabutasulfonate	-	NovelPFAS/etherPFAS	2	$C_3HF_6O_2S$
2:2H-PFESA	octafluoro-5H-3-oxapentasulfonate	-	NovelPFAS/etherPFAS	2	$C_4HF_8O_2S$
3:2H-PFESA	decafluoro-6H-3-oxahexasulfonate	-	NovelPFAS/etherPFAS	3	$C_5HF_{10}O_2S$
4:2H-PFESA	dodecafluoro-7H-3-oxaheptasulfonate	-	NovelPFAS/etherPFAS	4	$C_6HF_{12}O_2S$
6:2H-PFESA	hexadecafluoro-9H-3-oxanonasulfonate	-	NovelPFAS/etherPFAS	6	$C_8HF_{16}O_2S$
PFDI	Perfluorodecyliodide	423-62-1	Perfluoroiodides	10	$C_{10}F_{21}I$
PFDoI	Perfluorododecyliodide	307-60-8	Perfluoroiodides	12	$C_{12}F_{25}I$
PFBuDiI	Octafluoro-1,4-diiodobutane	375-50-8	Perfluoroiodides	4	$C_4F_8I_2$
PFHxDiI	Dodecafluoro-1,6-diiodohexane	375-80-4	Perfluoroiodides	6	$C_6F_{12}I_2$
PFoDiI	Hexadecafluoro-1,8-diioctane	335-70-6	Perfluoroiodides	8	$C_8F_{16}I_2$
PFHxPA	Perfluorohexylphosphonicacid	40143-76-8	Phosphonic/phinic acids	6	$C_6H_2F_{13}O_3P$
PFOPA	Perfluorooctylphosphonicacid	40143-78-0	Phosphonic/phinic acids	8	$C_8H_2F_{17}O_3P$
PFDPA	Perfluorodecylphosphonicacid	52299-26-0	Phosphonic/phinic acids	10	$C_{10}H_2F_{21}O_3P$
C4C4-PFPiA	C4/C4Perfluoroalkylphosphinicacid;bis(nonafluorobutyl)phosphinicacid	52299-25-9	Phosphonic/phinic acids	4	$C_8HF_{18}O_2P$
C6C6-PFPiA	C6/C6Perfluoroalkylphosphinicacid;bis(perfluorohexyl)phosphinicacid	40143-77-9	Phosphonic/phinic acids	6	$C_{12}HF_{26}O_2P$
C6C8-PFPiA	C6-C8Perfluoroalkylphosphinicacid;perfluorohexylperfluorooctylphosphinicacid	610800-34-5	Phosphonic/phinic acids	8	$C_{14}HF_{30}O_2P$
C8C8-PFPiA	C8/C8Perfluoroalkylphosphinicacid;bis(heptadecafluorooctyl)phosphinicacid	40143-79-1	Phosphonic/phinic acids	8	$C_{16}HF_{34}O_2P$
Cl-PFHxPA	6-Chloroperfluorohexylphosphonicacid	-	Phosphonic/phinic acids	6	$C_6H_2ClF_{12}O_3P$
Cl-PFOPA	8-Chloroperfluorooctylphosphonicacid	2252239-09-9	Phosphonic/phinic acids	8	$C_8H_2ClF_{16}O_3P$

Summary of all PFAS identified in this study. Most of the novel PFAS considered are classified as single H- or Cl- substituted perfluoroalkyl carboxylic acids and perfluorosulfonic acids, or per and poly-fluoro-ether acids.

https://doi.org/10.1038/s41561-024-01402-8

Extended Data Table 2 | Table of PFAS present in this study incorporated in methods or regulations

EPA 533	EPA 537.1	EPA 8327	EPA 1633	EPA OMT-45	20 EU	US Hazard	Stockholm + Candidates*
PFBA	PFOA	PFHxA	PFBA	PFBA	PFBA	PFBS	PFOA
PFPeA	PFNA	PFHpA	PFPeA	PFPeA	PFPeA	PFHxS	PFNA*
PFHxA	PFDA	PFOA	PFHxA	PFHxA	PFHxA	PFNAS	PFDA*
PFHpA	PFUnDA	PFNA	PFHpA	PFHpA	PFHpA	GenX	PFUnDA*
PFOA	PFDoDA	PFDA	PFOA	PFOA	PFOA		PFDoDA*
PFNA	PFTrDA	PFUnDA	PFNA	PFNA	PFNA		PFTrDA*
PFDA	PFTeDA	PFDoDA	PFDA	PFDA	PFDA		PFTeDA*
PFUnDA	PFBS	PFTrDA	PFUnDA	PFUnDA	PFUnDA		PFPeDA*
PFDoDA	PFPeS	PFTeDA	PFDoDA	PFDoDA	PFDoDA		PFHxDA*
PFBS	PFHxS	PFBS	PFTrDA	PFTrDA	PFTrDA		PFHpDA*
PFPeS	PFOS	PFPeS	PFTeDA	PFTeDA	PFBS		PFOcDA*
PFHxS	PFDS	PFHxS	PFBS	PFHxDA	PFPeS		PFNDA*
PFHpS	MeFOSAA	PFHpS	PFPeS	PFOcDA	PFHxS		PFCoA*
PFOS	EtFOSAA	PFOS	PFHxS	PFBS	PFHpS		PFHCoA*
4:2FTS	GenX	PFNS	PFHpS	PFPeS	PFOS		PFDoCoA*
6:2FTS	PFMOPrA	PFDS	PFOS	PFHxS	PFDS		PFTRrCoA*
8:2FTS	ADONA	PFDoDS	PFNS	PFHpS	PFDoDS		PFTeCoA*
6:2Cl-PFESA		3:3FTCA	PFDS	PFOS			PFPeCoA*
8:2Cl-PFESA		5:3FTCA	PFDoDS	PFNS			PFHxS
GenX		4:2FTS	3:3FTCA	PFDS			PFOS
PFMOPrA		8:2FTS	5:3FTCA	PFDoDS			
PFMOBA		FOSA	7:3FTCA	6:2FTCA			
ADONA		MeFOSAA	4:2FTS	8:2FTCA			
		EtFOSAA	6:2FTS	3:3FTCA			
			8:2FTS	5:3FTCA			
			FOSA	7:3FTCA			
			MeFOSA	6:2FTUCA			
			MeFOSE	8:2FTUCA			
			EtFOSE	4:2FTS			
			MeFOSAA	6:2FTS			
			EtFOSAA	8:2FTS			
			6:2Cl-PFESA	10:2FTS			
			8:2Cl-PFESA	FOSA			
			GenX	MeFOSA			
			PFMOPrA	EtFOSA			
			PFMOBA	MeFOSE			
			ADONA	EtFOSE			
				MeFOSAA			
				EtFOSAA			
				6:2Cl-PFESA			
				8:2Cl-PFESA			
				GenX			
				PFMOPrA			
				PFMOBA			
				ADONA			
				PFECHS			

Table of PFAS present in this study incorporated in methods or regulations.

https://doi.org/10.1038/s41561-024-01402-8

Extended Data Table 3 | Threshold percent based on cumulative distribution of surface and groundwater samples from an unknown or known AFFF or non-AFFF source that exceeds a given PFAS concentration

		Threshold %													
		US Hazard Index		PFOS - US Standard		PFOA - US Standard		All PFAS - Canada Standard		20 PFAS - EU Standards		All PFAS - EU Standard		PFOA - Australian Standard	
		Bdl =		Bdl =		Bdl =		Bdl =		Bdl =		Bdl =		Bdl =	
		0	random	0	random	0	random	0	random	0	random	0	random	0	random
SW	UNK	15.3	15.9	31.3	32	39.1	39.7	32.2	33	14	14.1	3.5	3.5	0.92	0.92
		(n=4339)	(n=4339)	(n=4384)	(n=4384)	(n=4243)	(n=4243)	(n=5155)	(n=5155)	(n=5096)	(n=5096)	(n=5155)	(n=5155)	(n=4243)	(n=4243)
	AFFF	64.3	70.9	75.1	77.6	55.8	63.4	74.5	83.8	60.4	70.1	40.6	53.8	5.4	5.4
		(n=2663)	(n=2663)	(n=2641)	(n=2641)	(n=2676)	(n=2676)	(n=2687)	(n=2687)	(n=2687)	(n=2687)	(n=2687)	(n=2687)	(n=2676)	(n=2676)
	non-AFFF	34.5	48.5	39	42.2	51.3	72.7	69	75.2	42.4	62.1	15.1	21.7	5.2	5.1
		(n=1443)	(n=1443)	(n=1618)	(n=1618)	(n=1620)	(n=1620)	(n=1637)	(n=1637)	(n=1637)	(n=1637)	(n=1637)	(n=1637)	(n=1620)	(n=1620)
GW	UNK	31.4	31.6	50.2	50.2	40	40	67.2	68.5	16.3	16.4	5.8	5.8	1.9	1.9
		(n=14905)	(n=14905)	(n=15351)	(n=15351)	(n=15499)	(n=15499)	(n=16151)	(n=16151)	(n=16143)	(n=16143)	(n=16151)	(n=16151)	(n=15499)	(n=15499)
	AFFF	54.7	70.7	56.6	72.1	51.4	63.4	63.2	89.1	53.7	65.9	41.7	50.2	13.5	13.5
		(n=6312)	(n=6312)	(n=6442)	(n=6442)	(n=6447)	(n=6447)	(n=6457)	(n=6457)	(n=6449)	(n=6449)	(n=6457)	(n=6457)	(n=6447)	(n=6447)
	non-AFFF	17.5	35.1	25.4	76.7	48.6	79.5	73.1	86.9	66.7	69.6	40.5	42.1	9.4	9.4
		(n=9600)	(n=9600)	(n=10048)	(n=10048)	(n=10044)	(n=10044)	(n=10082)	(n=10082)	(n=10082)	(n=10082)	(n=10082)	(n=10082)	(n=10044)	(n=10044)

Threshold percent based on cumulative distribution of surface and groundwater samples from an unknown or known AFFF or non-AFFF source that exceeds a given PFAS concentration. For samples where PFAS concentrations were below detection limits (BDL), a PFAS concentration was set to zero or a random value between zero and the detection limit. n represents the number of samples. For both SW and GW samples with no known PFAS source, the incidence of threshold exceedance changed little (< 1.3% for all criteria). For samples with a known source, the incidence of threshold exceedance decreased, with the greatest decrease for groundwater with an AFFF source using Health Canada's 30 ng/L sum of all PFAS criteria (from 89% to 63%).

EXHIBIT 3

AECOM Imagine it. Delivered.

2018 PFAS Sampling of Drinking Water Supplies in Michigan

Michigan Department of Environment, Great Lakes, and Energy

Project number: 60570309

July 26, 2019

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1. Introduction

Per- and polyfluoroalkyl substances (PFAS) are an emerging contaminant class of human-made chemicals that were first developed in the late 1930s. The term PFAS is attributed to a large class of chemicals composed of many families that have vastly different physical and chemical properties (Buck et al., 2011). A recent survey reported more than 4,000 PFAS had been identified (OECD, 2018). Due to their unique chemical properties, PFAS production increased as these chemicals were incorporated into components of inks, varnishes, waxes, firefighting foams, metal plating, and cleaning solutions, coating formulations, lubricants, water and oil repellents, paper, and textiles (Paul et al., 2009). Examples of industries using PFAS include automotive, aviation, aerospace and defense, biocides, cable and wiring, construction, electronics, energy, firefighting, food processing, household products, oil and mining production, metal plating, medical articles, paper and packaging, semiconductors, textiles, leather goods, and apparel (OECD, 2013).

Many PFAS are highly persistent, bioaccumulative, and toxic and have been detected ubiquitously throughout the environment. Some PFAS undergo partial biotic or abiotic degradation to stable PFAS end-compounds that are also highly persistent in the environment (Wang et al., 2017). As a result, these human-made chemicals are expected to be detected for decades in the environment. Varying concentrations of PFOS, PFOA, and other PFAS have been measured in surface waters in Michigan and in biota worldwide in areas remote from known or suspected sources, including in Polar Regions where contamination could occur only through environmental transport. Community water supplies (CWS) that use Michigan rivers, streams, lakes, or the Great Lakes could detect PFAS concentrations in the raw water due to this anthropogenic background concentration.

Widespread use of fluorinated chemistry at various manufacturing and industrial facilities in conjunction with these chemicals extreme resistant to degradation has resulted in the presence of PFAS in the environment. The Michigan Department of Environment, Great Lakes, and Energy's (EGLE) (formerly Michigan Department of Environmental Quality or MDEQ) primary objective for this state-wide PFAS sampling was to proactively sample CWS, schools, daycares, and tribal locations that utilize groundwater and/or surface water as their sources for drinking water to verify these supplies are protective of the populations they serve.

2. Background

The United States Environmental Protection Agency (USEPA) evaluated the potential presence of PFAS in drinking water between 2012 and 2015 under the 1996 amendment to the Safe Drinking Water Act (USEPA, 2016a, b). Once every five years the USEPA issues a list of compounds to be monitored by public water supplies. Six (6) PFAS compounds, including PFOA and PFOS, were among the list of contaminants monitored during the third Unregulated Contaminate Monitoring Rule (UCMR3). A full list of PFAS sampled during the UCMR3, and a minimum reporting limit is present below. Two types of water supplies were monitored, large public water supplies serving more than 10,000 people and small public water supplies serving less than 10,000 people. A total of 4,064 large public water supplies and 800 small public water supplies were monitored during the UCMR3. However, the total number of small public water supplies in the United States (US) is about 144,165 and only about 0.5% (800) of these public water supplies were included in the UCMR3 study. As a result, a large number of small public water supplies in the US, including Michigan, were not sampled during the UCMR3 sampling by USEPA.

UCMR3 PFAS Analytes and Reporting Limit

PFAS Full Name	Acronym	Minimum Reporting Limit (ng/L)
Perfluorobutane sulfonic acid	PFBS	90
Perfluorohexane sulfonic acid	PFHxS	30
Perfluorooctane sulfonic acid	PFOS	40
Perfluoroheptanoic acid	PFHpA	10
Perfluorooctanoic acid	PFOA	20
Perfluorononanoic acid	PFNA	20

USEPA sets Maximum Contaminant Levels (MCLs) for drinking water quality. An MCL is the legal threshold limit on the amount of a substance that is allowed in CWS under the Safe Drinking Water Act (SDWA). To set an MCL, USEPA must determine how much of the contaminant may be present with no adverse health effects. The USEPA is currently evaluating PFOA and PFOS as drinking water contaminants by the process required by the SDWA. To regulate a contaminant under SDWA, USEPA must find that:

1. It may have adverse health effects.
2. It frequently occurs (or there is a substantial likelihood that it occurs frequently) at levels of public health concern.
3. There is a meaningful opportunity for health risk reduction for people served by CWS.

In the absence of an MCL, the USEPA develops health advisories to provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. USEPA's health advisories are non-enforceable and non-regulatory and provide technical information to state agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination.

To provide consumers, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water, the USEPA, Office of Water, established a Lifetime Health Advisory (LHA) level of 70 ng/L in May 2016. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 ng/L LHA. These new advisory levels replace the USEPA's January 2009 provisional health advisory levels for PFOA (400 ng/L) and PFOS (200 ng/L) and reflect the evolution of the science regarding exposure and toxicity of these chemicals. Given the absence of an MCL from the USEPA, EGLE will be comparing sample results to the USEPA's LHA of 70 ng/L for PFOA and PFOS.

In Michigan, a total of 79 large and 13 small CWS were sampled by USEPA during the UCMR3 study. Two large CWS from Ann Arbor and Plainfield Township were identified to contain PFOS concentrations of 43 ng/L and 60 ng/L, respectively.

3. Sampling Approach

A total of 1,741 facilities, including both CWS and non-community water supplies (NCWS), were sampled during the EGLE 2018 Statewide PFAS Sampling Program. A total of 64 municipalities with intakes in one of the Great Lakes, connecting channels, or inland rivers, and 1,048 other facilities that rely on groundwater were sampled. The CWS facilities sampled consisted of municipalities, manufactured housing communities, apartment complexes, subdivisions, condominium developments, and others. A total of 460 schools and 152 daycares classified as NCWS, which have their own groundwater well(s), were also sampled. EGLE also included 17 federally recognized tribal entities as part of the 2018 Statewide PFAS Sampling Program. EGLE provided AECOM with a list of CWS and NCWS including schools, daycares, and tribal entities selected for the 2018 Statewide PFAS Sampling Program presented in **Figure 1**, and **Tables 1a, 1b, 1c, and 1d**. The initial sampling list was continually modified over the course of the 2018 Statewide PFAS Sampling Program, as more information was obtained by EGLE.

The objective for the 2018 Statewide PFAS Sampling Program was to evaluate and perform an initial statewide screening for PFAS in the drinking water facilities for approximately 75% of Michigan's population.

3.1 Implementation

EGLE contracted with AECOM to perform the 2018 Statewide PFAS Sampling Program of CWS, and select NCWS such as schools and daycares on their own well(s), and tribal entities beginning in May 2018 with the goal of completing the sampling program by December 2018.

Before the launch of the 2018 Statewide PFAS Sampling Program, EGLE sent out a notification to all of the identified CWS and NCWS entities and a copy of the notification letter template was emailed to all Local Health Departments and Michigan Department of Human Health Services (MDHHS). AECOM used the contact information that EGLE provided to arrange for sampling collection. Approximately one week before working in a new area, AECOM notified EGLE of the schedule for that particular area so the Local Health Department and MDHHS could be notified and made aware.

To develop a sampling schedule, EGLE and AECOM used available information, including wellhead protection areas, geological sensitivity, and potential PFAS sources to assign priority areas. EGLE developed a ranking of very high, high, medium, and low PFAS prioritization for each county (**Figure 2**). Population density and efficiency of sampling were also taken into account when developing the sampling progression. The PFAS prioritization was used to develop a sampling plan based on information known at that time. During the course of sampling, when EGLE obtained additional information and had reason to believe that a particular CWS and NCWS might be impacted with a known PFAS source, those locations were elevated in priority.

3.2 Sample Collection

The following sections describe sample location and frequency, field quality assurance, and quality control (QA/QC), sampling procedures, sample designation, and sample handling and analysis. These tasks have specifically been designed to meet the objective presented in **Section 3**. To meet the December 31, 2018 goal, AECOM provided up to three sampling teams from May through December 2018 to sample counties with PFAS prioritization ratings of very high, followed by high, medium, and low as presented in **Figure 2**. To facilitate expedited sampling of the higher prioritization, the three sampling teams were divided across the State with one team sampling from west to east across the Upper Peninsula (UP); one starting in southeast Michigan and progressing north and west; the third beginning in southwest Michigan and proceeding north.

3.2.1 Sampling Locations

The CWS, schools, daycares, and tribal entities locations included in the 2018 Statewide PFAS Sampling Program are shown in **Figure 1** and detailed in **Tables 1a, 1b, 1c**, and **1d**.

CWS and NCWS that rely on groundwater as their drinking water source had one sample collected from each point of entry. The point of entry was either representing one groundwater well or a combination of multiple wells. Generally, for facilities with multiple wells, the individual wells were only sampled as part of follow-up evaluation in the event of a criteria exceedance.

CWS that rely on surface water as their drinking water source had samples collected at two locations. The first sample point collected raw water (untreated) at a common header (if one existed) and were analyzed using an Isotope Dilution Method (IDM). The second sample point was a tap within the water treatment plant (treated water), where split samples were collected and analyzed using both IDM and USEPA Method 537 Rev. 1.1 (EPA-537). The analytical methods and laboratories will be discussed in **Section 3.5**.

Field notes were collected to document the type of CWS and NCWS source, details of which groundwater wells or surface water intakes were operating both 24 hours prior to sampling and at the time of sampling (if available), and all other pertinent information regarding the sampling (i.e. sampling staff, SOPs, field conditions, photos etc.). The field notes can be used to compare any future PFAS sampling results for samples that will be collected from the same CWS NCWS location.

3.2.2 Sampling Frequency

All locations selected as part of the 2018 Statewide PFAS Sampling Program were initially scheduled for a single sampling event. Any additional sampling and the frequency of additional sampling depended on the concentration of PFAS detected. Confirmation samples were collected immediately at facilities where PFOA and PFOS combined exceeded 70 ng/L and submitted to the laboratory for rush analysis. AECOM was also directed by EGLE to collect a confirmatory sample, within two weeks upon the results being received, from any school or daycare where the total PFAS concentration exceeded 10 ng/L.

3.2.3 Sampling Documentation

During the sampling of each location, field staff collected detailed notes regarding the sample location, conditions, and collection procedure. Each sampling point was located using a global positioning system receiver with sub-two-meter accuracy.

3.2.4 Sample Containers

The sample containers were provided by the analytical laboratories and were certified PFAS-free. Drinking water samples were analyzed using both EPA537 and IDM analysis. Samples analyzed using EPA-537 had Trizma preservative added to the sample containers by the laboratories. Sample containers with no preservative were used for the raw surface water samples analyzed using the IDM only.

3.3 Quality Control Samples

Proper preparation and field decontamination procedures are necessary to prevent cross-contamination resulting in false positive samples. Due to the widespread detection of PFAS in the environment and use in many different industries and products combined with low laboratory detection limits of ng/L, the probability of false positives is relatively high. To avoid false positives, very strict sampling protocols have been developed, including robust sampling guidance and training. The sampling was conducted by trained technicians who had to successfully complete AECOM's internal PFAS training and review of AECOM's internal PFAS Sampling Guidance (AECOM, 2018). AECOM, along with the Michigan PFAS Action Response Team (MPART), developed a General PFAS Sampling Guidance that was used to support the 2018 Statewide PFAS Sampling Program (MDEQ, 2018). The sampling teams participated in a two-week training program before sampling. AECOM utilized a PFAS Technical Leader that was responsible for sampling oversight to ensure proper sampling procedures were followed throughout the project.

The 2018 Statewide PFAS Sampling Program included quality control and assurance samples to evaluate if the data is defensible and reliable. Quality control samples that were collected included field duplicates, matrix spikes (MS) and matrix spike duplicates (MSD), field reagent blanks, and temperature blank samples as discussed further in the sections below. A detailed discussion about quality control samples is provided in **Appendix A**.

3.3.1 Field Reagent Blanks

Field reagent blanks (FRBs) consist of an aliquot of reagent water that is shipped to the field sampling site directly from the laboratory, where it is poured into a separate sample bottle in proximity to where samples are collected and shipped back to the laboratory for analysis. For example, immediately after collecting a drinking water sample, a field reagent blank would be collected near the faucet or water source that is being utilized for collection of the drinking water sample to determine if method analytes or other interferences are present in the field environment.

3.3.2 MS/MSD Samples

Matrix spikes and matrix spike duplicates (MS/MSDs) samples were collected as positive matrix controls to evaluated accuracy. MS/MSD samples were collected for samples analyzed using EPA-537.MS/MSD samples were not necessary for samples analyzed using IDM because the laboratory procedure includes labeled analog spikes as extracted internal standards in every sample. Detailed discussion and evaluation of MS/MSD samples are provided in **Appendix A**.

3.3.3 Field Duplicate Samples

A field duplicate (FD) consists of an actual sample which consists of twice the volume necessary to fill all sample containers. Aliquots of this volume are then equally distributed in two sets of sample containers. This division results in two equal volume samples collected from one sampling location. Field duplicates are used to assess the consistency of sampling, sample homogeneity, and laboratory analytical consistency.

3.3.4 Temperature Blank Samples

A pre-prepared temperature blank consisting of de-ionized water will accompany each sample cooler during transport to the laboratory. These will be used as a standard to ensure that samples were maintained within laboratory temperature specifications from EPA-537 during shipment.

3.4 Sample Designation

Sample designation is a unique number that identifies each sample under the 2018 Statewide PFAS Sampling Program. Immediately upon collection, each sample will be labeled with an adhesive label. Each sample label will include the sample ID, location ID, date/time of collection, sampler initials, and analysis requested. Each Sample ID consisted of a four identification parts that described the water source, location of sample on treatment, date, time, and sampler initials, as described below:

Sample ID Format: Sample Info/Year/Time/Sampler Initials

GWNT1804161020DB: Water Source Code **GW** = Groundwater and **SW** = Surface water;
GW**NT**1804161020DB: Location on Treatment with **NT** = Untreated drinking water, **IN** = Influent before any treatment, **MP** = Mid-Point between influent and effluent, and **EF** = Effluent post-treatment;
GWNT**180416**1020DB: Date in **YYMMDD** format;
GWNT180416**1020**DB: Time in **HHMM** format;
GWNT1804161020**DB**: Sampler's Initials (3 characters or 2 if no middle initial).

GWNT1804161020DB – Final Sample ID for a groundwater source with no treatment, sampled on April 16, 2018, at 10:20 AM by Dorin Bogdan.

NOTE:
FD samples had "-FD" added at the end of the Sample ID: **GWNT1804161020DB–FD**
FRB samples collected on June 11, 2018, at 10:25 AM by Dorin Bogdan had the following Sample ID: **FB1804161025DB**

For the MS and MSD sample, four extra bottles were collected, and in the comments section, it was noted for the extra bottles to be used as MS/MSD samples.

3.5 Analytical

All CWS and NCWS samples were analyzed using EPA-537. Vista Analytical Laboratory (Vista) was used throughout the entire 2018 Statewide PFAS Sampling Program, and later in the program Merit Laboratories, Inc. (Merit) was utilized to increase capacity. For surface water supply samples analyzed using both IDM and EPA 537 for raw water and treated tap samples, Vista was used exclusively. Both Vista and Merit performed the analysis of drinking water samples where only EPA-537 was used. To verify consistency within the 2018 Statewide PFAS Sampling Program, split samples were collected and analyzed by both laboratories using EPA-537 method. The split samples showed good agreement for the results for both laboratories.

The laboratories implemented the project required SOPs. These laboratory SOPs for sample preparation and analysis are based primarily on elements derived from:

- EPA Method 537 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 1.1, September 2009.

  EPA 821-R-11-007 Draft Procedure for Analysis of Perfluorinated Carboxylic Acids and Sulfonic Acids in Sewage Sludge and Biosolids by HPLC/MS/MS, Draft, December 2011.
- ISO 25101:2009 – Water Quality – Determination of perfluorooctanesulfonate (PFOS) and perfluorooctanoate (PFOA) – Method for unfiltered samples using solid phase extraction and liquid chromatography/mass spectrometry, 1st edition, dated March 2009.
- DoD ELAP QSM ver.5.1 Table B-15 requirements.

The nominal laboratory reporting limit levels for both analyses methods are provided below.

USEPA Method 537 Rev. 1.1 PFAS Analyte List

PFAS Full Name	Acronym	CAS Number	Reporting Limit (ng/L)
Perfluorohexanoic acid	**PFHxA**	307-24-4	2
Perfluoroheptanoic acid	**PFHpA**	375-85-9	2
Perfluorooctanoic acid	**PFOA**	335-67-1	2
Perfluorononanoic acid	**PFNA**	375-95-1	2
Perfluorodecanoic acid	**PFDA**	335-76-2	2
Perfluoroundecanoic acid	**PFUnDA**	2058-94-8	4
Perfluorododecanoic acid	**PFDoDA**	307-55-1	4
Perfluorotridecanoic acid	**PFTrDA**	72629-94-8	4
Perfluorotetradecanoic acid	**PFTeDA**	376-06-7	4
Perfluorobutanesulfonic acid	**PFBS**	375-73-5	2
Perfluorohexanesulfonic acid	**PFHxS**	355-46-4	2
Perfluorooctanesulfonic acid	**PFOS**	1763-23-1	2
N-methylperfluoro-1-octanesulfonamidoacetic acid	**N-MeFOSAA**	2355-31-9	4
N-ethylperfluoro-1-octanesulfonamidoacetic acid	**N-EtFOSAA**	2991-50-6	4

Isotope Dilution Method PFAS Analyte List

PFAS Full Name	Acronym	CAS Number	Reporting Limit (ng/L)
Perfluorobutanoic Acid	**PFBA**	375-22-4	2
Perfluoropentanoic Acid	**PFPeA**	2706-90-3	2
Perfluorohexanoic acid	**PFHxA**	307-24-4	2
Perfluoroheptanoic acid	**PFHpA**	375-85-9	2
Perfluorooctanoic acid	**PFOA**	335-67-1	2
Perfluorononanoic acid	**PFNA**	375-95-1	2
Perfluorodecanoic acid	**PFDA**	335-76-2	2
Perfluoroundecanoic acid	**PFUnDA**	2058-94-8	4
Perfluorododecanoic acid	**PFDoDA**	307-55-1	4
Perfluorotridecanoic acid	**PFTrDA**	72629-94-8	4
Perfluorotetradecanoic acid	**PFTeDA**	376-06-7	4
Perfluorobutanesulfonic acid	**PFBS**	375-73-5	2
Perfluoropentane sulfonic acid	**PFPeS**	2706-91-4	2
Perfluorohexanesulfonic acid	**PFHxS**	355-46-4	2
Perfluoroheptane Sulfonic acid	**PFHpS**	375-92-8	2
Perfluorooctanesulfonic acid	**PFOS**	1763-23-1	2
Perfluorononane sulfonic acid	**PFNS**	474511-07-4	2
Perfluorodecane Sulfonic acid	**PFDS**	335-77-3	4
Perfluorooctane sulfonamide	**PFOSA**	754-91-6	2
4:2 Fluorotelomer sulfonic acid	**4:2 FTS**	757124-72-4	2
6:2 Fluorotelomer sulfonic acid	**6:2 FTS**	27619-97-2	2
8:2 Fluorotelomer sulfonic acid	**8:2 FTS**	39108-34-4	2
N-methylperfluoro-1-octanesulfonamidoacetic acid	**N-MeFOSAA**	2355-31-9	4
N-ethylperfluoro-1-octanesulfonamidoacetic acid	**N-EtFOSAA**	2991-50-6	4

4. Results

A total of 2,286 individual entry point samples were collected from 1,741 individual CWS, schools, daycares, and tribal entities. Five community water supplies and six schools refused to sample. A total of 15 locations, including three (3) community water supplies and 12 daycares were not sampled in 2018 due to various logistical reasons and are presented in **Table 1e**. These remaining 15 locations will be contacted for sampling in the summer of 2019.

The completed percentage sampled in each county is presented in **Figure 3**. The percent complete was calculated as samples collected against those that were requested by EGLE to be sampled in 2018. The entities that refused to sample were not included in the calculation of the percent complete.

A summary of the CWS, schools, daycares, and tribal entities analytical results are presented in **Table 2a** through **Table 2d** and **Figure 4a** through **Figure 19b**. A total of 89.9% of the facilities sampled were reported as non-detect for all of the 14 PFAS compounds analyzed with a reporting limit of 2 and 4 ng/L. A total of 6.6% of the facilities sampled were found to be in the low tier with a Total PFAS below 10 ng/L. A total of 3.6% of the facilities sampled were found to be in the medium tier with a Total PFAS above 10 ng/L and PFOA+PFOS concentration below 70 ng/L. A total of 0.1% of the facilities sampled were found to be in the high tier with PFOA+PFOS above 70 ng/L. The percentage of detection was calculated based on the 1,741 supplies sampled during this 2018 Statewide PFAS Sampling Program. The facilities that refused to sample or are scheduled to be sampled in 2019 have not been included in the percent complete calculations. The PFAS results heat maps for all entry point samples from Michigan is presented in **Figure 4a** through **Figure 19b,** and heat maps by county are presented in **Appendix B**.

Drinking Water Supplies Testing Results

Supply Type	Supplies Sampled	Non-Detect	<10ng/L Total PFAS	>10ng/L Total PFAS <70ng/L PFOA+PFOS	>70ng/L PFOA+PFOS
CWS	1112	994	84	35	1
Schools	460	420	21	19	1
Daycares	152	134	10	8	0
Tribal Entities	17	17	0	0	0
Total Supplies	1741	1565	115	62	2
Approx. Population Served	**7.7 million**	**5.8 million**	**1.4 million**	**490,000**	**3,500**

All of the schools which had a total PFAS concentration greater than 10 ng/L were resampled, and the confirmatory sample showed concentrations similar to the original sample. The initial sampling was completed in 2018, with some confirmatory samples collected in the spring of 2019.

Of the 1,741 individual facilities sampled, only two locations were determined to have concentrations greater than the USEPA Health Advisory of 70 ng/L for PFOA and PFOS. These two locations were from the City of Parchment and Robinson Elementary School located in Robinson Township, Michigan, and are discussed below.

On July 26, 2018, AECOM received analytical results reporting PFOA and PFOS concentration of 1,410 ng/L for the City of Parchment. AECOM was directed to immediately collect confirmatory samples for the City of Parchment, including all three individual supply wells used by the City of Parchment on July 26, 2018. The samples were overnighted to the laboratory which performed a rush analysis confirming the previous results on July 27, 2018. The City of Parchment supply wells were immediately shut off, bottled water was supplied to the community, and ultimately the City of Parchment water supply was connected to the City of Kalamazoo water supply. EGLE directed AECOM to assist with additional sampling in the City of Parchment that included residential wells, existing monitoring wells, and surface water.

On October 29, 2018, AECOM received analytical results reporting PFOA and PFOS concentration of 110 ng/L at the Robinson Elementary from Grand Haven. AECOM was directed to immediately collect a confirmatory sample for the Robinson Elementary on October 29, 2018. The initial results were confirmed on October 31, 2018, with a total PFOA and PFOS concentration of 119 ng/L. Bottled water was provided to Robinson Elementary, and EGLE directed AECOM to sample private residential drinking water wells in the immediate area.

4.1 Quality Assurance and Quality Control

Monitoring for the 2018 Statewide PFAS Sampling Program was based on assessments of precision, accuracy, completeness, sensitivity, comparability, and representativeness. Reports from both participating laboratories (Vista and Merit) and both methods employed (EPA 537 rev.1.1 and the Vista PFAS Isotope Dilution Method) were selected for data validation. Out of a total of 1,866 reports, 186 were selected for data validation, including 138 reports from Vista (9.8%) and 48 reports from Merit (10.3%).

A complete QA/QC Summary is provided in **Appendix A,** and a summary table of all results qualified during data validation is provided in **Appendix A: Table 1**. This table provides reason codes which explain the cause for qualification and the laboratory report numbers (SDG) to assist the reader in finding the relevant Data Validation Reports provided in **Appendix C**. Comparability of the EPA-537 and Isotope Dilution Methods was evaluated using a subset of collocated samples collected in series on the same dates. A comparison of these results is presented in **Appendix A: Table 2**. Detailed discussion and evaluation of the QA/QC for the 2018 Statewide PFAS Sampling Program is provided in **Appendix A**.

5. Findings

EGLE's primary objective for this 2018 Statewide PFAS Sampling Program was to proactively sample CWS, schools, daycares, and tribal entities that utilize groundwater or surface water as their sources for drinking water to verify these supplies are protective of the populations they serve. This was accomplished by implementing a robust sampling program using a prioritized approach targeting first facilities that were potentially the most at-risk populations with a mandate to complete all 1,741 targeted facilities by the end of 2018. AECOM accomplished this task, as well as many related follow-up tasks including a collection of confirmatory samples (through February 2019), while maintaining the highest level of quality as described in this report.

As presented in the results section, over 89% of the sampled facilities were reported as non-detect for PFAS. However, due to the use of PFAS in so many commercial products and industries, PFAS were detected in just over 10% of various sampled facilities throughout Michigan in 2018. Two of the sampled facilities (City of Parchment and Robinson Elementary School) were reported with concentrations above the USEPA Lifetime Health Advisory of 70 ng/L for PFOA and PFOS. Follow-up investigative activities began immediately upon discovery and are ongoing in both cases.

EGLE recommended and requested additional PFAS sampling for all of the CWS, schools, daycares, and tribal entities based on the analytical results obtained during the 2018 Statewide PFAS Sampling Program as follows:

- EGLE recommended that all CWS, schools, daycares, and tribal entities to perform annual monitoring of the drinking water supplies that did not detect PFAS or had a total PFAS concentration below 10 ng/L to demonstrate that the concentrations are consistently and reliably below any existing LHA.
- EGLE requested all CWS, schools, daycares, and tribal entities that reported a total PFAS concentration above 10 ng/L to collect a confirmatory sample within one month and continue monitoring for PFAS on a quarterly basis to demonstrate the concentrations of PFAS are consistently and reliably below the existing USEPA LHA. As part of the current 2018 Statewide PFAS Sampling Program EGLE directed AECOM to collect confirmatory samples for all schools and daycares that detected a total PFAS concentration above 10 ng/L.

To further evaluate the potential of PFAS impacts in additional locations such as adult foster care providers, children camps, various industries, medical care facilities, offices, motels, and parks, EGLE has initiated a 2019 Phase 2 Statewide PFAS Sampling Program. Approximately 590 additional locations will be sampled by AECOM in 2019. EGLE has also initiated a 2019 Monthly PFAS Sampling Program of all surface water supplies that were initially sampled during the 2018 Statewide PFAS Sampling Program. The monthly sampling will be completed for six consecutive months and will help evaluate if there are fluctuations in PFAS concentrations in surface water over time. The sampling locations for the 2019 Phase 2 Statewide PFAS Sampling Program and the 2019 Monthly Statewide PFAS Sampling Program are presented in **Figure 20**.

EGLE has also directed AECOM to perform a 2019 Quarterly Statewide PFAS Sampling Program at all 63 CWS, schools, and daycares, which reported a total PFAS concentration above 10 ng/L during the 2018 Statewide PFAS Sampling Program to evaluate temporal variations. The sampling locations for the 2019 Quarterly Statewide Sampling Program are presented in **Figure 21**.

6. References

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Figures

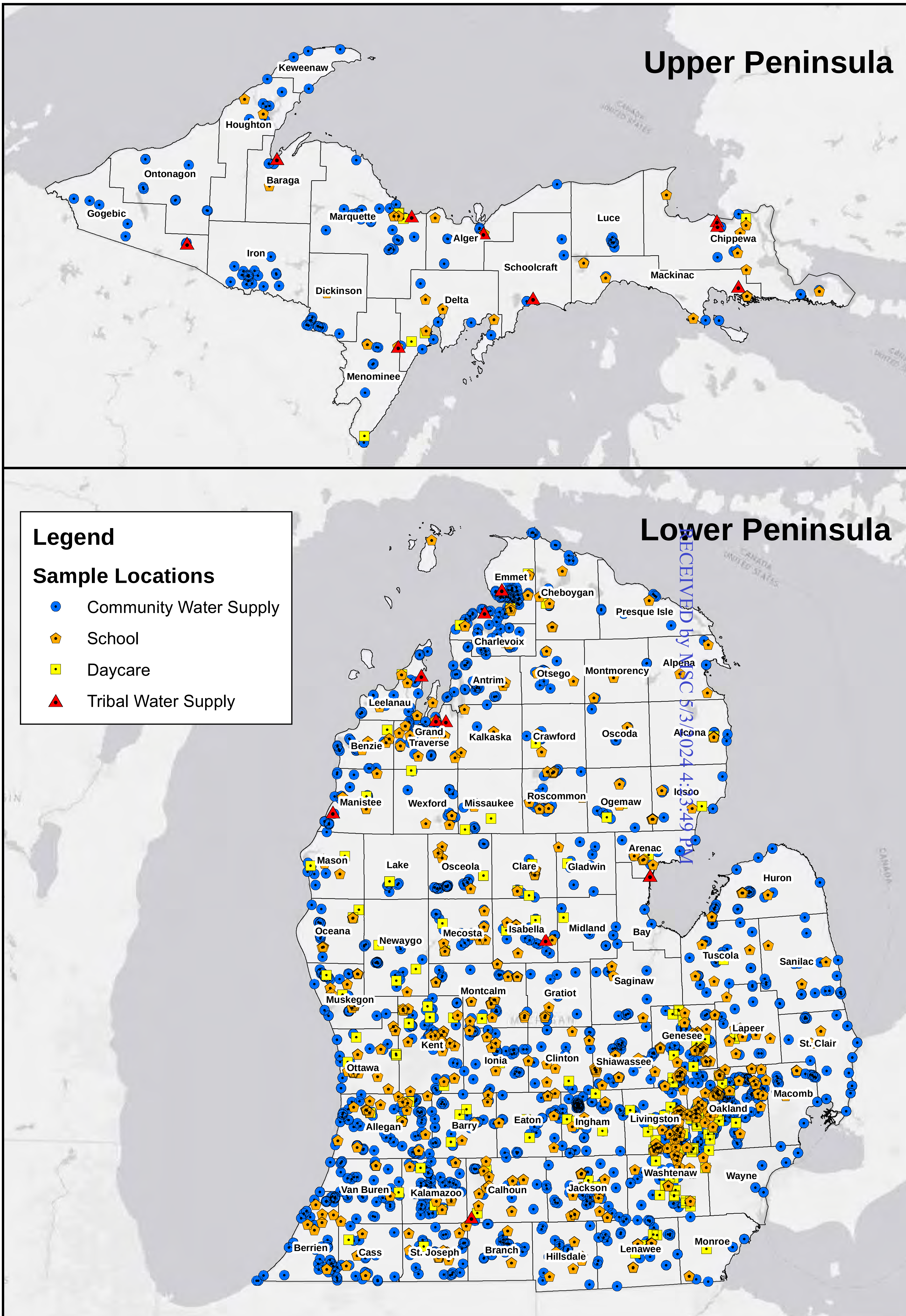

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FIGURE 1
CWS, SCHOOL, DAYCARE AND TRIBAL LOCATIONS

2018 STATEWIDE PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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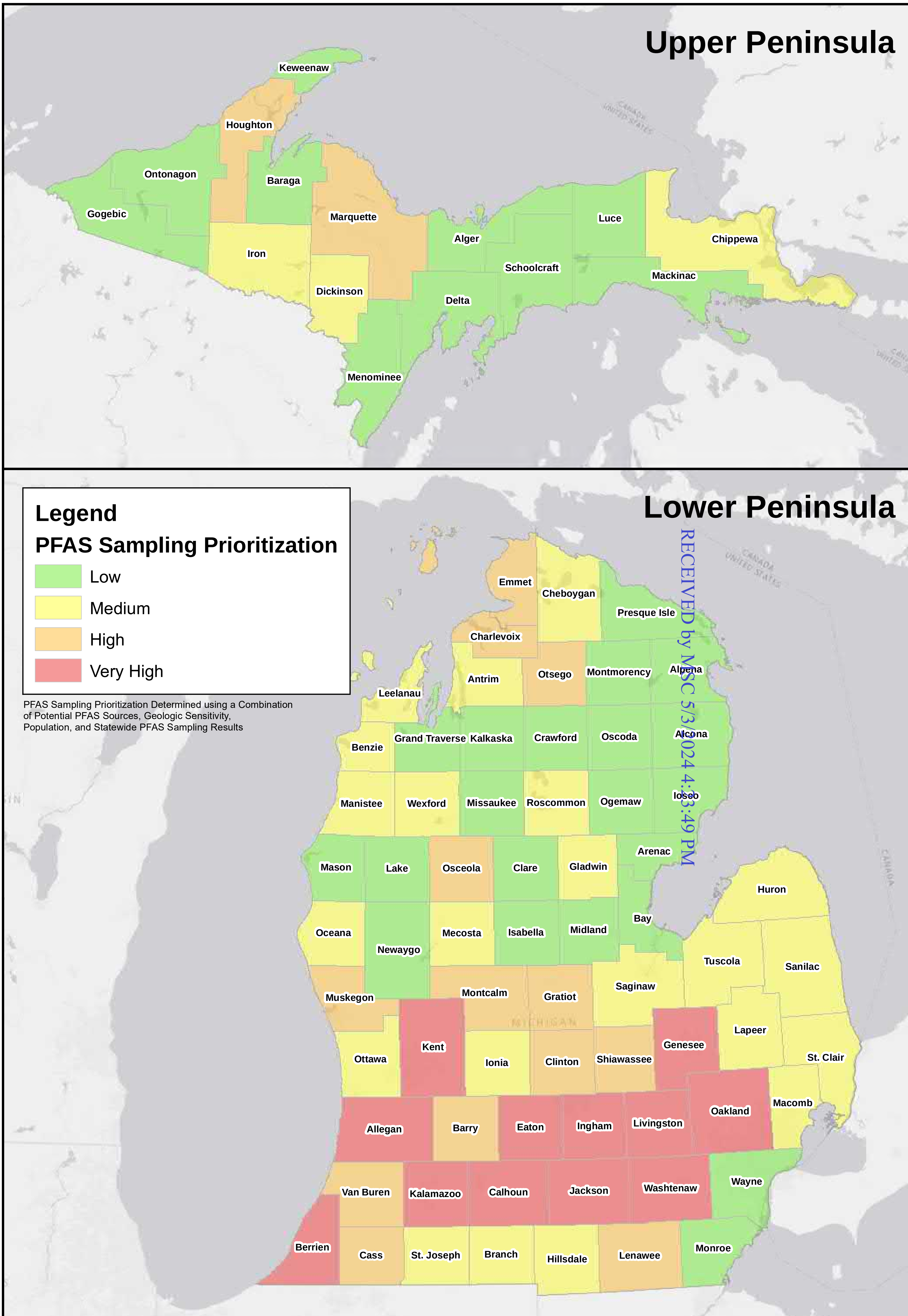

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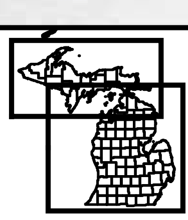

FIGURE 2
2018 PFAS SAMPLING PRIORITIZATION

MICHIGAN COUNTIES

Source: ESRI USA Topo Maps

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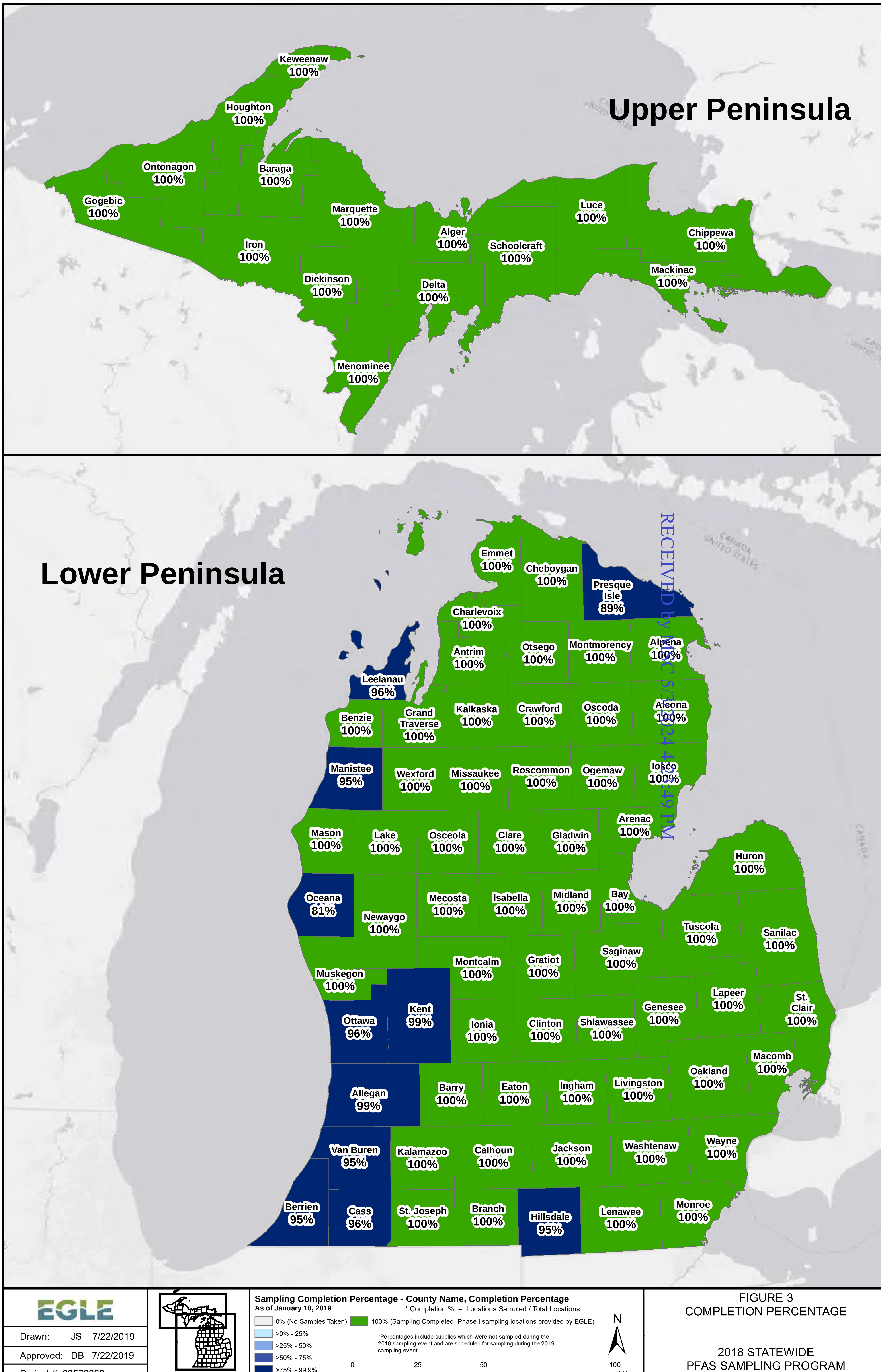

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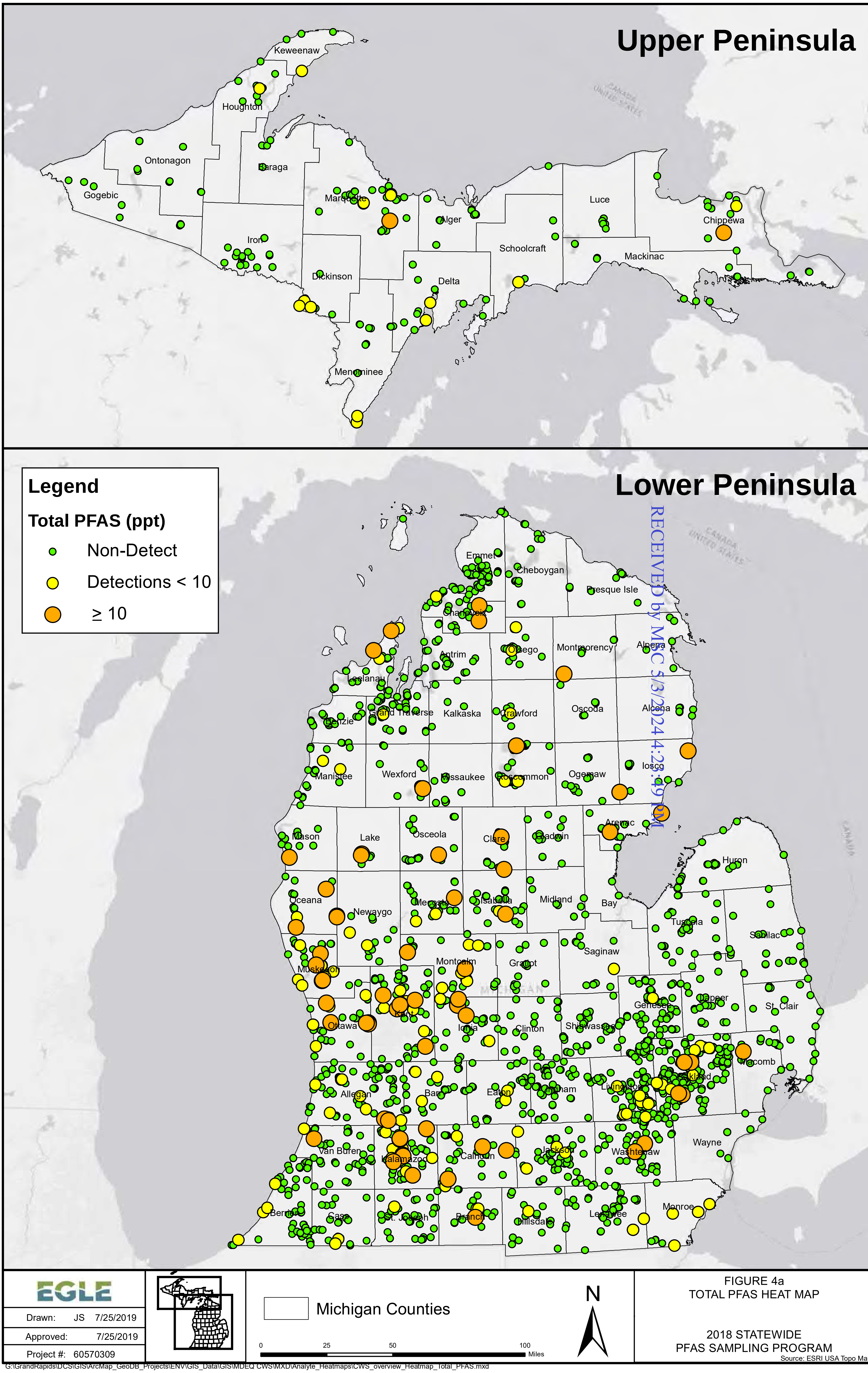
Upper Peninsula
Keweenaw
Houghton
Ontonagon
Baraga
Gogebic
Marquette
Alger
Luce
Chippewa
Iron
Schoolcraft
Mackinac
Dickinson
Delta
Menominee
Lower Peninsula
Legend
Total PFAS (ppt)
Non-Detect
Detections < 10
≥ 10
Emmet
Cheboygan
Presque Isle
Charlevoix
Otsego
Montmorency
Alpena
Antrim
Leelanau
Grand Traverse
Kalkaska
Crawford
Oscoda
Alcona
Benzie
Manistee
Wexford
Missaukee
Roscommon
Ogemaw
Iosco
Mason
Lake
Osceola
Clare
Gladwin
Arenac
Huron
Oceana
Newaygo
Mecosta
Isabella
Midland
Bay
Tuscola
Sanilac
Muskegon
Montcalm
Gratiot
Saginaw
Genesee
Lapeer
St. Clair
Ottawa
Kent
Ionia
Clinton
Shiawassee
Macomb
Allegan
Barry
Eaton
Ingham
Livingston
Oakland
Van Buren
Kalamazoo
Calhoun
Jackson
Washtenaw
Wayne
Berrien
Cass
St. Joseph
Branch
Hillsdale
Lenawee
Monroe
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Project #: 60570309
Michigan Counties
0 25 50 100 Miles
N
FIGURE 4a
TOTAL PFAS HEAT MAP
2018 STATEWIDE
PFAS SAMPLING PROGRAM
Source: ESRI USA Topo Maps
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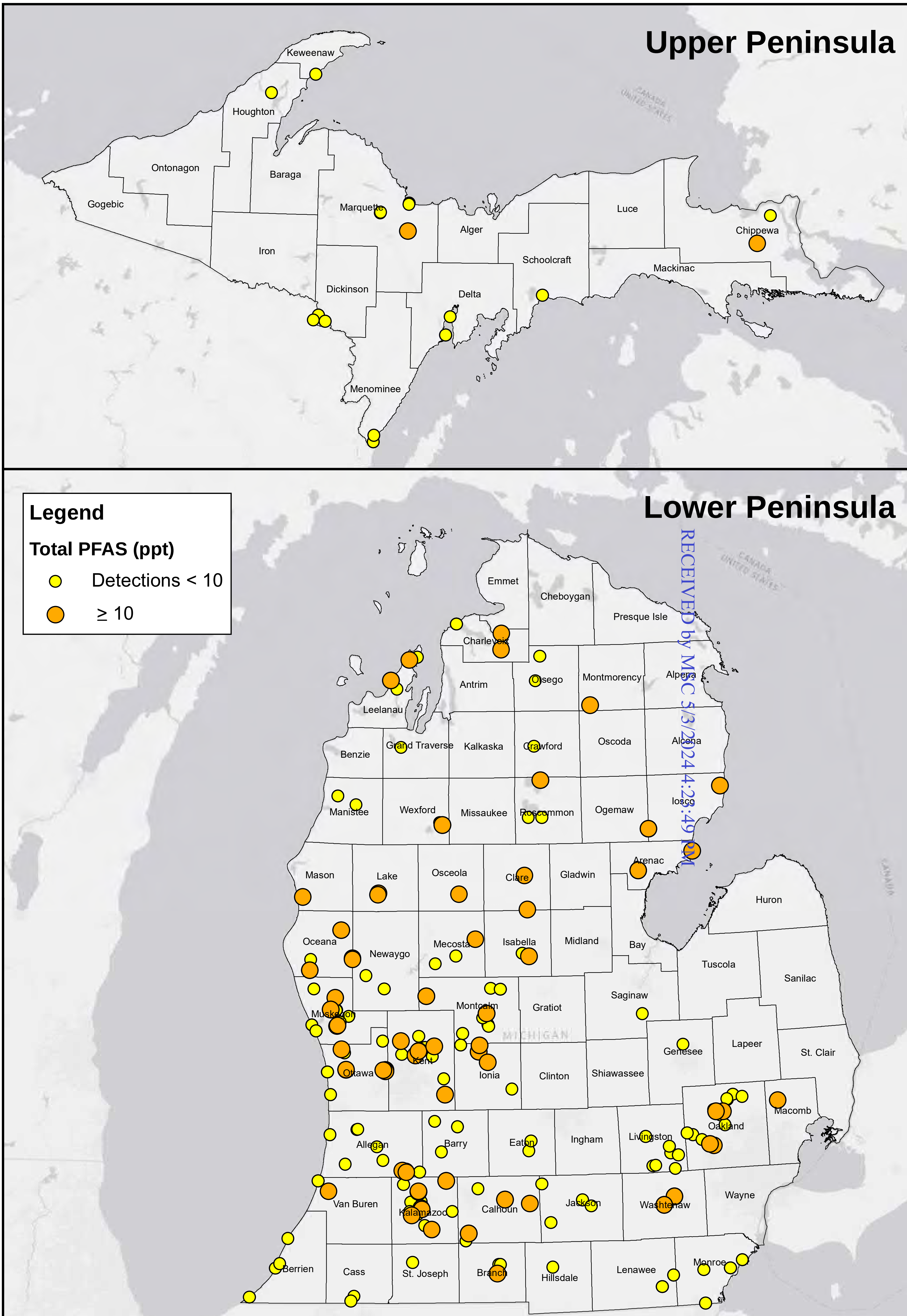

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Michigan Counties

0 25 50 100 Miles

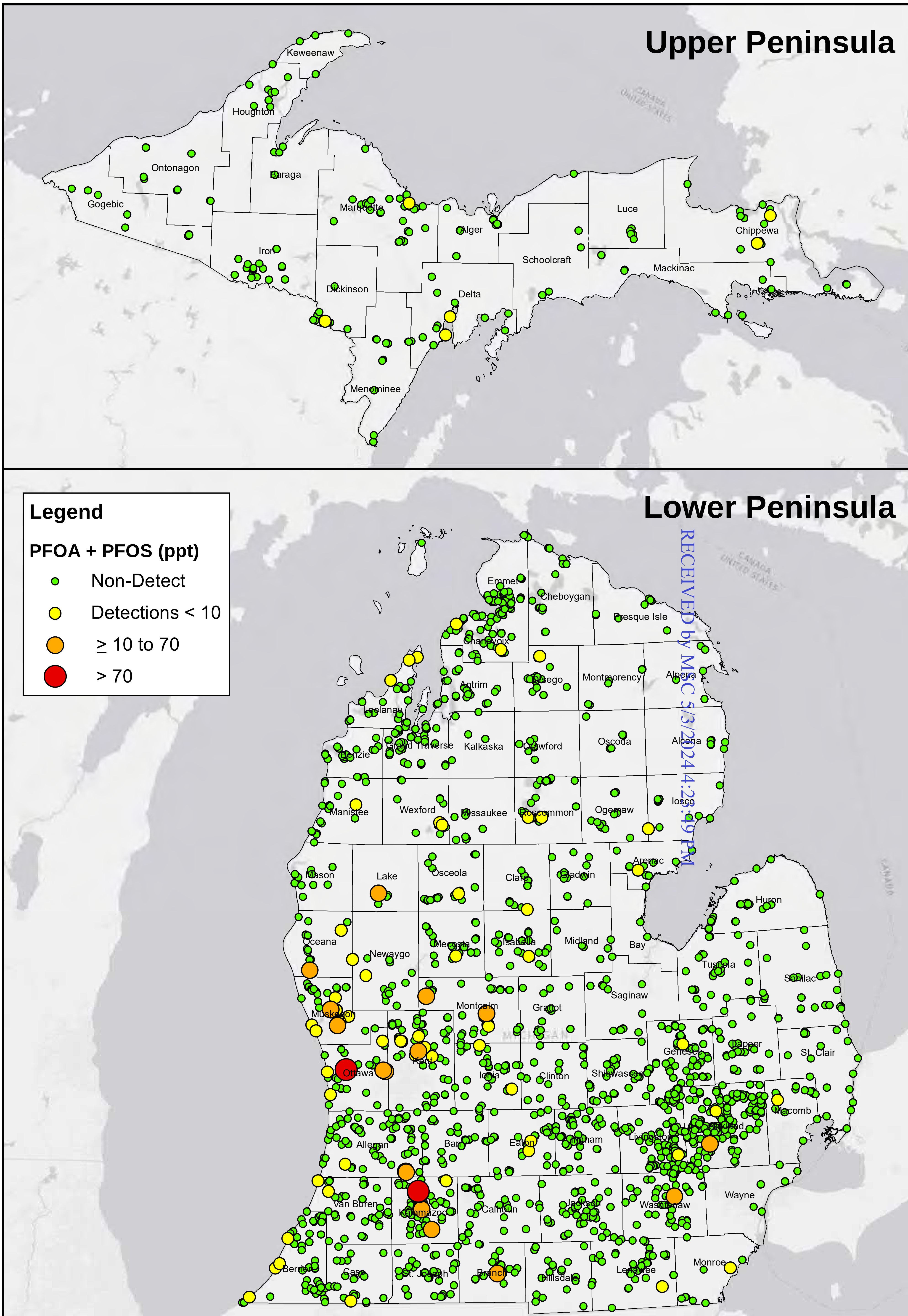
N

FIGURE 4b
TOTAL PFAS DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_Total_PFAS_Detections.mxd



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0 25 50 100 Miles

N

FIGURE 5a
PFOA + PFOS HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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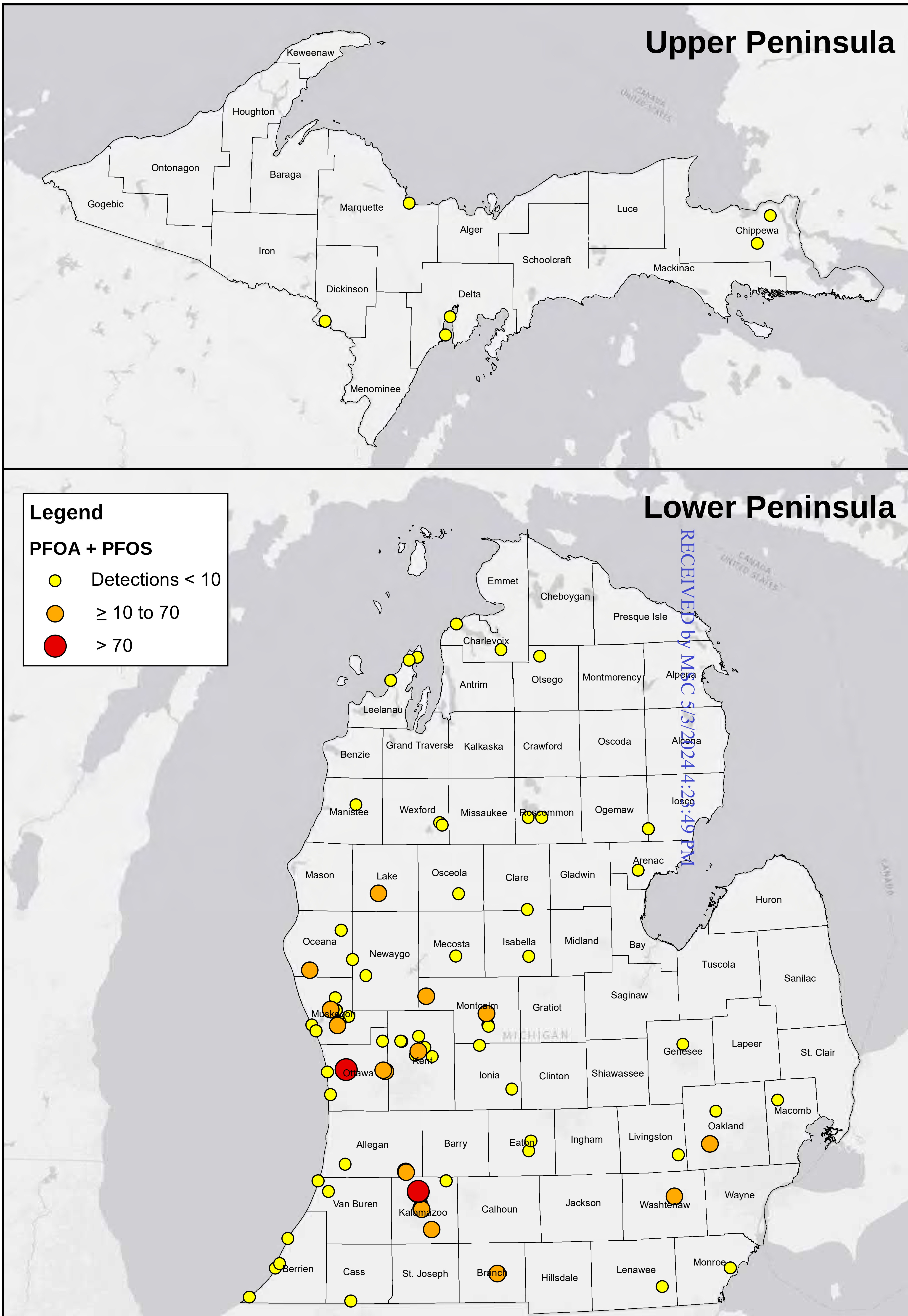

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Michigan Counties

0 25 50 100 Miles

N

FIGURE 5b
PFOA + PFOS DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFOA_PFOS_Detections.mxd

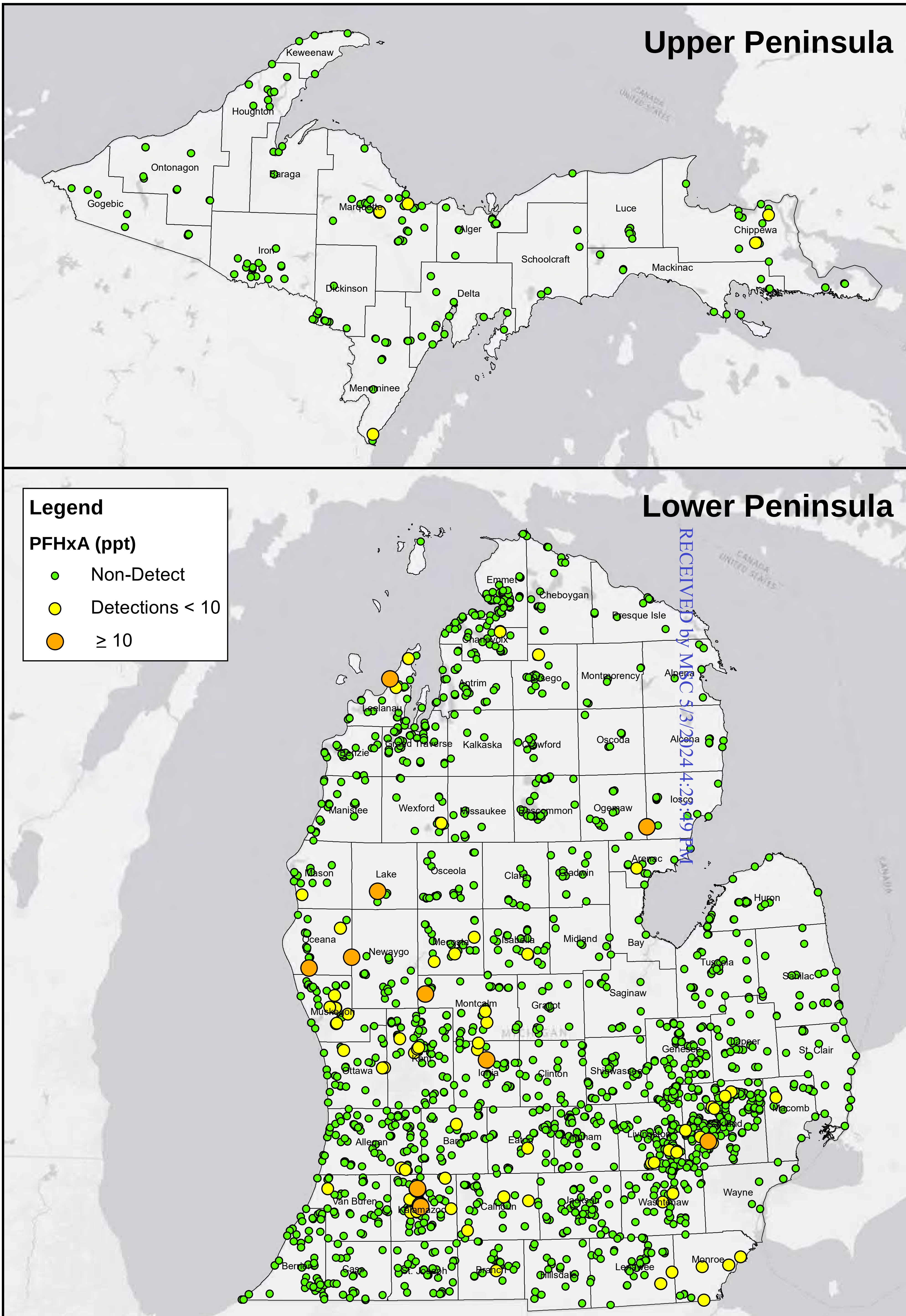

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FIGURE 6a
PFHxA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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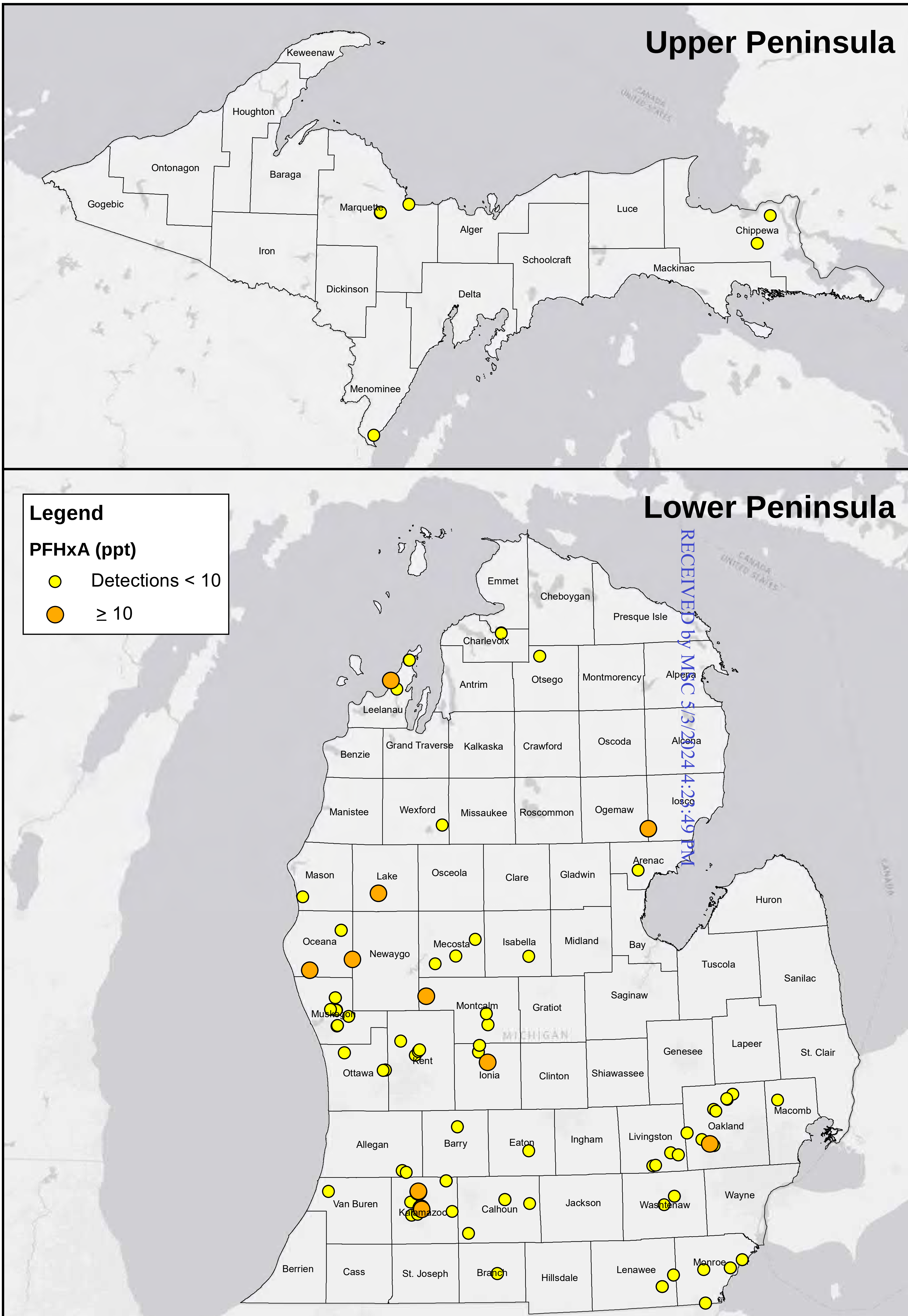

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Michigan Counties

0 25 50 100 Miles

N

FIGURE 6b
PFHxA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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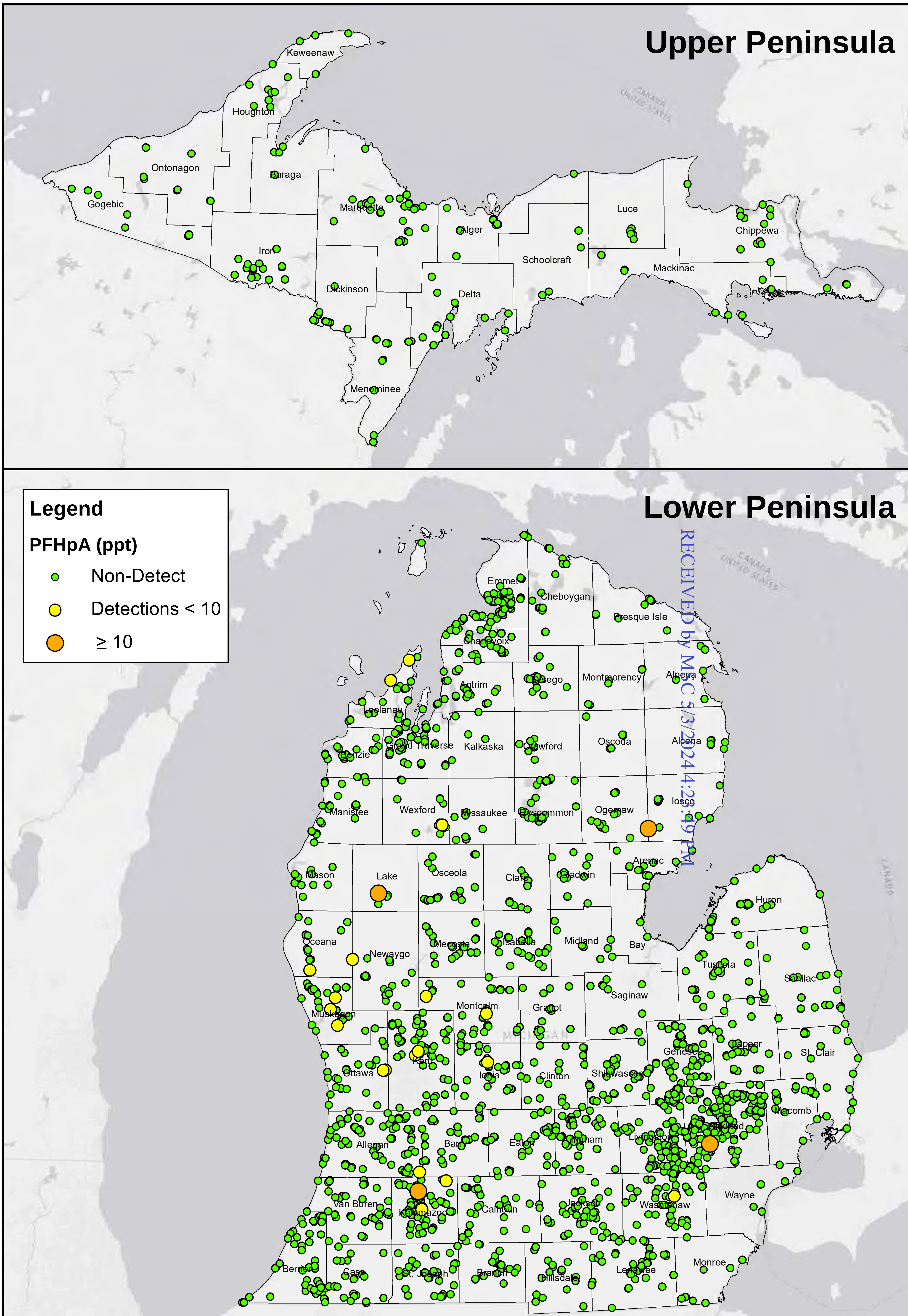

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Michigan Counties

0 25 50 100 Miles

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FIGURE 7a
PFHpA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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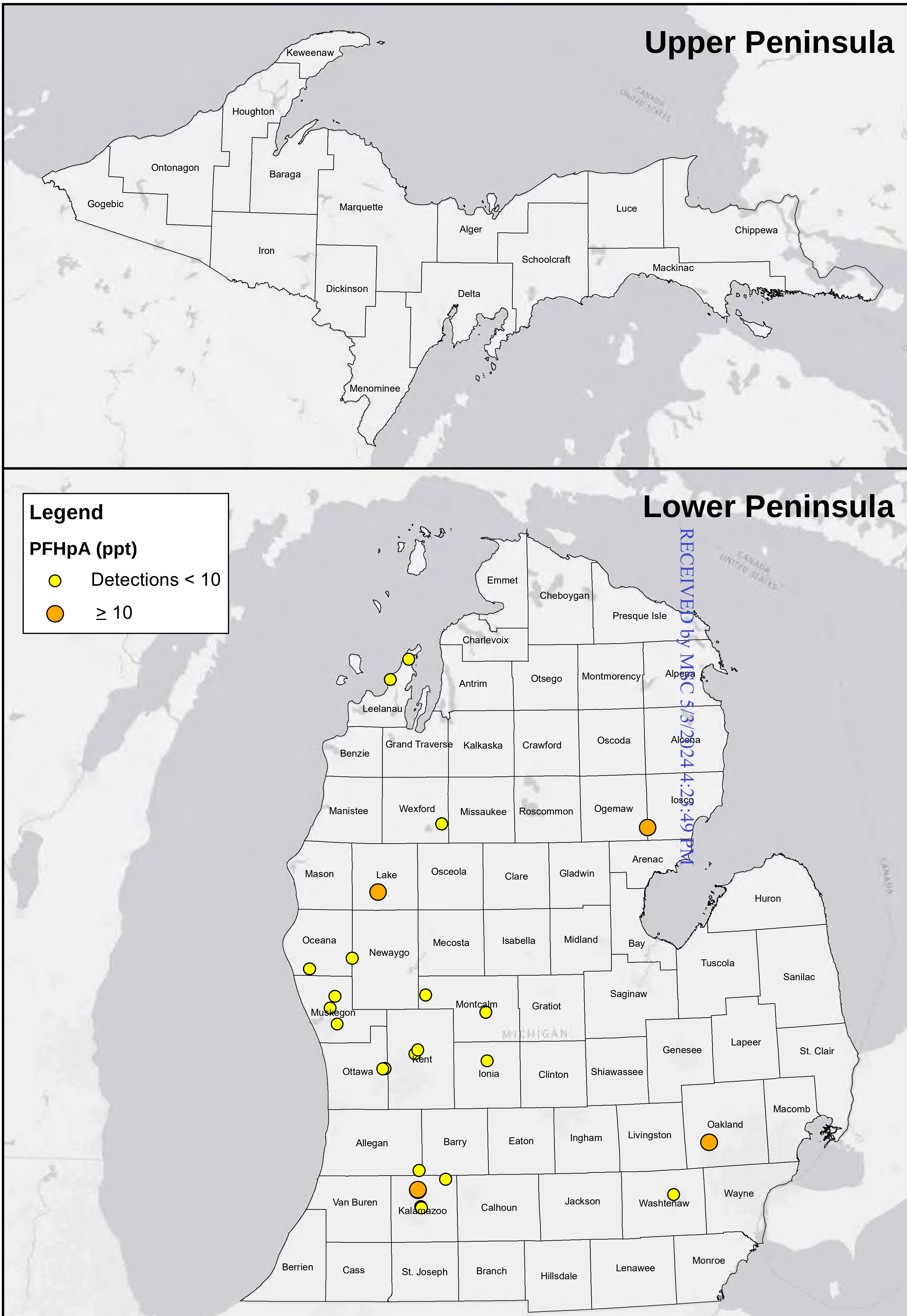

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Michigan Counties

0 25 50 100 Miles

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FIGURE 7b
PFHpA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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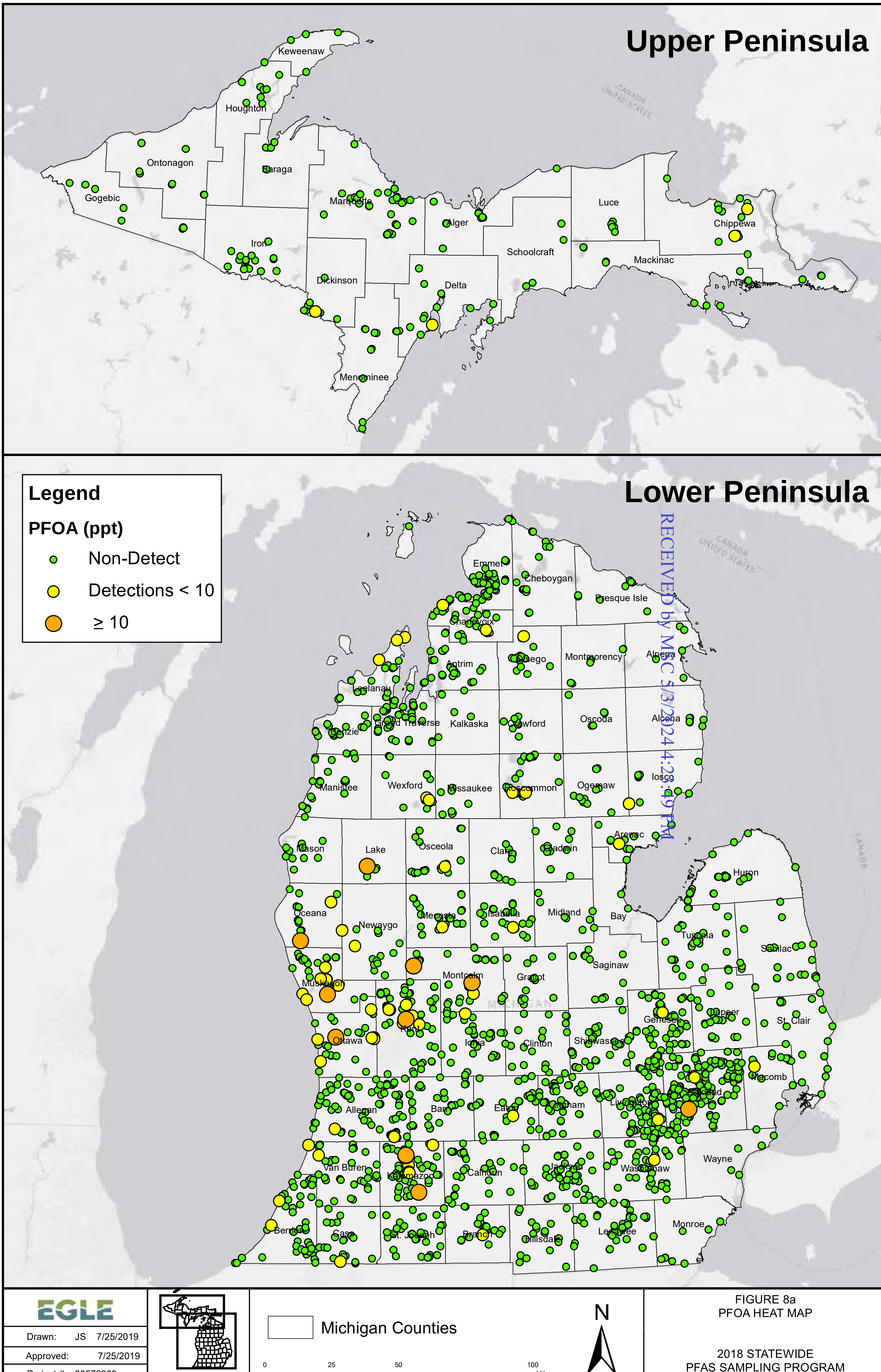

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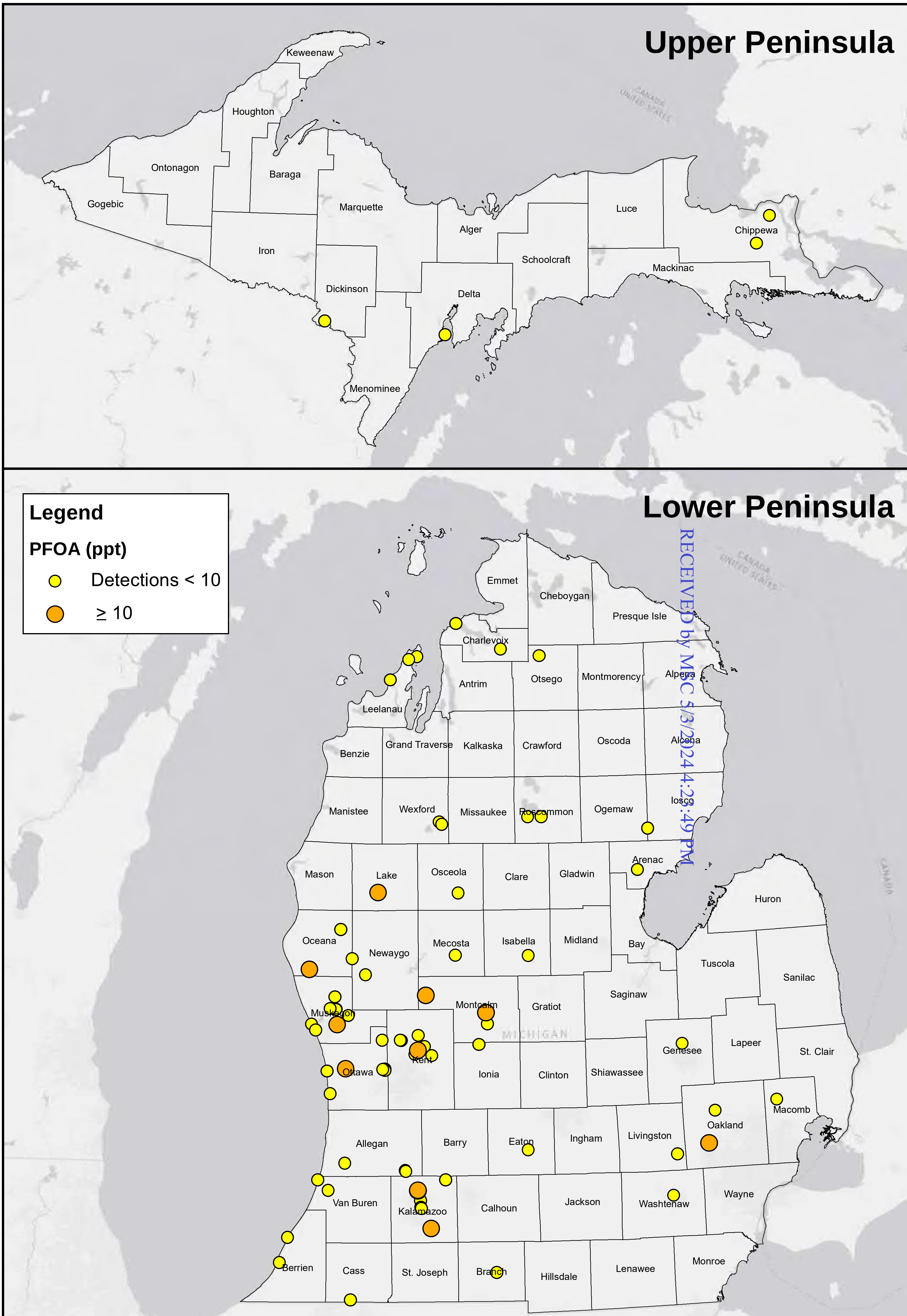

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Project #: 60570309	

Michigan Counties

0 25 50 100 Miles

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FIGURE 8b
PFOA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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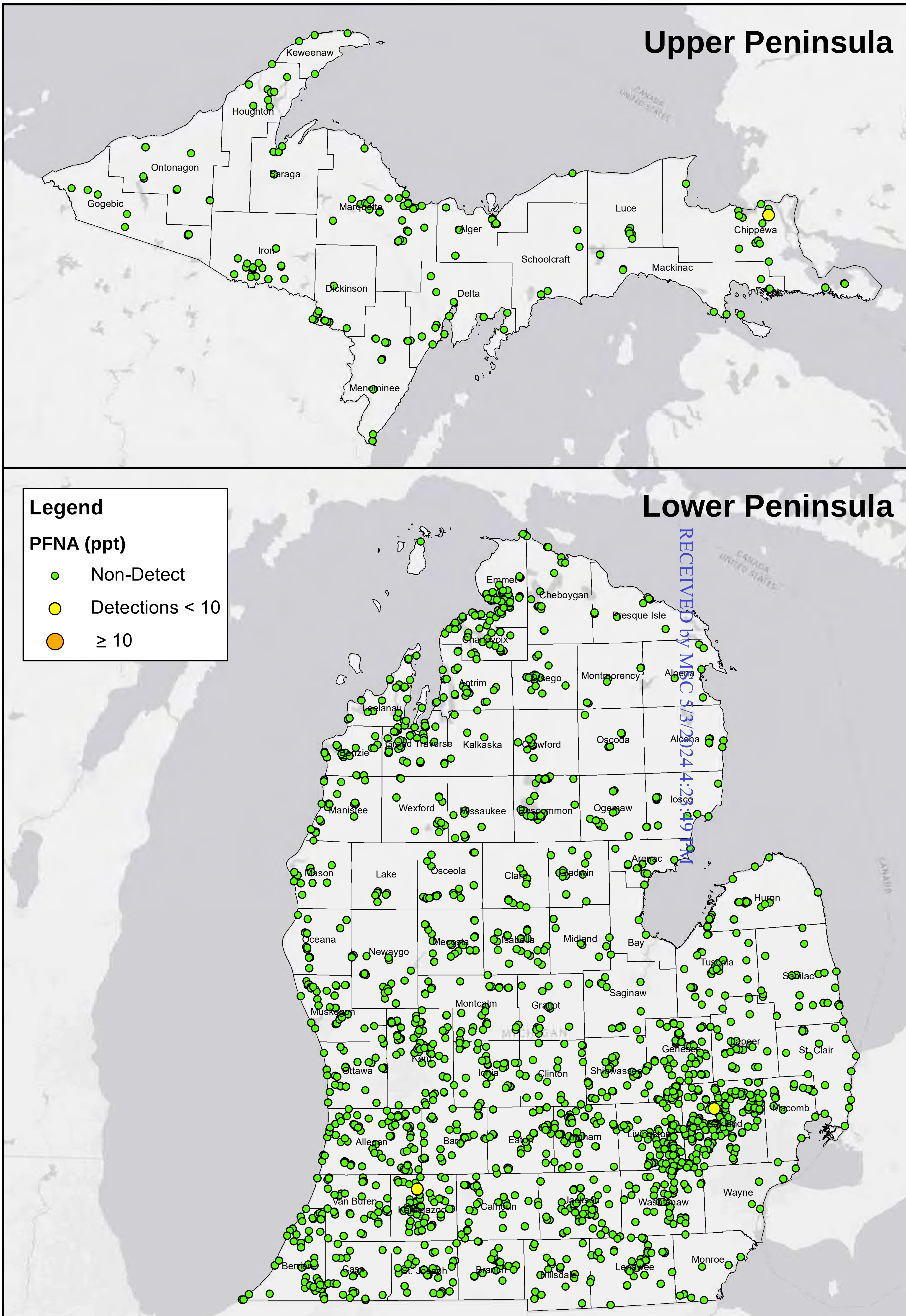

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Michigan Counties

0 25 50 100 Miles

N

FIGURE 9a
PFNA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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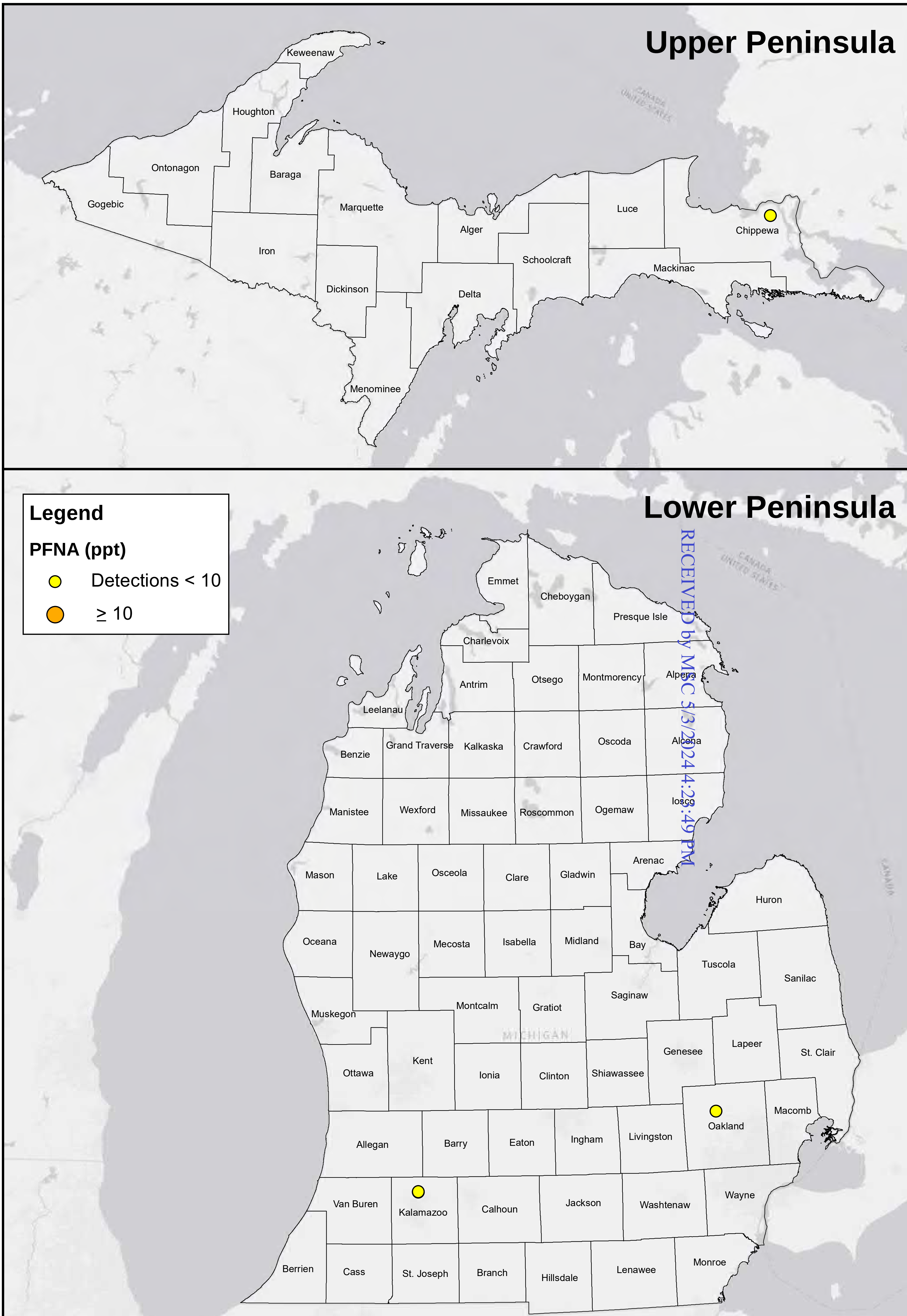

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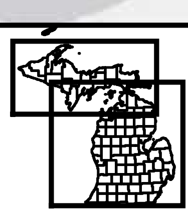

Michigan Counties

0 25 50 100 Miles

N

FIGURE 9b
PFNA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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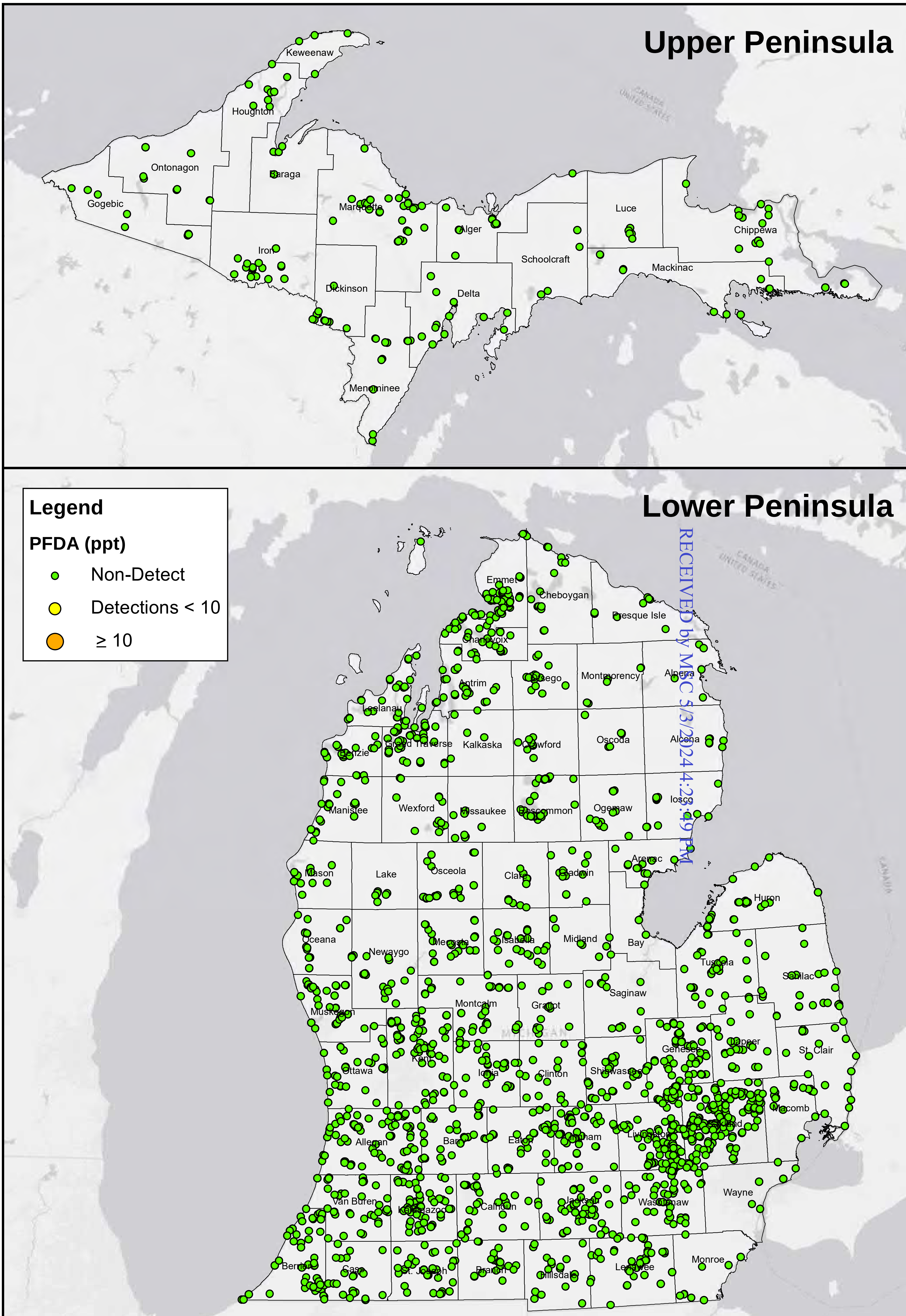

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Project #: 60570309

Michigan Counties

0 25 50 100 Miles

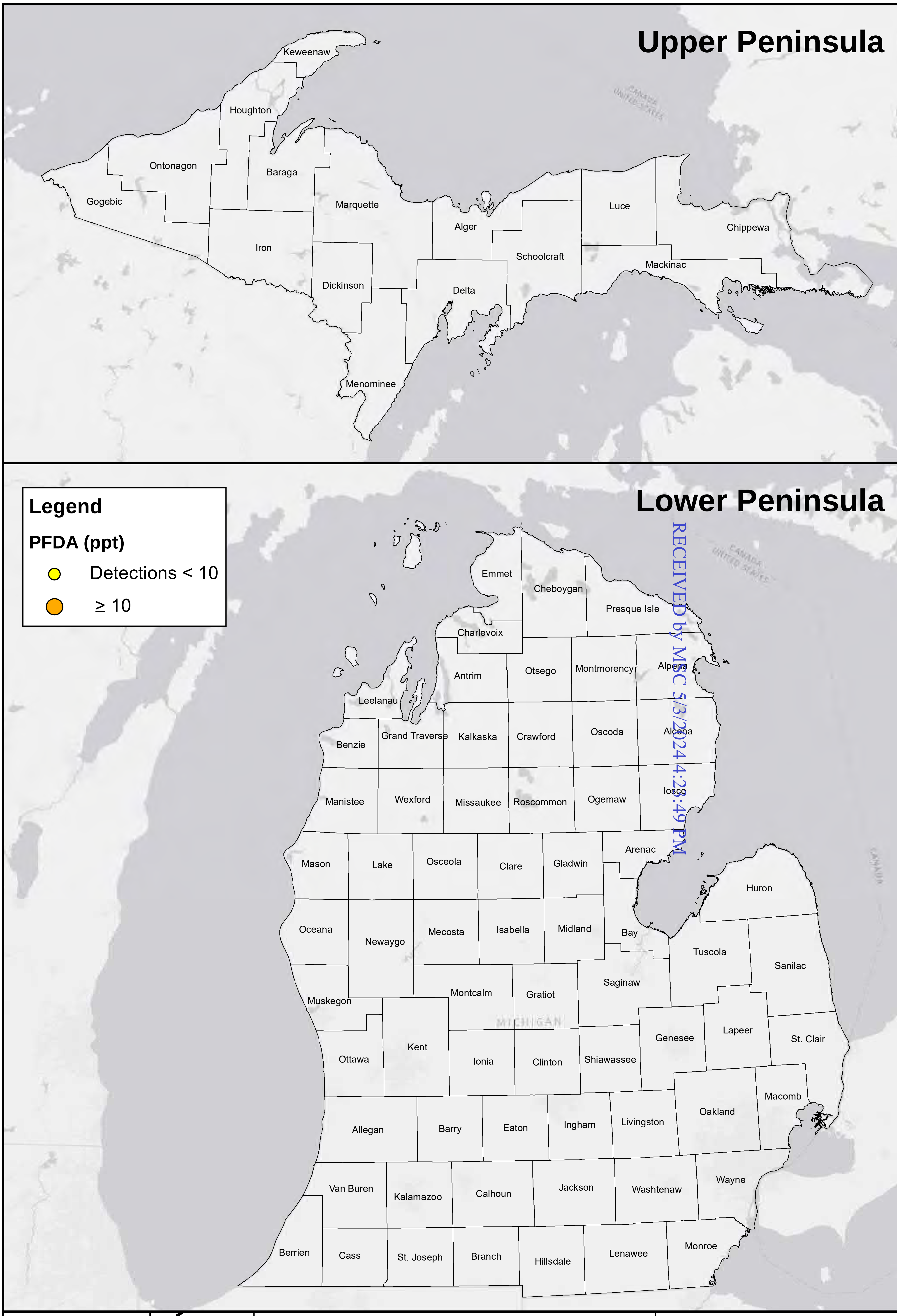
N

FIGURE 10a
PFDA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFDA.mxd



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Project #: 60570309

Michigan Counties

0 25 50 100 Miles

N

FIGURE 10b
PFDA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

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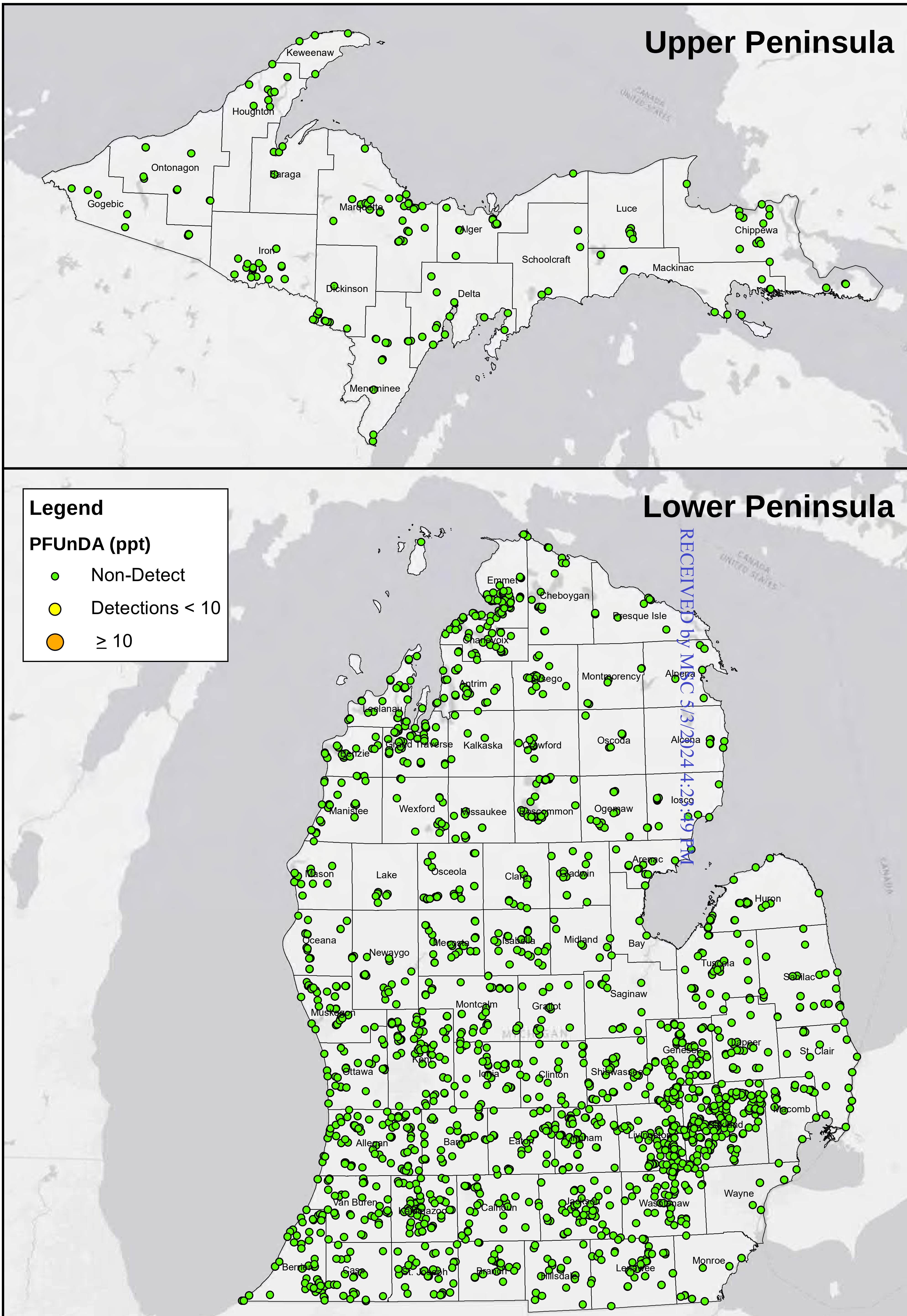

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Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

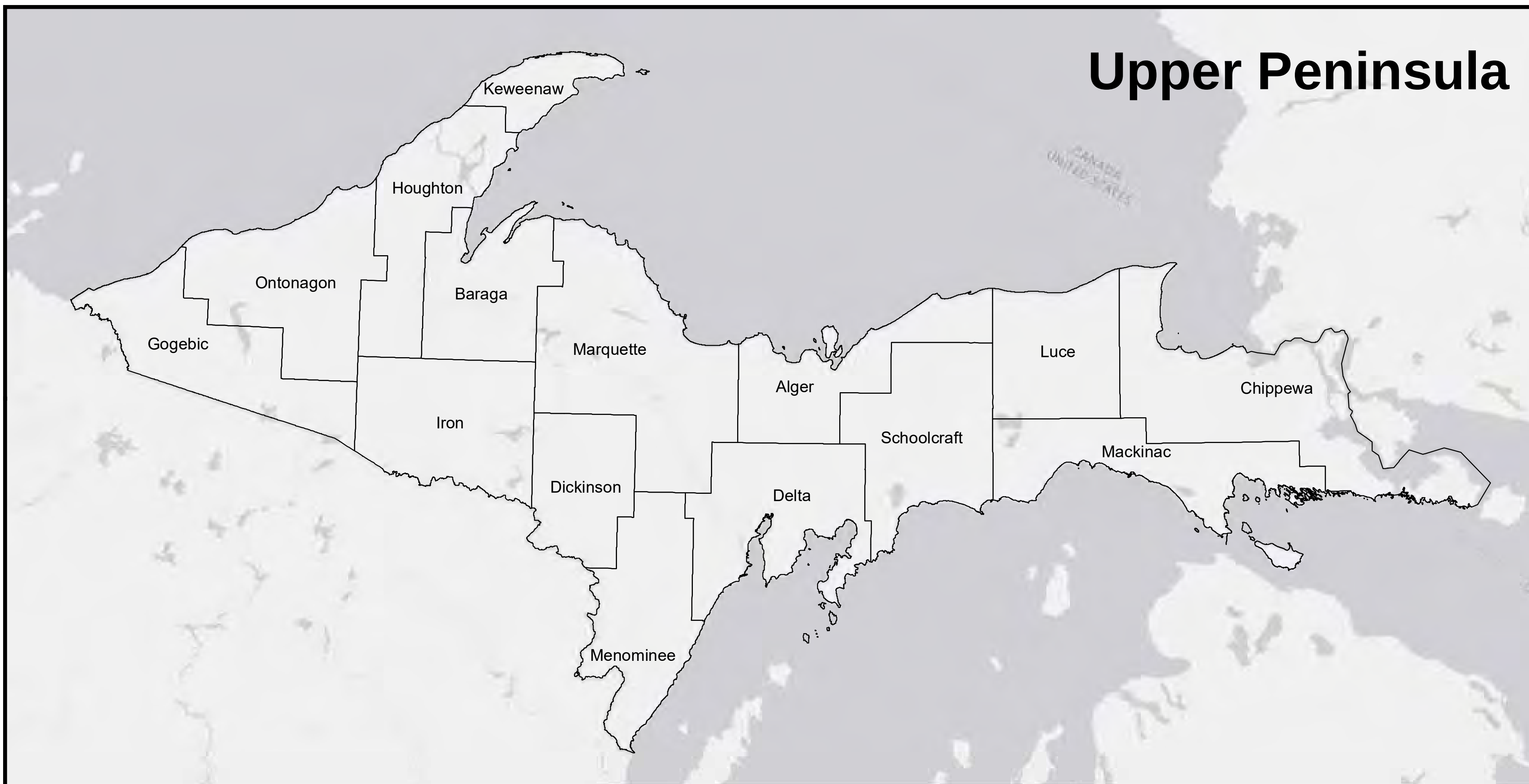
N

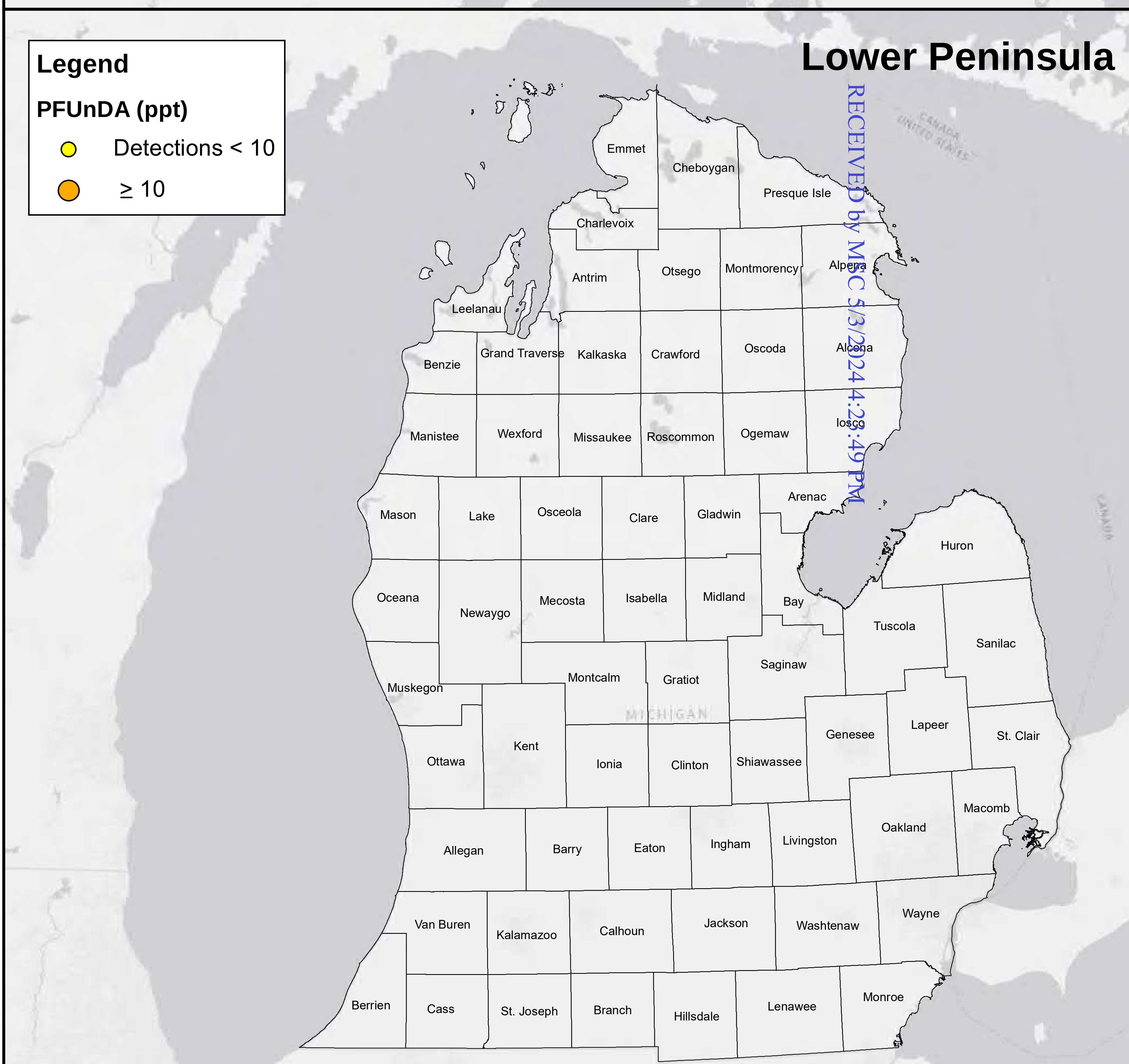
FIGURE 11a
PFUnDA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFUnDA.mxd





EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

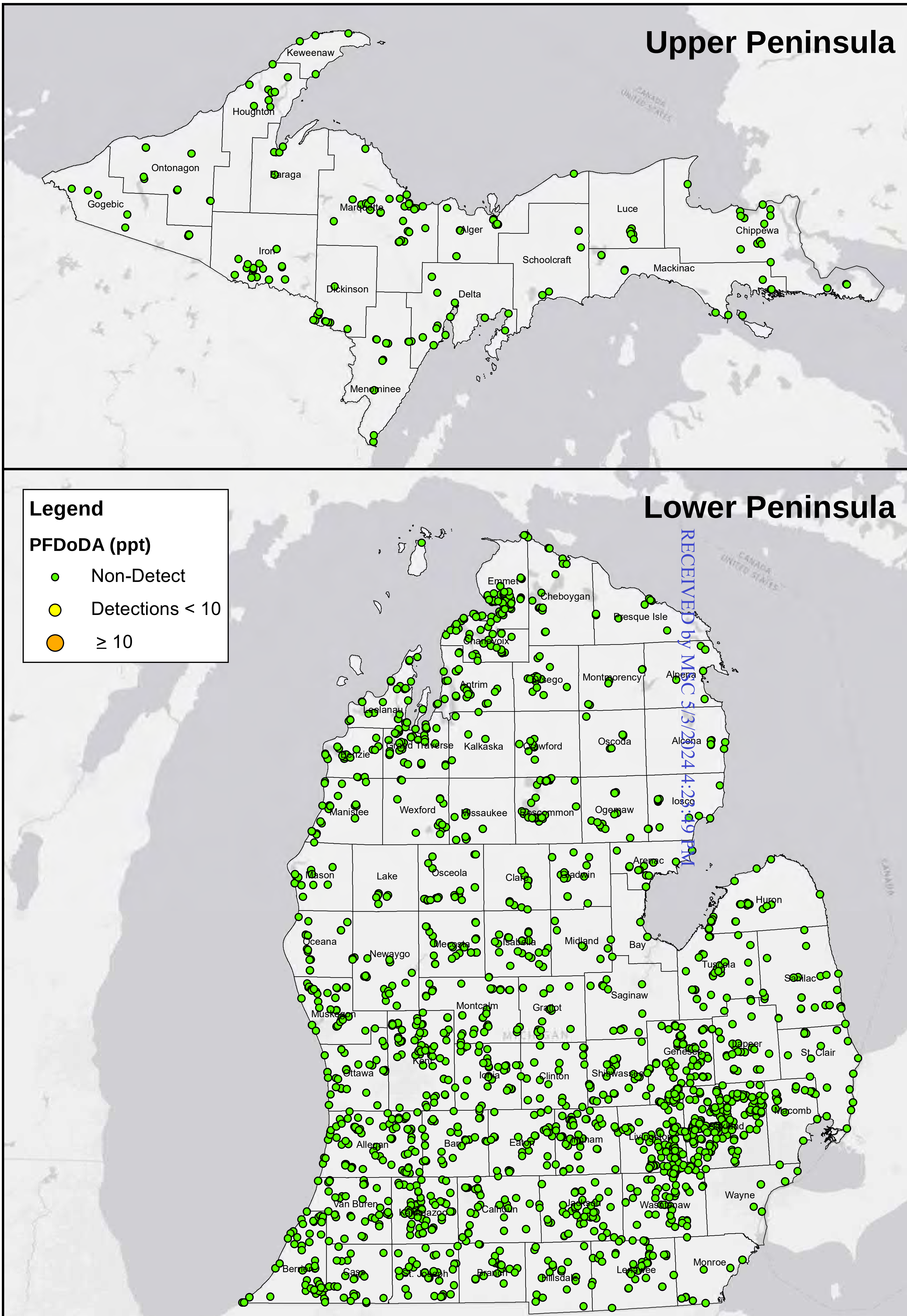
N

FIGURE 11b
PFUnDA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFUnDA_Detections.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

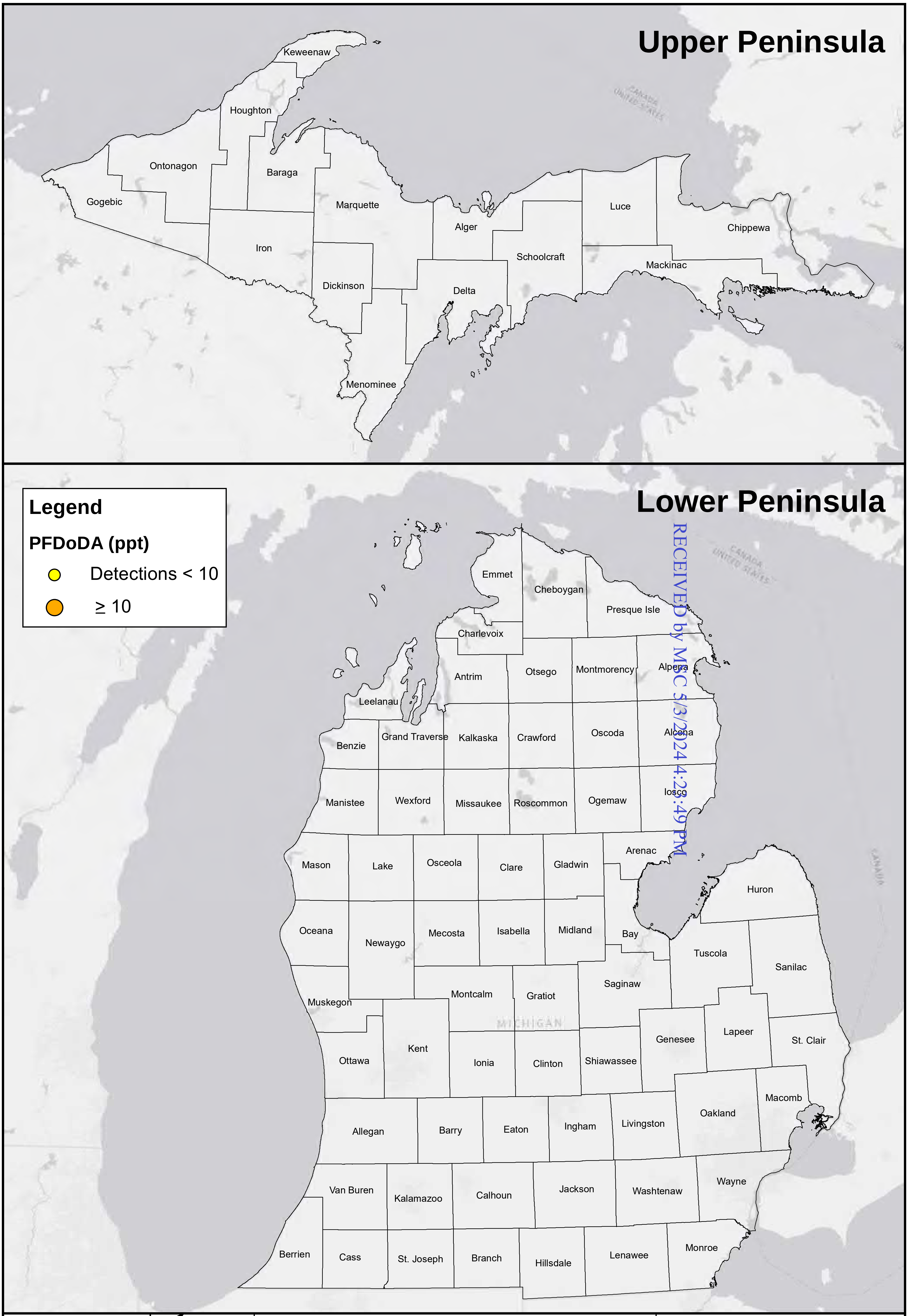
N

FIGURE 12a
PFDoDA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFDoDA.mxd

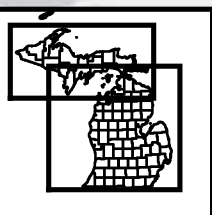


EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309



Michigan Counties

0 25 50 100 Miles

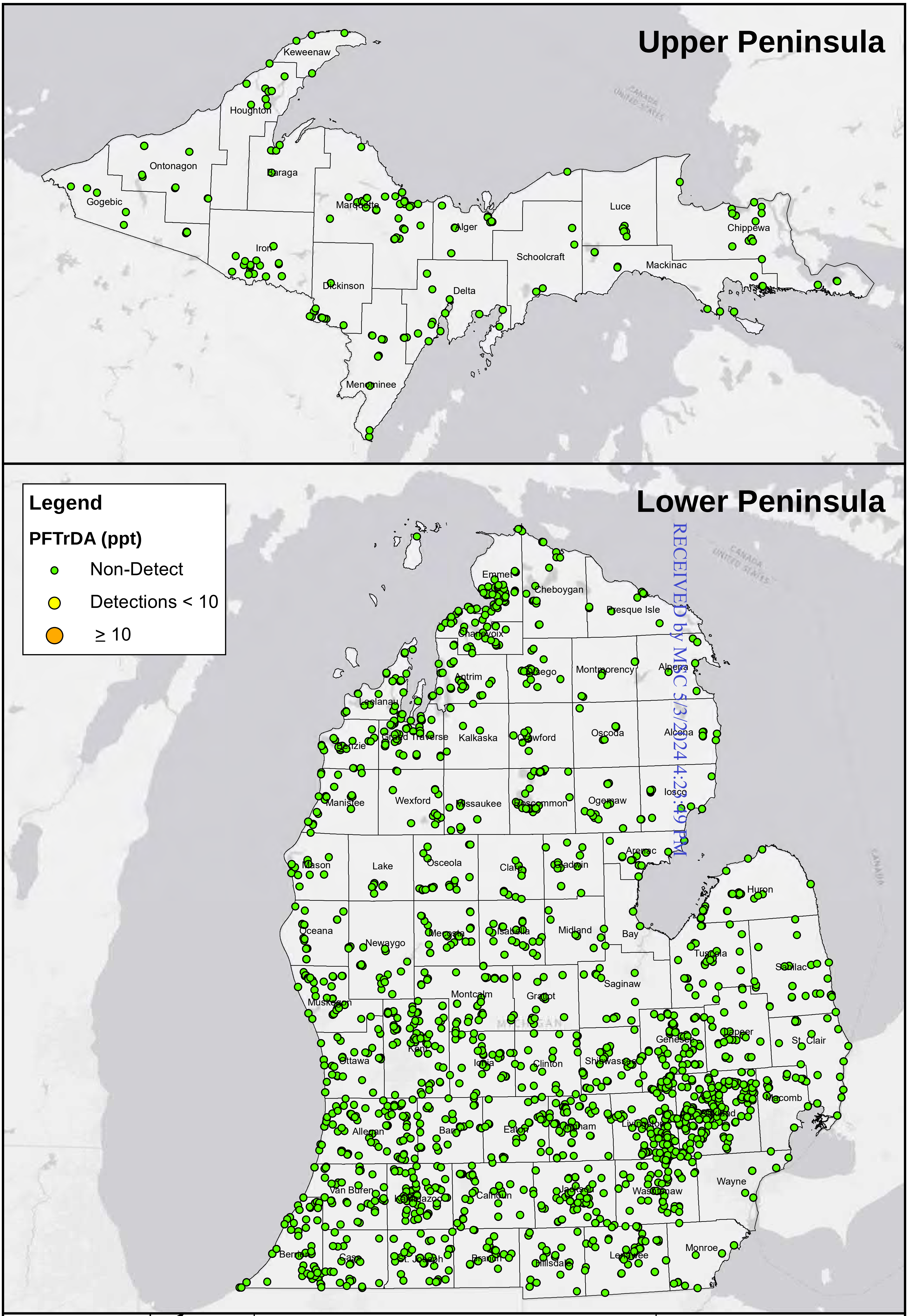
N

FIGURE 12b
PFDoDA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFDoDA_Detections.mxd



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EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

