

# State of Contaminants of Emerging Concern in the Estuary

2024 State of the Estuary

May 29, 2024



Maggie Monahan, San Francisco Bay Regional Water Board

# Contaminants of Emerging Concern (CECs)



William Duke, NYTimes

# CECs

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1. Un- or under-regulated

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2. Not commonly monitored

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3. Have the potential to enter the environment and cause adverse impacts

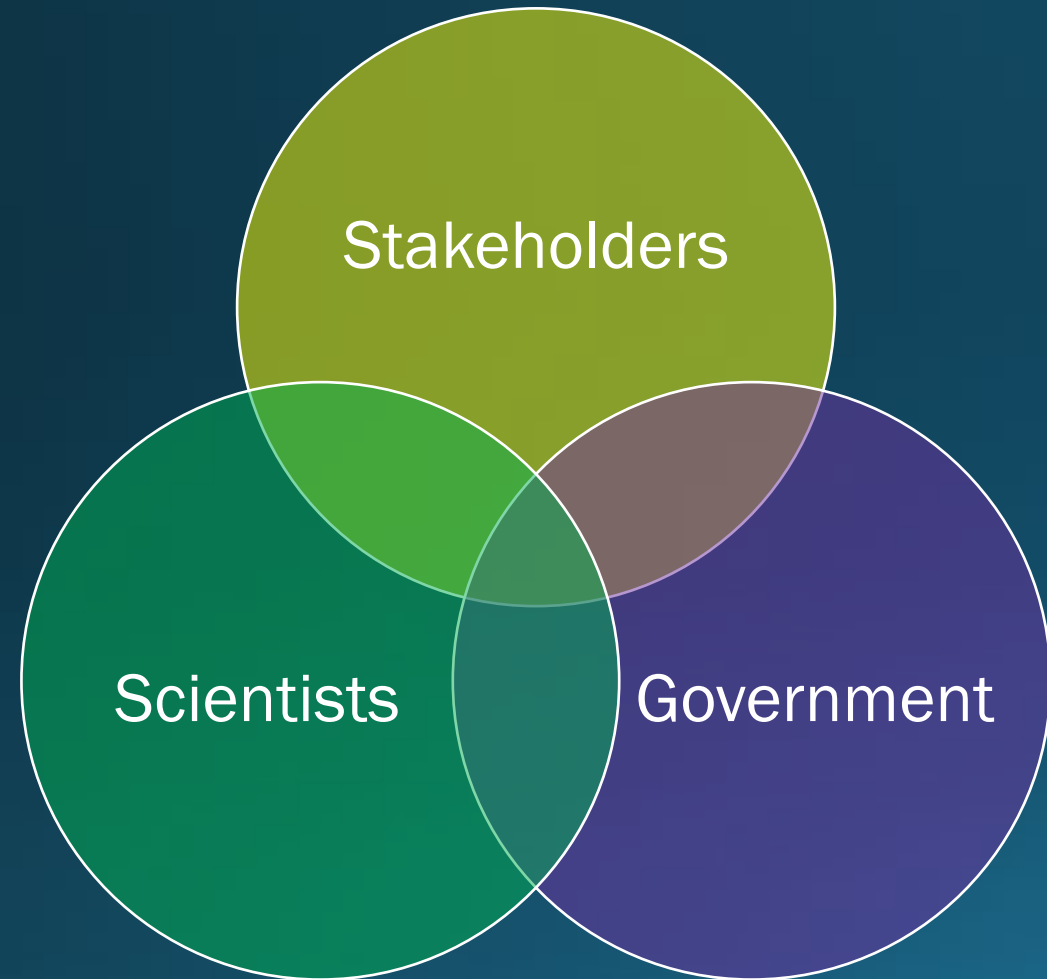


# CECs in the Estuary

alkylphenol perfluorooctane sulfonate erythromycin hydrate  
tris (1,3-dichloro-2-propyl) phosphate ranitidine sertraline  
diuron fenpropathrin triclosan bis(4-chlorophenyl)sulfone  
polybrominated diphenyl ether hexabromocyclododecane  
ziram 1,2-bis (2,4,6, tribromophenoxy) ethane bifenthrin  
bis(hexachlorocyclopentadieno)cyclooctane nanomaterials  
gemfibrozil tris (1,3-dichloro-2-propyl) phosphate maneb  
triclocarban 4-nonylphenol bisphenol a diphenhydramine  
fipronil caffeine sulfamethoxazole n,n-diethyl-m-toluamide  
carbamazepine bis(2-ethylhexyl) phthalate cypermethrin  
single-walled carbon nanotubes galaxolide siloxanes  
chlorinated paraffins dehydronifedipine ciprofloxacin D5  
esfenvalerate permethrin di-n-butylphthalate oxazepam  
chlorothalonil perfluoroperhydrophenanthrene cocaine  
traseolide nanosilver polybrominated dibenzo-p-dioxins  
cotinine 1,3,6,8-tetrabromopyrene indoxacarb cyfluthrin  
diphenhydramine ethylenebis-tetrabromophthalidimide V6  
chlorophenoxyphenols valsartan phenothrin mancozeb



# Regional Monitoring Program



- Partnership
  - San Francisco Estuary Institute
  - SF Bay Regional Water Board
  - Regulated discharger community
- Long-term monitoring and special studies to address legacy and emerging contaminants



# RMP Focus on CECs

- 15+ years of monitoring and studies
- CEC Synthesis and Strategy
- Emerging Contaminants Workgroup

