MBTS Water Resources Protection Task Force

Working Group 4 - Quality & Contaminants
Update 2022-05-12

Lynn Atkinson, Randi Augustine, Jessica Lamothe, Gordon Turner

Working Group Tasks

Assess Current Situation

- Current stats and trends
- Update HW report
- Projections (collect / make)

ID and Understand Key Issues

- PFA fixes (short/long term)
- Long-standing contaminants
- Potential as-yet unidentified issues

Topics the group is investigating

- Historical trends from DEP data
- Potential sources of contamination
    - Golf course
    - Burn dump
    - Transfer station dump
    - Gas stations
    - Other sources (DEP database)
- Understand stormwater drainage / runoff

Historical contaminant trends

Overview

- DPW reports to the Massachusetts Department of Environmental Protection (DEP)
- Data are available through the Department of Energy & Environmental Affairs portal
- Town/DEP also publishes an Annual Drinking Water Consumer Confidence Report (CCR)

Data source

Data were downloaded from the Department of Energy and Environmental Affairs Data Portal on April 29, 2022 for the Manchester-by-the-Sea DPW (https://eeaonline.eea.state.ma.us/Portal/#!/search/drinking-water)

The portal currently lacks data for bacteria, lead and copper (not included)

Data for the Manchester Athletic Club and the Manchester Medical Office Building are available from the portal (but not included)

Identification of trends

Linear modeling was used to identify contaminants with significant trends

-Increased or decreased levels over time

Data were filtered to contaminants with n ≥ 3 measurements

- This eliminated raw water (n < 3) and contaminants with "ND" (no data/not detected)
- Therefore, all results are for finished water

