# DUXBURY PFAS UPDATE

Duxbury Select Board Meeting

June 12, 2023

ENVIRONMENTAL PARTNERS

— An Apex Company —

# PRESENTERS


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# AGENDA

- Background & Current PFAS Regulations
- Town of Duxbury PFAS Policy Directive
- Duxbury Water Quality & Current PFAS Actions
- Duxbury Future PFAS Planning Schedule
- Q&A

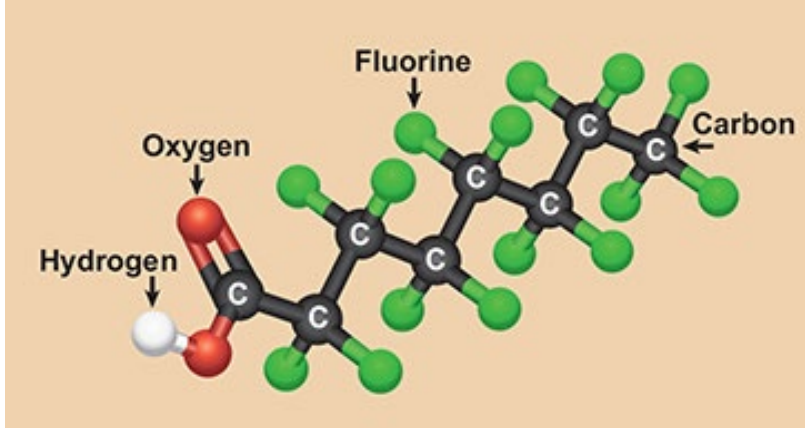
# BACKGROUND & CURRENT PFAS REGULATIONS

PFAS

# PER- & POLYFLUOROALKYL SUBSTANCES

## What are they?

- A class of chemicals engineered for use in commercial and industrial applications since the late 1940s.
- Chemical properties make it an effective surfactant for stain-resistant, water repellant, and non-stick coatings.
- “Forever Chemical” – water soluble and non-reactive
- PFOA, PFOS, and GEN-X




PFOA Chemical Structure

SOURCE: NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

PFAS

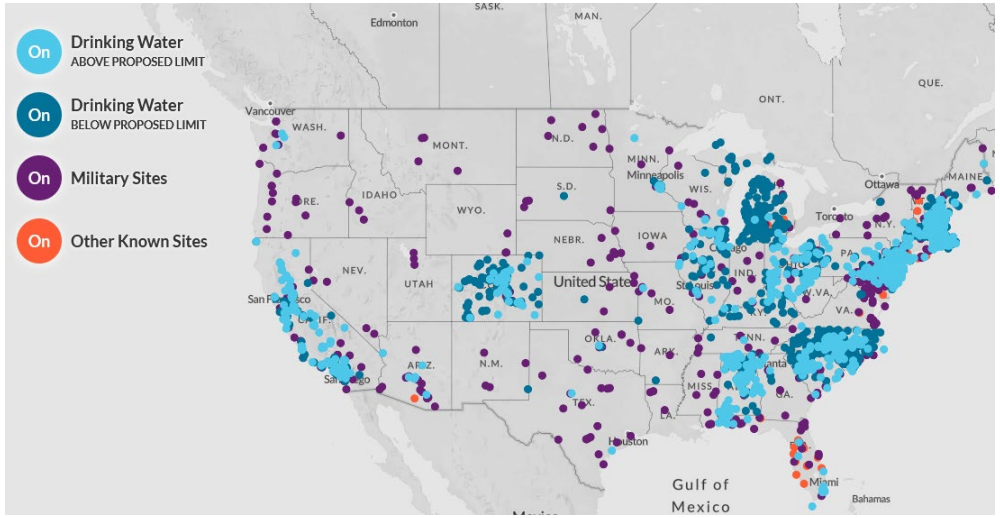
# WHAT ARE THEY USED IN?

