MassDEP PFAS Update

Presented to:

MA Water Resources Commission

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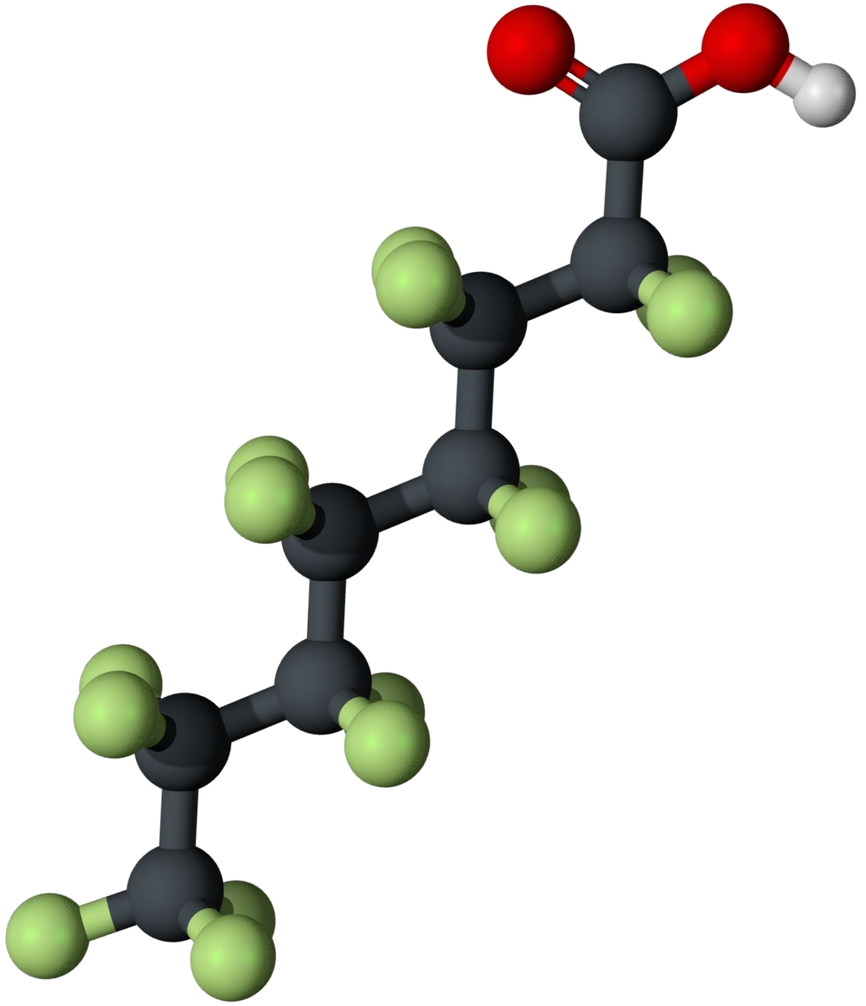
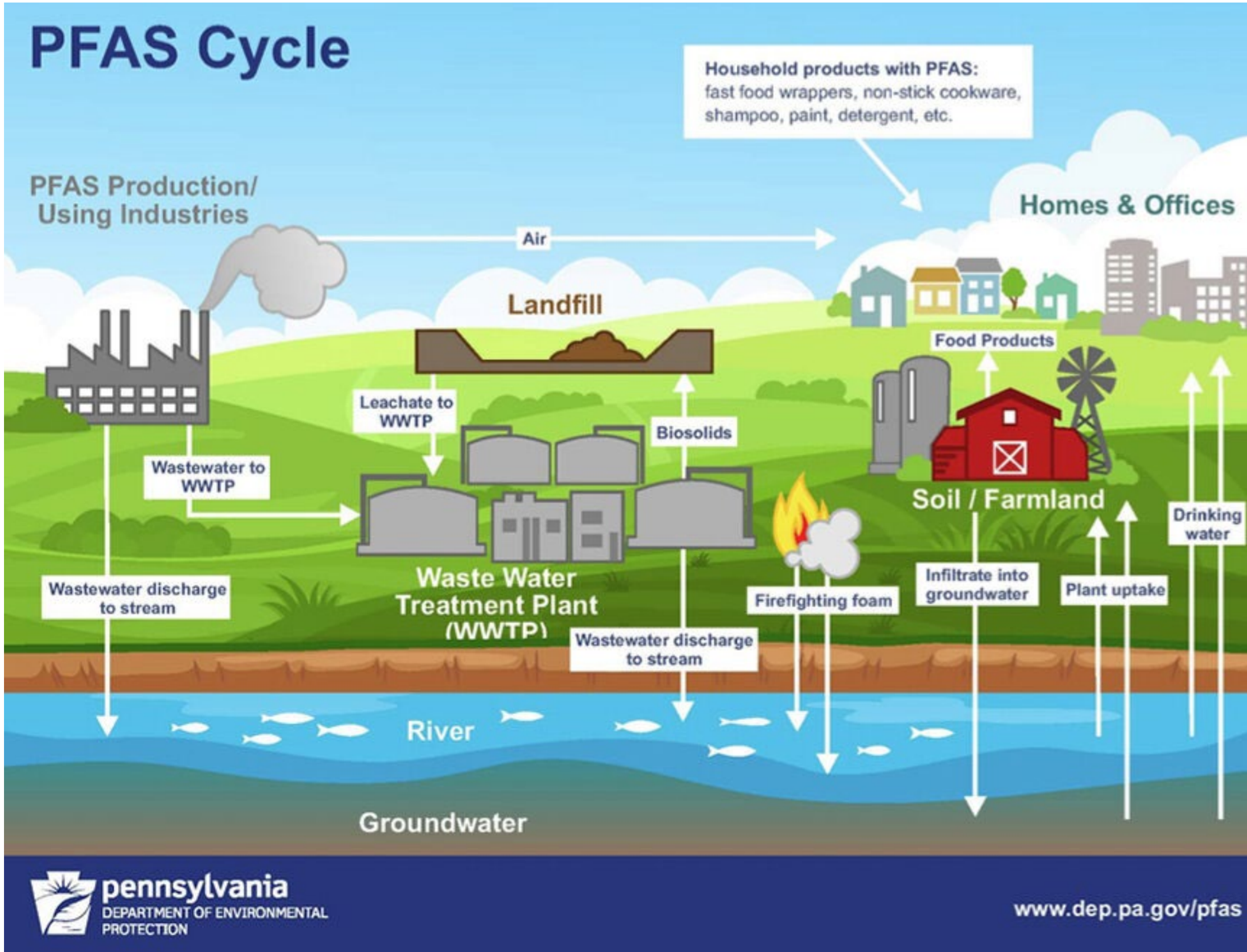
INTRODUCTION TO PFAS