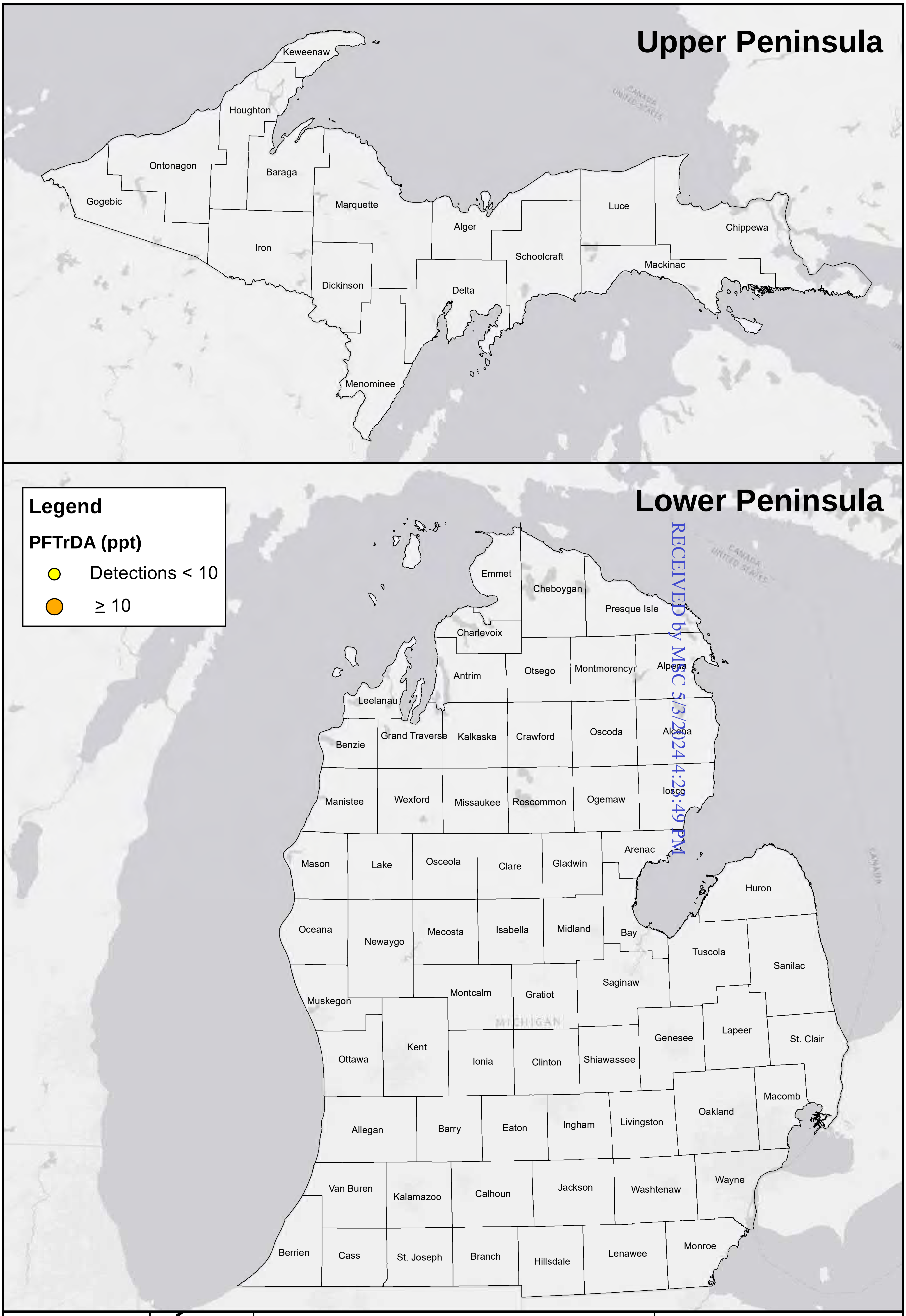
N

FIGURE 13a
PFTrDA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFTrDA.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

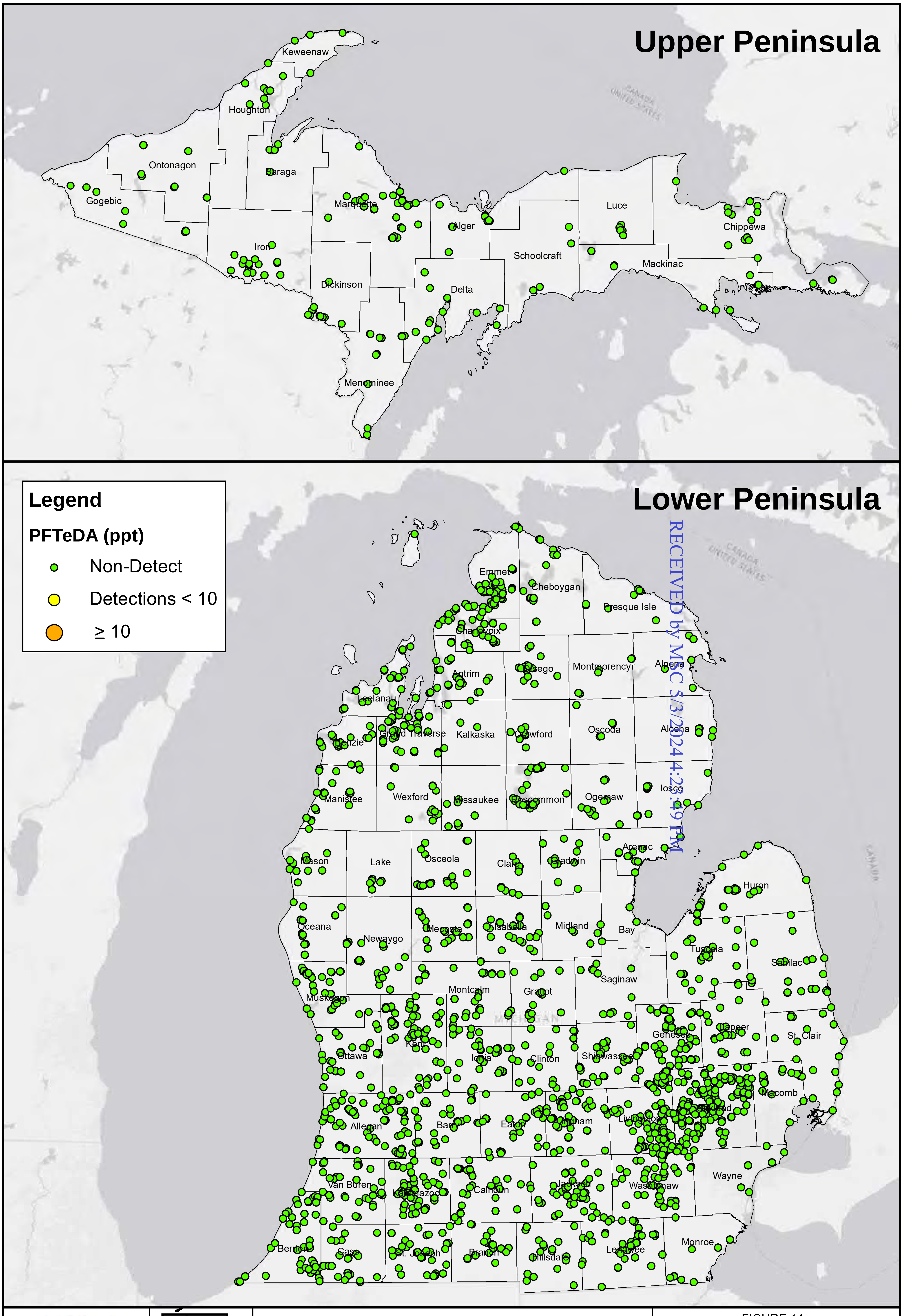
N

FIGURE 13b
PFTrDA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFTrDA_Detections.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

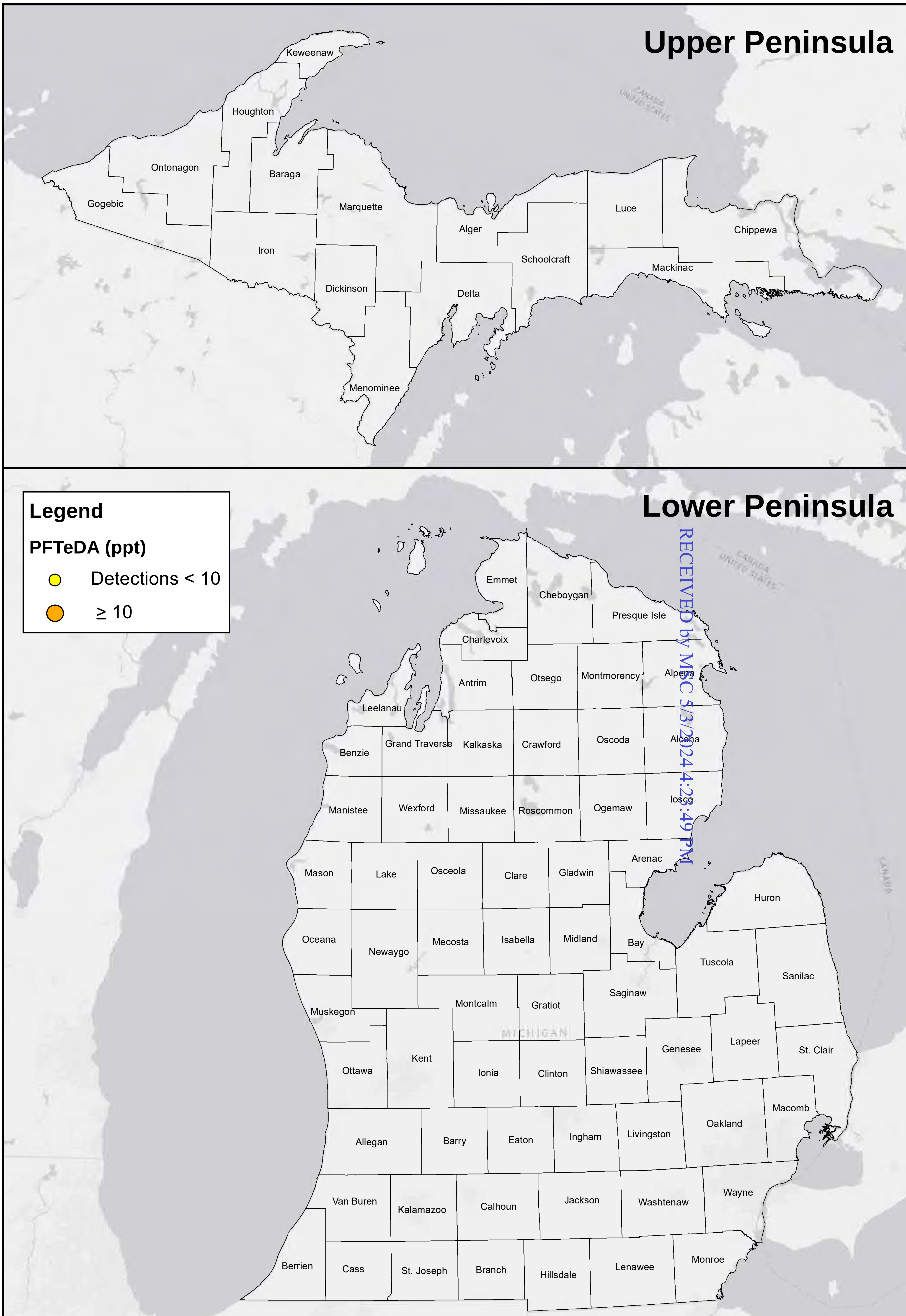
N

FIGURE 14a
PFTeDA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFTeDA.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

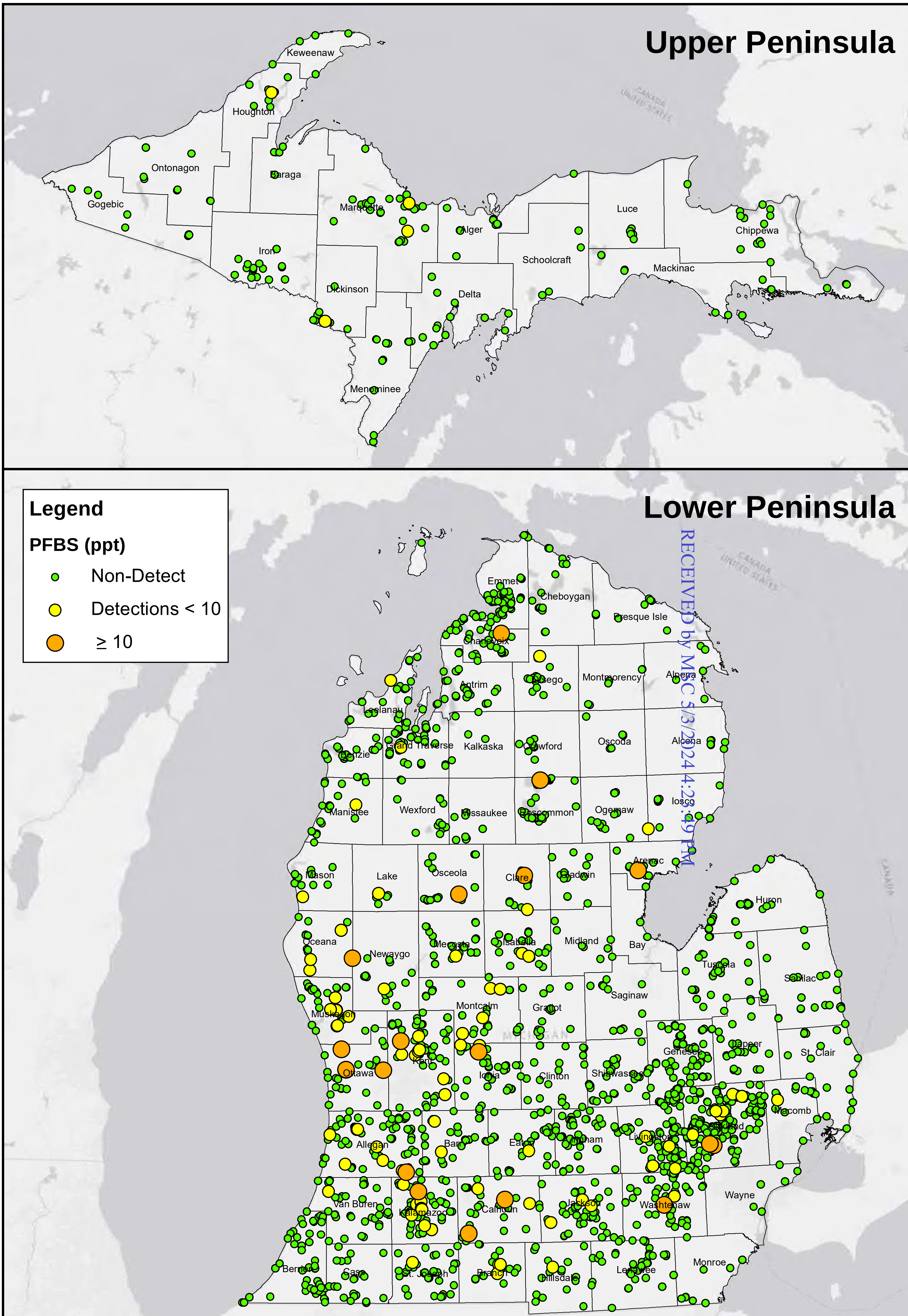
N

FIGURE 14b
PFTeDA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFTeDA_Detections.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

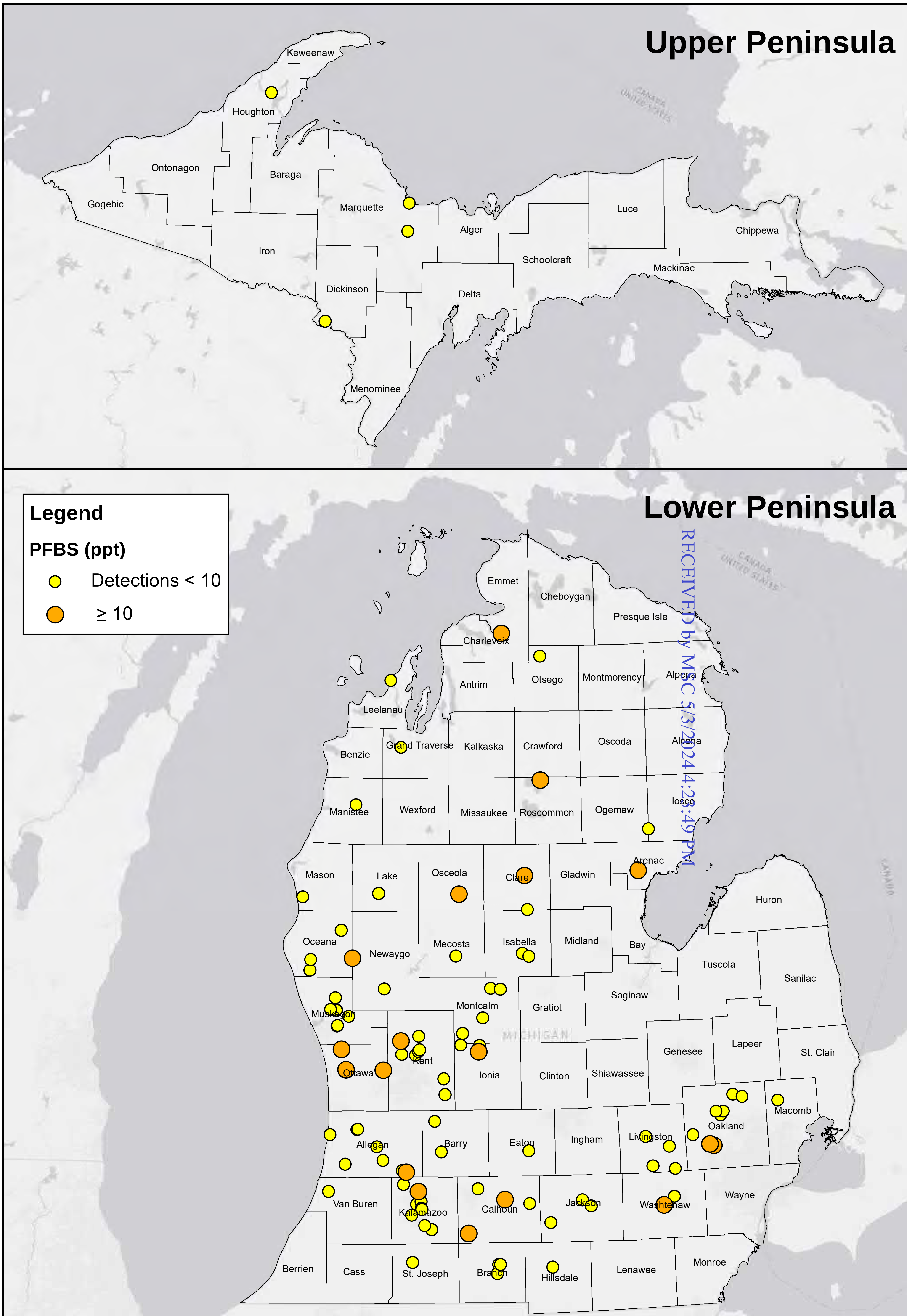
N

FIGURE 15a
PFBS HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFBS.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

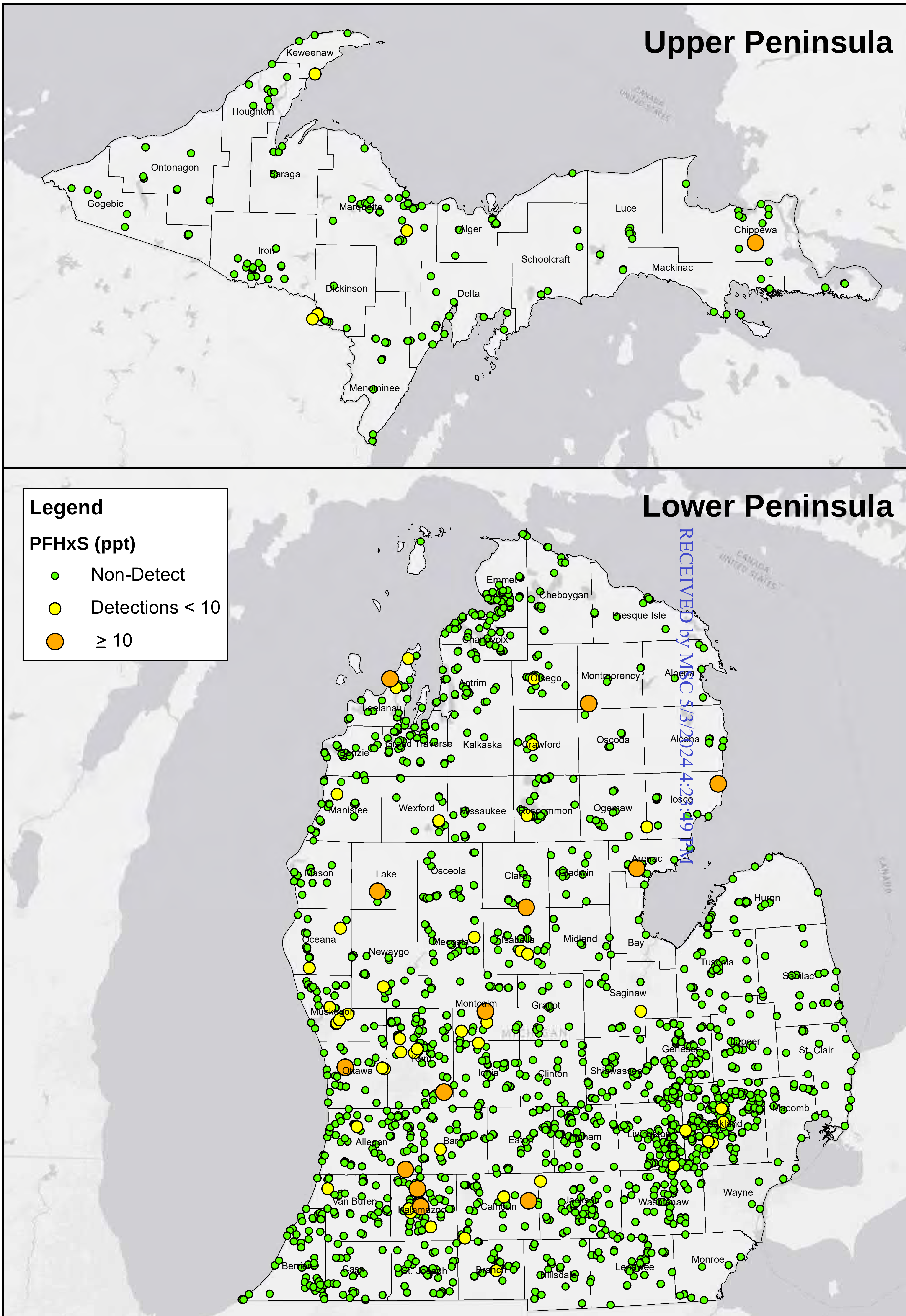
N

FIGURE 15b
PFBS DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFBS_Detections.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

N

FIGURE 16a
PFHxS HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFHxS.mxd

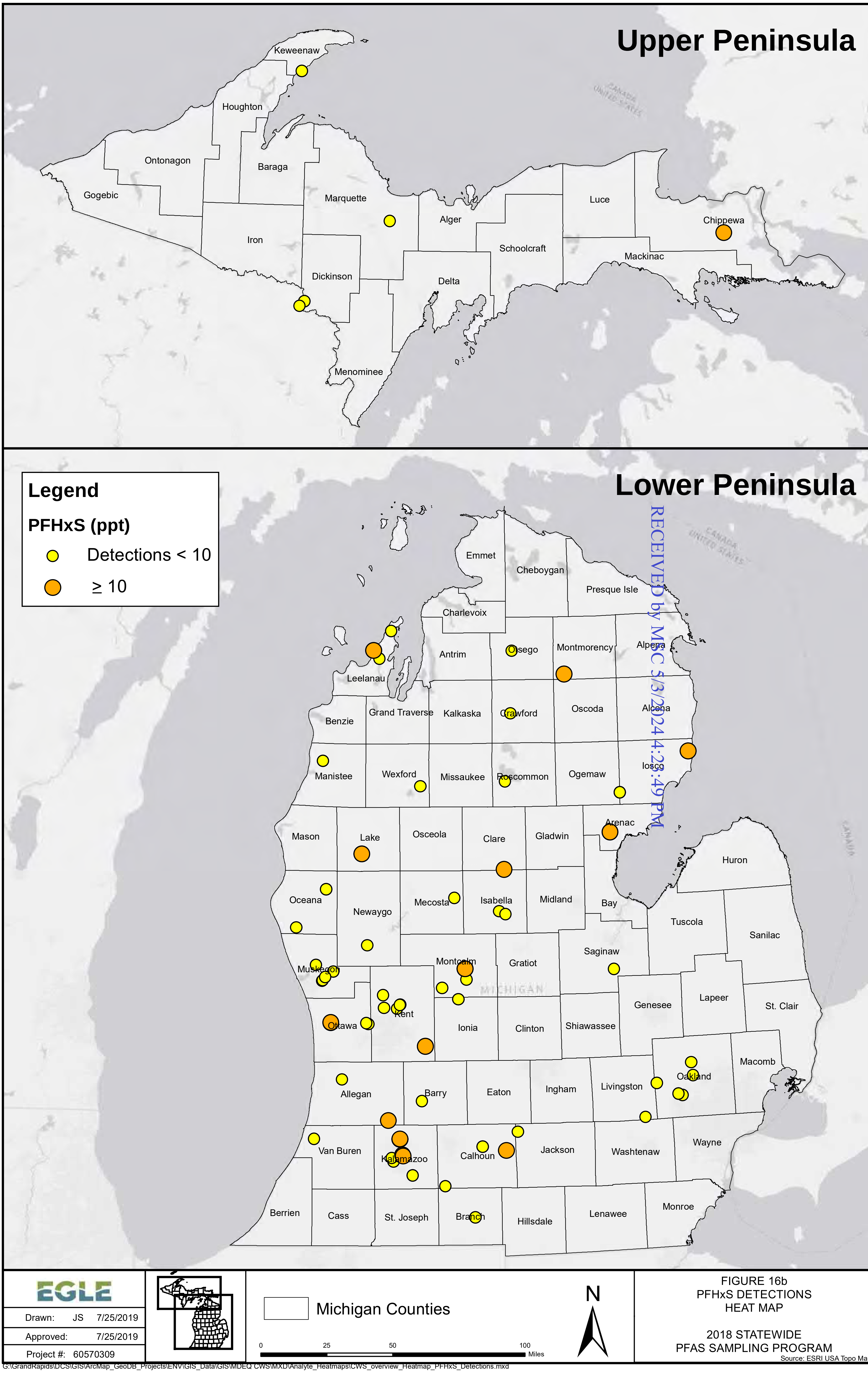
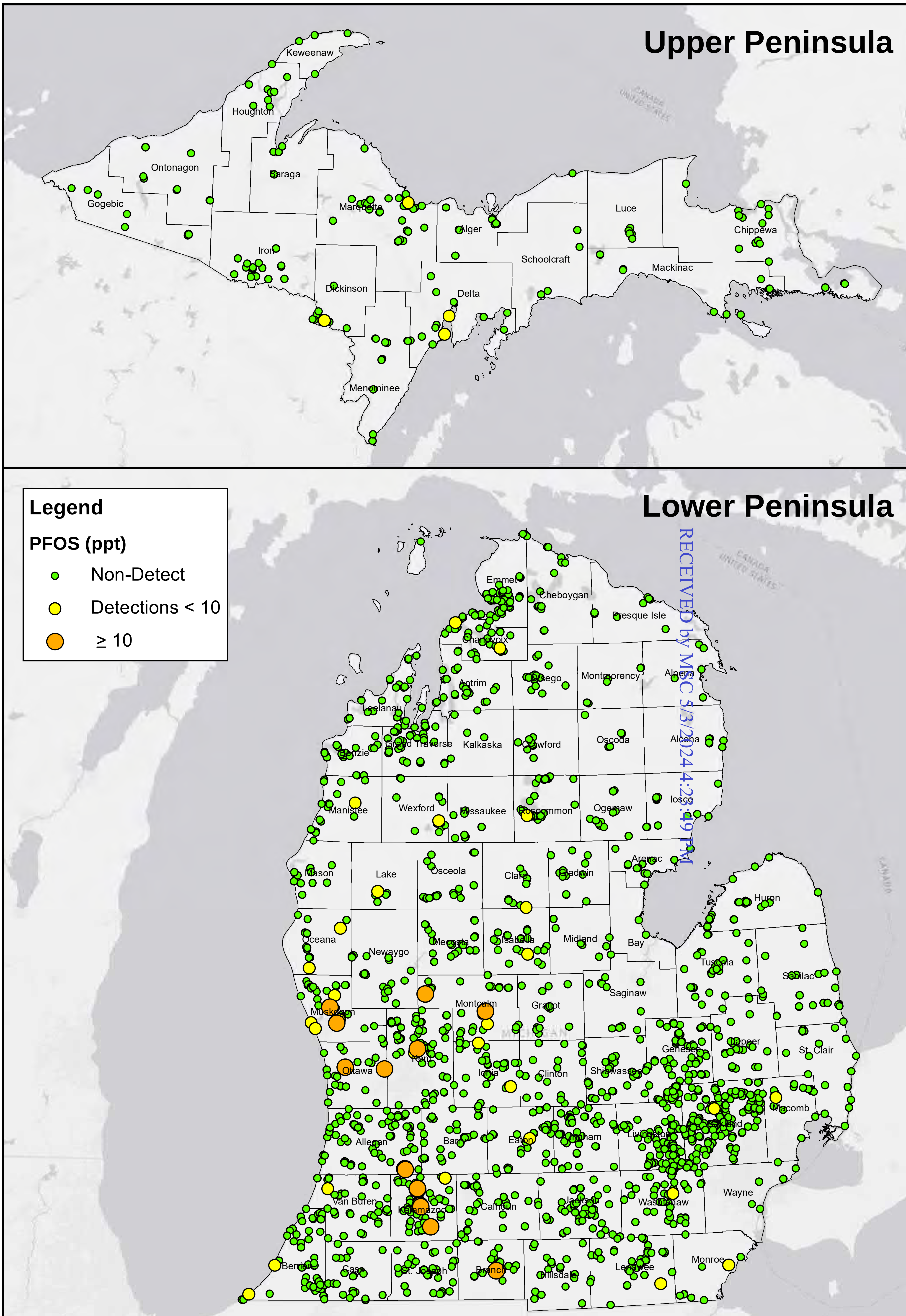


FIGURE 16b
PFHxS DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

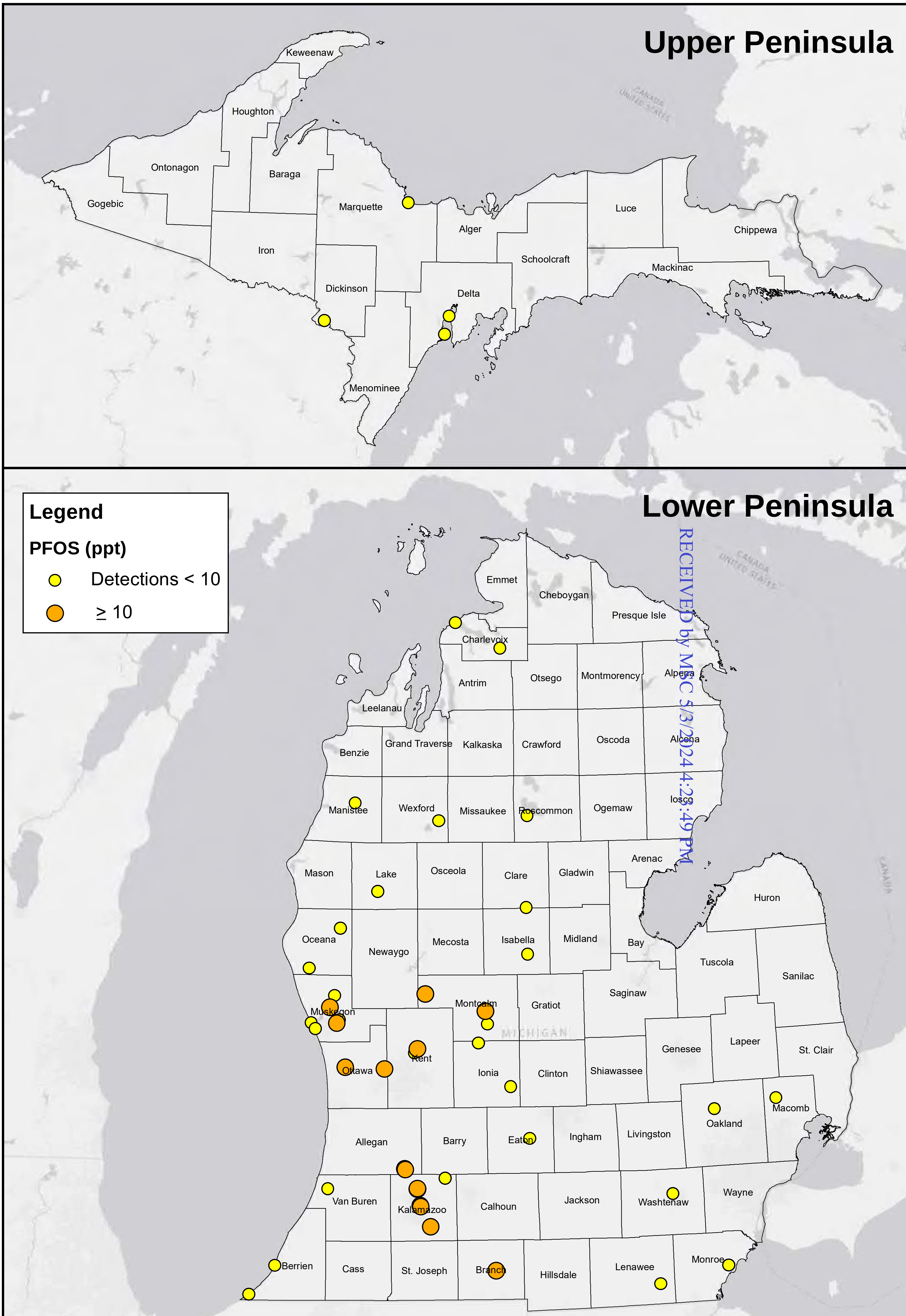
Project #: 60570309

FIGURE 17a
PFOS HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFOS.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

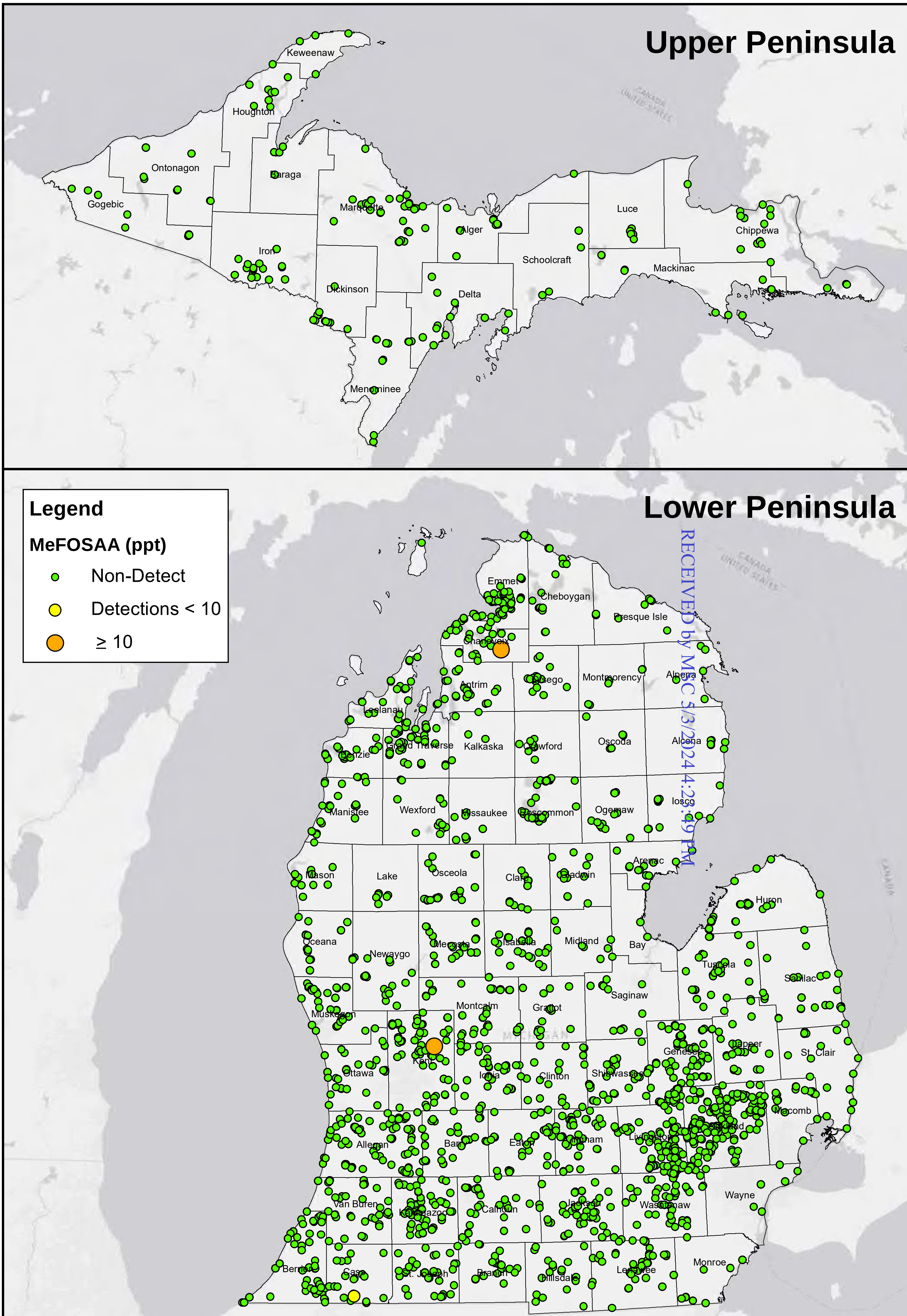
N

FIGURE 17b
PFOS DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_PFOS_Detections.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

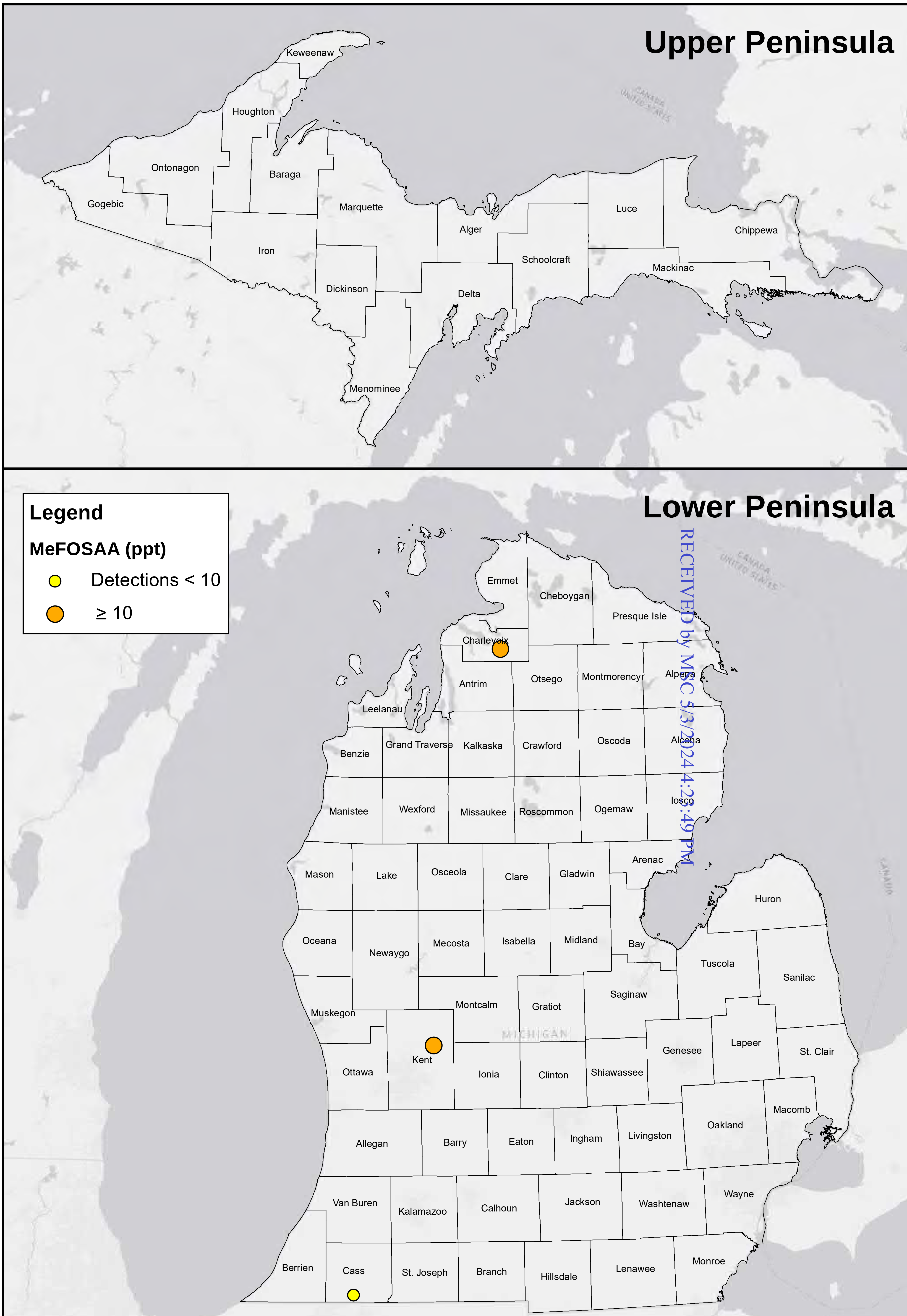
N

FIGURE 18a
MeFOSAA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_MeFOSAA.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

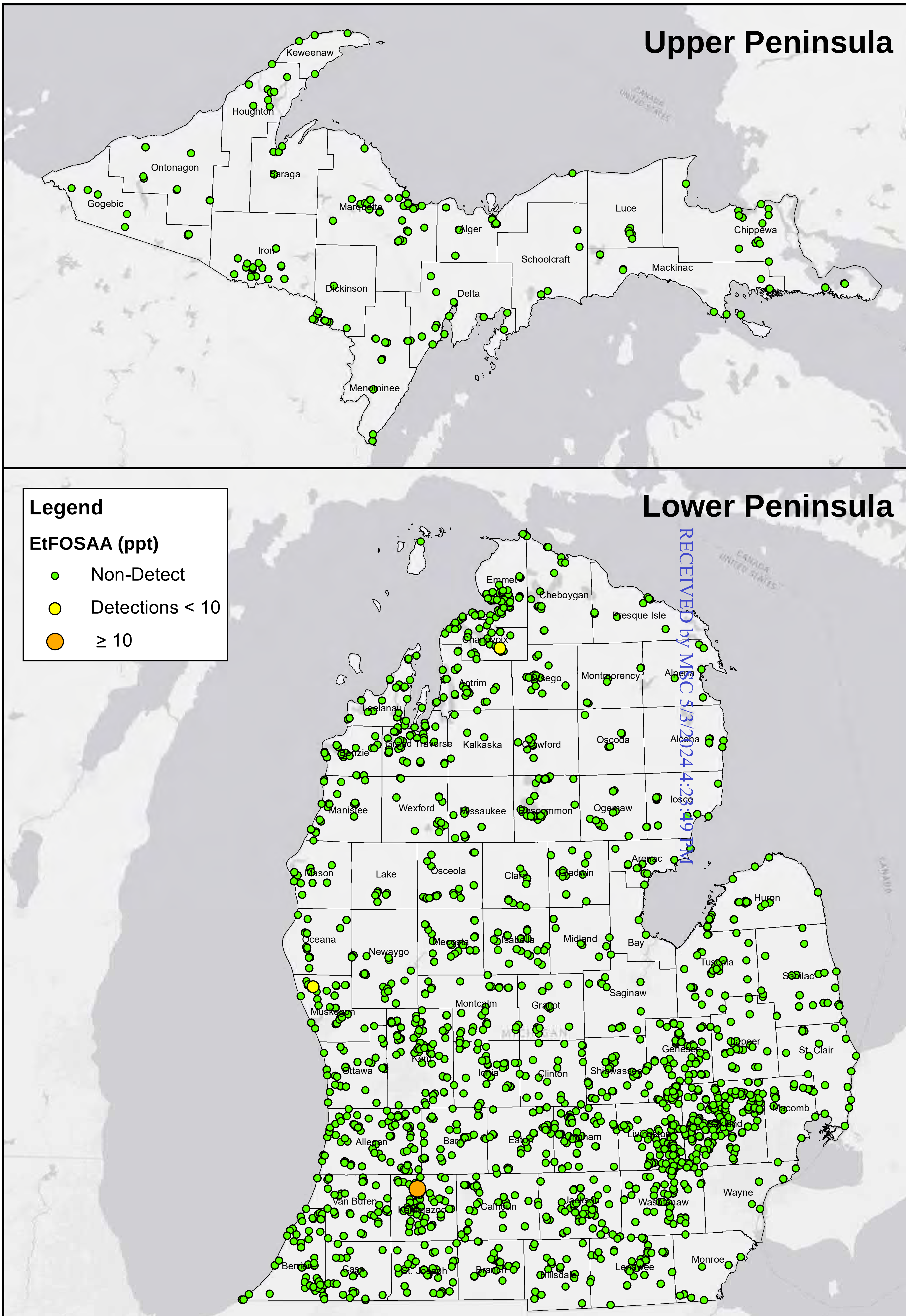
N

FIGURE 18b
MeFOSAA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_MeFOSAA_Detections.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

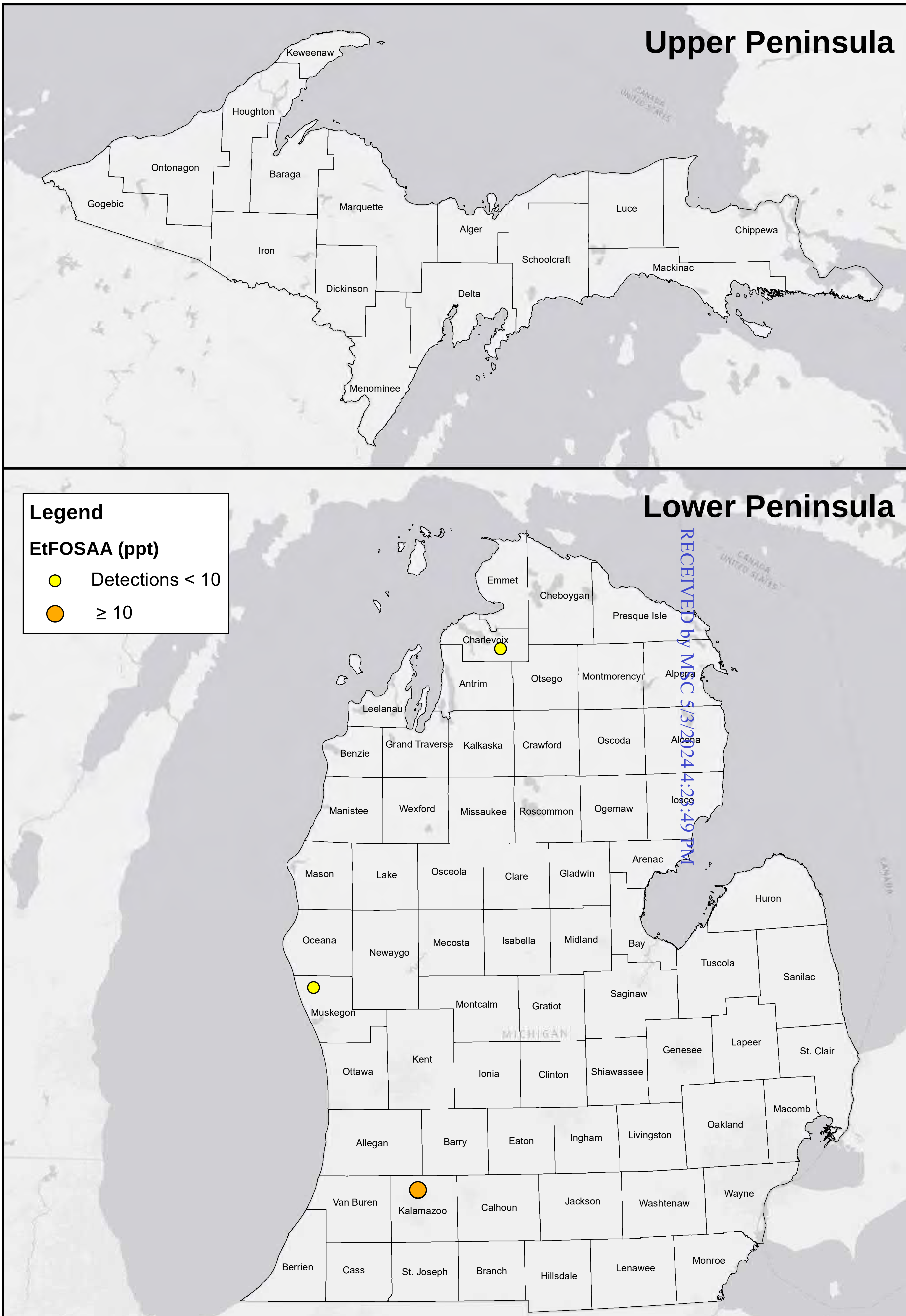
N

FIGURE 19a
EtFOSAA HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_EtFOSAA.mxd



EGLE

Drawn: JS 7/25/2019

Approved: 7/25/2019

Project #: 60570309

Michigan Counties

0 25 50 100 Miles

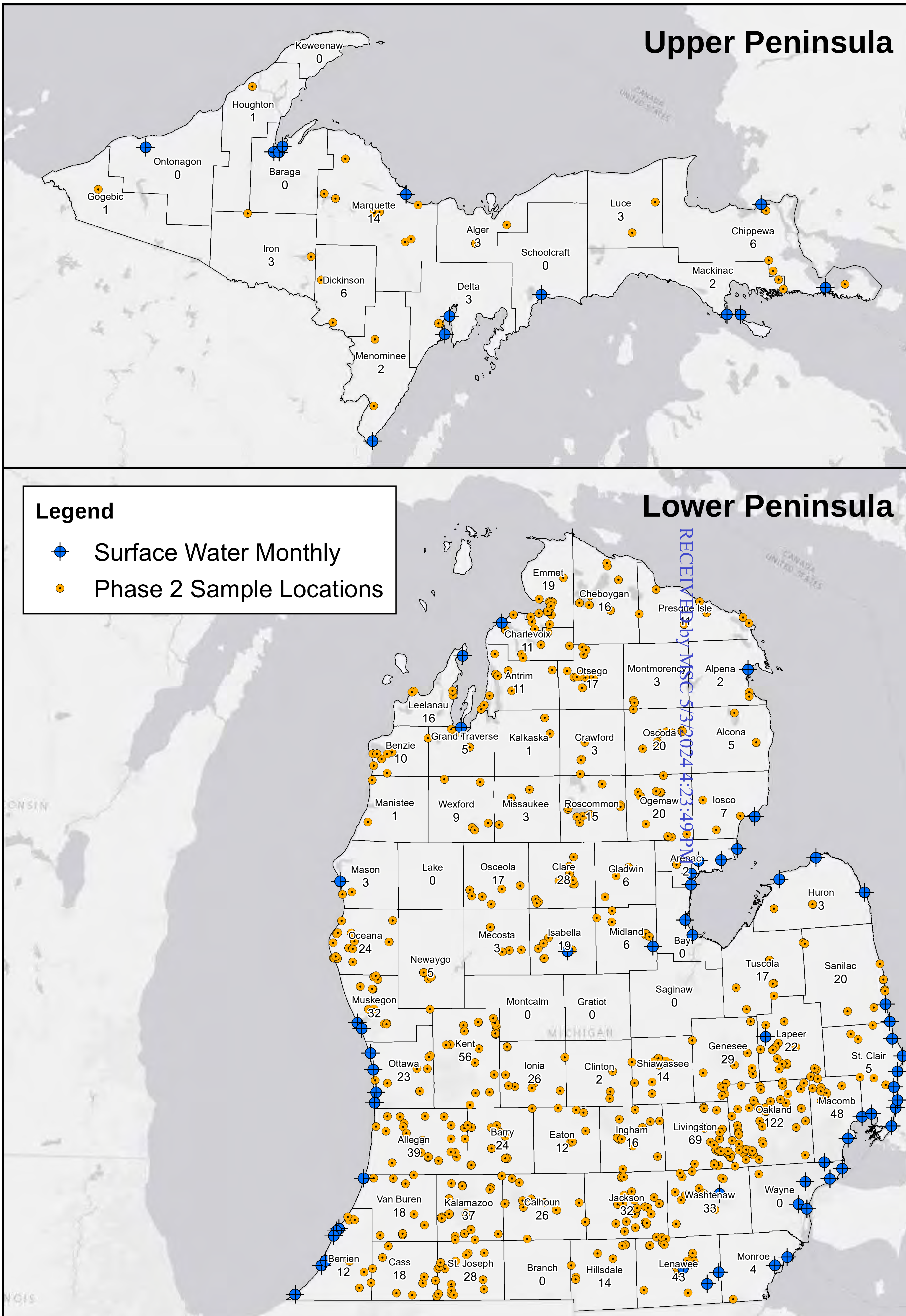
N

FIGURE 19b
EtFOSAA DETECTIONS
HEAT MAP

2018 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\Analyte_Heatmaps\CWS_overview_Heatmap_EtFOSAA_Detections.mxd



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EGLE		FIGURE 20
Drawn: JS 7/22/2019		2019 PHASE 2 AND MONTHLY PFAS SAMPLING
Approved: 7/22/2019		2019 STATEWIDE PFAS SAMPLING PROGRAM
Project #: 60570309		Source: ESRI USA Topo Maps

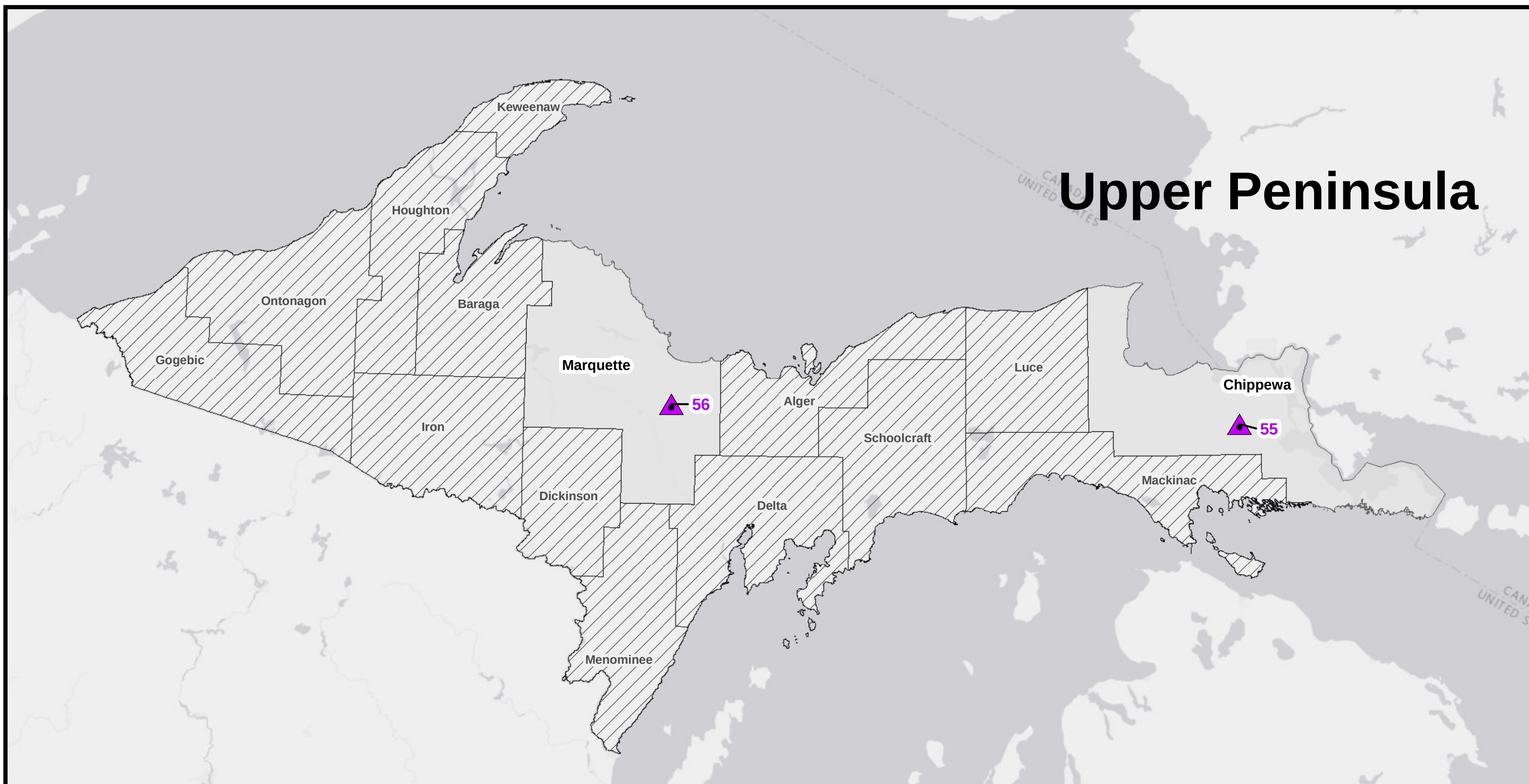
Legend

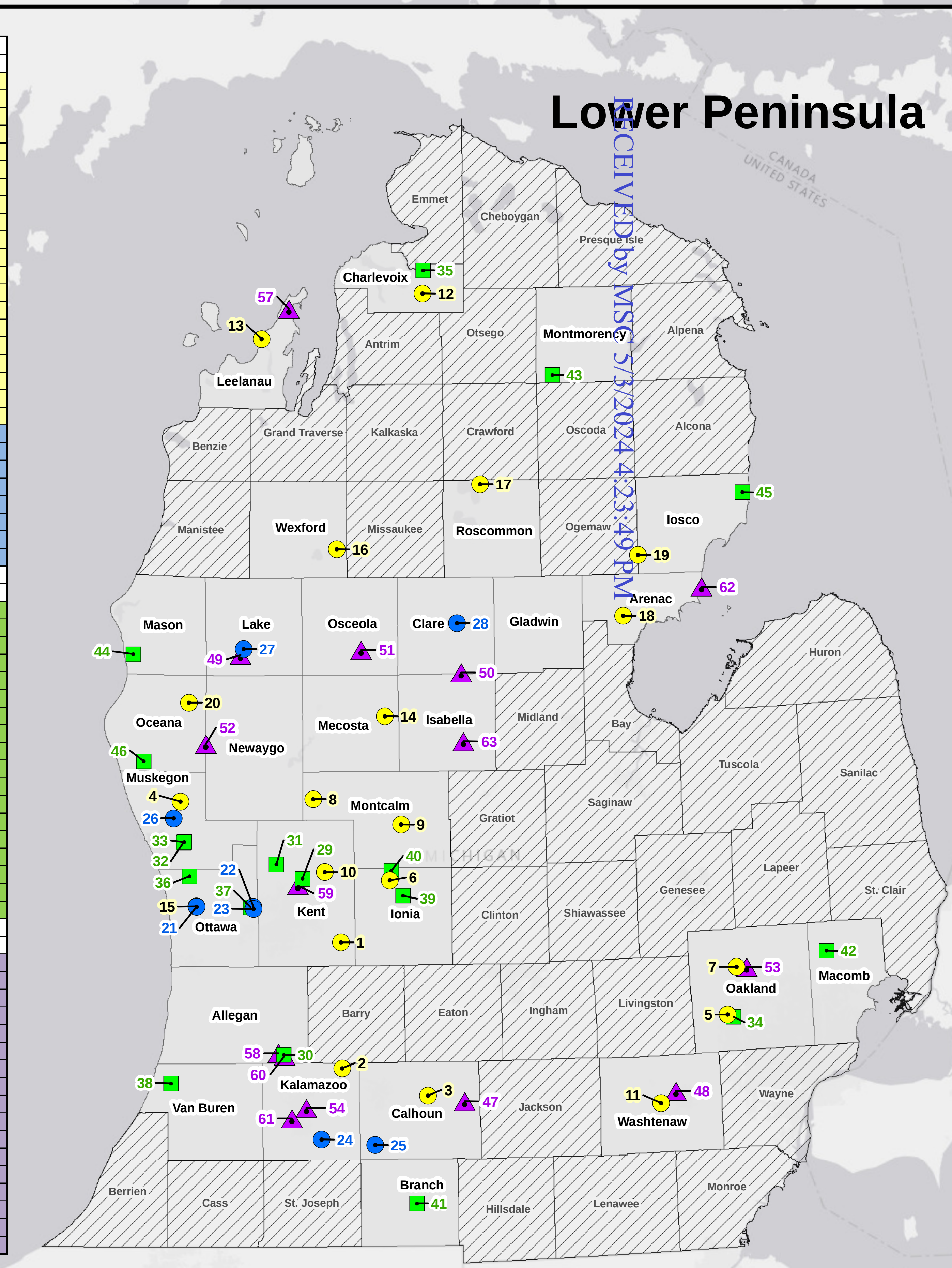
Michigan Counties (County Name, Phase II Sample Count)

0 25 50 100 Miles

N

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\CWS_overview_PhaseII_Sample_SW_Monthly.mxd





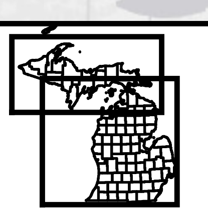
GROUP 1		
ID	TYPE	LOCATION
1	School	ALTO ELEMENTARY SCHOOL
2	School	GULL LAKE SCHOOLS-40TH ST EARLY LEARNING CTR
3	School	CALHOUN INTERM. SCHOOL DIST.
4	School	REETHS PUFFER/TWIN LAKE ELEMEN
5	School	GLENGARY ELEMENTARY/WLS
6	School	EIGHT CAP IONIA CO. OUTREACH
7	School	OAKLAND SCHOOLS-TECHNICAL CAMPUS NW
8	School	TRI COUNTY JUNIOR HIGH
9	School	CENTRAL MONTCALM SCHOOLS
10	School	ROCKFORD EAST MIDDLE SCHOOL
11	School	EMERSON SCHOOL - ELEMENTARY
12	School	BOYNE FALLS PUBLIC SCHOOL
13	School	LELAND PUBLIC SCHOOL DISTRICT 2
14	School	CHIPPEWA HILLS HIGH SCHOOL
15	School	ROBINSON ELEMENTARY SCHOOL
16	School	BAKER COLLEGE OF CADILLAC
17	School	C.O.O.R. SCHOOL
18	School	STANDISH-STERLING CENTRAL ELEMENTARY
19	School	WHITTEMORE/PRESCOTT SCHOOL COMPLEX
20	School	WALKERVILLE ELEMENTARY
21	Daycare	LOVING HEARTS LITTLE HANDS
22	Daycare	ALL FOR KIDS
23	Daycare	FUTURE STEPS LEARNING CENTER LLC
24	Daycare	CHAPMAN MEMORIAL CHURCH
25	Daycare	KIDS TIME DAY CARE CENTER
26	Daycare	THE HOP CHILDCARE CENTER
27	Daycare	FIVECAP INC - (RFW)
28	Daycare	MMCAA HARRISON PRESCHOOL
GROUP 2		
ID	TYPE	LOCATION
29	Municipal	SPRING VALLEY MOBILE HOME PARK
30	Municipal	ANDREWS MOBILE HOME PARK
31	Municipal	WHISPERING PINES
32	Municipal	ARLINGTON WOODS
33	Municipal	EGELCRAFT MOBILE HOME PARK
34	Municipal	HERITAGE APARTMENTS
35	Municipal	WALLOON LAKE WATER SYSTEM
36	Municipal	CROCKERY MOBILE HOME PARK
37	Municipal	TALLMADGE MEADOWS
38	Municipal	PORT OF CALL - WEST
39	Municipal	EVERGREEN MOBILE HOME COMMUNITY
40	Municipal	LONG LAKE MOBILE HOME ESTATES
41	Municipal	COUNTRYSIDE MOBILE COURT
42	Municipal	MAIN STREET APARTMENTS
43	Municipal	OAK LEAF MANOR
44	Municipal	HERITAGE HILLS MOBILE HOME VILLAGE
45	Municipal	WHISPERING WOODS-WHITE PINE RIDGE OSCOD
46	Municipal	GREENLAWN MOBILE HOME COURT
GROUP 3		
ID	TYPE	LOCATION
47	Municipal	ALBION
48	Municipal	ANN ARBOR
49	Municipal	BALDWIN, VILLAGE OF
50	Municipal	CLARE, CITY OF
51	Municipal	EVART, CITY OF
52	Municipal	HESPERIA
53	Municipal	INDEPENDENCE TWP.
54	Municipal	KALAMAZOO
55	Municipal	KINROSS TWP.
56	Municipal	K I SAWYER
57	Municipal	NORTHPORT, VILLAGE OF
58	Municipal	OTSEGO
59	Municipal	PLAINFIELD TWP.
60	Municipal	PLAINWELL
61	Municipal	PORTAGE
62	Municipal	SIMS-WHITNEY UTILITIES AUTHORITY
63	Municipal	UNION TWP.

EGLE

Drawn: JS 7/22/2019

Approved: 7/22/2019

Project #: 60570309



Legend

Group I: School; Daycare

Group II: Community Water Supply (CWS)

Group III: Municipal Water Supplies

0 25 50 100 Miles

N

FIGURE 21
2019 STATEWIDE
QUARTERLY PFAS SAMPLING

2019 STATEWIDE
PFAS SAMPLING PROGRAM

Source: ESRI USA Topo Maps

G:\GrandRapids\DCS\GIS\ArcMap_GeoDB_Projects\ENV\GIS_Data\GIS\MDEQ CWS\MXD\CWS_overview_Quarterly_Sampling.mxd

Tables

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1	ALCONA	HARRISVILLE, CITY OF	03050	HARRISVILL03050TP100
2	ALCONA	JAMIESON NURSING HOME	63476	JAMIESON63476CH003
3	ALCONA	LINCOLN ESTATES	40001	LINCOLNEST40001CH001
4	ALCONA	LINCOLN HAVEN NURSING & REHABILITATION	63865	LINCOLNNR63865CH003
5	ALCONA	LINCOLN MANOR	03868	LINCOLNMAN03868CH001
6	ALGER	BURT TOWNSHIP	02780	BURTTWP02780CH001
7	ALGER	CHATHAM	01355	CHATHAM01355WL001
8	ALGER	CHATHAM	01355	CHATHAM01355WL002
9	ALGER	MATHIAS TOWNSHIP	04152	MATHISTWP04152CH001
10	ALGER	MUNISING	04560	MUNISING04560TP001
11	ALGER	MUNISING	04560	MUNISING04560TP003
12	ALGER	MUNISING INDUSTRIAL PARK	04561	MUNISINGIP04561CH002
13	ALLEGAN	ALLEGAN	00120	ALGN00120TP101
14	ALLEGAN	ALLEGAN COUNTY SERVICES CENTER	00125	ALGNCSC00125TP013
15	ALLEGAN	ALLEGAN MOBILE ESTATES	40002	ALLEGANME40002CH001
16	ALLEGAN	ANDREWS MOBILE HOME PARK	40003	ANDREWSMHP40003CH001
17	ALLEGAN	BASELINE MOBILE HOME PARK	40005	BASLINEMHP40005CH001
18	ALLEGAN	COUNTRY ACRES MOBILE HOME PARK	40006	CNTRYACMHP40006CH001
19	ALLEGAN	COUNTRY MEADOWS	40004	CNTRYMDWS40004CH001
20	ALLEGAN	DOGWOOD MANOR MOBILE HOME PARK	40008	DOGWOODMHP40008CH001
21	ALLEGAN	DORR-LEIGHTON	01845	DORRLEIGHT01845TP012
22	ALLEGAN	DUMONT CREEK ESTATES	40563	DUMONTEST40563CH001
23	ALLEGAN	FENNVILLE	02260	FENNVILLE02260TP001
24	ALLEGAN	FENNVILLE	02260	FENNVILLE02260TP007
25	ALLEGAN	FILLMORE TOWNSHIP	02291	FILLMORE02291TP012
26	ALLEGAN	GLENN HAVEN SHORES	02655	GLENNHAVEN02655CH123
27	ALLEGAN	GLENNWOODS SUBDIVISION	02659	GLENNWOODS02659CH012
28	ALLEGAN	GREENFIELD ESTATES	02837	GREENFIELD02837CH012
29	ALLEGAN	GUN RIVER ESTATES WEST	40029	GUNRIVEREW40029CH001
30	ALLEGAN	GUN RIVER MOBILE ESTATES	40011	GUNRIVERME40011TP100
31	ALLEGAN	HIDDEN CREEK ESTATES	40682	HIDDENCRK40682TP100
32	ALLEGAN	HOMECREST VILLA MOBILE HOME PARK	40014	HOMCRSTMHP40014CH001
33	ALLEGAN	HUNTERS GLEN	40660	HUNTERGLEN40660TP100
34	ALLEGAN	INDIAN ACRES MOBILE HOME PARK	40015	INDACMHP40015CH001
35	ALLEGAN	JOHNSONS MOBILE VILLAGE	40016	JOHNSONSMV40016WL004
36	ALLEGAN	JOHNSONS MOBILE VILLAGE	40016	JOHNSONSMV40016WL005
37	ALLEGAN	KALAMAZOO LAKE SEWER & WATER AUTHORITY	03525	KAZOOLSWA03525TP004
38	ALLEGAN	KALAMAZOO LAKE SEWER & WATER AUTHORITY	03525	KAZOOLSWA03525TP005
39	ALLEGAN	KALAMAZOO LAKE SEWER & WATER AUTHORITY	03525	KAZOOLSWA03525TP012
40	ALLEGAN	KALAMAZOO LAKE SEWER & WATER AUTHORITY	03525	KAZOOLSWA03525TP067
41	ALLEGAN	LAKE DOSTER	02925	LDOSTER02925TP023
42	ALLEGAN	LAKESIDE PARK MHP	40018	LAKESDMHP40018WL001
43	ALLEGAN	LAKESIDE PARK MHP	40018	LAKESDMHP40018WL002
44	ALLEGAN	LYNX GOLF VIEW	03966	LYNXGOLF03966TP012
45	ALLEGAN	MAPLE GROVE ESTATES	40020	MAPLEGRVES40020TP100
46	ALLEGAN	MARTIN	04155	MARTIN04155TP012
47	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL001
48	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL002

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
49	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL003
50	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL004
51	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL005
52	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL006
53	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL007
54	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL008
55	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL009
56	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL010
57	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL011
58	ALLEGAN	MYSTIC VIEW APARTMENTS	04596	MYSTICVIEW04596WL012
59	ALLEGAN	OAK HAVEN	04873	OAKHAVEN04873WL001
60	ALLEGAN	OAK HAVEN	04873	OAKHAVEN04873WL004
61	ALLEGAN	OAK HAVEN	04873	OAKHAVEN04873WL005
62	ALLEGAN	OAK LANE APARTMENTS	04876	OAKLANEAPT04876CH012
63	ALLEGAN	OTSEGO	05060	OTSEGO05060TP003
64	ALLEGAN	OTSEGO	05060	OTSEGO05060TP004
65	ALLEGAN	OTSEGO	05060	OTSEGO05060TP005
66	ALLEGAN	OTSEGO TOWNSHIP	05065	OTSEGOTWP05065TP123
67	ALLEGAN	PINE RIDGE COMMUNITY, INC.	40603	PINERDGCOM40603CH001
68	ALLEGAN	PLAINWELL	05380	PLAINWELL05380SS047
69	ALLEGAN	PLAINWELL	05380	PLAINWELL05380TP005
70	ALLEGAN	RABBIT RIVER ESTATES	40021	RABBITRVR40021TP101
71	ALLEGAN	RABBIT RIVER ESTATES	40021	RABBITRVR40021WL001
72	ALLEGAN	RIVERSIDE ESTATES - Allegan	40030	RVRSIDEEST40030WL002
73	ALLEGAN	RIVERSIDE ESTATES - Allegan	40030	RVRSIDEEST40030WL003
74	ALLEGAN	RIVERVIEW MOBILE HOME PARK - Allegan	40023	RIVERVWMHP40023CH001
75	ALLEGAN	RIVERWALK DEVELOPMENT	05712	RIVERWALK05712CH012
76	ALLEGAN	SANDY PINES	05911	SANDYPINES05911CH012
77	ALLEGAN	SAPPHIRE ESTATES MOBILE HOME PARK	40013	SAPPHIRE40013CH001
78	ALLEGAN	SELKIRK LAKE MOBILE HOME PARK	40024	SELKRKLMHP40024CH001
79	ALLEGAN	SHADY ACRES MOBILE VILLAGE	40025	SHADYACMV40025CH001
80	ALLEGAN	SHANGRAI-LA VILLAGE	40026	SHANGRAI40026TP100
81	ALLEGAN	SWAN LAKE MOBILE ESTATES	40027	SWANLAKEME40027CH001
82	ALLEGAN	TOPAZ MOBILE HOME PARK	40007	TOPAZMHP40007TP100
83	ALLEGAN	VILLAGE EAST ESTATES	40028	VILLAGEAST40028CH001
84	ALLEGAN	WALNUT LANE APARTMENTS	06885	WALNUTLANE06885WL001
85	ALLEGAN	WALNUT LANE APARTMENTS	06885	WALNUTLANE06885WL002
86	ALLEGAN	WAYLAND	06940	WAYLAND06940SS056
87	ALLEGAN	WAYLAND	06940	WAYLAND06940TP003
88	ALPENA	ALPENA, CITY OF	00160	ALPENA00160TP100
89	ALPENA	LAKESHORE ESTATES MHP	40034	LKSHOREMHP40034CH001
90	ANTRIM	BAY HARBOR CLUB	00487	BAYHRBRCB00487CH502
91	ANTRIM	BELLAIRE, VILLAGE OF	00570	BELLAIRE00570CH502
92	ANTRIM	BELLAIRE, VILLAGE OF	00570	BELLAIRE00570WL001
93	ANTRIM	BELLAIRE, VILLAGE OF	00570	BELLAIRE00570WL002
94	ANTRIM	CEDAR HOLLOW CONDOMINIUMS	00044	CEDARHOLW00044CH501
95	ANTRIM	CENTRAL LAKE, VILLAGE OF	01300	CNTRLLAKE01300TP002
96	ANTRIM	CENTRAL LAKE, VILLAGE OF	01300	CNTRLLAKE01300WL002

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No.	County	Supply Name	WSSN	Location
97	ANTRIM	CENTRAL LAKE, VILLAGE OF	01300	CNTRLLAKE01300WL004
98	ANTRIM	COTTAGE COVE ON ELK LAKE	01643	COTTCOVELK01643CH001
99	ANTRIM	ELK RAPIDS, VILLAGE OF	02090	ELKRAPIDS02090TP101
100	ANTRIM	ELK RAPIDS, VILLAGE OF	02090	ELKRAPIDS02090TP102
101	ANTRIM	ELLSWORTH, VILLAGE OF	02110	ELLSWORTH02110CH502
102	ANTRIM	ELLSWORTH, VILLAGE OF	02110	ELLSWORTH02110WL003
103	ANTRIM	LAKEWOOD TERRACE ASSOCIATION	06935	LKWOODTERR06935CH501
104	ANTRIM	MANCELONA AREA WATER AND SEWER AUTHORITY	04010	MANCELAWSA04010TP101
105	ANTRIM	MANCELONA AREA WATER AND SEWER AUTHORITY	04010	MANCELAWSA04010TP102
106	ANTRIM	MANCELONA AREA WATER AND SEWER AUTHORITY	04010	MANCELAWSA04010TP103
107	ANTRIM	MANCELONA AREA WATER AND SEWER AUTHORITY	04010	MANCELAWSA04010TP104
108	ANTRIM	MANCELONA AREA WATER AND SEWER AUTHORITY	04010	MANCELAWSA04010TP106
109	ANTRIM	MANCELONA AREA WSA - THE CHIEF	06568	MANCELCHF06568TP001
110	ANTRIM	MAPLEWOOD RIDGE CONDOMINIUMS	04069	MAPLEWOOD04069CH500
111	ANTRIM	MEADOWBROOK MED CARE FACILITY	64213	MDWMEDCARE64213WL001
112	ANTRIM	PINEBROOK CONDOMINIUMS	05334	PINEBKCON05334TP100
113	ANTRIM	SHANTY CREEK - WATARS ASSOCIATION	05995	SHANTYCWA05995TP100
114	ANTRIM	SUNSET TORCH ASSOCIATION	06485	SUNSETTCH06485CH501
115	ARENAC	AUGRES, CITY OF	00280	AUGRES00280TP001
116	ARENAC	MEDILODGE OF STERLING	62841	MEDILODGE62841CH900
117	ARENAC	NORTHERN COUNTRY ESTATES	40039	NCNTRYEST40039CH001
118	ARENAC	OMER, CITY OF	05005	OMER05005TP001
119	ARENAC	SIMS-WHITNEY UTILITIES AUTHORITY	06073	SIMSWUA06073TP001
120	ARENAC	STANDISH, CITY OF	06350	STANDISH06350TP001
121	BARAGA	BARAGA	00410	BARAGA00410TP001
122	BARAGA	L'ANSE	03670	LANSE03670TP001
123	BARRY	BALTIMORE TERRACE	40041	BALTIMORE40041TP100
124	BARRY	BARRY TOWNSHIP	00426	BARYTWP00426TP100
125	BARRY	BARRY TOWNSHIP	00426	BARYTWP00426WL001
126	BARRY	BARRY'S RESORT	40042	BARRYRES40042CH001
127	BARRY	BARRY'S RESORT	40042	BARRYRES40042WL002
128	BARRY	DUNLOPS ORCHARD PARK	40045	DUNLOPS40045CH001
129	BARRY	FREEPORT	02480	FREEPORT02480TP100
130	BARRY	GUERNSEY LAKE MOBILE HOME COMMUNITY	40046	GUERNSEY40046CH001
131	BARRY	GUN LAKE MOBILE HOME COMMUNITY	40044	GUNLAKEMHC40044CH001
132	BARRY	GUN LAKE MOBILE HOME COMMUNITY	40044	GUNLAKEMHC40044WL003
133	BARRY	HASTINGS	03090	HASTINGS03090TP100
134	BARRY	MCTI	06375	MCTI06375TP100
135	BARRY	MCTI FAMILY HOUSING	06377	MCTIFAMHOU06377CH001
136	BARRY	MIDDLEVILLE	04360	MIDDLEVILL04360TP001
137	BARRY	MIDDLEVILLE	04360	MIDDLEVILL04360TP002
138	BARRY	MIDDLEVILLE	04360	MIDDLEVILL04360TP005
139	BARRY	NASHVILLE	04620	NASHVILLE04620TP001
140	BARRY	NASHVILLE	04620	NASHVILLE04620TP003
141	BARRY	THORNAPPLE LAKE ESTATES	40047	THORNAPPLE40047CH001
142	BARRY	THORNAPPLE MANOR	60425	THORNAPPLM60425TP100
143	BARRY	WOODLAND PARK APARTMENTS	07182	WOODLNDPK07182CH001
144	BARRY	YANKEE SPRINGS MEADOWS	40585	YANKEEMDW40585CH001

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No.	County	Supply Name	WSSN	Location
145	BARRY	YANKEE SPRINGS TOWNSHIP	07231	YANKEESPG07231TP100
146	BAY	BAY AREA WATER SYSTEM	00465	BAYAREAWS00465TP001
147	BAY	LINWOOD METRO WATER DISTRICT	03910	LINWOODMWD03910TP001
148	BENZIE	BENZONIA VILLAGE OF	00610	BENZONIA00610TP101
149	BENZIE	BENZONIA VILLAGE OF	00610	BENZONIA00610TP102
150	BENZIE	BENZONIA VILLAGE OF	00610	BENZONIA00610TP103
151	BENZIE	BEULAH, VILLAGE OF	00680	BEULAH00680TP101
152	BENZIE	BEULAH, VILLAGE OF	00680	BEULAH00680TP103
153	BENZIE	BEULAH, VILLAGE OF	00680	BEULAH00680TP104
154	BENZIE	BUENA VISTA ESTATES	40051	BUENAVISTA40051CH001
155	BENZIE	BUTTERCUP SHORES	01015	BUTTERCUP01015CH501
156	BENZIE	CRYSTAL HIGHLANDS SUBDIVISION	01715	XTALHLDSUB01715CH501
157	BENZIE	CRYSTAL MOUNTAIN RESORT & SPA	01716	XTALMNTSPA01716TP001
158	BENZIE	CRYSTAL MOUNTAIN RESORT & SPA	01716	XTALMNTSPA01716TP004
159	BENZIE	CRYSTAL RIDGE CONDOMINIUMS	01694	XTALRDGCON01694CH501
160	BENZIE	ELBERTA, VILLAGE OF	02080	ELBERTA02080TP101
161	BENZIE	ELBERTA, VILLAGE OF	02080	ELBERTA02080TP103
162	BENZIE	FRANKFORT, CITY OF	02430	FRANKFORT02430TP101
163	BENZIE	FRANKFORT, CITY OF	02430	FRANKFORT02430TP103
164	BENZIE	THOMPSONVILLE, VILLAGE OF	06590	THOMPSON06590TP101
165	BERRIEN	BEECHWOOD HILLS - TIMBER RIDGE	06627	BEECHWOOD06627WL001
166	BERRIEN	BEECHWOOD HILLS - TIMBER RIDGE	06627	BEECHWOOD06627WL002
167	BERRIEN	BEECHWOOD HILLS - TIMBER RIDGE	06627	BEECHWOOD06627WL003
168	BERRIEN	BENTON CHARTER TOWNSHIP	00605	BENTONCHRT00605TP001
169	BERRIEN	BENTON HARBOR	00600	BENTONHRBR00600TP001
170	BERRIEN	BERRIEN SPRINGS	00650	BERRIENSPG00650TP137
171	BERRIEN	BERRIEN SPRINGS	00650	BERRIENSPG00650WL005
172	BERRIEN	BERRIEN SPRINGS	00650	BERRIENSPG00650WL006
173	BERRIEN	BRIDGMAN	00850	BRIDGMAN00850TP001
174	BERRIEN	BUCHANAN	00960	BUCHANAN00960TP134
175	BERRIEN	CHALET DU PAW PAW CONDOMINIUMS	01325	CHALETDU01325CH012
176	BERRIEN	COLOMA	01530	COLOMA01530TP002
177	BERRIEN	COLOMA	01530	COLOMA01530TP003
178	BERRIEN	COLOMA	01530	COLOMA01530TP004
179	BERRIEN	COLOMA	01530	COLOMA01530TP005
180	BERRIEN	COUNTRY ACRES - Berrien	40060	COUNTRYAC40060TP100
181	BERRIEN	COUNTRY ACRES - Berrien	40060	COUNTRYAC40060TP101
182	BERRIEN	COUNTRY ACRES HOMEOWNERS ASSOCIATION	01655	CNTRYACRES01655CH012
183	BERRIEN	COUNTRY VIEW MANOR CONDOS	01657	CNTRYVIEW01657CH012
184	BERRIEN	EAU CLAIRE	02030	EAUCLAIRE02030TP123
185	BERRIEN	HILLS HAVEN MOBILE HOME PARK	40057	HILLSHAVEN40057CH001
186	BERRIEN	LAKE CHARTER TOWNSHIP	03741	LKCHARTER03741TP001
187	BERRIEN	LAKE MICHIGAN BEACH RESORT POTTAWATTAMIE	05549	LKMICHBRP05549CH012
188	BERRIEN	LAKE POINTE CONDOMINIUMS	03737	LAKEPTCOND03737CH012
189	BERRIEN	LAKELAND MEDICAL CENTER-BERRIEN CNTR	60640	LAKELNDMED60640TP012
190	BERRIEN	MARY'S CITY OF DAVID	04158	MARYCTYDAV04158CH013
191	BERRIEN	MEADOW STREAMS ESTATES	40061	MDWSTREAMS40061TP100
192	BERRIEN	MEADOW STREAMS ESTATES	40061	MDWSTREAMS40061WL003

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No.	County	Supply Name	WSSN	Location
193	BERRIEN	MEADOW STREAMS ESTATES	40061	MDWSTREAMS40061WL004
194	BERRIEN	MICHIANA	04320	MICHIANA04320TP001
195	BERRIEN	NEW BUFFALO	04680	NEWBUFFALO04680TP001
196	BERRIEN	NEW BUFFALO TOWNSHIP	04685	NEWBUFF04685TP001
197	BERRIEN	NILES	04740	NILES04740TP101
198	BERRIEN	NILES	04740	NILES04740TP105
199	BERRIEN	NILES	04740	NILES04740TP106
200	BERRIEN	NILES	04740	NILES04740TP108
201	BERRIEN	NILES	04740	NILES04740TP109
202	BERRIEN	NILES TOWNSHIP	04750	NILESTWP04750WL004
203	BERRIEN	NILES TOWNSHIP	04750	NILESTWP04750WL005
204	BERRIEN	NILES TOWNSHIP	04750	NILESTWP04750WL006
205	BERRIEN	NILES TOWNSHIP	04750	NILESTWP04750WL009
206	BERRIEN	ONTARIO PLACE	40067	ONTARIO40067CH001
207	BERRIEN	PAW PAW LAKE MH PARK	40062	PAWPAWLMHP40062WL001
208	BERRIEN	PAW PAW LAKE MH PARK	40062	PAWPAWLMHP40062WL002
209	BERRIEN	RIVERBROOKE HOME OWNERS ASSOCIATION	05692	RVRBKHOA05692CH012
210	BERRIEN	RIVERFRONT CONDOS OF NILES	04095	RVCONNILES04095CH012
211	BERRIEN	RIVERSIDE ESTATES - Berrien	40065	RVRSIDEEST40065TP100
212	BERRIEN	SHERWOOD SHORES CONDOMINIUMS	06042	SHERWDCOND06042CH012
213	BERRIEN	ST JOSEPH	06310	STJOSEPH06310TP001
214	BERRIEN	THREE OAKS	06600	THREEOAKS06600TP100
215	BERRIEN	WATERVLIET	06930	WATERVLIET06930TP124
216	BERRIEN	WHITE OAKS CONDOMINIUMS	07067	WHITEOAKS07067CH123
217	BRANCH	ARBOR VIEW CONDO OWNERS ASSOCIATION	04778	ARBRVCOA04778CH012
218	BRANCH	AVRA ESTATES	40074	AVRAEST40074CH001
219	BRANCH	AVRA ESTATES	40074	AVRAEST40074CH002
220	BRANCH	BRONSON	00910	BRONSON00910TP104
221	BRANCH	BRONSON	00910	BRONSON00910TP105
222	BRANCH	CAMBRIDGE VILLAGE	40068	CAMBRIDGE40068CH001
223	BRANCH	COLDWATER	01500	COLDWATER01500TP100
224	BRANCH	COUNTRYSIDE MOBILE COURT	40070	COUNTRYMC40070CH001
225	BRANCH	GRAND VILLAGE MOBILE HOME PARK	40069	GRDVLGMHP40069CH001
226	BRANCH	LAKECREST MOBILE COURT	40075	LAKECRSTMC40075CH001
227	BRANCH	LAKELAND CORRECTIONAL FACILITY	01510	LAKELANDCF01510TP001
228	BRANCH	LAKELAND CORRECTIONAL FACILITY	01510	LAKELANDCF01510TP002
229	BRANCH	LAKELAND CORRECTIONAL FACILITY	01510	LAKELANDCF01510TP004
230	BRANCH	LAKESIDE ESTATES SUBDIVISION	03742	LKSIDESUB03742CH012
231	BRANCH	MARBLE LAKE RESORT & MARINA	40071	MARBLELAKE40071CH001
232	BRANCH	QUINCY	05580	QUINCY05580TP012
233	BRANCH	SOMERSET MOBILE HOME PARK	40076	SOMERSTMHP40076CH001
234	BRANCH	UNION CITY	06720	UNIONCITY06720TP001
235	BRANCH	UNION CITY	06720	UNIONCITY06720TP003
236	CALHOUN	ALBION	00100	ALBION00100TP011
237	CALHOUN	ATHENS	00260	ATHENS00260TP023
238	CALHOUN	BATTLE CREEK - VERONA SYSTEM	00450	BCVERONA00450TP101
239	CALHOUN	BEDFORD HILLS	40080	BEDFORDHIL40080TP100
240	CALHOUN	BEDFORD HILLS	40080	BEDFORDHIL40080TP101

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No.	County	Supply Name	WSSN	Location
241	CALHOUN	BELLEVUE MOBILE HOME PARK	40081	BELEVUEMHP40081TP100
242	CALHOUN	BIRCHWOOD ESTATES	40082	BIRCHWDEST40082CH001
243	CALHOUN	CREEK VALLEY MOBILE HOME PARK	40655	CREEKVLY40655CH001
244	CALHOUN	CREEK VALLEY NORTH	40079	CRKVLYMHP40079WL001
245	CALHOUN	CREEK VALLEY NORTH	40079	CRKVLYMHP40079WL002
246	CALHOUN	HICKORY HILLS	40084	HICKORYHIL40084TP100
247	CALHOUN	HOMER	03220	HOMER03220TP034
248	CALHOUN	MARSHALL	04150	MARSHALL04150TP005
249	CALHOUN	PENNFIELD TOWNSHIP	04760	PENNFIELD04760TP036
250	CALHOUN	PHOENIX MOBILE HOME COURT	40086	PHOENIXMHC40086CH001
251	CALHOUN	TEKONSHA	06562	TEKONSHA06562CH012
252	CALHOUN	TWIN PINES MOBILE HOME PARK - Calhoun	40090	TWINPINES40090TP100
253	CALHOUN	TWIN VALLEY	40091	TWINVALLEY40091TP100
254	CASS	AUTUMN HILLS	01910	AUTUMNHILL01910CH012
255	CASS	BARN SWALLOW APARTMENTS	00418	BARNSWAPT00418CH034
256	CASS	BARRON LAKE/ROSEBUSH	40092	BARRONLAKE40092TP100
257	CASS	C & M MOBILE HOME COURT	40093	CMMHC40093CH001
258	CASS	CASS COUNTY WATER SYSTEM	05234	CASSCWS05234WL001
259	CASS	CASS COUNTY WATER SYSTEM	05234	CASSCWS05234WL002
260	CASS	CASSOPOLIS	01250	CASSOPOLIS01250SS045
261	CASS	COLONY BAY CONDOMINIUMS	01552	COLONYBAY01552CH123
262	CASS	DOWAGIAC	01860	DOWAGIAC01860TP100
263	CASS	EAGLE LAKE CONDOMINIUMS	01925	EAGLELAKE01925TP034
264	CASS	EAGLE LAKE ESTATES MHP	40103	EAGLELKMHP40103WL001
265	CASS	EAGLE LAKE ESTATES MHP	40103	EAGLELKMHP40103WL002
266	CASS	EDWARDSBURG	02077	EDWARDSBRG02077TP012
267	CASS	LINDEN MOBILE HOME PARK	40098	LINDENMHP40098CH001
268	CASS	MARCELLUS	04070	MARCELLUS04070TP034
269	CASS	MARLIN VILLAGE MOBILE HOME PARK	40100	MARLINMHP40100TP100
270	CASS	MILLS TRAILER COURT	40101	MILLSTRLCT40101CH001
271	CASS	RUSTIC ACRES PARK	40104	RUSTICACPK40104CH001
272	CASS	SIMMONS MOBILE HOME PARK	40598	SIMMONS40598CH001
273	CASS	WHITE PINES MOBILE HOME PARK	40105	WHITEMHP40105CH001
274	CHARLEVOIX	BOYNE CITY, CITY OF	00800	BOYNECITY00800TP100
275	CHARLEVOIX	BOYNE CITY, CITY OF	00800	BOYNECITY00800TP101
276	CHARLEVOIX	BOYNE FALLS, VILLAGE OF	00810	BOYNEFALLS00810TP100
277	CHARLEVOIX	BOYNE MOUNTAIN RESORT	00815	BOYNEMTRST00815CH501
278	CHARLEVOIX	BOYNE MOUNTAIN RESORT	00815	BOYNEMTRST00815TP101
279	CHARLEVOIX	CHARLEVOIX TOWNSHIP	01335	CHARLEVTWP01335TP100
280	CHARLEVOIX	CHARLEVOIX TOWNSHIP	01335	CHARLEVTWP01335TP101
281	CHARLEVOIX	CHARLEVOIX TOWNSHIP	01335	CHARLEVTWP01335TP102
282	CHARLEVOIX	CHARLEVOIX TOWNSHIP	01335	CHARLEVTWP01335TP103
283	CHARLEVOIX	CHARLEVOIX TOWNSHIP	01335	CHARLEVTWP01335TP104
284	CHARLEVOIX	CHARLEVOIX, CITY OF	01330	CHARLEVCTY01330TP100
285	CHARLEVOIX	EAST JORDAN, CITY OF	01970	EASTJORDAN01970TP100
286	CHARLEVOIX	EAST JORDAN, CITY OF	01970	EASTJORDAN01970TP101
287	CHARLEVOIX	EAST JORDAN, CITY OF	01970	EASTJORDAN01970TP102
288	CHARLEVOIX	EAST JORDAN, CITY OF	01970	EASTJORDAN01970TP104

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No.	County	Supply Name	WSSN	Location
289	CHARLEVOIX	HEMINGWAY POINTE CLUB OWNERS ASSOCIATION	03115	HEMINGPCOA03115TP100
290	CHARLEVOIX	HILLS OF WALLOON ASSOCIATION	03165	WALLOONASC03165CH501
291	CHARLEVOIX	HORTON BAY CLUB	03229	HORTONBAYC03229CH500
292	CHARLEVOIX	ISLANDVIEW HOME OWNERS ASSOCIATION	03452	ISLANDHOA03452CH501
293	CHARLEVOIX	LAKE MICHIGAN HEIGHTS	40106	LKMICHHGT40106CH001
294	CHARLEVOIX	MELROSE-CHANDLER WATER, LLC	04215	MELCHAWATR04215CH501
295	CHARLEVOIX	NINE MILE POINTE	04753	NINEMILEPT04753CH503
296	CHARLEVOIX	SOMMERSET POINTE CONDOMINIUMS	06081	SOMERPTCON06081TP001
297	CHARLEVOIX	VILLA NOUVA ASSOCIATION	06803	VILNOUVA06803WL003
298	CHARLEVOIX	VILLA NOUVA ASSOCIATION	06803	VILNOUVA06803WL004
299	CHARLEVOIX	WALLOON LAKE WATER SYSTEM	06880	WALLOONLWS06880TP101
300	CHARLEVOIX	WALLOON LAKE WATER SYSTEM	06880	WALLOONLWS06880TP102
301	CHARLEVOIX	WILDWOOD ON WALLOON ASSOCIATION	07105	WILDWOOD07105CH501
302	CHEBOYGAN	BURT VIEW ASSOCIATION	01005	BURTVIEW01005CH501
303	CHEBOYGAN	CHEBOYGAN, CITY OF	01360	CHEBOYGAN01360TP100
304	CHEBOYGAN	CHEBOYGAN, CITY OF	01360	CHEBOYGAN01360TP101
305	CHEBOYGAN	INDIAN RIVER MHP	40108	INDRVRMHP40108CH001
306	CHEBOYGAN	MACKINAW CITY, VILLAGE OF	03980	MACKINAW03980TP101
307	CHEBOYGAN	MACKINAW CITY, VILLAGE OF	03980	MACKINAW03980TP102
308	CHEBOYGAN	MACKINAW CITY, VILLAGE OF	03980	MACKINAW03980TP103
309	CHEBOYGAN	MACKINAW CITY, VILLAGE OF	03980	MACKINAW03980TP104
310	CHEBOYGAN	POINT NIPIGON RESORT	05425	PTNIPIGON05425CH505
311	CHEBOYGAN	POINT NIPIGON RESORT	05425	PTNIPIGON05425E504
312	CHEBOYGAN	SOUTH POINTE I APARTMENTS	06115	SOUTHPT1AP06115CH501
313	CHEBOYGAN	SOUTH POINTE II APARTMENTS	06116	SOUTHPT2AP06116CH503
314	CHEBOYGAN	SOUTH POINTE III APARTMENTS	06117	SOUTHPT3AP06117CH501
315	CHEBOYGAN	SUNSET BEACH ASSOCIATION	06484	SUNSETBCH06484CH501
316	CHEBOYGAN	TOWN AND COUNTRY MHP	40110	TWNCNTRY40110CH001
317	CHIPPEWA	DETOUR	01795	DETOUR01795TP001
318	CHIPPEWA	DRUMMOND ISLAND APARTMENTS	01865	DRUMISLAPT01865CH001
319	CHIPPEWA	KINROSS TOWNSHIP	03630	KINROSSTWP03630CH001
320	CHIPPEWA	KINROSS TOWNSHIP	03630	KINROSSTWP03630CH002
321	CHIPPEWA	KINROSS TOWNSHIP	03630	KINROSSTWP03630WL005
322	CHIPPEWA	RUDYARD TOWNSHIP	05844	RUDYARDTWP05844CH001
323	CHIPPEWA	SAULT STE MARIE	05950	SAULTSTE05950TP001
324	CHIPPEWA	SUPERIOR TOWNSHIP	00880	SUPERIOR00880WL002
325	CHIPPEWA	SUPERIOR TOWNSHIP	00880	SUPERIOR00880WL003
326	CLARE	CLARE, CITY OF	01420	CLARE01420TP004
327	CLARE	FARWELL, VILLAGE OF	02250	FARWELL02250TP004
328	CLARE	HARRISON, CITY OF	03030	HARRSION03030CH001
329	CLARE	NORTH WOODS NURSING CENTER	60238	NORTHWDNUR60238WL002
330	CLINTON	CADGEWITH FARMS	40599	CADGEWITH40599CH001
331	CLINTON	CAPITOL CROSSINGS	40675	CAPITOL40675TP001
332	CLINTON	CREEKSIDE MEADOWS OF ST. JOHNS	40119	CRKSTJOHN40119TP001
333	CLINTON	DUTCH HILLS	40116	DUTCHHILLS40116TP001
334	CLINTON	ELSIE, VILLAGE OF	02120	ELSIE02120SS001
335	CLINTON	ELSIE, VILLAGE OF	02120	ELSIE02120TP001
336	CLINTON	FOWLER, VILLAGE OF	02390	FOWLER02390TP001

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No.	County	Supply Name	WSSN	Location
337	CLINTON	MAPLE RAPIDS, VILLAGE OF	04060	MAPLERAPID04060TP001
338	CLINTON	MAPLE RAPIDS, VILLAGE OF	04060	MAPLERAPID04060TP002
339	CLINTON	OVID, VILLAGE OF	05100	OVID05100TP001
340	CLINTON	PRESTIGE PINES	03857	PRSTGPINE03857CH001
341	CLINTON	ST. JOHNS, CITY OF	06300	STJOHN06300TP001
342	CLINTON	WESTPHALIA, VILLAGE OF	07050	WESTPHALIA07050WL001
343	CLINTON	WESTPHALIA, VILLAGE OF	07050	WESTPHALIA07050WL002
344	CRAWFORD	GRAYLING, CITY OF	02840	GRAYLING02840TP101
345	CRAWFORD	GRAYLING, CITY OF	02840	GRAYLING02840TP102
346	CRAWFORD	HARTWICK PINES ESTATES	40620	HARTWICK40620CH001
347	CRAWFORD	SHAWONO CENTER - DHS	01073	SHAWONODHS01073CH501
348	CRAWFORD	TIMBERLY VILLAGE MHP	40121	TIMBERLY40121CH001
349	DELTA	CEDAR HILL ASSISTED LIVING	01253	CEDARHILL01253CH001
350	DELTA	ESCANABA	02170	ESCANABA02170TP002
351	DELTA	FORD RIVER TOWNSHIP	02350	FORDRIVER02350CH001
352	DELTA	GARDEN	02540	GARDEN02540TP003
353	DELTA	GLADSTONE	02640	GLADSTONE02640TP003
354	DELTA	MAPLE RIDGE TOWNSHIP	04063	MAPLERGD04063TP004
355	DELTA	MASONVILLE TOWNSHIP	04173	MASONVILLE04173CH001
356	DELTA	NAHMA TOWNSHIP	04600	NAHMATWP04600TP001
357	DICKINSON	IRON MOUNTAIN	03400	IRONMNT03400CH001
358	DICKINSON	IRON MOUNTAIN	03400	IRONMNT03400WL004
359	DICKINSON	KINGSFORD	03640	KINGSFORD03640CH001
360	DICKINSON	KINGSFORD	03640	KINGSFORD03640CH007
361	DICKINSON	NORWAY	04860	NORWAY04860TP004
362	DICKINSON	QUINNESEC	05590	QUINNESEC05590WL003
363	DICKINSON	QUINNESEC	05590	QUINNESEC05590WL004
364	DICKINSON	RIVERSBEND MOBILE HOME PARK	40515	RIVERSBEND40515CH002
365	DICKINSON	WHITE BIRCH MOBILE HOME VILLAGE	40516	WHITEBIRCH40516CH001
366	DICKINSON	WHITE BIRCH MOBILE HOME VILLAGE	40516	WHITEBIRCH40516CH002
367	EATON	BELLEVUE, VILLAGE OF	00590	BELLEVUE00590TP001
368	EATON	BLUE WATER VILLAGE WELL SITE, LLC	00795	BLUEWATER00795TP001
369	EATON	CHARLOTTE, CITY OF	01340	CHARLOTTE01340TP002
370	EATON	DIMONDALE HEALTH CARE CENTER	63477	DIMONDALE63477TP001
371	EATON	EATON GREEN ESTATES SUBDIVISION	02025	EATONGREEN02025CH001
372	EATON	EATON RAPIDS, CITY OF	02020	EATONRAPID02020TP001
373	EATON	GRAND LEDGE, CITY OF	02770	GRANDLEDGE02770TP001
374	EATON	GRAND POINTE SUBDIVISION	02785	GRANDPOINT02785CH001
375	EATON	HI-WAY MOBILE HAVEN	40122	HIWAYMH40122TP001
376	EATON	MAPLE KNOLL	40123	MAPLEKNOLL40123SS001
377	EATON	MISTY COVE SENIOR APARTMENTS	04428	MISTYCVESA04428CH001
378	EATON	OLIVET, CITY OF	04990	OLIVET04990TP004
379	EATON	OLIVET, CITY OF	04990	OLIVET04990TP005
380	EATON	OLIVET, CITY OF	04990	OLIVET04990TP006
381	EATON	POTTERVILLE, CITY OF	05550	POTTERVILL05550TP002
382	EATON	POTTERVILLE, CITY OF	05550	POTTERVILL05550TP003
383	EATON	SUNFIELD, VILLAGE OF	06470	SUNFIELD06470TP001
384	EATON	SUNNY CREST YOUTH RANCH	06477	SUNNYCREST06477CH001

Table 1a - Public Water Supply - CWS Site Information
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No.	County	Supply Name	WSSN	Location
385	EATON	VERMONTVILLE, VILLAGE OF	06790	VERMONTVIL06790TP003
386	EATON	VERMONTVILLE, VILLAGE OF	06790	VERMONTVIL06790TP006
387	EATON	WINDSOR ESTATES	40124	WINDSOREST40124TP002
388	EMMET	ALANSON ESTATES MOBILE HOME PARK	40129	ALANSONMHP40129CH001
389	EMMET	BAY SHORE ESTATES	40128	BAYSHOREST40128CH001
390	EMMET	BEAR CREEK ESTATES CONDOMINIUM	00505	BEARCKEST00505CH501
391	EMMET	BIRCHWOOD FARMS	00725	BIRCHWOOD00725TP100
392	EMMET	BIRCHWOOD FARMS	00725	BIRCHWOOD00725TP101
393	EMMET	BOYNAIRE LANDOWNERS ASSOCIATION	00799	BOYNAIRELA00799CH001
394	EMMET	BOYNE HIGHLANDS RESORT	00813	BOYNEHLRST00813TP100
395	EMMET	CECIL FARMS	01256	CECILFARMS01256CH501
396	EMMET	CHALET ESTATES MOBILE HOME PARK	40125	CHALETEMHP40125CH001
397	EMMET	CITY OF PETOSKEY	05300	PETOSKEY05300TP102
398	EMMET	CITY OF PETOSKEY	05300	PETOSKEY05300TP104
399	EMMET	CITY OF PETOSKEY	05300	PETOSKEY05300TP108
400	EMMET	CITY OF PETOSKEY	05300	PETOSKEY05300TP109
401	EMMET	CONWAY COMMONS MOBILE HOME PARK	40126	CONWAYCMHP40126CH001
402	EMMET	CROOKED RIVER APARTMENTS	01666	CROOKEDRVR01666CH501
403	EMMET	FOXFIELD APARTMENTS	02403	FOXFIELD02403CH501
404	EMMET	HAMLET VILLAGE CONDOMINIUMS ASSOCIATION	02944	HAMLETVCA02944CH501
405	EMMET	HAMLET WEST PROPERTY OWNERS ASSOC	02945	HAMLETPOA02945CH501
406	EMMET	HARBOR HILLS	03005	HRBRHILLS03005CH501
407	EMMET	HARBOR SPRINGS AREA AUTHORITY	03015	HRBRSPGAA03015TP501
408	EMMET	HARBOR SPRINGS, CITY OF	03010	HRBRSPG03010TP100
409	EMMET	HARBOR SPRINGS, CITY OF	03010	HRBRSPG03010TP101
410	EMMET	HARBOR SPRINGS, CITY OF	03010	HRBRSPG03010TP102
411	EMMET	HARBOR SPRINGS, CITY OF	03010	HRBRSPG03010TP103
412	EMMET	HEARTHSIDE GROVE MOTOR COACH RESORT	40680	HEARTHSIDE40680CH001
413	EMMET	HIDDEN HAMLET ASSOCIATION	03132	HDNHAMLET03132TP100
414	EMMET	HOMESTEAD PINES HOMEOWNERS' ASSOCIATION	03225	HMSTDPHA03225CH501
415	EMMET	INLAND HOUSE CONDOMINIUM ASSOCIATION	03362	INLANDHCA03362CH001
416	EMMET	KALCHIK ESTATES	03545	KALCHIKEST03545CH001
417	EMMET	LAKESIDE CLUB CONDOMINIUMS	03744	LKSIDECON03744CH501
418	EMMET	L'ARBRE CROCHE CLUB	03685	LARBRECC03685CH501
419	EMMET	LITTLE TRAVERSE TOWNSHIP	03927	LILTRAVTWP03927TP501
420	EMMET	LITTLE TRAVERSE TOWNSHIP	03927	LILTRAVTWP03927TP505
421	EMMET	MILL STREET 1 LDHA	06631	MILL1LDHA06631CH001
422	EMMET	PETOSKEY PARK APARTMENTS	05305	PETOSKEYPK05305CH501
423	EMMET	SPRING LAKE CLUB CONDOMINIUMS	06232	SPGLKCONDO06232CH501
424	EMMET	STONEHEDGE CLUB OWNERS ASSOCIATION, INC.	06428	STONHEDGE06428CH001
425	EMMET	TANNERY CREEK CONDOMINUM ASSOCIATION	06537	TANNERYCCA06537CH501
426	EMMET	THE SHORES ON CROOKED LAKE	06574	SHRCRKLK06574CH501
427	EMMET	TROUT CREEK CONDOMINIUMS	06682	TROUTCKO06682TP100
428	EMMET	WINDWARD OWNERS ASSOCIATION	07130	WINDWARD07130CH501
429	GENESEE	ARGENTINE CARE CENTER	66355	ARGENTINE66355TP001
430	GENESEE	BEECHER METROPOLITAN DISTRICT	00540	BEECHERMD00540TP001
431	GENESEE	BEECHER METROPOLITAN DISTRICT	00540	BEECHERMD00540TP002
432	GENESEE	BEECHER METROPOLITAN DISTRICT	00540	BEECHERMD00540TP003

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No.	County	Supply Name	WSSN	Location
433	GENESEE	BYRAM RIDGE	01019	BYRAMRIDGE01019TP001
434	GENESEE	CHATEAUX DU LAC CONDOMINIUMS	01353	CHATEAUX01353CH001
435	GENESEE	CRANES COVE CONDOMINIUMS	01663	CRANESCOVE01663TP001
436	GENESEE	DAVISON, CITY OF	01720	DAVISON01720TP001
437	GENESEE	EAST BAY MOBILE HOME PARK	40607	EASTBAYMHP40607TP001
438	GENESEE	FENTON HARBOR CONDOMINIUMS	02273	FENTONHRBR02273TP001
439	GENESEE	FENTON LAKEFRONT COMMUNITY LLC	40144	FENTONLLC40144TP001
440	GENESEE	FENTON, CITY OF	02270	FENTON02270TP001
441	GENESEE	GENESEE COUNTY WATER SYSTEM	02615	GENESEECWS02615TP001
442	GENESEE	GLEN DEVON CONDOMINIUMS	02654	GLENDEVON02654TP001
443	GENESEE	GRAND BLANC, CITY OF	02740	GRANDBLANC02740TP005
444	GENESEE	GRAND BLANC, CITY OF	02740	GRANDBLANC02740TP007
445	GENESEE	GUNTHER MOBILE HOME COURT INC	40138	GUNTHER40138WL003
446	GENESEE	GUNTHER MOBILE HOME COURT INC	40138	GUNTHER40138WL004
447	GENESEE	GUNTHER MOBILE HOME COURT INC	40138	GUNTHER40138WL005
448	GENESEE	LAKE FENTON MOBILE HOME PARK	40158	LKFENTON40158TP001
449	GENESEE	LAKE PARK VILLAGE CONDOMINIUMS	02277	LAKEPARK02277TP001
450	GENESEE	LINDEN PLACE MOBILE HOME PARK	40145	LINDENPMHO40145CH001
451	GENESEE	LINDEN, CITY OF	03890	LINDEN03890TP001
452	GENESEE	LOON LAKE MOBILE HOME PARK	40151	LOONLAKE40151CH001
453	GENESEE	MONTROSE TRAILER PARK	40152	MONTROSE40152TP001
454	GENESEE	MY PLACE AT HERITAGE ESTATES	40140	MYPLACE40140TP001
455	GENESEE	NORTH DORT MANOR LTD	40154	NORTHDORT40154CH001
456	GENESEE	NORTH MORRIS ESTATES	40155	NORTHMORIS40155WL001
457	GENESEE	NORTH MORRIS ESTATES	40155	NORTHMORIS40155WL002
458	GENESEE	OLD ORCHARD ESTATES	40156	OLDORCHARD40156TP001
459	GENESEE	ORCHARD COVE	40647	ORCHARDCV40647TP001
460	GENESEE	OTISVILLE, VILLAGE OF	05050	OTISVILLE05050TP001
461	GENESEE	OTISVILLE, VILLAGE OF	05050	OTISVILLE05050TP003
462	GENESEE	PHEASANT RUN MANOR APARTMENTS	05315	PHERUNMAN05315TP001
463	GENESEE	PINE RIDGE MOBILE HOME COMMUNITY	40601	PINERDGMHC40601TP001
464	GENESEE	PINEHURST APARTMENTS	05353	PINEHURAPT05353CH001
465	GENESEE	SUGARTREE APARTMENTS	06575	SUGARTREE06575CH001
466	GENESEE	SWARTZ CREEK MEADOWS	40164	SWARTZCRK40164WL001
467	GENESEE	SWARTZ CREEK MEADOWS	40164	SWARTZCRK40164WL004
468	GENESEE	SWARTZ CREEK MEADOWS	40164	SWARTZCRK40164WL006
469	GENESEE	TRADEWINDS MOBILE HOME PARK	40131	TRADEWINDS40131TP001
470	GENESEE	VICINIA GARDENS	06072	VICINIAGAR06072TP001
471	GENESEE	WEST COURT RANCHES	07015	WESTCOURT07015TP002
472	GENESEE	WEST COURT RANCHES	07015	WESTCOURT07015TP003
473	GENESEE	WESTERN PINES APARTMENTS	04754	WESTPINAPT04754TP001
474	GENESEE	WESTHAVEN MOBILE HOME PARK, LLC	40162	WESTHAVEN40162TP001
475	GLADWIN	BEAVERTON	00520	BEAVERTON00520WL001
476	GLADWIN	BEAVERTON	00520	BEAVERTON00520WL003
477	GLADWIN	GLADWIN NURSING AND REHABILITATION COMMU	62653	GLADWINNR62653CH600
478	GLADWIN	GLADWIN, CITY OF	02650	GLADWIN02650TP006
479	GLADWIN	GLADWIN, CITY OF	02650	GLADWIN02650TP007
480	GLADWIN	KEY COURT MOBILE HOME PARK	40166	KEYCOURT40166CH001

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No.	County	Supply Name	WSSN	Location
481	GLADWIN	LAKESHORE VILLAGE	40169	LAKESHORE40169TP001
482	GLADWIN	LAKESIDE DEVELOPMENT	03752	LKSIDEDEV03752CH301
483	GLADWIN	PLEASANT BEACH MOBILE HOME RESORT	40167	PLEASNTBCH40167TP100
484	GLADWIN	RIVERVIEW MOBILE HOME PARK - Gladwin	40168	RVRVIEWMHP40168CH001
485	GOGEBIC	BESSEMER	00660	BESSEMER00660TP007
486	GOGEBIC	IRONWOOD	03420	IRONWOOD03420TP012
487	GOGEBIC	MARENISCO TOWNSHIP	04080	MARENISCO04080CH001
488	GOGEBIC	OJIBWAY CORRECTIONAL FACILITY	01070	OJIBWAYCF01070CH001
489	GOGEBIC	WAKEFIELD	06830	WAKEFIELD06830TP005
490	GOGEBIC	WATERSMEET TOWNSHIP	06920	WATERSMEET06920CH001
491	GOGEBIC	WATERSMEET TOWNSHIP	06920	WATERSMEET06920WL004
492	GRAND TRAVERSE	ACME TOWNSHIP - HOPE VILLAGE	00011	ACMEHOPE00011CH500
493	GRAND TRAVERSE	BLACK BEAR FARMS	00733	BLACKBEAR00733TP001
494	GRAND TRAVERSE	BLAIR TOWNSHIP	00743	BLAIRTWP00743TP101
495	GRAND TRAVERSE	CHERRYLAND MOBILE HOME PARK	40174	CHERRYLAND40174WL001
496	GRAND TRAVERSE	COUNTRY EDEN L.L.C.	04045	CNTRYEDEN04045CH501
497	GRAND TRAVERSE	DEEPWATER POINTE ASSOCIATION	01765	DEEPWATER01765TP101
498	GRAND TRAVERSE	EAST BAY CHARTER TOWNSHIP	01935	EASTBAYTWP01935TP100
499	GRAND TRAVERSE	EAST BAY CHARTER TOWNSHIP	01935	EASTBAYTWP01935TP101
500	GRAND TRAVERSE	EAST BAY CHARTER TOWNSHIP	01935	EASTBAYTWP01935TP102
501	GRAND TRAVERSE	FIFE LAKE TOWNHOUSES	02287	FIFELAKE02287CH501
502	GRAND TRAVERSE	GRAND TRAVERSE CONDOMINIUMS	02805	GRANTRAV02805TP101
503	GRAND TRAVERSE	GREEN LAKE TOWNSHIP	02843	GREENLAKE02843TP001
504	GRAND TRAVERSE	INTERLOCHEN CENTER FOR THE ARTS	03365	INTERLOCHN03365TP101
505	GRAND TRAVERSE	INTERLOCHEN CENTER FOR THE ARTS	03365	INTERLOCHN03365TP102
506	GRAND TRAVERSE	JUNIPER HILLS CONDOMINIUMS	03505	JUNIPERCON03505CH501
507	GRAND TRAVERSE	KINGS COURT MOBILE HOME PARK	40171	KINGSCOURT40171TP100
508	GRAND TRAVERSE	KINGS COURT MOBILE HOME PARK	40171	KINGSCOURT40171TP101
509	GRAND TRAVERSE	KINGS COURT MOBILE HOME PARK	40171	KINGSCOURT40171TP102
510	GRAND TRAVERSE	KINGSLEY, VILLAGE OF	03650	KINGSLEY03650TP101
511	GRAND TRAVERSE	KINGSLEY, VILLAGE OF	03650	KINGSLEY03650TP102
512	GRAND TRAVERSE	KINGSLEY, VILLAGE OF	03650	KINGSLEY03650TP103
513	GRAND TRAVERSE	MEADOWLANE MOBILE HOME PARK	40172	MDWLMHP40172TP100
514	GRAND TRAVERSE	ROLLING MEADOWS WATER ASSN.	05775	ROLLMDWSWA05775CH501
515	GRAND TRAVERSE	SILVER LAKE VIEW MOBILE HOME PARK	40175	SILVERLAKE40175TP100
516	GRAND TRAVERSE	SILVER SHORES MOBILE HOME PARK	40176	SILVERSHOR40176TP100
517	GRAND TRAVERSE	SUBURBAN ESTATES MHP	40177	SUBURBAN40177CH001
518	GRAND TRAVERSE	THE LIGHTHOUSE-TRAVERSE CITY LLC	06569	LIGHTHOUSE06569CH001
519	GRAND TRAVERSE	TRAVERSE CITY, CITY OF	06640	TRAVERSE06640TP100
520	GRATIOT	ASHLEY, VILLAGE OF	00250	ASHLEY00250TP003
521	GRATIOT	GRATIOT AREA WATER AUTHORITY	02836	GRATIOTAWA02836TP001
522	GRATIOT	ITHACA, CITY OF	03460	ITHACA03460WL004
523	GRATIOT	ITHACA, CITY OF	03460	ITHACA03460WL005
524	GRATIOT	ITHACA, CITY OF	03460	ITHACA03460WL006
525	GRATIOT	ITHACA, CITY OF	03460	ITHACA03460WL007
526	GRATIOT	NESEN'S COUNTRYSIDE ACRES	40637	NESENACRES40637CH001
527	GRATIOT	PERRINTON, VILLAGE OF	05270	PERRINTON05270TP003
528	GRATIOT	THE LAURELS OF FULTON	60937	LAURELSFUL60937TP001

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No.	County	Supply Name	WSSN	Location
529	GRATIOT	TIMBER COUNTRY MOBILE HOME PARK	40574	TIMBERMHP40574CH001
530	GRATIOT	VILLAGE OF BRECKENRIDGE	00820	BRCKNRDG00820TP001
531	HILLSDALE	CAMDEN	01050	CAMDEN01050TP001
532	HILLSDALE	COUNTRY LIVING ADULT FOSTER CARE	01648	CNTRYLAFC01648CH001
533	HILLSDALE	COUNTRY LIVING ADULT FOSTER CARE	01648	CNTRYLAFC01648CH002
534	HILLSDALE	HILLSDALE	03170	HILLSDALE03170TP001
535	HILLSDALE	HILLSIDE ACRES	40180	HILLSIDEAC40180TP001
536	HILLSDALE	JONESVILLE	03490	JONESVILLE03490TP001
537	HILLSDALE	LITCHFIELD	03920	LITCHFIELD03920TP003
538	HILLSDALE	LITCHFIELD	03920	LITCHFIELD03920TP006
539	HILLSDALE	RAMBLEWOOD MOBILE HOME PARK	40181	RAMBLEWOOD40181CH001
540	HILLSDALE	READING	05620	READING05620TP005
541	HILLSDALE	RILEY'S MOBILE HOME PARK	40183	RILEYMHP40183CH001
542	HILLSDALE	SOMERSET CENTER	40184	SOMERSETCN40184CH001
543	HILLSDALE	WALDRON	06850	WALDRON06850TP001
544	HOUGHTON	ADAMS TOWNSHIP	00020	ADAMSTWP00020TP004
545	HOUGHTON	CHASSELL TOWNSHIP	01350	CHASSELL01350TP007
546	HOUGHTON	FRANKLIN TOWNSHIP	05680	FRANKLIN05680CH001
547	HOUGHTON	HOUGHTON	03230	HOUGHTON03230TP004
548	HOUGHTON	LAKE LINDEN	03720	LAKELINDEN03720CH001
549	HOUGHTON	MICHIGAN-AMERICAN WATER CO	04800	MIAMERWACO04800TP001
550	HOUGHTON	OSCEOLA TOWNSHIP	01840	OSCEOLATWP01840CH001
551	HURON	BAYSIDE ESTATES	40190	BAYSIDE40190CH001
552	HURON	CASEVILLE, CITY OF	01190	CASEVILLE01190TP001
553	HURON	CLARKSON-RIVERVIEW COURT	40191	CLARKSON40191CH001
554	HURON	ELKTON, VILLAGE OF	02100	ELKTON02100WL003
555	HURON	ELKTON, VILLAGE OF	02100	ELKTON02100WL005
556	HURON	ELKTON, VILLAGE OF	02100	ELKTON02100WL006
557	HURON	ELKTON, VILLAGE OF	02100	ELKTON02100WL007
558	HURON	HARBOR BEACH, CITY OF	03000	HRBRBEACH03000TP001
559	HURON	HURON DUNES SUBDIVISION	03315	HURONDSUB03315CH501
560	HURON	HURON REGIONAL WATER AUTHORITY	03317	HURONRWA03317TP001
561	HURON	MISTY MEADOWS MOBILE HOME PARK	40571	MISTYMDWS40571CH001
562	HURON	OWENDALE, VILLAGE OF	05110	OWENDALE05110TP003
563	HURON	OWENDALE, VILLAGE OF	05110	OWENDALE05110TP004
564	HURON	SEBEWAING LIGHT & WATER	05990	SEBEWANGLW05990TP004
565	HURON	SEBEWAING LIGHT & WATER	05990	SEBEWANGLW05990WL003
566	HURON	SEBEWAING LIGHT & WATER	05990	SEBEWANGLW05990WL004
567	HURON	SUMMER WOOD ESTATES	40187	SUMMERWOOD40187CH001
568	INGHAM	COLUMBIA LAKES ESTATES	01565	COLUMLKEST01565TP001
569	INGHAM	COUNTRY MANOR M H P	40193	COUNTRYMHP40193WL001
570	INGHAM	COUNTRY MANOR M H P	40193	COUNTRYMHP40193WL002
571	INGHAM	DANSVILLE, VILLAGE OF	01718	DANSVILLE01718TP001
572	INGHAM	EAGLE POINTE CONDOMINIUMS	07285	EAGLEPTCON07285TP001
573	INGHAM	EAST LANSING MERIDIAN WATER AUTHORITY	01995	ELANSNGMWA01995TP001
574	INGHAM	HAMLIN MOBILE HOME PARK	40194	HAMLINMHP40194TP001
575	INGHAM	HIGHFIELDS YOUTH CAMP	03134	HIGHYOCAMP03134WL005
576	INGHAM	HIGHFIELDS YOUTH CAMP	03134	HIGHYOCAMP03134WL006

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No.	County	Supply Name	WSSN	Location
577	INGHAM	HIGHFIELDS YOUTH CAMP	03134	HIGHYOCAMP03134WL034
578	INGHAM	LANSING BOARD OF WATER & LIGHT	03760	LANSINGBWL03760TP001
579	INGHAM	LANSING BOARD OF WATER & LIGHT	03760	LANSINGBWL03760TP002
580	INGHAM	LESLIE, CITY OF	03840	LESLIE03840TP001
581	INGHAM	MASON MANOR	40197	MASONMANOR40197CH001
582	INGHAM	MASON MANOR	40197	MASONMANOR40197CH002
583	INGHAM	MASON, CITY OF	04170	MASON04170TP008
584	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL001
585	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL016
586	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL017
587	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL018
588	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL019
589	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL020
590	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL021
591	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL022
592	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL023
593	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL024
594	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL025
595	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL026
596	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL028
597	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL029
598	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL030
599	INGHAM	MICHIGAN STATE UNIVERSITY	04340	MSU04340WL031
600	INGHAM	STOCKBRIDGE, VILLAGE OF	06420	STOCKBRIDG06420TP001
601	INGHAM	STONEGATE MOBILE HOME COMMUNITY	40199	STONEGATE40199TP001
602	INGHAM	SUNSET MOBILE HOME PARK - Ingham	40200	SUNSETMHP40200CH001
603	INGHAM	V F W NATIONAL HOME	06792	VFWNATION06792TP001
604	INGHAM	WEBBERVILLE, VILLAGE OF	06970	WEBBERVILL06970TP001
605	INGHAM	WEBBERVILLE, VILLAGE OF	06970	WEBBERVILL06970TP003
606	INGHAM	WILLIAMSTON, CITY OF	07120	WILLAMSTON07120TP001
607	INGHAM	WILLOW VILLAGE	40202	WILLOW40202TP001
608	INGHAM	WINDMILL PARK	40203	WINDMILL40203CH001
609	INGHAM	WINDMILL PARK	40203	WINDMILL40203CH002
610	INGHAM	WINSLOW'S MOBILE HOME TERRACE	40204	WINDSLOW40204TP001
611	INGHAM	WINSLOW'S MOBILE HOME TERRACE	40204	WINDSLOW40204TP002
612	IONIA	BEAR CREEK VILLA	00508	BEARCKVLG00508CH001
613	IONIA	BELDING	00560	BELDING00560TP101
614	IONIA	BELDING	00560	BELDING00560TP102
615	IONIA	BELDING	00560	BELDING00560TP104
616	IONIA	BELDING	00560	BELDING00560TP105
617	IONIA	CANTERBURY ESTATES MHP	40617	CANTERBURY40617TP100
618	IONIA	EVERGREEN MOBILE HOME COMMUNITY	40206	EVERGREEN40206TP100
619	IONIA	EVERGREEN MOBILE HOME COMMUNITY	40206	EVERGREEN40206TP101
620	IONIA	HIDDEN VALLEY	40208	HIDDENVAL40208CH001
621	IONIA	HOPE NETWORK - WEST LAKE- FACILITY	03228	HOPEWLFAC03228CH001
622	IONIA	IONIA	03370	IONIA03370WL009
623	IONIA	IONIA	03370	IONIA03370WL011
624	IONIA	IONIA	03370	IONIA03370WL013

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
625	IONIA	IONIA	03370	IONIA03370WL015
626	IONIA	LAKE ODESSA	03730	LAKEODESSA03730TP100
627	IONIA	LAKE ODESSA	03730	LAKEODESSA03730WL002
628	IONIA	LONG LAKE MOBILE HOME ESTATES	40209	LONGLKMHE40209WL001
629	IONIA	LONG LAKE MOBILE HOME ESTATES	40209	LONGLKMHE40209WL002
630	IONIA	LYONS	03967	LYONS03967TP100
631	IONIA	LYONS	03967	LYONS03967TP102
632	IONIA	MUIR	04550	MUIR04550TP001
633	IONIA	MUIR	04550	MUIR04550TP002
634	IONIA	PEWAMO	05310	PEWAMO05310CH001
635	IONIA	PINE HAVEN ESTATES	40609	PINEHAVEN40609CH001
636	IONIA	PINE VIEW MOBILE HOME PARK	40210	PINEVMHP40210CH001
637	IONIA	PORTLAND	05530	PORTLAND05530TP104
638	IONIA	PORTLAND	05530	PORTLAND05530TP105
639	IONIA	PORTLAND	05530	PORTLAND05530TP106
640	IONIA	PORTLAND	05530	PORTLAND05530TP107
641	IONIA	SARANAC	05930	SARANAC05930CH001
642	IONIA	SUNSET RIDGE MHC	40662	SUNSETRDG40662TP100
643	IONIA	WOODCREEK MOBILE ESTATES	40564	WOODCREEK40564CH001
644	IOSCO	HALE CREEK MANOR	62942	HALECREEK62942CH001
645	IOSCO	HALE HOMESTEAD APARTMENTS	02943	HALEHMSDAP02943CH500
646	IOSCO	HURON SHORE REGIONAL UTILITY AUTHORITY	03319	HURONSRUA03319TP001
647	IOSCO	NORTHERN PINES	40212	NORTHPINES40212CH001
648	IOSCO	WHISPERING WOODS-WHITE PINE RIDGE OSCOD	40213	WHISWPRO40213CH001
649	IOSCO	WHITTEMORE SQUARE APARTMENTS	07104	WHITTEMORE07104CH001
650	IRON	ALPHA	00180	ALPHA00180TP004
651	IRON	BATES TOWNSHIP	00440	BATESTWP00440CH001
652	IRON	BATES TOWNSHIP	00440	BATESTWP00440WL003
653	IRON	CASPIAN	01210	CASPIAN01210WL001
654	IRON	CRYSTAL FALLS TOWNSHIP - LIND	03880	XTALFALIND03880CH001
655	IRON	CRYSTAL FALLS TOWNSHIP - LIND	03880	XTALFALIND03880WL002
656	IRON	CRYSTAL FALLS TWP - TOWNLINE	06630	XTALFATOW06630CH002
657	IRON	GAASTRA	02510	GAASTRA02510WL003
658	IRON	IRON RIVER	03410	IRONRVR03410CH001
659	IRON	IRON RIVER	03410	IRONRVR03410WL004
660	IRON	IRON RIVER	03410	IRONRVR03410WL005
661	IRON	IRON RIVER TOWNSHIP-BEECHWOOD	00550	IRONRVRBEE00550CH001
662	IRON	IRON RIVER TOWNSHIP-NASH	04610	IRONRVRNAS04610WL001
663	IRON	IRON RIVER TOWNSHIP-RYDEN ROAD	05760	IRONRVRRYD05760WL003
664	IRON	STAMBAUGH TOWNSHIP-INDIAN LAKE	03350	STAMTWPIND03350CH002
665	IRON	STAMBAUGH TOWNSHIP-WEST BRULE	06090	STAMTWPWES06090CH002
666	IRON	STAMBAUGH TWP.-HAGERMAN LAKE	02940	STAMTWPHAG02940CH001
667	ISABELLA	ALEXANDERS MOBILE VILLAGE	40216	ALEXANDER40216SS001
668	ISABELLA	BROOMFIELD VALLEY	40218	BROOMFIELD40218CH001
669	ISABELLA	COUNTRY PLACE	40220	COUNTRYPLA40220CH001
670	ISABELLA	COUNTRY PLACE SENIOR CARE CENTER	01649	CNTRYPSCC01649WL001
671	ISABELLA	LAKE ISABELLA WATER DIST. #1	03435	LAKEISABEL03435CH001
672	ISABELLA	MAPLEVIEW ESTATES	40217	MAPLEVIEW40217CH001