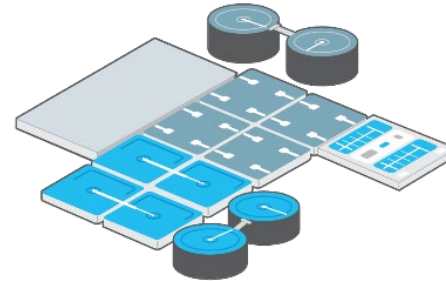


Contaminants of  
Emerging  
Concern

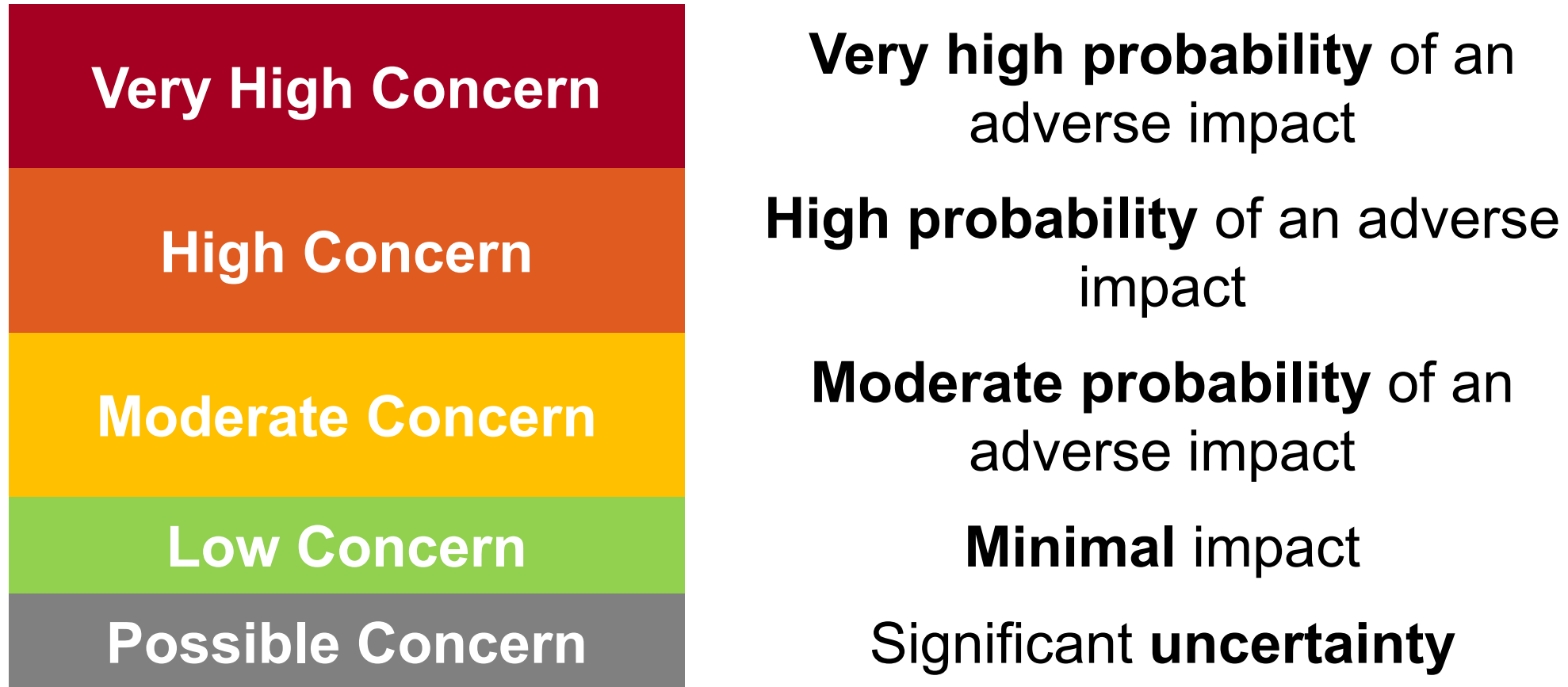
IN SAN FRANCISCO BAY



# Monitoring San Francisco Bay



# Tiered risk-based framework





# Monitoring & management actions

<b>Very High Concern</b>	<b>Studies to support clean up, status &amp; trends</b> <b>Clean up plan and control/treatment actions</b>
<b>High Concern</b>	<b>Status &amp; trends, special studies</b> <b>Aggressive pollution prevention</b>
<b>Moderate Concern</b>	<b>Consider status &amp; trends, special studies</b> <b>Pollution prevention</b>
<b>Low Concern</b>	<b>Screening &amp; trends</b> <b>Low-cost source control</b>
<b>Possible Concern</b>	<b>Periodic screening</b> <b>Novel approaches to identify</b>

# SF Bay Tiered Risk CECs

## Very High Concern

None currently

