



# Emerging Contaminants Update

Current SF Bay Science

**SFEI**

SAN FRANCISCO  
ESTUARY INSTITUTE



Ezra Miller, Senior Scientist

**BAPPG Meeting**  
**August 6, 2025**



# SFEI

SAN FRANCISCO  
ESTUARY INSTITUTE

- **Nonprofit research institute** with over 80 staff working in the Bay Area and California
- We **deliver visionary science** to empower people to revitalize nature

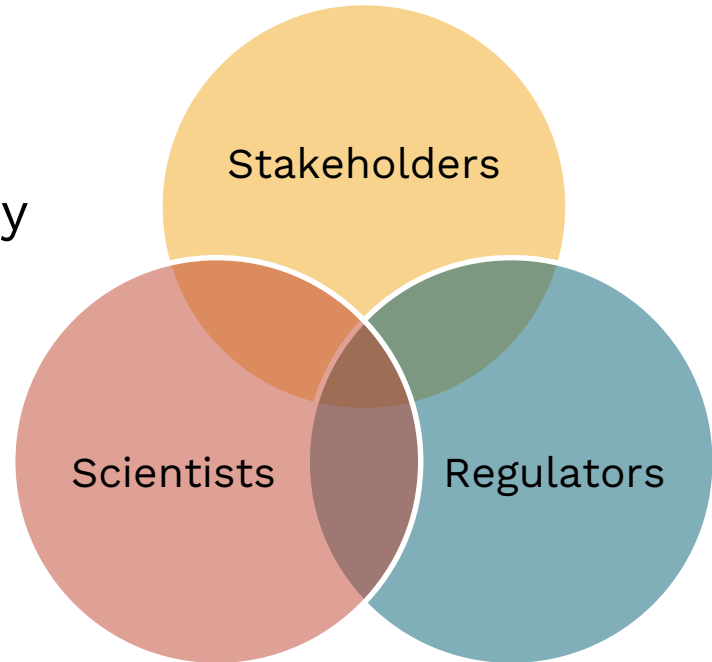
[sfei.org](https://sfei.org)

# Regional Monitoring Program (RMP)

Partnership to monitor the health of SF Bay  
to support management decisions



Implemented by



# Emerging Contaminants

- CECs = contaminants of emerging concern
  - Unregulated or under-regulated substances that can enter the environment and harm people and wildlife
  - Not typically monitored in the environment
- Rather than evaluating chemicals one at a time, we use a **class-based approach** for efficient decision making based on entire groups of chemicals

Derek Muir  
Environment and  
Climate Change Canada



Dan Villeneuve  
US Environmental  
Protection Agency



Heather Stapleton  
Duke University



**Emerging  
Contaminants  
Expert  
Advisors**

Miriam Diamond  
University of  
Toronto



Bill Arnold  
University of  
Minnesota



Lee Ferguson  
Duke University





# Emerging Contaminants Team at SFEI



Rebecca Sutton  
(she/her)



Ezra Miller  
(ze/zir)



Kelly Moran  
(she/her)



Diana Lin  
(she/her)



Miguel Mendez  
(he/him)



Jennifer Dougherty  
(she/her)



Kayli Paterson  
(she/they)



Martin Trinh  
(he/him)



Alicia Gilbreath  
(she/her)

