



# RMP

REGIONAL MONITORING  
PROGRAM FOR WATER QUALITY  
IN SAN FRANCISCO BAY

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

# RMP CECs Toolbox

Rebecca Sutton, SFEI - ASC

# Essential Tools for Success

- Establishing a **CEC strategy**
- Monitoring tied to **management actions**
- Examining CECs by **class**
- Tracking the **science**
- Guidance from **stakeholders & experts**
- Partnering with **laboratories**
- **Exploring** new methods
- **Leveraging** outside expertise
- **Modeling** to refine understanding
- **Screening** receiving waters, then pathways



# Essential Tools for Success

Use the right tool  
for the job!



# Establishing a CEC Strategy



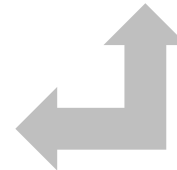
## 1. CEC monitoring, evaluating risk



## 2. Learning from others, sharing expertise



## 3. Non-targeted monitoring (bioassays, broadscans)





**MODERATE OR HIGH IMPACT**

## Monitoring

## Management

- Studies to support cleanup plan

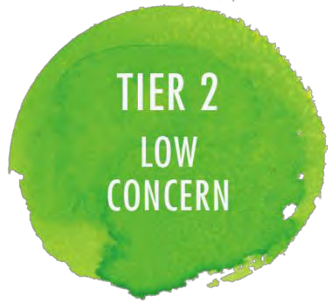
- 303(d) listing
- Cleanup plan (e.g., TMDL)
- Aggressive control



**LOW IMPACT**

- Status & trends
- Studies of fate, effects, sources, pathways, loadings

- Action plan
- Aggressive pollution prevention
- Low-cost control



**NO IMPACT**

- Reduced screening in water, sediment, or biota
- Periodic screening in pathways, track trends

- Low-cost source ID and control
- Low-level pollution prevention
- Track use trends



**UNCLEAR**

- Screening in water, sediment, biota, wastewater, stormwater

- Prioritize contaminants of potential concern, track other efforts
- Develop analytical methods

# Monitoring Tied to Management Actions



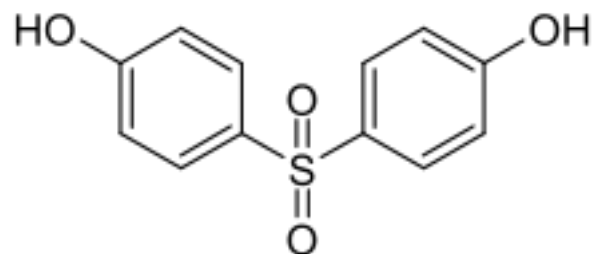
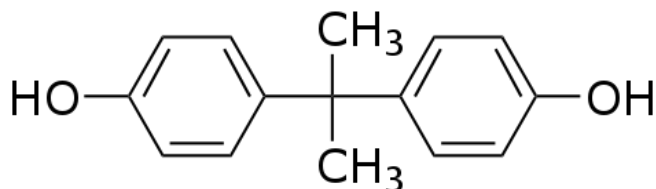
- Which CECs have the potential to adversely impact beneficial uses in San Francisco Bay?
- *What are the sources, pathways, loadings, and processes leading to CEC pollution in the Bay?*
- *Have the concentrations of CECs in the Bay increased or decreased?*
- *Which management actions may be effective in reducing CEC levels?*



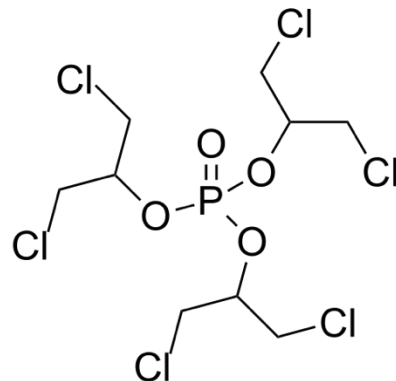
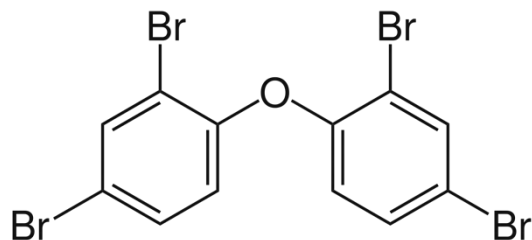
# Examining CECs by Class