What are Per- and Polyfluoroalkyl Substances (PFAS)?

- Family of chemicals used since the 1950s to manufacture stain-resistant, water-resistant, and non-stick products
- Persist in environment for a long time; do not break down easily. As a result, PFAS are widely detected in nature and in people.
- PFAS can seep into surface soils, leach into ground and surface waters, eventually contaminating drinking water



Common Uses of PFAS

- Aqueous fire-fighting foam (AFFF)
- Textile treatments
    - stain resistance/water repellency
- Paper coatings - grease resistant
- “Waxes” - floor, car, ski
- “Waterproof” down
- Manufacturing

Exposure to PFAS through consumer products is common, but when drinking water is contaminated, it is the primary source of exposure.

PFAS IN DRINKING WATER

New EPA PFAS Rule

MassDEP PFAS6 Drinking Water Standard

- Regulations establish an enforceable standard called Maximum Contaminant Level (MCL)
- In October 2020, established MCL of 20 parts per trillion for the sum of six PFAS (“PFAS6”).
- Routine Monitoring Required
- MCL is violated when three months of sampling results exceed or projected to exceed the standard; Public Notice Required for Violations
- Three-year review regulations to ensure consideration of latest science required by 310 CMR 22.07(g)(3)(e); delayed to address final EPA PFAS regulations; to be completed this summer

EPA National Primary Drinking Water Standards (published April 26, 2024)

PFAS		Maximum Contaminant Level Goal	Maximum Contaminant Level
PFOA (perfluorooctanoic acid)		0	4.0 ppt
PFOS (perfluorooctane sulfonic acid)		0	4.0 ppt
PFNA (perfluorononanoic acid)		10 ppt	10* ppt
PFHxS (perfluorohexanesulfonic acid)		10 ppt	10* ppt
HFPO-DA (hexafluoropropylene oxide dimer acid, GenX)		10 ppt	10* ppt
Mixture of 2+	**PFNA**	1 (unitless) Hazard Index (HI)	1 (unitless) Hazard Index (HI)
	PFHxS		
	HFPO-DA		
	PFBS (perfluorobutane sulfonic acid)		

* One significant figure

How is MA/PFAS6 different from the EPA MCL?

