Looking for Sources of PFAS in Bay Area Wastewater

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SFEI AQUATIC SCIENCE CENTER
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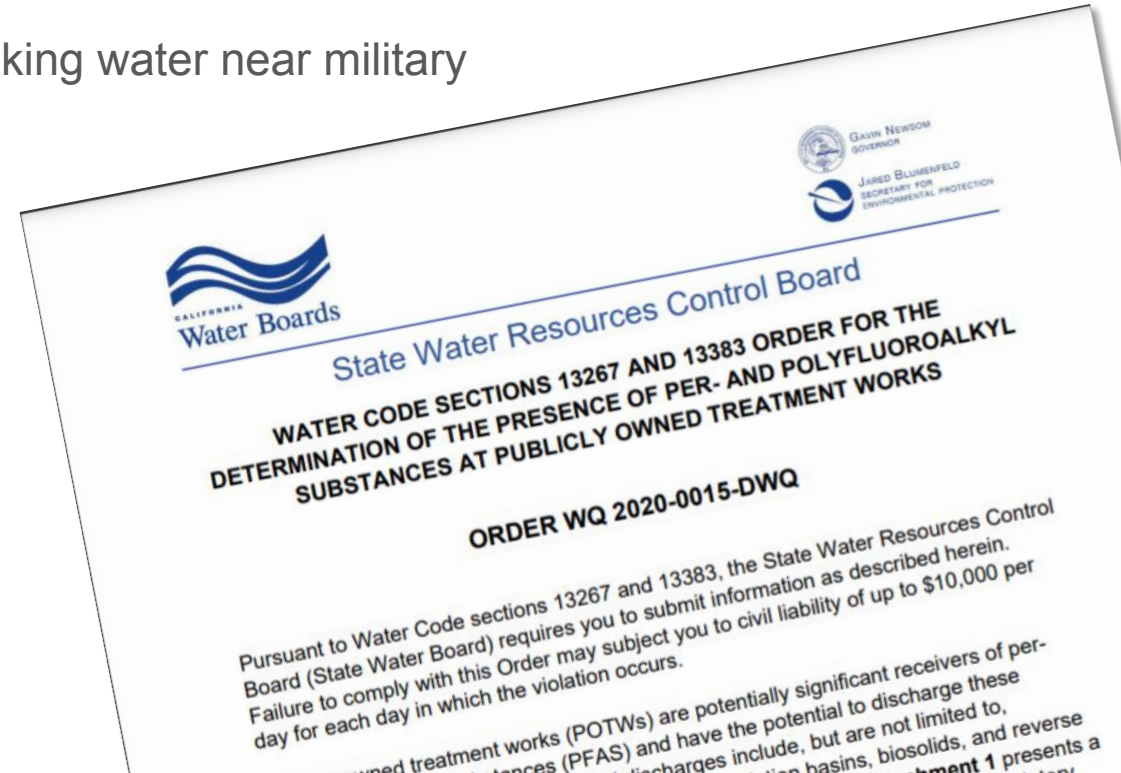
BACWA BAY AREA CLEAN WATER AGENCIES

SWB requires PFAS sampling in California

State Water Board has issued 13267/13383 Orders to:

- Drinking water systems (& drinking water near military facilities
- Airports and Landfills
- Chrome platers
- Bulk fuel terminals/refineries
- POTWs: 4x influent, effluent, and biosolids

  ⇒ except in Region 2



GAVIN NEWSOM
GOVERNOR

JARED BLUMENFELD
SECRETARY FOR ENVIRONMENTAL PROTECTION

CALIFORNIA Water Boards

State Water Resources Control Board

WATER CODE SECTIONS 13267 AND 13383 ORDER FOR THE DETERMINATION OF THE PRESENCE OF PER- AND POLYFLUOROALKYL SUBSTANCES AT PUBLICLY OWNED TREATMENT WORKS

ORDER WQ 2020-0015-DWQ

Pursuant to Water Code sections 13267 and 13383, the State Water Resources Control Board (State Water Board) requires you to submit information as described herein. Failure to comply with this Order may subject you to civil liability of up to $10,000 per day for each day in which the violation occurs.

...ned treatment works (POTWs) are potentially significant receivers of per-...stances (PFAS) and have the potential to discharge these ...discharges include, but are not limited to, ...tion basins, biosolids, and reverse ...**hment 1** presents a

How we leverage RMP's mature CECs program to best use resources

1. Inform region-wide understanding
   - (Nearly) all effluent goes to the Bay, not to drinking water sources

2. Develop study design that is efficient and informs management actions
   - Reduce unnecessary costs, resources by sampling representative POTWs
   - Region-wide QA/QC, data management and comparability
   - Investigate sources of PFAS
   - Flexible analyte list

3. Leverage other RMP PFAS studies to gain insight on PFAS fate and transport

Why is the R2/RMP study important?