Contaminants that show significant change: Gravelly Pond and Lincoln St Well
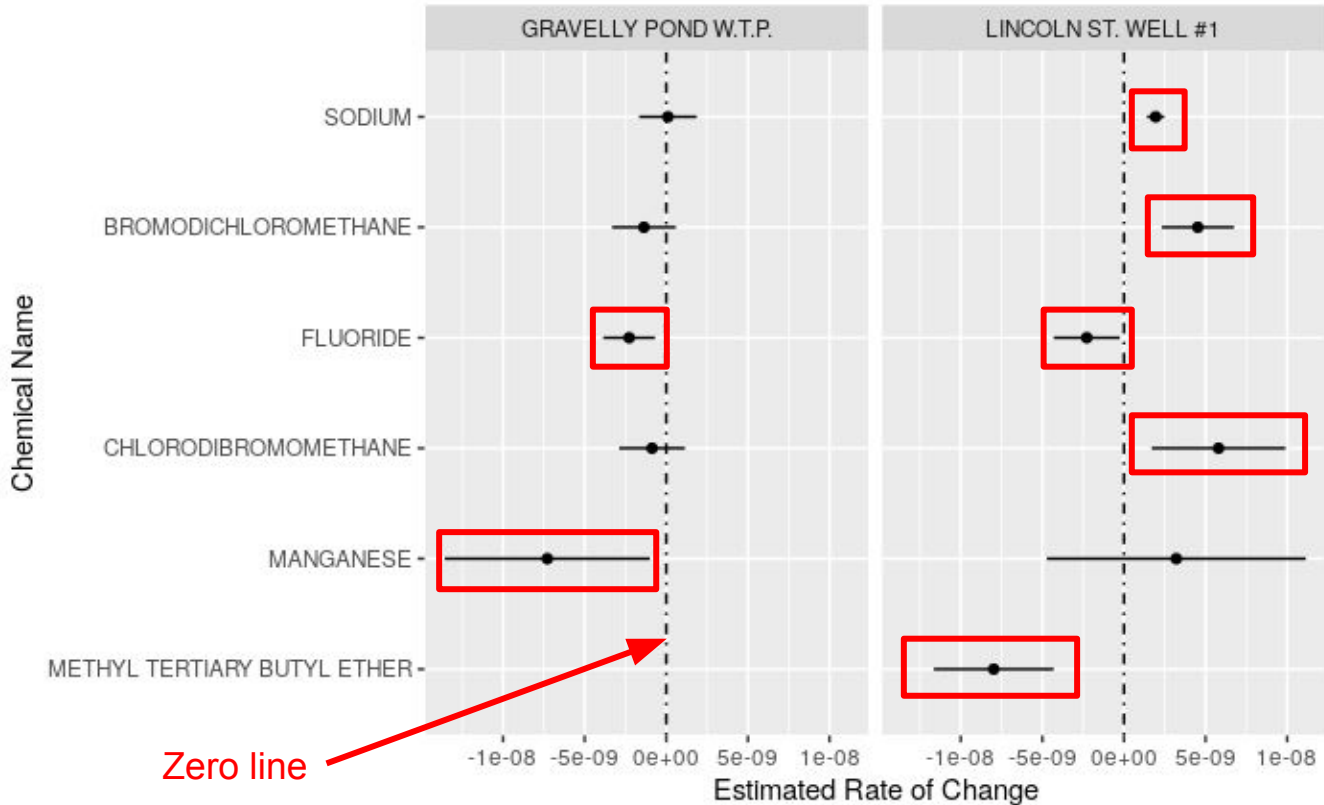