- PFAS Compounds
  - EPA includes 2 PFAS not in Massachusetts' PFAS6 (HFPO-DA and PFBS)
  - Massachusetts includes 2 PFAS not in EPA's MCLs (PFHpA and PFDA)
- MCL Compliance based on EPA's Running Annual Average (4 Quarters) versus MA's Quarterly Average (3 Months)
- EPA's Hazard Index MCL (MA's PFAS6 MCL is roughly equivalent with Health-Based Water Concentrations set at 20 ppt)

$$HI\ MCL = \left(\frac{[HFPO\text{-}DA_{water}]}{[10\ ppt]}\right) + \left(\frac{[PFBS_{water}]}{[2000\ ppt]}\right) + \left(\frac{[PFNA_{water}]}{[10\ ppt]}\right) + \left(\frac{[PFHxS_{water}]}{[10\ ppt]}\right) = 1$$

- EPA's Practical Quantitation Levels are less stringent than MA's Minimum Reporting Levels

PFAS	EPA PQL (ppt)	MA MRL (ppt)
PFHxS	3.0	2.0
PFNA	4.0	2.0
PFOA	4.0	2.0
PFOS	4.0	2.0

Potential Impact on Public Water Suppliers

- Based on recent sampling results (not a running annual average)
- Only PWS required to test for PFAS included. Consecutive PWS were not required to test for PFAS because they purchase their water from another PWS

Type of Public Water Supplier	# PWS (non-consecutive)	# PWS exceeding EPA MCLs	% of PWS
Community	449	approx. 135	30%
Non-Transient Non-Community	234	approx. 46	20%
Total	683	approx. 181 (85 underway)	27%

PFAS Regulation Schedule

EPA's Schedule

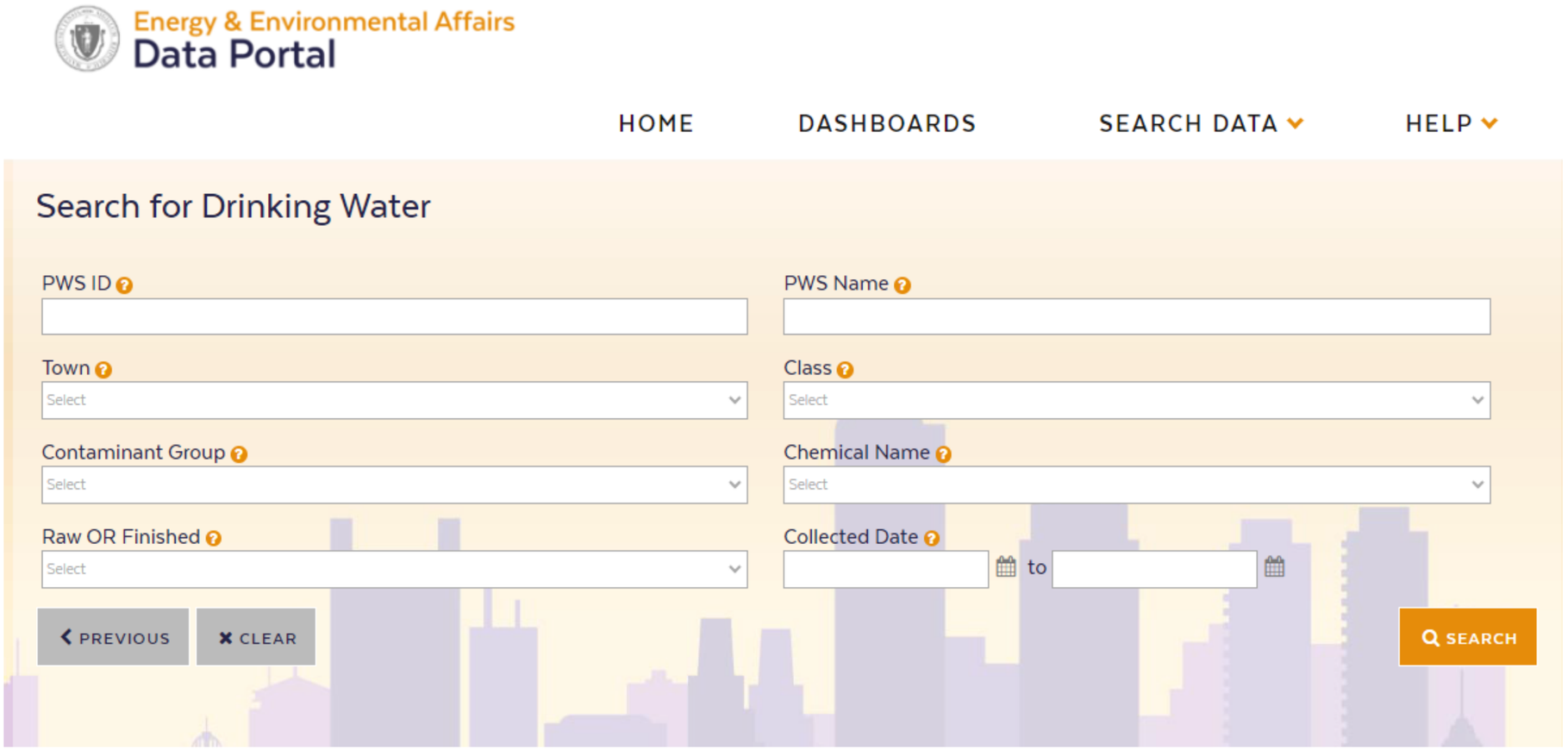
- Within three years of rule promulgation (2024 – 2027): initial monitoring must be complete
- Starting three years following rule promulgation (2027 – 2029):
  - Results of initial monitoring must be included in annual Consumer Confidence Reports
  - Compliance monitoring begins, and results of compliance monitoring must be included in Consumer Confidence Reports
  - Public notification required for monitoring and testing violations
- Starting five years following rule promulgation (2029)
  - Comply with all Maximum Contaminant Levels
  - Public notification required for MCL violations