- POTWs are PFAS receivers, not PFAS sources
- POTWs have limited ability to control PFAS sources or destroy PFAS
- We can use this study to better understand the magnitude, sources, transport, and fate of PFAS to best target management actions and source control efforts

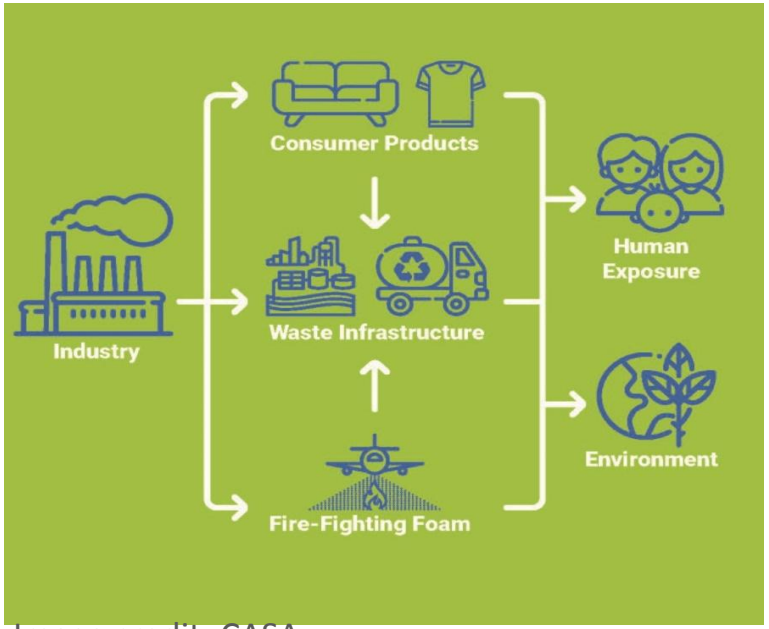


Image credit: CASA

Project Overview

Phase 1

Monitor representative subset of facilities in Q4 2020

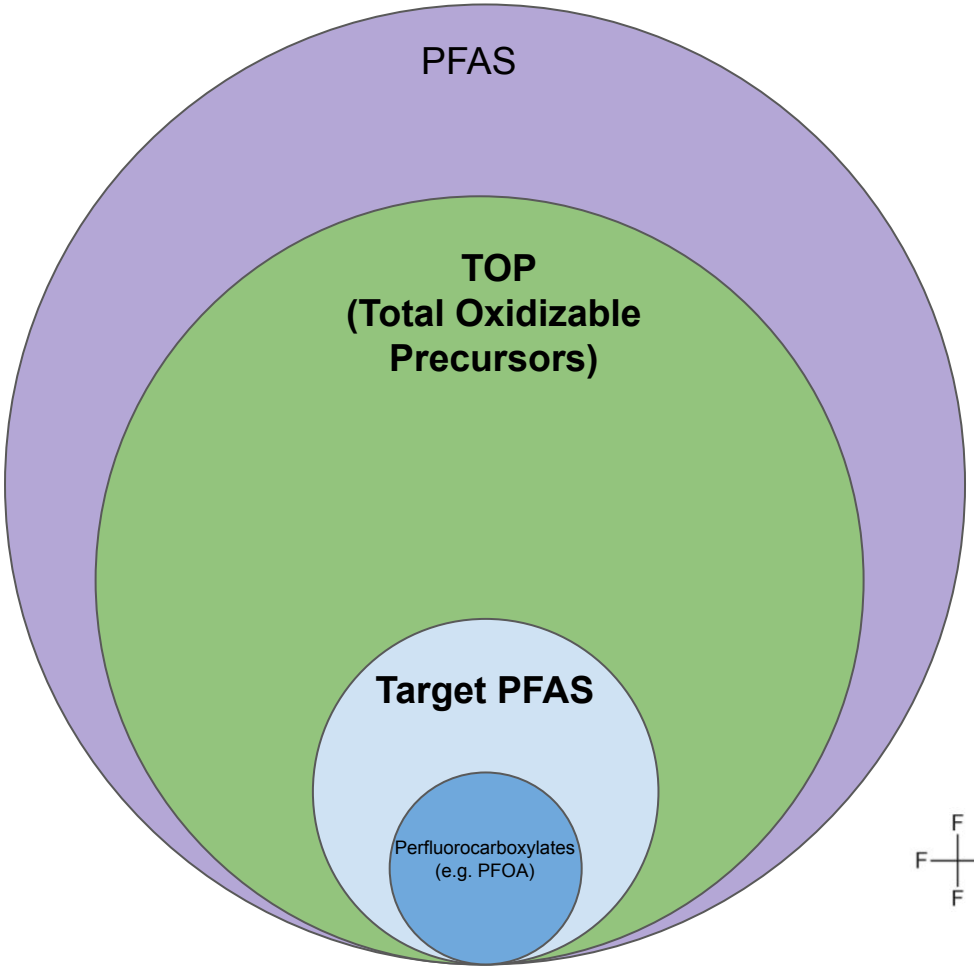
- 15 representative facilities were chosen to particpate based on size, geography, treatment processes and service area characteristics
- Sample influent, effluent, and biosolids using target and total oxidizable precursors (TOP) analysis

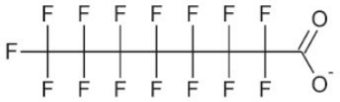
Phase 2

Additional monitoring and analysis based on Phase 1 Results (Beginning in Q1 2022)

