Community Update Regarding PFAS in Drinking Water in Duxbury, MA

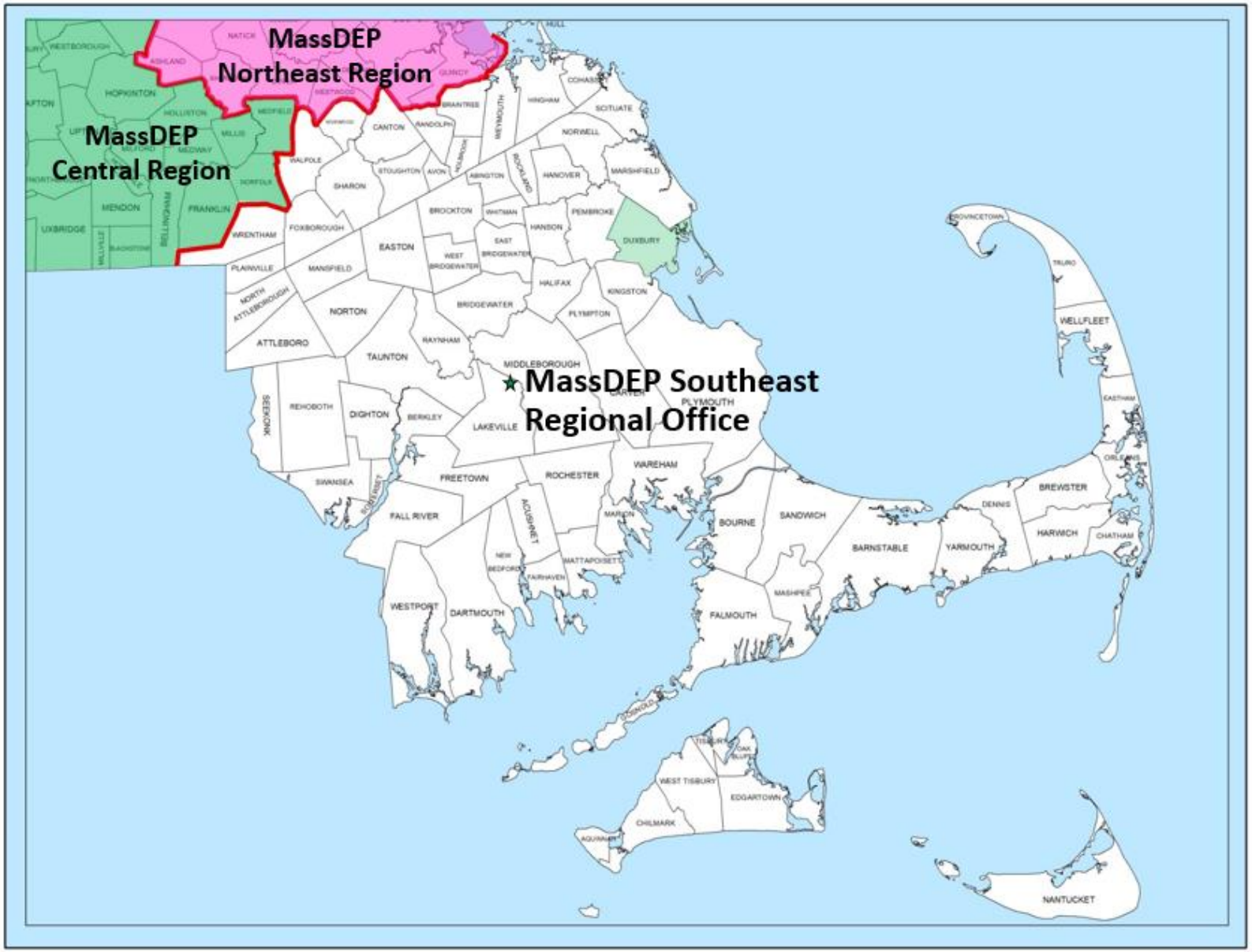
April 11, 2022

Massachusetts Department of Environmental Protection (MassDEP)

