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BACWA PFAS
Phase 1 Findings

August 10, 2021
Lab & Permits Committee Discussion
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Agenda

- Background
- SFEI presents Phase 1 findings
- Discussion of Phase 1 results
- Project next steps and Phase 2

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Background: Phase 1 Study Objective

- State Water Board requires PFAS sampling in CA (13267/13383) orders
- R2 granted exception to conduct regional study of PFAS
  - Resource efficiency
  - Leverage RMP
  - Inform management
- Study design and reporting consistent with SWB investigation orders

Phase 2: Additional monitoring based on Phase 1 Results (2021)

- May include further investigation of PFAS precursors and analytes, trends, and/or source identification, additional matrices

Phase 1 study design: select representative set of facilities for participation

- Discharge volume
  - 1 – 170 MGD
- Service population and industries
  - 0 - 100% residential/commercial
  - Fabricated metals, electronic manufacturing, industrial laundries, automatic vehicle washing, hospital, military, landfill
- Treatment
  - Secondary and advanced secondary filtration
  - Activated sludge, trickling filter, batch nitrification reactor, oxidation tower
- Participation in 2014 study to evaluate trends
- Geography
  - All Bay subembayments represented

Phase 1 study design

- Sample influent, effluent, biosolids at 15 facilities
  - Evaluate whether samples sufficiently representative for R2, particularly for biosolids
- Partner with SGS Axys for target PFAS analysis that includes 40 target analytes
- QA/QC samples collected at subset of facilities
- Compare composites v. grab samples
- Collect field replicates to assess variation
- Utilize Total Oxidizable Precursors (TOP) assay
  - Indirectly quantify PFAS precursors through oxidation of precursors to terminal PFCAs
  - Analyze influent and biosolids samples and compare to target analytical method

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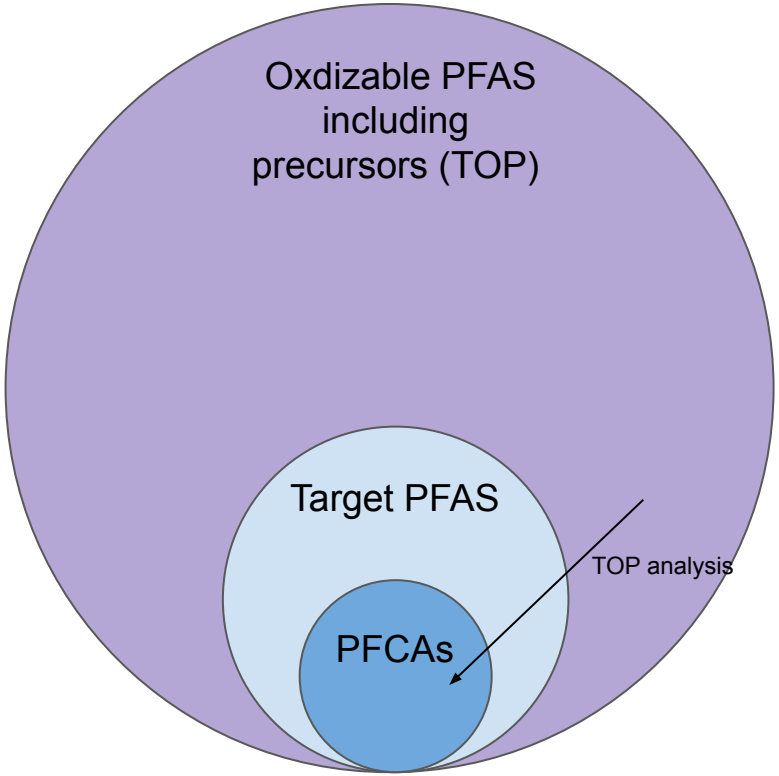
Oxdizable PFAS including precursors (TOP)
Target PFAS
PFCAs
TOP analysis