Table 1a - Public Water Supply - CWS Site Information
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No.	County	Supply Name	WSSN	Location
673	ISABELLA	MAPLEVIEW ESTATES EAST	40219	MAPLEVIEW40219CH001
674	ISABELLA	MOUNT PLEASANT, CITY OF	04530	MTPLEASANT04530TP001
675	ISABELLA	OAKVIEW MOBILE ESTATES	40222	OAKVIEWME40222CH004
676	ISABELLA	ROSEBUSH ESTATES APARTMENTS	05823	ROSEBUSHAP05823CH500
677	ISABELLA	ROSEBUSH MANOR SENIOR LIVING COMMUNITY	05824	ROSEBUSHMS05824CH001
678	ISABELLA	SHEPHERD, VILLAGE OF	06030	SHEPHERD06030CH001
679	ISABELLA	UNION TOWNSHIP	06725	UNIONTWP06725TP007
680	ISABELLA	UNION TOWNSHIP	06725	UNIONTWP06725TP008
681	ISABELLA	UNION TOWNSHIP	06725	UNIONTWP06725TP009
682	JACKSON	ARBOR RIDGE CONDOMINIUMS	00236	ARBORRIDGE00236CH001
683	JACKSON	ARBOR VILLAGE	40223	ARBORVILL40223TP001
684	JACKSON	BROOKLYN	00920	BROOKLYN00920TP001
685	JACKSON	COACHMANS COVE	40225	COACHMAN40225TP001
686	JACKSON	COFFMANS TRAILER PARK	40226	COFFMANS40226CH001
687	JACKSON	CONCORD	01580	CONCORD01580TP001
688	JACKSON	CONCORD	01580	CONCORD01580TP003
689	JACKSON	FISHER TRAILER PARK	40229	FISHERTLR40229CH001
690	JACKSON	GRASS LAKE	02830	GRASSLAKE02830TP001
691	JACKSON	HILLANLAKE VILLAGE	40231	HILLANLAKE40231TP001
692	JACKSON	INDIAN VILLAGE	40233	INDIANVIL40233TP001
693	JACKSON	JACKSON	03470	JACKSON03470TP001
694	JACKSON	LAKESHORE CONDOMINIUMS	03751	LKSHRCONDO03751CH001
695	JACKSON	LEONI TOWNSHIP	03837	LEONITWP03837WL001
696	JACKSON	LEONI TOWNSHIP	03837	LEONITWP03837WL002
697	JACKSON	LEONI TOWNSHIP	03837	LEONITWP03837WL004
698	JACKSON	LEONI TOWNSHIP	03837	LEONITWP03837WL005
699	JACKSON	LILLY BANK LANE	40227	LILLYBANK40227CH001
700	JACKSON	NAPOLEON TOWNSHIP	04605	NAPOLEON04605CH001
701	JACKSON	PARMA TOWNSHIP-AMBERTON VILL.	05205	PARMAAMBER05205CH001
702	JACKSON	PARMA, VILLAGE OF	05204	PARMA05204TP001
703	JACKSON	PLEASANT LAKE MOBILE HOME COURT	40240	PLEASNTMHC40240CH001
704	JACKSON	SHADY PARK	40241	SHADYPARK40241TP001
705	JACKSON	SHERMAN OAKS	40242	SHERMANOAK40242CH001
706	JACKSON	SHERMAN OAKS	40242	SHERMANOAK40242CH003
707	JACKSON	SPRING VALLEY ESTATES	40230	SPRINGVAL40230CH001
708	JACKSON	SPRINGPORT	06250	SPRINGPORT06250WL001
709	JACKSON	SPRINGPORT	06250	SPRINGPORT06250WL003
710	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450CH002
711	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450TP004
712	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450TP005
713	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450TP006
714	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450TP007
715	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450WL001
716	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450WL002
717	JACKSON	SUMMIT TOWNSHIP	06450	SUMM06450WL005WL006
718	JACKSON	SUMMIT TOWNSHIP	06450	SUMMITTWP06450WL007
719	JACKSON	WILLOWS ON TWIN PONDS	01658	WLLWTWNPD01658WL004
720	JACKSON	WILLOWS ON TWIN PONDS	01658	WLLWTWNPD01658WL005

Table 1a - Public Water Supply - CWS Site Information
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No.	County	Supply Name	WSSN	Location
721	KALAMAZOO	ALAMO NURSING HOME	60085	ALAMONURSE60085CH123
722	KALAMAZOO	ANDREWS ESTATES	40246	ANDREWEST40246CH001
723	KALAMAZOO	AUGUSTA	00320	AUGUSTA00320SS012
724	KALAMAZOO	BOERMAN MOBILE VILLAGE	40247	BOERMAN40247CH001
725	KALAMAZOO	CHARLESTON TOWNSHIP	01327	CHARLESTON01327TP012
726	KALAMAZOO	CLIMAX	01465	CLIMAX01465TP123
727	KALAMAZOO	CLIMAX MOBILE HOME PARK	40248	CLIMAXMHP40248CH001
728	KALAMAZOO	EVERGREEN PARK	40250	EVERGREENP40250CH001
729	KALAMAZOO	GALESBURG	02530	GALESBURG02530-1
730	KALAMAZOO	GALESBURG	02530	GALESBURG02530-2
731	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP201
732	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP303
733	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP304
734	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP305
735	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP306
736	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP307
737	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP308
738	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP309
739	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP310
740	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP311
741	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP312
742	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP313
743	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP314
744	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP315
745	KALAMAZOO	KALAMAZOO	03520	KAZOO03520TP316
746	KALAMAZOO	KELLOGG BIOLOGICAL STATION	03598	KELLBIOST03598TP012
747	KALAMAZOO	NAZARENE CAMP	04647	NZARENECAM04647TP123
748	KALAMAZOO	PARCHMENT	05200	PARCHMENT05200TP001
749	KALAMAZOO	PARCHMENT	05200	PARCHMENT05200WL001
750	KALAMAZOO	PARCHMENT	05200	PARCHMENT05200WL002
751	KALAMAZOO	PARCHMENT	05200	PARCHMENT05200WL003
752	KALAMAZOO	PLAINWELL PINES H C F	60695	PLAINWLHCF60695CH012
753	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP201
754	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP202
755	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP203
756	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP204
757	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP205
758	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP207
759	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP209
760	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP211
761	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP223
762	KALAMAZOO	PORTAGE	05520	PORTAGE05520TP224
763	KALAMAZOO	PORTAGE TERRACE	40253	PORTAGETER40253TP100
764	KALAMAZOO	ROYAL ESTATES	40255	ROYALEST40255CH001
765	KALAMAZOO	ROYAL ESTATES	40255	ROYALEST40255WL003
766	KALAMAZOO	SCHOOLCRAFT	05970	SCHOOLCRAF05970TP034
767	KALAMAZOO	SUGARLOAF MOBILE HOME PARK	40256	SUGARMHP40256CH001
768	KALAMAZOO	SUN MEADOWS APARTMENTS	06465	SUNMDWAPTS06465CH034

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
769	KALAMAZOO	VICKSBURG	06800	VICKSBURG06800WL005
770	KALAMAZOO	VICKSBURG	06800	VICKSBURG06800WL006
771	KALKASKA	KALKASKA, VILLAGE OF	03560	KALKASKA03560TP104
772	KALKASKA	RAPID RIVER MEADOWS	05607	RAPIDRVMDW05607CH001
773	KENT	ALGOMA ESTATES	40259	ALGOMAEST40259TP100
774	KENT	ALTO MEADOWS	40681	ALTOMDWS40681CH001
775	KENT	APPLE GROVE ESTATES	40664	APPLEGRV40664TP100
776	KENT	CALEDONIA ESTATES	01037	CALEDESTS01037TP100
777	KENT	CALEDONIA TOWNSHIP	01039	CALEDTWP01039TP100
778	KENT	CALEDONIA TOWNSHIP	01039	CALEDTWP01039TP200
779	KENT	CEDAR SPRINGS	01260	CEDARSPG01260SS001
780	KENT	CEDAR SPRINGS	01260	CEDARSPG01260TP103
781	KENT	CEDARFIELD MOBILE HOME PARK	40619	CEDARMHP40619TP100
782	KENT	GLENWOOD ESTATES	40566	GLENWOOD40566TP100
783	KENT	GRAND RAPIDS	02790	GRNDRAPIDS02790TP100
784	KENT	GRAND VALLEY ESTATES	02809	GRANDVLYET02809TP100
785	KENT	GREEN ACRES MOBILE HOME PARK	40273	GREENACMHP40273CH001
786	KENT	GREGG APARTMENTS	02845	GREGGAPTS02845CH001
787	KENT	KENT CITY MOBILE HOME PARK	40264	KENTCTYMHP40264TP100
788	KENT	KENT RIDGE APARTMENTS	03615	KENTRDGAPT03615TP100
789	KENT	KEY HEIGHTS MOBILE VILLAGE	40276	KEYHGTMV40276TP100
790	KENT	LA-E-MA MOBILE HOME PARK	40277	LAEMAMHP40277CH001
791	KENT	LAKE BELLA VISTA	03695	LKBVS03695TP100TP200
792	KENT	LAKESIDE MOBILE HOME COMMUNITY	40292	LAKESDMHC40292TP100
793	KENT	LEISURE VILLAGE	40279	LEISUREVIL40279CH002
794	KENT	LINCOLN PINES	40586	LINCOLNPN40586TP100
795	KENT	LINCOLN PINES	40586	LINCOLNPN40586TP101
796	KENT	LINCOLN PINES	40586	LINCOLNPN40586TP102
797	KENT	LOWELL	03950	LOWELL03950TP100
798	KENT	OAKFIELD MOBILE HOME PARK	40266	OAKFIELD40266WL003
799	KENT	OAKFIELD MOBILE HOME PARK	40266	OAKFIELD40266WL004
800	KENT	OAKS OF ROCKFORD	40678	OAKSROCK40678TP100
801	KENT	PARKWOOD GREEN	40284	PARKWOOD40284WL001
802	KENT	PARKWOOD GREEN	40284	PARKWOOD40284WL002
803	KENT	PARKWOOD GREEN	40284	PARKWOOD40284WL003
804	KENT	PINE AIRE MOBILE HOME PARK	40285	PINEAIRE40285CH001
805	KENT	PLAINFIELD TOWNSHIP	05370	PLAINFIELD05370TP100
806	KENT	RIVERVIEW MOBILE VILLAGE	40288	RIVERVIEW40288TP100
807	KENT	RIVERVIEW MOBILE VILLAGE	40288	RIVERVIEW40288WL001
808	KENT	ROCKFORD	05730	ROCKFORD05730TP100
809	KENT	SADDLE RIDGE CONDO ASSOC.	05849	SADDLERDG05849TP100
810	KENT	SAND LAKE	05907	SANDLAKE05907TP001
811	KENT	SILVER LAKE WATER AUTHORITY, INC.	06071	SILVERLKWA06071CH001
812	KENT	SPARTA	06200	SPARTA06200TP100
813	KENT	SPARTA	06200	SPARTA06200WL002
814	KENT	SPRING VALLEY MOBILE HOME PARK	40291	SPGVALLEY40291WL002
815	KENT	SPRING VALLEY MOBILE HOME PARK	40291	SPGVALLEY40291WL003
816	KENT	SUMMERSET MEADOWS	06448	SUMMERSET06448CH001

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No.	County	Supply Name	WSSN	Location
817	KENT	TILLICUM FARMS	06624	TILLICUM06624CH001
818	KENT	WELLERS TRAILER PARK	40293	WELLERS40293CH001
819	KENT	WHISPERING PINES	40576	WHISPINE40576CH001
820	KENT	WHITE CREEK COUNTRY ESTATES	40294	WHITECREEK40294CH001
821	KENT	WOODLAND ESTATES	40296	WOODLNDEST40296CH002
822	KENT	WYOMING	07220	WYOMING07220TP100
823	KEWEENAW	EAGLE HARBOR TOWNSHIP	01920	EAGLEHRBR01920CH001
824	KEWEENAW	GRANT TOWNSHIP - COPPER HARBOR	01630	GRANTTWP01630TP001
825	KEWEENAW	HOUGHTON TOWNSHIP	01930	HOUGHTNTWP01930WL001
826	KEWEENAW	SHERMAN TOWNSHIP	02590	SHERMAN02590CH001
827	LAKE	BALDWIN, VILLAGE OF	00350	BALDWIN00350WL002
828	LAKE	BALDWIN, VILLAGE OF	00350	BALDWIN00350WL003
829	LAKE	BALDWIN, VILLAGE OF	00350	BALDWIN00350WL004
830	LAKE	BALDWIN, VILLAGE OF	00350	BALDWIN00350WL005
831	LAKE	CLEAN WATER ASSOCIATION, INC.	06901	CWAINC06901CH501
832	LAKE	DUVERNAY PARK APARTMENTS	01915	DUVERNAY01915CH001
833	LAKE	IDLEWILD GARDEN HOUSING	07233	IDLEWILD07233CH501
834	LAPEER	CLIFFORD, VILLAGE OF	01460	CLIFFORD01460TP001
835	LAPEER	CLIFFORD, VILLAGE OF	01460	CLIFFORD01460TP002
836	LAPEER	COLUMBIAVILLE, VILLAGE OF	01570	COLUMVILLE01570TP001
837	LAPEER	DEERFIELD PINES MOBILE HOME PARK	40644	DEERFIELD40644CH001
838	LAPEER	DRYDEN, VILLAGE OF	01870	DRYDEN01870TP001
839	LAPEER	FENTON HEIGHTS APARTMENTS	02274	FENTONHGTS02274TP001
840	LAPEER	IDEAL VILLA MOBILE HOME PARK	40299	IDEALVILLA40299CH001
841	LAPEER	METAMORA, VILLAGE OF	04312	METAMORE04312TP001
842	LAPEER	NORTH BRANCH, VILLAGE OF	04770	NORBRANCH04770TP003
843	LAPEER	PINE LAKES MANUFACTURED HOMES	40670	PINELAKES40670TP001
844	LAPEER	RIVER RIDGE	40672	RIVERRIDGE40672CH001
845	LAPEER	SANDHILL ESTATES	40592	SANDHILEST40592TP001
846	LAPEER	WEDGEWOOD GOLFSIDE CONDO ASSOC	06971	WEDGEWOOD06971CH001
848	LEELANAU	CEDAR CREEK WATER COMPANY	01252	CEDARCKWC01252TP001
849	LEELANAU	ELMWOOD TWP - TIMBERLEE	06625	ELMWOODTWP06625CH501
850	LEELANAU	ELMWOOD TWP - TIMBERLEE	06625	ELMWOODTWP06625CH502
851	LEELANAU	EMPIRE, VILLAGE OF	02130	EMPIRE02130CH502
852	LEELANAU	EMPIRE, VILLAGE OF	02130	EMPIRE02130WL001
853	LEELANAU	EMPIRE, VILLAGE OF	02130	EMPIRE02130WL004
854	LEELANAU	FIRST POINT MOBILE COURT	40302	FIRSTPOINT40302CH001
855	LEELANAU	HOMESTEAD/CRYSTAL RIVER WATER CO	07103	XTALRWCO07103TP101
856	LEELANAU	LEELANAU CO LAW ENFORCEMENT CENTER	03829	LEELANAUEC03829TP100
857	LEELANAU	MAPLE VALLEY NURSING HOME	64067	MAPLENURSE64067TP101
858	Leelanau	NORTHPORT POINT COTTAGE OWNERS ASSOCIATION	04820	NPORTCOA04820TP001
859	LEELANAU	NORTHPORT, VILLAGE OF	04810	NORTHPORT04810TP102
860	LEELANAU	NORTHPORT, VILLAGE OF	04810	NORTHPORT04810TP103
861	LEELANAU	NORTHPORT, VILLAGE OF	04810	NORTHPORT04810TP104
862	LEELANAU	SUGAR LOAF RESORT	06445	SUGARLOAF06445TP101
863	LEELANAU	SUTTONS BAY, VILLAGE OF	06500	SUTTONSBAY06500CH501
864	LEELANAU	SUTTONS BAY, VILLAGE OF	06500	SUTTONSBAY06500CH502
865	LEELANAU	THE LEELANAU SCHOOL	03831	LEELANAUSC03831CH001

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No.	County	Supply Name	WSSN	Location
866	LEELANAU	THORN CREEK CONDOMINIUMS	06592	THORNCREEK06592CH501
867	LEELANAU	YORK CONDOMINIUMS	07240	YORKCONDO07240CH501
868	LENAWEE	ADDISON	00030	ADDISON00030TP001
869	LENAWEE	ADRIAN	00040	ADRIAN00040TP001
870	LENAWEE	BEAN CREEK RESORT	40554	BEANCREEK40554CH001
871	LENAWEE	BLISSFIELD	00750	BLISSFIELD00750TP001
872	LENAWEE	BRITTON	00890	BRITTON00890TP001
873	LENAWEE	BRITTON	00890	BRITTON00890TP002
874	LENAWEE	BRITTON	00890	BRITTON00890TP006
875	LENAWEE	BROOKDALE ADRIAN	00045	BROKDALEAD00045TP001
876	LENAWEE	CLINTON	01470	CLINTON01470TP001
877	LENAWEE	CLINTON	01470	CLINTON01470TP004
878	LENAWEE	CLINTON	01470	CLINTON01470WL002
879	LENAWEE	CLINTON ESTATES	40305	CLINTONEST40305CH001
880	LENAWEE	COUNTRY VILLA ESTATES	40306	COUNTRYVIL40306TP001
881	LENAWEE	DEERFIELD	01770	DEERFLD01770TP001
882	LENAWEE	HUDSON	03280	HUDSON03280TP001
883	LENAWEE	LAKE ARROWHEAD ESTATES	03692	LKARROWEST03692TP001
884	LENAWEE	LEE VILLA MOBILE HOME PARK	40308	LEEVILLA40308TP001
885	LENAWEE	LEFFINGWELL ESTATES	40311	LEFFINGWEL40311CH001
886	LENAWEE	MADISON TOWNSHIP	04006	MADISONTWP04006TP001
887	LENAWEE	MAN NOR FARMS SUBDIVISION	05180	MANNORFARM05180TP001
888	LENAWEE	MORENCI	04490	MORENCI04490TP001
889	LENAWEE	ONSTED	05020	ONSTED05020TP002
890	LENAWEE	ONSTED	05020	ONSTED05020TP003
891	LENAWEE	RAISIN VALLEY ESTATES	40309	RAISINVLY40309CH001
892	LENAWEE	RICHLYN MANOR	00048	RICHLYN00048CH001
893	LENAWEE	ROBIN HOOD MOBILE COURT	40310	ROBINHOOD40310CH001
894	LENAWEE	ROUND LAKE ESTATES	40307	ROUNDLAKE40307CH001
895	LENAWEE	SOUTH SHORE WATER SYSTEM	04890	SSHOREWS04890TP001
896	LENAWEE	SUNSET MOBILE HOME PARK - Lenawee	40313	SUNSETMHP40313TP001
897	LENAWEE	TECUMSEH	06560	TECUMSEH06560TP001
898	LENAWEE	TECUMSEH	06560	TECUMSEH06560TP002
899	LENAWEE	TECUMSEH	06560	TECUMSEH06560TP003
900	LENAWEE	TECUMSEH	06560	TECUMSEH06560TP004
901	LENAWEE	WATERS EDGE MH COMMUNITY	40673	WATERSEDGE40673WL001
902	LENAWEE	WATERS EDGE MH COMMUNITY	40673	WATERSEDGE40673WL002
903	LIVINGSTON	ALAN'S PARK - FOWLERVILLE	40319	ALANPARK40319CH001
904	LIVINGSTON	BISHOP LAKE APARTMENTS	00731	BISHOPAPTS00731CH001
905	LIVINGSTON	BRIGHTON, CITY OF	00860	BRIGHTON00860TP001
906	LIVINGSTON	BRIGHTON, CITY OF	00860	BRIGHTON00860TP002
907	LIVINGSTON	CIDERMILL CROSSINGS	40679	CIDERMILL40679TP001
908	LIVINGSTON	COVENTRY WOODS MHC	40649	COVENTRY40649TP001
909	LIVINGSTON	EASTERN MICHIGAN NAZARENE DISTRICT CENTE	02292	EMICHNAZDC02292TP001
910	LIVINGSTON	FAIRLANE ESTATES	40316	FAIRLANE40316CH001
911	LIVINGSTON	FAIRLAWN MEADOWS	40318	FAIRLAWN40318CH001
912	LIVINGSTON	FONDA LAKE WATER AUTHORITY	02347	FONDALWA02347TP001
913	LIVINGSTON	FOWLERVILLE, VILLAGE OF	02400	FOWLERVILL02400TP001

Table 1a - Public Water Supply - CWS Site Information
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No.	County	Supply Name	WSSN	Location
914	LIVINGSTON	FOWLERVILLE, VILLAGE OF	02400	FOWLERVILL02400TP002
915	LIVINGSTON	GREEN BROOK ESTATES	05395	GRNBRKEST05395CH001
916	LIVINGSTON	GREEN OAK TWP - CENTENNIAL FARMS	01543	GREENOAK01543TP001
917	LIVINGSTON	GREENFIELD POINTE SUBDIVISION	02846	GNFDPOINTE02846TP001
918	LIVINGSTON	HAMBURG HILLS ESTATES	40317	HAMBURG40317TP001
919	LIVINGSTON	HANDY TOWNSHIP - RED CEDARS CROSSING	02982	HANDYTWP02982TP001
920	LIVINGSTON	HARTLAND HILLS CONDOMINIUMS	03073	HARTLNDHIL03073CH001
921	LIVINGSTON	HARTLAND MEADOWS	40654	HARTLAND40654TP001
922	LIVINGSTON	HARTLAND TOWNSHIP	03075	HARTLNDTWP03075TP001
923	LIVINGSTON	HARVEST HILLS SUBDIVISION ASSO	03080	HARVESTSUB03080TP001
924	LIVINGSTON	HIDDEN LAKES OF GREEN OAKS	03137	HDNLAKESGO03137TP001
925	LIVINGSTON	HIDDEN SHORES WEST	05819	HDSHORESWE05819CH001
926	LIVINGSTON	HOWELL, CITY OF	03250	HOWELL03250TP001
927	LIVINGSTON	HUNTMORE ESTATES	05033	HUNTMORE05033TP001
928	LIVINGSTON	ISLAND LAKE APARTMENTS	03942	ISLLAKEAP03942WL004
929	LIVINGSTON	LAKESHORE VILLAGE SUBDIVISION	05577	LKSHORESUB05577TP001
930	LIVINGSTON	LIVINGSTON COMMUNITY WATER AUTHORITY	03929	LIVINGCWA03929TP001
931	LIVINGSTON	MHOG SEWER & WATER AUTHORITY	04098	MHOGSWA04098TP001
932	LIVINGSTON	MILLPOINTE OF HARTLAND	04403	MILLPOINTE04403TP001
933	LIVINGSTON	MYSTIC RIDGE L.L.C.	04595	MYSTICRDG04595TP001
934	LIVINGSTON	NORTH BAY HARBOR CLUB MHP	40616	NBAYHRBR40616TP001
935	LIVINGSTON	OAK POINTE	01002	OAKPOINTE01002TP001
936	LIVINGSTON	OSBORN LAKE ESTATES	05037	OSBORNLKES05037CH001
937	LIVINGSTON	PINCKNEY, VILLAGE OF	05322	PINCKNEY05322TP001
938	LIVINGSTON	PINE KNOLL APARTMENTS, LLC	02000	PNKNOLLAPT02000WL001
939	LIVINGSTON	PINE KNOLL APARTMENTS, LLC	02000	PNKNOLLAPT02000WL002
940	LIVINGSTON	PINE KNOLL APARTMENTS, LLC	02000	PNKNOLLAPT02000WL003
941	LIVINGSTON	PRENTIS ESTATES APARTMENTS	02619	PRENTISAPT02619CH001
942	LIVINGSTON	SILVER LAKE MOBILE HOME PARK	40322	SILVERLKMH40322TP001
943	LIVINGSTON	STARLIGHT MOBILE HOME PARK	40323	STARLIGHT40323TP001
944	LIVINGSTON	STONE RIDGE	06423	STONERIDGE06423TP001
945	LIVINGSTON	SYLVAN GLEN ESTATES	40314	SYLVANGLEN40314TP001
946	LIVINGSTON	THE PENINSULA DEVELOPMENT LLC	05229	PENINDEV05229TP001
947	LIVINGSTON	TYRONE WOODS	40658	TYRONEWOOD40658TP001
948	LIVINGSTON	UNIVERSITY MOBILE ESTATES #2	40325	UNIVERME40325CH001
949	LIVINGSTON	WHITMORE LAKE APARTMENTS	07101	WHITEMORE07101TP001
950	LIVINGSTON	WOODLAND CENTER CORRECTIONAL FACILITY	06820	WOODLNDCCF06820TP001
951	LIVINGSTON	WOODLAND PARK AND SALES	40326	WOODLAND40326CH001
952	LIVINGSTON	WOODLAND RIDGE	40669	WOODLANDRG40669TP001
953	LIVINGSTON	WOODRUFF LAKE CO-OP APARTMENTS	07185	WOODRUFF07185CH001
954	LIVINGSTON	WOODRUFF LAKE CO-OP APARTMENTS	07185	WOODRUFF07185CH003
955	LUCE	NEWBERRY CORRECTIONAL FACILITY	04730	NEWBRYCOFA04730TP004
956	LUCE	NEWBERRY CORRECTIONAL FACILITY	04730	NEWBRYCOFA04730TP005
957	LUCE	NEWBERRY CORRECTIONAL FACILITY	04730	NEWBRYCOFA04730TP006
958	LUCE	NEWBERRY WATER & LIGHT	04720	NEWBRYWL04720TP001
959	LUCE	NEWBERRY WATER & LIGHT	04720	NEWBRYWL04720TP002
960	LUCE	PENTLAND TOWNSHIP	05240	PENTLAND05240WL001
961	LUCE	PENTLAND TOWNSHIP	05240	PENTLAND05240WL002

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No.	County	Supply Name	WSSN	Location
962	MACKINAC	MACK. CO. HOUSING-CURTIS	01692	MACKHOUSCU01692CH001
963	MACKINAC	MACK. CO. HOUSING-ENGADINE	02145	MACKHOUSEN02145CH003
964	MACKINAC	MACKINAC ISLAND	03970	MACKINCISL03970TP003
965	MACKINAC	ST IGNACE	06290	STIGNACE06290TP001
966	MACOMB	ARMADA, VILLAGE OF	00240	ARMADA00240TP101
967	MACOMB	DEER PARK CONDOMINIUMS	01774	DEERPKCOND01774CH001
968	MACOMB	MAIN STREET APARTMENTS	01545	MAINSTAPTS01545WL001
969	MACOMB	MAIN STREET APARTMENTS	01545	MAINSTAPTS01545WL002
970	MACOMB	MOUNT CLEMENS, CITY OF	04510	MTCLEMENS04510TP100
971	MACOMB	NEW BALTIMORE, CITY OF	04670	NEWBALT04670TP101
972	MACOMB	RICHMOND, CITY OF	05670	RICHMOND05670TP100
973	MACOMB	RICHMOND, CITY OF	05670	RICHMOND05670TP200
974	MACOMB	RICHMOND, CITY OF	05670	RICHMOND05670TP300
975	MACOMB	RICHMOND, CITY OF	05670	RICHMOND05670TP400
976	MACOMB	RICHMOND, CITY OF	05670	RICHMOND05670TP500
977	MACOMB	RICHMOND, CITY OF	05670	RICHMOND05670TP600
978	MACOMB	RIDGEWAY	05673	RIDGEWAY05673CH002
979	MACOMB	ROMEO, VILLAGE OF	05780	ROMEO05780TP100
980	MACOMB	ROMEO, VILLAGE OF	05780	ROMEO05780TP200
981	MACOMB	SPRINGBROOK ESTATES MHC	40327	SPGBROOK40327TP100
982	MACOMB	WASHINGTON MHP	40330	WASHINGTON40330TP100
983	MANISTEE	BEAR LAKE, VILLAGE OF	00510	BEARLAKE00510WL002
984	MANISTEE	BEAR LAKE, VILLAGE OF	00510	BEARLAKE00510WL003
985	MANISTEE	CAMP ARCADIA / LCA	01052	CMPARCADIA01052CH501
986	MANISTEE	FILER CHARTER TOWNSHIP	02290	FILERTWP02290TP102
987	MANISTEE	FILER CHARTER TOWNSHIP	02290	FILERTWP02290TP103
988	MANISTEE	FILER CHARTER TOWNSHIP	02290	FILERTWP02290TP104
989	MANISTEE	KALEVA, VILLAGE OF	03550	KALEVA03550TP101
990	MANISTEE	KALEVA, VILLAGE OF	03550	KALEVA03550TP102
991	MANISTEE	KALEVA, VILLAGE OF	03550	KALEVA03550TP103
992	MANISTEE	KAMP VILLA RV PARK	40580	KAMPVILLA40580CH001
993	MANISTEE	MANISTEE, CITY OF	04030	MANISTEE04030TP106
994	MANISTEE	MANISTEE, CITY OF	04030	MANISTEE04030TP108
995	MANISTEE	MANISTEE, CITY OF	04030	MANISTEE04030TP109
996	MANISTEE	MANISTEE, CITY OF	04030	MANISTEE04030TP110
997	MANISTEE	PIRATES COVE CONDOMINIUMS	05355	PIRATECOVE05355CH501
998	MANISTEE	PORTAGE POINT INN	05527	PORTAGEINN05527CH502
999	MANISTEE	VALLEY SIDE APARTMENTS	06763	VALLEYSIDE06763CH501
1000	MANISTEE	VALLEY WOOD COVE CONDOMINIUMS	06765	VALLEYWOOD06765CH401
1001	MARQUETTE	553 MOBILE ESTATES	40520	553MOBILE40520CH001
1002	MARQUETTE	CHERRY CREEK VILLAGE	01371	CHERRYCRK01371CH001
1003	MARQUETTE	CHOCOLAY SHORES APARTMENTS	01416	CHOCOLAY01416CH001
1004	MARQUETTE	COUNTRY LOG APTS	01653	CNTRYLOGAP01653CH001
1005	MARQUETTE	ELY TOWNSHIP-DIORITE	01820	ELYTWPDIO01820CH001
1006	MARQUETTE	ELY TOWNSHIP-GREENWOOD	02860	ELYTWPGRN02860CH001
1007	MARQUETTE	FORSYTH TOWNSHIP	02370	FORSYTHTWP02370CH001
1008	MARQUETTE	FORSYTH TOWNSHIP	02370	FORSYTHTWP02370CH002
1009	MARQUETTE	FORSYTH TOWNSHIP	02370	FORSYTHTWP02370WL006

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No.	County	Supply Name	WSSN	Location
1010	MARQUETTE	ISHPEMING TWP - EAST	04775	ISHPEMEAST04775WL001
1011	MARQUETTE	ISHPEMING TWP - WEST	03450	ISHPEMWEST03450CH001
1012	MARQUETTE	ISHPEMING TWP - WEST	03450	ISHPEMWEST03450WL005
1013	MARQUETTE	K I SAWYER	03510	KISWAYER03510TP001
1014	MARQUETTE	K I SAWYER	03510	KISWAYER03510TP002
1015	MARQUETTE	MARQUETTE	04120	MARQUETTE04120TP001
1016	MARQUETTE	MARQUETTE COUNTY CORRECTIONS CENTER	04025	MARQUTECCC04025WL001
1017	MARQUETTE	MARQUETTE COUNTY CORRECTIONS CENTER	04025	MARQUTECCC04025WL003
1018	MARQUETTE	MARQUETTE TOWNSHIP	04140	MARQTWP04140TP001
1019	MARQUETTE	NEGAUNEE TOWNSHIP	04655	NEGAUNEE04655CH001
1020	MARQUETTE	NEGAUNEE-ISHPEMING AUTHORITY	04653	NEGISHAUTH04653TP010
1021	MARQUETTE	PINE ACRES MOBILE HOME PARK	40525	PINEACRES40525CH001
1022	MARQUETTE	POWELL TOWNSHIP	00700	POWELLTWP00700CH001
1023	MARQUETTE	REPUBLIC TOWNSHIP	05660	REPUBLIC05660TP008
1024	MARQUETTE	RICHMOND TOWNSHIP	05160	RICHMNDTWP05160CH001
1025	MARQUETTE	RICHMOND TOWNSHIP	05160	RICHMNDTWP05160WL003
1026	MARQUETTE	SILVER CREEK ESTATES MOBILE HOME COURT	40519	SILVERCRK40519CH001
1027	MARQUETTE	SKANDIA-W BRANCH WATER DEPT	06075	SKANDIABWD06075CH001
1028	MARQUETTE	TILDEN TOWNSHIP	04640	TILDENTWP04640CH001
1029	MASON	HERITAGE HILLS MOBILE HOME VILLAGE	40333	HERITAGEHV40333CH001
1030	MASON	HOLIDAY VILLAGE MOBILE HOME PARK	40335	HOLIDAYMHP40335CH001
1031	MASON	LUDINGTON, CITY OF	03960	LUDINGTON03960TP100
1032	MASON	MANISTEE FOREST PINES ESTATES	40332	MANISTEEFO40332CH001
1033	MASON	PERE MARQUETTE TWP - WELLS	05268	PERMAQWELL05268TP001
1034	MASON	TALL OAKS CONDOMINUMS	06532	TALLOAKSC06532CH101
1035	MASON	TAMARAC VILLAGE	40337	TAMARAC40337TP001
1036	MECOSTA	BIG RAPIDS	00710	BIGRAPIDS00710TP100
1037	MECOSTA	CIRCLE DRIVE MOBILE HOME PARK	40339	CIRCLEDRV40339CH001
1038	MECOSTA	COUNTRY MANOR- Mecosta	40656	CNTRYMANOR40656CH001
1039	MECOSTA	HAVEN VIEW MOBILE COURT	40343	HAVENVIEW40343CH001
1040	MECOSTA	HOLIDAY TERRACE	40344	HOLIDAYTER40344CH001
1041	MECOSTA	HUNTERS CREEK ESTATES	40342	HUNTERCRK40342CH001
1042	MECOSTA	PARKS PLACE ESTATES	40340	PARKSPLACE40340CH001
1043	MECOSTA	REMUS APARTMENT COMPANY	05655	REMUSAPTC05655TP100
1044	MECOSTA	ROSEVILLE APARTMENTS	05821	ROSEVILLE05821CH001
1045	MECOSTA	ROYAL VIEW RETIREMENT VILLAGE	05841	ROYALVRV05841CH001
1046	MECOSTA	SUNSET SHORES	40653	SUNSETSHOR40653CH001
1047	MECOSTA	SUNSET SHORES	40653	SUNSETSHOR40653CH002
1048	MECOSTA	SUNSET SHORES	40653	SUNSETSHOR40653CH003
1049	MECOSTA	T.J. WHITE PINE MANOR APARTMENTS	07085	TJWHITEPNE07085CH001
1050	MECOSTA	TULLYMORE CLUBHOUSE AND CAMELOT VILLAGE	06693	TULLYMORE06693SS001
1051	MENOMINEE	CARNEY-NADEAU TWP WATER DEPT	01125	CARNEYTWP01125WL001
1052	MENOMINEE	CARNEY-NADEAU TWP WATER DEPT	01125	CARNEYTWP01125WL002
1053	MENOMINEE	HERMANSVILLE HOUSING COMM.	03120	HERMANHCOM03120CH001
1054	MENOMINEE	MENOMINEE	04250	MENOMINEE04250TP001
1055	MENOMINEE	POWERS-SPALDING TWP WATER DEPT	05563	PWSPALDWD05563TP004
1056	MENOMINEE	POWERS-SPALDING TWP WATER DEPT	05563	PWSPALDWD05563WL002
1057	MENOMINEE	STEPHENSON	06380	STEPHENSON06380TP001

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No.	County	Supply Name	WSSN	Location
1058	MIDLAND	COLEMAN, CITY OF	01520	COLEMAN01520WL003
1059	MIDLAND	COLEMAN, CITY OF	01520	COLEMAN01520WL004
1060	MIDLAND	COUNTRY ACRES - Midland	40345	COUNTRYAC40345CH001
1061	MIDLAND	COUNTRYSIDE MOBILE HOME PARK	40346	COUNTRYMHP40346TP100
1062	MIDLAND	MIDLAND, CITY OF	04370	MIDLAND04370TP001
1063	MIDLAND	WHISPERING PINES HOUSING COMMUNITY	40347	WHISPHC40347TP100
1064	MIDLAND	YODER APARTMENTS	07235	YODERAPT07235WL001
1065	MIDLAND	YODER APARTMENTS	07235	YODERAPT07235WL002
1066	MIDLAND	YODER APARTMENTS	07235	YODERAPT07235WL003
1067	MIDLAND	YODER APARTMENTS	07235	YODERAPT07235WL004
1068	MISSAUKEE	BELLE OAKES ASSISTED LIVING CENTER	00575	BELLEOAKS00575TP001
1069	MISSAUKEE	LAKE CITY, CITY OF	03700	LAKECITY03700TP102
1070	MISSAUKEE	LAKE CITY, CITY OF	03700	LAKECITY03700TP103
1071	MISSAUKEE	MCBAIN, CITY OF	04190	MCBAIN04190TP101
1072	MISSAUKEE	MCBAIN, CITY OF	04190	MCBAIN04190TP103
1073	MISSAUKEE	MCBAIN, CITY OF	04190	MCBAIN04190TP105
1074	MONROE	BEDFORD MEADOWS	06435	BEDFORDMDW06435TP001
1075	MONROE	FRENCHTOWN TOWNSHIP	02500	FRENCHTOWN02500TP001
1076	MONROE	MONROE	04450	MONROE04450TP001
1077	MONROE	MONROE SOUTH COUNTY	04455	MONROESO04455TP001
1078	MONROE	Whiteford Township	07063	WHITEFORD07063TP100
1079	MONTCALM	CARSON CITY	01170	CARSONCITY01170WL005
1080	MONTCALM	CARSON CITY	01170	CARSONCITY01170WL006
1081	MONTCALM	EDMORE	02070	EDMORE02070TP105
1082	MONTCALM	EDMORE	02070	EDMORE02070TP106
1083	MONTCALM	EDMORE	02070	EDMORE02070WL003
1084	MONTCALM	GREAT LAKE ADVENTIST ACADEMY	02839	GREATLKAA02839WL001
1085	MONTCALM	GREAT LAKE ADVENTIST ACADEMY	02839	GREATLKAA02839WL002
1086	MONTCALM	GREENBRIER ESTATES	40352	GREENBRIAR40352WL001
1087	MONTCALM	GREENBRIER ESTATES	40352	GREENBRIAR40352WL002
1088	MONTCALM	GREENVILLE	02850	GRNVILLE02850TP100
1089	MONTCALM	GREENVILLE ACRES	02851	GRNVILLEAC02851CH001
1090	MONTCALM	HOWARD CITY	03240	HOWARDCITY03240TP105
1091	MONTCALM	HOWARD CITY	03240	HOWARDCITY03240WL003
1092	MONTCALM	LAKEVIEW	03750	LAKEVIEW03750TP100
1093	MONTCALM	SHERIDAN	06040	SHERIDAN06040TP102
1094	MONTCALM	SHERIDAN	06040	SHERIDAN06040WL001
1095	MONTCALM	SHERIDAN	06040	SHERIDAN06040WL003
1096	MONTCALM	SHERIDAN ESTATES	40351	SHERIDAN40351CH001
1097	MONTCALM	STANTON	06360	STANTON06360SS001
1098	MONTCALM	TAMARACK PINES ESTATES	40640	TAMARACK40640CH001
1099	MONTMORENCY	BRILEY TOWNSHIP	00877	BRILEY00877TP100
1100	MONTMORENCY	HILLMAN, VILLAGE OF	03160	HILLMAN03160TP107
1101	MONTMORENCY	HILLMAN, VILLAGE OF	03160	HILLMAN03160TP108
1102	MONTMORENCY	OAK LEAF MANOR	04874	OAKLEAKMAN04874CH501
1103	MUSKEGON	APPLE CARR VILLAGE	40355	APPLECARR40355TP100
1104	MUSKEGON	ARLINGTON WOODS	40356	ARLINGTON40356CH001
1105	MUSKEGON	ARLINGTON WOODS	40356	ARLINGTON40356CH002

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No.	County	Supply Name	WSSN	Location
1106	MUSKEGON	ARLINGTON WOODS	40356	ARLINGTON40356WL003
1107	MUSKEGON	ARLINGTON WOODS	40356	ARLINGTON40356WL006
1108	MUSKEGON	ARLINGTON WOODS	40356	ARLINGTON40356WL010
1109	MUSKEGON	BLUE LAKE RESIDENCES	03925	BLULAKERES03925TP100
1110	MUSKEGON	BUTTERFIELD WOODS SUBDIVISION	01018	BUTTERFLD01018CH001
1111	MUSKEGON	CRYSTAL DOWNS MOBILE VILLAGE	40357	XTALDMV40357WL001
1112	MUSKEGON	CRYSTAL DOWNS MOBILE VILLAGE	40357	XTALDMV40357WL003
1113	MUSKEGON	EDGEWOOD TRAILER PARK	40359	EDGEWOOD40359CH001
1114	MUSKEGON	EGELCRAFT MOBILE HOME PARK	40600	EGELCRAFT40600TP100
1115	MUSKEGON	MAPLE ISLAND ESTATES	40361	MAPLEISLE40361WL001
1116	MUSKEGON	MAPLE ISLAND ESTATES	40361	MAPLEISLE40361WL002
1117	MUSKEGON	MAPLE ISLAND ESTATES	40361	MAPLEISLE40361WL003
1118	MUSKEGON	MONTAGUE	04470	MANTAGUE04470TP102
1119	MUSKEGON	MONTAGUE	04470	MANTAGUE04470TP104
1120	MUSKEGON	MONTAGUE	04470	MANTAGUE04470WL001
1121	MUSKEGON	MONTAGUE	04470	MANTAGUE04470WL005
1122	MUSKEGON	MUSKEGON	04570	MUSKEGON04570TP100
1123	MUSKEGON	MUSKEGON HEIGHTS	04580	MUSKHGTS04580TP100
1124	MUSKEGON	PINE ISLAND LAKE REC PARK	40577	PINEISLAND40577CH001
1125	MUSKEGON	RAVENNA	05610	RAVENNA05610TP010
1126	MUSKEGON	TIMBERLINE ESTATES	40363	TIMBERLINE40363CH001
1127	MUSKEGON	TIMBERLINE ESTATES	40363	TIMBERLINE40363CH002
1128	MUSKEGON	WEST PINE ISLAND	40650	WESTPINE40650CH001
1129	MUSKEGON	WHITE LAKE ASSISTED LIVING CENTER	07064	WHITELKALC07064CH001
1130	MUSKEGON	WHITEHALL	07100	WHITEHALL07100TP102
1131	MUSKEGON	WHITEHALL	07100	WHITEHALL07100TP105
1132	MUSKEGON	WHITEHALL	07100	WHITEHALL07100TP106
1133	MUSKEGON	WHITEHALL	07100	WHITEHALL07100TP107
1134	MUSKEGON	WHITEHALL	07100	WHITEHALL07100TP108
1135	NEWAYGO	EVERGREEN VILLAGE MH PARK	40587	EVERGRVIL40587CH001
1136	NEWAYGO	FOUR SEASONS TRAILER PARK	40369	FOURSEASON40369CH001
1137	NEWAYGO	FREMONT	02490	FREMONT02490TP102
1138	NEWAYGO	FREMONT	02490	FREMONT02490TP103
1139	NEWAYGO	FREMONT	02490	FREMONT02490TP105
1140	NEWAYGO	FREMONT	02490	FREMONT02490TP106
1141	NEWAYGO	FREMONT	02490	FREMONT02490TP107
1142	NEWAYGO	FREMONT	02490	FREMONT02490TP108
1143	NEWAYGO	FREMONT	02490	FREMONT02490TP109
1144	NEWAYGO	FREMONT	02490	FREMONT02490TP110
1145	NEWAYGO	GRANT	02823	GRANT02823TP100
1146	NEWAYGO	HESPERIA	03130	HESPERIA03130CH001
1147	NEWAYGO	HESPERIA	03130	HESPERIA03130WL003
1148	NEWAYGO	HESS LAKE RV AND MOBILE HOME PARK	40370	HESSLAKE40370CH001
1149	NEWAYGO	LAKE FOREST PARK	40368	LAKEFOREST40368CH001
1150	NEWAYGO	NEWAYGO	04710	NEWAYGO04710TP100
1151	NEWAYGO	NEWAYGO	04710	NEWAYGO04710WL007
1152	NEWAYGO	WHITE CLOUD	07060	WHITECLOUD07060WL001
1153	NEWAYGO	WHITE CLOUD	07060	WHITECLOUD07060WL002

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No.	County	Supply Name	WSSN	Location
1154	NEWAYGO	WHITE CLOUD	07060	WHITECLOUD07060WL004
1155	OAKLAND	BAVARIAN SOFTWATER VILLAGE	06077	BAVARVILL06077CH001
1156	OAKLAND	BRIARCLIFF HOMEOWNERS ASSN	02450	BRIARCLIFF02450CH001
1157	OAKLAND	BROOKDALE APARTMENTS	05993	BROKDALEAP05993CH001
1158	OAKLAND	CASS LAKESIDE SUBDIVISION	01230	CASSLKSB01230CH001
1159	OAKLAND	CEDARBROOK ESTATES	40375	CEDARBROOK40375TP100
1160	OAKLAND	CHATEAU VIEW APARTMENTS	01352	CHATEAUAPT01352CH001
1161	OAKLAND	CHILDS LAKE ESTATES MHC	40376	CHILDSLAKE40376TP100
1162	OAKLAND	CLARKSTON LAKE ESTATES	40377	CLARKSTON40377TP100
1163	OAKLAND	COLLEGE HEIGHTS MOBILE HOME PARK	40379	COLLEGEMHP40379TP100
1164	OAKLAND	COLOMBIERE CENTER	01572	COLOMBIERE01572CH001
1165	OAKLAND	COUNTRY ESTATES MHP	40381	COUNTRYMHP40381TP100
1166	OAKLAND	CRANBERRY LAKE MHC	40382	CRANBERRY40382TP100
1167	OAKLAND	CROSSROADS FOR YOUTH	01067	XROADYOUTH01067WL001
1168	OAKLAND	CROSSROADS FOR YOUTH	01067	XROADYOUTH01067WL002
1169	OAKLAND	CROSSROADS FOR YOUTH	01067	XROADYOUTH01067WL004
1170	OAKLAND	CROSSROADS FOR YOUTH	01067	XROADYOUTH01067WL005
1171	OAKLAND	CROSSROADS FOR YOUTH	01067	XROADYOUTH01067WL006
1172	OAKLAND	CROSSROADS FOR YOUTH	01067	XROADYOUTH01067WL009
1173	OAKLAND	CROSSROADS FOR YOUTH	01067	XROADYOUTH01067WL010
1174	OAKLAND	DEERWOOD SUBDIVISION	01773	DEERWDSUB01773TP100
1175	OAKLAND	DEERWOOD SUBDIVISION	01773	DEERWDSUB01773TP101
1176	OAKLAND	DEERWOOD SUBDIVISION	01773	DEERWDSUB01773TP102
1177	OAKLAND	FRANKLIN KNOLLS SUBDIVISION	02440	FRANKLNSUB02440CH001
1178	OAKLAND	GREENS LAKE APARTMENTS	02847	GREENSLAKE02847CH001
1179	OAKLAND	GROVELAND MANOR	40384	GROVELAND40384TP100
1180	OAKLAND	HERITAGE APARTMENTS	03117	HERITAGEAP03117CH001
1181	OAKLAND	HIDDEN LAKE ESTATES	40386	HIDDENLAKE40386TP100
1182	OAKLAND	HIGHLAND GREENS ESTATES	40387	HIGHLANDGR40387TP100
1183	OAKLAND	HIGHLAND GREENS ESTATES	40387	HIGHLANDGR40387TP101
1184	OAKLAND	HIGHLAND HAVEN/WOODSIDE APTS	03138	HHWSAPTS03138CH001
1185	OAKLAND	HIGHLAND HILLS OF HIGHLAND MHC	40388	HIGHLANDMH40388TP001
1186	OAKLAND	HIGHLAND MEADOWVIEW APARTMENTS	03139	HHWSAPTS03139CH001
1187	OAKLAND	HIGHLAND TOWNSHIP	03312	HIGHLNDTWP03312TP100
1188	OAKLAND	HIGHLAND TOWNSHIP	03312	HIGHLNDTWP03312TP300
1189	OAKLAND	HIGHLAND TOWNSHIP	03312	HIGHLNDTWP03312TP500
1190	OAKLAND	HIGHLAND TOWNSHIP	03312	HIGHLNDTWP03312TP600
1191	OAKLAND	HILLVIEW ESTATES SUBDIVISION	03175	HILLVIEW03175TP100
1192	OAKLAND	HOLLY HILLS MHC	40665	HOLLYHILLS40665TP100
1193	OAKLAND	HOLLY, VILLAGE OF	03200	HOLLY03200TP100
1194	OAKLAND	INDEPENDENCE TOWNSHIP	03342	INDEPENTWP03342TP100
1195	OAKLAND	INDEPENDENCE TOWNSHIP	03342	INDEPENTWP03342TP101
1196	OAKLAND	INDEPENDENCE TOWNSHIP	03342	INDEPENTWP03342TP102
1197	OAKLAND	INDEPENDENCE TOWNSHIP	03342	INDEPENTWP03342TP103
1198	OAKLAND	INDEPENDENCE TOWNSHIP	03342	INDEPENTWP03342TP104
1199	OAKLAND	INDEPENDENCE TOWNSHIP	03342	INDEPENTWP03342TP105
1200	OAKLAND	KINGSTON APARTMENTS	06243	KINGSTONAP06243TP100
1201	OAKLAND	KNORRWOOD KNOLLS SUBDIVISION	03666	KNORRSUB03666CH001

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No.	County	Supply Name	WSSN	Location
1202	OAKLAND	LAGUNA VISTA SUBDIVISION	03690	LAGUNASUB03690CH001
1203	OAKLAND	LAKE ANGELA CONDO APTS #3	03691	LK3ANGELA03691TP100
1204	OAKLAND	LAKE ANGELA CONDO APTS #4	03694	LK4ANGELA03694CH001
1205	OAKLAND	LAKE ANGELA CONDO APTS #5	03693	LK5ANGELA03693CH001
1206	OAKLAND	LAKE ANGELA CONDO APTS #6	03696	LK6ANGELA03696CH001
1207	OAKLAND	LAKESHORE HILLTOP APARTMENTS	03753	LKSHRHILAP03753CH001
1208	OAKLAND	LAKESHORE HILLTOP APARTMENTS	03753	LKSHRHILAP03753CH003
1209	OAKLAND	LAKESHORE HILLTOP APARTMENTS	03753	LKSHRHILAP03753CH004
1210	OAKLAND	LAKESHORE HILLTOP APARTMENTS	03753	LKSHRHILAP03753CH005
1211	OAKLAND	LAKESIDE APARTMENTS	01669	LAKESDEAPT01669CH001
1212	OAKLAND	LAKEVIEW CHALET CONDOMINIUMS	05445	LCHALTCON05445CH001
1213	OAKLAND	LONG LAKE VILLAGE SUBDIVISION	03947	LNGLAKESUB03947TP100
1214	OAKLAND	LYON TOWNSHIP	03968	LYONTWP03968TP100
1215	OAKLAND	LYON TOWNSHIP	03968	LYONTWP03968TP101
1216	OAKLAND	MANITOU LAKE APARTMENTS	04042	MANITOUAPT04042CH001
1217	OAKLAND	MEADOW LAKE ESTATES MHC	40612	MEADOWLAKE40612TP100
1218	OAKLAND	MILFORD, VILLAGE OF	04390	MILFORD04390TP100
1219	OAKLAND	MILFORD, VILLAGE OF	04390	MILFORD04390WL002
1220	OAKLAND	MILFORD, VILLAGE OF	04390	MILFORD04390WL004
1221	OAKLAND	NORTH SHORE APARTMENTS	06487	NSHOREAPT06487TP100
1222	OAKLAND	OAK HILL ESTATES MHC	40391	OAKHILLMHC40391CH001
1223	OAKLAND	OAKLAND HUNT SUBDIVISION	05573	OAKLANDSUB05573TP100
1224	OAKLAND	OLD FARM COLONY WATER ASSOCIATION	04960	OLDFARMCWA04960CH001
1225	OAKLAND	ORION LAKE ESTATES MHC	40399	ORIONLAKE40399TP103
1226	OAKLAND	OXFORD TOWNSHIP	05138	OXFORDTWP05138TP100
1227	OAKLAND	OXFORD TOWNSHIP	05138	OXFORDTWP05138TP101
1228	OAKLAND	OXFORD TOWNSHIP	05138	OXFORDTWP05138TP102
1229	OAKLAND	OXFORD TOWNSHIP	05138	OXFORD05138WL004
1230	OAKLAND	OXFORD VILLAGE CONDOMINIUMS	05136	OXFORDCON05136WL001
1231	OAKLAND	OXFORD VILLAGE CONDOMINIUMS	05136	OXFORDCON05136WL002
1232	OAKLAND	OXFORD, VILLAGE OF	05130	OXFORD05130TP100
1233	OAKLAND	PENNY LAKE ESTATES SUBDIVISION	05235	PENNYLKSUB05235CH001
1234	OAKLAND	PINECREST APARTMENTS	05345	PNCRESTAPT05345CH001
1235	OAKLAND	PINECREST APARTMENTS	05345	PNCRESTAPT05345WL005
1236	OAKLAND	PLUM CREEK SUB	05397	PLUMCRKSUB05397TP100
1237	OAKLAND	RIDGE VALLEY OF MILFORD	00838	RDGVLYMLFD00838CH001
1238	OAKLAND	RIDGEWOOD MOBILE HOME PARK INC	40671	RIDGEWOOD40671TP100
1239	OAKLAND	ROCHESTER	05720	ROCHESTER05720TP100
1240	OAKLAND	ROSE HILL CENTER	05816	ROSEHILL05816TP100
1241	OAKLAND	SAN MARINO VILLAS SUBDIVISION	05910	SANMARNOSB05910CH001
1242	OAKLAND	SASHABAW MEADOWS MHP	40575	SASHABAW40575TP100
1243	OAKLAND	SHOREWOOD HILLS SUBDIVISION	06070	SHORWDSUB06070CH001
1244	OAKLAND	SOUTH BLOOMFIELD HIGHLANDS	06080	SBLOOMHIGH06080TP100
1245	OAKLAND	SOUTH BLOOMFIELD HIGHLANDS	06080	SBLOOMHIGH06080TP101
1246	OAKLAND	SOUTH LYON, CITY OF	06110	SOUTHLYON06110TP100
1247	OAKLAND	SOUTHEAST OAKLAND TOWNSHIP	04877	SEOAKLAND04877CH001
1248	OAKLAND	SOUTHEAST OAKLAND TOWNSHIP	04877	SEOAKLAND04877TP100
1249	OAKLAND	SOUTHEAST OAKLAND TOWNSHIP	04877	SEOAKLAND04877WL001

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No.	County	Supply Name	WSSN	Location
1250	OAKLAND	SOUTHEAST OAKLAND TOWNSHIP	04877	SEOAKLAND04877WL002
1251	OAKLAND	SOUTHWEST OAKLAND TOWNSHIP	04878	SWOAKLAND04878CH001
1252	OAKLAND	SOUTHWEST OAKLAND TOWNSHIP	04878	SWOAKLAND04878CH002
1253	OAKLAND	SOUTHWEST OAKLAND TOWNSHIP	04878	SWOAKLAND04878CH003
1254	OAKLAND	SOUTHWEST OAKLAND TOWNSHIP	04878	SWOAKLAND04878CH004
1255	OAKLAND	SOUTHWEST OAKLAND TOWNSHIP	04878	SWOAKLAND04878CH005
1256	OAKLAND	SPRINGROVE MHC	40397	SPRINGROVE40397TP100
1257	OAKLAND	SPRINGS/PORTSMOUTH APARTMENTS	03749	SPGPRTAPT03749CH001
1258	OAKLAND	SPRINGS/PORTSMOUTH APARTMENTS	03749	SPGPRTAPT03749WL003
1259	OAKLAND	SUE KAY APARTMENTS	06443	SUEKAYAPT06443CH001
1260	OAKLAND	SUNNYDALE GARDENS SUBDIVISION	06480	SUNNYDALE06480CH001
1261	OAKLAND	TWIN LAKES SUBDIVISION	06696	TWINLAKES06696TP001
1262	OAKLAND	VILLA AT GREEN LAKE ESTATES	60792	VILLAGREEN60792CH001
1263	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP100
1264	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP101
1265	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP102
1266	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP104
1267	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP105
1268	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP106
1269	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP107
1270	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP108
1271	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP109
1272	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP111
1273	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP112
1274	OAKLAND	WATERFORD TOWNSHIP	06910	WATERFORD06910TP113
1275	OAKLAND	WEST HICKORY HAVEN	67020	WSTHICKORY67020CH001
1276	OAKLAND	WHITE EAGLE SUBDIVISION	07061	WHITEEAGLE07061TP100
1277	OAKLAND	WHITE LAKE TOWNSHIP	07065	WHITELAKE07065TP201
1278	OAKLAND	WHITE LAKE TOWNSHIP	07065	WHITELAKE07065TP202
1279	OAKLAND	WHITE LAKE TOWNSHIP	07065	WHITELAKE07065TP204
1280	OAKLAND	WHITE LAKE TOWNSHIP	07065	WHITELAKE07065TP205
1281	OAKLAND	WHITE LAKE TOWNSHIP	07065	WHITELAKE07065TP206
1282	OAKLAND	WOODBINE SUBDIVISION	07160	WOODBRINE07160TP100
1283	OAKLAND	WOODLANDS ESTATES MHC	40404	WOODLANDS40404CH001
1284	OAKLAND	WYNSTONE SUBDIVISION	07217	WYNSTONE07217TP100
1285	OCEANA	GREENLAWN MOBILE HOME COURT	40405	GREENLAWN40405CH001
1286	OCEANA	GREENLAWN MOBILE HOME COURT	40405	GREENLAWN40405WL001
1287	OCEANA	GREENLAWN MOBILE HOME COURT	40405	GREENLAWN40405WL002
1288	OCEANA	HART	03060	HART03060WL001
1289	OCEANA	HART	03060	HART03060WL002
1290	OCEANA	HART	03060	HART03060WL003
1291	OCEANA	HART	03060	HART03060WL004
1292	OCEANA	HART	03060	HART03060WL005
1293	OCEANA	HYLANDER VALLEY	40406	HYLANDER40406CH001
1294	OCEANA	PENTWATER	05260	PENTWATER05260TP101
1295	OCEANA	SHELBY	06000	SHELBY06000WL001
1296	OCEANA	SHELBY	06000	SHELBY06000WL003
1297	OCEANA	SHELBY	06000	SHELBY06000WL004

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No.	County	Supply Name	WSSN	Location
1298	OGEMAW	COUNTRY VILLAGE ESTATES MHP	40408	CNTRYVLMHP40408CH001
1299	OGEMAW	OGEMAW TOWNSHIP	04935	OGEMAWTWP04935CH001
1300	OGEMAW	PRESCOTT-HIDDEN CREEK MANOR	05570	PRESHCMAN05570CH501
1301	OGEMAW	ROSE CITY, CITY OF	05815	ROSECITY05815TP001
1302	OGEMAW	THE VILLA AT ROSE CITY	64934	VILLAROSE64934CH600
1303	OGEMAW	TWIN PINES MOBILE HOME PARK - Ogemaw	40410	TWINPNMHP40410TP001
1304	OGEMAW	WEST BRANCH TOWNSHIP	07012	WESTBRANCH07012CH001
1305	OGEMAW	WEST BRANCH, CITY OF	07010	WESTBRANCH07010TP104
1306	OGEMAW	WEST BRANCH, CITY OF	07010	WESTBRANCH07010TP105
1307	ONTONAGON	BERGLAND TOWNSHIP	00620	BERGLAND00620WL003
1308	ONTONAGON	BERGLAND TOWNSHIP	00620	BERGLAND00620WL004
1309	ONTONAGON	INTERIOR TOWNSHIP	06680	INTERIOR06680CH001
1310	ONTONAGON	INTERIOR TOWNSHIP	06680	INTERIOR06680CH002
1311	ONTONAGON	MCMILLAN TOWNSHIP	02200	MCMILLAN02200W004
1312	ONTONAGON	MCMILLAN TOWNSHIP	02200	MCMILLAN02200W005
1313	ONTONAGON	ONTONAGON	05030	ONTONAGON05030TP002
1314	ONTONAGON	ROCKLAND TOWNSHIP	05740	ROCKLAND05740TP001
1315	OSCEOLA	CITY OF REED CITY	05650	REEDCITY05650TP102
1316	OSCEOLA	CITY OF REED CITY	05650	REEDCITY05650TP103
1317	OSCEOLA	CITY OF REED CITY	05650	REEDCITY05650TP104
1318	OSCEOLA	CITY OF REED CITY	05650	REEDCITY05650TP105
1319	OSCEOLA	EAGLE VILLAGE	01932	EAGLEVLG01932WL001
1320	OSCEOLA	EAGLE VILLAGE	01932	EAGLEVLG01932WL002
1321	OSCEOLA	EAGLE VILLAGE	01932	EAGLEVLG01932WL005
1322	OSCEOLA	EAGLE VILLAGE	01932	EAGLEVLG01932WL006
1323	OSCEOLA	EAGLE VILLAGE	01932	EAGLEVLG01932WL007
1324	OSCEOLA	EAGLE VILLAGE	01932	EAGLEVLG01932WL008
1325	OSCEOLA	EAGLE VILLAGE	01932	EAGLEVLG01932WL009
1326	OSCEOLA	EVART, CITY OF	02190	EVART02190TP101
1327	OSCEOLA	EVART, CITY OF	02190	EVART02190TP102
1328	OSCEOLA	EVART, CITY OF	02190	EVART02190TP103
1329	OSCEOLA	EVART, CITY OF	02190	EVART02190TP104
1330	OSCEOLA	EVART, CITY OF	02190	EVART02190TP106
1331	OSCEOLA	EVART, CITY OF	02190	EVART02190TP108
1332	OSCEOLA	EVART, CITY OF	02190	EVART02190TP109
1333	OSCEOLA	EVART, CITY OF	02190	EVART02190WL014
1334	OSCEOLA	PINEVIEW HOMES	05351	PINEVIEWHM05351CH001
1335	OSCEOLA	VILLAGE OF MARION	04100	MARION04100TP103
1336	OSCEOLA	VILLAGE OF MARION	04100	MARION04100TP104
1337	OSCEOLA	VILLAGE OF MARION	04100	MARION04100TP105
1338	OSCEOLA	WHITE BIRCH ESTATES	40561	WHITEBREST40561CH001
1339	OSCODA	AUSABLE VALLEY COMMUNITY	00324	AUSABLEVLY00324CH001
1340	OSCODA	AUSABLE VALLEY COMMUNITY	00324	AUSABLEVLY00324CH002
1341	OSCODA	AUSABLE VALLEY COMMUNITY	00324	AUSABLEVLY00324CH003
1342	OSCODA	BIG CREEK/MENTOR UTILITY AUTHORITY	00705	BIGCKMUA00705TP100
1343	OSCODA	GARLAND RESORT	02568	GARLANDRES02568TP100
1344	OSCODA	MAPLEWOOD AND STONE MANORS	04419	MAPLEWDMAN04419CH001
1345	OTSEGO	BEAVER CREEK RESORT	00514	BEAVERCK00514TP001

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No.	County	Supply Name	WSSN	Location
1346	OTSEGO	FAIRWAY LAKE CONDOMINIUMS	02215	FAIRWAYCON02215CH013
1347	OTSEGO	GAYLORD, CITY OF	02600	GAYLORD02600TP103
1348	OTSEGO	GAYLORD, CITY OF	02600	GAYLORD02600TP104
1349	OTSEGO	GAYLORD, CITY OF	02600	GAYLORD02600TP105
1350	OTSEGO	GAYLORD, CITY OF	02600	GAYLORD02600TP106
1351	OTSEGO	GLEN MEADOWS CONDOMINIUMS	02656	GLENMDWS02656TP100
1352	OTSEGO	HORSELL MANOR	06773	HORSELL06773CH001
1353	OTSEGO	LAKEVIEW APARTMENTS	03755	LAKEVIEWAP03755TP100
1354	OTSEGO	NOTTINGHAM FOREST MHP	40414	NOTTINGHAM40414CH001
1355	OTSEGO	SUNSET ESTATES GAYLORD	40416	SUNSETEST40416CH001
1356	OTSEGO	TREETOPS RESORT (TREETOPS NORTH)	06647	TREETOPS06647TP101
1357	OTSEGO	WEST PARK APARTMENTS	05606	WESTPKAPTS05606CH501
1359	OTTAWA	COUNTRY VILLAGE	40418	COUNTRYVLG40418TP100
1360	OTTAWA	CRICKLEWOOD COURT	40425	CRICKLEWD40425CH001
1361	OTTAWA	CROCKERY MOBILE HOME PARK	40417	CROCKERY40417CH001
1362	OTTAWA	CROCKERY MOBILE HOME PARK	40417	CROCKERY40417WL001
1363	OTTAWA	GRAND COUNTRY	40419	GRANDCNTRY40419TP100
1364	OTTAWA	HOLLAND BOARD OF PUBLIC WORKS	03190	HOLLNDBPW03190TP100
1365	OTTAWA	METRON OF LAMONT	62658	METRON62658CH001
1366	OTTAWA	NORTHWEST OTTAWA CO WATER SYST	04847	NWOTTCWS04847TP100
1367	OTTAWA	SHELDON DUNES	06025	SHELDONDUN06025CH001
1368	OTTAWA	TALLMADGE MEADOWS	40426	TALLMADGE40426CH001
1369	OTTAWA	TALLMADGE MEADOWS	40426	TALLMADGE40426WL001
1370	OTTAWA	WEST OLIVE ESTATES	40614	WESTOLIVE40614CH001
1371	PRESQUE ISLE	MILLERSBURG, VILLAGE OF	04397	MILLERSBRG04397TP100
1372	PRESQUE ISLE	ONAWAY, CITY OF	05010	ONAWAY05010TP103
1373	PRESQUE ISLE	ONAWAY, CITY OF	05010	ONAWAY05010TP104
1374	PRESQUE ISLE	POSEN, VILLAGE OF	05543	POSEN05543TP001
1375	PRESQUE ISLE	ROGERS CITY, CITY OF	05770	ROGERSCITY05770TP104
1376	PRESQUE ISLE	ROGERS CITY, CITY OF	05770	ROGERSCITY05770TP106
1377	PRESQUE ISLE	ROGERS CITY, CITY OF	05770	ROGERSCITY05770WL008
1378	ROSCOMMON	BROOK OF HOUGHTON LAKE	00894	BKHOUGHTON00894CH001
1379	ROSCOMMON	COUNTRY VILLAGE APARTMENTS	01652	CNTRYVLAPT01652CH100
1380	ROSCOMMON	DEERFIELD VILLA	01768	DEERFLDVL01768CH501
1381	ROSCOMMON	EMERY PINES	02124	EMERYPINES02124CH001
1382	ROSCOMMON	HOUGHTON HEIGHTS MANOR	03237	HOUGHTONHM03237CH501
1383	ROSCOMMON	HOUGHTON LAKE TIMBER APTS.	03238	HOUGHTONLT03238CH501
1384	ROSCOMMON	KING NURSING & REHABILITATION COMMUNITY	63635	KINGNURSE63635CH001
1385	ROSCOMMON	KIRTLAND COMMUNITY COLLEGE	03661	KIRTLANDCC03661CH001
1386	ROSCOMMON	LAKESHORE EAST CONDOMINIUMS	03145	LKSHECON03145CH501
1387	ROSCOMMON	LAKEVIEW TRAILER PARK	40431	LAKEVWTRL40431CH001
1388	ROSCOMMON	MAPLE GROVE APARTMENTS	04053	MPLGRVAPT04053CH501
1389	ROSCOMMON	NORTH SHORE TRAILER PARK	40432	NORTHSHORE40432CH001
1390	ROSCOMMON	ROSCOMMON, VILLAGE OF	05810	ROSCOMMON05810WL002
1391	ROSCOMMON	ROSCOMMON, VILLAGE OF	05810	ROSCOMMON05810WL003
1392	ROSCOMMON	ROSCOMMON, VILLAGE OF	05810	ROSCOMMON05810WL004
1393	ROSCOMMON	SANDHILL MANOR	05905	SANDHILL05905CH501
1394	ROSCOMMON	WHISPERING OAKS MHP	40435	WHISOAKMHP40435CH001

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No.	County	Supply Name	WSSN	Location
1395	ROSCOMMON	WHITE DEER VILLAGE	07062	WHITEDEER07062CH501
1396	SAGINAW	FREELAND MOBILE HOME PARK	40438	FREELAND040438TP100
1397	SAGINAW	HEMLOCK/RICHLAND TOWNSHIP	03110	HEMRICHTWP03110TP005
1398	SAGINAW	HEMLOCK/RICHLAND TOWNSHIP	03110	HEMRICHTWP03110TP006
1399	SAGINAW	MERRILL, VILLAGE OF	04276	MERRILL04276TP001
1400	SAGINAW	PARKWOOD VILLAGE	40441	PARKWOODVL40441CH001
1401	SAGINAW	SAGINAW, CITY OF	05850	SAGINAW05850TP001
1402	SAGINAW	STODDARD MOBILE HOME COURT	40443	STODDARD40443SS001
1403	SAGINAW	VILLAGE OF CHESANING	01380	CHESANING01380TP001
1404	SAGINAW	VILLAGE OF CHESANING	01380	CHESANING01380TP007
1405	SAGINAW	VILLAGE OF CHESANING	01380	CHESANING01380TP011
1406	SAGINAW	VILLAGE OF CHESANING	01380	CHESANING01380TP013
1407	SANILAC	BROWN CITY	00930	BROWNCTY00930TP001
1408	SANILAC	BROWN CITY	00930	BROWNCTY00930TP002
1409	SANILAC	BUEL HILL MOBILE HOME PARK	40615	BUELHILMHP40615CH001
1410	SANILAC	CARSONVILLE, VILLAGE OF	01180	CARSONVLLE01180TP001
1411	SANILAC	COUNTRY HILL PINES	40591	CNTRYHILL40591CH001
1412	SANILAC	CROSWELL, CITY OF	01690	CROSWELL01690TP005
1413	SANILAC	CROSWELL, CITY OF	01690	CROSWELL01690WL001
1414	SANILAC	DECKERVILLE, VILLAGE OF	01760	DECKERVLG01760SS01
1415	SANILAC	HURON BAY RESORT	40448	HURONBAY40448TP100
1416	SANILAC	LEXINGTON, VILLAGE OF	03850	LEXINGTON03850TP001
1417	SANILAC	LEXINGTON, VILLAGE OF	03850	LEXINGTON03850WL003
1418	SANILAC	MARLETTE, CITY OF	04110	MARLETTE04110CH035
1419	SANILAC	MARLETTE, CITY OF	04110	MARLETTE04110WL004
1420	SANILAC	MINDEN CITY, VILLAGE OF	04410	MINDENCITY04410TP001
1421	SANILAC	PECK, VILLAGE OF	05220	PECK05220TBD
1422	SANILAC	PECK, VILLAGE OF	05220	PECK05220TP008
1423	SANILAC	PECK, VILLAGE OF	05220	PECK05220TP009
1424	SANILAC	PINE TERRACE ESTATES	40446	PINETERR40446CH001
1425	SANILAC	PORT SANILAC, VILLAGE OF	05500	PORTSNILAC05500TP001
1426	SANILAC	SANDPIPER ESTATES	40447	SANDPIPER40447CH001
1427	SANILAC	SANDUSKY, CITY OF	05920	SANDUSKY05920TP001
1428	SANILAC	SUNSET MOBILE HOME PARK - Sanilac	40449	SUNSETMO40449TP001
1429	SCHOOLCRAFT	GERMFASK TOWNSHIP	02625	GERMFASK02625CH001
1430	SCHOOLCRAFT	MANISTIQUE	04040	MANISTIQUE04040TP001
1431	SCHOOLCRAFT	SENEY TOWNSHIP	05991	SENEYTWP05991CH001
1432	SHIAWASSEE	ALAN'S PARK - DURAND	40458	ALANPARKDU40458CH001
1433	SHIAWASSEE	BANCROFT, VILLAGE OF	00370	BANCROFT00370TP001
1434	SHIAWASSEE	CITY OF DURAND	01900	DURAND01900TP001
1435	SHIAWASSEE	COUNTRY MANOR - Shiawassee	40457	CNTRYMAN40457TP001
1436	SHIAWASSEE	COUNTRYSIDE VILLAGE	40450	CNTRYVIL40450TP001
1437	SHIAWASSEE	GREENWOOD APARTMENTS	02855	GREENWOOD02855CH001
1438	SHIAWASSEE	HIDDEN GLEN APARTMENTS	03131	HDNGLENAPT03131CH001
1439	SHIAWASSEE	LAKEVIEW ESTATES	40451	LAKEVWEST40451TP001
1440	SHIAWASSEE	LOOKING GLASS TERRACES APTS.	03946	LOOKGLASS03946CH001
1441	SHIAWASSEE	MOON LAKE ESTATES	40452	MOONLAKE40452CH001
1442	SHIAWASSEE	MORRICE MEADOWS	40643	MORRICE40643TP001

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1443	SHIAWASSEE	NEW LOTHROP, VILLAGE OF	04700	NEWLOTHROP04700TP001
1444	SHIAWASSEE	NORTHWOODS COMMUNITY	40453	NORTHWOODS40453TP001
1445	SHIAWASSEE	NORTHWOODS COMMUNITY	40453	NORTHWOODS40453TP002
1446	SHIAWASSEE	ORCHARD PLACE MANOR APARTMENTS	05039	ORCHARDAPT05039CH001
1447	SHIAWASSEE	OWOSSO, CITY OF	05120	OWOSSO05120TP001
1448	SHIAWASSEE	PERRY, CITY OF	05280	PERRY05280TP001
1449	SHIAWASSEE	PLEASANT VALLEY TRAILER PARK	40454	PLSNTTRL40454TP001
1450	SHIAWASSEE	PLEASANT VALLEY TRAILER PARK	40454	PLSNTTRL40454WL002
1451	SHIAWASSEE	QUIET COVE TRAILER PARK	40456	QUIETCOVE40456CH001
1452	SHIAWASSEE	STONEY CREEK VILLAGE APARTMENTS	06431	STONEYCRK06431CH001
1453	SHIAWASSEE	VILLAGE OF BYRON	01020	BYRON01020TP001
1454	SHIAWASSEE	WOODS AND FIELDS COMMUNITIES EAST	40639	WOODFIELDE40639TP001
1455	SHIAWASSEE	WOODS AND FIELDS COMMUNITIES WEST	40455	WOODFIELDW40455TP001
1456	ST CLAIR	ALGONAC, CITY OF	00110	ALGONAC00110TP100
1457	ST CLAIR	CAPAC, VILLAGE OF	01110	CAPAC01110TP012
1458	ST CLAIR	DUNRENTIN HEIGHTS SUBDIVISION	01905	DUNRENTIN01905TP100
1459	ST CLAIR	IRA TOWNSHIP	03390	IRATWP03390TP100
1460	ST CLAIR	Karegnondi Water Authority	03563	KAREGNONDI03563IN001
1461	ST CLAIR	MARINE CITY	04090	MARINECITY04090TP100
1462	ST CLAIR	MARYSVILLE, CITY OF	04160	MARYSVILLE04160TP100
1463	ST CLAIR	MEMPHIS, CITY OF	04230	MEMPHIS04230TP100
1464	ST CLAIR	PINEWOOD ON THE LAKE MHP	40464	PINEWOOD40464TP100
1465	ST CLAIR	PORT HURON, CITY OF	05480	PORTHURON05480TP100
1466	ST CLAIR	ST. CLAIR WATER AND SEWER AUTHORITY	06284	STCLAIRWSA06284TP100
1467	ST CLAIR	ST. CLAIR, CITY OF	06270	STCLAIR06270TP100
1468	ST CLAIR	SUNRISE MHP	40466	SUNRISEMHP40466CH001
1469	ST CLAIR	YALE, CITY OF	07230	YALE07230TP101
1470	ST CLAIR	YALE, CITY OF	07230	YALE07230TP102
1471	ST CLAIR	YALE, CITY OF	07230	YALE07230TP105
1472	ST JOSEPH	BURR OAK	01000	BURROAK01000TP034
1473	ST JOSEPH	CENTREVILLE	01310	CNTREVILLE01310WL001
1474	ST JOSEPH	CENTREVILLE	01310	CNTREVILLE01310WL003
1475	ST JOSEPH	CENTREVILLE	01310	CNTREVILLE01310WL004
1476	ST JOSEPH	COLON	01540	COLON01540TP004
1477	ST JOSEPH	COLON	01540	COLON01540TP005
1478	ST JOSEPH	COLON	01540	COLON01540TP023
1479	ST JOSEPH	CONSTANTINE	01600	CONSTANTNE01600TP046
1480	ST JOSEPH	GLEN OAKS COMMUNITY COLLEGE DORM	02657	GLENOAKS02657TP100
1481	ST JOSEPH	GOLDEN POND ESTATES	40476	GOLDENPOND40476CH001
1482	ST JOSEPH	HICKORY LANE MOBILE HOME PARK	40469	HICKORYLN40469CH001
1483	ST JOSEPH	KLINES RESORT	40471	KLINESRES40471TP100
1484	ST JOSEPH	LOCKPORT TOWNSHIP	03943	LOCKPORT03943WL002
1485	ST JOSEPH	LOCKPORT TOWNSHIP	03943	LOCKPORT03943WL003
1486	ST JOSEPH	MEMORY LANE MOBILE HOME PARK	40470	MEMORYMHP40470CH001
1487	ST JOSEPH	MENDON	04240	MENDON04240TP005
1488	ST JOSEPH	MENDON	04240	MENDON04240TP034
1489	ST JOSEPH	MICHIANA MOBILE HOME PARK	40472	MICHIANA40472TP100
1490	ST JOSEPH	STURGIS	06440	STURGIS06440SS067

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1491	ST JOSEPH	STURGIS	06440	STURGIS06440TP100
1492	ST JOSEPH	STURGIS	06440	STURGIS06440TP102
1493	ST JOSEPH	SWEET LAKE MOBILE HOME PARK	40474	SWEETLAKE40474CH001
1494	ST JOSEPH	THREE RIVERS	06610	THREERVRS06610CH567
1495	ST JOSEPH	THREE RIVERS	06610	THREERVRS06610WL008
1496	ST JOSEPH	WASHBURN LAKE VILLAGE MHP	40477	WASHBURN40477CH001
1497	ST JOSEPH	WHITE PIGEON	07070	WHITEPIGN07070CH012
1498	ST JOSEPH	WHITE PIGEON	07070	WHITEPIGN07070WL003
1499	TUSCOLA	AKRON	00070	AKRON00070TP001
1500	TUSCOLA	AKRON	00070	AKRON00070TP005
1501	TUSCOLA	CARO CENTER	01140	CAROCENTER01140TP007
1502	TUSCOLA	CARO CENTER	01140	CAROCENTER01140TP009
1503	TUSCOLA	CARO, CITY OF	01130	CAROCITY01130TP001
1504	TUSCOLA	CARO, CITY OF	01130	CAROCITY01130TP008
1505	TUSCOLA	CARO, CITY OF	01130	CAROCITY01130TP009
1506	TUSCOLA	CARO, CITY OF	01130	CAROCITY01130TP011
1507	TUSCOLA	CARO, CITY OF	01130	CAROCITY01130TP012
1508	TUSCOLA	CASS CITY, VILLAGE OF	01220	CASSCITY01220TP001
1509	TUSCOLA	EVERGREEN ESTATES	40484	EVERGREENE40484TP100
1510	TUSCOLA	GAGETOWN, VILLAGE OF	02520	GAGETOWN02520TP004
1511	TUSCOLA	GAGETOWN, VILLAGE OF	02520	GAGETOWN02520TP006
1512	TUSCOLA	KINGSTON, VILLAGE OF	03660	KINGSTON03660TP001
1513	TUSCOLA	KINGSTON, VILLAGE OF	03660	KINGSTONE03660TP002
1514	TUSCOLA	MAYVILLE, VILLAGE OF	04180	MAYVILLE04180TP001
1515	TUSCOLA	MILLINGTON, VILLAGE OF	04400	MILLINGTON04400TP006
1516	TUSCOLA	PEBBLE CREEK MOBILE HOME PARK	40479	PEBBLEMHP40479TP100
1517	TUSCOLA	PINE CREST MOBILE HOME PARK	40481	PINCRSTMHP40481CH001
1518	TUSCOLA	RIVERVIEW PARK	40482	RIVERVWPK40482CH001
1519	TUSCOLA	UNIONVILLE, VILLAGE OF	06730	UNIONVILL06730WL001
1520	TUSCOLA	UNIONVILLE, VILLAGE OF	06730	UNIONVILL06730WL002
1521	TUSCOLA	UNIONVILLE, VILLAGE OF	06730	UNIONVILL06730WL003
1522	TUSCOLA	VASSAR, CITY OF	06780	VASSAR06780TP008
1523	TUSCOLA	VASSAR, CITY OF	06780	VASSAR06780TP009
1524	TUSCOLA	VASSAR, CITY OF	06780	VASSAR06780TP010
1525	TUSCOLA	VASSAR, CITY OF	06780	VASSAR06780TP011
1526	TUSCOLA	WOOD VALLEY	40480	WOODVALLEY40480WL001
1527	TUSCOLA	WOOD VALLEY	40480	WOODVALLEY40480WL002
1528	VAN BUREN	APPLEWOOD	40668	APPLEWOOD40668CH001
1529	VAN BUREN	BANGOR	00380	BANGOR00380TP003
1530	VAN BUREN	BANGOR	00380	BANGOR00380TP007
1531	VAN BUREN	BANGOR	00380	BANGOR00380TP008
1532	VAN BUREN	BANGOR	00380	BANGOR00380TP009
1533	VAN BUREN	COUNTRY HOLIDAY ESTATES	40488	CNTRYHOLI40488CH001
1534	VAN BUREN	DECATUR	01750	DECATUR01750CH034
1535	VAN BUREN	DECATUR	01750	DECATUR01750WL002
1536	VAN BUREN	DEVAN MOBILE HOME PARK	40490	DEVANMHP40490CH001
1537	VAN BUREN	GENERAL WHITE APARTMENTS	00796	GENWHITE00796CH012
1538	VAN BUREN	GOBLES	02680	GOBLES02680SS456

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1539	VAN BUREN	HARTFORD	03070	HARTFORD03070TP456
1540	VAN BUREN	LANTERN BAY TREATMENT CENTER	02195	LANTERNBAY02195CH234
1541	VAN BUREN	LAWRENCE	03820	LAWRENCE03820TP001
1542	VAN BUREN	LAWRENCE	03820	LAWRENCE03820TP002
1543	VAN BUREN	LAWRENCE	03820	LAWRENCE03820TP004
1544	VAN BUREN	LAWTON	03830	LAWTON03830CH001
1545	VAN BUREN	LAWTON	03830	LAWTON03830WL004
1546	VAN BUREN	MATTAWAN	04177	MATTAWAN04177TP012
1547	VAN BUREN	MATTAWAN	04177	MATTAWAN04177TP034
1548	VAN BUREN	MEADOW BROOK VILLAGE	40605	MEADOWVIL40605CH001
1549	VAN BUREN	MEADOW WOODS N/R CENTER	60675	MEADOWWDS60675CH034
1550	VAN BUREN	MITCHELL BROTHERS EAST	40606	MITCHELL40606CH001
1551	VAN BUREN	PAW PAW	05210	PAWPAW05210TP068
1552	VAN BUREN	PHELPS MOBILE HOME VILLA	40494	PHELPSVIL40494CH001
1553	VAN BUREN	PORT OF CALL - WEST	40491	PORTCALLW40491CH001
1554	VAN BUREN	RUSH LAKE MHP/CAMPGROUND	40495	RUSHLAKE40495CH001
1555	VAN BUREN	SHADY BROOK MOBILE HOME PARK	40496	SHADYBROOK40496CH001
1556	VAN BUREN	SOUTH HAVEN	06100	SOUTHHAVEN06100TP101
1557	VAN BUREN	THREE MILE LAKE TRAILER PARK	40497	THREEMILE40497CH001
1558	VAN BUREN	VIKING RIVER MOBILE HOME PARK	40498	VIKINGMHP40498CH001
1559	VAN BUREN	WHISPERING PINES ESTATES	40500	WHISPNEST40500CH001
1560	VAN BUREN	WOLF LAKE MOBILE HOME PARK	40501	WOLFLAKE40501CH001
1561	WASHTENAW	ANN ARBOR	00220	ANNARBOR00220TP001
1562	WASHTENAW	AUSTIN COMMONS II	00322	AUSTINCOM00322TP001
1563	WASHTENAW	BARTON HILLS	00430	BARTONHILL00430TP001
1564	WASHTENAW	BARTON HILLS	00430	BARTONHILL00430TP002
1565	WASHTENAW	CHELSEA	01370	CHELSEA01370TP001
1566	WASHTENAW	COPPER MEADOWS	01631	COPPERMDWS01631TP001
1567	WASHTENAW	DEXTER	01810	DEXTER01810TP002
1568	WASHTENAW	DEXTER	01810	DEXTER01810TP003
1569	WASHTENAW	HARBOR COVE APARTMENTS	03001	HRBRCOVE03001TP001
1570	WASHTENAW	LOCH ALPINE SANITARY AUTHORITY	03940	LOCHALPSA03940TP001
1571	WASHTENAW	MANCHESTER	04020	MANCHESTER04020TP001
1572	WASHTENAW	MILAN	04380	MILAN04380TP001
1573	WASHTENAW	NORTHFIELD ESTATES	40594	NORTHFIELD40594TP001
1574	WASHTENAW	NORTHVILLE CROSSING	40657	NORTHVILLE40657TP001
1575	WASHTENAW	ORCHARD GROVE	40503	ORCHARDGR40503TP001
1576	WASHTENAW	PLEASANT LAKE MOBILE HOME PARK	40504	PLSNTMHP40504CH001
1577	WASHTENAW	REGENCY AT WHITMORE LAKE	67101	REGENCY67101CH001
1578	WASHTENAW	RIVER RIDGE - SALINE	40663	RIVERRDGSA40663TP001
1579	WASHTENAW	SALINE	05900	SALINE05900TP001
1580	WASHTENAW	SALINE VALLEY FARMS	05901	SALINEVF05901TP001
1581	WASHTENAW	SISTERS OF MARY, MOTHER OF EUCHARIST	06074	SISMARY06074TP001
1582	WASHTENAW	ST. LOUIS CENTER	06325	STLOUISCEN06325CH001
1583	WASHTENAW	ST. LOUIS CENTER	06325	STLOUISCEN06325CH002
1584	WASHTENAW	ST. LOUIS CENTER	06325	STLOUISCEN06325CH003
1585	WASHTENAW	SYLVAN TOWNSHIP	06531	SYLVANTWP06531TP001
1586	WASHTENAW	THORNTON FARMS	06594	THORNTON06594TP001

Table 1a - Public Water Supply - CWS Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1587	WASHTENAW	VILLAGE AT EAGLE GARDENS	07099	VLGEAGLE07099TP001
1588	WASHTENAW	WESTBROOK APARTMENTS	07035	WESTBROOK07035TP001
1589	WAYNE	GREAT LAKES WATER AUTHORITY	02838	GREATLAKES02838TP100
1590	WAYNE	GREAT LAKES WATER AUTHORITY	02838	GREATLAKES02838TP101
1591	WAYNE	GREAT LAKES WATER AUTHORITY	02838	GREATLAKES02838TP102
1592	WAYNE	GREAT LAKES WATER AUTHORITY	02838	GREATLAKES02838TP103
1593	WAYNE	GREAT LAKES WATER AUTHORITY	02838	GREATLAKES02838TP104
1594	WAYNE	GROSSE POINTE FARMS	02890	GROSSEPTFM02890TP100
1595	WAYNE	WYANDOTTE	07210	WYANDOTTE07210TP100
1596	WEXFORD	BUCKLEY, VILLAGE OF	00970	BUCKLEY00970TP100
1597	WEXFORD	CADILLAC, CITY OF	01030	CADILLAC01030TP011
1598	WEXFORD	CADILLAC, CITY OF	01030	CADILLAC01030TP100
1599	WEXFORD	CEDAR CREEK TOWNSHIP	01258	CEDARCKTWP01258TP001
1600	WEXFORD	CURRY HOUSE ASSISTED LIVING CENTER	61700	CURRYHOUSE61700TP101
1601	WEXFORD	HARING CHARTER TOWNSHIP	03018	HARINGCHTR03018TP101
1602	WEXFORD	MANTON, CITY OF	04050	MANTON04050TP003
1603	WEXFORD	MANTON, CITY OF	04050	MANTON04050TP005
1604	WEXFORD	MESICK, VILLAGE OF	04310	MESICK04310CH501

Footnotes:
WSSN = Water Supply Serial Number

Location: The location is a combination of an acronym of the supply name, the WSSN, and the site code. The site code includes an abbreviation of the site type as detailed below.
CH = Combined Header
SS = Sample Site
TP = Treatment Plant
WL = Well

Table 1b - Public Water Supply - School Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1	ALCONA	ALCONA COMMUNITY HIGH SCHOOL	2010901	ALCONAHIGH-2010901-1
2	ALCONA	ALCONA COMMUNITY HIGH SCHOOL	2010901	ALCONAHIGH-2010901-2
3	ALCONA	ALCONA ELEMENTARY SCHOOL	2003201	ALCONAELEM-2003201
4	ALGER	AUTRAIN-ONOTA PUBLIC SCHOOL	2007502	AUTRAINPS-2007502
5	ALGER	MUNISING BAPTIST SCHOOL	2015002	MUNISING-2015002
6	ALLEGAN	BENTHEIM ELEMENTARY	2024003	BENTHEIMES-2024003
7	ALLEGAN	BLUE STAR ELEMENTARY SCHOOL	2023803	BLUESTAR-2023803
8	ALLEGAN	Community Action Early Head Start	2061703	COMMACTEHS-2061703
9	ALLEGAN	DORR ELEMENTARY SCHOOL	2003803	DORRELEM-2003803
10	ALLEGAN	EAST MARTIN CHRISTIAN SCHOOL	2036003	EMARTINSCH-2036003
11	ALLEGAN	GLENN SCHOOL	2025003	GLENNSCH-2025003
12	ALLEGAN	HAMILTON ELEMENTARY SCHOOL	2024303	HAMILTONES-2024303
13	ALLEGAN	HAMILTON HIGH SCHOOL	2060403	HAMILTONHS-2060403
14	ALLEGAN	HAMILTON HIGH SCHOOL	2060503	HAMILTONHS-2060503
15	ALLEGAN	HAMILTON MIDDLE SCHOOL	2024403	HAMILTONMS-2024403
16	ALLEGAN	HAMILTON MIDDLE SCHOOL	2053303	HAMILTONMS-2053303
17	ALLEGAN	HOPKINS ELEMENTARY SCHOOL	2002903	HOPKINSES-2002903-1
18	ALLEGAN	HOPKINS ELEMENTARY SCHOOL	2002903	HOPKINSES-2002903-2
19	ALLEGAN	HOPKINS HIGH SCHOOL	2057603	HOPKINSHS-2057603
20	ALLEGAN	HOPKINS MIDDLE SCHOOL	2003003	HOPKINSMS-2003003
21	ALLEGAN	Paris Ridge Elementary School	2065103	PARISRIDGE-2065103-1
22	ALLEGAN	Paris Ridge Elementary School	2065103	PARISRIDGE-2065103-2
23	ALLEGAN	PULLMAN ELEMENTARY SCHOOL	2003503	PULLMANES-2003503
24	ALLEGAN	SANDYVIEW ELEMENTARY SCHOOL	2023903	SANDYELEM-2023903
25	ALLEGAN	ST MARYS VISIT COMMUNITY CTR	2002703	STMARYCOMM-2002703
26	ALLEGAN	ST STANISLAUS SCHOOL	2004103	STANISLAUS-2004103
27	ALLEGAN	SYCAMORE ELEMENTARY SCHOOL	2003103	SYCAMOREES-2003103
28	ALPENA	HINKS SCHOOL	2013004	HINKSSCH-2013004
29	ALPENA	SANBORN ELEMENTARY SCHOOL	2002904	SANBORNELE-2002904
30	ALPENA	WILSON COMMUNITY SCHOOL	2012604	WILSONCOMM-2012604
31	ANTRIM	ALBA ELEMENTARY SCHOOL	2004805	ALBAELEM-2004805
32	ANTRIM	NORTH CENTRAL ACADEMY	2010605	NCENTRAL-2010605
33	ARENAC	BAY ARENAC ISD	2019706	BAYARENAC-2019706
34	ARENAC	STANDISH/STERLING H.S.	2020706	STANDISHHS-2020706
35	ARENAC	Standish-Sterling Central Elementary	2000206	STANDISHES-2000206-1
36	ARENAC	Standish-Sterling Central Elementary	2000206	STANDISHES-2000206-2
37	ARENAC	STERLING ELEM SCHOOL	2002006	STERLINGES-2002006
38	BARAGA	FORD FORESTRY CENTER	2005207	FORDFOREST-2005207
39	BARRY	BARRY COUNTY CHRISTIAN SCHOOL	2026808	BARRYCHRIS-2026808
40	Barry	Cedar Creek Bible Church	2014408	CEDARCRK-2014408
41	BARRY	FAITH BAPTIST CHURCH	2029908	FAITHCHRIST-2029908
42	BARRY	LAKEWOOD PUBLIC SCHOOLS/WOODLAND ELEM	2009908	LAKEWOODES-2009908-1
43	BARRY	LAKEWOOD PUBLIC SCHOOLS/WOODLAND ELEM	2009908	LAKEWOODES-2009908-2
44	BENZIE	BENZIE CENTRAL HIGH/MIDDLE SCHOOL	2001110	BENZIEMHS-2001110
45	BENZIE	LAKE ANN ELEMENTARY	2014210	LAKEANNELE-2014210
46	BENZIE	NEW COVENANT CHRISTIAN ACADEMY	2017610	NEWCOVCHRIST-2017610
47	BENZIE	PLATTE RIVER ELEMENTARY SCHOOL	2002110	PLATTEELEM-2002110
48	BERRIEN	BERRIEN	2065011	CEDARLANE-2065011

Table 1b - Public Water Supply - School Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
49	BERRIEN	BROOKVIEW SCHOOL	2057911	BROOKVIEW-2057911
50	BERRIEN	COUNTRYSIDE - MILLBURG EARLY LEARNING CENTER	2006911	CNTRYMELC-2006911
51	BERRIEN	COUNTRYSIDE ACADEMY	2068111	CNTRYACAD-2068111-1
52	BERRIEN	COUNTRYSIDE ACADEMY	2068111	CNTRYACAD-2068111-2
53	BERRIEN	GRACE CHRISTIAN SCHOOL	2011411	GRACECHRIS-2011411
54	BERRIEN	RIVER SCHOOL, SODUS TOWNSHIP #5	2012111	RVRSCHSODU-2012111
55	BERRIEN	RIVERSIDE HAGAR #6 SCHOOL	2016911	RVRHAGAR-2016911
56	BRANCH	BRANCH CO. HEADSTART, GIRARD	2018612	BRANCHHS-2018612
57	BRANCH	LAKELAND ELEMENTARY SCHOOL	2009812	LAKELANDES-2009812
58	CALHOUN	BEADLE LAKE ELEMENTARY	2005613	BEADLEELEM-2005613
59	CALHOUN	CALHOUN INTERM. SCHOOL DIST.	2018813	CALHOUNINT-2018813
60	CALHOUN	DORIS KLAUSSEN DEV CENTER	2002413	DORISKLAUS-2002413
61	CALHOUN	EAST LEROY ELEMENTARY	2019213	ELEROYELEM-2019213
62	CALHOUN	Harper Creek Administration Building	2022013	HARPERADM-2022013
63	CALHOUN	MAR-LEE SCHOOL	2003813	MARLEESCH-2003813
64	CALHOUN	MARSHALL ACADEMY	2040513	MARSHALLACAD-2040513
65	CALHOUN	NORTH PENNFIELD SCHOOL	2004313	NPENFIELDSCH-2004313
66	CALHOUN	PURDY SCHOOL	2004213	PURDYSCHOOL-2004213
67	CALHOUN	SONOMA ELEMENTARY SCHOOL	2005413	SONOMAELEM-2005413
68	CALHOUN	WATTLES PARK ELEMENTARY SCHOOL	2006713	WATTLESELE-2006713
69	CASS	EAGLE LAKE ELEM SCHOOL	2007914	EAGLELAKE-2007914-1
70	CASS	EAGLE LAKE ELEM SCHOOL	2007914	EAGLELAKE-2007914-2
71	CASS	HOWARD ELEMENTARY SCHOOL	2008014	HOWARDELEM-2008014
72	CASS	KINCHELOE ELEMENTARY SCHOOL	2004114	KINCHELOE-2004114
73	CASS	VAN BUREN-CASS	2007614	BROOKSIDE-2007614
74	CHARLEVOIX	BEAVER ISLAND COMMUNITY SCHOOL	2001615	BEAVERCOMM-2001615
75	CHARLEVOIX	BOYNE FALLS PUBLIC SCHOOL	2017215	BOYNEFALLS-2017215
76	CHARLEVOIX	CHARLEVOIX HIGH SCHOOL	2017815	CHARLEHIGH-2017815-1
77	CHARLEVOIX	CHARLEVOIX HIGH SCHOOL	2017815	CHARLEHIGH-2017815-2
78	CHARLEVOIX	CONCORD ACADEMY BOYNE	2015715	CONCORDAC-2015715
79	CHEBOYGAN	CHEBOYGAN AREA SCHOOLS ADMIN. BLDG.	2008216	CHEBOYGAN-2008216
80	CHEBOYGAN	INLAND LAKES SCHOOL	2008416	INLANDSCH-2008416
81	CHEBOYGAN	NORTHERN MICHIGAN BAPTIST BIBLE CHURCH	2007116	NMIBAPTIST-2007116
82	CHEBOYGAN	WOLVERINE ELEMENTARY SCHOOL	2005716	WOLVELEM-2005716
83	CHEBOYGAN	WOLVERINE HIGH SCHOOL	2005816	WOLVHIGH-2005816
84	CHIPPEWA	DRUMMOND ISLAND ELEM SCHOOL	2051417	DRUMMONDES-2051417
85	CHIPPEWA	LAKE SUPERIOR ACADEMY	2008717	LKSUPRACAD-2008717
86	CHIPPEWA	MAPLEWOOD BAPTIST ACADEMY	2054717	MAPLEBAPAC-2054717
87	CHIPPEWA	PICKFORD PUBLIC SCHOOLS	2004917	PICKFORDPS-2004917
88	CHIPPEWA	SOO TWP. SCHOOL	2031017	SOOTWPSCH-2031017
89	CHIPPEWA	WHITEFISH TOWNSHIP SCHOOL	2000217	WHITEFISH-2000217
90	CLARE	CLARE-GLADWIN RESD	2002018	CLAREGLAD-2002018
91	CLARE	Clare-Gladwin RESD Magnus Center	2030118	CLAREGLADM-2030118
92	CLARE	Farwell Alternative Education	2029018	FARWELLALT-2029018
93	CLARE	Mid Mi. Community College, RADTECH	2018418	MIDMICCRAD-2018418
94	CLARE	MID MICH COLLEGE / TECH	2022518	MIDMICCTEC-2022518
95	CLARE	MID-MICHIGAN COMM COLLEGE	2002318	MIDMICOCOL-2002318
96	CLARE	William J Magnus Center	2030718	WILLMAGCEN-2030718

Table 1b - Public Water Supply - School Site Information
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No.	County	Supply Name	WSSN	Location
97	CLINTON	EUREKA ELEMENTARY SCHOOL	2003819	EUREKAELEM-2003819
98	CLINTON	OVID-ELSIE HIGH SCHOOL	2015919	OVIELSHIGH-2015919-1
99	CLINTON	OVID-ELSIE HIGH SCHOOL	2015919	OVIELSHIGH-2015919-2
100	CLINTON	PEWAMO-WESTPHALIA COMMUNITY SCHOOLS	2006819	PEWWESCOMM-2006819-1
101	CLINTON	PEWAMO-WESTPHALIA COMMUNITY SCHOOLS	2006819	PEWWESCOMM-2006819-2
102	CLINTON	RILEY ELEMENTARY SCHOOL	2005919	RILEYELEM-2005919
103	CLINTON	ST. PETER LUTHERAN CHURCH	2025219	STPETERLTH-2025219
104	CLINTON	WACOUSTA SCHOOL CAFETERIA	2002919	WACOUSTA-2002919
105	CRAWFORD	GRAYLING HIGH SCHOOL	2006420	GRAYLINGHS-2006420
106	CRAWFORD	KIRTLAND COMMUNITY COLLEGE HSETC	2022320	KIRTLANDCC-2022320
107	DELTA	BIG BAY DE NOC SCHOOL DIST	2013421	BIGBAYDIST-2013421
108	DELTA	DELTA-MENOMINEE	2013521	TRITWPSCH-2013521
109	DELTA	MID-PENINSULA SCHOOL	2017021	MIDPENINSC-2017021
110	DELTA	SOO HILL SCHOOL	2013221	SOCHILLSCH-2013221
111	DICKINSON	NORTH DICKINSON SCHOOL	2004622	NDICKINSON-2004622
112	EATON	DIMONDALE ELEMENTARY SCHOOL	2009323	DIMONDALELEM-2009323
113	EATON	GRAND LEDGE PUBLIC SCHOOLS-OPERATIONS BLDG	2025723	GRANDLEDGE-2025723
114	EATON	HAYES SCHOOL	2005223	HAYESCHOOL-2005223
115	EATON	ISLAND CITY ACADEMY	2026723	ISLANDACAD-2026723
116	EATON	MAPLE VALLEY JR & SR HS	2011623	MAPLEVLYHS-2011623
117	EMMET	ALANSON PUBLIC SCHOOL	2028824	ALANSONPUB-2028824
118	EMMET	CONCORD ACADEMY OF PETOSKEY	2029524	CONCORDAC-2029524
119	EMMET	PELLSTON ELEMENTARY SCHOOL	2009524	PELLSTONES-2009524
120	EMMET	PELLSTON HIGH/MIDDLE SCHOOL	2009624	PELLSTONHS-2009624
121	EMMET	ST. MICHAEL ACADEMY	2025524	STMICHAEL-2025524
122	GENESEE	ARGENTINE ELE SCHOOL	2071125	ARGENTINE-2071125
123	GENESEE	ARMSTRONG MIDDLE SCHOOL	2024125	ARMSTRONG-2024125
124	GENESEE	ATHERTON COMMUNITY SCHOOLS	2052325	ATHERTONCS-2052325
125	GENESEE	ATHERTON ELEMENTARY SCHOOL	2052425	ATHERTONCS-2052425
126	GENESEE	BUFFEY SCHOOL	2025125	BUFFEYSCH-2025125
127	GENESEE	BURGTORF EDUCATION CENTER	2022625	BURGTORFEC-2022625
128	GENESEE	DIECK ELEMENTARY	2045225	DIECKELEM-2045225
129	GENESEE	FAITH BAPTIST SCHOOLS	2079925	FAITHBAP-2079925
130	GENESEE	FIEDLER SCHOOL	2023925	FIELDERSCH-2023925
131	GENESEE	FLORENCE M SIPLE ELEM SCHOOL	2015525	FLORENCEES-2015525
132	GENESEE	GAINES ELEMENTARY SCHOOL	2063525	GAINESELEM-2063525
133	GENESEE	GATES ELEM SCHOOL	2044525	GATESELEM-2044525
134	GENESEE	GENESEE ACADEMY	2145325	GENESSEACD-2145325
135	GENESEE	GEORGE A LACURE ELEM SCHOOL	2117425	GEORGEELEM-2117425
136	GENESEE	GOODRICH ELEMENTARY REID	2057325	GOODRICHES-2057325
137	GENESEE	GOODRICH HIGH SCHOOL	2057425	GOODRICHHS-2057425
138	GENESEE	GOODRICH MIDDLE SCHOOL	2155125	GOODRICHMS-2155125
139	GENESEE	LAKE FENTON HIGH SCHOOL	2156225	LKFENTONHS-2156225
140	GENESEE	LAKE FENTON MIDDLE SCHOOL	2070225	LKHIGHMIDD-2070225
141	GENESEE	LAKEVILLE HIGH SCHOOL	2027625	LKVILLEHS-2027625
142	GENESEE	LAKEVILLE MIDDLE SCHOOL	2073825	LKVILLEMS-2073825
143	GENESEE	MICHIGAN COMMUNITY SVCS. INC.	2041525	MICHCOMM-2041525
144	GENESEE	MOORE ELEMENTARY SCHOOL	2021525	MOOREELEM-2021525

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No.	County	Supply Name	WSSN	Location
145	GENESEE	OAKTREE ELEMENTARY	2147625	OAKTREEELE-2147625
146	GENESEE	RANKIN ELEMENTARY	2064825	RANKINELEM-2064825
147	GENESEE	SOUTHERN LK CAMPUS	2039425	SOUTHLKCAM-2039425
148	GENESEE	ST THOMAS MORE ACADEMY	2128325	STTHOMACAD-2128325
149	GENESEE	TORREY HILL INTERMEDIATE SCHOOL	2040625	TORREYHILL-2040625
150	GENESEE	WEST SHORE ELEMENTARY	2068525	WSHOREELEM-2068525
151	Gladwin	Gladwin Community Schools - Alt Education	2011426	GLADWINALT-2011426
152	GLADWIN	SKEELS CHRISTIAN SCHOOL	2004226	SKEELSCHR-2004226-1
153	GLADWIN	SKEELS CHRISTIAN SCHOOL	2004226	SKEELSCHR-2004226-2
154	GRAND TRAVERSE	BLAIR ELEM SCHOOL	2026628	BLAIRELEM-2026628
155	GRAND TRAVERSE	COURTADE ELEM SCHOOL	2025428	COURTADEES-2025428
156	GRAND TRAVERSE	FIFE LAKE ELEMENTARY SCHOOL	2003628	FIFELAKEES-2003628
157	GRAND TRAVERSE	LONG LAKE ELEM SCHOOL	2004428	LONGLAKEES-2004428
158	GRAND TRAVERSE	OLD MISSION PENINSULA SCHOOL	2000728	OLDMISSION-2000728
159	GRAND TRAVERSE	SILVER LAKE ELEM SCH	2026928	SILVERLKES-2026928
160	GRAND TRAVERSE	ST MARYS SCHOOL OF HANNAH	2004028	STMARYSCH-2004028
161	GRAND TRAVERSE	TCAPS/BERTHA VOS SCHOOL	2000928	TCAPSBVSCH-2000928
162	GRAND TRAVERSE	TCAPS/INTERLOCHEN ELEM SCHOOL	2006028	TCAPSINTES-2006028
163	GRAND TRAVERSE	WESTWOODS ELEM SCHOOL	2026428	WESTWOODS-2026428
164	GRAND TRAVERSE	WOODLAND SCHOOL	2021728	WOODLAND-2021728
165	GRATIOT	COUNTRYSIDE CHRISTIAN SCHOOL	2010929	CTRYCHRIST-2010929
166	GRATIOT	FULTON ALTERNATIVE EDUC SCH	2014429	FULTONALT-2014429
167	GRATIOT	FULTON SCHOOLS	2004029	FULTONSCH-2004029-1
168	GRATIOT	FULTON SCHOOLS	2004029	FULTONSCH-2004029-2
169	HILLSDALE	BIRD LAKE BIBLE SCHOOL	2030230	BIRDLAKE-2030230
170	HILLSDALE	CAMDEN-FRONTIER SCHOOL	2000630	CAMDENFRON-2000630
171	HILLSDALE	COUNTRYSIDE MONTESSORI SCHOOL	2030930	CNTRYMONT-2030930
172	HILLSDALE	FREEDOM FARM CHRISTIAN SCHOOL	2006030	FREEDOMFCS-2006030
173	HILLSDALE	NORTH ADAMS PUBLIC SCHOOLS	2003130	NADAMSSCH-2003130
174	HILLSDALE	PITTSFORD HIGH SCHOOL	2002930	PITTSFORD-2002930-1
175	HILLSDALE	PITTSFORD HIGH SCHOOL	2002930	PITTSFORD-2002930-2
176	HOUGHTON	COPPER CO. CHRISTIAN SCHOOL	2007731	COPPERSCH-2007731
177	HOUGHTON	EARL B. HOLMAN SCHOOL	2002631	EARLHOLMAN-2002631
178	HURON	HURON AREA TECH CENTER	2024232	HURONTECH-2024232
179	HURON	LAKER ELEMENTARY SCHOOL	2034332	LAKERELEM-2034332
180	HURON	LAKERS SCHOOLS-JR.& SR. HIGH	2017832	LAKERHIGH-2017832
181	HURON	USA Elementary School	2034432	USAELEM-2034432
182	HURON	USA HIGH SCHOOL	2019132	USAHIGH-2019132
183	INGHAM	ALAIEDON ELEMENTARY SCHOOL	2002833	ALAIEDONELEM-2002833
184	INGHAM	CAPITAL AREA CAREER CENTER	2009033	CAPITALCENT-2009033
185	INGHAM	HEARTWOOD SCHOOL	2008933	HEARTWOODSCH-2008933
186	INGHAM	MEMORIAL LUTHERAN SCHOOL	2001533	MEMLUTHSCH-2001533
187	INGHAM	N AURELIUS ELEMENTARY SCHOOL	2002633	NAURELIUSELE-2002633
188	IONIA	BERLIN FRACTIONAL #3 COON	2008934	BERLINCOON-2008934
189	IONIA	EIGHT CAP IONIA CO. OUTREACH	2008634	EIGHTCAP-2008634
190	IONIA	FAITH COMMUNITY CHRISTIAN SCH.	2023134	FAITHCOMCS-2023134
191	IONIA	HAYNOR SCHOOL	2003234	HAYNORSCH-2003234
192	IONIA	R B BOYCE ELEMENTARY SCHOOL	2001834	RBBOYCEES-2001834

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No.	County	Supply Name	WSSN	Location
193	IONIA	SCHOOL OF MISSIONARY AVIATION TECH.	2027034	SCHAVITECH-2027034
194	IOSCO	Hale Area Schools	2021135	HALESCHOOL-2021135
195	IOSCO	IOSCO RESA	2022735	ISOCARESA-2022735
196	IOSCO	WHITTEMORE/PRESCOTT SCHOOL COMPLEX	2021235	WHITTESCH-2021235-4
197	IOSCO	WHITTEMORE/PRESCOTT SCHOOL COMPLEX	2021235	WHITTESCH-2021235-5
198	IOSCO	WHITTEMORE/PRESCOTT SCHOOL COMPLEX	2021235	WHITTESCH-2021235-6
199	IOSCO	WHITTEMORE/PRESCOTT SCHOOL COMPLEX	2021235	WHITTESCH-2021235-7
200	ISABELLA	BEAL CITY PUBLIC SCHOOLS	2004037	BEALCTYPS-2004037-01
201	ISABELLA	BEAL CITY PUBLIC SCHOOLS	2004037	BEALCTYPS-2004037-02
202	ISABELLA	BEAL CITY PUBLIC SCHOOLS	2004037	BEALCTYPS-2004037-03
203	ISABELLA	ODYSSEY HIGH SCHOOL	2013037	ODYSSEYHS-2013037
204	ISABELLA	ST JOSEPH SCHOOL	2004237	STJOSEPHSC-2004237
205	ISABELLA	WEIDMAN ELEMENTARY	2003937	WEIDMANELE-2003937
206	ISABELLA	WINN ELEMENTARY SCHOOL	2004537	WINNELEM-2004537
207	JACKSON	ACKERSON LAKE EDUCATION CTR	2010438	ACKERSONED-2010438
208	JACKSON	BEAN ELEMENTARY #2	2072238	BEANELEM-2072238
209	JACKSON	COLUMBIA COMMUNITY ED CENTER	2004338	COLUMBIAEC-2004338
210	JACKSON	COLUMBIA HIGH SCHOOL	2004438	COLUMBIAHS-2004438-1
211	JACKSON	COLUMBIA HIGH SCHOOL	2004438	COLUMBIAHS-2004438-2
212	JACKSON	EAST JACKSON ELEMENTARY SCHOOL	2000938	EJACKSONES-2000938
213	JACKSON	FLORA LIST CHILD CARE	2006338	FLORACHILD-2006338
214	JACKSON	HAN-HORTON ELEMENTARY - MARK D. HUBBARD	2073938	HORTONES-2073938
215	JACKSON	HANOVER-HORTON COMPLEX	2051238	HORTONCOMP-2051238-1
216	JACKSON	HANOVER-HORTON COMPLEX	2051238	HORTONCOMP-2051238-2
217	JACKSON	KIDDER MIDDLE SCHOOL	2014138	KIDDERMIDD-2014138
218	JACKSON	MICHIGAN CENTER HIGH SCHOOL	2001538	MICHCTRHS-2001538
219	JACKSON	NORTHWEST HIGH SCHOOL	2014038	NORTHWEST-2014038-1
220	JACKSON	NORTHWEST HIGH SCHOOL	2014038	NORTHWEST-2014038-2
221	JACKSON	WOODVILLE COMMUNITY CENTER	2034938	WOODVILLE-2034938
222	KALAMAZOO	Alamo Elementary School	2033539	ALAMOELEM-2033539
223	KALAMAZOO	Climax-Scotts Elementary	2013539	CLIMSCOTES-2013539
224	KALAMAZOO	Gull Lake Schools, Kellogg Elementary	2013339	GULLLAKEELEM-2013339
225	KALAMAZOO	Gull Lake Schools-40th St Early Learning Ctr	2017839	GULLLAKEEARL-2017839
226	KALAMAZOO	Prairie Baptist Church	2005739	PRAIRIEBAP-2005739
227	KALAMAZOO	Vicksburg Schools Indian Lake Elementary	2013939	VICKSINDELEM-2013939
228	KALAMAZOO	Vicksburg Schools Tobey Elementary	2001939	VICKSTOBELEM-2001939
229	KALKASKA	CRAWFORD SCHOOL	2007440	CRAWFORD-2007440
230	KALKASKA	FOREST AREA HIGH SCHOOL	2000940	FORESTHS-2000940
231	KALKASKA	RAPID CITY ELEMENTARY SCHOOL	2000240	RAPIDCTYES-2000240
232	KENT	ALGOMA CHRISTIAN SCHOOL	2047841	ALGOMACHRI-2047841
233	KENT	ALPINE ELEMENTARY SCHOOL	2024541	ALPINEELEM-2024541-1
234	KENT	ALPINE ELEMENTARY SCHOOL	2024541	ALPINEELEM-2024541-2
235	KENT	ALTO ELEMENTARY SCHOOL	2002741	ALTOELEMSCH-2002741
236	KENT	BYRON CENTER CHARTER ACADEMY	2009741	BYRONCTR-2009741
237	KENT	CANNONSBURG ELEMENTARY SCHOOL	2030041	CANNONELEM-2030041
238	KENT	CRESTWOOD ELEMENTARY SCHOOL	2052641	CRESTWOOD-2052641
239	KENT	GOODWILLIE ENVIRONMENTAL SCHOOL	2089341	GOODWILLIE-2089341
240	KENT	KENT CITY ELEMENTARY COMPLEX	2056741	KENTCITYELEM-2056741

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No.	County	Supply Name	WSSN	Location
241	KENT	KENT CITY HIGH & MIDDLE SCHOOL	2015541	KENTCTYHMS-2015541
242	KENT	KETTLE LAKE ELEMENTARY	2013241	KETTLEELEM-2013241
243	KENT	LAKES ELEMENTARY SCHOOL	2022541	LAKESELEM-2022541
244	KENT	LINCOLN HEIGHTS ELEMENTARY SCHOOL	2023641	LINCOLNES-2023641
245	KENT	MURRAY LAKE ELEMENTARY	2092141	MURRAYELEM-2092141
246	KENT	ROCKFORD CHRISTIAN SCHOOL	2089741	ROCKFDCHRIST-2089741
247	KENT	ROCKFORD EAST MIDDLE SCHOOL	2087341	ROCKFDMIDD-2087341
248	KENT	ST PATRICKS ELEMENTARY SCHOOL	2036841	STPATRICK-2036841-1
249	KENT	ST PATRICKS ELEMENTARY SCHOOL	2036841	STPATRICK-2036841-2
250	LAPEER	CRAMTON ELEMENTARY	2025244	CRAMTONES-2025244
251	LAPEER	ELVA LYNCH ELEM SCHOOL	2054244	ELVALYNCH-2054244
252	LAPEER	IMLAY CITY CHRISTIAN SCHOOL	2037744	IMLAYCHRIS-2037744
253	LAPEER	LAPEER CO ED. & TECH. CENTER	2007644	LAPEERTECH-2007644
254	LAPEER	MAPLE GROVE ELEMENTARY	2169044	MAPLEGROVE-2169044
255	LAPEER	MAYFIELD ELEMENTARY SCHOOL	2054544	MAYFLDELEM-2054544
256	LAPEER	MURPHY ELEMENTARY SCHOOL	2181544	MURPHYELEM-2181544
257	LEELANAU	GLEN LAKE COMMUNITY SCHOOL	2006545	GLENLAKECS-2006545
258	LEELANAU	LELAND PUBLIC SCHOOL DISTRICT 2	2001945	LELANDPSD-2001945
259	LEELANAU	PATHFINDER SCHOOL	2001145	PATHFDR-2001145
260	LEELANAU	PATHFINDER SCHOOL - GYM	2020045	PATHFDRGYM-2020045
261	LEELANAU	ST MARYS ELEM & HIGH SCHOOL	2004745	STMARYEHS-2004745
262	LENAWEE	LISD Center for Sustainable Future	2066646	LISDCENTER-2066646-1
263	LENAWEE	LISD Center for Sustainable Future	2066646	LISDCENTER-2066646-2
264	LENAWEE	Porter Education Center	2018546	PORTEREDU-2018546-1
265	LENAWEE	Porter Education Center	2018546	PORTEREDU-2018546-2
266	LENAWEE	Sand Creek Elementary School	2019246	SANDCRKES-2019246
267	LENAWEE	Sand Creek High School	2019346	SANDCRKHS-2019346
268	LENAWEE	Sutton Elementary School	2018846	SUTTONES-2018846
269	LIVINGSTON	BRIGHTON - HAWKINS ELEMENTARY SCHOOL	2012047	BRIGHTHAWK-2012047
270	LIVINGSTON	BRIGHTON - HILTON ELEMENTARY SCHOOL	2012447	BRIGHTHILT-2012447
271	LIVINGSTON	BRIGHTON - HORNUNG ELEMENTARY SCHOOL	2006047	BRIGHTHORN-2006047
272	LIVINGSTON	BRIGHTON - MALTBY MIDDLE SCHOOL	2021747	BRIGHTMALT-2021747
273	LIVINGSTON	BRIGHTON - SCRANTON MIDDLE SCHOOL	2051047	BRIGHTSCRA-2051047
274	LIVINGSTON	BRIGHTON - SPENCER ELEMENTARY SCHOOL	2010447	BRIGHTSPEN-2010447
275	LIVINGSTON	BRIGHTON INSTITUTE OF COSMETOL	2081147	BRIGHTINST-2081147
276	LIVINGSTON	BRUMMER ELEMENTARY SCHOOL	2079547	BRUMMERES-2079547
277	LIVINGSTON	CORNERSTONE PRESBYTERIAN CHURCH & SCHOOL	2046347	CORNERSTON-2046347
278	LIVINGSTON	DRYDEN HIGH SCHOOL	2022744	DRYDENHIGH-2022744
279	LIVINGSTON	GARDEN GATE MONTESSORI	2090847	GARDENMONT-2090847
280	LIVINGSTON	HARTLAND SCHOOLS - ED SUPPORT	2007347	HARTLDEDSP-2007347
281	LIVINGSTON	HARTLAND SCHOOLS - FARMS MIDDLE SCHOOL	2022347	HARTLDMIDD-2022347
282	LIVINGSTON	HARTLAND SCHOOLS - LAKES ELEMENTARY	2022447	HARTLDELEM-2022447
283	LIVINGSTON	HARTLAND SCHOOLS - LATCHKEY/DAYCARE	2016747	HARTLDDAY-2016747
284	LIVINGSTON	HARTLAND SCHOOLS - ROUND ELEM SCHOOL	2016447	HARTLDRELE-2016447
285	LIVINGSTON	HARTLAND SCHOOLS - VILLAGE ELEM CENT KITCH	2016647	HARTLDVELE-2016647
286	LIVINGSTON	HOLY SPIRIT CATHOLIC CHURCH & SCHOOL	2075547	HOLYSPIRIT-2075547
287	LIVINGSTON	LIGHT OF THE WORLD ACADEMY	2087847	LIGHTWORLD-2087847
288	LIVINGSTON	MAPLE TREE MONTESSORI SCHOOL	2014347	MAPLEMONT-2014347

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No.	County	Supply Name	WSSN	Location
289	LIVINGSTON	OUR SAVIOR LUTHRN CH-PRESCHOOL	2046847	OURSAVIOR-2046847
290	LIVINGSTON	PINCKNEY SCHOOLS - COUNTRY ELEMENTARY	2035747	PINCKCTYES-2035747
291	LIVINGSTON	PINCKNEY SCHOOLS - FARLEY ELEMENTARY	2048847	PINCKFRYES-2048847
292	LIVINGSTON	PINCKNEY SCHOOLS - FINE ART + NAVIGATOR	2015347	PINCKNAVI-2015347
293	LIVINGSTON	PINCKNEY SCHOOLS - HIGH SCHOOL	2078447	PINCKHIGH-2078447
294	LIVINGSTON	PINCKNEY SCHOOLS - LAKELAND ELEMENTARY	2075447	PINCKLKDES-2075447
295	LIVINGSTON	PINCKNEY SCHOOLS - PATHFINDER SCHOOL	2015747	PINCKPATH-2015747
296	LIVINGSTON	ST. MARY'S CATHOLIC CHURCH	2056547	STMARYCATH-2056547
297	LIVINGSTON	THREE FIRES MIDDLE SCHOOL	2082047	THREEFIRES-2082047
298	MACKINAC	CEDARVILLE HEADSTART	2040849	CEDARVILLE-2040849
299	MACKINAC	ENGADINE SCHOOL	2019749	ENGADINE-2019749
300	MACKINAC	LES CHENEAUX SCHOOL	2047949	LESCHENSCH-2047949
301	MACKINAC	Moran Township Schools	2044449	MORANTWP-2044449
302	MACKINAC	THREE LAKES CHARTER SCHOOL	2017049	THREELAKES-2017049
303	MACOMB	ARMADA HIGH SCHOOL	2008250	ARMADAHIGH-2008250-1
304	MACOMB	ARMADA HIGH SCHOOL	2008250	ARMADAHIGH-2008250-2
305	MACOMB	St. Joe	2034350	STJOE-2034350
306	MANISTEE	BETSIE VALLEY ELEMENTARY SCH	2000251	BETSIEELEM-2000251
307	MANISTEE	BRETHREN HIGH SCHOOL	2000151	BRETHRENHS-2000151-1
308	MANISTEE	BRETHREN HIGH SCHOOL	2000151	BRETHRENHS-2000151-2
309	MANISTEE	ONEKAMA HIGH SCHOOL	2006851	ONEKAMAHS-2006851-1
310	MANISTEE	ONEKAMA HIGH SCHOOL	2006851	ONEKAMAHS-2006851-2
311	MARQUETTE	CHERRY CREEK ELEMENTARY SCHOOL	2017352	CHERRYELEM-2017352
312	MARQUETTE	Teaching Family Homes School	2020052	TEACHFARM-2020052-1
313	MARQUETTE	Teaching Family Homes School	2020052	TEACHFARM-2020052-2
314	MASON	MASON CO EASTERN HIGH SCHOOL	2007253	MASONEHS-2007253
315	MASON	VICTORY EARLY CHILDHOOD CENTER	2013153	VICTORYECC-2013153
316	MASON	WEST SHORE COMMUNITY COLLEGE	2020453	WESTSHORE-2020453
317	MECOSTA	BARRYTON ELEMENTARY SCHOOL	2007954	BARRYTONES-2007954
318	MECOSTA	CHIPPEWA HILLS HIGH SCHOOL	2007854	CHIPPEWAHS-2007854
319	MECOSTA	CHIPPEWA INTERMEDIATE SCHOOL	2037554	CHIPPEWAIS-2037554
320	MECOSTA	MECOSTA ELEMENTARY	2008054	MECOSTAES-2008054
321	MECOSTA	MORLEY-STANWOOD ELEMENTARY SCHOOL	2019354	MORLEYELEM-2019354
322	MECOSTA	MORLEY-STANWOOD HIGH SCHOOL	2034854	MORLEYHIGH-2034854
323	MECOSTA	REMUS MOSAIC	2008154	REMUSMOS-2008154
324	MECOSTA	ST MICHAEL SCHOOL	2007554	STMICHAEL-2007554
325	MECOSTA	STANWOOD LEARNING CENTER	2019254	STANWOODLC-2019254
326	MENOMINEE	BARK RIVER-HARRIS SCHOOLS	2001755	BARKRVRSCH-2001755
327	MENOMINEE	NORTH CENTRAL AREA ELEM SCHOOL	2013855	NCENTRAL-2013855
328	MISSAUKEE	LAKE CITY CHILD DEVELOPMENT	2005857	LKCITYDEV-2005857
329	MONROE	WHITEFORD ELEM SCHOOL	2015658	WHITEFRDHS-2015658
330	MONROE	WHITEFORD HIGH SCHOOL	2011958	WHITEFRDES-2011958
331	MONTCALM	1ST BAPTIST CHURCH	2035759	FIRSTBAP-2035759
332	MONTCALM	BETH HAVEN BAPT. CHURCH/SCHOOL	2052659	BETHHAVEN-2052659
333	MONTCALM	CEDAR LAKE ELEMENTARY SCHOOL	2037759	CEDARLAK-2037759
334	MONTCALM	CENTRAL MONTCALM SCHOOLS	2001959	CNTMONTSCH-2001959
335	MONTCALM	CENTRAL MONTCALM UPPER ELEMENTARY	2050759	CNTMONTELE-2050759
336	MONTCALM	Eight Cap Annex	2061159	EIGHTCAPAX-2061159