## High Concern

PFAS; Organophosphate esters

## Moderate Concern

Bisphenols; Ethoxylated surfactants; Fipronil\*; Imidacloprid\*; Microplastics

## Low Concern

PBDEs & HBCD; Pharmaceuticals; Personal care & cleaning products; Pyrethroids\*

## Possible Concern

Alternative halogenated flame retardants; UV Stabilizers; Plastic additives; Polyhalogenated carbazoles; Quaternary ammonium compounds; Siloxanes; others

\* High or Very High Concern in urban creeks

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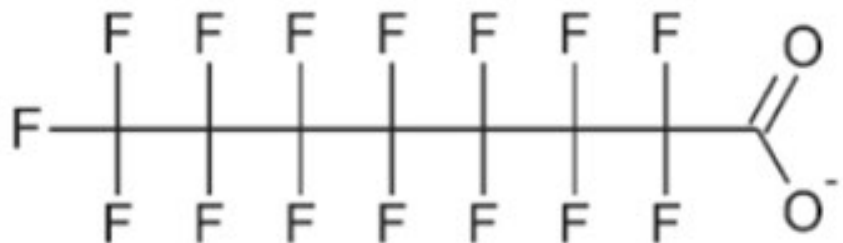
Alternative halogenated flame retardants; UV Stabilizers; Plastic additives; Polyhalogenated carbazoles;  
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# Per- and Polyfluoroalkyl Substances (PFAS)

