PFAS in Drinking Water

Barnstable County Water Utilities Association
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Health Effects and Standards

Health Effects

- Developmental risks to fetus/infants, endocrine disruption and cancers

Drinking Water Standards

- 2016 EPA Health Advisory: 70 ppt for sum of PFOA and PFOS
- 2018 MassDEP Office of Research and Standards Guideline (ORSG): 70 ppt for sum of PFOA PFOS, PFNA, PFHxS, and PFHpA (5 compounds)
- 2019 MassDEP Draft MCP Groundwater Standards: 20 ppt for the sum of PFOA, PFOS, PFNA, PFHxS, PFHpA, and PFDA (6 compounds)

Other states

- Most implementing 2016 EPA Health Advisory
- Many, in particular in northeast, have proposed or established guidance or regulatory values

Why Focus on Drinking Water?

Human exposure includes a wide array of consumer products and foods

- Drinking water identified as a substantial source of PFAS exposure for many populations. Next to contaminated sites, drinking water has been reported to account for up to 75% of total PFAS exposure.

- Food is the primary source of PFAS for many populations*
  - PFOS: Fish and other seafood for adults (up to 86% of total exposure)
  - PFOS: Meat and meat products account for up to 52% exposure, for the elderly
  - PFOS: Eggs and egg products account for up to 42% of infant exposure.
  - PFOA: Milk and dairy products for toddlers (up to 86% of exposure),
  - **PFOA: Drinking water (up to 60% for infants)**
  - PFOA: Seafood (up to 56% in elderly).

* *A Review of the Pathways of Human Exposure to Poly- and Perfluoroalkyl Substances (PFASs) and Present Understanding of Health Effects*. Journal of Exposure Science Environmental Epidemiology, November 2018, Sunderland et. al.

Drinking Water Contributions to PFOA Exposure

PFOA "Background" vs. Drinking Water Serum Levels

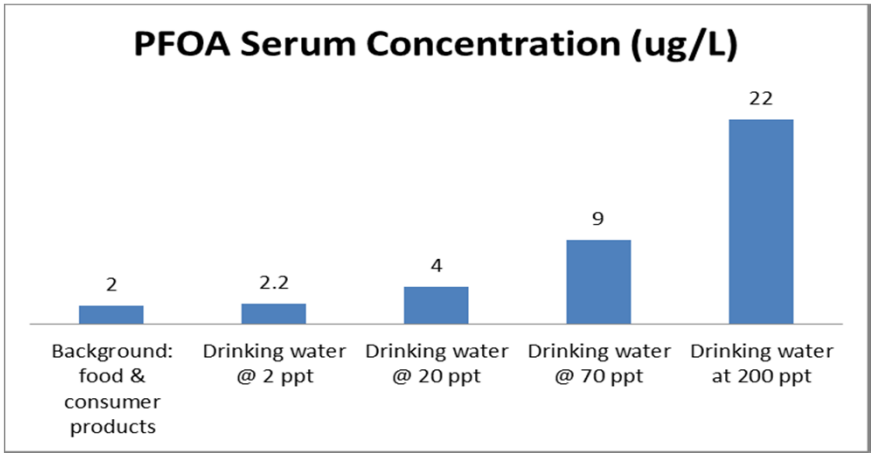
Drinking water level (ug/L)	Predicted increase in serum level[1] (ug/L)	NHANES "background" serum level[2] (ug/L)	% increase in serum level due to drinking water
0.002 (2 ppt)	0.2	2	10%
0.02 (20 ppt)[3]	**2**	**2**	**100%**
0.07 (70 ppt)[4]	**7**	**2**	**350%**
0.2 (200 ppt)	20	2	1000%

[1] Based on a PFOA serum to water ratio of 100:1.

[2] Geometric mean (approximate) PFOA serum concentration based on National Health and Nutrition Examination Survey (NHANES) 2013-2014 data.

[3] MassDEP proposed MCP GW-1 value.

[4] USEPA Lifetime Health Advisory for drinking water.