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No.	County	Supply Name	WSSN	Location
337	MONTCALM	EIGHT-CAP	2007759	EIGHTCAP-2007759
338	MONTCALM	FISH CREEK SCHOOL	2035659	FISHCREEK-2035659
339	MONTCALM	FLAT RIVER ACADEMY	2056759	FLATRIVER-2056759
340	MONTCALM	MONTABELLA ELEMENTARY SCHOOL	2033159	MONTELEM-2033159
341	MONTCALM	MONTABELLA JR/SR HIGH SCHOOL	2052959	MONTHIGH-2052959
342	MONTCALM	MONTCALM AREA CAREER CENTER	2032659	MONTCARCEN-2032659
343	MONTCALM	MONTCALM COMMUNITY COLLEGE	2031159	MONTCOMC-2031159
344	MONTCALM	TRI COUNTY HIGH SCHOOL	2037359	TRICOUNTRY-2037359
345	MONTCALM	TRI COUNTY JUNIOR HIGH	2001359	TRICTRYJUN-2001359
346	MONTCALM	VESTABURG COMMUNITY SCHOOLS	2040659	VESTACOMM-2040659
347	MONTCALM	VESTABURG COMMUNITY SCHOOLS	2065359	VESTAHIGH-2065359
348	MONTCALM	VESTABURG HIGH SCHOOL	2004359	VESTAHIGH-2004359
349	MONTMORENCY	ATLANTA JR-SR HIGH SCH	2009260	ATLANTASCH-2009260-1
350	MONTMORENCY	ATLANTA JR-SR HIGH SCH	2009260	ATLANTASCH-2009260-2
351	MONTMORENCY	LEWISTON K-6 SCHOOL	2002360	LEWISTON-2002360-1
352	MONTMORENCY	LEWISTON K-6 SCHOOL	2002360	LEWISTON-2002360-2
353	MUSKEGON	HOLTON DISTRICT SERVICE BUILDING	2019861	HOLTONDIST-2019861
354	MUSKEGON	HOLTON ELEMENTARY SCHOOL	2041261	HOLTONELEM-2041261-1
355	MUSKEGON	HOLTON ELEMENTARY SCHOOL	2041261	HOLTONELEM-2041261-2
356	MUSKEGON	HOLTON MIDDLE/ HIGH SCHOOL	2009261	HOLTONHIGH-2009261
357	MUSKEGON	OAKRIDGE -CARR SCHOOL/COMMUNITY ED	2016961	OAKRIDGEED-2016961
358	MUSKEGON	OAKRIDGE HIGH SCHOOL	2041161	OAKRIDGEHS-2041161
359	MUSKEGON	OAKRIDGE LOWER ELEMENTARY SCHOOLS	2047061	OAKRIDGLES-2047061-1
360	MUSKEGON	OAKRIDGE LOWER ELEMENTARY SCHOOLS	2047061	OAKRIDGLES-2047061-2
361	MUSKEGON	OAKRIDGE MIDDLE SCHOOL	2016761	OAKRIDGEMS-2016761
362	MUSKEGON	OAKRIDGE UPPER ELEMENTARY SCHOOL	2016661	OAKRIDGUES-2016661
363	MUSKEGON	REETHS PUFFER/TWIN LAKE ELEMEN	2021461	REETHSELEM-2021461
364	MUSKEGON	REETHS PUFFER-DUCK CREEK	2026961	REETHSDUCK-2026961
365	MUSKEGON	REETHS PUFFER-MCMILLAN SCHOOL	2024661	REETHSMCMI-2024661
366	NEWAYGO	GRANT CHRISTIAN SCHOOL	2008262	GRANTCHRIS-2008262
367	OAKLAND	ANDERSONVILLE ELEM/CCS	2079263	ANDERSON-2079263
368	OAKLAND	APOLLO CENTER/HVS	2016563	APOLLOCHVS-2016563
369	OAKLAND	BAILEY LAKE ELEM SCHOOL/CCS	2077863	BAILEYLAKE-2077863-1
370	OAKLAND	BAILEY LAKE ELEM SCHOOL/CCS	2077863	BAILEYLAKE-2077863-2
371	OAKLAND	BALDWIN ELEMENTARY SCHOOL	2211363	BALDWINELE-2211363
372	OAKLAND	BRANDON HIGH SCHOOL/BSD	2136163	BRANDONHIGH-2136163
373	OAKLAND	BRANDON MIDDLE SCHOOL	2247463	BRANDONMIDD-2247463
374	OAKLAND	BROOKS ELEMENTARY SCHOOL	2149463	BROOKSELEM-2149463
375	OAKLAND	CEDAR CREST ACADEMY	2123363	CEDARACAD-2123363
376	OAKLAND	CEDAR CREST EARLY CHILDHOOD	2156563	CEDARCHILD-2156563
377	OAKLAND	CLEAR LAKE ELEMENTARY SCHOOL	2141363	CLEARLKELEM-2141363
378	OAKLAND	DAVISBURG ELEMENTARY SCHOOL	2104363	DAVISBURG-2104363
379	OAKLAND	DIXIE BAPTIST- AUDITORIUM	2078963	DIXIEBAPA-2078963
380	OAKLAND	DIXIE BAPTIST- FOUNDERS	2147063	DIXIEBAPF-2147063
381	OAKLAND	DUCK LAKE CONT ED/HVS	2017763	DUCKLAKE-2017763
382	OAKLAND	GLENGARY ELEMENTARY/WLS	2052663	GLENGARY-2052663
383	OAKLAND	HAMILTON-PARSONS ELEM SCHOOL	2148863	HAMILTONP-2148863
384	OAKLAND	HARVEY SWANSON ELEMENTARY SCHOOL	2106363	HARVEYELEM-2106363

Table 1b - Public Water Supply - School Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
385	OAKLAND	HERITAGE ELEMENTARY - HVS	2254963	HERITAGEES-2254963
386	OAKLAND	HIGHLAND ELEM SCHOOL/HVS	2016163	HIGHLANDES-2016163
387	OAKLAND	HUDA SCHOOL/MONTESSORI	2043163	HUDAMONTES-2043163
388	OAKLAND	HUGGER ELEMENTARY SCHOOL	2141263	HUGGERELEM-2141263
389	OAKLAND	KINGSBURY SCHOOL - HOSNER CAMPUS	2140663	KINGSBURY-2140663
390	OAKLAND	KINGSBURY SCHOOL - OAKWOOD CAMPUS	2140563	KINGSOAKWD-2140563
391	OAKLAND	KINGSBURY SCHOOL - OAKWOOD CAMPUS	2254163	KINGSJASC-2254163
392	OAKLAND	LAKELAND HS-WHITE LAKE MS-LAKEWOOD EL	2080963	LAKELDWHIT-2080963
393	OAKLAND	LEONARD ELEMENTARY SCHOOL	2057463	LEONARDES-2057463
394	OAKLAND	MILFORD HIGH SCHOOL/HVS	2014563	MILFORDHVS-2014563
395	OAKLAND	OAK VALLEY/COUNTRY OAKS/HVS	2213763	OAKVLYHVS-2213763
396	OAKLAND	OAKLAND SCHOOLS-TECHNICAL CAMPUS NW	2079063	OAKLNDTECH-2079063
397	OAKLAND	OAKVIEW SCHOOL	2271263	OAKVIEWSCH-2271263
398	OAKLAND	OAKWOOD ELEMENTARY	2287463	OAKWOODELEM-2287463
399	OAKLAND	OXBOW ELEMENTARY SCHOOL/HVS	2081363	OXBOWES-2081363
400	Oakland	PURE FOODS KITCHEN LLC	2292463	PUREFOODS-2292463
401	OAKLAND	ROCHESTER COLLEGE	2140963	ROCHESTCOL-2140963
402	OAKLAND	ROSE PIONEER ELEMENTARY	2244363	ROSEELEM-2244363
403	OAKLAND	SPRING MILLS ELEM SCHOOL/HVS	2016863	SPRINGES-2016863
404	OAKLAND	SPRINGFIELD PLAINS ELEMENTARY	2214463	SPRINGPES-2214463
405	OAKLAND	UPLAND HILLS SCHOOL	2056563	UPLANDHILL-2056563
406	OAKLAND	WEST HIGHLAND CHRISTIAN	2090463	WESTHIGHLD-2090463
407	OCEANA	NEW ERA CHRISTIAN SCHOOL	2006864	NEWERACHRI-2006864
408	OCEANA	NEW ERA PUBLIC SCHOOL	2000964	NEWERARUB-2000964
409	OCEANA	WALKERVILLE COMMUNITY SCHOOL	2026264	WALKERCOMM-2026264
410	OCEANA	WALKERVILLE ELEM/MIDDLE/HIGH	2002064	WALKEREMHS-2002064
411	OCEANA	WALKERVILLE ELEMENTARY SCHOOL	2001964	WALKERELEM-2001964
412	OGEMAW	OGEMAW HEIGHTS HIGH SCHOOL	2015765	OGEMAWHIGH-2015765
413	OGEMAW	ROSE CITY ELEMENTARY SCHOOL	2006565	ROSECTYELE-2006565
414	OSCEOLA	DAY STAR ACADEMY	2017367	DAYSTARACA-2017367
415	OSCEOLA	LEROY ELEMENTARY	2005167	LEROYELEM-2005167
416	OSCEOLA	PINE RIVER JR-SR HIGH	2004767	PINERVRHS-2004767-1
417	OSCEOLA	PINE RIVER JR-SR HIGH	2004767	PINERVRHS-2004767-2
418	OSCODA	FAIRVIEW AREA SCHOOLS	2007268	FAIRVIEW-2007268
419	OTSEGO	GRACE BAPTIST CHRISTIAN SCHOOL	2011269	GRACECHRIS-2011269
420	OTSEGO	JOHANNESBURG-LEWISTON AREA SCHOOLS	2006769	JOHLEWSCH-2006769
421	OTSEGO	OTSEGO CHRISTIAN SCHOOL	2013269	OTSEGOCHR-2013269
422	OTSEGO	VANDERBILT SCHOOL	2002769	VANDERBILT-2002769
423	OTTAWA	FOREST GROVE ELEMENTARY SCHOOL	2023970	FORESTGRV-2023970
424	OTTAWA	LAMONT CHRIST ELEMENTARY SCH	2024570	LAMONTELEM-2024570
425	OTTAWA	Libertas Christian School	2027570	LIBERTAS-2027570
426	OTTAWA	OAISD - CAREERLINE TECH CENTER	2026770	OAISDCTECH-2026770
427	OTTAWA	OAISD - M-TECH EDUCATIONAL CENTER	2057670	OAISDMTECH-2057670
428	OTTAWA	OAISD - SHELDON PINES SCHOOL	2039070	OAISDPINES-2039070
429	OTTAWA	ROBINSON ELEMENTARY SCHOOL	2025370	ROBINSONES-2025370
430	OTTAWA	SHELDON WOODS ELEM SCHOOL	2025770	SHELDONES-2025770
431	OTTAWA	SOUTH OLIVE CHRISTIAN SCHOOL	2030170	SOUTHOLIVE-2030170
432	OTTAWA	St. Joseph School	2009670	STJOSEPH-2009670-1

Table 1b - Public Water Supply - School Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
433	OTTAWA	St. Joseph School	2009670	STJOSEPH-2009670-2
434	OTTAWA	TRINITY LUTHERAN SCHOOL	2030370	TRINITYSCH-2030370
435	PRESQUE ISLE	ROGERS CITY BAPTIST CHURCH	2015871	ROGERSBAP-2015871
436	ROSCOMMON	C.O.O.R. SCHOOL	2025472	COORSCHOOL-2025472
437	ROSCOMMON	Charlton Heston Academy	2009172	CHARLTONHA-2009172-1
438	ROSCOMMON	Charlton Heston Academy	2009172	CHARLTONHA-2009172-2
439	ROSCOMMON	H.L. HIGH SCHOOL	2025572	HLHIGHSCH-2025572
440	ROSCOMMON	H.L. MIDDLE/ELEMENTARY SCHOOL	2005472	HLMIDELEM-2005472
441	ROSCOMMON	H.L. SCHOOLS COMM ED CENTER	2026972	HLCOMMCTR-2026972
442	ROSCOMMON	OUR LADY OF THE LAKE	2039172	OURLADYLK-2039172
443	ROSCOMMON	ROSCOMMON ELEMENTARY	2019172	ROSCOMELEM-2019172-1
444	ROSCOMMON	ROSCOMMON ELEMENTARY	2019172	ROSCOMELEM-2019172-2
445	ROSCOMMON	ROSCOMMON HIGH SCHOOL	2014672	ROSCOMHIGH-2014672
446	ROSCOMMON	ROSCOMMON MIDDLE SCHOOL	2029172	ROSCOMMIDD-2029172-1
447	ROSCOMMON	ROSCOMMON MIDDLE SCHOOL	2029172	ROSCOMMIDD-2029172-2
448	SAGINAW	SAINT JOHN'S LUTHERAN	2009473	STJOHNLUTH-2009473
449	SAGINAW	SAINT MICHAELS CHURCH	2018773	STMICHAELS-2018773
450	SAGINAW	ST PETER'S LUTHERAN SCHOOL	2009673	STPETERS-2009673
451	SANILAC	BETHANY CHRISTIAN SCHOOL	2000776	BETHANYSCH-2000776
452	SANILAC	CARSONVILLE-PORT SANILAC SCHS	2002776	CARSONSCHS-2002776
453	SANILAC	SANILAC ISD	2003376	SANILACISD-2003376-1
454	SANILAC	SANILAC ISD	2003376	SANILACISD-2003376-2
455	SANILAC	SANILAC ISD	2003376	SANILACISD-2003376-3
456	SHIAWASSEE	FIRST BAPTIST CHURCH	2004678	FIRSTBAP-2004678
457	SHIAWASSEE	Graham Community Church Shaftsburg	2020478	GRAHAMCC-2020478
458	SHIAWASSEE	Laingsburg Community Schools	2004878	LAINGSBURG-2004878
459	SHIAWASSEE	Laingsburg High School	2027278	LAINGSBURG-2027278
460	SHIAWASSEE	Laingsburg Middle School	2004778	LAINGSBURG-2004778
461	SHIAWASSEE	Morrice Elementary	2007778	MORRICE-2007778
462	SHIAWASSEE	Morrice High School	2007178	MORRICE-2007178
463	SHIAWASSEE	Nellie Reed Elementary School	2001978	NELLIE-2001978
464	SHIAWASSEE	Shiawassee RESD	2009678	SHIAWRESD-2009678
465	SHIAWASSEE	SPRING VALE ACADEMY	2013578	SPGVLYACAD-2013578
466	ST. CLAIR	Avoca Elementary School	2006674	AVOCAELEM-2006674
467	ST. CLAIR	John Farrell Elementary School	2001474	JOHNELEM-2001474
468	ST. JOSEPH	COLON PUBLIC SCH\LEONIDAS ELEM	2009275	COLONPSLE-2009275
469	ST. JOSEPH	FACTORYVILLE BIBLE SCHOOL	2021475	FACTORYSCH-2021475
470	ST. JOSEPH	GLEN OAKS COMMUNITY COLLEGE	2009375	GLENOAKSCC-2009375-1
471	ST. JOSEPH	GLEN OAKS COMMUNITY COLLEGE	2009375	GLENOAKSCC-2009375-2
472	ST. JOSEPH	GLEN OAKS COMMUNITY COLLEGE	2009375	GLENOAKSCC-2009375-3
473	ST. JOSEPH	HOWARDSVILLE CHRISTIAN SCHOOL	2020875	HOWARDSCHO-2020875-1
474	ST. JOSEPH	HOWARDSVILLE CHRISTIAN SCHOOL	2020875	HOWARDSCHO-2020875-2
475	ST. JOSEPH	LAKE AREA CHRISTIAN SCHS	2019875	LAKEAREACS-2019875
476	ST. JOSEPH	NORTON SCHOOL	2009775	NORTONSCH-2009775
477	ST. JOSEPH	NOTTAWA COMMUNITY SCHOOL	2009875	NOTTAWACS-2009875
478	ST. JOSEPH	PATHFINDER CENTER	2009175	PATHFDRCTR-2009175
479	ST. JOSEPH	PLEASANT VIEW SCHOOL	2031075	PLEASANTSC-2031075
480	ST. JOSEPH	ST JOSEPH CO ISD	2017975	STJOECOISD-2017975

Table 1b - Public Water Supply - School Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
481	TUSCOLA	AKRON - FAIRGROVE HIGH SCHOOL	2032679	AKRONHIGH-2032679
482	TUSCOLA	DEFORD COMMUNITY CHURCH	2066279	DEFORDCOMM-2066279
483	TUSCOLA	FOSTORIA BAPTIST CHURCH	2084679	FOSTORIA-2084679
484	TUSCOLA	JUNIATA BAPTIST CHRISTIAN SCH.	2039179	JUNIATABAP-2039179
485	TUSCOLA	ST LUKES LUTHERAN SCHOOL	2071479	STLUKES-2071479
486	VAN BUREN	BLOOMINGDALE ELEMENTARY SCHOOL	2011080	BLOOMELEM-2011080
487	VAN BUREN	BLOOMINGDALE HIGH SCHOOL	2026980	BLOOMHIGH-2026980-1
488	VAN BUREN	BLOOMINGDALE HIGH SCHOOL	2026980	BLOOMHIGH-2026980-2
489	VAN BUREN	PAW PAW HIGH SCHOOL	2052180	PAWPAWHIGH-2052180
490	VAN BUREN	SISTER LAKES ELEMENTARY SCHOOL	2010380	SISTERELEM-2010380
491	WASHTENAW	ANN ARBOR CHRISTIAN SCHOOL	2053181	ANNARBOR-2053181
492	WASHTENAW	CASSIDY LAKE S.A.I.	2057381	CASSIDYSAI-2057381
493	WASHTENAW	EMERSON SCHOOL - ELEMENTARY	2017981	EMERSONES-2017981
494	WASHTENAW	EMERSON SCHOOL - MIDDLE	2037281	EMERSONMS-2037281
495	WASHTENAW	FREEMAN ELEMENTARY SCHOOL	2009281	FREEMAN-2009281
496	WASHTENAW	SALEM ELEMENTARY SCHOOL	2001381	SALEMELEM-2001381
497	WASHTENAW	SOUTH ARBOR ACADEMY	2050281	SOUTHARBOR-2050281
498	WASHTENAW	SPIRITUS SANCTUS ACADEMY	2046281	SPIRITUS-2046281
499	WASHTENAW	SPIRITUS SANCTUS ACADEMY	2049081	SPIRITUS-2049081
500	WASHTENAW	WHITMORE LAKE ELEMENTARY	2037381	WHITEMORE-2037381-1
501	WASHTENAW	WHITMORE LAKE ELEMENTARY	2037381	WHITEMORE-2037381-2
502	WASHTENAW	WHITMORE LAKE HIGH SCHOOL	2054181	WHITEMORE-2054181-1
503	WASHTENAW	WHITMORE LAKE HIGH SCHOOL	2054181	WHITEMORE-2054181-2
504	WASHTENAW	WHITMORE LAKE MIDDLE SCHOOL	2002981	WHITEMORE-2002981
505	WEXFORD	BAKER COLLEGE OF CADILLAC	2019583	BAKERCOLLE-2019583-1
506	WEXFORD	BAKER COLLEGE OF CADILLAC	2019583	BAKERCOLLE-2019583-2
507	WEXFORD	FOREST VIEW SCHOOL	2010783	FORESTVIEW-2010783
508	WEXFORD	MACKINAW TRAIL MIDDLE SCHOOL	2026083	MACKINAWMS-2026083

Footnotes:
WSSN = Water Supply Serial Number

Location: The location is a combination of an acronym of the supply name and the WSSN. If more than one well was present, it follows the WSSN.

Table 1c - Public Water Supply - Daycare Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1	Alcona	ALCONA HEAD START	2019601	ALCONA-2019601
2	Allegan	Lakeshore Little People's Place	2066703	LAKESHORE-2066703
3	Allegan	Little Vikings Learning Center	2068303	LITTLEVIK-2068303
4	Allegan	South Side Plaza	2064303	SOUTHSIDE-2064303
5	Arenac	Lil Sprouts Child Development Ctr	2020606	LILSPROUTS-2020606
6	Barry	DELTON EHS	2009308	DELTONEHS-2009308
7	Barry	Education Station	2041508	EDUCSTAT-2041508
8	Barry	Hastings Head Start at Community Action	2021108	HASTINGSCA-2021108
9	Benzie	STEPPING STONES CHILDREN'S CENTER	2012910	STONECHILD-2012910
10	Calhoun	KIDS TIME DAY CARE CENTER	2038413	KIDSCENTER-2038413
11	Calhoun	The Learning Zone	2043813	LEARNZONE-2043813
12	Cass	APOSTOLIC LIGHTHOUSE	2017814	APOSTOLIC-2017814
13	Charlevoix	Northern Explorers Child Daycare Center	2021015	NORTHEXP-2021015
14	Cheboygan	TRANSFIGURATION JUBILATE DAY CARE	2045316	TRANSJUB-2045316
15	Chippewa	KIDS KASTLE DAYCARE	2056617	KIDSKASTLE-2056617
16	Clare	Mid Michigan Community Action Agency	2026818	MIDMICHAA-2026818
17	Clare	MMCAA Farwell CAPS	2028618	MMCAAFARWL-2028618
18	Clare	MMCAA Harrison Preschool	2027618	MMCAA-2027618
19	Clinton	CROSSROADS PLAZA BUILDINGS	2024819	XROADPLAZA-2024819
20	Crawford	CRAWFORD AUSABLE DAYCARE	2016820	CRAWFORD-2016820
21	Delta	COUNTRY SCHOOLHOUSE DAY CARE	2020621	SCHLHOUSE-2020621
22	Delta	Hyde Properties	2021221	HYDEPROP-2021221
23	Eaton	CAPITAL AREA COMMUNITY SERVICES	2019823	CAPITA-2019823
24	EATON	Delta Mills Early Child Center	2008623	DELTAMILEC-2008623
25	Eaton	TOT SPOT, THE	2011423	TOTSPOT-2011423
26	Emmet	CONCORD CONDOMINIUMS	2038424	CONCORD-2038424
27	Emmet	PIONEER PROFESSIONAL BUILDING	2035224	PIONEER-2035224
28	Genesee	Circle of Friends Childcare Center	2097125	CIRFRIENDS-2097125
29	Genesee	CREATIVE LEARNING CENTER	2044625	CREATLEARN-2044625
30	Genesee	ERNIES PARTY STORE & DAY CARE CENTER	2158925	ERNIES-2158925
31	Genesee	HONEY BEAR DAY CARE 2	2146225	HONEYBEAR-2146225
32	Genesee	Lady Di's Daycare South	2146025	LADYDI-2146025
33	Genesee	LINDEN CHILD DEVELOPMENT CENTER	2089225	LINDENDEV-2089225
34	Genesee	LINDEN FREE METHODIST CHURCH	2147525	LINDENFREE-2147525
35	Genesee	LINDEN ROAD CENTER (LLC)	2150525	LINDENCNTR-2150525
36	Genesee	Paula's Club House	2142025	PAULACLUB-2142025
37	Genesee	Terry Matlock Child Care	2148225	TERMATCC-2148225
38	Gladwin	Robins Playhouse	2045626	ROBINSPLAY-2045626
39	Ingham	Colt's and Filly's Childcare	2018033	COLTFILLY-2018033
40	Ingham	Dansville Community Center	2018533	DANSVILLE-2018533
41	Ingham	HUNDRED ACRE WOOD DAYCARE	2017333	HUNDRED-2017333
42	Ingham	ROCKING HORSE PRE-SCHOOL	2018333	ROCKHORSE-2018333
43	Ingham	VLAHAKIS MANAGEMENT COMPANY	2016933	VLAHAKIS-2016933
44	Ionia	LEVALLEY METHODIST CHURCH	2006234	LEVALLEY-2006234
45	Iosco	TAWAS HEADSTART	2020835	TAWAS-2020835
46	Isabella	Happy Ending Ice Cream Plaza	2018937	HAPPYEND-2018937
47	Isabella	ROSEBUSH ELEMENTARY	2004137	ROSEBUSH-2004137
48	Jackson	ABC ACADEMY #1	2061038	ABC1-2061038

Table 1c - Public Water Supply - Daycare Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
49	Jackson	ABC ACADEMY #2	2061638	ABC2-2061638
50	Jackson	EARLY IMPRESSIONS	2082338	ERLYIMPRES-2082338
51	Kalamazoo	Chapman Memorial Church	2004739	CHAPMEM-2004739
52	Kalamazoo	Lakeland Reformed Church	2001839	LAKELAND-2001839-1
53	Kalamazoo	Lakeland Reformed Church	2001839	LAKELAND-2001839-2
54	Kalamazoo	Little Daffodils, LLC	2045739	LITTLEDAFF-2045739
55	Kent	CREATIVE CHILD CARE CENTER	2093441	CREATECHILD-2093441
56	Kent	KIDS R ANGELS	2055541	KIDSANGELS-2055541
57	Kent	NORTH KENT HEAD START	2059341	NORTHKENT-2059341
58	Kent	SONSHINE CORNER LEARNING CENTER	2094141	SONSHINE-2094141
59	Kent	TENDERCARE LEARNING CENTER	2075641	TENDERCARE-2075641
60	Kent	WHITE EARLY CHILDHOOD CENTER	2020341	WHITEARLY-2020341
61	Lake	FIVECAP INC - (RFW)	2013043	FIVECAPRFW-2013043
62	Lapeer	LAPEER EARLY HEAD START	2166444	LAPEER-2166444
63	Lapeer	RAINBOW CHILD CARE CENTER	2165844	RAINBOW-2165844
64	Leelanau	LEELANAU CHILDREN'S CENTER	2016745	LEELANAU-2016745
65	Lenawee	Apple Tree Learning Center, LLC	2059046	APPLETREE-2059046
66	Lenawee	Birth, Toddler and Beyond	2065546	BIRTODBEY-2065546
67	Lenawee	St. John's Lutheran Church	2065146	STJOHNLUTH-2065146
68	Lenawee	Stepping Stones Learning	2064946	STONELEARN-2064946
69	Livingston	ALL SAINTS LUTHERAN CHURCH	2077147	ALLSAINTS-2077147
70	Livingston	ALWAYS UNIQUE CHILDCARE	2064247	ALWAYS-2064247
71	Livingston	COUNTRY MOUSE CHILD CARE INC	2060347	MOUSECHILD-2060347
72	Livingston	CROSSROADS CHURCH & LEARNING CENTER	2000747	XROADCHUR-2000747
73	Livingston	DOWN ON THE FARM LEARNING CENTER	2092547	DOWNFARM-2092547
74	Livingston	DOWN ON THE FARM TOO	2019247	DOWNFARM2-2019247
75	Livingston	FOR KID'S SAKE EARLY LEARNING CENTER	2063647	KIDSAKE-2063647
76	Livingston	HAMBURG PROFESSIONAL OFFICES (SOUTH)	2059847	HAMBURG-2059847
77	Livingston	LASTING IMPRESSIONS	2089047	LASTING-2089047
78	Livingston	LEARNING LADDER	2054047	LEARNING-2054047
79	Livingston	LIFE CHRISTIAN CENTER	2081647	LIFECHRIST-2081647
80	Livingston	LITTLE COUNTRY KIDS	2073347	LITTLEKIDS-2073347
81	Livingston	LITTLE FRIENDS DAY CARE	2061947	LITTLEFRIE-2061947
82	Livingston	LORD OF LIFE - DAYCARE/PRESCHOOL	2089347	LORDOFLIFE-2089347
83	Livingston	TEDDY BEAR DAYCARE	2077247	TEDDYBEAR-2077247
84	Livingston	UNITED BRETHREN FOWLERVILLE	2033547	UNITEDBRE-2033547
85	Manistee	FIVE CAP INC - KALEVA	2015951	FIVECAPKAL-2015951
86	Marquette	CHOCOLAY CHILD CARE CENTER	2014652	CHOCOLAY-2014652
87	Marquette	Grove R Daycare and Preschool	2014952	GROVEDAY-2014952
88	Marquette	Silver Creek Church	2004252	SILVERCRK-2004252
89	Mason	FIVECAP-FOUNTAIN CHILD DEVELOPMENT CTR	2007653	FIVECAPFOU-2007653
90	Mason	Oaktree Academy	2012453	OAKTREE-2012453
91	Mecosta	DEVRIES DAY CARE OF BIG RAPIDS	2035554	DEVRIES-2035554
92	Mecosta	HUNTEY CLUBHOUSE	2041554	HUNTEYCLUB-2041554
93	Menominee	MENOMINEE HEADSTART	2009755	MENOMINEE-2009755
94	Midland	KIDS TIME	2008556	KIDSTIME-2008556
95	Missaukee	FALMOUTH PRESCHOOL	2005657	FALMOUTH-2005657
96	Missaukee	LITTLE BLESSINGS CHRISTIAN DC CTR	2005757	LITLEBLESS-2005757

Table 1c - Public Water Supply - Daycare Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
97	Monroe	IDA STRIP MALL	2034258	IDASTRIP-2034258
98	Montcalm	KIDS R KIDS	2041359	KIDSRKIDS-2041359
99	Muskegon	CCP Discovery School	2042661	CCPDIS-2042661
100	Muskegon	The Hop Childcare Center	2044161	HOPCHILD-2044161
101	Newaygo	FIVE CAP INC - NEWAYGO CENTER	2025162	FIVECAPNEW-2025162
102	Newaygo	FIVE CAP-HESPERIA AREA CHILD DEVELOPMEN	2022462	FIVECAPHES-2022462
103	Newaygo	NEWAYGO COUNTY CHILD DEV CTR	2005962	NEWAYGOTR-2005962
104	Oakland	ALL STARS PRESCHOOL	2229063	ALLSTARS-2229063
105	Oakland	BUILDING BLOCKS	2196163	BUILDBLOCL-2196163
106	Oakland	CREAM OF THE CROP	2241163	CREAMCROP-2241163
107	Oakland	EPIC LIFE CHURCH	2138863	EPICLIFE-2138863
108	Oakland	FOR LITTLE PEOPLE	2249963	LITTLEPPL-2249963
109	Oakland	GANEINU DAY SCHOOL	2260363	GANEINU-2260363
110	Oakland	HOUR KIDZ	2144463	HOURKIDZ-2144463
111	Oakland	LEARNING RAINBOW PRESCHOOL	2145063	LEARNRAIN-2145063
112	Oakland	LEARNING TREE	2246763	LEARNTREE-2246763
113	Oakland	MILFORD COUNTRY DAY CHILD CARE	2230763	MILFORDDCC-2230763
114	Oakland	MILFORD MONTESSORI SCHOOL	2264763	MILFORD-2264763
115	Oakland	OAK HILL CORNERS	2280263	OAKHILL-2280263
116	Oakland	PLANET KIDS	2260263	PLANETKIDS-2260263
117	Oakland	RISING STARS CHILDCARE	2262263	RISINGSTAR-2262263
118	Oakland	ROSEBROOK CHILD DEVELOPMENT CENTER	2213463	ROSEBROOK-2213463
119	Oakland	SCHOOL BELL	2149363	SCHOOLBELL-2149363
120	Oakland	THE STEPPING STONE	2224963	STEPSTONE-2224963
121	Oakland	WEE FRIENDS	2031663	WEEFRIENDS-2031663
122	Oakland	WIGGLES AND GIGGLES	2149263	WIGGLES-2149263
123	Oakland	WORLD OF WONDER	2217263	WORLDWONDER-2217263
124	Oceana	ARBRE FARMS CORPORATION	2020364	ARBREFARMS-2020364
125	Ogemaw	MISS SUE'S KIDS ZONE	2026065	MISSSUE-2026065
126	Ogemaw	WEST BRANCH HEAD START	2024665	WESTBRANCH-2024665
127	Osceola	MUSKEGON RIVER YOUTH HOME	2017267	MUSKEGON-2017267-1
128	Osceola	MUSKEGON RIVER YOUTH HOME	2017267	MUSKEGON-2017267-2
129	Osceola	Tustin Elementary School	2005267	TUSTINELEM-2005267
130	Ottawa	ALL FOR KIDS	2055670	ALLKIDS-2055670
131	Ottawa	Future Steps Learning Center LLC	2049370	FUTRESTEP-2049370
132	Ottawa	LITTLE TYKES UNIVERSITY LLC	2067070	LITTLETYKE-2067070
133	OTTAWA	LOVING HEARTS LITTLE HANDS	2008270	LOVNGHEART-2008270
134	Ottawa	Roundabouts Playschool LLC	2051870	ROUNDABOUT-2051870
135	St. Joseph	FIRST PLACE DAY CARE	2023575	FIRSTPLACE-2023575
136	Tuscola	KIDS CLUB DAY CARE	2045279	KIDSCLUB-2045279
137	Van Buren	RED ARROW COMMERCIAL LLC	2053680	REDARROW-2053680
138	Washtenaw	BEMIS FARMS DAYCARE & PRESCHOOL	2041581	BEMISFARMS-2041581
139	Washtenaw	CALVARY BIBLE CHURCH - MULTIPURPOSE BLDG	2044481	CALVARY-2044481
140	Washtenaw	CHILDREN'S CREATIVE LEARNING CENTER	2058181	CHILDLEARN-2058181-1
141	Washtenaw	CHILDREN'S CREATIVE LEARNING CENTER	2058181	CHILDLEARN-2058181-2
142	Washtenaw	FINE ARTS ACADEMY	2064181	FINEARTS-2064181
143	Washtenaw	FIRST UNITARIAN CHURCH	2047181	FIRSTUNIT-2047181
144	Washtenaw	FREEDOM CHILDCARE CENTER	2052881	FREEDOM-2052881

Table 1c - Public Water Supply - Daycare Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
145	Washtenaw	HAPPY FEET LEARNING CENTER	2062081	HAPPYFEET-2062081
146	Washtenaw	HOLY FAITH CHURCH/SALINE CO-OP	2048681	HOLYFAITH-2048681
147	Washtenaw	JELLYBEAN DAYCARE AND PRESCHOOL	2060481	JELLYBEAN-2060481
148	Washtenaw	LITTLE FOLKS CORNER	2006581	LITTLEFOLK-2006581
149	Washtenaw	STONY CREEK PRESCHOOL & CHILD CARE CTR	2019681	STONYCCC-2019681
150	Washtenaw	STONY CREEK PRESCHOOL TOO!	2045381	STONYPRE-2045381
151	Washtenaw	SUNSHINE SPECIAL CHILDREN'S STUDIO	2050581	SUNSHINE-2050581
152	Washtenaw	TERRITORIAL PROFESSIONAL BUILDING	2043281	TERRPROFES-2043281
153	Washtenaw	TRINITY PRESCHOOL	2062981	TRINITY-2062981
154	Wayne	MAYBURY CHILD CARE	2001082	MAYBURY-2001082
155	Wexford	LITTLE BEAR CHILD CARE	2026783	LITTLEBEAR-2026783

Footnotes:
WSSN = Water Supply Serial Number

Location: The location is a combination of an acronym of the supply name and the WSSN. If more than one well was present, it follows the WSSN.

Table 1d - Public Water Supply - Tribal Site Information
EGLE 2018 Statewide PFAS Sampling Program

No.	County	Supply Name	WSSN	Location
1	ALGER	Wetmore - CWS	55293502	WETMORE55293502
2	ARENAC	Saginaw Chippewa Indian Tribe of Michigan - Saganing	50593203	SAGCHIPTRIBE50593203
3	BARAGA	Keweenaw Bay Indian community (KBIC) - Zeba Water Plant	55293302	KEWEEZEBA55293302
4	CALHOUN	Nottawaseppi Huron Band - Pine Creek Reservation	55293901	NOTTAWASEPPI55293901
5	CHIPPEWA	Bay Mills - CWS	55293101	CHIPBAYMILLS55293101
6	CHIPPEWA	Bay Mills Resort and Casino - NTNCWS	50593105	CHIPCASINO50593105
7	EMMET	Little Traverse Bay of Bands of Odawa - Mtigwaakiis	55293802	ODAWAMTIGW55293802
8	EMMET	Little Traverse Bay of Bands of Odawa - Wah Wahs Noo Da Ke	55293801	ODAWAWAHWA55293801
9	GOGEBIC	Lac Vieux Desert Band of Lake Superior Chippewa-Waters Meet	55293401	LACVIEUX55293401-1
10	GOGEBIC	Lac Vieux Desert Band of Lake Superior Chippewa-Waters Meet	55293401	LACVIEUX55293401-2
11	GRAND TRAVERSE	Grand Traverse Band of Ottawa and Chippewa - East Bay Water	55293603	OTTAWAEAST55293603
12	GRAND TRAVERSE	Grand Traverse Band of Ottawa and Chippewa - Peshawbestown	55293601	OTTAWAPESH55293601
13	ISABELLA	Saginaw Chippewa Indian Tribe of Michigan - Mt. Pleasant	55293201	SAGINAWCHIP55293201
14	LEELANAU	Grand Traverse Band of Ottawa and Chippewa - East Bay Water	55293603	OTTAWALAW55293603
15	MACKINAC	Hessel - CWS	55293504	HESSEL55293504
16	MANISTEE	Little River Band of Ottawa Indians	55293702	OTTAWALITL55293702
17	MARQUETTE	Keweenaw Bay Indian Community - Kawbawgam Road	55293303	KEWEEKAWB55293303
18	MENOMINEE	Hannahville Indian Community	55293611	HANNAHVILL55293611
19	SCHOOLCRAFT	Manistique - CWS	55293501	MANISTIQUE55293501

Footnotes:
WSSN = Water Supply Serial Number

Location: The location is a combination of an acronym of the supply name and the WSSN. If more than one well was present, it follows the WSSN.

Table 1e - Public Water Supply - CWS and Daycare Pending Sampling
EGLE 2018 Statewide PFAS Sampling Program

No.	Type	County	Supply Name	WSSN	Site Cide	Sample Location	Location	Sampling Status
1	CWS	Cass	Colonial Acres	40094	CH001	40094-CH001	COLONIALAC40094CH001	Pending in 2019
2	CWS	Oceana	Shelby	06000	WL002	0600-WL001	SHELBY06000WL002	Pending in 2019
3	CWS	Presque Island	Presque Isle Harbor Water Co.	05575	CH501	05575-CH501	PRESQUEHWC05575CH501	Pending in 2019
4	DAY	Allegan	Pullman Migrant Headstart	2051703		2051703	PULLMANMIG-2051703	Pending in 2019
5	DAY	Berrien	Telamon Sodus Migrant Head Start	2065311		2065311	TELAMONMIG-2065311	Pending in 2019
6	DAY	Berrien	Spinks Corner Head Start	2064911		2064911	SPINKS-2064911	Pending in 2019
7	DAY	Berrien	Telamon Watervliet Migrant Headtsrt	2069711		2069711	TELAMONMIG-2069711	Pending in 2019
8	DAY	Kent	Kent City Migrant Headstart	2086641		2086641	KENT CITY-2086641	Pending in 2019
9	DAY	Leelanau	Telamon Migrant Head Start	2019445		2019445	TELAMONMIG-2019445	Pending in 2019
10	DAY	Manistee	Telamon Migrant Headstart School	2017051		2017051	TELAMONMIG-2017051	Pending in 2019
11	DAY	Oceana	New Era Migrant Headstart	2027164		2027164	NEWERAMIG-2027164	Pending in 2019
12	DAY	Oceana	Telamon Headstart	2022464		2022464	TELAMON-2022464	Pending in 2019
13	DAY	Ottawa	Conklin Migrant Head Start	2027270		2027270	CONKLIN-202720	Pending in 2019
14	DAY	Van Buren	Migrant Head Start-Keeler	2053180		2053180	MIGRANTHS-2053180	Pending in 2019
15	DAY	Van Buren	Decatur Migant Head Start	2049880		2049880	DECATURE-2049880	Pending in 2019

Footnotes:
CWS = Community Water Supply
DAY = Daycare Water Supply
WSSN = Water Supply Serial Number

Location: The location is a combination of an acronym of the supply name, the WSSN, and the site code. The site code includes an abbreviation of the site type as detailed below.

CH = Combined Header
SS = Sample Site
TP = Treatment Plant
WL = Well

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound	Total PFAS	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	PFBS	PFHxS	PFOS	EtFOSAA	MeFOSAA
				Unit	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1	553MOBILE40520CH001	GWNT1808161115GSC	8/16/2018	1802588	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
2	ACMEHOPE00011CH500	GWNT1810241100GGA	10/24/2018	S96129	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3	ADAMSTWP00020TP004	GWEF1807311500GGA	7/31/2018	1802228	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
4	ADDISON00030TP001	GWEF1808271030GSC	8/27/2018	1802787	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
5	AKRON00070TP001	GWNT1810161000GGA	10/16/2018	S95849	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
6	AKRON00070TP005	GWEF1810161030GGA	10/16/2018	S95849	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
7	ALAMONURSE60085CH123	GW1804261305GSC	4/26/2018	1800790	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
8	ALANPARK40319CH001	GWNT1807271100GSC	7/27/2018	1802147	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
9	ALANPARKDU40458CH001	GWIN1808211150KER	8/21/2018	1802643	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
10	ALANSONMHP40129CH001	GWNT1808231100GGA	8/23/2018	1802711	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
11	ALBION00100TP011	GWEF1806201000KER	6/20/2018	1801472	20	4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	14	< 2	< 4	< 4
12	ALEXANDER40216SS001	GWNT1810221010KME	10/22/2018	S96104	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
13	ALGN00120TP101	GW1804251430GSC	4/25/2018	1800784	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
14	ALGNCSC00125TP013	GW1804251400GSC	4/25/2018	1800785	7	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	7	< 2	< 2	< 4	< 4
15	ALGOMAEST40259TP100	GW1804191100CKA	4/19/2018	1800722	5	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
16	ALLEGANME40002CH001	GW1804301315GSC	4/30/2018	1800850	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
17	ALPHA00180TP004	GWEF1808241020GSC	8/24/2018	1802733	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
18	ALTOMDWS40681CH001	GW1805310955GSC	5/31/2018	1801097	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
19	ANDREWEST40246CH001	GWNT1806181130KER	6/18/2018	1801390	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
20	ANDREWSMHP40003CH001	GW1804301010GSC	4/30/2018	1800848	39	< 2	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	6	4	23	< 4	< 4
21	APPLECARR40355TP100	GWEF1807061150GGA	7/6/2018	1801641	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
22	APPLEGRV40664TP100	GW1805291305EDK	5/29/2018	1801089	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
23	APPLEWOOD40668CH001	GWNT1808071600GGA	8/7/2018	1802338	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
24	ARBORRIDGE00236CH001	GWEF1807060925KER	7/6/2018	1801689	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
25	ARBORVILL40223TP001	GWEF1807110900KER	7/11/2018	1801771	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
26	ARBRVCOA04778CH012	GWNT1808281100CKA	8/28/2018	1802822	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
27	ARGENTINE66355TP001	GWEF1808091200GSC	8/9/2018	1802387	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
28	ARGENTINE66355TP001	GWEF1808091210GSC-FD	8/9/2018	1802387	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
29	ARLINGTON40356CH001	GWNT1807060930GGA	7/6/2018	1801638	4	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	2	< 4	< 4
30	ARLINGTON40356CH002	GWNT1807061035GGA	7/6/2018	1801638	12	3	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	2	2	2	< 4	< 4
31	ARLINGTON40356WL003	GWNT1807060945GGA	7/6/2018	1801638	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
32	ARLINGTON40356WL006	GWNT1807061030GGA	7/6/2018	1801638	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
33	ARLINGTON40356WL010	GWNT1807060950GGA	7/6/2018	1801638	5	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	3	< 4	< 4
34	ARMADA00240TP101	GWEF1810301000KME	10/30/2018	S96352	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
35	ASHLEY00250TP003	GWEF1807301145KER	7/30/2018	1802129	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
36	ATHENS00260TP023	GWEF1806220940KER	6/22/2018	1801511	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	3	< 2	< 4	< 4
37	ATHENS00260TP023	GWEF1806220945KER-FD	6/22/2018	1801511	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	2	< 2	< 4	< 4
38	AUGUSTA00320SS012	GWEF1806131435KER	6/13/2018	1801322	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
39	AUSABLEVLY00324CH001	GWEF1811081120GGA	11/8/2018	S96668	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
40	AUSABLEVLY00324CH002	GWEF1811081100GGA	11/8/2018	S96668	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
41	AUSABLEVLY00324CH003	GWEF1811081140GGA	11/8/2018	S96668	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
42	AUSTINCOM00322TP001	GWEF1808101000KER	8/10/2018	1802446	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
43	AUTUMNHILL01910CH012	GWNT1807261000GGA	7/26/2018	1802070	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
44	AVRAEST40074CH001	GWNT1808281500CKA	8/28/2018	1802827	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
45	AVRAEST40074CH002	GWNT1808281530CKA	8/28/2018	1802828	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
46	BALDWIN00350WL002	GWNT1809190950KER	9/19/2018	S94667	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
47	BALDWIN00350WL002	GWNT1809191000KER-FD	9/19/2018	S94667	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
48	BALDWIN00350WL003	GWNT1809190910KER	9/19/2018	S94667	10	4	2	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
49	BALDWIN00350WL004	GWNT1809190920KER	9/19/2018	S94667	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
50	BALDWIN00350WL005	GWNT1809190940KER	9/19/2018	S94667	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
51	BALTIMORE40041TP100	GWR1806131100GSC	6/13/2018	1801335	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
52	BANCROFT00370TP001	GWEF1808211050KER	8/21/2018	1802641	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
53	BANGOR00380TP003	GWEF1807251245GGA	7/25/2018	1802065	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
54	BANGOR00380TP007	GWEF1807251230GGA	7/25/2018	1802065	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
55	BANGOR00380TP008	GWEF1807251310GGA	7/25/2018	1802065	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
56	BANGOR00380TP009	GWEF1807251320GGA	7/25/2018	1802065	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
57	BARNSWAPT00418CH034	GWNT1809251500GGA	9/25/2018	S94987	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
58	BARRONLAKE40092TP100	GWEF1807250930GGA	7/25/2018	1802062	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
59	BARRYRES40042CH001	GWT1806131520GSC	6/13/2018	1801339	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
60	BARRYRES40042WL002	GWT1806131535GSC	6/13/2018	1801339	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
61	BARTONHILL00430TP001	GWEF1807171445GSC	7/17/2018	1801822	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
62	BARTONHILL00430TP002	GWEF1807171500GSC	7/17/2018	1801822	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
63	BARYTWP00426TP100	GW1804241130GSC	4/24/2018	1800755	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
64	BARYTWP00426WL001	GW1804241120GSC	4/24/2018	1800755	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
65	BASLINEMHP40005CH001	GWT1806121530GSC	6/12/2018	1801323	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
66	BATESTWP00440CH001	GWNT1808240800GSC	8/24/2018	1802730	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
67	BATESTWP00440WL003	GWNT1808240830GSC	8/24/2018	1802730	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
68	BAVARVILL06077CH001	GW1806141405EDK	6/14/2018	1801288	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
69	BAYHRBRCB00487CH502	GWNT1809051200GGA	9/5/2018	1802968	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
70	BAYSHOREST40128CH001	GWNT1808231000GGA	8/23/2018	1802709	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
71	BAYSIDE40190CH001	GWNT1810091300GGA	10/9/2018	S95592	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
72	BCVERONA00450TP101	GWEF1807251430KER	7/25/2018	1802039	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
73	BEANCREEK40554CH001	GWEF1808290915CKA	8/28/2018	1802818	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
74	BEARCKEST00505CH501	GWNT1808230900GGA	8/23/2018	1802707	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
75	BEARCKVLG00508CH001	GWIN1809270910KER	9/27/2018	S94970	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
76	BEARLAKE00510WL002	GWIN1809181500GGA	9/18/2018	S94690	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2
77	BEARLAKE00510WL003	GWEF1809181530GGA	9/18/2018	S94690	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2
78	BEAVERCK00514TP001	GWEF1808141030GGA	8/14/2018	1802477	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
79	BEAVERTON00520WL001	GWIN1810081515KER	10/8/2018	S95563	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
80	BEAVERTON00520WL003	GWIN1810081530KER	10/8/2018	S95563	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
81	BEDFORDHIL40080TP100	GWEF1806210930KER	6/21/2018	1801468	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
82	BEDFORDHIL40080TP101	GWEF1806210900KER	6/21/2018	1801468	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
83	BEDFORDMDW06435TP001	GWEF1807261220GSC	7/26/2018	1802088	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
84	BEDFORDMDW06435TP001	GWEF1807261230GSC-FD	7/26/2018	1802088	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
85	BEECHERMD00540TP001	GWEF1808061500GSC	8/6/2018	1802306	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
86	BEECHERMD00540TP002	GWEF1808070800GSC	8/7/2018	1802306	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
87	BEECHERMD00540TP003	GWEF1808061515GSC	8/6/2018	1802306	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
88	BEECHWOOD06627WL001	GWNT1807170900GGA	7/17/2018	1801833	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
89	BEECHWOOD06627WL002	GWNT1807170905GGA	7/17/2018	1801833	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
90	BEECHWOOD06627WL003	GWNT1807170910GGA	7/17/2018	1801833	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
91	BELDING00560TP101	GWEF1809280930KER	9/28/2018	S94977	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
92	BELDING00560TP102	GWEF1809280945KER	9/28/2018	S94977	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
93	BELDING00560TP104	GWEF1809281000KER	9/28/2018	S94977	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
94	BELDING00560TP105	GWEF1809280910KER	9/28/2018	S94977	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
95	BELEVUEMHP40081TP100	GWEF1807051200KER	7/5/2018	1801644	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
96	BELLAIRE00570CH502	GWNT1808151110GGA	8/15/2018	1802550	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
97	BELLAIRE00570WL001	GWNT1808151130GGA	8/15/2018	1802550	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
98	BELLAIRE00570WL002	GWNT1808151120GGA	8/15/2018	1802550	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
99	BELLEOAKS00575TP001	GWEF1811091000GGA	11/9/2018	S96673	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
100	BELLEVUE00590TP001	GWEF1806211300KER	6/21/2018	1801471	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
101	BENZONIA00610TP101	GWIN1809070945CKA	9/7/2018	1803009	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
102	BENZONIA00610TP102	GWNT1809071015CKA	9/7/2018	1803009	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
103	BENZONIA00610TP103	GWIN1809071000CKA	9/7/2018	1803009	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
104	BERGLAND00620WL003	GWNT1808011200GGA	8/1/2018	1802234	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
105	BERGLAND00620WL004	GWNT1808011210GGA	8/1/2018	1802234	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
106	BERRIENSPG00650TP137	GWIN1807241300GGA	7/24/2018	1802003	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
107	BERRIENSPG00650WL005	GWEF1807241330GGA	7/24/2018	1802003	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
108	BERRIENSPG00650WL006	GWEF1807241400GGA	7/24/2018	1802003	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
109	BESSEMER00660TP007	GWEF1808011330GGA	8/1/2018	1802236	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
110	BEULAH00680TP101	GWIN1809070830CKA	9/7/2018	1803008	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
111	BEULAH00680TP103	GWIN1809070840CKA	9/7/2018	1803008	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
112	BEULAH00680TP104	GWIN1809070850CKA	9/7/2018	1803008	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
113	BIGCKMUA00705TP100	GWEF1811080900GGA	11/8/2018	S96666	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
114	BIGRAPIDS00710TP100	GWEF1809120845KER	9/12/2018	S94387	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
115	BIRCHWDEST40082CH001	GWNT1806261420GSC	6/26/2018	1801544	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
116	BIRCHWOOD00725TP100	GWEF1808211545GGA	8/21/2018	1802669	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
117	BIRCHWOOD00725TP101	GWNT1808211600GGA	8/21/2018	1802669	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
118	BISHOPAPTS00731CH001	GWEF1807250810GSC	7/25/2018	1802007	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
119	BKHOUGHTON00894CH001	GWNT1811011100GGA	11/1/2018	S96371	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
120	BLACKBEAR00733TP001	GWEF1810241400GGA	10/24/2018	S96131	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
121	BLAIRTWP00743TP101	GWEF1809211100GGA	9/21/2018	S94705	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
122	BLUEWATER00795TP001	GWEF1806271600GSC	6/27/2018	1801564	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
123	BLULAKERES03925TP100	GWEF1807051330GGA	7/5/2018	1801650	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
124	BOERMAN40247CH001	GWNT1808061220GGA	8/6/2018	1802335	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
125	BOYNAIRELA00799CH001	GWNT1808231300GGA	8/23/2018	1802714	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
126	BOYNECITY00800TP100	GWEF1808311100GGA	8/31/2018	1802917	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
127	BOYNECITY00800TP101	GWEF1808311110GGA	8/31/2018	1802917	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
128	BOYNEFALLS00810TP100	GWIN1809041100GGA	9/4/2018	1802961	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
129	BOYNEHLRST00813TP100	GWEF1808291000GGA	8/29/2018	1802812	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

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EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
130	BOYNEMTRST00815CH501	GWEF1809041130GGA	9/4/2018	1802962	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
131	BOYNEMTRST00815TP101	GWEF1809041300GGA	9/4/2018	1802962	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
132	BRCKNRDG00820TP001	GWEF1808291145KER	8/29/2018	1802866	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
133	BRIARCLIFF02450CH001	GW1806130905EDK	6/13/2018	1801294	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
134	BRIGHTON00860TP001	GWEF1807181300GSC	7/18/2018	1801851	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
135	BRIGHTON00860TP002	GWEF1807181320GSC	7/18/2018	1801851	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
136	BRILEY00877TP100	GWEF1810301200GGA	10/30/2018	S96362	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
137	BRITTON00890TP001	GWEF1808031030GSC	8/3/2018	1802424	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
138	BRITTON00890TP002	GWEF1808031000GSC	8/3/2018	1802424	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
139	BRITTON00890TP006	GWEF1808031100GSC	8/3/2018	1802424	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
140	BROKDALEAD00045TP001	GWEF1808221630KER	8/22/2018	1802655	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
141	BROKDALEAP05993CH001	GW1806151110EDK	6/15/2018	1801416	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
142	BRONSON00910TP104	GWEF1809141315MK	9/14/2018	S94386	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
143	BRONSON00910TP105	GWNT1809141320MK	9/14/2018	S94386	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
144	BROOKLYN00920TP001	GWEF1808221400KER	8/22/2018	1802652	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
145	BROOMFIELD40218CH001	GWNT1810171340KME	10/17/2018	S95834	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
146	BROWNCTY00930TP001	GWEF1810181200GGA	10/18/2018	S95866	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
147	BROWNCTY00930TP002	GWEF1810181230GGA	10/18/2018	S95866	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
148	BUCHANAN00960TP134	GWEF1807191430GGA	7/19/2018	1801943	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
149	BUCKLEY00970TP100	GWIN1810040930KER	10/4/2018	S95278	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
150	BUELHILMHP40615CH001	GWNT1810221130GGA	10/22/2018	S96120	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
151	BUENAVISTA40051CH001	GWNT1809071205CKA	9/7/2018	1803013	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
152	BURROAK01000TP034	GWEF1809281100GGA	9/28/2018	S95009	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
153	BURTTWP02780CH001	GWNT1808170900GSC	8/17/2018	1802579	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
154	BURTVIEW01005CH501	GWNT1809140930GGA	9/14/2018	1803131	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
155	BUTTERCUP01015CH501	GWNT1809171100GGA	9/17/2018	S94680	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
156	BUTTERFLD01018CH001	GWNT1807051300GGA	7/5/2018	1801649	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
157	BYRAMRIDGE01019TP001	GWEF1808161330KER	8/16/2018	1802560	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
158	BYRON01020TP001	GWEF1808210940KER	8/21/2018	1802640	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
159	CADGEWITH40599CH001	GWNT1807231300KER	7/23/2018	1802030	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
160	CADILLAC01030TP011	GWEF1810021130KER	10/2/2018	S95261	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
161	CADILLAC01030TP100	GWEF1810021200KER	10/2/2018	S95261	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
162	CALEDESTS01037TP100	GW1805311330EDK	5/31/2018	1801101	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
163	CALEDTWP01039TP100	GW1805311500GSC	5/31/2018	1801102	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
164	CALEDTWP01039TP200	GW1805311445GSC	5/31/2018	1801102	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
165	CAMBRIDGE40068CH001	GWNT1810011600GGA	10/1/2018	S95230	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
166	CAMDEN01050TP001	GWIN1808291200CKA	8/29/2018	1802832	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
167	CANTERBURY40617TP100	GWEF1810010900KER	10/1/2018	S95253	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
168	CAPAC01110TP012	GWEF1810241115KME	10/24/2018	S96114	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
169	CAPITOL40675TP001	GWEF1807251045KER	7/25/2018	1802036	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
170	CARNEYTWP01125WL001	GWNT1808211340GSC	8/21/2018	1802673	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
171	CARNEYTWP01125WL002	GWNT1808211330GSC	8/21/2018	1802673	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
172	CAROCENTER01140TP007	GWIN1810111100GGA	10/11/2018	S95602	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
173	CAROCENTER01140TP009	GWIN1810111130GGA	10/11/2018	S95602	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
174	CAROCITY01130TP001	GWEF1810101300GGA	10/10/2018	S95600	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
175	CAROCITY01130TP008	GWIN1810101330GGA	10/10/2018	S95600	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
176	CAROCITY01130TP009	GWIN1810101400GGA	10/10/2018	S95600	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
177	CAROCITY01130TP011	GWEF1810101430GGA	10/10/2018	S95600	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
178	CAROCITY01130TP012	GWIN1810101500GGA	10/10/2018	S95600	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
179	CARSONCITY01170WL005	GWIN1807031530GGA	7/3/2018	1801631	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
180	CARSONCITY01170WL006	GWIN1807031540GGA	7/3/2018	1801631	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
181	CARSONVLLE01180TP001	GWEF1810171100GGA	10/17/2018	S95857	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
182	CASPIAN01210WL001	GWNT1808231120GSC	8/23/2018	1802727	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
183	CASSCITY01220TP001	GWEF1810101000GGA	10/10/2018	S95597	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
184	CASSCWS05234WL001	GWIN1808060910GGA	8/6/2018	1802330	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
185	CASSCWS05234WL002	GWIN1808060920GGA	8/6/2018	1802330	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
186	CASSLKSB01230CH001	GW1806050950EDK	6/5/2018	1801186	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
187	CASSOPOLIS01250SS045	GWEF1808060900GGA	8/6/2018	1802328	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
188	CECILFARMS01256CH501	GWNT1808230930GGA	8/23/2018	1802708	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
189	CEDARBROOK40375TP100	GW1806200905EDK	6/20/2018	1801449	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
190	CEDARCKTWP01258TP001	GWEF1810021400KER	10/2/2018	S95264	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
191	CEDARCKWC01252TP001	GWEF1809041100KER	9/4/2018	1802944	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
192	CEDARHILL01253CH001	GWEF1808220800GSC	8/22/2018	1802771	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
193	CEDARHOLW00044CH501	GWNT1809051400GGA	9/5/2018	1802969	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
194	CEDARMHP40619TP100	GW1805291500EDK	5/29/2018	1801091	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
195	CEDARSPG01260SS001	GW1805291400EDK	5/29/2018	1801090	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
196	CEDARSPG01260TP103	GW1805291410EDK	5/29/2018	1801090	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
197	CHALETDU01325CH012	GWNT1807171000GGA	7/17/2018	1801835	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
198	CHALETEMHP40125CH001	GWNT1808291200GGA	8/29/2018	1802904	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
199	CHARLESTON01327TP012	GWEF1806131415KER	6/13/2018	1801321	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
200	CHARLEVTWP01335TP100	GWEF1808301100GGA	8/30/2018	1802908	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
201	CHARLEVTWP01335TP101	GWIN1808301110GGA	8/30/2018	1802908	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
202	CHARLEVTWP01335TP102	GWIN1808301120GGA	8/30/2018	1802908	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
203	CHARLEVTWP01335TP103	GWIN1808301130GGA	8/30/2018	1802908	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
204	CHARLEVTWP01335TP104	GWEF1808301140GGA	8/30/2018	1802908	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
205	CHARLOTTE01340TP002	GWEF1806270910GSC	6/27/2018	1801557	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
206	CHASSELL01350TP007	GWEF1807311230GGA	7/31/2018	1802167	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
207	CHATEAUAPT01352CH001	GW1806081145EDK	6/8/2018	1801257	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
208	CHATEAUX01353CH001	GWNT1810311320KME	10/31/2018	S96333	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
209	CHATHAM01355WL001	GWEF1808161400GSC	8/16/2018	1802590	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
210	CHATHAM01355WL002	GWEF1808161345GSC	8/16/2018	1802590	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
211	CHEBOYGAN01360TP100	GWEF1809131200GGA	9/13/2018	1803127	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
212	CHEBOYGAN01360TP101	GWEF1809131220GGA	9/13/2018	1803127	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
213	CHELSEA01370TP001	GWEF1807241230KER	7/24/2018	1802078	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
214	CHERRYCRK01371CH001	GWNT1808150930GSC	8/15/2018	1802520	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
215	CHERRYLAND40174WL001	GWNT1810031200KER	10/3/2018	S95272	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
					Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
216	CHESANING01380TP001	GWEF1808271030KER	8/27/2018	1802763	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
217	CHESANING01380TP007	GWNT1808271115KER	8/27/2018	1802763	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
218	CHESANING01380TP011	GWEF1808271045KER	8/27/2018	1802763	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
219	CHESANING01380TP013	GWIN1808271100KER	8/27/2018	1802763	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
220	CHILDSLAKE40376TP100	GW1806151140EDK	6/15/2018	1801417	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
221	CHOCOLAY01416CH001	GWNT1808160800GSC	8/16/2018	1802585	5	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	3	< 4	< 4
222	CIDERMILL40679TP001	GWEF1807190905GSC	7/19/2018	1801875	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
223	CIRCLEDRV40339CH001	GWNT1809120930KER	9/12/2018	S94388	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
224	CLARE01420TP004	GWEF1811120900GGA	11/12/2018	S96901	17	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	3	10	4	< 2	< 2
225	CLARKSON40191CH001	GWNT1810091500GGA	10/9/2018	S95594	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
226	CLARKSTON40377TP100	GW1806201000EDK	6/20/2018	1801450	3	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
227	CLIFFORD01460TP001	GWIN1808081330GSC	8/8/2018	1802348	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
228	CLIFFORD01460TP002	GWNT1808081340GSC	8/8/2018	1802348	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
229	CLIMAX01465TP123	GWEF1806131320KER	6/13/2018	1801320	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
230	CLIMAXMHP40248CH001	GWT1806141355GSC	6/14/2018	1801394	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
231	CLIMAXMHP40248CH001	GWT1806141410GSC-FD	6/14/2018	1801394	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
232	CLINTON01470TP001	GWEF1808030900GSC	8/3/2018	1802423	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
233	CLINTON01470TP004	GWEF1808030800GSC	8/3/2018	1802423	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
234	CLINTON01470WL002	GWNT1808030830GSC	8/3/2018	1802423	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
235	CLINTONEST40305CH001	GWNT1808231120KER	8/23/2018	1802699	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
236	CMMHC40093CH001	GWNT1810041100GGA	10/4/2018	S95247	2	< 2	< 2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
237	CMPARCADIA01052CH501	GWEF1809181230GGA	9/18/2018	S94688	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
238	CNTREVILLE01310WL001	GWEF1809261300GGA	9/26/2018	S94997	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
239	CNTREVILLE01310WL003	GWEF1809261340GGA	9/26/2018	S94997	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
240	CNTREVILLE01310WL004	GWEF1809261320GGA	9/26/2018	S94997	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
241	CNTRLLAKE01300TP002	GWNT1809051030GGA	9/5/2018	1802967	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
242	CNTRLLAKE01300WL002	GWNT1809051020GGA	9/5/2018	1802967	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
243	CNTRLLAKE01300WL004	GWNT1809051040GGA	9/5/2018	1802967	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
244	CNTRYACMHP40006CH001	GW1806061410KER	6/6/2018	1801193	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
245	CNTRYACRES01655CH012	GWNT1807241430GGA	7/24/2018	1802004	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
246	CNTRYEDEN04045CH501	GWNT1810041130KER	10/4/2018	S95281	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
247	CNTRYHILL40591CH001	GWNT1810221300GGA	10/22/2018	S96121	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
248	CNTRYHOLI40488CH001	GWNT1807251100GGA	7/25/2018	1802063	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
249	CNTRYLAFC01648CH001	GWIN1808280950CKA	8/28/2018	1802820	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
250	CNTRYLAFC01648CH002	GWIN1808280940CKA	8/28/2018	1802819	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
251	CNTRYLOGAP01653CH001	GWNT1808151400GSC	8/15/2018	1802524	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
252	CNTRYMAN40457TP001	GWEF1808201120KER	8/20/2018	1802603	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
253	CNTRYMANOR40656CH001	GWNT1809140950KER	9/14/2018	S94400	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
254	CNTRYMDWS40004CH001	GWT1806121325GSC	6/12/2018	1801325	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
255	CNTRYPSCC01649WL001	GWNT1810171140KME	10/17/2018	S95830	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
256	CNTRYVIEW01657CH012	GWNT1807170930GGA	7/17/2018	1801834	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
257	CNTRYVIL40450TP001	GWEF1808160900KER	8/16/2018	1802555	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
258	CNTRYVIL40450TP001	GWEF1808160910KER-FD	8/16/2018	1802555	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
259	CNTRYVLAPT01652CH100	GWNT1810111000KME	10/11/2018	S95579	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
260	CNTRYVLMHP40408CH001	GWNT1811051200GGA	11/5/2018	S96647	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
261	COACHMAN40225TP001	GWEF1807201200KER	7/20/2018	1801967	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
262	COFFMANS40226CH001	GWNT1807201030KER	7/20/2018	1801964	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
263	COLDWATER01500TP100	GWEF1810011300GGA	10/1/2018	S95227	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
264	COLEMAN01520WL003	GWNT1810161005KME	10/16/2018	S95822	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
265	COLEMAN01520WL004	GWNT1810161015KME	10/16/2018	S95822	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
266	COLLEGEMHP40379TP100	GW1806191505EDK	6/19/2018	1801433	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
267	COLOMA01530TP002	GWIN1807161000GGA	7/16/2018	1801829	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
268	COLOMA01530TP003	GWIN1807161005GGA	7/16/2018	1801829	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
269	COLOMA01530TP004	GWIN1807161020GGA	7/16/2018	1801829	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
270	COLOMA01530TP005	GWIN1807161010GGA	7/16/2018	1801829	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
271	COLOMBIERE01572CH001	GW1806191250EDK	6/19/2018	1801430	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
272	COLON01540TP004	GWIN1809280920GGA	9/28/2018	S95007	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
273	COLON01540TP005	GWEF1809280940GGA	9/28/2018	S95007	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
274	COLON01540TP023	GWEF1809280900GGA	9/28/2018	S95007	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
275	COLONYBAY01552CH123	GWNT1807260930GGA	7/26/2018	1802069	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
276	COLUMLKEST01565TP001	GWEF1807100915KER	7/10/2018	1801692	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
277	COLUMVILLE01570TP001	GWEF1808081430GSC	8/8/2018	1802347	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
278	CONCORD01580TP001	GWEF1807241000KER	7/24/2018	1802076	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
279	CONCORD01580TP003	GWEF1807241020KER	7/24/2018	1802076	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
280	CONSTANTNE01600TP046	GWEF1810041200GGA	10/4/2018	S95248	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
281	CONWAYCMHP40126CH001	GWNT1808220900GGA	8/22/2018	1802675	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
282	COPPERMDWS01631TP001	GWEF1807241415GSC	7/24/2018	1801988	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
283	COPPERMDWS01631TP001	GWEF1807241420GSC-FD	7/24/2018	1801988	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
284	COTTCOVELK01643CH001	GWNT1809061200GGA	9/6/2018	1803041	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
285	COUNTRYAC40060TP100	GWNT1807171345GGA	7/17/2018	1801840	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
286	COUNTRYAC40060TP101	GWNT1807171330GGA	7/17/2018	1801840	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
287	COUNTRYAC40345CH001	GWNT1810161055KME	10/16/2018	S95823	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
288	COUNTRYMC40070CH001	GWNT1810011500GGA	10/1/2018	S95229	33	3	< 2	6	< 2	< 2	< 2	< 2	< 2	< 2	6	4	14	< 2	< 2
289	COUNTRYMHP40193WL001	GWNT1807131130KER	7/13/2018	1801797	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
290	COUNTRYMHP40193WL002	GWNT1807131100KER	7/13/2018	1801797	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
291	COUNTRYMHP40193WL002	GWNT1807131110KER-FD	7/13/2018	1801797	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
292	COUNTRYMHP40346TP100	GWEF1810161420KME	10/16/2018	S95825	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
293	COUNTRYMHP40381TP100	GWEF1806151215EDK	6/15/2018	1801418	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
294	COUNTRYPLA40220CH001	GWNT1810221630KME	10/22/2018	S96109	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
295	COUNTRYVIL40306TP001	GWNT1808241130KER	8/24/2018	1802761	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
296	COUNTRYVLG40418TP100	GWEF1809241200KER	9/24/2018	S94958	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
297	COVENTRY40649TP001	GWEF1807191230GSC	7/19/2018	1801883	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
298	CRANBERRY40382TP100	GW1806180910EDK	6/18/2018	1801424	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
299	CRANESCOVE01663TP001	GWEF1808031000KER	8/3/2018	1802427	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
300	CREEKVLY40655CH001	GWNT1806221400KER	6/22/2018	1801516	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
301	CRICKLEWD40425CH001	GWNT1809180900KER	9/18/2018	S94662	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
302	CRKSTJOHN40119TP001	GWEF1807250915KER	7/25/2018	1802033	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
303	CRKVLYMHP40079WL001	GWNT1806221335KER	6/22/2018	1801515	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
304	CRKVLYMHP40079WL002	GWNT1806221345KER	6/22/2018	1801515	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
305	CROCKERY40417CH001	GWNT1809201345KER	9/20/2018	S94677	13	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	13	< 2	< 2	< 2	< 2
306	CROCKERY40417WL001	GWNT1809201330KER	9/20/2018	S94677	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	3	< 2	< 2	< 2	< 2
307	CROOKEDRVR01666CH501	GWNT1808281300GGA	8/28/2018	1802810	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
308	CROSWELL01690TP005	GWEF1810221030GGA	10/22/2018	S96119	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
309	CROSWELL01690WL001	GWIN1810221100GGA	10/22/2018	S96119	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
310	CURRYHOUSE61700TP101	GWEF1810021300KER	10/2/2018	S95263	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
311	CWAINC06901CH501	GWNT1809121600KER	9/12/2018	S94398	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
312	DANSVILLE01718TP001	GWIN1807101300KER	7/10/2018	1801698	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
313	DAVISON01720TP001	GWEF1808020840KER	8/2/2018	1802257	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
314	DECATUR01750CH034	GWNT1809251145GGA	9/25/2018	S94984	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
315	DECATUR01750WL002	GWNT1809251130GGA	9/25/2018	S94984	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
316	DECKERVLG01760SS01	GWEF1810221000GGA	10/22/2018	S96118	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
317	DEEPWATER01765TP101	GWEF1810031300KER	10/3/2018	S95274	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
318	DEERFIELD40644CH001	GWNT1808141330KER	8/14/2018	1802466	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
319	DEERFLDVL01768CH501	GWNT1810091035KER	10/9/2018	S95566	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
320	DEERPKCOND01774CH001	GWNT1810291410KME	10/29/2018	S96350	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
321	DEERWDSUB01773TP100	GW1806041305EDK	6/4/2018	1801188	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
322	DEERWDSUB01773TP101	GW1806041250EDK	6/4/2018	1801188	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
323	DEERWDSUB01773TP102	GW1806041235EDK	6/4/2018	1801188	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
324	DEVANMHP40490CH001	GWNT1809241300GGA	9/24/2018	S94992	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
325	DEXTER01810TP002	GWEF1807241530GSC	7/24/2018	1801989	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
326	DEXTER01810TP003	GWEF1807241550GSC	7/24/2018	1801989	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
327	DIMONDALE63477TP001	GWIN1806271510GSC	6/27/2018	1801563	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
328	DOGWOODMHP40008CH001	GW1806051120GSC	6/5/2018	1801206	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
329	DORRLEIGHT01845TP012	GW1804261045GSC	4/26/2018	1800787	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
330	DOWAGIAC01860TP100	GWEF1808061100GGA	8/6/2018	1802333	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
331	DRUMISLAPT01865CH001	GWNT1809111200GGA	9/11/2018	1803053	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
332	DRYDEN01870TP001	GWEF1808140900KER	8/14/2018	1802460	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
333	DUMONTEST40563CH001	GWT1806121350GSC	6/12/2018	1801324	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
334	DUNLOPS40045CH001	GWNT1807091520KER	7/9/2018	1801704	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
335	DUNLOPS40045CH001	GWNT1807091540KER-FD	7/9/2018	1801704	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
336	DUNRENTIN01905TP100	GWNT1811121500KME	11/12/2018	S96933	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
337	DURAND01900TP001	GWEF1808211120KER	8/21/2018	1802642	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
338	DUTCHHILLS40116TP001	GWEF1809261100KER	9/26/2018	S94966	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
339	DUVERNAY01915CH001	GWNT1809121545KER	9/12/2018	S94397	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
340	EAGLEHRBR01920CH001	GWEF1807300930GGA	7/30/2018	1802156	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
341	EAGLELAKE01925TP034	GWEF1808081135GGA	8/8/2018	1802372	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
342	EAGLELKMHP40103WL001	GWNT1808081010GGA	8/8/2018	1802371	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
343	EAGLELKMHP40103WL002	GWNT1808081020GGA	8/8/2018	1802371	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
344	EAGLEPTCON07285TP001	GWNT1807160830KER	7/16/2018	1801802	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
345	EAGLEVLG01932WL001	GWNT1809101540KER	9/10/2018	S94384	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
346	EAGLEVLG01932WL002	GWNT1809101545KER	9/10/2018	S94384	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
347	EAGLEVLG01932WL005	GWNT1809101445KER	9/10/2018	S94384	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
348	EAGLEVLG01932WL006	GWNT1809101430KER	9/10/2018	S94384	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
349	EAGLEVLG01932WL007	GWNT1809101530KER	9/10/2018	S94384	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
350	EAGLEVLG01932WL008	GWNT1809101515KER	9/10/2018	S94384	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
351	EAGLEVLG01932WL009	GWNT1809101500KER	9/10/2018	S94384	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
352	EASTBAYMHP40607TP001	GWEF1810191140KME	10/19/2018	S95842	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
353	EASTBAYTWP01935TP100	GWEF1810241000GGA	10/24/2018	S96128	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
354	EASTBAYTWP01935TP101	GWEF1810241020GGA	10/24/2018	S96128	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
355	EASTBAYTWP01935TP102	GWNT1810241040GGA	10/24/2018	S96128	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
356	EASTJORDAN01970TP100	GWEF1808311400GGA	8/31/2018	1802918	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
357	EASTJORDAN01970TP101	GWEF1808311410GGA	8/31/2018	1802918	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
358	EASTJORDAN01970TP102	GWEF1808311420GGA	8/31/2018	1802918	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
359	EASTJORDAN01970TP104	GWNT1808311440GGA	8/31/2018	1802918	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
360	EATONGREEN02025CH001	GWNT1806270940GSC	6/27/2018	1801558	8	3	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
361	EATONRAPID02020TP001	GWEF1806281400GSC	6/28/2018	1801605	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
362	EAUCLAIRE02030TP123	GWEF1808301145KER	8/30/2018	1802884	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
363	EDGEWOOD40359CH001	GWNT1807051425GGA	7/5/2018	1801652	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
364	EDMORE02070TP105	GWIN1807021330GSC	7/2/2018	1801616	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
365	EDMORE02070TP106	GWIN1807021305GSC	7/2/2018	1801616	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
366	EDMORE02070WL003	GWNT1807021335GSC	7/2/2018	1801616	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
367	EDWARDSBRG02077TP012	GWEF1808081045GGA	8/8/2018	1802370	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
368	EGELCRAFT40600TP100	GWEF1807061215GGA-FD	7/6/2018	1801642	21	4	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	< 2	4	7	< 4	< 4
369	EGELCRAFT40600TP100	GWEF1807061220GGA	7/6/2018	1801642	49	7	4	12	< 2	< 2	< 4	< 4	< 4	< 4	3	9	14	< 4	< 4
370	ELANSNGMWA01995TP001	GWEF1807120915KER	7/12/2018	1801779	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
371	ELBERTA02080TP101	GWEF1809171300GGA	9/17/2018	S94682	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
372	ELBERTA02080TP103	GWEF1809171230GGA	9/17/2018	S94682	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
373	ELKRAPIDS02090TP101	GWEF1809061310GGA	9/6/2018	1803040	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
374	ELKRAPIDS02090TP102	GWEF1809061320GGA	9/6/2018	1803040	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
375	ELKTON02100WL003	GWNT1810090900GGA	10/9/2018	S95588	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
376	ELKTON02100WL005	GWNT1810090920GGA	10/9/2018	S95588	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
377	ELKTON02100WL006	GWNT1810090940GGA	10/9/2018	S95588	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
378	ELKTON02100WL007	GWNT1810091000GGA	10/9/2018	S95588	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
379	ELLSWORTH02110CH502	GWNT1809050930GGA	9/5/2018	1802966	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
380	ELLSWORTH02110WL003	GWNT1809050900GGA	9/5/2018	1802966	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
381	ELMWOODTWP06625CH501	GWNT1809041020KER	9/4/2018	1802943	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
382	ELMWOODTWP06625CH502	GWNT1809041000KER	9/4/2018	1802943	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
383	ELSIE02120SS001	GWEF1807301215KER	7/30/2018	1802130	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
384	ELSIE02120TP001	GWEF1807301200KER	7/30/2018	1802130	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
385	ELYTWPDIO01820CH001	GWEF1808141100GSC	8/14/2018	1802502	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
386	ELYTWPGRN02860CH001	GWNT1808141045GSC	8/14/2018	1802501	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
387	EMERYPINES02124CH001	GWNT1810151310KME	10/15/2018	S95821	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
388	EMICHNAZDC02292TP001	GWNT1807301000GSC	7/30/2018	1802140	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
389	EMPIRE02130CH502	GWNT1809041445KER	9/4/2018	1802949	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
390	EMPIRE02130WL001	GWNT1809041520KER	9/4/2018	1802949	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
391	EMPIRE02130WL004	GWNT1809041500KER	9/4/2018	1802949	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
392	EVART02190TP101	GWNT1809101100KER	9/10/2018	S94382	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	4	< 2	< 2	< 2	< 2
393	EVART02190TP102	GWNT1809101120KER	9/10/2018	S94382	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
394	EVART02190TP103	GWEF1809101130KER	9/10/2018	S94382	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
395	EVART02190TP104	GWEF1809101050KER	9/10/2018	S94382	20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	20	< 2	< 2	< 2	< 2
396	EVART02190TP106	GWEF1809101110KER	9/10/2018	S94382	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
397	EVART02190TP108	GWEF1809101030KER	9/10/2018	S94382	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
398	EVART02190TP109	GWEF1809101000KER	9/10/2018	S94382	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
399	EVART02190WL014	GWEF1809101020KER	9/10/2018	S94382	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
400	EVERGREEN40206TP100	GWEF1809271400KER	9/27/2018	S94976	18	15	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
401	EVERGREEN40206TP101	GWEF1809271430KER	9/27/2018	S94976	3	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
402	EVERGREENE40484TP100	GWEF1810111000GGA	10/11/2018	S95601	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
403	EVERGREENP40250CH001	GWNT1806180900KER	6/18/2018	1801381	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
404	EVERGRVIL40587CH001	GWNT1809191330KER	9/19/2018	S94670	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
405	FAIRLANE40316CH001	GWNT1807251230GSC	7/25/2018	1802012	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
406	FAIRLAWN40318CH001	GWNT1807251500GSC	7/18/2018	1802015	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
407	FAIRWAYCON02215CH013	GWNT1808141125GGA	8/14/2018	1802478	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
408	FARWELL02250TP004	GWEF1811121000GGA	11/12/2018	S96902	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
409	FENNVILLE02260TP001	GW1804251245GSC	4/25/2018	1800773	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
410	FENNVILLE02260TP007	GW1804251300GSC	4/25/2018	1800773	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
411	FENTON02270TP001	GWEF1808070845GSC	8/7/2018	1802309	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
412	FENTONHGTS02274TP001	GWEF1808140930KER	8/14/2018	1802461	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
413	FENTONHRBR02273TP001	GWEF1808011530KER	8/1/2018	1802205	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
414	FENTONLLC40144TP001	GWEF1808011600KER	8/1/2018	1802206	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
415	FIFELAKE02287CH501	GWNT1811071050MK	11/7/2018	1803568	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
416	FILERTWP02290TP102	GWIN1809191500GGA	9/19/2018	S94697	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
417	FILERTWP02290TP103	GWIN1809191520GGA	9/19/2018	S94697	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
418	FILERTWP02290TP104	GWIN1809191540GGA	9/19/2018	S94697	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
419	FILLMORE02291TP012	GW1804250935GSC	4/25/2018	1800781	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
420	FIRSTPOINT40302CH001	GWNT1809041200KER	9/4/2018	1802945	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
421	FISHERTLR40229CH001	GWNT1808221120KER	8/22/2018	1802650	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
422	FONDALWA02347TP001	GWEF1807251045GSC	7/25/2018	1802010	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
423	FORDRIVER02350CH001	GWNT1808211015GSC	8/21/2018	1802664	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
424	FORSYTHTWP02370CH001	GWEF1808151340GSC	8/15/2018	1802523	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
425	FORSYTHTWP02370CH002	GWNT1808151300GSC	8/15/2018	1802523	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
426	FORSYTHTWP02370WL006	GWEF1808151330GSC	8/15/2018	1802523	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
427	FOURSEASON40369CH001	GWNT1809141030KER	9/14/2018	S94401	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
428	FOWLER02390TP001	GWEF1807301300KER	7/30/2018	1802131	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
429	FOWLERVILL02400TP001	GWEF1807270900GSC	7/27/2018	1802148	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
430	FOWLERVILL02400TP002	GWEF1807270930GSC	7/27/2018	1802148	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
431	FOXFIELD02403CH501	GWNT1808211530GGA	8/21/2018	1802667	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
432	FRANKFORT02430TP101	GWEF1809171400GGA	9/17/2018	S94683	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
433	FRANKFORT02430TP103	GWEF1809171430GGA	9/17/2018	S94683	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
434	FRANKLIN05680CH001	GWIN1807310910GGA	7/31/2018	1802163	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
435	FRANKLNSUB02440CH001	GW1806130945EDK	6/13/2018	1801293	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
436	FREELAND040438TP100	GWEF1808281120KER	8/28/2018	1802873	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
437	FREEPORT02480TP100	GW1804270900GSC	4/27/2018	1800846	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
438	FREMONT02490TP102	GWIN1807111340GGA	7/11/2018	1801758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
439	FREMONT02490TP103	GWIN1807111350GGA	7/11/2018	1801758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
440	FREMONT02490TP105	GWIN1807111200GGA	7/11/2018	1801758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
441	FREMONT02490TP106	GWIN1807111310GGA	7/11/2018	1801758	2	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
442	FREMONT02490TP107	GWIN1807111300GGA	7/11/2018	1801758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
443	FREMONT02490TP108	GWIN1807111220GGA	7/11/2018	1801758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
444	FREMONT02490TP109	GWIN1807111210GGA	7/11/2018	1801758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
445	FREMONT02490TP110	GWIN1807111230GGA	7/11/2018	1801758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
446	GAASTRA02510WL003	GWNT1808231140GSC	8/23/2018	1802744	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
447	GAGETOWN02520TP004	GWEF1810100900GGA	10/10/2018	S95596	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
448	GAGETOWN02520TP006	GWEF1810100930GGA	10/10/2018	S95596	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
449	GALESBURG02530-1	GWIN1806261310GSC	6/26/2018	1801546	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
450	GALESBURG02530-2	GWIN1806261320GSC	6/26/2018	1801546	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
451	GARDEN02540TP003	GWEF1808201245GSC	8/20/2018	1802632	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
452	GARLANDRES02568TP100	GWNT1811081200GGA	11/8/2018	S96669	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
453	GAYLORD02600TP103	GWEF1811011000GGA	11/1/2018	S96370	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
454	GAYLORD02600TP104	GWEF1808131100GGA	8/13/2018	1802470	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	2	< 2	< 4	< 4
455	GAYLORD02600TP105	GWEF1808131115GGA	8/13/2018	1802470	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
456	GAYLORD02600TP106	GWEF1808131130GGA	8/13/2018	1802470	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
457	GENWHITE00796CH012	GWNT1809251200GGA	9/25/2018	S94985	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
458	GERMFASK02625CH001	GWNT1808171100GSC	8/17/2018	1802581	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
459	GLADWIN02650TP006	GWEF1810081420KER	10/8/2018	S95562	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
460	GLADWIN02650TP007	GWEF1810081440KER	10/8/2018	S95562	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
461	GLADWINNR62653CH600	GWIN1810081400KER	10/8/2018	S95561	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
462	GLENDEVON02654TP001	GWEF1808030930KER	8/3/2018	1802426	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
463	GLENMDWS02656TP100	GWEF1808141000GGA	8/14/2018	1802476	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
464	GLENNHAVEN02655CH123	GW1806081330KER	6/8/2018	1801236	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
465	GLENNWOODS02659CH012	GW1806081115KER	6/8/2018	1801235	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
466	GLENNWOODS02659CH012	GW1806081120KER-FD	6/8/2018	1801235	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
467	GLENOAKS02657TP100	GWEF1810041400GGA	10/4/2018	S95250	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
468	GLENWOOD40566TP100	GWR1806110910KER	6/11/2018	1801310	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
469	GNFDPOINTE02846TP001	GWEF1807191400GSC	7/19/2018	1801887	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
470	GOBLES02680SS456	GWEF1809241030GGA	9/24/2018	S94990	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
471	GOLDENPOND40476CH001	GWNT1809270900GGA	9/27/2018	S94999	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
472	GRANDBLANC02740TP005	GWEF1808031200KER	8/3/2018	1802429	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
473	GRANDBLANC02740TP007	GWEF1808031130KER	8/3/2018	1802429	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
474	GRANDCNTRY40419TP100	GWEF1809241120KER	9/24/2018	S94957	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
475	GRANDLEDGE02770TP001	GWEF1806290830GSC	6/29/2018	1801609	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
476	GRANDPOINT02785CH001	GWNT1806271330GSC	6/27/2018	1801561	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
477	GRANDVLYET02809TP100	GW1806050900GSC	6/5/2018	1801208	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
478	GRANT02823TP100	GWMP1807311100KER	7/31/2018	1802183	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
479	GRANTRAV02805TP101	GWEF1810031330KER	10/3/2018	S95275	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
480	GRANTTWP01630TP001	GWEF1807300900GGA	7/30/2018	1802153	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
481	GRASSLAKE02830TP001	GWEF1807201100KER	7/20/2018	1801965	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
482	GRATIOTAWA02836TP001	GWEF1808291030KER	8/29/2018	1802864	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
483	GRAYLING02840TP101	GWEF1811061100GGA	11/6/2018	S96656	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
484	GRAYLING02840TP102	GWEF1811061130GGA	11/6/2018	S96656	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	3	< 2	< 2	< 2
485	GRDVLGMHP40069CH001	GWNT1808281240CKA	8/28/2018	1802823	6	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	6	< 2	< 2	< 4	< 4
486	GREATLKAA02839WL001	GWNT1807021130GSC	7/2/2018	1801614	4	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	4	< 2	< 2	< 4	< 4
487	GREATLKAA02839WL002	GWNT1807021140GSC	7/2/2018	1801614	7	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	7	< 2	< 2	< 4	< 4
488	GREENACMHP40273CH001	GWEF1806111120KER	6/11/2018	1801312	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
489	GREENBRIAR40352WL001	GWNT1807091430GGA	7/9/2018	1801743	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
490	GREENBRIAR40352WL002	GWNT1807091445GGA	7/9/2018	1801743	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
491	GREENFIELD02837CH012	GW1806061240KER	6/6/2018	1801196	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
492	GREENLAKE02843TP001	GWEF1810231500GGA	10/23/2018	S96126	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
493	GREENLAWN40405CH001	GWNT1811050905KME	11/5/2018	S96624	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
494	GREENLAWN40405CH001	GWNT1811050915KME-FD	11/5/2018	S96624	16	6	2	8	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
495	GREENLAWN40405CH001	GWNT1902151010KME	2/15/2019	1900304	27	12	3	12	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
496	GREENLAWN40405WL001	GWNT1902151020KME	2/15/2019	1900304	69	25	8	25	< 2	< 2	< 4	< 4	< 4	< 4	3	4	4	< 4	< 4
497	GREENLAWN40405WL002	GWNT1902151030KME	2/15/2019	1900304	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
498	GREENOAK01543TP001	GWEF1807231400GSC	7/23/2018	1801970	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
499	GREENSLAKE02847CH001	GW1806071040EDK	6/7/2018	1801180	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
500	GREENWOOD02855CH001	GWNT1808151020KER	8/15/2018	1802542	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
501	GREGGAPTS02845CH001	GW1805311520GSC	5/31/2018	1801103	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
502	GRNBRKEST05395CH001	GWEF1807181415GSC	7/18/2018	1801853	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
503	GRNVILLE02850TP100	GWEF1807030950GSC	7/3/2018	1801625	5	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	3	< 2	< 4	< 4
504	GRNVILLEAC02851CH001	GWNT1807020900GSC	7/2/2018	1801611	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
505	GROVELAND40384TP100	GW1806081135EDK	6/8/2018	1801254	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
506	GUERNSEY40046CH001	GWT1806121130GSC	6/12/2018	1801327	8	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	5	< 2	< 4	< 4
507	GUNLAKEMHC40044CH001	GWEF1806130900GSC	6/13/2018	1801334	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
508	GUNLAKEMHC40044WL003	GWEF1806130920GSC	6/13/2018	1801334	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
509	GUNRIVEREW40029CH001	GW1804241010GSC	4/24/2018	1800754	0	< 4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
510	GUNRIVERME40011TP100	GW1804240945GSC	4/24/2018	1800753	0	< 4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
511	GUNTHER40138WL003	GWNT1808091040GSC	8/9/2018	1802386	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
512	GUNTHER40138WL004	GWNT1808091050GSC	8/9/2018	1802386	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
513	GUNTHER40138WL005	GWNT1808091030GSC	8/9/2018	1802386	2	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
514	HALECREEK62942CH001	GWEF1811150900GGA	11/15/2018	S96921	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
515	HALEHMSDAP02943CH500	GWEF1811151000GGA	11/15/2018	S96922	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
516	HAMBURG40317TP001	GWEF1807191245GSC	7/19/2018	1801884	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
517	HAMLETPOA02945CH501	GWNT1808291130GGA	8/29/2018	1802814	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
518	HAMLETVCA02944CH501	GWNT1808291100GGA	8/29/2018	1802813	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
519	HAMLINMHP40194TP001	GWEF1807121200KER	7/12/2018	1801783	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
520	HANDYTWP02982TP001	GWEF1807271030GSC	7/23/2018	1802146	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
521	HARINGCHTR03018TP101	GWEF1810021330KER	10/2/2018	S95262	9	< 2	< 2	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	3	3	< 2	< 2
522	HARRISVILL03050TP100	GWEF1811141400GGA	11/14/2018	S96919	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
523	HARRSION03030CH001	GWNT1811130900GGA	11/13/2018	S96911	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
524	HART03060WL001	GWNT1811051230KME	11/5/2018	S96628	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
525	HART03060WL002	GWNT1811051240KME	11/5/2018	S96628	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
526	HART03060WL003	GWNT1811051310KME	11/5/2018	S96628	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
527	HART03060WL004	GWNT1811051315KME	11/5/2018	S96628	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
528	HART03060WL005	GWNT1811051250KME	11/5/2018	S96628	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
529	HARTFORD03070TP456	GWEF1808071500GGA	8/7/2018	1802337	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
530	HARTLAND40654TP001	GWEF1807311400GSC	7/31/2018	1802177	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
531	HARTLNDHIL03073CH001	GWEF1807251145GSC	7/25/2018	1802011	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
532	HARTLNDTWP03075TP001	GWEF1807251315GSC	7/25/2018	1802013	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
533	HARTWICK40620CH001	GWEF1811061300GGA	11/6/2018	S96658	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
534	HARVESTSUB03080TP001	GWEF1807191345GSC	7/19/2018	1801886	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
535	HASTINGS03090TP100	GW1804231325GSC	4/23/2018	1800749	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
536	HAVENVIEW40343CH001	GWNT1809140930KER	9/14/2018	S94399	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
537	HDNGLENAPT03131CH001	GWNT1808160945KER	8/16/2018	1802556	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
538	HDNHAMLET03132TP100	GWEF1808220930GGA	8/22/2018	1802676	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
539	HDNLAKESGO03137TP001	GWEF1807191135GSC	7/19/2018	1801881	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
540	HDSHORESWE05819CH001	GWEF1807301245GSC	7/30/2018	1802135	7	3	< 2	4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
541	HEARTHSIDE40680CH001	GWEF1808291300GGA	8/29/2018	1802905	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
542	HEMINGPCOA03115TP100	GWIN1808301400GGA	8/30/2018	1802912	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
543	HEMRICHTWP03110TP005	GWIN1808281320KER	8/28/2018	1802875	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
544	HEMRICHTWP03110TP006	GWIN1808281300KER	8/28/2018	1802875	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
545	HERITAGEAP03117CH001	GWEF1807111000GSC	7/11/2018	1801705	36	7	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	21	8	< 2	< 4	< 4
546	HERITAGEHV40333CH001	GWNT1811061240KME	11/6/2018	S96635	13	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	9	< 2	< 2	< 2	< 2
547	HERMANHCOM03120CH001	GWEF1808220930GSC	8/22/2018	1802774	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
548	HESPERIA03130CH001	GWNT1809191240KER	9/19/2018	S94669	15	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	15	< 2	< 2	< 2	< 2
549	HESPERIA03130WL003	GWNT1809191300KER	9/19/2018	S94669	29	11	9	7	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
550	HESSLAKE40370CH001	GWNT1809191420KER	9/19/2018	S94671	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
551	HHWSAPTS03138CH001	GW1806180815EDK	6/18/2018	1801422	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
552	HHWSAPTS03139CH001	GW1806180830EDK	6/18/2018	1801422	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
553	HICKORYHIL40084TP100	GWEF1806220900KER	6/22/2018	1801509	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
554	HICKORYLN40469CH001	GWNT1809271000GGA	9/27/2018	S95000	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
555	HIDDENCRK40682TP100	GWEF1807261020KER	7/26/2018	1802082	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
556	HIDDENLAKE40386TP100	GW1806181020EDK	6/18/2018	1801426	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
557	HIDDENVAL40208CH001	GWNT1810011100KER	10/1/2018	S95256	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
558	HIGHLANDGR40387TP100	GW1806051320EDK	6/5/2018	1801185	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
559	HIGHLANDGR40387TP101	GW1806051315EDK	6/5/2018	1801185	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
560	HIGHLANDMH40388TP001	GWEF1806190840EDK	6/19/2018	1801455	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
561	HIGHLNDTWP03312TP100	GW1806141145EDK	6/14/2018	1801289	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
562	HIGHLNDTWP03312TP300	GW1806141305EDK	6/14/2018	1801289	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
563	HIGHLNDTWP03312TP500	GW1806141250EDK	6/14/2018	1801289	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
564	HIGHLNDTWP03312TP600	GW1806141225EDK	6/14/2018	1801289	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
565	HIGHLNDTWP03312TP600	GW1806141230EDK-FD	6/14/2018	1801289	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
566	HIGHYOCAMP03134WL005	GWNT1807131015KER	7/13/2018	1801796	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
567	HIGHYOCAMP03134WL006	GWNT1807131030KER	7/13/2018	1801796	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
568	HIGHYOCAMP03134WL034	GWNT1807131000KER	7/13/2018	1801796	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
569	HILLANLAKE40231TP001	GWIN1807161015KER	7/16/2018	1801803	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
570	HILLMAN03160TP107	GWEF1810301300GGA	10/30/2018	S96363	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
571	HILLMAN03160TP108	GWEF1810301330GGA	10/30/2018	S96363	0	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
572	HILLSDALE03170TP001	GWEF1808271130GSC	8/27/2018	1802788	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
573	HILLSHAVEN40057CH001	GWNT1808301010KER	8/30/2018	1802881	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
574	HILLSIDEAC40180TP001	GWEF1808271400GSC	8/27/2018	1802790	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
575	HILLVIEW03175TP100	GW1806041205EDK	6/4/2018	1801189	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
576	HIWAYMH40122TP001	GWIN1806271415GSC	6/27/2018	1801562	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	3	< 4	< 4
577	HMSTDPHA03225CH501	GWNT1808231130GGA	8/23/2018	1802712	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
578	HOLIDAYMHP40335CH001	GWNT1811061205KME	11/6/2018	S96634	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
579	HOLIDAYTER40344CH001	GWNT1809121330KER	9/12/2018	S94394	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
580	HOLLY03200TP100	GWEF1807121250GSC	7/12/2018	1801733	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
581	HOLLYHILLS40665TP100	GW1806081015EDK	6/8/2018	1801251	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
582	HOMCRSTMHP40014CH001	GW1806051320GSC	6/5/2018	1801205	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
583	HOMER03220TP034	GWEF1806260950GSC	6/26/2018	1801542	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
584	HOPEWLFAC03228CH001	GWNT1809271000KER	9/27/2018	S94971	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
585	HORSELL06773CH001	GWNT1808131240GGA	8/13/2018	1802472	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
586	HORTONBAYC03229CH500	GWNT1808310930GGA	8/31/2018	1802915	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
587	HOUGHTNTWP01930WL001	GWNT1807301030GGA	7/30/2018	1802158	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
588	HOUGHTON03230TP004	GWEF1807311100GGA	7/31/2018	1802164	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
589	HOUGHTONHM03237CH501	GWNT1810151205KME	10/15/2018	S95820	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
590	HOUGHTONLT03238CH501	GWEF1810091410KER	10/9/2018	S95570	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
591	HOWARDCITY03240TP105	GWEF1807090920GA	7/9/2018	1801734	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
592	HOWARDCITY03240WL003	GWEF1807090910GA	7/9/2018	1801734	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
593	HOWELL03250TP001	GWEF1807230930GSC	7/23/2018	1801968	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
594	HRBRCOVE03001TP001	GWEF1808071130KER	8/7/2018	1802314	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
595	HRBRHILLS03005CH501	GWNT1808271335GGA	8/27/2018	1802806	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
596	HRBRSPG03010TP100	GWEF1808281000GGA	8/28/2018	1802809	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
597	HRBRSPG03010TP101	GWEF1808281030GGA	8/28/2018	1802809	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
598	HRBRSPG03010TP102	GWEF1808281100GGA	8/28/2018	1802809	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
599	HRBRSPG03010TP103	GWEF1808281130GGA	8/28/2018	1802809	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
600	HRBRSPGAA03015TP501	GWEF1808271000GGA	8/27/2018	1802800	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
601	HUDSON03280TP001	GWEF1808271015GSC	8/27/2018	1802786	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
602	HUNTERCRK40342CH001	GWNT1809121110KER	9/12/2018	S94391	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
603	HUNTERGLEN40660TP100	GWEF1806130845KER	6/13/2018	1801314	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
604	HUNTMORE05033TP001	GWEF1807301030GSC	7/30/2018	1802142	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
605	HURONBAY40448TP100	GWEF1810171400GGA	10/17/2018	S95860	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
606	HURONDSUB03315CH501	GWNT1810081200GGA	10/8/2018	S95583	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
607	HYLANDER40406CH001	GWNT1811051410KME	11/5/2018	S96629	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
608	IDEALVILLA40299CH001	GWNT1808021130KER	8/2/2018	1802263	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
609	IDLEWILD07233CH501	GWNT1809121530KER	9/12/2018	S94396	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
610	INDACMHP40015CH001	GWT1806121010KER	6/12/2018	1801305	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
611	INDEPENTWP03342TP100	GW1806040940EDK	6/4/2018	1801190	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
612	INDEPENTWP03342TP101	GW1806040920EDK	6/4/2018	1801190	10	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	4	6	< 2	< 4	< 4
613	INDEPENTWP03342TP102	GW1806041050EDK	6/4/2018	1801190	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
614	INDEPENTWP03342TP103	GW1806041115EDK	6/4/2018	1801190	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
615	INDEPENTWP03342TP104	GW1806041010EDK	6/4/2018	1801190	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
616	INDEPENTWP03342TP104	GW1806041015EDK-FD	6/4/2018	1801190	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
617	INDEPENTWP03342TP105	GW1806041140EDK	6/4/2018	1801190	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
618	INDIANVIL40233TP001	GWEF1807190900KER	7/19/2018	1801945	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
619	INDRVRMHP40108CH001	GWNT1810261300GGA	10/26/2018	S96138	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
620	INLANDHCA03362CH001	GWNT1808211200GGA	8/21/2018	1802660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
621	INTERIOR06680CH001	GWIN1808011100GGA	8/1/2018	1802233	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
622	INTERIOR06680CH002	GWIN1808011000GGA	8/1/2018	1802233	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
623	INTERLOCHN03365TP101	GWEF1810231300GGA	10/23/2018	S96125	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
624	INTERLOCHN03365TP102	GWEF1810231330GGA	10/23/2018	S96125	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
625	IONIA03370WL009	GWIN1807130910GGA	7/13/2018	1801798	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
626	IONIA03370WL011	GWIN1807130900GGA	7/13/2018	1801798	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
627	IONIA03370WL013	GWIN1807130930GGA	7/13/2018	1801798	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
628	IONIA03370WL015	GWIN1807131000GGA	7/13/2018	1801798	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
629	IRONMNT03400CH001	GWIN1808221340GSC	8/22/2018	1802778	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	2	< 2	< 4	< 4
630	IRONMNT03400WL004	GWIN1808221330GSC	8/22/2018	1802778	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
631	IRONRVR03410CH001	GWNT1808231030GSC	8/23/2018	1802781	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
632	IRONRVR03410WL004	GWNT1808231040GSC	8/23/2018	1802781	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
633	IRONRVR03410WL005	GWNT1808231050GSC	8/23/2018	1802781	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
634	IRONRVRBEE00550CH001	GWNT1808230915GSC	8/23/2018	1802745	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
635	IRONRVRNAS04610WL001	GWNT1808230900GSC	8/23/2018	1802743	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
636	IRONRVRRYD05760WL003	GWNT1808230940GSC	8/23/2018	1802746	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
637	IRONWOOD03420TP012	GWEF1808011400GGA	8/1/2018	1802237	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
638	ISHPEMEAST04775WL001	GWNT1808141400GSC	8/14/2018	1802505	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
639	ISHPEMWEST03450CH001	GWNT1808141330GSC	8/14/2018	1802504	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
640	ISHPEMWEST03450WL005	GWNT1808141340GSC	8/14/2018	1802504	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
641	ISLANDHOA03452CH501	GWNT1808301500GGA	8/30/2018	1802913	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
642	ISLLAKEAP03942WL004	GWEF1811121045KME	11/12/2018	S96932	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
643	ITHACA03460WL004	GWNT1808290930KER	8/29/2018	1802863	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
644	ITHACA03460WL005	GWNT1809261430KER	9/26/2018	S94969	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
645	ITHACA03460WL006	GWNT1808290950KER	8/29/2018	1802863	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