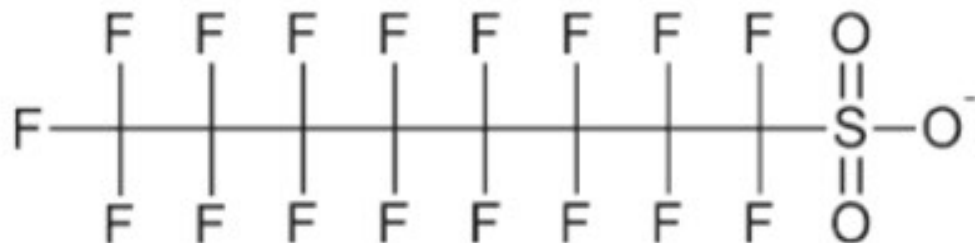
## PFOA

Perfluorooctanoic acid



## PFOS

Perfluorooctane sulfonate



# Organophosphate Esters (OPEs)

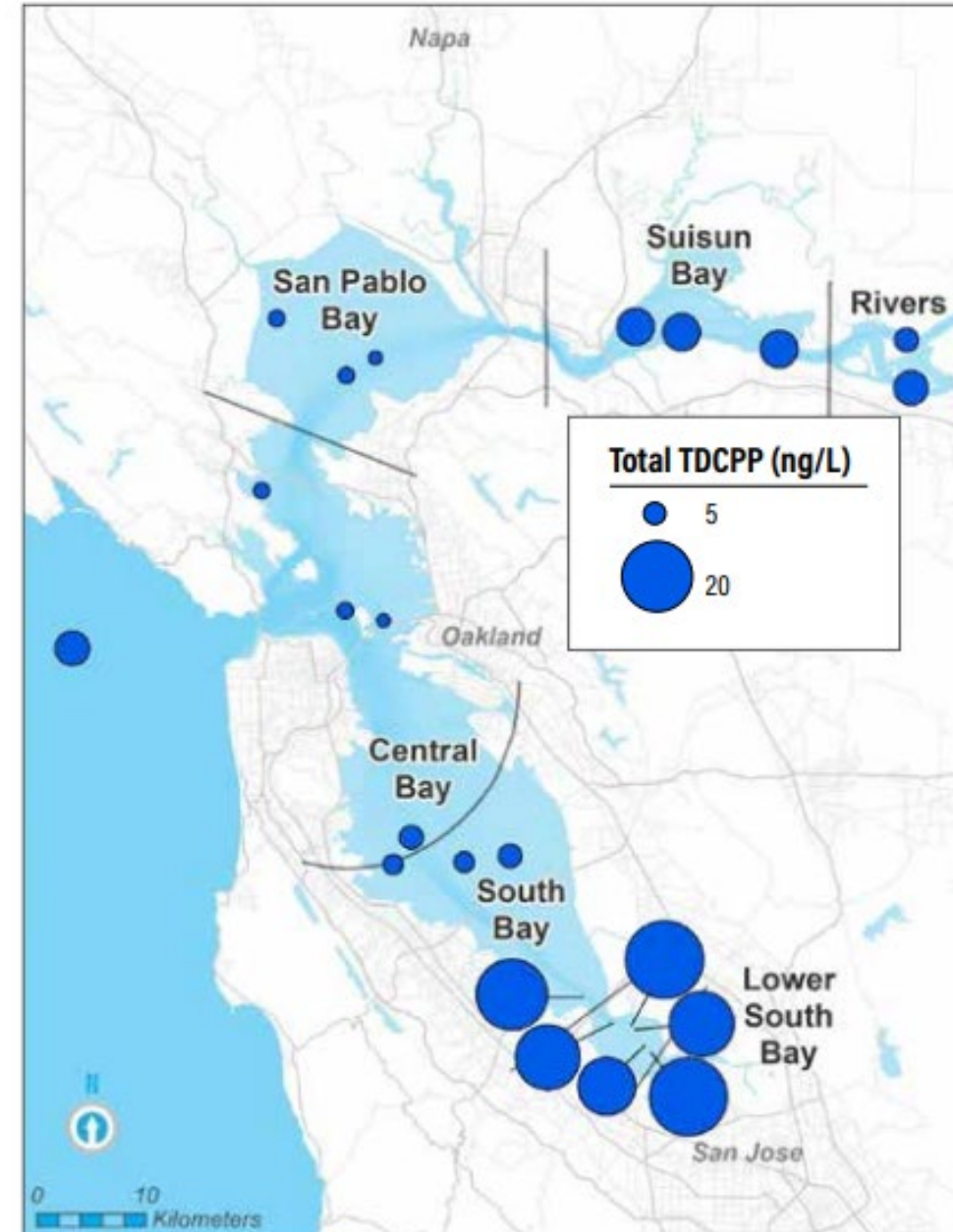
**Flame retardants and plastic ingredients**