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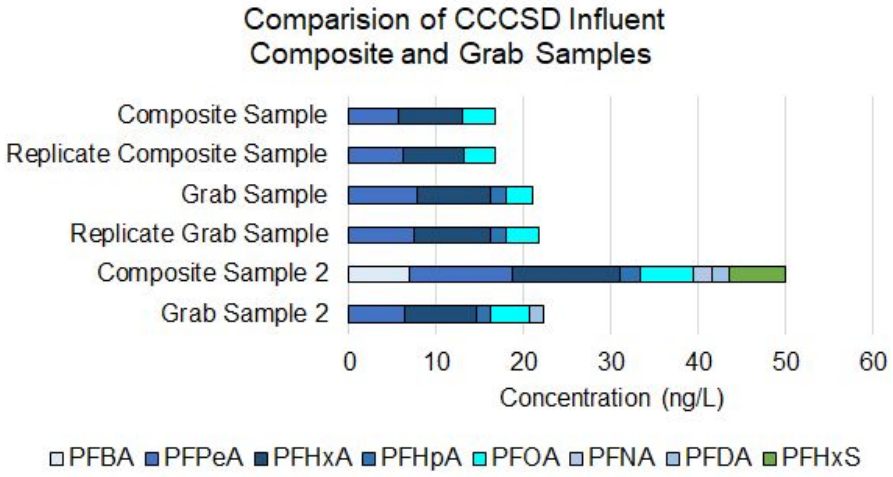
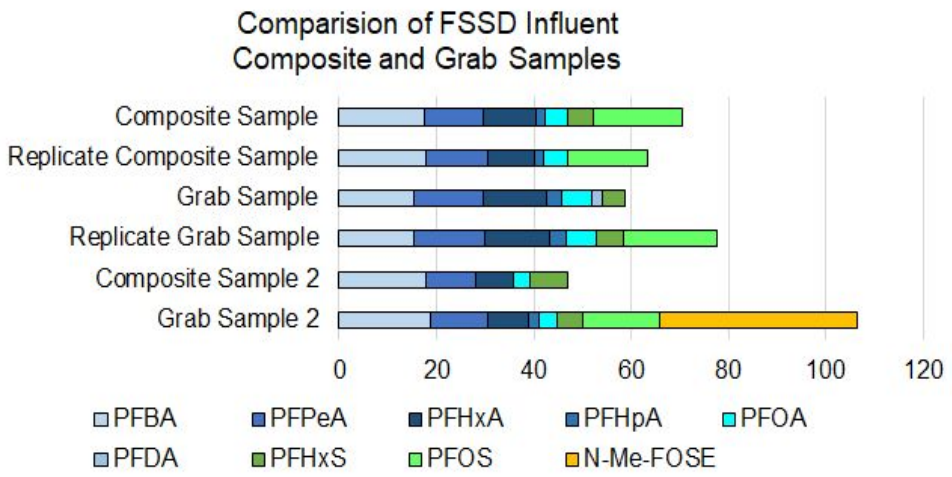
Data QA/QC review indicates no major quality concerns

- No significant contamination issues observed
  - Elevated detection of 6:2 Fluorotelomer sulfonate (flagged with data qualifier)
- Field replicates showed good reproducibility
  - RPD for individual analytes = 9±11%
  - Grab and composite replicates collected at 3 facilities
- Precision: all MSD pairs met DoD QSM target for replicate RPDs of 30% in all quantified pairs
- Accuracy: Most LCS and MS/MSD samples met DoD QSM targets
  - Samples outside limits flagged with data qualifiers
- SFEI review did not add additional censoring qualifiers

Composites and grabs are generally comparable





- Average RPD for individual analytes 19±15%
  - Compare to RPD of 9% for sample replicates using the same method
- No clear trend whether composites or grabs are higher

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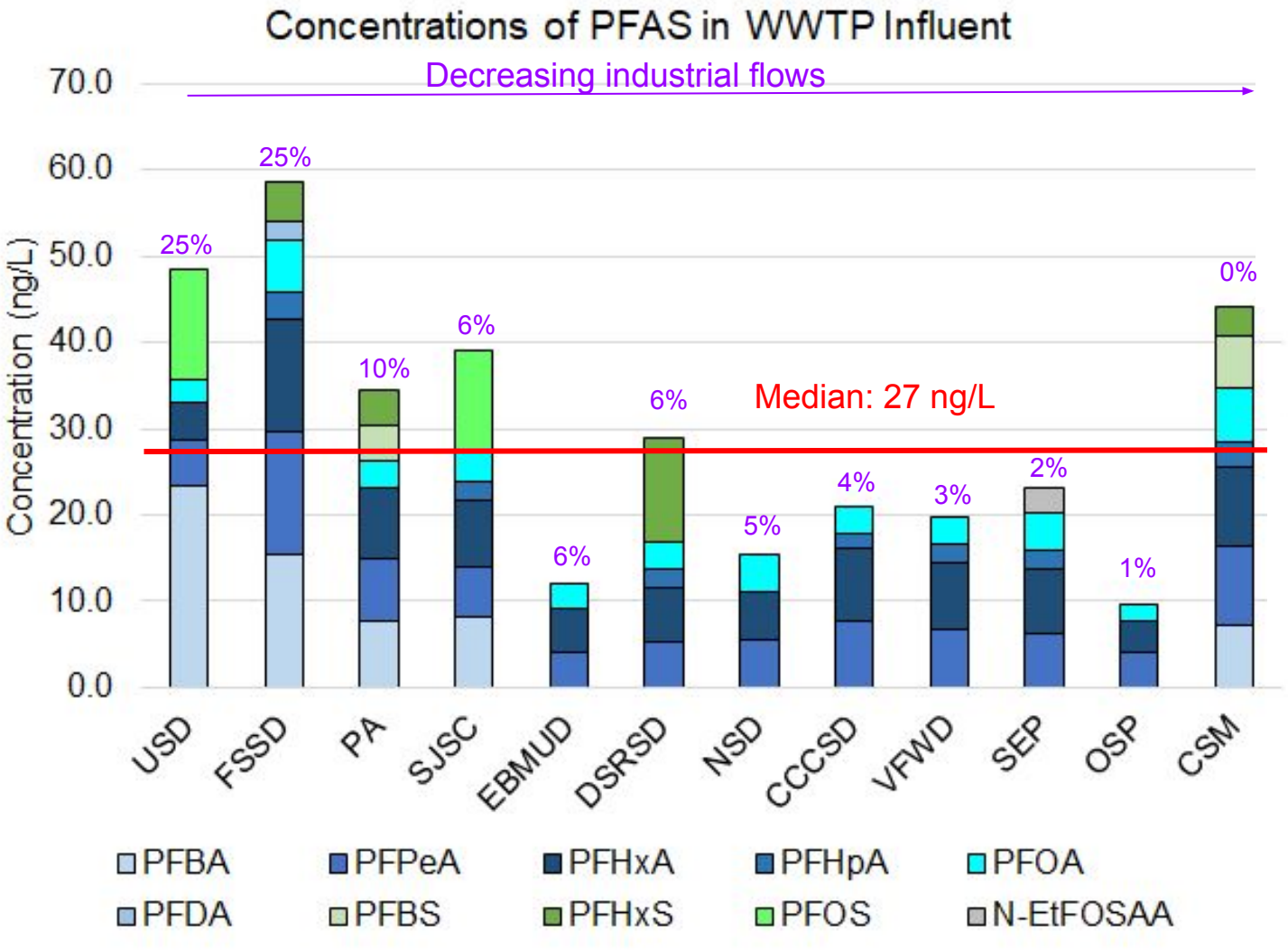

