Managing PFAS in Maine

Final Report from the Maine PFAS Task Force

January 2020

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Guiding Principles

In March 2019, Governor Janet Mills created the Maine PFAS Task Force by Executive Order (Appendix A) to review the extent of PFAS contamination in Maine and provide recommendations about how we can protect Maine residents from exposure.

The Maine PFAS Task Force reviewed information from a variety of sources, including results of sampling submitted by DEP-licensed facilities and sampling conducted by State of Maine agencies, as well as various health studies, and solicited input from stakeholders and other members of the public.

The varied viewpoints of Task Force members strengthened discussions about priorities for State action. These diverse perspectives helped us deliver more comprehensive recommendations that center around a shared set of priorities.

Summary of Recommendations

To be most protective of Maine citizens, now and in the future, we believe the following are of greatest importance:

1. **Providing safe drinking water;**
2. **Protecting our food supply;**
3. **Identifying and investigating PFAS contaminants in the environment;**
4. **Identifying and reducing uses of PFAS;**
5. **Managing waste and waste residuals responsibly;**
6. **Improving public education about PFAS;**
7. **Promoting federal action; and**
8. **Funding for state agencies to investigate, respond to and reduce exposure of Maine citizens to PFAS.**

Our recommendations reflect a commitment to determine where PFAS contaminants exist in Maine and put in place strategic responses to protect people from exposure. It is important to recognize that some of the actions recommended will require additional public processes and funding to develop and implement the specific related tasks. The following report details recommendations the Task Force has identified that fulfill the Governor's charge.

PFAS Background

What is PFAS?

"PFAS" (per- and poly-fluoroalkyl substances) are a large group of synthetic fluorinated chemicals. There are over 4,000 compounds that have been identified as PFAS to-date. This family of chemicals take a long time to break down in the environment due to the extremely strong bond between fluorine and carbon. Because of this strong bond, which resists break-down, the use of the entire PFAS family should be viewed with great caution.

The two most commonly used PFAS were PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate). These two compounds were used in households across the country in the non-stick, grease resistant convenience items of the 20th century. PFOA and PFOS were widely used in and are still used in firefighting foam (Class B Aqueous Film Forming Foam (AFFF)) used to quickly extinguish petroleum-based fires.

Chemical manufacturers in the U.S. phased out production of PFOA and PFOS in the early 2000's, but they were replaced with a wide variety of other PFAS. PFOA and PFOS are also still present in imported products, and other PFAS break down in the environment into more stable and extremely persistent degradation byproducts.

A wide variety of PFAS, many still unidentified as manufacturers claim their formulations to be proprietary information, are now used in consumer products that are stain, oil, heat, and water resistant, such as clothing, furniture fabric, food packaging, carpets, cookware, outdoor recreational items, and electronics. Because these chemicals are used so widely in consumer products, they are also present in our wastewater in septic tanks and in treatment plants.

The scientific understanding of how PFAS impacts people and the environment is still developing, and for thousands of PFAS compounds much remains unknown. Laboratories can still only accurately analyze for a small subset of PFAS.

State governments typically rely on the federal government to certify analytical methods for environmental contaminants. At the time the Task Force convened, the U.S. EPA had only formally certified one method for analysis of 18 PFAS in drinking water (Method 537.1, Document #EPA/600/R-18/352 (2018)), although other methods for groundwater, wastewater and soils have been accepted by the U.S. EPA and Department of Defense for remediation site cleanup decisions.

Other states have wide-ranging levels of industrial activity and methods for managing wastes, which have resulted in varying levels of PFAS contaminants within their borders.

In the absence of federal action these other states have developed a variety of standards and screening levels based on their own scientific assessments of the risks to human health.

Human exposure to PFAS continues to be widespread because this chemistry is used in hundreds of products for a variety of applications. Manufacturers may not report their uses of PFAS so it is difficult to limit exposures. International studies have been supported by Maine-specific sampling to indicate that PFAS are present in our environment, and that the highest concentrations of PFAS exist in environmental media such as soil and groundwater in areas where materials containing PFAS were utilized or disposed. In 2019, Maine is similar to other states trying to manage a shifting landscape while keeping pace with changes in our knowledge of this emerging contaminant and protecting human health with limited resources and authority.

Human Exposure Concerns

Scientists are still learning about the potential health effects from exposure to PFAS chemicals. Four specific PFAS chemicals - PFOA, PFOS, PFHxS and PFNA - have been studied more extensively than other PFAS. According to the U.S. Agency for Toxic Substances and Disease Registry (ATSDR), studies in humans with PFAS exposure have shown that these chemicals may:[1]

- increase cholesterol levels;
- decrease how well the body responds to vaccines;
- increase the risk of thyroid disease;
- decrease fertility in women;
- increase the risk of high blood pressure or pre-eclampsia in pregnant women;
- lower infant birth weights; however, the decrease in birth weight is small and may not affect the infant's health; and
- increase risk of kidney cancer or testicular cancer.[2]

Studies with laboratory animals exposed to high doses of one or more of these PFAS have shown changes in liver, thyroid, pancreatic function, and hormone levels. [3] In animal

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[1] U.S. Department of Health and Human Services, Agency for Toxic Substance and Disease Registry (ATSDR). *Perfluoroalkyls - ToxFAQs™* (2018). Retrieved from https://www.atsdr.cdc.gov/toxfaqs/tfacts200.pdf.

[2] U.S. Department of Health and Human Services, Agency for Toxic Substance and Disease Registry (ATSDR). PFAS An Overview of the Science and Guidance for Clinicians on Per- and Polyfluoroalkyl Substances (PFAS). (2019). Retrieved from https://www.atsdr.cdc.gov/pfas/docs/ATSDR_PFAS_ClinicalGuidance_12202019.pdf.

[3] U.S. Department of Health and Human Services, Agency for Toxic Substance and Disease Registry (ATSDR). *Per- and Polyfluoroalkyl Substances (PFAS) and Your Health. What are the health effects?* (2018). Retrieved from https://www.atsdr.cdc.gov/pfas/health-effects.html.

studies, exposure to PFOA and PFOS have shown increases in testicular, liver and pancreatic tumors.[4]

Nearly everyone is exposed to PFAS chemicals. By measuring PFAS in blood serum it is possible to estimate the amount of PFAS that have entered people's bodies. Because some PFAS persist in our bodies for years, the levels in our blood serum at any time reflects exposure to these chemicals over the preceding several years. U.S. Centers for Disease Control and Prevention (CDC) scientists have measured at least 12 PFAS in the blood serum of participants who have taken part in the National Health and Nutrition Examination Survey (NHANES) since 1999.[5] Four PFAS (PFOS, PFOA, PFHxS and PFNA) have been found in the blood serum of nearly all the people tested, indicating widespread exposure to these PFAS in the U.S. population. Notably, since 1999 the measured levels of PFOS and PFOA in the blood serum of NHANES participants have decreased by about 80 percent. The exposure pathway or pathways responsible for this decline remains unclear, though the timing does coincide with the declining manufacture and use of these two chemicals in the U.S.

For most people, diet is thought to be the primary source of exposure to PFAS.[6] The major types of dietary exposure to PFAS include ingesting food and water contaminated with PFAS, and eating food packaged in materials containing PFAS. Hand-to-mouth transfer from dust in households containing products treated with PFAS-containing stain protectants, such as carpets, is thought to be an important exposure pathway for infants and toddlers. Dermal exposure from water is thought to be a minor exposure pathway, and therefore bathing is not considered of concern.

Across the country, much of the early attention to PFAS has been in response to contaminated drinking water supplies. Community drinking water supplies and residential wells have been contaminated by releases at chemical manufacturing facilities, as well as past use of AFFF at closed military bases and fire training areas. Sizable population exposures to contaminated water have been reported in Colorado, Michigan, Minnesota, New York, New Hampshire, Pennsylvania, and Vermont.

More recent testing has shown drinking water may be contaminated by many different sources, such as landfills, waste residuals and septage spreading sites, air emissions from

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[4] U.S. Department of Health and Human Services, Agency for Toxic Substance and Disease Registry (ATSDR). *Perfluoroalkyls - ToxFAQs*™ (2018). Retrieved from https://www.atsdr.cdc.gov/toxfaqs/tfacts200.pdf.

[5] U.S. Center for Disease Control and Prevention. *National Report on Human Exposure to Environmental Chemicals*. https://www.cdc.gov/exposurereport/index.html.

[6] Egeghy & Lorber. Journal of Exposure Science and Environmental Epidemiology. (2011). 21,150–168.

manufacturing facilities, and the discharge of AFFF for firefighting.