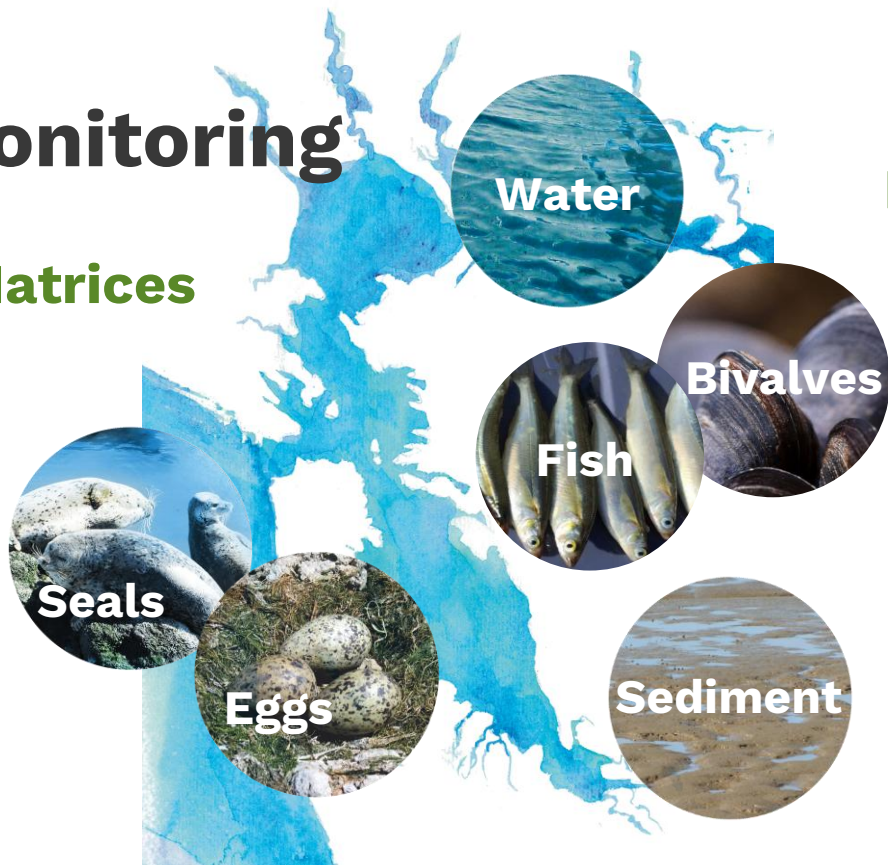


Pedro Avellaneda  
(he/him)