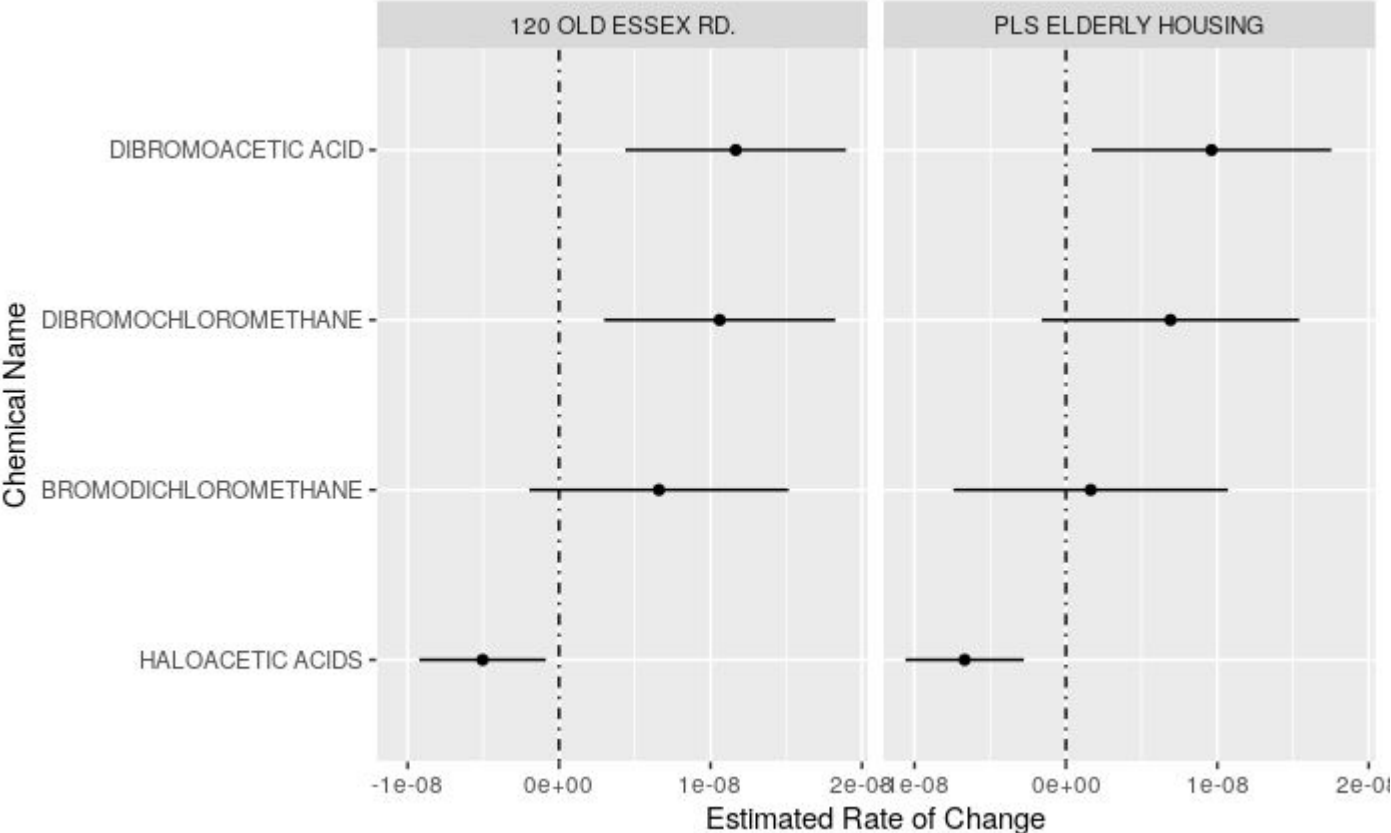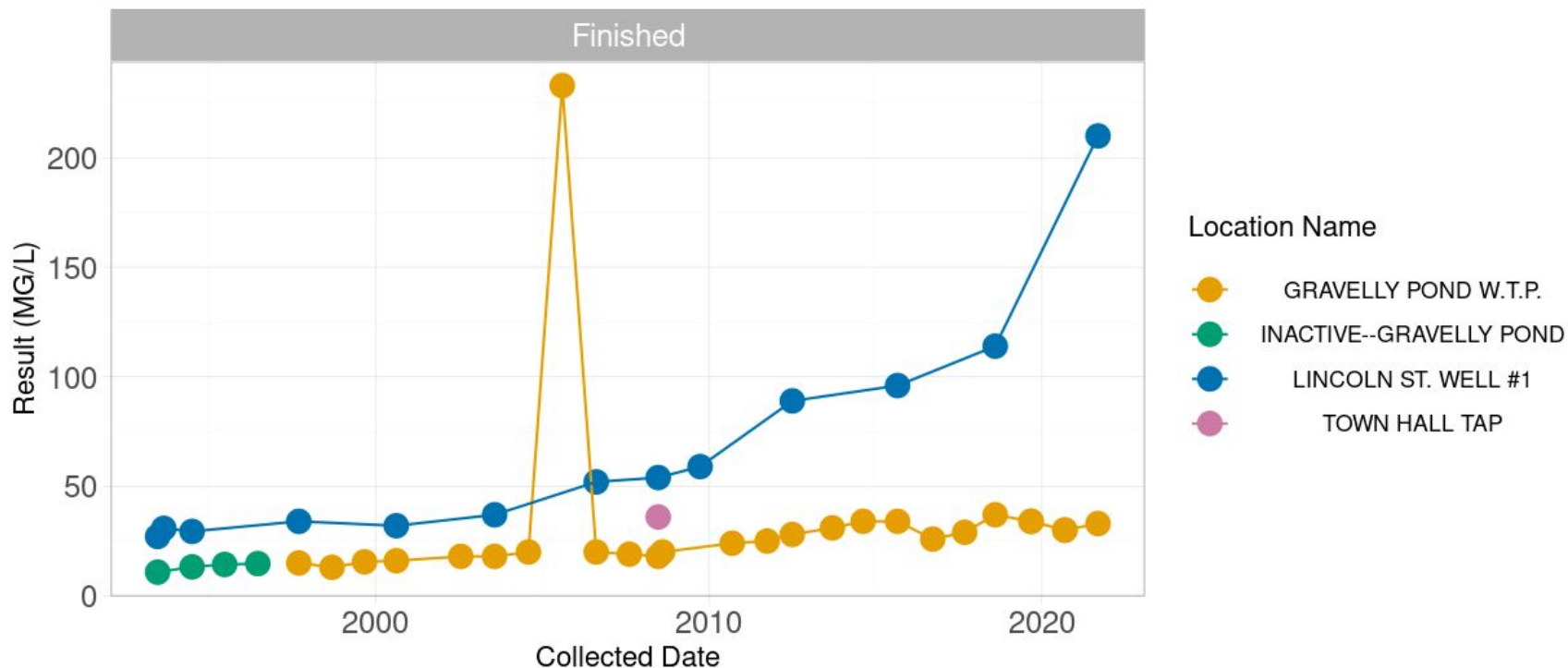