In 2016, the U.S. Environmental Protection Agency (EPA) issued a final Lifetime Health Advisory (LHA) informing state health agencies with regulatory authority over public water systems that, due to its adverse health effects, members of the public should not drink water where PFOA and PFOS individually or combined are measured above 70 parts per trillion (ppt). EPA Health Advisories are intended as informational resources for administrators of public water systems and agencies responsible for their oversight. Health Advisories are not regulations and do not represent legally enforceable standards.[7]

Since the release of EPA's 2016 PFOA/PFOS health advisory, the ATSDR and several states have reviewed the toxicity information available for PFOA and PFOS (and some agencies have also reviewed information on PFHxS and PFNA) and proposed or developed their own toxicity values. Despite looking at mostly the same toxicity information as EPA, nearly all of these agencies, including ATSDR, have adopted or proposed toxicity values as much as 10-fold lower with differences largely a consequence of divergent views on which animal studies and which toxic effects to rely on, as well as divergent views on the appropriate application of uncertainty factors.

Absent a federal drinking water standard (called a Maximum Contaminant Level or MCL), some states confronting significant community water contamination problems have proposed or adopted their own drinking water standards. These state specific standards are lower than EPA's Health Advisory, a consequence of both the aforementioned lower toxicity values but also differences in the modeling of exposure and differences in how background exposure is considered. EPA's Health Advisory is based on water consumption by a lactating woman, to be consistent with a toxicity value based on developmental toxicity resulting from in utero exposure. Some states have instead modeled water consumption by the formula-fed infant, conservatively assuming the infant has similar sensitivity to PFAS as the developing fetus. Recently a few states have modeled transgenerational exposure to PFAS in water that considers both exposure in utero from water consumption during pregnancy followed by exposure to the infant from breast feeding. While most states continue to rely on EPA's Health Advisory for making risk management decisions on water contamination (including Maine), a national consensus regarding appropriate guidelines for PFAS in water has not been achieved. Moreover, toxicity data is lacking for most PFAS. The on-going lowering of levels of

[7] U.S. Environmental Protection Agency. *Fact Sheet PFOA & PFOS Drinking Water Health Advisories* (November 2016). EPA 800-F-16-003. https://www.epa.gov/sites/production/files/2016-06/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf.

contamination considered safe for human health is consistent with the past history of advancing research into the health impacts of other contaminants with adverse health effects.

Across the country, as well as here in Maine, PFOA, PFOS, and other PFAS are also being detected in soils, sediment, surface water, air, sludge, septage, compost, fish, milk and some foods. With these discoveries, new exposure pathways become apparent, such as soil-to-groundwater and soil-to-plant. Yet models and data for some of these exposure pathways are limited, posing challenges for developing guidelines for these media. It is also becoming apparent that trace levels of PFAS can be found in soils and freshwater fish in locations with no known release of PFAS, indicating a possible role for atmospheric transport and deposition.[8]

PFAS in Maine

PFAS was first discovered in groundwater in Maine at former military installations. Those sites were already known to contain other contaminants and surrounding areas are served by public water systems. The potential for more widespread PFAS impacts in Maine was not realized until PFAS was discovered in the Kennebunk, Kennebunkport, Wells Water District supply well, which led to the discovery of PFAS in a nearby dairy farm well, milk, hay and soil. This one incident raised a series of questions about the soil-to-groundwater pathway, agronomic exposure pathways, and whether this was an isolated or more common occurrence. Since that time, many State of Maine agencies have become involved in efforts to investigate, respond to, and reduce exposure of Maine citizens to PFAS.

Maine DEP, the Maine Department of Agriculture, Conservation and Forestry (DACF), and the Maine Center for Disease Control and Prevention (Maine CDC) continue to investigate sites and materials for possible PFAS compounds, including:

- Public water systems near potential sources of PFAS;
- Groundwater, surface water, and private water supplies around Maine DEP cleanup sites, landfills, residuals land application sites, and Superfund sites;
- Retail milk supply;
- Vegetation (corn and hay) associated with agricultural feed for the dairy industry;
- Sludge and other residuals; and
- Fish tissue.

[8] Zhu W., Roakes H., Zemba S.G., Badireddy A. "PFAS Background In Vermont Shallow Soils". (February 2019). Retrieved from https://anrweb.vt.gov/PubDocs/DEC/PFOA/Soil-Background/PFAS-Background-Vermont-Shallow-Soils-03-24-19.pdf.

Maine Department of Environmental Protection

As of October 2019, the Maine DEP had more than 30,000 records for 28 different PFAS at 245 locations across the State. Records in the Department's database include locations associated with former military sites, closed unlined landfills, Superfund sites, uncontrolled sites, residual land application sites and compost facilities processing residuals, drinking water (both public and private), wastewater, and the DEP's Surface Water Ambient Toxics (SWAT) program. A summary of these records can be found in Appendix C.

The DEP began testing for PFAS in fish tissue in 2013 near former military installations. DEP collected samples in subsequent years downstream of wastewater treatment plant outfalls, near known contaminated sites, and from some lakes and ponds. Sampling of brook trout and smallmouth bass in waters adjacent to the former Loring Air Force Base – specifically Durepo Reservoir and Limestone Stream – found levels of PFOS above Maine CDC's recently updated fish tissue action levels (34.1 ug/kg for protection of sensitive populations, 79.0 ug/kg for protection of the general population). However, measured PFOS levels were not high enough to warrant an advisory due to the existing and more restrictive statewide advisories on consumption of these fish species due to the presence of methylmercury.[9] All other fish data tested by DEP's SWAT Program for PFOA, PFOS and PFBS have been below the recreational angler fish tissue screening levels recommended by Maine CDC, with one exception. PFOS levels found in fish from Estes Lake, Mousam River had reported levels for white perch as high as 42.9 ug/kg, wet weight. Additional information is available online in DEP's biennial SWAT program reports.[10]

The DEP follows a step-out approach to site investigation – if contaminants are found above screening levels at a sampling point DEP evaluates environmental pathways for those contaminants and conducts testing at nearby locations where impacts may also be predicted. For example, DEP may investigate contamination along a bedrock fracture where groundwater is predicted to travel to drinking water wells. DEP's Remedial Action Guidelines, developed in collaboration with Maine CDC and that rely on EPA toxicity values for PFAS, recommend treatment or replacement of drinking water supplies where PFOA and PFOS exceed 70 ppt. As a matter of practice, DEP also recommends treatment or replacement of drinking water supplies when the sum of all measured PFAS exceed 400 ppt. As a result of this approach, carbon filtration drinking water treatment systems

[9] Maine Center for Disease Control interdepartmental memorandum to DEP on "PFOS fish tissue levels in Durepo Reservoir and Limestone Stream –April 26, 2018.

[10] Maine Department of Environmental Protection. *Surface Water Ambient Toxics Monitoring Program Report*. Retrieved from https://www.maine.gov/dep/publications/reports/index.html

for PFAS have been installed on four private supplies near closed, unlined municipal landfills and three more are pending installation.

In 2018, the Legislature and Board of Environmental Protection approved adoption of DEP's Chapter 418 rule, *Beneficial Use of Solid Wastes*, containing screening levels for PFOA, PFOS and PFBS in waste materials. In 2019, the DEP required testing of wastewater treatment plant and papermill residuals prior to land spreading as well as testing of finished compost produced from these same types of residuals. Results indicated:

- 65% of the residuals samples tested in 2019 exceeded the screening level for PFOA and 93% exceeded for PFOS;
- 89% of finished compost samples exceeded the screening level for PFOA and 74% exceeded for PFOS;
- There were no exceedances of PFBS screening levels for any of the residuals, compost and soils tested; and
- None of the papermill residuals tested exceeded any of the PFAS screening levels.

Appendix D contains a summary of this data.

The DEP's rules currently allow residuals to be agronomically utilized if the levels of contaminants in the residuals will not cause concentrations of those contaminants in the soil to exceed the Chapter 418 screening levels. This is predicted using pollutant loading rate calculations described in DEP's Chapter 419, *Agronomic Utilization of Residuals*. In 2019, approximately 27% of the licensed land application sites had some level of site-specific testing performed. It is important to note that a licensed site may consist of several fields, not all fields may be used in a given year, and acreage may vary significantly (therefore site-specific soil test results should not be viewed in the absence of this information). With that understanding, of the fields tested in 2019, 19% of soils exceeded the screening levels for PFOA and 57% exceeded for PFOS. As a result of this, many fields licensed for land spreading could not be used in 2019 and thousands of cubic yards of residuals were disposed at landfills. Although the finished compost results generally exceeded the Chapter 418 screening levels, loading rate calculations using site-specific soils or background soils testing predicted that use of compost would not cause soils to exceed the screening levels if applied as recommended.

Maine DEP, DACF, and Maine CDC are continuing efforts to refine modeling assumptions used to derive health-based limits for PFAS in water, soil, and certain foods (e.g., milk) to ensure that decisions are made based on the best available science. Work is on-going or underway to:

- Assess all available historic records to determine extent of residuals spreading activities on farmland and determine appropriate next steps;
- Sample corn stalks growing on farm fields with extensive land spreading history that will be harvested for silage feedstock;
- Further evaluate the extent to which PFAS compounds transfer from soil to silage corn to animals and ultimately into the food supply; and
- Communicate with other states and agencies to evaluate toxicological data that is the foundation of DEP's and Maine CDC's modeling work.