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EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
646	ITHACA03460WL007	GWNT1808290900KER	8/29/2018	1802863	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
647	JACKSON03470TP001	GWEF1807110830KER	7/11/2018	1801770	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
648	JAMIESON63476CH003	GWEF1811141500GGA	11/14/2018	S96920	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
649	JOHNSONSMV40016WL004	GW1806080930KER	6/8/2018	1801238	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
650	JOHNSONSMV40016WL005	GW1806080920KER	6/8/2018	1801238	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
651	JONESVILLE03490TP001	GWEF1810021500GGA	10/2/2018	S95237	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
652	JUNIPERCON03505CH501	GWNT1810031230KER	10/3/2018	S95273	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
653	KALCHIKEST03545CH001	GWNT1808211650GGA	8/21/2018	1802671	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
654	KALEVA03550TP101	GWIN1809190900GGA	9/19/2018	S94691	7	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	5	< 2	2	< 2	< 2
655	KALEVA03550TP102	GWIN1809190920GGA	9/19/2018	S94691	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
656	KALEVA03550TP103	GWIN1809190940GGA	9/19/2018	S94691	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
657	KALKASKA03560TP104	GWEF1811071100GGA	11/7/2018	S96663	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
658	KAMPVILLA40580CH001	GWNT1809181100GGA	9/18/2018	S94687	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
659	KAZOO03520TP201	GWEF1806151540KER	6/15/2018	1801413	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
660	KAZOO03520TP303	GWEF1806151525KER	6/15/2018	1801412	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
661	KAZOO03520TP304	GWEF1806151510KER	6/15/2018	1801411	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
662	KAZOO03520TP305	GWEF1806151030KER	6/15/2018	1801397	6	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	4	< 2	< 2	< 4	< 4
663	KAZOO03520TP306	GWEF1806151245KER	6/15/2018	1801404	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
664	KAZOO03520TP307	GWEF1806151300KER	6/15/2018	1801405	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
665	KAZOO03520TP308	GWEF1806151455KER	6/15/2018	1801410	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
666	KAZOO03520TP309	GWEF1806151440	6/15/2018	1801409	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
667	KAZOO03520TP310	GWEF1806151050KER	6/15/2018	1801398	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
668	KAZOO03520TP311	GWEF1806151230KER	6/15/2018	1801403	69	10	2	3	< 2	< 2	< 4	< 4	< 4	< 4	7	32	15	< 4	< 4
669	KAZOO03520TP312	GWEF1806151215KER	6/15/2018	1801402	72	12	3	5	< 2	< 2	< 4	< 4	< 4	< 4	7	31	14	< 4	< 4
670	KAZOO03520TP313	GWEF1806151425KER	6/15/2018	1801408	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
671	KAZOO03520TP314	GWEF1806151120KER	6/15/2018	1801399	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
672	KAZOO03520TP315	GWEF1806151355KER	6/15/2018	1801407	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
673	KAZOO03520TP315	GWEF1806151405KER-FD	6/15/2018	1801407	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
674	KAZOO03520TP316	GWEF1806151145KER	6/15/2018	1801401	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
675	KAZOOLSWA03525TP004	GWEF1808091130GGA	8/9/2018	1802379	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
676	KAZOOLSWA03525TP005	GW1804251100GSC	4/25/2018	1800774	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
677	KAZOOLSWA03525TP012	GW1804251045GSC	4/25/2018	1800774	3	< 4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
678	KAZOOLSWA03525TP067	GW1804251120GSC	4/25/2018	1800774	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
679	KELLBIOST03598TP012	GWEF1806191100KER	6/19/2018	1801461	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
680	KENTCTYMHP40264TP100	GW1804180950CKA	4/18/2018	1800811	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
681	KENTRDGAPT03615TP100	GW1804180915CKA	4/18/2018	1800812	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
682	KEYCOURT40166CH001	GWNT1810081300KER	10/8/2018	S95560	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
683	KEYHGTMV40276TP100	GW1806011000EDK-FD	6/1/2018	1801202	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
684	KEYHGTMV40276TP100	GW1806011030EDK	6/1/2018	1801202	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
685	KINGNURSE63635CH001	GWIN1810111240KME	10/11/2018	S95582	7	< 2	< 2	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	2	< 2	< 2
686	KINGSCOURT40171TP100	GWEF1811161230GGA	11/16/2018	S96928	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
687	KINGSCOURT40171TP101	GWEF1810041200KER	10/4/2018	S95282	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
688	KINGSCOURT40171TP102	GWEF1810041220KER	10/4/2018	S95282	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
689	KINGSFORD03640CH001	GWNT1808221200GSC	8/22/2018	1802777	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
690	KINGSFORD03640CH007	GWNT1808221215GSC	8/22/2018	1802777	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	3	< 2	< 4	< 4
691	KINGSLEY03650TP101	GWEF1810231000GGA	10/23/2018	S96123	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
692	KINGSLEY03650TP102	GWEF1810231020GGA	10/23/2018	S96123	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
693	KINGSLEY03650TP103	GWEF1810231040GGA	10/23/2018	S96123	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
694	KINGSTON03660TP001	GWIN1810111200GGA	10/11/2018	S95603	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
695	KINGSTONAP06243TP100	GW1806191205EDK	6/19/2018	1801429	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
696	KINGSTONE03660TP002	GWIN1812111000KER	12/11/2018	1804099	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
697	KINROSSTWP03630CH001	GWIN1809121400GGA	9/12/2018	1803062	50	4	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	< 2	40	< 2	< 4	< 4
698	KINROSSTWP03630CH002	GWNT1809121420GGA	9/12/2018	1803062	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
699	KINROSSTWP03630WL005	GWIN1809121440GGA	9/12/2018	1803062	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
700	KIRTLANDCC03661CH001	GWEF1810101045KME	10/10/2018	S95573	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
701	KISWAYER03510TP001	GWIN1808151530GSC	8/15/2018	1802525	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
702	KISWAYER03510TP001	GWIN1808151535GSC	8/15/2018	1802525	10	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	7	< 2	< 4	< 4
703	KISWAYER03510TP002	GWIN1808151500GSC	8/15/2018	1802525	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
704	KISWAYER03510TP002	GWIN1808151510GSC	8/15/2018	1802525	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
705	KLINESRES40471TP100	GWEF1810031200GGA	10/3/2018	S95242	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
706	KNORRSUB03666CH001	GWEF1806110805EDK	6/11/2018	1801259	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
707	LAEMAMHP40277CH001	GW1804191320CKA	4/19/2018	1800723	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
708	LAGUNASUB03690CH001	GW1806151000EDK	6/15/2018	1801414	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
709	LAKECITY03700TP102	GWEF1811081400GGA	11/8/2018	S96671	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
710	LAKECITY03700TP103	GWEF1811081430GGA	11/8/2018	S96671	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
711	LAKECRSTMC40075CH001	GWNT1808281330CKA	8/28/2018	1802824	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
712	LAKEFOREST40368CH001	GWNT1809141130KER	9/14/2018	S94402	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
713	LAKEISABEL03435CH001	GWEF1810221130KME	10/22/2018	S96105	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
714	LAKELANDCF01510TP001	GWIN1810011100GGA	10/1/2018	S95225	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
715	LAKELANDCF01510TP002	GWIN1810011120GGA	10/1/2018	S95225	0	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
716	LAKELANDCF01510TP004	GWIN1810011140GGA	10/1/2018	S95225	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
717	LAKELINDEN03720CH001	GWNT1807301400GGA	7/30/2018	1802161	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
718	LAKELNDMED60640TP012	GWEF1807231400GGA	7/23/2018	1802000	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
719	LAKEODESSA03730TP100	GWEF1809271250KER	9/27/2018	S94974	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
720	LAKEODESSA03730WL002	GWNT1809271230KER	9/27/2018	S94974	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
721	LAKEPARK02277TP001	GWEF1808141445KER	8/14/2018	1802467	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
722	LAKEPTCOND03737CH012	GWEF1807231000GGA	7/23/2018	1801996	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
723	LAKESDEAPT01669CH001	GW1806131015EDK	6/13/2018	1801292	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
724	LAKESDMHC40292TP100	GW1806011125GSC	6/1/2018	1801199	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
725	LAKESDMHP40018WL001	GWINT1806131110KER	6/13/2018	1801319	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
726	LAKESDMHP40018WL002	GWINT1806131115KER	6/13/2018	1801319	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
727	LAKESHORE40169TP001	GWEF1810081100KER	10/8/2018	S95558	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
728	LAKEVIEW03750TP100	GWEF1807091010GGA	7/9/2018	1801736	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
729	LAKEVIEWAP03755TP100	GWEF1808140915GGA	8/14/2018	1802475	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
730	LAKEVWEST40451TP001	GWEF1808150800KER	8/15/2018	1802539	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
731	LAKEVWTRL40431CH001	GWEF1810091440KME	10/9/2018	S95571	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
732	LANSINGBWL03760TP001	GWEF1807270915KER	7/27/2018	1802103	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
733	LANSINGBWL03760TP002	GWEF1807270950KER	7/27/2018	1802103	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
734	LANTERNBAY02195CH234	GWNT1807251330GGA	7/25/2018	1802066	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
735	LARBRECC03685CH501	GWNT1808221130GGA	8/22/2018	1802679	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
736	LAURELSFUL60937TP001	GWEF1807301100KER	7/30/2018	1802127	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
737	LAWRENCE03820TP001	GWEF1808071245GGA	8/7/2018	1802334	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
738	LAWRENCE03820TP002	GWEF1808071250GGA	8/7/2018	1802334	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
739	LAWRENCE03820TP004	GWEF1808071330GGA	8/7/2018	1802334	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
740	LAWTON03830CH001	GWNT1808071115GGA	8/7/2018	1802332	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
741	LAWTON03830WL004	GWNT1808071110GGA	8/7/2018	1802332	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
742	LCHALTCON05445CH001	GW1806071105EDK	6/7/2018	1801178	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
743	LDOSTER02925TP023	GW1804241040GSC	4/24/2018	1800752	2	< 8	2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
744	LEELANAUEC03829TP100	GWEF1809051040KER	9/5/2018	1802952	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
745	LEELANAUSC03831CH001	GWNT1809041300KER	9/4/2018	1802946	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
746	LEEVILLA40308TP001	GWEF1808231350KER	8/23/2018	1802701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
747	LEFFINGWEL40311CH001	GWNT1808271000GSC	8/27/2018	1802785	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
748	LEISUREVIL40279CH002	GW1804171020GSC	4/17/2018	1800810	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
749	LEONITWP03837WL001	GWNT1807191110KER	7/19/2018	1801946	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
750	LEONITWP03837WL002	GWEF1807191120KER	7/19/2018	1801946	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
751	LEONITWP03837WL004	GWNT1807191040KER	7/19/2018	1801946	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
752	LEONITWP03837WL005	GWNT1807191050KER	7/19/2018	1801946	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
753	LESLIE03840TP001	GWIN1807231010KER	7/23/2018	1802028	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
754	LEXINGTON03850WL003	GWNT1810171545GGA	10/17/2018	S95861	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
755	LIGHTHOUSE06569CH001	GWNT1810041030KER	10/4/2018	S95279	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
756	LILLYBANK40227CH001	GWNT1807201000KER	7/20/2018	1801962	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
757	LILTRAVTWP03927TP501	GWNT1808221100GGA	8/22/2018	1802678	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
758	LILTRAVTWP03927TP505	GWEF1808221030GGA	8/22/2018	1802678	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
759	LINCOLNEST40001CH001	GWNT1811141100GGA	11/14/2018	S96916	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
760	LINCOLNMAN03868CH001	GWNT1811141200GGA	11/14/2018	S96917	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
761	LINCOLNNR63865CH003	GWIN1811141300GGA	11/14/2018	S96918	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
762	LINCOLNPN40586TP100	GW1805301255GSC	5/30/2018	1801095	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
763	LINCOLNPN40586TP101	GW1805301305GSC	5/30/2018	1801095	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
764	LINCOLNPN40586TP102	GW1805301245GSC	5/30/2018	1801095	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
765	LINDEN03890TP001	GWEF1808071315GSC	8/7/2018	1802321	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
766	LINDENMHP40098CH001	GWNT1808080920GGA	8/8/2018	1802369	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
767	LINDENPMHO40145CH001	GWNT1808080900GSC	8/8/2018	1802340	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
768	LITCHFIELD03920TP003	GWEF1808280810CKA	8/28/2018	1802816	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
769	LITCHFIELD03920TP006	GWIN1808280820CKA	8/28/2018	1802817	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
770	LIVINGCWA03929TP001	GWEF1807191010GSC	7/19/2018	1801877	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
771	LK3ANGELA03691TP100	GW1806121220EDK	6/12/2018	1801296	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
772	LK4ANGELA03694CH001	GW1806121205EDK	6/12/2018	1801297	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
773	LK5ANGELA03693CH001	GW1806121155EDK	6/12/2018	1801298	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
774	LK6ANGELA03696CH001	GW1806121140EDK	6/12/2018	1801299	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
775	LKARROWEST03692TP001	GWEF1808230850KER	8/23/2018	1802694	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
776	LKBVS03695TP100TP200	GW1804170930GSC	4/17/2018	1800717	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
777	LKFENTON40158TP001	GWEF1810191130KME	10/19/2018	S95841	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
778	LKMICHBRP05549CH012	GWNT1807201130GGA	7/20/2018	1801937	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
779	LKMICHHGT40106CH001	GWNT1808300930GGA	8/30/2018	1802906	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
780	LKSHECON03145CH501	GWNT1810101420KME	10/10/2018	S95577	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
781	LKSHOREMHP40034CH001	GWNT1810291300GGA	10/29/2018	S96357	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
782	LKSHORESUB05577TP001	GWEF1807301045GSC	7/30/2018	1802141	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
783	LKSHRCONDO03751CH001	GWEF1807161100KER	7/16/2018	1801804	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
784	LKSHRHILAP03753CH001	GW1806201115EDK	6/20/2018	1801451	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
785	LKSHRHILAP03753CH003	GW1806201135EDK	6/20/2018	1801451	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
786	LKSHRHILAP03753CH004	GW1806201125EDK	6/20/2018	1801451	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
787	LKSHRHILAP03753CH005	GW1806201145EDK	6/20/2018	1801451	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
788	LKSIDECON03744CH501	GWEF1808231030GGA	8/23/2018	1802710	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
789	LKSIDEDEV03752CH301	GWNT1810081015KER	10/8/2018	S95557	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
790	LKSIDESUB03742CH012	GWNT1808281400CKA	8/28/2018	1802825	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
791	LKWOODTERR06935CH501	GWEF1808151400GGA	8/15/2018	1802553	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
792	LNGLAKESUB03947TP100	GW1806081105EDK	6/8/2018	1801253	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
793	LOCHALPSA03940TP001	GWEF1808071100KER	8/7/2018	1802312	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
794	LOCKPORT03943WL002	GWNT1810031100GGA	10/3/2018	S95241	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
795	LOCKPORT03943WL003	GWNT1810031130GGA	10/3/2018	S95241	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
796	LONGLKMHE40209WL001	GWNT1809281110KER	9/28/2018	S94979	15	3	< 2	4	< 2	< 2	< 2	< 2	< 2	< 2	4	2	2	< 2	< 2
797	LONGLKMHE40209WL002	GWNT1809281120KER	9/28/2018	S94979	15	3	< 2	4	< 2	< 2	< 2	< 2	< 2	< 2	4	2	2	< 2	< 2
798	LOOKGLASS03946CH001	GWEF1808151210KER	8/15/2018	1802544	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
799	LOONLAKE40151CH001	GWNT1810311355KME	10/31/2018	S96334	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
800	LOWELL03950TP100	GW1804190905CKA	4/19/2018	1800724	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
801	LYNXGOLF03966TP012	GW1804301045GSC	4/30/2018	1800849	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
802	LYONS03967TP100	GWIN1807131100GGA	7/13/2018	1801799	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
803	LYONS03967TP102	GWIN1807131120GGA	7/13/2018	1801799	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
804	LYONS03967TP102	GWIN1807131125GGA-FD	7/13/2018	1801799	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
805	LYONTWP03968TP100	GW1806121305EDK	6/12/2018	1801295	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
806	LYONTWP03968TP101	GW1806121240EDK	6/12/2018	1801295	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
807	MACKHOUSCU01692CH001	GWNT1809101200GGA	9/10/2018	1803038	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
808	MACKHOUSEN02145CH003	GWNT1809101100GGA	9/10/2018	1803037	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
809	MACKINAW03980TP101	GWEF1809130830GGA	9/13/2018	1803124	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
810	MACKINAW03980TP102	GWEF1809130900GGA	9/13/2018	1803124	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
811	MACKINAW03980TP103	GWEF1809130800GGA	9/13/2018	1803124	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
812	MACKINAW03980TP104	GWEF1809130930GGA	9/13/2018	1803124	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
813	MADISONTWP04006TP001	GWEF1808241045KER	8/24/2018	1802760	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
814	MAINSTAPTS01545WL001	GWEF1810290840KME	10/29/2018	S96345	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
815	MAINSTAPTS01545WL002	GWNT1810290850KME	10/29/2018	S96345	12	< 2	< 2	6	< 2	< 2	< 2	< 2	< 2	< 2	3	< 2	3	< 2	< 2
816	MANCELAWSA04010TP101	GWEF1808150915GGA	8/15/2018	1802547	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
817	MANCELAWSA04010TP102	GWEF1808150930GGA	8/15/2018	1802547	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
818	MANCELAWSA04010TP103	GWEF1808150945GGA	8/15/2018	1802547	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
819	MANCELAWSA04010TP104	GWEF1808151000GGA	8/15/2018	1802547	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
820	MANCELAWSA04010TP106	GWEF1808150900GGA	8/15/2018	1802547	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
821	MANCELCHF06568TP001	GWEF1808151030GGA	8/15/2018	1802548	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
822	MANCHESTER04020TP001	GWEF1807241430KER	7/24/2018	1802080	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
823	MANISTEE04030TP106	GWEF1809200930GGA	9/20/2018	S94699	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
824	MANISTEE04030TP108	GWEF1809200940GGA	9/20/2018	S94699	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
825	MANISTEE04030TP109	GWEF1809200950GGA	9/20/2018	S94699	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
826	MANISTEE04030TP110	GWEF1809201000GGA	9/20/2018	S94699	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
827	MANISTEEFO40332CH001	GWNT1811071235KME	11/7/2018	S96642	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
828	MANITOUAPT04042CH001	GWNT1806201330EDK	6/20/2018	1801454	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
829	MANNORFARM05180TP001	GWEF1808230950KER	8/23/2018	1802695	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
830	MANNORFARM05180TP001	GWEF1808231000KER-FD	8/23/2018	1802695	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
831	MANTAGUE04470TP102	GWEF1807051000GGA	7/5/2018	1801647	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
832	MANTAGUE04470TP104	GWEF1807050925GGA	7/5/2018	1801647	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
833	MANTAGUE04470WL001	GWEF1807050935GGA	7/5/2018	1801647	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
834	MANTAGUE04470WL005	GWEF1807050950GGA	7/5/2018	1801647	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
835	MANTON04050TP003	GWEF1810021445KER	10/2/2018	S95265	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
836	MANTON04050TP005	GWEF1810021430KER	10/2/2018	S95265	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
837	MAPLEGRVES40020TP100	GW1806071340KER	6/7/2018	1801231	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
838	MAPLEISLE40361WL001	GWNT1808131505MK	8/13/2018	1802437	8	2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
839	MAPLEISLE40361WL002	GWNT1808131510MK	8/13/2018	1802437	8	< 2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	3	2	< 2	< 4	< 4
840	MAPLEISLE40361WL003	GWNT1808131515MK	8/13/2018	1802437	9	2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	2	2	< 2	< 4	< 4
841	MAPLEKNOLL40123SS001	GWEF1808171400KER	8/17/2018	1802601	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
842	MAPLENURSE64067TP101	GWMP1809061050KER	9/6/2018	1803017	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
843	MAPLERAPID04060TP001	GWEF1807301030KER	7/30/2018	1802126	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
844	MAPLERAPID04060TP002	GWEF1807301045KER	7/30/2018	1802126	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
845	MAPLERGD04063TP004	GWEF1808201710GSC	8/20/2018	1802638	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
846	MAPLEVIEW40217CH001	GWNT1810171240KME	10/17/2018	S95833	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
847	MAPLEVIEW40219CH001	GWNT1810171230KME	10/17/2018	S95832	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
848	MAPLEWDMAN04419CH001	GWNT1811081000GGA	11/8/2018	S96667	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
849	MAPLEWOOD04069CH500	GWNT1809051500GGA	9/5/2018	1802970	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
850	MARBLELAKE40071CH001	GWNT1810011400GGA	10/1/2018	S95228	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
851	MARCELLUS04070TP034	GWEF1809251300GGA	9/25/2018	S94986	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
852	MARENISCO04080CH001	GWNT1808011445GGA	8/1/2018	1802238	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
853	MARION04100TP103	GWNT1809111300KER	9/11/2018	S94381	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
854	MARION04100TP104	GWEF1809111320KER	9/11/2018	S94381	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
855	MARION04100TP105	GWEF1809111340KER	9/11/2018	S94381	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
856	MARION04100TP105	GWEF1809111400KER-FD	9/11/2018	S94381	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
857	MARLETTE04110CH035	GWNT1810161500GGA	10/16/2018	S95854	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
858	MARLETTE04110WL004	GWNT1810161530GGA	10/16/2018	S95854	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
859	MARLINMHP40100TP100	GWEF1809260900GGA	9/26/2018	S94994	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
860	MARQTWP04140TP001	GWEF1808140900GSC	8/14/2018	1802498	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound / Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
861	MARQUTECCC04025WL001	GWNT1808151000GSC	8/15/2018	1802521	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
862	MARQUTECCC04025WL003	GWNT1808151015GSC	8/15/2018	1802521	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
863	MARSHALL04150TP005	GWEF1806201045KER	6/20/2018	1801473	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
864	MARTIN04155TP012	GW1804271050GSC	4/27/2018	1800845	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
865	MARYCTYDAV04158CH013	GWNT1807241510GGA	7/24/2018	1802005	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
866	MASON04170TP008	GWEF1807100830KER	7/10/2018	1801691	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
867	MASONMANOR40197CH001	GWNT1807101215KER	7/10/2018	1801697	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
868	MASONMANOR40197CH002	GWNT1807101225KER	7/10/2018	1801697	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
869	MASONVILLE04173CH001	GWEF1808201500GSC	8/20/2018	1802635	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
870	MATHISTWP04152CH001	GWIN1808161130GSC	8/16/2018	1802589	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
871	MATHISTWP04152CH001	GWIN1808161140GSC-FD	8/16/2018	1802589	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
872	MATTAWAN04177TP012	GWEF1808071430GGA	8/7/2018	1802336	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
873	MATTAWAN04177TP034	GWEF1808071455GGA	8/7/2018	1802336	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
874	MAYVILLE04180TP001	GWEF1810111300GGA	10/11/2018	S95604	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
875	MCBAIN04190TP101	GWEF1811091100GGA	11/9/2018	S96674	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
876	MCBAIN04190TP103	GWEF1811091120GGA	11/9/2018	S96674	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
877	MCBAIN04190TP105	GWEF1811091140GGA	11/9/2018	S96674	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
878	MCMILLAN02200W004	GWNT1808010930GGA	8/1/2018	1802232	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
879	MCMILLAN02200W005	GWEF1808010900GGA	8/1/2018	1802232	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
880	MCTI06375TP100	GW1804241300GSC	4/24/2018	1800751	0	< 4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
881	MCTIFAMHOU06377CH001	GW1804241310GSC	4/24/2018	1800958	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
882	MDWLMHP40172TP100	GWEF1810031100KER	10/3/2018	S95271	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
883	MDWLMHP40172TP100	GWEF1810031110KER-FD	10/3/2018	S95271	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
884	MDWMEDCARE64213WL001	GWIN1808151100GGA	8/15/2018	1802549	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
885	MDWSTREAMS40061TP100	GWIN1807231300GGA	7/23/2018	1801999	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
886	MDWSTREAMS40061WL003	GWEF1807231330GGA	7/23/2018	1801999	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
887	MDWSTREAMS40061WL004	GWEF1807231345GGA	7/23/2018	1801999	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
888	MEADOWLAKE40612TP100	GW1806180845EDK	6/18/2018	1801423	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
889	MEADOWVIL40605CH001	GWNT1808091045GGA	8/9/2018	1802378	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
890	MEADOWWDS60675CH034	GWEF1807251130GGA	7/25/2018	1802064	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
891	MEDILODGE62841CH900	GWNT1811020820KME	11/2/2018	S96343	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
892	MELCHAWATR04215CH501	GWNT1809040930GGA	9/4/2018	1802958	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
893	MEMORYMHP40470CH001	GWNT1809271600GGA	9/27/2018	S95006	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
894	MEMPHIS04230TP100	GWEF1810241220KME	10/24/2018	S96115	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
895	MENDON04240TP005	GWEF1810031330GGA	10/3/2018	S95243	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
896	MENDON04240TP034	GWEF1810031300GGA	10/3/2018	S95243	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
897	MERRILL04276TP001	GWEF1808281500KER	8/28/2018	1802878	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
898	MERRILL04276TP001	GWEF1808281510KER-FD	8/28/2018	1802878	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
899	MESICK04310CH501	GWNT1810040900KER	10/4/2018	S95277	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
900	METAMORE04312TP001	GWEF1808140830KER	8/14/2018	1802459	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
901	METRON62658CH001	GWIN1809181100KER	9/18/2018	S94665	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
902	MHOGSWA04098TP001	GWEF1807250900GSC	7/25/2018	1802008	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
903	MIAMERWACO04800TP001	GWEF1807301310GGA	7/30/2018	1802160	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
904	MICHIANA04320TP001	GWEF1810230940MK	10/23/2018	1803401	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
905	MICHIANA40472TP100	GWNT1809271200GGA	9/27/2018	S95002	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
906	MIDDLEVILL04360TP001	GW1804260915GSC	4/26/2018	1800786	3	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
907	MIDDLEVILL04360TP002	GW1804260950GSC	4/26/2018	1800786	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
908	MIDDLEVILL04360TP005	GW1804260940GSC	4/26/2018	1800786	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
909	MILAN04380TP001	GWEF1808020930GSC	8/2/2018	1802251	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
910	MILFORD04390TP100	GW1806141530EDK	6/14/2018	1801287	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
911	MILFORD04390WL002	GWIN1904101015LEM	4/10/2019	1900744	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
912	MILFORD04390WL004	GWIN1904101020LEM	4/10/2019	1900744	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
913	MILL1LDHA06631CH001	GWEF1808271330GGA	8/27/2018	1802805	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
914	MILLERSBRG04397TP100	GWEF1810310800GGA	10/31/2018	S96364	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
915	MILLINGTON04400TP006	GWEF1810111400GGA	10/11/2018	S95605	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
916	MILLPOINTE04403TP001	GWEF1807190930GSC	7/19/2018	1801876	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
917	MILLSTRLCT40101CH001	GWNT1807260900GGA	7/26/2018	1802067	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
918	MINDENCITY04410TP001	GWEF1810180900GGA	10/18/2018	S95863	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
919	MISTYCVESA04428CH001	GWIN1806281115GSC	6/28/2018	1801604	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
920	MISTYMDWS40571CH001	GWNT1810081500GGA	10/8/2018	S95587	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
921	MITCHELL40606CH001	GWNT1808091000GGA	8/9/2018	1802377	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
922	MONROESO04455TP001	GWNT1810241130MK	10/24/2018	1803416	3	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
923	MONTROSE40152TP001	GWEF1808011130KER	8/1/2018	1802201	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
924	MONTROSE40152TP001	GWEF1808011145KER-FD	8/1/2018	1802201	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
925	MOONLAKE40452CH001	GWNT1808171145KER	8/17/2018	1802599	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
926	MORENCI04490TP001	GWEF1808240900KER	8/24/2018	1802758	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
927	MORRICE40643TP001	GWEF1808151330KER	8/15/2018	1802546	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
928	MPLGRVAPT04053CH501	GWNT1810091020KER	10/9/2018	S95565	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
929	MSU04340WL001	GWEF1807181350KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
930	MSU04340WL016	GWNT1807181045KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
931	MSU04340WL017	GWNT1807181345KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
932	MSU04340WL018	GWNT1807181105KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
933	MSU04340WL019	GWNT1807181330KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
934	MSU04340WL020	GWNT1810191015MK	10/19/2018	1803399	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
935	MSU04340WL021	GWNT1807181300KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
936	MSU04340WL022	GWNT1807181310KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
937	MSU04340WL023	GWNT1807181120KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
938	MSU04340WL024	GWNT1807181130KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
939	MSU04340WL025	GWNT1807181155KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
940	MSU04340WL026	GWNT1807181210KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
941	MSU04340WL028	GWNT1810191000MK	10/19/2018	1803399	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
942	MSU04340WL029	GWNT1807181240KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
943	MSU04340WL030	GWNT1807181220KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
944	MSU04340WL031	GWNT1807181140KER	7/18/2018	1801869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
945	MUIR04550TP001	GWEF1809281300KER	9/28/2018	S94981	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
946	MUIR04550TP002	GWEF1809281320KER	9/28/2018	S94981	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
947	MUNISING04560TP001	GWEF1808161540GSC	8/16/2018	1802591	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
948	MUNISING04560TP003	GWEF1808161535GSC	8/16/2018	1802591	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
949	MUNISINGIP04561CH002	GWNT1808161530GSC	8/16/2018	1802594	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
950	MUSKHGTS04580TP100	GWEF1808131410MK	8/13/2018	1802434	4	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	2	< 4	< 4
951	MYPLACE40140TP001	GWEF1808011330KER	8/1/2018	1802202	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
952	MYSTICRDG04595TP001	GWEF1807191310GSC	7/19/2018	1801885	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
953	MYSTICVIEW04596WL001	GWNT1807090820KER	7/9/2018	1801701	4	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
954	MYSTICVIEW04596WL002	GWNT1807090835KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
955	MYSTICVIEW04596WL003	GWNT1807090855KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
956	MYSTICVIEW04596WL004	GWNT1807090910KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
957	MYSTICVIEW04596WL005	GWNT1807090925KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
958	MYSTICVIEW04596WL006	GWNT1807090950KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
959	MYSTICVIEW04596WL007	GWNT1807091010KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
960	MYSTICVIEW04596WL008	GWNT1807091030KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
961	MYSTICVIEW04596WL009	GWNT1807091045KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
962	MYSTICVIEW04596WL010	GWNT1807091100KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
963	MYSTICVIEW04596WL011	GWNT1807091115KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
964	MYSTICVIEW04596WL012	GWNT1807091130KER	7/9/2018	1801701	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
965	NAHMATWP04600TP001	GWEF1808201410GSC	8/20/2018	1802633	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
966	NAPOLEON04605CH001	GWNT1807061145KER	7/6/2018	1801690	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
967	NASHVILLE04620TP001	GW1804231145GSC	4/23/2018	1800750	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
968	NASHVILLE04620TP003	GW1804231205GSC	4/23/2018	1800750	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
969	NBAYHRBR40616TP001	GWEF1811120900KME	11/12/2018	S96930	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
970	NBAYHRBR40616TP001	GWEF1811120910KME-FD	11/12/2018	S96930	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
971	NCNTRYEST40039CH001	GWNT1811020900KME	11/2/2018	S96344	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
972	NEGAUNEE04655CH001	GWNT1808140940GSC	8/14/2018	1802499	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
973	NEGISHAUTH04653TP010	GWEF1808141010GSC	8/14/2018	1802500	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
974	NESENACRES40637CH001	GWNT1808291100KER	8/29/2018	1802865	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
975	NEWAYGO04710TP100	GWEF1807311220KER	7/31/2018	1802184	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
976	NEWAYGO04710WL007	GWEF1807311200KER	7/31/2018	1802184	6	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	4	< 2	< 4	< 4
977	NEWBRYCOFA04730TP004	GWIN1808171250GSC	8/17/2018	1802583	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
978	NEWBRYCOFA04730TP005	GWIN1808171245GSC	8/17/2018	1802583	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
979	NEWBRYCOFA04730TP006	GWIN1808171230GSC	8/17/2018	1802583	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
980	NEWBRYWL04720TP001	GWEF1808171350GSC	8/17/2018	1802584	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
981	NEWBRYWL04720TP002	GWEF1808171330GSC	8/17/2018	1802584	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
982	NEWBUFF04685TP001	GWMP1810231015MK	10/23/2018	1803400	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
983	NEWLOTHROP04700TP001	GWEF1808150930KER	8/15/2018	1802541	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
984	NILES04740TP101	GWEF1807241035GGA	7/24/2018	1802002	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
985	NILES04740TP105	GWEF1807241000GGA	7/24/2018	1802002	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
986	NILES04740TP106	GWEF1807241100GGA	7/24/2018	1802002	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
987	NILES04740TP108	GWNT1811131500KME	11/13/2018	S96934	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
988	NILES04740TP109	GWEF1807240930GGA	7/24/2018	1802002	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
989	NILESTWP04750WL004	GWNT1807191400GGA	7/19/2018	1801942	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
990	NILESTWP04750WL005	GWNT1807191340GGA	7/19/2018	1801942	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
991	NILESTWP04750WL006	GWNT1807191420GGA	7/19/2018	1801942	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
992	NILESTWP04750WL009	GWNT1807191330GGA	7/19/2018	1801942	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
993	NINEMILEPT04753CH503	GWNT1808310900GGA	8/31/2018	1802914	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
994	NORBRANCH04770TP003	GWEF1808141200KER	8/14/2018	1802465	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
995	NORTHDORT40154CH001	GWEF1808061415GSC	8/6/2018	1802288	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
996	NORTHFIELD40594TP001	GWEF1808100915KER	8/10/2018	1802445	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
997	NORTHMORIS40155WL001	GWNT1810190925KME	10/19/2018	S95839	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
998	NORTHMORIS40155WL002	GWNT1810190940KME	10/19/2018	S95839	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
999	NORTHPINES40212CH001	GWNT1811151200GGA	11/15/2018	S96924	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1000	NORTHPINES40212CH001	GWNT1811151210GGA-FD	11/15/2018	S96924	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1001	NORTHPORT04810TP102	GWEF1809051245KER	9/5/2018	1802954	20	9	3	4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	4	< 2	< 4	< 4
1002	NORTHPORT04810TP103	GWEF1809051300KER	9/5/2018	1802954	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1003	NORTHPORT04810TP103	GWEF1809051320KER-FD	9/5/2018	1802954	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1004	NORTHPORT04810TP104	GWEF1809051230KER	9/5/2018	1802954	4	4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1005	NORTHSHORE40432CH001	GWNT1810111020KME	10/11/2018	S95580	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1006	NORTHVILLE40657TP001	GWEF1807241315GSC	7/24/2018	1801987	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1007	NORTHWDNUR60238WL002	GWEF1811121300GGA	11/12/2018	S96907	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1008	NORTHWOODS40453TP001	GWEF1808201330KER	8/20/2018	1802606	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1009	NORTHWOODS40453TP002	GWEF1808201315KER	8/20/2018	1802606	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1010	NORWAY04860TP004	GWEF1808221000GSC	8/22/2018	1802775	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1011	NOTTINGHAM40414CH001	GWNT1808131700GGA	8/13/2018	1802483	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1012	NSHOREAPT06487TP100	GW1806071125EDK	6/7/2018	1801172	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1013	NZARENECAM04647TP123	GWEF1806191345KER	6/19/2018	1801465	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1014	OAKFIELD40266WL003	GWIN1807030910GSC	7/3/2018	1801624	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1015	OAKFIELD40266WL004	GWIN1807030900GSC	7/3/2018	1801624	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1016	OAKHAVEN04873WL001	GW1806061030KER	6/6/2018	1801194	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1017	OAKHAVEN04873WL004	GW1806061020KER	6/6/2018	1801194	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1018	OAKHAVEN04873WL005	GW1806061010KER	6/6/2018	1801194	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1019	OAKHILLMHC40391CH001	GW1806081035EDK	6/8/2018	1801252	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1020	OAKLANDSUB05573TP100	GW1806110915EDK	6/11/2018	1801255	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1021	OAKLANEAPT04876CH012	GWR1806131025KER	6/13/2018	1801317	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1022	OAKLEAKMAN04874CH501	GWNT1810301000GGA	10/30/2018	S96360	18	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	18	< 2	< 2	< 2
1023	OAKPOINTE01002TP001	GWEF1807250930GSC	7/25/2018	1802009	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1024	OAKSROCK40678TP100	GW1804191120CKA	4/19/2018	1800721	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1025	OAKVIEWME40222CH004	GWNT1810171200KME	10/17/2018	S95831	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1026	OGEMAWTWP04935CH001	GWNT1811051400GGA	11/5/2018	S96649	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1027	OJIBWAYCF01070CH001	GWEF1808011500GGA	8/1/2018	1802239	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1028	OLDFARMCWA04960CH001	GWNT1807091005GSC	7/9/2018	1801663	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1029	OLDORCHARD40156TP001	GWEF1808020800KER	8/2/2018	1802256	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1030	OLIVET04990TP004	GWEF1806211120KER	6/21/2018	1801470	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1031	OLIVET04990TP005	GWEF1806211140KER	6/21/2018	1801470	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1032	OLIVET04990TP006	GWEF1806211100KER	6/21/2018	1801470	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
					Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1033	ONAWAY05010TP103	GWEF1810311200GGA	10/31/2018	S96368	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1034	ONAWAY05010TP104	GWEF1810311230GGA	10/31/2018	S96368	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1035	ONSTED05020TP002	GWEF1808221500KER	8/22/2018	1802653	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1036	ONSTED05020TP003	GWEF1808221530KER	8/22/2018	1802653	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1037	ONTARIO40067CH001	GWNT1807171430GGA	7/17/2018	1801843	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1038	ORCHARDAPT05039CH001	GWNT1808161030KER	8/16/2018	1802557	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1039	ORCHARDCV40647TP001	GWEF1810191010KME	10/19/2018	S95840	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1040	ORCHARDGR40503TP001	GWEF1807240845GSC	7/24/2018	1801981	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1041	ORIONLAKE40399TP103	GWEF1806181055EDK	6/18/2018	1801427	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1042	OSBORNLKES05037CH001	GWNT1807301100GSC	7/30/2018	1802133	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1043	OSCEOLATWP01840CH001	GWIN1807310900GGA	7/31/2018	1802162	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1044	OTISVILLE05050TP001	GWEF1808061300GSC	8/6/2018	1802286	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1045	OTISVILLE05050TP003	GWEF1808061330GSC	8/6/2018	1802286	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1046	OTSEGO05060TP003	GW1804271135GSC	4/27/2018	1800853	11	4	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	7	< 2	< 2	< 4	< 4
1047	OTSEGO05060TP004	GW1804271150GSC	4/27/2018	1800853	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1048	OTSEGO05060TP005	GW1804271145GSC	4/27/2018	1800853	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1049	OTSEGOTWP05065TP123	GW1804271255GSC	4/27/2018	1800847	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1050	OVID05100TP001	GWEF1807231430KER	7/23/2018	1802032	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1051	OWENDALE05110TP003	GWEF1810091200GGA	10/9/2018	S95591	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1052	OWENDALE05110TP004	GWEF1810091230GGA	10/9/2018	S95591	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1053	OWOSSO05120TP001	GWEF1808201150KER	8/20/2018	1802604	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1054	OWOSSO05120TP001	GWEF1808201200KER-FD	8/20/2018	1802604	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1055	OXFORD05130TP100	GW1806181000EDK	6/18/2018	1801425	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1056	OXFORD05138WL004	GWNT1812200905LEM	12/20/2018	1804166	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1057	OXFORDCON05136WL001	GWEF1807101310GSC	7/10/2018	1801661	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1058	OXFORDCON05136WL002	GWEF1807101330GSC	7/10/2018	1801661	7	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	4	< 2	< 2	< 4	< 4
1059	OXFORDTWP05138TP100	GW1806111310EDK	6/11/2018	1801249	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1060	OXFORDTWP05138TP101	GW1806111255EDK	6/11/2018	1801249	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1061	OXFORDTWP05138TP102	GW1806111320EDK	6/11/2018	1801249	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1062	PARCHMENT05200TP001	GWEF1806181400KER	6/18/2018	1801392	1600	49	96	670	6	< 2	< 4	< 4	< 4	< 4	7	19	740	13	< 4
1063	PARCHMENT05200TP001	GWEF1807261700GGA	7/26/2018	1802006	327	15	26	170	< 2	< 2	< 4	< 4	< 4	< 4	< 2	6	110	< 4	< 4
1064	PARCHMENT05200WL001	GWIN1807261710GGA	7/26/2018	1802006	466	23	28	220	< 2	< 2	< 4	< 4	< 4	< 4	8	17	170	< 4	< 4
1065	PARCHMENT05200WL002	GWIN1807261720GGA	7/26/2018	1802006	1828	79	150	780	8	< 2	< 4	< 4	< 4	< 4	12	40	740	19	< 4
1066	PARCHMENT05200WL003	GWIN1807261730GGA	7/26/2018	1802006	271	12	20	140	< 2	< 2	< 4	< 4	< 4	< 4	< 2	5	94	< 4	< 4
1067	PARKSPLACE40340CH001	GWNT1809121145KER	9/12/2018	S94392	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1068	PARKWOOD40284WL001	GW1804181415CKA	4/18/2018	1800817	5	< 2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
1069	PARKWOOD40284WL002	GW1804181430CKA	4/18/2018	1800817	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1070	PARKWOOD40284WL003	GW1804181425CKA	4/18/2018	1800817	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1071	PARKWOODVL40441CH001	GWEF1808271200KER	8/27/2018	1802764	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	2	< 2	< 4	< 4
1072	PARMA05204TP001	GWEF1807061400KER	7/6/2018	1801686	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1073	PARMAAMBER05205CH001	GWNT1807060840KER	7/6/2018	1801688	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1074	PAWPAW05210TP068	GWEF1808071000GGA	8/7/2018	1802331	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1075	PAWPAWLMHP40062WL001	GWNT1807231130GGA	7/23/2018	1801998	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1076	PAWPAWLMHP40062WL002	GWNT1807231100GGA	7/23/2018	1801998	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1077	PEBBLEMHP40479TP100	GWEF1810161200GGA	10/16/2018	S95851	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1078	PECK05220TBD	GWEF1810181140GGA	10/18/2018	S95865	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1079	PECK05220TP008	GWIN1810181100GGA	10/18/2018	S95865	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1080	PECK05220TP009	GWIN1810181130GGA	10/18/2018	S95865	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1081	PENINDEV05229TP001	GWEF1807301145GSC	7/30/2018	1802136	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1082	PENNFIELD04760TP036	GWEF1806211000KER	6/21/2018	1801469	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1083	PENNYLKSUB05235CH001	GW1806151015EDK	6/15/2018	1801415	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1084	PENTLAND05240WL001	GWNT1808171200GSC	8/17/2018	1802582	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1085	PENTLAND05240WL002	GWNT1808171140GSC	8/17/2018	1802582	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1086	PENTWATER05260TP101	GWEF1811061110KME	11/6/2018	S96633	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1087	PERMAQWELL05268TP001	GWEF1811061305KME	11/6/2018	S96636	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1088	PERRINTON05270TP003	GWEF1809261345KER	9/26/2018	S94968	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1089	PERRY05280TP001	GWEF1808151300KER	8/15/2018	1802545	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1090	PETOSKEY05300TP102	GWEF1808211030GGA	8/21/2018	1802657	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1091	PETOSKEY05300TP104	GWEF1808210930GGA	8/21/2018	1802657	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1092	PETOSKEY05300TP108	GWEF1808211000GGA	8/21/2018	1802657	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1093	PETOSKEY05300TP109	GWEF1808211020GGA	8/21/2018	1802657	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1094	PETOSKEYPK05305CH501	GWEF1809040900GGA	9/4/2018	1802955	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1095	PEWAMO05310CH001	GWNT1810010950KER	10/1/2018	S95254	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1096	PHELPSVIL40494CH001	GWNT1808070930GGA	8/7/2018	1802329	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1097	PHERUNMAN05315TP001	GWEF1808030900KER	8/3/2018	1802425	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1098	PHOENIXMHC40086CH001	GWNT1806221245KER	6/22/2018	1801514	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1099	PINCKNEY05322TP001	GWEF1808011150GSC	8/1/2018	1802220	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1100	PINCRSTMHP40481CH001	GWNT1810101200GGA	10/10/2018	S95599	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1101	PINEACRES40525CH001	GWNT1808151645GSC	8/15/2018	1802527	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1102	PINEAIRE40285CH001	GW1805300855GSC	5/30/2018	1801092	8	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	5	3	< 2	< 4	< 4
1103	PINEBKCON05334TP100	GWEF1808151200GGA	8/15/2018	1802552	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1104	PINEHAVEN40609CH001	GWNT1810011030KER	10/1/2018	S95255	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1105	PINEHURAPT05353CH001	GWEF1808131100KER	8/13/2018	1802449	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1106	PINEISLAND40577CH001	GWNT1807101530GGA	7/10/2018	1801752	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1107	PINELAKES40670TP001	GWEF1808021215KER	8/2/2018	1802264	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1108	PINERDGCOM40603CH001	GW1806051515KER	6/5/2018	1801204	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1109	PINERDGMHC40601TP001	GWEF1808031030KER	8/3/2018	1802428	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1110	PINETERR40446CH001	GWNT1810161400GGA	10/16/2018	S95853	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1111	PINEVIEWHM05351CH001	GWNT1809111115KER	9/11/2018	S94379	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1112	PINEVMHP40210CH001	GWNT1810011230KER	10/1/2018	S95258	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1113	PINEWOOD40464TP100	GWEF1810250940KME	10/25/2018	S96117	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1114	PIRATECOVE05355CH501	GWNT1809191300GGA	9/19/2018	S94695	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1115	PLAINFIELD05370TP100	GW1805301040GSC	5/30/2018	1801094	22	5	4	4	< 2	< 2	< 4	< 4	< 4	< 4	3	2	4	< 4	< 4
1116	PLAINWELL05380SS047	GW1804261130GSC	4/26/2018	1800788	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1117	PLAINWELL05380TP005	GW1804261155GSC	4/26/2018	1800788	54	2	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	19	10	17	< 4	< 4
1118	PLAINWLHCF60695CH012	GWEF1806190910KER	6/19/2018	1801458	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
1119	PLEASNTBCH40167TP100	GWEF1810081140KER	10/8/2018	S95559	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1120	PLEASNTMHC40240CH001	GWNT1807111130KER	7/11/2018	1801774	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1121	PLSNTMHP40504CH001	GWIN1807240905GSC	7/24/2018	1801982	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1122	PLSNTTRL40454TP001	GWEF1808161600KER	8/16/2018	1802563	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1123	PLSNTTRL40454WL002	GWNT1808161545KER	8/16/2018	1802563	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1124	PLUMCRKSUB05397TP100	GW1806110935EDK	6/11/2018	1801256	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1125	PNCRESTAPT05345CH001	GW1806201255EDK	6/20/2018	1801452	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1126	PNCRESTAPT05345WL005	GW1806201305EDK	6/20/2018	1801452	8	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	8	< 2	< 2	< 4	< 4
1127	PNKNOLLAPT02000WL001	GWNT1808081345KER	8/8/2018	1802401	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1128	PNKNOLLAPT02000WL002	GWNT1808081400KER	8/8/2018	1802401	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1129	PNKNOLLAPT02000WL003	GWNT1808081415KER	8/8/2018	1802401	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1130	PORTAGE05520TP201	GWEF1806141115GSC	6/14/2018	1801393	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1131	PORTAGE05520TP202	GWEF1806141025GSC	6/14/2018	1801393	13	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	6	5	< 2	< 4	< 4
1132	PORTAGE05520TP203	GWT1806141315GSC	6/14/2018	1801393	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1133	PORTAGE05520TP204	GWEF1806140930GSC	6/14/2018	1801393	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1134	PORTAGE05520TP205	GWEF1808061515MK	8/6/2018	1802290	4	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	4	< 2	< 4	< 4
1135	PORTAGE05520TP207	GWEF1806141045GSC	6/14/2018	1801393	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1136	PORTAGE05520TP209	GWT1806141205GSC	6/14/2018	1801393	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1137	PORTAGE05520TP211	GWNT1811090935MK	11/9/2018	1803627	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1138	PORTAGE05520TP223	GWEF1806141145GSC	6/14/2018	1801393	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1139	PORTAGE05520TP224	GWEF1806141235GSC	6/14/2018	1801393	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1140	PORTAGEINN05527CH502	GWNT1809191200GGA	9/19/2018	S94694	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1141	PORTAGETER40253TP100	GWEF1806121405KER	6/12/2018	1801308	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1142	PORTCALLW40491CH001	GWEF1809240900GGA	9/24/2018	S94988	18	5	< 2	4	< 2	< 2	< 2	< 2	< 2	< 2	4	2	3	< 2	< 2
1143	PORTLAND05530TP104	GWEF1809251320KER	9/25/2018	S94963	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1144	PORTLAND05530TP105	GWNT1809251245KER	9/25/2018	S94963	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	4	< 2	< 2
1145	PORTLAND05530TP106	GWEF1809251300KER	9/25/2018	S94963	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1146	PORTLAND05530TP107	GWEF1809251340KER	9/25/2018	S94963	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1147	PORTSNILAC05500TP001	GWEF1810171300GGA	10/17/2018	S95859	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1148	POSEN05543TP001	GWEF1810310900GGA	10/31/2018	S96365	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1149	POTTERVILL05550TP002	GWEF1806271005GSC	6/27/2018	1801559	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1150	POTTERVILL05550TP003	GWEF1806271025GSC	6/27/2018	1801559	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1151	POWELLTWP00700CH001	GWNT1808161000GSC	8/16/2018	1802587	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1152	PRENTISAPT02619CH001	GWNT1808011500GSC	8/1/2018	1802226	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1153	PRESHCMAN05570CH501	GWEF1811051000GGA	11/5/2018	S96645	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1154	PRSTGPINE03857CH001	GWIN1809261020KER	9/26/2018	S94965	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1155	PTNIPIGON05425CH505	GWNT1809131000GGA	9/13/2018	1803125	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1156	PTNIPIGON05425E504	GWNT1811131200GGA	11/13/2018	S96912	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1157	PWSPALDWD05563TP004	GWEF1808220910GSC	8/22/2018	1802772	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1158	PWSPALDWD05563WL002	GWNT1808220900GSC	8/22/2018	1802772	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1159	QUIETCOVE40456CH001	GWNT1808171030KER	8/17/2018	1802598	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1160	QUINCY05580TP012	GWEF1808281035CKA	8/28/2018	1802821	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1161	QUINNESEC05590WL003	GWEF1808221100GSC	8/22/2018	1802776	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1162	QUINNESEC05590WL004	GWNT1808221110GSC	8/22/2018	1802776	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1163	RABBITRVR40021TP101	GW1806071420KER	6/7/2018	1801230	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1164	RABBITRVR40021WL001	GW1806071400KER	6/7/2018	1801230	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1165	RAISINVLY40309CH001	GWEF1808231100KER	8/23/2018	1802698	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1166	RAMBLEWOOD40181CH001	GWNT1810021300GGA	10/2/2018	S95235	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1167	RAPIDRVMDW05607CH001	GWNT1811071200GGA	11/7/2018	S96664	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1168	RAVENNA05610TP010	GWEF1807061110GGA	7/6/2018	1801639	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1169	RDGVLYMLFD00838CH001	GW1806180755EDK	6/18/2018	1801419	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1170	READING05620TP005	GWIN1808291140CKA	8/29/2018	1802831	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1171	REEDCITY05650TP102	GWEF1809101335KER	9/10/2018	S94383	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1172	REEDCITY05650TP103	GWEF1809101345KER	9/10/2018	S94383	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1173	REEDCITY05650TP104	GWEF1809101320KER	9/10/2018	S94383	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1174	REEDCITY05650TP105	GWEF1809101300KER	9/10/2018	S94383	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1175	REGENCY67101CH001	GWEF1808081330KER	8/8/2018	1802400	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1176	REMUSAPTC05655TP100	GWEF1809170940KER	9/17/2018	S94657	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1177	REPUBLIC05660TP008	GWEF1808141630GSC	8/14/2018	1802507	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1178	RICHLYN00048CH001	GWNT1808221600KER	8/22/2018	1802654	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1179	RICHMNDTWP05160CH001	GWNT1808141530GSC	8/14/2018	1802506	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1180	RICHMNDTWP05160WL003	GWNT1808141515GSC	8/14/2018	1802506	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1181	RICHMOND05670TP100	GWEF1810301135KME	10/30/2018	S96354	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1182	RICHMOND05670TP200	GWEF1810301120KME	10/30/2018	S96354	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1183	RICHMOND05670TP300	GWEF1810301150KME	10/30/2018	S96354	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1184	RICHMOND05670TP400	GWEF1810301220KME	10/30/2018	S96354	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1185	RICHMOND05670TP500	GWNT1810301235KME	10/30/2018	S96354	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1186	RICHMOND05670TP600	GWNT1810301200KME	10/30/2018	S96354	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1187	RIDGEWAY05673CH002	GWNT1810301030KME	10/30/2018	S96353	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1188	RIDGEWOOD40671TP100	GWEF1808071300KER	8/7/2018	1802317	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1189	RILEYMHP40183CH001	GWNT1810021600GGA	10/2/2018	S95238	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1190	RIVERRDGSA40663TP001	GWEF1808101020KER	8/10/2018	1802447	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1191	RIVERRIDGE40672CH001	GWNT1808141130KER	8/14/2018	1802464	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1192	RIVERSBEND40515CH002	GWNT1808221530GSC	8/22/2018	1802780	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1193	RIVERVIEW40288TP100	GW1804181055CKA	4/18/2018	1800813	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1194	RIVERVIEW40288WL001	GW1804181045CKA	4/18/2018	1800813	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1195	RIVERVWMHP40023CH001	GW1806061505KER	6/6/2018	1801197	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
1196	RIVERVWPK40482CH001	GWNT1810161300GGA	10/16/2018	S95852	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1197	RIVERWALK05712CH012	GW1806061255KER	6/6/2018	1801195	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1198	ROBINHOOD40310CH001	GWNT1808231030KER	8/23/2018	1802696	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1199	ROBINSON FIRE STA	GWNT1810291240MK	10/29/2018	S96103	7	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	5	< 2	< 2
1200	ROCHESTER05720TP100	GW1806191420EDK	6/19/2018	1801432	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1201	ROCKFORD05730TP100	GW1804161320GSC	4/16/2018	1800819	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1202	ROCKLAND05740TP001	GWEF1807311730GGA	7/31/2018	1802231	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1203	ROGERSCITY05770TP104	GWEF1810311000GGA	10/31/2018	S96366	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1204	ROGERSCITY05770TP106	GWEF1810311020GGA	10/31/2018	S96366	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1205	ROGERSCITY05770WL008	GWIN1810311040GGA	10/31/2018	S96366	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1206	ROLLMDWSWA05775CH501	GWNT1809211000GGA	9/21/2018	S94704	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1207	ROMEO05780TP100	GWEF1810291050KME	10/29/2018	S96348	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1208	ROMEO05780TP200	GWNT1810291110KME	10/29/2018	S96348	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1209	ROSCOMMON05810WL002	GWEF1810100920KME	10/10/2018	S95572	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1210	ROSCOMMON05810WL003	GWEF1810100930KME	10/10/2018	S95572	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1211	ROSCOMMON05810WL004	GWEF1810100950KME	10/10/2018	S95572	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1212	ROSEBUSHAP05823CH500	GWEF1810170950KME	10/17/2018	S95828	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1213	ROSEBUSHMS05824CH001	GWEF1810170915KME	10/17/2018	S95827	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1214	ROSECITY05815TP001	GWEF1811060800GGA	11/6/2018	S96652	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1215	ROSEHILL05816TP100	GW1806080935EDK	6/8/2018	1801250	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1216	ROSEVILLE05821CH001	GWNT1809121210KER	9/12/2018	S94393	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1217	ROUNDLAKE40307CH001	GWNT1808290940CKA	8/29/2018	1802833	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1218	ROYALEST40255CH001	GWNT1806181305KER	6/18/2018	1801391	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
1219	ROYALEST40255WL003	GWNT1806181315KER	6/18/2018	1801391	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1220	ROYALVRV05841CH001	GWIN1809121020KER	9/12/2018	S94389	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1221	RUDYARDTWP05844CH001	GWNT1809111500GGA	9/11/2018	1803056	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1222	RUSHLAKE40495CH001	GWNT1807261300GGA	7/26/2018	1802072	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1223	RUSTICACPK40104CH001	GWNT1807260920GGA	7/26/2018	1802068	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1224	RVCONNILES04095CH012	GWIN1807171300GGA	7/17/2018	1801839	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1225	RVRBKHOA05692CH012	GWNT1807171400GGA	7/17/2018	1801841	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1226	RVRSIDEEST40030WL002	GW1806051035GSC	6/5/2018	1801207	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1227	RVRSIDEEST40030WL003	GW1806051040GSC	6/5/2018	1801207	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1228	RVRSIDEEST40065TP100	GWEF1807240900GGA	7/24/2018	1802001	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1229	RVRVIEWMHP40168CH001	GWNT1810081615KER	10/8/2018	S95564	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1230	SADDLERDG05849TP100	GW1804171425GSC	4/17/2018	1800805	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1231	SALINE05900TP001	GWEF1808020830GSC	8/2/2018	1802252	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1232	SALINEVF05901TP001	GWEF1807240945GSC	7/24/2018	1801983	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1233	SANDHILEST40592TP001	GWEF1808081530GSC	8/8/2018	1802349	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
1234	SANDHILL05905CH501	GWEF1810091350KME	10/9/2018	S95569	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1235	SANDHILL05905CH501	GWEF1810091400KME-FD	10/9/2018	S95569	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1236	SANDLAKE05907TP001	GW1804161110JNR	4/16/2018	1800818	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1237	SANDPIPER40447CH001	GWNT1810171600GGA	10/17/2018	S95862	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1238	SANDUSKY05920TP001	GWEF1810171000GGA	10/17/2018	S95856	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1239	SANDYPINES05911CH012	GW1806061210KER	6/6/2018	1801192	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1240	SANMARNOSB05910CH001	GW1806210930EDK	6/21/2018	1801442	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1241	SAPPHIRE40013CH001	GWT1806130920KER	6/13/2018	1801315	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1242	SARANAC05930CH001	GWNT1809271100KER	9/27/2018	S94972	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1243	SASHABAW40575TP100	GW1806191330EDK	6/19/2018	1801431	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1244	SBLOOMHIGH06080TP100	GW1806140950EDK	6/14/2018	1801291	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1245	SBLOOMHIGH06080TP101	GW1806141005EDK	6/14/2018	1801291	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1246	SCHOOLCRAF05970TP034	GWEF1806180950KER	6/18/2018	1801389	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1247	SEBEWANGLW05990TP004	GWEF1810091400GGA	10/9/2018	S95593	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound / Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1248	SEBEWANGLW05990WL003	GWEF1810091420GGA	10/9/2018	S95593	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1249	SEBEWANGLW05990WL004	GWEF1810091440GGA	10/9/2018	S95593	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1250	SELKRKLMHP40024CH001	GWT1806131050KER	6/13/2018	1801318	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1251	SENEYTWP05991CH001	GWNT1808171000GSC	8/17/2018	1802580	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1252	SEOAKLAND04877CH001	GW1806111105EDK	6/11/2018	1801261	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1253	SEOAKLAND04877TP100	GW1806111025EDK	6/11/2018	1801261	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1254	SEOAKLAND04877WL001	GW1806111005EDK	6/11/2018	1801261	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1255	SEOAKLAND04877WL002	GW1806111050EDK	6/11/2018	1801261	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1256	SHADYACMV40025CH001	GW1806051530KER	6/5/2018	1801203	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1257	SHADYBROOK40496CH001	GWNT1809241100GGA	9/24/2018	S94993	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1258	SHADYPARK40241TP001	GWEF1808221100KER	8/22/2018	1802649	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1259	SHANGRAI40026TP100	GWEF1806120850GSC	6/12/2018	1801328	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1260	SHANTYCWA05995TP100	GWEF1808151330GGA	8/15/2018	1802551	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1261	SHAWONODHS01073CH501	GWEF1811070800GGA	11/7/2018	S96660	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1262	SHELBY06000WL001	GWNT1811051055KME	11/5/2018	S96627	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1263	SHELBY06000WL003	GWNT1811051125KME	11/5/2018	S96627	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1264	SHELBY06000WL004	GWEF1811051110KME	11/5/2018	S96627	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1265	SHELDONDUN06025CH001	GWNT1809240920KER	9/24/2018	S94954	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1266	SHEPHERD06030CH001	GWEF1810171030KME	10/17/2018	S95829	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1267	SHERIDAN06040TP102	GWIN1807031430GGA	7/3/2018	1801630	9	4	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	3	< 2	< 4	< 4
1268	SHERIDAN06040WL001	GWIN1807031450GGA	7/3/2018	1801630	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1269	SHERIDAN06040WL003	GWIN1807031445GGA	7/3/2018	1801630	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1270	SHERIDAN40351CH001	GWIN1807031050GSC	7/3/2018	1801626	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1271	SHERIDAN40351CH001	GWIN1807031055GSC-FD	7/3/2018	1801626	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	2	< 4	< 4
1272	SHERMAN02590CH001	GWEF1807301230GGA	7/30/2018	1802159	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	2	< 2	< 4	< 4
1273	SHERMANOAK40242CH001	GWNT1807110945KER	7/11/2018	1801772	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1274	SHERMANOAK40242CH003	GWNT1807111000KER	7/11/2018	1801772	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1275	SHERWDCOND06042CH012	GWNT1808300920KER	8/30/2018	1802879	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1276	SHORWDSUB06070CH001	GWNT1808071530KER	8/7/2018	1802319	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1277	SHRCRKLK06574CH501	GWNT1808211400GGA	8/21/2018	1802662	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1278	SILVERCRK40519CH001	GWNT1808151130GSC	8/15/2018	1802522	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1279	SILVERLAKE40175TP100	GWEF1810041100KER	10/4/2018	S95280	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1280	SILVERLKMH40322TP001	GWEF1807231145GSC	7/23/2018	1801969	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1281	SILVERLKWA06071CH001	GW1804170955GSC	4/17/2018	1800809	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1282	SILVERSHOR40176TP100	GWEF1809201200GGA	9/20/2018	S94700	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
1283	SIMMONS40598CH001	GWNT1808080900GGA	8/8/2018	1802368	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1284	SISMARY06074TP001	GWEF1807161245GSC	7/16/2018	1801817	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1285	SKANDIABWD06075CH001	GWNT1808151630GSC	8/15/2018	1802526	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1286	SOMERPTCON06081TP001	GWEF1809041330GGA	9/4/2018	1802963	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1287	SOMERSETCN40184CH001	GWNT1808291015CKA	8/29/2018	1802829	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1288	SOMERSTMHP40076CH001	GWNT1808281430CKA	8/28/2018	1802826	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1289	SOUTHLYON06110TP100	GWEF1807311500GSC	7/31/2018	1802178	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1290	SOUTHPT1AP06115CH501	GWNT1810261000GGA	10/26/2018	S96134	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
1291	SOUTHPT2AP06116CH503	GWNT1810261030GGA	10/26/2018	S96135	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1292	SOUTHPT3AP06117CH501	GWNT1810261100GGA	10/26/2018	S96136	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1293	SPARTA06200TP100	GW1804181245CKA	4/18/2018	1800816	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1294	SPARTA06200WL002	GW1804181255CKA	4/18/2018	1800816	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1295	SPGBROOK40327TP100	GWEF1810291310KME	10/29/2018	S96349	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1296	SPGLKCONDO06232CH501	GWNT1811010900GGA	11/1/2018	S96369	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1297	SPGPRTAPT03749CH001	GW1806211030EDK	6/21/2018	1801443	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1298	SPGPRTAPT03749WL003	GW1806211015EDK	6/21/2018	1801443	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1299	SPGVALLEY40291WL002	GW1804171535CKA	4/17/2018	1800804	12	< 2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	7	2	< 2	< 4	< 4
1300	SPGVALLEY40291WL003	GW1804171515CKA	4/17/2018	1800804	43	4	3	10	< 2	< 2	< 4	< 4	< 4	< 4	9	4	13	< 4	< 4
1301	SPRINGPORT06250WL001	GWIN1807171315KER	7/17/2018	1801871	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1302	SPRINGPORT06250WL003	GWIN1807171300KER	7/17/2018	1801871	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	3	< 2	< 4	< 4
1303	SPRINGROVE40397TP100	GWIN1808061530KER	8/6/2018	1802300	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1304	SPRINGROVE40397TP100	GWIN1808061545KER-FD	8/6/2018	1802300	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1305	SPRINGVAL40230CH001	GWNT1807191500KER	7/19/2018	1801961	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1306	SSHOREWS04890TP001	GWEF1808230810KER	8/23/2018	1802693	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1307	STAMTWPHAG02940CH001	GWNT1808231400GSC	8/23/2018	1802742	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1308	STAMTWPIND03350CH002	GWNT1808231430GSC	8/23/2018	1802782	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1309	STAMTWPWES06090CH002	GWNT1808231330GSC	8/23/2018	1802728	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1310	STANTON06360SS001	GWIN1808131210MK	8/13/2018	1802433	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1311	STARLIGHT40323TP001	GWIN1812060910KER	12/6/2018	1804008	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1312	STEPHENSON06380TP001	GWEF1808211300GSC	8/21/2018	1802672	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1313	STJOHN06300TP001	GWEF1807250945KER	7/25/2018	1802034	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1314	STLOUISCEN06325CH001	GWEF1807241330KER	7/24/2018	1802079	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1315	STLOUISCEN06325CH002	GWEF1807241400KER	7/24/2018	1802079	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1316	STLOUISCEN06325CH003	GWEF1807241345KER	7/24/2018	1802079	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1317	STOCKBRIDG06420TP001	GWEF1807231045KER	7/23/2018	1802029	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1318	STODDARD40443SS001	GWNT1808271000KER	8/27/2018	1802762	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1319	STONEGATE40199TP001	GWIN1807230915KER	7/23/2018	1802027	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1320	STONERIDGE06423TP001	GWEF1807191045GSC	7/19/2018	1801879	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1321	STONEYCRK06431CH001	GWEF1808161100KER	8/16/2018	1802558	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1322	STONHEDGE06428CH001	GWNT1808231200GGA	8/23/2018	1802713	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1323	STURGIS06440SS067	GWEF1810051000GGA	10/5/2018	S95252	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1324	STURGIS06440TP100	GWEF1810050900GGA	10/5/2018	S95252	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1325	STURGIS06440TP100	GWEF1810050910GGA-FD	10/5/2018	S95252	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1326	STURGIS06440TP102	GWEF1810050930GGA	10/5/2018	S95252	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1327	SUBURBAN40177CH001	GWNT1809211200GGA	9/21/2018	S94706	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1328	SUEKAYAPT06443CH001	GW1806050900EDK	6/5/2018	1801187	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1329	SUGARLOAF06445TP101	GWEF1809061200KER	9/6/2018	1803018	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1330	SUGARMHP40256CH001	GWNT1806261520GSC	6/26/2018	1801545	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1331	SUGARTREE06575CH001	GWNT1808201020KER	8/20/2018	1802602	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1332	SUMM06450WL005WL006	GWEF1807061245KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1333	SUMMERSET06448CH001	GW1804171125GSC	4/17/2018	1800806	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

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EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
1334	SUMMERWOOD40187CH001	GWNT1810091600GGA	10/9/2018	S95595	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1335	SUMMITTWP06450CH002	GWNT1807061010KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1336	SUMMITTWP06450TP004	GWEF1807061115KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1337	SUMMITTWP06450TP005	GWEF1807061315KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1338	SUMMITTWP06450TP006	GWEF1807061030KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1339	SUMMITTWP06450TP007	GWEF1807061050KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1340	SUMMITTWP06450WL001	GWEF1807061225KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1341	SUMMITTWP06450WL002	GWEF1807061215KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1342	SUMMITTWP06450WL007	GWEF1807061255KER	7/6/2018	1801685	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1343	SUNFIELD06470TP001	GWIN1806280850GSC	6/28/2018	1801601	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1344	SUNMDWAPTS06465CH034	GWNT1806121440KER	6/12/2018	1801309	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1345	SUNNYCREST06477CH001	GWEF1806280910GSC	6/28/2018	1801602	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1346	SUNNYDALE06480CH001	GW1806120930EDK	6/12/2018	1801303	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1347	SUNRISEMHP40466CH001	GWNT1810240905KME	10/24/2018	S96111	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1348	SUNRISEMHP40466CH001	GWNT1810240915KME-FD	10/24/2018	S96111	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1349	SUNSETBCH06484CH501	GWNT1810261200GGA	10/26/2018	S96137	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1350	SUNSETEST40416CH001	GWNT1808131400GGA	8/13/2018	1802473	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1351	SUNSETMHP40200CH001	GWNT1807271230KER	7/27/2018	1802106	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1352	SUNSETMHP40313TP001	GWNT1808231045KER	8/23/2018	1802697	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1353	SUNSETMO40449TP001	GWEF1810170900GGA	10/17/2018	S95855	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1354	SUNSETRDG40662TP100	GWEF1809251230KER	9/25/2018	S94962	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1355	SUNSETSHOR40653CH001	GWNT1810231430MK	10/23/2018	1803402	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1356	SUNSETSHOR40653CH002	GWNT1810231435MK	10/23/2018	1803402	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1357	SUNSETSHOR40653CH003	GWNT1810231440MK	10/23/2018	1803402	9	2	< 2	4	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
1358	SUNSETTCH06485CH501	GWNT1809061100GGA	9/6/2018	1803042	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1359	SUPERIOR00880WL002	GWNT1809131500GGA	9/13/2018	1803128	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1360	SUPERIOR00880WL003	GWNT1809131530GGA	9/13/2018	1803128	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1361	SUTTONSBAY06500CH501	GWNT1809050940KER	9/5/2018	1802950	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1362	SUTTONSBAY06500CH502	GWNT1809050920KER	9/5/2018	1802950	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1363	SWANLAKEME40027CH001	GWNT1807091235KER	7/9/2018	1801703	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1364	SWARTZCRK40164WL001	GWNT1808011050KER	8/1/2018	1802200	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1365	SWARTZCRK40164WL004	GWNT1808011010KER	8/1/2018	1802200	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1366	SWARTZCRK40164WL006	GWNT1808011030KER	8/1/2018	1802200	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1367	SWEETLAKE40474CH001	GWNT1809281300GGA	9/28/2018	S95011	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1368	SWOAKLAND04878CH001	GW1806111200EDK	6/11/2018	1801262	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1369	SWOAKLAND04878CH002	GW1806111145EDK	6/11/2018	1801262	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1370	SWOAKLAND04878CH003	GW1806111210EDK	6/11/2018	1801262	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1371	SWOAKLAND04878CH004	GW1806111225EDK	6/11/2018	1801262	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1372	SWOAKLAND04878CH005	GW1806111125EDK	6/11/2018	1801262	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1373	SYLVANGLEN40314TP001	GWEF1808011630GSC	8/1/2018	1802225	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1374	SYLVANGLEN40314TP001	GWEF1808011640GSC-FD	8/1/2018	1802225	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1375	SYLVANTWP06531TP001	GWEF1808081130KER	8/8/2018	1802399	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1376	TALLMADGE40426CH001	GWNT1809241100KER	9/24/2018	S94956	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
1377	TALLMADGE40426WL001	GWNT1809241040KER	9/24/2018	S94956	40	7	3	8	< 2	< 2	< 2	< 2	< 2	< 2	11	4	7	< 2	< 2
1378	TALLOAKSC06532CH101	GWNT1811070915KME	11/7/2018	S96639	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1379	TALLOAKSC06532CH101	GWNT1811070925KME-FD	11/7/2018	S96639	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1380	TAMARAC40337TP001	GWEF1811061350KME	11/6/2018	S96637	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1381	TAMARACK40640CH001	GWNT1807091050GA	7/9/2018	1801737	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1382	TANNERYCCA06537CH501	GWNT1808280900GGA	8/28/2018	1802807	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1383	TECUMSEH06560TP001	GWEF1808021410GSC	8/2/2018	1802247	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1384	TECUMSEH06560TP002	GWEF1808021340GSC	8/2/2018	1802247	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1385	TECUMSEH06560TP003	GWEF1808021350GSC	8/2/2018	1802247	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1386	TECUMSEH06560TP004	GWEF1808021330GSC	8/2/2018	1802247	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1387	TEKONSHA06562CH012	GWNT1806201320KER	6/20/2018	1801475	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1388	THOMPSON06590TP101	GWEF1809181000GGA	9/18/2018	S94685	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1389	THORNAPPLE40047CH001	GWT1806131340GSC	6/13/2018	1801337	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1390	THORNAPPLM60425TP100	GWEF1806131300GSC	6/13/2018	1801336	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1391	THORNCREEK06592CH501	GWNT1809060920KER	9/6/2018	1803014	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1392	THORNTON06594TP001	GWEF1808081100KER	8/8/2018	1802398	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1393	THREEMILE40497CH001	GWNT1809250900GGA	9/25/2018	S94982	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1394	THREEOAKS06600TP100	GWEF1807191230GGA	7/19/2018	1801941	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1395	THREERVRS06610CH567	GWEF1810031000GGA	10/3/2018	S95240	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1396	THREERVRS06610WL008	GWEF1810031030GGA	10/3/2018	S95240	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1397	TILDENTWP04640CH001	GWEF1808141220GSC	8/14/2018	1802503	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1398	TILLICUM06624CH001	GW1804171110GSC	4/17/2018	1800807	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1399	TIMBERLINE40363CH001	GWNT1807111050GGA	7/11/2018	1801757	9	2	< 2	4	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
1400	TIMBERLINE40363CH002	GWNT1807111055GGA	7/11/2018	1801757	9	3	< 2	4	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
1401	TIMBERLY40121CH001	GWNT1811061200GGA	11/6/2018	S96657	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1402	TIMBERMHP40574CH001	GWNT1808291230KER	8/29/2018	1802867	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1403	TJWHITEPNE07085CH001	GWNT1809121420KER	9/12/2018	S94395	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1404	TOPAZMHP40007TP100	GWEF1806130945KER	6/13/2018	1801316	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1405	TRADEWINDS40131TP001	GWEF1808061400GSC	8/6/2018	1802287	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1406	TREETOPS06647TP101	GWEF1808141210GGA	8/14/2018	1802479	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1407	TROUTCKO06682TP100	GWEF1808271300GGA	8/27/2018	1802804	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1408	TULLYMORE06693SS001	GWEF1809121040KER	9/12/2018	S94390	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1409	TWINLAKES06696TP001	GW1806110830EDK	6/11/2018	1801260	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1410	TWINLAKES06696TP001	GW1806110835EDK-FD	6/11/2018	1801260	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1411	TWINPINES40090TP100	GWNT1807241100KER	7/24/2018	1802077	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1412	TWINPNMHP40410TP001	GWEF1811051100GGA	11/5/2018	S96646	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1413	TWINVALLEY40091TP100	GWEF1806201345KER	6/20/2018	1801476	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1414	TWNCNTRY40110CH001	GWNT1809131100GGA	9/13/2018	1803126	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1415	TYRONEWOOD40658TP001	GWEF1807190845GSC	7/19/2018	1801874	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1416	UNIONCITY06720TP001	GWEF1810010900GGA	10/1/2018	S95223	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1417	UNIONCITY06720TP003	GWEF1810010930GGA	10/1/2018	S95223	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1418	UNIONTWP06725TP007	GWEF1810181040KME	10/18/2018	S95836	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1419	UNIONTWP06725TP008	GWEF1810181000KME	10/18/2018	S95836	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1420	UNIONTWP06725TP009	GWEF1810181030KME	10/18/2018	S95836	18	3	< 2	3	< 2	< 2	< 2	< 2	< 2	< 2	3	6	3	< 2	< 2
1421	UNIONVILL06730WL001	GWIN1810160900GGA	10/16/2018	S95848	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1422	UNIONVILL06730WL002	GWIN1810160920GGA	10/16/2018	S95848	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1423	UNIONVILL06730WL003	GWIN1810160940GGA	10/16/2018	S95848	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1424	UNIVERME40325CH001	GWNT1807191200GSC	7/19/2018	1801882	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1425	VALLEYSIDE06763CH501	GWNT1809191100GGA	9/19/2018	S94693	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1426	VALLEYWOOD06765CH401	GWNT1809181400GGA	9/18/2018	S94689	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1427	VASSAR06780TP008	GWEF1810151300GGA	10/15/2018	S95846	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1428	VASSAR06780TP009	GWEF1810151320GGA	10/15/2018	S95846	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1429	VASSAR06780TP010	GWEF1810151340GGA	10/15/2018	S95846	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1430	VASSAR06780TP011	GWEF1810151400GGA	10/15/2018	S95846	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1431	VERMONTVIL06790TP003	GWEF1807050900KER	7/5/2018	1801640	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1432	VERMONTVIL06790TP006	GWIN1807050850KER	7/5/2018	1801640	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1433	VFWNATION06792TP001	GWEF1807251300KER	7/25/2018	1802038	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1434	VICINIAGAR06072TP001	GWEF1808161415KER	8/16/2018	1802561	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1435	VICKSBURG06800WL005	GWNT1806191300KER	6/19/2018	1801464	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1436	VICKSBURG06800WL006	GWNT1806191245KER	6/19/2018	1801464	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1437	VIKINGMHP40498CH001	GWNT1809251100GGA	9/25/2018	S94983	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1438	VILLAGEAST40028CH001	GW1804301330GSC	4/30/2018	1800851	2	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
1439	VILLAGREEN60792CH001	GW1806121040EDK	6/12/2018	1801302	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1440	VILLAROSE64934CH600	GWEF1811060830GGA	11/6/2018	S96653	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1441	VILNOUVA06803WL003	GWNT1809041600GGA	9/4/2018	1802964	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1442	VILNOUVA06803WL004	GWNT1809041500GGA	9/4/2018	1802964	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1443	VLGEAGLE07099TP001	GWNT1807301310GSC	7/30/2018	1802134	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1444	WAKEFIELD06830TP005	GWEF1808011300GGA	8/1/2018	1802235	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1445	WALDRON06850TP001	GWEF1810021000GGA	10/2/2018	S95232	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1446	WALLOONASC03165CH501	GWNT1808301000GGA	8/30/2018	1802907	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1447	WALLOONLWS06880TP101	GWEF1808291400GGA	8/29/2018	1802815	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1448	WALLOONLWS06880TP102	GWEF1808291500GGA	8/29/2018	1802815	19	5	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	14	< 2	< 2	< 4	< 4
1449	WALNUTLANE06885WL001	GWR1806130815KER	6/13/2018	1801313	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1450	WALNUTLANE06885WL002	GWR1806130820KER	6/13/2018	1801313	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1451	WASHBURN40477CH001	GWNT1809281000GGA	9/28/2018	S95008	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1452	WASHINGTON40330TP100	GWEF1810291020KME	10/29/2018	S96347	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1453	WATERFORD06910TP100	GW1806061420EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1454	WATERFORD06910TP101	GW1806061530EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1455	WATERFORD06910TP102	GW1806061340EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1456	WATERFORD06910TP104	GW1806061510EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1457	WATERFORD06910TP105	GW1806061450EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1458	WATERFORD06910TP106	GW1806061550EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1459	WATERFORD06910TP107	GW1806061400EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1460	WATERFORD06910TP108	GW1806061315EDK	6/6/2018	1801181	4	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	4	< 2	< 4	< 4
1461	WATERFORD06910TP109	GW1806061415EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1462	WATERFORD06910TP111	GWIN1810241400MK	10/24/2018	1803417	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report (Compound / Unit)	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
1463	WATERFORD06910TP112	GW1806061325EDK	6/6/2018	1801181	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1464	WATERFORD06910TP113	GW1806061610EDK	6/6/2018	1801183	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1465	WATERSEDGE40673WL001	GWNT1808231250KER	8/23/2018	1802700	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1466	WATERSEDGE40673WL002	GWNT1808231300KER	8/23/2018	1802700	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1467	WATERSMEET06920CH001	GWNT1808011700GGA	8/1/2018	1802240	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1468	WATERSMEET06920WL004	GWNT1808011710GGA	8/1/2018	1802240	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1469	WATERVLIET06930TP124	GWEF1807231030GGA	7/23/2018	1801997	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1470	WAYLAND06940SS056	GW1804231530GSC	4/23/2018	1800746	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1471	WAYLAND06940TP003	GW1804231500GSC	4/23/2018	1800746	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1472	WEBBERVILL06970TP001	GWEF1807121130KER	7/12/2018	1801782	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1473	WEBBERVILL06970TP003	GWEF1807121110KER	7/12/2018	1801782	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1474	WEDGEWOOD06971CH001	GWNT1808021315KER	8/2/2018	1802265	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1475	WELLERS40293CH001	GW1805311100EDK	5/31/2018	1801099	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1476	WESTBRANCH07010TP104	GWIN1811051300GGA	11/5/2018	S96648	0	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
1477	WESTBRANCH07010TP105	GWIN1811051330GGA	11/5/2018	S96648	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1478	WESTBRANCH07012CH001	GWEF1811051500GGA	11/5/2018	S96650	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1479	WESTBROOK07035TP001	GWEF1807301400GSC	7/30/2018	1802137	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1480	WESTCOURT07015TP002	GWIN1808161245KER	8/16/2018	1802559	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1481	WESTCOURT07015TP003	GWEF1808161215KER	8/16/2018	1802559	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1482	WESTHAVEN40162TP001	GWEF1808011500KER	8/1/2018	1802204	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1483	WESTOLIVE40614CH001	GWNT1809240945KER	9/24/2018	S94955	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1484	WESTPHALIA07050WL001	GWNT1807271045KER	7/27/2018	1802105	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1485	WESTPHALIA07050WL002	GWNT1807271100KER	7/27/2018	1802105	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1486	WESTPHALIA07050WL002	GWNT1807271120KER-FD	7/27/2018	1802105	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1487	WESTPINAPT04754TP001	GWEF1808011415KER	8/1/2018	1802203	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1488	WESTPINE40650CH001	GWNT1807101550GGA	7/10/2018	1801753	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1489	WESTPKAPTS05606CH501	GWEF1808131200GGA	8/13/2018	1802471	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1490	WHISOAKMHP40435CH001	GWNT1810091320KME	10/9/2018	S95568	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1491	WHISPHC40347TP100	GWEF1810161500KME	10/16/2018	S95826	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1492	WHISPHC40347TP100	GWEF1810161510KME-FD	10/16/2018	S95826	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1493	WHISPINE40576CH001	GW1805301435EDK	5/30/2018	1801096	64	4	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	49	5	< 2	< 4	< 4
1494	WHISPNEST40500CH001	GWNT1809241000GGA	9/24/2018	S94989	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1495	WHISWPRO40213CH001	GWNT1811151100GGA	11/15/2018	S96923	14	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	14	< 2	< 2	< 2
1496	WHITEBIRCH40516CH001	GWNT1808221440GSC	8/22/2018	1802779	6	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	2	< 4	< 4
1497	WHITEBIRCH40516CH002	GWNT1808221450GSC	8/22/2018	1802779	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1498	WHITEBREST40561CH001	GWNT1809101600KER	9/10/2018	S94385	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1499	WHITECLOUD07060WL001	GWNT1809191130KER	9/19/2018	S94668	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1500	WHITECLOUD07060WL002	GWNT1809191145KER	9/19/2018	S94668	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1501	WHITECLOUD07060WL004	GWNT1809191100KER	9/19/2018	S94668	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1502	WHITECREEK40294CH001	GW1804161020JNR	4/16/2018	1800690	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1503	WHITEDEER07062CH501	GWNT1810151140KME	10/15/2018	S95819	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1504	WHITEEAGLE07061TP100	GW1806141120EDK	6/14/2018	1801290	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1505	WHITEFORD07063TP100	GWEF1812190920LEM	12/19/2018	1804165	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1506	WHITEHALL07100TP102	GWEF1807051100GGA	7/5/2018	1801648	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1507	WHITEHALL07100TP105	GWEF1807051110GGA	7/5/2018	1801648	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1508	WHITEHALL07100TP106	GWEF1807051045GGA	7/5/2018	1801648	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1509	WHITEHALL07100TP107	GWIN1807051135GGA	7/5/2018	1801648	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1510	WHITEHALL07100TP108	GWEF1807051120GGA	7/5/2018	1801648	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1511	WHITELAKE07065TP201	GW1806190930EDK	6/19/2018	1801456	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1512	WHITELAKE07065TP201	GW1806190935EDK-FD	6/19/2018	1801456	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1513	WHITELAKE07065TP202	GW1806191110EDK	6/19/2018	1801456	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1514	WHITELAKE07065TP204	GW1806191035EDK	6/19/2018	1801456	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1515	WHITELAKE07065TP205	GW1806191050EDK	6/19/2018	1801456	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1516	WHITELAKE07065TP206	GW1806191130EDK	6/19/2018	1801456	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1517	WHITELKALC07064CH001	GWNT1807051415GGA	7/5/2018	1801651	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1518	WHITEMHP40105CH001	GWNT1810041000GGA	10/4/2018	S95246	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1519	WHITEMORE07101TP001	GWEF1807191030GSC	7/19/2018	1801878	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1520	WHITEOAKS07067CH123	GWNT1807171420GGA	7/17/2018	1801842	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1521	WHITEPIGN07070CH012	GWNT1809261530GGA	9/26/2018	S94998	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1522	WHITEPIGN07070WL003	GWNT1809261500GGA	9/26/2018	S94998	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1523	WHITTEMORE07104CH001	GWNT1811081045KME	11/8/2018	S96644	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1524	WILDWOOD07105CH501	GWNT1808311000GGA	8/31/2018	1802916	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1525	WILLAMSTON07120TP001	GWEF1807121245KER	7/12/2018	1801784	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1526	WILLOW40202TP001	GWEF1807121040KER	7/12/2018	1801781	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1527	WINDMILL40203CH001	GWNT1807120800KER	7/12/2018	1801778	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1528	WINDMILL40203CH002	GWNT1807120830KER	7/12/2018	1801778	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1529	WINDSLOW40204TP001	GWEF1807121000KER	7/12/2018	1801780	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1530	WINDSLOW40204TP002	GWEF1807121020KER	7/12/2018	1801780	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1531	WINDSOREST40124TP002	GWEF1806271150GSC	6/27/2018	1801560	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1532	WINDWARD07130CH501	GWNT1808290930GGA	8/29/2018	1802811	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1533	WLLWTWNPD01658WL004	GWIN1807161155KER	7/16/2018	1801805	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1534	WLLWTWNPD01658WL005	GWIN1807161145KER	7/16/2018	1801805	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1535	WOLFLAKE40501CH001	GWNT1807261400GGA	7/26/2018	1802073	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1536	WOODBRINE07160TP100	GW1806060935EDK	6/6/2018	1801182	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1537	WOODCREEK40564CH001	GWNT1809281130KER	9/28/2018	S94980	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1538	WOODFIELDE40639TP001	GWEF1808201400KER	8/20/2018	1802607	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1539	WOODFIELDW40455TP001	GWEF1808201430KER	8/20/2018	1802608	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1540	WOODLAND40326CH001	GWNT1807181345GSC	7/18/2018	1801852	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
1541	WOODLANDRG40669TP001	GWEF1807191055GSC	7/19/2018	1801880	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1542	WOODLANDS40404CH001	GWNT1807111440GSC	7/11/2018	1801711	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1543	WOODLNDCCF06820TP001	GWEF1807301430GSC	7/30/2018	1802138	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1544	WOODLNDEST40296CH002	GW1804161400GSC	4/16/2018	1800820	6	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	4	< 2	< 2	< 4	< 4
1545	WOODLNDPK07182CH001	GWR1806121110KER	6/12/2018	1801306	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1546	WOODRUFF07185CH001	GWEF1807231100GSC	7/23/2018	1801966	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1547	WOODRUFF07185CH003	GWIN1807231110GSC	7/23/2018	1801966	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1548	WOODVALLEY40480WL001	GWNT1810151000GGA	10/15/2018	S95844	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
					Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1549	WOODVALLEY40480WL002	GWNT1810151030GGA	10/15/2018	S95844	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1550	WSTHICKORY67020CH001	GW1806071155EDK	6/7/2018	1801174	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1551	WYNSTONE07217TP100	GW1806110900EDK	6/11/2018	1801258	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1552	XROADYOUTH01067WL001	GWEF1807101105GSC	7/10/2018	1801660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1553	XROADYOUTH01067WL002	GWEF1807101120GSC	7/10/2018	1801660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1554	XROADYOUTH01067WL004	GWEF1807101140GSC	7/10/2018	1801660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1555	XROADYOUTH01067WL005	GWEF1807101210GSC	7/10/2018	1801660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1556	XROADYOUTH01067WL006	GWEF1807101150GSC	7/10/2018	1801660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1557	XROADYOUTH01067WL009	GWEF1807101220GSC	7/10/2018	1801660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1558	XROADYOUTH01067WL010	GWEF1807101235GSC	7/10/2018	1801660	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1559	XTALDMV40357WL001	GWNT1808161210GGA	8/16/2018	1802554	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1560	XTALDMV40357WL001	GWNT1808161210GGA-FD	8/16/2018	1802554	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1561	XTALDMV40357WL003	GWNT1808161130GGA	8/16/2018	1802554	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1562	XTALFALIND03880CH001	GWNT1808240900GSC	8/24/2018	1802731	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1563	XTALFALIND03880CH001	GWNT1808240910GSC	8/24/2018	1802731	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1564	XTALFALIND03880WL002	GWNT1808240940GSC	8/24/2018	1802731	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1565	XTALFATOW06630CH002	GWIN1808240950GSC	8/24/2018	1802732	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1566	XTALFATOW06630CH002	GWNT1808241000GSC	8/24/2018	1802732	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1567	XTALHLDSUB01715CH501	GWNT1809171000GGA	9/17/2018	S94679	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1568	XTALMNTSPA01716TP001	GWEF1809180900GGA	9/18/2018	S94684	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1569	XTALMNTSPA01716TP004	GWNT1809180920GGA	9/18/2018	S94684	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1570	XTALRDGCON01694CH501	GWNT1809171130GGA	9/17/2018	S94681	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1571	XTALRWCO07103TP101	GWIN1809041330KER	9/4/2018	1802947	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1572	YALE07230TP101	GWEF1810231325KME	10/23/2018	S96110	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1573	YALE07230TP102	GWEF1810231340KME	10/23/2018	S96110	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1574	YALE07230TP105	GWEF1810231310KME	10/23/2018	S96110	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1575	YANKEEMDW40585CH001	GWNT1807261130KER	7/26/2018	1802083	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1576	YANKEESPG07231TP100	GW1804231420GSC	4/23/2018	1800748	0	< 8	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1577	YODERAPT07235WL001	GWIN1810161255KME	10/16/2018	S95824	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1578	YODERAPT07235WL002	GWIN1810161310KME	10/16/2018	S95824	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1579	YODERAPT07235WL003	GWIN1810161325KME	10/16/2018	S95824	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1580	YODERAPT07235WL004	GWIN1810161335KME	10/16/2018	S95824	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1581	YORKCONDO07240CH501	GWNT1809061250KER	9/6/2018	1803019	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
1582	ADRIAN00040TP001	SWEF1808021230GSC	8/2/2018	1802248	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1583	ALGONAC00110TP100	SWEF1810251255KME	10/25/2018	1803457	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1584	ALPENA00160TP100	SWEF1810291230GGA	10/29/2018	1803543	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1585	ANNARBOR00220TP001	SWEF1807171545GSC	7/17/2018	1801823	24	< 2	< 2	< 2	< 4	< 4	< 4	< 4	4	< 2	4	< 4	4	< 4	< 4
1586	AUGRES00280TP001	SWEF1811021020KME	11/2/2018	1803545	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1587	BARAGA00410TP001	SWEF1808020930GGA	8/2/2018	1802302	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1588	BAYAREAWS00465TP001	SWEF1810230955KME	10/23/2018	1803443	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1589	BENTONCHRT00605TP001	SWEF1807201110GGA	7/20/2018	1801938	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1590	BENTONHRBR00600TP001	SWEF1807201010GGA	7/20/2018	1801936	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1591	BLISSFIELD00750TP001	SWEF1808021115GSC	8/2/2018	1802249	3	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
1592	BRIDGMAN00850TP001	SWEF1807191020GGA	7/19/2018	1801939	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1593	CASEVILLE01190TP001	SWEF1810080920GGA	10/8/2018	1803298	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1594	CHARLEVCTY01330TP100	SWEF1808301310GGA	8/30/2018	1802909	3	3	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1595	DEERFLD01770TP001	SWEF1808021030GSC	8/2/2018	1802250	2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1596	DETOUR01795TP001	SWEF1809111020GGA	9/11/2018	1803051	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1597	ESCANABA02170TP002	SWEF1808210930GSC	8/21/2018	1802661	2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1598	FRENCHTOWN02500TP001	SWEF1807261020GSC	7/26/2018	1802086	3	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1599	GENESEECWS02615TP001	SWEF1808081500GSC	8/8/2018	1802350	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1600	GENESEECWS02615TP001	SWEF1901221215KME	1/22/2019	1900168	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1601	GLADSTONE02640TP003	SWEF1808210800GSC	8/21/2018	1802656	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1602	GREATLAKES02838TP100	SWEF1807091310GSC	7/9/2018	1801664	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1603	GREATLAKES02838TP101	SWEF1807091410GSC	7/9/2018	1801664	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1604	GREATLAKES02838TP102	SWEF1807091550GSC	7/9/2018	1801664	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1605	GREATLAKES02838TP103	SWEF1807091140GSC	7/9/2018	1801664	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1606	GREATLAKES02838TP104	SWEF1811131015KME	11/13/2018	1803681	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1607	GRNDRAPIDS02790TP100	SWT1804201025GSC	4/20/2018	1800739	2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1608	GROSSEPTFM02890TP100	SWEF1807171020GSC	7/17/2018	1801821	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1609	HOLLNDBPW03190TP100	SWEF1809200920KER	9/20/2018	1803138	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1610	HRBRBEACH03000TP001	SWEF1810081020GGA	10/8/2018	1803300	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1611	HURONRWA03317TP001	SWEF1810081120GGA	10/8/2018	1803302	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1612	HURONSRUA03319TP001	SWEF1811151330GGA	11/15/2018	1803695	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1613	IRATWP03390TP100	SWEF1810251215KME	10/25/2018	1803455	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1614	LANSE03670TP001	SWEF1808021010GGA	8/2/2018	1802303	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1615	LEXINGTON03850TP001	SWEF1810171530GGA	10/17/2018	1803390	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1616	LINWOODMWD03910TP001	SWEF1810231040KME	10/23/2018	1803445	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1617	LKCHARTER03741TP001	SWEF1807190910GGA	7/19/2018	1801944	2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1618	MACKINCISL03970TP003	SWEF1809081510GGA	9/8/2018	1803033	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1619	MANISTIQUE04040TP001	SWEF1808201100GSC	8/20/2018	1802629	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1620	MARINECITY04090TP100	SWEF1810251125KME	10/25/2018	1803453	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1621	MARQUETTE04120TP001	SWEF1808140800GSC	8/14/2018	1802496	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1622	MARYSVILLE04160TP100	SWEF1810250910KME	10/25/2018	1803449	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1623	MENOMINEE04250TP001	SWEF1808211200GSC	8/21/2018	1802668	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1624	MIDLAND04370TP001	SWEF1810161210KME	10/16/2018	1803379	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1625	MONROE04450TP001	SWEF1807261120GSC	7/26/2018	1802087	2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1626	MTCLEMENS04510TP100	SWEF1810311025KME	10/31/2018	1803504	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1627	MTPLEASANT04530TP001	SWEF1810161125KME	10/18/2018	1803381	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1628	MUSKEGON04570TP100	SWEF1807261415KER	7/26/2018	1802084	2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1629	MUSKHGTS04580TP100	SWEF1808131410MK	8/13/2018	1802434	4	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	2	< 4	2	< 4	< 4
1630	NEWBALT04670TP101	SWEF1810310935KME	10/31/2018	1803506	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1631	NEWBUFFALO04680TP001	SWEF1807191130GGA	7/19/2018	1801940	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1632	NPORTCOA04820TP001	SWEF1811071430GGA	11/7/2018	1803692	2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1633	NWOTTCWS04847TP100	SWEF1809181240KER	9/18/2018	1803136	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1634	OMER05005TP001	SWEF1811080955KME	11/8/2018	1803585	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4

Table 2a - Public Water Supply: CWS Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report (Compound / Unit)	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
1635	ONTONAGON05030TP002	SWEF1807311640GGA	7/31/2018	1802230	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1636	ONTONAGON05030TP002	SWIN1807311630GGA	7/31/2018	1802230	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1637	PORTHURON05480TP100	SWEF1810241320KME	10/24/2018	1803447	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1638	SAGINAW05850TP001	SWEF1808281030KER	8/28/2018	1802872	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1639	SAULTSTE05950TP001	SWEF1809121020GGA	9/12/2018	1803060	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1640	SIMSWUA06073TP001	SWEF1811021055KME	11/2/2018	1803548	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1641	SOUTHHAVEN06100TP101	SWEF1808090920GGA	8/9/2018	1802376	2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1642	STANDISH06350TP001	SWEF1811011440KME	11/1/2018	1803508	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1643	STCLAIR06270TP100	SWEF1811121340KME	11/12/2018	1803679	0	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 2	< 5	< 5
1644	STCLAIRWSA06284TP100	SWEF1810251045KME	10/25/2018	1803451	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1645	STIGNACE06290TP001	SWEF1809100930GGA	9/10/2018	1803031	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1646	STJOSEPH06310TP001	SWEF1807200930GGA	7/20/2018	1801935	2	2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1647	TRAVERSE06640TP100	SWEF1810241230GGA	10/24/2018	1803484	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1648	WYANDOTTE07210TP100	SWEF1807260900GSC	7/26/2018	1802085	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1649	WYOMING07220TP100	SWT1804201130GSC	4/20/2018	1800738	3	3	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
1650	KAREGNONDI03563IN001	SWIN1901221035KME	1/22/2019	1900170	0	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 4	< 2	< 4	< 4

Footnotes:

ng/l = nanograms per liter

PFHxA = Perfluorohexanoic Acid
PFHpA = Perfluoroheptanoic Acid
PFOA = Perfluorooctanoic Acid
PFNA = Perfluorononanoic Acid
PFDA = Perfluorodecanoic Acid

PFUnDA = Perfluoroundecanoic Acid
PFDoDA = Perfluorododecanoic Acid
PFTrDA = Perfluorotridecanoic Acid
PFTeDA = Perfluorotetradecanoic Acid
PFBS = Perfluorobutane Sulfonic acid

PFHxS = Perfluorohexane Sulfonic acid
PFOS = Perfluorooctane Sulfonic acid
EtFOSAA = N-Ethyl perfluorooctane sulfonamidoacetic acid
MeFOSAA = N-Methyl perfluorooctane sulfonamidoacetic acid

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound	Total PFAS	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	PFBS	PFHxS	PFOS	EtFOSAA	MeFOSAA
				Unit	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1	ACKERSONED-2010438	GWNT1807191130KER	7/19/2018	1801955	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
2	AKRONHIGH-2032679	GWNT1810161100GGA	10/16/2018	S95850	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3	ALAIEDONELEM-2002833	GWNT1807101030KER	7/10/2018	1801694	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
4	ALAMOELEM-2033539	GW1805011630GSC	5/1/2018	1800875	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
5	ALAMOELEM-2033539	GW1805011630GSC-FD	5/1/2018	1800875	0	< 2	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
6	ALANSONPUB-2028824	GWNT1808271100GGA	8/27/2018	1802801	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
7	ALBAELEM-2004805	GWNT1809060900GGA	9/6/2018	1803044	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
8	ALCONAELEM-2003201	GWNT1811141030GGA	11/14/2018	S96915	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
9	ALCONAHIGH-2010901-1	GWNT1811141000GGA	11/14/2018	S96914	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
10	ALCONAHIGH-2010901-2	GWNT1811141020GGA	11/14/2018	S96914	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
11	ALGOMACHRI-2047841	GW1805291050GSC	5/29/2018	1801088	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
12	ALPINEELEM-2024541-1	GW1806040920GSC	6/4/2018	1801241	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
13	ALPINEELEM-2024541-2	GW1806040925GSC	6/4/2018	1801241	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
14	ALTOELEMSCH-2002741	GW1805311035GSC	5/31/2018	1801098	23	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	21	< 2	< 4	< 4
15	ALTOELEMSCH-2002741	GWEF1808061140MK	8/6/2018	1802282	17	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	15	< 2	< 4	< 4
16	ANDERSON-2079263	GWIN1808081530KER	8/8/2018	1802402	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
17	ANNARBOR-2053181	GWIN1808080910KER	8/8/2018	1802396	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
18	APOLLOCHVS-2016563	GWEF1807131215GSC	7/13/2018	1801791	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
19	ARGENTINE-2071125	GWNT1808090800GSC	8/9/2018	1802388	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
20	ARMADAHIGH-2008250-1	GWNT1810300930KME	10/30/2018	S96351	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
21	ARMADAHIGH-2008250-2	GWEF1810300910KME	10/30/2018	S96351	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
22	ARMSTRONG-2024125	GWEF1808131445KER	8/13/2018	1802454	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
23	ATHERTONCS-2052325	GWEF1808061000GSC	8/6/2018	1802281	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
24	ATHERTONCS-2052425	GWEF1808061030GSC	8/6/2018	1802283	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
25	ATLANTASCH-2009260-1	GWEF1810301100GGA	10/30/2018	S96361	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
26	ATLANTASCH-2009260-2	GWNT1810301130GGA	10/30/2018	S96361	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
27	AUTRAINPS-2007502	GWNT1808161700GSC	8/16/2018	1802593	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
28	AVOCAELEM-2006674	GWEF1810241000KME	10/24/2018	S96112	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
29	BAILEYLAKE-2077863-1	GWIN1808081645KER	8/8/2018	1802404	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
30	BAILEYLAKE-2077863-2	GWIN1808081630KER	8/8/2018	1802404	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
31	BAKERCOLLE-2019583-1	GWNT1810040800KER	10/4/2018	S95276	15	8	3	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
32	BAKERCOLLE-2019583-1	GWNT1811161400GGA	11/16/2018	S96929	16	8	3	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
33	BAKERCOLLE-2019583-2	GWNT1810040815KER	10/4/2018	S95276	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
34	BAKERCOLLE-2019583-2	GWNT1811161430GGA	11/16/2018	S96929	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
35	BALDWINELE-2211363	GWEF1807111400GSC	7/11/2018	1801710	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
36	BARKRVRSCH-2001755	GWIN1808211450GSC	8/21/2018	1802674	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
37	BARRYCHRIS-2026808	GWT1806131425GSC	6/13/2018	1801338	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
38	BARRYTONES-2007954	GWNT1809131020KER	9/13/2018	S94405	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
39	BAYARENAC-2019706	GWEF1811011235KME	11/1/2018	S96339	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
40	BEADLEELEM-2005613	GWNT1806251105RAP	6/25/2018	1801553	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
41	BEALCTYPS-2004037-01	GWEF1810221310KME	10/22/2018	S96107	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
42	BEALCTYPS-2004037-02	GWEF1810221300KME	10/22/2018	S96107	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
43	BEALCTYPS-2004037-03	GWNT1810221330KME	10/22/2018	S96107	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
44	BEANELEM-2072238	GWNT1807240920KER	7/24/2018	1802075	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound	Total PFAS	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	PFBS	PFHxS	PFOS	EtFOSAA	MeFOSAA
				Unit	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
45	BEAVERCOMM-2001615	GWEF1809071400GGA	9/7/2018	1803045	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
46	BENTHEIMES-2024003	GWIN1807260910KER	7/26/2018	1802081	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
47	BENZIEMHS-2001110	GWNT1809071045CKA	9/7/2018	1803010	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
48	BERLINCOON-2008934	GWNT1809271120KER	9/27/2018	S94973	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
49	BETHANYSCH-2000776	GWEF1810241500KME	10/24/2018	S96116	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
50	BETHHAVEN-2052659	GWEF1807031130GSC	7/3/2018	1801627	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
51	BETSIEELEM-2000251	GWNT1809181030GGA	9/18/2018	S94686	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
52	BIGBAYDIST-2013421	GWEF1808201200GSC	8/20/2018	1802631	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
53	BIRDLAKE-2030230	GWEF1810021100GGA	10/2/2018	S95233	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
54	BLAIRELEM-2026628	GWEF1807190835MK	7/19/2018	1801864	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
55	BLOOMELEM-2011080	GWNT1808090730GGA	8/9/2018	1802373	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
56	BLOOMHIGH-2026980-1	GWNT1808090800GGA	8/9/2018	1802374	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
57	BLOOMHIGH-2026980-2	GWNT1808090820GGA	8/9/2018	1802374	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
58	BLUESTAR-2023803	GW1806071055KER	6/7/2018	1801228	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
59	BOYNEFALLS-2017215	GWNT1809041030GGA	9/4/2018	1802960	41	< 2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	4	4	30
60	BOYNEFALLS-2017215	GWNT1810151640MK	10/15/2018	1803356	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
61	BOYNEFALLS-2017215	GWNT1811131400GGA	11/13/2018	S96913	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
62	BRANCHHS-2018612	GWEF1810011000GGA	10/1/2018	S95224	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
63	BRANDONHIGH-2136163	GW1806211150EDK	6/21/2018	1801446	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
64	BRANDONMIDD-2247463	GW1806211205EDK	6/21/2018	1801447	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
65	BRETHRENHS-2000151-1	GWNT1809191400GGA	9/19/2018	S94696	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
66	BRETHRENHS-2000151-2	GWNT1809191430GGA	9/19/2018	S94696	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
67	BRIGHTHAWK-2012047	GWNT1807181045GSC	7/18/2018	1801850	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
68	BRIGHTHILT-2012447	GWEF1807180900GSC	7/18/2018	1801845	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
69	BRIGHTHORN-2006047	GWIN1807180945GSC	7/18/2018	1801847	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
70	BRIGHTINST-2081147	GWEF1807310930GSC	7/31/2018	1802170	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
71	BRIGHTMALT-2021747	GWIN1807181000GSC	7/18/2018	1801848	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
72	BRIGHTSCRA-2051047	GWEF1807181030GSC	7/18/2018	1801849	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
73	BRIGHTSPEN-2010447	GWNT1807180915GSC	7/18/2018	1801846	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
74	BROOKSELEM-2149463	GWEF1807131345GSC	7/13/2018	1801794	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
75	BROOKSELEM-2149463	GWEF1807131355GSC-FD	7/13/2018	1801794	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
76	BROOKSIDE-2007614	GWNT1808301230KER	8/30/2018	1802885	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
77	BROOKVIEW-2057911	GWIN1807161400GGA	7/16/2018	1801832	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
78	BRUMMERES-2079547	GWEF1807160945GSC	7/16/2018	1801818	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
79	BUFFEYSCH-2025125	GWEF1808131420KER	8/13/2018	1802453	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
80	BURGTORFEC-2022625	GWEF1808131400KER	8/13/2018	1802452	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
81	BYRONCTR-2009741	GW1806041410GSC	6/4/2018	1801243	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
82	CALHOUNINT-2018813	GWEF1806251310RAP	6/25/2018	1801555	20	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	10	7	< 2	< 4	< 4
83	CALHOUNINT-2018813	GWEF1808061620MK	8/6/2018	1802291	17	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	9	5	< 2	< 4	< 4
84	CAMDENFRON-2000630	GWEF1810020900GGA	10/2/2018	S95231	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
85	CANNONELEM-2030041	GWNT1807310900KER	7/31/2018	1802181	6	< 2	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
86	CAPITALCENT-2009033	GWEF1807101100KER	7/10/2018	1801695	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
87	CARSONSCHS-2002776	GWIN1810171200GGA	10/17/2018	S95858	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
88	CASSIDYSAI-2057381	GWEF1808221000KER	8/22/2018	1802648	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report (Compound / Unit)	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
89	CEDARACAD-2123363	GWEF1807120830GSC	7/12/2018	1801726	3	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
90	CEDARCHILD-2156563	GWEF1807120840GSC	7/12/2018	1801727	3	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
91	CEDARCRK-2014408	GWEF1808061400MK	8/6/2018	1802289	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
92	CEDARLAK-2037759	GWIN1807021148GSC	7/2/2018	1801615	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
93	CEDARLANE-2065011	GWEF1808301100KER	8/30/2018	1802883	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
94	CEDARVILLE-2040849	GWEF1809110930GGA	9/11/2018	1803050	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
95	CHARLEHIGH-2017815-1	GWEF1809041700GGA	9/4/2018	1802965	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
96	CHARLEHIGH-2017815-2	GWNT1809041730GGA	9/4/2018	1802965	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
97	CHARLTONHA-2009172-1	GWNT1810111120KME	10/11/2018	S95581	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
98	CHARLTONHA-2009172-2	GWNT1810111140KME	10/11/2018	S95581	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
99	CHEBOYGAN-2008216	GWNT1809141100GGA	9/14/2018	1803133	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
100	CHERRYELEM-2017352	GWNT1808150815GSC	8/15/2018	1802518	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
101	CHIPPEWAHS-2007854	GWIN1809130930KER	9/13/2018	S94403	14	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	9	< 2	< 2	< 2
102	CHIPPEWAIS-2037554	GWIN1809130945KER	9/13/2018	S94404	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
103	CLAREGLAD-2002018	GWEF1811121440GGA	11/12/2018	S96910	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
104	CLAREGLADM-2030118	GWEF1811121400GGA	11/12/2018	S96908	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
105	CLEARLKELEM-2141363	GWNT1807101040GSC	7/10/2018	1801668	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
106	CLIMSCOTES-2013539	GWNT1806261230GSC	6/26/2018	1801543	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
107	CNTMONTELE-2050759	GWNT1807131315GGA	7/13/2018	1801801	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
108	CNTMONTSCH-2001959	GWNT1807131300GGA	7/13/2018	1801800	64	5	3	12	< 2	< 2	< 4	< 4	< 4	< 4	< 2	37	7	< 4	< 4
109	CNTMONTSCH-2001959	GWNT1808171310GGA	8/17/2018	1802622	79	6	3	16	< 2	< 2	< 4	< 4	< 4	< 4	< 2	43	11	< 4	< 4
110	CNTMONTSCH-2001959	GWNT1809140950MK	9/14/2018	1803129	91	6	3	19	< 2	< 2	< 4	< 4	< 4	< 4	< 2	51	12	< 4	< 4
111	CNTRYACAD-2068111-1	GWIN1807161300GGA	7/16/2018	1801831	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
112	CNTRYACAD-2068111-2	GWIN1807161230GGA	7/16/2018	1801831	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
113	CNTRYMELC-2006911	GWNT1807161200GGA	7/16/2018	1801830	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
114	CNTRYMONT-2030930	GWEF1808271200GSC	8/27/2018	1802789	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
115	COLONPSLE-2009275	GWNT1810041500GGA	10/4/2018	S95251	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
116	COLUMBIAEC-2004338	GWNT1807191410KER	7/19/2018	1801960	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
117	COLUMBIAHS-2004438-1	GWEF1807191300KER	7/19/2018	1801959	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
118	COLUMBIAHS-2004438-2	GWIN1807191330KER	7/19/2018	1801959	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
119	COLUMBIAHS-2004438-2	GWIN1807191340KER-FD	7/19/2018	1801959	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
120	COMMACTEHS-2061703	GW1805011015GSC	5/1/2018	1800874	0	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
121	CONCORDAC-2015715	GWNT1809041000GGA	9/4/2018	1802959	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
122	CONCORDAC-2029524	GWNT1808280930GGA	8/28/2018	1802808	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
123	COORSCHOOL-2025472	GWNT1810101450KME	10/10/2018	S95578	17	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	17	< 2	< 2	< 2	< 2
124	COORSCHOOL-2025472	GWNT1811161030GGA	11/16/2018	S96927	14	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	14	< 2	< 2	< 2	< 2
125	COPPERSCH-2007731	GWNT1807311130GGA	7/31/2018	1802166	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
126	CORNERSTON-2046347	GWEF1807301215GSC	7/30/2018	1802139	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
127	COURTADEES-2025428	GWIN1810030900KER	10/3/2018	S95267	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
128	CRAMTONES-2025244	GWNT1808020930KER	8/2/2018	1802258	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
129	CRAWFORD-2007440	GWNT1811071000GGA	11/7/2018	S96662	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
130	CRESTWOOD-2052641	GWNT1807310930KER	7/31/2018	1802182	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
131	CTRYCHRIST-2010929	GWIN1808291400KER	8/29/2018	1802868	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
132	DAVISBURG-2104363	GWNT1807121130GSC	7/12/2018	1801730	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound	Total PFAS	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	PFBS	PFHxS	PFOS	EtFOSAA	MeFOSAA
				Unit	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
133	DAYSTARACA-2017367	GWEF1809111130KER	9/11/2018	S94380	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
134	DEFORDCOMM-2066279	GWNT1810101100GGA	10/10/2018	S95598	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
135	DIECKELEM-2045225	GWNT1810311445KME	10/31/2018	S96335	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
136	DIMONDALELEM-2009323	GWEF1807051045KER	7/5/2018	1801643	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
137	DIXIEBAPA-2078963	GWEF1807120930GSC	7/12/2018	1801728	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
138	DIXIEBAPF-2147063	GWNT1807120945GSC	7/12/2018	1801729	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
139	DORISKLAUS-2002413	GWEF1806251220RAP	6/25/2018	1801556	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
140	DORRELEM-2003803	GWT1806111300GSC	6/11/2018	1801329	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
141	DRUMMONDES-2051417	GWNT1809111300GGA	9/11/2018	1803054	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
142	DRYDENHIGH-2022744	GWEF1808011600GSC	8/1/2018	1802223	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
143	DUCKLAKE-2017763	GWEF1807131310GSC	7/13/2018	1801793	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
144	EAGLELAKE-2007914-1	GWNT1807261100GGA	7/26/2018	1802071	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
145	EAGLELAKE-2007914-2	GWNT1807261120GGA	7/26/2018	1802071	7	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	7
146	EARLHOLMAN-2002631	GWNT1807311110GGA	7/31/2018	1802165	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
147	EIGHTCAP-2007759	GWNT1807121110GA	7/12/2018	1801739	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
148	EIGHTCAP-2008634	GWNT1807121200GGA	7/12/2018	1801741	182	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	180	< 2	< 2	< 4	< 4
149	EIGHTCAP-2008634	GWNT1808031550JTM	8/3/2018	1802268	203	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	200	< 2	< 2	< 4	< 4
150	EIGHTCAPAX-2061159	GWNT1807121120GA	7/12/2018	1801740	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
151	EJACKSONES-2000938	GWIN1807171120KER	7/17/2018	1801870	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
152	ELEROYELEM-2019213	GWNT1806221030KER	6/22/2018	1801513	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
153	ELVALYNCH-2054244	GWNT1808021040KER	8/2/2018	1802261	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
154	EMARTINSCH-2036003	GWR1806121300GSC	6/12/2018	1801326	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
155	EMERSONES-2017981	GWEF1808021600GSC	8/2/2018	1802245	15	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	13	< 2	< 2	< 4	< 4
156	EMERSONES-2017981	GWEF1809131510MK	9/13/2018	1803065	15	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	15	< 2	< 2	< 4	< 4
157	EMERSONMS-2037281	GWNT1808021550GSC	8/2/2018	1802246	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
158	ENGADINE-2019749	GWNT1809101030GGA	9/10/2018	1803036	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
159	EUREKAELEM-2003819	GWNT1809261300KER	9/26/2018	S94967	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
160	FACTORYSCH-2021475	GWNT1810031400GGA	10/3/2018	S95244	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
161	FAIRVIEW-2007268	GWNT1811081300GGA	11/8/2018	S96670	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
162	FAITHBAP-2079925	GWEF1808131530KER	8/13/2018	1802456	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
163	FAITHCHRIST-2029908	GWEF1808241000GGA	8/24/2018	1802729	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
164	FAITHCOMCS-2023134	GWEF1809281020KER	9/28/2018	S94978	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
165	FAITHCOMCS-2023134	GWEF1809281030KER-FD	9/28/2018	S94978	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	< 2
166	FARWELLALT-2029018	GWNT1811121200GGA	11/12/2018	S96906	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
167	FIELDERSCH-2023925	GWEF1808131500KER	8/13/2018	1802455	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
168	FIFELAKEES-2003628	GWNT1810230900GGA	10/23/2018	S96122	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
169	FIRSTBAP-2004678	GWNT1808211430KER	8/21/2018	1802647	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
170	FIRSTBAP-2035759	GWNT1807031320GGA	7/3/2018	1801628	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
171	FISHCREEK-2035659	GWIN1807031345GGA	7/3/2018	1801629	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
172	FLATRIVER-2056759	GWNT1807020930GSC	7/2/2018	1801612	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
173	FLORACHILD-2006338	GWNT1807111415KER	7/11/2018	1801777	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
174	FLORENCEES-2015525	GWEF1808061130GSC	8/6/2018	1802285	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
175	FORDFOREST-2005207	GWNT1808021125GGA	8/2/2018	1802305	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
176	FORESTGRV-2023970	GWEF1809250900KER	9/25/2018	S94959	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
177	FORESTGRV-2023970	GWEF1809250910KER-FD	9/25/2018	S94959	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
178	FORESTHS-2000940	GWNT1811070900GGA	11/7/2018	S96661	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
179	FORESTVIEW-2010783	GWNT1810021010KER	10/2/2018	S95259	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
180	FOSTORIA-2084679	GWEF1810150900GGA	10/15/2018	S95843	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
181	FREEDOMFCS-2006030	GWEF1808291115CKA	8/29/2018	1802830	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
182	FREEMAN-2009281	GWEF1807161400GSC	7/16/2018	1801819	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
183	FULTONALT-2014429	GWEF1808291500KER	8/29/2018	1802870	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
184	FULTONSCH-2004029-1	GWEF1808291415KER	8/29/2018	1802869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
185	FULTONSCH-2004029-2	GWEF1808291430KER	8/29/2018	1802869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
186	GAINESELEM-2063525	GWEF1810311525KME	10/31/2018	S96336	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
187	GARDENMONT-2090847	GWEF1807251345GSC	7/25/2018	1802014	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
188	GATESELEM-2044525	GWEF1808061100GSC	8/6/2018	1802284	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
189	GENESSEACD-2145325	GWEF1808131020KER	8/13/2018	1802448	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
190	GEORGEELEM-2117425	GWNT1808080800GSC	8/8/2018	1802339	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
191	GLADWINALT-2011426	GWNT1904021300KER	4/2/2019	1900646	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
192	GLENGARY-2052663	GWNT1807111020GSC	7/11/2018	1801707	77	29	10	20	< 2	< 2	< 4	< 4	< 4	< 4	10	8	< 2	< 4	< 4
193	GLENGARY-2052663	GWNT1808071400KER	8/7/2018	1802318	78	30	12	18	< 2	< 2	< 4	< 4	< 4	< 4	10	8	< 2	< 4	< 4
194	GLENLAKECS-2006545	GWIN1809041400KER	9/4/2018	1802948	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
195	GLENNSCH-2025003	GW1806081110KER	6/8/2018	1801237	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
196	GLENOAKSCC-2009375-1	GWIN1810041340GGA	10/4/2018	S95249	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
197	GLENOAKSCC-2009375-2	GWIN1810041320GGA	10/4/2018	S95249	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
198	GLENOAKSCC-2009375-3	GWIN1810041300GGA	10/4/2018	S95249	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
199	GOODRICHES-2057325	GWEF1808081045GSC	8/8/2018	1802343	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
200	GOODRICHHS-2057425	GWIN1808081030GSC	8/8/2018	1802344	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
201	GOODRICHMS-2155125	GWIN1808081000GSC	8/8/2018	1802342	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
202	GOODWILLIE-2089341	GW1806010945EDK	6/1/2018	1801201	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
203	GRACECHRIS-2011269	GWNT1808141400GGA	8/14/2018	1802482	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
204	GRACECHRIS-2011411	GWNT1807171045GGA	7/17/2018	1801836	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
205	GRAHAMCC-2020478	GWNT1808211400KER	8/21/2018	1802646	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
206	GRANDLEDGE-2025723	GWNT1806290910GSC	6/29/2018	1801608	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
207	GRANTCHRIS-2008262	GWNT1807311300KER	7/31/2018	1802185	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
208	GRAYLINGHS-2006420	GWNT1811061400GGA	11/6/2018	S96659	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
209	GULLLAKEEARL-2017839	GWNT1806191000KER	6/19/2018	1801459	10	3	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	4	< 4	< 4
210	GULLLAKEEARL-2017839	GWNT1808171100GGA	8/17/2018	1802621	15	4	2	4	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	5	< 4	< 4
211	GULLLAKEELEM-2013339	GWNT1806191010KER	6/19/2018	1801460	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
212	HALESCHOOL-2021135	GWEF1811160900GGA	11/16/2018	S96925	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
213	HAMILTONES-2024303	GW1806071205KER	6/7/2018	1801232	6	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	3	< 2	< 4	< 4
214	HAMILTONHS-2060403	GW1806071025KER	6/7/2018	1801227	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
215	HAMILTONHS-2060503	GWNT1806071000KER	6/7/2018	1801395	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
216	HAMILTONMS-2024403	GW1806070920KER	6/7/2018	1801234	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
217	HAMILTONMS-2053303	GW1806070945KER	6/7/2018	1801233	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
218	HAMILTONP-2148863	GWEF1807111545GSC	7/11/2018	1801712	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
219	HAMILTONP-2148863	GWEF1807111550GSC-FD	7/11/2018	1801712	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
220	HARPERADM-2022013	GWNT1806251010RAP	6/25/2018	1801551	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
221	HARTLDDAY-2016747	GWEF1807311210GSC	7/31/2018	1802175	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
222	HARTLDEDSP-2007347	GWEF1807311045GSC	7/31/2018	1802173	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
223	HARTLDELEM-2022447	GWEF1807311000GSC	7/31/2018	1802171	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
224	HARTLDMIDD-2022347	GWEF1811010940KME	11/1/2018	S96338	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
225	HARTLDRELE-2016447	GWEF1807311145GSC	7/31/2018	1802174	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
226	HARTLDVELE-2016647	GWEF1811010915KME	11/1/2018	S96337	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
227	HARVEYELEM-2106363	GWEF1806211215EDK	6/21/2018	1801448	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
228	HAYESCHOOL-2005223	GWNT1806290920GSC	6/29/2018	1801607	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
229	HAYNORSCH-2003234	GWNT1810011130KER	10/1/2018	S95257	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
230	HEARTWOODSCH-2008933	GWEF1807101200KER	7/10/2018	1801696	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
231	HERITAGEES-2254963	GWEF1807131115GSC	7/13/2018	1801788	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
232	HIGHLANDES-2016163	GWEF1807131200GSC	7/13/2018	1801790	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
233	HINKSSCH-2013004	GWEF1810291400GGA	10/29/2018	S96358	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
234	HLCOMMCTR-2026972	GWEF1810151005KME	10/15/2018	S95816	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
235	HLHIGHSCH-2025572	GWNT1810151055KME	10/15/2018	S95818	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
236	HLMIDELEM-2005472	GWEF1810151035KME	10/15/2018	S95817	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
237	HOLTONDIST-2019861	GWNT1807111000GGA	7/11/2018	1801756	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
238	HOLTONELEM-2041261-1	GWNT1807110905GGA	7/11/2018	1801754	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
239	HOLTONELEM-2041261-2	GWNT1807110910GGA	7/11/2018	1801754	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
240	HOLTONHIGH-2009261	GWNT1807110920GGA	7/11/2018	1801755	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
241	HOLYSPIRIT-2075547	GWEF1807310900GSC	7/31/2018	1802169	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
242	HOPKINSES-2002903-1	GWEF1806110945GSC	6/11/2018	1801333	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
243	HOPKINSES-2002903-2	GWEF1806111030GSC	6/11/2018	1801333	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
244	HOPKINSHS-2057603	GWEF1806111045GSC	6/11/2018	1801332	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
245	HOPKINSMS-2003003	GWEF1806111120GSC	6/11/2018	1801331	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
246	HORTONCOMP-2051238-1	GWNT1807171420KER	7/17/2018	1801872	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
247	HORTONCOMP-2051238-2	GWNT1807171440KER	7/17/2018	1801872	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
248	HORTONES-2073938	GWNT1807171500KER	7/17/2018	1801873	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
249	HOWARDELEM-2008014	GWNT1807250900GGA	7/25/2018	1802061	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
250	HOWARDSCHO-2020875-1	GWEF1809261200GGA	9/26/2018	S94996	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
251	HOWARDSCHO-2020875-2	GWNT1809261230GGA	9/26/2018	S94996	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
252	HUDAMONTES-2043163	GWIN1807090920GSC	7/9/2018	1801662	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
253	HUGGERELEM-2141263	GWEF1807111330GSC	7/11/2018	1801709	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
254	HURONTECH-2024232	GWEF1810081300GGA	10/8/2018	S95584	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
255	IMLAYCHRIS-2037744	GWNT1808141045KER	8/14/2018	1802463	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
256	INLANDSCH-2008416	GWNT1809141030GGA	9/14/2018	1803132	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
257	ISLANDACAD-2026723	GWEF1806281015GSC	6/28/2018	1801603	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
258	ISOCARESA-2022735	GWNT1811161000GGA	11/16/2018	S96926	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
259	JOHLEWSCH-2006769	GWNT1808141330GGA	8/14/2018	1802481	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
260	JOHNELEM-2001474	GWEF1810241020KME	10/24/2018	S96113	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
261	JUNIATABAP-2039179	GWEF1810151100GGA	10/15/2018	S95845	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
262	KENTCITYELEM-2056741	GW1805290945GSC	5/29/2018	1801086	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
263	KENTCTYHMS-2015541	GW1805291005GSC	5/29/2018	1801087	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
264	KENTCTYHMS-2015541	GW1805291020GSC	5/29/2018	1801087	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
265	KETTLEELEM-2013241	GW1805311300EDK	5/31/2018	1801100	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
266	KIDDERMIDD-2014138	GWNT1807111400KER	7/11/2018	1801776	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
267	KINCHELOE-2004114	GWNT1810040900GGA	10/4/2018	S95245	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
268	KINGSBURY-2140663	GWNT1808061330KER	8/6/2018	1802297	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
269	KINGSJASC-2254163	GWNT1808061410KER	8/6/2018	1802299	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
270	KINGSOAKWD-2140563	GWNT1808061350KER	8/6/2018	1802298	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
271	KIRTLANDCC-2022320	GWEF1811061000GGA	11/6/2018	S96655	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
272	LAINGSBURG-2004778	GWEF1808170900KER	8/17/2018	1802595	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
273	LAINGSBURG-2004878	GWEF1808170930KER	8/17/2018	1802596	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
274	LAINGSBURG-2027278	GWEF1808171000KER	8/17/2018	1802597	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
275	LAKEANNELE-2014210	GWNT1809071145CKA	9/7/2018	1803012	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
276	LAKEAREACS-2019875	GWEF1809281200GGA	9/28/2018	S95010	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
277	LAKELANDES-2009812	GWNT1810011200GGA	10/1/2018	S95226	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
278	LAKELDWHIT-2080963	GWIN1807131015GSC	7/13/2018	1801786	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
279	LAKERELEM-2034332	GWEF1810081400GGA	10/8/2018	S95585	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
280	LAKERHIGH-2017832	GWNT1810081430GGA	10/8/2018	S95586	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
281	LAKESELEM-2022541	GWEF1807310830KER	7/31/2018	1802180	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
282	LAKEWOODES-2009908-1	GWR1806131620GSC	6/13/2018	1801340	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
283	LAKEWOODES-2009908-2	GWR1806131630GSC	6/13/2018	1801340	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
284	LAMONTELEM-2024570	GWEF1809251020KER	9/25/2018	S94961	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
285	LAPEERTECH-2007644	GWEF1808141010KER	8/14/2018	1802462	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
286	LELANDPSD-2001945	GWIN1809051110KER	9/5/2018	1802953	71	23	9	7	< 2	< 2	< 4	< 4	< 4	< 4	3	29	< 2	< 4	< 4
287	LELANDPSD-2001945	GWIN1810151325MK	10/15/2018	1803355	64	19	8	8	< 2	< 2	< 4	< 4	< 4	< 4	3	26	< 2	< 4	< 4
288	LEONARDES-2057463	GWEF1807100915GSC	7/10/2018	1801665	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
289	LEROYELEM-2005167	GWNT1809110930KER	9/11/2018	S94376	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
290	LESCHENSCH-2047949	GWNT1809110900GGA	9/11/2018	1803049	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
291	LEWISTON-2002360-1	GWNT1810300900GGA	10/30/2018	S96359	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
292	LEWISTON-2002360-2	GWNT1810300930GGA	10/30/2018	S96359	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
293	LIBERTAS-2027570	GWNT1809250945KER	9/25/2018	S94960	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
294	LIGHTWORLD-2087847	GWEF1808011415GSC	8/1/2018	1802222	5	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
295	LINCOLNES-2023641	GWT1806111015KER	6/11/2018	1801311	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
296	LISDCENTER-2066646-1	GWIN1808231500KER	8/23/2018	1802703	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
297	LISDCENTER-2066646-2	GWIN1808231510KER	8/23/2018	1802703	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
298	LKCITYDEV-2005857	GWNT1811090900GGA	11/9/2018	S96672	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
299	LKFENTONHS-2156225	GWIN1808071200GSC	8/7/2018	1802320	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
300	LKHIGHMIDD-2070225	GWEF1808071100GSC	8/7/2018	1802313	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
301	LKSUPRACAD-2008717	GWEF1809120900GGA	9/12/2018	1803058	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
302	LKVILLEHS-2027625	GWNT1808081200GSC	8/8/2018	1802346	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
303	LKVILLEMS-2073825	GWIN1808081230GSC	8/8/2018	1802345	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
304	LONGLAKEES-2004428	GWIN1809211300GGA	9/21/2018	S94707	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
305	MACKINAWMS-2026083	GWIN1810021040KER	10/2/2018	S95260	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
306	MAPLEBAPAC-2054717	GWNT1809120830GGA	9/12/2018	1803057	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
307	MAPLEGROVE-2169044	GWNT1808021020KER	8/2/2018	1802260	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
308	MAPLEMONT-2014347	GWEF1807311330GSC	7/31/2018	1802176	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
309	MAPLEVLYHS-2011623	GWNT1807050810KER	7/5/2018	1801637	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
310	MARLEESCH-2003813	GWEF1806261030GSC	6/26/2018	1801541	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
311	MARSHALLACAD-2040513	GWNT1806201130KER	6/20/2018	1801474	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
312	MASONEHS-2007253	GWNT1811070830KME	11/7/2018	S96638	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
313	MAYFLDELEM-2054544	GWIN1808021100KER	8/2/2018	1802262	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
314	MECOSTAES-2008054	GWNT1809131045KER	9/13/2018	S94406	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
315	MEMLUTHSCH-2001533	GWNT1807130845KER	7/13/2018	1801795	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
316	MICHCOMM-2041525	GWNT1808071500GSC	8/7/2018	1802322	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
317	MICHCTRHS-2001538	GWNT1808221320KER	8/22/2018	1802651	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
318	MIDMICCRAD-2018418	GWNT1811121120GGA	11/12/2018	S96904	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
319	MIDMICCTEC-2022518	GWNT1811121140GGA	11/12/2018	S96905	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
320	MIDMICOCOL-2002318	GWNT1811121100GGA	11/12/2018	S96903	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
321	MIDPENINSC-2017021	GWNT1808210830GSC	8/21/2018	1802659	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
322	MILFORDHVS-2014563	GWEF1807131140GSC	7/13/2018	1801789	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
323	MONTCARCEN-2032659	GWIN1807121030GA	7/12/2018	1801763	5	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	5	< 2	< 2	< 4	< 4
324	MONTCOMC-2031159	GWNT1807021010GSC	7/2/2018	1801613	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
325	MONTELEM-2033159	GWIN1807021440GSC	7/2/2018	1801617	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
326	MONTHIGH-2052959	GWIN1807021445GSC	7/2/2018	1801618	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
327	MOOREELEM-2021525	GWNT1808090915GSC	8/9/2018	1802389	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
328	MORANTWP-2044449	GWEF1809101000GGA	9/10/2018	1803035	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
329	MORLEYELEM-2019354	GWNT1809171120KER	9/17/2018	S94660	2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
330	MORLEYHIGH-2034854	GWNT1809171100KER	9/17/2018	S94659	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
331	MORRICE-2007178	GWEF1808211300KER	8/21/2018	1802644	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
332	MORRICE-2007778	GWEF1808211330KER	8/21/2018	1802645	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
333	MUNISING-2015002	GWIN1808161600GSC	8/16/2018	1802592	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
334	MURPHYELEM-2181544	GWNT1808020950KER	8/2/2018	1802259	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
335	MURRAYELEM-2092141	GW1806010930GSC	6/1/2018	1801200	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
336	NADAMSSCH-2003130	GWEF1810021400GGA	10/2/2018	S95236	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
337	NAURELIUSELE-2002633	GWNT1807101000KER	7/10/2018	1801693	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
338	NCENTRAL-2010605	GWNT1809061000GGA	9/6/2018	1803043	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
339	NCENTRAL-2013855	GWEF1808220915GSC	8/22/2018	1802773	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
340	NDICKINSON-2004622	GWEF1808241130GSC	8/24/2018	1802734	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
341	NELLIE-2001978	GWEF1808150840KER	8/15/2018	1802540	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
342	NEWCOVCHRIST-2017610	GWNT1809170900GGA	9/17/2018	S94678	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
343	NEWERACHRI-2006864	GWNT1811050940KME	11/5/2018	S96625	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	3	< 2	< 2	< 2	< 2
344	NEWERARUB-2000964	GWNT1811051025KME	11/5/2018	S96626	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
345	NMIBAPTIST-2007116	GWNT1809140900GGA	9/14/2018	1803130	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
346	NORTHWEST-2014038-1	GWNT1807111330KER	7/11/2018	1801775	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
347	NORTHWEST-2014038-2	GWNT1807111345KER	7/11/2018	1801775	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
348	NORTONSCH-2009775	GWEF1810030900GGA	10/3/2018	S95239	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
349	NOTTAWACS-2009875	GWNT1809271300GGA	9/27/2018	S95003	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
350	NPENFIELDSCH-2004313	GWEF1807051345KER	7/5/2018	1801646	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
351	OAISDCTECH-2026770	GWEF1809201045KER	9/20/2018	S94673	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
352	OAISDMTECH-2057670	GWNT1809201100KER	9/20/2018	S94674	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit / Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
353	OAISDPINES-2039070	GWEF1809201120KER	9/20/2018	S94675	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
354	OAKLNDTECH-2079063	GWEF1807120800GSC	7/12/2018	1801725	12	< 2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	4	< 2	5	< 4	< 4
355	OAKLNDTECH-2079063	GWEF1808090930KER	8/9/2018	1802406	18	3	< 2	3	2	< 2	< 4	< 4	< 4	< 4	6	< 2	4	< 4	< 4
356	OAKRIDGEED-2016961	GWNT1807101030GGA	7/10/2018	1801748	5	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	2	3	< 4	< 4
357	OAKRIDGEHS-2041161	GWNT1807100930GGA	7/10/2018	1801746	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
358	OAKRIDGEMS-2016761	GWNT1807100925GGA	7/10/2018	1801745	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
359	OAKRIDGLES-2047061-1	GWNT1807100955GGA	7/10/2018	1801747	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
360	OAKRIDGLES-2047061-2	GWNT1807101000GGA	7/10/2018	1801747	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
361	OAKRIDGUES-2016661	GWNT1807100915GGA	7/10/2018	1801744	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
362	OAKTREEELE-2147625	GWIN1808081015GSC	8/8/2018	1802341	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
363	OAKVIEWSCH-2271263	GWEF1808081700KER	8/8/2018	1802405	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
364	OAKVLYHVS-2213763	GWIN1807131045GSC	7/13/2018	1801787	5	5	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
365	OAKWOODELEM-2287463	GW1806211235EDK	6/21/2018	1801457	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
366	ODYSSEYHS-2013037	GWNT1810180915KME	10/18/2018	S95835	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
367	OGEMAWHIGH-2015765	GWIN1811051600GGA	11/5/2018	S96651	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
368	OLDMISSION-2000728	GWEF1810241300GGA	10/24/2018	S96130	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
369	ONEKAMAHS-2006851-1	GWIN1809191030GGA	9/19/2018	S94692	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
370	ONEKAMAHS-2006851-2	GWNT1809191040GGA	9/19/2018	S94692	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
371	OTSEGOCHR-2013269	GWNT1808140900GGA	8/14/2018	1802474	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
372	OURLADYLK-2039172	GWIN1810091130KER	10/9/2018	S95567	3	< 2	< 2	3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
373	OURSAVIOR-2046847	GWEF1807311020GSC	7/31/2018	1802172	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
374	OVIELSHIGH-2015919-1	GWIN1807231345KER	7/23/2018	1802031	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
375	OVIELSHIGH-2015919-2	GWIN1807231400KER	7/23/2018	1802031	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
376	OXBOWES-2081363	GWEF1807130900GSC	7/13/2018	1801785	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
377	PARISRIDGE-2065103-1	GW1806041550GSC	6/4/2018	1801239	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
378	PARISRIDGE-2065103-2	GW1806041600GSC	6/4/2018	1801239	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
379	PATHFDR-2001145	GWNT1809061000KER	9/6/2018	1803016	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
380	PATHFDRCTR-2009175	GWNT1809271400GGA	9/27/2018	S95004	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
381	PATHFDRGYM-2020045	GWNT1809060945KER	9/6/2018	1803015	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
382	PAWPAWHIGH-2052180	GWEF1809241200GGA	9/24/2018	S94991	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
383	PELLSTONES-2009524	GWNT1808271130GGA	8/27/2018	1802802	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
384	PELLSTONHS-2009624	GWNT1808271200GGA	8/27/2018	1802803	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
385	PEWWESCOMM-2006819-1	GWIN1807300930KER	7/30/2018	1802125	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
386	PEWWESCOMM-2006819-2	GWIN1807300900KER	7/30/2018	1802125	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
387	PICKFORDPS-2004917	GWEF1809111400GGA	9/11/2018	1803055	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
388	PINCKCTYES-2035747	GWEF1808010900GSC	8/1/2018	1802213	4	4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
389	PINCKFRYES-2048847	GWEF1808010930GSC	8/1/2018	1802214	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
390	PINCKHIGH-2078447	GWEF1808010945GSC	8/1/2018	1802215	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
391	PINCKLKDES-2075447	GWEF1808011100GSC	8/1/2018	1802219	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
392	PINCKNAVI-2015347	GWEF1808011030GSC	8/1/2018	1802217	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
393	PINCKPATH-2015747	GWEF1808011000GSC	8/1/2018	1802216	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
394	PINERVRHS-2004767-1	GWNT1809111000KER	9/11/2018	S94377	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
395	PINERVRHS-2004767-2	GWNT1809111015KER	9/11/2018	S94377	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
396	PITTSFORD-2002930-1	GWIN1810021200GGA	10/2/2018	S95234	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Compound / Unit: Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
397	PITTSFORD-2002930-2	GWIN1810021230GGA	10/2/2018	S95234	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
398	PLATTEELEM-2002110	GWNT1809071115CKA	9/7/2018	1803011	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
399	PLEASANTSC-2031075	GWNT1809271100GGA	9/27/2018	S95001	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
400	PORTEREDU-2018546-1	GWIN1808231410KER	8/23/2018	1802702	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
401	PORTEREDU-2018546-2	GWIN1808231420KER	8/23/2018	1802702	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
402	PRAIRIEBAP-2005739	GWEF1806121315KER	6/12/2018	1801307	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
403	PULLMANES-2003503	GWNT1808090900GGA	8/9/2018	1802375	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
404	PURDYSCHOOL-2004213	GWEF1807051315KER	7/5/2018	1801645	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
405	PUREFOODS-2292463	GWEF1807101000GSC	7/10/2018	1801667	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
406	RANKINELEM-2064825	GWEF1808131200KER	8/13/2018	1802451	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
407	RANKINELEM-2064825	GWEF1808131210KER-FD	8/13/2018	1802451	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
408	RAPIDCTYES-2000240	GWNT1811071300GGA	11/7/2018	S96665	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
409	RBBOYCEES-2001834	GWEF1807121300GGA	7/12/2018	1801761	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
410	REETHSDUCK-2026961	GWNT1807101420GGA	7/10/2018	1801750	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
411	REETHSELEM-2021461	GWNT1807101430GGA	7/10/2018	1801751	14	3	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	2	< 4	< 4
412	REETHSELEM-2021461	GWNT1808101230GGA	8/10/2018	1802431	14	4	2	5	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
413	REETHSMCMI-2024661	GWNT1807101400GGA	7/10/2018	1801749	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
414	REMUSMOS-2008154	GWNT1809131120KER	9/13/2018	S94407	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
415	RILEYELEM-2005919	GWNT1807251130KER	7/25/2018	1802037	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
416	ROBINSONES-2025370	GWNT1809181315KER	9/18/2018	S94666	144	< 2	< 2	9	< 2	< 2	< 2	< 2	< 2	< 2	14	20	101	< 2	< 2
417	ROBINSONES-2025370	GWNT1810291140MK	10/29/2018	S96101	171	< 2	< 2	13	< 2	< 2	< 2	< 2	< 2	< 2	29	23	106	< 2	< 2
418	ROCHESTCOL-2140963	GWNT1807111130GSC	7/11/2018	1801708	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
419	ROCKFDCHRIST-2089741	GW1805301015GSC	5/30/2018	1801093	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
420	ROCKFDMIDD-2087341	GWEF1807310800KER	7/31/2018	1802179	15	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	15
421	ROCKFDMIDD-2087341	GWIN1809131300KER	9/13/2018	1803063	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
422	ROGERSBAP-2015871	GWEF1810311100GGA	10/31/2018	S96367	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
423	ROSCOMELEM-2019172-1	GWNT1810101130KME	10/10/2018	S95574	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
424	ROSCOMELEM-2019172-2	GWNT1810101140KME	10/10/2018	S95574	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
425	ROSCOMHIGH-2014672	GWNT1810101225KME	10/10/2018	S95576	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
426	ROSCOMMIDD-2029172-1	GWNT1810101200KME	10/10/2018	S95575	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
427	ROSCOMMIDD-2029172-2	GWNT1810101210KME	10/10/2018	S95575	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
428	ROSECTYELE-2006565	GWEF1811060900GGA	11/6/2018	S96654	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
429	ROSEELEM-2244363	GWEF1807121200GSC	7/12/2018	1801731	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
430	RVRHAGAR-2016911	GWNT1807171200GGA	7/17/2018	1801837	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
431	RVRSCHSODU-2012111	GWIN1807171230GGA	7/17/2018	1801838	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
432	SALEMELEM-2001381	GWEF1807161030GSC	7/16/2018	1801816	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
433	SANBORNELE-2002904	GWEF1810291000GGA	10/29/2018	S96355	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
434	SANDCRKES-2019246	GWNT1808240815KER	8/24/2018	1802757	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
435	SANDCRKHS-2019346	GWNT1808240800KER	8/24/2018	1802756	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
436	SANDYELEM-2023903	GW1806071120KER	6/7/2018	1801229	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
437	SANILACISD-2003376-1	GWIN1810181000GGA	10/18/2018	S95864	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
438	SANILACISD-2003376-2	GWIN1810181030GGA	10/18/2018	S95864	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
439	SANILACISD-2003376-3	GWIN1810181040GGA	10/18/2018	S95864	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
440	SCHAVITECH-2027034	GWIN1809271330KER	9/27/2018	S94975	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
441	SHELDONES-2025770	GWIN1809201200KER	9/20/2018	S94676	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
442	SHIAWRESD-2009678	GWNT1808161515KER	8/16/2018	1802562	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
443	SILVERLKES-2026928	GWIN1810030945KER	10/3/2018	S95268	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
444	SISTERELEM-2010380	GWNT1808070900GGA	8/7/2018	1802327	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
445	SKEELSCHR-2004226-1	GWNT1810080900KER	10/8/2018	S95556	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
446	SKEELSCHR-2004226-2	GWNT1810080920KER	10/8/2018	S95556	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
447	SOCHILLSCH-2013221	GWNT1808201645GSC	8/20/2018	1802636	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
448	SONOMAELEM-2005413	GWNT1806251035RAP	6/25/2018	1801552	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
449	SOOTWPSCH-2031017	GWNT1809120930GGA	9/12/2018	1803059	9	4	< 2	3	2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
450	SOUTHARBOR-2050281	GWIN1808081000KER	8/8/2018	1802397	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
451	SOUTHLKCAM-2039425	GWEF1808131130KER	8/13/2018	1802450	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
452	SOUTHOLIVE-2030170	GWEF1809201010KER	9/20/2018	S94672	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
453	SPGVLYACAD-2013578	GWEF1808151130KER	8/15/2018	1802543	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
454	SPIRITUS-2046281	GWEF1807241200GSC	7/24/2018	1801985	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
455	SPIRITUS-2049081	GWEF1807241230GSC	7/24/2018	1801986	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
456	SPRINGES-2016863	GWEF1807131240GSC	7/13/2018	1801792	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
457	SPRINGPES-2214463	GWIN1808081600KER	8/8/2018	1802403	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
458	STANDISHES-2000206-1	GWNT1811011340KME	11/1/2018	S96341	29	3	< 2	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	21	< 2	< 2	< 2
459	STANDISHES-2000206-1	GWNT1902051110KME	2/5/2019	1900245	28	3	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	< 2	19	< 2	< 4	< 4
460	STANDISHES-2000206-2	GWNT1811011345KME	11/1/2018	S96341	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
461	STANDISHES-2000206-2	GWNT1902051105KME	2/5/2019	1900245	26	< 2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	13	10	< 2	< 4	< 4
462	STANDISHHS-2020706	GWNT1811011325KME	11/1/2018	S96340	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
463	STANISLAUS-2004103	GWT1806120915KER	6/12/2018	1801304	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
464	STANWOODLC-2019254	GWNT1809171140KER	9/17/2018	S94661	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
465	STERLINGES-2002006	GWNT1811011400KME	11/1/2018	S96342	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
466	STJOE-2034350	GWNT1810290920KME	10/29/2018	S96346	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
467	STJOE-2034350	GWNT1810290940KME-FD	10/29/2018	S96346	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
468	STJOECOISD-2017975	GWNT1809271500GGA	9/27/2018	S95005	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
469	STJOHNLUTH-2009473	GWNT1808281430KER	8/28/2018	1802877	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
470	STJOSEPH-2009670-1	GWIN1809181000KER	9/18/2018	S94664	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
471	STJOSEPH-2009670-2	GWIN1809181020KER	9/18/2018	S94664	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
472	STJOSEPHSC-2004237	GWEF1810221600KME	10/22/2018	S96108	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
473	STLUKES-2071479	GWNT1810151500GGA	10/15/2018	S95847	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
474	STMARYCATH-2056547	GWEF1807311545GSC	7/31/2018	1802186	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
475	STMARYCOMM-2002703	GW1806041330GSC	6/4/2018	1801242	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
476	STMARYEHS-2004745	GWNT1809051000KER	9/5/2018	1802951	5	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	3	< 2	< 4	< 4
477	STMARYSCH-2004028	GWNT1810231100GGA	10/23/2018	S96124	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
478	STMICHAEL-2007554	GWIN1809171000KER	9/17/2018	S94658	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
479	STMICHAEL-2007554	GWIN1809171020KER-FD	9/17/2018	S94658	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
480	STMICHAEL-2025524	GWEF1808211500GGA	8/21/2018	1802665	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
481	STMICHAELS-2018773	GWEF1808271230KER	8/27/2018	1802765	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
482	STPATRICK-2036841-1	GW1806041100GSC	6/4/2018	1801240	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
483	STPATRICK-2036841-2	GW1806041110GSC	6/4/2018	1801240	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
484	STPETERLTH-2025219	GWNT1809260930KER	9/26/2018	S94964	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
485	STPETERS-2009673	GWEF1808281345KER	8/28/2018	1802876	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
486	STTHOMACAD-2128325	GWEF1808071010GSC	8/7/2018	1802311	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
487	SUTTONES-2018846	GWNT1808241000KER	8/24/2018	1802759	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
488	SYCAMOREES-2003103	GWEF1806111145GSC	6/11/2018	1801330	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
489	TCAPSBVSCH-2000928	GWNT1810030830KER	10/3/2018	S95266	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
490	TCAPSINTES-2006028	GWNT1810031020KER	10/3/2018	S95270	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
491	TEACHFARM-2020052-1	GWNT1808150845GSC	8/15/2018	1802519	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
492	TEACHFARM-2020052-2	GWNT1808150900GSC	8/15/2018	1802519	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
493	THREEFIRES-2082047	GWEF1811121000KME	11/12/2018	S96931	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
494	THREELAKES-2017049	GWNT1809101300GGA	9/10/2018	1803039	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
495	TORREYHILL-2040625	GWEF1808071120GSC	8/7/2018	1802315	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
496	TRICOUNTRY-2037359	GWIN1807120900GGA	7/12/2018	1801759	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
497	TRICTRYJUN-2001359	GWNT1807120910GA	7/12/2018	1801760	84	20	6	28	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	30	< 4	< 4
498	TRICTRYJUN-2001359	GWNT1808031440JTM	8/3/2018	1802243	39	9	3	13	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	14	< 4	< 4
499	TRINITYSCH-2030370	GWEF1809180930KER	9/18/2018	S94663	2	< 2	< 2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
500	TRITWPSCH-2013521	GWEF1808201445GSC	8/20/2018	1802634	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
501	UPLANDHILL-2056563	GWEF1807100950GSC	7/10/2018	1801666	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
502	USAELEM-2034432	GWEF1810091100GGA	10/9/2018	S95589	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
503	USAHIGH-2019132	GWEF1810091130GGA	10/9/2018	S95590	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
504	VANDERBILT-2002769	GWEF1808141300GGA	8/14/2018	1802480	8	2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
505	VESTACOMM-2040659	GWNT1807091235GGA	7/9/2018	1801742	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
506	VESTAHIGH-2004359	GWNT1807091230GGA	7/9/2018	1801738	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
507	VESTAHIGH-2065359	GWNT1807091300GGA	7/9/2018	1801738	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
508	VICKSINDELEM-2013939	GWNT1806191415KER	6/19/2018	1801466	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
509	VICKSTOBELEM-2001939	GWNT1806191445KER	6/19/2018	1801467	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
510	VICTORYECC-2013153	GWNT1811071140KME	11/7/2018	S96641	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
511	WACOUSTA-2002919	GWNT1806290950GSC	6/29/2018	1801606	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
512	WALKERCOMM-2026264	GWNT1811060925KME	11/6/2018	S96631	4	2	< 2	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
513	WALKERELEM-2001964	GWNT1811060935KME	11/6/2018	S96632	16	< 2	< 2	5	< 2	< 2	< 2	< 2	< 2	< 2	2	6	3	< 2	< 2
514	WALKERELEM-2001964	GWNT1901160950KME	1/16/2019	1900136	21	3	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	3	7	2	< 4	< 4
515	WALKEREMHS-2002064	GWNT1811060915KME	11/6/2018	S96630	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
516	WATTLESELE-2006713	GWNT1806251130RAP	6/25/2018	1801554	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
517	WEIDMANELE-2003937	GWNT1810221200KME	10/22/2018	S96106	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
518	WESTHIGHLD-2090463	GWEF1807170800GSC	7/17/2018	1801820	6	4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	2	< 2	< 4	< 4
519	WESTSHORE-2020453	GWNT1811071110KME	11/7/2018	S96640	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
520	WESTSHORE-2020453	GWNT1811071115KME	11/7/2018	S96640	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
521	WESTWOODS-2026428	GWIN1810031040KER	10/3/2018	S95269	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
522	WHITEFISH-2000217	GWNT1809121600GGA	9/12/2018	1803064	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
523	WHITEFRDES-2011958	GWEF1807261315GSC	7/26/2018	1802090	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
524	WHITEFRDHS-2015658	GWEF1807261300GSC	7/26/2018	1802089	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
525	WHITEMORE-2002981	GWEF1808070945KER	8/7/2018	1802308	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
526	WHITEMORE-2037381-1	GWEF1808071000KER	8/7/2018	1802310	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
527	WHITEMORE-2037381-2	GWIN1808071020KER	8/7/2018	1802310	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
528	WHITEMORE-2054181-1	GWIN1808070900KER	8/7/2018	1802307	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2b - Public Water Supply: School Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

