WATER SUPPLY CITIZENS ADVISORY COMMITTEE
to the Mass. Water Resources Authority

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WSCAC/WAC Meeting

Location: Waterworks Museum
Chestnut Hill, MA
October 15, 2019—10:30 A.M.

Members in Bold in Attendance:

Michael Baram, WSCAC Chair, BU & CLF
Whitney Beals, NE Forestry
William Copithorne, Town of Arlington
Steven Daunais, Tata & Howard
Andrea Donlon, CT River Conservancy
Gerald Eves, Trout Unlimited
Bill Fadden, OARS
Bill Kiley, BWSC, WAC
Paul Lauenstein, NepRWA
Martha Morgan, Nashua River Watershed
Martin Pillsbury, MAPC
Janet Rothrock, League of Women Voters
Kurt Tramposch, Wayland Wells
Roger Wrubel, Mass Audubon

WAC members in Attendance:
Mary Adelstein, WAC
Adriana Cillo, BWSC
James Guiod, MWRA
Kannan Vembu, WAC
Stephen Green, WAC
Taber Keally, NepRWA/WAC
Wayne Chouinard, WAC
Belinda Stansbury, WAC
Karen Lachmayr, WAC
Philip Ashcroft, WAC
Craig Allen, WAC (by phone)
Dan Winograd, WAC (by phone)
Martin Pillsbury, WAC/MAPC

Non-Members in Attendance:

Steve Rhode, MWRA
Alison Field-Juma, OARS
John Raschko, MA OTA
Sally Carroll, MWRA
Luener Charlestra, MWRA
Denise Ellis-Hibbelt, MWRA
Susy King, MassDEP
Kyla Bennett, New England PEER
Betsy Reilley, MWRA
Kate Hogan, State rep
Mark Smith, MassDEP
Heather Miller, CRWA
John Sanchez, Town of Burlington
Wendy Leo, MWRA
John DiModica, Noresco
Sean Navin, MWRA

Staff:
Andreae Downs, WAC
Lexi Dewey, WSCAC

<u>WSCAC Business</u>

The meeting opened with attendees introducing themselves. Lexi Dewey requested motions to approve June and September WSCAC minutes, which were separately made and seconded, and both sets of minutes were unanimously approved. Lexi noted a recent letter from the Water Infrastructure Alliance which both WSCAC and WAC signed onto. Copies were available at the meeting and had been emailed earlier to WSCAC members. Finally, Lexi announced that the next WSCAC meeting will be on November 21st at the Wellesley Free Library with the MWRA Advisory Board.

WAC Business

Andreae Downs requested a motion to approve WAC's June minutes. Motion was made, seconded, and the minutes were approved. Andreae then brought up for discussion WAC's letter regarding labeling sanitary wipe products as "flushable". The committee voted to approve the letter, as well as Andreae's plan to submit the letter and speak on the topic at a preliminary hearing on Beacon Hill later in the day.

Andreae introduced **Rep. Kate Hogan, 3rd Middlesex District.** Rep. Hogan has co-sponsored a bill with Rep. Jennifer Benson, D-Lunenburg, and Sen. Julian Cyr, D-Truro, and it is supported by leading environmental organizations from across the state, including OARS, the Conservation Law Foundation, and Mass Audubon. One of the chief provisions of the bill is the convening of experts working on PFAS across state government -- from environmental and agricultural scientists to public health and emergency response officials – to lay the foundation for best practices in testing, treatment, and resource-sharing.

Representative Hogan acknowledged that attendees of the meeting probably had a fair amount of knowledge of PFAS already. A recently-assembled task force of nineteen members has been organized to assess how state agencies can most effectively use their existing authority and resources to reduce and eliminate the risks of PFAS contamination. PFAS are ubiquitous, and two of the towns Rep. Hogan represents have public water supply wells and so can be filtered, but the other towns have private wells, which pose a much greater difficulty in protecting households. The task force will partner with state and federal agencies to address emergency and response management and best practices, and develop a plan to address how to handle the situation moving forward by the end of 2020. Governor Baker has proposed monies to look for various ways to explore solutions in the next supplemental budget. The task force is requesting that state agencies provide a representative to join the task force.

The legislation for the task force is expected to pass in October (H. 3851, S. 2284). Senator Cyr is also on the bill, and Representative Jen Benson is co-sponsoring from Lunenburg. As more information comes to light, MassDEP may reduce the current limit of 70 parts per trillion down to 20 ppt. Education and data are key as the task force looks for ways to address the issue. The filter industry is also very important in this process, as there are currently no cost-efficient ways to test for PFAS or check the success of installed filters.