- Aqueous Film-Forming Foam (AFFF)
- Non-stick cookware (Teflon)
- Textiles (Gore-Tex and Tyvek®)
- Furniture and Carpets/Rugs (Stainmaster® and Scotchguard™)
- Food packaging (popcorn bags)
- Consumer care products (cosmetics, dental floss)
- Plumbing products (Teflon tubing and tape)


PFAS

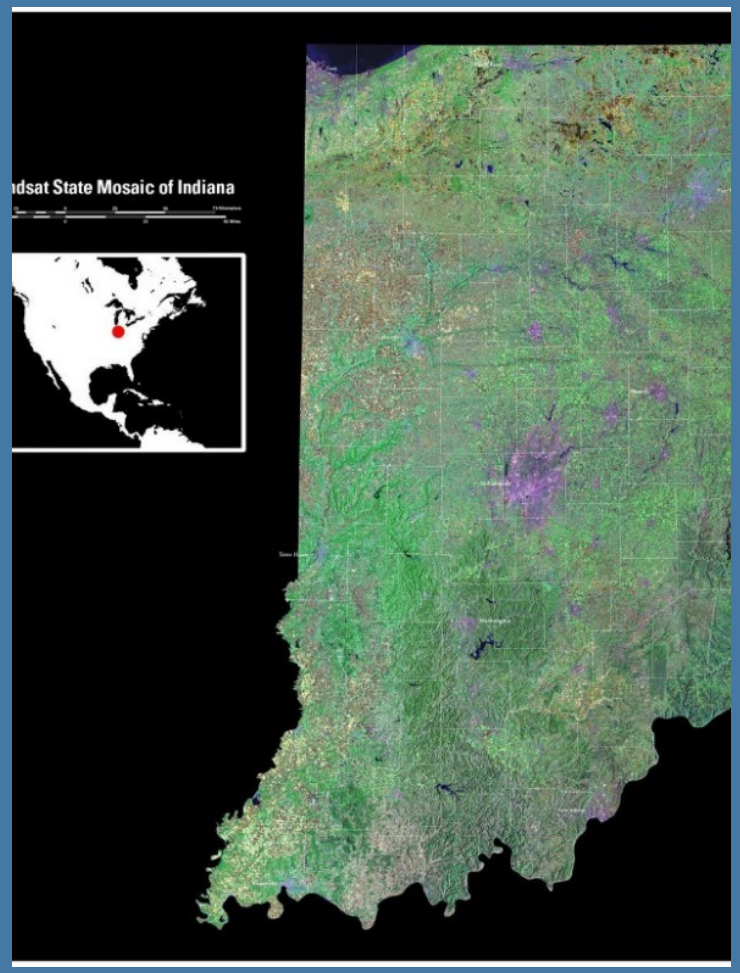
# COMMON ENVIRONMENTAL SOURCES

- Releases to Air, Groundwater, and Surface Water
- Industrial/Manufacturing Sites
- Fire Fighting Training Sites
- Airports
- Dept. of Defense Sites
- Landfills
- Biosolids/Residuals Land Application Sites




SOURCE: HTTPS://WWW.EWG.ORG/INTERACTIVE-MAPS/PFAS_CONTAMINATION/MAP/
PFAS CONTAMINATION IN THE U.S. (JUNE 8, 2022)

# WHAT IS EQUIVALENT TO 1 PART PER TRILLION?




SOURCE: USGS

One 12” x 12” tile in Indiana

SOURCE: RIO2016.COM

One Water Drop in 20 Olympic Swimming Pools

# MASSDEP REGULATIONS

- Finalized October 2020 (310 CMR 22.07G)

- Enforceable Maximum Contaminant Level (MCL) for a summation of six PFAS compounds (PFAS6)
  - PFOA
  - PFOS
  - PFNA
  - PFHxS
  - PFHpA
  - PFDA

- PFAS6 MCL = 20 ppt

# EPA PROPOSED DRINKING WATER REGULATION

- Draft regulation published March 29, 2023
- Enforceable Maximum Contaminant Levels (MCLs) for PFOA and PFOS
  - 4 ppt
- Enforceable Hazard Index for four PFAS compounds
  - PFHxS
  - PFNA
  - PFBS
  - HFPO-DA (GenX Chemicals)
  - Hazard Index (HI) = 1

# EPA PROPOSED DRINKING WATER REGULATION

- Public comment period closed May 30, 2023. Final regulation expected end of 2023.