MassDEP
Southeast Regional Office

Millie Garcia-Serrano, MPH
Regional Director
Lakeville, MA

MassDEP's Southeast Region



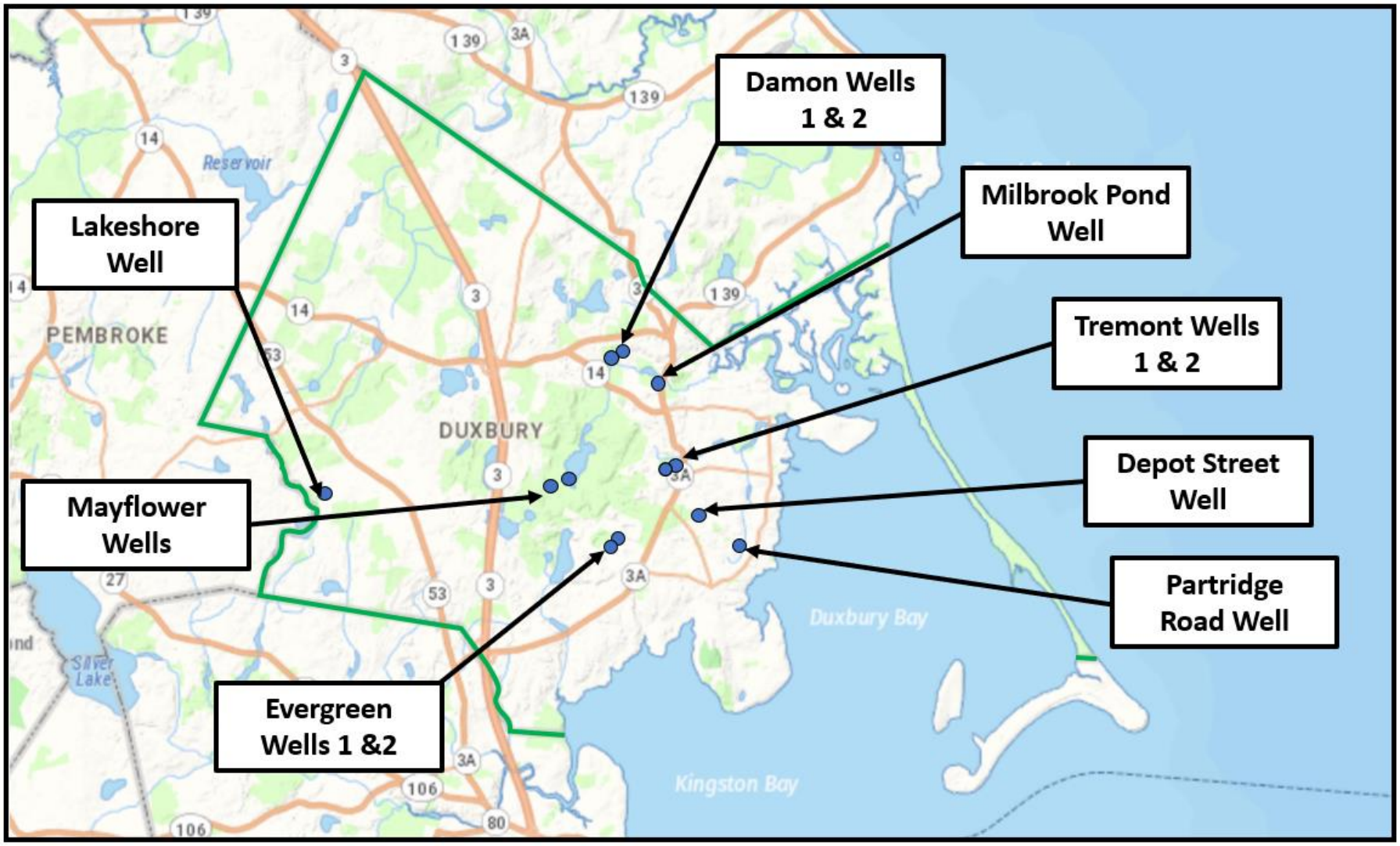
Duxbury Drinking Water:
Where does it come from?
How is it regulated, treated and tested?

Jim McLaughlin

Drinking Water Program Section Chief

MassDEP Southeast Regional Office

Source of Duxbury Drinking Water



Regulated by the Safe Drinking Water Act

- Safe Drinking Water Act passed by Congress in 1974
- Authorizes US Environmental Protection Agency (EPA) to set national health-based standards to protect against natural-occurring and man-made contaminants
- Requires actions to protect drinking water and sources: rivers, lakes, reservoirs, springs, and groundwater
- MassDEP has a compendium of standards and guidance values available for evaluating contaminants in Massachusetts drinking waters
- EPA, MassDEP and Public Water System Operators work together to provide drinking water that is safe

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Treatment of Duxbury Public Water

- Each well has its own pump station and chemical feed equipment to:
  - add sodium hydroxide to reduce the acidity of the water in to minimize lead and copper leaching out of plumbing and
  - add fluoride for dental health
- Some of the wells require additional chemicals to reduce or iron and manganese that is naturally occurring
  - Sodium hexametaphosphate is used to accomplish this and minimize brown water complaints.
- The Evergreen Wells require green sand filtration due to high concentration of iron and manganese
  - Sodium hydroxide, potassium permanganate and sodium hypochlorite are injected into the water prior to filtering

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Testing of Duxbury Public Water

Water from the Duxbury Water Supply Wells is regularly analyzed for:

- Bacteria
- Inorganic compounds
  - Metals, nitrite/nitrate, perchlorate
- Synthetic organic chemicals
  - Pesticides, polychlorinated biphenyls (PCBs), furans, etc.
- Volatile organic compounds (VOCs)
  - Benzene, toluene, trichlorethylene, etc.
- And now… the six per- and polyfluoroalkyl substances (PFAS6), a contaminant of emerging concern

Annual Consumer Confidence Reports with the analytical results sent to customers every year

- Sent by July 1st
  - Duxbury CCRs available at: 2020_ccr.pdf (duxbury.ma.us)

MassDEP

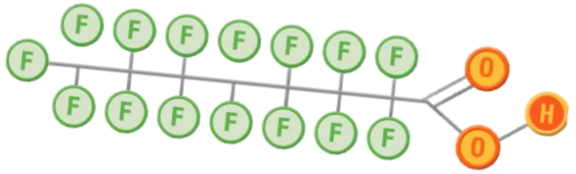
PFAS and Drinking Water

C. Mark Smith, Ph.D.
Director
MassDEP Office of Research and Standards
Boston, MA

and

Damon Guterman
Drinking Water Program
Boston, MA

What are Per- and Polyfluoroalkyl Substances (PFAS)?