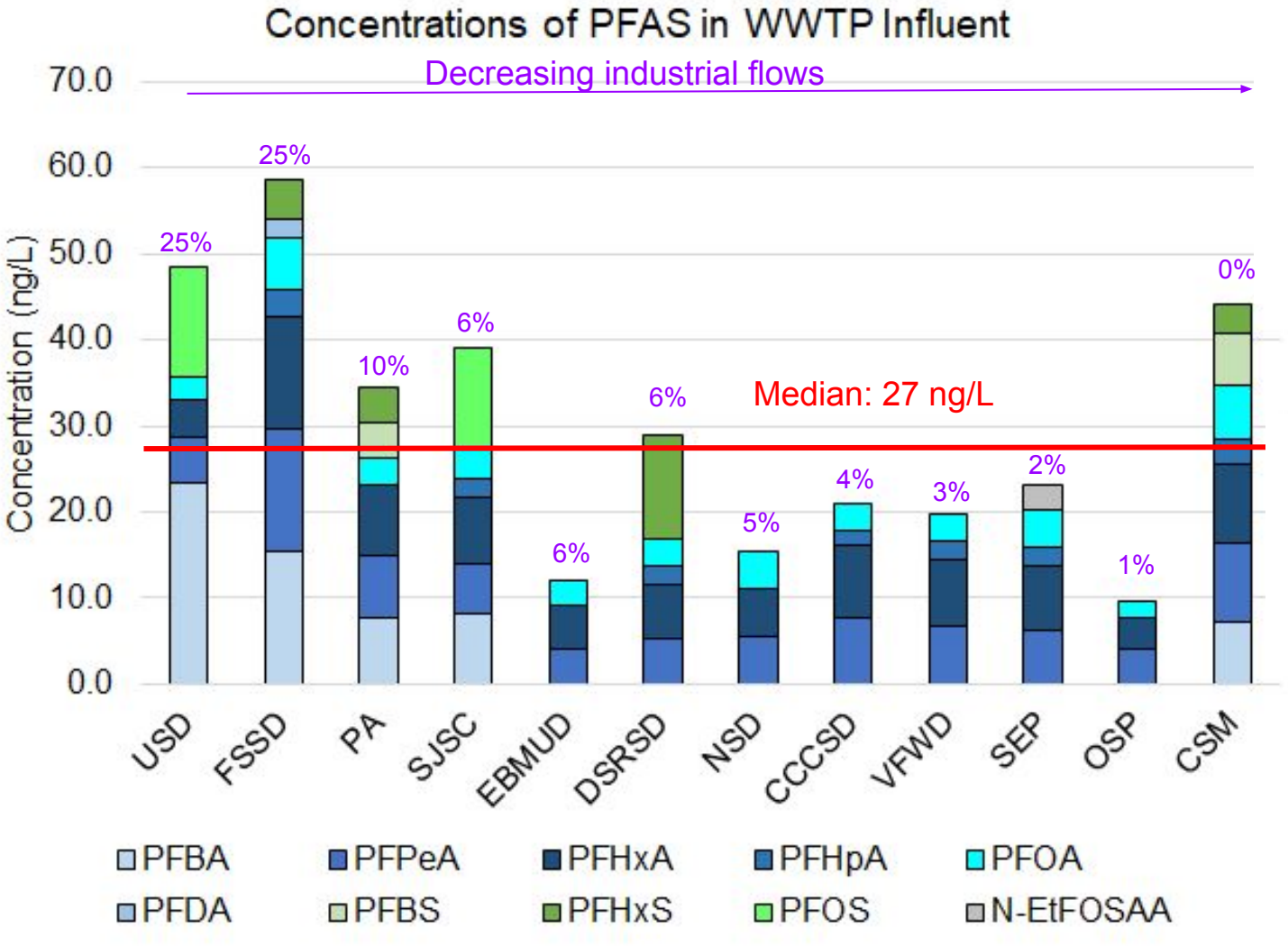
- Subset of Phase 1 agencies
- Followup on Phase 1 data gaps
- Investigate PFAS sources