- Until a final regulation is published, there is **no action required** by public water utilities to meet the proposed MCLs
  - Public water utilities will have three years to conform with the new regulation (end of 2026)

- MassDEP expected to follow with similar, or possibly more stringent, regulations

# COMPARISON OF FEDERAL AND STATE REGULATIONS

| USEPA Proposed National Primary Drinking Water Regulation | | | MassDEP Regulation | |
|---|---|---|---|---|
| **PFAS Compound**[1] | **Maximum Contaminant Level** | | **PFAS Compound** | **Maximum Contaminant Level** |
| Perfluorooctanoic acid (PFOA) | 4 ppt[2] | | Perfluorooctanoic acid (PFOA) | 20 ppt for the sum of these six compounds (PFAS6) |
| Perfluorooctanesulfonic acid (PFOS) | 4 ppt[2] | | Perfluorooctanesulfonic acid (PFOS) | |
| Perfluorononanoic acid (PFNA) | 1.0 (unitless) Hazard Index[3] | 10 ppt | Perfluorononanoic acid (PFNA) | |
| Perfluorohexanesulfonic acid (PFHxS) | | 9 ppt | Perfluorohexanesulfonic acid (PFHxS) | |
| **Perfluorobutanesulfonic acid (PFBS)** | | 2,000 ppt | Perfluoroheptanoic acid (PFHpA) | |
| **Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)** | | 10 ppt | Perfluorodecanoic acid (PFDA) | |

[1] **Bolded** compounds indicate PFAS compounds that are not currently included in the MassDEP PFAS6.

[2] The non-enforceable, health-based MCL goal (MCLG) for PFOA and PFOS is 0 ppt.

[3] The Hazard Index (HI) for PFNA, PFHxS, PFBS, and GenX is comprised of the sum of each PFAS compound's hazard quotient, which is calculated by taking the ratio of the measured PFAS level and that PFAS compound's Health-Based Water Concentration (HBWC) as listed in the table.

# TOWN OF DUXBURY PFAS DIRECTIVE

# TOWN OF DUXBURY PFAS POLICY DIRECTIVE

- Proposes a PFAS Response Action Plan for monitoring and implementing PFAS treatment to the extent possible

- The Town has already accomplished or is in the progress of completing the actions listed in the directive:
  - Maintains quarterly sampling at drinking water sources per MassDEP and EPA guidelines (Action Item 1)
  - Developed a Water System Master Plan, which includes analyses on water quality, existing infrastructure, and hydraulic analyses performed with an updated hydraulic model (Action Items 2a and 2c)
  - Implementing PFAS treatment at the Partridge Street Well, including developing construction cost estimates for performing this work (Action Items 2b and 3)
  - Planning future PFAS treatment projects and developing planning-level costs at the Town's other wells (Action Item 2b)
  - Procuring outside funding for the PFAS treatment projects, such as the MassDEP State Revolving Fund (SRF) or ARPA (Action Item 4)

# DUXBURY WATER QUALITY & CURRENT PFAS

# PFAS

- EPA occurrence (2013-2015) testing – non detect
- Massachusetts PFAS6 MCL = 20 parts per trillion

- Impacted sources
  - Partridge Well = as high as 75 – 105 ppt
  - Depot Street Well = 10 – 15 ppt, below PFAS6 MCL

PARTRIDGE ROAD WELL PUMP STATION

# DUXBURY – PFAS6 (2023 UPDATE)

| *PFAS6 Compliance Sampling Results* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source** | **4/28/2021** | **5/20/2021** | **6/15/2021** | **10/20/2021** | **1/24/2022** | **2/8/2022** | **9/20/2022** | **1/24/2023** | **4/25/2023** |
| Millbrook Well | - | 6.56 | - | 3.67* | 5.93* | - | 7.04* | 6.46* | - |
| Partridge Well | 75.93 | 5.10* | 105.21 | - | 83.15 | - | 56.90 | 72.70 | 71.01 |
| Depot Well | 10.40* | 0.86* | - | 11.96* | 14.88* | - | 11.40* | 7.57* | 6.90* |
| Lakeshore Well | 6.43* | 6.56* | - | 8.60 | 8.97* | - | 2.56* | 6.45* | - |
| Tremont Wells No. 1 and 2 | 0.00* | - | - | 0.72* | 0.00* | 0.00* | 0.00* | 0.00* | - |
| Evergreen Wells No. 1 and 2 | 1.88* | 0.00* | - | 3.85* | 4.39* | - | 2.27* | 0.00* | - |
| Mayflower Wells No. 1 and 2 | 4.11* | 4.50 | - | 2.80* | 6.26* | - | 2.17* | 4.58* | - |
| Damon Wells No. 1 and 2 | 6.48* | 7.66 | - | 6.39* | 7.83* | - | 6.71* | 7.24* | - |