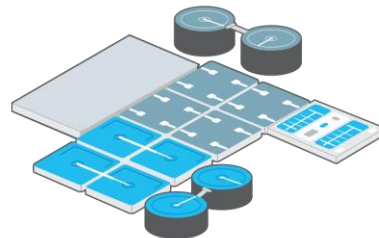


# SFEI Monitoring

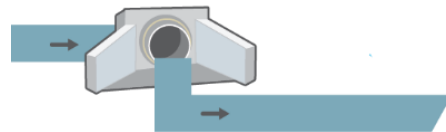
## Bay Matrices



## Pollution Pathways



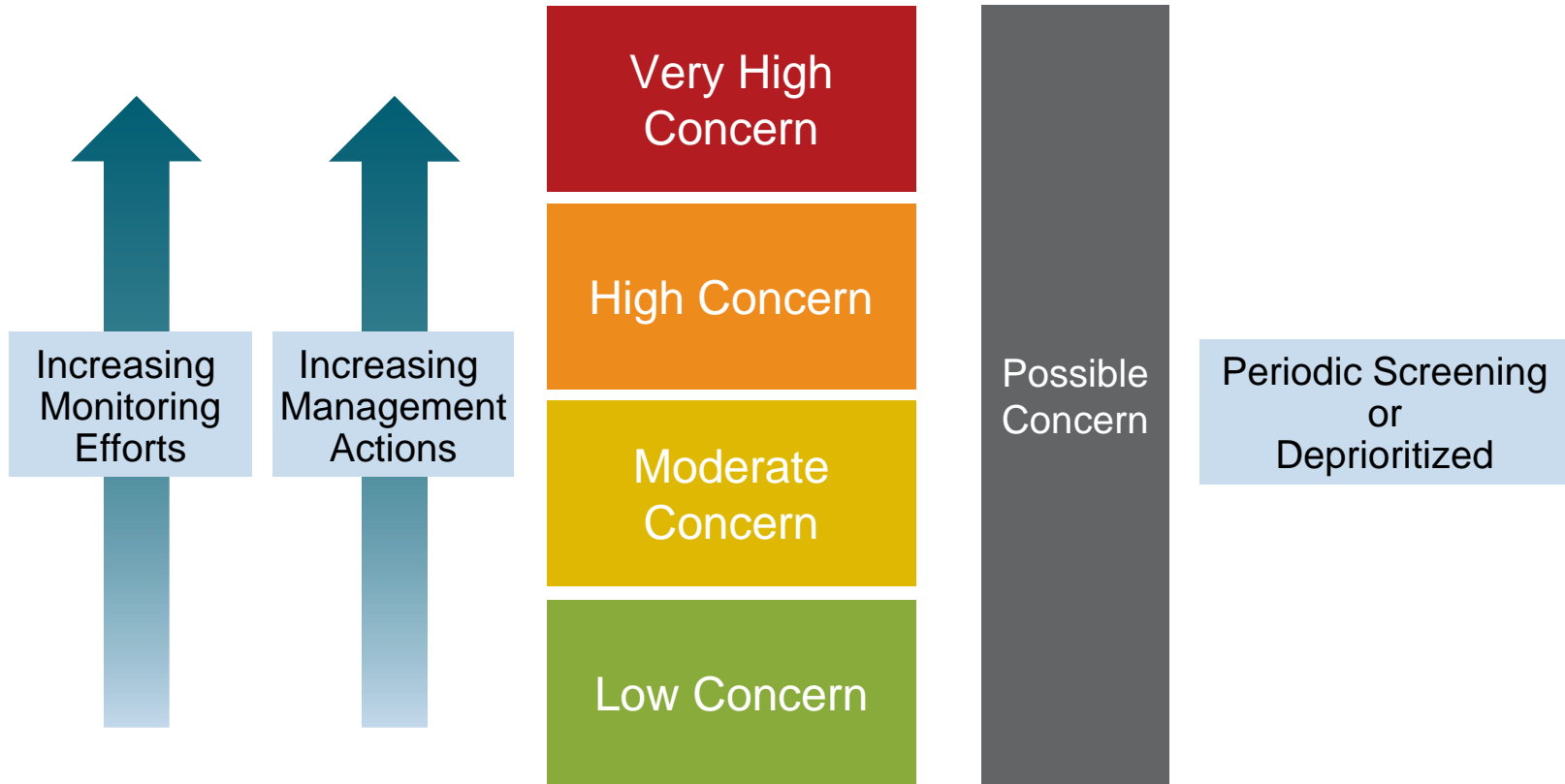
**Wastewater Effluent**



**Urban Stormwater Runoff**

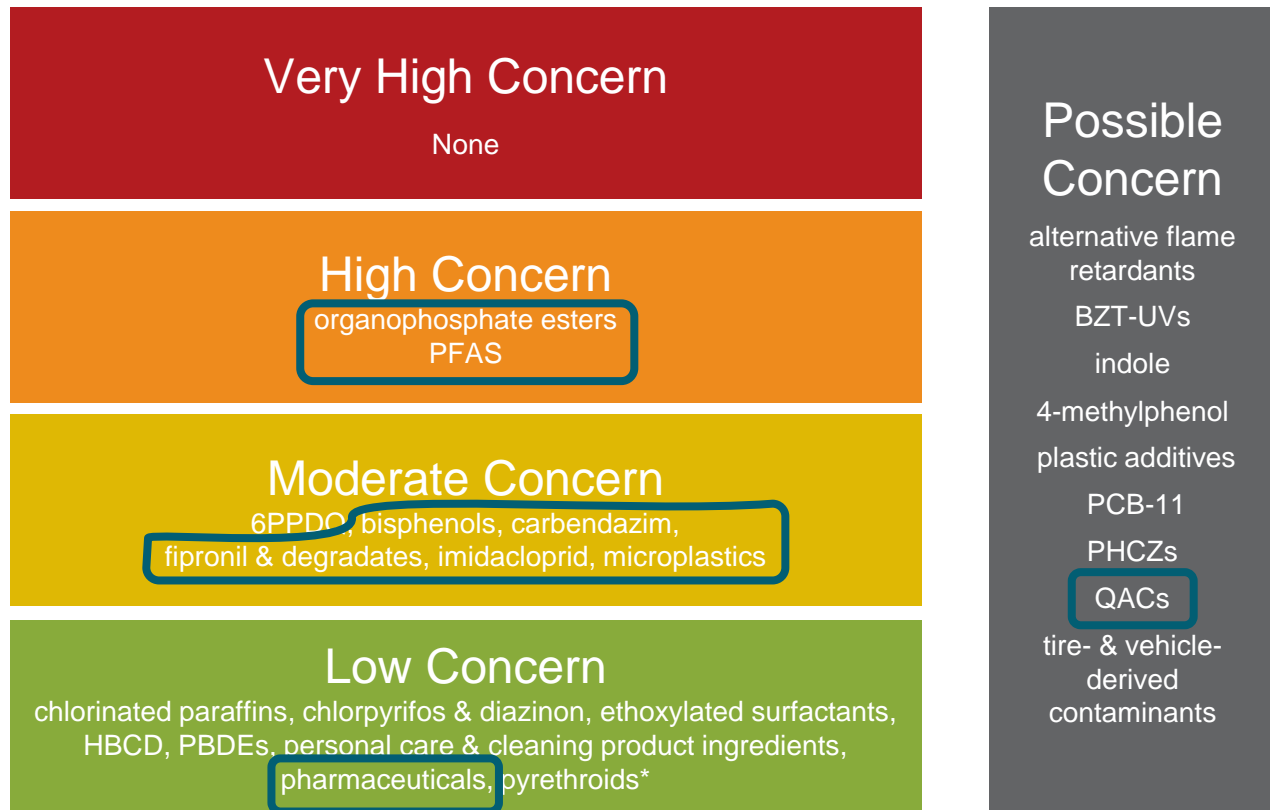
**Reactionary & Anticipatory:** Legacy and Emerging Contaminants

# Tiered Risk-based Framework for CECs





# Tiered Risk-based Framework for CECs

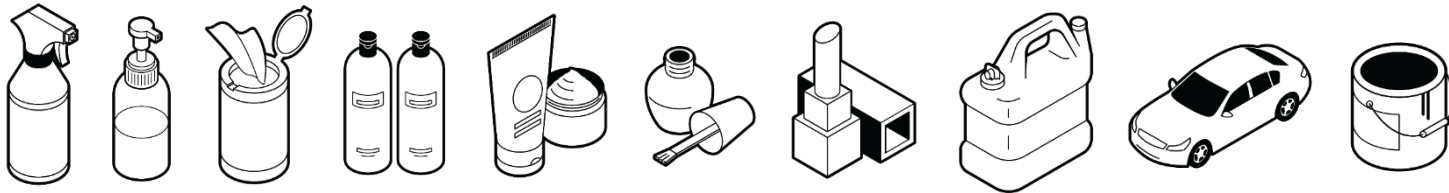


\*Higher concern in Bay Area creeks



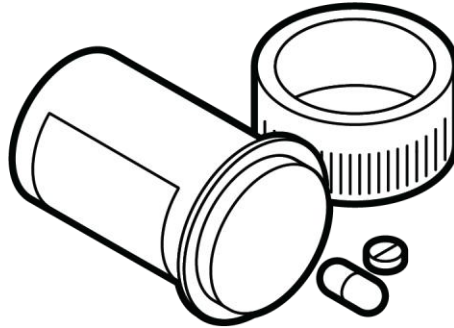
# Possible Concern: QACs

- = Quaternary Ammonium Compounds
- Used as antimicrobials, preservatives, antistatic agents, and for other functions in many products (but only sometimes on the label)
- Linked with antimicrobial resistance
- Evidence of human and aquatic toxicity
- Linked with WWTP upsets