- Man-made chemicals
- Used in stain-resistant, water-resistant, and non-stick products, firefighting foams, food packaging, outdoor clothing, carpets, leather goods, ski waxes, and more
- Persistent in the environment, leaching into groundwater from spills, landfills, air deposition
- Linked to health risks, particularly in immuno-compromised individuals, women who are pregnant or nursing, and infants

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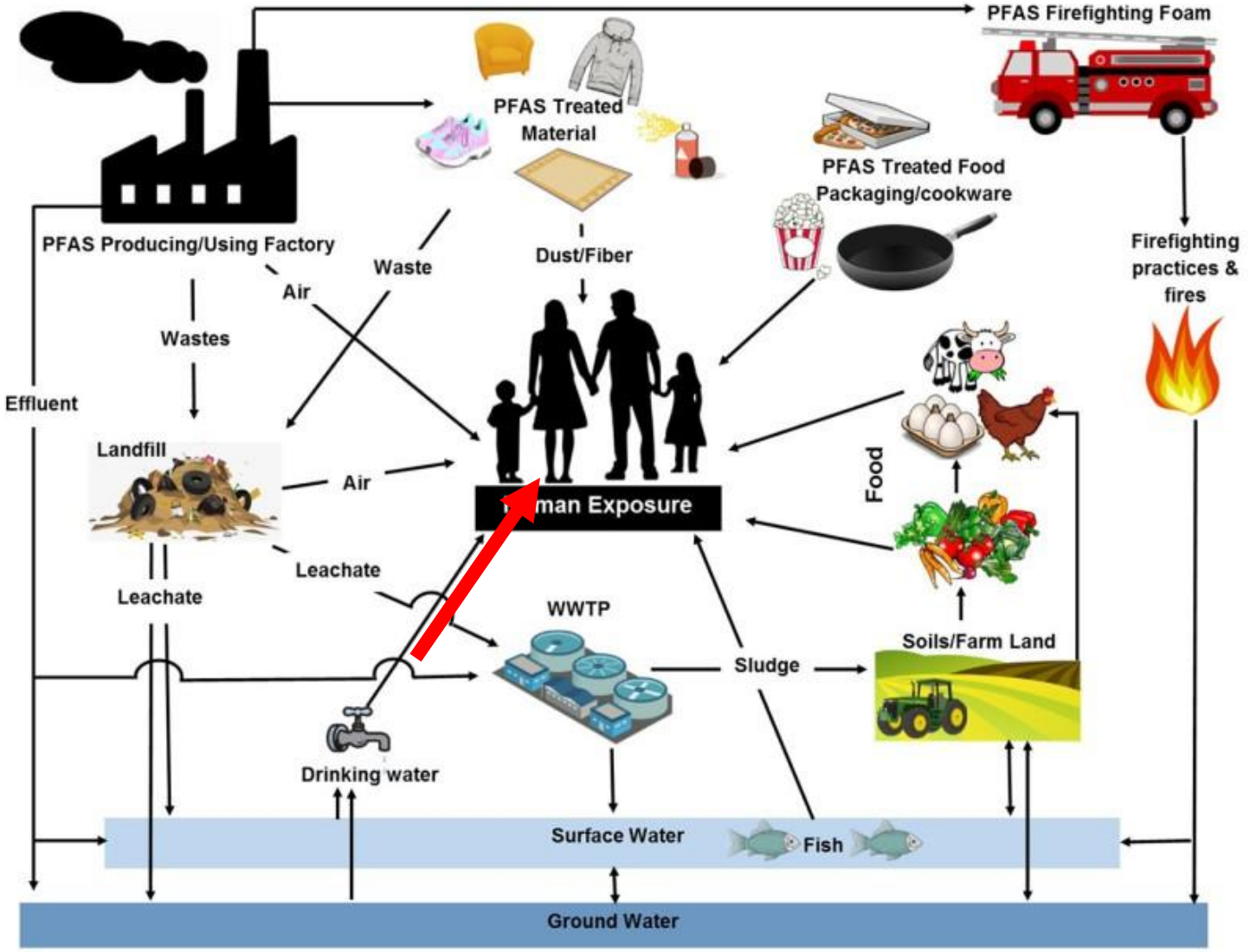
Environment & Human Exposure to PFAS



Human Exposure and sources of PFAS
Image: DWP, adapted from Oliaei et al. 2013.