- Correlation with industrial flows unclear and requires further investigation
- PFAS in municipal facilities generally comparable

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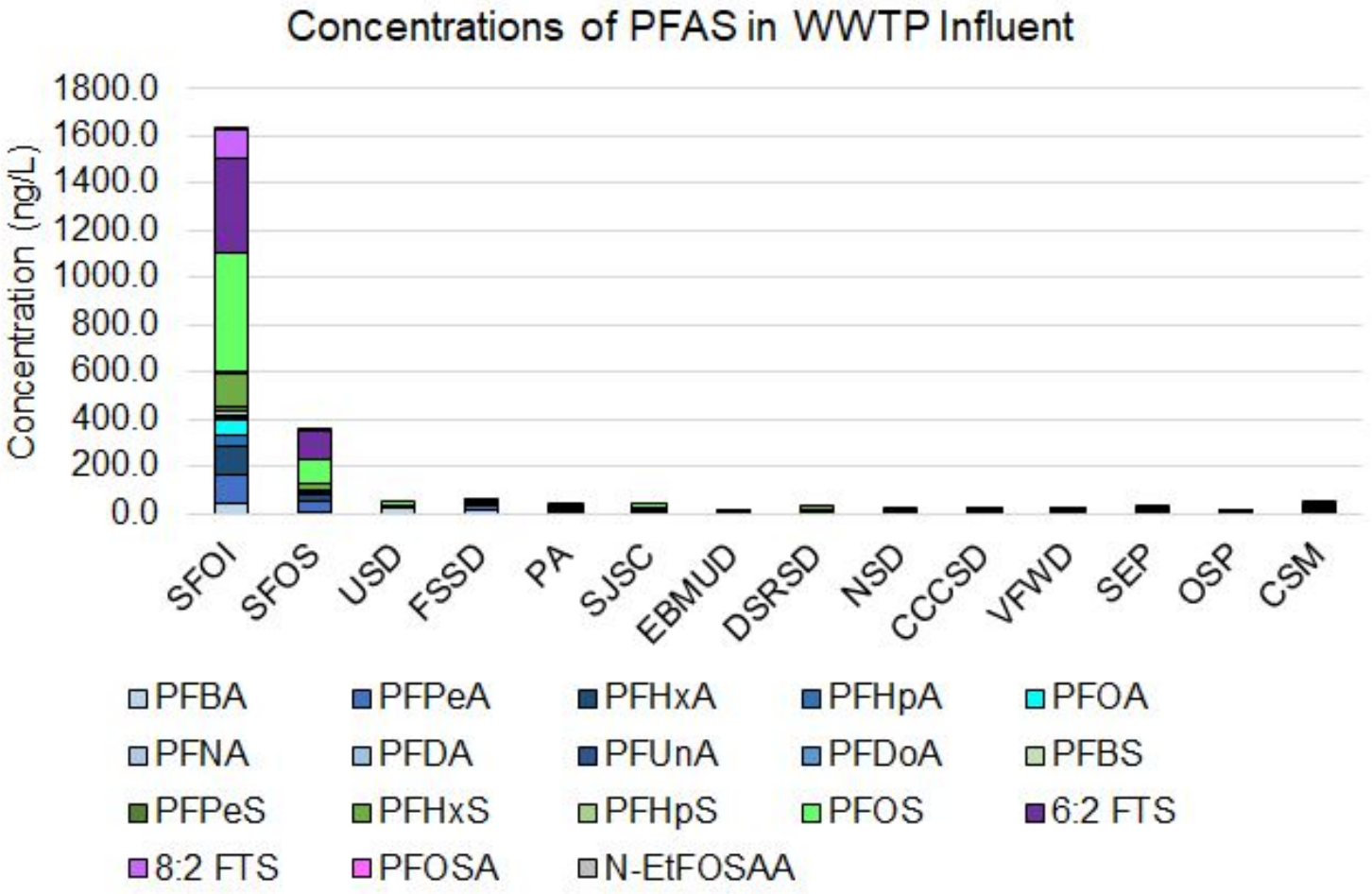