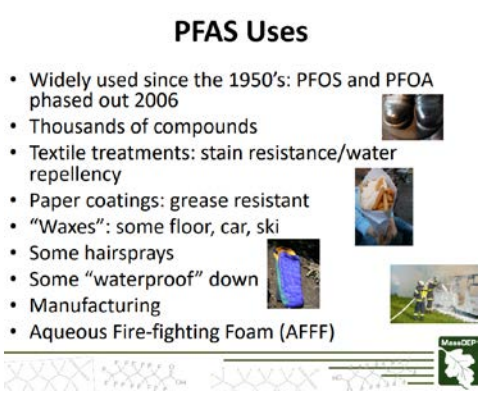
A question was asked about filtering and testing methods, and Rep. Hogan explained that the Town of Hudson, for example, has five or six public wells with huge charcoal filtering systems on them, and the water is undergoing constant testing to ensure that the PFAS contaminating the wells are being filtered out.

Philip Ashcroft commented that PFAS is clearly a huge environmental problem, but resolving it is going to be expensive, and asked how that would be managed. Rep. Hogan responded that there is funding available, and part of the task force's goal is to work with the federal government to resolve the issue. She pointed out that military bases, which have used firefighting foams containing PFAS are a major source of the contamination.

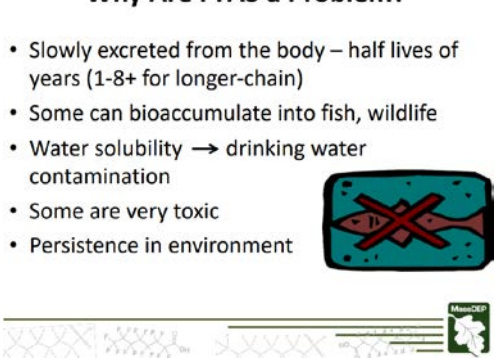
Kurt Tramposch inquired if MWRA would be included in the task force, specifically relating to public education. Rep. Hogan agreed that public education will be a vital component, and that all parties will need to be involved, from state government down to individual communities. The task force will be addressing these questions.

Andreae thanked Rep. Hogan for her presentation, and welcomed **Mark Smith, Director of MassDEP's Office of Research and Standards**. Mark is a trained toxicologist, and presented "Per and Poly Fluoroalkyl Substances (PFAS): Why all the Fuss?", available for viewing here. Mark works with other toxicologists studying PFAS. They are looking into potentially reducing the current federal guidelines from 70 parts per trillion to 20 ppt. in Massachusetts.

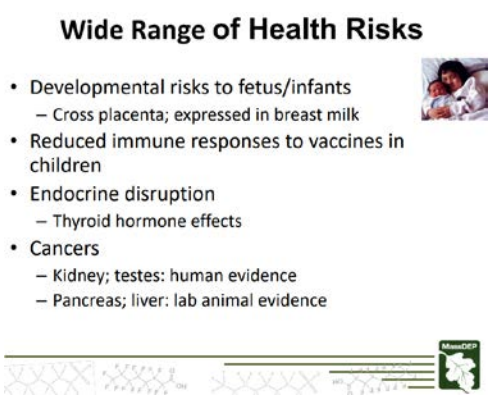
Mark provided background information about PFAS, which stands for Poly and per fluoroalkyl substances, reviewing their chemical structure: a water soluble head, and a carbon chain tail with fluorine (water insoluble). This chemical makeup means that PFAS are extremely stable, heat-resistant, and water repellant, which makes them very useful in many industries, including everyday items such as waterproofed clothing. They're considered "forever chemicals", because they don't break down in the environment (although there is one micro-organism that was recently discovered in New Jersey that might be able to break it down partially), but must be incinerated at high temperatures.



PFAS are ubiquitous, found around the world, and are common in drinking water and soils. They've been in use since the 1950. PFOS and PFOA were phased out in 2006. Yet, there are thousands of compounds and uses include manufacturing, textile treatments, paper coatings (such as pizza boxes, since PFAS are grease-resistant), floor wax, some hairsprays, and aqueous fire-fighting foam, among others.



PFAS are a health issue because these longer-chain compounds are excreted from the human body extremely slowly – it can take anywhere from a year to over 8 years for the body to get rid of half of it. This means that people who have consumed PFAS are experiencing long-term exposure to toxic and persistent chemicals. Some PFAS can accumulate into fish and wildlife, or contaminate drinking water, and they remain in the environment for extended periods of time.



