

# PFAS in San Francisco Bay

## 2024 State of the Estuary

Kimberlee West

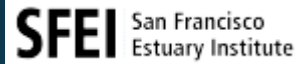
San Francisco Bay Regional Water Board



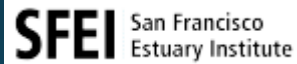
# RMP PFAS Team



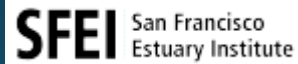
Rebecca Sutton



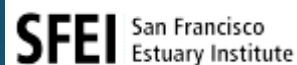
Diana Lin



Ezra Miller



Miguel Mendez



Kelly Moran

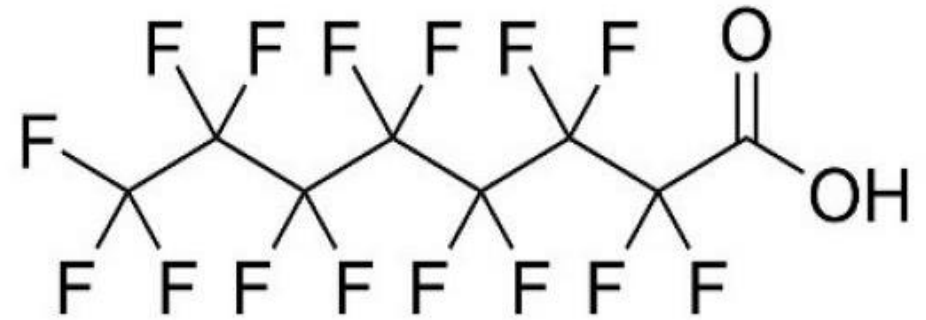


Lorien Fono

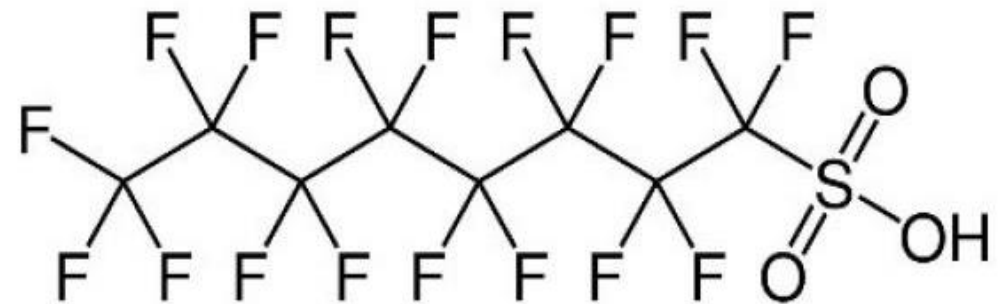


# Per- and Polyfluoroalkyl Substances (PFAS)

- >14,000 known compounds
  - PFOA and PFOS are common and well-studied



**PFOA: Perfluorooctanoic acid**



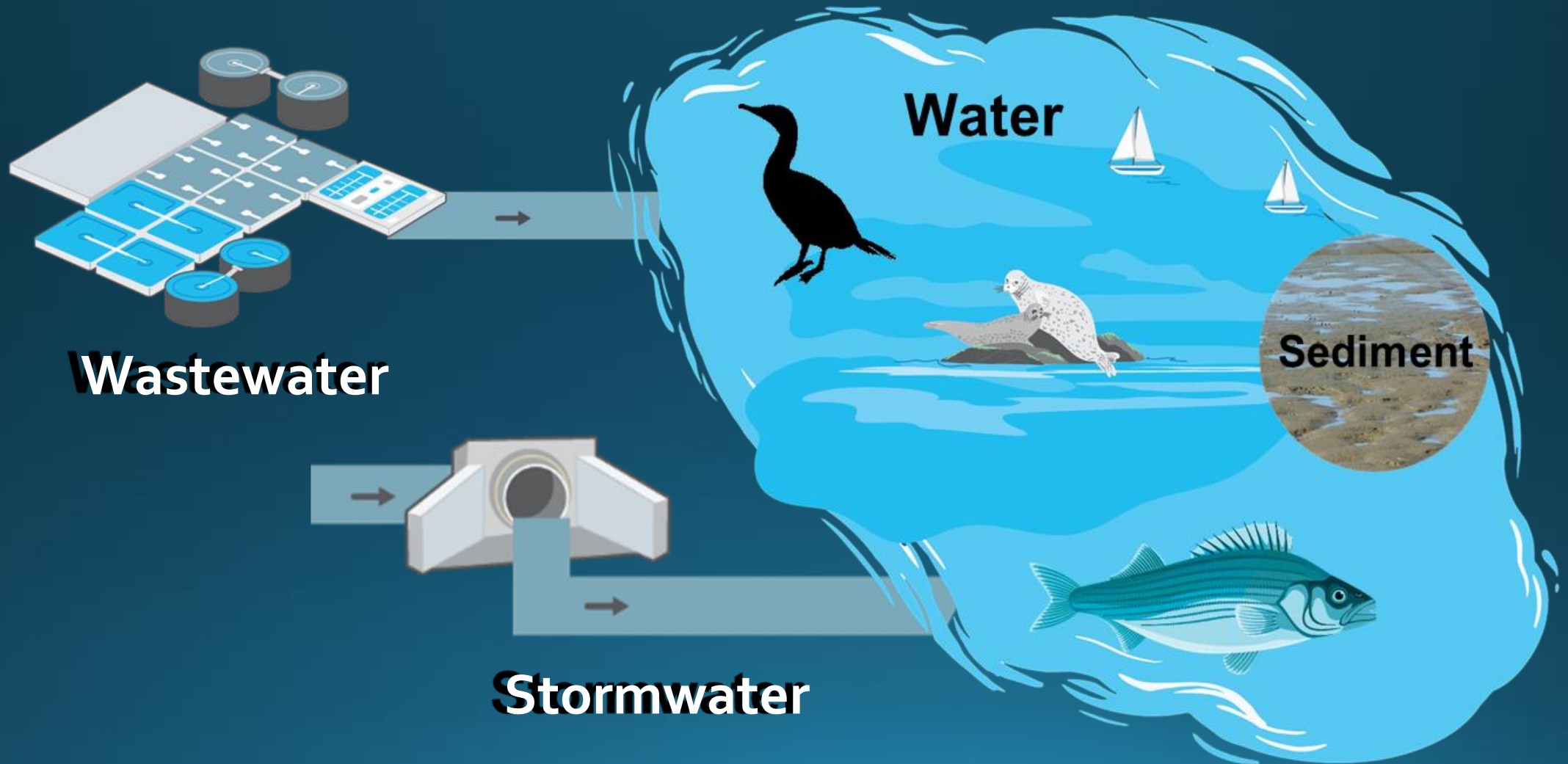
**PFOS: Perfluorooctane sulfonic acid**

# Why do we care?

- Do not degrade in environment
- Widely distributed
- Toxic to humans and animals