- PFAS concentrations in SFOI and SFOS different from municipal facilities

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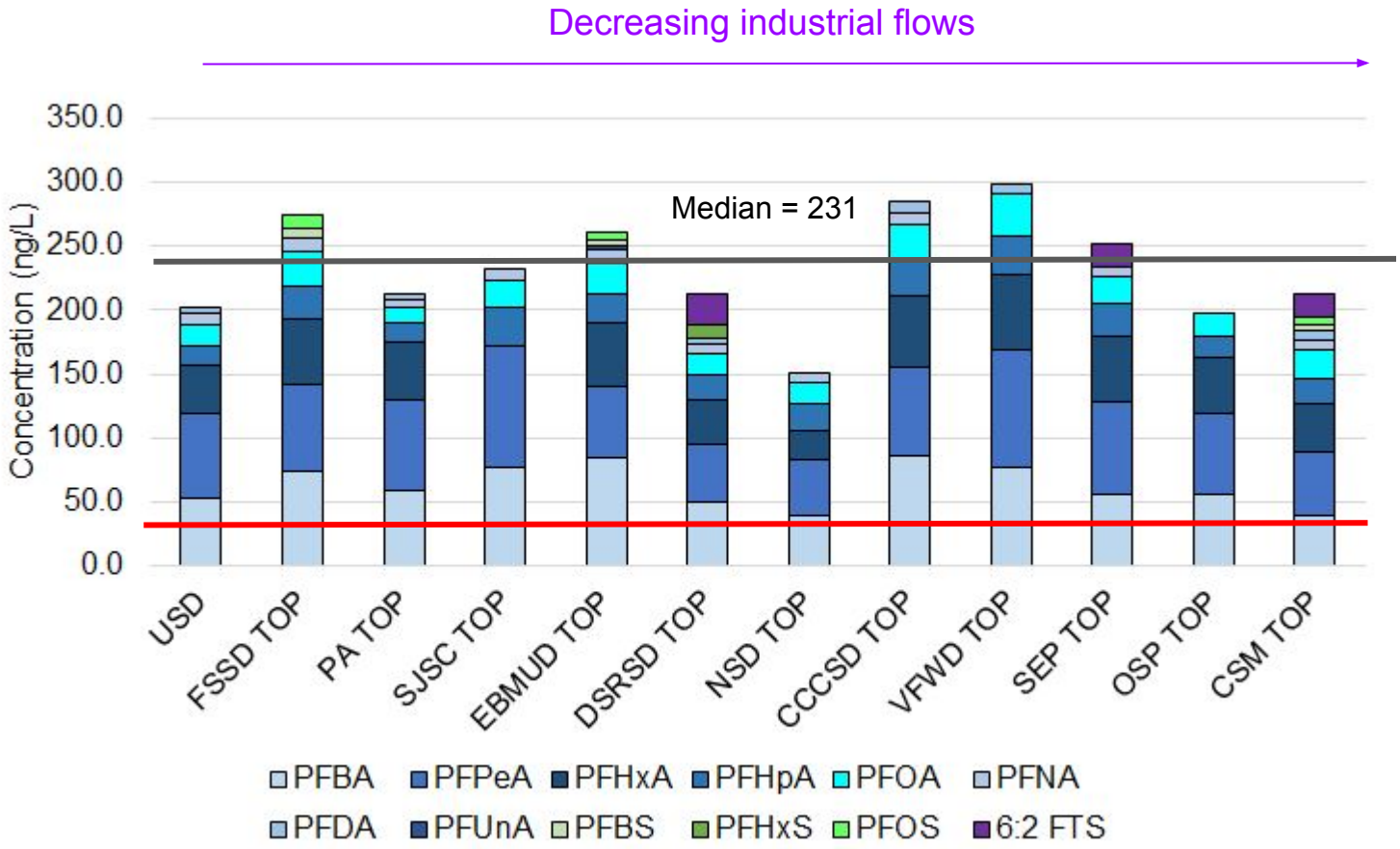
TOP results indicate significant presence of precursors