There are a large number of potential health risks. There are developmental risks to fetuses and infants; contamination crosses the placenta and is expressed in breast milk, and exposure to PFAS reduces immune responses to vaccines in children. PFAS can cause endocrine disruption and cancers (kidney, testes, pancreas, and liver).

The science and regulations around PFAS is evolving rapidly. Drinking water advisories and standards are not concrete, and the EPA's drinking water advisory is only for PFOS and PFOA, not other compounds. Most states use 70ppt (parts per trillion) as a default limit. Minimum detectable amount in drinking water is 1.5- 2 ppt. Several states such as New Hampshire have lower limits than the EPA's recommendation of 70ppt, or include additional compounds.

MassDEP has been focusing on drinking water contamination, as it is the predominant form of exposure. They are also focused on cleanup regulations and wastewater residuals.

The current adopted guidelines for drinking water are based on five compounds, totaling up to 70ppt. Other agencies have released drafts of recommendations that are more stringent, but these are still in process. MassDEP requires a proposed new public drinking water supply to test for PFAS before going online. If they test above 20ppt, they are encouraged to treat or seek an alternative source. MassDEP has initiated a targeted sampling program centered around where PFAS have been detected.

In response to questions about drinking water testing, Mark said that each water sample costs $200-$400 to test. This price tests for up to fourteen compounds, but regulations only recommend actions in regard to five of these compounds, with a possible sixth to be added in the near future.

Additional questions included whether pesticides commonly contain PFAS, including dormant oils, and a query about how testing is actually done. Mark answered that dormant oils are probably not a source of PFAS, and the analytical method for testing is GC Mass Spectrometry.

Philip asked about legislation banning further use of PFAS. Mark responded that the longer chain varieties have largely been phased out, but the shorter chains are still being used.

MassDEP is also working on regulations for certifying labs for drinking water PFAS analysis. This should be implemented in the next few months and is considered "high priority" status for treatment projects seeking Drinking Water State Revolving Fund financing.

Per the MA Office of Research and Standards Guidelines for Drinking Water (adopted June 12, 2018), the five chemicals that have current limits are PFOS, PFOA, PFHxS, PFHpA, and PFNA. These are based on EPA Health Advisory values on PFOS and PFOA, and extended to closely related compounds that have less extensive data available, based on similarities in chemical structures, half lives, and toxicity.

MassDEP received a petition from Conservation Law Foundation's Toxics Action Center that requested the adoption of a treatment standard for all PFAS in drinking water down to 1ppt. MassDEP agreed to initiate a standard maximum contaminant level for drinking water, and will further consider the proposal. They are also currently reconsidering the Office of Research and Standards [Drinking Water] Guidelines, and have proposed a groundwater cleanup standard of 20ppt.

A question was posed regarding the ill effects of high levels of exposure vs the lower levels of exposure that most of the public experience. Mark responded that while epidemiological studies are often difficult to draw conclusions from, there is (non-conclusive, but consistent with current information) evidence that low levels of exposure to PFAS can have a harmful effect on physical health.

The original Guidelines considered all six of the PFAS that were included in a monitoring program (the only chemicals for which data was available): five long-chain compounds and one shorter-chain compound, and addressed the five longer-chain compounds. More recently, they are considering adding a new compound, PFDA, which is structurally similar to PFOS and PFOA.

Drinking Water Values for PFAS
(parts per trillion; ppt) (Sept. 2019)

	PFOS	PFOA	PFNA	PFHxS	PFHpA	PFDA
USEPA Health Advisories	70 Sum of two		NA	NA	NA	NA
ATSDR Based on draft ATSDR toxicity values	7	11	10	70	NA	NA
NY Recommended MCL	10	10	NA	NA	NA	NA
NJ MCL or recommended	13	14	13	NA	NA	NA
CA Notification levels	6.5	5.1	NA	NA	NA	NA
VT GW standard/legislative	20 Sum of five					NA
MI Health-based values	16	8	6	51	NA	PFNA value
MN Drinking water guidelines	15	35	NA	47	NA	NA
NH MCLs	15	12	11	18	NA	NA
CT Action Levels	70 Sum of five					NA
MA Current ORSG	70 (2018 ORSG) → 20 (proposed GW-1 standard) Sum of five → Sum of six (adds PFDA)					
Most other states (EPA value by default)	70		NA	NA	NA	NA

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Mark shared a chart outlining a comparison of permitted values in the states that limit PFAS, noting that Massachusetts is considering lowering the limit from 70ppt (for the sum of all five current PFAS) to 20 ppt (for the sum of all six PFAS, the current five plus an additional proposed compound). Several other states have individual limits for each compound, which are in many cases lower than the suggested 20ppt limit, but MA is using a sum total, and including those compounds that don't currently have suggested limits, but are similar in chemical structure to the more known PFAS. (Most other states use the EPA default of 70ppt for PFOS, and do not have limits on the other compounds.)