PFAS Analytical Methods



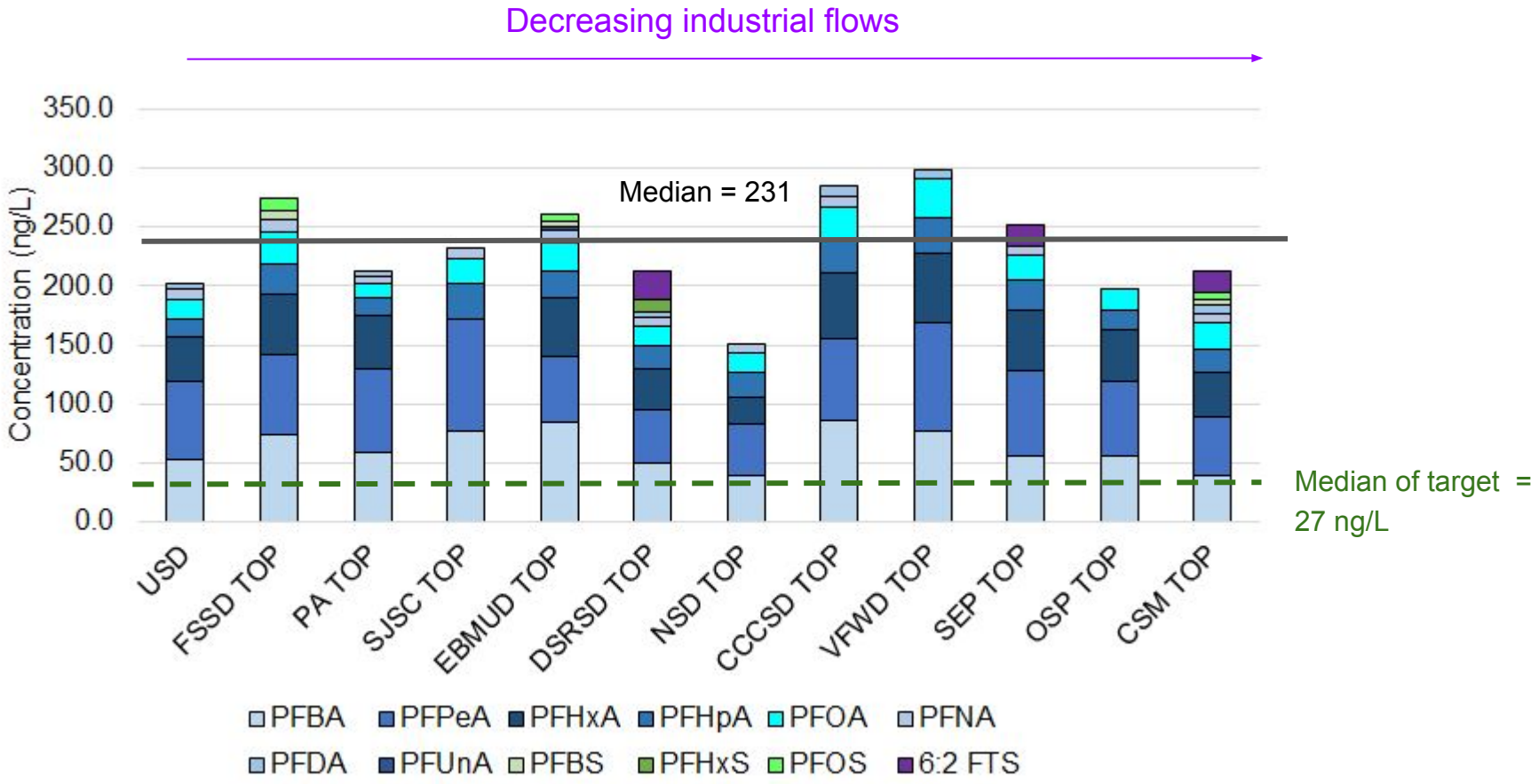


Phase 1 Results

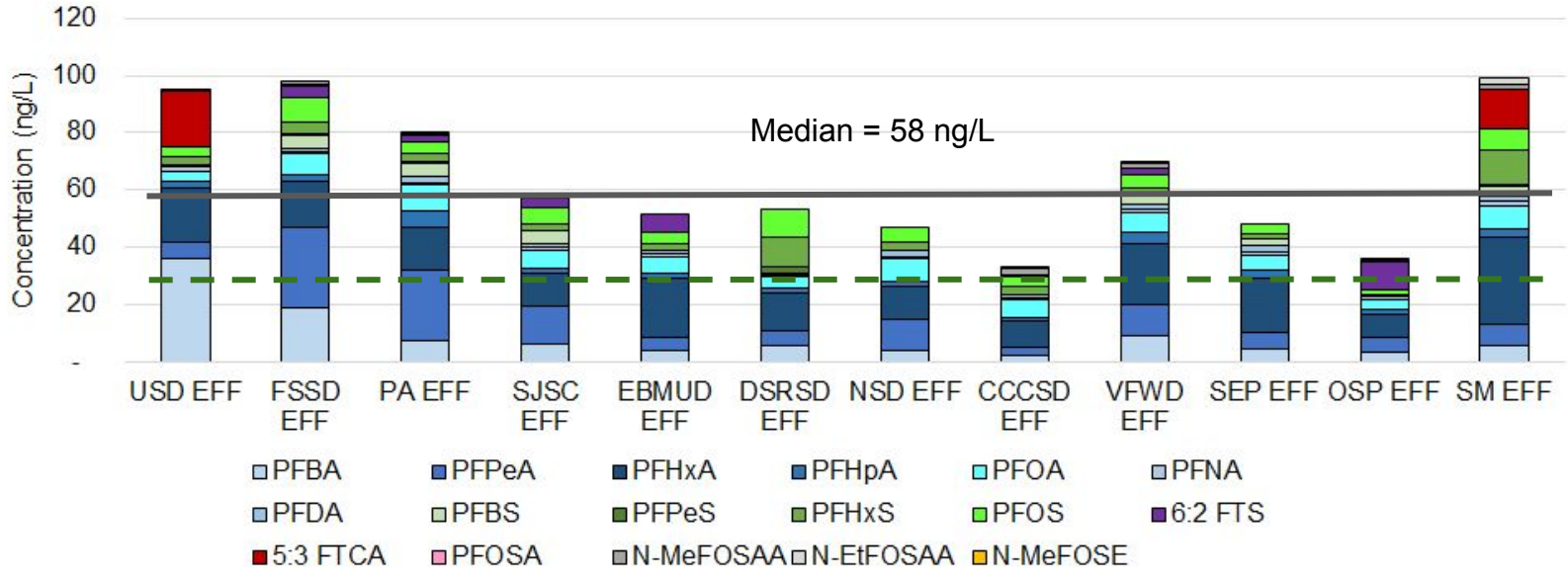


- **No clear trend observed from industrial flows**
- **PFAS in municipal facilities generally comparable**