MassDEP Addressing PFAS

May 2016

USEPA issued a health advisory of 70 ppt for the sum of two PFAS compounds in drinking water

June 2018

MassDEP ORS issued a drinking water guidance for the sum of five PFAS compounds of 70 ppt

January 2019

MassDEP revised the ORS Guideline for the sum of six PFAS compounds to 20 ppt to align with anticipated regulations

December 2019

MassDEP issues final rules for soil & groundwater cleanup under the Massachusetts Contingency Plan (MCP)

October 2020

MassDEP issues final drinking water regulations establishing a Maximum Contaminant Level (MCL) of 20 ppt

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MassDEP PFAS Regulations

Soil & Groundwater
(Massachusetts Contingency Plan)
310 CMR 40.16

Effective 12/27/19

Massachusetts is only one of two states with comprehensive cleanup standards for soil and groundwater

Parties responsible for soil and groundwater contamination will be required to cleanup groundwater that could be used as drinking water to meet the 20 ppt standard

Drinking Water
(Massachusetts Maximum Contaminant Level)
310 CMR 22.00

Effective 10/2/20

Establishes a limit of 20 ppt for the sum of six PFAS compounds (PFAS6), providing a higher degree of protection than any other state

Requires public water suppliers to test for PFAS6 on a quarterly basis and act when there is a detection above the limit; implementation staggered based on community public water supplier size

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Drinking Water Values for PFAS by State

	PFOS	PFOA	PFNA	PFHxS	PFHpA	PFDA
U.S. EPA Health Advisory	**70 Sum of two**		**NA**	**NA**	**NA**	**NA**
MA MCL, GW standard	**70 (2018 ORSG) → 20 (MCL; MCP GW standard) Sum of five → Sum of six (add PFDA) MCL October 2020: Sum of six PFAS = 20**					
VT MCL	**20 Sum of five**					**NA**
CT Action Levels	**70 Sum of five**					**NA**
WI Recommended GW standard	**20**					
ATSDR Based on draft ATSDR toxicity values and EPA exposure parameters	**7**	**11**	**10**	**70**	**NA**	**NA**
NY MCL	**10**	**10**	**NA**	**NA**	**NA**	**NA**
NJ MCL	**13**	**14**	**13**	**NA**	**NA**	**NA**
CA Notification levels (Response Levels)	**6.5 (40)**	**5.1 (10)**	**NA**	**NA**	**NA**	**NA**
MI MCL	**16**	**8**	**6**	**51**	**NA**	**PFNA value recommended**
MN guidelines	**15**	**35**	**NA**	**47**	**NA**	**NA**
NH MCL	**15**	**12**	**11**	**18**	**NA**	**NA**
Most other states (EPA value by default)	**70**		**NA**	**NA**	**NA**	**NA**

Results are in nanograms per liter (ng/L or parts per trillion (ppt)

PFAS6 Drinking Water Standard

- Regulations establish a new Maximum Contaminant Level: highest level of a contaminant allowed in drinking water. MCLs are enforceable standards
- Program Review: MassDEP required to review regulations every three years to ensure we are incorporating, reflecting, responsive to the latest science.
- PFAS6 Maximum Contaminant Level (MCL) is 20 ng/L (ppt) for the sum of six PFAS compounds
  - PFOS: perfluorooctane sulfonic acid
  - PFOA: perfluorooctanoic acid
  - PFHxS: perfluorohexane sulfonic acid
  - PFNA:perfluorononanoic acid
  - PFHpA: perfluoroheptanoic acid
  - PFDA: perfluorodecanoic acid
- No federal (EPA) drinking water standard:
  - PFOS and PFOA health advisory only

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Ongoing Evaluation

- Massachusetts Maximum Contaminant Level (MMCL) requires reassessment at least every three years
  - Reflects rapidly expanding scientific data
  - Potential updates to current regulation covering subclass of PFAS
  - Potential expansion to include guidelines for additional PFAS
    - Some other states have developed, or are considering, values for PFBA; PFBS; PFHxA, and GenX
- MassDEP's Office of Research and Standards developing PFAS database and tracking scientific developments
  - Including carcinogenicity data

MCL Applicability to Public Water Systems

Massachusetts Maximum Contaminant Level (MCL) applies to:

- Community Water Systems (year-round residential customers)
- Non-transient, Non-Community Water Systems (NTNCs)
  - Schools/Daycares, Larger Businesses (25+ employees)

Massachusetts Maximum Contaminant Level (MCL) does not apply to:

- Transient, Non-Community Water Systems (TNCs)
  - Recreational Areas, Campgrounds, Hotel/Motels, Small Businesses
  - But they must collect one sample
- Consecutive Systems (those that purchase all their water)

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State Funding for PFAS Remediation

- Funding provided by two supplemental budgets: Chapter 142 of the Acts of 2019 and Chapter 31 of the Acts of 2020)
- $8.4 million for Public Water System testing and treatment design, including reimbursement for costs already incurred, including three rounds of grant funding:
    - PFAS Design Grants #1 - $1.98M to 10 PWS
    - PFAS Design Grants #2 - $3M for 17 PWS
    - 1st Interim PFAS6 Response Grants – 7/8/21 application deadline
  - State funding for Public Water System Testing
  - Free Private Well Drinking Water testing

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State Funding for PFAS Remediation

- Clean Water Trust; State Revolving Fund will include some funds for PFAS:
  - American Rescue Plan Act of 2021 (ARPA)
    - $100M-$175M proposed for CSOs, PFAS, Lead Service Lines
  - Bipartisan Infrastructure Deal (BID)
    - $1.5B expected through SRF over five years
- State Revolving Fund: priority funding; will provide principal forgiveness and zero-percent interest on loans
- To Date: $180 million in State Revolving Fund financing for 16 projects