All environmental sampling data is publicly available through Maine DEP's website in several formats, including:

- An interactive mapping tool that includes a visual map, the ability to search for sites, and all supporting data in a downloadable format;
- For residuals land application sites, a table that includes information for all licensed sites; and
- A copy of all PFAS test results for all site types included in Maine DEP's database.

Recognizing the financial burden PFAS has placed on some of Maine's wastewater treatment facilities, in 2019 Maine DEP:

- Offered emergency dewatering grants to certain facilities that did not have a way to dispose of low-solids content wastewater sludge that cannot be land applied due to high PFAS levels, and
- Offered planning grants to assist these same facilities in planning for future wastewater sludge disposal.

Maine CDC Drinking Water Program

Just under half (49%) of Maine's citizens are served water by Community Water Systems, which are regulated under the federal Safe Drinking Water Act administered through Maine CDC's Drinking Water Program (DWP) – the remaining 51% obtain their drinking water from residential wells that are not subject to federal or state regulation or testing requirements. There is limited data on the presence of PFAS in residential wells, and PFAS is just one of the contaminants that might be found in residential well water. Maine's relatively unique reliance on residential wells will pose additional challenges as the PFAS problem is addressed.

Maine has approximately 378 regulated Community Water Systems (public water systems that serve people in their homes on a year-round basis). All municipal water systems are classified as Community Water Systems. Community Water Systems must test for approximately 87 synthetic and natural contaminants on a regular basis and take necessary steps to reduce detected contaminant levels to below drinking water standards established by EPA, known as Maximum Contaminant Levels (MCLs). Maine also has 375 Non-Transient Non-Community systems (these include schools, daycares and businesses); 1,151 Transient systems (these include restaurants and campgrounds); and 54 regulated bottled water sources.

Public water systems are not required to monitor for or treat PFAS in drinking water. However, several public water systems (those serving a population of more than 10,000) have been sampled for PFAS in Maine through an EPA-coordinated sampling program from 2013-2015 (through UCMR-3, the Unregulated Contaminant Monitoring Rule, Phase 3) and two sampling rounds coordinated by the Maine CDC Drinking Water Program in 2017 and 2019. The 2017 and 2019 sampling rounds used a targeted selection approach to include only public water systems that were close to potential sources of PFAS impacts. These programs were part of a data gathering effort to help evaluate the presence of PFAS in Maine's public water systems to inform future decisions on possible regulation of these chemicals as drinking water contaminants. The combined sampling efforts have resulted in analysis of drinking water samples for PFAS concentration in a total of 53 public water systems in Maine, mostly Community Water Systems. These systems represent more than 65% of the population served by Community Water Systems.

The following table presents a summary of all PFAS detections in the 53 tested public water systems.

Table 1 – PFAS Detections in Maine Public Water Systems[1]

Public Water System	Population Served	Year Sampled	PFOS	PFOA	PFHxS	PFHxA	PFBS	PFNA	NEtFOSAA	PFHpA
Kennebunk, Kennebunkport & Wells Water District	34,250	2013-2015 (EPA UCMR)	50	---	---	---	---	---	---	---
Sanford Water District [2]	N/A	2013-2015 (EPA UCMR)	290	---	110	---	---	---	---	---
Houlton Mobile Home Park	140	2017 (Maine CDC)	70.6	---	62.0	14.2	16.2	---	---	---

AOS98 Princeton Elementary School	169	2017 (Maine CDC)	---	---	8.7	---	5.0	---	---	---
Princeton Water District	75	2017 (Maine CDC)	---	---	---	5.1	---	---	---	---
Trenton Elementary School	165	2017 (Maine CDC)	7.4	16.6	---	---	---	9.9	---	---
Estes Lake Mobile Home Park	172	2019 (Maine CDC)	2.2	---	---	---	---	---	---	---
Pine Ridge Hunton Brook Association	298	2019 (Maine CDC)	---	3.6	---	---	---	---	---	---
Charter Oaks Mobile Home Village	105	2019 (Maine CDC)	---	3.0	---	2.4	---	---	---	---
The Pines at Arundel	105	2019 (Maine CDC)	---	2.7	---	2.2	---	---	---	---
Mexico Water District	2,425	2019 (Maine CDC)	---	---	---	---	---	---	2.1	---
AOS98 Georgetown Central School	98	2019 (Maine CDC)	---	3.1	---	---	12.1	---	---	---
Fayette Central School	105	2019 (Maine CDC)	---	2.1	---	------	---	---	---	---
Pejepscot School in Topsham	31	2019 (Maine CDC)	5.2	5.1	3.2	3.7	2.1	---	---	---
Lisbon Water Department	6,150	2019 (Maine CDC)	---	10.2	5.7	4.5	3.3	---	---	2.7

(1) All results expressed in nanogram per liter or parts per trillion (ppt).

(2) The Sanford Water District well is not used as a public drinking water source.

Maine CDC has advised public water systems testing for PFAS to use EPA's Health Advisory to guide decisions on whether to install filtration to reduce PFAS levels. The current Health Advisory for drinking water is a combined concentration of 70 ppt for two PFAS compounds, perfluorooctanoic acid (PFOA) and perfluoro octane sulfonate (PFOS). As shown in the table above, only one active public water supply was found to have combined PFOA and PFOS above the health advisory of 70 ppt. This is a small community system in Houlton (Houlton Mobile Home Park) serving approximately 140 people. This system is currently providing bottled water to their customers while considering

installation of a treatment system and/or replacement of the water source. In addition, one public water supply in southern Maine (Kennebunk, Kennebunkport & Wells Water District) serving a population of approximately 34,250 elected to install a treatment system for PFAS in one of their well sources, although PFAS levels in the well averaged about 50 ppt. The Sanford Water District well with reportable concentrations of PFAS has been abandoned for several years and is not used as a public drinking water source.

In Maine's most recent PFAS sampling round conducted in 2019, 17 of the 36 public water systems included in the program declined to participate, in several cases stating that they wished to wait until testing was required rather than participating in the voluntary sampling program. Based on this result, it will be necessary to create a requirement for Community Water Systems to sample for PFAS to assess potential risks to all of Maine's citizens that receive their water from Community Water Systems.

Maine Department of Agriculture, Conservation and Forestry

DACF is responsible for ensuring the safety of Maine's food supply while providing support to farmers and food producers through a host of programs and resources. To date, DACF has concentrated its efforts on investigating potential contamination of PFAS in retail milk; however, it anticipates this scope to expand upon further data collection and assessment, additional scientific study, and the establishment of recognized PFAS standards for food.

In late 2016, PFAS chemicals were found to be present at levels up to 1,420 ppt in the milk of a Maine dairy farm that had historically applied municipal wastewater and papermill residuals to its fields. These results exceeded the Action Threshold of 210 ppt for milk that was developed by the Maine CDC to determine when milk is considered adulterated.

To explore the safety of Maine's current overall milk supply, DACF completed a state-wide retail milk survey in June 2019. The survey focused on Maine-produced, fluid pasteurized milk that was: 1) bottled in-state; or 2) was bottled out of state but sold in Maine. Twenty-six samples were taken throughout the state to ensure broad geographic representation. All results were below the laboratory reporting level of 50 ppt.

At the same time DACF tested milk from three commercial dairy farms, two with an extensive history of municipal wastewater and/or paper mill residual applications and whose soil samples exceeded DEP's screening levels for PFOA and/or PFOS. The third farm was near the farm that had tested high for PFOS in 2016. The results from all three farms were also below the laboratory's reporting level of 50 ppt.