PFAS in MA Public Water Supplies

- 6 systems: PFAS in finished water > MassDEP ORSG of 70 ppt
  - Ayer, Mass Development (Devens), Hudson, Hyannis, Lakeside Estates (Mashpee), and Westfield
- 11 systems: MassDEP ORSG 70 ppt > PFAS > draft MCP 20 ppt
  - Harvard Green Condominiums, The Appleworks (Harvard), US Army Devens (South Post), Littleton Water Dept, MCI Shirley, Hale Middle School (Stow), Stow Center School, Ayer Road Properties LLC (Harvard), Falmouth Water Dept, Mashpee Water District, Danvers Water Dept, Barnstable Fire District
- Responses: install treatment; shut off well(s); modify well usage; connect to municipal water; and purchase water from adjacent communities
- Firefighting foam (AFFF) is primary source (also one likely manufacturing source and one source under investigation)
- Analytical results of PWS PFAS are on mass.gov

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Governor
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MassDEP
GIS Program
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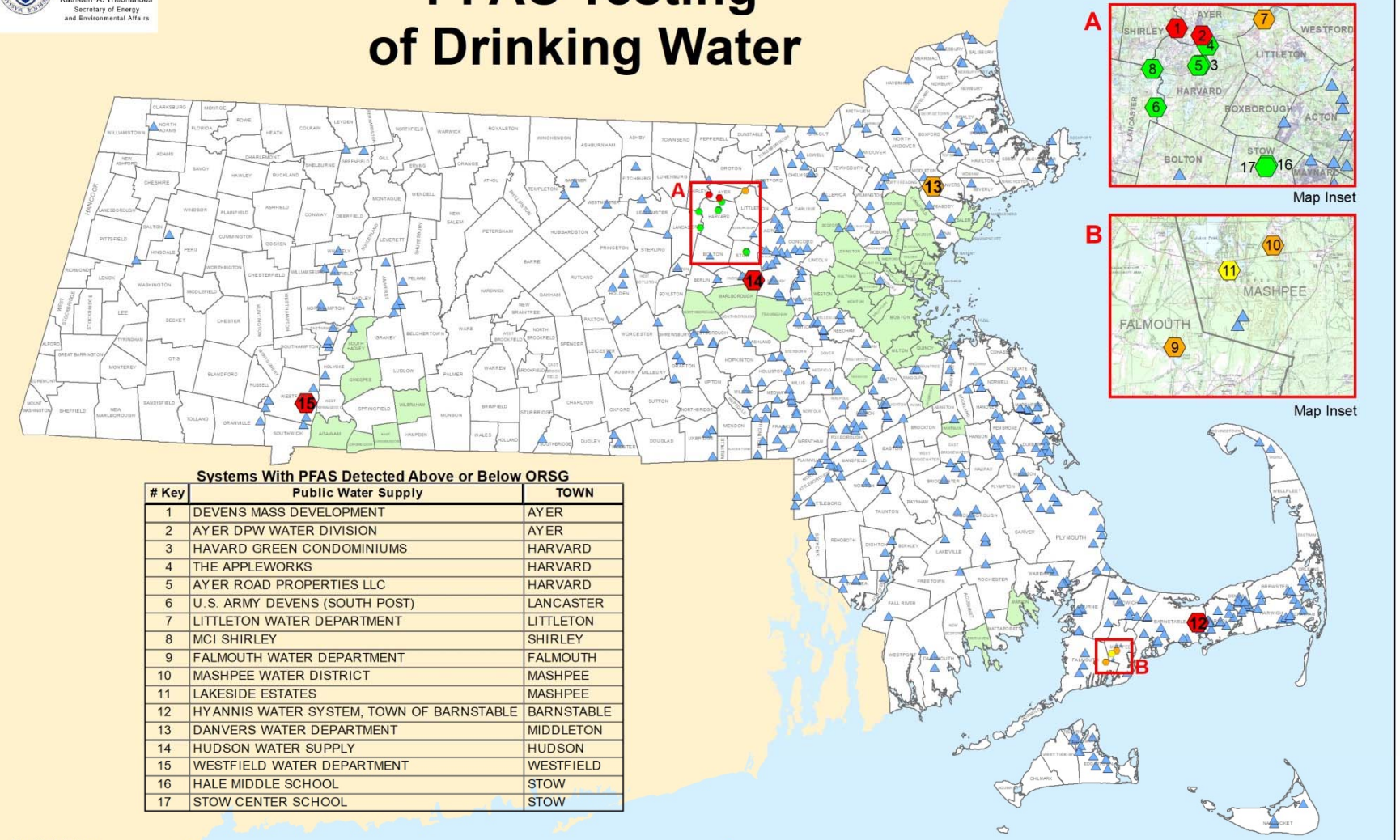
PFAS Testing of Drinking Water