No.	Location	Sample	Sample Date	Lab Report	Total PFAS ng/l Result	PFHxA ng/l Result	PFHpA ng/l Result	PFOA ng/l Result	PFNA ng/l Result	PFDA ng/l Result	PFUnDA ng/l Result	PFDoDA ng/l Result	PFTrDA ng/l Result	PFTeDA ng/l Result	PFBS ng/l Result	PFHxS ng/l Result	PFOS ng/l Result	EtFOSAA ng/l Result	MeFOSAA ng/l Result
529	WHITEMORE-2054181-2	GWIN1808070915KER	8/7/2018	1802307	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
530	WHITTESCH-2021235-4	GWNT1811080825KME	11/8/2018	S96643	33	15	6	6	< 2	< 2	< 2	< 2	< 2	< 2	2	4	< 2	< 2	< 2
531	WHITTESCH-2021235-4	GWNT1902051310KME	2/5/2019	1900243	50	34	10	3	< 2	< 2	< 4	< 4	< 4	< 4	< 2	3	< 2	< 4	< 4
532	WHITTESCH-2021235-5	GWNT1811080830KME	11/8/2018	S96643	20	10	4	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2
533	WHITTESCH-2021235-5	GWNT1902051315KME	2/5/2019	1900243	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
534	WHITTESCH-2021235-6	GWNT1811080840KME	11/8/2018	S96643	27	14	6	4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	3	< 2	< 2	< 2
535	WHITTESCH-2021235-6	GWNT1902051320KME	2/5/2019	1900243	30	17	5	5	< 2	< 2	< 4	< 4	< 4	< 4	< 2	3	< 2	< 4	< 4
536	WHITTESCH-2021235-7	GWNT1811080850KME	11/8/2018	S96643	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
537	WHITTESCH-2021235-7	GWNT1902051245KME	2/5/2019	1900243	0	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 5	< 5	< 2	< 2	< 2	< 5	< 5
538	WILLMAGCEN-2030718	GWEF1811121420GGA	11/12/2018	S96909	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
539	WILSONCOMM-2012604	GWEF1810291100GGA	10/29/2018	S96356	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
540	WINNELEM-2004537	GWEF1810181230KME	10/18/2018	S95837	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
541	WOLVELEM-2005716	GWNT1809141300GGA	9/14/2018	1803134	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
542	WOLVHIGH-2005816	GWNT1809141400GGA	9/14/2018	1803135	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
543	WOODLAND-2021728	GWNT1810240900GGA	10/24/2018	S96127	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
544	WOODVILLE-2034938	GWNT1807240900KER	7/24/2018	1802074	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
545	WSHOREELEM-2068525	GWEF1808071130GSC	8/7/2018	1802316	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Footnotes:

ng/l = nanograms per liter

PFHxA = Perfluorohexanoic Acid
PFHpA = Perfluoroheptanoic Acid
PFOA = Perfluorooctanoic Acid
PFNA = Perfluorononanoic Acid
PFDA = Perfluorodecanoic Acid

PFUnDA = Perfluoroundecanoic Acid
PFDoDA = Perfluorododecanoic Acid
PFTrDA = Perfluorotridecanoic Acid
PFTeDA = Perfluorotetradecanoic Acid
PFBS = Perfluorobutane Sulfonic acid

PFHxS = Perfluorohexane Sulfonic acid
PFOS = Perfluorooctane Sulfonic acid
EtFOSAA = N-Ethyl perfluorooctane sulfonamidoacetic acid
MeFOSAA = N-Methyl perfluorooctane sulfonamidoacetic acid

Table 2c - Public Water Supply: Daycare Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1	ABC1-2061038	GWEF1812040910KER	12/4/2018	1803994	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
2	ABC2-2061638	GWIN1812040940KER	12/4/2018	1803995	3	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	< 2	< 4	< 4
3	ALCONA-2019601	GWNT1811300900GGA	11/30/2018	1803885	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
4	ALLKIDS-2055670	GWNT1811280800KME	11/28/2018	1803818	12	4	3	5	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
5	ALLKIDS-2055670	GWNT1901071400KME	1/7/2019	1900063	13	4	2	5	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
6	ALLSAINTS-2077147	GWEF1812061040KER	12/6/2018	1804010	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
7	ALLSTARS-2229063	GWEF1811271130KER	11/27/2018	1803827	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
8	ALWAYS-2064247	GWEF1812041250KER	12/4/2018	1804000	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
9	APOSTOLIC-2017814	GWNT1811301025KME	11/30/2018	1803939	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
10	APPLETREE-2059046	GWNT1812031200KER	12/3/2018	1803917	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
11	ARBREFARMS-2020364	GWNT1812031140KME	12/3/2018	1803945	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
12	BEMISFARMS-2041581	GWEF1811301110KER	11/30/2018	1803912	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
13	BIRTODBEY-2065546	GWEF1812031030KER	12/3/2018	1803914	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
14	BUILDBLOCL-2196163	GWEF1811261600KER	11/26/2018	1803802	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
15	BUILDBLOCL-2196163	GWEF1811261620KER-FD	11/26/2018	1803802	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
16	CALVARY-2044481	GWEF1811281400KER	11/28/2018	1803837	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
17	CAPITA-2019823	GWNT1811270905KME	11/27/2018	1803811	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
18	CCPDIS-2042661	GWNT1812030930KME	12/3/2018	1803944	4	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	4	< 4
19	CHAPMEM-2004739	GWNT1811291525KME	11/29/2018	1803937	44	< 2	< 2	15	< 2	< 2	< 4	< 4	< 4	< 4	9	5	15	< 4	< 4
20	CHAPMEM-2004739	GWNT1901040955KME	1/4/2019	1900061	43	< 2	< 2	15	< 2	< 2	< 4	< 4	< 4	< 4	9	5	14	< 4	< 4
21	CHILDLEARN-2058181-1	GWEF1811301010KER	11/30/2018	1803920	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
22	CHILDLEARN-2058181-2	GWEF1811301020KER	11/30/2018	1803920	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
23	CHILDLEARN-2058181-2	GWEF1811301040KER-FD	11/30/2018	1803920	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
24	CHOCOLAY-2014652	GWNT1811271230GGA	11/27/2018	1803870	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
25	CIRFRIENDS-2097125	GWNT1812101245KER	12/10/2018	1804094	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
26	COLTFILLY-2018033	GWEF1811271245KME	11/27/2018	1803814	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
27	CONCORD-2038424	GWNT1811291300GGA	11/29/2018	1803883	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
28	CRAWFORD-2016820	GWNT1811301100GGA	11/30/2018	1803886	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
29	CREAMCROP-2241163	GWEF1811271050KER	11/27/2018	1803826	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
30	CREATECHILD-2093441	GWEF1811261425KME	11/26/2018	1803808	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
31	CREATLEARN-2044625	GWNT1812101320KER	12/10/2018	1804096	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
32	DANSVILLE-2018533	GWNT1812070920KER	12/7/2018	1804087	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
33	DELTAMILEC-2008623	GWIN1808171230KER	8/17/2018	1802600	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
34	DELTONEHS-2009308	GWEF1811291250KME	11/29/2018	1803934	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
35	DEVRIES-2035554	GWEF1812100905KME	12/10/2018	1804066	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
36	DOWNFARM-2092547	GWEF1812051100KER	12/5/2018	1804004	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
37	DOWNFARM2-2019247	GWNT1812041145KER	12/4/2018	1803998	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
38	EDUCSTAT-2041508	GWEF1811291125KME	11/29/2018	1803933	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
39	EPICLIFE-2138863	GWEF1811270940KER	11/27/2018	1803803	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
40	ERLYIMPRES-2082338	GWEF1812031300KER	12/3/2018	1803918	6	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	6	< 2	< 2	< 4	< 4
41	ERNIES-2158925	GWEF1812111140KER	12/11/2018	1804102	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
42	FALMOUTH-2005657	GWNT1812041400KME	12/4/2018	1803957	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
43	FALMOUTH-2005657	GWNT1812041410KME-FD	12/4/2018	1803957	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
44	FINEARTS-2064181	GWNT1811291100KER	11/29/2018	1803840	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
45	FIRSTPLACE-2023575	GWNT1811301245KME	11/30/2018	1803940	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
46	FIRSTUNIT-2047181	GWIN1811290915KER	11/29/2018	1803838	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2c - Public Water Supply: Daycare Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
47	FIVECAPFOU-2007653	GWNT1812031505KME	12/3/2018	1803947	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
48	FIVECAPHES-2022462	GWNT1812051120KME	12/5/2018	1803960	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
49	FIVECAPKAL-2015951	GWNT1812040840KME	12/4/2018	1803954	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
50	FIVECAPNEW-2025162	GWEF1812051355KME	12/5/2018	1803962	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
51	FIVECAPRFW-2013043	GWNT1812051015KME	12/5/2018	1803959	104	25	23	36	< 2	< 2	< 4	< 4	< 4	< 4	4	13	3	< 4	< 4
52	FIVECAPRFW-2013043	GWNT1901030955KME	1/3/2019	1900057	102	26	22	33	< 2	< 2	< 4	< 4	< 4	< 4	4	14	3	< 4	< 4
53	FREEDOM-2052881	GWEF1811300945KER	11/30/2018	1803911	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
54	FUTRESTEP-2049370	GWNT1811280820KME	11/28/2018	1803819	13	< 2	< 2	3	< 2	< 2	< 4	< 4	< 4	< 4	3	< 2	7	< 4	< 4
55	FUTRESTEP-2049370	GWNT1901031405KME	1/3/2019	1900060	24	< 2	< 2	2	< 2	< 2	< 4	< 4	< 4	< 4	3	3	16	< 4	< 4
56	GANEINU-2260363	GWEF1811280900KER	11/28/2018	1803831	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
57	GROVEDAY-2014952	GWNT1811271200GGA	11/27/2018	1803869	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
58	HAMBURG-2059847	GWEF1812041230KER	12/4/2018	1803999	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
59	HAPPYEND-2018937	GWEF1812061000GGA	12/6/2018	1804051	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
60	HAPPYFEET-2062081	GWEF1811281220KER	11/28/2018	1803836	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
61	HASTINGSCA-2021108	GWNT1812110905KME	12/11/2018	1804069	2	2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
62	HASTINGSCA-2021108	GWNT1812110915KME-FD	12/11/2018	1804069	3	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
63	HOLYFAITH-2048681	GWEF1812030930KER	12/3/2018	1803913	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
64	HONEYBEAR-2146225	GWNT1812101050KER	12/10/2018	1804092	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
65	HOPCHILD-2044161	GWNT1901031300KME	1/3/2019	1900059	40	9	2	9	< 2	< 2	< 4	< 4	< 4	< 4	7	3	10	< 4	< 4
66	HOPCHILD-2044161	GWNT812030905KME	12/3/2018	1803943	30	7	< 2	6	< 2	< 2	< 4	< 4	< 4	< 4	6	3	8	< 4	< 4
67	HOURKIDZ-2144463	GWEF1811261410KER	11/26/2018	1803797	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
68	HUNDRED-2017333	GWNT1811271030KME	11/27/2018	1803813	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
69	HUNDRED-2017333	GWNT1811271040KME-FD	11/27/2018	1803813	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
70	HUNTEYCLUB-2041554	GWEF1812060900GGA	12/6/2018	1804046	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
71	HYDEPROP-2021221	GWNT1811281000GGA	11/28/2018	1803873	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
72	IDASTRIP-2034258	GWIN1812050920KER	12/5/2018	1804002	4	4	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
73	JELLYBEAN-2060481	GWEF1812051000KER	12/5/2018	1804003	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
74	KIDSAKE-2063647	GWEF1812041120KER	12/4/2018	1803997	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
75	KIDSANGELS-2055541	GWIN1811260825KME	11/26/2018	1803799	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
76	KIDSCENTER-2038413	GWNT1811301330KME	11/30/2018	1803941	18	5	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	13	< 2	< 2	< 4	< 4
77	KIDSCENTER-2038413	GWNT1901041045KME	1/4/2019	1900062	17	5	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	12	< 2	< 2	< 4	< 4
78	KIDSCLUB-2045279	GWNT1812110915KER	12/11/2018	1804098	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
79	KIDSKASTLE-2056617	GWEF1811270900GGA	11/27/2018	1803868	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
80	KIDSRKIDS-2041359	GWNT1811261455KME	11/26/2018	1803809	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
81	KIDSTIME-2008556	GWEF1812061200GGA	12/6/2018	1804054	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
82	LADYDI-2146025	GWEF1812111150KER	12/11/2018	1804104	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
83	LAKELAND-2001839-1	GWEF1811291440KME	11/29/2018	1803936	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
84	LAKELAND-2001839-2	GWEF1811291450KME	11/29/2018	1803936	5	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	5	< 2	< 2	< 4	< 4
85	LAKESHORE-2066703	GWEF1811281305KME	11/28/2018	1803822	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
86	LAPEER-2166444	GWEF1812111500KER	12/11/2018	1804109	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
87	LASTING-2089047	GWEF1812060940KER	12/6/2018	1804009	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
88	LEARNING-2054047	GWEF1812071010KER	12/7/2018	1804088	2	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	2	< 2	< 2	< 4	< 4
89	LEARNRAIN-2145063	GWEF1811261255KER	11/26/2018	1803795	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
90	LEARNTREE-2246763	GWEF1811261440KER	11/26/2018	1803798	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
91	LEARNZONE-2043813	GWEF1811301405KME	11/30/2018	1803942	5	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	5	< 2	< 2	< 4	< 4
92	LEELANAU-2016745	GWNT1812041030KME	12/4/2018	1803956	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2c - Public Water Supply: Daycare Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound	Total PFAS	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	PFBS	PFHxS	PFOS	EtFOSAA	MeFOSAA
				Unit	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l	ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
93	LEVALLEY-2006234	GWEF1811270815KME	11/27/2018	1803810	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
94	LIFECHRIST-2081647	GWEF1812061120KER	12/6/2018	1804011	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
95	LILSPROUTS-2020606	GWNT1812071200MK	12/7/2018	1804065	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
96	LINDENCNTR-2150525	GWEF1812111110KER	12/11/2018	1804100	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
97	LINDENDEV-2089225	GWEF1812100915KER	12/10/2018	1804089	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
98	LINDENFREE-2147525	GWEF1812100940KER	12/10/2018	1804090	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
99	LITLEBLESS-2005757	GWNT1812041440KME	12/4/2018	1803958	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
100	LITTLEBEAR-2026783	GWNT1811301600GGA	11/30/2018	1803888	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
101	LITTLEDAFF-2045739	GWNT1811291345KME	11/29/2018	1803935	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
102	LITTLEFOLK-2006581	GWEF1811291230KER	11/29/2018	1803842	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
103	LITTLEFRIE-2061947	GWEF1812041310KER	12/4/2018	1804001	6	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	3	3	< 2	< 4	< 4
104	LITTLEKIDS-2073347	GWEF1812051130KER	12/5/2018	1804005	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
105	LITTLEPPL-2249963	GWEF1811281020KER	11/28/2018	1803833	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
106	LITTLETYKE-2067070	GWNT1811280915KME	11/28/2018	1803820	3	3	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
107	LITTLEVIK-2068303	GWEF1811281335KME	11/28/2018	1803823	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
108	LORDOFLIFE-2089347	GWEF1812051210KER	12/5/2018	1804006	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
109	LOVNGHEART-2008270	GWNT1810291225MK	10/29/2018	S96102	32	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	17	11	4	< 2	< 2
110	MAYBURY-2001082	GWNT1811281050KER	11/28/2018	1803834	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
111	MENOMINEE-2009755	GWNT1811280900GGA	11/28/2018	1803872	5	5	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
112	MIDMICHAA-2026818	GWEF1812061300GGA	12/6/2018	1804055	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
113	MILFORD-2264763	GWEF1811261325KER	11/26/2018	1803796	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
114	MILFORDDCC-2230763	GWNT1811261515KER	11/26/2018	1803800	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
115	MISSSUE-2026065	GWNT1812070940MK	12/7/2018	1804063	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
116	MMCAA-2027618	GWNT1812061340GGA	12/6/2018	1804057	10	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	10	< 2	< 2	< 4	< 4
117	MMCAA-2027618	GWNT1901101000KME	1/10/2019	1900098	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
118	MMCAAFARWL-2028618	GWEF1812061320GGA	12/6/2018	1804056	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
119	MOUSECHILD-2060347	GWEF1812061150KER	12/6/2018	1804012	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
120	MUSKEGON-2017267-1	GWEF1812101110KME	12/10/2018	1804067	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
121	MUSKEGON-2017267-2	GWEF1812101120KME	12/10/2018	1804067	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
122	NEWAYGOTR-2005962	GWNT1812051305KME	12/5/2018	1803961	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
123	NORTHEXP-2021015	GWNT1812101405KME	12/10/2018	1804068	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
124	NORTHKENT-2059341	GWNT1812051530KME	12/5/2018	1803963	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
125	OAKHILL-2280263	GWEF1811271420KER	11/27/2018	1803830	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
126	OAKTREE-2012453	GWNT1812031410KME	12/3/2018	1803946	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
127	PAULACLUB-2142025	GWEF1812101140KER	12/10/2018	1804093	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
128	PIONEER-2035224	GWNT1811291200GGA	11/29/2018	1803882	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
129	PLANETKIDS-2260263	GWEF1811271310KER	11/27/2018	1803828	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
130	RAINBOW-2165844	GWEF1812111410KER	12/11/2018	1804107	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
131	RAINBOW-2165844	GWEF1812111420KER-FD	12/11/2018	1804107	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
132	REDARROW-2053680	GWNT1811300840KME	11/30/2018	1803938	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
133	REDARROW-2053680	GWNT1811300850KME-FD	11/30/2018	1803938	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
134	RISINGSTAR-2262263	GWEF1811261530KER	11/26/2018	1803801	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
135	ROBINSPLAY-2045626	GWNT1812111150KME	12/11/2018	1804070	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
136	ROCKHORSE-2018333	GWEF1811271340KME	11/27/2018	1803815	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
137	ROSEBROOK-2213463	GWEF1811281140KER	11/28/2018	1803835	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
138	ROSEBUSH-2004137	GWNT1812061100GGA	12/6/2018	1804052	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Table 2c - Public Water Supply: Daycare Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

				Compound Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
139	ROUNDABOUT-2051870	GWNT1811280950KME	11/28/2018	1803817	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
140	SCHLHOUSE-2020621	GWNT1811281100GGA	11/28/2018	1803874	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
141	SCHOOLBELL-2149363	GWEF1811271015KER	11/27/2018	1803804	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
142	SILVERCRK-2004252	GWNT1811271300GGA	11/27/2018	1803871	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
143	SONSHINE-2094141	GWNT1811261115KME	11/26/2018	1803807	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
144	SOUTHSIDE-2064303	GWEF1811281400KME	11/28/2018	1803824	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
145	STEPSTONE-2224963	GWEF1811271350KER	11/27/2018	1803829	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
146	STJOHNLUTH-2065146	GWEF1812031100KER	12/3/2018	1803915	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
147	STONECHILD-2012910	GWNT1811301500GGA	11/30/2018	1803887	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
148	STONELEARN-2064946	GWNT1812031130KER	12/3/2018	1803916	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
149	STONYCCC-2019681	GWNT1811291330KER	11/29/2018	1803844	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
150	STONYPRE-2045381	GWEF1811291245KER	11/29/2018	1803843	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
151	SUNSHINE-2050581	GWEF1811300920KER	11/30/2018	1803908	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
152	TAWAS-2020835	GWEF1812071040MK	12/7/2018	1804064	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
153	TEDDYBEAR-2077247	GWEF1812051240KER	12/5/2018	1804007	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
154	TEDDYBEAR-2077247	GWEF1812051250KER-FD	12/5/2018	1804007	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
155	TENDERCARE-2075641	GWNT1811261005KME	11/26/2018	1803806	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
156	TERMATCC-2148225	GWEF1812101010KER	12/10/2018	1804091	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
157	TERRPROFES-2043281	GWIN1811291145KER	11/29/2018	1803841	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
158	TOTSPOT-2011423	GWNT1811270945KME	11/27/2018	1803812	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
159	TRANSJUB-2045316	GWNT1811291500GGA	11/29/2018	1803884	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
160	TRINITY-2062981	GWIN1811291020KER	11/29/2018	1803839	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
161	TUSTINELEM-2005267	GWNT1809111030KER	9/11/2018	S94378	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
162	UNITEDBRE-2033547	GWEF1812061240KER	12/6/2018	1804013	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
163	VLAHAKIS-2016933	GWIN1812031440KER	12/3/2018	1803919	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
164	WEEFRIENDS-2031663	GWEF1811280940KER	11/28/2018	1803832	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
165	WESTBRANCH-2024665	GWNT1812070905MK	12/7/2018	1804062	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
166	WHITEARLY-2020341	GWNT1811260935KME	11/26/2018	1803805	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
167	WIGGLES-2149263	GWEF1811261015KER	11/26/2018	1803793	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
168	WORLDWONDER-2217263	GWNT1811261050KER	11/26/2018	1803794	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
169	XROADCHUR-2000747	GWEF1812041050KER	12/4/2018	1803996	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
170	XROADPLAZA-2024819	GWEF1811271415KME	11/27/2018	1803816	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4

Footnotes:

ng/l = nanograms per liter

PFHxA = Perfluorohexanoic Acid
PFHpA = Perfluoroheptanoic Acid
PFOA = Perfluorooctanoic Acid
PFNA = Perfluorononanoic Acid
PFDA = Perfluorodecanoic Acid

PFUnDA = Perfluoroundecanoic Acid
PFDoDA = Perfluorododecanoic Acid
PFTrDA = Perfluorotridecanoic Acid
PFTeDA = Perfluorotetradecanoic Acid
PFBS = Perfluorobutane Sulfonic acid

PFHxS = Perfluorohexane Sulfonic acid
PFOS = Perfluorooctane Sulfonic acid
EtFOSAA = N-Ethyl perfluorooctane sulfonamidoacetic acid
MeFOSAA = N-Methyl perfluorooctane sulfonamidoacetic acid

Table 2d - Public Water Supply: Tribal Analytical Results
EGLE 2018 Statewide PFAS Sampling Program

			Compound	Unit	Total PFAS ng/l	PFHxA ng/l	PFHpA ng/l	PFOA ng/l	PFNA ng/l	PFDA ng/l	PFUnDA ng/l	PFDoDA ng/l	PFTrDA ng/l	PFTeDA ng/l	PFBS ng/l	PFHxS ng/l	PFOS ng/l	EtFOSAA ng/l	MeFOSAA ng/l
No.	Location	Sample	Sample Date	Lab Report	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1	CHIPBAYMILLS55293101	GWEF1810251300GGA	10/25/2018	S96132	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2	CHIPCASINO50593105	GWNT1810251400GGA	10/25/2018	S96133	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3	HANNAHVILL55293611	GWEF1808211045GSC	8/21/2018	1802666	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
4	HESSEL55293504	GWEF1811290900GGA	11/29/2018	1803881	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
5	KEWEEKAWB55293303	GWEF1808160845GSC	8/16/2018	1802586	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
6	LACVIEUX55293401-1	GWIN1808230800GSC	8/23/2018	1802747	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
7	LACVIEUX55293401-2	GWIN1808230810GSC	8/23/2018	1802747	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
8	MANISTIQUE55293501	GWEF1811281230GGA	11/28/2018	1803875	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
9	NOTTAWASEPPI55293901	GWEF1809261000GGA	9/26/2018	S94995	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
10	ODAWAMTIGW55293802	GWNT1808221200GGA	8/22/2018	1802680	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
11	ODAWAWAHWA55293801	GWEF1808221000GGA	8/22/2018	1802677	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
12	OTTAWAEAST55293603	GWEF1809201500GGA	9/20/2018	S94702	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
13	OTTAWALAW55293603	GWEF1809210900GGA	9/21/2018	S94703	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
14	OTTAWALITL55293702	GWEF1809200900GGA	9/20/2018	S94698	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
15	OTTAWAPESH55293601	GWEF1809201400GGA	9/20/2018	S94701	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
16	SAGINAWCHIP55293201	GWEF1810181320KME	10/18/2018	S95838	0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
17	WETMORE55293502	GWEF1811281400GGA	11/28/2018	1803876	0	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 4
18	KEWEEZEBA55293302	SWEF1808021050GGA	8/2/2018	1802304	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4
19	SAGCHIPTRIBE50593203	SWEF1811011205KME	11/1/2018	1803510	0	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	< 2	< 2	< 4	< 2	< 4	< 4

Footnotes:

ng/l = nanograms per liter

PFHxA = Perfluorohexanoic Acid
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Appendix A

Quality Assurance and Quality Control Summary Analytical

(See Disk)

Quality Assurance and Quality Control Summary

Ten percent of the laboratory reports were selected for data validation to confirm that the data quality objectives for this project were met. The report subset was not randomly selected, but based on a preliminary review of quality control results in the reports to find samples where quality criteria, such as surrogate recovery, were exceeded or other potential quality issues, such as method blank contamination, were observed. The intent was to focus on potential problems, and therefore, the overall assessment below may over-represent the true frequency of data quality problems in the dataset. Reports from both participating laboratories (Vista and Merit) and both methods employed (EPA 537 rev.1.1 and the Vista PFAS Isotope Dilution Method) were selected for data validation. Out of a total of 1866 reports, 186 were selected for data validation, including 138 reports from Vista (9.8%) and 48 reports from Merit (10.3%).

Data validation was conducted with reference to guidance provided by EPA in the USEPA National Functional Guidelines in Organic Superfund Methods Data Review (January 2017), the USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review (April 2016), the EPA reference method 537 revision 1.1, and toward the end of the program the USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFAS) Analyzed using EPA method 537 (November 2018). When reviewing the isotope dilution method results, additional guidance was derived from the Table B-15 of the DoD Quality Systems Manual for Environmental Laboratories, Version 5.1.

The data were evaluated based on the following review elements:

- Data completeness (chain-of-custody (COC)/sample integrity.
- Holding times and sample preservation.
- Initial calibration/initial calibration and continuing calibration verification.
- Laboratory reagent blank (LRB)/field reagent blank (FRB) results, or Laboratory method blanks/equipment blanks.
- Surrogate spike recoveries (EPA Method 537 only).
- Laboratory fortified sample matrix (LFSM)/ laboratory fortified sample matrix duplicate (LFSMD) results (EPA Method 537 only).
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results, Laboratory fortified blank (LFB) results (EPA Method 537 only).
- Field duplicate results.
- Extracted internal standard results (Isotope Dilution Method only).

All of the validation reports are organized by the laboratory report work order numbers and are provided in **Appendix D**.

A complete table of all results qualified during data validation is provided in **Attachment A - Table 1**. This table provides reason codes which explain the cause for qualification and the laboratory report numbers (SDG) to assist the reader in finding the relevant Data Validation Report in **Appendix D**.

Precision

Precision is a measure of the degree to which two or more measurements are in agreement. Precision was assessed by (1) evaluating the relative percent difference between results in field samples and field duplicates, (2) evaluating the relative percent difference between results for matrix spikes and matrix spike duplicates, and (3) in the absence of MS/MSD precision, evaluating the relative percent difference between results for the LCS/LCSD. Precision for aqueous samples was measured through the calculation of the relative percent difference (RPD). The objective for field precision RPDs is < 30% RPD for aqueous samples, where results are reported at greater than five times the quantitation limit. Field duplicates were collected at a frequency of 2.4% of field samples. Matrix Spikes and Matrix Spike Duplicates were collected at a frequency of 2.3% of field samples. LCS/LCSD precision was reported by the laboratories for preparatory batches.

All sample duplicate and spike duplicate RPDs evaluated during data validation were in control, and no results were qualified based on RPD exceedance within the validated dataset.

Accuracy

Accuracy is the degree of agreement between the observed value and an accepted reference or true value. Accuracy in the field for drinking water analysis is assessed through the use of field reagent blanks as negative controls and through the adherence to all sample handling, preservation, and holding time requirements. The objective for field reagent blanks is that no target compounds are detected above the laboratory method reporting limits for both the EPA-537 and Isotope Dilution Method.

Laboratory accuracy is assessed through the analysis of laboratory method blanks as negative controls, laboratory control samples (LCSs) or laboratory fortified blanks (LFBs) as clean matrix positive controls, matrix spikes and matrix spike duplicates (MS/MSDs) as sample matrix positive controls, surrogate spike recoveries, and recovery of extracted internal standard compounds for the isotope dilution method. Method blanks should not contain any target compounds above the reporting limits. For the LCS and extracted internal standards, the accuracy objectives, as measured by percent recoveries (%Rs), were the control limits provided in the laboratory SOPs (Isotope Dilution Method) or reference method (EPA-537).

No results were qualified based on laboratory method blank or field blank negative controls in the validated dataset. No detections of target analytes were reported in the task field blanks, either validated or unvalidated.

A total of only four results, representing 0.06% of total validated results, were qualified as estimated and possibly biased low (J-) based on low LCS recoveries in the validated dataset.

No results were qualified based on MS/MSD recoveries in the validated dataset.

A total of 1,036 results, representing 23% of total validated results from EPA-537, were qualified as estimated (J/UJ) or estimated and possibly biased low (J-) based on surrogate spike recoveries outside the method defined control limits. Only 12 of these qualified results were detections, and the remainders were non-detects.

A total of 26 results, representing 1.4% of total validated results from the Isotope Dilution Method, were qualified as non-detect but estimated (UJ) based on extracted internal standard recoveries outside control limits.

A total of 2 non-detect results, representing 0.1% of total validated results from the Isotope Dilution Method, were rejected based on extracted internal standard recoveries below 10%.

A total of 360 results, representing 5.7% of total validated results, were qualified as estimated (J/UJ) based on holding time exceedance at the time of analysis. Only 1 of these qualified results were detections, and the remainder were non-detects.

A single result was qualified as estimated (UJ) based on Continuing Calibration Verification standard recovery slightly below the low control limit.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned. Field completeness is a measure of the amount of valid samples obtained during all sampling for the project. A generic field completeness objective is greater than 90 percent, which was achieved for this task.

Laboratory completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. A generic laboratory completeness objective is greater than 95 percent, which was achieved for this task (actual completeness >99%).   All results, except the two rejected results cited above, should be regarded as usable for all project purposes.

Sensitivity

The sensitivity of analytical data is demonstrated by laboratory Method Reporting Limits (MRL), which are generally based on the low point of calibration. For this task, MDEQ requested nominal reporting limits of 2 ng/L for all analytes where it was attainable, and four ng/L were needed to meet the EPA-537 method requirements for reporting limit confirmation. All results were to be reported to a single significant figure if < 10 ng/L and results below the project defined RLs but above the MDLs were not reported.

Comparability

Comparability expresses the confidence with which one data set can be compared to another.

Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the protocols described in the reference methods are followed and that proper sampling techniques are used. Planned analytical data will be comparable when similar sampling and analytical methods are used in future events.

Comparability of the EPA-537 and Isotope Dilution Methods were evaluated using a subset of collocated samples collected in series on the same dates. A comparison of these results is presented in **Attachment A - Table 2**. However there were so few detections, and the detected concentrations were so low (< 10 ng/L so reported to a single significant figure) that a meaningful comparison of the method performance based on these results is not possible.

Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary.

Representativeness was ensured through the design of the sampling program and was satisfied by ensuring that the proper sampling techniques per field SOPs were used. Within the laboratory, representativeness was ensured by the use of appropriate reference methods, conformance to the approved analytical procedures described in the laboratory SOPs, and adherence to sample holding times.

Appendix B

Heat Maps of 2018 Statewide PFAS Sampling Program by County

(See Disk)

Appendix C

Analytical Laboratory Reports

(See Disk)

Appendix D

Validation Reports

(See Disk)

AECOM
3950 Sparks Drive Southeast
Grand Rapids, MI 49546
aecom.com

EXHIBIT 4

2019

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HEALTH-BASED DRINKING WATER VALUE RECOMMENDATIONS FOR PFAS IN MICHIGAN

Michigan Science Advisory Workgroup

DR. JAMIE DEWITT
MR. KEVIN COX
DR. DAVID SAVITZ

Executive Director's Foreword

This report accomplishes a key milestone in Michigan's effort to identify and reduce exposures to per- and polyfluoroalkyl substances (PFAS) contamination. With it, we are now one step closer to developing state drinking water standards for PFAS.

Michigan is a national leader at addressing PFAS contamination. Through our unique, multi-agency approach, Michigan's PFAS Action Response Team (MPART) is systematically identifying sources of PFAS contamination and getting a better understanding of their occurrence throughout our environment.

By using analytical techniques capable of finding PFAS as low as 2 parts per trillion, we have found the presence of PFAS in the drinking water from thousands of private residential wells near contaminated sites. We have also found PFAS in public water supplies across the state. We tested over 1,700 supplies covering all community water supplies plus schools and larger day cares with their own wells. We found PFAS in ten percent of the supplies. While most of the PFAS levels were very low, three percent of the supplies have required follow-up actions, and a few have required an alternate water source.

Unfortunately, we do not have federal drinking water standards, despite knowing they are in our drinking water and that some PFAS have been associated with adverse health effects. Recognizing that the USEPA is still likely several years away from providing any leadership on PFAS drinking water standards, Michigan, like other states, was left to develop our own.

With Governor Gretchen Whitmer's leadership, MPART formed a Science Advisory Workgroup to navigate the science and standards from across the country to advise Michigan on drinking water health-based values for PFAS. These health-based values will be used to inform the next step of the drinking water rule-making process, which includes stakeholder involvement where other factors will be considered.

I could not be more impressed with the thoughtful deliberation of our workgroup and the tireless technical support from our staff. As the information in this report is given to EGLE for consideration during the development of drinking water standards, we all owe them our sincere appreciation for giving us a firm foundation on which to move forward with protecting Michiganders from unacceptable levels of PFAS in their drinking water.

Steve Sliver,
Executive Director,
Michigan PFAS Action Response Team

Michigan Science Advisory Workgroup

Dr. Jamie DeWitt
Mr. Kevin Cox
Dr. David Savitz

Agency Support Staff to the Panel

Mr. Steve Sliver, Michigan Department of Environment, Great Lakes, and Energy
Mr. Kory Groetsch, Michigan Department of Health and Human Services
Dr. Jennifer Gray, Michigan Department of Health and Human Services
Dr. Eric Wildfang, Michigan Department of Environment, Great Lakes, and Energy
Ms. Chelsea Dickerson, Michigan Department of Environment, Great Lakes, and Energy

Report developed for the Michigan PFAS Action Response Team,
Lansing, Michigan
June 27, 2019

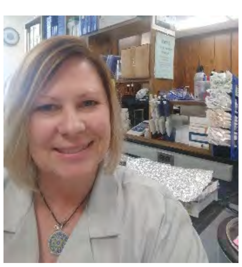
The Michigan Science Advisory Workgroup

Dr. David Savitz

Dr. David Savitz, who chairs the advisory Workgroup, is a professor of epidemiology in the School of Public Health at Brown University. He also serves as associate dean for research, and holds joint appointments in obstetrics and gynecology, and pediatrics in the Alpert Medical School. His epidemiological research has addressed a wide range of public health issues including environmental hazards in the workplace and community, reproductive health outcomes, and environmental influences on cancer. He has done extensive work on health effects of nonionizing radiation, pesticides, drinking water treatment by-products, and perfluorinated compounds. He is the author of nearly 350 papers in professional journals and editor or author of three books. He was president of the Society for Epidemiologic Research and the Society for Pediatric and Perinatal Epidemiologic Research, and North American regional councilor for the International Epidemiological Association. Dr. Savitz is a member of the National Academy of Sciences Institute of Medicine. From 2013-2017 he served as vice president for research at Brown University. He was a member of the C8 Science Panel that conducted some of the first epidemiologic research on PFAS in the mid-Ohio Valley and has published a number of reports related to potential health effects of PFAS. He recently chaired the Science Panel to advise MPART on the current research related to toxicology, epidemiology, exposure pathways, and remediation of PFAS.

Mr. Kevin Cox

Kevin Cox is a Managing Toxicologist at NSF International. Prior to his current role, Mr. Cox was a Supervising Toxicologist supporting NSF's drinking water additives and dietary supplement certification programs. As an expert in human health risk assessment, Mr. Cox has authored numerous chemical risk assessments evaluating exposure from unregulated drinking water contaminants, dietary supplement ingredients, toy product materials, and pool and spa treatment chemicals. Specific to PFAS, Mr. Cox has conducted a state-of-the-science analysis of published PFAS risk assessments in support of NSF International drinking water programs. This analysis was recently presented to Michigan water management professionals. Mr. Cox received his B.S. in biochemistry and history from the University of Michigan and his MPH in Environmental Health Sciences - Toxicology from the University of Michigan School of Public Health. He is currently an Associate Member of the Society of Toxicology. Mr. Cox also holds a J.D. from the University of Michigan Law School and is a member of the Michigan Bar Association.



Dr. Jamie DeWitt

Dr. Jamie DeWitt is an associate professor in the Department of Pharmacology and Toxicology of the Brody School of Medicine at East Carolina University. Her laboratory's research program explores relationships between biological organisms and their responses after exposure to environmental contaminants, with a specific focus on the immune system and its interactions with the nervous system during development and adulthood. The research program particularly focuses on emerging aquatic contaminants, especially PFAS. With respect to PFAS, DeWitt has published 13 primary research articles, six review articles, two book chapters, and edited a book on PFAS toxicity. She has served as an external reviewer for the United States Environmental Protection Agency (USEPA) health effects assessment of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), the United States National Toxicology Program's immune effects assessment of PFOA and

PFOS, the United States Agency for Toxic Substances and Disease Registry toxicological profile for PFASs, and was a member of the International Agency for Research on Cancer working group for the assessment of the carcinogenicity of PFOA. Her laboratory currently assesses the immunotoxicity of emerging PFAS that have been designed to replace those that have been phased out of production and that are of concern in North Carolina. She double-majored in environmental science and biology for her bachelor’s degree from Michigan State University and has doctoral degrees in environmental science and neural science from Indiana University-Bloomington. She completed postdoctoral training in ecotoxicology at Indiana University-Bloomington and in immunotoxicology at the USEPA in partnership with the University of North Carolina at Chapel Hill.

Table of Contents

Executive Summary

Background: The Michigan PFAS Action Response Team (MPART), is a unique, multi-agency proactive approach for coordinating state resources to address per- and polyfluoroalkyl substances (PFAS) contamination. Agencies responsible for environmental protection, public health, natural resources, agriculture, military installations, commercial airports, and fire departments work together to ensure the most efficient and effective response. The work done by MPART on drinking water supports the development of standards now that we have key information, including:

- PFAS have been discovered in drinking water during investigations of contaminated sites and a survey of all of Michigan's public water supplies. Public health responses, such as the provision of alternate water (e.g., point of use filters) have been necessary for thousands of Michiganders based on the strength of the source, location, and the concentrations found.

- The MPART Science Advisory Panel report issued in December 2018 indicated that observational epidemiology literature supports the need for drinking water values below the United States Environmental Protection Agency (USEPA) Lifetime Health Advisory (LHA) level of 70 ppt PFOS and PFOA, individually or in combination, and included a recommendation for establishing state drinking water standards for PFAS.

- The Michigan Department of Health and Human Services (MDHHS)-led MPART Human Health Workgroup developed public health drinking water screening levels for five individual PFAS in February 2019. Those screening levels will prompt further evaluation and public health consultations at numerous public water supplies and residences across the state including where detectable levels of PFOS and/or PFOA are below the USEPA LHA.

On March 26, 2019, Governor Gretchen Whitmer announced that Michigan was establishing enforceable state drinking water standards for PFAS. These standards, otherwise known as Maximum Contaminant Levels (MCLs), under the federal Safe Drinking Water Act have traditionally been established first by the USEPA and then adopted by the states. At this time, however, the USEPA has not initiated its process for establishing PFAS MCLs, and its process could take five or more years to complete. Michigan chose not to wait any longer for federal action.

Governor Whitmer called on MPART to form a Science Advisory Workgroup (Workgroup) to review the existing and proposed PFAS standards from across the country and develop health-based values (HBVs) to inform the initial phase of the rulemaking process for establishing state drinking water standards. The workgroup was given until July 1, 2019 to develop the HBVs. On April 4, 2019, MPART approved a motion to create the Workgroup. The Charge from MPART to the Workgroup is included in Appendix B. The members of the Workgroup were announced on April 11, 2019. The Workgroup was supported by MPART staff.

The Workgroup members are experts in the fields of epidemiology, toxicology, and risk assessment. The composition of the Workgroup matches the typical fields of evaluation for HBV developments. Dr. Jamie DeWitt provided the strong toxicological expertise and up-to-date knowledge on PFAS toxicology as HBVs typically use laboratory animal toxicity studies. Epidemiological information supports the laboratory animal data, and Dr. David Savitz provided his epidemiological expertise in selection of health endpoints and relevance to humans. Tying both toxicology and epidemiology together are risk assessment practices, and Mr. Kevin Cox provided the expertise in that field. Taken together, this Workgroup was able to knowledgably speak on the current state of PFAS health research and provide the scientific expertise needed to efficiently develop HBVs on the requested timeline.

The evaluation and deliberations of the Workgroup occurred over a very limited timeframe (Appendix D), which required frequent interaction. Much of that interaction occurred during 7 web conferences between April 19 and May 29, 2019, culminating in an in-person meeting the weekend of June 1-2, 2019. The Workgroup's final conclusions were presented to MPART on June 27, 2019.

Conclusions: The Workgroup undertook a methodical approach to evaluate existing and proposed standards from across the country for the 18 PFAS analytes considered under USEPA Method 537.1 (Appendix C). They focused on those PFAS that they determined had enough peer reviewed studies on which to base their conclusions. What they considered, and the logic behind their approach, has been carefully documented in individual chemical summaries for each compound that has a derived HBV in the following table:

Summary Table of Drinking Water Health-Based Values

Specific PFAS	Drinking Water Health-based Value	Chemical Abstract Services Registry Number (CASRN)
PFNA	6 ng/L (ppt)	375-95-1
PFOA	8 ng/L (ppt)	335-67-1
PFHxA	400,000 ng/L (ppt)	307-24-4
PFOS	16 ng/L (ppt)	1763-23-1
PFHxS	51 ng/L (ppt)	355-46-4
PFBS	420 ng/L (ppt)	375-73-5
GenX	370 ng/L (ppt)	13252-13-6

The Workgroup also recommended MPART and water supply operators screen analytical results for other long-chain PFAS (eight carbons and above for carboxylates and six carbons and above for sulfonates) included in USEPA Method 537.1 at the lowest concentration proposed for any of the compounds, which is 6 ppt. Based on the similarity in toxicity for the long-chain PFAS, the Workgroup recommends use of the HBV for PFNA (6 ng/L [ppt]) as a screening level for all other long-chain PFAS included on the USEPA Method 537.1 analyte list for which the Workgroup did not develop an individual HBV. Those other long-chain PFAS included in USEPA Method 537.1 are: NEtFOSAA (CASRN: 2991-50-6); NMeFOSAA (CASRN: 2355-31-9); PFDA (CASRN: 335-76-2); PFDoA (CASRN: 307-55-1); PFTA (CASRN: 376-06-7); PFTrDA (CASRN: 72629-94-8); and PFUnA (CASRN: 2058-94-8). While there is not enough information available at this time to support HBVs and drinking water standards for them, these compounds are expected to produce similar health effects. Additional monitoring, research for potential sources, notification of the public, and efforts to reduce exposure are warranted.

The Workgroup recognizes that their conclusions in some cases deviate modestly from those of other organizations. Evolving science and professional judgement can account for the variation. The variation is not substantial, however, and the values are trending lower nationally over time.

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Approach

Workgroup Interpretation of the Charge

The Workgroup was conscience of the importance and responsibility placed upon its efforts to identify public health toxicity values for certain PFAS as described within the Charge. Prior to initiating its efforts, the Workgroup sought and received clarification on the scope of the Charge. Given the relatively short timeframe for which to accomplish the tasks set forth within Charge, the Workgroup confirmed that the focus of the effort was to utilize the existing and proposed national- and state-derived PFAS assessments to inform its decision-making process as opposed to conducting a full systematic review of the available scientific literature on PFAS.

Additionally, as one of the outputs of the Charge is to inform State of Michigan on drinking water health-based values for PFAS, it was important to understand if the State of Michigan had any paradigms in place that the Workgroup must follow when deriving drinking water health-based values. The response received from the State of Michigan indicated that the Workgroup was only limited to applying a scientifically defensible approach as described within the Charge. With these issues clarified, the Workgroup approached the tasks set forth in the charge in the following manner:

1) Initially, PFAS analytes were identified within USEPA Method 537.1 for which published or externally peer reviewed PFAS drinking water criteria or reference doses (RfDs) existed and the derivation of such values was done in a scientifically defensible manner. This approach resulted in the selection of PFOA, PFOS, PFHxS, PFHxA, PFBS, PFNA and GenX as PFAS analytes for which the Workgroup would then develop individual public health toxicity values. The remaining PFAS values within USEPA Method 537.1 were later considered as to whether a class-based or group-based public health toxicity value could be applied.

2) For each of the selected PFAS analytes, the Workgroup evaluated the identified points of departure (defined as the point on a toxicological dose-response curve corresponding to an estimated low effect level or no effect level) and rationale from published risk assessments and assessed the underlying key studies that served as the basis for the published values. From this review, the merits of each available point of departure was discussed among the Workgroup and critical studies and points of departures for each of the seven identified PFAS analytes were identified to form the basis of public health toxicity values described further herein.

3) With critical studies and points of departure identified for each individual PFAS, the Workgroup then identified appropriate uncertainty factors to derive public health toxicity values. From these public health toxicity values, the Workgroup recommended specific drinking water exposure paradigms, accounting for sensitive sub-populations, and applied selected relative source contribution factors to derive the drinking water health-based values described further herein.

4) Lastly, consideration was given to the remaining PFAS analytes from USEPA Method 537.1 that were not selected for the development of individual criteria as to whether a class-based or grouping-based evaluation approach would be appropriate. As described

below, the Workgroup concluded that a screening level approach was valid to assess longer-chain PFAS based on the lowest derived drinking water health-based values.

Based on guidance from the Director of EGLE's Drinking Water and Environmental Health Division, PFAS chemical summary sheets were used to capture the necessary information for the MCL rulemaking process. The Workgroup and MPART staff used this format to provide maximum transparency on the decisions and rationale for drinking water health-based value development for each PFAS.

The chemical summary sheets describe:

- The critical study or studies, point of departure from each study, and conversion to a human equivalent dose;
- Uncertainty factors and a calculated toxicity value;
- Exposure parameters, and methodology for calculation of a drinking water health-based value.

Challenges and Limitations

The premises for the Workgroup's efforts to provide evidence-based conclusions for informing the regulation of PFAS in drinking water are compelling. Policy needs to provide clarity on what levels of specific chemicals are believed to be protective of public health and develop a mechanism to monitor and mitigate pollutants such as PFAS where needed. The Workgroup identified and made optimal use of the scientific evidence that is available to provide guidance, drawing on its knowledge of research methods and quantitative risk assessment. Furthermore, the Workgroup approached the issue free of bias, and as a panel, has a wide range of expertise and familiarity with the research on PFAS. However, the nature of this process is inherently subject to uncertainty and other equally qualified experts presented with the same scientific data the Workgroup drew upon might well make somewhat different conclusions. A number of other organizations have been through a similar exercise in providing guidance on acceptable drinking water contaminant levels, and while there are not extreme differences, there is not complete convergence either. As described in some detail below, a series of inputs were needed to derive the Workgroup's estimates and make that sequence of decisions as transparent as possible for those who wish to compare these conclusions to those made by other agencies. Like all the others, they are based exclusively on toxicology studies given the ability to quantify exposure-response relationships with great precision, but there is a loss of certainty in applying these estimates to free-living human populations. In most cases, there is epidemiologic evidence pertaining to the same health endpoints used in toxicology, and where there is such convergent evidence (e.g., immune function, development), confidence in the applicability of the experimental studies to human populations is enhanced. Finally, it should be noted that the scientific evidence on PFAS is expanding rapidly and that with new studies, the guidelines may well need to be revised. While it would be inefficient to do so frequently, on some periodic basis of several years, it would be useful to repeat the process that generated this report to determine where changes may be needed.

Process

Selection of Toxicity Values

Adverse health effects reported following exposure to PFAS in laboratory animal models and epidemiological studies have been summarized in myriad peer-reviewed and publicly available documents, including those generated by other state agencies. Most recently, the Agency for Toxic Substances and Disease Registry (ATSDR), compiled a toxicological profile for 14 PFAS that comprehensively summarizes evidence from publicly available published studies (ATSDR, 2018). This, and other summary documents, as well as the published studies themselves, were relied on to determine points of departure, as well as the toxicity values that protect the most sensitive populations and reflect a level that is unlikely to lead to adverse health effects if those sensitive populations are exposed over a lifetime or during a sensitive period (i.e., during development). The toxicity values are therefore designed to be protective of all exposed populations. For all of the PFAS examined, points of departure were selected from studies with laboratory animal models. This approach does not negate findings associated with epidemiological studies, but reflects that humans experience uncontrolled and imperfectly documented rather than controlled, precisely measured exposures. Additionally, these points of departure reflect adverse health effects that occur at low doses and that are supported by the weight-of-evidence across endpoints and between findings in humans and laboratory animal models. Therefore, the process to select points of departure used the available scientific evidence to identify an adverse health effect that occurred at a low dose, was supported by findings in other studies, was relevant to humans, and would be protective of sensitive populations.

Uncertainty Factors

In deriving the toxicity values for PFAS, the selected points of departure are divided by uncertainty factors. Uncertainty factors are applied in order to account for:

1. Variation in susceptibility among the human population (intraspecies uncertainty);

2. Uncertainty in extrapolating animal data to humans (interspecies uncertainty);

3. Uncertainty in extrapolating from data obtained from a study with a less-than-lifetime exposure (subchronic to chronic uncertainty);

4. Uncertainty in extrapolating from a lowest observed adverse effect level (LOAEL) as opposed to a no observed adverse effect level (NOAEL); and

5. Uncertainty associated with an incomplete toxicity database. Uncertainty factors assigned for each of these five categories are typically 1x, 3x ($10^{0.5}$x), or 10x with the default value being 10x, which represents greater uncertainty.

For both interspecies and intraspecies uncertainty factors, the variability in response to a toxicant may result from differences in toxicokinetics and/or toxicodynamics. Toxicokinetics refers to the absorption, distribution, biotransformation and excretion of the toxicant following exposure. Toxicodynamics refers to the molecular, biochemical and physiological effects of the toxicant or its metabolites leading to the toxic response. Therefore, the interspecies and intraspecies uncertainty factors are divided into subparts representing the toxicokinetic factor and the toxicodynamic factor. In evaluating the interspecies uncertainty for the selected PFAS, in each case the toxicokinetic subfactor was able to be reduced to 1x on account of adjustments based on serum half-lives or allometric scaling. Due to lack of data to depart from the default the toxicodynamic subfactor 3x ($10^{0.5}$x), the resulting interspecies uncertainty factor is 3x ($10^{0.5}$x).

When considering the subchronic to chronic uncertainty, the relevant consideration is whether the selected point of departure may differ if the duration of exposure were to be increased. For PFAS, a weight of evidence approach was used to assess the subchronic to chronic uncertainty factor, including, but not limited to, duration of the key study, potential impact of duration on the selected point of departure, as well as availability of chronic repeat-dose toxicity data.

For the NOAEL to LOAEL uncertainty factor, use of a NOAEL (or lower confidence limit on the benchmark dose [BMDL]) allows for an uncertainty factor of 1x. If the point of departure is based on a LOAEL, the uncertainty factor is either 3x ($10^{0.5}$x) or 10x depending on the severity and/or reversibility of the critical effect.

The database uncertainty factor is based on the ability of the existing data to support a scientific judgment of the likely critical effect from exposure to the compound. In assessing the database completeness, the types of toxicity data (e.g., human, animal, mode of action) as well as data gaps that may have improved the derived risk values should be emphasized. This approach should take into consideration issues such as the types of endpoints evaluated, life-stages evaluated, duration, timing, route of exposure, and the potential for latent effects and/or reversibility of effects (USEPA, 2002). For the selected PFAS, each database was unique; however, common concerns were lack of appropriate characterization of immune, endocrine or neurodevelopmental effects.

Relative Source Contribution

Relative source contribution (RSC) is the percentage of a person's exposure to a chemical that comes from drinking water. For example, an RSC of 20 percent assumes that the other 80 percent of a person's exposure to a chemical comes from non-drinking water sources. The USEPA (2000) provides guidance on the selection of an RSC value using an exposure decision tree that takes into account specific populations of concern, whether these populations are experiencing exposure from multiple sources, and whether levels of exposure or other circumstances make apportionment of the toxicity value or POD/UF desirable. The most conservative RSC is established at 20 percent, and the RSC can reach a ceiling of 80 percent as more information is available about exposure pathways and the source of exposure.

Drinking Water Health-Based Value Derivation

The traditional risk assessment approach using simple equations based on body weight, water intake rate and RSC to calculate drinking water HBVs is not adequate to address the bioaccumulative nature and known or presumed developmental toxicity of PFAS. These traditional equations do not consider the PFAS body-burden at birth or any transfer of maternal PFAS through breastmilk. To better address these concerns, and to also account for higher early-life intake rates, the Goeden et al. (2019) simple one-compartment toxicokinetic model was used where the data were available for the individual PFAS. The resulting drinking water HBVs are considered protective for an infant exclusively breast-fed for 12 months, followed by drinking contaminated water through life. Additionally, these drinking water HBVs also protective for formula-fed infants. Where data were not available to derive drinking water HBVs using the model, traditional equations were used.

Confidence Statement

Following USEPA guidance (2002), risk assessments may contain a narrative description of the overall confidence in the derived health-effects based values. Confidence in the risk assessment would be low if there is a high degree of scientific uncertainty and would be high if there is a low degree of scientific uncertainty. Major elements of scientific uncertainty may be considered to include, but not limited to, the following; database completeness, quality of key study(ies), severity and relevance of the critical effect, quality of the dose-response analysis and consideration of sensitive subpopulations. (NRC, 2009; Beck et al., 2016).

For the selected PFAS for which quantitative values were derived there remains significant scientific uncertainty. Health outcomes due to PFAS exposure that warrant additional study include, but are not limited to, endocrine disruption, immunological and neurodevelopmental effects as well as cancer. Further information is needed on the mode of action as well as the cumulative risk of exposure to multiple PFAS. Overall, the present evaluation of the selected PFAS is based on sound science and current practices in risk assessment; however, the Workgroup recognizes that the science of PFAS is constantly evolving and new information may come to light that requires a re-evaluation of the drinking water HBVs established herein.

Chemical Summary for PFNA

	Decision Point	Rationale/justification
Critical study	Das KP, Grey BE, Rosen MB, et al. 2015. Developmental toxicity of perfluorononanoic acid in mice. *Reproductive Toxicology* 51:133-144.	The Workgroup reviewed the available evaluations and focused on the assessments by ATSDR and New Jersey. Das et al. (2015) was selected by both ATSDR (2018) and NJDEP (2015).
Description of the critical study	Timed-pregnant CD-1 mice were administered 0, 1, 3, 5 or 10 mg/kg PFNA by daily oral gavage from gestational day (GD) 1 to 17. Maternal toxicity and reproductive outcomes were investigated. Postnatal toxicity, liver gene expression and developmental effects were evaluated in mouse offspring. *Body weight endpoints* – Decreased body weight gain in mouse pups *Developmental endpoints* – Delayed eye opening, preputial separation, and vaginal opening in mouse pups	The Workgroup reviewed the health endpoints investigated in Das et al. (2015) and identified the developmental endpoints as more relevant than liver endpoints.
Point of Departure (POD)	A NOAEL of 1 mg/kg/day was identified for developmental effects. The average serum concentration for NOAEL (1 mg/kg/day) was estimated (6.8 mg/L) in dams using an empirical clearance model (Wambaugh et al., 2013). The estimated time-weighted average serum concentration corresponding to the NOAEL was 6.8 mg/L.	The Workgroup decided that serum-based points of departure were appropriate for PFAS.
Human equivalent dose (HED)	The time-weighted average serum concentration of 6.8 mg/L was converted to the HED using the below equation. $NOAEL_{HED}$ = (TWA serum x k_e x V_d) = 0.000665 mg/kg/day Ke = 0.000489165 (4.8 x 10^{-4}) based on a human serum half-life of 1417 days (calculated from Zhang et al. [2013] as described above) Vd = 0.2 L/kg (ATSDR [2018]; Ohmori et al. [2003])	The Workgroup discussed the human serum half-lives available from Zhang et al. (2013), which were an arithmetic mean of 2.5 years (913 days) for 50 year old or younger females and 4.3 years (1570 days) for females older than 50 years old and all males. An average of 3.9 years (1417 days) was calculated based on those averages. The Workgroup selected the calculated average as it would better represent the entire population.
Uncertainty factors	A total uncertainty factor of 300: • 1 for LOAEL to NOAEL • 10 for human variability • 3 ($10^{0.5}$) for animal to human variability • 1 for subchronic to chronic • 10 for database deficiencies was used.	The Workgroup discussed the uncertainty factors selected by ATSDR (2018) and agreed that those selected were appropriate.

Toxicity value	2.2 ng/kg/day (2.2 x 10^{-6} mg/kg/day) which corresponds to a serum concentration of 0.023 mg/L Serum levels used in development of these toxicity levels are not meant to indicate a level where health effects are likely. These serum levels are calculated to be at a point where no or minimal risk exists for people drinking water with a certain PFAS.	Human equivalent dose or serum level divided by the total uncertainty factors = toxicity value
Exposure parameters for drinking water screening HBVs	Breast-fed infant, which is also protective of a formula-fed infant Placental transfer of 69% (MDHHS 2019) Breastmilk transfer of 3.2% (MDHHS 2019) Half-life = 1417 days (3.9 years) (calculated from Zhang et al. [2013] as described above) Volume of distribution = 0.2 L/kg (ATSDR [2018]; Ohmori et al. [2003]) 95th percentile drinking water intake, consumers only, from birth to more than 21 years old (Goeden et al. [2019]) Upper percentile (mean plus two standard deviations) breast milk intake rate (Goeden et al. [2019]) Time-weighted average water ingestion rate from birth to 30-35 years of age (to calculate maternal serum concentration at delivery) (Goeden et al. [2019]) Relative Source Contribution of 50% (0.5) Based on NHANES 95th percentiles for 3-11 (2013-2014) and over 12 years old (2015-2016) participants (CDC 2019)	The Workgroup discussed the Goeden et al. (2019) model which considered full life stage exposure, from fetal exposure, to infant exposure through breastfeeding, and into adulthood. While the model was also developed for a formula-fed infant, the breastfed infant scenario is protective of a formula-fed infant. The Workgroup selected this model for developing drinking water HBVs when the needed inputs were available.
Drinking water HBV	6 ng/L (ppt)	Numeric HBV derived and justified using the above information

Chemical Summary for PFOA

	Decision point	**Rationale/justification**
Critical study	Onishchenko N, Fischer C, Wan Ibrahim WN, Negri S, Spulber S, Cottica D, Ceccatelli S. 2011. Prenatal exposure to PFOS or PFOA alters motor function in mice in a sex-related manner. Neurotox. Res. 19(3):452-61. Koskela A, Finnilä MA, Korkalainen M, Spulber S, Koponen J, Håkansson H, Tuukkanen J, Viluksela M. 2016. Effects of developmental exposure to perfluorooctanoic acid (PFOA) on long bone morphology and bone cell differentiation. Toxicol. Appl. Pharmacol. 301:14-21.	The Workgroup reviewed the available evaluation and selected the ATSDR (2018) critical studies. The Workgroup concluded that the ATSDR position was defensible with respect to range and sensitivity of health endpoints identified and considered in ATSDR (2018).
Description of the critical study	Onishchenko et al.: Pregnant C57BL/6 mice were exposed to 0 or 0.3 mg PFOA/kg/day throughout pregnancy. The critical effects considered were Neurobehavioral effects (decreased number of inactive periods, altered novelty induced activity) at 5-8 weeks of age. Koskela et al.: Pregnant C57BL/6 mice were exposed to PFOA mixed with food at the dose of 0 or 0.3 mg PFOA/kg/day throughout pregnancy. Group of five offspring (female) were sacrificed at either 13 or 17 months of age. The critical effects considered were skeletal alteration such as bone morphology and bone cell differentiation in the femurs and tibias.	The Workgroup selected these developmental delays as most appropriate health endpoint as the mammary gland effects may represent a delay that may not be considered adverse. However, the mammary gland effects may be representative of endocrine effects at doses below the selected POD.
Point of Departure	The average serum concentration was estimated in the mice (8.29 mg/L) using a three-compartment pharmacokinetic model (Wambaugh et al. 2013) using animal species-, strain-, sex-specific parameters.	The Workgroup decided that serum-based points of departure were appropriate for PFAS.
Human equivalent dose	The time-weighted average serum concentration of 8.29 mg/L was converted to the HED using the below equation. $LOAEL_{HED}$ = (TWA serum x k_e x V_d) = 0.001163 mg/kg/day Ke = 0.000825175 (8.2×10^{-4}) based on a human serum half-life of 840 days (Bartell et al. 2010) Vd = 0.17 L/kg (Thompson et al. 2010)	The Workgroup selected the PFOA serum half-life of 840 days (2.3 years) as more relevant for exposure to the general population as this half-life corresponds to data from Bartell et al. (2010) in which 200 individuals (100 men, 100 women) were exposed by drinking PFOA-contaminated water. The Workgroup selected the volume of distribution based on human data, when available.

Uncertainty factors	A total uncertainty factor of 300: • 3 ($10^{0.5}$) for LOAEL to NOAEL • 10 for human variability • 3 ($10^{0.5}$) for animal to human variability • 1 for subchronic to chronic • 3 ($10^{0.5}$) for database deficiencies (endocrine effects)	The Workgroup discussed the use of an uncertainty factor of 3 for use of a LOAEL. They noted that a NOAEL for immune effects was similar to the LOAEL selected and that the selected LOAEL represented less severe effects. The Workgroup concluded that use of the 3 ($10^{0.5}$) would be sufficiently protective. The Workgroup added a database uncertainty factor of 3 ($10^{0.5}$) for deficiencies the database regarding endocrine effects. The Workgroup noted that the mammary gland effects may signal a concern for other low dose endocrine effects.
Toxicity value	3.9 ng/kg/day (3.9 x 10^{-6} mg/kg/day) which corresponds to a serum concentration of 0.028 mg/L Serum levels used in development of these toxicity levels are not meant to indicate a level where health effects are likely. These serum levels are calculated to be at a point where no or minimal risk exists for people drinking water with a certain PFAS.	Human equivalent dose or serum level divided by the total uncertainty factors = toxicity value
Exposure parameters for drinking water HBVs	Breast-fed infant, which is also protective of a formula-fed infant Placental transfer of 87% (MDH 2017) Breastmilk transfer of 5.2% (MDH 2017) Human Serum half-life of 840 days (Bartell et al. 2010) Volume of distribution of 0.17 L/kg (Thompson et al. [2010]) 95th percentile drinking water intake, consumers only, from birth to more than 21 years old (Goeden et al. [2019]) Upper percentile (mean plus two standard deviations) breast milk intake rate (Goeden et al. [2019]) Time-weighted average water ingestion rate from birth to 30-35 years of age (to calculate maternal serum concentration at delivery) (Goeden et al. [2019]) Relative Source Contribution of 50% (0.5) Based on NHANES 95th percentiles for 3-11 (2013-2014) and over 12 years old (2015-2016) participants (CDC 2019)	The Workgroup discussed the Goeden et al. (2019) model which considered full life stage exposure, from fetal exposure, to infant exposure through breastfeeding, and into adulthood. While the model was also developed for a formula-fed infant, the breastfed infant scenario is protective of a formula-fed infant. The Workgroup selected this model for developing drinking water HBVs when the needed inputs were available.
Drinking water HBV	8 ng/L (ppt)	Numeric HBV derived and justified using the above information

Chemical Summary for PFHxA

	Decision point	Rationale/justification
Critical study	Klaunig, J.E., Shinohara, M., Iwai, H., Chengelis, C.P., Kirkpatrick, J.B., Wang, Z., Bruner, R.H., 2015. Evaluation of the chronic toxicity and carcinogenicity of perfluorohexanoic acid (PFHxA) in Sprague-Dawley rats. Toxicol. Pathol. 43 (2), 209–220.	The Workgroup reviewed the Luz et al. (2019) compiled information and development of a toxicity value. The Workgroup was in agreement with Luz et al. (2019) on selection of the chronic study (Klaunig et al. 2015) for toxicity value development.
Description of the critical study	PFHxA was administered to male and female Crl:CD rats (n=60-70/sex/dose) via daily oral gavage for up to 104 weeks. Males: 0, 2.5, 15, and 100 mg/kg/day. Females: 0, 5, 30, and 200 mg/kg/day. Functional observational battery, locomotor activity, ophthalmic, hematology, serum chemistry, and tissue and organ histopathology endpoints were evaluated.	The Workgroup also considered the developmental effects observed in Loveless et al. (2009) one generation reproductive assay. Pup body weight was significantly reduced in the 500 mg/kg/day, resulting in NOAEL of 100 mg/kg/day. Data were not available for Benchmark Dose Modeling for further evaluation.
Point of Departure	Critical effect renal tubular degeneration and renal papillary necrosis in female rats – $BMDL_{10}$ 90.4 mg/kg/day (Luz et al., 2019).	The Workgroup noted that the Benchmark Dose approach is preferred over the use of a NOAEL/LOAEL.
Human equivalent dose	Therefore, the BMD was adjusted by $(80kg/0.45\ kg)^{1/4}$ = 3.65. The resulting POD_{HED} (90.4 mg/kg/day divided by 3.65) = 24.8 mg/kg/day. (Luz et al., 2019).	The Workgroup discussed the description of the Benchmark Dose modeling conducted by Luz et al. (2019) and concluded the modeling was adequate for use. The Workgroup did not conduct their own Benchmark Dose modeling. The Workgroup took into consideration the available serum half-life data presented in Russell et al. (2013) and concluded that, unlike most PFAS, allometric scaling could be supported.
Uncertainty factors	Total uncertainty factor of 300: • 1 for LOAEL to NOAEL • 10 for human variability • 3 ($10^{0.5}$) for animal to human variability • 1 for subchronic to chronic • 10 for database deficiencies – lack of additional chronic toxicity studies and no additional developmental data in a second species, and immune and thyroid endpoints	The Workgroup discussed the uncertainty factors and selected an uncertainty factor of 10 for database deficiencies. Several items noted were that the available studies were largely in one species, with no mouse or non-human primate data, and that there was insufficient information addressing immune or thyroid endpoints.
Toxicity value	83,000 ng/kg/day (8.3 mg/kg/day)	Human equivalent dose divided by the total uncertainty factor = toxicity value

Exposure parameters for drinking water HBVs	95th percentile of water intake for consumers only (direct and indirect consumption) for adults (>21 years old) of 3.353 L/day, per Table 3-1, USEPA Exposure Factors Handbook, 2019. An adult body weight of 80 kilograms was used (Table 8-1, USEPA 2011b). A default Relative Source Contribution of 20% was included.	The Workgroup discussed the use of an upper percentile water intake. The 95th percentile for consumers only was selected as it would protect those drinking larger amounts of water. As no human serum data were available to assess the population's exposure to PFHxA from sources other than drinking water, a default Relative Source Contribution of 20% was selected consistent with USEPA (2000) guidance. The Workgroup evaluated the protectiveness of the renal tubular degeneration and renal papillary necrosis in relation to the reduced pup weights observed in Loveless et al. (2009). Available data did not support Benchmark Dose Modeling for further evaluation of Loveless et al. (2009) data.
Drinking water HBV	400,000 ng/L (ppt) (400 micrograms per Liter or parts per billion)	Numeric HBV derived and justified using the above information in the following equation: $HBV = \frac{RSC \times Toxicity\ value \times Body\ weight}{Water\ intake}$

Chemical Summary for PFOS

	Decision point	**Rationale/justification**
Critical study	Dong GH, Zhang YH, Zheng L, Liu W, Jin YH, He QC. (2009). Chronic effects of perfluorooctanesulfonate exposure on immunotoxicity in adult male C57BL/6 mice. Arch Toxicol. 83(9):805-815.	The Workgroup discussed the available evaluations, particularly MDH (2019) and New Jersey Department of Environmental Protection (NJDEP) (2018), and selected a critical study with an immune system functional assay rather than observational data.
Description of the critical study	Adult male C57BL/6 mice were exposed to PFOS daily via oral gavage for 60 days with 0, 0.5, 5, 25, 50 or 125 mg/kg total administered dose, equivalent to 0 or approximately 0.008, 0.08, 0.4, 0.8 or 2.1 mg/kg/day. The NOAEL for suppression of plaque forming cell response and increase in liver mass was 0.5 mg/kg total administered dose which corresponded to a serum concentration of 0.674 mg/L.	The Workgroup acknowledged that immune effects in mice were seen at lower doses in Peden-Adams et al. (2008). Serum concentrations from Peden-Adams et al. (2008) were well below both the NOAEL and LOAEL serum concentrations measured from several other studies as described by Pachkowski et al. (2019) and may be an outlier in the database.
Point of Departure	The NOAEL for suppression of plaque forming cell response and increase in liver mass was 0.5 mg/kg total administered dose which corresponded to a serum concentration of 0.674 mg/L.	The Workgroup decided that serum-based points of departure were appropriate for PFAS.
Human equivalent dose	The serum concentration of 0.674 mg/L was converted to the HED using the below equation (based on ATSDR 2018). $NOAEL_{HED}$ = (TWA serum x k_e x V_d) = 0.0000866 mg/kg/day Ke = 0.000558539 (5.5 x 10^{-4}) based on a human serum half-life of 1241 days (Li et al. 2018) Vd = 0.23 L/kg (Thompson et al. 2010)	The Workgroup selected the serum half-life from a non-occupationally exposed population as it is closer to the general population's exposure. The Workgroup selected volume of distributions based on human data, when available.
Uncertainty factors	A total uncertainty factor of 30: • 1 for LOAEL to NOAEL • 10 for human variability • 3 ($10^{0.5}$) for animal to human difference (toxicodynamics) • 1 for subchronic to chronic • 1 for database deficiencies	The Workgroup reviewed the uncertainty factors selected by MDH (2019) and adjusted the database uncertainty factor to 1 based on the critical study selection. With consideration of the selected immunotoxicity endpoint, the database uncertainty factor of 1 was supported by the assessments by USEPA (2016), NJDEP (2018), ATSDR (2018) and New Hampshire (2019).

Toxicity value	2.89 ng/kg/day (2.89 x 10^{-6} mg/kg/day) which corresponds to a serum concentration of 0.022 µg/ml Serum levels used in development of these toxicity levels are not meant to indicate a level where health effects are likely. These serum levels are calculated to be at a point where no or minimal risk exists for people drinking water with a certain PFAS.	Human equivalent dose or serum level divided by the total uncertainty and modifying factors = toxicity value
Exposure parameters for drinking water HBV	Breast-fed infant, which is also protective of a formula-fed infant Placental transfer of 43% (MDHHS 2019) Breastmilk transfer of 1.3% (MDHHS 2019) Human serum half-life of 1241 days (3.2 years) (Li et al. 2018) Volume of distribution of 0.23 L/kg (Thompson et al. 2010) 95th percentile drinking water intake, consumers only, from birth to more than 21 years old (Goeden et al. [2019]) Upper percentile (mean plus two standard deviations) breast milk intake rate (Goeden et al. [2019]) Time-weighted average water ingestion rate from birth to 30-35 years of age (to calculate maternal serum concentration at delivery) (Goeden et al. [2019]) Relative Source Contribution of 50% Based on NHANES 95th percentiles for 3-11 (2013-2014) and over 12 years old (2015-2016) participants (CDC 2019)	The Workgroup discussed the Goeden et al. (2019) model which considered full life stage exposure, from fetal exposure, to infant exposure through breastfeeding, and into adulthood. While the model was also developed for a formula-fed infant, the breastfed infant scenario is protective of a formula-fed infant. The Workgroup selected this model for developing drinking water HBVs when the needed inputs were available.
Drinking water HBV	16 ng/L (ppt)	Numeric HBV derived and justified using the above information

Chemical Summary for PFHxS

	Decision point	Rationale/justification
Critical study	NTP 2018 TOX-96: Toxicity Report Tables and Curves for Short-term Studies: Perfluorinated Compounds: Sulfonates and personal communication between MDH and NTP project manager Dr. Chad Blystone (as cited in the HRA Toxicology Review Worksheet for PFHxS, last revised 3/8/2019)	The Workgroup reviewed available evaluations and focused on the ones from Minnesota Department of Health (2019) and ATSDR (2018). In both evaluations, thyroid endpoints were selected. The Workgroup discussed Chang et al. (2018) and concluded that the health outcome (reduction in litter size) was a marginal effect.
Description of the critical study	28-day oral toxicity study in Sprague Dawley rats (NTP, 2018). PFHxS was administered via daily gavage at the following doses for 28 continuous days: Male rats: 0, 0.625, 1.25, 2.5, 5 or 10 mg/kg/day Male rats mean measured plasma levels: 0.102, 66.76, 92.08, 129.0, 161.7, and 198.3 µg/ml Female rats: 0, 3.12, 6.25, 12.5, 25, 50 mg/kg/day Female rats mean measured plasma levels: 0.1754, 37.03, 50.41, 63.82, 83.82, and 95.51 µg/ml n=10/sex/dose Critical effect: decreased serum free thyroxin (T_4) levels was observed in adult male rats at the lowest PFHxS dose administered (0.625 mg/kg/day) Co-critical effects: decreased free and total T_4, triiodothyronine (T_3), and changes in cholesterol levels and increased hepatic focal necrosis	The Workgroup selected this thyroid endpoint as it was a measure of a clinical or functional effect rather than observational.
Point of Departure	POD of 32.4 mg/L serum concentration for male rats based on $BMDL_{20}$. A BMR of 20% was used in the BMD modeling based on clinical and toxicological knowledge regarding adverse outcomes associated with decreases in circulating thyroid hormones. MDH stated that 20% provided a more statistically reliable and biologically significant BMR. (MDH conducted Benchmark Dose modeling and provided modeling run data in the HRA Toxicology Review Worksheet for PFHxS, last revised 3/8/2019.	The Workgroup decided that serum-based points of departure were appropriate for PFAS. Although the Workgroup concluded that the Chang et al. (2018) health outcome was marginal, they did note that the serum concentration at the NOAEL for Chang et al. (2018) was equivalent to the serum concentration at the selected POD.
Human equivalent dose	The POD (32.4 mg/L) was multiplied by a toxicokinetic adjustment based on the chemical's specific clearance rate of 0.000090 L/kg-d (Vd = 0.25 L/kg [Sundstrom et al. [2012], half-life = 1935 days [Li et al. 2018]) for a human equivalent dose of 0.00292 mg/kg/day.	The Workgroup selected the human serum half-life from Li et al. (2018) as it was a non-occupational population drinking water with elevated PFAS.

Uncertainty factors	Total Uncertainty Factor of 300 • 1 for LOAEL to NOAEL • 10 for human variability • 3 ($10^{0.5}$) for animal to human variability (toxicodynamic differences) • 1 for subchronic to chronic • 10 for database deficiencies - to address concerns for early life sensitivity and lack of 2-generation or immunotoxicity studies	The Workgroup reviewed the uncertainty factors used by MDH (2019) and concluded that the database uncertainty factor of 10 was very defensible in this situation, especially for the lack of information on early-life sensitivity.
Toxicity value	9.7 ng/kg/day (9.7×10^{-6} mg/kg/day) which corresponds to a serum concentration of 0.11 µg/ml Serum levels used in development of these toxicity levels are not meant to indicate a level where health effects are likely. These serum levels are calculated to be at a point where no or minimal risk exists for people drinking water with a certain PFAS.	Human equivalent dose or serum level divided by the total uncertainty factors = toxicity value
Exposure parameters for drinking water HBV	Breast-fed infant, which is also protective of a formula-fed infant Placental transfer of 80% (MDHHS 2019) Breastmilk transfer of 1.2% (MDHHS 2019) Human serum half-life of 1935 days (Li et al. [2018]) Volume of distribution of 0.25 L/kg (MDH [2019] based on Sundstrom et al. [2012]) 95th percentile drinking water intake, consumers only, from birth to more than 21 years old (Goeden et al. [2019]) Upper percentile (mean plus two standard deviations) breast milk intake rate (Goeden et al. [2019]) Time-weighted average water ingestion rate from birth to 30-35 years of age (to calculate maternal serum concentration at delivery) (Goeden et al. [2019]) Relative Source Contribution of 50% (0.5) Based on NHANES 95th percentiles for 3-11 (2013-2014) and over 12 years old (2015-2016) participants (CDC 2019)	The Workgroup discussed the Goeden et al. (2019) model which considered full life stage exposure, from fetal exposure, to infant exposure through breastfeeding, and into adulthood. While the model was also developed for a formula-fed infant, the breastfed infant scenario is protective of a formula-fed infant. The Workgroup selected this model for developing drinking water HBVs when the needed inputs were available.
Drinking water HBV	51 ng/L (ppt)	Numeric HBV derived and justified using the above information

Chemical Summary for PFBS

	Decision point	**Rationale/justification**
Critical study	Feng, X; Cao, X; Zhao, S; Wang, X; Hua, X; Chen, L; Chen, L. (2017). Exposure of pregnant mice to perfluorobutanesulfonate causes hypothyroxinemia and developmental abnormalities in female offspring. Toxicol Sci 155: 409-419.	The Workgroup evaluated available agency decision documents and selected the study associated with the draft USEPA (2018) PFBS toxicity value based on thyroid effects. The kidney effects identified in the draft USEPA (2018) toxicity assessment were identified as a potentially compensatory response. The thyroid effects were identified as having greater functional significance.
Description of the critical study	PFBS was orally administered to pregnant ICR mice (n=30/dose) at doses of 0, 50, 200, and 500 mg/kg/day from gestational day (GD) 1 to GD20. Dams (F0) and female offspring (F1) from each dose group were subsequently evaluated for 1) growth and development, 2) hormone levels, and 3) serum PFBS levels. The critical effect is decreased serum total thyroxine (T_4) in newborn (PND 1) mice. Selection of total T_4 as the critical effect is based on a several key considerations that account for cross-species correlations in thyroid physiology and hormone dynamics particularly within the context of a developmental life stage.	
Point of Departure	A POD of 28.19 mg/kg/day ($BMDL_{20}$) for decreased serum total T_4 in newborn (PND 1) mice was selected	The Workgroup noted that a Benchmark Dose approach is preferable to a NOAEL/LOAEL. The Workgroup noted that the thyroid point of departure would be protective of the kidney effects as well. The draft USEPA (2018) toxicity assessment contained administered doses from the individual studies converted to HED doses using study-specific Dosimetric Adjustment Factors (DAF; not reported for each dosing group) derived using allometric scaling ($BW^{3/4}$) prior to BMD model analysis. An example DAF calculation was provided in Table 8 of the draft USEPA (2018) toxicity assessment: dose x DAF = 200 x 0.149 = 29.9 mg/kg/day, where DAF equals $(BW_{animal}^{1/4})/(BW_{human}^{1/4}) = 0.0399^{1/4} \div 80^{1/4} = 0.149$ The POD_{HED} = 4.2 mg/kg/day for decreased serum total T_4 in newborn (PND 1) mice (USEPA 2018). The USEPA POD_{HED} of 4.2 was divided by 0.149 (USEPA example DAF) to obtain a $BMDL_{20}$ of 28.19 mg/kg/day.

Human equivalent dose	The $BMDL_{20}$-HED is 0.0892 mg/kg/day. The $BMDL_{20}$ of 28.19 mg/kg/day was divided by the Dose Adjustment Factor of 316 (human serum half-life/female mouse serum half-life = 665 hours/2.1 hours = 316) (MDH, 2017).	The Workgroup evaluated the half-life based Dose Adjustment Factor used by the Minnesota Department of Health (MDH) (2017). As that allowed conversion of the point of departure to a human equivalent dose using chemical-specific information, the Workgroup selected this approach over the allometric scaling used in the draft USEPA (2018) PFBS toxicity assessment.
Uncertainty factors	The total uncertainty factor is 300. • 1 for LOAEL to NOAEL • 10 for human variability • 3 ($10^{0.5}$) for animal to human variability • 1 for subchronic to chronic • 10 for database deficiencies, for the lack of neurodevelopmental, immunotoxicological, and chronic studies	The Workgroup discussed the uncertainty factors selected in the draft USEPA (2018) toxicity assessment and supported their use.
Toxicity value	300 ng/kg/day (0.0003 mg/kg/day)	Human equivalent dose or serum level divided by the total uncertainty factors = toxicity value
Exposure parameters for drinking water HBV	95th percentile of water intake for consumers only (direct and indirect consumption) for infants (birth to <1 year old) of 1.106 L/day, per Table 3-1, USEPA Exposure Factors Handbook, 2019. An infant body weight of 7.8 kilograms was used and represents a time-weighted average for birth to 1 year old (Table 8-1, USEPA 2011). A default Relative Source Contribution of 20% was included.	The Workgroup discussed the use of an upper percentile water intake. The 95th percentile for consumers only was selected as it would protect those drinking larger amounts of water. As insufficient human serum data was available to assess the population's exposure to PFBS from sources other than drinking water, a default Relative Source Contribution of 20% was selected consistent with USEPA (2000) guidance.
Drinking water HBV	420 ng/L (ppt)	Numeric HBV derived and justified using the above information in the following equation: $HBV = \frac{RSC \times Toxicity\ value \times Body\ weight}{Water\ intake}$

Chemical Summary for GenX

	Decision point	Rationale/justification
Critical study	Oral (Gavage) Reproduction/ Developmental Toxicity Study in Mice (OECD TG 421; modified according to the Consent Order) DuPont-18405-1037 (2010) (also contains 90-day toxicity study information and outcomes - that information is not described here)	The Workgroup evaluated the North Carolina Department of Health and Human Services (2017) and draft USEPA (2018) information. The draft USEPA (2018) evaluation was identified as providing a more in-depth and robust analysis and approach.
Description of the critical study	In a combined oral gavage reproductive/developmental toxicity study in mice with HFPO dimer acid ammonium salt, the test compound was administered by oral gavage to Crl:CD1(ICR) mice (25/sex/group) at doses of 0, 0.1, 0.5, or 5 mg/kg/day, according to a modified OECD TG 421. Parental F0 males were dosed 70 days prior to mating and throughout mating through 1 day prior to scheduled termination. Parental F0 females were dosed for 2 weeks prior to pairing and were dosed through LD 20. F1 animals (offspring) were dosed daily beginning on PND 21 through PND 40. At 0.5 mg/kg/day, liver effects (increased absolute and relative weight and histopathologic findings) were reported in both males and females. At 5 mg/kg/day, male and female F1 pups exhibited lower mean BWs at PNDs 4, 7, 14, 21, and 28. Male F1 pups continued to exhibit lower mean BWs at PNDs 35 and 40. The USEPA (2018) identified additional developmental effects (delays in balanopreputial separation and vaginal patency) that occurred at the same dose level, but the biological significance of these effects are equivocal as described. NOAEL (F0) = 0.1; LOAEL (F0) = 0.5 for liver effects (single-cell necrosis in males, and increased relative liver weight in both sexes). NOAEL (F1) = 0.5 for developmental effects (decreased pup weights).	The Workgroup noted that while primarily industry-funded studies are the only ones available, they followed recognized testing guidelines and/or were published following external peer-review. These studies appear to be sufficient for developing values.

Point of Departure	$BMDL_{10}$ = 0.15 mg/kg/day for liver single cell necrosis in parental males (DuPont-18405-1037, 2010).	The Workgroup noted that the Benchmark Dose approach is preferred over the use of a NOAEL/LOAEL. USEPA (2018) evaluated the relevance of this endpoint in humans and noted that, per the Hall criteria (Hall et al., 2012) liver effects accompanied by effects such as necrosis or inflammation, among others, are indicative of liver tissue damage (USEPA, 2018). While some liver effects in rodents are mediated through PPARα and may be less relevant to humans, available information indicates that liver single cell necrosis may be mediated by a number of processes and pathways. In PPARα-mediated rodent hepatocarcinogenesis, liver necrosis is not a key event. (DeWitt and Belcher, 2018)
Human equivalent dose	A candidate POD_{HED} was derived from the $BMDL_{10}$ for liver effects using a $BW^{3/4}$ allometric scaling approach. A BW_a of 0.0372 kg was identified as the mean BW of the F0 male mouse controls. A BW_h of 80 kg for humans was selected. The resulting DAF for the allometric scaling of doses from mice to humans is 0.15. Using the $BMDL_{10}$ of 0.15 mg/kg/day to complete the calculation results in a POD_{HED} for single-cell necrosis of the liver from DuPont-18405-1037 (2010) of 0.023 mg/kg/day (USEPA 2018).	The Workgroup noted that a toxicokinetic adjustment from the point of departure to human equivalent dose would provide a chemical-specific conversion. However, no chemical-specific data on human serum half-life was available that would allow this conversion. Allometric scaling, per USEPA (2011a) guidance, was used.
Uncertainty factors	Total Uncertainty Factor of 300 • 1 for use of a LOAEL to NOAEL • 10 for human variability • 3 ($10^{0.5}$) for animal to human variability • 3 ($10^{0.5}$) for subchronic-to-chronic • 3 ($10^{0.5}$) for database deficiencies, including lack of epidemiological, and developmental and immunotoxicological studies in laboratory animals	The Workgroup evaluated the uncertainty factors selected by USEPA (2018). Given the deficiencies in the database, including a lack of epidemiological studies and developmental and immunotoxicological in laboratory animals, a database uncertainty factor of 3 was retained. In conjunction with the deficiencies covered by the database uncertainty factor, the subchronic to chronic uncertainty factor of 3 was identified as sufficient.
Toxicity value	77 ng/kg/day (7.7 x10-5 mg/kg/day)	Human equivalent dose or serum level divided by the total uncertainty = toxicity value

Exposure parameters for drinking water HBV	95th percentile of water intake for consumers only (direct and indirect consumption) for adults (>21 years old) of 3.353 L/day, per Table 3-1, USEPA Exposure Factors Handbook, 2019. An adult body weight of 80 kilograms was used (Table 8-1, USEPA 2011b). A default Relative Source Contribution (RSC) of 20% was included.	The Workgroup discussed the use of an upper percentile water intake. The 95th percentile for consumers only was selected as it would protect those drinking larger amounts of water. As no human serum data was available to assess the population's exposure to GenX from sources other than drinking water, a default Relative Source Contribution of 20% was selected consistent with USEPA (2000) guidance. The Workgroup evaluated the protectiveness of adult exposure in combination with the point of departure. The NOAEL for developmental effects described above was at a dose five times higher than the NOAEL for liver necrosis effects. As a drinking water value based on the developmental NOAEL would be higher than the level presented below, the Workgroup decided that the drinking water HBV below based on liver effects would be sufficiently conservative to be protective of infant exposure.
Drinking water HBV	370 ng/L (ppt)	Numeric HBV derived and justified using the above information in the following equation: $HBV = \frac{RSC \times Toxicity\ value \times Body\ weight}{Water\ intake}$

Rationale for Individual HBVs

While there are on-going discussions regarding the grouping of multiple PFAS into one drinking water value, there is no consensus from the scientific community on which PFAS should be grouped or the basis of that grouping. Grouping methods that have been applied include combining multiple PFAS into one number based on known or assumed toxicity, carbon chain length, and/or biological half-life (simple addition) as well as the use of relative ability of the grouped PFAS to lead to a comparable health endpoint (toxic equivalency); the latter approach being similar to those used for dioxins, furans, and coplanar polychlorinated biphenyls.

There is, however, scientific agreement that the long-chain PFAS (eight carbons and above for carboxylates and six carbons and above for sulfonates) have similar toxicity. Based on the similarity in toxicity for the long-chain PFAS, the Workgroup recommends use of the HBV for PFNA (6 ng/L [ppt]) as a screening level for all other long-chain PFAS included on the USEPA Method 537.1 analyte list for which the Workgroup did not develop an individual HBV. This screening level should not be used to evaluate the risk of developing health effects, but as a screening tool for EGLE/public water supplies to use for decision making.

Adverse health effects of long chain (six-carbon perfluorosulfonic acids or eight-carbon perfluorocarboxylic acids) have been established in epidemiological and laboratory animal model studies. These adverse health effects include kidney and testicular cancer, elevated serum cholesterol, endocrine effects, immune effects, and reproductive effects (ATSDR, 2018). These effects are supported by studies of different human populations exposed to a few or to many PFAS, including those from populations of high PFAS exposure and the general population and demonstrate that many different long-chain PFAS can produce similar adverse health effects in exposed humans. However, while not all long-chain PFAS have robust data available for the development of a HBV, the totality of evidence indicates that long-chain PFAS in drinking water may pose risks of adverse health effects.

While health concerns are based on the total exposure to PFAS across many sources, because drinking water is the predominant source of exposure for many people consuming contaminated water, it remains the focus for health-based regulation based on current knowledge. Therefore, monitoring of drinking water should continue and be based on levels that will be protective for exposure to all PFAS.

At this time, it is recommended that the proposed HBV for PFNA be used as a screening level for the long chain PFAS included in USEPA Method 537.1 that may be found in drinking water that are not covered by an individual PFAS HBVs as presented in the Summary Table of Drinking Water HBVs.

Summary of Conclusions

Summary Table of Drinking Water HBVs

Specific PFAS	Drinking Water Health-based Value	Chemical Abstract Services Registry Number (CASRN)
PFNA	6 ng/L (ppt)	375-95-1
PFOA	8 ng/L (ppt)	335-67-1
PFHxA	400,000 ng/L (ppt)	307-24-4
PFOS	16 ng/L (ppt)	1763-23-1
PFHxS	51 ng/L (ppt)	355-46-4
PFBS	420 ng/L (ppt)	375-73-5
GenX	370 ng/L (ppt)	13252-13-6

For all other PFAS on the USEPA Method 537.1 analyte list, the Workgroup recommendation is to use the lowest long-chain (eight carbons and above for carboxylates and six carbons and above for sulfonates) HBV of 6 ppt, which is the HBV for PFNA. Those other long-chain PFAS included in USEPA Method 537.1 are: NEtFOSAA (CASRN: 2991-50-6); NMeFOSAA (CASRN: 2355-31-9); PFDA (CASRN: 335-76-2); PFDoA (CASRN: 307-55-1); PFTA (CASRN: 376-06-7); PFTrDA (CASRN: 72629-94-8); and PFUnA (CASRN: 2058-94-8).

As shown in Figure 1 (below), the drinking water values for PFOS and PFOA have gone down over time. This is a reflection of the evolving science, both the ever-increasing knowledge gained from published toxicology and epidemiology studies and the risk assessments for development of toxicity values and drinking water values. Information continues to become available on multiple PFAS and as there are thousands of PFAS, new information will likely become available for many years to come. It is quite possible that the same trend demonstrated in Figure 1 will be seen for other PFAS, where drinking water values become lower over time and that new values could be developed within a few years' time. As described in the Challenges and Limitations section, along with use of current scientific data, development of drinking water values includes a certain amount of scientific judgement informed from the scientific knowledgebase. It is that combination of scientific judgement and data that ultimately informs the development of drinking water values. With emerging contaminants like PFAS, rapid availability of data drives public health protective actions and drinking water values.

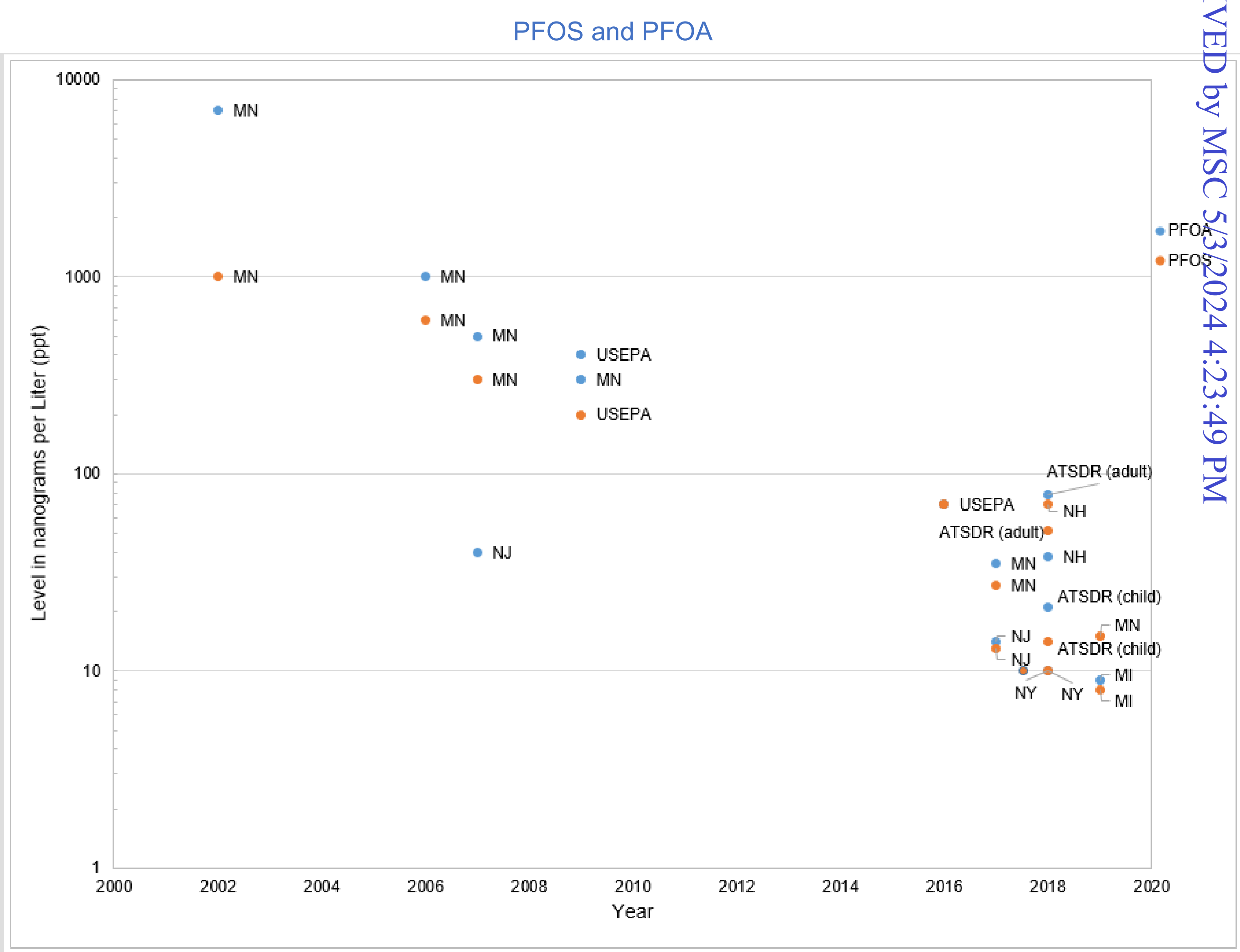

Figure 1: Screening Levels, Health-Based Values, and Regulatory Standards for PFOS and PFOA Over a 20-Year Timeframe.

The numbers in Figure 1 are the various screening levels, HBVs, and regulatory standards developed by various agencies and states over time as of June 2019. It does not include the agencies that include multiple PFAS into a single value. This should not be considered an exhaustive list of all PFAS drinking water values available, and values may be updated, and additional values will likely become available. The Michigan values included in Figure 1 are the MPART Human Health Workgroup public health drinking water screening levels.

Concluding Remarks

The Workgroup would like to commend the State of Michigan for addressing PFAS concerns with unusual rigor, openness, and reliance on independent scientific guidance. From the beginning of the recognition of environmental and public health issues related to PFAS, the State of Michigan has been at the forefront nationally in assessing the scope of the contamination, intervening to mitigate exposure, and monitoring the evidence to guide policy. The statewide survey of drinking water supplies was highly unusual if not unique relative to other areas, and the process of developing Maximum Contaminant Levels as rigorous as any in the nation. By engaging experts from outside the state agencies to complement the considerable expertise of the staff in the Michigan Departments of Health and Human Services and Environment, Great Lakes, and Energy, they have demonstrated their commitment to following the evidence through to developing sound policy.

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Appendix A: Acronym List

ATSDR	Agency for Toxic Substances and Disease Registry
BMD	benchmark dose
BMDL	lower confidence limit on the benchmark dose
BMR	benchmark response
BW	body weight
BWa	body weight animal
BWh	body weight human
CDC	Centers for Disease Control and Prevention
DAF	dosimetric adjustment factor
EGLE	Environment, Great Lakes, and Energy (Michigan Department of)
GD	gestational day
GenX	perfluoro-2-propoxypropanoic acid
HBV	health-based value
HED	human equivalent dose
HFPO	hexafluoropropylene oxide
HRA	health risk assessment
kg	kilogram
L	liter
LD	lactation day
LHA	lifetime health advisory
LOAEL	lowest observed adverse effect level
MCL	Maximum Contaminant Level
MDH	Minnesota Department of Health
MDHHS	Michigan Department of Health and Human Services
mg	milligram
MI	Michigan
ml	milliliter
MPART	Michigan PFAS Action Response Team
µg	microgram
ng	nanogram
NHANES	National Health and Nutrition Examination Survey
NJDEP	New Jersey Department of Environmental Protection
NOAEL	no observed adverse effect level
OECD	Organization for Economic Co-operation and Development
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutane sulfonic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexane sulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PND	postnatal day
POD	point of departure
POD_{HED}	point of departure human equivalent dose
PPAR	peroxisome proliferator-activated receptor
ppt	parts per trillion
RfD	reference dose
RSC	relative source contribution
TWA	time weighted average
UF	uncertainty factor
USEPA	United States Environmental Protection Agency

Appendix B: MPART Motion for Creation of Science Advisory Workgroup, April 4, 2019

Motion

Motion to establish a Science Advisory Workgroup with the Charge described below, comprised of external members with expertise in toxicology, epidemiology, and risk assessment, and further to authorize the chairperson of MPART to finalize the appointments in consultation with MPART members.

Preamble

On March 26, 2019, Governor Whitmer directed the Michigan PFAS Action Response Team (MPART) to further protect public health and the environment, by forming a Science Advisory Workgroup to "review both existing and proposed health-based drinking water standards from around the nation to inform the rule making process for appropriate Maximum Contaminant Levels for Michigan..." Toward this objective, the Science Advisory Workgroup shall make numeric recommendation(s) to MPART for those per- and polyfluoroalkyls substances (PFAS) for which adequate information exists.

Charge

The Science Advisory Workgroup shall:

1. For the PFAS listed in USEPA Method 537.1, review all existing and proposed national- and state-derived PFAS drinking water standards and identify the most scientifically defensible non-cancer or cancer-based public health toxicity values available for each individual PFAS chemical family member, or combination thereof, for which the Science Advisory Workgroup determines that adequate information exists. Provide written justification that shall include, but not be limited to, the basis for the selection of the primary study, critical effect identification, point of departure determination, evaluation of all uncertainty and/or modification factors applied, and the non-cancer or cancer-based toxicity value derivation.
2. Review all existing and proposed national- and state-derived PFAS drinking water standards and identify the most scientifically defensible exposure assessment and risk evaluation methodology for each individual PFAS chemical family member, or combination thereof, for which the Science Advisory Workgroup determines that adequate information exists. Provide written justification that shall include, but not be limited to, selection of the most appropriate receptor(s) and identification of all appropriate exposure assumptions for the receptor(s).
3. Identify the most appropriate and scientifically defensible combination of each specific PFAS toxicity value and exposure assessment and risk evaluation methodology, including consideration of relative source contribution, from which to derive a health-based drinking water value for each individual PFAS chemical family member, or combination thereof, for which the Science Advisory Workgroup determines that adequate information exists.
4. Provide to MPART no later than July 1, 2019, a report recommending scientifically-defensible numeric health-based values to inform the rulemaking process for Maximum Contaminant Levels for each individual PFAS chemical family member, or combination thereof, with written justification for the calculation methodology and each input into used in the methodology by the Science Advisory Workgroup.

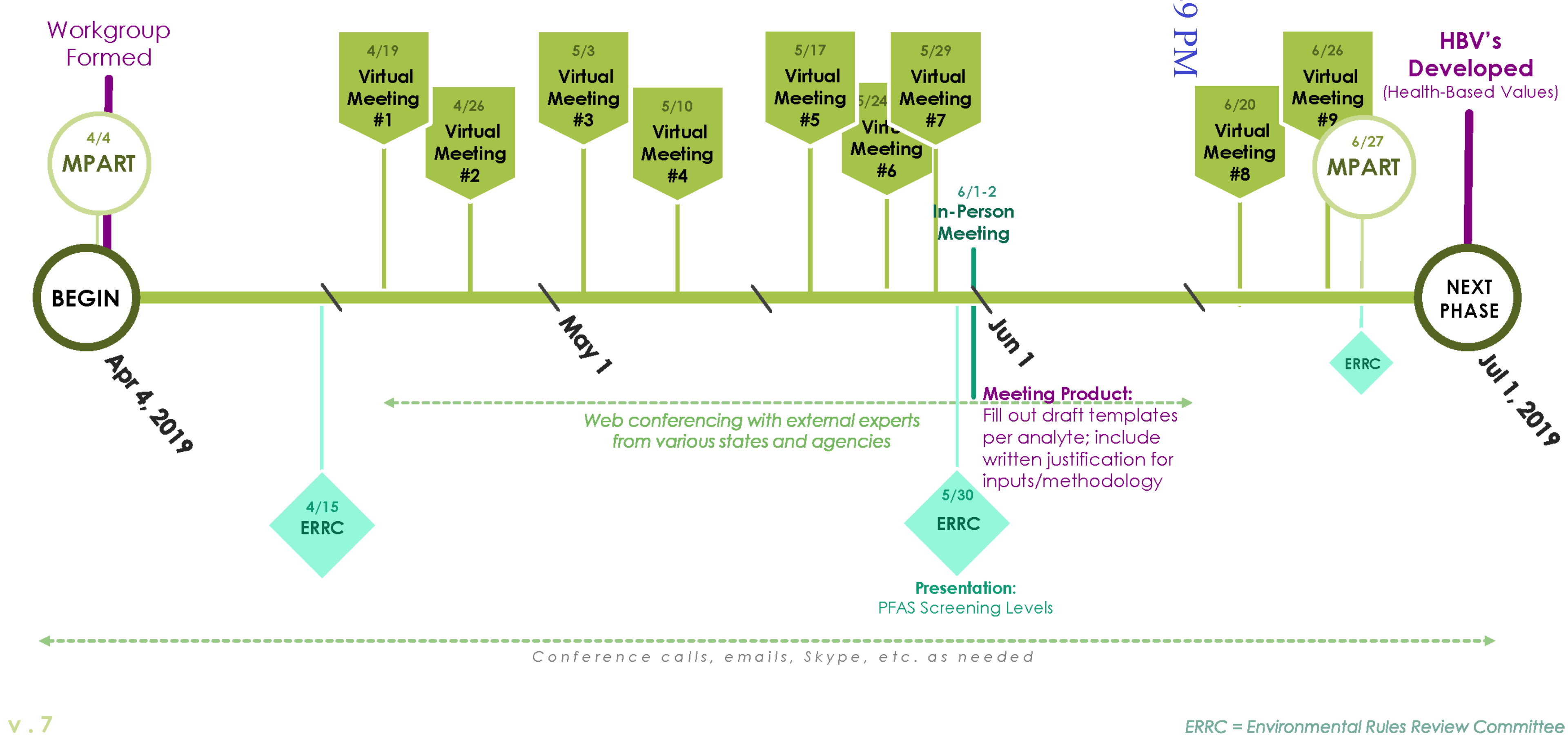
End

Appendix C: USEPA Method 537.1 Analyte List

Analyte Name*	Acronym	Fluorinated Carbon Chain Length	Chemical Abstract Services Registry Number (CASRN)
Perfluorotetradecanoic acid	PFTeA	C_{14}	376-06-7
Perfluorotridecanoic acid	PFTriA	C_{13}	72629-94-8
Perfluorododecanoic acid	PFDoA	C_{12}	307-55-1
Perfluoroundecanoic acid	PFUnA	C_{11}	2058-94-8
Perfluorodecanoic acid	PFDA	C_{10}	335-76-2
Perfluorononanoic acid	PFNA	C_9	375-95-1
Perfluorooctanoic acid	PFOA	C_8	335-67-1
Perfluoroheptanoic acid	PFHpA	C_7	375-85-9
Perfluorohexanoic acid	PFHxA	C_6	307-24-4
Perfluorooctanesulfonic acid	PFOS	C_8	1763-23-1
Perfluorohexanesulfonic acid	PFHxS	C_6	355-46-4
Perfluorobutanesulfonic acid	PFBS	C_4	375-73-5
2-(N-Ethylperfluorooctanesulfonamido) acetic acid	N-EtFOSAA	C_8	2991-50-6
2-(N-Methylperfluorooctanesulfonamido) acetic acid	N-MeFOSAA	C_8	2355-31-9
Hexafluoropropylene oxide dimer acid	HFPO-DA (GenX)	C_6	13252-13-6[a]
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	C_{10}	763051-92-9[b]
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	C_8	756426-58-1[c]
4,8-dioxa-3H-perfluorononanoic acid	ADONA	C_7	919005-14-4[d]

[a] HFPO-DA is one component of the GenX processing aid technology.
[b] 11Cl-PF3OUdS is available in salt form (e.g. CASRN of potassium salt is 83329-89-9).
[c] 9Cl-PF3ONS analyte is available in salt form (e.g. CASRN of potassium salt is 73606-19-6)
[d] ADONA is available as the sodium salt (no CASRN) and the ammonium salt (CASRN is 958445-448).
** Some PFAS are commercially available as ammonium, sodium, and potassium salts. This method measures all forms of the analytes as anions while the counterion is inconsequential. Analytes may be purchased as acids or as any of the corresponding salts.*

Appendix D: Timeline for the Science Advisory Workgroup's Development of Drinking Water HBVs



Appendix E: Timeline of the Maximum Contaminant Level Development Process

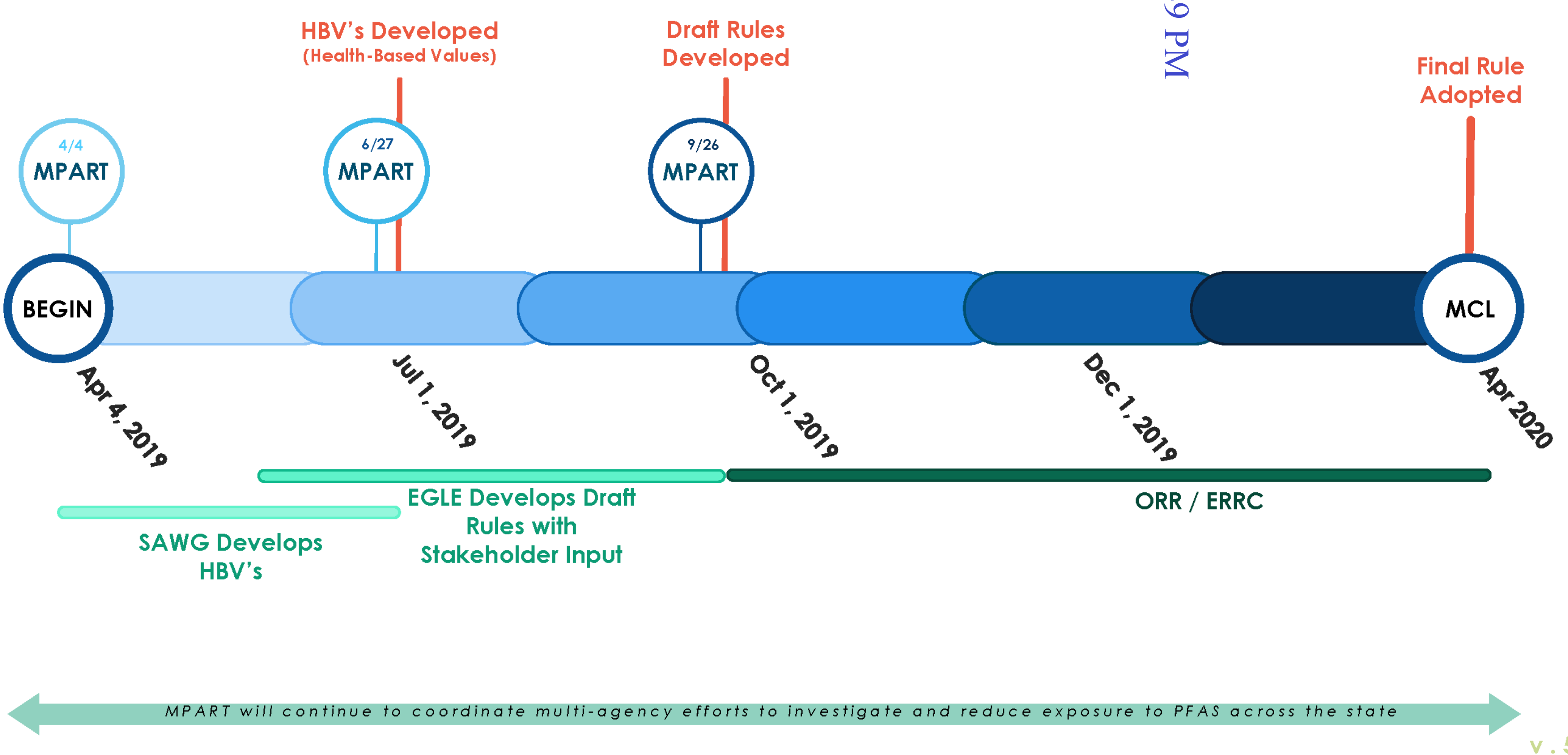


EXHIBIT 5

Approved, SCAO

Original - Court
1st copy - Defendant

2nd copy - Plaintiff
3rd copy - Return

STATE OF MICHIGAN Court of Claims JUDICIAL DISTRICT JUDICIAL CIRCUIT COUNTY PROBATE	SUMMONS	CASE NO. 21-000078-MZ Judge Colleen O'Brien

Court address
Hall of Justice, 925 W. Ottawa St., Lansing, MI 48909

Court telephone no.
(517) 373-0807

Plaintiff's name(s), address(es), and telephone no(s).	v	Defendant's name(s), address(es), and telephone no(s).
3M COMPANY		MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
Plaintiff's attorney, bar no., address, and telephone no. Amy M. Johnston (P51272) Miller, Canfield, Paddock and Stone, PLC 150 W. Jefferson, Suite 2500 Detroit, MI 48226 (313) 963-6420		

Instructions: Check the items below that apply to you and provide any required information. Submit this form to the court clerk along with your complaint and, if necessary, a case inventory addendum (form MC 21). The summons section will be completed by the court clerk.

Domestic Relations Case

☐ There are no pending or resolved cases within the jurisdiction of the family division of the circuit court involving the family or family members of the person(s) who are the subject of the complaint.

☐ There is one or more pending or resolved cases within the jurisdiction of the family division of the circuit court involving the family or family members of the person(s) who are the subject of the complaint. I have separately filed a completed confidential case inventory (form MC 21) listing those cases.

☐ It is unknown if there are pending or resolved cases within the jurisdiction of the family division of the circuit court involving the family or family members of the person(s) who are the subject of the complaint.

Civil Case

☐ This is a business case in which all or part of the action includes a business or commercial dispute under MCL 600.8035.

☐ MDHHS and a contracted health plan may have a right to recover expenses in this case. I certify that notice and a copy of the complaint will be provided to MDHHS and (if applicable) the contracted health plan in accordance with MCL 400.106(4).

☑ There is no other pending or resolved civil action arising out of the same transaction or occurrence as alleged in the complaint.

☐ A civil action between these parties or other parties arising out of the transaction or occurrence alleged in the complaint has been previously filed in ☐ this court, ☐ ______________________ Court, where it was given case number ______________ and assigned to Judge ______________________.

The action ☐ remains ☐ is no longer pending.

Summons section completed by court clerk.

SUMMONS

NOTICE TO THE DEFENDANT: In the name of the people of the State of Michigan you are notified:

1. You are being sued.
2. **YOU HAVE 21 DAYS** after receiving this summons and a copy of the complaint to **file a written answer with the court** and serve a copy on the other party **or take other lawful action with the court** (28 days if you were served by mail or you were served outside this state).
3. If you do not answer or take other action within the time allowed, judgment may be entered against you for the relief demanded in the complaint.
4. If you require special accommodations to use the court because of a disability or if you require a foreign language interpreter to help you fully participate in court proceedings, please contact the court immediately to make arrangements.

Court of Claims State of Michigan

Issue date	Expiration date*	Court clerk
4/22/2021	7/21/2021	Jerome W. Zimmer Jr.

*This summons is invalid unless served on or before its expiration date. This document must be sealed by the seal of the court.

SUMMONS
Case No. 21-000078-MZ

PROOF OF SERVICE

TO PROCESS SERVER: You are to serve the summons and complaint not later than 91 days from the date of filing or the date of expiration on the order for second summons. You must make and file your return with the court clerk. If you are unable to complete service you must return this original and all copies to the court clerk.

CERTIFICATE / AFFIDAVIT OF SERVICE / NONSERVICE

☐ **OFFICER CERTIFICATE**
I certify that I am a sheriff, deputy sheriff, bailiff, appointed court officer, or attorney for a party (MCR 2.104[A][2]), and that: (notarization not required)

OR

☐ **AFFIDAVIT OF PROCESS SERVER**
Being first duly sworn, I state that I am a legally competent adult, and I am not a party or an officer of a corporate party (MCR 2.103[A]), and that: (notarization required)

☐ I served personally a copy of the summons and complaint,
☐ I served by registered or certified mail (copy of return receipt attached) a copy of the summons and complaint,

together with ______________________________
List all documents served with the summons and complaint

______________________________ on the defendant(s):

Defendant's name	Complete address(es) of service	Day, date, time

☐ I have personally attempted to serve the summons and complaint, together with any attachments, on the following defendant(s) and have been unable to complete service.

Defendant's name	Complete address(es) of service	Day, date, time

I declare under the penalties of perjury that this proof of service has been examined by me and that its contents are true to the best of my information, knowledge, and belief.

Service fee	Miles traveled	Fee	
$		$	
Incorrect address fee	Miles traveled	Fee	**TOTAL FEE**
$		$	**$**

____
Signature

____
Name (type or print)

____
Title

Subscribed and sworn to before me on ______________ , ______________ County, Michigan.
Date

My commission expires: ______________ Signature: ______________
Date Deputy court clerk/Notary public

Notary public, State of Michigan, County of ______________

ACKNOWLEDGMENT OF SERVICE

I acknowledge that I have received service of the summons and complaint, together with ______________
Attachments

______________ on ______________
Day, date, time

______________ on behalf of ______________ .
Signature

Approved, SCAO

Original - Court
1st copy - Defendant

2nd copy - Plaintiff
3rd copy - Return

STATE OF MICHIGAN Court of Claims JUDICIAL DISTRICT JUDICIAL CIRCUIT COUNTY PROBATE	SUMMONS	CASE NO. 21-000078-MZ Judge Colleen O'Brien

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3M COMPANY		MICHIGAN ATTORNEY GENERAL
Plaintiff's attorney, bar no., address, and telephone no. Amy M. Johnston (P51272) Miller, Canfield, Paddock and Stone, PLC 150 W. Jefferson, Suite 2500 Detroit, MI 48226 (313) 963-6420		

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The action ☐ remains ☐ is no longer pending.

Summons section completed by court clerk.

SUMMONS

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Issue date	Expiration date*	Court clerk
4/21/2021	7/21/2021	Jerome W. Zimmer Jr.

*This summons is invalid unless served on or before its expiration date. This document must be sealed by the seal of the court.

SUMMONS
Case No. 21-000078-MZ

PROOF OF SERVICE

TO PROCESS SERVER: You are to serve the summons and complaint not later than 91 days from the date of filing or the date of expiration on the order for second summons. You must make and file your return with the court clerk. If you are unable to complete service you must return this original and all copies to the court clerk.

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☐ **OFFICER CERTIFICATE**
I certify that I am a sheriff, deputy sheriff, bailiff, appointed court officer, or attorney for a party (MCR 2.104[A][2]), and that: (notarization not required)

OR

☐ **AFFIDAVIT OF PROCESS SERVER**
Being first duly sworn, I state that I am a legally competent adult, and I am not a party or an officer of a corporate party (MCR 2.103[A]), and that: (notarization required)

☐ I served personally a copy of the summons and complaint,
☐ I served by registered or certified mail (copy of return receipt attached) a copy of the summons and complaint,

together with ______________________________
List all documents served with the summons and complaint

______________________________ on the defendant(s):

Defendant's name	Complete address(es) of service	Day, date, time

☐ I have personally attempted to serve the summons and complaint, together with any attachments, on the following defendant(s) and have been unable to complete service.

Defendant's name	Complete address(es) of service	Day, date, time

I declare under the penalties of perjury that this proof of service has been examined by me and that its contents are true to the best of my information, knowledge, and belief.

Service fee	Miles traveled	Fee	
$		$	
Incorrect address fee	Miles traveled	Fee	**TOTAL FEE**
$		$	**$**

____
Signature

____
Name (type or print)

____
Title

Subscribed and sworn to before me on ____________ (Date), ____________ County, Michigan.

My commission expires: ____________ (Date) Signature: ____________ (Deputy court clerk/Notary public)

Notary public, State of Michigan, County of ______________________________

ACKNOWLEDGMENT OF SERVICE

I acknowledge that I have received service of the summons and complaint, together with ____________ (Attachments)

______________________________ on ____________ (Day, date, time)

______________________________ on behalf of ______________________________ .
Signature

STATE OF MICHIGAN
IN THE COURT OF CLAIMS

3M COMPANY,

Plaintiff,

Case No. 21-000078-MZ

v.

Hon. Colleen O'Brien

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY,

Defendants.

Amy M. Johnston (P51272)
Joseph M. Infante (P68719)
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Attorneys for Plaintiff 3M Company

Michigan Department of Environment, Great Lakes, and Energy
Constitution Hall
525 West Allegan Street
P.O. Box 30473
Lansing, MI 48909-7973
Phone: 800-662-9278
Defendant

VERIFIED COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF

3M Company ("3M" or "Plaintiff") files this Complaint for Declaratory and Injunctive Relief against the Michigan Department of Environment, Great Lakes, and Energy ("EGLE") to invalidate and enjoin enforcement of Rule Set 2019-35 EG, Supplying Water to the Public (the "Final Rule") which set drinking water standards for certain per- and polyfluoroalkyl substances ("PFAS")[1] effective August 3, 2020. In support of this Complaint, Plaintiff states as follows:

INTRODUCTION

1. The drinking water standards at issue in this action, also known as maximum contaminant levels ("MCLs"), are the result of a rushed and invalid regulatory process, scientifically flawed, and reliant on speculative and unquantified purported benefits to justify the costly Final Rule.

2. In their haste to meet the unrealistic timeline requested by the Governor to establish drinking water standards, EGLE and the Environmental Rules Review Committee ("ERRC") failed to comply with the statutory requirements established by the Michigan Safe Drinking Water Act ("SDWA"), MCL 325.1005, and the Michigan Administrative Procedures Act of 1969, 1969 PA 306, MCL 24.201 to 24.328 ("APA"), and established arbitrary and capricious MCLs without sound basis.

3. As a result, approximately 2,700 water supplies in Michigan will be required to test for these substances quarterly or annually and treat any exceedances of the established levels. In addition, property owners and businesses across the state must comply with more stringent

[1] As discussed in Paragraph 14 below, per- and polyfluoroalkyl substances ("PFAS") refers to thousands of compounds with a wide range of physical and chemical properties (*e.g.*, solids, liquids, and gases), uses, and characteristics. Among other uses, PFAS substances have been used for their water and stain repellency, resistance to high temperatures, and to reduce surface tensions.

groundwater cleanup standards, since those standards have been updated and added to reflect the levels in the drinking water standards.

4. EGLE has expressly acknowledged it did not make a "serious" estimate of the benefits of the Proposed Rule, but the APA requires precisely that. This serious failure to comply with the APA is independently sufficient to invalidate the Final Rule.

5. EGLE also failed to properly evaluate the costs of the Proposed Rule. By EGLE's estimate, the direct cost of compliance to the regulated community will be over $17 million in the first year. The cost is likely to be significantly higher, however, because EGLE did not fully account for ongoing operation and maintenance costs for water systems, or the costs for retrofitting, treatment and pretreatment, sampling, and disposing of waste arising from those activities. In addition, EGLE failed to account for the costs associated with the revised groundwater cleanup standards and associated costs related to the management of biosolids, compost, and soils. This is particularly egregious considering that EGLE did not justify such costly standards with evidence of particular benefits to support those standards.

6. Plaintiff seeks a declaration that these drinking water standards are invalid and seeks to enjoin EGLE from implementing and enforcing them.

PARTIES

7. Plaintiff is a Delaware corporation with a principal place of business at 3M Center, St. Paul, Minnesota 55133. Plaintiff is a global manufacturing company that produces a variety of products, including adhesives, automotive products, and medical supplies.

8. Plaintiff has a substantial interest at stake in this matter. Plaintiff operates a facility located at 11900 East 8 Mile Road, Detroit, MI, 48205, that will be subject to the Final Rule. To the extent that perfluorooctanoic acid ("PFOA"), perfluorooctanesulfonic acid

("PFOS"), perfluorononanoic acid ("PFNA"), perfluorohexanoic acid ("PFHxA"), perfluorohexanesulfonic acid ("PFHxS"), perfluorobutanesulfonic acid ("PFBS"), and hexafluoropropylene oxide dimer acid ("HFPO-DA") (together, "Regulated PFAS") are found above regulatory limits at the facility, Plaintiff will be required to do remediation if the Final Rule is not enjoined.

9. In addition, the Michigan Attorney General has filed two lawsuits seeking payment from 3M and others related to the historical uses of the Regulated PFAS and other fluorinated chemicals, including uses by State governmental agencies. Those actions allege natural resource damages, including to surface and groundwater from these fluorinated chemicals. The MCLs for the Regulated PFAS are relevant to the lawsuits already filed against 3M because they establish drinking water standards and, by default, groundwater cleanup standards. The MCLs form the basis for allegations of injury and subsequent damage claims by State agencies, as well as private litigants. Moreover, at least one Michigan court has held, in a case including 3M, that a plaintiff cannot sustain a claim for damages for detections of PFOA and PFOS in water below the MCL. *See* Opinion at ¶¶ 3-4, *Brimmer v. Wolverine World Wide, Inc.*, No. 18-01136-CZ (Mich. Cir. Ct. Jan. 25, 2021), attached as Exhibit A.

10. Finally, Plaintiff submitted comments to EGLE on the Proposed Rule, outlining significant flaws in EGLE's proposal. As a participant in the rulemaking process and a party that must comply with the SDWA, Plaintiff will be detrimentally affected if EGLE is not required to follow the APA and is permitted to enforce rules that do not comply with the SDWA.

11. Defendant Michigan Department of Environment, Great Lakes, and Energy is an administrative agency of the State of Michigan. It is the Michigan agency that has responsibility

for environmental regulatory programs, including those relating to drinking water, and is the agency that promulgated the rule at issue in this action.

JURISDICTION AND VENUE

12. This Court has jurisdiction over this action pursuant to MCL 600.6419, et. seq.

13. Venue is proper pursuant to MCL 600.6410 and 600.6419.

FACTUAL BACKGROUND

Per- and Polyfluoroalkyl Substances

14. Per- and polyfluoroalkyl substances ("PFAS") refers to thousands of compounds with a wide range of physical and chemical properties (*e.g.*, solids, liquids, and gases), uses, and characteristics. Among other uses, PFAS substances have been used for their water and stain repellency, resistance to high temperatures, and to reduce surface tensions. At issue in this suit are the seven PFAS compounds, also with varying characteristics, for which EGLE has promulgated drinking water standards: PFOA, PFOS, PFNA, PFHxA, PFHxS, PFBS, and HFPO-DA.

EGLE's Rulemaking Authority Under the Michigan Safe Drinking Water Act

15. Under Section 5 of the SDWA, MCL 325.1005, EGLE is authorized to promulgate and enforce "[s]tate drinking water standards and associated monitoring requirements, the attainment and maintenance of which are ***necessary to protect the public health***." (emphasis added).

16. In promulgating any drinking water standards, Section 5 of the SDWA requires that EGLE follow the Michigan APA.

17. The APA requires agencies promulgating rules to follow a process to evaluate whether there are appropriate and necessary policy and legal bases for the rulemaking, evaluate

the regulatory impact of the rule, provide notice to the public and opportunities for public participation, and obtain approvals from the Michigan Office of Administrative Hearings and Rules ("MOAHR"), the Legislative Service Bureau ("LSB"), and the Joint Committee on Administrative Rules ("JCAR"). *See, e.g.*, MCL 24.239, 24.241, 24.242, 24.245 & 24.245a.

18. As part of this process, the agency must prepare a Regulatory Impact Statement ("RIS") that, among other things, (a) estimates compliance costs on individuals, businesses, and "other groups," (b) estimates a variety of costs and impacts unique to small businesses, (c) estimates the primary and direct benefits of the rule, and (d) demonstrates that the proposed rule is "necessary and suitable to achieve its purpose in proportion to the burdens it places on individuals." *See* MCL 24.245(3)(*l*)-(s), (x).

19. For certain rulemaking proceedings conducted by EGLE, the APA also requires review and approval by the ERRC. *See* MCL 24.266.

20. The ERRC is an independent body within EGLE, which has the responsibility of overseeing rulemaking conducted by EGLE. The ERRC is comprised of twelve members appointed by the Governor and four nonvoting ex-officio members. *See* MCL 24.265 & 324.99923.

21. When a rulemaking proceeds under ERRC review, reviews occur at two stages in the rulemaking proceedings:

a. After receiving the draft rule and RIS, the ERRC must determine if the draft rule meets specific statutory criteria. These criteria include, among other things, that the rule is: (i) consistent with "the rule-making delegation contained in the statute authorizing the rule-making;" (ii) "necessary and suitable to achieve [its] purpose in proportion to the burdens [it] place[s] on individuals and businesses," and (iii) "based on sound and objective scientific reasoning." MCL 24.266(4).

b. After the public comment period has ended and the ERRC has received "an agency report containing a synopsis of the comments made at and received in connection with the public hearing and a description of any changes that are suggested by [EGLE] to the draft proposed rule[]," the ERRC must "discuss the report and comments made and testimony given at the public hearing" and determine whether to approve the proposed rule with modifications, approve the proposed rule, or reject the proposed rule. MCL 24.266(8), (9).

EGLE's Initiation of the Rulemaking Process for PFAS Substances

22. On March 26, 2019, Governor Gretchen Whitmer announced that Michigan was establishing enforceable drinking water standards, also known as Maximum Contaminant Levels ("MCLs"), for PFAS. The announcement did not direct EGLE to establish drinking water standards for any particular PFAS.

23. In Governor Whitmer's March 26, 2019 announcement, she directed the Michigan PFAS Action Response Team ("MPART") to "form a science advisory workgroup to review both existing and proposed health-based drinking water standards from around the nation to inform the rulemaking process for appropriate Maximum Contaminant Levels (MCL) for Michigan by no later than July 1, 2019." Office of Governor Gretchen Whitmer, *Gov. Whitmer Directs MDEQ to File a Request for Rulemaking to Establish PFAS Drinking Water Standards*, https://www.michigan.gov/whitmer/0,9309,7-387-90499_90640-493041--,00.html (accessed March 31, 2021).

24. The March 26, 2019 announcement also directed EGLE "to immediately file a Request for Rulemaking to establish enforceable MCLs for PFAS in our drinking water supplies." *Id.* Governor Whitmer directed that the proposed regulations "be completed on an accelerated schedule with input from stakeholders by no later than October 1, 2019." *Id.*

25. Nothing in Governor Whitmer's announcement could or did amend or abrogate any statutory obligations created by the SDWA and APA for a rulemaking process to establish drinking water standards.

26. In accordance with Governor Whitmer's direction, EGLE filed a Request for Rulemaking with the Office of Regulatory Reinvention on March 26, 2019 to begin the rulemaking process.

27. Just two days later, on March 28, 2019, the Office of Regulatory Reinvention approved the Request for Rulemaking. Request for Rulemaking, available at https://ars.apps.lara.state.mi.us/Transaction/DownloadFile?FileName=RFRForm_2019-35_EG.pdf&FileType=RFRForm&TransactionID=29&EffectiveDate=8%2F3%2F2020 (accessed March 31, 2021).