Table 2 - PFAS Retail Milk Testing Results May/June 2019, Vista Labs (ND= Not Detected)
Samples of Maine milk processed either: 1) in-state or 2) out-of-state (but sold in Maine)

Sample Number	Sample Date	State in Which Sample Containing ME Milk was Processed	PFOS Results with Laboratory Reporting Limit at 50 ng/L	PFOA Results with Laboratory Reporting Limit at 50 ng/L	PFOS or PFOA Concentration Detected below the Laboratory Reporting Limit but Above the Laboratory Method Detection Limit at 20.2 ng/L PFOS and 16.3 ng/L PFOA
#2	5/30/2019	NY	ND	ND	PFOA, 24.7 ng/L *
#4	5/30/2019	ME	ND	ND	ND
#6	5/30/2019	ME	ND	ND	ND
#1	5/29/2019	NY	ND	ND	ND
#9	5/31/2019	ME	ND	ND	PFOS, 44.7 ng/L *† **NOTE**: Sample retested on 7/12/2019. **Results were ND**.
#11	5/31/2019	ME	ND	ND	ND
#16	5/31/2019	ME	ND	ND	ND
#17	5/31/2019	MA	ND	ND	ND
#21	5/31/2019	ME	ND	ND	ND
#7	5/31/2019	MA	ND	ND	ND
#8	5/31/2019	ME	ND	ND	PFOS, 27.4 ng/L *†
#13	5/31/2019	ME	ND	ND	PFOS, 24.9 ng/L *†
#15	5/31/2019	MA	ND	ND	ND
#25	6/03/2019	ME	ND	ND	ND
#29	6/03/2019	ME	ND	ND	ND
#22	6/03/2019	ME	ND	ND	ND
#23	6/01/2019	NH	ND	ND	ND
#28	6/03/2019	ME	ND	ND	PFOS, 27.7 ng/L *
#31	6/03/2019	ME	ND	ND	PFOS, 24.6 ng/L *†
#24	6/03/2019	ME	ND	ND	ND
#26	6/03/2019	MA	ND	ND	ND
#27	6/03/2019	ME	ND	ND	ND
#32	6/04/2019	ME	ND	ND	ND
#34	6/04/2019	ME	ND	ND	ND
#35	6/04/2019	ME	ND	ND	ND
#36	6/04/2019	MA	ND	ND	ND

* Result qualified by the laboratory as detected below the laboratory reporting limit.
† Results further qualified by the laboratory as not meeting laboratory analytical criterion.

Table 3 - Farm Test Results April/May 2019, Vista Labs (ND = Not Detected)

Farm	Sample Date	PFOS Results with Laboratory Reporting Limit at 50 ng/L	PFOA Results with Laboratory Reporting Limit at 50 ng/L	PFOS or PFOA Concentration Detected below the Laboratory Reporting Limit but Above the Laboratory Method Detection Limit at 20.2 ng/L PFOS and 16.3 ng/L PFOA
#1	4/29/2019	ND	ND	ND
#2	5/2/2019	ND	ND	ND
#3	5/29/2019	ND	ND	PFOA, 28.1 ng/L *

* Result qualified by the laboratory as detected below the laboratory reporting limit.

Future testing of milk and other agricultural products will occur based on additional factors, including the careful review of historic records, assessment of emerging science (including improved testing methods), and with the establishment of PFAS thresholds for other foods. DACF is in the process of assessing historical records of where licensed residuals may have been applied on Maine farmland. These records must be thoroughly vetted to fully understand past spreading activities (residual type(s), location(s), amount(s), and date(s)), the crops or livestock produced, soil characteristics, and other relevant data to assess potential risk and next steps.

DACF will work closely with any farmer whose products may be found to be adulterated by PFAS, with the goal of identifying mitigation strategies that could allow them to continue farming and producing safe agricultural products. DACF, in collaboration with DEP and DHHS, is prepared to help identify on-farm sources of PFAS contamination, design elimination strategies, and conduct ongoing testing and monitoring. DACF will further advocate for additional sources of funding to assist farmers who face financial hardship from lost production caused by PFAS contamination.

Maine Emergency Management Agency

The Maine Emergency Management Agency (MEMA) implements the Toxics Release Inventory (TRI) reports for the State. At the current time PFAS is not a TRI chemical but recommendations to the EPA have been sent on behalf of Maine to include PFAS on the chemical list.

The AFFF working group was formed to establish a comprehensive inventory of Class B AFFF firefighting foam throughout Maine and to make recommendations to the Governor's PFAS Task Force regarding the future use of Class B AFFF. The AFFF workgroup included the State Fire Marshal and representation from Maine DEP, MEMA,

Maine Fire Chief's Association, Professional Firefighters of Maine, Maine Department of Labor, Maine Fire Service Institute, Bangor International Jetport, Portland International Jetport, Sappi Fine Paper, Maine State Police, Irving Oil, Citgo Oil, Global Partners LP, Gulf Oil, State Emergency Response Commission, and the Maine Air National Guard. A formal letter of request from the State Fire Marshal along with a survey was developed and sent to all Maine fire departments and industry partners to collect Class B AFFF information on behalf of the Task Force. Additionally, working group members developed and emailed a Class B AFFF infographic to all fire service organizations and industry partners in the state. Out of 305 fire departments in the State only 60 responses were received and out of 20 industry partners only 8 were received. Response to these surveys has been disappointing, even after multiple requests, but there is no regulatory mechanism that requires fire departments to respond to these surveys. Maine DEP, MEMA and the State Fire Marshal's office will continue to encourage organizations to respond to these surveys and manage survey data for future use to ensure accurate information is available once an appropriate takeback and replacement program is established.

The AFFF workgroup submitted their recommendations to the Task Force at their October 29, 2019 meeting. Those recommendations are included in Appendix E.

Financial Impacts

PFAS has already had a significant financial impact in Maine and is likely to impose an even greater cost as Maine moves forward to remediate the current contamination and reduce future contamination. Unfortunately, due to the accumulating evidence about adverse health effects, there are significant risks to delaying action. A recent European study reported that the cost of adverse health effects related to PFAS could be much higher than those of clean-up.[11] And that is just considering the financial aspects and not the individual experiences. While it is impossible to establish clear financial estimates of the possible health costs of PFAS for Maine people, it is certainly a cautionary note, and worth keeping in mind as we consider the importance of taking action.

Looking at what we can estimate for Maine based on experience, it is useful to divide the picture into several sections— Municipalities, State Government Agencies, Other States, and Individual Mainers.

[11]Nordic Council of Ministers. Nordic Working Group for Chemicals, Environment, and Health. *The Cost of Inaction, A socioeconomic analysis of environmental and health impacts linked to exposure to PFAS.* (2019). Publication number 2019:516.

Municipalities

The Kennebunk, Kennebunkport and Wells Water District spent approximately $1.5 million to install a water treatment system for the removal of PFAS. Municipalities spent hundreds of thousands of dollars more than they had budgeted for in 2019 to test for PFAS and to send wastewater sludge to landfills instead of using it as a soil amendment.

Another financial problem for municipalities is likely to be the replacement of AFFF at local fire departments unless manufacturers can be required to take back the product. An unknown number of fire departments still have stocks of AFFF on hand that they have been using to fight certain types of fires. As it is known that PFAS free foam is available for firefighting, it is recommended that AFFF stocks be taken back and replaced with alternatives. This will be an expensive effort for some departments.

State Government Agencies

State of Maine agencies redirected numerous staff from other priority projects to investigation, data analysis, scientific review, regulatory and policy development, and other tasks focused specifically on PFAS impacts in Maine. This kind of redirection of staff cannot proceed without putting other important agency work at risk. For that reason, it will be important to add staff at relevant agencies to address this crisis, rather than "borrowing" from other established responsibilities.

To-date, the DEP estimates that more than $200,000 has been devoted to PFAS work; Maine CDC's Drinking Water Program estimates the program has spent $24,180 on sampling and analysis, and by the end of 2019 its estimated that $1,794,173 from the Drinking Water State Revolving Fund will have been used for the installation of PFAS drinking water treatment systems. DACF estimates that staff time, sampling, and laboratory fees in 2019 totaled approximately $40,000.

Other States

Other states have already spent millions of dollars for investigation of PFAS contamination. For example, Michigan's initial PFAS response has been estimated to cost $50 million, which included sampling all public water systems and private water supplies serving schools and daycares. Michigan's Legislature recently authorized an annual appropriation of $15 million to address emerging contaminants. Vermont's investigation of contamination from an industrial fabric coating facility involved sampling over 600 residential drinking water wells, the extension of a municipal water line, legal expenses, and utilized more than a dozen full-time employees from four different Vermont state agencies, all at an estimated cost of $60 million. Identifying and preventing exposure of

Maine citizens to PFAS contaminants in Maine has the potential to impose an unsustainable burden on state and private resources.

Individual Maine Families

Private property owners who want to test their drinking water or other materials may do so at their own cost by working directly with laboratories and environmental professionals. Analyzing one drinking water sample may cost a homeowner up to $400 and take several weeks to obtain results. Installation of a carbon filtration system to treat PFAS in a residential well costs approximately $3,000 to $5,000 and such systems will have annual maintenance costs of $1,000 to $2,000.

The potential impacts to farms can be severe. One Maine farm to date has completely ceased dairy operations and suffered enormous financial consequences. Further, by eliminating the use of waste residual land application, farms may incur the additional expense of purchasing alternative fertilizers.

Recommendations

1. **Providing safe drinking water;**
2. **Protecting our food supply;**
3. **Identifying and investigating PFAS contaminants in the environment;**
4. **Identifying and reducing uses of PFAS;**
5. **Managing waste responsibly;**
6. **Improving public education about PFAS;**
7. **Promoting federal action; and**
8. **Funding for state agencies to investigate, respond to and reduce exposure of Maine citizens to PFAS.**

Providing Safe Drinking Water

The Task Force unanimously recommends that all Community Water Systems (currently 378) and all schools and daycare facilities that are regulated as Non-Transient Non-Community water systems (approximately 223) should be required to test for PFAS using certified analytical methods. Members also support legislation and rulemaking necessary to implement this recommendation.