Median municipal influent concentration = 27 ng/L

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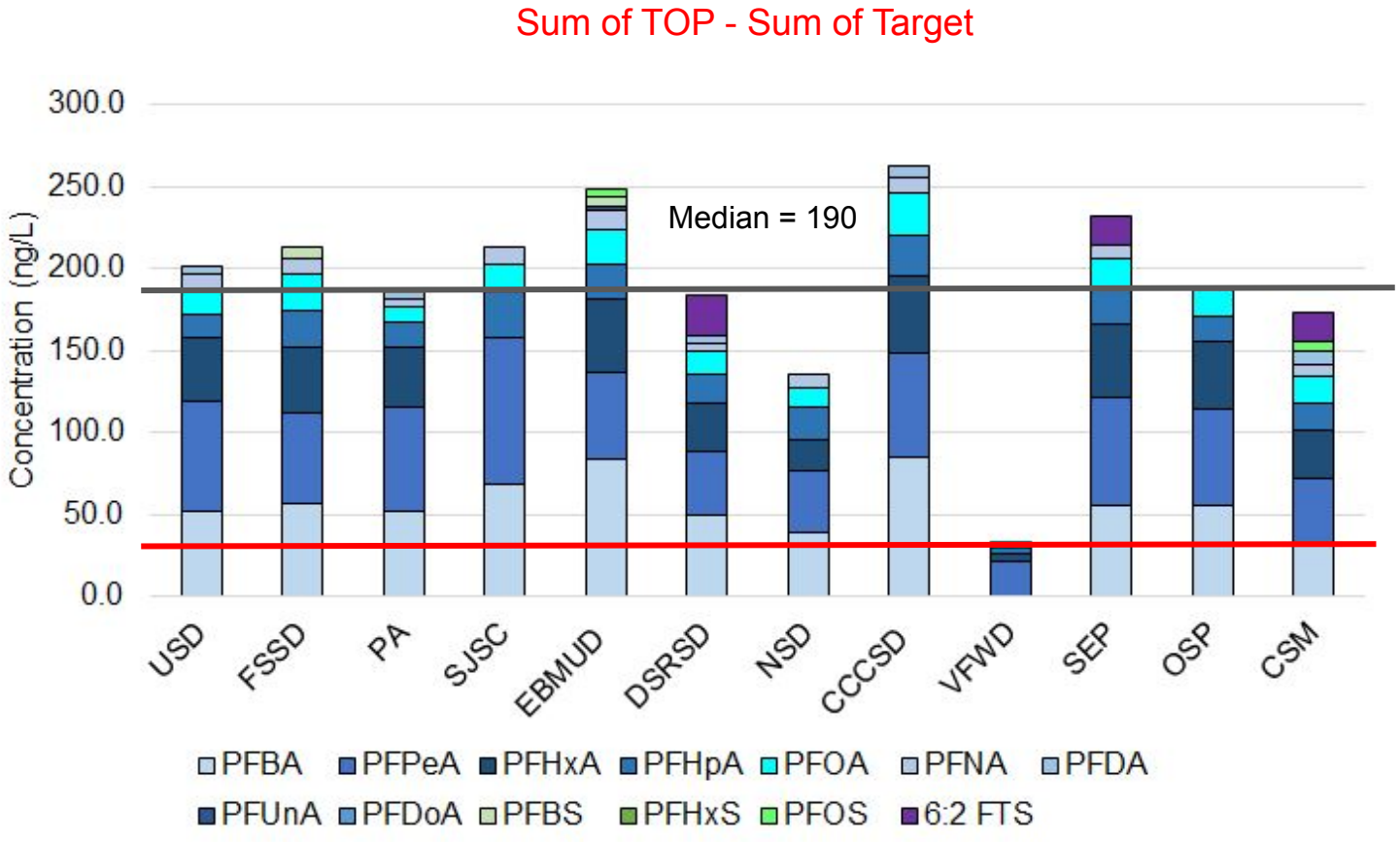

Median municipal influent concentration = 27 ng/L

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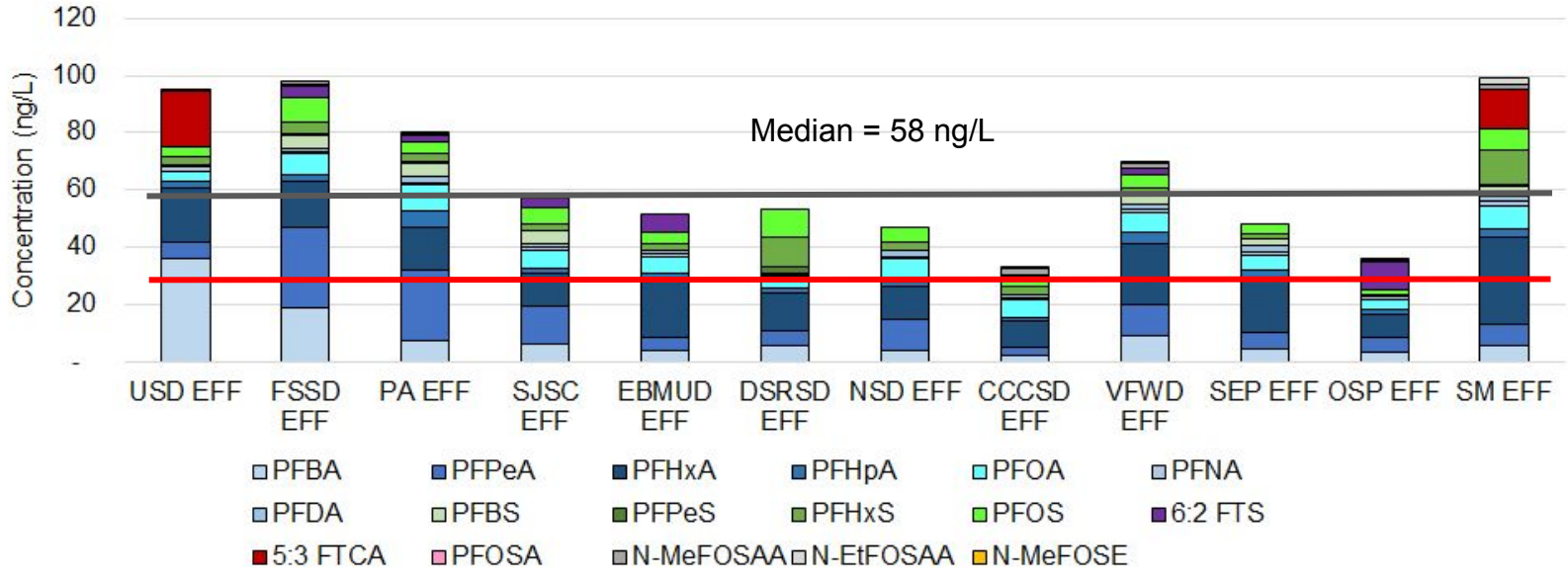
Concentrations of PFAS in WWTP Effluent