Science Advisory Workgroup Report

28. On April 4, 2019, MPART approved a motion to form a Science Advisory Workgroup ("Workgroup").

29. On April 11, 2019, MPART named three members to the Workgroup: Dr. David Savitz, Kevin Cox, and Dr. Jamie DeWitt. Both Dr. Savitz and Dr. DeWitt have served and continue to serve as experts for plaintiffs in litigation related to PFAS. *E.g., Baker v. Saint-Gobain Performance Plastics Corp.*, No. 1:16-cv-917 (N.D.N.Y); *Brimmer v. Wolverine World Wide, Inc.*, No. 18-01136-CZ (Mich. Cir. Ct.).

30. Under the timeline established by Governor Whitmer, the Workgroup had just eleven weeks to complete its review and develop recommended health-based drinking water standards, or MCLs, for PFAS.

31. The time and resources allocated to developing these MCLs were a mere fraction of the time and resources that are typically needed to develop an MCL. MCL development typically takes multiple years and involves extensive teams of scientists and toxicologists, comprehensive review and analyses of available science, and an independent peer review process in advance of the public notice and comment period.

32. The Workgroup released a report on June 27, 2019, within Governor Whitmer's timeline, titled "Health-Based Drinking Water Value Recommendations for PFAS in Michigan" ("Workgroup Report"), available at https://www.michigan.gov/documents/pfasresponse/Health-Based_Drinking_Water_Value_Recommendations_for_PFAS_in_Michigan_Report_659258_7.pdf (accessed March 31, 2021).

33. Because the Workgroup Report was completed under such an accelerated timeline, *id.* at 36, the Workgroup placed significant limitations on the scope of the review and did not allow for an independent peer review process. *See id*. at 5; *see also* Comments Submitted to EGLE, at 20, 266[2] available at https://ars.apps.lara.state.mi.us/Transaction/DownloadFile?FileName=WrittenComments.pdf&FileType=JCARPackageWrittenComments&TransactionID=29&EffectiveDate=8%2F3%2F2020 (accessed March 31, 2021).

34. The Workgroup acknowledged in its report that the short timeframe afforded to it limited the scope of its technical review and analysis to "existing and proposed national- and

[2] Pincites to PDF page numbers as the document is a compilation of independently paginated materials.

state-derived PFAS assessments to inform its decision-making process as opposed to conducting a full systematic review of available scientific literature on PFAS." Workgroup Report at 5, available at https://www.michigan.gov/documents/pfasresponse/Health-Based_Drinking_Water_Value_Recommendations_for_PFAS_in_Michigan_Report_659258_7.pdf (accessed March 31, 2021).

35. Some of the assessments the Workgroup considered have significant flaws, are incomplete, and do not reflect the most recent and best data and analysis available.

36. The Workgroup also acknowledged "significant scientific uncertainty" with regard to PFAS exposure and health outcomes. *Id*. at 9.

37. Despite these limitations and uncertainties, the Workgroup recommended the following health-based drinking water standards, *id*. at 3:

a. PFNA: 6 ppt
b. PFOS: 16 ppt
c. PFOA: 8 ppt
d. PFHxA: 400,000 ppt
e. PFHxS: 51 ppt
f. PFBS: 420 ppt
g. HFPO-DA: 370 ppt

38. The health-based values the Workgroup derived were flawed because, among other things, the Workgroup relied on assumptions and uncertainty values in place of available data, deviated from standard risk assessment methodologies, relied on studies that lacked fundamental scientific rigor, and failed to consider key human studies that would have provided the best available data.

EGLE's Proposed Rule and Regulatory Impact Statement

39. As directed by Governor Whitmer, EGLE developed a draft rule set for PFAS, numbered 2019-35 EG ("Proposed Rule"), by October 1, 2019. *See* ERRC October 31, 2019 Meeting Packet, available at https://www.michigan.gov/documents/egle/egle-imd-errc-2019-10-31_Meeting_Packet_669637_7.pdf (accessed April 7, 2021); *see also* March 26, 2019 Office of Governor Gretchen Whitmer Press Release, available at https://www.michigan.gov/whitmer/0,9309,7-387-90499_90640-493041--,00.html (accessed April 6, 2021).

40. The Proposed Rule identified drinking water standards, or MCLs, for seven PFAS substances, and contained requirements for testing water supplies, treating any exceedances of the standards, operator oversight, public notification, and laboratory certification. *See* ERRC October 31, 2019 Meeting Packet at 64[3], available at https://www.michigan.gov/documents/egle/egle-imd-errc-2019-10-31_Meeting_Packet_669637_7.pdf (accessed April 7, 2021)

41. The MCLs in the Proposed Rule were identical to the health-based drinking water standards proposed by the Workgroup, *id.*:

a. PFNA: 6 ppt

b. PFOS: 16 ppt

c. PFOA: 8 ppt

d. PFHxA: 400,000 ppt

e. PFHxS: 51 ppt

f. PFBS: 420 ppt

[3] Pincites to PDF page numbers as the document is a compilation of independently paginated materials.

g. HFPO-DA: 370 ppt

42. EGLE representatives have acknowledged that they relied wholly on the Workgroup Report in selecting these MCLs and they did not consider "other studies because that was the charge of the Science Advisory Work Group." October 31, 2019 ERRC Meeting Video, available at https://www.youtube.com/watch?v=Zee5nHK7sqs&feature=youtu.be (accessed March 31, 2021).

43. The RIS accompanying the Proposed Rule provided cursory information about the costs and benefits of the Proposed Rule. *See* October 11, 2019 Regulatory Impact Statement, attached as Exhibit B.

44. In the RIS, EGLE acknowledged that "[m]ore study on the health benefits and impacts of PFAS exposure reduction and the economic benefit is required before a serious estimate [of the benefits] can be made." *Id*. at 7. But, EGLE went ahead and speculated that the Proposed Rule would result in "a general improvement in public health" and that "there is likely a significant benefit to the reduction [in] exposure to PFAS chemicals given recent findings of the health effects." *Id.*

45. EGLE did not substantiate its claim of a causal relationship between exposure to PFAS chemicals and "health effects." The referenced "health effects" are only reported as associations, and the literature on this subject is so inconsistent that both the federal Agency for Toxic Substances and Disease Registry ("ATSDR") and the Michigan PFAS Science Advisory Panel concluded that causal relationships have not been established for any of the associations reported. S*ee* ATSDR, *Toxicological Profile for Perfluoroalkyls (PFAS)*, available at https://www.atsdr.cdc.gov/sites/peer_review/tox_profile_perfluoroalkyls.html (accessed March 31, 2021); Michigan PFAS Science Advisory Panel, Scientific Evidence and Recommendations

for Managing PFAS Contamination in Michigan at 10 (Dec. 7, 2018), available at https://www.michigan.gov/documents/pfasresponse/Science_Advisory_Board_Report_641294_7.pdf (accessed March 31, 2021).

46. In addition, EGLE entirely failed to evaluate the benefits of setting an MCL at the proposed levels as opposed to 5, 50, or 500 ppt higher or lower. Without evaluating the incremental benefits of setting an MCL at one level versus another, there was no way for EGLE to evaluate whether the Proposed Rule was necessary and suitable to protect human health.

47. EGLE also failed to provide a quantitative estimate of the benefits as required by MCL 24.245(3)(x).

48. EGLE further failed to adequately compare the proposed rule to parallel standards set by other states as required by MCL 24.245(3)(a). The RIS instead merely states that the proposed standards "are similar to standards being proposed by other states" and wholly ignores that the proposed standards are the strictest in the country for PFNA, PFOA, and PFBS, failing to "explain why and specify the costs and benefits arising out of the deviation." Ex. B at 1–2.

49. Moreover, the RIS fails to provide any support for the proposed PFHxS, PFOS, and HFPO-DA standards where they each arbitrarily fall above or below other state standards without explanation. *Id.*

50. Further, the RIS failed to adequately account for the costs that the Proposed Rule would impose on public water systems, their customers, and other businesses and groups as required by MCL 24.245(3)(k), (l), (n).

51. EGLE failed to fully consider the rule's ongoing operation and maintenance costs for water systems, or the costs for retrofitting, treatment and pretreatment, sampling, and disposing of waste arising from those activities.

52. In addition, Michigan had existing groundwater cleanup standards for PFOS and PFOA of 70 ppt, combined or individually, under the Part 201 Site Investigation and Cleanup Program ("Part 201 Program"). Adopting the Proposed Rule would automatically result in lowering the PFOS cleanup standard from 70 ppt to 16 ppt and the PFOA cleanup standard from 70 ppt to 8 ppt. *See generally* Ex. B at 2.

53. EGLE failed to account altogether for the costs that would arise from the required changes to the groundwater cleanup standards for PFOS and PFOA under the Part 201 Program.

54. Moreover, once the Proposed Rule was adopted, EGLE could establish new groundwater cleanup standards for PFNA, PFHxS, PFHxA, PFBS, and HFPO-DA that were consistent with the MCLs for those substances. That is precisely what EGLE did after adopting the Final Rule. December 21, 2020 EGLE Press Release, available at https://www.michigan.gov/egle/0,9429,7-135-3308_3323-548018--rss,00.html (accessed April 6, 2021).

55. In the October 11, 2019 RIS, EGLE also failed to account for the costs that would arise from the new and revised cleanup standards and associated costs for the management of biosolids, compost, and soils. *See* Ex. B.

56. Because EGLE relied on speculative benefits not tied to the level of the MCL, and did not fully account for all of the costs associated with the Proposed Rule, EGLE could not and did not demonstrate that "the proposed rule [was] necessary and suitable to achieve its purpose in proportion to the burdens" in accordance with MCL 24.245(3)(m).

ERRC's First Vote on the Proposed Rule

57. The Proposed Rule and RIS were transmitted to the ERRC on or about October 11, 2019. *See* October 11, 2019 EGLE Press Release, *Michigan Moves Forward on Drinking*

Water Standards for PFAS, available at https://www.michigan.gov/egle/0,9429,7-135--509830--,00.html (accessed April 7, 2021).

58. The ERRC met on October 31, 2019 to deliberate on and determine whether the Proposed Rule met the criteria in MCL 24.266(4). *See* October 31, 2019 ERRC Meeting Agenda, available at https://www.michigan.gov/documents/pfasresponse/ERRC_Final_Meeting_Agenda_-_October_31_2019_670037_7.pdf (accessed April 6, 2021).

59. During the deliberations at the October 31, 2019 meeting, some members of the ERRC expressed concerns that EGLE did not fully account for all costs associated with the Proposed Rule, such as those related to retrofitting, disposal, and compliance with the new groundwater cleanup standards that would result from the rule. They expressed concern that there was not a full understanding of the burdens the Proposed Rule would place on individual businesses. *See* October 31, 2019 ERRC Meeting Video, available at https://www.youtube.com/watch?v=Zee5nHK7sqs&feature=youtu.be (accessed March 31, 2021).

60. Some ERRC members also raised questions about the studies and judgment calls that informed the Workgroup's development of the proposed MCLs. For instance, ERRC members questioned whether sufficient weight was given to studies conducted by other states and why the Workgroup had chosen certain values that were lower than those selected by other states. They also commented that the process used to develop the values was imprecise. The attendees that were present did not address the substance of these comments. Instead, they indicated that the scientific basis for the MCLs had already been addressed during a June 2019 meeting. *See id.*

61. At the close of the October 31, 2019 meeting, the ERRC decided that it needed additional information regarding the Proposed Rule and would not vote on the rule until its next meeting, which it scheduled for November 14, 2019. *See id.*

62. Following the October 31, 2019 meeting, the ERRC forwarded questions on the Proposed Rule and RIS to David Fiedler, the Regulatory Affairs Officer of EGLE. These questions related to the proposed costs associated with the rule, the impact that the rules would have on compliance obligations and associated costs under Michigan's Part 201 Program, and the ability of the rule to adapt to evolving science since "[i]t has been acknowledged that science around these new MCL's [sic] will continue to emerge." ERRC November 14, 2019 Meeting Packet at 7[4], available at https://www.michigan.gov/documents/egle/egle-imd-errc-2019-11-14_Meeting_Packet_671266_7.pdf (accessed April 7, 2021).

63. Mr. Fiedler first responded to ERRC's questions on behalf of EGLE on November 12, 2019 and updated his response on November 13, 2019. *See id.*

64. In response to ERRC's questions, EGLE updated the RIS to include additional information about the costs to local health departments overseeing the rule and the costs of installing treatment systems, but still failed to fully account for other costs such as ongoing operation and maintenance costs. *See* November 25, 2019 Published RIS at 3, attached as Exhibit C.

65. EGLE's responses to ERRC also explained that Question 3.A of the RIS would be updated to read:

> There are surface water standards and groundwater cleanup standards. The groundwater cleanup standards for PFOA and PFOS will be changed as a result of the rule to match the final values adopted for those chemicals. The state may move forward

[4] Pincites to PDF page numbers as the document is a compilation of independently paginated materials.

> for groundwater standards for PFNA, PFHxS, PFBS, PFHxA and HFPO-DA following the process set forth in MCL 324.20120a. However, adoption of the proposed rules does not alter that process. Any new groundwater standards will be factored into future decisions regarding the biosolids application program.

ERRC November 14, 2019 Meeting Packet at 7[5], available at https://www.michigan.gov/documents/egle/egle-imd-errc-2019-11-14_Meeting_Packet_671266_7.pdf (accessed April 7, 2021). However, the RIS was instead updated as follows:

> Since there are not generic groundwater cleanup standards for PFNA, PFHxS, PFBS, PFHxA and HFPO-DA, the department may establish them following the process set forth in Natural Resource and Environmental Protection Act, 1994 PA 451, MCL 324.20120a(23). Ex. C at 2.

66. Even though EGLE's responses to ERRC explained that the rule could impact stakeholders' compliance obligations under Michigan's Part 201 Program, EGLE did not update the RIS to discuss this impact. *See id.* at 3.

67. Moreover, in response to ERRC's specific request that EGLE estimate the impact of changing compliance obligations under the Part 201 Program on small businesses, state agencies, municipalities, and other stakeholders, EGLE stated that "it is not practical to determine the impact of this change."

68. During the November 14, 2019 meeting, some members of the ERRC continued to raise questions about whether the Proposed Rule met all of the criteria set forth in MCL 25.266(4). *See* November 14, 2019 ERRC Meeting Video, available at https://www.youtube.com/watch?v=deZxu0856qA&feature=youtu.be (accessed March 31, 2021). Specifically, they raised concerns about the changing compliance obligations under the

[5] Pincites to PDF page numbers as the document is a compilation of independently paginated materials.

Part 201 Program that would result from the Proposed Rule, and the burdens those obligations would place on individuals and businesses, and the science underlying the Proposed Rule. *See id.*

69. Without ever addressing these questions regarding the burdens of and scientific basis for the Proposed Rule, the ERRC voted that the Proposed Rule met all of the criteria set forth in MCL 25.266(4) and could proceed to the public hearing process. *See id.*

70. Even though they voted that all of the statutory criteria of MCL 25.266(4) were met, some members of the ERRC acknowledged that their view on whether the Proposed Rule met the statutory criteria might change based on the outcome of the public hearing process. *See id.*

Public Comment Period

71. Upon receiving ERRC approval, EGLE filed the Proposed Rule and the RIS with Michigan's Office of Administrative Hearings and Rules ("MOAHR"). *See* EGLE Rulemaking Process Overview, available at https://www.michigan.gov/documents/egle/Rulemaking_Process_Overview_679312_7.pdf (accessed April 7, 2021).

72. On December 12, 2019, EGLE published a Notice of Public Hearing. The Notice of Public Hearing announced that three public hearings would be held with respect to the Proposed Rule on January 8, 2020, January 14, 2020, and January 16, 2020. The Notice of Public Hearing also announced that EGLE would accept written comments on the Proposed Rule until January 31, 2020. *See* EGLE Notice of Public Hearing, available at https://ars.apps.lara.state.mi.us/Transaction/DownloadFile?FileName=NoPHForm_2019-

35_EG.pdf&FileType=NoPHForm&TransactionID=29&EffectiveDate=8%2F3%2F2020&ReturnHTML=True (accessed at March 31, 2021).

73. During the short public comment period, EGLE received 3,334 written and 82 oral comments on the rules. *See* Summary of Public Comments for Rule Set #2019-35 EG, attached as Exhibit D. Those comments addressed both the rulemaking process and the substance of the Proposed Rule. *See id*. at 3.

74. Some commenters, including Plaintiff, expressed concern that the rulemaking process was so rushed that it had not afforded EGLE adequate time to develop a scientifically sound rule and to fully understand the impacts of the proposed rule. *See id.*

75. Several commenters, including Plaintiff, called into question the seven health-based values established by the Workgroup and incorporated in the Proposed Rule. These commenters did not think it necessary or appropriate to regulate the seven compounds selected by EGLE and questioned whether the levels proposed were necessary to address public health concerns, if any. *See id.*

76. Plaintiff and other commenters highlighted that the rushed rulemaking process resulted in flawed proposed MCLs and that the Workgroup relied on assumptions and uncertainty values in place of available data, deviated from standard risk assessment methodologies, relied on studies that lacked fundamental scientific rigor, and failed to consider key human studies that would have provided the best available data. *See* Comments Submitted to EGLE, at 20–23[6], available at https://ars.apps.lara.state.mi.us/Transaction/DownloadFile?FileName=WrittenComments.pdf&FileType=JCARPackageWrittenComments&TransactionID=29&EffectiveDate=8%2F3%2F2020

[6] Pincites to PDF page numbers as the document is a compilation of independently paginated materials.

(accessed March 31, 2021). They urged EGLE to rely on sound scientific data and approaches before moving forward in the rulemaking process. *See id.*

77. Stakeholders, including Plaintiff, also commented that the RIS failed to adequately substantiate and analyze the costs and benefits of the Proposed Rule. *See generally id*.

78. Specifically, these comments pointed out that EGLE had not fully addressed the costs of ongoing operation and maintenance costs for water systems, retrofitting, treatment and pretreatment, sampling, and disposing of waste arising from those activities, and that EGLE failed to account altogether for the costs that would arise from the resulting changes to the groundwater cleanup standards for PFOS and PFOA and associated costs for the management of biosolids, compost, and soils. *See id*. at 23, 253.

79. Plaintiff and other commenters also explained that the purported benefits of the Proposed Rule described in the RIS were speculative and not supported by sound science. *See id*. at 20–22, 281.

EGLE Responses to Public Comments and Revisions to the Proposed Rule

80. On February 21, 2020, just three weeks after receiving *thousands* of public comments, EGLE released a summary of those comments. *See* Ex. D.

81. The summary acknowledged that commenters had raised concerns regarding the scientific basis for the Proposed Rule, the adequacy of the RIS, and the thoroughness and appropriateness of the rulemaking process due to its accelerated nature. *See id.* EGLE itself commented that the "one-year promulgation" timeframe that had been set for the rule "represents an accelerated timetable, with these rules normally taking multiple years to complete." *Id*. at 5.

82. Although EGLE's summary generally acknowledged the concerns commenters raised, EGLE failed to describe the concerns with any specificity or respond substantively to them. *See id.*

83. Instead, just three weeks after the close of the public comment period, and despite receiving thousands of comments, some of which included detailed technical information, EGLE determined that no substantive changes to the Proposed Rule were warranted. *See id.* at 6.

84. The only changes that EGLE made to the Proposed Rule were to correct typos in the Chemical Abstract Service ("CAS") Registry Numbers for PFBS and PFHxS (resulting in the "Revised Proposed Rule"). *Id.*

ERRC's Second Vote

85. On February 27, 2020, just six days after receiving EGLE's summary and over 1,000 pages of public comments, the ERRC met to discuss EGLE's summary of comments and vote on the Revised Proposed Rule. February 27, 2020 ERRC Meeting Minutes, available at https://www.michigan.gov/documents/egle/Environmental-Rules-Review-Committee-ERRC-Meeting-Minutes-Feb-27-2020_711225_7.pdf (accessed March 31, 2021).

86. During the meeting, an ERRC member expressed concern that EGLE's summary of comments did not fully reflect the substance of the comments submitted to EGLE. February 27, 2020 ERRC Meeting Video, available at https://www.youtube.com/watch?v=dQKuu9yyPMs (accessed March 31, 2021).

87. Some ERRC members also noted that EGLE still had not adequately accounted for the full costs and impacts of the rule. *See id.*

88. In addition, multiple ERRC members stated that both EGLE and the ERRC itself had not had enough time to review the lengthy comments that critiqued the scientific basis for the Revised Proposed Rule. See *id.*

89. Nevertheless, other members of the ERRC suggested that ERRC did not need time to review the comments before voting on the Revised Proposed Rule. *See id.*

90. The ERRC discussed how to communicate their comments, concerns, and key points to JCAR. ERRC member Jeremy Orr then made a motion to approve the Revised Proposed Rule without having addressed ERRC's outstanding issues and concerns. Instead, the ERRC voted to approve the Revised Proposed Rule and have Chair Robert Nederhood work with EGLE to draft a supplement to JCAR describing the ongoing concerns as well as the factors that went into the decision. *See id*.

91. ERRC was not required to approve or disapprove the Revised Proposed Rule at its February 27, 2020 meeting. ERRC could have asked EGLE to provide the additional information and clarifications requested *before* voting to approve the Revised Proposed Rule.

92. Nonetheless, a majority of the ERRC ultimately voted to approve the Revised Proposed Rule despite the outstanding questions and concerns that had been raised, and despite the fact that multiple ERRC members had not had time to review the full rulemaking package, including comments and responses. *See id.*

93. ERRC's vote to approve the Revised Proposed Rule meant that neither ERRC nor the public had the opportunity to consider or provide comment on the additional information ERRC requested be added to the rulemaking package.

Promulgation of the Final Rule

94. On March 16, 2020, the Revised Proposed Rule was filed with the JCAR for the final step of the rulemaking process. *See* March 16, 2020 MOAHR Letter to JCAR, available at http://legislature.mi.gov/publications/jcar/JCAR%20Files/Rule%20Documents%20by%20Department%20and%20Rule%20Number/Department%20of%20Environment,%20Great%20Lakes,%20and%20Energy/2019-035%20EG/2019-035%20EG%20JCARPackage_Letter.pdf (accessed April 7, 2021).

95. On March 23, 2020, despite having approved the Revised Proposed Rule nearly one month earlier, the ERRC sent a letter to JCAR that raised "several questions and concerns regarding the [Revised Proposed Rule] and [its] interpretation and implementation." March 23, 2020 Email to JCAR at 1, available at https://mimfg.org/Portals/0/Documents/GA/envpfas_errc-jcar-letter_200323.pdf (accessed March 31, 2021). This was not consistent with the understanding at the February 27, 2020 ERRC meeting that such a letter would accompany the Revised Proposed Rule when it was submitted to JCAR. *See* February 27, 2020 ERRC Meeting, available at https://www.youtube.com/watch?v=dQKuu9yyPMs&feature=youtu.be (accessed April 6, 2021).

96. ERRC's March 23, 2020 letter to JCAR identified several concerns with the Revised Proposed Rule, including that it "create[s] ambiguity with respect to certain regulations which are ancillary to drinking water, including Part 201 clean-up criteria and regulations of biosolids, compost and soils." March 23, 2020 Email to JCAR at 1, *supra*.

97. In addition, ERRC's March 23, 2020 letter acknowledged that "[t]he written public comments submitted in response to the [Proposed Rule] include multiple technical reports that exhaustively analyzed the report of the MPART Science Advisory Workgroup" and

"encourage[d] MPART or the Science Advisory Workgroup to provide more detailed written responses to those public comments." *Id*. at 2.

98. Just as it did when it promised ERRC it would update the Proposed Rule, EGLE again failed to act on ERRC's letter. In its rush to promulgate a rule, EGLE failed to provide additional information regarding the impacts of the Revised Proposed Rule or a more detailed written response to the public comments, whether from itself, MPART, or the Science Advisory Workgroup.

99. During the fifteen session days that the Revised Proposed Rule was before JCAR, JCAR failed to affirmatively act to object to the Revised Proposed Rule, request that EGLE make changes to the rule, introduce a bill to enact the rule into law, or waive the fifteen session days and allow the rule to proceed to promulgation.

100. On July 27, 2020, following the expiration of fifteen session days, the MOAHR filed the Revised Proposed Rule with the Office of the Great Seal, making the rule final and official. Department of Environment, Great Lakes, and Energy Drinking Water and Environmental Health Division Supply Water to the Public (July 27, 2020), available at https://ars.apps.lara.state.mi.us/Transaction/DownloadFile?FileName=FinalRule.pdf&FileType=FinalRule&TransactionID=29&EffectiveDate=8%2F3%2F2020 (accessed March 31, 2021).

101. The Final Rule became effective on August 3, 2020. *See id*.

102. As a result of the Final Rule, approximately 2,700 water supplies in Michigan are now subject to the MCLs for PFNA, PFOS, PFOA, PFHxA, PFHxS, PFBS, and HFPO-DA. *See* July 22, 2020 EGLE Press Release, *Michigan Adopts Strict PFAS in Drinking Water Standards*, available at https://www.michigan.gov/pfasresponse/0,9038,7-365-86513_96296-534663--,00.html (accessed April 7, 2021).

103. These water supplies will be required to test for these substances quarterly or annually and treat any exceedances of the MCLs.

104. In addition, the groundwater cleanup standards for PFOS and PFOA under Michigan's Part 201 Program were immediately lowered from 70 ppt to 16 ppt and 8 ppt, respectively. For PFNA, PFHxS, PFHxA, PFBS, and HFPO-DA, EGLE went forward with establishing new groundwater cleanup standards on December 21, 2020 that were consistent with the MCLs for those substances. Those criteria became effective on that same date. *See* December 21, 2020 EGLE Press Release, EGLE Updates PFAS Cleanup Standards, *Adding Five New Compounds*, available at https://www.michigan.gov/egle/0,9429,7-135-3308_3323-548018--rss,00.html (accessed April 6, 2021).

105. Ongoing remediations at contaminated sites in the state are now subject to these lowered and unsupported standards, resulting in increased cleanup costs. *Id.*; Part 201.

106. Lowering the groundwater standards has resulted in at least 42 additional sites, including landfills and over a dozen former plating or manufacturing sites, being investigated by EGLE. It will also likely impact compliance obligations with regard to biosolids, compost, and soils. *See* July 22, 2020 EGLE Press Release, *Michigan Adopts Strict PFAS in Drinking Water Standards*, available at https://www.michigan.gov/pfasresponse/0,9038,7-365-86513_96296-534663--,00.html (accessed April 7, 2021).

CLAIMS FOR RELIEF

COUNT ONE: DECLARATORY JUDGMENT THAT THE RULE IS INVALID BECAUSE IT EXCEEDS EGLE'S AUTHORITY UNDER THE SDWA

107. Plaintiff repeats and incorporates by reference every allegation in the preceding paragraphs.

108. The scope of EGLE'S authority to promulgate drinking water standards is set forth in Section 5 of the SDWA, MCL 325.1005.

109. As set forth in Section 5, EGLE may only promulgate drinking water standards that "are necessary to protect the public health" and must evaluate the costs and benefits of the rule, including impacts on small businesses.

110. The drinking water standards in the Final Rule are not necessary to protect the public health.

111. As described above, EGLE speculated that the impact of the rule would be a "general improvement in public health" and that "there is likely a significant benefit to the reduction [in] exposure to PFAS chemicals given recent findings of the health effects." Ex. C at 8.

112. EGLE did not evaluate the benefits to be obtained by setting the MCLs at the proposed levels as opposed to 5, 50, or 500 ppt higher or lower.

113. Without evaluating the incremental benefits of setting the MCLs at one level versus another, there was no way for EGLE to evaluate whether the Proposed Rule was necessary to protect public health.

114. EGLE itself acknowledged that "[m]ore study on the health benefits and impacts of PFAS exposure reduction . . . is required." Ex. C at 8.

115. Because EGLE cannot promulgate a drinking water standard under the SDWA unless it is necessary to protect the public health and EGLE failed to meet this standard, this Court should declare the Final Rule invalid and enjoin EGLE from implementing and enforcing the Final Rule.

COUNT TWO: DECLARATORY JUDGMENT THAT THE RULE IS INVALID BECAUSE IT IS ARBITRARY AND CAPRICIOUS

116. Plaintiff repeats and incorporates by reference every allegation in the preceding paragraphs.

117. Under Michigan law, an administrative rule is invalid if it is arbitrary and capricious. *See Mich. Farm Bureau v. Dep't of Envtl. Quality*, 292 Mich App 106, 128-29, 807 NW2d 866, 883 (2011).

118. An agency rule will be found to be arbitrary and capricious if the agency "had no reasonable ground for the exercise of judgment." *See id.* at 890 (internal quotations and citation omitted).

119. In developing the health-based drinking water standards and promulgating the Final Rule, EGLE and its Workgroup relied on assumptions and uncertainty values in place of available data, deviated from standard risk assessment methodologies, relied on studies that lacked fundamental scientific rigor, and failed to consider key human studies that would have provided the best available data.

120. Although EGLE and its Workgroup referenced other state drinking water standards during the rulemaking process, the Final Rule adopted standards that arbitrarily deviated from those adopted by other states without explanation.

121. Even though these significant flaws were brought to EGLE's attention during the public comment period, EGLE failed to address them through responses to comment or revisions to the health-based drinking water standards.

122. Likewise, even though ERRC "encourage[d] MPART or the Science Advisory Workgroup to provide more detailed written responses to those public comments," EGLE, MPART, and Workgroup failed to do so. March 23, 2020 Email to JCAR at 2, available at

https://mimfg.org/Portals/0/Documents/GA/envpfas_errc-jcar-letter_200323.pdf (accessed March 31, 2021).

123. Instead, EGLE finalized the proposed drinking water standards even though it was aware of the "significant scientific uncertainty" surrounding the standards and acknowledged that a "serious estimate" of the benefits of those standards could not be made. *See* Workgroup Report at 9, available at https://www.michigan.gov/documents/pfasresponse/Health-Based_Drinking_Water_Value_Recommendations_for_PFAS_in_Michigan_Report_659258_7.pdf (accessed March 31, 2021); Ex. C at 8.

124. EGLE's decision to promulgate the Final Rule and the associated drinking water standards had no reasonable grounds, and was thus arbitrary and capricious.

125. Accordingly, this Court should declare the Final Rule invalid and enjoin EGLE from implementing and enforcing the Final Rule.

COUNT THREE: DECLARATORY JUDGMENT THAT EGLE FAILED TO ADEQUATELY ASSESS THE IMPACT OF THE RULE IN ITS REGULATORY IMPACT STATEMENT AS REQUIRED BY MCL 24.245.

126. Plaintiff repeats and incorporates by reference every allegation in the preceding paragraphs.

127. Section 5 of the SDWA requires EGLE to follow the procedures set forth in the APA when promulgating state drinking water standards and associated monitoring requirements. MCL 325.1005.

128. A critical requirement in the APA rulemaking process is that the promulgating agency must prepare a RIS. MCL 24.245(3)

129. Under MCL 24.245(3), the RIS must address several topics. Among other things, the RIS must (a) estimate compliance costs on individuals, businesses, and "other groups," (b)

estimate a variety of costs and impacts unique to small businesses, (c) estimate the primary and direct benefits of the rule, and (d) demonstrate that the proposed rule is "necessary and suitable to achieve its purpose in proportion to the burdens it places on individuals." MCL 24.245(3)(*l*)-(s), (x).

130. EGLE did not comply with the APA because the RIS prepared by EGLE failed to adequately address these required topics. In particular:

a. The RIS failed to adequately account for the costs that the Proposed Rule would impose on public water systems, their customers, and other businesses and groups as required by MCL 24.245(3)(l)-(s) by:

   i. failing to fully consider the rule's ongoing operation and maintenance costs for water systems and the costs for retrofitting, treatment and pretreatment, sampling, and disposing of waste arising from those activities; and

   ii. failing to address altogether the costs that would arise from the resulting changes to the groundwater cleanup standards for PFOS and PFOA and associated costs for the management of biosolids, compost, and soils.

b. The RIS failed to estimate the primary and direct benefits of the rule as required by MCL 24.245(3)(x). Specifically, EGLE failed to substantiate its claim that the rule would improve public health. Instead, EGLE merely speculated that the impact of the Proposed Rule would be "a general improvement in public health" and that "there is likely a significant benefit to the reduction [in] exposure to PFAS chemicals given recent findings of the health effects." Ex. C at 8.

c. In violation of MCL 24.245(3)(x), the RIS failed to evaluate the benefits to be obtained by setting an MCL at the proposed levels as opposed to 5, 50, or 500 ppt higher or lower. Without evaluating the incremental benefits of setting an MCL at one level versus another, there was no way for EGLE to evaluate whether the Proposed Rule was necessary and suitable to protect human health.

d. The RIS failed to provide a quantitative estimate of the benefits as required by MCL 24.245(3)(x) and acknowledged that "[m]ore study on the health benefits and impacts of PFAS exposure reduction and the economic benefit is required before a serious estimate [of the benefits] can be made." Ex. C at 8.

e. Because EGLE relied on speculative and unquantified benefits not tied to the level of the MCL and did not fully account for all of the costs associated with the Proposed Rule, EGLE could not and did not demonstrate that "the proposed rule [was] necessary and suitable to achieve its purpose in proportion to the burdens" in accordance with MCL 24.245(3)(m).

131. "A rule that does not comply with the procedural requirements of the APA is invalid under Michigan Law." *Detroit Base Coalition for Human Rights of the Handicapped v. Dep't of Social Servs.*, 431 Mich. 172, 183, 428 NW 2d 335, 340 (1988).

132. Because EGLE did not comply with the RIS requirements in MCL 24.245(3), this Court should declare the Final Rule invalid and enjoin EGLE from implementing and enforcing the Final Rule.

COUNT FOUR: DECLARATORY JUDGMENT THAT ERRC FAILED TO CONSIDER AND DETERMINE WHETHER THE RULE EXCEEDS EGLE'S RULEMAKING AUTHORITY AS REQUIRED BY MCL 24.266.

133. Plaintiff repeats and incorporates by reference every allegation in the preceding paragraphs.

134. This rulemaking was subject to the ERRC review and approval procedures in MCL 24.266.

135. As required by MCL 24.266(4)(b), ERRC must consider and determine whether the Proposed Rule "reasonably implement[s] and appl[ies] the statute authorizing the rule-making and [is] consistent with all other applicable law" contained in the SDWA.

136. The SDWA requires that any drinking water standards promulgated by EGLE be "necessary to protect the public health." MCL 325.1005.

137. During its review of the Proposed Rule, ERRC did not consider whether the proposed MCLs reasonably implemented the requirement that the standards be necessary to protect the public health.

138. ERRC simply deferred to EGLE's mere speculation that the impact of the Proposed Rule would be a "general improvement in public health" and that "there is likely a significant benefit to the reduction [in] exposure to PFAS chemicals given recent findings of the health effects." Ex. C at 8. EGLE did not and cannot substantiate that the "health effects" are established as cause-and-effect relationships.

139. Under MCL 24.243, "a rule is not valid unless it is processed in compliance with section 66," MCL 24.266.

140. In addition, it is well settled under Michigan law that a rule is invalid if it is promulgated in violation of the APA. *See Detroit Base Coalition for Human Rights of the*

Handicapped, 431 Mich. at 183 ("A rule that does not comply with the procedural requirements of the APA is invalid under Michigan Law.")

141. Because ERRC did not comply with the requirements in MCL 24.266(4)(b), this Court should declare the Final Rule invalid and enjoin EGLE from implementing and enforcing the Final Rule.

COUNT FIVE: DECLARATORY JUDGMENT THAT ERRC FAILED TO CONSIDER AND DETERMINE WHETHER THE RULE IS NECESSARY AND SUITABLE TO ACHIEVE ITS PURPOSE IN PROPORTION TO ITS BURDENS AS REQUIRED BY MCL 24.266.

142. Plaintiff repeats and incorporates by reference every allegation in the preceding paragraphs.

143. This rulemaking was subject to the ERRC review and approval procedures in MCL 24.266.

144. As required by MCL 24.266(4)(c), ERRC must consider and determine whether the Proposed Rule is "necessary and suitable to achieve [its] purpose in proportion to the burdens [it] places[s] on individuals and businesses."

145. During its review of the Proposed Rule, ERRC did not determine whether the proposed MCLs were necessary and suitable to achieve their purpose in proportion to the burden they place on individuals and businesses.

146. The ERRC members questioned the scientific basis for the Proposed Rule and acknowledged that they did not have a full understanding of the burden the rules would place on individuals and businesses. *See* October 31, 2019 ERRC Meeting Video, available at https://www.youtube.com/watch?v=Zee5nHK7sqs&feature=youtu.be (accessed March 31, 2021); November 14, 2019 ERRC Meeting Video, available at https://www.youtube.com/watch?v=deZxu0856qA&feature=youtu.be (accessed March 31,

2021). ERRC nevertheless approved the rule without having determined that the rule is necessary and suitable to achieve its purpose and that it is based on sound and objective scientific reasoning.

147. Under MCL 24.243, "a rule is not valid unless it is processed in compliance with section 66," MCL 24.266.

148. In addition, it is well settled under Michigan law that a rule is invalid if it is promulgated in violation of the APA. *See Detroit Base Coalition for Human Rights of the Handicapped*, 431 Mich at 183 ("A rule that does not comply with the procedural requirements of the APA is invalid under Michigan Law.")

149. Because ERRC did not comply with the requirements in MCL 24.266(4)(c), this Court should declare the Final Rule invalid and enjoin EGLE from implementing and enforcing the Final Rule.

COUNT SIX: DECLARATORY JUDGMENT THAT ERRC FAILED TO CONSIDER AND DETERMINE WHETHER THE RULE IS BASED ON SOUND AND OBJECTIVE SCIENTIFIC REASONING AS REQUIRED BY MCL 24.266

150. Plaintiff repeats and incorporates by reference every allegation in the preceding paragraphs.

151. This rulemaking was subject to the ERRC review and approval procedures in MCL 24.266.

152. As required by MCL 24.266(4)(e), ERRC must consider and determine whether the Proposed Rule is "based on sound and objective scientific reasoning."

153. During its review of the Proposed Rule, ERRC did not determine that the proposed MCLs were based on sound and objective scientific reasoning.

154. To the contrary, ERRC members raised questions about the studies that were relied on and the judgment calls that were made by the Workgroup when developing the proposed MCLs. Nevertheless ERRC voted to approve the Proposed Rule without having determined that the criterion was met. *See* October 31, 2019 ERRC Meeting Transcript, available at https://www.youtube.com/watch?v=Zee5nHK7sqs&feature=youtu.be (accessed March 31, 2021); November 14, 2019 ERRC Meeting Transcript, available at https://www.youtube.com/watch?v=deZxu0856qA&feature=youtu.be (accessed March 31, 2021); February 7, 2020 ERC Meeting Transcript, available at https://www.youtube.com/watch?v=dQKuu9yyPMs (accessed March 31, 2021).

155. Under MCL 24.243, "a rule is not valid unless it is processed in compliance with section 66," MCL 24.266.

156. In addition, it is well settled under Michigan law that a rule is invalid if it is promulgated in violation of the APA. *Detroit Base Coalition for Human Rights of the Handicapped*, 431 Mich at 183 ("A rule that does not comply with the procedural requirements of the APA is invalid under Michigan Law.")

157. Because ERRC did not comply with the requirements in MCL 24.266(4)(e), this Court should declare the Final Rule invalid and enjoin EGLE from implementing and enforcing the Final Rule.

COUNT SEVEN: DECLARATORY JUDGMENT THAT THE RULE IS INVALID BECAUSE ERRC FAILED TO MAKE AN APPROPRIATE DETERMINATION REGARDING THE APPROVAL OF THE RULE AS REQUIRED BY MCL 24.266

158. Plaintiffs repeat and incorporate by reference every allegation in the preceding paragraphs.

159. This rulemaking was subject to the ERRC review and approval procedures in MCL 24.266.

160. As required by MCL 24.266(8) and (9), ERRC must determine whether to approve the proposed rule with modifications, approve the proposed rule, or reject the proposed rule after receiving "an agency report containing a synopsis of the comments made at and received in connection with the public hearing and a description of any changes that are suggested by [EGLE] to the draft proposed rule[]" and "discuss[ing] the report and comments made and testimony given at the public hearing."

161. ERRC's approval of the Revised Proposed Rule was improper and did not comply with MCL 24.266(9) for several reasons:

a. As set forth above, at least one ERRC member had concerns that the EGLE report was inadequate because it did not fully reflect the substance of the comments submitted to EGLE. *See* February 7, 2020 ERC Meeting Video, available at https://www.youtube.com/watch?v=dQKuu9yyPMs (accessed March 31, 2021).

b. In addition, ERRC members acknowledged that they had not sufficiently reviewed EGLE's report and the public comments prior to approving the Revised Proposed Rule. *See id.*

c. At the time the ERRC voted to approve the Revised Proposed Rule, ERRC members remained concerned that EGLE had not adequately addressed the comments that critiqued the scientific basis for the Revised Proposed Rule and whether EGLE had adequately accounted for the full costs and impacts of the rule. *See id.*

d. Even after ERRC voted to approve the Revised Proposed Rule, ERRC continued to raise questions and concerns about the Revised Proposed Rule, acknowledging that the Rule's impact remained unclear and that the written response to the public comments critiquing the scientific basis for the rule was inadequate. *See id.*

162. Under MCL 24.243, "a rule is not valid unless it is processed in compliance with section 66," MCL 24.266.

163. In addition, it is well settled under Michigan law that a rule is invalid if it is promulgated in violation of the APA. *Detroit Base Coalition for Human Rights of the Handicapped*, 431 Mich at 183 ("A rule that does not comply with the procedural requirements of the APA is invalid under Michigan Law.")

164. Because ERRC did not comply with the requirements in MCL 24.266(9), this Court should declare the Final Rule invalid and enjoin EGLE from implementing and enforcing the Final Rule.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff respectfully requests that the Court enter a judgment in its favor and against Defendant, and provide to Plaintiff the following relief:

a. A declaratory judgment and decree that the Final Rule is invalid because:

  i. The rule exceeds EGLE's authority under MCL 325.1005;

  ii. The rule is arbitrary and capricious;

  iii. EGLE failed to adequately assess the impact of the rule in its RIS as required by MCL 24.245;

iv. ERRC failed to consider and determine whether the rule exceeds EGLE's rulemaking authority as required by MCL 24.266(4)(a);

v. ERRC failed to consider and determine that the proposed rule was "necessary and suitable to achieve [its] purposes in proportion to the burden" it places "on individual and businesses" as required by MCL 24.266(4)(c);

vi. ERRC failed to consider and determine that the proposed rule was "based on sound and objective scientific reasoning as required by MCL 24.266(4)(e); and

vii. ERRC failed to make an appropriate determination regarding the approval of the rule as required by MCL 24.266(9).

b. Enjoin EGLE from implementing and enforcing the Final Rule; and

c. Such other legal or equitable relief as this Court deems just and proper.

Dated: April 15, 2021

Respectfully submitted,

By: /s/*Amy M. Johnston*

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Attorneys for Plaintiff 3M Company

VERIFICATION

I declare under the penalties of perjury that this Verified Complaint has been examined by me and that its contents are true to the best of my information, knowledge, and belief.

I hereby certify that I am physically located in Minnesota, outside of the State of Michigan and am signing this document intended for a filing in a matter before a court in the State of Michigan.

3M COMPANY

BY: ______________________________
ITS: Michael Irwin

This record was signed and sworn to before me by use of communication technology on this 21 day of April, 2021 by Michael Irwin who declared that he is located in Ramsey, Minnesota and that this record is to be filed with or relates to a matter before a court located in the territorial jurisdiction of the United States, or involves property located in the territorial jurisdiction of, or a transaction substantially connected with, the United States.

____

Notary Public State of Texas | County of Harris

ANA SALAZAR URIBE
ELECTRONIC
NOTARY PUBLIC
NOTARY ID
131757026
STATE OF TEXAS | EXP: 10/11/2022

37535992.1/151741.00009

Document Notarized using a Live Audio-Video Connection

Exhibit Index

Exhibit	Description
A	Brimmer Opinion
B	Regulatory Impact Statement 10-11-2019
C	Regulatory Impact Statement 11-25-2019
D	Rulemaking Public Comment Summary 2-21-2020

Complaint Exhibit A

STATE OF MICHIGAN
17th CIRCUIT COURT - KENT COUNTY
* * * * * * * * * *

RONALD BRIMMER and
MARY BRIMMER,

Plaintiffs,

vs

WOLVERINE WORLD WIDE, INC., and
3M COMPANY (f/k/a MINNESOTA
MINING AND MANUFACTURING CO.),

Defendants.
_______________________________/

HON. GEORGE JAY QUIST
Case No. 18-01136-CZ

OPINION/ORDER RE: DEFENDANTS' MOTION FOR SUMMARY DISPOSITION UNDER MCR 2.116(C)(10)

The Court has reviewed the briefs submitted on the above-captioned motion. The Court heard oral argument on January 22, 2021. The Court finds and orders as follows:

1. Plaintiffs have filed this case alleging that they are entitled to damages due to the PFAS contamination of the water on their property attributable to the acts or omissions of Defendants.
2. To prevail, Plaintiffs must prove that (a) their property is contaminated, and/or (b) the type of damages they seek to recover are permissible under Michigan law.
3. Plaintiffs cannot establish that their property is contaminated. All of the testing indicates that any PFAS in their water is below toxic levels established by the state of Michigan and the United States Environmental Protection Agency. Plaintiffs point out that their expert has opined that even 1 part per trillion of PFAS is harmful. However, the relevant case law looks to the levels established by governmental agencies to determine toxicity or contamination. Because Plaintiffs cannot establish that their property is contaminated, summary disposition is appropriate.

4. Plaintiffs argue that they are not required to establish that their property is contaminated to prevail under a nuisance theory. While there is support for this position, Plaintiffs must also seek damages which are properly recoverable under Michigan law to survive summary disposition. During oral argument, Plaintiffs' counsel claimed that Plaintiffs are seeking damages for "all economic loss." This claim, however, clearly contradicts Plaintiffs' deposition testimony. The only damages Plaintiffs are seeking are attributable to diminution in the value of their property because their property is located in an area where other properties are contaminated with PFAS.[1] Although there may be some restrictions on the use and enjoyment of their property, diminution of property value damages are not recoverable under these facts because they are impermissible "stigma" damages.

5. Moreover, the Court finds that the facts of this case are not materially distinguishable from *Debski v Wolverine World Wide and 3M Company* (18-00055-CZ), where the Court granted Defendants' motion for summary disposition.

6. Finally, Defendants made other arguments in support of their motion not specifically addressed in this opinion. The Court finds Defendants' arguments persuasive and adopts them as the analysis of the Court. No further analysis is necessary. MCR 2.517(A)(4). Lud v Howard, 161 Mich App 603 (1987).

Based on the above analysis, Defendants' motion for summary disposition is **GRANTED.** Plaintiffs' case is dismissed with prejudice.

This is a final order and does close the case.

1-25-21
Date

Hon. George Jay Quist (P43884)

[1] See Ronald Brimmer deposition, p. 22-23
See Mary Brimmer deposition, p. 29

PROOF OF SERVICE

Service of a copy of this document was made by ordinary mail this date upon the parties who have appeared, or their attorneys of record.

1-25-2021
DATE

Marceedes Langlois
Marceedes Langlois, Judicial Clerk

Complaint Exhibit B

Michigan Office of Administrative Hearings and Rules
Administrative Rules Division (ARD)
611 W. Ottawa Street
Lansing, MI 48909
Phone: 517-335-8658 Fax: 517-335-9512

REGULATORY IMPACT STATEMENT and COST-BENEFT ANALYSIS (RIS)

Agency Information:

Department name:
Environment, Great Lakes and Energy

Bureau name:
Drinking Water & Municipal Assistance Division

Name of person filling out RIS:
Candra Wilcox

Phone number of person filling out RIS:
517-284-5004

E-mail of person filling out RIS:
WilcoxC2@michigan.gov

Rule Set Information:

ARD assigned rule set number:
2019-35 EG

Title of proposed rule set:
Supplying Water to the Public

Comparison of Rule(s) to Federal/State/Association Standared:

1. Compare the proposed rules to parallel federal rules or standards set by a state or national licensing agency or accreditation association, if any exist.

The Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), currently contains numerous drinking water standards that are consistent with federal requirements. This requested rulemaking will add additional drinking water standards and related sampling and response requirements. These additional standards would be in addition to the regulations under the federal Safe Drinking Water Act (SDWA), which was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The SDWA authorizes the U.S. Environmental Protection Agency to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. Title 40 of the Code of Federal Regulations (CFR), Part 141, National Primary Drinking Water Regulations, currently does not contain standards for per and poly-fluorinated substances (PFAS).

A. Are these rules required by state law or federal mandate?

These rules are not required by state law or federal mandate.

B. If these rules exceed a federal standard, please identify the federal standard or citation, describe why it is necessary that the proposed rules exceed the federal standard or law, and specify the costs and benefits arising out of the deviation.

There are no applicable federal standards for these chemicals.

2. Compare the proposed rules to standards in similarly situated states, based on geographic location, topography, natural resources, commonalities, or economic similarities.

Four other states have established maximum contaminant levels (MCLs) for several PFAS compounds. New Hampshire, New Jersey, New York, and Vermont are establishing regulations for the chemicals. Michigan's proposed levels similar to standards being proposed by other states.

A. If the rules exceed standards in those states, please explain why and specify the costs and benefits arising out of the deviation.

The standards in these rules are similar to standards being proposed by other states.

3. Identify any laws, rules, and other legal requirements that may duplicate, overlap, or conflict with the proposed rules.

No other rules or legal requirements pertain.

A. Explain how the rules have been coordinated, to the extent practicable, with other federal, state, and local laws applicable to the same activity or subject matter. This section should include a discussion of the efforts undertaken by the agency to avoid or minimize duplication.

There are surface water standards and groundwater cleanup standards. The groundwater cleanup standards for PFOA and PFOS will be changed as a result of the rule. Surface water standards will remain the same. There are no other laws concerning PFAS standards in drinking water.

4. If MCL 24.232(8) applies and the proposed rules are more stringent than the applicable federally mandated standard, a statement of specific facts that establish the clear and convincing need to adopt the more stringent rules and an explanation of the exceptional circumstances that necessitate the more stringent standards is required.

Because there are no existing applicable federal standards, MCL 24.232(8) does not apply. Further, in any event, there is a "clear and convincing need" for these rules given the prevalence of PFAS contamination within the state and its potential impact on drinking water. The state has conducted extensive sampling for 14 PFAS compounds at all community water systems and many non-transient non-community water systems to determine the extent of contamination. Through these efforts, a significant exposure was discovered in the city of Parchment which posed a significant on-going risk to the public. Through a voluntary effort with the City of Parchment and the City of Kalamazoo, the public was protected from further exposure. This sampling also identified a number of drinking water systems with levels of PFAS contaminants that could cause adverse health effects if not addressed. The new rules require on-going sampling and response to selected PFAS chemicals and represent a balanced approach to protecting public health and managing impact to water supplies.

5. If MCL 24.232(9) applies and the proposed rules are more stringent than the applicable federal standard, either the statute that specifically authorizes the more stringent rules or a statement of the specific facts that establish the clear and convincing need to adopt the more stringent rules and an explanation of the exceptional circumstances that necessitate the more stringent standards is required.

Because there are no existing federal standards, MCL 24.232(9) does not apply. Nonetheless, the Michigan Safe Drinking Water Act allows EGLE to promulgate rules setting standards for public water supplies, see MCL 325.1003.

6. Identify the behavior and frequency of behavior that the proposed rules are designed to alter.

The proposed rules are designed to alter the current practices of public water supplies (PWSs) in the state of Michigan in order to be more protective of public health by requiring certain water supplies to sample for seven PFAS chemicals. Supplies would be required to initially sample for seven regulated PFAS chemicals on a quarterly basis. Based on sampling results, sampling could be reduced. Supplies currently do not routinely sample for any PFAS chemicals.

A. Estimate the change in the frequency of the targeted behavior expected from the proposed rules.

The change is from no sampling to quarterly or annual sampling.

B. Describe the difference between current behavior/practice and desired behavior/practice.

The current practice is no testing for PFAS chemicals. The rules will require quarterly or annual testing and reporting for seven PFAS chemicals.

C. What is the desired outcome?

Improved public health by limiting exposure to PFAS chemicals. The rules will also broaden the understanding of where these chemicals are occurring in our drinking water systems.

7. Identify the harm resulting from the behavior that the proposed rules are designed to alter and the likelihood that the harm will occur in the absence of the rule.

Exposure to PFAS chemicals has been shown to cause numerous adverse health impacts. The Science Advisory Workgroup (SAW) assigned by the Michigan PFAS Action Response Team (MPART) identified seven PFAS contaminants of concern for which, in their professional judgement, there was enough scientific evidence to establish Health-Based Values (HBVs). HBVs establish a level of contamination below which there is not expected to be adverse health impacts. The DWEHD took these HBVs and used them to create MCLs. Supplies will sample for these chemicals, and when a running annual average exceeds the MCL for any PFAS contaminant, they will be required to take action to reduce that level of contamination to below the appropriate MCL.

A. What is the rationale for changing the rules instead of leaving them as currently written?

The current rules provide no protection or monitoring for PFAS chemicals.

8. Describe how the proposed rules protect the health, safety, and welfare of Michigan citizens while promoting a regulatory environment in Michigan that is the least burdensome alternative for those required to comply.

The proposed rules protect public health by requiring the monitoring of selected PFAS chemicals, and in the event they exceed the established limit, a response to lower exposure below that limit. The rules require quarterly samples that are averaged over a year in order to address seasonal and source variations. The rules require a violation for exceedances of the MCL but does not stipulate a required strategy or timeline to return to compliance. Instead, the supply will likely enter into an Administrative Consent Order (ACO) with EGLE to establish timelines and other details for the response. This process ensures an approach that balances the need to protect public health with the fiscal and technical realities the supply is facing.

9. Describe any rules in the affected rule set that are obsolete or unnecessary and can be rescinded.

There are no components that are obsolete.

10. Please provide the fiscal impact on the agency (an estimate of the cost of rule imposition or potential savings for the agency promulgating the rule).

These rules will impose an increased fiscal impact on EGLE due to increased oversight and data handling. Although the proposed MCLs will be added to an existing monitoring program, the initial sampling requirement and training burden will be significant. Approximately 2,700 public water supplies will be subject to the new monitoring requirements. Quarterly sampling will generate almost 11,000 sample results and calculations that will need to be reviewed. We also anticipate approximately 22 supplies will be out of compliance based on prior testing. This will result in the need for increased oversight and review of ACOs and corrective action plans.

11. Describe whether or not an agency appropriation has been made or a funding source provided for any expenditures associated with the proposed rules.

The fiscal year 2020 budget includes funding for new FTEs for the drinking water program. It is anticipated that some of these additional FTEs will be utilized to administer the new rules.

12. Describe how the proposed rules are necessary and suitable to accomplish their purpose, in relationship to the burden(s) the rules place on individuals. Burdens may include fiscal or administrative burdens, or duplicative acts.

The new rules are necessary to protect human health from PFAS contamination that has been identified in PWSs. The burden of the new rules is lessened due to the fact that the MCLs have been added to an existing sampling requirement, meaning supplies will simply have to take more samples. Sampling for PFAS contamination, it should be noted, is more difficult due to the potential for cross-contamination and training will be required. The new rules will most likely result in some systems requiring modification/addition of their treatment process that will result in increased costs.

A. Despite the identified burden(s), identify how the requirements in the rules are still needed and reasonable compared to the burdens.

The rules are still needed to identify PFAS contamination in drinking water and to limit the exposure, through treatment or alternate sources, to the public.

13. Estimate any increase or decrease in revenues to other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Estimate the cost increases or reductions for other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Include the cost of equipment, supplies, labor, and increased administrative costs in both the initial imposition of the rule and any ongoing monitoring.

These rules will impose costs on local government units that own or operate a PWS, including most municipalities (community water supplies) along with some schools and other public entities that are on their own wells (non-transient noncommunity water supplies). There are approximately 1,400 community water supplies (CWSs) in the state, and 733 of them are owned by a local unit of government. There are approximately 1,300 non-transient noncommunity water supplies in the state, and 291 of them are owned publicly. These two categories make up the water supplies that will be impacted by this rule. The cost estimates below apply to all impacted water supplies, both private and public.

There are two significant drivers of cost to PWSs. The first is the cost of sampling and monitoring PFAS in the drinking water supplies. The second is the cost of installation and operation of treatment where supplies exceed the MCL.

The initial costs to all water supplies regulated by these rules will be the requirement to sample for PFAS on a quarterly basis. If all supplies sample quarterly for the first year, a total of 10,800 samples will be required. The average sample analysis has been approximately \$300 per sample for a total sampling cost of \$3.2 million. The cost to take samples, by contract, has also averaged \$300 per sample. Therefore, the additional cost to physically take the samples is approximately \$3.2 million. Supplies may reduce this cost if they elect to take their own samples. The total conservative estimate for the sampling effort is \$6.4 million for the first year the rules are in effect. Because some supplies will only be required to sample annually, and there are provisions for reduction in sampling if a track record for detections under a certain level can be established, this estimate is likely higher than the actual anticipated cost of sampling and analysis. Annual sampling and analysis costs after the first year should run lower than this estimate.

The other significant cost will be the installation of treatment. There are two options a water system can pursue to reduce the level of contamination in their finished water. The first is to switch to an alternate water source. Because this option is extremely variable from supply to supply, and indeed may not even be an option for some supplies, EGLE cannot reliably develop a cost estimate for that option. The second option is treatment. Recommended treatment is based on a study by the New Jersey Drinking Water Quality Institute that identified Granular Activated Carbon (GAC) as the preferred treatment option. The major costs of GAC include design, installation, and operation/maintenance. While a specific cost of design and installation vary by site, we can make a rough estimated based on a general cost per million gallons treated.

After several rounds of testing affected water supplies, we have identified 22 water systems that may likely be impacted by a requirement to install treatment due to an exceedance of the proposed MCLs. These supplies are treating a total of 0.93 million gallons per day (MGD). Cost estimates are based on a January 2019 report from the State of New Hampshire. New Hampshire identified a one-time treatment installation cost based on gallons treated per day. Their lowest cost estimate was \$2.90 per gallon, and their highest cost estimate was \$8.10 per gallon. Based on a conservative estimated cost of \$8 per gallon treated per day, the estimated one-time installation cost of the new rules will be \$7.4 million (\$8 x 930,000) for affected supplies to install treatment. There will also be a cost associated with operating and maintaining the treatment systems. Those costs are more difficult to estimate based on the unique water chemistry and existing treatment design associated with each water supply. Those variables will affect how a GAC solution is implemented and how often the GAC system media will need to be replaced. The New Hampshire study used a high annual estimate of \$0.35 per gallon, or \$0.000959 per gallon per day.

$0.000959 \text{ dollars/gallon/day} \times 930{,}000 \text{ gal}/1 \times 365 \text{ day}/1 = \$325{,}500$

Based on that, the estimated annual operation and maintenance cost for the new rules is \$325,500 per year.

It is noted that several water systems have proactively responded to PFAS contamination which has resulted in costs that could have been incurred if those actions were taken after this rule went into effect. The City of Plainfield is installing GAC treatment in response to contamination which is not currently in excess of the proposed MCLs. The treatment installation is estimated to be approximately \$15 million. Additionally, the City of Ann Arbor has been conducting a treatment study and has been sampling for PFAS in a manner that exceeds the requirements of the new rule. The City of Parchment abandoned their public water system and connected to the City of Kalamazoo resulting in costs to both systems.

14. Discuss any program, service, duty, or responsibility imposed upon any city, county, town, village, or school district by the rules.

MCL 24.245(3)

Water supplies owned by governmental units will need to comply with all of the requirements of the new PFAS MCLs, including increased sampling and reporting. There are also expanded public notification requirements and follow up based on sampling results.

A. Describe any actions that governmental units must take to be in compliance with the rules. This section should include items such as record keeping and reporting requirements or changing operational practices.

Municipalities that own/operate a PWS will be required to comply with the new rules and to sample, report, and respond to exceedance of the new MCLs.

15. Describe whether or not an appropriation to state or local governmental units has been made or a funding source provided for any additional expenditures associated with the proposed rules.

No identification of funding source or appropriation has taken place.

16. In general, what impact will the rules have on rural areas?

In general, rural areas will be less impacted by these rules than urban areas, since most contamination found to date occurs in larger systems. EGLE staff will be gearing up to provide additional direct assistance to small rural supplies if these rules are promulgated.

A. Describe the types of public or private interests in rural areas that will be affected by the rules.

Water supplies located in rural areas will be affected by the new rules.

17. Do the proposed rules have any impact on the environment? If yes, please explain.

A secondary goal of the selected preferred treatment method is the possibility that regeneration of the GAC media may physically destroy the PFAS contamination. Most other treatment options simply move the contamination from one media to another. If the spent GAC media is regenerated through incineration, it will physically destroy the PFAS contamination, breaking the cycle of media transfer and thereby improving the environment by ending the cycle and destroying the contamination. This benefit depends on the ultimate fate of spent GAC media. Some supplies may choose to dispose of the media in an appropriate landfill, therefore, this benefit may not apply.

18. Describe whether and how the agency considered exempting small businesses from the proposed rules.

No – EGLE did not consider exempting small businesses from the proposed rules.

19. If small businesses are not exempt, describe (a) the manner in which the agency reduced the economic impact of the proposed rules on small businesses, including a detailed recitation of the efforts of the agency to comply with the mandate to reduce the disproportionate impact of the rules upon small businesses as described below (in accordance with MCL 24.240(1)(a-d)), or (b) the reasons such a reduction was not lawful or feasible.

While small private water supplies will be required to comply, the impact should be minimized due to the low amount of water treated at these supplies. The state will offer technical support to these supplies as required.

A. Identify and estimate the number of small businesses affected by the proposed rules and the probable effect on small businesses.

There are approximately 650 privately-owned CWSs with populations under 10,000 and approximately 1,000 privately-owned non-transient noncommunity water supplies in Michigan. These two categories constitute the PWSs that are impacted by the proposed MCLs. These PWSs will be required to comply with the requirements of the rules, creating a financial and administrative burden.

B. Describe how the agency established differing compliance or reporting requirements or timetables for small businesses under the rules after projecting the required reporting, record-keeping, and other administrative costs.

While small private PWSs do have to comply with the proposed rules requirements, any exceedance of an MCL will be ultimately resolved through an ACO. The ACO will take into account economic factors in the supply's return to compliance while maintaining a balance to protect human health.

C. Describe how the agency consolidated or simplified the compliance and reporting requirements for small businesses and identify the skills necessary to comply with the reporting requirements.

EGLE incorporated the new requirements into an existing regulatory framework that PWSs are already familiar with, thereby simplifying compliance. EGLE is also working on a new database system that will allow laboratories to report monitoring results electronically, as well as accept electronic submittal of reports. This will significantly reduce the effort involved for all regulated supplies.

D. Describe how the agency established performance standards to replace design or operation standards required by the proposed rules.

MCLs are by their nature already performance-based. Although GAC is identified as a preferred treatment method, supplies are free to use any available treatment method that is proven to remove PFAS contamination to below the MCLs.

20. Identify any disproportionate impact the proposed rules may have on small businesses because of their size or geographic location.

Small businesses should be impacted less by this regulation since they treat a lower volume of water than municipalities due to their size and less urban location.

21. Identify the nature of any report and the estimated cost of its preparation by small businesses required to comply with the proposed rules.

There are no reports required by the new rules.

22. Analyze the costs of compliance for all small businesses affected by the proposed rules, including costs of equipment, supplies, labor, and increased administrative costs.

The compliance costs for all PWSs are analyzed above in #13; however, these costs will impact the medium and large municipal systems far more than the smaller private supplies.

23. Identify the nature and estimated cost of any legal, consulting, or accounting services that small businesses would incur in complying with the proposed rules.

It is possible that a small private PWS will hire an engineering firm to help them with compliance with these rules, but the majority of these systems will be able to comply without third party assistance. EGLE will be placing considerable emphasis on providing compliance assistance to PWSs.

24. Estimate the ability of small businesses to absorb the costs without suffering economic harm and without adversely affecting competition in the marketplace.

Since the rules apply equally to all small private PWSs, there will not be an uneven distribution of burden between them. It is likely that some costs will be passed along to ratepayers who are using the drinking water supply.

25. Estimate the cost, if any, to the agency of administering or enforcing a rule that exempts or sets lesser standards for compliance by small businesses.

None – there will be equal oversight for all impacted by the rules.

26. Identify the impact on the public interest of exempting or setting lesser standards of compliance for small businesses.

The rules still require small businesses to comply with the new sampling requirements and MCLs, thereby protecting public health interests.

27. Describe whether and how the agency has involved small businesses in the development of the proposed rules.

Several small businesses and/or those serving small private water supplies were involved in the stakeholder process. These include the Michigan Manufactured Housing Association and the Michigan Rural Water Association.

A. If small businesses were involved in the development of the rules, please identify the business(es).

No specific small businesses were involved in development of the rules.

28. Estimate the actual statewide compliance costs of the rule amendments on businesses or groups.

The businesses that will be most affected by these rules will be those with their own water supply. This includes approximately 650 CWSs. More than half of these are manufactured housing communities, and many of the rest are condominiums, apartment buildings, and other residential units. It also includes approximately 1,000 non-transient noncommunity water supplies – industries, small businesses, etc. – that are not hooked up to municipal water.

The compliance costs for all PWSs are analyzed above in #13; however, these costs will impact medium and large municipal systems far more than smaller private supplies. Specific costs are directly related to the contaminant level in source water and the amount of water the system delivers to its customers. Many of the other ancillary costs associated with these rules have been minimized for small supplies.

A. Identify the businesses or groups who will be directly affected by, bear the cost of, or directly benefit from the proposed rules.

Those directly affected include owners of private water systems, laboratories, engineering firms, companies that supply and install treatment, and companies that provide water system operations services.

B. What additional costs will be imposed on businesses and other groups as a result of these proposed rules (i.e. new equipment, supplies, labor, accounting, or recordkeeping)? Please identify the types and number of businesses and groups. Be sure to quantify how each entity will be affected.

Businesses that operate their own water supplies will be required to comply with the new rules. They will be required to sample their finished drinking water for PFAS ($300 per sample if the business collects themselves or $600 per sample if they hire a contractor to take the sample) and find alternate water or install treatment if their water exceeds the proposed MCLs. Costs are outlined in #13.

29. Estimate the actual statewide compliance costs of the proposed rules on individuals (regulated individuals or the public). Include the costs of education, training, application fees, examination fees, license fees, new equipment, supplies, labor, accounting, or recordkeeping.

There are no direct compliance costs to the public for this rule. There is a likelihood that PWSs will pass along to their customers at least some of the costs associated with compliance with these rules. Municipalities and other governmental bodies, in particular, will likely need to increase their utility rates to pay for their infrastructure upgrades and additional compliance costs. This will result in higher costs to homeowners, but it is very difficult to estimate this impact. It is important to note that drinking water has historically been the most affordable utility and will likely remain this way even with increases.

A. How many and what category of individuals will be affected by the rules?

Approximately 75% of Michigan residents get their drinking water from a PWS. Assuming 10 million people in the state, this equates to 7.5 million people that will be served drinking water that is regularly tested for PFAS chemicals.

B. What qualitative and quantitative impact do the proposed changes in rules have on these individuals?

The impact will be a general improvement in public health achieved through limiting PFAS exposure. The individuals will also have access to testing records so they will be aware of the level of PFAS in their drinking water regardless of the level.

30. Quantify any cost reductions to businesses, individuals, groups of individuals, or governmental units as a result of the proposed rules.

There are no known cost reductions associated directly with these rules.

31. Estimate the primary and direct benefits and any secondary or indirect benefits of the proposed rules. Please provide both quantitative and qualitative information, as well as your assumptions.

The primary benefits of this rules package are reducing the exposure to the PFAS chemicals regulated under the rules. Implementation of treatment will also remove other contaminants (other PFAS compounds, etc.) that will result in less exposure to contamination, thereby improving public health.

While estimating the cost to implement the new rules is relatively easy, the estimate of the benefits is not. It is generally difficult to monetize the benefits of drinking water standards, and this is especially true for PFAS chemicals. In particular, indirect costs such as reduced quality of life are particularly hard to capture. More study on the health benefits and impacts of PFAS exposure reduction and the economic benefit is required before a serious estimate can be made. There is likely a significant benefit to the reduction is exposure to PFAS chemicals given recent findings of the health effects. Health effects that have been identified include: lowering a woman's chance of getting pregnant, an increase in the chance of high blood pressure in pregnant women, an increase in the chance of thyroid disease, an increase in cholesterol levels, changes in immune response, and an increase in the chance of cancer, especially kidney and testicular cancers. In a general, qualitative measure, given the potential for direct health care treatment costs, loss of income, and associated indirect costs, limiting exposure to the seven PFAS chemicals for which these rules establish MCLs will likely result in significant avoided costs.

An additional consideration, and environmental benefit, of the rules is the preference given to GAC treatment of PFAS compounds. This treatment technology has the advantage of not only capturing the contamination but the potential for permanent destruction of PFAS compounds in the regeneration process. More study is needed to quantify the temperature at which PFAS chemicals are destroyed.

Additional benefits will be general improvement to water systems and quality, creation of jobs, and increased community goodwill through better service to customers.

32. Explain how the proposed rules will impact business growth and job creation (or elimination) in Michigan.

The proposed rules have the potential to increase demand on engineering firms and laboratories in the state. If water treatment plant modifications are required, the rules will also create some business growth in that sector. Ongoing treatment operation and maintenance may also increase job opportunities at PWSs around the state.

33. Identify any individuals or businesses who will be disproportionately affected by the rules as a result of their industrial sector, segment of the public, business size, or geographic location.

PFAS contamination tends to be found in more industrialized, urban areas leading to a higher compliance burden in those geographic locations.

34. Identify the sources the agency relied upon in compiling the regulatory impact statement, including the methodology utilized in determining the existence and extent of the impact of the proposed rules and a cost-benefit analysis of the proposed rules.

•Summary Report on the New Hampshire Department of Environmental Services Development of Maximum Contaminant Levels and Ambient Groundwater Quality Standards for Perfluorooctanesulfonic Acid (PFOS), Perfluorooctanoic Acid (PFOA), Perfluorononanoic Acid (PFNA), and Perfluorohexanesulfonic Acid (PFHxS). New Hampshire Department of Environmental Services, January 2019.

•Recommendation on Perfluorinated Compound Treatment Options for Drinking Water. New Jersey Drinking Water Quality Institute Treatment Subcommittee, June 2015.

•Health-Based Drinking Water Value Recommendations for PFAS in Michigan. Michigan Science Advisory Workgroup, Michigan PFAS Action Response Team, June 2019.

A. How were estimates made, and what were your assumptions? Include internal and external sources, published reports, information provided by associations or organizations, etc., which demonstrate a need for the proposed rules.

Estimates of sampling costs were made based on the statewide sampling effort under MPART. Treatment costs were made based on the number of supplies over the proposed MCLs at the time the estimate was made and the average cost of treatment based on a study by the State of New Hampshire.

35. Identify any reasonable alternatives to the proposed rules that would achieve the same or similar goals.

There are no reasonable alternatives. Possible alternatives include no establishment of any MCL or testing requirement that provides no public health protection, the requirement to install basic treatment for PFAS chemicals at all water supplies that is cost prohibitive, or a change in the MCLs that were based on the best data available.

A. Please include any statutory amendments that may be necessary to achieve such alternatives.

Changes in the MCLs would be required if additional science shows that is prudent.

36. Discuss the feasibility of establishing a regulatory program similar to that proposed in the rules that would operate through private market-based mechanisms. Please include a discussion of private market-based systems utilized by other states.

This is a federal law (SDWA) that must be implemented in Michigan. The state is choosing to add PFAS to its regulated contaminants; no other states have implemented a market-based system of regulation, and this does not seem feasible.

36. Discuss the feasibility of establishing a regulatory program similar to that proposed in the rules that would operate through private market-based mechanisms. Please include a discussion of private market-based systems utilized by other states.

Stakeholders had concerns about the levels at which the MCLs were set. The MCLs were set based on an expert panel that considered the latest scientific data available.

Many alternatives discussed dealt with changes to the timing and logistics of the new requirements, levels of the MCLs, testing protocols, sampling frequency to capture seasonal variations, applicability of the new rules, laboratory capacity concerns, reporting limit concerns, and public notification requirements. We wrote and modified the rules where these concerns and suggestions provided less ambiguity in the rules and provided better, more reasonable public health protection.

38. As required by MCL 24.245b(1)(c), please describe any instructions regarding the method of complying with the rules, if applicable.

Significant guidance material will be available to provide compliance assistance.

Complaint Exhibit C

Michigan Office of Administrative Hearings and Rules
Administrative Rules Division (ARD)
611 W. Ottawa Street
Lansing, MI 48909
Phone: 517-335-8658 Fax: 517-335-9512

REGULATORY IMPACT STATEMENT and COST-BENEFT ANALYSIS (RIS)

Agency Information:

Department name:
Environment, Great Lakes and Energy

Bureau name:
Drinking Water and Environmental Health Division

Name of person filling out RIS:
Candra Wilcox

Phone number of person filling out RIS:
517-284-5004

E-mail of person filling out RIS:
WilcoxC2@michigan.gov

Rule Set Information:

ARD assigned rule set number:
2019-35 EG

Title of proposed rule set:
Supplying Water to the Public

Comparison of Rule(s) to Federal/State/Association Standared:

1. Compare the proposed rules to parallel federal rules or standards set by a state or national licensing agency or accreditation association, if any exist.

The Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), currently contains numerous drinking water standards that are consistent with federal requirements. This requested rulemaking will add additional drinking water standards and related sampling and response requirements. These additional standards would be in addition to the regulations under the federal Safe Drinking Water Act (SDWA), which was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The SDWA authorizes the U.S. Environmental Protection Agency to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. Title 40 of the Code of Federal Regulations (CFR), Part 141, National Primary Drinking Water Regulations, currently does not contain standards for per and poly-fluorinated substances (PFAS).

A. Are these rules required by state law or federal mandate?

These rules are not required by state law or federal mandate.

B. If these rules exceed a federal standard, please identify the federal standard or citation, describe why it is necessary that the proposed rules exceed the federal standard or law, and specify the costs and benefits arising out of the deviation.

There are no applicable federal standards for these chemicals.

2. Compare the proposed rules to standards in similarly situated states, based on geographic location, topography, natural resources, commonalities, or economic similarities.

Four other states have established maximum contaminant levels (MCLs) for several PFAS compounds. New Hampshire, New Jersey, New York, and Vermont are establishing regulations for the chemicals. Michigan's proposed levels are similar to standards being proposed by other states.

A. If the rules exceed standards in those states, please explain why and specify the costs and benefits arising out of the deviation.

The standards in these rules are similar to standards being proposed by other states.

3. Identify any laws, rules, and other legal requirements that may duplicate, overlap, or conflict with the proposed rules.

No other rules or legal requirements pertain to establishing drinking water standards for public water supplies.

A. Explain how the rules have been coordinated, to the extent practicable, with other federal, state, and local laws applicable to the same activity or subject matter. This section should include a discussion of the efforts undertaken by the agency to avoid or minimize duplication.

Since there are not generic groundwater cleanup standards for PFNA, PFHxS, PFBS, PFHxA and HFPO-DA, the department may establish them following the process set forth in Natural Resource and Environmental Protection Act, 1994 PA 451, MCL 324.20120a(23).

4. If MCL 24.232(8) applies and the proposed rules are more stringent than the applicable federally mandated standard, a statement of specific facts that establish the clear and convincing need to adopt the more stringent rules and an explanation of the exceptional circumstances that necessitate the more stringent standards is required.

Because there are no existing applicable federal standards, MCL 24.232(8) does not apply. Further, in any event, there is a "clear and convincing need" for these rules given the prevalence of PFAS contamination within the state and its potential impact on drinking water. The state has conducted extensive sampling for 14 PFAS compounds at all community water systems and many non-transient non-community water systems to determine the extent of contamination. Through these efforts, a significant exposure was discovered in the city of Parchment which posed a significant on-going risk to the public. Through a voluntary effort with the City of Parchment and the City of Kalamazoo, the public was protected from further exposure. This sampling also identified a number of drinking water systems with levels of PFAS contaminants that could cause adverse health effects if not addressed. The new rules require on-going sampling and response to selected PFAS chemicals and represent a balanced approach to protecting public health and managing impact to water supplies.

5. If MCL 24.232(9) applies and the proposed rules are more stringent than the applicable federal standard, either the statute that specifically authorizes the more stringent rules or a statement of the specific facts that establish the clear and convincing need to adopt the more stringent rules and an explanation of the exceptional circumstances that necessitate the more stringent standards is required.

Because there are no existing federal standards, MCL 24.232(9) does not apply. Nonetheless, the Michigan Safe Drinking Water Act allows EGLE to promulgate rules setting standards for public water supplies, see MCL 325.1003.

6. Identify the behavior and frequency of behavior that the proposed rules are designed to alter.

The proposed rules are designed to alter the current practices of public water supplies (PWSs) in the state of Michigan in order to be more protective of public health by requiring certain water supplies to sample for seven PFAS chemicals. Supplies would be required to initially sample for seven regulated PFAS chemicals on a quarterly basis. Based on sampling results, sampling could be reduced. Supplies currently do not routinely sample for any PFAS chemicals.

A. Estimate the change in the frequency of the targeted behavior expected from the proposed rules.

The change is from no sampling to quarterly or annual sampling.

B. Describe the difference between current behavior/practice and desired behavior/practice.

The current practice is no testing for PFAS chemicals. The rules will require quarterly or annual testing and reporting for seven PFAS chemicals.

C. What is the desired outcome?

Improved public health by limiting exposure to PFAS chemicals. The rules will also broaden the understanding of where these chemicals are occurring in our drinking water systems.

7. Identify the harm resulting from the behavior that the proposed rules are designed to alter and the likelihood that the harm will occur in the absence of the rule.

Exposure to PFAS chemicals has been shown to cause numerous adverse health impacts. The Science Advisory Workgroup (SAW) assigned by the Michigan PFAS Action Response Team (MPART) identified seven PFAS contaminants of concern for which, in their professional judgement, there was enough scientific evidence to establish Health-Based Values (HBVs). HBVs establish a level of contamination below which there is not expected to be adverse health impacts. The Drinking Water and Environmental Health Division (DWEHD) took these HBVs and used them to create MCLs. Supplies will sample for these chemicals, and when a running annual average exceeds the MCL for any PFAS contaminant, they will be required to take action to reduce that level of contamination to below the appropriate MCL.

A. What is the rationale for changing the rules instead of leaving them as currently written?

The current rules provide no protection or monitoring for PFAS chemicals.

8. Describe how the proposed rules protect the health, safety, and welfare of Michigan citizens while promoting a regulatory environment in Michigan that is the least burdensome alternative for those required to comply.

The proposed rules protect public health by requiring the monitoring of selected PFAS chemicals, and in the event they exceed the established limit, a response to lower exposure below that limit. The rules require quarterly samples that are averaged over a year in order to address seasonal and source variations. The rules require a violation for exceedances of the MCL but does not stipulate a required strategy or timeline to return to compliance. Instead, the supply will likely enter into an Administrative Consent Order (ACO) with EGLE to establish timelines and other details for the response. This process ensures an approach that balances the need to protect public health with the fiscal and technical realities the supply is facing.

9. Describe any rules in the affected rule set that are obsolete or unnecessary and can be rescinded.

There are no components that are obsolete.

10. Please provide the fiscal impact on the agency (an estimate of the cost of rule imposition or potential savings for the agency promulgating the rule).

These rules will impose an increased fiscal impact on EGLE due to increased oversight and data handling. Although the proposed MCLs will be added to an existing monitoring program, the initial sampling requirement and training burden will be significant. Approximately 2,700 public water supplies will be subject to the new monitoring requirements. Quarterly sampling will generate almost 11,000 sample results and calculations that will need to be reviewed. We also anticipate approximately 22 supplies will be out of compliance based on prior testing. This will result in the need for increased oversight and review of ACOs and corrective action plans. Local health departments directly oversee approximately half of these supplies which will result in increased oversight responsibilities and costs primarily in processing sampling results and issuing enforcement communications. The bulk of the cost of the response, approving and overseeing corrective action, will be borne by EGLE as EGLE approves construction permits for treatment systems. It is important to note that the increase in oversight is mitigated by the fact that the new rules require sampling, analysis and compliance calculation in exactly the same way as existing rules resulting in a lower "learning curve" for local health departments in administering the new rules.

11. Describe whether or not an agency appropriation has been made or a funding source provided for any expenditures associated with the proposed rules.

The fiscal year 2020 budget includes funding for new FTEs for the drinking water program. It is anticipated that some of these additional FTEs will be utilized to administer the new rules.

12. Describe how the proposed rules are necessary and suitable to accomplish their purpose, in relationship to the burden(s) the rules place on individuals. Burdens may include fiscal or administrative burdens, or duplicative acts.

The new rules are necessary to protect human health from PFAS contamination that has been identified in PWSs. The burden of the new rules is lessened due to the fact that the MCLs have been added to an existing sampling requirement, meaning supplies will simply have to take more samples. Sampling for PFAS contamination, it should be noted, is more difficult due to the potential for cross-contamination and training will be required. The new rules will most likely result in some systems requiring modification/addition of their treatment process that will result in increased costs.

A. Despite the identified burden(s), identify how the requirements in the rules are still needed and reasonable compared to the burdens.

The rules are still needed to identify PFAS contamination in drinking water and to limit the exposure, through treatment or alternate sources, to the public.

13. Estimate any increase or decrease in revenues to other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Estimate the cost increases or reductions for other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Include the cost of equipment, supplies, labor, and increased administrative costs in both the initial imposition of the rule and any ongoing monitoring.

These rules will impose costs on local government units that own or operate a PWS, including most municipalities (community water supplies) along with some schools and other public entities that are on their own wells (non-transient noncommunity water supplies). There are approximately 1,400 community water supplies (CWSs) in the state, and 733 of them are owned by a local unit of government. There are approximately 1,300 non-transient noncommunity water supplies in the state, and 291 of them are owned publicly. These two categories make up the water supplies that will be impacted by this rule. The cost estimates below apply to all impacted water supplies, both private and public. In general, non-transient noncommunity water systems tend to be smaller while community water systems tend to be larger.

There are two significant drivers of cost to PWSs. The first is the cost of sampling and monitoring PFAS in the drinking water supplies. The second is the cost of installation and operation of treatment where supplies exceed the MCL.

The initial costs to all water supplies regulated by these rules will be the requirement to sample for PFAS on a quarterly basis. If all supplies sample quarterly for the first year, a total of 10,800 samples will be required. The average sample analysis has been approximately $300 per sample for a total sampling cost of $3.2 million. The cost to take samples, by contract, has also averaged $300 per sample. Therefore, the additional cost to physically take the samples is approximately $3.2 million. Supplies may reduce this cost if they elect to take their own samples. The total conservative estimate for the sampling effort is $6.4 million for the first year the rules are in effect. Because some supplies will only be required to sample annually, and there are provisions for reduction in sampling if a track record for detections under a certain level can be established, this estimate is likely higher than the actual anticipated cost of sampling and analysis. Annual sampling and analysis costs after the first year should run lower than this estimate.

The other significant cost will be the installation of treatment. There are two options a water system can pursue to reduce the level of contamination in their finished water. The first is to switch to an alternate water source. Because this option is extremely variable from supply to supply, and indeed may not even be an option for some supplies, EGLE cannot reliably develop a cost estimate for that option. The second option is treatment. Recommended treatment is based on a study by the New Jersey Drinking Water Quality Institute that identified Granular Activated Carbon (GAC) as the preferred treatment option. The major costs of GAC include design, installation, and operation/maintenance. While a specific cost of design and installation vary by site, we can make a rough estimated based on a general cost per million gallons treated.

After several rounds of testing affected water supplies, we have identified 22 water systems that may likely be impacted by a requirement to install treatment due to an exceedance of the proposed MCLs. These 22 systems consist of both small systems and larger systems. Because smaller systems often pay a higher cost per gallon due to their size, we have estimated the cost separately for the larger community waster systems and the smaller non-community systems.

The larger, community systems are treating a total of 0.928 million gallons per day (MGD). To estimate the costs for these systems we were able to use a January 2019 report from the State of New Hampshire. New Hampshire identified a one-time treatment installation cost based on gallons treated per day. Their lowest cost estimate was $2.90 per gallon, and their highest cost estimate was $8.10 per gallon. To be conservative in our estimate, we have used the higher end of this range at $8 per gallon treated per day. Based on this value, the estimated one-time installation cost of the new rules for the larger, community systems will be $7.4 million ($8 x 928,000).
The smaller, non-community systems treat a total of 79,000 gallons per day. A recent cost estimate for Robinson Elementary school was $206,000 to treat a designed load of 4,500 gallons of water per day ($46 per gallon treated per day). Projecting this value forward, to install treatment for 79,000 gallons of water it is estimated that it will cost $3.6 million.

Combining the estimated cost for treatment installation at the larger, community systems with the estimated cost for the smaller, non-community systems, the total estimated cost for all water systems where we currently know PFAS needs to be addressed is an estimated total of $11 million.

14. Discuss any program, service, duty, or responsibility imposed upon any city, county, town, village, or school district by the rules.

Water supplies owned by governmental units will need to comply with all of the requirements of the new PFAS MCLs, including increased sampling and reporting. There are also expanded public notification requirements and follow up based on sampling results.

The following is a continuation of the response to Question 13 above:
There will also be a cost associated with operating and maintaining the treatment systems. Those costs are more difficult to estimate based on the unique water chemistry and existing treatment design associated with each water supply. Those variables will affect how a GAC solution is implemented and how often the GAC system media will need to be replaced. The New Hampshire study used a high annual estimate of $0.35 per gallon, or $0.000959 per gallon per day.

Based on that, the estimated annual operation and maintenance cost for the new rules is $352,500 per year. There is no anticipated difference in operations and maintenance costs between large and small systems.

It is noted that several water systems have proactively responded to PFAS contamination which has resulted in costs that could have been incurred if those actions were taken after this rule went into effect. The City of Plainfield is installing GAC treatment in response to contamination which is not currently in excess of the proposed MCLs. The treatment installation is estimated to be approximately $15 million. Additionally, the City of Ann Arbor has been conducting a treatment study and has been sampling for PFAS in a manner that exceeds the requirements of the new rule. The City of Parchment abandoned their public water system and connected to the City of Kalamazoo resulting in costs to both systems. While these costs are not directly related to the new rule it is important to acknowledge that some systems have already implemented actions to protect their communities that are not included in this cost estimate.

In conclusion, there are many costs to regulated supplies, including ancillary administrative costs. Again, this is the cost for all impacted water supplies in the state, both public and private, with the largest impact to medium and large municipalities.

A. Describe any actions that governmental units must take to be in compliance with the rules. This section should include items such as record keeping and reporting requirements or changing operational practices.

Municipalities that own/operate a PWS will be required to comply with the new rules and to sample, report, and respond to exceedance of the new MCLs.

15. Describe whether or not an appropriation to state or local governmental units has been made or a funding source provided for any additional expenditures associated with the proposed rules.

No identification of funding source or appropriation has taken place.

16. In general, what impact will the rules have on rural areas?

In general, rural areas will be less impacted by these rules than urban areas, since most contamination found to date occurs in larger systems. EGLE staff will be gearing up to provide additional direct assistance to small rural supplies if these rules are promulgated.

A. Describe the types of public or private interests in rural areas that will be affected by the rules.

Water supplies located in rural areas will be affected by the new rules.

17. Do the proposed rules have any impact on the environment? If yes, please explain.

A secondary goal of the selected preferred treatment method is the possibility that regeneration of the GAC media may physically destroy the PFAS contamination. Most other treatment options simply move the contamination from one media to another. If the spent GAC media is regenerated through incineration, it will physically destroy the PFAS contamination, breaking the cycle of media transfer and thereby improving the environment by ending the cycle and destroying the contamination. This benefit depends on the ultimate fate of spent GAC media. Some supplies may choose to dispose of the media in an appropriate landfill, therefore, this benefit may not apply.

18. Describe whether and how the agency considered exempting small businesses from the proposed rules.

No – EGLE did not consider exempting small businesses from the proposed rules.

19. If small businesses are not exempt, describe (a) the manner in which the agency reduced the economic impact of the proposed rules on small businesses, including a detailed recitation of the efforts of the agency to comply with the mandate to reduce the disproportionate impact of the rules upon small businesses as described below (in accordance with MCL 24.240(1)(a-d)), or (b) the reasons such a reduction was not lawful or feasible.

While small private water supplies will be required to comply, the impact should be minimized due to the low amount of water treated at these supplies. The state will offer technical support to these supplies as required.

A. Identify and estimate the number of small businesses affected by the proposed rules and the probable effect on small businesses.

There are approximately 650 privately-owned CWSs with populations under 10,000 and approximately 1,000 privately-owned non-transient noncommunity water supplies in Michigan. These two categories constitute the PWSs that are impacted by the proposed MCLs. These PWSs will be required to comply with the requirements of the rules, creating a financial and administrative burden.

B. Describe how the agency established differing compliance or reporting requirements or timetables for small businesses under the rules after projecting the required reporting, record-keeping, and other administrative costs.

While small private PWSs do have to comply with the proposed rules requirements, any exceedance of an MCL will be ultimately resolved through an ACO. The ACO will take into account economic factors in the supply's return to compliance while maintaining a balance to protect human health.

C. Describe how the agency consolidated or simplified the compliance and reporting requirements for small businesses and identify the skills necessary to comply with the reporting requirements.

EGLE incorporated the new requirements into an existing regulatory framework that PWSs are already familiar with, thereby simplifying compliance. EGLE is also working on a new database system that will allow laboratories to report monitoring results electronically, as well as accept electronic submittal of reports. This will significantly reduce the effort involved for all regulated supplies.

D. Describe how the agency established performance standards to replace design or operation standards required by the proposed rules.

MCLs are by their nature already performance-based. Although GAC is identified as a preferred treatment method, supplies are free to use any available treatment method that is proven to remove PFAS contamination to below the MCLs.

20. Identify any disproportionate impact the proposed rules may have on small businesses because of their size or geographic location.

Small businesses should be impacted less by this regulation since they treat a lower volume of water than municipalities due to their size and less urban location.

21. Identify the nature of any report and the estimated cost of its preparation by small businesses required to comply with the proposed rules.

There are no reports required by the new rules. Test results will be reported directly to regulators through standard means already in place for similar contaminants.

22. Analyze the costs of compliance for all small businesses affected by the proposed rules, including costs of equipment, supplies, labor, and increased administrative costs.

There are approximately 1,300 non-transient noncommunity water supplies in the state that EGLE will define as "small businesses." The sampling requirement for these supplies is estimated to be $3.1 million annually (1,300 supplies sampling 4 times per year at a cost of $600 per sample). The cost for smaller water supplies that will exceed the proposed MCLs to install treatment is estimated to be $3.6 million with an annual maintenance cost of $76 thousand.

23. Identify the nature and estimated cost of any legal, consulting, or accounting services that small businesses would incur in complying with the proposed rules.

It is possible that a small private PWS will hire an engineering firm to help them with compliance with these rules, but the majority of these systems will be able to comply without third party assistance. EGLE will be placing considerable emphasis on providing compliance assistance to PWSs.

24. Estimate the ability of small businesses to absorb the costs without suffering economic harm and without adversely affecting competition in the marketplace.

Since the rules apply equally to all small private PWSs, there will not be an uneven distribution of burden between them. It is likely that some costs will be passed along to ratepayers who are using the drinking water supply.

25. Estimate the cost, if any, to the agency of administering or enforcing a rule that exempts or sets lesser standards for compliance by small businesses.

None – there will be equal oversight for all impacted by the rules.

26. Identify the impact on the public interest of exempting or setting lesser standards of compliance for small businesses.

Exempting small business or setting lesser standards would ignore the public health risk created by these chemicals and create two classes of drinking water customers in the state, those protected from PFAS exposure at a level determined to be protective by science, and second class customers exposed at a higher level. This would be unacceptable from a public health and environmental justice perspective.

27. Describe whether and how the agency has involved small businesses in the development of the proposed rules.

Several small businesses and/or those serving small private water supplies were involved in the stakeholder process. These include the Michigan Manufactured Housing Association and the Michigan Rural Water Association.

A. If small businesses were involved in the development of the rules, please identify the business(es).

No specific small businesses were involved in development of the rules.

28. Estimate the actual statewide compliance costs of the rule amendments on businesses or groups.

The businesses that will be most affected by these rules will be those with their own water supply. This includes approximately 650 CWSs. More than half of these are manufactured housing communities, and many of the rest are condominiums, apartment buildings, and other residential units. It also includes approximately 1,000 non-transient noncommunity water supplies – industries, small businesses, etc. – that are not hooked up to municipal water.

The compliance costs for all PWSs as presented in item #13 would apply to this group as follows. For annual monitoring this group of 1,650 water supplies would spend approximately $4 million (1,650 supplies taking 4 samples per year at a cost of $600 per sample. Of the 22 water systems identified in statewide testing to be exceeding the proposed MCLs, 9 can be classified as businesses (not a school or a church). Using the methodology in item 13, these supplies pump an average of 20,000 gallons per day. With an estimated cost of treatment of $46 per gallon it is estimated that these supplies will spend $920,000 to install treatment with an anticipated annual maintenance cost of $7,000.

A. Identify the businesses or groups who will be directly affected by, bear the cost of, or directly benefit from the proposed rules.

Those directly affected include owners of private water systems, laboratories, engineering firms, companies that supply and install treatment, and companies that provide water system operations services.

B. What additional costs will be imposed on businesses and other groups as a result of these proposed rules (i.e. new equipment, supplies, labor, accounting, or recordkeeping)? Please identify the types and number of businesses and groups. Be sure to quantify how each entity will be affected.

Businesses that operate their own water supplies will be required to comply with the new rules. They will be required to sample their finished drinking water for PFAS ($300 per sample if the business collects themselves or $600 per sample if they hire a contractor to take the sample) and find alternate water or install treatment if their water exceeds the proposed MCLs. Sampling costs are estimated at $4 million annually. Installation of treatment is estimated to be a one-time cost of $920,000 with annual maintenance costs of $7,000. Reporting cost increases are negligible as these supplies are already required to report monthly operations and testing – this rule would add one more item 4 times a year.

29. Estimate the actual statewide compliance costs of the proposed rules on individuals (regulated individuals or the public). Include the costs of education, training, application fees, examination fees, license fees, new equipment, supplies, labor, accounting, or recordkeeping.

There are no direct compliance costs to the public for this rule. There is a likelihood that PWSs will pass along to their customers at least some of the costs associated with compliance with these rules. Municipalities and other governmental bodies, in particular, will likely need to increase their utility rates to pay for their infrastructure upgrades and additional compliance costs. This will result in higher costs to homeowners, but it is very difficult to estimate this impact. It is important to note that drinking water has historically been the most affordable utility and will likely remain this way even with increases.

A. How many and what category of individuals will be affected by the rules?

Approximately 75% of Michigan residents get their drinking water from a PWS. Assuming 10 million people in the state, this equates to 7.5 million people that will be served drinking water that is regularly tested for PFAS chemicals.

B. What qualitative and quantitative impact do the proposed changes in rules have on these individuals?

The impact will be a general improvement in public health achieved through limiting PFAS exposure. The individuals will also have access to testing records so they will be aware of the level of PFAS in their drinking water regardless of the level.

30. Quantify any cost reductions to businesses, individuals, groups of individuals, or governmental units as a result of the proposed rules.

There are no known cost reductions associated directly with these rules.

31. Estimate the primary and direct benefits and any secondary or indirect benefits of the proposed rules. Please provide both quantitative and qualitative information, as well as your assumptions.

The primary benefits of this rules package are reducing the exposure to the PFAS chemicals regulated under the rules. Implementation of treatment will also remove other contaminants (other PFAS compounds, etc.) that will result in less exposure to contamination, thereby improving public health.

While estimating the cost to implement the new rules is relatively easy, the estimate of the benefits is not. It is generally difficult to monetize the benefits of drinking water standards, and this is especially true for PFAS chemicals. In particular, indirect costs such as reduced quality of life are particularly hard to capture. More study on the health benefits and impacts of PFAS exposure reduction and the economic benefit is required before a serious estimate can be made. There is likely a significant benefit to the reduction is exposure to PFAS chemicals given recent findings of the health effects. Health effects that have been identified include: lowering a woman's chance of getting pregnant, an increase in the chance of high blood pressure in pregnant women, an increase in the chance of thyroid disease, an increase in cholesterol levels, changes in immune response, and an increase in the chance of cancer, especially kidney and testicular cancers. In a general, qualitative measure, given the potential for direct health care treatment costs, loss of income, and associated indirect costs, limiting exposure to the seven PFAS chemicals for which these rules establish MCLs will likely result in significant avoided costs.

An additional consideration, and environmental benefit, of the rules is the preference given to GAC treatment of PFAS compounds. This treatment technology has the advantage of not only capturing the contamination but the potential for permanent destruction of PFAS compounds in the regeneration process. More study is needed to quantify the temperature at which PFAS chemicals are destroyed.

Additional benefits will be general improvement to water systems and quality, creation of jobs, and increased community goodwill through better service to customers.

32. Explain how the proposed rules will impact business growth and job creation (or elimination) in Michigan.

The proposed rules have the potential to increase demand on engineering firms and laboratories in the state. If water treatment plant modifications are required, the rules will also create some business growth in that sector. Ongoing treatment operation and maintenance may also increase job opportunities at PWSs around the state.

33. Identify any individuals or businesses who will be disproportionately affected by the rules as a result of their industrial sector, segment of the public, business size, or geographic location.

PFAS contamination tends to be found in more industrialized, urban areas leading to a higher compliance burden in those geographic locations.

34. Identify the sources the agency relied upon in compiling the regulatory impact statement, including the methodology utilized in determining the existence and extent of the impact of the proposed rules and a cost-benefit analysis of the proposed rules.

•Summary Report on the New Hampshire Department of Environmental Services Development of Maximum Contaminant Levels and Ambient Groundwater Quality Standards for Perfluorooctanesulfonic Acid (PFOS), Perfluorooctanoic Acid (PFOA), Perfluorononanoic Acid (PFNA), and Perfluorohexanesulfonic Acid (PFHxS). New Hampshire Department of Environmental Services, January 2019.
•Recommendation on Perfluorinated Compound Treatment Options for Drinking Water. New Jersey Drinking Water Quality Institute Treatment Subcommittee, June 2015.
•Health-Based Drinking Water Value Recommendations for PFAS in Michigan. Michigan Science Advisory Workgroup, Michigan PFAS Action Response Team, June 2019.

A. How were estimates made, and what were your assumptions? Include internal and external sources, published reports, information provided by associations or organizations, etc., which demonstrate a need for the proposed rules.

Estimates of sampling costs were made based on the statewide sampling effort under MPART. Treatment costs were made based on the number of supplies over the proposed MCLs at the time the estimate was made and the average cost of treatment based on a study by the State of New Hampshire.

35. Identify any reasonable alternatives to the proposed rules that would achieve the same or similar goals.

There are no reasonable alternatives. Possible alternatives include no establishment of any MCL or testing requirement that provides no public health protection, the requirement to install basic treatment for PFAS chemicals at all water supplies that is cost prohibitive, or a change in the MCLs that were based on the best data available.

A. Please include any statutory amendments that may be necessary to achieve such alternatives.

Changes in the MCLs would be required if additional science shows that is prudent.

36. Discuss the feasibility of establishing a regulatory program similar to that proposed in the rules that would operate through private market-based mechanisms. Please include a discussion of private market-based systems utilized by other states.

This is a federal law (SDWA) that must be implemented in Michigan. The state is choosing to add PFAS to its regulated contaminants; no other states have implemented a market-based system of regulation, and this does not seem feasible.

36. Discuss the feasibility of establishing a regulatory program similar to that proposed in the rules that would operate through private market-based mechanisms. Please include a discussion of private market-based systems utilized by other states.

Stakeholders had concerns about the levels at which the MCLs were set. The MCLs were set based on an expert panel that considered the latest scientific data available.

Many alternatives discussed dealt with changes to the timing and logistics of the new requirements, levels of the MCLs, testing protocols, sampling frequency to capture seasonal variations, applicability of the new rules, laboratory capacity concerns, reporting limit concerns, and public notification requirements. We wrote and modified the rules where these concerns and suggestions provided less ambiguity in the rules and provided better, more reasonable public health protection.

38. As required by MCL 24.245b(1)(c), please describe any instructions regarding the method of complying with the rules, if applicable.

Significant guidance material will be available to provide compliance assistance.

Complaint Exhibit D

Summary of Public Comments for Rule Set # 2019-35 EG: Supplying Water to the Public

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) per- and polyfluoroalkyl substances (PFAS) rulemaking public comment period ran from December 19, 2019, through January 31, 2020, during which time **3,334 written public comments** were received via the designated email inbox (EGLE-PFAS-RuleMaking@Michigan.gov) and by mail via the Drinking Water and Environmental Health Division (DWEHD) mailbox:

Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
Attention: Suzann Ruch
P.O. Box 30817
Lansing, Michigan 48909-8311

An additional **82 oral public comments** were presented to EGLE representatives during three public hearings:

Public Hearing Dates and Locations		
Wednesday, January 8, 2020	Tuesday, January 14, 2020	Thursday, January 16, 2020
Grand Valley State University LV Eberhard Center 301 Fulton Street West Grand Rapids, Michigan 49504	Washtenaw Community College Towsley Auditorium 4800 East Huron River Drive Ann Arbor, Michigan 48105	Ralph A. MacMullan Conference Center 104 Conservation Drive Roscommon, Michigan 48653

The template utilized in drafting the Joint Committee on Administrative Rules (JCAR) Agency Report Package dictates a breakdown by two categories: *persons submitting comments of support* and *persons submitting comments of opposition*. This model does not easily fit the reality and range of public comments in this case as the majority of these (whether *in favor*, *neutral*, or *in opposition*) included some number of recommendations for improvement. In order to meet the requirements of the JCAR Agency Report Package, only the two required categories are included in the form – however, the neutral comment group is included in EGLE's considerations as summarized in this report.

Additionally, at the request of the Michigan Office of Administrative Hearings and Rules, Administrative Rules Division, the list of commenters included in the report form comprises example commenters for each of six form letter-style comments. This is due to a limited amount of space within the online form which cannot accommodate the names of over 3,300 authors of written comments.

These comments were individually read and reviewed by EGLE-DWEHD Emerging Contaminants Unit staff, assigned categories of concern based on the content of each comment, and classified as *in favor*, *neutral*, or *in opposition* regarding the proposed PFAS maximum contaminant level (MCL) rule set 2019-35 EG.

In addition, if any comment did not apply to the proposed rule set, it was classified as "not pertaining to proposed rules," and was not counted as *in favor*, *neutral*, or *in opposition*.

Criteria for the three comment categories are summarized below.

I. Comments in Favor: 2,584 (75.6%)

Comments were classified as *in favor* in cases where language directly indicated overall support for the rulemaking effort. Examples include:

- "…strongly supports the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) efforts to establish a rule to create a maximum contaminant level (MCL) for PFAS;"
- "As a Michigan resident, I'm encouraged to hear that the Department of Environment, Great Lakes, and Energy (EGLE) has proposed new drinking water rules that would help reduce exposure to toxic PFAS chemicals in a big way;"
- "…the proposed MCLs are an improvement over those contained in EPA guidance…;" and
- "The PFAS limits proposed by the state are a step in the right direction, but key changes need to be made to ensure they protect the health of Michigan communities."

Often, comments *in favor* included feedback regarding proposed adjustments to the draft rule language. These are reflected in ***IV. Categories of Concern***, below.

II. Neutral Comments: 816 (23.9%)

Comments were classified as *neutral* in cases where language did not directly indicate positive or negative leaning. These comments often included feedback about categories of concern similar to that presented in the comments *in favor* described above.

III. Comments in Opposition: 16 (0.5%)

Comments were classified as *in opposition* in cases where language directly indicated opposition, such as:

- "…to articulate its strong opposition to the proposed changes and additions set out at R 325.10107, R 325.10116, R 325.10308b, R 325.10313, R 325.10401a, R 325.10405, R 325.12701, R 325.10604g, R 325.10717d, R 325.12708, and R 325.12710 (collectively, the "Proposed PFAS Rules")";

- "The rushed regulatory process has resulted in a Proposed Rule that is scientifically flawed and relies on speculative and unquantified benefits in an attempt to demonstrate it is necessary to protect human health;" and
- "The rush to develop the MCL proposal is reflected in the inadequacy of the Regulatory Impact Statement (RIS) that EGLE has filed for the rulemaking;" and
- "…the public's confidence is achieved by ensuring the integrity and soundness of the process and information used as the solid foundation for setting safety standards. Anything less subjects regulators, drinking water systems, and others to potential skepticism and lack of confidence in drinking water safety."

AND/OR cases where a different path forward for developing a standard was proposed. Examples of this include:

- "…continues to urge the development of uniform federal standards;"
- "…EGLE does not appear to have considered it to establish MCLs for PFOA and PFOS equal to EPA's LHA of 70 ppt and to continue monitoring levels of the other five PFAS while EPA develops guidance on these substances;" and
- "While we recognize that not all states and stakeholders can agree on specific priorities or approaches to PFAS regulations, these congressional actions combined with USEPA's efforts, are important national developments that should be supported by the states through their contribution of expertise, resources, and efforts as the Nation works to respond to the PFAS exposure risks."

IV. Categories of Concern

Across *in favor*, *neutral*, and *in opposition* classifications, comments were also assigned into *categories of concern*, identified by EGLE-DWEHD Emerging Contaminants Unit staff during review. Of these categories, the seven listed in this section were the most common (an additional 19 categories were identified in less than 2 percent of comments – see Table 1, Appendix A).

Many of these *categories of concern* directly address the health-based values (HBVs) developed by the Michigan PFAS Action Response Team (MPART) Science Advisory Work Group (SAWG), a group of experts in the fields of epidemiology, toxicology, and risk assessment. In order to address these categories, EGLE requested that MPART perform a review of the arguments presented and provide a response. The MPART Human Health Workgroup was handed this task and concluded that none of the comments submitted raise concerns which would meaningfully alter the SAWG's conclusions.

With MPART's comments in mind, EGLE reviewed the *categories of concern* and offer the following responses:

1. **EGLE must take into account all new data/science in determining the appropriate levels used in developing PFAS MCLs.**

   A methodical approach was undertaken by MPART leading to the identification of seven PFAS compounds for which exist published PFAS drinking water criteria and/or reference doses. This determination was made by the MPART SAWG.

   MPART and EGLE recognize that this class of emerging contaminants will require ongoing assessment of available science as new information may come to light which requires a re-assessment of the proposed MCLs. The existing rulemaking process allows this as needed.

2. **EGLE should consider utilizing a class-based approach in developing a PFAS MCL.**

   A class-based approach is not presently feasible, as PFAS analytical techniques are currently only useful in quantifying a set of known PFAS compounds (18 for the United States Environmental Protection Agency (USEPA) Method 537.1). Semi-quantitative and qualitative analysis for non-targeted PFAS analytes are available but must be paired with well-established quantitative analyses to accurately assess PFAS analyte levels in drinking water.

   Additionally, the orders-of-magnitude variations in HBVs for PFAS do not lend themselves to a single combined level. This number would necessarily be lower than all but the lowest individual proposed values.

3. **Michigan must be/is a leader in developing PFAS MCLs.**

   Michigan is one of several states which have chosen to develop regulatory standards for PFAS compounds in drinking water. This approach is proactive and is not contingent on the development of a federal MCL by the USEPA, which will likely be a multi-year process.

   Michigan's statewide public water PFAS survey presently provides a unique tool to assess the scope of PFAS contamination and has been a driver for the development of the PFAS MCLs. Other states have since begun similar initiatives, but Michigan has been a leader in this regard.

4. **EGLE should include a combined PFAS MCL, including some or all of the seven compounds proposed.**

   As stated by the MPART SAWG, there is not currently scientific consensus regarding which PFAS compounds should be grouped, or whether there is a basis for that grouping, when developing HBVs.

   Also, as discussed in Response 2, above, the orders-of-magnitude variations in HBVs for PFAS do not lend themselves to a combined level.

   Again, it is recognized that the science of PFAS is evolving, and an ongoing assessment will be undertaken by the EGLE-DWEHD Emerging Contaminants Unit, with any new information being considered in potential re-assessment of the rule. The rulemaking process allows this as needed.

5. **Michigan's MCLs must be at a level which is protective of its most vulnerable populations.**

   For the approach taken by the MPART SAWG in deriving the HBVs, the bioaccumulative nature and developmental toxicity of PFAS compounds were taken into account while addressing their effect on Michigan's vulnerable populations.

6. **Michigan's MCLs must be protective of public health.**

   The charge with which the MPART SAWG was presented was to develop toxicity values for certain PFAS compounds for the purpose of protecting public health. This was accomplished and the MPART SAWG HBVs were published, which were then utilized as the starting point for the MCL process.

   During the rulemaking process, the proposed MCLs were not adjusted from the initially proposed values (HBVs). The result is a set of proposed MCLs protective of public health.

7. **EGLE must complete rule promulgation more quickly.**

   The rule promulgation process for Michigan's PFAS MCLs has moved as quickly as feasible, with EGLE meeting the benchmarks of the rulemaking process in as expedient a manner as possible. The process for the proposed MCLs began in April 2019 and is slated to be complete in early May 2020. A one-year promulgation of an MCL represents an accelerated timetable, with these rules normally taking multiple years to complete.

   Some commenters also submitted that the risk of moving too rapidly through rulemaking should also be considered. Care must be taken to assure that the process, while accelerated, remains thorough and establishes appropriate and enforceable drinking water standards. EGLE's approach to Michigan's PFAS MCLs has been both expedient and thorough.

V. Regulatory Impact Statement/Cost Benefit Analysis

A common theme among comments in opposition was to question the appropriateness of the Regulatory Impact Statement (RIS) prepared by EGLE-DWEHD. Having reviewed these comments, EGLE-DWEHD has deemed that nothing was presented that would change the existing RIS.

VI. Proposed Rule Changes

Having reviewed the public comments, EGLE identified an item within the rule for which a change is necessary. The Chemical Abstracts Service numbers listed for two of the seven PFAS compounds were incorrect in the draft rule document. These were identified by EGLE staff as well as two participants in the public comment process:

- PFBS 375-73-5
- PFHxS 355-46-4

These will be corrected in the final document.

APPENDIX A

Table 1 – Categories of Concern

Rank	Category of Concern	Percent Incidence
1	Take into account all new data	93.76%
2	Class based MCL	80.15%
3	Michigan is a leader	68.33%
4	Combined MCL	59.87%
5	Protect vulnerable populations	55.94%
6	Protect public health	25.09%
7	Further expedite process	18.00%
8	100% clean water	1.67%
9	Include tough penalties for polluters	1.23%
10	Lower standards/Add more compounds	1.46%
11	Require regular rule review	0.88%
12	Costs to communities not addressed	0.67%
13	Shift regulation to the sources	0.67%
14	Include private wells	0.59%
15	Focus on public health, not profits	0.53%
16	Require manufacturers to assess toxicity prior to use	0.41%
17	Unduly burden small public water supplies	0.41%
18	Concern about State MCL vs. USEPA #s (Primacy)	0.26%
19	Adjustable monitoring schedule based on results	0.23%
20	Consider additional PFAS methods in appropriate cases	0.23%
21	Outpacing PFAS science	0.18%
22	Make testing widely available, and affordable/free	0.15%
23	Public posting/rapid results sharing	0.15%
24	Harms Michigan's economy	0.12%
25	Premature/Misplaced	0.12%
26	Require disclosure in real estate transactions	0.03%

EXHIBIT 6

STATE OF MICHIGAN

COURT OF CLAIMS

3M COMPANY,

Plaintiff,

v

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY,

Defendant.

______________________________/

OPINION AND ORDER

Case No. 21-000078-MZ

Hon. Brock A. Swartzle

Defendant Department of Environment, Great Lakes, and Energy promulgated rules establishing the allowable maximum-contaminant levels in drinking water for seven chemical substances, all of which fall within the general family of waterproofing chemicals called perfluoroalkyl and polyfluoroalkyl substances (PFAS). Throughout the process, the Department recognized that the rules it set for drinking water regarding Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS) would, by operation of law, automatically set the rules for those substances with respect to groundwater. In other words, once the rules for PFOA and PFOS were set for drinking water, the rules were set for groundwater too. Plaintiff 3M was not directly impacted by the rules with respect to drinking water because it did not operate any drinking-water systems, but the company was impacted by the drinking-water rules because they became the de jure rules for groundwater.

3M challenged the drinking-water rules on several grounds, three of which survived this Court's earlier ruling under MCR 2.116(C)(8): necessity (Count I); arbitrariness or capriciousness

(Count II); and deficiencies in the regulatory-impact statement (Count III). As explained below, the first two claims are without merit. On the third claim, however, the Department did issue a deficient regulatory-impact statement.

Specifically with respect to the regulatory-impact statement: Under the Administrative Procedures Act of 1969, MCL 24.201 *et seq.* (APA), our Legislature requires Executive branch departments to consider the benefits and costs of regulating a particular substance or activity when it promulgates a rule. To ensure that a department actually considers all of the relevant benefits and costs, our Legislature further requires that a department "show its work" in a regulatory-impact statement. MCL 24.245(3). But here, with respect to the anticipated costs imposed on 3M and others like it by the proposed rule, the Department told 3M, lawmakers, and the public that the Department would consider certain costs in a subsequent rulemaking; but then in that subsequent rulemaking, the Department declined to consider those costs, citing the prior promulgated rules as, in effect, a "done deal." A deficient regulatory-impact statement invalidates the promulgated rules.

With that said and as explained more fully below, the Court will, on its own motion, stay the effect of this opinion and order until final judgment, which will allow the parties to seek appellate review under the regulatory status quo. The interests of public health weigh in favor of this stay, so that the parties can pursue appellate relief and the Department can consider, if it wishes, whether additional regulatory actions should be taken in the meantime.

I. BACKGROUND

PFAS are chemicals that have been used in waterproofing products for years without concern, until recently when they have been recognized as hazardous to human health. This realization has prompted several states to regulate the maximum levels of PFAS permitted in drinking water. For its part, the federal government recently issued proposed rulemaking to designate PFOA and PFOS as hazardous materials under 42 USC 9602, the federal statute governing the designation of hazardous substances and establishment of reportable released quantities. See Environmental Protection Agency, *Proposed Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances*, (Sept. 8, 2022), <https://www.epa.gov/superfund/proposed-designation-perfluorooctanoic-acid-pfoa-and-perfluorooctanesulfonic-acid-pfos> (accessed November 15, 2022).

Michigan was one of the first states to address the problem and, given the emergent nature of the threat, Governor Gretchen Whitmer called for an accelerated timetable for the Department to promulgate rules under the Safe Drinking Water Act, MCL 325.1001 *et seq.* (SDWA) and Part 201 of the Natural Resources and Environmental Protection Act, MCL 324.101 *et seq.* (Part 201). The Department acted quickly to address the problem, at one point telling the public, "WE ARE MOVING AT REGULATORY LIGHT SPEED. AWARE OF COMMENTS ON THE OTHER SIDE THAT WE ARE MOVING TOO QUICKLY." Even given the call for prompt action and the acknowledged uncertainties about various benefits and costs, the decision was made at the outset to use the regular, more extensive APA rulemaking process, rather than the APA's more streamlined process for emergent, uncertain environmental risks. See MCL 24.248.

Governor Whitmer directed the Michigan PFAS Action Response Team to establish a science-advisory workgroup "to review both existing and proposed health-based drinking water standards from around the nation to inform the rulemaking process for appropriate" maximum-contaminant levels of PFAS in drinking water. The Response Team created a three-person Workgroup, which in turn developed health-based values for the seven PFAS substances addressed in the drinking-water rules. (In addition to PFOA and PFOS, the group looked at

Perfluorononanoic acid (PFNA), Perfluorohexanoic acid (PFHxA), Perfluorohexanesulfonic acid (PFHxS), Perfluorobutanesulfonic acid (PFBS), and Hexafluoropropylene oxide dimer acid (HFPO-DA).)

The Workgroup identified health-based values for each substance, and each value reflected the group's conclusion of the appropriate maximum levels of contamination, below which "adverse health effects" were not anticipated. The Workgroup acknowledged that "other equally qualified experts" could reach "somewhat different conclusions," but the group concluded that its health-based values were "based on sound science and current practices in risk assessment." The Workgroup also "recognize[d] that the science of PFAS is constantly evolving and new information may come to light that requires a re-evaluation of the drinking water [health-based values] established herein." The Workgroup's health-based values were ultimately adopted by the Department as the PFAS maximum-contaminant levels.

The Department proposed drinking-water rules after the Workgroup submitted its report. As part of its proposal, the Department drafted a regulatory-impact statement titled, "Supplying Water to the Public," 2019-35 EG ("SDWA RIS"). In the statement, the Department explained that the maximum-contaminant levels for the seven PFAS substances were "similar" to those proposed by other states and that there was a " 'clear and convincing need' " for the rules "given the prevalence of PFAS contamination" in Michigan. SDWA RIS ¶¶ 2, 4.

The Department explained that the drinking-water rules would require quarterly sampling and regular monitoring for public-water supplies to track their PFAS levels. *Id.* ¶ 6. The Department estimated that 2,700 public-water supplies would be subject to the monitoring requirements, and that "approximately 22 supplies will be out of compliance based on prior testing." *Id.* ¶ 10. Sampling for PFAS was estimated to cost $300 to take each sample and another $300 to test each sample, for an estimated total of $600 per sample and $6.4 million per year in sampling costs alone. *Id.* ¶ 13. Other costs associated with the drinking-water rules included installation and maintenance of treatment equipment, although switching to a different water source would also be available for some public-water supplies. *Id.* The Department separated installation costs into large and small systems. The cost for large systems was based on an estimate from a New Hampshire report that had less-stringent PFAS standards. *Id.* The Department used the high end of New Hampshire's estimates. *Id.* The estimate for small systems was based on "[a] recent cost estimate for Robinson Elementary school." *Id.* The Department noted that some public-water supplies were already proactively addressing PFAS contamination and that, for example, the City of Plainfield's efforts were expected to cost $15 million. *Id.* ¶ 14.

As for the benefits of the drinking-water rules, the Department noted that the maximum-contaminant levels would lead to a general increase in public health, but no quantitative estimates were included in the regulatory-impact statement. *Id.* ¶ 31. The Department believed that "[t]here is likely a significant benefit to the reduction [in] exposure to PFAS chemicals given recent findings." *Id.* The Department identified a list of expected health benefits, including improved outcomes along various dimensions with respect to women's pregnancies, decreases in the risks of certain diseases (e.g., thyroid disease, kidney and testicular cancers), and overall better cardiovascular and immune responses. *Id.* The Department estimated that the approximately 75% of Michiganders who receive their drinking water from public-water supplies would realize these health benefits. *Id.* ¶ 29(A). With that said, the Department recognized that more work was needed: "More study on the health benefits and impacts of PFAS exposure reduction and the economic benefit is required before a serious estimate can be made." *Id.*

With respect to groundwater, the Department did not address the costs or benefits that the drinking-water rules would have on groundwater cleanup or the approximately 25% of Michiganders who would benefit from reduced PFAS in groundwater. The Department did note, however, that "[s]ince there are not generic groundwater cleanup standards for [the five PFAS compounds other than PFOA and PFOS], the department may establish them" under Part 201. *Id.* ¶ 3(A). The SDWA RIS did not include any other discussion about groundwater.

As directed by MCL 24.266, the Department then sent its request for rulemaking to the Environmental Rules Review Committee. The Environmental Committee received public comments for a month and a half; the comments were overwhelmingly in favor of the proposed rules, although several "categories of concern" were noted following the public-comment period. 3M participated in this process and raised concerns with the proposed drinking-water rules, including how these rules would necessarily set the groundwater criteria for PFOA and PFOS to which 3M would be subject.

The Department summarized the comments it received and addressed the categories of concern during an Environmental Committee meeting but noted that it would defer to the Response Team and the Workgroup regarding setting the appropriate maximum-contaminant levels. Critical here, the Department explained that it "did not include costs [to businesses or groups] due to changes in [Part] 201 clean-up standards" in the SDWA RIS. The Department informed the Environmental Committee that issues raised by 3M and others involving groundwater (including costs of compliance) would be addressed in a separate groundwater-rulemaking process under Part 201. In other words, the Department recognized that the standards it set in the drinking-water rulemaking process for PFOA and PFOS would, by operation of MCL 324.20120a(5), set the standards for those two substances with respect to groundwater, but the Department explained that it would consider the costs to business and groups in a separate groundwater (i.e., Part 201) rulemaking process.

The Environmental Committee approved the proposed drinking-water rules despite concerns expressed by some of its members, and the proposed rules were sent to our Legislature's Joint Committee on Administrative Rules (JCAR). In response to an inquiry from JCAR, the Department explained that, by operation of law, the drinking-water rules would automatically change the maximum-contaminant levels for PFOA and PFOS in groundwater, but the rules would not similarly set the levels for the other five PFAS substances in groundwater because, at that time, there were no such existing maximum-contaminant levels. JCAR did not object to the proposed drinking-water rules, and the rules became final on August 3, 2020. See Mich Admin Code, R 325.10107 *et seq.*

3M then sued the Department on seven counts alleging that the drinking-water rules were invalid. The Department moved for summary disposition under MCR 2.116(C)(8). Judge Colleen A. O'Brien, sitting as a Court of Claims judge, granted in part and denied in part the Department's motion, dismissing counts IV-VII.

The present action concerns the three remaining counts. 3M argues that the drinking-water rules are invalid because they exceed the Department's rulemaking authority (Count I); are arbitrary or capricious (Count II); and are embodied in a deficient regulatory-impact statement (Count III). 3M asks this Court to declare the rules procedurally and substantively invalid and enjoin the Department from any efforts to implement or enforce the rules. Both parties have now moved for summary disposition under MCR 2.116 (C)(10).

In its motion, the Department argues that it acted within its authority under the SDWA because the drinking-water rules are necessary to protect the public health. When determining the maximum-contaminant levels, according to the Department, it was not required to consider incremental changes, so its failure to do so does not make the drinking-water rules invalid. Additionally, the rules were not arbitrary or capricious because the Department engaged in a deliberative process.

Finally, with respect to the SDWA RIS, the Department maintains that it considered all the factors for which it was required and the statement itself was not deficient simply because there was nothing included about groundwater cleanup or compliance costs. The drinking-water rules addressed drinking water, not groundwater, so the regulatory-impact statement properly focused on drinking water because groundwater could be addressed in a separate rulemaking process. As the Department explains in one of its briefs, "Moreover, [the Department] intended to issue new rules specifically setting criteria for PFAS in groundwater and would address the costs of complying with the groundwater standards in the RIS relating to those new rules." DEFENDANT MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY'S 04/14/2022 BRIEF IN RESPONSE TO PLAINTIFF'S 03/15/2022 MOTION FOR SUMMARY DISPOSITION, pp 10-11. This point was emphasized by the Attorney General's office during the Court's hearing on the parties' cross motions for summary disposition. In response to the Court's question about whether the Department had considered 3M's concerns about cleanup and compliance costs in the Part 201 rulemaking process, counsel answered: "I don't know the answer to that [] question, but they would have had to prepare a regulatory impact statement, and that would be one of the topics that they *would have to address*." Hr Tr, p 52 (emphasis added).

In response and in support of its own motion, 3M argues that the maximum-contaminant levels were not "necessary" because they were not absolutely required to protect public health. Additionally, the rules were arbitrary or capricious because they resulted from a rushed process that deviated from the PFAS levels established by other states without offering a satisfactory explanation for doing so. Finally, the regulatory-impact statement failed to consider adequately the costs and potential benefits of the rules or how the rules would affect groundwater cleanup.

As just mentioned, this Court held a hearing to address the parties' competing motions for summary disposition, and this Court asked the parties to provide supplemental briefing on 3M's standing. In its supplemental brief, the Department argues that 3M lacks standing because it is not a public-water supply and the drinking-water rules addressed only public-water supplies. 3M responds that it has standing because the drinking-water rules necessarily affected groundwater PFOA and PFOS maximum-contaminant levels by operation of law, and the groundwater standards unquestionably affect 3M's business.

Finally, before analyzing the merits of the parties' arguments, the Court takes judicial notice of the Department's Part 201 groundwater-cleanup rules, Mich Admin Code, R 299.1 *et seq*., which adopted the same maximum-contaminant levels for PFAS in groundwater that the drinking-water rules established for drinking water. MRE 201; see also *Edwards v Detroit News, Inc*, 322 Mich App 1, 4 n 2; 910 NW2d 394 (2017). The Department issued a regulatory-impact statement as part of the groundwater process entitled, "Cleanup Criteria Requirements for Response Activity," 2020-130 EQ ("Part 201 RIS").

A review of the Part 201 RIS confirms that the Department viewed this latter rulemaking as a continuation of the drinking-water rulemaking process. For example, the Department explicitly recognized, "This rule builds on the rules promulgated by the Department . . . that established PFAS standards for safe water at public water supplies." Part 201 RIS ¶ 1(A). Further, as the Department pointed out, "This [Part 201] rule ensures that all drinking water in the state is protected, regardless of whether the drinking water comes from a public water supply or a private well." *Id.* ¶ 7. With respect to health benefits, the Department did not identify any new benefits beyond those identified in the SDWA RIS:

> As required by and in accordance with the statutory provisions of MCL 324.20120a(4), EGLE calculated and considered the health-based values for establishing the generic cleanup criteria for groundwater used for drinking water for the various PFAS. However, in accordance with the statutory provisions of MCL 324.20120a(5), the SDWS [i.e., drinking-water standards] become the generic cleanup criteria for groundwater used for drinking water for the various PFAS, regardless of the calculated health-based values. [*Id.* ¶ 37.]

Pertinent to 3M's third claim here, the Department recognized in the Part 201 RIS that the groundwater rules for PFOA and PFOS under Part 201 were already set as a result of the earlier SDWA rulemaking. This is because, under Part 201, if there were already existing-cleanup criteria for groundwater (which there were for PFOA and PFOS) and more stringent criteria are subsequently set for drinking water under the SDWA, then that more stringent drinking-water criteria would automatically become the new criteria for groundwater. See MCL 324.20120a(5). Given the SDWA rulemaking, the Department "replaced the existing generic cleanup criteria for [PFOA] and [PFOS] with the State Drinking Water Standards (SDWS), otherwise known as maximum contaminant levels, that were promulgated on August 3, 2020." *Id.* ¶ 1(A). In the words of the Department, "These criteria are effective and legally enforceable by operation of law." *Id.* Because there were not any then-existing groundwater criteria for the other five substances when the drinking-water rules were promulgated, the Department needed a separate rulemaking process under Part 201 to set the groundwater criteria for those other substances. *Id.*

With respect to compliance costs on businesses or groups, the Department did not identify any that were specific to the Part 201 criteria. Instead, the Department identified 154 locations where groundwater cleanup was needed for PFOA and PFOS. *Id.* ¶ 28. But, because the criteria for PFOA and PFOS had already been set as part of the drinking-water rulemaking process, the Department did not consider any costs associated with the cleanup of those substances as part of the subsequent Part 201 rulemaking process. Similarly, the Department did not consider any costs associated with the cleanup of the other five substances, because those five substances could be treated at the same time as PFOA and PFOS: "Since the same treatment technology can be used to address all seven PFAS, the department does not anticipate that additional actions would be required above and beyond those already required by the presence of PFOA and PFOS contamination." *Id.*

Thus, during the Part 201 rulemaking process, the Department did not address the benefits or costs of the drinking-water maximum-contaminant levels for PFOA and PFOS as those applied to groundwater. In fact, the Department used the PFOA and PFOS standards from the drinking-water rules to reduce the projected costs associated with the groundwater rules' regulation of the other five PFAS substances.

With this background set, the Court now turns to whether the drinking-water rules were properly promulgated.

II. ANALYSIS

This Court reviews a motion brought under MCR 2.116(C)(10) "by considering the pleadings, admissions, and other evidence submitted by the parties in the light most favorable to the nonmoving party." *Patrick v Turkelson*, 322 Mich App 595, 605; 913 NW2d 369 (2018).