TOP results indicate significant presence of precursors

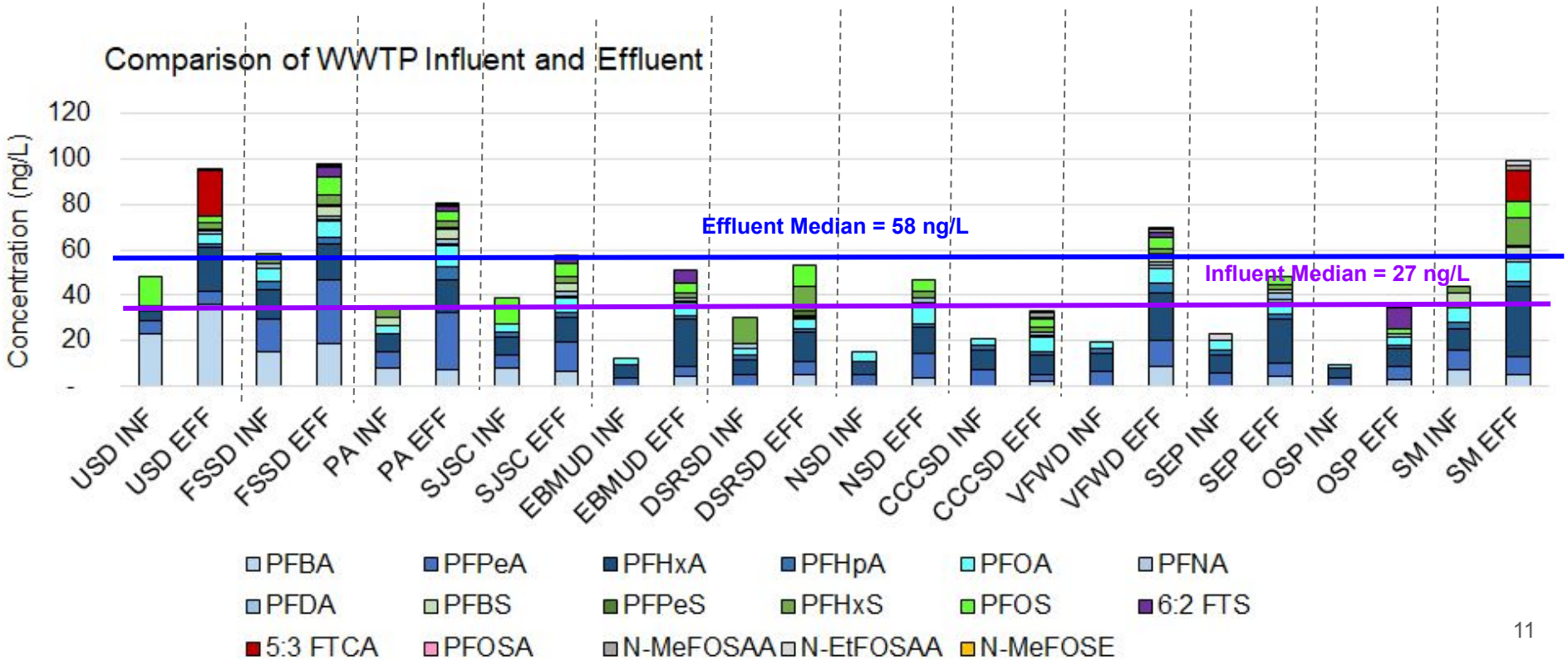


Concentrations of PFAS in WWTP Effluent



Influent = 27 ng/L

Sum of PFAS measured in effluent increased compared to influent

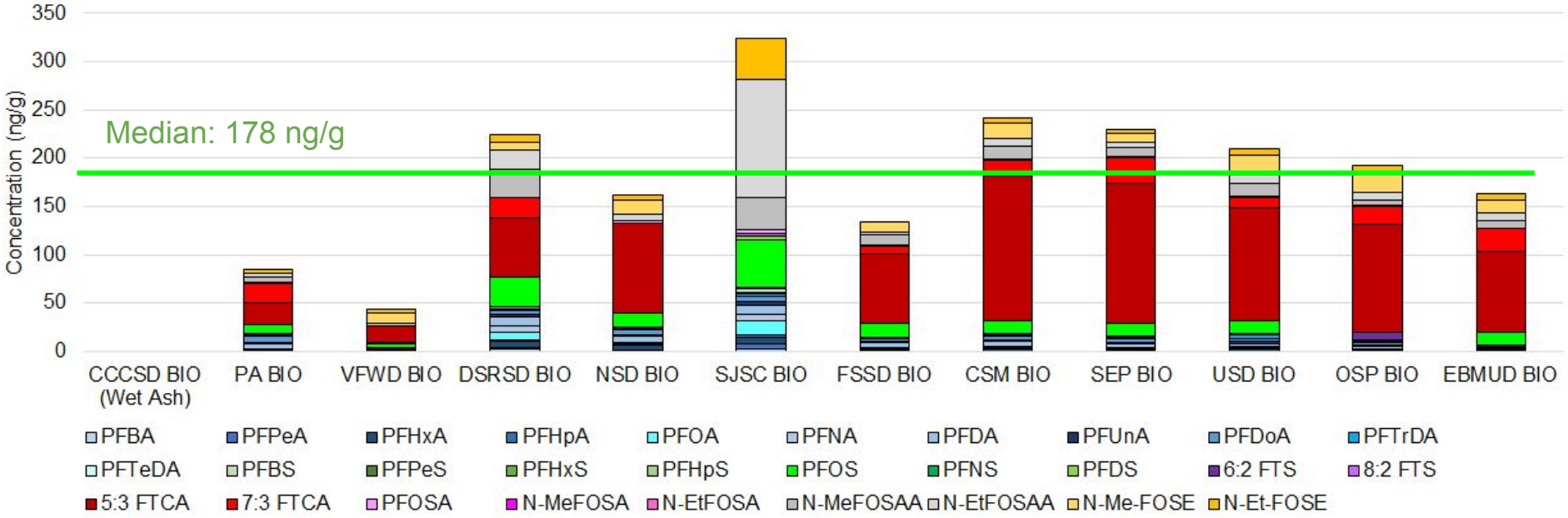