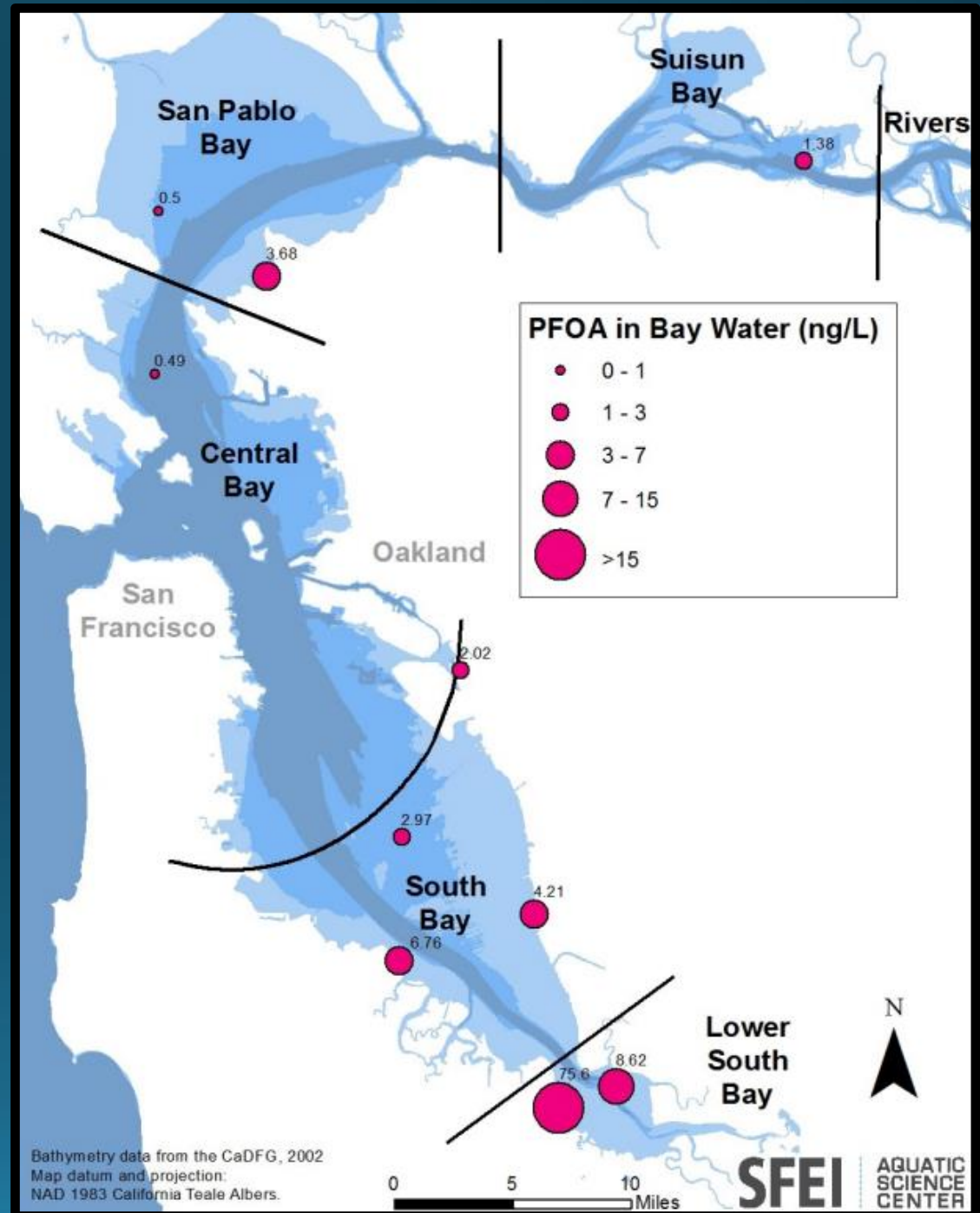


# Monitoring PFAS in San Francisco Bay

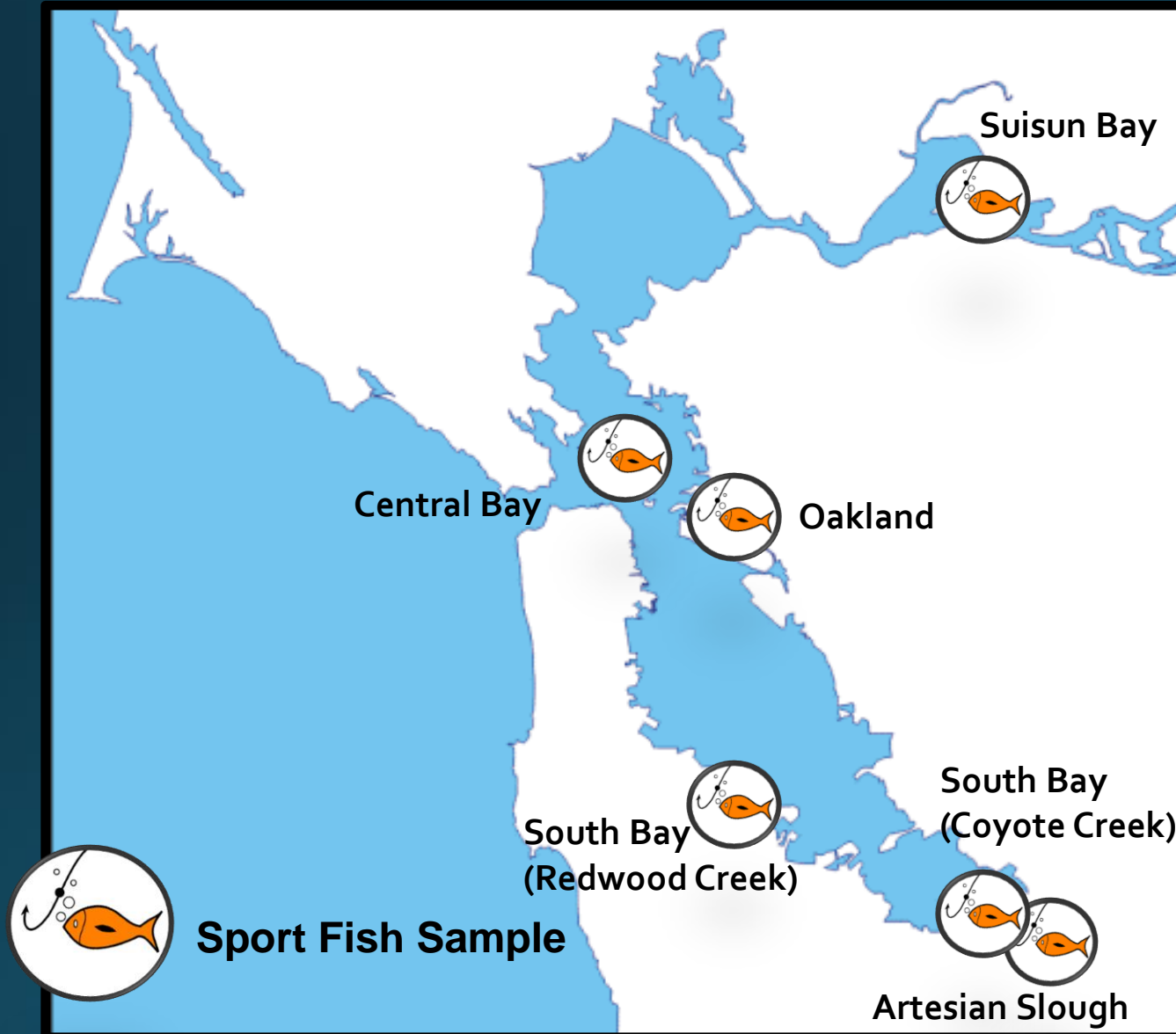


# PFOA in Bay Surface Water

- PFAS throughout the Bay
- Highest PFOA in South Bay
  - Limited hydraulic flushing
  - Many potential sources