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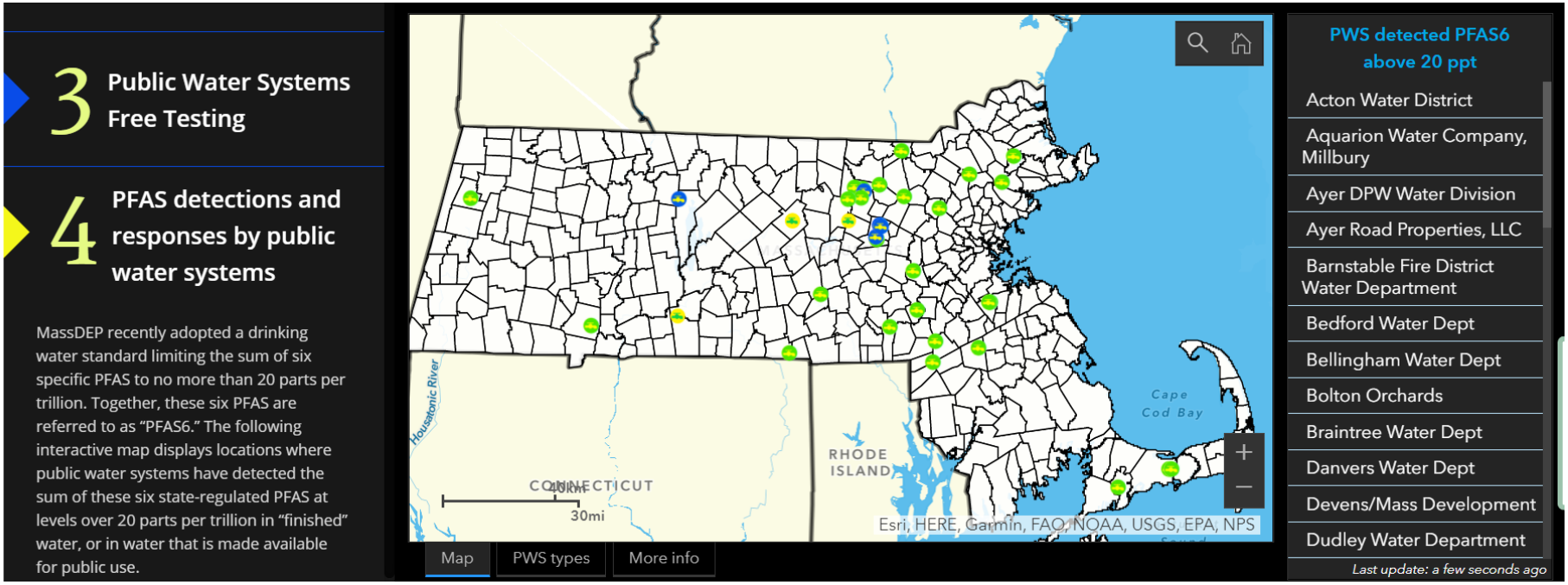
PFAS in Public Water Systems

- About 600 Public Water Systems (PWS) have sampled, including all 25 of the largest systems
- Of the Public Water Systems tested:
  - Many systems report results with no issues
  - MassDEP is currently working with 23 Community Systems on short- and-long term measures to address exceedances identified through testing

MassDEP PFAS6 Story Map



https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas#pfas-detected-in-drinking-water-supplies-in-massachusetts-