* PFAS6 summation excludes compound levels below the Method Reporting Level (MRL) for the compound

# DUXBURY – PFOA (2023 UPDATE)

| *PFOA Sampling Results* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source** | **4/28/2021** | **5/20/2021** | **6/15/2021** | **10/20/2021** | **1/24/2022** | **2/8/2022** | **9/20/2022** | **1/24/2023** | **4/25/2023** |
| Millbrook Well | - | 3.11 | - | 3.67 | 3.60 | - | 4.20 | 3.21 | - |
| Partridge Well | 7.29 | 2.39 | 9.44 | - | 7.73 | - | 6.42 | 7.82 | 7.22 |
| Depot Well | 2.56 | 0.78 | - | 9.86 | 10.40 | - | 8.76 | 7.57 | 6.90 |
| Lakeshore Well | 4.08 | 3.63 | - | 3.94 | 4.63 | - | 2.56 | 4.23 | - |
| Tremont Wells No. 1 and 2 | 0.74 | - | - | 0.72 | - | 0.92 | 1.40 | 1.04 | - |
| Evergreen Wells No. 1 and 2 | 1.88 | 1.36 | - | 2.28 | 2.12 | - | 2.27 | 1.87 | - |
| Mayflower Wells No. 1 and 2 | 2.24 | 1.94 | - | 2.20 | 3.13 | - | 2.17 | 2.54 | - |
| Damon Wells No. 1 and 2 | 3.87 | 3.36 | - | 4.04 | 3.88 | - | 4.13 | 4.49 | - |

- Partridge and Depot Wells above 4 ppt proposed MCL
- Lakeshore, Millbrook and Damon Wells have PFOA measurements above 4 ppt

# DUXBURY – PFOS (2023 UPDATE)

| *PFOS Sampling Results* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Source** | **4/28/2021** | **5/20/2021** | **6/15/2021** | **10/20/2021** | **1/24/2022** | **2/8/2022** | **9/20/2022** | **1/24/2023** | **4/25/2023** |
| Millbrook Well | - | 2.06 | - | 1.91 | 2.33 | - | 2.84 | 3.25 | - |
| Partridge Well | 24.40 | 1.86 | 33.50 | - | 23.40 | - | 15.20 | 21.20 | 21.30 |
| Depot Well | 3.60 | 0.86 | - | 1.51 | 2.09 | - | 2.66 | 1.26 | 1.86 |
| Lakeshore Well | 2.35 | 2.08 | - | 2.31 | 4.34 | - | 1.73 | 2.22 | - |
| Tremont Wells No. 1 and 2 | 0.74 | - | - | 1.09 | - | 0.89 | 1.33 | 1.15 | - |
| Evergreen Wells No. 1 and 2 | 0.85 | 0.82 | - | 1.19 | 2.27 | - | 1.19 | 1.06 | - |
| Mayflower Wells No. 1 and 2 | 1.87 | 1.83 | - | 1.64 | 3.13 | - | 1.95 | 2.04 | - |
| Damon Wells No. 1 and 2 | 2.61 | 2.31 | - | 2.35 | 3.95 | - | 2.58 | 2.75 | - |

- Partridge above 4 ppt proposed MCL
- Lakeshore, Depot, and Damon Wells have PFOS measurements above or close to 4 ppt

# CURRENT PFAS ACTIONS

- Master Plan Recommendations
  - PFAS removal at Partridge Well
  - Reserve space for PFAS treatment for Depot Well
- Wright Pierce selected for Partridge Well PFAS Treatment Project
- Metals and PFAS Treatment Project beginning for Depot Well and Tremont Wells (recommended in Master Plan)
- Future PFAS Project Planning (discussed next)

# DUXBURY FUTURE PFAS PLANNING SCHEDULE

# FUTURE PFAS PROJECTS

EP developed the following PFAS treatment projects, prioritized based on water quality, location, pressure zones, etc.