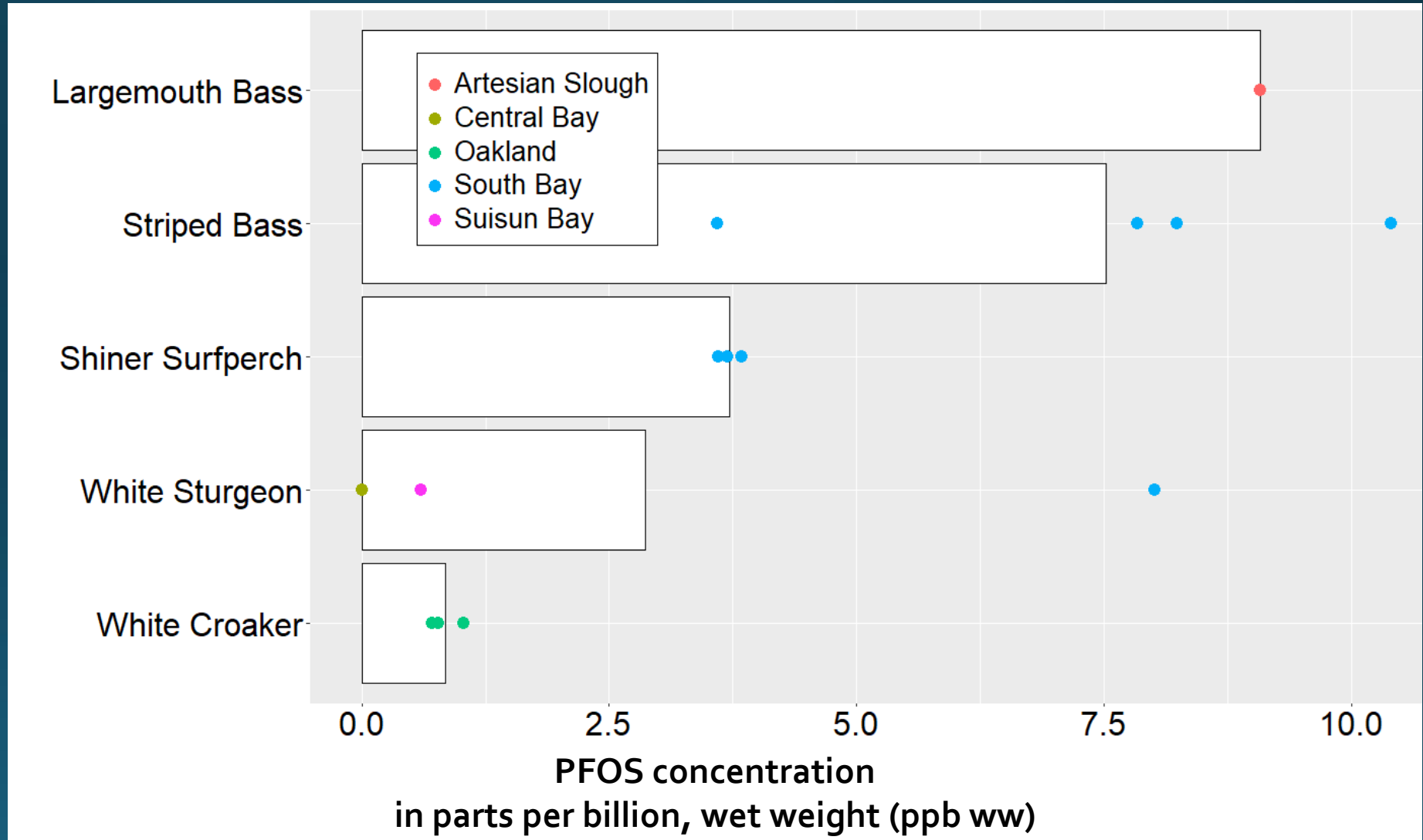
# PFAS in Fish



- 2009 - 2019
- 6 locations
- 5 species of sport fish

# PFOS in Fish

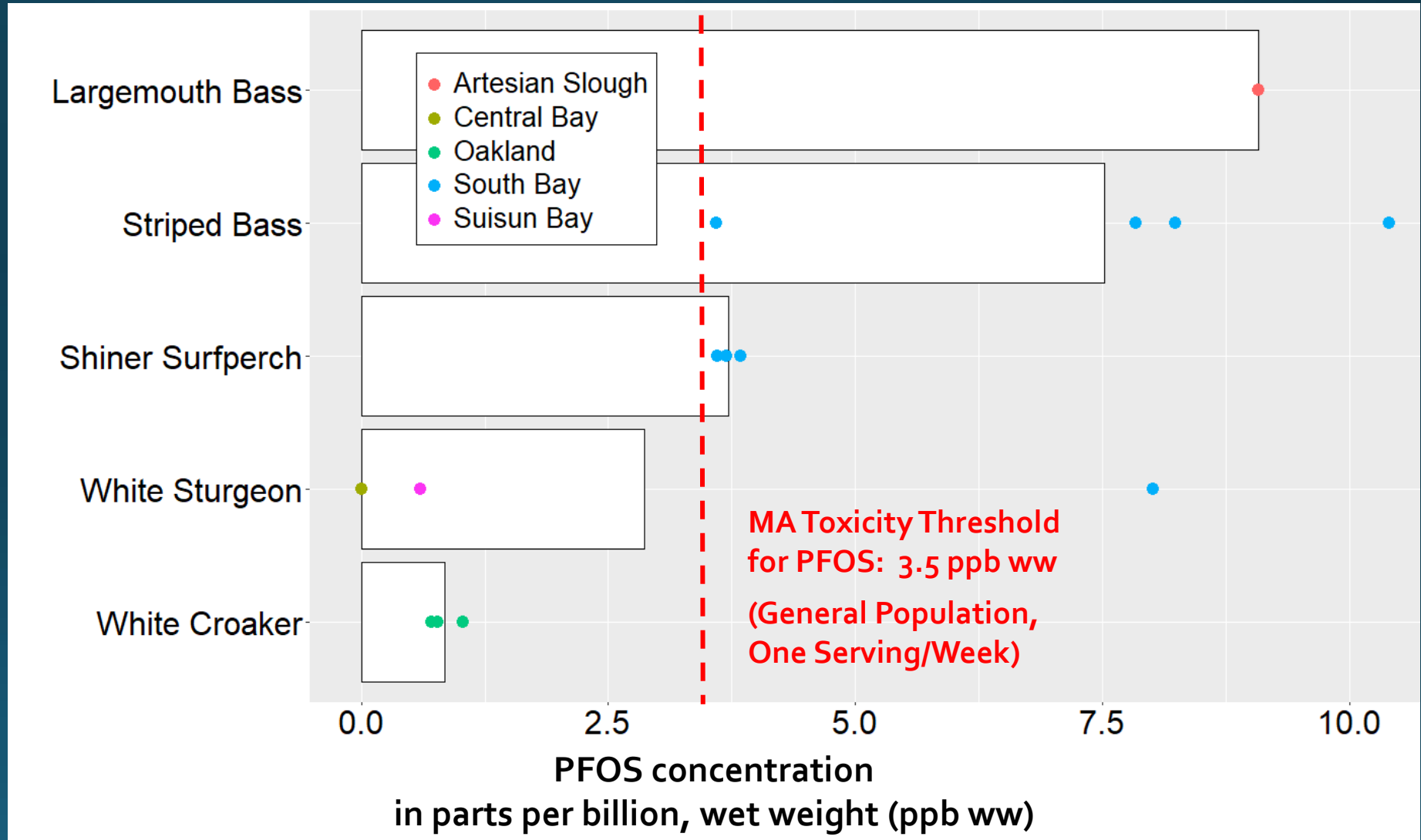
- PFOS is dominant
- South Bay area has highest PFOS





# PFOS in Fish

PFOS may pose human health concern



# Bay Monitoring Take-Aways

1. PFAS are ubiquitous throughout the Bay.
2. Bay fish monitoring shows PFOS, especially in South Bay, at levels exceeding other state's fish consumption advisories.
3. Sustained, multi-matrix monitoring of PFAS is a high priority for the RMP.