Bay Area PFAS detections generally lower than Preliminary Statewide Results

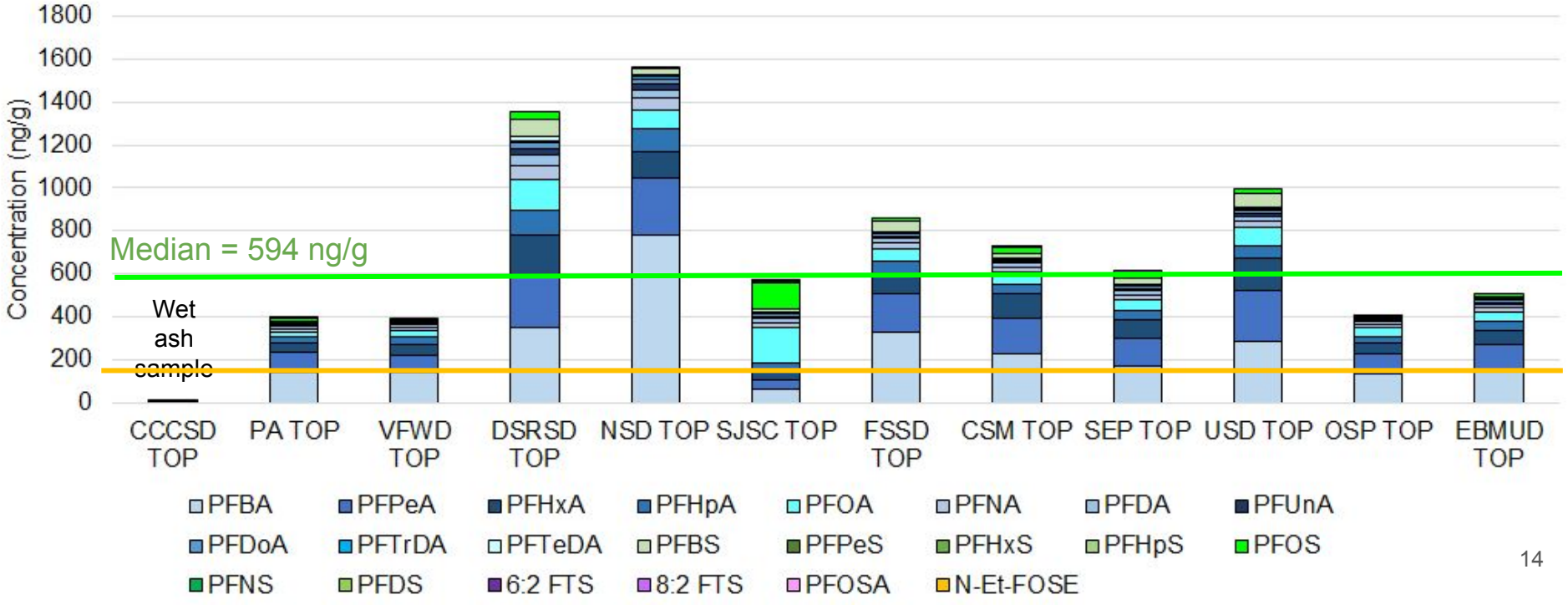
- BACWA influent median: 27 ng/L
- BACWA influent median with TOP: 231 ng/L
- Statewide influent median: 66 ng/L
- Statewide influent median of facilities with 100% residential flow: 95 ng/L