Median municipal influent concentration = 27 ng/L

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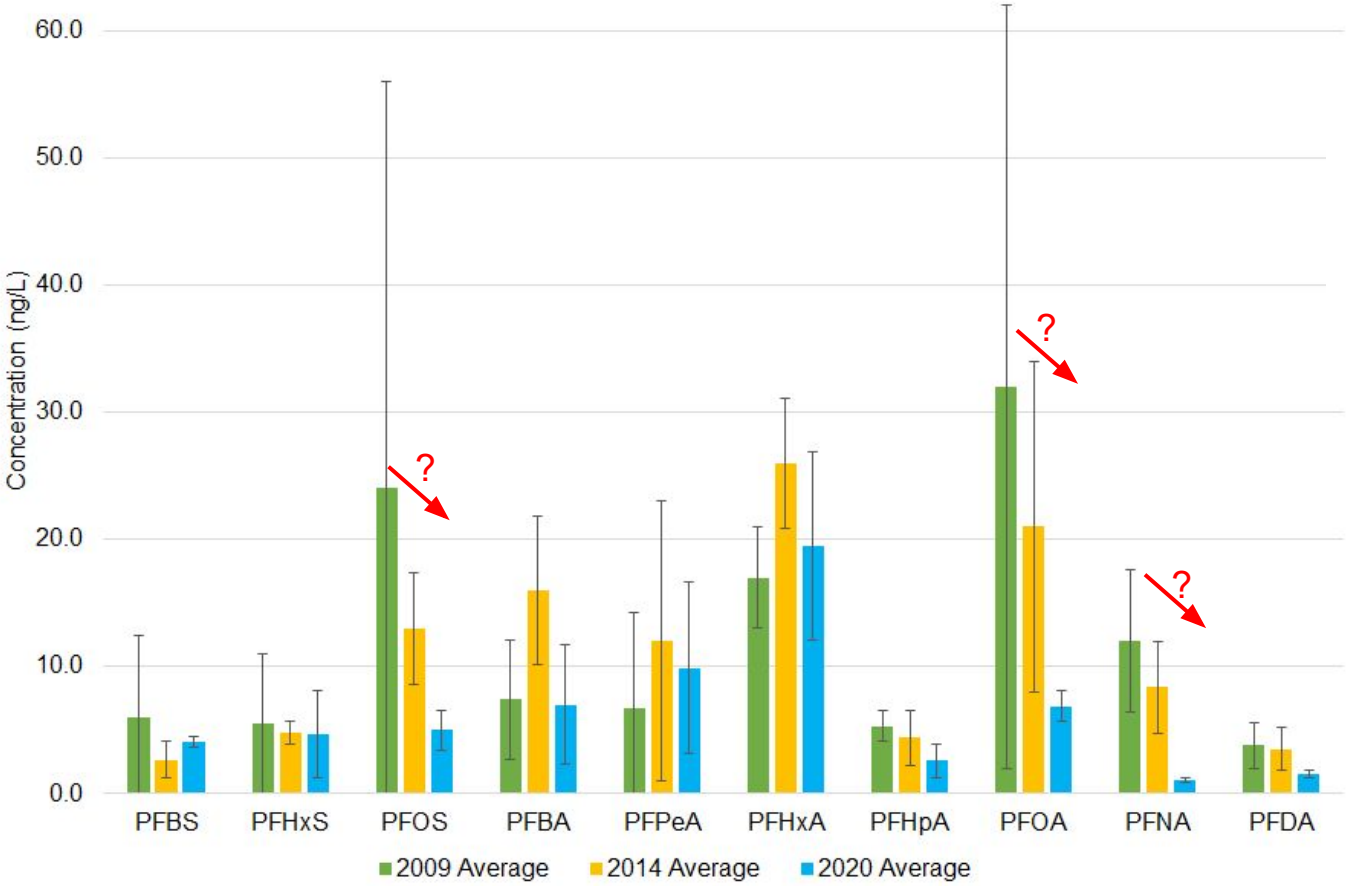
Comparison of 2009, 2014, and 2020 Studies