PFAS6 Impacts to the Duxbury Public Water Supply

Gerard Martin

Deputy Regional Director

Bureau of Water Resources

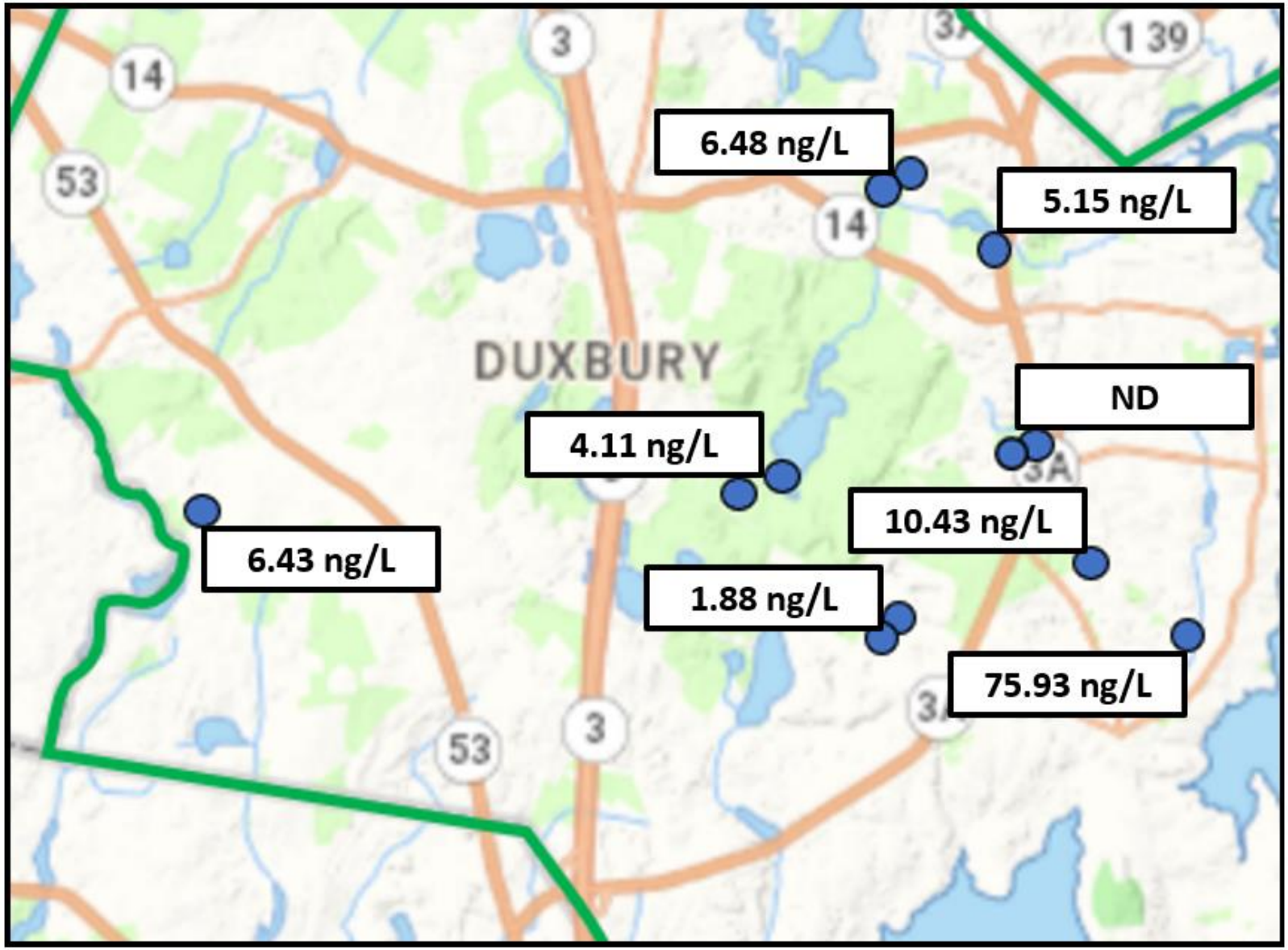
MassDEP Southeast Regional Office

PFAS6 in Duxbury Drinking Water

Public Well	Date Sampled					
	4/21	5/21	6/21	10/21	1/22	2/22
Milbrook Pond Well	5.17			3.67	5.93	
Partridge Street Well	**75.93**	4.25	**105.21**	**79.90**	**83.20**	
Depot Street Well	10.43	ND		12.00	14.90	
Lake Shore Drive Well	6.43	5.71		6.25	8.97	
Tremont Street Wells (1 & 2)	ND			ND		ND
Evergreen Wells (1 & 2)	1.88	ND		2.28	4.39	
Mayflower Wells (1 & 2)	4.11	3.77		2.20	6.26	
Damon Wells (1 & 2)	6.48	5.67		6.39	7.83	

Results are in nanograms per liter (ng/L) or parts per trillion (ppt)
ND = not detected above the method detection limit of 2.0 ng/L
Blank square indicates sample not collected.

PFAS6 in Duxbury Drinking Water



Public Outreach/Public Notice

- A Public Notice was posted on the Town's Website on July 16, 2021 and issued to Duxbury Customers on July 26, 2021
- The Public Notice included:
  - PFAS6 results for the Partridge Road Wells samples
  - PFAS6 definition
  - Information on what you can/should do
  - Information on what is being done by the Duxbury Water Department