The hazardous waste cleanup regulations are due for new amendments, and will include new standards for groundwater (20ppt for sum of the six PFAS) and soil (still under consideration in light of recent data). The public comment period closed in July, and MassDEP is finalizing standards in response to information and comments. The public comments included answers to the questions of which PFAS should be regulated, whether the proposed standards are appropriate, whether Massachusetts' proposed summation of the chemicals is appropriate, and other comments. There was a widely varied response to these questions.

MassDEP has issued Requests for Information, and some Notices of Responsibility, from industries in areas where PFAS are detected. They've also taken samples from public and private wells, have issued guidance to Licensed Site Professionals (LSPs) for PFAS investigations, and proposed a draft of cleanup standards for soil and groundwater, which should be finalized in 2-3 months.

PFAS are also found in wastewater and residuals, the significance of which is still in question. MassDEP is following developments, including background concentrations in soils and data from other states, such as a specific study from Maine which showed screening levels being exceeded. MassDEP is also collecting further Massachusetts data, and requiring further testing. EPA does not have an approved method of measuring soils, so MassDEP is reviewing proposed laboratory methods

and data. Efforts are also being made to determine the source of PFAS, and debating whether pretreatment options would be warranted.

The question was posed as to whether the EPA is studying standards of PFAS in effluent. Steve Rhode responded that the defense budget authorization that passed a few months ago had riders directing the EPA to work on PFAS issues. The US House version included setting water quality and treatment standards, while the US Senate version did not, and the bill is currently in negotiations. Drinking water remains the priority.

In response to questions, Mark confirmed that we know very little about how PFAS collects in crops, other than a study done on cranberries, which did not contain a concentration of PFAS. The compounds do cause endocrine disruption (though not feminization); Silent Spring Institute is doing a study on long-term effects of human exposure to PFAS.

Mark noted that there are efforts in collecting and disposing of the firefighting foam that contains PFAS, contacting water bottlers for sampling results, and sharing information between agencies and states.

Mark was thanked for his presentation, and **Steve Rhode, MWRA Lab Director**, was introduced.

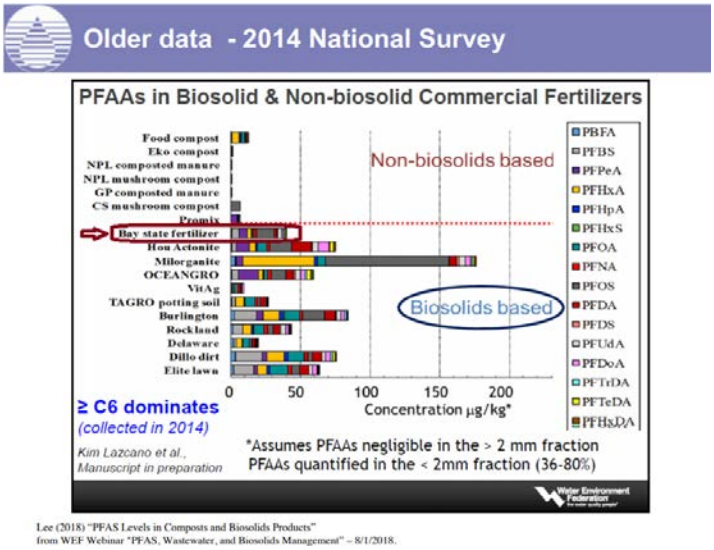
- UCMR3 (2014 – 2016) – 180 samples all ND
- 2019 voluntary sampling - DEP Totals
  - Quabbin ~1 ng/L
  - Wachusett ~3 ng/L