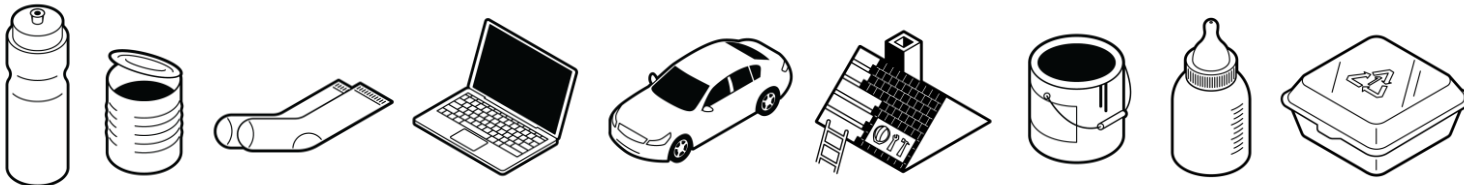
# Low Concern: Pharmaceuticals

- Available Bay data generally indicate concentrations are well below levels of concern
- Haven't actually looked at that many analytes
- Appreciate your source control efforts (e.g., take-back programs)



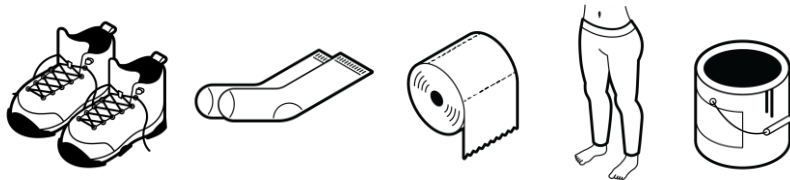
# Moderate Concern: Bisphenols

- Plastic additives
- Endocrine disruptors
- Concentrations in Bay water and sediment approaching protective aquatic toxicity thresholds
- BPA bans have led manufacturers to switch to other bisphenols (with similar properties)



# Moderate Concern: Preservatives

- Commonly added to a range of consumer products to prevent the growth of bacteria and mold
- Carbendazim detected in stormwater and throughout Bay water exceeding available toxicity thresholds
- Isothiazolinones detected but not yet quantified





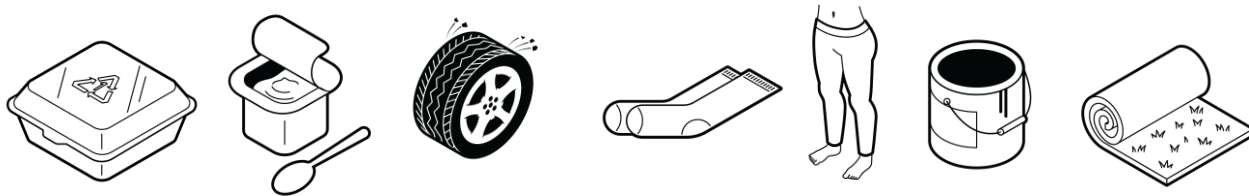
# Moderate Concern: Pet flea/tick control

- Fipronil (& degradates), imidacloprid, dinotefuran, etc.
- Concentrations in POTW effluent and Bay water exceed aquatic toxicity thresholds
- Human health concerns for pet groomers and owners, especially children
- One of the foci of the BACWA Pesticides Workgroup



# Moderate Concern: Microplastics

- Plastic fragments smaller than 5 mm
- Many different sizes, shapes, and chemicals!
- Loads from stormwater far exceed loads from wastewater



# Microplastics cont'd

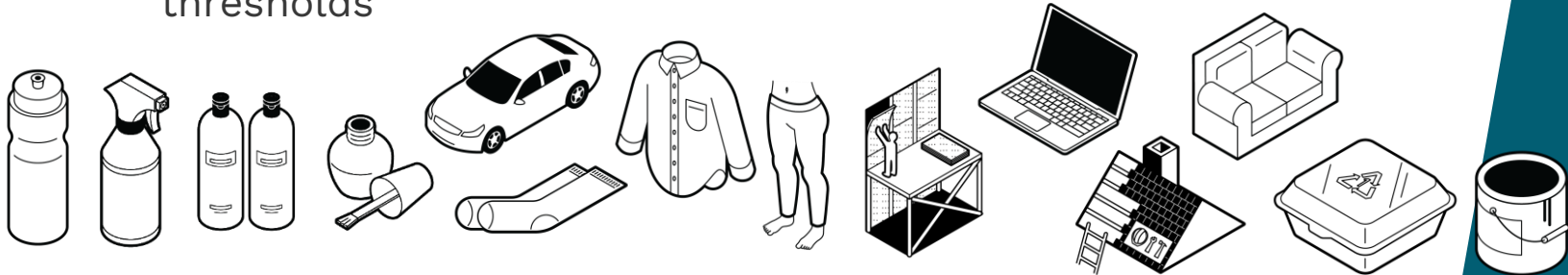
- Other ongoing non-RMP work:
  - Dryers study: Are clothes dryers a significant source of microplastic pollution?
  - California Statewide Plastics Monitoring Strategy