One Task Force member recommends ultimately requiring all public water systems (more than 1,900) to conduct testing (this includes transient water systems, defined as any entity that serves water to 25 people or more for 60 days or more in a year as a non-primary source of drinking water, such as campgrounds and other seasonal uses). A majority of Task Force members recommend that all public water systems not required to test should consider conducting voluntary PFAS testing.

Task Force members disagreed about the level of PFAS in drinking water that should require treatment or the use of an alternative drinking water supply. A majority (8) of Task Force members recommend using U.S. EPA health advisory levels as a threshold for action by public water systems. Two members recommend setting Maine-specific thresholds for action in light of the U.S. DHHS, ATSDR draft recommendations, and such action by other states.

The Task Force unanimously recommends that DEP and Maine CDC's DWP consider applying the EPA health advisory level to the sum of at least PFHxS, PFNA, PFHpA, PFOA, and PFOS when detected in drinking water.

The Task Force unanimously recommends that customers of public water systems should be notified of PFAS detections in drinking water at an appropriate level to be determined through the legislative and rulemaking process.

In the absence of federal regulation, legislation would be needed to establish a drinking water testing and notification requirement for PFAS in Maine.

The Task Force also recommends that private drinking water should be tested for PFAS in areas where groundwater is likely to have been impacted by PFAS at unsafe levels, such as: 1) manufacturing locations that utilized PFAS; 2) unlined landfills; 3) areas where Class B AFFF has been discharged or stored; and 4) residuals land spreading sites. The Task Force recommends that the Legislature consider funding for educational outreach and financial assistance to expand testing and treatment of all residential well water to reduce exposure to PFAS.

The Task Force recommends that the State should evaluate the advisability of developing State laboratory capacity to offer testing for PFAS to private well owners, recognizing that this proposal will require significant upfront instrument and infrastructure costs.

One Task Force member recommended that the State should require PFAS testing of private wells at the time of real estate transfers.

Protecting our Food Supply

The Task Force recommends that the State protect foods produced in Maine from PFAS adulteration through restrictions on PFAS uses, restrictions on the agronomic utilization and land application of PFAS-containing residuals, investigation and remediation of PFAS contamination, and greatly expanded testing of agricultural produce and products grown and/or raised in soils where residuals have been agronomically utilized.

Some members also recommend testing fish caught near sites where PFAS contaminants have been found. Members disagreed about whether fish consumption advisories should be issued where testing finds PFAS levels in fish tissue above Maine CDC's recommended fish tissue screening levels when the resulting advisories would be no more restrictive than the existing statewide fish consumption advisory already in place for mercury contamination.

Identifying and Reducing Uses of PFAS

A majority of Task Force members (8) recommend that the State require manufacturers to report the intentional use of PFAS of concern in consumer products, and to require the use of safer alternatives when they are available. The State should also discourage non-essential uses of PFAS in Maine by requiring those uses to be phased out. Legislation should be introduced to require this where authority does not already exist. One member recommends requiring manufacturers to report the use of PFOA and PFOS, specifically, when they are intentionally added to consumer products.

One Task Force member recommends that existing authorities granted to DEP and wastewater treatment plant operators should be used to the greatest extent possible to identify and control commercial or industrial PFAS discharges to sewer systems.

Task Force members disagreed about whether reporting requirements and restrictions on PFAS uses should apply to the entire family of PFAS compounds, or to individual PFAS due to differences in toxicity. Some members recommended utilizing federal review and approval processes to determine which PFAS should be allowed in food contact products, and recommended aligning with federal requirements for reporting to the Toxics Release Inventory (TRI).

The Task Force unanimously supports the recommendations of the Firefighting Foam workgroup (included in Appendix E) with the addition that existing alternatives to fluorinated foam have already been shown to be effective for many scenarios and should be rapidly deployed everywhere appropriate. This includes recommending legislation to require fire service organizations to report discharges of Class B AFFF to the environment, and legislation requiring all fire departments to report the locations of all known past fire training activities that utilized AFFF or other PFAS containing material.

The Firefighting Foam workgroup also recommends legislation to establish a Class B AFFF take back and replacement program. One Task Force member recommends the Legislature establish such a program once an alternative that meets performance requirements is readily available at a reasonable cost.

A majority (8) of Task Force members recommend that State procurement guidelines should discourage the purchase of PFAS-containing products.

One member recommends that releases of PFAS should be subject to DEP permitting and reporting requirements like other compounds designated as hazardous matter. This would potentially include requirements for wastewater discharge licenses, air emissions licenses, and waste handling licenses. Other members disagreed with imposing these

requirements due to the limited availability of analytical methods and toxicity data for individual PFAS.

Investigating PFAS Contaminants in the Environment

A majority (9) of the Task Force strongly recommends the State accelerate its ongoing efforts to identify prioritized locations and to sample groundwater, surface water and soil for PFAS, analyze sampling results for patterns, and refine models of PFAS fate and transport. The highest priority should be to identify and eliminate current human exposures that have the potential to exceed health-based guidelines for drinking water and screening levels for food products. The highest priority locations for sampling should include locations where Class B AFFF has been discharged, near unlined landfills, and where waste residuals were spread on fields that produce crops for human consumption or feed.

Task Force members also recommend testing for PFAS in groundwater near manufacturing facilities that currently or historically used PFAS, landfills, airports, wastewater disposal systems (e.g. leach fields), and other locations where PFAS may be present.

A majority (9) of Task Force members support legislation introduced by DEP to amend Maine's Uncontrolled Sites law to include pollutants or contaminants, which would give the State authority to require the removal and treatment of PFAS when they are a danger to public health (LR 3002). One Task Force member recommends limiting this to only specific PFAS with published toxicity values and certified analytical methods, while others recommend including the entire family of compounds.

A majority (8) of Task Force members recommend that the State continue to rely on federal agencies to establish toxicity values that are the basis for health risk levels of PFAS. A minority (2) of members recommend that the State should establish specific health risk levels for all PFAS compounds where sufficient data exists based on best available science.

The Task Force unanimously agreed that Maine CDC should continue to work toward finalizing its agronomic uptake model for PFAS to inform screening values.

A majority (9) of Task Force members agreed that, to protect both drinking water supplies and our natural environment, Maine DEP consider establishing an air deposition sampling program for a suite of PFAS.

Managing Waste and Waste Residuals Responsibly

A majority (9) of the Task Force recommends that DEP require regular testing of all wastewater residuals for PFAS prior to land spreading or commercial distribution in Maine. This should include industrial residuals, wastewater treatment plant sludge and septage. The Task Force unanimously agreed to recommend that this testing frequency be modified as appropriate for individual generators when concentrations diminish over time.

Two Task Force members recommended prohibiting any land spreading of residuals and general distribution of compost derived from residuals containing PFAS in excess of the screening level. However, members also recognize that agronomic utilization of residuals has environmental benefits, including improvements to soil health, nutrient recycling and carbon sequestration. The recommendation to reduce uses of PFAS is expected to reduce concentrations of PFAS in residuals so that utilization can resume.

The Task Force unanimously recommends that the Maine DEP investigate the availability of treatment and disposal technologies that minimize the potential for environmental PFAS contamination. Preference should be given to technologies with the demonstrated capacity to safely destroy PFAS. Additionally, the State should promote the development of infrastructure, on the scale necessary to meet the needs of the State, to manage PFAS-contaminated wastes safely and in a cost-effective manner.

Public Education

Maine citizens, physicians, government officials and other professionals must have access to information regarding PFAS to guide their own decision making. The Task Force recommends that the State develop or identify educational materials at the appropriate literacy level for their intended audience, to be provided through a variety of forums such as webpages, social media, training events, and fairs. Those audiences should include healthcare providers, farmers, drinking water and wastewater utility customers, fire-fighters, educators and students, and residential well owners. Different materials should be developed for the general public and for persons at potentially higher risk due to occupational exposures. Materials should be based on the best available scientific information.

Federal Action

The Maine PFAS Task Force recommends that the State advocate for the federal government to take prompt action to reduce harmful exposures of citizens to PFAS due to the widespread nature of PFAS uses and potential exposures. These actions should include:

a) Source Reduction

The federal government should require manufacturers to reduce and eliminate the use of PFAS in non-essential applications, with particular focus on those uses with the highest potential for human exposure. Manufacturers (domestic and foreign) of consumer products should be required to report their use of PFAS compounds in products sold in the United States.

The Federal Aviation Administration and the Department of Defense should be encouraged to specify effective foams that do not contain PFAS.