- Only 2014 municipal participants included in comparison
- Possible reductions in long-chain PFAS, but trends require further investigation

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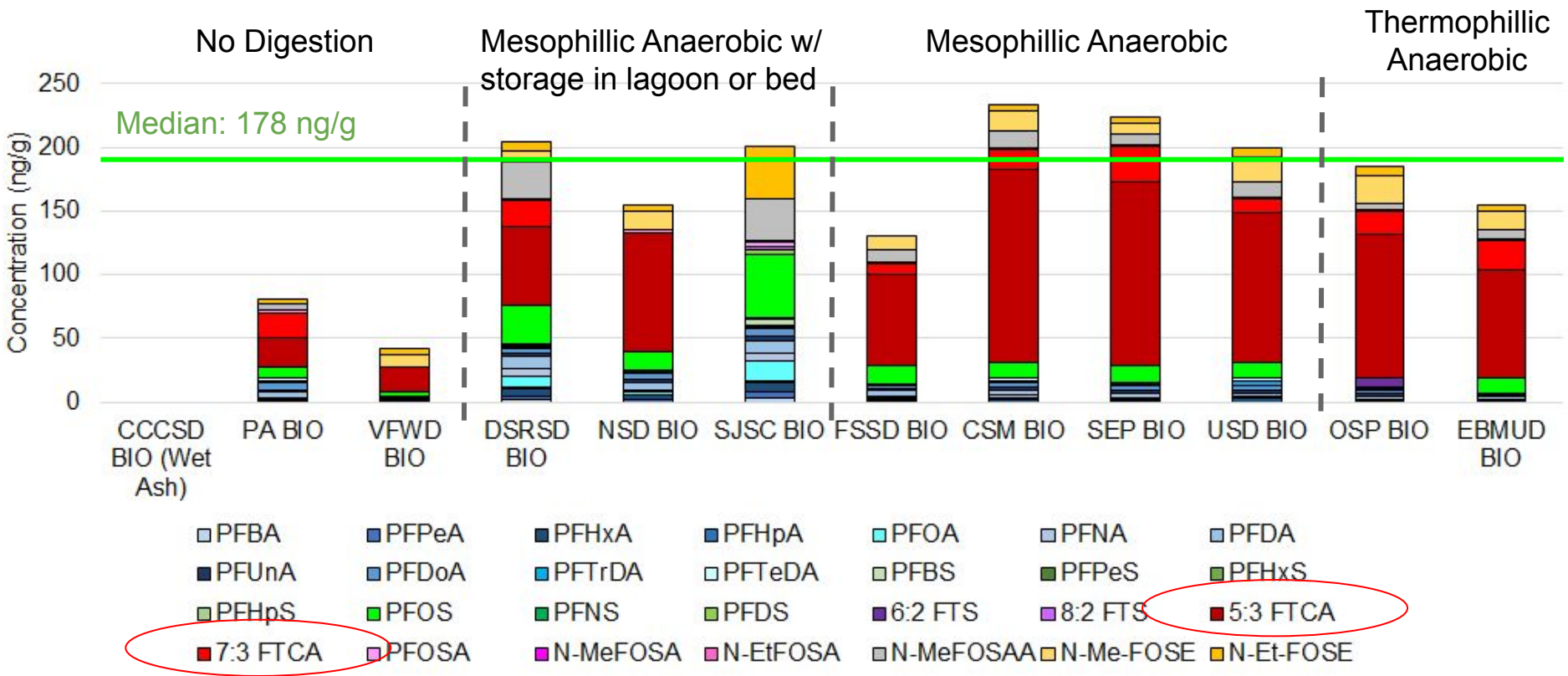
Municipal biosolid samples generally comparable