Image credit: Lorien Fono

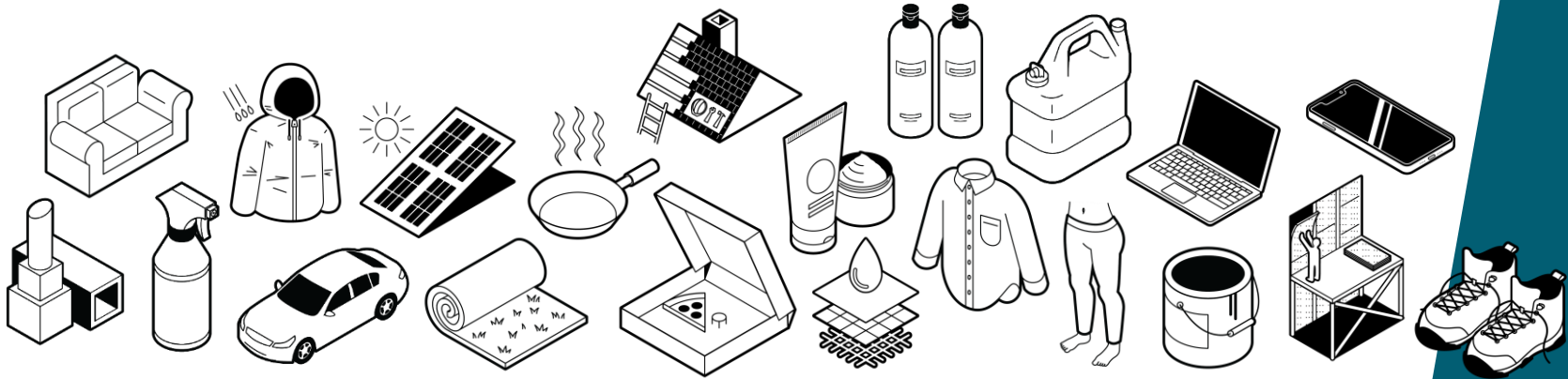
# High Concern: OPEs

- = Organophosphate Esters
- Flame retardants and plasticizers
- Neurological toxicity (humans and aquatic organisms)
- Now banned in upholstered furniture, mattresses, and children's products in California
- Concentrations in Bay water well above aquatic toxicity thresholds



## High Concern: PFAS

- “Forever chemicals”
- Toxic to people and wildlife
- Concentrations in Bay sportfish well above human health consumption thresholds



# SFEI



# PFAS Sources to Solutions

- Partnership among the RMP, SFEI, independent scientists, BACWA, BAMSC, and the DTSC Safer Consumer Products regulatory program
- Synthesis and Strategy Report
  - Synthesis of all PFAS Bay monitoring data
  - Chart course for future studies
- Additional monitoring in wastewater and stormwater
- Linkages to consumer products containing PFAS through product testing and conceptual models

# Ongoing Monitoring

Contaminant	Bay Water	Sediment	Biota	Wastewater	Stormwater
PFAS	X	X	X	sewershed, influent, effluent	X
OPEs	X			effluent	X
Bisphenols	X	X		effluent	
Preservatives	X			effluent	X
Pet flea/tick control				(DPR led)	(DPR led)
Microplastics			X		X
QACs	X			influent, effluent, biosolids	X

[illegible]

# Questions?

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**[www.sfei.org/programs/cw/  
emerging-contaminants](http://www.sfei.org/programs/cw/emerging-contaminants)**

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