Significant change = confidence interval that does not cross the zero line

Increasing contaminants: right of zero line

Decreasing contaminants: left of zero line

Changing contaminants at other sites

Significant change = confidence interval that does not cross the zero line

Increasing contaminants: right of zero line

Decreasing contaminants: left of zero line

Graphical analysis of trends (1)

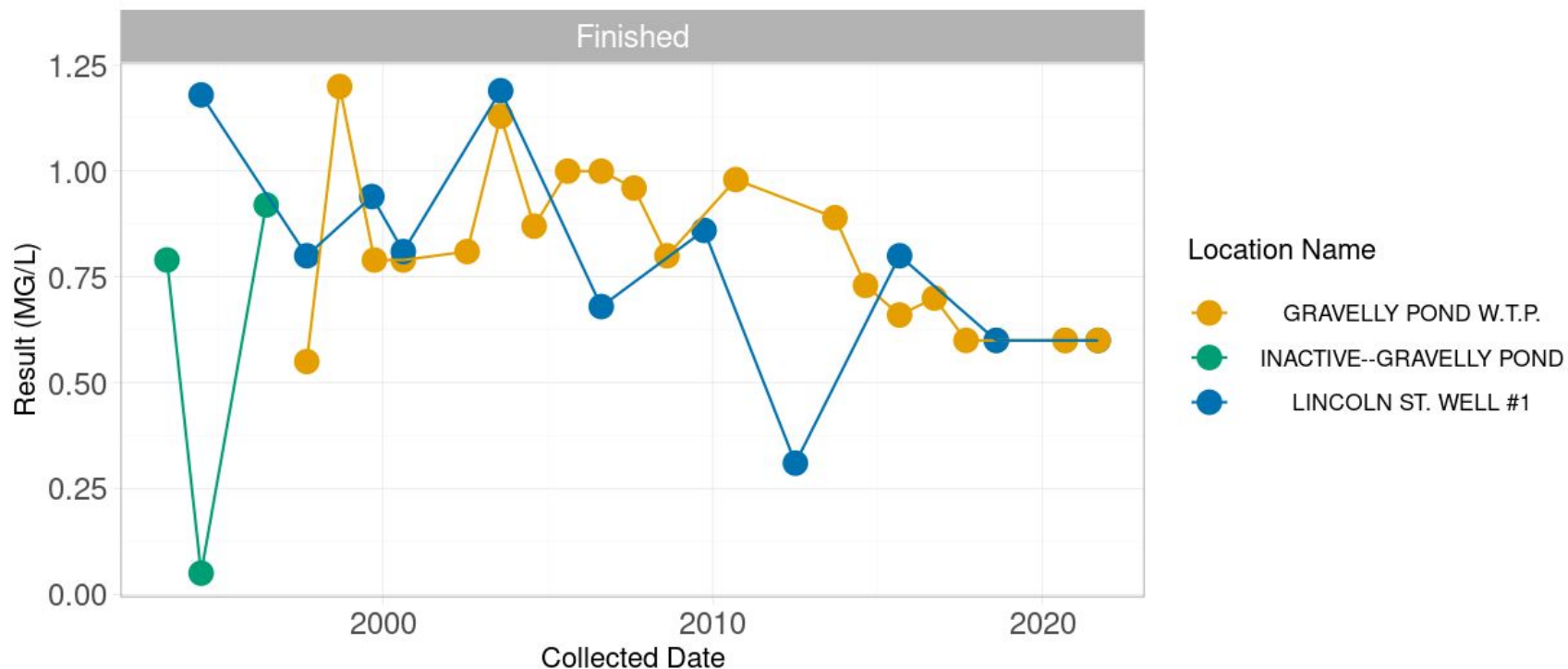# Graphical analysis of trends (2)

Graphical analysis of trends (3)

BROMODICHLOROMETHANE

Graphical analysis of trends (4)