Systems With PFAS Detected Above or Below ORSG

# Key	Public Water Supply	TOWN
1	DEVENS MASS DEVELOPMENT	AYER
2	AYER DPW WATER DIVISION	AYER
3	HAVARD GREEN CONDOMINIUMS	HARVARD
4	THE APPLEWORKS	HARVARD
5	AYER ROAD PROPERTIES LLC	HARVARD
6	U.S. ARMY DEVENS (SOUTH POST)	LANCASTER
7	LITTLETON WATER DEPARTMENT	LITTLETON
8	MCI SHIRLEY	SHIRLEY
9	FALMOUTH WATER DEPARTMENT	FALMOUTH
10	MASHPEE WATER DISTRICT	MASHPEE
11	LAKESIDE ESTATES	MASHPEE
12	HYANNIS WATER SYSTEM, TOWN OF BARNSTABLE	BARNSTABLE
13	DANVERS WATER DEPARTMENT	MIDDLETON
14	HUDSON WATER SUPPLY	HUDSON
15	WESTFIELD WATER DEPARTMENT	WESTFIELD
16	HALE MIDDLE SCHOOL	STOW
17	STOW CENTER SCHOOL	STOW

Map Updated on
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- Municipal PWS detected above 70 ppt
- Municipal PWS detected between 20 and 70 ppt
- Non-Municipal PWS detected above 70 ppt
- Non-Municipal PWS detected between 20 and 70 ppt

Public Water Supply Sources Tested (locations are approximate)

Towns That Purchase Water No PFAS Detected

N

Miles
0 15 30

Guideline = MassDEP Office of Research and Standards Guideline 70 ppt (70 nanograms per liter)

Disclaimer on the map:
This map is intended to provide a general overview of public water supply locations in the Commonwealth that have been tested for certain PFAS compounds, including a snapshot of any positive test results, where available. Test locations shown on the map are approximate. The Department makes no representations concerning the validity, the reliability or the accuracy of the information portrayed on this map.

Drinking Water Limits

parts per trillion (10/10/19)

		PFOS	PFOA	PFNA	PFHxS	PFHpA	PFDA
USEPA	Health Advisory	70 Sum of both					
ATSDR	Toxicity value	7	11	10	70		
MA	ORSG (Guideline)	70 Sum of five					
MA groundwater clean-up standard	Proposed MCP -	20 Sum of six					
NH	MCL - Final	15	12	11	18		
NY	Recommended MCL	10	10				
NJ	Recommended MCL	13	14	13 Final			
VT	Health Advisory/ Groundwater rule	20 Sum of five					
CT	DW Action Levels	70 Sum of five					
Most other states (EPA value by default)		70 sum of both					

MassDEP Actions to Date

- Targeted monitoring of Public Water System sources
- Testing of new public water supply sources
- Outreach to all PWS encouraging voluntary sampling
- Outreach to PWS tested during UCMR3 for lower detection limits, if available
- High Priority status for treatment projects for SRF loans
- Required testing of wastewater residuals subject to Approval of Suitability (renewed every 5 years)
- Firefighting foam collection and disposal
- Request to water bottlers and bulk suppliers for sampling results

MassDEP Actions (cont'd)

- Pursuing laboratory certification regulations and certification program for PFAS analysis
- Moving forward with:
  - Waste Site Cleanup/GW standard regulations
  - Pursuing drinking water MCL
- Sanitary surveys of MA water bottling/ice making sources

Targeted Monitoring

- Began August 2019
- Criteria: PWS sources near known or suspected sources of PFAS, including:
  - Civilian airports
  - Active and former military bases
  - Firefighting-academies
  - Manufacturers
  - Drinking water sources that previously tested positive for PFAS
- Samples processed by MassDEP lab
- Initial round: ~60 drinking water sources at 25 Public Water Suppliers

Testing Drinking Water for PFAS

- EPA Method 537: results for 14 PFAS chemicals
  EPA Method 537.1: results for 18 PFAS chemicals

- Special handling and care must be taken when collecting samples to avoid contamination

- MassDEP has not begun certifying labs for PFAS analysis; labs must submit copies of certifications from other states and achieve a reporting level of 5 ppt or lowe

Bottled Water and Home Water Filters

- MassDEP asked water bottlers voluntarily share results of PFAS testing
- For private well owners: countertop or under sink home water treatment filters can remove PFAS from drinking water ($$)
- Mass Dept of Public Health issued health advisory regarding Spring Hill bottled water in Haverhill

Proposal for a Massachusetts Drinking Water MCL

- Will follow the issuance MCP Groundwater Clean-Up regulations
- Will set similar levels to those standards
- Draft regulations, public comment and issuance of final MCLs within one year

Promulgating Regulations in MA

- Process governed by:
  - Secretary of State
  - M.G.L. c. 30A the *Administrative Procedures Act*, the Secretary's regulation 950 CMR 20.00
  - Executive Orders of the Governor
  - Policies and practices of the Executive Office of Energy and Environmental Affairs and MassDEP