The U.S. Occupational Safety and Health Administration and National Institute for Occupational Safety and Health should adopt exposure limits for workers exposed to PFAS. These limits should also apply to firefighters and other emergency personnel supporting emergency response activities.

Two members recommend that EPA should end the approval of new PFAS under the New Chemicals Review program of the Toxic Substances Control Act.

Members unanimously recommend adding PFAS to the hazardous substance list under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), with some exceptions for entities such as water and wastewater utilities.

b) Drinking Water

The EPA should establish a Maximum Contaminant Level for PFAS in drinking water, and the FDA should apply that same standard to bottled water.

c) Food Supply

Members unanimously recommend that the FDA establish PFAS adulteration levels for foods and regulatory limits for food packaging in order to minimize dietary exposures to all PFAS.

Three members recommend that FDA revoke authorization for PFAS in all food contact materials.

The majority (8) of members recommend that FDA expand its published testing methodologies for PFAS in food; and two members recommend that FDA include all measurable PFAS in its Total Diet Studies.

The U.S. Department of Agriculture should establish additional sources of funding support for farmers impacted by PFAS contamination, similar to the Farm Service Agency's Dairy Indemnity Payment Program.

d) Waste Management

ATSDR should finalize toxicity values for PFAS commonly found in environmental samples.

The EPA should publish and update Regional Screening Levels to include additional screening level guidelines as toxicity levels become available.

The EPA should certify additional laboratory methods to measure PFAS in various media (groundwater, wastewater, soils and other solids, ambient air).

A majority (9) of members recommend that EPA support states in addressing PFAS in residuals and support the development of agronomic models of PFAS uptake from residual treated soils and soil-to-groundwater modeling.

e) Research

The federal government must invest further in research into PFAS health effects, environmental fate and transport, treatment and destruction technologies.

f) Funding

The federal government should provide grant funding to state agencies to support their efforts to protect citizens from exposure to unsafe levels of PFAS.

Funding for State Actions

The State is expending significant funds to investigate and control PFAS exposures for Maine citizens, and Task Force members recognize that substantial additional funding will be needed to implement the actions recommended in this report. Municipalities, drinking water and wastewater utility districts, farmers, businesses, property owners and other Maine citizens are also bearing direct and indirect costs from PFAS contamination.

State Funding

The Task Force recommends that funding from appropriate State accounts should be utilized, to the extent it is available, to fund sampling of drinking water systems, and to fund the investigation of PFAS contamination that threatens Maine's citizens. The Task Force recommends an increase in funding for state agencies to support this work.

State agencies must also be adequately staffed to conduct the work necessary to implement any and all of the Task Force's recommendations, which will cost millions of dollars in the coming years.

Bond Initiative

The Task Force recommends that the State introduce a bond initiative to raise money for the costs for PFAS sampling, analysis, remediation, and drinking water treatment.

Damage Claims

Many municipalities and states across the country are engaged in litigation against companies that manufactured PFAS-containing products, including claims for financial compensation. The Task Force recommends that the Maine Attorney General fully consider available legal avenues to apply the costs of PFAS contamination in Maine to appropriate responsible parties who supplied products that are harmful to human health and the environment.

A majority (8) of Task Force members recommend that the Legislature consider revising the statute of limitations for private claims to be within six years of discovery of PFAS contamination on private property.

Conclusion

These recommendations reflect a commitment to determine where PFAS contaminants exist in Maine due to current and historic activities, and to put in place a strategy to protect people from exposure. Through our deliberations and review of data, we concluded that there are risks of exposure to PFAS in Maine that require our attention. We believe that these recommendations exemplify the sincerity of our work and the seriousness of this issue.

Managing PFAS in Maine

Final Report from the Maine PFAS Task Force
January 2020

Appendices

APPENDIX A

OFFICE OF
THE GOVERNOR

NO. S FY 19.QO
DATE March6,2019

**AN ORDER TO STUDY THE THREATS OF
PFAS CONTAMINATION TO PUBLIC HEALTH AND THE ENVIRONMENT**

WHEREAS, Perfluoroalkyl and Polyfluoroalkyl (PFAS) are chemicals that are not naturally occurring, are stable and persistent in the environment, bioaccumulative, toxic at low concentrations, and easily transferred to groundwater and other media; and

WHEREAS, the use of PFAS in thousands of commercial and industrial applications, processes, and products has resulted in detectable concentrations in drinking water, soil and vegetation throughout the country, including sites in Maine; and

WHEREAS, the United States Environmental Protection Agency has established a lifetime health advisory level for perfluorooctanoic acid and perfluoro octane sulfonate in drinking water, and has developed a National Action Plan to protect public health from exposure to these compounds; and

WHEREAS, Maine State agencies are charged by *MR.S. Titles* 7, *22 and 38* with protecting public health and the environment from the risks of human exposure to these substances; and

WHEREAS, a coordinated response informed by persons with pertinent expertise is necessary to study PFAS distribution, assess the potential environmental and health impacts of PFAS, and recommend effective strategies to reduce or eliminate or reduce those impacts;

NOW THEREFORE, I, Janet T. Mills, Governor of the State of Maine, pursuant to authority conferred by *Me. Const. Art. V. Pt. 1, §1 and §12,* do hereby Order the following:

I. ESTABLISHMENT

The Governor's Task Force on the Threats of PFAS Contamination to Public Health and the Environment (Task Force) is hereby created. The purpose of the Task Force is to identify the extent of PFAS exposure in Maine, examine the risks of PFAS to Maine residents and the environment, and recommend State approaches to most effectively address this risk.

II. MEMBERSHIP

The Task Force shall consist of the following members:

A. The Commissioners, or their designees, of the Departments of:

1. Environmental Protection;

2. Health and Human Services;

3. Agriculture, Conservation and Forestry; and

4. Defense, Veterans and Emergency Management;

B. A public health physician designated by the Maine Public Health Association;

C. A representative, selected jointly by the Commissioners of Environmental Protection and Health and Human Services, from:

1. A Maine-based non-profit whose mission includes protecting human health and the environment from the effects of chemical contamination;

2. Maine's pulp and paper industry; and

3. A Maine-based association of:

a. Certified wastewater treatment plant operators;

b. Drinking water supply professionals; and

c. Biosolids and residuals management professionals.

The Commissioner of Environmental Protection shall, after conferring with the Governor, select a chair of the Task Force.

III. DUTIES

The Task Force shall:

A. Review information regarding known locations of PFAS detection in Maine and the status of any response strategies for those sites;

B. Identify significant data gaps in the knowledge of PFAS in Maine and develop recommendations to address such gaps;

C. Identify opportunities for public education regarding PFAS contamination and the effects of its exposure on public health and the environment;

D. Identify the sources of PFAS contamination and exposure pathways that pose the greatest risk to public health and the environment in Maine;

E. Examine the benefits and burdens of various treatment and disposal options for PFAS-contaminated media;

F. Assess how State agencies can most effectively use their existing authority and resources to reduce or eliminate priority and other risks from PFAS contamination;

G. Determine the inventory and use of fluorinated Aqueous Film Forming Foam in firefighting and fire training activities in Maine and evaluate effective nonfluorinated alternatives; and

H. Examine Maine and other data regarding PFAS contamination in freshwater fish and marine organisms and determine whether further such examination is warranted.

IV. OPERATIONS

The Task Force shall meet at the call of its Chair. The Task Force may form workgroups, make inquiries, conduct studies, hold public hearings and otherwise solicit and consider public comment. The Task Force may also consult with outside experts including those in other governmental agencies, institutions of higher education, non-governmental organizations, and the private sector. The Task Force shall issue a written report as soon as reasonably practicable.

V. OTHER

State agencies shall assist the Task Force in the performance of its duties and provide administrative and other support as requested. This Order shall not be construed to limit the discretion of any such agency to exercise its lawful authority to take any such action it deems necessary and appropriate to address issues of PFAS contamination.

VI. EFFECTIVE DATE

The effective date of this Order is March 6, 2019.

Janet T. Mills, Governor

APPENDIX B

Definitions and Acronyms

Acronym	Definition
AFFF	Aqueous Film Forming Foam
ATSDR	Agency for Toxic Substances and Disease Registry
Biosolids	Sewage sludge managed by wastewater treatment facilities
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Chain length	Number of carbon atoms linked together in a PFAS molecule
DACF	Maine Department of Agriculture, Conservation and Forestry
DEP	Maine Department of Environmental Protection
HA	Health Advisory issued by U.S. EPA Office of Water
MCL	Maximum Contaminant Level
Method 537.1	U.S. EPA certified analytical method used to determine presence of 18 different PFAS in drinking water
MRL	Minimal Risk Levels
NHANES	National Health and Nutrition Examination Survey
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PFAS	per- and poly- fluoroalkyl substances
PFHxS	Perfluorohexane sulfonate
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
Residuals	Solid wastes generated from municipal, commercial or industrial facilities that may be suitable for agronomic utilization.