- BACWA effluent median: 58 ng/L
- BACWA effluent median with TOP: Not part of Phase 1 Study
- Statewide effluent median: 115 ng/L
- Statewide influent median of facilities with 100% residential flow: 146 ng/L

Municipal biosolid samples generally comparable



TOP results in Biosolids



Main Takeaways from Phase 1

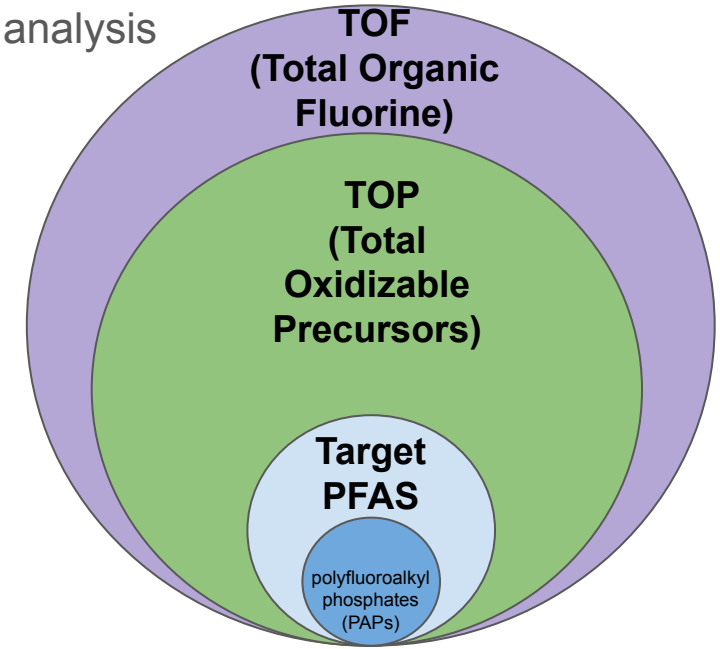
- Sum of PFAS concentrations in municipal influent, effluent, and biosolids generally comparable among POTWs for each matrix
- Quantified concentrations of PFAS are higher in effluent than influent, likely due to transformation of precursors
- Significant presence of unknown PFAS precursors in influent and biosolids

- BACWA Phase 1 results are about ½ preliminary statewide results for influent and effluent
- BACWA and preliminary statewide results both show 100% residential service areas have higher quantified PFAS concentrations compared to mixed residential/commercial/industrial service areas, but no difference for TOP

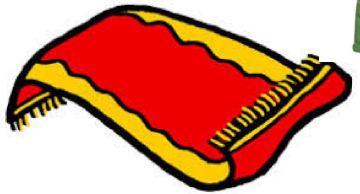
Phase 2 Planning

On to Phase 2: Taking a closer look at 6 facilities

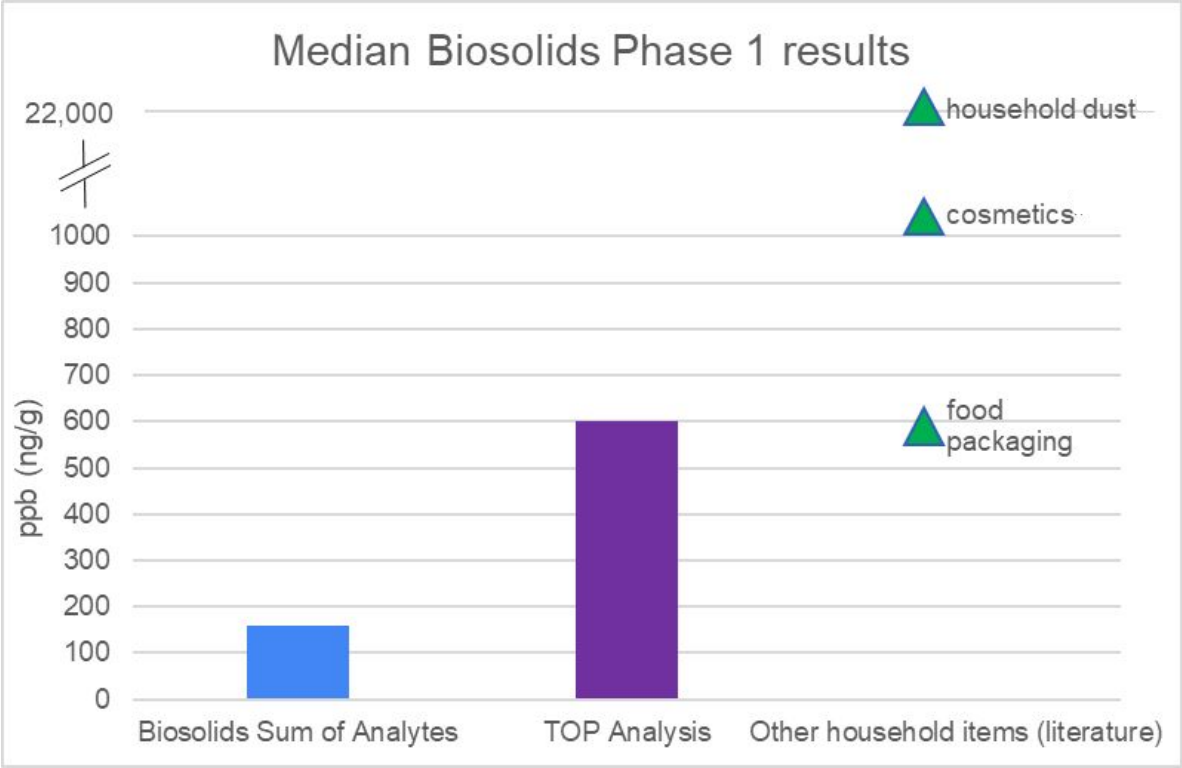
1) Data gaps from Phase 1
   - TOP in effluent
   - Groundwater
   - PAP analysis
   - TOF