MassDEP's Schedule

- By May 1, 2026, propose amendments to PFAS regulations to be at least as stringent as the EPA rule

Where to Find PFAS Testing Results

All Public Water System testing results are at: https://eeaonline.eea.state.ma.us/Portal/#!/search/drinking-water



Search under the Town name or PWS name and the Contaminant Group "PFAS"

Private Well Sampling 2021-2022

2,782 well owners signed up

53 of 84 towns begun sampling

727 well results received

95% below MCL

34 results > 20 ppt

3 results > imminent hazard 90 ppt

(excludes Waste Site Cleanup)

PFAS and RESIDUALS

PFAS in Wastewater Residuals

- **Wastewater Residuals**: historically reused as fertilizer
  - MassDEP regulates 30-35 entities that land apply residuals
- **PFAS Testing**: required since 2020 for residuals that are land applied
- **Regulation**: Currently, no established land application standards for PFAS; conducting modeling, evaluating options and consulting with stakeholders
- **Policy issues**:
  - Impacts of PFAS on water, crops, plants and animals
  - Impacts of regulating on market, reuse and alternatives
  - Disposal alternatives include land application, landfilling, incineration, export

Sludge Capacity Master Plan:
Part 1: Current/Near-Term (5 years) Sludge and Septage Disposal

Sludge: Evaluation 3 main current disposal options: landfill, land application, and incineration

- Compile information:
  - MA POTWs targeting those with greatest amount of average daily effluent flow
  - Disposal providers within MA that are used by MA POTWs
  - Disposal providers outside of MA that are used by MA POTW
  - Other potential future disposal providers not currently used by MA POTWs

Septage: Evaluate septage storage/consolidation and bulk transportation to POTWs and other locations

- Compile information:
  - From POTWs, septage haulers, other facilities, other sources (literature review), and select stakeholders

Schedule: completed and under review

Sludge Capacity Master Plan:
Part 2: Future of PFAS Management in Sludge and Wastewater

- Reduction and management technologies for wastewater and sludge
  - Review technologies to reduce sludge volume and/or reduce/eliminate PFAS in wastewater & sludge
  - Life-cycle cost comparison to determine affordability for POTWs

- Contributions of PFAS into POTWs (indirect discharges)
  - Methods for, and costs of, high-impact approaches to reducing PFAS before it enters the POTWs

- PFAS impacts on sludge disposal methods
  - Implemented and/or planned limitations of sludge disposal that will impact MA facilities
  - Summary of PFAS reduction approaches performed by other states.