**Mobile and toxic, widely observed in the environment**



**OPEs: TDCPP  
exceeds ecotoxicity  
threshold**

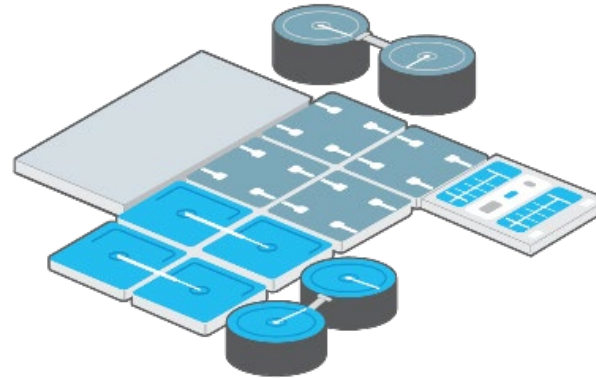
## An Organophosphate Ester (TDCPP) in Bay Water, 2017



# OPEs: Current Monitoring



**Urban Stormwater Runoff**



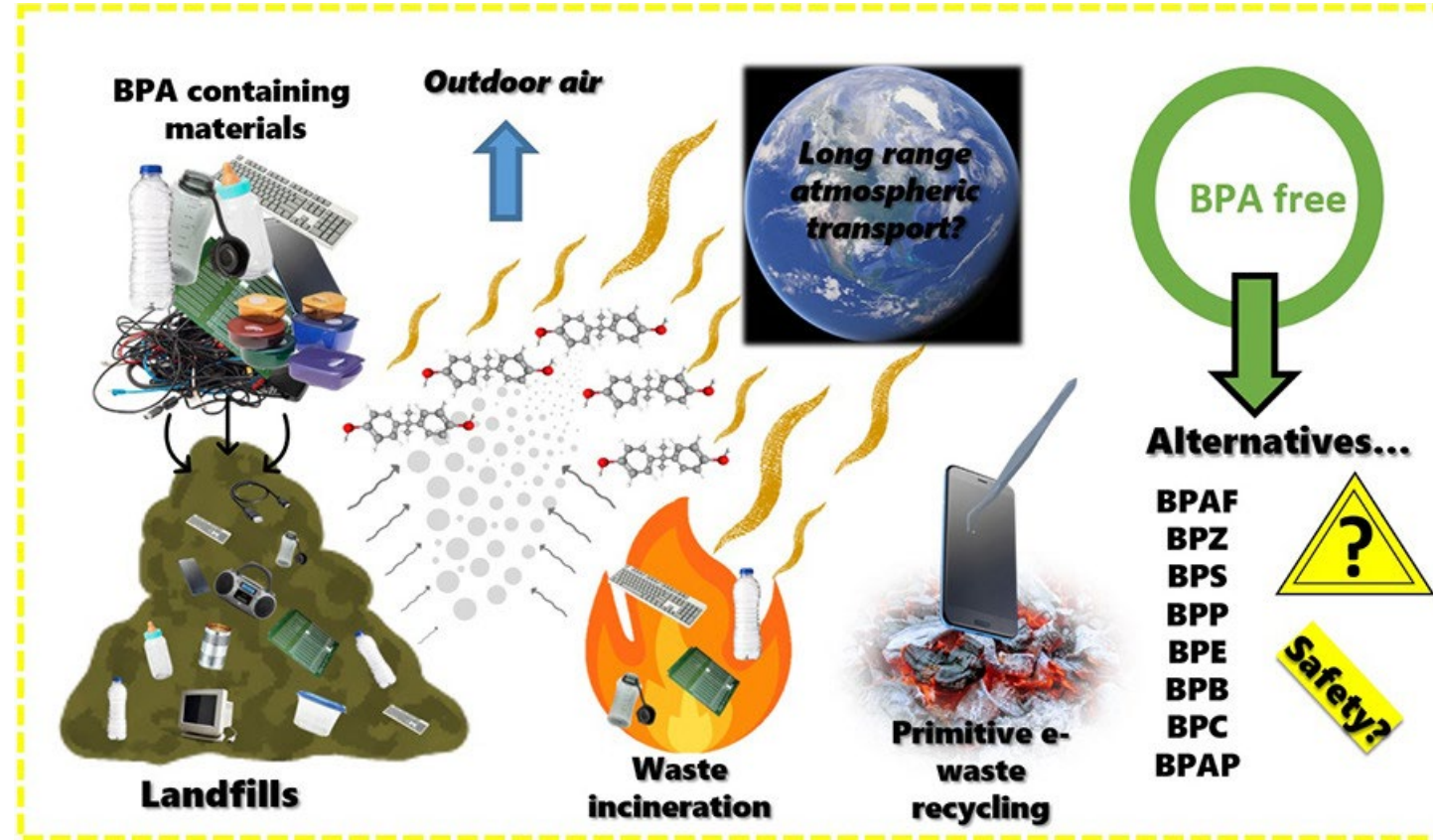
**Wastewater**



# Bisphenols

BPA and related plastic ingredients

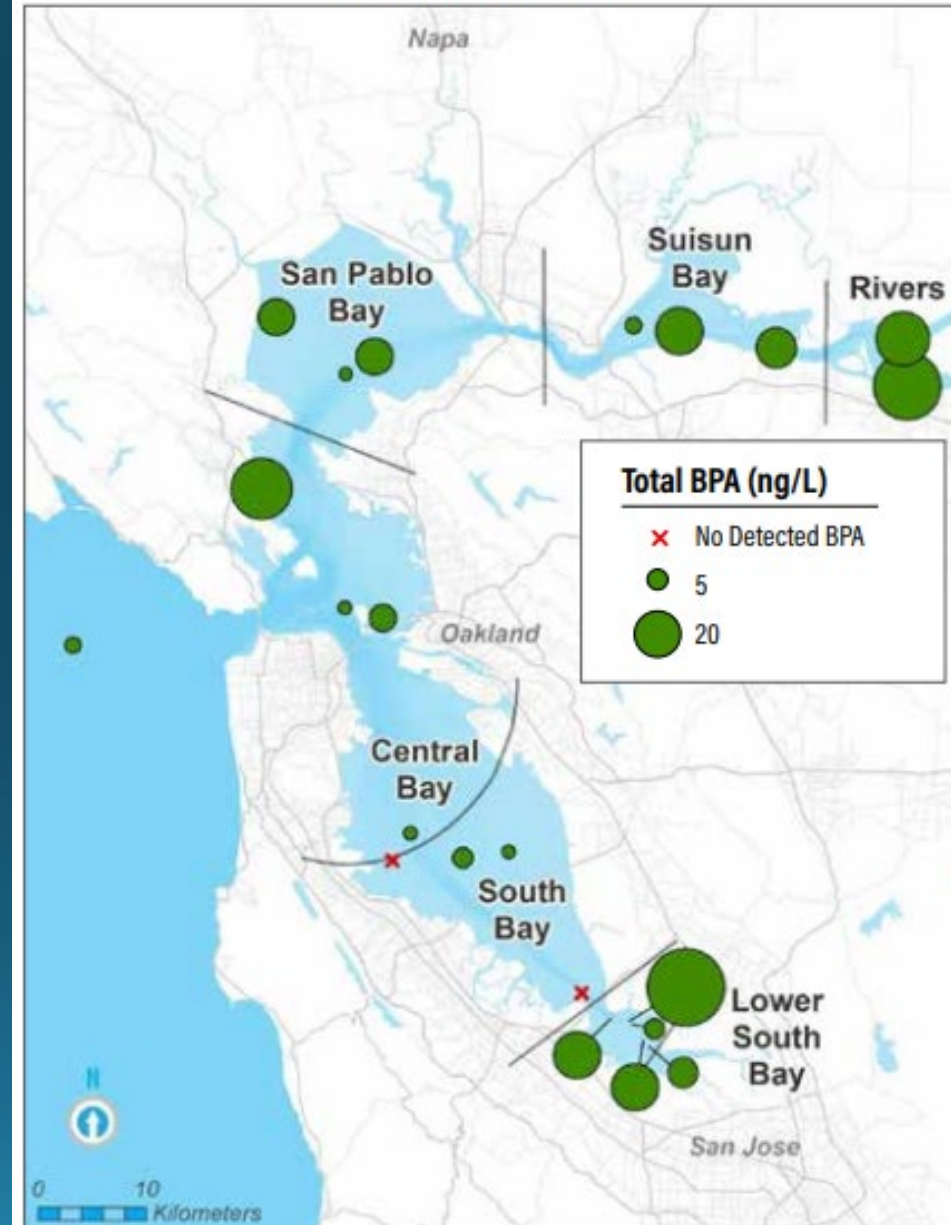
Mobile and toxic, widely observed in the environment