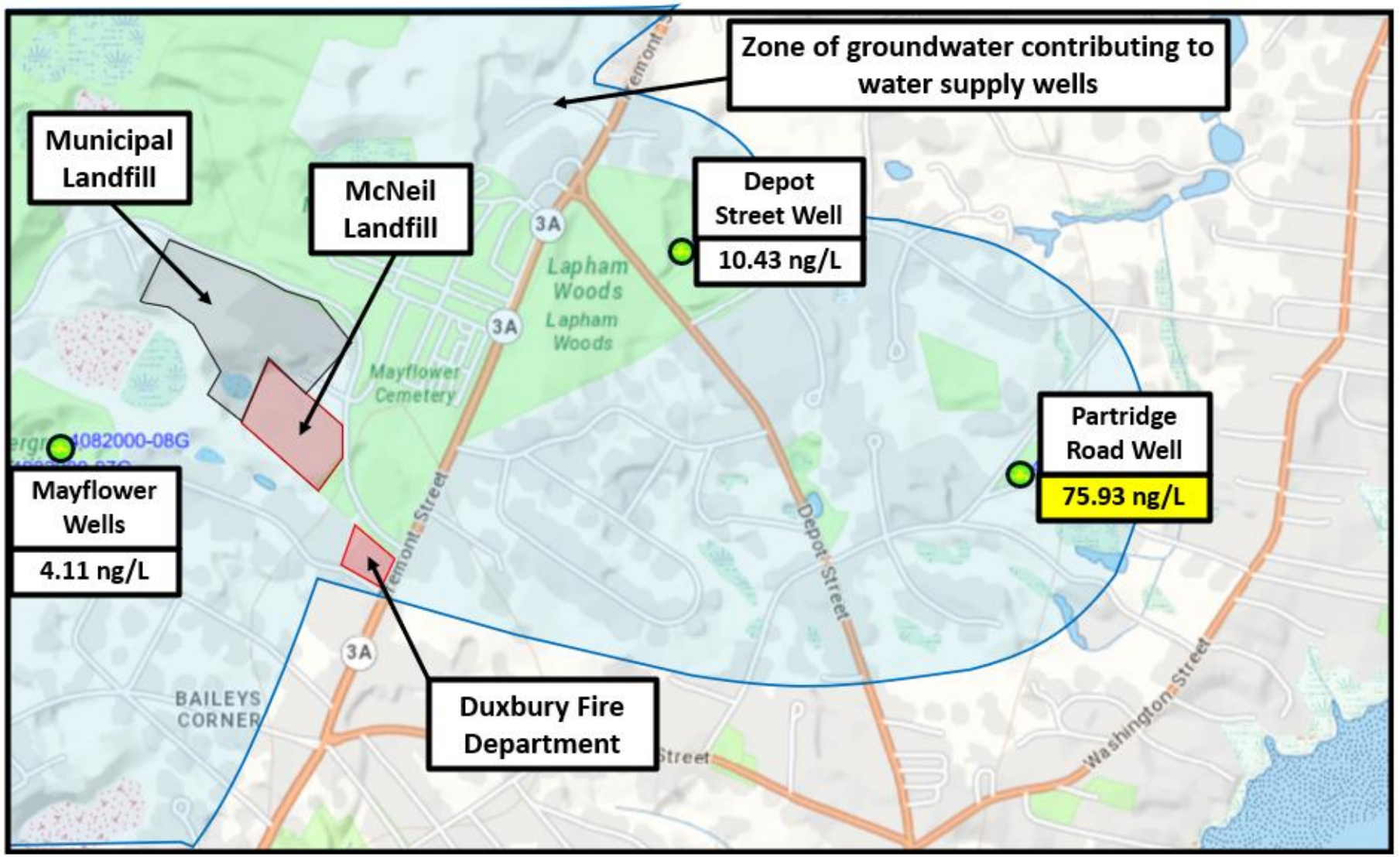
What is Being Done?

- Partridge Road Well was taken out of service
  - This well is a minor source of water
  - The Water Department is investigating treatment options
- Continue monitoring drinking water for PFAS
- Include this information in the Master Plan under development to assist the Town moving forward with capital expenditure suggestions to improve overall water quality

PFAS Source Discovery

- MassDEP will is conducting an investigation to identify potential sources of PFAS
- If a potentially responsible party (PRP) is identified they will be required to assess and cleanup the source of PFAS in the environment

PFAS Source Discovery



PFAS ASSESSEMENT
AT
DUXBURY LANDFILLS

Mark Dakers

Chief - Solid Waste Management Section

Bureau of Air & Waste

MassDEP Southeast Regional Office

Potential Source of PFAS in Groundwater - Landfills

- Two (2) Unlined Landfills: Municipal Landfill and Duxbury Landfill, Inc.
- Landfills: Considered a potential source of PFAS
- Landfills in the Recharge Area of Partridge Road Well
- Leachate = Rainwater percolating through buried waste picks chemicals and constituents from waste
- Leachate flows out bottom of waste into soils and groundwater below