- Future sludge disposal scenario analysis
  - Project hypothetical future conditions in sludge management by MA POTWs
  - Will help MassDEP and the wastewater industry better understand options, technical and regulatory support needed, and potential impact on POTW rates and options for financing

- Recommendations for sludge disposal
  - Recommendations on current and future sludge management and disposal practices as well as PFAS reduction and elimination

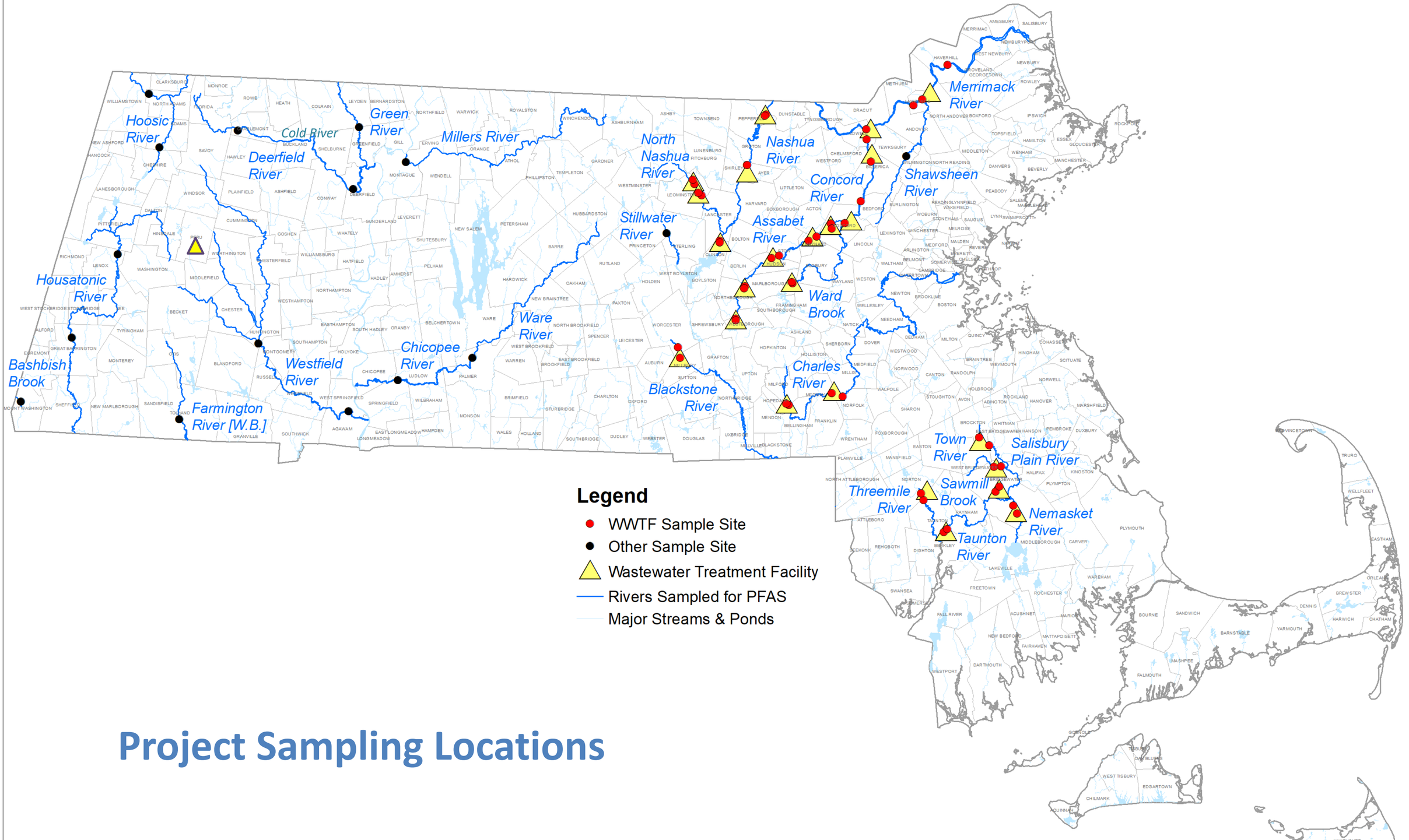
Schedule: Completion by Early 2025

PFAS, RIVERS, and WASTEWATER

PFAS & River Water

- Conducted in 2020; with USGS
- 48 Sites: upstream/downstream of 24 Wastewater Treatment Facilities (WWTF) discharging upstream of public water supply intakes
- 9 downstream sites with possible non-point or industrial sources (non WWTF)
- 7 background locations with no known PFAS sources