# Pathways to the Bay

- Wastewater



- Stormwater



# Wastewater Treatment Plant (WWTP) Study

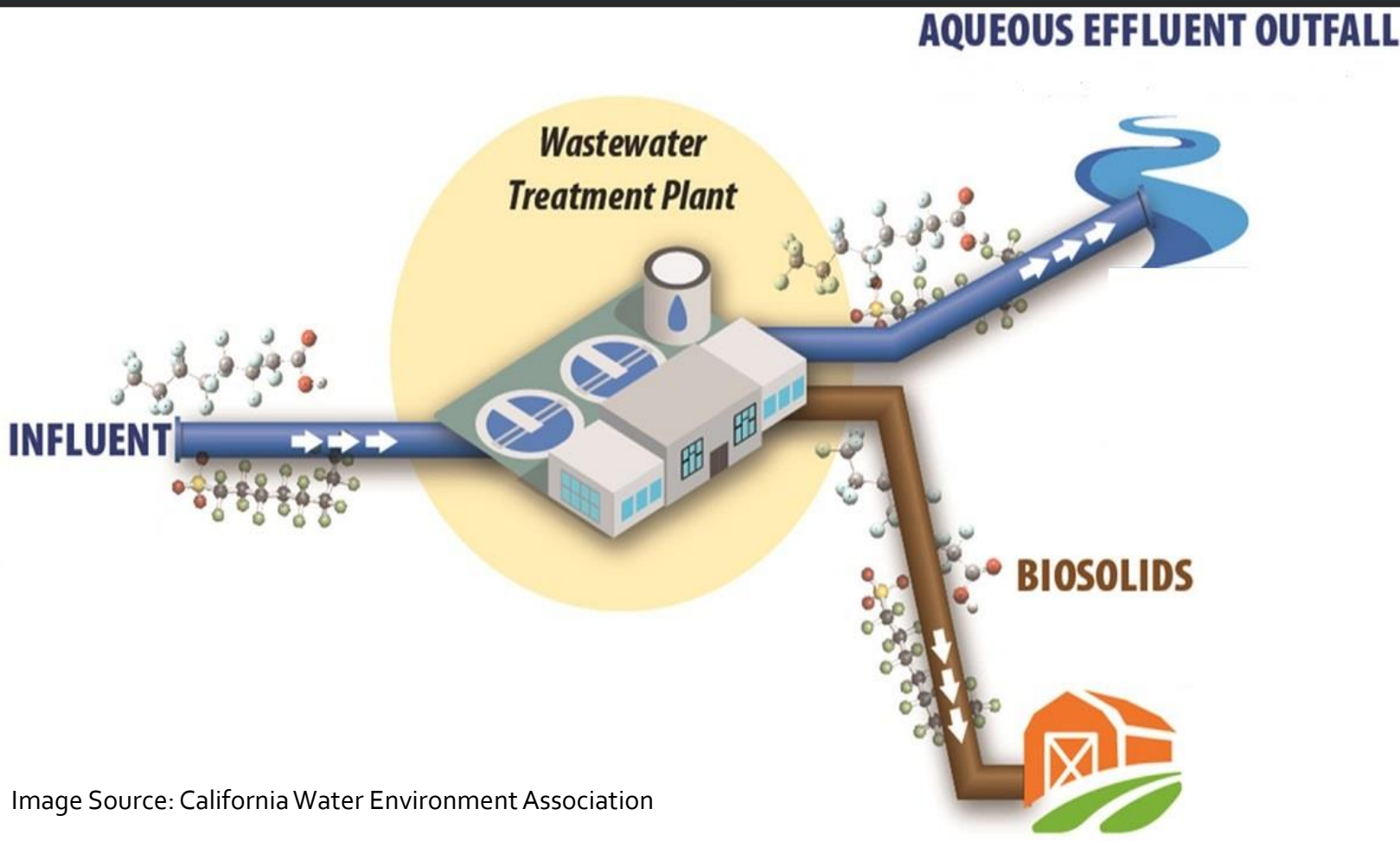
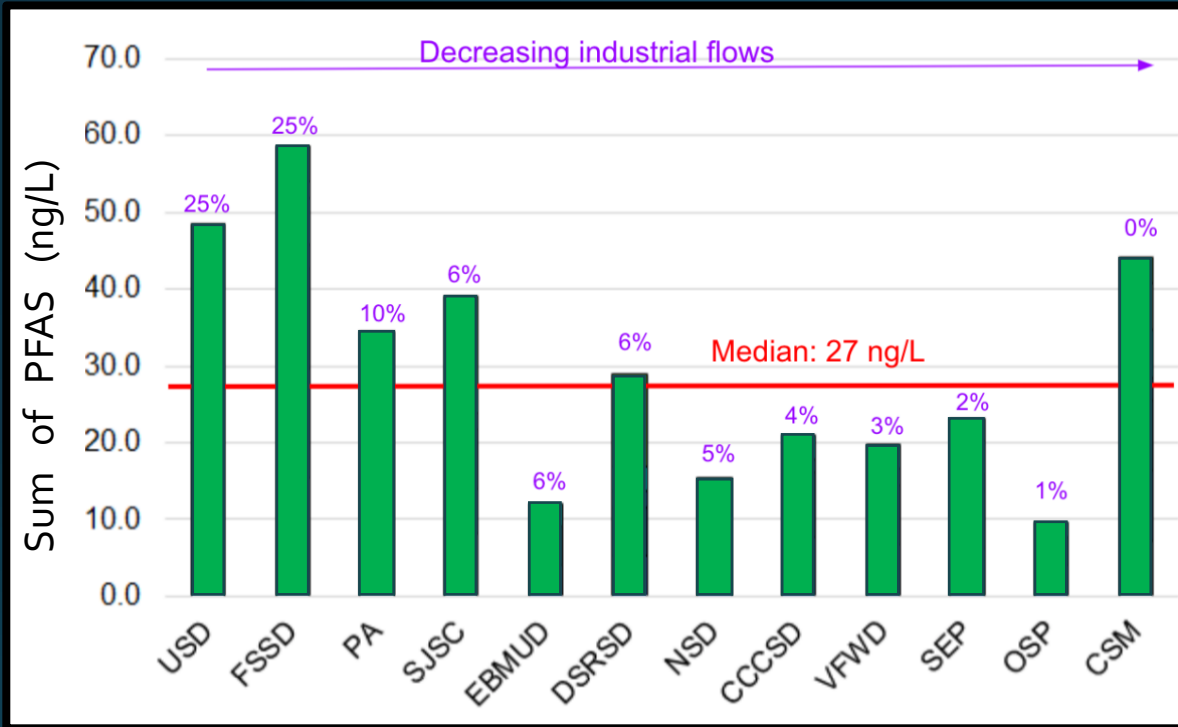