1. Partridge Well (in progress)
2. Depot Well & Tremont Wells (beginning)
3. Mayflower Wells
4. Damon Wells & Millbrook Well
5. Evergreen Wells
6. Lakeshore Well

# FUTURE PFAS PROJECTS

1. Partridge Well (in progress)
   - Currently offline
   - Highest PFAS6 levels
   - Included in WSMP

2. Depot Well & Tremont Wells
   - Depot Well offline for high iron and manganese
   - WTP siting included in WSMP

3. Mayflower Wells
   - High pressure zone
   - Best option to begin treatment compared to other high pressure zone wells (Evergreen Wells and Lakeshore Well)

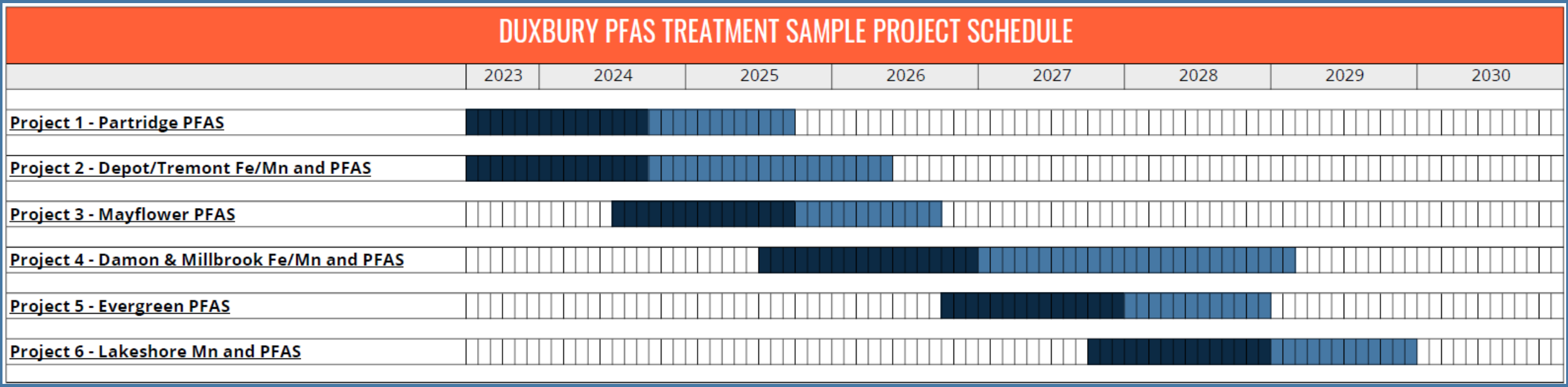
# FUTURE PFAS PROJECTS

4. Damon Wells & Millbrook Well
    - Combined treatment facility at Damon Wells site
    - Requires pretreatment of iron and manganese

5. Evergreen Wells
    - Low PFAS6 levels

6. Lakeshore Well
    - Requires pretreatment of manganese
    - Limited land and site constraints may make treatment siting complicated

# FUTURE PFAS PROJECTS SAMPLE PROJECT SCHEDULE




Notes

- Dark blue indicates the estimated design, permitting, and bidding phases of each project
- Light blue indicates the estimated construction phases of each project
- Multiple projects are being constructed in order of priority due to funding limitation

# FUTURE PFAS PROJECTS ESTIMATED COSTS

- EP estimates a high-level planning cost of **$75M - $100M** for all treatment projects
- Funding assumed to be achieved through Town bonding or outside funding sources (e.g. MassDEP State Revolving Fund)
- If a large bond or funding is received, performing one large organized treatment project at all locations could be considered

# Q&A

# THANK YOU

ENVIRONMENTAL PARTNERS

— An Apex Company —