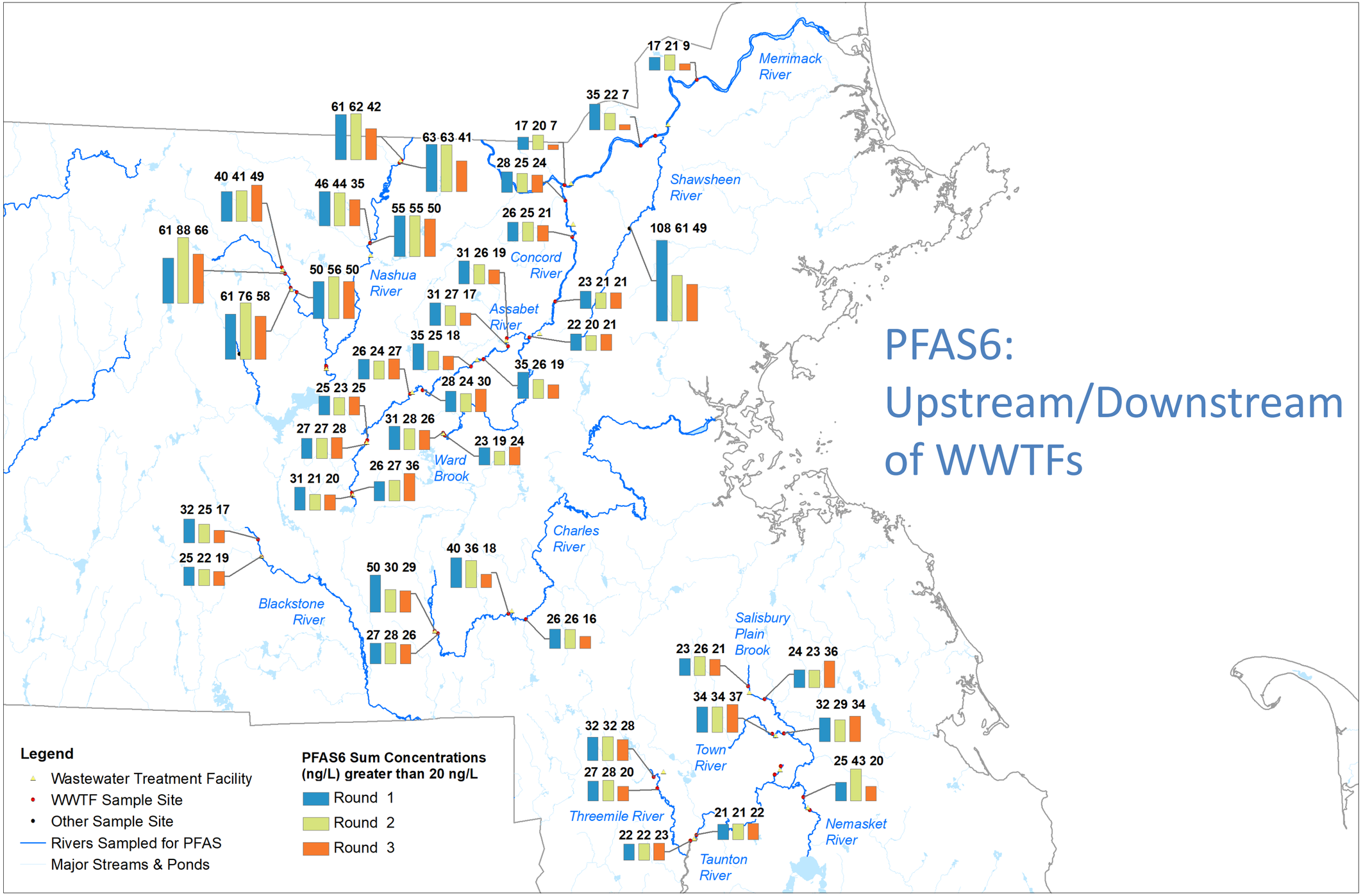
Westfield River



Project Sampling Locations

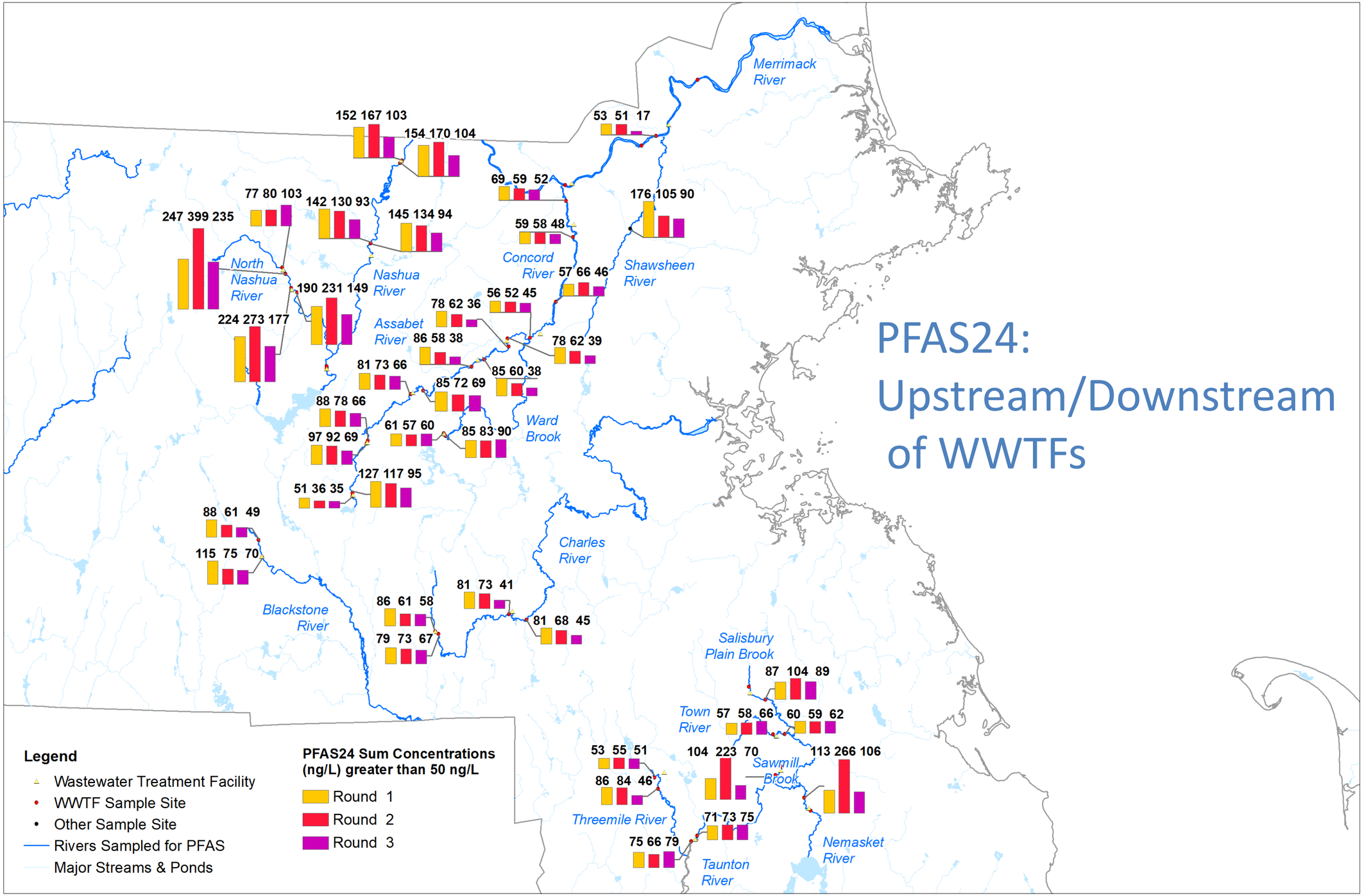
PFAS6 Results

- Concentration range for individual PFAS6 analytes only (all sites): **ND-55 ng/l (PFOS was max in the Shawsheen)**
- Concentration range for [sumPFAS6, (PFOA, PFOS, PFHpA, PFHxS, PFNA, PFDA)] (all sites): **ND-108 ng/l**
- # of sites (of 64 total) with [sumPFAS6] concentrations greater than 20 ng/l: **43 sites**