Image Source: California Water Environment Association



# WWTP Study: Influent Data

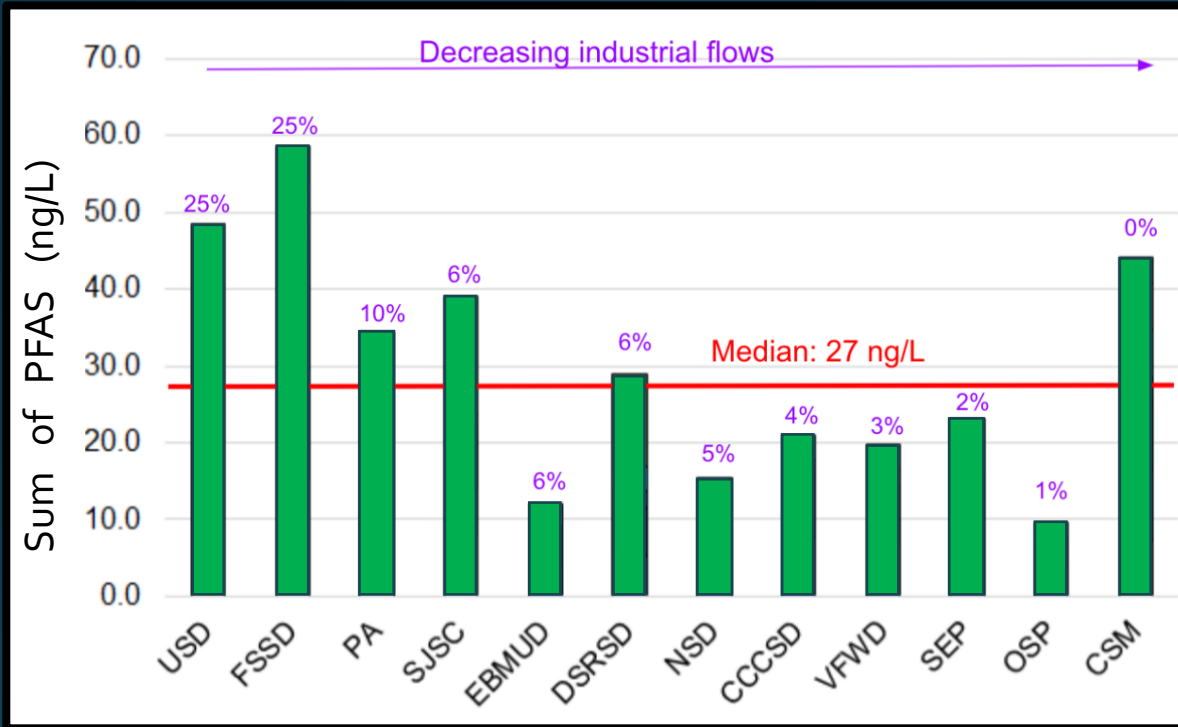
## PFAS in Influent Using Targeted Analysis



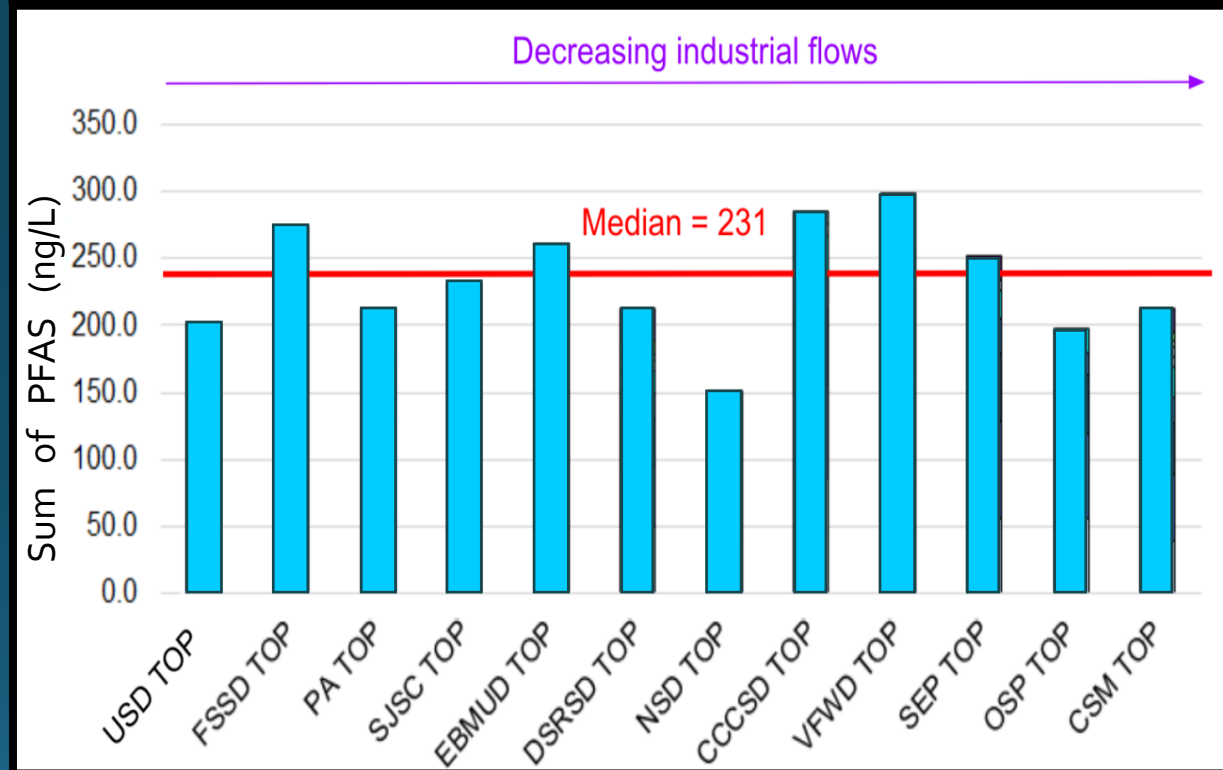
- PFAS levels comparable among facilities
- No clear trend from industrial vs. residential discharges