Common Units of Measure

1 milligram/kilogram (mg/kg) = 1 milligram/liter (mg/L) = 1 part per million (ppm)

1 microgram/kilogram (µg/kg) = 1 microgram/Liter (µg/L) = 1 part per billion (ppb)

1 nanogram/kilogram (ng/kg) = 1 nanogram/Liter (ng/L0 = 1 part per trillion (ppt)

Conversions

1 ppm = 1,000 ppb = 1,000,000 ppt

APPENDIX C

	PFOA			PFOA + PFOS			PFOS		
	Number of Samples	Max Result	Average Result	Number of Samples	Max Result	Average Result	Number of Samples	Max Result	Average Result
COMPOST/SLUDGE/SEPTAGE SITES	**265**	**NA**	**NA**	**267**	**NA**	**NA**	**265**	**NA**	**NA**
COMPOST [1]	28	60	12.7	28	121	26.4	28	81.8	13.7
DRINKING WATER [2]	21	46.8	14.5	22	61.2	24	20	42.1	10.9
GROUNDWATER [2]	4	340	190.6	4	510	139.4	4	170	44.1
SLUDGE [1]	68	46	10.1	69	125.4	32.6	69	120	25.3
SOIL [1]	140	23.6	2.7	140	896.2	32.1	140	878	30
SURFACE WATER [2]	4	249	65.8	4	725	199.5	4	476	133.7
DEPARTMENT OF DEFENSE SITES	**1143**	**NA**	**NA**	**1,094**	**NA**	**NA**	**1143**	**NA**	**NA**
DRINKING WATER [2]	77	7.2	1.9	77	18.6	5.1	77	11.4	5.5
FISH [3]	56	3.2	0.9	NA	NA	NA	56	1,167	150.3
GROUNDWATER [2]	607	15,000	860.3	614	33,000	1,750.2	607	24,000	1129
SOIL [1]	264	43.2	1.9	264	3,584.3	91.5	264	3,570	103.2
SURFACE WATER [2]	139	1,500	80.7	139	7,240	557.8	139	7,100	489.3
DRINKING WATER	**69**	**5.1**	**4.5**	**70**	**290**	**102.3**	**70**	**290**	**120**
DRINKING WATER [2]	69	5.1	4.5	70	290	102.3	70	290	120
LANDFILLS	**194**	**NA**	**NA**	**195**	**NA**	**NA**	**192**	**NA**	**NA**
DRINKING WATER [2]	116	458	46.9	116	470	52.5	115	120	13.5
GROUNDWATER [2]	46	3,050	407.3	47	3,095.1	587	45	2,700	204.1
SOIL [1]	31	3.8	2.2	31	114.2	34.4	31	112	31.3
SURFACE WATER [2]	1	ND	ND	1	3.5	3.5	1	3.5	3.5
MYSTERY & SURFACE SPILL	**15**	**NA**	**NA**	**16**	**NA**	**NA**	**15**	**NA**	**NA**
DRINKING WATER [2]	13	61	11.3	14	63.4	10.9	13	2.4	1.5
SOIL [1]	2	0.1	0.1	2	0.2	0.2	2	0.2	0.2
SUPERFUND/RCRA SITES	**107**	**NA**	**NA**	**103**	**NA**	**NA**	**106**	**738**	**53.3**
DRINKING WATER [2]	37	3.8	1.9	35	5.1	2.2	36	2.2	2.1
GROUNDWATER [2]	51	270	33.9	49	759.2	90.3	51	738	65.8
SOIL [1]	5	ND	ND	5	ND	ND	5	ND	ND
SURFACE WATER [2]	14	18.6	10.3	14	129.6	43.1	14	122	43.7

PFAS Results Summary (2007 – 2019)

	PFOA			PFOA + PFOS			PFOS		
	Number of Samples	Max Result	Average Result	Number of Samples	Max Result	Average Result	Number of Samples	Max Result	Average Result
SWAT	**113**	**0.1**	**0.1**	**NA**	**NA**	**NA**	**113**	**47.1**	**11.8**
FISH [3]	113	0.1	0.1	NA	NA	NA	113	47.1	11.8
UNCONTROLLED SITES	**95**	**NA**	**NA**	**94**	**NA**	**NA**	**95**	**NA**	**NA**
DRINKING WATER [2]	60	38.2	11.7	60	956.3	119.1	60	930	167.9
GROUNDWATER [2]	30	1,160	258.7	29	5,040	795.7	30	4,180	522.1
SURFACE WATER [2]	5	1.9	1.9	5	1.9	1.9	5	ND	ND

(1) Results in ng/g dry weight.

(2) Results in ng/L.

(3) Results in ng/g wet weight.

(4) NA = not available or not applicable; ND = non-detect.

Maine Screening Levels

Water RAGs[1] (ppb)		
Compound	Residential	Construction Worker
PFBS	400	100,000
PFOS[2]	0.40	750
PFOA[2]	0.40	750

Soil RAGs[1] (mg/kg)						
Compound	Leaching to Groundwater[3]	Residential	Commercial Worker	Park User	Recreator Sediment	Construction Worker
PFBS	7.1	1,700	22,000	4,900	5,700	51,000
PFOS	0.021	1.7	22	4.9	5.7	5.1
PFOA	0.0095	1.7	22	4.9	5.7	5.1

Recreational Angler RAGs[1] (mg/kg wet weight)	
Compound	Fish Tissue
PFBS	52
PFOS	0.052
PFOA	0.052

Surface Water[4,5] (µg/l)		
Compound	Recreational	Construction Worker
PFBS	7,914	795,695
PFOS	0.17	0.74
PFOA	0.30	1.3

Beneficial Use[6] (mg/kg, dry weight)	
Compound	Beneficial Use
PFBS	1.9
PFOS	0.0052
PFOA	0.0025

[1] *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances*, Maine Department of Environmental Protection, effective October 19, 2018.

[2] In 2016, EPA established a lifetime health advisory of .070 µg/l (parts per billion) for the combined concentration of PFOA and PFOS. The RAGs for PFOA and PFOS in this table are risk-based values based on current science; however, EPA is developing further information on these contaminants. At this time, the Maine DEP recommends that the EPA health advisory level be applied at sites where groundwater is currently being used, or may be used in the future, for human consumption.

[3] Leaching to Groundwater RAGs are based on the Residential Water RAGs (PFBS = 400 ppb, PFOS = 0.40 ppb, PFOA = 0.40 ppb).

[4] Maine Center for Disease Control and Prevention, Department of Health and Human Services, *Human Health Risk-based Screening Levels for Perfluoroalkyl Compounds*, (Interdepartmental Memorandum to David Wright, DEP, from Pamela Wadman), August 17, 2016.

[5] Surface Water screening levels need to be recalculated according to EPA's "*Regional Screening Levels for Chemical Contaminants at Superfund Sites*" risk calculator approach.

[6] *Beneficial Use of Solid Wastes*, 06-096 C.M.R. ch. 418, Appendix A, last amended July 8, 2018. Screening levels are based on the leaching to groundwater pathway.

APPENDIX D

Residuals Testing Results

Material Type	PFOA (ng/g)			PFOS (ng/g)		
	Average	Median	Maximum	Average	Median	Maximum
Sludge	9	3.8	46	26.2	23	120
Compost	14	7.9	60	15.5	6.1	81.8
Site-Specific Soils	2	1.3	12.9	9.6	7.1	36.6

APPENDIX E

CLASS B AFFF Working Group Report To Governor's PFAS Task Force

Report Outline

Working Group Membership
Background
Recommendations
Survey Results
Enclosures 1-4

Prepared By
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Membership:

Joseph Thomas – Maine State Fire Marshal

James Graves – Maine Fire Training Institute

John Duross – Maine Fire Chiefs Association

John Martell – Professional Firefighters of Maine

Brain Bernosky – Bangor International Airport

Chris Cronin – Maine Air National Guard

Sean Goodwin – State Emergency Response Commission

Bruce Yates – Global Partners LP

Jon Hendricks – Portland Fire Department/ Portland Jetport

Skip Pratt – Sappi Fine Paper

Monika Niedbala – Buckeye Partners

Jeff Squires – Maine DEP

Faith Staples – Maine Emergency Management Agency

Chris Rogers – Maine State Police

Michael LaPlante – Maine Department of Labor

Drake Bell – Irving Oil

Donald Griffin – Citgo

Terry Sullivan – Gulf Oil

Jason Farris – Maine Fire Chiefs Association

Arthur True – Kennebec County Emergency Management Agency

Matt Fournier – Maine Emergency Management Agency

Jeff Zahniser – Maine Air National Guard

Paul LaValle – Global Partners LP

Thomas Palmer – City of Bangor

Mike Scott – Professional Firefighters of Maine

Date Group Created: June 28th, 2019
Meetings Held: 3

Background: Recent reports and studies have raised awareness about the potential health effects associated with Perfluoroalkyl and Polyfluoroalkyl substances (PFAS), inclusive of the compounds PFOA and PFOS, and how it has been found in ground water sources. It has been determined that Class B Aqueous Film-Forming Foam (AFFF) used during fire suppression and firefighter training contributes to PFAS contamination of ground water. Aqueous film-forming foam (AFFF) is highly effective foam intended for fighting high-hazard flammable liquid fires. AFFF products are typically formed by combining hydrocarbon foaming agents with fluorinated surfactants. When mixed with water, the resulting solution achieves the interfacial tension characteristics needed to produce an aqueous film that spreads across the surface of a hydrocarbon fuel to extinguish the flame and to form a vapor barrier between the fuel and atmospheric oxygen to prevent re-ignition. [Interstate Technology Regulatory Council (ITRC) document "Aqueous Film-Forming Foams (AFFF)", (October 2018). **(Enclosure 1)**.]