# Bisphenols: BPA and BPS in Bay water

## Bisphenol A in Bay Water, 2017

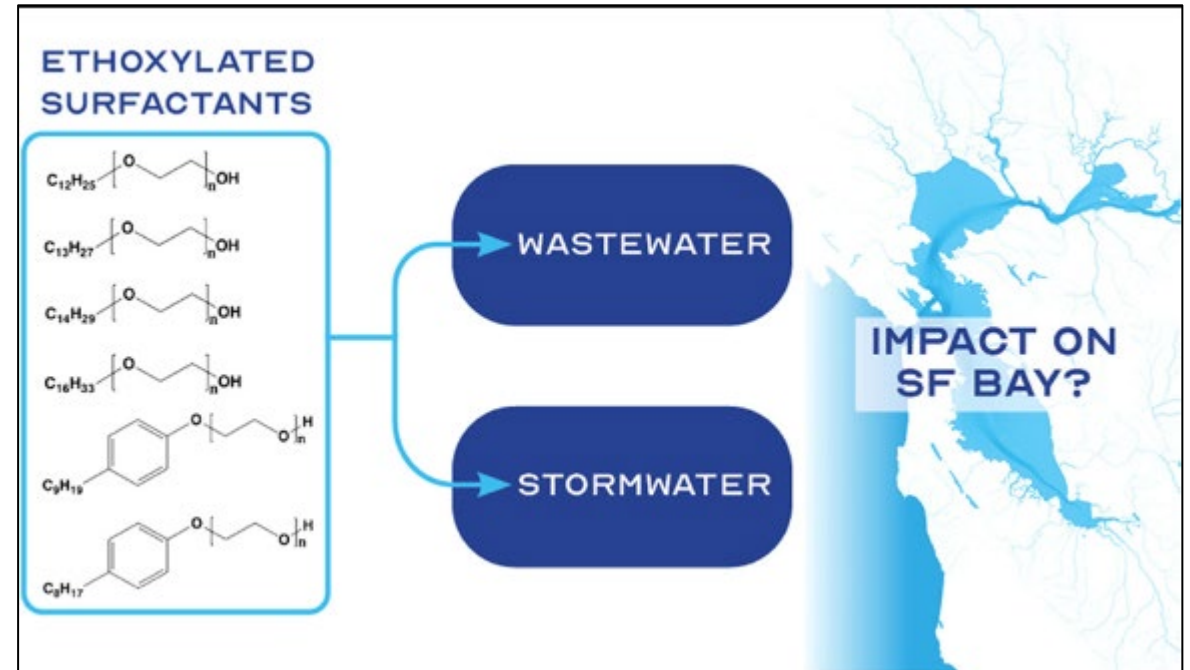


# Bisphenols: Current Monitoring



**Urban Stormwater Runoff**

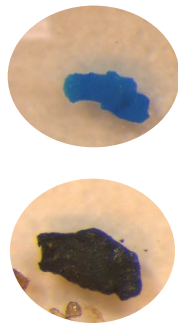
# Ethoxylated surfactants



Surfactants in products have ethoxylate chain lengths of **6-20**

# Microplastics

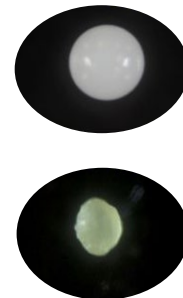
Fragments



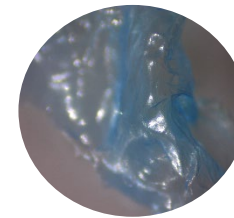
Fibers &  
Fiber  
Bundles



Spheres/  
Pellets



Films

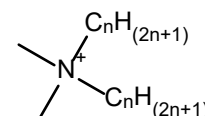
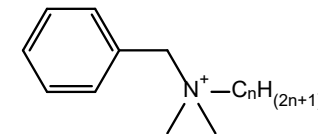
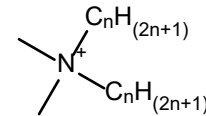
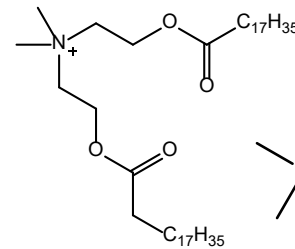
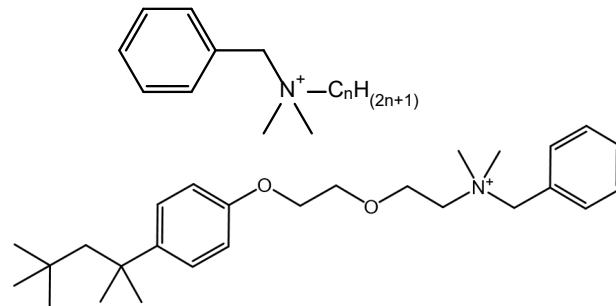
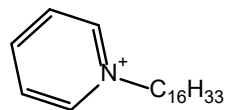