# WWTP Study: Influent Data

## PFAS in Influent Using Targeted Analysis



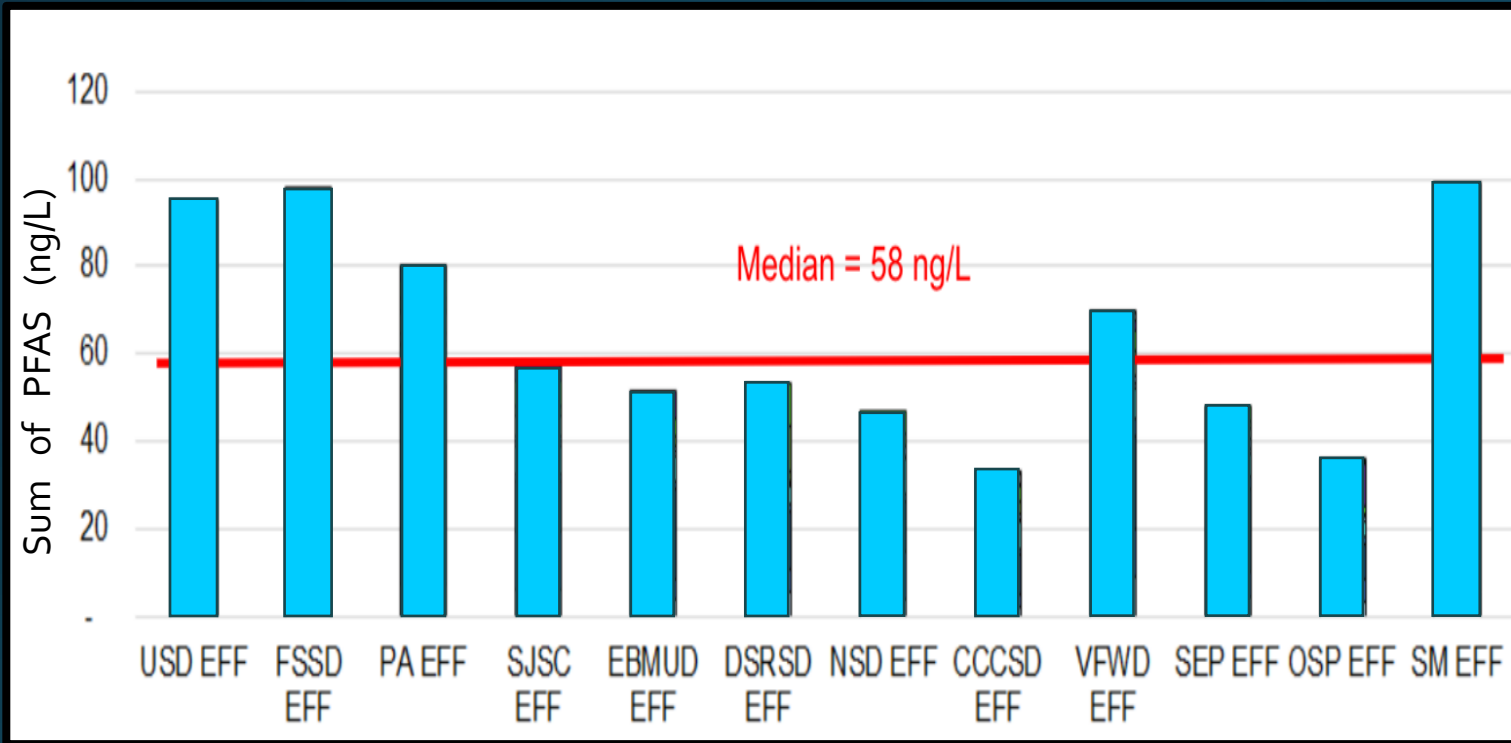
## PFAS in Influent Using TOP Assay to Measure Precursors and Terminal PFAS



- A significant amount of total PFAS are missed by typical targeted analytical methods.

# WWTP Study: Effluent Data

## PFAS in Effluent Using Targeted Analysis



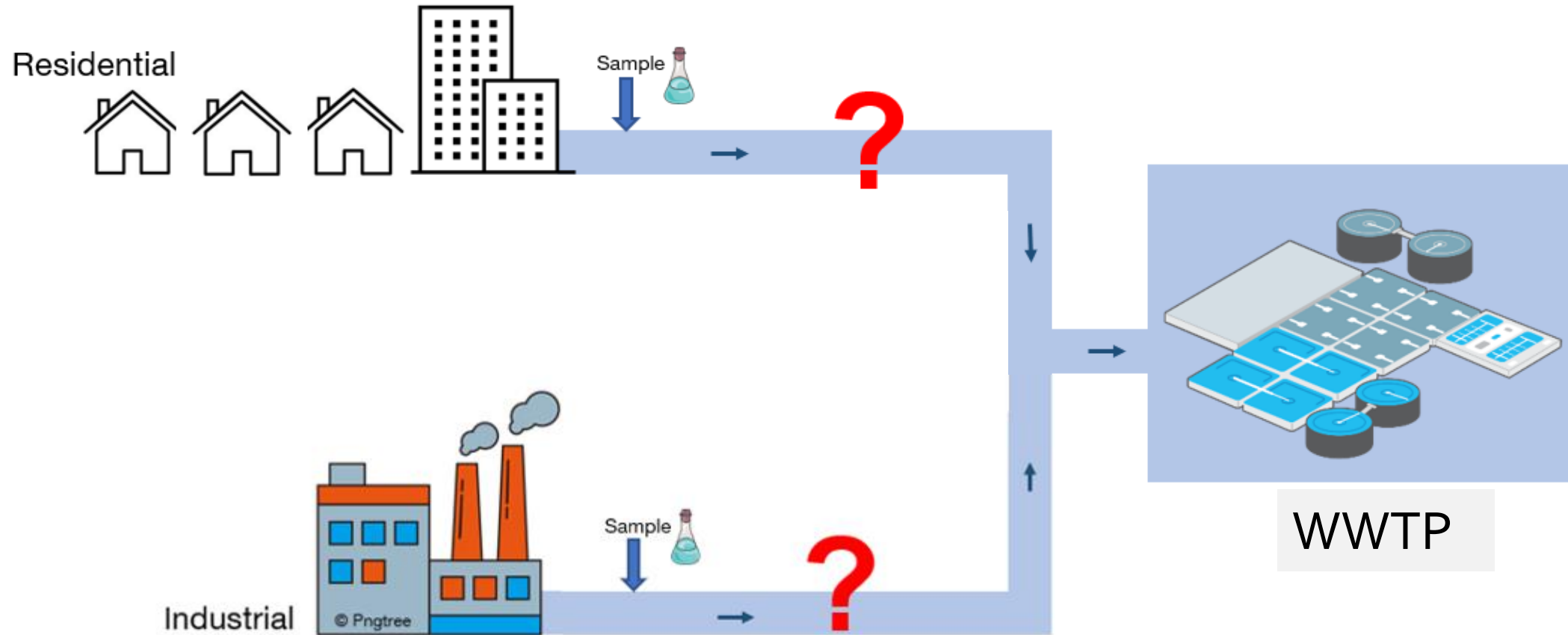
- PFAS measured in effluent is higher than in influent
- Treatment processes transform PFAS into other PFAS