PFAS6: Upstream/Downstream of WWTFs
Merrimack River
Shawsheen River
Concord River
Nashua River
Assabet River
Ward Brook
Charles River
Blackstone River
Salisbury Plain Brook
Town River
Threemile River
Nemasket River
Taunton River
17 21 9
35 22 7
61 62 42
63 63 41
17 20 7
28 25 24
40 41 49
46 44 35
55 55 50
26 25 21
108 61 49
61 88 66
31 26 19
50 56 50
23 21 21
61 76 58
31 27 17
22 20 21
35 25 18
26 24 27
35 26 19
28 24 30
25 23 25
31 28 26
27 27 28
23 19 24
26 27 36
31 21 20
32 25 17
25 22 19
40 36 18
50 30 29
26 26 16
27 28 26
23 26 21
24 23 36
34 34 37
32 29 34
32 32 28
25 43 20
27 28 20
21 21 22
22 22 23
Legend
Wastewater Treatment Facility
WWTF Sample Site
Other Sample Site
Rivers Sampled for PFAS
Major Streams & Ponds
PFAS6 Sum Concentrations (ng/L) greater than 20 ng/L
Round 1
Round 2
Round 3

PFAS24 Results

- ”PFAS24”: the sum of the 24 PFAS included in the lab methodology and is not a drinking water standard.
- Range of PFAS 24 (all sites): **0.3-399 ng/l (ppt)**
- PFAS24 > 50 ng/L detected at 41 of the 64 sites sampled
- Waterbodies with higher PFAS24 concentrations >~50 ng/l:
    - Assabet River
    - Sewage Brook
    - Concord River
    - Nashua River (**maximum [sum24] observed= 399 ng/l, DS of E. Fitchburg**)
    - Blackstone River
    - Charles River
    - Three Mile River
    - Sawmill Brook
    - Nemasket River
    - Salisbury Plain River
    - Town River
    - Taunton River
    - Millers River
    - Shawsheen River (**maximum [PFAS6] observed= 108 ng/l)**
    - Westfield River


PFAS24: Upstream/Downstream of WWTFs
Merrimack River
152 167 103
154 170 104
53 51 17
69 59 52
77 80 103
142 130 93
145 134 94
247 399 235
59 58 48
176 105 90
Concord River
57 66 46
Shawsheen River
North Nashua River
Nashua River
190 231 149
78 62 36
56 52 45
224 273 177
Assabet River
86 58 38
78 62 39
81 73 66
85 60 38
85 72 69
88 78 66
Ward Brook
61 57 60
85 83 90
97 92 69
127 117 95
51 36 35
88 61 49
115 75 70
Charles River
81 73 41
86 61 58
81 68 45
Blackstone River
79 73 67
Salisbury Plain Brook
87 104 89
Town River
57 58 66
60 59 62
53 55 51
104 223 70
113 266 106
Sawmill Brook
86 84 46
Threemile River
71 73 75
75 66 79
Taunton River
Nemasket River
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Wastewater Treatment Facility
WWTF Sample Site
Other Sample Site
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Round 1
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Round 3

PFAS, RIVERS and FISH TISSUE

Freshwater Fish Tissue & Lakes/Rivers

- Objectives: to evaluate …
  - PFAS levels in edible tissue of more commonly consumed freshwater fish
  - Site-specific potential risk to human health from fish consumption
  - Potential impairment to aquatic life (e.g. potential bioaccumulation and toxicity in fish)
- 52 sites sampled; 66 surface water and 242 fish tissue composite samples (from 948 fish) were analyzed for 40 PFAS
- All but one waterbody had at least one fish tissue sample with a concentration above DPH's draft action limit of 0.22 ng/g for at least one of the seven PFAS for which DPH issues fish consumption advisories; all fish tissue concentrations of PFOS and PFOA were also well below EPA's draft Aquatic Life Ambient Water Quality Criteria values (for fish muscle).
- All surface water concentrations of PFOS and PFOA were well below EPA's draft acute and chronic water column Aquatic Life Ambient Water Quality Criteria values. There are no MA or federal surface water quality standards for PFAS in fish or surface waters.

PFAS & STATE FUNDING

State Revolving Fund and Bipartisan Infrastructure Law Funding

- MassDEP Drinking Water State Revolving Loan Fund 2024 Final Intended Use Plan (IUP) includes 22 new PFAS projects and 5 multi-year carryover projects
- Additional $10 million set aside for PFAS planning & design loans
- To date, $457 million in loans to address PFAS
- Principal forgiveness on the loans for disadvantaged communities
- SRF 2025 solicitation for construction projects is open until July 26, 2024: https://www.mass.gov/lists/state-revolving-fund-applications-forms#2025-project-evaluation-form-instructions-and-guidances-
- Over $40M in grants available for small and disadvantaged Public Water Systems addressing emerging contaminants from EPA (BIL funding)

Thank you

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