DIBROMOACETIC ACID

Finished

Result (UG/L) vs Collected Date (2018, 2020, 2022)

Location Name
- 120 OLD ESSEX RD.
- PLS ELDERLY HOUSING
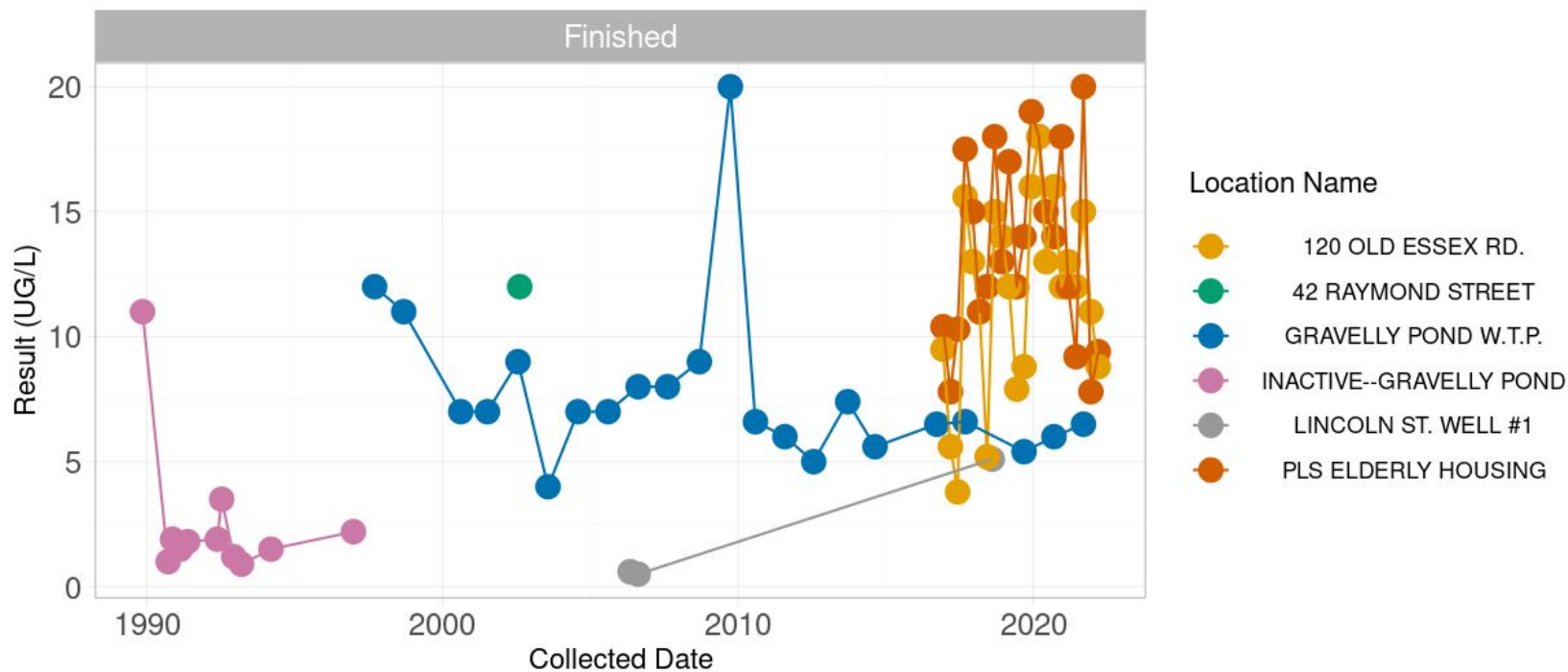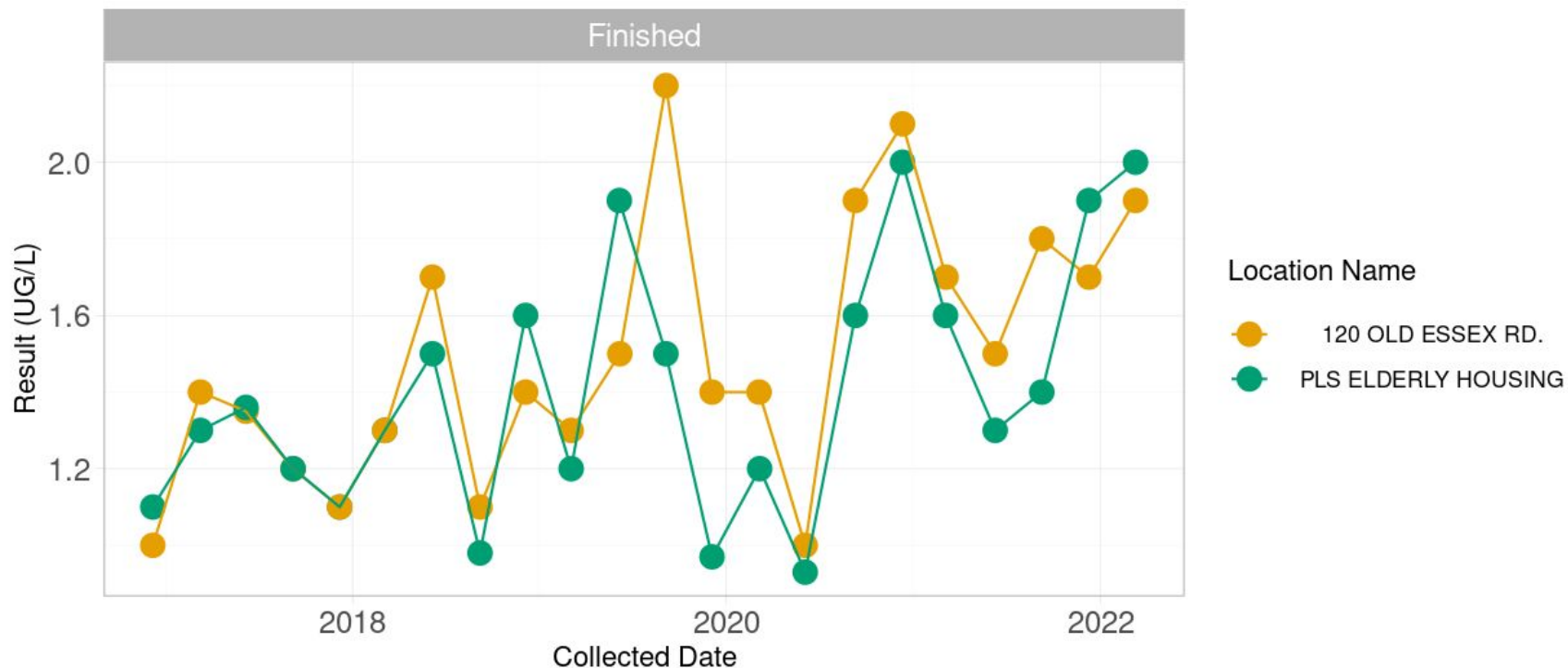
Click on a point to view details. Maximum Contaiminant Level (MCL) = NA

Graphical analysis of trends (5)

Explore more yourself!

Dashboard was published to ShinyApps.IO website portal:

https://data-by-the-sea.shinyapps.io/mbts-water-trends/

Free level with limited hours (25) per month of hosting.

We can explore other hosting options if the group feels this would be helpful for broader community access. (paid service, inquiry about non-profit access, etc.)

Summary

- Historical data dating back to as early as 1989 were downloaded from the Massachusetts Energy & Environmental Affairs website to analyze trends in drinking water contaminants over time.
- Linear modeling was used to identify contaminants whose trends are changing over time.
- Sodium in the Lincoln Street Well (LSW) appears to be one of the few tracked contaminants that has significantly changed since the 1990s, with a trend upwards beginning about 12 years ago.
- Other contaminants with upward trends appear to be byproducts of the water treatment process.
- Trends in PFAs are hard to interpret given the short duration of sampling, but are near the limit for the LSW

Open Questions

What are these additional sites reported along with the MBTS DPW sources?

Are more **raw water** tests available for Sodium to help narrow in on potential sources?

Have policy changes / regulations led to **lower fluoride levels**?