# WWTP Study Take-Aways

1. PFAS are detected in wastewater influent, effluent, and biosolids.
2. Analytical methods that target specific individual PFAS do not provide the total PFAS picture.
3. PFAS in wastewater influent are transformed to other PFAS species during treatment but are not destroyed.
4. No clear difference between facilities with residential or industrial influent.



# Sewershed Study



# Sewershed Study



Image Source: Ellis Corp

# Stormwater Study

- Urban stormwater monitored
- 4 wet seasons, 2019 - 2022



Collecting a stormwater sample in Visitacion Valley in San Francisco, December 2022.

# Stormwater Sites

**Urban  
stormwater**

21 sites  
Mean 65% impervious area

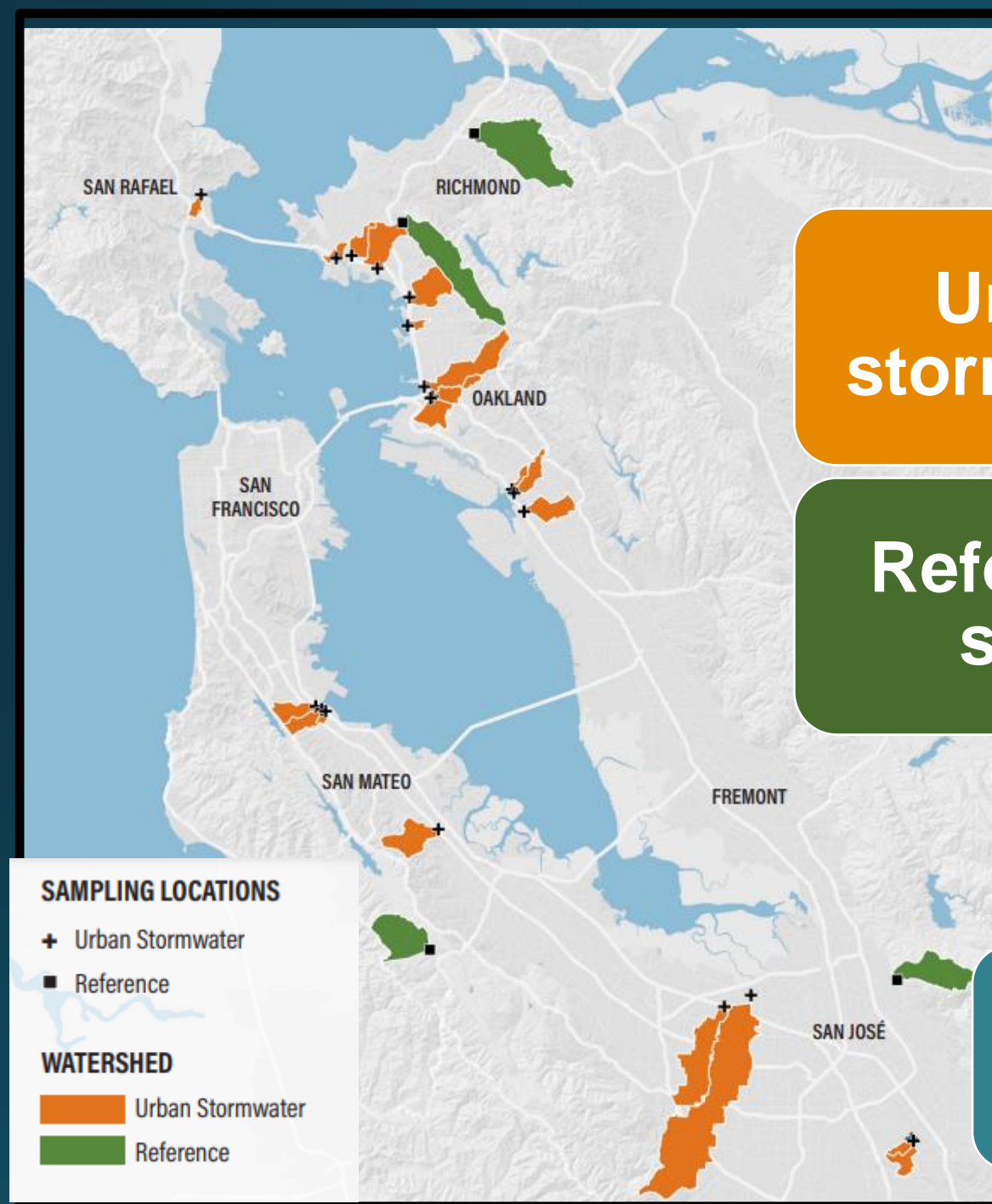
**Reference  
sites**

4 sites  
Mean 4% impervious area

# Sampling Events

**Storms**

11 storms



# Stormwater Study Take-Aways

1. PFAS observed at every urban site
2. Dominant PFAS: perfluorohexanoic acid (PFHxA), PFOS, and PFOA
3. PFAS in stormwater at similar concentrations to those in municipal wastewater effluent

# Conclusions – So What Now?

## 1. Source control

- Turn off the tap
- Investigate and clean up PFAS source sites



## 2. Minimize your exposure

- PFAS Central
- California Safer Consumer Product Program

# Thank you

State of the Estuary Conference  
May 29, 2024



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