2) Source Investigation
   - Commercial/industrial/residential service areas
   - Food waste
   - Specific industries



Top Priority for Phase 2 Study Objective – understand sources of PFAS entering sewershed

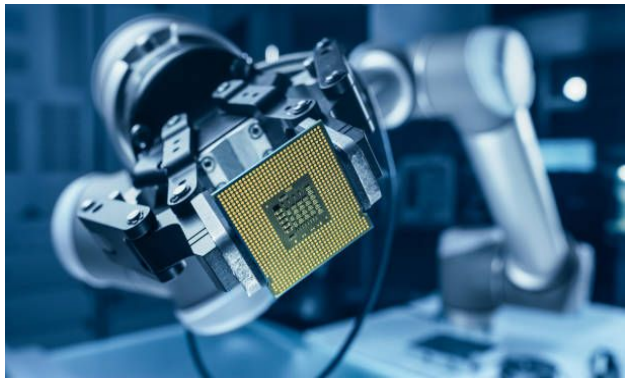


Top Priority for Phase 2 Study Objective – understand sources of PFAS entering sewershed

- Focus on where PFAS is coming from, in addition to where it's going
- Sample upstream in sewershed to understand PFAS concentrations from different service populations in sewershed
- What is the relative importance of residential flows compared to commercial and industrial flows?
  - Which industries or commercial entities are important sources?

What industries or types of businesses are unique or are disproportionately high sources of PFAS (if any)?

- Car washes
- Laundries/carpet cleaners
- Manufacturing
- Hospitals
- Prisons
- Military facilities
- Food waste/organics

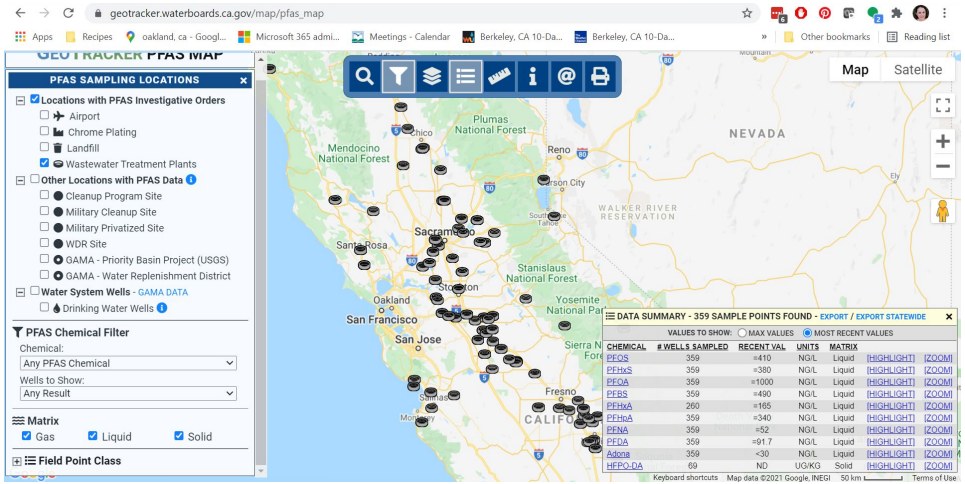


Phase 2 Project Timeline

Milestone	Date
Sampling and analysis plan complete	February 2022
Sampling	March through May 2022
Lab analysis and data quality assurance	June through November 2022
Analysis and internal discussion of results	December 2022 through April 2023
Draft report	June 2023
Final report	September 2023

Is there information we can use from the statewide effort?

- Compare R2 data to statewide 13267 data – apples to apples
- Consulting firm volunteered to synthesize statewide
  - Characterization of residential signal
  - Investigation of outliers
  - Correlation with service area, treatment technologies, others



Acknowledgements

- Participating POTWs and their staff
  - CCCSD, CSM, DSRSD, EBMUD, FSSD, NSD, PA, SFO, SFPUC, SJSC, USD, VFWD

Target data available at:
https://geotracker.waterboards.ca.gov/