Foams

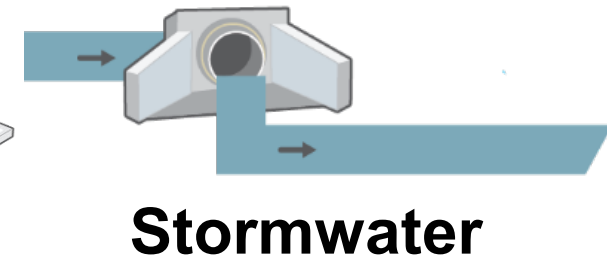


# Quaternary Ammonium Compounds (QACs)

Possible Concern



# QACs: Monitoring



UNIVERSITY OF MINNESOTA  
Driven to Discover<sup>SM</sup>

- San Francisco has safer disinfectant guide to avoid QACs:
  - <https://www.sfapproved.org/safer-disinfectants-covid-19>

# Summary

- CEC Strategy
- Tiered risk-based framework
- Inform priorities for monitoring and management
- Stakeholder input on scope and priorities





## Additional Information

[www.sfei.org/rmp](http://www.sfei.org/rmp)

- Rebecca Sutton
- Alicia Gilbreath
- Diana Lin
- Ezra Miller
- Jennifer Dougherty
- Kayli Paterson
- Kelly Moran
- Miguel Mendez
- Pedro M. Avellaneda-Lopez