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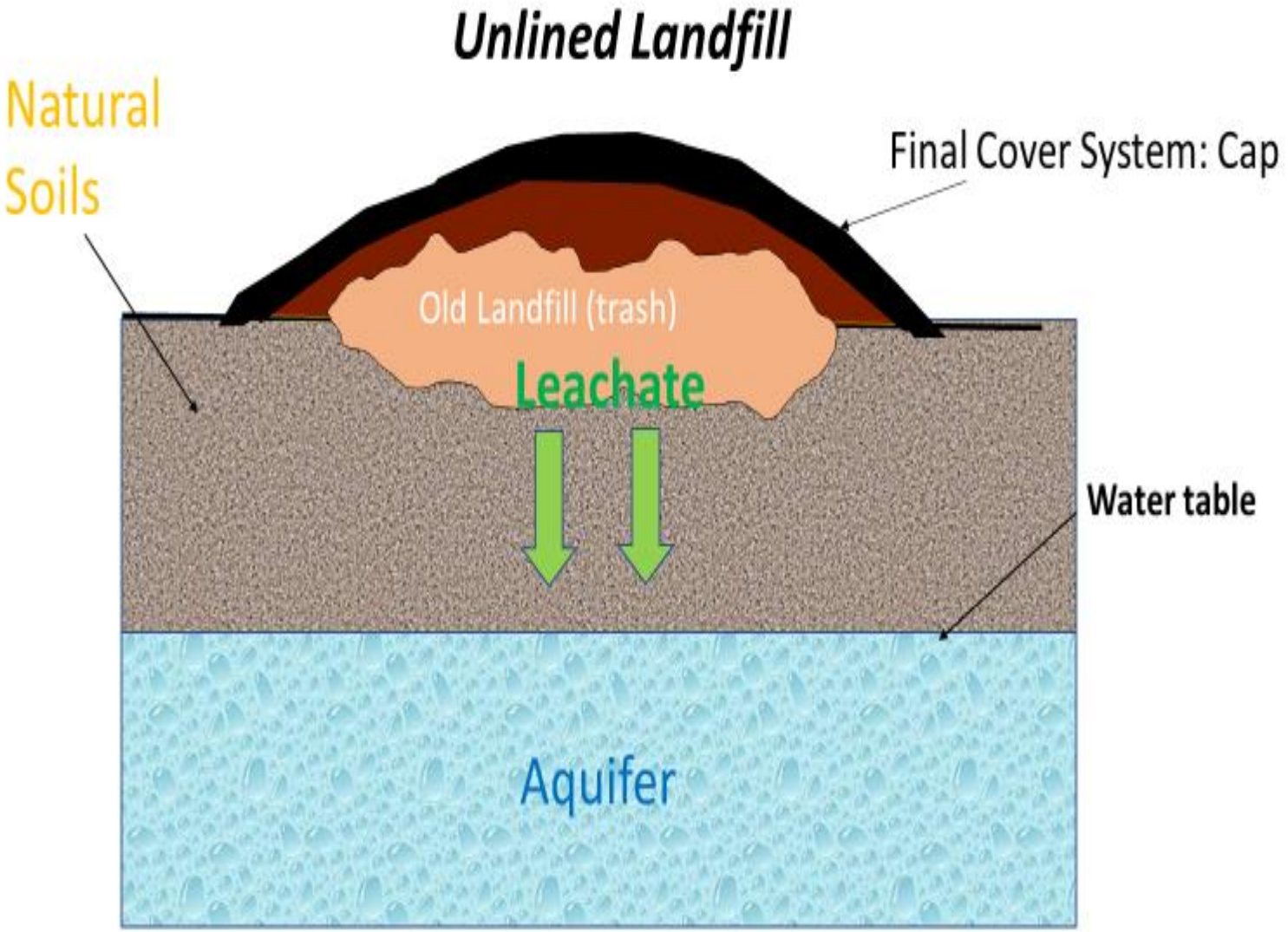
Unlined Landfill
Natural Soils
Final Cover System: Cap
Old Landfill (trash)
Leachate
Water table
Aquifer

DUXBURY MUNICIPAL LANDFILL

- 19-acre parcel with 12-acres of waste area
  - 1904 - 1968 Burn Dump
  - Sanitary Landfill until 1976
- Closure: Unlined and capped in 1977 with two-foot low permeability soil – MassDEP approved Closed
- Assessment: Comprehensive Site Assessment approved by MassDEP June 2001
- Ongoing Post-Closure Monitoring
- Located in a Zone of Contribution of several Public Water Supplies

MUNICIPAL LANDFILL ASSESSMENT FINDINGS

- 2001 Assessment - No significant groundwater impacts identified (PFAS not evaluated)
- Located in a Zone of Contribution of Public Water Supplies
- No Private Wells identified down-gradient
- April 2011 – Permit to Revise Post-Closure Groundwater Monitoring Plan
  - 2003 – 2010 data indicated no exceedances of GW-1 Standards

DUXBURY LANDFILL, INC.

- Closure status listed “Incomplete” – not capped, also know as “McNeil Dump”
- 7-acre parcel, southeast & adjacent to Municipal LF
- Facility acquired by Town under Tax Title
- Historic Operations: Sand & Gravel Pit followed by use as Open Dump (MSW). Fire Fighting Foams, which typically contain PFAS, potentially used to extinguish fires that occurred during operations
- Limited assessment/monitoring conducted to date (i.e., 1987 Hydrogeologic study)

MassDEP

Assessment PFAS of both Landfill(s)

- January 2022 – Landfill Permit Application submitted to MassDEP by Town – *currently under review*

  1. Evaluate Both Landfills as Potential Sources PFAS in Groundwater
     - 10 Groundwater Monitoring Wells at Municipal Landfill
     - 4 Groundwater Monitoring Wells at McNeil Landfill
  2. McNeil Landfill Assessment
     - 6 Soil-gas monitoring probes at McNeil Landfill
     - 16 Test pits at McNeil Landfill
  3. Collect additional information on 1,4-Dioxane

  Next Steps: MassDEP permit decision within 2 weeks

How to REVIEW the Landfill Permit Application

- The application may be reviewed online at: https://eeaonline.eea.state.ma.us/EEA/PublicApp/.

- **Instructions**: Scroll down on the first screen and in the "Site Name/Location Name" box type **Duxbury Landfill** and then scroll down and click on the orange "Search" box the bottom of the page. Under "Record Type", select the "Application" file with the **1/19/2022** "Application Date". The Permit Application and supporting documents will appear in blue links. Click on one link at a time to access each separate document.

- If you have any trouble viewing the application, please contact Doug Coppi of MassDEP at Douglas.Coppi@mass.gov with subject line "Application HELP".

Questions?