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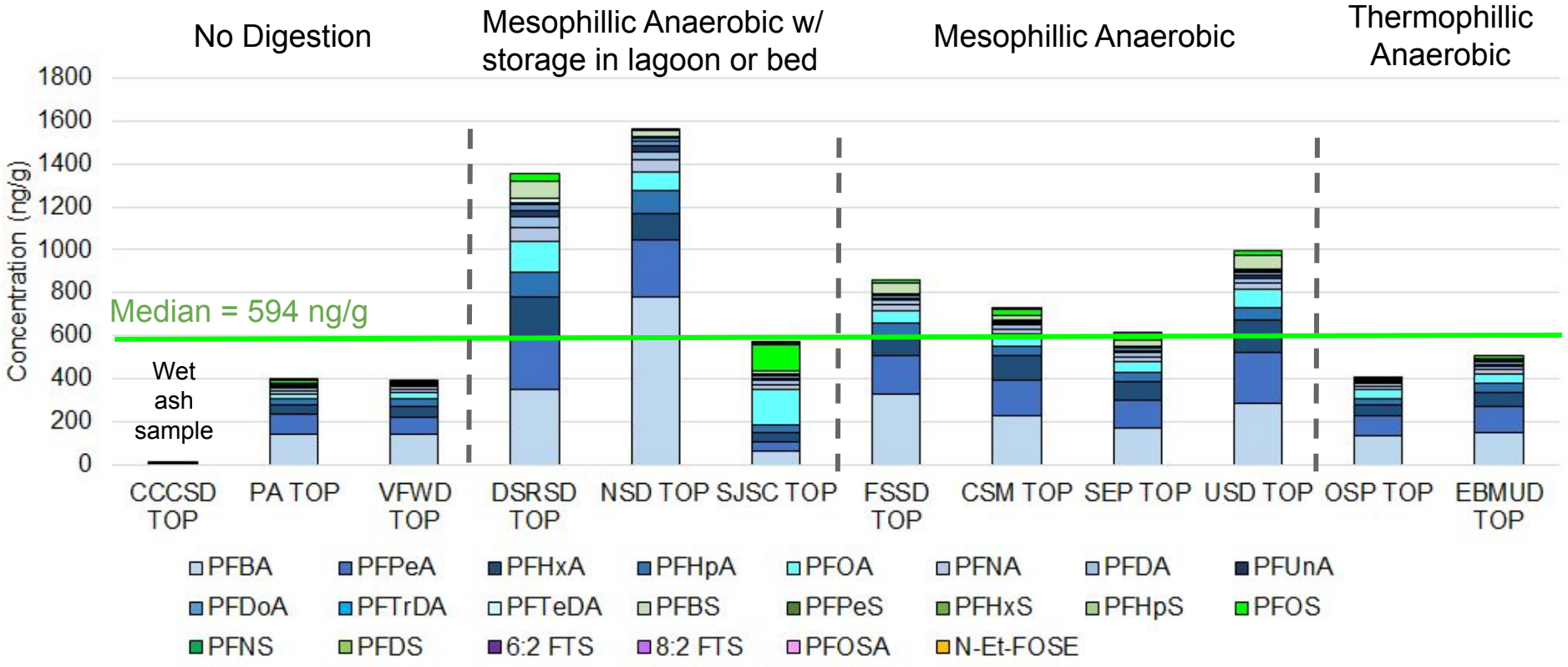
TOP results in Biosolids

- TOP results indicate significant presence of PFAS precursors
- Sum of target PFAS median was 178 ng/g



Main Takeaways

- Sample procedures sufficient to minimize contamination
- Composites and grab samples are generally comparable
- Sum of PFAS concentrations in municipal influent, effluent, and biosolids generally comparable for each matrix
- Quantified concentrations of PFAS increased in effluent compared to influent due to conversion of PFAS precursors to terminal PFAS products through treatment process
- Significant presence of unknown PFAS precursors in influent and biosolids

Questions? Comments?

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Project Timeline

- August
  - Phase 1 Data and Monitoring Report upload to Geotracker
  - Discuss and prioritize Phase 2 study objectives
    - Aug. 10 Permits Committee
    - Aug. 20 BACWA Board
- September
  - SFEI, BACWA, WB discuss and agree on Phase 2 study objectives
  - SFEI delivers technical memo summarizing Phase 1 results and Phase 2 recommendations
  - BACWA contracts with SFEI to design and support implementation of Phase 2
  - SFEI, BACWA develop sampling plan for Phase 2
- October
  - Begin sampling

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Discuss Priorities for Phase 2 Study Objectives

- Preliminary discussion of Phase 2 study priorities on 7/23
- Proposed Priority Goal:
  - Inform management of PFAS entering Bay Area sewersheds
  - Sample upstream in sewershed to understand PFAS concentrations from different service populations in sewershed.

Do you agree with this study priority?

- Other objectives briefly discussed
  - Monitoring at groundwater on-site that may be impacted by landfill leachate at specific facilities
  - Mass balance of PFAS through wastewater treatment process (generally or specific facility)
  - Mass balance of PFAS through Reverse Osmosis treatment
  - Total organofluorine analysis (TOF) compared to TOP and target in influent, effluent, and biosolids
  - Another round of monitoring influent, effluent, biosolids for participants, or recruit additional participants

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Study Design Discussion

- Recruit and confirm volunteers for participation in Phase 2.
  - Would require significant participation in developing study design and collecting samples.
  - BACWA would pay for sample analysis.

- Are there particular industries or neighborhoods of interest?

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What PFAS analytical methods are available and appropriate?

- Propose combination of TOP and Target methods are necessary
  - Consider feasibility of extending Target analyte list to included additional commonly detected precursors
- Consider inclusion of suspect screening analysis to help identify additional non-target analytes
- Consider including small sampling set using Total Organofluorine Analysis (TOF)
  - Liquid samples use Adsorbable Organofluorine analysis
  - Screening approach
  - Strong interest to SWB

Questions?

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Sum of PFAS measured in effluent increased compared to influent