The AFFF working group was formed to establish a comprehensive inventory of Class B AFFF firefighting foam throughout Maine and to make recommendations to the Governors PFAS Task Force regarding the future use of Class B AFFF. A formal letter of request from the State Fire Marshall **(Enclosure 2)** along with a survey **(Enclosure 3)** was developed and sent out to all Maine fire departments and industry partners to collect Class B AFFF information. Additionally, working group members developed and emailed a Class B AFFF infographic **(Enclosure 4)** to all fire service organization and industry partners in the state. Out of 305 fire departments in the State only 61 responses were received and out of 20 industry partners only 8 were received. Response to these surveys has been underwhelming, even after multiple requests. We are unaware of any mechanism that obligates response to these surveys. Maine DEP, MEMA and the State Fire Marshal's office will continue to encourage organizations to respond to these surveys and manage survey data for future use to ensure accurate information is available once an appropriate takeback and replacement program is established.

Recommendations

1. **Best Management Practices**

   That fire departments and industry partners in the State of Maine adopt the best management practices for Class B AFFF use outlined in the ITRC October 2018 document.

2. **Inventory and Product Management**

   a. That all fire departments in the State of Maine be required to disclose the type and quantity of current inventory of Class B AFFF using the survey that was sent out in August 2019. Maine DEP and MEMA will continue to track and compile that information until an appropriate takeback program is established.

   b. Establish standardized protocols for the safe containerization, storage and routine inspection of Class B AFFF foam inventories in accordance with adopted best management practices.

   c. Establish protocols for the proper disposal of containers used to store Class B AFFF and any associated equipment that may contain residual product.

3. **Continued Use of PFAS-Containing AFFF**

   a. Because Class B AFFF is vital for controlling and extinguishing petroleum-based fires, allow continued use of the currently available product until a suitable and effective replacement is identified to save life and critical infrastructure.

   b. That any Maine fire department or industry that uses PFAS-containing Class B AFFF for operational response, report that use immediately to the Maine Department of Environmental Protection Response Hotline (1-800-452-4664) to include the type of foam, manufacturer, quantity, location and circumstances in the report so that a determination can be made regarding potential impact to nearby drinking water supplies.

   c. Require the use of non-PFAS containing foam for training and flushing/testing systems unless otherwise directed by federal law (such as airports). This option may not be available for foam dispensing fire trucks that contain pre-filled internal foam storage tanks. These internal systems must be tested routinely and may already contain Class B AFFF which contains PFAS. In these situations, users will follow best management practices for the complete containment and disposal of any dispensed product.

4. **Establish State Level Funding Mechanism**

   a. That allows MEMA and Maine DEP to develop and execute a Class B AFFF takeback and/or replacement program that does not financially burden Maine fire departments or their municipalities.

   b. So that fire departments and their municipalities are not financially burdened for environmental clean-up incidental to Class B AFFF used for operational response if best management practices are adopted and utilized.

5. **Training and Education**

   a. That a training and educational component be added to the Fire Fighter I and Fire Fighter II programs of instruction at the Maine State Fire Academy. Education should focus on gaining a basic understanding of the threat PFAS containing Class B AFFF presents, as well as best practices for the operational use and training with foam.

   b. That all current/active firefighters in Maine receive similar instruction related to PFAS as a component to their annual In-Service training programs.

   c. That all fire service organizations and industry partners that use Class B AFFF, display the Class B AFFF infographic in a prominent location at their worksites and where foam is stored to increase employee awareness.

6. **Medical Surveillance Program**

   Incorporate baseline testing and medical monitoring procedures for Maines Firefighters and HAZMAT Technicians that have had and continue to have a greater exposure potential than the general population, with special focus on those who have had direct contact with AFFF over the course of their employment.

7. **Class B AFFF Formulation Analysis**

   Require Total Oxidizable Precursor (TOP) Assay sample analysis of Class B AFFF foams used by industry and Maine Fire Departments if it is unclear whether or not the foam contains the PFAS family of compounds.

Survey Results: As of 25 October 2019
Fire Departments: 61 responses
Industry: 8 responses

Fire Department Name	AFFF Firefighting Foam (gallons)	Manufacturer	No Foam Confirmed by FD (Need to Follow Up)
Littleton Fire	55	Not Listed	Cape Elizabeth Fire Department
Newcastle Fire	200	Not Listed	Farmingdale Fire Department
Bath Fire Department	65	Rockwood, Lightwater	Vassalboro Fire Department
Rumford Fire Department	115	Chemguard, Angus, Fire Ade	Frenchville Fire Department
Sabattus Fire Dept	95	National Foam	Farmington Fire Department
Fryeburg Fire Department	100	Fire Ade	Livermore Falls Fire Department
Bremen Fire Department	5	National Foam	Lincoln Fire Department
City of Augusta Fire Department	490	Fire Ade, Chemguard	Milford Fire/Rescue
Kennebunk Fire Rescue	30	National Foam	Presque Isle
Owls Head FD	345	Denko, 3M, Rockwood	Phillips Fire Department
Portland Fire Dept	1750	Chemguard	Westbrook Fire Department
Strong Fire Department	55	National Foam, Angus Fire, Rockwoood, Ansul	Peru Fire Department
Union Fire-Rescue	150	Minn. Mining & MFG., Co.	Mount Desert Fire Department
Biddeford Fire Department	155	Chemguard	Kingfield Fire Department
Eddington Fire Dept	50	National Firefighting Foam	Easton Fire Department
Richmond Fire Department	60	National Foam	Warren Fire Department
Scarborough Fire Department	195	Varies	Caribou Fire and Ambulance
South Portland Fire Department	3400	Many kinds	St. Agatha Volunteer Fire Department
South China Volunteer Fire Dept	10	3M 9/90	Lovell
Presque Isle Fire Department	440	Chemguard Class B AFFF	
Windham Fire Department	150	Chemguard AR-AFFF	
Monmouth Fire Department	5	Not Listed	
Bridgton Fire Department	430	National Foam Universal Gold AR-AFFF and GVC Aqua Det	
Raymond Fire Rescue Department	45	National Foam	
Fairfield Fire Department	10	National Foam	
Brunswick Fire Department	120	Chemguard	
Brewer Fire Department	90	Denko Class A&B Hi-X Foam	
Albion Fire Department	70	FireAde 2000 (Fore Service Plus Mfg)	
Limestone Fire Department	50	Denko	
Gardiner Fire Department	20	National Foam	
Brownfield Fire Department	15	Chemguard, Ansulite	
Thomaston Fire Department	250	Chemguard, Angus and 3M Lightwater	
101st Air National Guard Fire Dept.	2800	PHOS-CHEK 3% AFFF MILSPEC C6	
Epping Volunteer Fire District	95	Fire Ade	
Dixfield Fire Department	130	FireAde 2000	
Cumberland Fire Department	165	Chemguard	
Mexico Fire Department	30	Fire Service Plus Inc.	
Goodwins Mills Fire Rescue	25	Specialty Chemicals and Equipment	
Dedham Fire Department	50	Fire Ade	
Waterville Fire Department	150	Chemguard, FireAid	
Orono Fire Department	25	Kiddie Fire	
Berwick Fire Department	40	National Foam	
Total Gallons	**12530**		

Survey Results: As of 25 October 2019

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Waterville Fire Department	150	Chemguard, FireAid	
Orono Fire Department	25	Kiddie Fire	
Berwick Fire Department	40	National Foam	
Total Gallons	**9730**		

Industry: 8 responses

Industry Name	AFFF Foam (gallons)	Manafacturer	No Foam Confirmed by Industry - Follow Up
Sprague Operating Resources, LLC	4600	National Foam	Penobscot Bay Terminals
Cold Brook Energy	400	National Foam	Global Companies LLC
Sappi Mill Skowhegan	1100		Irving Oil Terminals
			Portland Pipe Line Corporation
			Portland Jetport
Total Gallons	**6100**		