"Summary disposition is appropriate if there is no genuine issue regarding any material fact and the moving party is entitled to judgment as a matter of law." *Sherman v City of St Joseph*, 332 Mich App 626, 632; 957 NW2d 838 (2020).

This lawsuit centers on the Department's promulgated rules regulating PFAS. "To be enforceable, administrative rules must be constitutionally valid, procedurally valid, and substantively valid." *Mich Farm Bureau v Dep't of Environmental Quality*, 292 Mich App 106, 129; 807 NW2d 866 (2011). "It is well settled that an administrative agency may make such rules and regulations as are necessary for the efficient exercise of its powers expressly granted." *Id.* at 134 (cleaned up). "Administrative rules are valid so long as they are not unreasonable; and, if doubt exists as to their invalidity, they must be upheld." *Id*. at 129 (quotation marks and citation omitted). "[J]udicial review of an administrative rule . . . is limited to the administrative record . . . ." *Mich Ass'n of Home Builders v Dir of Dep't of Labor & Economic Growth*, 481 Mich 496, 498; 750 NW2d 593 (2008).

A. 3M HAS STANDING

Before addressing the validity of the rules, 3M must first establish that it has standing to challenge the rules. "A litigant may have standing . . . if the litigant has a special injury or right, or substantial interest, that will be detrimentally affected in a manner different from the citizenry at large or if the statutory scheme implies that the Legislature intended to confer standing on the litigant." *Lansing Sch Ed Ass'n v Lansing Bd of Ed*, 487 Mich 349, 372; 792 NW2d 686 (2010).

3M is not a public-water supply so, on their face, the drinking-water rules do not directly govern the company's groundwater activities. But the drinking-water rules did set—automatically by operation of law—the maximum-contaminant levels for PFOA and PFOS in groundwater. See

MCL 324.20120a(5). Given this, if the drinking-water rules were improperly promulgated, the rules would injure 3M because they also established the maximum-contaminant levels for PFOA and PFOS in groundwater, which in turn unquestionably affected 3M's business. Thus, 3M has established an injury different from the citizenry at large sufficient to establish standing to challenge the drinking-water rules.

B. THE DEPARTMENT DID NOT EXCEED ITS RULEMAKING AUTHORITY

The SDWA requires that the Department promulgate rules under the APA "to carry out this act." MCL 325.1005(1). The rules must include, among other things, "State drinking water standards and associated monitoring requirements, the attainment and maintenance of which are necessary to protect the public health." MCL 325.1005(1)(b). 3M challenges the "substantive validity" of the Department's PFAS rules in two essential respects. *Michigan Farm Bureau*, 292 Mich App at 129. First, 3M argues that the rules do not satisfy our Legislature's requirement that the rules be "necessary" for public health. Second, the company argues that the rules are arbitrary or capricious. The Court takes up each of these in turn.

With regard to its first challenge, 3M argues that the Department's PFAS rules do not meet the proper understanding of "necessary" in MCL 325.1005(1)(b). In support of its reading, 3M points this Court to our Supreme Court's decision in *In re Certified Questions from the United States District Court*, 506 Mich 332, 368; 958 NW2d 1 (2020) for the proposition that the term "necessary" means "absolutely needed: REQUIRED." 3M argues that other regulatory options existed from which the Department could have selected, including different levels of maximum exposure or methods of treatment.

3M posits a standard of regulatory fine-tuning that is divorced from the APA. The company draws its preferred standard from a case where our Supreme Court considered whether our Legislature could constitutionally delegate certain authority to Governor Whitmer under the Emergency Powers of the Governor Act of 1945, MCL 10.31 *et seq*., in response to the Covid pandemic. A lengthy recitation of our Supreme Court's opinion is unnecessary, as it is hard to fathom a more divergent set of facts or legal questions than the ones presented in that case and the instant one. It is bad enough to compare apples to oranges; this would be like comparing apples to car batteries.

Relying instead on well-trodden administrative law, unlike a state department's interpretation of statute, to which no deference is given by a court, *In re Complaint of Rovas Against SBC Mich*, 482 Mich 90, 117-118; 754 NW2d 259 (2008), this Court must give deference to a department's properly promulgated rules, so long as those rules "are consistent with the legislative scheme," *Mich Farm Bureau*, 292 Mich App at 135. Even when there is some doubt as to the validity of a rule, the department gets the benefit of that doubt. *Id*. at 129.

On the question of what "necessary" means, our Court of Appeals explained in *Twp of Hopkins v State Boundary Comm*, __ Mich App __, __; __ NW2d __ (2022), slip op, p 10, that "the term 'necessary' can have different meanings, depending on the specific context." By using the term, our Legislature could mean " 'requisite' or 'indispensable' " as 3M suggests, or, as the Department argues, "merely 'appropriate' or 'suitable.' " *Id.*

There is nothing in the SDWA to support 3M's strict reading. The term "public health" is a broad concept, one that can be influenced by a virtually infinite number of factors. Given the realities of bounded knowledge, scientific uncertainty, and ever-changing conditions, it would be an impossible task for the Department to identify and select the single, perfectly optimized regulatory scheme. Instead, the Department must promulgate a rule that is suitable and consistent with the act's objectives, specifically the protection of public health, based on a thoughtful and thorough analysis of the evidence and science.

A review of the record confirms that the Department met this standard here (setting aside, for the moment, the adequacy of the regulatory-impact statement discussed *infra*). The Department found that there was a clear and convincing need for establishing maximum-contaminant levels given the prevalence of PFAS contamination in this state. The scientific and health data confirm that exposure to PFAS above certain levels has been shown to cause various adverse health impacts, as noted earlier. The Department and Workgroup identified research that strongly suggested that there would be improvements in public health, potentially avoided costs, and other positive effects if maximum-contaminant levels were set for the seven PFAS substances. While the Department did add the caveat that more research was needed, when read in context, this and similar statements were not a sign of scientific speculation but rather appropriate caution.

In sum, the Court concludes, based on a thorough review of the administrative record and the arguments made by the parties, that the Department's drinking-water rules do not merely contain speculative assertions about benefits to the public health or costs to be borne by various entities. 3M's allegations regarding the Department's admitted uncertainty as to the precise extent of the health and financial benefits/costs expected from the rules do not convince this Court that the Department's findings are wholly speculative or that the maximum-contaminant levels established by the Department are not necessary to protect the public health.

3M posits that a different level of maximum PFAS concentrations as well as less stringent treatment requirements could be equally beneficial to the public health. 3M might very well be correct, but this type of regulatory fine-tuning is not required by the APA, and this Court must defer to the Department's better vantage point and expertise in setting the precise exposure levels and treatment requirements. See *Mich Farm Bureau* at 129, 135.

C. THE DRINKING-WATER RULES ARE NOT ARBITRARY OR CAPRICIOUS

3M next takes aim at whether the rules are arbitrary or capricious under the APA. Setting aside again the adequacy of the regulatory-impact statement (which is taken up in the next section), the arbitrary-or-capricious analysis essentially "equates with rational-basis analysis." *Johnson v Dep't of Natural Resources*, 310 Mich App 635, 650 n 8; 873 NW2d 842 (2015). A rule that is rationally related to the purpose of the enabling statute is neither arbitrary nor capricious. *Dykstra v Dir, Dept of Nat Res*, 198 Mich App 482, 491; 499 NW2d 367 (1993).

The Department established the rules with assistance of the Workgroup, and that group considered standards from other states as well as scientific and other data from a variety of sources. Despite 3M's contention, the Department's standards were similar to standards imposed in those other states. Moreover, as even 3M acknowledges, the Department followed the advice of the Workgroup that was comprised of subject-matter experts. While 3M may disagree with the composition and methodologies of the Workgroup or the timeframe in which it operated, a difference of opinion does not mean that the rule was "motivated by caprice, prejudice, or animus," promulgated without regard to principles, or otherwise arbitrary or capricious. See *Mich Farm Bureau*, 292 Mich App at 145. Moreover, while 3M faults the Department for failing to incorporate other views into its promulgated rules, a department need not address "every conceivable issue" related to a particular subject. *Dykstra*, 198 Mich App at 493.

Similarly, 3M's allegations regarding the Department's "uncertainty" over the benefits offered by the rules do not demonstrate that the rules themselves are arbitrary or capricious. As already explained, the Department clearly found, based on reams of evidence, that a reduction in exposure to PFOA, PFOS, and the other PFAS substances would benefit public health. The Department sought and received input from the public and submitted the proposed rules to the Environmental Committee and JCAR for their respective reviews. The Department offered reasoned justification for its rules, and the rules are rationally related to improving public health, which is the purpose of the SDWA. Therefore, the promulgated rules themselves are not arbitrary or capricious.

D. THE REGULATORY IMPACT STATEMENT WAS DEFICIENT

Moving to 3M's final claim, the company takes issue with the procedural validity of the SDWA RIS. Generally speaking, a regulatory-impact statement is required whenever an agency seeks to promulgate a new rule, and the statement must include specific information to comply with the APA. MCL 24.245(3). Among other things, a regulatory-impact statement must include "[a]n estimate of the actuals statewide compliance costs of the proposed rule on businesses and other groups." MCL 24.245(3)(n). Failure to comply with the requirements invalidates the entire rule. See *Mich Charitable Gaming Ass'n v Michigan*, 310 Mich App 584, 594; 873 NW2d 827 (2015).

Most of 3M's challenges to the sufficiency of the SDWA RIS are without merit. With that said, the Court concludes that the Department issued a deficient regulatory-impact statement in one material respect.

To start, the Court does not view the Department's SDWA-rulemaking process with blinders on. Ordinarily, a court reviewing an administrative department's action is limited to the administrative record specific to that action. See *Mich Ass'n of Home Builders*, 481 Mich at 501. In this circumstance, however, the Department repeatedly made clear that it viewed the Part 201-rulemaking process for groundwater as related to, and a continuation of, its earlier SDWA-rulemaking process for drinking water. This made sense, as everyone knew that the criteria that the Department set for PFOA and PFOS in the SDWA-rulemaking process would apply by operation of law to businesses and groups like 3M because of MCL 324.20120a(5). Consistent with this, during the SDWA-rulemaking process, the Department repeatedly justified its decision not to consider groundwater cleanup and compliance costs incurred by businesses and groups because it would consider those costs during the Part 201 rulemaking process.

But this did not happen.

Specifically, nowhere in the Part 201 RIS did the Department address any cleanup or compliance costs that a business or group would incur as a result of the PFAS rules. In fact, it was the exact opposite—the Department actually relied on the criteria set for PFOA and PFOS as a result of the SDWA-rulemaking process to justify its decision to ignore any cleanup and compliance costs faced by businesses and groups with respect to the other five PFAS substances under Part 201. Thus, the costs to businesses and groups of complying with the PFOA and PFOS groundwater criteria were never considered in either rulemaking proceeding, and the Department asserted in the Part 201 RIS that regulating the other five PFAS would not lead to additional costs because those costs would already be incurred due to the PFOA and PFOS rules.

A court must give a certain amount of deference to an administrative department's rulemaking process. *Brang, Inc v Liquor Control Comm*, 320 Mich App 652, 661; 910 NW2d 309 (2017). But judicial deference is not infinitely elastic—our Legislature has made clear that, when promulgating a rule, administrative departments must comply with certain standards, and one of those is estimating "the actual statewide compliance costs of the proposed rule on businesses and other groups" and including that information in the regulatory-impact statement. MCL 24.245(3)(n). A department cannot skirt this statutory requirement during Rulemaking A by promising to address the costs later in Rulemaking B, but then when later comes, ignoring the costs in Rulemaking B because the criteria were already set in Rulemaking A, and then, on top of this, characterizing all of the ignored costs as actually zero because they are sunk costs. To do this would be to play a shell game with the public.

The deficient regulatory-impact statement invalidates the PFAS rulemaking. MCL 24.243(1); *Clonlara, Inc v State Bd of Ed*, 442 Mich 230, 239; 501 NW2d 88 (1993); *Mich Charitable Gaming Ass'n*, 310 Mich App at 594. 3M has only challenged the SDWA rules in this lawsuit, so the Court will confine its holding to the rules developed under the SDWA-rulemaking process.

Finally, on its own motion and for good cause shown on the record, the Court will stay the effect of this holding under MCR 2.614. There is ample record evidence that, for the benefit of public health, the seven PFAS chemical substances need to be subject to maximum-contaminant levels. While the Department violated the APA by failing to account for certain costs to businesses and groups, the other side of the ledger is sound—there are significant benefits to public health from stringent maximum-contaminant levels for PFAS substances. Moreover, the federal government has recently moved forward with respect to regulating PFOA and PFOS, and depending on where the maximum-contaminant levels are set by that government, 3M's challenge might become effectively moot under MCL 324.20120a(5). Accordingly, this Court will stay the effect of today's opinion and order as to Count III of 3M's complaint until the parties have exhausted their appellate rights and a judgment becomes final.

III. CONCLUSION

Based on foregoing, the Court orders as follows:

IT IS ORDERED that 3M's motion for summary disposition under MCR 2.116(C)(10) is DENIED on Counts I and II of its complaint and GRANTED on Count III of that complaint.

IT IS FURTHER ORDERED that the Department's motion for summary disposition under MCR 2.116(C)(10) is GRANTED on Counts I and II and DENIED on Count III.

IT IS FURTHER ORDERED that, on this Court's own motion, the holding and effect of this Opinion and Order, specifically with respect to the declaratory and injunctive relief granted on Count III of 3M's complaint, is stayed under MCR 2.614 until the parties have exhausted their appellate rights and a judgment becomes final.

IT IS SO ORDERED. This is a final order and closes the case.

Date: November 15, 2022

Hon. Brock A. Swartzle
Judge, Court of Claims

EXHIBIT 7

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Michigan Office of Administrative Hearings and Rules
Administrative Rules Division (ARD)
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Lansing, MI 48909
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REGULATORY IMPACT STATEMENT and COST-BENEFT ANALYSIS (RIS)

Agency Information:

Department name:
Environment, Great Lakes and Energy

Bureau name:
Remediation and Redevelopment Division

Name of person filling out RIS:
Kevin Schrems

Phone number of person filling out RIS:
517-275-1180

E-mail of person filling out RIS:
schremsk@michigan.gov

Rule Set Information:

ARD assigned rule set number:
2020-130 EQ

Title of proposed rule set:
Cleanup Criteria Requirements for Response Activity

Comparison of Rule(s) to Federal/State/Association Standard

1. Compare the proposed rules to parallel federal rules or standards set by a state or national licensing agency or accreditation association, if any exist.

There are no parallel promulgated federal rules for cleanup criterion to make a comparison. Several states have developed compliance requirements, screening levels, or other adopted standards for per- and polyfluoroalkyl substances (PFAS).

A. Are these rules required by state law or federal mandate?

No, there is not a state or federal mandate. This rule builds on the rules promulgated by the Department of Environment, Great Lakes, and Energy (EGLE) and approved by the Environmental Rules Review Committee (ERRC) in 2020 that established PFAS standards for safe water at public water supplies. This proposed rule will ensure that the drinking water of all Michigan citizens, whether from a public water supply or for a private well, are equally protected.

Section 20104(1) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), authorizes EGLE to promulgate rules. Michigan Compiled Laws (MCL) 324.20120a(17) mandates that the department shall promulgate all generic cleanup criteria and target detection limits as rules except in those circumstances where generic cleanup criteria are determined by MCL 324.20120a(5) and (23) and MCL 324.20120e(1)(a). Consistent with MCL 324.20120a(5) and Rule 299.6(11) EGLE replaced the existing generic cleanup criteria for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS) with the State Drinking Water Standards (SDWS), otherwise known as maximum contaminant levels, that were promulgated on August 3, 2020. These criteria are effective and legally enforceable by operation of law. MCL 324.20120a(23) requires that new generic cleanup criteria for Perfluorononanoic Acid (PFNA), Perfluorohexane Sulfonic Acid (PFHxS), Perfluorobutanesulfonic Acid (PFBS), Perfluorohexanoic Acid (PFHxA), and Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) that are published pursuant to this subsection take effect and are legally enforceable when published by the department if the department also initiates rulemaking to promulgate rules for the new criteria within 30 days.

B. If these rules exceed a federal standard, please identify the federal standard or citation, describe why it is necessary that the proposed rules exceed the federal standard or law, and specify the costs and benefits arising out of the deviation.

These rules do not exceed a federal standard.

2. Compare the proposed rules to standards in similarly situated states, based on geographic location, topography, natural resources, commonalities, or economic similarities.

The proposed rules' generic cleanup criteria for groundwater used for drinking water for PFAS were compared to groundwater or drinking water standards for PFAS of other U.S. Environmental Protection Agency Region 5 states. Minnesota [PFHxS] has values for drinking water or groundwater protection that are lower than the proposed generic cleanup criteria for groundwater used for drinking water for PFAS. (Source: January 2021 Interstate Technology Regulatory Council).

A. If the rules exceed standards in those states, please explain why and specify the costs and benefits arising out of the deviation.

This rule builds on the rules promulgated by EGLE and approved by the ERRC in 2020 that established PFAS standards for safe water at public water supplies. This proposed rule will ensure that the drinking water of all Michigan citizens, whether from a public water supply or for a private well, are equally protected. Currently nearly 3 million people obtain their drinking water from a private well. Individuals using these wells are not currently protected from PFAS contamination to the same degree that citizens who obtain their water from a public water supply are protected.

This rule also creates regulatory certainty for individuals that cause or are impacted by PFAS contamination in groundwater used for drinking water. Michigan uses the generic cleanup criteria to determine "facility" status. Determining facility status is the threshold for all responsibilities and requirements of the cleanup program. Michigan's generic cleanup criteria also provides a party responsible for addressing a contaminant with an initial screening tool to determine if response activities or other actions should be taken at a contaminated site. A responsible party can use these generic cleanup criteria as their cleanup levels to achieve "no further action." A responsible party also has the ability to use site-specific criteria based on a site-specific risk assessment in lieu of the generic cleanup criteria.

3. Identify any laws, rules, and other legal requirements that may duplicate, overlap, or conflict with the proposed rules.

The proposed rules do not duplicate, overlap, or conflict with any other laws, rules, or legal requirements.

A. Explain how the rules have been coordinated, to the extent practicable, with other federal, state, and local laws applicable to the same activity or subject matter. This section should include a discussion of the efforts undertaken by the agency to avoid or minimize duplication.

In accordance with the procedures established in Part 201, the generic criteria proposed in these regulations are identical to the SDWS promulgated on August 3, 2020, pursuant to the Supplying Water to the Public rules (R 325.10101 – R 325.12820) and Section 5 of the Safe Drinking Water Act, 1976 PA 399, as amended (MCL 325.1005). This ensures that all drinking water in Michigan is protected equally.

The following NREPA standards will apply to PFAS contamination governed by Part 201; Part 213, Leaking Underground Storage Tanks; Part 111, Hazardous Waste Management; Part 31, Water Resources Protection (groundwater discharge remediation); and Part 115, Solid Waste Management. This applicability creates consistency across all EGLE cleanup programs and ensures that all drinking water in the state is adequately and equitably protected.

4. If MCL 24.232(8) applies and the proposed rules are more stringent than the applicable federally mandated standard, provide a statement of specific facts that establish the clear and convincing need to adopt the more stringent rules.

MCL 24.232(8) does not apply as there are no federally mandated cleanup standards or criteria for PFAS in the groundwater. In any event, there is a "clear and convincing need" for these rules given the prevalence of PFAS contamination within the state and its potential impact on individual water supply wells that rely on groundwater as a drinking water source. The state and other entities have conducted extensive sampling for PFAS and have identified at least 154 sites where groundwater is impacted by the release of PFAS into the environment. This presents an ongoing risk to public health, safety, and welfare and the environment.

5. If MCL 24.232(9) applies and the proposed rules are more stringent than the applicable federal standard, provide either the Michigan statute that specifically authorizes the more stringent rules OR a statement of the specific facts that establish the clear and convincing need to adopt the more stringent rules.

MCL 24.232(9) does not apply as there are no applicable federal cleanup standards or criteria for PFAS in the groundwater.

Purpose and Objectives of the Rule(s)

6. Identify the behavior and frequency of behavior that the proposed rules are designed to alter.

These rules will provide the basis for identifying hazardous levels of PFAS in the environment and will assist responsible parties and the public with the information necessary to take actions that protect the public from unhealthy exposure to these hazardous substances.

A. Estimate the change in the frequency of the targeted behavior expected from the proposed rules.

This proposed rule would apply to any property where groundwater has been contaminated by PFAS above the state's generic criteria for groundwater used for drinking water. EGLE does not have the data necessary to identify the number of locations potentially affected by groundwater contaminated with these PFAS, because there is not always a statutory obligation to report the discovery of PFAS contamination to the department.

To date, 154 locations have been identified where groundwater contaminated with PFAS is present above enforceable generic cleanup criteria for groundwater used for drinking water for PFOA and PFOS. The department has also identified locations where concentrations of PFNA, PFHxS, PFBS, PFHxA, and HFPO-DA have been detected above their respective criteria in addition to PFOA and PFOS. Since the same treatment technology can be used to address all seven PFAS, the department does not anticipate that additional actions would be required above and beyond those already required by the presence of PFOA and PFOS contamination.

B. Describe the difference between current behavior/practice and desired behavior/practice.

On December 15, 2020, EGLE published the proposed generic cleanup criteria for groundwater used for drinking water for PFNA, PFHxS, PFBS, PFHxA, and HFPO DA pursuant to MCL 324.20120a(23). This proposed rule codifies these generic cleanup criteria pursuant to MCL 324.20120a(5). Completing this step as required by Part 201, Michigan will be able to ensure that all drinking water, irrespective of source, is protected from PFAS equally.

C. What is the desired outcome?

This proposed rule will protect Michigan citizens from potential health impacts caused by PFAS contamination. It equally protects all Michigan citizens' drinking water from PFAS contamination regardless if a person's source of drinking water is a regulated municipal water supply system or an individual water supply well that relies on groundwater.

7. Identify the harm resulting from the behavior that the proposed rules are designed to alter and the likelihood that the harm will occur in the absence of the rule.

Exposure to PFAS chemicals has been shown to cause numerous adverse health impacts. The Science Advisory Workgroup (SAW) assigned by the Michigan PFAS Action Response Team (MPART) identified seven PFAS contaminants of concern for which, in their professional judgement, there was enough scientific evidence to establish Health-Based Values (HBVs). HBVs establish a level of contamination below which there is not expected to be adverse health impacts. The generic criteria established in this proposed rule are consistent with these HBV and the SDWS established in 2020. This rule ensures that all drinking water in the state is protected, regardless of whether the drinking water comes from a public water supply or a private well.

A. What is the rationale for changing the rules instead of leaving them as currently written?

MCL 324.20120a(23) requires the department to initiate rulemaking to promulgate rules for any criteria that are established for a hazardous substance that does not have any generic criteria. Part 201 also defines that the generic criteria for groundwater used for drinking water have the same value as a SDWS established in accordance with the SDWA.

8. Describe how the proposed rules protect the health, safety, and welfare of Michigan citizens while promoting a regulatory environment in Michigan that is the least burdensome alternative for those required to comply.

The fundamental objective of the Remediation and Redevelopment Division (RRD) programs is to manage risks from environmental contamination in a manner that is protective of public health, safety, and welfare and the environment. The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS is designed to meet this objective. The use of the proposed generic cleanup criteria for groundwater used for drinking water for PFAS to support risk management decisions provides a less burdensome alternative than the development of site-specific criteria or conducting a site-specific risk assessment. Most response activity relying upon generic cleanup criteria can be self-implemented by liable parties or potential owners of contaminated properties, reducing transaction costs. Development of site-specific criteria or reliance on a site-specific risk assessment requires EGLE involvement in review and approval to ensure the protection of public health, safety, and welfare and the environment, increasing the expenditure of time and money for the development of site-specific criteria and subsequent interactions. Statutory risk management options do not require remediation (cleanup, removal, treatment, etc.) using the generic cleanup criteria. The statutory alternatives offer flexibility to the regulated community to select response activity necessary to safely manage the risk associated with the contamination.

The proposed generic cleanup criteria for groundwater used for drinking water for PFAS also allows the least burdensome alternative to determine a property is a "facility" for property transactions. The proposed generic cleanup criteria for groundwater used for drinking water for PFAS allows a more accurate evaluation of the risk represented by the contamination for a purchaser without requiring the development of site-specific criteria or a site-specific environmental assessment. Purchasers of properties can limit their liability for cleanup of past environmental concerns based upon generic cleanup criteria. Financial institutions rely on the generic cleanup criteria to evaluate whether properties are "facilities" that give rise to environmental response obligations at properties for which they may acquire an interest or provide loan funds. Brownfield financial incentives, such as grants, loans, and tax increment financing, are available to properties meeting the definition of a "facility." Brownfield redevelopment incentives promote the reuse of contaminated properties in a manner that is protective of public health, safety, and welfare and the environment.

9. Describe any rules in the affected rule set that are obsolete or unnecessary and can be rescinded.

This rule package does not propose to rescind rules that are obsolete or unnecessary.

Fiscal Impact on the Agency

Fiscal impact is an increase or decrease in expenditures from the current level of expenditures, i.e. hiring additional staff, higher contract costs, programming costs, changes in reimbursements rates, etc. over and above what is currently expended for that function. It does not include more intangible costs for benefits, such as opportunity costs, the value of time saved or lost, etc., unless those issues result in a measurable impact on expenditures.

10. Please provide the fiscal impact on the agency (an estimate of the cost of rule imposition or potential savings for the agency promulgating the rule).

The proposed promulgation of generic cleanup criteria for groundwater used for drinking water for these PFAS result in minimal change to the existing fiscal impact to EGLE. EGLE costs for training, training materials, and outreach for rule implementation are expected to be minimal. The proposed rules will be implemented using existing resources.

11. Describe whether or not an agency appropriation has been made or a funding source provided for any expenditures associated with the proposed rules.

There have been no agency appropriations or funding sources provided for any expenditures directly related to these proposed rules.

12. Describe how the proposed rules are necessary and suitable to accomplish their purpose, in relationship to the burden(s) the rules place on individuals. Burdens may include fiscal or administrative burdens, or duplicative acts.

Failure to establish these standards puts public health at risk. These standards are necessary to protect the public from the risk of drinking groundwater contaminated by PFAS.

The promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any burden on an individual. However, if an individual is responsible for a site of PFAS contamination, then it is not unreasonable to expect that there will be costs to address the pollutants that they are responsible for to ensure citizens are not harmed by the contamination. To the same extent when the state undertakes cleanup actions at orphan sites it will be subject to these same expectations in order to protect public health.

Compliance obligations are embodied in the remedial action or corrective action requirements of the statutes that rely upon the generic cleanup criteria. Any fiscal or administrative burdens associated with these rules would be incurred in the same manner as those necessary to comply with statutory obligations to address the release of any hazardous substance.

A. Despite the identified burden(s), identify how the requirements in the rules are still needed and reasonable compared to the burdens.

Failure to establish these rules will leave roughly 3 million Michiganders who rely on a private well for their drinking water without the assurances that their drinking water will be safe from PFAS contamination. These citizens deserve the same protections that Michigan provides to the 7 million citizens who are connected to a public water supply.

Impact on Other State or Local Governmental Units

13. Estimate any increase or decrease in revenues to other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Estimate the cost increases or reductions for other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Include the cost of equipment, supplies, labor, and increased administrative costs in both the initial imposition of the rule and any ongoing monitoring.

While it is possible that a local government unit may be responsible for causing a release of PFAS that affects groundwater, it is more likely that they are impacted by a release caused by another party. Many communities are currently struggling to pay for water supply lines that will allow residents who have a contaminated well to get a safe alternative for water. Michigan has some communities where key development opportunities are stopped because a site has PFAS-contaminated groundwater. The burden that PFAS contamination has placed on Michigan communities is real and significant.

The generic cleanup criteria rules facilitate property transactions to occur and, therefore, enable the redevelopment and reuse of previously contaminated, vacant properties. Redevelopment of abandoned properties has been documented to increase the property values of the surrounding neighborhood, adding to the increase of local tax revenue.

If a local government was responsible for the release and, as a result, is subject to state statutes governing the cleanup of contamination, the costs associated with the cleanup would vary location to location depending on a number of factors – the proximity of wells used for drinking water supply, the ability to contain and properly manage the release, the volume and concentration of the pollutant in the groundwater, etc. Because of this variability, EGLE is unable to quantify any significant impact on gross revenues to other state or local governmental units as a result of the promulgation of the generic cleanup criteria for groundwater used for drinking water for these PFAS.

14. Discuss any program, service, duty, or responsibility imposed upon any city, county, town, village, or school district by the rules.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any new programs, services, duties, or responsibilities upon any city, county, town, village, or school district simply due to their rural location. Where a city, county, town, village, or school district is the owner or operator responsible for a site of PFAS contamination, there may be costs of compliance associated with these rules that would be incurred in the same manner as those necessary to comply with statutory obligations to address the release of any hazardous substance.

A. Describe any actions that governmental units must take to be in compliance with the rules. This section should include items such as record keeping and reporting requirements or changing operational practices.

These proposed rules do not establish any new compliance requirements. Existing statutes, including Parts 201, 213, 111, 31, and 115, dictate the administrative and technical requirements associated with addressing a contaminated facility.

15. Describe whether or not an appropriation to state or local governmental units has been made or a funding source provided for any additional expenditures associated with the proposed rules.

An appropriation to state or local governmental units has not been made or a funding source provided for any additional expenditures that are directly related to these proposed rules. However, to date, Michigan has provided over $150 million for statewide PFAS response efforts and financial assistance to local governments to help them pay for PFAS contamination impacting their communities.

Rural Impact

16. In general, what impact will the rules have on rural areas?

The presence of PFAS in the environment poses a risk to public health and the environment no matter where PFAS comes to be located. Rural areas may have a higher percentage of people who rely on individual water supply wells that use groundwater as a drinking water source.

These proposed rules will ensure that the drinking water of all Michigan citizens, whether from a public water supply or from a private well, are equally protected. The proposed rules for the generic cleanup criteria for groundwater used for drinking water for PFAS will allow for appropriate risk management decisions with respect to sites of environmental contamination in rural areas that are necessary to protect public health and the environment.

A. Describe the types of public or private interests in rural areas that will be affected by the rules.

Citizens in rural Michigan will be assured that their drinking water is being protected from PFAS contamination to the same degree that citizens who get their drinking water from a public water supply are having their drinking water protected.

If an entity in rural Michigan is responsible for addressing a release of PFAS to groundwater used for drinking water, the proposed rules do not result in additional costs simply due to the rural location. It is possible that the cost to address a release of PFAS in a rural area could have some additional costs because rural areas often have a higher percentage of the population that rely on individual water supply wells as a drinking water source.

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Environmental Impact

17. Do the proposed rules have any impact on the environment? If yes, please explain.

The fundamental objective of the RRD programs is to manage risks from environmental contamination in a manner that is protective of public health and the environment. Groundwater contaminated by PFAS can transport PFAS to nearby surface waters, which can adversely affect environmental health and quality. While these rules are focused on the prevention of public health impacts to humans caused by drinking PFAS-contaminated groundwater, any cleanup activities resulting from providing their protection will undoubtedly benefit the environment as well.

Small Business Impact Statement

18. Describe whether and how the agency considered exempting small businesses from the proposed rules.

Exempting small businesses from the proposed rules was not appropriate for this rule. The proposed PFAS generic cleanup criteria for groundwater used for drinking water apply to all businesses, regardless of size. While EGLE can work with small businesses to identify reasonable solutions for addressing PFAS, the level of protection provided to citizens exposed to PFAS should not be adjusted based on the size of the facility responsible for the contamination.

19. If small businesses are not exempt, describe (a) the manner in which the agency reduced the economic impact of the proposed rules on small businesses, including a detailed recitation of the efforts of the agency to comply with the mandate to reduce the disproportionate impact of the rules upon small businesses as described below (in accordance with MCL 24.240(1)(a-d)), or (b) the reasons such a reduction was not lawful or feasible.

There is no provision for addressing a small business' compliance obligations differently within the statutes since there is no relationship between the size of a business, the environmental contamination related to a business, and the risk to public health, safety, and welfare and the environment. However, EGLE routinely uses enforcement discretion with regards to the financial viability of a particular business and do a formal assessment of a person's ability to pay for the necessary remedial actions or corrective actions when pursing compliance and enforcement alternatives.

A. Identify and estimate the number of small businesses affected by the proposed rules and the probable effect on small businesses.

EGLE does not have the necessary data to estimate the number of small businesses responsible for the PFAS contamination because there is not always a statutory obligation to report the discovery of PFAS contamination to the department In addition, any person can self-implement actions necessary to address the risks associated with PFAS contamination without department approval.

B. Describe how the agency established differing compliance or reporting requirements or timetables for small businesses under the rules after projecting the required reporting, record-keeping, and other administrative costs.

EGLE did not establish differing compliance or reporting requirements or timetables specific to small businesses. The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any additional compliance or reporting obligations. The obligations to address the release of any hazardous substance to the environment are embodied in the remedial action or corrective action requirements of the statutes that rely upon the generic cleanup criteria. The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS does not impact the requirements for reporting and recordkeeping under any of the programs' statutory provisions.

C. Describe how the agency consolidated or simplified the compliance and reporting requirements for small businesses and identify the skills necessary to comply with the reporting requirements.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS does not contain any additional reporting requirements.

D. Describe how the agency established performance standards to replace design or operation standards required by the proposed rules.

The proposed revision and promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS does not include design and operating standards.

20. Identify any disproportionate impact the proposed rules may have on small businesses because of their size or geographic location.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS will not impact small businesses specifically because of their size or location. The impact of these rules is proportional to the nature and extent of the release of PFAS to the environment and the actions necessary to protect public health, safety, and welfare and the environment. This is true for the release of any hazardous substance regardless of who is responsible.

21. Identify the nature of any report and the estimated cost of its preparation by small businesses required to comply with the proposed rules.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any obligation for a small business to prepare a report for submission to the agency.

22. Analyze the costs of compliance for all small businesses affected by the proposed rules, including costs of equipment, supplies, labor, and increased administrative costs.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any compliance obligations. The cost of compliance, including costs of equipment, supplies, labor, and increased administrative costs with respect to the implementation of remedial or corrective action relying on the proposed rules, would be incurred in the same manner as those costs to comply with statutory obligations to address the release of any hazardous substance.

The cost to a business to comply with statutory obligations resulting from the contamination at a site are dependent on the type and level of contamination present at a site, the amount and quality of environmental data already known about a site, the type of use of the site, as well as the response activities selected for managing the risks presented by the environmental contamination.

23. Identify the nature and estimated cost of any legal, consulting, or accounting services that small businesses would incur in complying with the proposed rules.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any compliance obligations. The cost of any legal, consulting, or accounting services would be incurred in the same manner as those costs to comply with statutory obligations to address the release of any hazardous substance.

As previously stated, the cost to a business to comply with statutory obligations resulting from the contamination at a site are dependent on the type and level of contamination present at a site, the amount and quality of environmental data already known about a site, the type of use of the site, as well as the response activities selected for managing the risks presented by the environmental contamination.

24. Estimate the ability of small businesses to absorb the costs without suffering economic harm and without adversely affecting competition in the marketplace.

It is not expected that these rules will adversely affect competition in the marketplace. All businesses that are liable for a release of hazardous substances into the environment are required by statute to address the risks posed by the contamination. There are costs associated with those responsibilities, but as stated above, those costs vary depending on the specifics at the site. EGLE routinely uses enforcement discretion with regards to the financial viability of a particular business and does a formal assessment of a person's ability to pay for the necessary remedial actions or corrective actions when pursing compliance and enforcement alternatives.

25. Estimate the cost, if any, to the agency of administering or enforcing a rule that exempts or sets lesser standards for compliance by small businesses.

EGLE will not incur any additional costs since the proposed revisions do not specifically exempt or set lesser standards for compliance for small businesses.

26. Identify the impact on the public interest of exempting or setting lesser standards of compliance for small businesses.

There would be an adverse impact to the public if small businesses were exempt or the rules set lesser standards of compliance for small businesses. If a private well is impacted from PFAS contamination originating from a small business, the residents who depend on that well will be at risk. These citizens deserve the same protections that Michigan provides to the 7 million citizens who are connected to a public water supply.

In the event that a small business responsible for a PFAS release fails to appropriately act, the burden to abate the risks caused by the release would be placed on limited public resources.

27. Describe whether and how the agency has involved small businesses in the development of the proposed rules.

In consideration of the proposed rules for the generic cleanup criteria for groundwater used for drinking water for PFAS, EGLE held two public webinars on November 2 and November 16, 2020. In order to facilitate participation for those who were unable to attend these live webinars, the webinars were also recorded for future viewing.

In addition to the webinars, EGLE allowed for a three-week public comment period after the second webinar to allow interested parties to submit comments regarding whether the process for establishing the proposed generic cleanup criteria for groundwater used for drinking water for PFAS followed the regulations under Part 201. An estimated 232 individuals representing federal, state and local governments, large and small businesses, tribal entities, and associations that represent large and small businesses participated in the webinars.

A. If small businesses were involved in the development of the rules, please identify the business(es).

No individual small businesses were directly involved in the development of the proposed rules.

Cost-Benefit Analysis of Rules (independent of statutory impact)

28. Estimate the actual statewide compliance costs of the rule amendments on businesses or groups.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any compliance obligations. The cost of compliance would be incurred in the same manner as those costs to comply with statutory obligations to address the release of any hazardous substance. In this case, there will be increased costs if a person (i.e., individual, small or large business, federal, state or local unit of government, etc.) is the owner or operator responsible for a site of PFAS groundwater contamination.

EGLE does not have the ability to estimate the actual statewide compliance costs of the rule amendments on business [or individuals] since the statute does not always require a responsible party to report the presence of PFAS groundwater contamination. To date, 154 locations have been identified where groundwater contaminated with PFAS is present above enforceable generic cleanup criteria for groundwater used for drinking water for PFOA and PFOS. EGLE has also identified locations where concentrations of PFNA, PFHxS, PFBS, PFHxA, and HFPO-DA have been detected above their respective criteria in addition to PFOA and PFOS. Since the same treatment technology can be used to address all seven PFAS, the department does not anticipate that additional actions would be required above and beyond those already required by the presence of PFOA and PFOS contamination.

The costs associated with each cleanup would vary location to location depending on a number of factors – the proximity of wells used for the drinking water supply, the ability to contain and properly manage the release, the volume and concentration of the pollutant in the groundwater, etc.

A. Identify the businesses or groups who will be directly affected by, bear the cost of, or directly benefit from the proposed rules.

Small and large businesses that used products containing PFAS may be directly impacted, if those businesses are responsible for an activity causing a release of the products containing PFAS.

Businesses engaging in property transactions for the redevelopment of contaminated property will benefit from the liability protections that these proposed rules will provide.

The public will directly benefit because the proposed rules will establish cleanup criteria intended to protect public health and the environment and will establish a basis for persons liable for the release of PFAS for undertaking response activities necessary for protecting public health and the environment.

B. What additional costs will be imposed on businesses and other groups as a result of these proposed rules (i.e. new equipment, supplies, labor, accounting, or recordkeeping)? Please identify the types and number of businesses and groups. Be sure to quantify how each entity will be affected.

EGLE does not have the ability to quantify the additional costs of education, training, application fees, examination fees, new equipment, supplies, labor, accounting, or recordkeeping for the public or regulated individuals. Not only are there no reporting requirements to estimate the number of sites that have PFAS groundwater contamination, but a person can self-implement actions necessary to address the risks associated with PFAS contamination without department approval and there is no requirement to report the costs of these actions to EGLE.

29. Estimate the actual statewide compliance costs of the proposed rules on individuals (regulated individuals or the public). Include the costs of education, training, application fees, examination fees, license fees, new equipment, supplies, labor, accounting, or recordkeeping.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any compliance obligations. The cost of compliance would be incurred in the same manner as those costs to comply with statutory obligations to address the release of any hazardous substance. The proposed rules will only result in increased costs for statutory compliance relative to the cost to comply with the current generic cleanup criteria rules where a person (i.e., individual, small or large business, federal, state or local unit of government, etc.) is the owner or operator responsible for a site of PFAS groundwater contamination.

EGLE does not have the ability to estimate the actual statewide compliance costs of the rule amendments on business [or individuals] since there are no reporting requirements to estimate the number of sites that have PFAS groundwater contamination or the potential additional response activities that may be necessary. In addition, a person can self-implement actions necessary to address the risks associated with PFAS contamination without department approval and there is no requirement to report the costs of these actions to EGLE.

There are no known costs for education, training, application fees, examination fees, new equipment, supplies, labor, accounting, or recordkeeping as a result of these proposed rules.

A. How many and what category of individuals will be affected by the rules?

EGLE does not have data with respect to the number of sites affected by groundwater contaminated with these PFAS, because there is no statutory obligation to report the discovery of PFAS contamination to the department.

To date, EGLE has identified 154 facilities where PFAS exceeds the generic cleanup criteria for groundwater used for drinking water for PFOA and PFOS. EGLE has also identified locations where concentrations of PFNA, PFHxS, PFBS, PFHxA, and HFPO-DA have been detected above their respective criteria in addition to PFOA and PFOS. These facilities are comprised of large and small businesses, public and privately owned or operated waste disposal areas, military installations, and other locations.

These proposed rules will protect Michigan citizens from potential health impacts caused by PFAS contamination. It equally protects all Michigan citizens' drinking water from PFAS contamination regardless of a whether a person's source of drinking water is a regulated municipal water supply system or an individual water supply well that relies on groundwater. Roughly 3 million Michiganders rely on a private well for their drinking water. These rules will protect those residents.

B. What qualitative and quantitative impact do the proposed changes in rules have on these individuals?

EGLE does not have the ability to estimate the qualitative and quantitative impact of actual statewide compliance costs of the proposed rules on business [or individuals] since there are no reporting requirements to estimate the number of sites that have PFAS groundwater contamination or the potential additional response activities that may be necessary to protect public health or the environment. There are no known costs for education, training, application fees, examination fees, new equipment, supplies, labor, accounting, or recordkeeping for the public or regulated individuals.

30. Quantify any cost reductions to businesses, individuals, groups of individuals, or governmental units as a result of the proposed rules.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, does not impose any costs to these entities; therefore, these proposed rules are not expected to result in any significant cost reductions to businesses, individuals, groups, of individuals, or governmental units. The cost of compliance would be incurred in the same manner as those costs to comply with statutory obligations to address the release of any hazardous substance.

For the entities responsible for the release of PFAS, the proposed rules would establish generic criteria that would provide a cost savings by avoiding the additional costs of developing site-specific criteria or conducting site-specific risk assessments.

These proposed rules also would allow property owners or prospective purchasers of properties to use generic cleanup criteria to evaluate the risk from environmental conditions at the property, avoiding additional costs of developing site-specific criteria or conducting a site-specific risk assessment.

The promulgation of the proposed rules may result in cost reductions to the state of Michigan by establishing an enforceable standard that will allow the state of Michigan to expect response activities from parties responsible for the release of PFAS.

31. Estimate the primary and direct benefits and any secondary or indirect benefits of the proposed rules. Please provide both quantitative and qualitative information, as well as your assumptions.

These rules will provide the basis for identifying hazardous levels of PFAS in the environment and will assist responsible parties and the public with the information necessary to take actions that protect the public from unhealthy exposure to these hazardous substances.

32. Explain how the proposed rules will impact business growth and job creation (or elimination) in Michigan.

The proposed rules will continue to facilitate the sale and redevelopment of contaminated properties based upon scientifically sound risk management for the protection of public health, safety, and welfare and the environment. Businesses engaging in property transactions for the redevelopment of contaminated property will benefit from the liability protections that these proposed rules will provide. The redeveloped properties result in investment in communities, create jobs, improve property values, and provide increased tax revenue to state and local units of government.

33. Identify any individuals or businesses who will be disproportionately affected by the rules as a result of their industrial sector, segment of the public, business size, or geographic location.

The proposed promulgation of the generic cleanup criteria for groundwater used for drinking water for PFAS, by itself, will not disproportionately affect businesses. Only those individuals or businesses responsible for PFAS contamination will be affected. There is no known affect from the proposed rules to specific segments of the public, industrial sectors, business size, and geographic location other than those that have used and released PFAS to the environment.

34. Identify the sources the agency relied upon in compiling the regulatory impact statement, including the methodology utilized in determining the existence and extent of the impact of the proposed rules and a cost-benefit analysis of the proposed rules.

EGLE relied upon department experts and information obtained from existing EGLE data sources in the determination of the impact and estimated costs related to the proposed rules.

A. How were estimates made, and what were your assumptions? Include internal and external sources, published reports, information provided by associations or organizations, etc., that demonstrate a need for the proposed rules.

Reliable, quantifiable estimates cannot be made without knowing the entire universe of sites and the nature and extent of PFAS contamination. As previously stated, the cost to comply with statutory obligations resulting from PFAS contamination at a site are dependent on the type and level of contamination present at a site, the amount and quality of environmental data already known about a site, the type of use of the site, as well as the response activities selected for managing the risks presented by the environmental contamination. In addition, a person can self-implement actions necessary to address the risks associated with PFAS contamination without department approval. As a result, there is not reliable data available to EGLE.

Alternative to Regulation

35. Identify any reasonable alternatives to the proposed rules that would achieve the same or similar goals.

EGLE has not identified any reasonable alternatives. Failure to establish these rules will leave roughly 3 million Michiganders who rely on a private well for their drinking water without the assurances that their drinking water will be safe from PFAS contamination. These citizens deserve the same protections that Michigan provides to the 7 million citizens who are connected to a public water supply.

A. Please include any statutory amendments that may be necessary to achieve such alternatives.

EGLE has not identified a reasonable alternative or any statutory amendments that may be necessary to achieve an alternative, if one existed.

36. Discuss the feasibility of establishing a regulatory program similar to that proposed in the rules that would operate through private market-based mechanisms. Please include a discussion of private market-based systems utilized by other states.

The development of cleanup standards is a state function rather than a private market-based system for other state cleanup programs. The development of site-specific cleanup standards may be required of private parties by other state programs, but the determination of whether the resulting standards are protective of public health, safety, and welfare and the environment is a state agency decision.

A few states have implemented licensed site remediation professional programs that oversee investigation and remediation of contaminated sites and certifies to the state agency full compliance with statute and rules. These programs require any party responsible for an existing or newly identified contaminated site to complete the remediation of the affected properties under specific time frames and regulations. The development of cleanup standards for these states was done by the state agency responsible for environmental protection. An extensive revision to Michigan’s cleanup programs would be necessary to mirror these programs, including revisions to Michigan’s unique causational liability scheme that has made brownfield redevelopment successful in Michigan.

37. Discuss all significant alternatives the agency considered during rule development and why they were not incorporated into the rules. This section should include ideas considered both during internal discussions and discussions with stakeholders, affected parties, or advisory groups.

As required by and in accordance with the statutory provisions of MCL 324.20120a(4), EGLE calculated and considered the health-based values for establishing the generic cleanup criteria for groundwater used for drinking water for the various PFAS. However, in accordance with the statutory provisions of MCL 324.20120a(5), the SDWS become the generic cleanup criteria for groundwater used for drinking water for the various PFAS, regardless of the calculated health-based values.

Additional Information

38. As required by MCL 24.245b(1)(c), please describe any instructions regarding the method of complying with the rules, if applicable.

Compliance obligations are embodied in the remedial action or corrective action requirements of the statutes that rely upon the generic cleanup criteria. Compliance with these rules would be expected to occur in the same manner as those who are responsible for the release of any hazardous substance. EGLE will continue to provide information to assist the regulated community in understanding its compliance obligations through outreach workshops, webinars, plain English fact sheets, and postings on its web page.

EXHIBIT 8

RECEIVED by MSC 5/3/2024 4:23:49 PM

Department of Environment, Great Lakes and Energy
Remediation and Redevelopment Division
Administrative Rules for Cleanup Criteria Requirements for Response Activity
Rule Set 2020-130 EQ

NOTICE OF PUBLIC HEARING
Thursday, July 8, 2021
02:00 PM

The public hearing will be held virtually via Zoom to receive public comments while complying with measures designed to help prevent the spread of COVID-19 and the City of Lansing Resolution #2021-081.
https://us02web.zoom.us/webinar/register/WN_jmAlNyOiQdWwvY7dnMSQfQ

The Department of Environment, Great Lakes and Energy will hold a public hearing to receive public comments on proposed changes to the Cleanup Criteria Requirements for Response Activity rule set.

The proposed rule set (2020-130 EQ) will amend the current rules to add per- and polyfluoroalkyl substances (PFAS) generic cleanup criteria for groundwater used for drinking water to R 299.49.

These rules are promulgated by authority conferred on the Director of EGLE by Section 20104(1) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, MCL 324.20104(1). The proposed rules will take effect immediately after filing with the Secretary of State. The proposed rules are published on the State of Michigan web site at http://www.michigan.gov/ARD and in the Michigan Register in the 7/1/2021 issue. Copies of these proposed rules may also be obtained by mail or electronic transmission at the following address: EGLE-RRD@michigan.gov.

Comments on these proposed rules may be made at the hearing or by mail or electronic mail at the following address until 8/9/2021 at 05:00PM.

Kevin Schrems

Email: EGLE-RRD@michigan.gov

P.O. Box 30426 Lansing, Michigan 48909-7926

The public hearing will be conducted in compliance with the 1990 Americans with Disabilities Act. If the hearing is held at a physical location, the building will be accessible with handicap parking available. Anyone needing assistance to take part in the hearing due to disability may call 517-275-1180 to make arrangements.

EXHIBIT 9

DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

REMEDIATION AND REDEVELOPMENT DIVISION

ENVIRONMENTAL CONTAMINATION RESPONSE ACTIVITY

Filed with the secretary of state on February 15, 2022

These rules take effect immediately upon filing with the secretary of state unless adopted under section 33, 44, or 45a(9) of the administrative procedures act of 1969, 1969 PA 306, MCL 24.233, 24.244, or 24.245a. Rules adopted under these sections become effective 7 days after filing with the secretary of state.

(By authority conferred on the director of the department of environment, Great Lakes, and energy by sections 20104, and 20120a of the natural resources and environmental protection act**,** 1994 PA 451, MCL 324.20104 and-324.20120a)

R 299.44 of the Michigan Administrative Code is amended**,** as follows:

CLEANUP CRITERIA REQUIREMENTS FOR RESPONSE ACTIVITY

R 299.44 Generic groundwater cleanup criteria.
Rule 44. The generic groundwater cleanup criteria for all categories are shown in table 1 and table 1a.

TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Acenaphthene	83329	1,300	3,800	38	4,200 (S)	4,200 (S)	4,240	ID
Acenaphthylene	208968	52	150	ID	3,900 (S)	3,900 (S)	3,930	ID
Acetaldehyde (I)	75070	950	2,700	130	1.1E+6	2.3E+6	1.00E+9	8.9E+6
Acetate	71501	4,200	12,000	(G)	ID	ID	ID	ID
Acetic acid	64197	4,200	12,000	(G)	NLV	NLV	6.00E+9	1.0E+9 (D)
Acetone (I)	67641	730	2,100	1,700	1.0E+9 (D,S)	1.0E+9 (D,S)	1.00E+9	1.5E+7
Acetonitrile	75058	140	400	NA	2.4E+7	4.5E+7	2.00E+8	2.1E+7
Acetophenone	98862	1,500	4,400	ID	6.1E+6 (S)	6.1E+6 (S)	6.10E+6	ID
Acrolein (I)	107028	120	330	NA	2,100	4,200	2.10E+8	6.7E+6
Acrylamide	79061	0.5 (A)	0.5 (A)	10 (X)	NLV	NLV	2.20E+9	NA
Acrylic acid	79107	3,900	11,000	NA	1.2E+7	2.8E+7	1.00E+9	1.0E+9 (D)
Acrylonitrile (I)	107131	2.6	11	2.0 (M); 1.2	34,000	1.9E+5	7.50E+7	6.4E+6
Alachlor	15972608	2.0 (A)	2.0 (A)	11 (X)	NLV	NLV	1.83E+5	ID
Aldicarb	116063	3.0 (A)	3.0 (A)	NA	NLV	NLV	6.00E+6	ID
Aldicarb sulfone	1646884	2.0 (A)	2.0 (A)	NA	NLV	NLV	7.80E+6	ID
Aldicarb sulfoxide	1646873	4.0 (A)	4.0 (A)	NA	NLV	NLV	2.80E+7	ID
Aldrin	309002	0.098	0.4	0.01 (M); 8.7E-6	180 (S)	180 (S)	180	ID
Aluminum (B)	7429905	50 (V)	50 (V)	NA	NLV	NLV	NA	ID
Ammonia	7664417	10,000 (N)	10,000 (N)	(CC)	3.2E+6	7.1E+6	5.30E+8	ID
t-Amyl methyl ether (TAME)	994058	190 (E)	190 (E)	NA	2.6E+5	5.7E+5	2.64E+6	NA
Aniline	62533	53	220	4	NLV	NLV	3.60E+7	NA
Anthracene	120127	43 (S)	43 (S)	ID	43 (S)	43 (S)	43.4	ID
Antimony	7440360	6.0 (A)	6.0 (A)	130 (X)	NLV	NLV	NA	ID
Arsenic	7440382	10 (A)	10 (A)	10	NLV	NLV	NA	ID
Asbestos (BB)	1332214	7.0E MFL (A)	7.0E MFL (A)	NA	NLV	NLV	NA	NA
Atrazine	1912249	3.0 (A)	3.0 (A)	7.3	NLV	NLV	70,000	ID
Azobenzene	103333	23	94	ID	6,400 (S)	6,400 (S)	6,400	ID
Barium (B)	7440393	2,000 (A)	2,000 (A)	(G)	NLV	NLV	NA	ID

TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

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Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Benzene (I)	71432	5.0 (A)	5.0 (A)	200 (X)	5,600	35,000	1.75E+6	68,000
Benzidine	92875	0.3 (M); 0.0037	0.3 (M); 0.015	0.3 (M); 0.073	NLV	NLV	5.20E+5	ID
Benzo(a)anthracene (Q)	56553	2.1	8.5	ID	NLV	NLV	9.4	ID
Benzo(b)fluoranthene (Q)	205992	1.5 (S,AA)	1.5 (S,AA)	ID	ID	ID	1.5	ID
Benzo(k)fluoranthene (Q)	207089	1.0 (M); 0.8 (S)	1.0 (M); 0.8 (S)	NA	NLV	NLV	0.8	ID
Benzo(g,h,i)perylene	191242	1.0 (M); 0.26 (S)	1.0 (M); 0.26 (S)	ID	NLV	NLV	0.26	ID
Benzo(a)pyrene (Q)	50328	5.0 (A)	5.0 (A)	ID	NLV	NLV	1.62	ID
Benzoic acid	65850	32,000	92,000	NA	NLV	NLV	3.50E+6	ID
Benzyl alcohol	100516	10,000	29,000	NA	NLV	NLV	4.40E+7	ID
Benzyl chloride	100447	7.7	32	NA	12,000	77,000	4.90E+5	NA
Beryllium	7440417	4.0 (A)	4.0 (A)	(G)	NLV	NLV	NA	ID
bis(2-Chloroethoxy)ethane	112265	ID	ID	ID	NLV	NLV	1.89E+7	ID
bis(2-Chloroethyl)ether (I)	111444	2	8.3	1.0 (M); 0.79	38,000	2.1E+5	1.72E+7	1.7E+7 (S)
bis(2-Ethylhexyl)phthalate	117817	6.0 (A)	6.0 (A)	25	NLV	NLV	340	NA
Boron (B)	7440428	500 (F)	500 (F)	7,200 (X)	NLV	NLV	NA	ID
Bromate	15541454	10 (A)	10 (A)	40 (X)	NLV	NLV	38,000	ID
Bromobenzene (I)	108861	18	50	NA	1.8E+5	3.9E+5	4.13E+5	ID
Bromodichloromethane	75274	80 (A,W)	80 (A,W)	ID	4,800	37,000	6.74E+6	ID
Bromoform	75252	80 (A,W)	80 (A,W)	ID	4.7E+5	3.1E+6 (S)	3.10E+6	ID
Bromomethane	74839	10	29	35	4,000	9,000	1.45E+7	ID
n-Butanol (I)	71363	950	2,700	9,800 (X)	NLV	NLV	7.40E+7	4.7E+7
2-Butanone (MEK) (I)	78933	13,000	38,000	2,200	2.4E+8 (S)	2.4E+8 (S)	2.40E+8	ID
n-Butyl acetate	123864	550	1,600	NA	6.7E+6 (S)	6.7E+6 (S)	6.70E+6	2.5E+6
t-Butyl alcohol	75650	3,900	11,000	NA	1.0E+9 (D,S)	1.0E+9 (D,S)	1.00E+9	6.1E+7
Butyl benzyl phthalate	85687	1,200	2,700 (S)	67 (X)	NLV	NLV	2,690	ID
n-Butylbenzene	104518	80	230	ID	ID	ID	NA	ID
sec-Butylbenzene	135988	80	230	ID	ID	ID	NA	ID
t-Butylbenzene (I)	98066	80	230	ID	ID	ID	NA	ID

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Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Cadmium (B)	7440439	5.0 (A)	5.0 (A)	(G,X)	NLV	NLV	NA	ID
Camphene (I)	79925	ID	ID	NA	440	1,000	33,400	ID
Caprolactam	105602	5,800	17,000	NA	NLV	NLV	5.25E+9	NA
Carbaryl	63252	700	2,000	NA	ID	ID	1.26E+5	ID
Carbazole	86748	85	350	10 (M); 4.0	NLV	NLV	7,480	ID
Carbofuran	1563662	40 (A)	40 (A)	NA	NLV	NLV	7.00E+5	ID
Carbon disulfide (I,R)	75150	800	2,300	ID	2.5E+5	5.5E+5	1.19E+6	13,000
Carbon tetrachloride	56235	5.0 (A)	5.0 (A)	45 (X)	370	2,400	7.93E+5	ID
Chlordane (J)	57749	2.0 (A)	2.0 (A)	2.0 (M); 0.00025	56 (S)	56 (S)	56	ID
Chloride	16887006	2.5E+5 (E)	2.5E+5 (E)	(FF)	NLV	NLV	NA	ID
Chlorobenzene (I)	108907	100 (A)	100 (A)	25	2.1E+5	4.7E+5 (S)	4.72E+5	1.6E+5
p-Chlorobenzene sulfonic acid	98668	7,300	21,000	ID	ID	ID	NA	ID
1-Chloro-1,1-difluoroethane	75683	15,000	44,000	NA	3.9E+6 (S)	3.9E+6 (S)	3.90E+6	NA
Chloroethane	75003	430	1,700	1,100 (X)	5.7E+6 (S)	5.7E+6 (S)	5.74E+6	1.1E+5
2-Chloroethyl vinyl ether	110758	ID	ID	NA	ID	ID	1.50E+7	ID
Chloroform	67663	80 (A,W)	80 (A,W)	350	28,000	1.8E+5	7.92E+6	ID
Chloromethane (I)	74873	260	1,100	ID	8,600	45,000	6.34E+6	36,000
4-Chloro-3-methylphenol	59507	150	420	7.4	NLV	NLV	3.90E+6	ID
beta-Chloronaphthalene	91587	1,800	5,200	NA	ID	ID	6,740	ID
2-Chlorophenol	95578	45	130	18	4.9E+5	1.1E+6	2.20E+7	ID
o-Chlorotoluene (I)	95498	150	420	ID	2.2E+5	3.7E+5 (S)	3.73E+5	ID
Chlorpyrifos	2921882	22	63	2.0 (M); 0.002	2.9	6.6	1,120	ID
Chromium (III) (B,H)	16065831	100 (A)	100 (A)	(G,X)	NLV	NLV	NA	ID
Chromium (VI)	18540299	100 (A)	100 (A)	11	NLV	NLV	NA	ID
Chrysene (Q)	218019	1.6 (S)	1.6 (S)	ID	ID	ID	1.6	ID
Cobalt	7440484	40	100	100	NLV	NLV	NA	ID
Copper (B)	7440508	1,000 (E)	1,000 (E)	(G)	NLV	NLV	NA	ID
Cyanazine	21725462	2.3	9.4	56 (X)	NLV	NLV	1.70E+5	ID

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Cyanide (P,R)	57125	200 (A)	200 (A)	5.2	NLV	NLV	NA	ID
Cyclohexanone	108941	33,000	94,000	NA	1,500	3,300	2.30E+7	NA
Dacthal	1861321	73	210	NA	NLV	NLV	500	ID
Dalapon	75990	200 (A)	200 (A)	NA	NLV	NLV	5.02E+8	ID
4-4'-DDD	72548	9.1	37	NA	NLV	NLV	90	ID
4-4'-DDE	72559	4.3	15	NA	NLV	NLV	120	ID
4-4'-DDT	50293	3.6	10	0.02 (M); 1.1E-5	NLV	NLV	25	NA
Decabromodiphenyl ether	1163195	30 (S)	30 (S)	NA	30 (S)	30 (S)	30	ID
Di-n-butyl phthalate	84742	880	2,500	9.7	NLV	NLV	11,200	NA
Di(2-ethylhexyl) adipate	103231	400 (A)	400 (A)	ID	NLV	NLV	471	ID
Di-n-octyl phthalate	117840	130	380	ID	NLV	NLV	3,000	ID
Diacetone alcohol (I)	123422	ID	ID	NA	NLV	NLV	1.00E+9	1.0E+9 (S)
Diazinon	333415	1.3	3.8	1.0 (M); 0.004	NLV	NLV	68,800	NA
Dibenzo(a,h)anthracene (Q)	53703	2.0 (M); 0.21	2.0 (M); 0.85	ID	NLV	NLV	2.49	ID
Dibenzofuran	132649	ID	ID	4	10,000 (S)	10,000 (S)	10,000	ID
Dibromochloromethane	124481	80 (A,W)	80 (A,W)	ID	14,000	1.1E+5	2.60E+6	ID
Dibromochloropropane	96128	0.2 (A)	0.2 (A)	ID	220	1,200 (S)	1,230	NA
Dibromomethane	74953	80	230	NA	ID	ID	1.10E+7	ID
Dicamba	1918009	220	630	NA	NLV	NLV	4.50E+6	ID
1,2-Dichlorobenzene	95501	600 (A)	600 (A)	13	1.6E+5 (S)	1.6E+5 (S)	1.56E+5	NA
1,3-Dichlorobenzene	541731	6.6	19	28	18,000	41,000	1.11E+5	ID
1,4-Dichlorobenzene	106467	75 (A)	75 (A)	17	16,000	74,000 (S)	73,800	NA
3,3'-Dichlorobenzidine	91941	1.1	4.3	0.3 (M); 0.2	NLV	NLV	3,110	ID
Dichlorodifluoromethane	75718	1,700	4,800	ID	2.2E+5	3.0E+5 (S)	3.00E+5	ID
1,1-Dichloroethane	75343	880	2,500	740	1.0E+6	2.3E+6	5.06E+6	3.8E+5
1,2-Dichloroethane (I)	107062	5.0 (A)	5.0 (A)	360 (X)	9,600	59,000	8.52E+6	2.5E+6
1,1-Dichloroethylene (I)	75354	7.0 (A)	7.0 (A)	130	200	1,300	2.25E+6	97,000
cis-1,2-Dichloroethylene	156592	70 (A)	70 (A)	620	93,000	2.1E+5	3.50E+6	5.3E+5

TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS;

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Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
trans-1,2-Dichloroethylene	156605	100 (A)	100 (A)	1,500 (X)	85,000	2.0E+5	6.30E+6	2.3E+5
2,6-Dichloro-4-nitroaniline	99309	2,200	6,300	NA	NLV	NLV	7,000	ID
2,4-Dichlorophenol	120832	73	210	11	NLV	NLV	4.50E+6	ID
2,4-Dichlorophenoxyacetic acid	94757	70 (A)	70 (A)	220	NLV	NLV	6.80E+5	ID
1,2-Dichloropropane (I)	78875	5.0 (A)	5.0 (A)	230 (X)	16,000	36,000	2.80E+6	5.5E+5
1,3-Dichloropropene	542756	8.5	35	9.0 (X)	3,900	26,000	2.80E+6	1.3E+5
Dichlorovos	62737	1.6	6.7	NA	NLV	NLV	1.60E+7	NA
Dicyclohexyl phthalate	84617	ID	ID	NA	ID	ID	4,000	ID
Dieldrin	60571	0.11	0.43	0.02 (M); 6.5E-6	200 (S)	200 (S)	195	ID
Diethyl ether	60297	10 (E)	10 (E)	ID	6.1E+7 (S)	6.1E+7 (S)	6.10E+7	6.5E+5
Diethyl phthalate	84662	5,500	16,000	110	NLV	NLV	1.08E+6	NA
Diethylene glycol monobutyl ether	112345	88	250	NA	NLV	NLV	1.00E+9	ID
Diisopropyl ether	108203	30	86	ID	8,000 (S)	8,000 (S)	8,041	8,000 (S)
Diisopropylamine (I)	108189	5.6	16	NA	2.1E+7	3.7E+7 (S)	3.69E+7	4.6E+6
Dimethyl phthalate	131113	73,000	2.10E+05	NA	NLV	NLV	4.19E+6	NA
N,N-Dimethylacetamide	127195	180	520	4,100 (X)	NLV	NLV	1.00E+9	NA
N,N-Dimethylaniline	121697	16	46	NA	2.4E+5	1.3E+6 (S)	1.27E+6	NA
Dimethylformamide (I)	68122	700	2,000	NA	NLV	NLV	1.00E+9	ID
2,4-Dimethylphenol	105679	370	1,000	380	NLV	NLV	7.87E+6	ID
2,6-Dimethylphenol	576261	4.4	13	NA	NLV	NLV	6.14E+6	ID
3,4-Dimethylphenol	95658	10	29	25	NLV	NLV	4.93E+6	ID
Dimethylsulfoxide	67685	2.2E+5	6.3E+5	1.9E+5	NLV	NLV	1.66E+8	ID
2,4-Dinitrotoluene	121142	7.7	32	NA	NLV	NLV	2.70E+5	ID
Dinoseb	88857	7.0 (A)	7.0 (A)	1.0 (M); 0.48	NLV	NLV	52,000	ID
1,4-Dioxane (I)	123911	7.2 (II)	350	2,800 (X)	NLV	NLV	9.00E+8	1.4E+8
Diquat	85007	20 (A)	20 (A)	20 (M); 6.0	NLV	NLV	7.00E+5	ID
Dissolved oxygen (DO)	NA	ID	ID	(EE)	ID	ID	NA	NA
Diuron	330541	31	90	NA	NLV	NLV	37,300	ID

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Endosulfan (J)	115297	44	130	0.03 (M); 0.029	ID	ID	510	ID
Endothall	145733	100 (A)	100 (A)	NA	NLV	NLV	1.00E+8	ID
Endrin	72208	2.0 (A)	2.0 (A)	ID	NLV	NLV	250	ID
Epichlorohydrin (I)	106898	5.0 (M); 2.0 (A)	5.0 (M); 2.0 (A)	NA	3.2E+5	6.3E+5	6.60E+7	4.7E+7
Ethanol (I)	64175	1.9E+6	3.8E+6	ID	NLV	NLV	1.00E+9	9.7E+7
Ethyl acetate (I)	141786	6,600	19,000	NA	6.4E+7 (S)	6.4E+7 (S)	6.40E+7	4.2E+6
Ethyl-tert-butyl ether (ETBE)	637923	49 (E)	49 (E)	ID	2.9E+6	5.6E+6 (S)	5.63E+6	ID
Ethylbenzene (I)	100414	74 (E)	74 (E)	18	1.1E+5	1.7E+5 (S)	1.69E+5	43,000
Ethylene dibromide	106934	0.05 (A)	0.05 (A)	5.7 (X)	2,400	15,000	4.20E+6	ID
Ethylene glycol	107211	15,000	42,000	1.9E+5 (X)	NLV	NLV	1.00E+9	NA
Ethylene glycol monobutyl ether	111762	3,700	10,000	NA	2.9E+6	6.5E+6	2.24E+8	NA
Fluoranthene	206440	210 (S)	210 (S)	1.6	210 (S)	210 (S)	206	ID
Fluorene	86737	880	2,000 (S)	12	2,000 (S)	2,000 (S)	1,980	ID
Fluorine (soluble fluoride) (B)	7782414	2,000 (E)	2,000 (E)	ID	NLV	NLV	NA	ID
Formaldehyde	50000	1,300	3,800	120	63,000	3.6E+5	5.50E+8	ID
Formic acid (I,U)	64186	10,000	29,000	ID	7.7E+6	1.5E+7	1.00E+9	1.0E+9 (D)
1-Formylpiperidine	2591868	80	230	NA	ID	ID	NA	ID
Gentian violet	548629	15	63	NA	NLV	NLV	1.00E+6	ID
Glyphosate	1071836	700 (A)	700 (A)	NA	NLV	NLV	1.16E+7	ID
Heptachlor	76448	0.4 (A)	0.4 (A)	0.01 (M); 0.0018	180 (S)	180 (S)	180	ID
Heptachlor epoxide	1024573	0.2 (A)	0.2 (A)	ID	NLV	NLV	200	ID
n-Heptane	142825	2,700 (S)	2,700 (S)	NA	2,700 (S)	2,700 (S)	2,690	200
Hexabromobenzene	87821	0.17 (S); 20	0.17 (S); 58	ID	ID	ID	0.17	ID
Hexachlorobenzene (C-66)	118741	1.0 (A)	1.0 (A)	0.2 (M); 0.0003	440	3,000	6,200	ID
Hexachlorobutadiene (C-46)	87683	15	42	0.053	1,600	3,200 (S)	3,230	ID
alpha-Hexachlorocyclohexane	319846	0.43	1.7	ID	2,000 (S)	2,000 (S)	2,000	ID
beta-Hexachlorocyclohexane	319857	0.88	3.6	ID	NLV	NLV	240	ID
Hexachlorocyclopentadiene (C-56)	77474	50 (A)	50 (A)	ID	130	420	1,800	ID

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Hexachloroethane	67721	7.3	21	6.7 (X)	27,000	50,000 (S)	50,000	ID
n-Hexane	110543	3,000	8,600	NA	12,000 (S)	12,000 (S)	12,000	12,000 (S)
2-Hexanone	591786	1,000	2,900	ID	4.2E+6	8.7E+6	1.60E+7	NA
Indeno(1,2,3-cd)pyrene (Q)	193395	2.0 (M); 0.022 (S)	2.0 (M); 0.022 (S)	ID	NLV	NLV	0.022	ID
Iron (B)	7439896	300 (E)	300 (E)	NA	NLV	NLV	NA	ID
Isobutyl alcohol (I)	78831	2,300	6,700	NA	7.6E+7 (S)	7.6E+7 (S)	7.60E+7	ID
Isophorone	78591	770	3,100	1,300 (X)	NLV	NLV	1.20E+7	ID
Isopropyl alcohol (I)	67630	470	1,300	57,000 (X)	NLV	NLV	1.00E+9	6.0E+7
Isopropyl benzene	98828	800	2,300	28	56,000 (S)	56,000 (S)	56,000	29,000
Lead (B)	7439921	4.0 (L)	4.0 (L)	(G,X)	NLV	NLV	NA	ID
Lindane	58899	0.2 (A)	0.2 (A)	0.03 (M); 0.026	ID	ID	6,800	ID
Lithium (B)	7439932	170	350	440	NLV	NLV	NA	ID
Magnesium (B)	7439954	4.0E+5	1.1E+6	NA	NLV	NLV	NA	ID
Manganese (B)	7439965	50 (E)	50 (E)	(G,X)	NLV	NLV	NA	ID
Mercury (Total) (B,Z)	Varies	2.0 (A)	2.0 (A)	0.0013	56 (S)	56 (S)	56	ID
Methane	74828	ID	ID	NA	(K)	(K)	NA	(AA)
Methanol	67561	3,700	10,000	5.9E+5 (X)	2.9E+7 (S)	2.9E+7 (S)	2.90E+7	4.5E+6
Methoxychlor	72435	40 (A)	40 (A)	NA	ID	ID	45	ID
2-Methoxyethanol (I)	109864	7.3	21	NA	NLV	NLV	1.00E+9	ID
2-Methyl-4-chlorophenoxyacetic acid	94746	7.3	21	NA	NLV	NLV	9.24E+5	ID
2-Methyl-4,6-dinitrophenol	534521	20 (M); 2.6	20 (M); 7.3	NA	NLV	NLV	2.00E+5	ID
N-Methyl-morpholine (I)	109024	20	56	NA	NLV	NLV	1.00E+9	ID
Methyl parathion	298000	1.8	5.2	NA	NLV	NLV	50,000	ID
4-Methyl-2-pentanone (MIBK) (I)	108101	1,800	5,200	ID	2.0E+7 (S)	2.0E+7 (S)	2.00E+7	ID
Methyl-tert-butyl ether (MTBE)	1634044	40 (E)	40 (E)	7,100 (X)	4.7E+7 (S)	4.7E+7 (S)	4.68E+7	ID
Methylcyclopentane (I)	96377	ID	ID	NA	22,000	49,000	73,890	ID
4,4'-Methylene-bis-2- chloroaniline	101144	1.1	4.5	NA	NLV	NLV	14,000	ID
Methylene chloride	75092	5.0 (A)	5.0 (A)	1,500 (X)	2.2E+5	1.4E+6	1.70E+7	ID

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2-Methylnaphthalene	91576	260	750	19	25,000 (S)	25,000 (S)	24,600	ID
Methylphenols (J)	1319773	370	1,000	30 (M); 25	NLV	NLV	2.80E+7	NA
Metolachlor	51218452	240	990	15	NLV	NLV	5.30E+5	ID
Metribuzin	21087649	180	520	NA	ID	ID	1.20E+6	ID
Mirex	2385855	0.02 (M); 6.8E-6 (S)	0.02 (M); 6.8E-6 (S)	0.02 (M); 6.8E-6 (S)	ID	ID	6.80E-6	NA
Molybdenum (B)	7439987	73	210	3,200 (X)	NLV	NLV	NA	ID
Naphthalene	91203	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA
Nickel (B)	7440020	100 (A)	100 (A)	(G)	NLV	NLV	NA	ID
Nitrate (B,N)	14797558	10,000 (A,N)	10,000 (A,N)	ID	NLV	NLV	NA	ID
Nitrite (B,N)	14797650	1,000 (A,N)	1,000 (A,N)	NA	NLV	NLV	NA	ID
Nitrobenzene (I)	98953	3.4	9.6	180 (X)	2.8E+5	5.5E+5	2.09E+6	NA
2-Nitrophenol	88755	20	58	ID	NLV	NLV	2.50E+6	ID
n-Nitroso-di-n-propylamine	621647	5.0 (M); 0.19	5.0 (M); 0.77	NA	NLV	NLV	9.89E+6	ID
N-Nitrosodiphenylamine	86306	270	1,100	NA	NLV	NLV	35,100	ID
Oxamyl	23135220	200 (A)	200 (A)	NA	NLV	NLV	2.80E+8	ID
Oxo-hexyl acetate	88230357	73	210	NA	ID	ID	NA	ID
Pendimethalin	40487421	280 (S)	280 (S)	NA	NLV	NLV	275	ID
Pentachlorobenzene	608935	6.1	17	5.0 (M); 0.019	ID	ID	650	ID
Pentachloronitrobenzene	82688	32 (S)	32 (S)	NA	32 (S)	32 (S)	32	ID
Pentachlorophenol	87865	1.0 (A)	1.0 (A)	(G,X)	NLV	NLV	1.85E+6	ID
Pentane	109660	ID	ID	NA	38,000 (S)	38,000 (S)	38,200	340
2-Pentene (I)	109682	ID	ID	NA	ID	ID	2.03E+5	ID
pH	NA	6.5 to 8.5 (E)	6.5 to 8.5 (E)	6.5 to 9.0	ID	ID	NA	NA
Phenanthrene	85018	52	150	2.0 (M); 1.4	1,000 (S)	1,000 (S)	1,000	ID
Phenol	108952	4,400	13,000	450	NLV	NLV	8.28E+7	NA
Phenytoin	57410	17	68	89 (X)	NLV	NLV	32,000	ID
Phosphorus (Total)	7723140	63,000	2.40E+05	(EE)	NLV	NLV	NA	ID
Phthalic acid	88993	14,000	40,000	NA	NLV	NLV	1.42E+7	ID

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PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

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Phthalic anhydride	85449	15,000	44,000	NA	NLV	NLV	6.20E+6	NA
Picloram	1918021	500 (A)	500 (A)	46	NLV	NLV	4.30E+5	ID
Piperidine	110894	3.2	9.2	NA	NLV	NLV	1.00E+9	ID
Polybrominated biphenyls (J)	67774327	0.03	0.09	ID	NLV	NLV	1.66E+7	ID
Polychlorinated biphenyls (PCBs) (J,T)	1336363	0.5 (A)	0.5 (A)	0.2 (M); 2.6E-5	45 (S)	45 (S)	44.7	ID
Prometon	1610180	160	460	NA	NLV	NLV	7.50E+5	ID
Propachlor	1918167	95	270	NA	NLV	NLV	6.55E+5	ID
Propazine	139402	200	560	NA	NLV	NLV	8,600	ID
Propionic acid	79094	12,000	35,000	ID	NLV	NLV	1.00E+9	1.0E+9 (D)
Propyl alcohol (I)	71238	1,400	4,000	NA	NLV	NLV	1.00E+9	7.1E+7
n-Propylbenzene (I)	103651	80	230	ID	ID	ID	NA	ID
Propylene glycol	57556	1.5E+5	4.2E+5	2.9E+5	NLV	NLV	1.00E+9	ID
Pyrene	129000	140 (S)	140 (S)	ID	140 (S)	140 (S)	135	ID
Pyridine (I)	110861	20 (M); 7.3	21	NA	5,500	12,000	3.00E+5	81,000
Selenium (B)	7782492	50 (A)	50 (A)	5	NLV	NLV	NA	ID
Silver (B)	7440224	34	98	0.2 (M); 0.06	NLV	NLV	NA	ID
Silvex (2,4,5-TP)	93721	50 (A)	50 (A)	30	NLV	NLV	1.40E+5	ID
Simazine	122349	4.0 (A)	4.0 (A)	17	NLV	NLV	4,470	ID
Sodium	17341252	2.3E+S(HH)	3.5E+5	NA	NLV	NLV	NA	ID
Sodium azide	26628228	88	250	50 (M); 7.3	ID	ID	NA	ID
Strontium (B)	7440246	4,600	13,000	21,000	NLV	NLV	NA	ID
Styrene	100425	100 (A)	100 (A)	80 (X)	1.7E+5	3.1E+5 (S)	3.10E+5	1.4E+5
Sulfate	14808798	2.5E+5 (E)	2.5E+5 (E)	NA	NLV	NLV	NA	ID
Tebuthiuron	34014181	510	1,500	NA	NLV	NLV	2.50E+6	ID
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	50585416	(O)	(O)	(O)	NLV	NLV	0.00996	ID
1,2,4,5-Tetrachlorobenzene	95943	1,300 (S)	1,300 (S)	2.9 (X)	1,300 (S)	1,300 (S)	1,300	ID
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	1746016	3.0E-5 (A)	3.0E-5 (A)	1.0E-5 (M); 3.1E-9	NLV	NLV	0.019	ID
1,1,1,2-Tetrachloroethane	630206	77	320	ID	15,000	96,000	1.10E+6	ID

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1,1,2,2-Tetrachloroethane	79345	8.5	35	78 (X)	12,000	77,000	2.97E+6	ID
Tetrachloroethylene	127184	5.0 (A)	5.0 (A)	60 (X)	25,000	1.7E+5	2.00E+5	ID
Tetrahydrofuran	109999	95	270	11,000 (X)	6.9E+6	1.6E+7	1.00E+9	60,000
Tetranitromethane	509148	ID	ID	NA	580	3,200	85,000	ID
Thallium (B)	7440280	2.0 (A)	2.0 (A)	3.7 (X)	NLV	NLV	NA	ID
Toluene (I)	108883	790 (E)	790 (E)	270	5.3E+5 (S)	5.3E+5 (S)	5.26E+5	61,000
p-Toluidine	106490	15	62	NA	NLV	NLV	7.60E+6	NA
Total dissolved solids (TDS)	NA	5.0E+5 (E)	5.0E+5 (E)	(EE)	ID	ID	NA	NA
Toxaphene	8001352	3.0 (A)	3.0 (A)	1.0 (M); 6.8E-5	NLV	NLV	740	ID
Triallate	2303175	95	270	NA	ID	ID	4,000	ID
Tributylamine	102829	10	29	ID	14,000	32,000	75,400	ID
1,2,4-Trichlorobenzene	120821	70 (A)	70 (A)	99 (X)	3.0E+5 (S)	3.0E+5 (S)	3.00E+5	NA
1,1,1-Trichloroethane	71556	200 (A)	200 (A)	89	6.6E+5	1.3E+6 (S)	1.33E+6	ID
1,1,2-Trichloroethane	79005	5.0 (A)	5.0 (A)	330 (X)	17,000	1.1E+5	4.42E+6	NA
Trichloroethylene	79016	5.0 (A)	5.0 (A)	200 (X)	2,200	4,900	1.10E+6	ID
Trichlorofluoromethane	75694	2,600	7,300	NA	1.1E+6 (S)	1.1E+6 (S)	1.10E+6	ID
2,4,5-Trichlorophenol	95954	730	2,100	NA	NLV	NLV	1.20E+6	ID
2,4,6-Trichlorophenol	88062	120	470	5	NLV	NLV	8.00E+5	ID
1,2,3-Trichloropropane	96184	42	120	NA	8,300	18,000	1.90E+6	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	76131	1.7E+5 (S)	1.7E+5 (S)	32	1.7E+5 (S)	1.7E+5 (S)	1.70E+5	ID
Triethanolamine	102716	3,700	10,000	NA	NLV	NLV	1.00E+9	ID
Triethylene glycol	112276	4,300	12,000	NA	NLV	NLV	1.00E+6	ID
3-Trifluoromethyl-4-nitrophenol	88302	4,500	13,000	NA	NLV	NLV	5.00E+6	ID
Trifluralin	1582098	37	110	NA	ID	ID	8,100	ID
2,2,4-Trimethyl pentane	540841	ID	ID	NA	2,300 (S)	2,300 (S)	2,330	160
2,4,4-Trimethyl-2-pentene (I)	107404	ID	ID	NA	ID	ID	11,900	ID
1,2,4-Trimethylbenzene (I)	95636	63 (E)	63 (E)	17	56,000 (S)	56,000 (S)	55,890	56,000 (S)
1,3,5-Trimethylbenzene (I)	108678	72 (E)	72 (E)	45	61,000 (S)	61,000 (S)	61,150	ID

TABLE 1. GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. When the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion (§324.20120a(10)). In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Triphenyl phosphate	115866	1,200	1,400 (S)	NA	NLV	NLV	1,430	ID
tris(2,3-Dibromopropyl)phosphate	126727	10 (M); 0.71	10 (M); 2.9	ID	4,700 (S)	4,700 (S)	4,700	ID
Urea	57136	ID	ID	NA	NLV	NLV	NA	ID
Vanadium	7440622	4.5	62	27	NLV	NLV	NA	ID
Vinyl acetate (I)	108054	640	1,800	NA	4.1E+6	8.9E+6	2.00E+7	1.8E+6
Vinyl chloride	75014	2.0 (A)	2.0 (A)	13 (X)	1,100	13,000	2.76E+6	33,000
White phosphorus (R)	12185103	0.11	0.31	NA	NLV	NLV	NA	ID
Xylenes (I)	1330207	280 (E)	280 (E)	41	1.9E+5 (S)	1.9E+5 (S)	1.86E+5	70,000
Zinc (B)	7440666	2,400	5,000 (E)	(G)	NLV	NLV	NA	ID

TABLE 1a. PER- AND POLYFLUOROALKYL SUBSTANCES
GROUNDWATER: RESIDENTIAL AND NONRESIDENTIAL
PART 201 GENERIC CLEANUP CRITERIA AND SCREENING LEVELS

All criteria, unless otherwise noted, are expressed in units of parts per billion (ppb). One ppb is equivalent to 1 microgram per liter (ug/L). Criteria with 6 or more digits are expressed in scientific notation. For example, 200,000 is presented as 2.0E+5. A footnote is designated by a letter in parentheses and is explained in the footnote pages that follow the criteria tables. Pursuant to section 20120a(10) of the act, MCL 324.20120a, when the risk-based criterion is less than the target detection limit (TDL), the TDL is listed as the criterion. In these cases, 2 numbers are present in the cell. The first number is the criterion (i.e., TDL), and the second number is the risk-based or solubility value, whichever is lower.

Hazardous Substance	Chemical Abstract Service Number	Residential Drinking Water Criteria	Nonresidential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Nonresidential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level
Hexafluoropropylene oxide dimer acid	13252136	0.37 (A)	0.37 (A)	NA	ID	ID	NA	NA
Perfluorobutane sulfonic acid	375735	0.42 (A)	0.42 (A)	NA	ID	ID	NA	NA
Perfluorohexane sulfonic acid	355464	0.051 (A)	0.051 (A)	NA	ID	ID	NA	NA
Perfluorohexanoic acid	307244	400 (A)	400 (A)	NA	ID	ID	NA	NA
Perfluorononanoic acid	375951	0.006 (A)	0.006 (A)	NA	ID	ID	NA	NA
Perfluorooctanoic acid (DD)	335671	0.008 (A)	0.008 (A)	12 (X)	ID	ID	9.50E+06	NA
Perfluorooctane sulfonic acid (DD)	1763231	0.016 (A)	0.016 (A)	0.012 (X)	NLV	NLV	3.1	NA

EXHIBIT 10

Michigan Office of Administrative Hearings and Rules
Administrative Rules Division (ARD)
611 W. Ottawa Street
Lansing, MI 48909
Phone: 517-335-8658 Fax: 517-335-9512

REGULATORY IMPACT STATEMENT and COST-BENEFT ANALYSIS (RIS)

Agency Information:

Department name:

Environment, Great Lakes and Energy

Bureau name:

Drinking Water and Environmental Health Division

Name of person filling out RIS:

Candra Wilcox

Phone number of person filling out RIS:

517-284-5004

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WilcoxC2@michigan.gov

Rule Set Information:

ARD assigned rule set number:

2019-35 EG

Title of proposed rule set:

Supplying Water to the Public

Comparison of Rule(s) to Federal/State/Association Standared:

1. Compare the proposed rules to parallel federal rules or standards set by a state or national licensing agency or accreditation association, if any exist.

The Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), currently contains numerous drinking water standards that are consistent with federal requirements. This requested rulemaking will add additional drinking water standards and related sampling and response requirements. These additional standards would be in addition to the regulations under the federal Safe Drinking Water Act (SDWA), which was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The SDWA authorizes the U.S. Environmental Protection Agency to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. Title 40 of the Code of Federal Regulations (CFR), Part 141, National Primary Drinking Water Regulations, currently does not contain standards for per and poly-fluorinated substances (PFAS).

A. Are these rules required by state law or federal mandate?

These rules are not required by state law or federal mandate.

B. If these rules exceed a federal standard, please identify the federal standard or citation, describe why it is necessary that the proposed rules exceed the federal standard or law, and specify the costs and benefits arising out of the deviation.

There are no applicable federal standards for these chemicals.

2. Compare the proposed rules to standards in similarly situated states, based on geographic location, topography, natural resources, commonalities, or economic similarities.

Four other states have established maximum contaminant levels (MCLs) for several PFAS compounds. New Hampshire, New Jersey, New York, and Vermont are establishing regulations for the chemicals. Michigan's proposed levels are similar to standards being proposed by other states.

A. If the rules exceed standards in those states, please explain why and specify the costs and benefits arising out of the deviation.

The standards in these rules are similar to standards being proposed by other states.

3. Identify any laws, rules, and other legal requirements that may duplicate, overlap, or conflict with the proposed rules.

No other rules or legal requirements pertain to establishing drinking water standards for public water supplies.

A. Explain how the rules have been coordinated, to the extent practicable, with other federal, state, and local laws applicable to the same activity or subject matter. This section should include a discussion of the efforts undertaken by the agency to avoid or minimize duplication.

Since there are not generic groundwater cleanup standards for PFNA, PFHxS, PFBS, PFHxA and HFPO-DA, the department may establish them following the process set forth in Natural Resource and Environmental Protection Act, 1994 PA 451, MCL 324.20120a(23).

4. If MCL 24.232(8) applies and the proposed rules are more stringent than the applicable federally mandated standard, a statement of specific facts that establish the clear and convincing need to adopt the more stringent rules and an explanation of the exceptional circumstances that necessitate the more stringent standards is required.

Because there are no existing applicable federal standards, MCL 24.232(8) does not apply. Further, in any event, there is a "clear and convincing need" for these rules given the prevalence of PFAS contamination within the state and its potential impact on drinking water. The state has conducted extensive sampling for 14 PFAS compounds at all community water systems and many non-transient non-community water systems to determine the extent of contamination. Through these efforts, a significant exposure was discovered in the city of Parchment which posed a significant on-going risk to the public. Through a voluntary effort with the City of Parchment and the City of Kalamazoo, the public was protected from further exposure. This sampling also identified a number of drinking water systems with levels of PFAS contaminants that could cause adverse health effects if not addressed. The new rules require on-going sampling and response to selected PFAS chemicals and represent a balanced approach to protecting public health and managing impact to water supplies.

5. If MCL 24.232(9) applies and the proposed rules are more stringent than the applicable federal standard, either the statute that specifically authorizes the more stringent rules or a statement of the specific facts that establish the clear and convincing need to adopt the more stringent rules and an explanation of the exceptional circumstances that necessitate the more stringent standards is required.

Because there are no existing federal standards, MCL 24.232(9) does not apply. Nonetheless, the Michigan Safe Drinking Water Act allows EGLE to promulgate rules setting standards for public water supplies, see MCL 325.1003.

6. Identify the behavior and frequency of behavior that the proposed rules are designed to alter.

The proposed rules are designed to alter the current practices of public water supplies (PWSs) in the state of Michigan in order to be more protective of public health by requiring certain water supplies to sample for seven PFAS chemicals. Supplies would be required to initially sample for seven regulated PFAS chemicals on a quarterly basis. Based on sampling results, sampling could be reduced. Supplies currently do not routinely sample for any PFAS chemicals.

A. Estimate the change in the frequency of the targeted behavior expected from the proposed rules.

The change is from no sampling to quarterly or annual sampling.

B. Describe the difference between current behavior/practice and desired behavior/practice.

The current practice is no testing for PFAS chemicals. The rules will require quarterly or annual testing and reporting for seven PFAS chemicals.

C. What is the desired outcome?

Improved public health by limiting exposure to PFAS chemicals. The rules will also broaden the understanding of where these chemicals are occurring in our drinking water systems.

7. Identify the harm resulting from the behavior that the proposed rules are designed to alter and the likelihood that the harm will occur in the absence of the rule.

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Exposure to PFAS chemicals has been shown to cause numerous adverse health impacts. The Science Advisory Workgroup (SAW) assigned by the Michigan PFAS Action Response Team (MPART) identified seven PFAS contaminants of concern for which, in their professional judgement, there was enough scientific evidence to establish Health-Based Values (HBVs). HBVs establish a level of contamination below which there is not expected to be adverse health impacts. The Drinking Water and Environmental Health Division (DWEHD) took these HBVs and used them to create MCLs. Supplies will sample for these chemicals, and when a running annual average exceeds the MCL for any PFAS contaminant, they will be required to take action to reduce that level of contamination to below the appropriate MCL.

A. What is the rationale for changing the rules instead of leaving them as currently written?

The current rules provide no protection or monitoring for PFAS chemicals.

8. Describe how the proposed rules protect the health, safety, and welfare of Michigan citizens while promoting a regulatory environment in Michigan that is the least burdensome alternative for those required to comply.

The proposed rules protect public health by requiring the monitoring of selected PFAS chemicals, and in the event they exceed the established limit, a response to lower exposure below that limit. The rules require quarterly samples that are averaged over a year in order to address seasonal and source variations. The rules require a violation for exceedances of the MCL but does not stipulate a required strategy or timeline to return to compliance. Instead, the supply will likely enter into an Administrative Consent Order (ACO) with EGLE to establish timelines and other details for the response. This process ensures an approach that balances the need to protect public health with the fiscal and technical realities the supply is facing.

9. Describe any rules in the affected rule set that are obsolete or unnecessary and can be rescinded.

There are no components that are obsolete.

10. Please provide the fiscal impact on the agency (an estimate of the cost of rule imposition or potential savings for the agency promulgating the rule).

These rules will impose an increased fiscal impact on EGLE due to increased oversight and data handling. Although the proposed MCLs will be added to an existing monitoring program, the initial sampling requirement and training burden will be significant. Approximately 2,700 public water supplies will be subject to the new monitoring requirements. Quarterly sampling will generate almost 11,000 sample results and calculations that will need to be reviewed. We also anticipate approximately 22 supplies will be out of compliance based on prior testing. This will result in the need for increased oversight and review of ACOs and corrective action plans. Local health departments directly oversee approximately half of these supplies which will result in increased oversight responsibilities and costs primarily in processing sampling results and issuing enforcement communications. The bulk of the cost of the response, approving and overseeing corrective action, will be borne by EGLE as EGLE approves construction permits for treatment systems. It is important to note that the increase in oversight is mitigated by the fact that the new rules require sampling, analysis and compliance calculation in exactly the same way as existing rules resulting in a lower "learning curve" for local health departments in administering the new rules.

11. Describe whether or not an agency appropriation has been made or a funding source provided for any expenditures associated with the proposed rules.

The fiscal year 2020 budget includes funding for new FTEs for the drinking water program. It is anticipated that some of these additional FTEs will be utilized to administer the new rules.

12. Describe how the proposed rules are necessary and suitable to accomplish their purpose, in relationship to the burden(s) the rules place on individuals. Burdens may include fiscal or administrative burdens, or duplicative acts.

The new rules are necessary to protect human health from PFAS contamination that has been identified in PWSs. The burden of the new rules is lessened due to the fact that the MCLs have been added to an existing sampling requirement, meaning supplies will simply have to take more samples. Sampling for PFAS contamination, it should be noted, is more difficult due to the potential for cross-contamination and training will be required. The new rules will most likely result in some systems requiring modification/addition of their treatment process that will result in increased costs.

A. Despite the identified burden(s), identify how the requirements in the rules are still needed and reasonable compared to the burdens.

The rules are still needed to identify PFAS contamination in drinking water and to limit the exposure, through treatment or alternate sources, to the public.

13. Estimate any increase or decrease in revenues to other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Estimate the cost increases or reductions for other state or local governmental units (i.e. cities, counties, school districts) as a result of the rule. Include the cost of equipment, supplies, labor, and increased administrative costs in both the initial imposition of the rule and any ongoing monitoring.

These rules will impose costs on local government units that own or operate a PWS, including most municipalities (community water supplies) along with some schools and other public entities that are on their own wells (non-transient noncommunity water supplies). There are approximately 1,400 community water supplies (CWSs) in the state, and 733 of them are owned by a local unit of government. There are approximately 1,300 non-transient noncommunity water supplies in the state, and 291 of them are owned publicly. These two categories make up the water supplies that will be impacted by this rule. The cost estimates below apply to all impacted water supplies, both private and public. In general, non-transient noncommunity water systems tend to be smaller while community water systems tend to be larger.

There are two significant drivers of cost to PWSs. The first is the cost of sampling and monitoring PFAS in the drinking water supplies. The second is the cost of installation and operation of treatment where supplies exceed the MCL.

The initial costs to all water supplies regulated by these rules will be the requirement to sample for PFAS on a quarterly basis. If all supplies sample quarterly for the first year, a total of 10,800 samples will be required. The average sample analysis has been approximately $300 per sample for a total sampling cost of $3.2 million. The cost to take samples, by contract, has also averaged $300 per sample. Therefore, the additional cost to physically take the samples is approximately $3.2 million. Supplies may reduce this cost if they elect to take their own samples. The total conservative estimate for the sampling effort is $6.4 million for the first year the rules are in effect. Because some supplies will only be required to sample annually, and there are provisions for reduction in sampling if a track record for detections under a certain level can be established, this estimate is likely higher than the actual anticipated cost of sampling and analysis. Annual sampling and analysis costs after the first year should run lower than this estimate.

The other significant cost will be the installation of treatment. There are two options a water system can pursue to reduce the level of contamination in their finished water. The first is to switch to an alternate water source. Because this option is extremely variable from supply to supply, and indeed may not even be an option for some supplies, EGLE cannot reliably develop a cost estimate for that option. The second option is treatment. Recommended treatment is based on a study by the New Jersey Drinking Water Quality Institute that identified Granular Activated Carbon (GAC) as the preferred treatment option. The major costs of GAC include design, installation, and operation/maintenance. While a specific cost of design and installation vary by site, we can make a rough estimated based on a general cost per million gallons treated.

After several rounds of testing affected water supplies, we have identified 22 water systems that may likely be impacted by a requirement to install treatment due to an exceedance of the proposed MCLs. These 22 systems consist of both small systems and larger systems. Because smaller systems often pay a higher cost per gallon due to their size, we have estimated the cost separately for the larger community waster systems and the smaller non-community systems.

The larger, community systems are treating a total of 0.928 million gallons per day (MGD). To estimate the costs for these systems we were able to use a January 2019 report from the State of New Hampshire. New Hampshire identified a one-time treatment installation cost based on gallons treated per day. Their lowest cost estimate was $2.90 per gallon, and their highest cost estimate was $8.10 per gallon. To be conservative in our estimate, we have used the higher end of this range at $8 per gallon treated per day. Based on this value, the estimated one-time installation cost of the new rules for the larger, community systems will be $7.4 million ($8 x 928,000).
The smaller, non-community systems treat a total of 79,000 gallons per day. A recent cost estimate for Robinson Elementary school was $206,000 to treat a designed load of 4,500 gallons of water per day ($46 per gallon treated per day). Projecting this value forward, to install treatment for 79,000 gallons of water it is estimated that it will cost $3.6 million.

Combining the estimated cost for treatment installation at the larger, community systems with the estimated cost for the smaller, non-community systems, the total estimated cost for all water systems where we currently know PFAS needs to be addressed is an estimated total of $11 million.

14. Discuss any program, service, duty, or responsibility imposed upon any city, county, town, village, or school district by the rules.

Water supplies owned by governmental units will need to comply with all of the requirements of the new PFAS MCLs, including increased sampling and reporting. There are also expanded public notification requirements and follow up based on sampling results.

The following is a continuation of the response to Question 13 above:
There will also be a cost associated with operating and maintaining the treatment systems. Those costs are more difficult to estimate based on the unique water chemistry and existing treatment design associated with each water supply. Those variables will affect how a GAC solution is implemented and how often the GAC system media will need to be replaced. The New Hampshire study used a high annual estimate of $0.35 per gallon, or $0.000959 per gallon per day.

Based on that, the estimated annual operation and maintenance cost for the new rules is $352,500 per year. There is no anticipated difference in operations and maintenance costs between large and small systems.

It is noted that several water systems have proactively responded to PFAS contamination which has resulted in costs that could have been incurred if those actions were taken after this rule went into effect. The City of Plainfield is installing GAC treatment in response to contamination which is not currently in excess of the proposed MCLs. The treatment installation is estimated to be approximately $15 million. Additionally, the City of Ann Arbor has been conducting a treatment study and has been sampling for PFAS in a manner that exceeds the requirements of the new rule. The City of Parchment abandoned their public water system and connected to the City of Kalamazoo resulting in costs to both systems. While these costs are not directly related to the new rule it is important to acknowledge that some systems have already implemented actions to protect their communities that are not included in this cost estimate.

In conclusion, there are many costs to regulated supplies, including ancillary administrative costs. Again, this is the cost for all impacted water supplies in the state, both public and private, with the largest impact to medium and large municipalities.

A. Describe any actions that governmental units must take to be in compliance with the rules. This section should include items such as record keeping and reporting requirements or changing operational practices.

Municipalities that own/operate a PWS will be required to comply with the new rules and to sample, report, and respond to exceedance of the new MCLs.

15. Describe whether or not an appropriation to state or local governmental units has been made or a funding source provided for any additional expenditures associated with the proposed rules.

No identification of funding source or appropriation has taken place.

16. In general, what impact will the rules have on rural areas?

In general, rural areas will be less impacted by these rules than urban areas, since most contamination found to date occurs in larger systems. EGLE staff will be gearing up to provide additional direct assistance to small rural supplies if these rules are promulgated.

A. Describe the types of public or private interests in rural areas that will be affected by the rules.

Water supplies located in rural areas will be affected by the new rules.

17. Do the proposed rules have any impact on the environment? If yes, please explain.

A secondary goal of the selected preferred treatment method is the possibility that regeneration of the GAC media may physically destroy the PFAS contamination. Most other treatment options simply move the contamination from one media to another. If the spent GAC media is regenerated through incineration, it will physically destroy the PFAS contamination, breaking the cycle of media transfer and thereby improving the environment by ending the cycle and destroying the contamination. This benefit depends on the ultimate fate of spent GAC media. Some supplies may choose to dispose of the media in an appropriate landfill, therefore, this benefit may not apply.

18. Describe whether and how the agency considered exempting small businesses from the proposed rules.

No – EGLE did not consider exempting small businesses from the proposed rules.

19. If small businesses are not exempt, describe (a) the manner in which the agency reduced the economic impact of the proposed rules on small businesses, including a detailed recitation of the efforts of the agency to comply with the mandate to reduce the disproportionate impact of the rules upon small businesses as described below (in accordance with MCL 24.240(1)(a-d)), or (b) the reasons such a reduction was not lawful or feasible.

While small private water supplies will be required to comply, the impact should be minimized due to the low amount of water treated at these supplies. The state will offer technical support to these supplies as required.

A. Identify and estimate the number of small businesses affected by the proposed rules and the probable effect on small businesses.

There are approximately 650 privately-owned CWSs with populations under 10,000 and approximately 1,000 privately-owned non-transient noncommunity water supplies in Michigan. These two categories constitute the PWSs that are impacted by the proposed MCLs. These PWSs will be required to comply with the requirements of the rules, creating a financial and administrative burden.

B. Describe how the agency established differing compliance or reporting requirements or timetables for small businesses under the rules after projecting the required reporting, record-keeping, and other administrative costs.

While small private PWSs do have to comply with the proposed rules requirements, any exceedance of an MCL will be ultimately resolved through an ACO. The ACO will take into account economic factors in the supply's return to compliance while maintaining a balance to protect human health.

C. Describe how the agency consolidated or simplified the compliance and reporting requirements for small businesses and identify the skills necessary to comply with the reporting requirements.

EGLE incorporated the new requirements into an existing regulatory framework that PWSs are already familiar with, thereby simplifying compliance. EGLE is also working on a new database system that will allow laboratories to report monitoring results electronically, as well as accept electronic submittal of reports. This will significantly reduce the effort involved for all regulated supplies.

D. Describe how the agency established performance standards to replace design or operation standards required by the proposed rules.

MCLs are by their nature already performance-based. Although GAC is identified as a preferred treatment method, supplies are free to use any available treatment method that is proven to remove PFAS contamination to below the MCLs.

20. Identify any disproportionate impact the proposed rules may have on small businesses because of their size or geographic location.

Small businesses should be impacted less by this regulation since they treat a lower volume of water than municipalities due to their size and less urban location.

21. Identify the nature of any report and the estimated cost of its preparation by small businesses required to comply with the proposed rules.

There are no reports required by the new rules. Test results will be reported directly to regulators through standard means already in place for similar contaminants.

22. Analyze the costs of compliance for all small businesses affected by the proposed rules, including costs of equipment, supplies, labor, and increased administrative costs.

There are approximately 1,300 non-transient noncommunity water supplies in the state that EGLE will define as "small businesses." The sampling requirement for these supplies is estimated to be $3.1 million annually (1,300 supplies sampling 4 times per year at a cost of $600 per sample). The cost for smaller water supplies that will exceed the proposed MCLs to install treatment is estimated to be $3.6 million with an annual maintenance cost of $76 thousand.

23. Identify the nature and estimated cost of any legal, consulting, or accounting services that small businesses would incur in complying with the proposed rules.

It is possible that a small private PWS will hire an engineering firm to help them with compliance with these rules, but the majority of these systems will be able to comply without third party assistance. EGLE will be placing considerable emphasis on providing compliance assistance to PWSs.

24. Estimate the ability of small businesses to absorb the costs without suffering economic harm and without adversely affecting competition in the marketplace.

Since the rules apply equally to all small private PWSs, there will not be an uneven distribution of burden between them. It is likely that some costs will be passed along to ratepayers who are using the drinking water supply.

25. Estimate the cost, if any, to the agency of administering or enforcing a rule that exempts or sets lesser standards for compliance by small businesses.

None – there will be equal oversight for all impacted by the rules.

26. Identify the impact on the public interest of exempting or setting lesser standards of compliance for small businesses.

Exempting small business or setting lesser standards would ignore the public health risk created by these chemicals and create two classes of drinking water customers in the state, those protected from PFAS exposure at a level determined to be protective by science, and second class customers exposed at a higher level. This would be unacceptable from a public health and environmental justice perspective.

27. Describe whether and how the agency has involved small businesses in the development of the proposed rules.

Several small businesses and/or those serving small private water supplies were involved in the stakeholder process. These include the Michigan Manufactured Housing Association and the Michigan Rural Water Association.

A. If small businesses were involved in the development of the rules, please identify the business(es).

No specific small businesses were involved in development of the rules.

28. Estimate the actual statewide compliance costs of the rule amendments on businesses or groups.

The businesses that will be most affected by these rules will be those with their own water supply. This includes approximately 650 CWSs. More than half of these are manufactured housing communities, and many of the rest are condominiums, apartment buildings, and other residential units. It also includes approximately 1,000 non-transient noncommunity water supplies – industries, small businesses, etc. – that are not hooked up to municipal water.

The compliance costs for all PWSs as presented in item #13 would apply to this group as follows. For annual monitoring this group of 1,650 water supplies would spend approximately $4 million (1,650 supplies taking 4 samples per year at a cost of $600 per sample. Of the 22 water systems identified in statewide testing to be exceeding the proposed MCLs, 9 can be classified as businesses (not a school or a church). Using the methodology in item 13, these supplies pump an average of 20,000 gallons per day. With an estimated cost of treatment of $46 per gallon it is estimated that these supplies will spend $920,000 to install treatment with an anticipated annual maintenance cost of $7,000.

A. Identify the businesses or groups who will be directly affected by, bear the cost of, or directly benefit from the proposed rules.

Those directly affected include owners of private water systems, laboratories, engineering firms, companies that supply and install treatment, and companies that provide water system operations services.

B. What additional costs will be imposed on businesses and other groups as a result of these proposed rules (i.e. new equipment, supplies, labor, accounting, or recordkeeping)? Please identify the types and number of businesses and groups. Be sure to quantify how each entity will be affected.

Businesses that operate their own water supplies will be required to comply with the new rules. They will be required to sample their finished drinking water for PFAS ($300 per sample if the business collects themselves or $600 per sample if they hire a contractor to take the sample) and find alternate water or install treatment if their water exceeds the proposed MCLs. Sampling costs are estimated at $4 million annually. Installation of treatment is estimated to be a one-time cost of $920,000 with annual maintenance costs of $7,000. Reporting cost increases are negligible as these supplies are already required to report monthly operations and testing – this rule would add one more item 4 times a year.

29. Estimate the actual statewide compliance costs of the proposed rules on individuals (regulated individuals or the public). Include the costs of education, training, application fees, examination fees, license fees, new equipment, supplies, labor, accounting, or recordkeeping.

There are no direct compliance costs to the public for this rule. There is a likelihood that PWSs will pass along to their customers at least some of the costs associated with compliance with these rules. Municipalities and other governmental bodies, in particular, will likely need to increase their utility rates to pay for their infrastructure upgrades and additional compliance costs. This will result in higher costs to homeowners, but it is very difficult to estimate this impact. It is important to note that drinking water has historically been the most affordable utility and will likely remain this way even with increases.

A. How many and what category of individuals will be affected by the rules?

Approximately 75% of Michigan residents get their drinking water from a PWS. Assuming 10 million people in the state, this equates to 7.5 million people that will be served drinking water that is regularly tested for PFAS chemicals.

B. What qualitative and quantitative impact do the proposed changes in rules have on these individuals?

The impact will be a general improvement in public health achieved through limiting PFAS exposure. The individuals will also have access to testing records so they will be aware of the level of PFAS in their drinking water regardless of the level.

30. Quantify any cost reductions to businesses, individuals, groups of individuals, or governmental units as a result of the proposed rules.

There are no known cost reductions associated directly with these rules.

31. Estimate the primary and direct benefits and any secondary or indirect benefits of the proposed rules. Please provide both quantitative and qualitative information, as well as your assumptions.

The primary benefits of this rules package are reducing the exposure to the PFAS chemicals regulated under the rules. Implementation of treatment will also remove other contaminants (other PFAS compounds, etc.) that will result in less exposure to contamination, thereby improving public health.

While estimating the cost to implement the new rules is relatively easy, the estimate of the benefits is not. It is generally difficult to monetize the benefits of drinking water standards, and this is especially true for PFAS chemicals. In particular, indirect costs such as reduced quality of life are particularly hard to capture. More study on the health benefits and impacts of PFAS exposure reduction and the economic benefit is required before a serious estimate can be made. There is likely a significant benefit to the reduction is exposure to PFAS chemicals given recent findings of the health effects. Health effects that have been identified include: lowering a woman's chance of getting pregnant, an increase in the chance of high blood pressure in pregnant women, an increase in the chance of thyroid disease, an increase in cholesterol levels, changes in immune response, and an increase in the chance of cancer, especially kidney and testicular cancers. In a general, qualitative measure, given the potential for direct health care treatment costs, loss of income, and associated indirect costs, limiting exposure to the seven PFAS chemicals for which these rules establish MCLs will likely result in significant avoided costs.

An additional consideration, and environmental benefit, of the rules is the preference given to GAC treatment of PFAS compounds. This treatment technology has the advantage of not only capturing the contamination but the potential for permanent destruction of PFAS compounds in the regeneration process. More study is needed to quantify the temperature at which PFAS chemicals are destroyed.

Additional benefits will be general improvement to water systems and quality, creation of jobs, and increased community goodwill through better service to customers.

32. Explain how the proposed rules will impact business growth and job creation (or elimination) in Michigan.

The proposed rules have the potential to increase demand on engineering firms and laboratories in the state. If water treatment plant modifications are required, the rules will also create some business growth in that sector. Ongoing treatment operation and maintenance may also increase job opportunities at PWSs around the state.

33. Identify any individuals or businesses who will be disproportionately affected by the rules as a result of their industrial sector, segment of the public, business size, or geographic location.

PFAS contamination tends to be found in more industrialized, urban areas leading to a higher compliance burden in those geographic locations.

34. Identify the sources the agency relied upon in compiling the regulatory impact statement, including the methodology utilized in determining the existence and extent of the impact of the proposed rules and a cost-benefit analysis of the proposed rules.

•Summary Report on the New Hampshire Department of Environmental Services Development of Maximum Contaminant Levels and Ambient Groundwater Quality Standards for Perfluorooctanesulfonic Acid (PFOS), Perfluorooctanoic Acid (PFOA), Perfluorononanoic Acid (PFNA), and Perfluorohexanesulfonic Acid (PFHxS). New Hampshire Department of Environmental Services, January 2019.
•Recommendation on Perfluorinated Compound Treatment Options for Drinking Water. New Jersey Drinking Water Quality Institute Treatment Subcommittee, June 2015.
•Health-Based Drinking Water Value Recommendations for PFAS in Michigan. Michigan Science Advisory Workgroup, Michigan PFAS Action Response Team, June 2019.

A. How were estimates made, and what were your assumptions? Include internal and external sources, published reports, information provided by associations or organizations, etc., which demonstrate a need for the proposed rules.

Estimates of sampling costs were made based on the statewide sampling effort under MPART. Treatment costs were made based on the number of supplies over the proposed MCLs at the time the estimate was made and the average cost of treatment based on a study by the State of New Hampshire.

35. Identify any reasonable alternatives to the proposed rules that would achieve the same or similar goals.

There are no reasonable alternatives. Possible alternatives include no establishment of any MCL or testing requirement that provides no public health protection, the requirement to install basic treatment for PFAS chemicals at all water supplies that is cost prohibitive, or a change in the MCLs that were based on the best data available.

A. Please include any statutory amendments that may be necessary to achieve such alternatives.

Changes in the MCLs would be required if additional science shows that is prudent.

36. Discuss the feasibility of establishing a regulatory program similar to that proposed in the rules that would operate through private market-based mechanisms. Please include a discussion of private market-based systems utilized by other states.

This is a federal law (SDWA) that must be implemented in Michigan. The state is choosing to add PFAS to its regulated contaminants; no other states have implemented a market-based system of regulation, and this does not seem feasible.

36. Discuss the feasibility of establishing a regulatory program similar to that proposed in the rules that would operate through private market-based mechanisms. Please include a discussion of private market-based systems utilized by other states.

Stakeholders had concerns about the levels at which the MCLs were set. The MCLs were set based on an expert panel that considered the latest scientific data available.

Many alternatives discussed dealt with changes to the timing and logistics of the new requirements, levels of the MCLs, testing protocols, sampling frequency to capture seasonal variations, applicability of the new rules, laboratory capacity concerns, reporting limit concerns, and public notification requirements. We wrote and modified the rules where these concerns and suggestions provided less ambiguity in the rules and provided better, more reasonable public health protection.

38. As required by MCL 24.245b(1)(c), please describe any instructions regarding the method of complying with the rules, if applicable.

Significant guidance material will be available to provide compliance assistance.

EXHIBIT 11

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STATE OF MICHIGAN

COURT OF APPEALS

3M COMPANY,

Plaintiff-Appellee,

v

DEPARTMENT OF ENVIRONMENT GREAT LAKES AND ENERGY,

Defendant-Appellant.

FOR PUBLICATION
August 22, 2023
9:05 a.m.

No. 364067
Court of Claims
LC No. 21-000078-MZ

Before: GADOLA, P.J., and MURRAY and MALDONADO, JJ.

MURRAY, J.

The sole issue in this appeal is whether the trial court erred in holding that the Department of Environment, Great Lakes, and Energy (EGLE), violated Section 45 of the Administrative Procedures Act of 1969 (APA), MCL 24.201 *et seq*., which requires agencies to prepare a regulatory impact statement (RIS) that includes an estimate of how much compliance with the proposed rules will cost "businesses and other groups." MCL 24.245(3)(n). For the reasons explained below, we conclude that the trial court did not err, and we therefore affirm its order granting summary disposition in favor of plaintiff.

I. BACKGROUND

At issue is a new set of rules promulgated by EGLE that regulate the permissible levels of per- and polyfluoroalkyl substances (PFAS) in drinking water pursuant to Section 5 of the Safe Drinking Water Act (SDWA), MCL 325.1001 *et seq*.[1] It is undisputed that implementation of these rules causes changes to groundwater-cleanup standards pursuant to Part 201 of the Natural Resources and Environmental Protection Act (NREPA), MCL 324.101 *et seq*.[2] This is because

[1] See MCL 325.1005(1)(b).

[2] See MCL 324.20120a(5).

groundwater-cleanup standards are tied to drinking water rules; therefore, any changes to the drinking water rules also cause a change to the groundwater-cleanup rules.

A lengthy administrative process took place prior to the implementation of these rules. In March 2019, a Science Advisory Workgroup was established to review existing and proposed drinking-water standards for PFAS. A month later, the Workgroup indicated that more than 70 sites were being investigated for contamination for two specific PFASs: perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). Soon after, EGLE proposed to create rules to establish enforceable drinking-water standards for PFAS. In doing so, EGLE indicated that the United States Department of Environmental Quality had designated health-advisory levels for PFOS and PFOA, but EGLE determined that the lack of enforceable standards for those chemicals and other PFAS impaired its ability to act to protect human health and the environment. Thus, a new ruleset was proposed, designated as 2019-35 EG, or "Supplying Water to the Public," which was to add additional drinking water standards and related sampling and response requirements.

In October 2019, EGLE's Drinking Water and Environmental Health Division submitted an RIS for proposed ruleset 2019-35 EG. In the RIS, the primary costs to state and local governmental units were identified as arising from sampling and monitoring requirements and the installation and operation of treatment systems where PFAS exceeded the maximum contaminant levels. Regarding costs imposed on businesses and groups, EGLE addressed only businesses that operated their own water supplies and estimated the following:

	Government		Businesses	
	Unit Cost	Annual	Unit Cost	Annual
Sampling cost	$300 per sample	$3.2 mil	$300 to $600 per sample	$4 mil
Treatment cost	$8 per gal	$7.4 mil		
Maintenance cost	$0.35 per gal	$325,000		$7,000
Installation of treatment			one time $920,000	

The costs were to be the same for businesses and other groups except that sampling would cost $600 per sample if the business or group hired an outside contractor rather than doing the sampling itself.

After an October 2019 meeting of the Environmental Rules Review Committee, EGLE's Regulatory Affairs Officer, David Fiedler, responded to a question regarding the estimated impact on small businesses and other stakeholders "when the PFOA and PFOSs criteria are changed under Part 201" by stating:

> If an entity is responsible for either causing a PFAS release or being responsible for the due diligence associated with a PFOS or PFOA release under Part 201, then they would be obligated to meet these standards. This impact will vary depending on the PFOS or PFOA concentration, media effected [sic], and extent of contamination. Because of this variability, it is not practical to determine the impact of this change. Even if it was, this impact is a result of current statutory applicability not a regulatory requirement.

The next month, a second RIS was prepared. The revised RIS recognized that the new surface water standards would alter the standards for groundwater cleanup: "There are surface water standards and groundwater-cleanup standards. The groundwater-cleanup standards for PFOA and PFOS will be changed as a result of the rule."

Public hearings were held on 2019-35 EG in January 2020, and the Review Committee approved a final draft of the rules in February. The Office of Regulatory Reinvention, an office within the Department of Licensing and Regulatory Affairs, MCL 445.2031(*l*)(A), approved the proposed drinking-water rules after determining that they were within the scope of EGLE's authority, did not violate constitutional requirements, and conformed to APA requirements. The Joint Rules Committee did not act on the proposed rules during the 15 session days following their receipt, making the rules effective on August 3, 2020. See MCL 24.245a(1), (3).

3M Company subsequently filed suit seeking declaratory and injunctive relief regarding the drinking-water standard's rules for PFAS. According to 3M Company, EGLE had not fully accounted for all costs associated with the rules, as it had not estimated costs for businesses to comply with the related groundwater-cleanup standards that automatically result from the new drinking water rules. Because every RIS was required to contain an estimate of the compliance costs for businesses and other groups, EGLE's RIS was deficient as it had not accounted for costs resulting from changes to the separate, but related, groundwater-cleanup standards. Accordingly, 3M Company asserted that EGLE had not complied with the APA-based RIS requirements, and the drinking water rules were invalid.

The parties filed competing motions for summary disposition pursuant to MCR 2.116(C)(10). After a hearing, the Court of Claims issued a thorough opinion and order granting summary disposition in 3M Company's favor and declaring the new drinking water rules invalid. Although the court determined that most of 3M's arguments did not carry the day, the court held that the RIS was deficient for lack of a cost estimate for groundwater cleanup, reasoning:

> Specifically, nowhere in the Part 201 RIS did the Department address any cleanup or compliance costs that a business or group would incur as a result of the PFAS rules. In fact, it was the exact opposite—the Department actually relied on the criteria set for PFOA and PFOS as a result of the SDWA-rulemaking process to justify its decision to ignore any cleanup and compliance costs faced by businesses and groups with respect to the other five PFAS substances under Part 201. Thus, the costs to businesses and groups of complying with the PFOA and PFOS groundwater criteria were never considered in either rulemaking proceeding, and the Department asserted in the Part 201 RIS that regulating the other five PFAS would not lead to additional costs because those costs would already be incurred due to the PFOA and PFOS rules.
>
> A court must give a certain amount of deference to an administrative department's rulemaking process. *Brang, Inc v Liquor Control Comm*, 320 Mich App 652, 661; 910 NW2d 309 (2017). But judicial deference is not infinitely elastic—our Legislature has made clear that, when promulgating a rule, administrative departments must comply with certain standards, and one of those is estimating "the actual statewide compliance costs of the proposed rule on businesses and other groups" and including that information in the regulatory-impact statement. MCL 24.245(3)(n). A department cannot skirt this statutory

requirement during Rulemaking A by promising to address the costs later in Rulemaking B, but then when later comes, ignoring the costs in Rulemaking B because the criteria were already set in Rulemaking A, and then, on top of this, characterizing all of the ignored costs as actually zero because they are sunk costs. To do this would be to play a shell game with the public.

The court, on its own motion, stayed the effect of its holding to grant time for appellate review of its decision.

II. STANDARDS OF REVIEW

Const 1963, art 6 § 28, provides the scope of review for an administrative agency's decision:

> All final decisions, findings, rulings and orders of any administrative officer or agency existing under the constitution or by law, which are judicial or quasi-judicial and affect private rights or licenses, shall be subject to direct review by the courts as provided by law. This review shall include, as a minimum, the determination whether such final decisions, findings, rulings and orders are authorized by law; and, in cases in which a hearing is required, whether the same are supported by competent, material and substantial evidence on the whole record.

"[W]hen a hearing is not required, courts review an agency decision only under the 'authorized by law' standard . . . ." *Henderson v Civil Serv Comm*, 321 Mich App 25, 39; 913 NW2d 665 (2017).[3] "An agency decision is not authorized by law if it violates constitutional or statutory provisions, lies beyond the agency's jurisdiction, follows from unlawful procedures resulting in material prejudice, or is arbitrary and capricious." *Dearborn Hts Pharmacy v Dep't of Health & Human Servs*, 338 Mich App 555, 559; 980 NW2d 736 (2021) (quotation marks and citation omitted).

Courts review de novo questions of law, including whether an agency's action complied with a statute. *In re Complaint of Rovas Against SBC Mich*, 482 Mich 90, 100-101; 754 NW2d 259 (2008). The normal rules of statutory interpretation apply when interpreting statutes concerning agency decisions. *Dearborn Hts Pharmacy*, 338 Mich App at 560. If the language is clear and unambiguous, this Court may not engage in judicial construction. *Id*. (citation omitted). And, if the statute does not define a word, this Court applies the common meaning of nontechnical words, while also considering the placement of the words and phrases in the statutory scheme. *Id*. (citation omitted). Words must be read and understood within their grammatical context. *Mich Charitable Gaming Ass'n v Michigan*, 310 Mich App 584, 592; 873 NW2d 827 (2015).

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[3] A contested case is "a proceeding, including rate-making, price-fixing, and licensing, in which a determination of the legal rights, duties, or privileges of a named party is required by law to be made by an agency after an opportunity for an evidentiary hearing." MCL 24.203(3). A noncontested case is any case that falls outside this definition. *Mich Ass'n of Home Builders v Dir of Dep't of Labor & Economic Growth*, 481 Mich 496, 498; 750 NW2d 593 (2008).

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Respectful consideration is given to an agency's interpretation of the statute that it is charged with executing, and we may not overrule that interpretation without cogent reasons. *Rovas*, 482 Mich at 103. " '[R]espectful consideration' is much like what we give to a trial court's view of a legal issue on de novo review." *Stirling v Leelanau Co*, 336 Mich App 575, 578 n 2; 970 NW2d 910 (2021), rev'd on other grounds *Stirling v Leelanau*, ___ Mich ___; ___ NW2d ___ (2023) (Docket No. 162961).

III. DISCUSSION

The APA governs the creation of agency rules and regulations. *Mich Charitable Gaming*, 310 Mich App at 594. "An agency's failure to follow the process outlined in the APA renders a rule invalid." *Id*. One of the processes that the agency must follow is the creation of an RIS. MCL 24.245(3). "The regulatory impact statement must contain . . . [a]n estimate of the actual statewide compliance costs of the proposed rule on businesses and other groups." MCL 24.245(3)(n). Section 5 of the SDWA requires EGLE to promulgate rules setting "[s]tate drinking water standards and associated monitoring requirements, the attainment and maintenance of which are necessary to protect the public health." MCL 325.1005(1)(b).

Pursuant to this statutory command, EGLE promulgated ruleset 2019-35 EG, establishing new standards for PFAS in drinking water. As noted, however, under Part 201 of the NREPA, once new drinking water standards are promulgated under Section 5 of the SDWA, the cleanup criterion for hazardous substances in groundwater are also changed. MCL 324.20120a(5). In other words, the impact of Part 201 is that whenever EGLE sets drinking water standards, it is also setting groundwater cleanup criterion. Despite this, EGLE refrained from providing compliance cost estimates for the new groundwater cleanup criterion in the RIS it prepared for the new drinking water standards, arguing that because MCL 24.245(3)(n) only requires it to estimate costs of *the proposed rule*, it only needed to provide a cost estimate for businesses and other groups to comply with the drinking-water rule; it did not need to provide an estimate of the costs that businesses and other groups might incur as a result of the groundwater-cleanup provisions found in Part 201 of NREPA.

It is true that MCL 24.245(3)(n) provides that the agency must include in its RIS "[a]n estimate of the actual statewide compliance costs *of the proposed rule* on businesses and other groups." (Emphasis added.) We don't quibble with EGLE's position that within MCL 24.245(3)(n) the word "the" modifies the phrase "proposed rule," and that the proposed rule is 2019-35 EG, "Supplying Water to the Public." But the statute has to be read in its entirety, and what MCL 24.245(3)(n) requires is that EGLE provide an estimate "of the actual statewide compliance costs of" the proposed rule. And as we have described above, and as the parties agree, "the proposed rule[s]" resulted in modified groundwater criteria, which triggered the possibility of additional "statewide compliance costs." It is that triggering effect from adoption of "the proposed [drinking water]" rules that brought into play EGLE's statutory obligation to provide "an estimate of the actual statewide compliance costs" of any required groundwater cleanup resulting from adoption of the proposed drinking water rules.

Although EGLE identified the estimated actual statewide compliance costs of the proposed drinking-water rule on businesses and groups, it did not estimate costs that these changes automatically imposed on groundwater cleanup. Failing to do so resulted in EGLE's noncompliance with MCL 24.245(3)(n), which in turn means the rules were not promulgated in compliance with the APA, and are invalid. MCL 24.243; *Goins v Greenfield Jeep Eagle, Inc*, 449 Mich 1, 9-10; 534 NW2d 467 (1995).[4]

EGLE's argument that it was not required to estimate the costs to businesses that would necessarily occur under Part 201 because it lacked the necessary information to make an estimate does not save the day as the applicable statutory provisions say otherwise.

MCL 24.245(3) provides that an agency must prepare a RIS which "shall" contain all of the listed information, meaning that providing the information is mandatory. *Walters v Nadell*, 481 Mich 377, 383; 751 NW2d 431 (2008). And as noted earlier, one piece of information that the APA requires to be included in a RIS is "[a]n estimate of the actual statewide compliance costs of the proposed rule on businesses and other groups." MCL 24.245(3)(n).

According to EGLE, it was permitted to determine that it was factually incapable of making an estimate and that the Court of Claims should have deferred to its administrative expertise when making that determination. However, MCL 24.245(3)(n) does not contain any such exception, and to adopt EGLE's position would require this Court to read an exception into MCL 24.245(3)(n) that would allow EGLE, as well as any other departments of state government, to avoid estimating costs to businesses in a RIS if the department concludes an estimate is not possible. But MCL 24.245(3)(n) requires an estimation, and if EGLE cannot provide one, then it cannot propose the rule in a way that complies with the APA.

Affirmed. No costs, a matter of public concern being at issue. MCR 7.219(A).

/s/ Christopher M. Murray
/s/ Michael F. Gadola

[4] EGLE challenges the trial court's review of the RIS subsequently adopted for groundwater cleanup, which likewise contained no numerical cost estimate. According to EGLE, the trial court had no authority to consider that RIS because it was not part of the administrative record. As Judge SMOLENSKI previously wrote for this Court, a court is expressly permitted to take judicial notice on its own of those laws set out in MRE 202(a), which includes a state administrative regulation. *Rudolph Steiner Sch of Ann Arbor v Ann Arbor Charter Twp*, 237 Mich App 721, 723 n1; 605 NW2d 18 (1999). However, a RIS is not an administrative regulation, nor does that document fall within one of the other laws that a court can judicially notice. But this error was harmless, as the statutory language supports the trial court's ultimate holding.