- Proposed regulations are:
  - Drafted by MassDEP
  - Notice of Public Hearings and Comment Period published in the Massachusetts Register

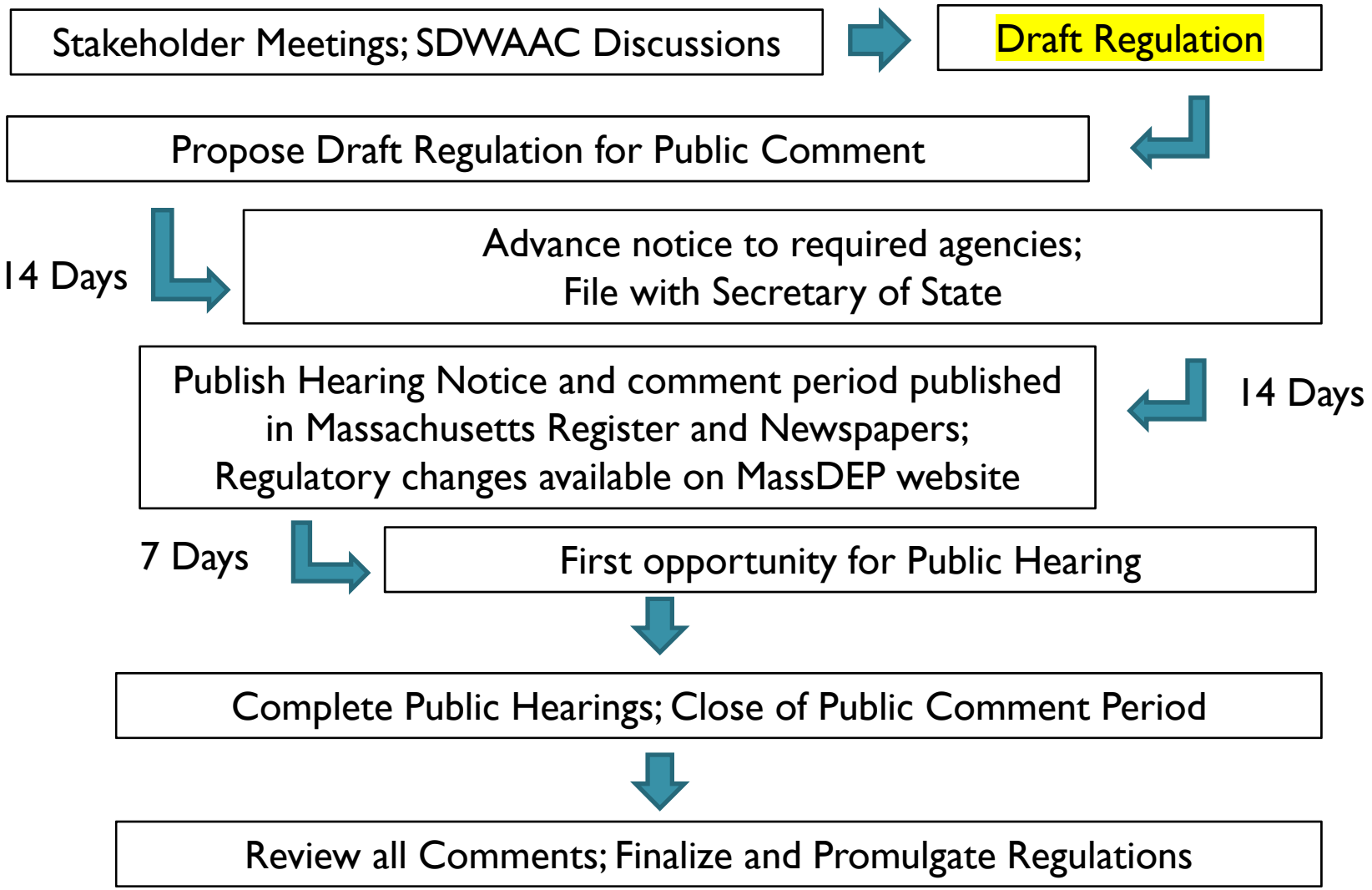
PFAS MCL Rule Elements to Consider

- Maximum Contaminant Level (MCL) – informed by MCP regulatory process and review of the existing ORSG
- Applicability by Class – Type of Public Water System (PWS)
  - Community – cities/towns, condos, apartments, mobile home parks, residential facilities
  - Non-Transient, Non-Community – schools/institutions, industries, medical facilities
  - Transient Non-Community – restaurants, recreational areas, summer camps, hotels
- Variable implementation based on Class, Size, Source Water
- Monitoring requirements
  - Initial (grandfathering), routine, increased and reduced
  - Availability of Monitoring Waivers

PFAS MCL Rule Elements (Cont.)