Not detected	PFDA, PFDoA, PFTeDA, PFTrDA, PFUnA, NEtFOSAA, NMeFOSAA, 11Cl-PF3OUdS, 9Cl-PF3ONS, ADONA, HFPO-DA
Quabbin	PFOA^{TD}, PFOS^{U}, PFHpA^{U}, PFHxS^{U}, PFNA^{U}, PFHxA^{U}
Wachusett	PFOA^{TD}, PFOS^{TD}, PFHpA^{TD}, PFHxS^{U}, PFNA^{U}, PFHxA^{U}, PFBS^{U}
Detect > MRL	PFOA, PFHxA – ***only at one community entry point***
TD = Trace Detect (1/3 MRL < result < MRL)	U = Ultra-Trace Detect (MDL < result < 1/3 MRL)

Steve's presentation began by noting that PFAS have been detected throughout the world. He explained briefly how test results are revealed, sharing a sample table of test results. In tests done between 2014 and 2016, 180 samples returned non-detectable amounts of PFAS. In the summer of 2019, public water suppliers were asked to perform voluntary testing. See image (right) for compounds that were detected; he also noted that the lab used by the MWRA could detect parts per quadrillion, so some of the numbers are "trace detect" or "ultra trace detect". The compounds may have ended up in the reservoirs from the surrounding environment, from rain or airborne transport.

The results, which are available on the MWRA website, are significantly lower than the proposed 20ppt.

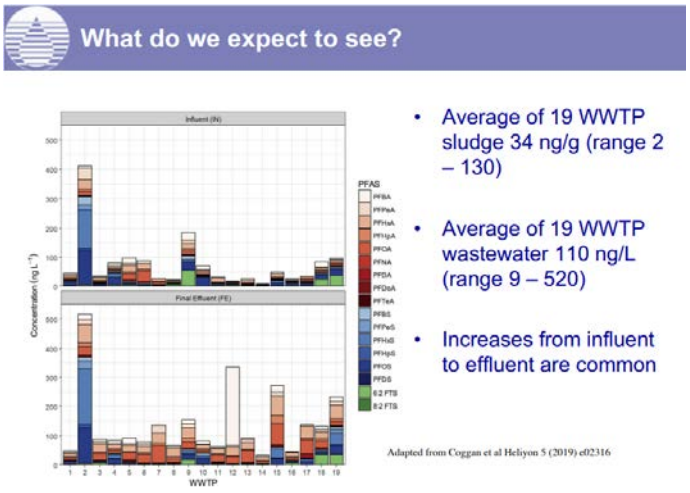
Steve moved on to discuss biosolids. Maine required biosolids testing in spring of 2019 – see presentation for results; MWRA's results are in the lower half. He also included an independent test of biosolids from



Lee (2018) "PFAS Levels in Composts and Biosolids Products" from WEF Webinar "PFAS, Wastewater, and Biosolids Management" – 8/1/2018.

2014 (see image, left), which appears consistent with current results.

The source of the PFAS in biosolids is mostly what people eat and excrete. Serum levels have been decreasing over the years, although the numbers are much higher in biosolids than they are in drinking water. Many municipal composting facilities accept paper products, which results in compost that is much higher in PFAS.



MWRA is participating in a study where Deer Island effluent was collected for five days; results will be available mid-November. Steve forecasts that the average range will be around 110, based on a study from Australia that shows an average of sludge content similar to MWRA's (34 to MWRA's 39). The numbers typically increase from influent to effluent, because compounds that we don't yet measure break down into the compounds that are currently regulated.

Sources of PFAS, as Mark mentioned, include textile stain and soil repellents, food-contact paper, and surfactant applications, including aqueous film-forming foams, used to extinguish fires involving highly-flammable liquids, as well as industry uses such as textiles or anti-mist films.

Research on bioaccumulation of PFAS is in process, and is one of the reasons for concern about these substances.

A particular dairy farm was referenced as being contaminated with PFAS; the farmer was using biosolids, and the neighboring farm was using paper waste, which is also high in PFAS, so the source is undetermined.

Another question was posed about labeling requirements. Many products that use PFAS are not required to disclose which chemicals they use, due to confidential business information practices.

There are several artificial turf fields near Sudbury Reservoir. MWRA is testing for Dioxane, which is a related chemical.

At this time, the current treatment option is activated carbon. Reverse osmosis is also useful, but is impractical on a large scale. Both these options generate a concentrated waste, and the activated carbon can be regenerated, but won't decompose the PFAS, so there is a risk that the compounds will go airborne.

The meeting was adjourned.

WSCAC will next meet jointly with the MWRA Advisory Board on November 21, 2019, at 11:30 am at the Wellesley Free Library. Please visit our website for more information on this meeting.