- MCL Compliance Method
  - Quarterly average: (M1+M2+M3)/3
  - Average of initial and confirmation samples: (Sample 1+Sample 2)/2
- State and Public Notification Triggers
  - Consumer Confidence Reporting
- Identification of Best Available Technology (treatment)

Sequence/Minimum Timelines



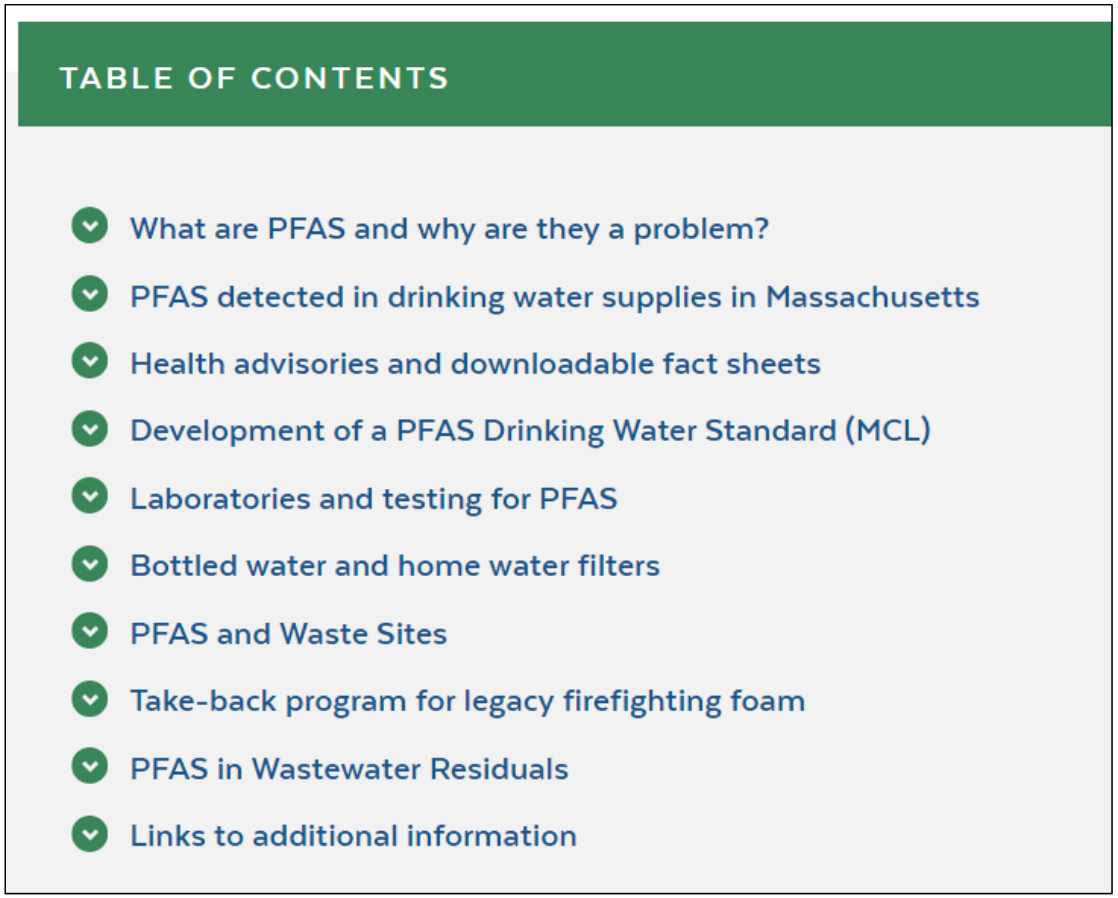
Governor's FY19 Supplemental Budget on PFAS (H.4067, filed 9/6/19)

- $8.4M for testing publicly-owned municipal sources & privately-owned sources, and support treatment & design of affected drinking water systems
- $20M transfer of existing funds to Clean Water Trust for 0% loans to support PFAS remediation for public water supplies
- $35M transfer of existing funds to Clean Water Trust to increase general project capacity; not earmarked for PFAS

- *Note: H.3851/S.2284 filed by Rep. Hogan (Hudson, Stow), Rep. Benson (Ayer, Devens, Harvard, MCI Shirley) and Senator Cyr (Hyannis, Mashpee, Martha's Vineyard) may be included in version of supplemental budget taken up for debate this week; would create an 18-member interagency PFAS task force*

More Information Online

www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas



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