- Chemical class: Bisphenol A & Bisphenol S



- Functional class: PBDE & Phosphate-based Flame Retardants



# Tracking the Science

CECs field is:

- Rapidly evolving
- Extremely broad
- Diverse management actions
- Region-specific needs





# Guidance from Stakeholders & Experts



## Emerging Contaminants Workgroup

- Stakeholder decision-making
- Expert guidance
- State and federal agency participation
- RMP Technical Review & Steering Committee oversight



# CECs Science Advisors



**Dr. Bill Arnold**  
University of Minnesota



**Dr. Kelly Moran**  
TDC Environmental



**Dr. Derek Muir**  
Environment & Climate  
Change Canada



**Dr. Lee Ferguson**  
Duke University



**Dr. Daniel Schlenk**  
UC Riverside



**Dr. Heather Stapleton**  
Duke University



# Partnering with Laboratories

- Lack of standardized methods
- Lack of commercially available standards

## CECs Perspective:

- Science is a process of reducing uncertainty
- Analytical laboratory as a valuable partner
- Informed stakeholder community





# Partnering with Laboratories

- Commercial, agency, academic laboratories
- Best partnerships are long-term
- Communication and best practices
- Rigorous QA/QC
- Data reporting



# Partnering with Laboratories: Microplastic



Cotton

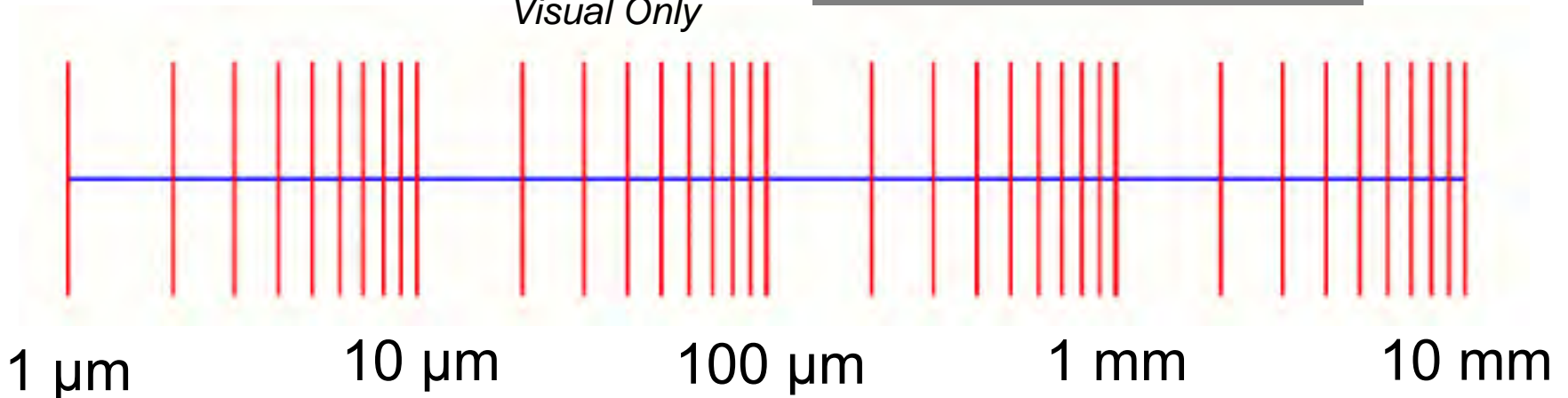


Spectroscopic  
Identification  
Necessary

Visual  
Identification  
Sufficient

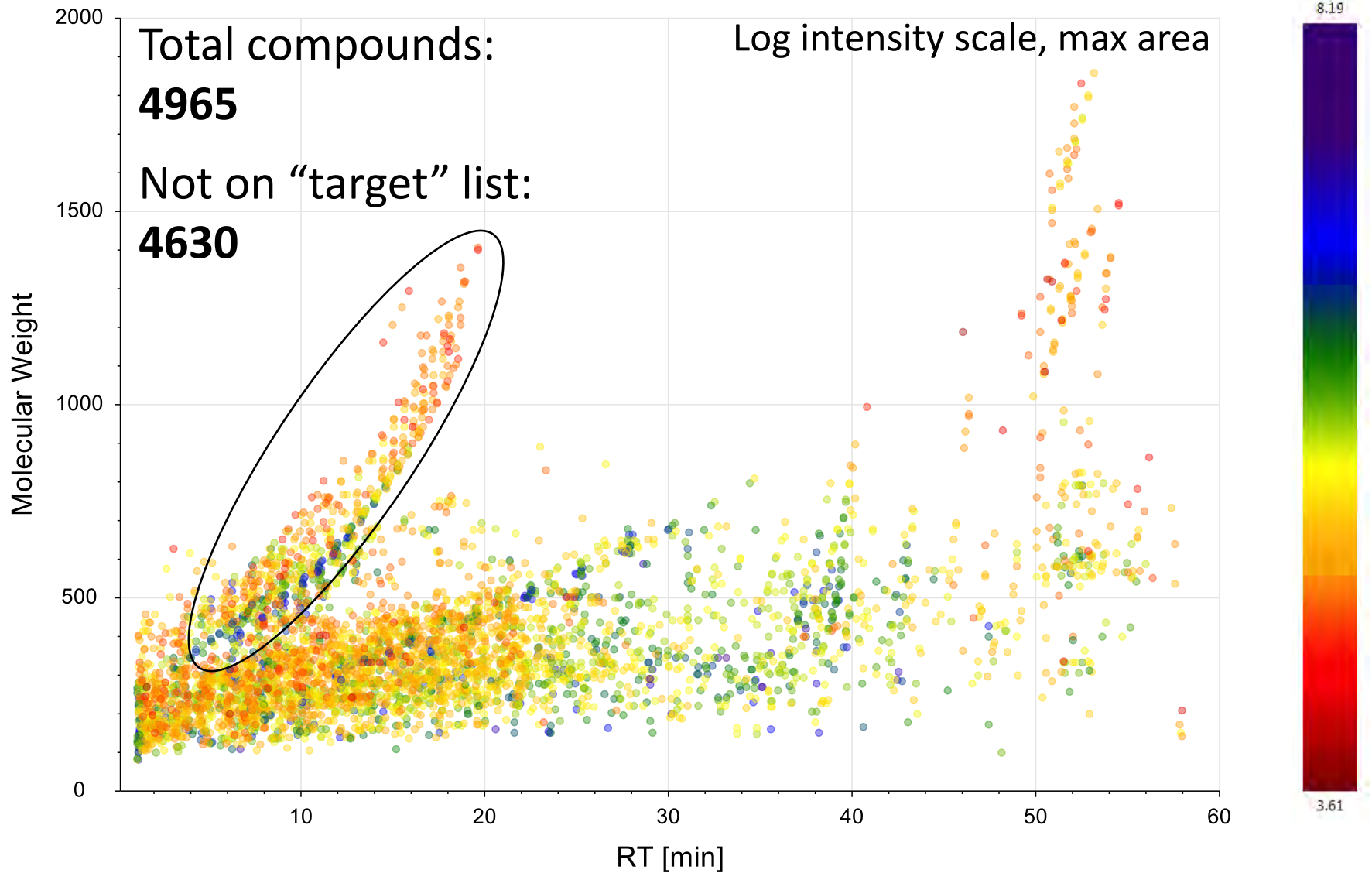


*Previous Study  
Visual Only*





# Exploring New Methods





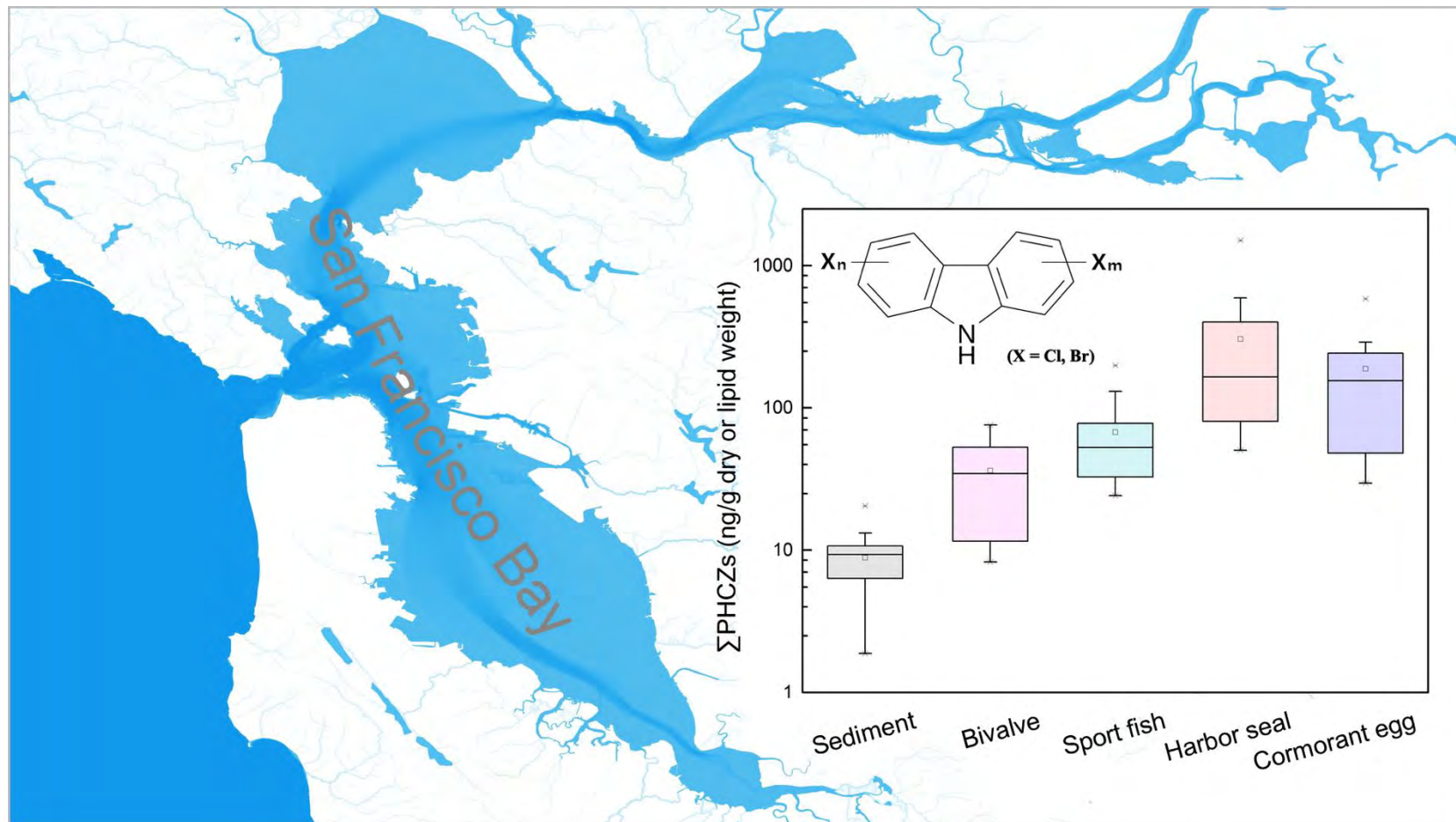
# Leveraging Outside Expertise



Photo by Katy Raddatz



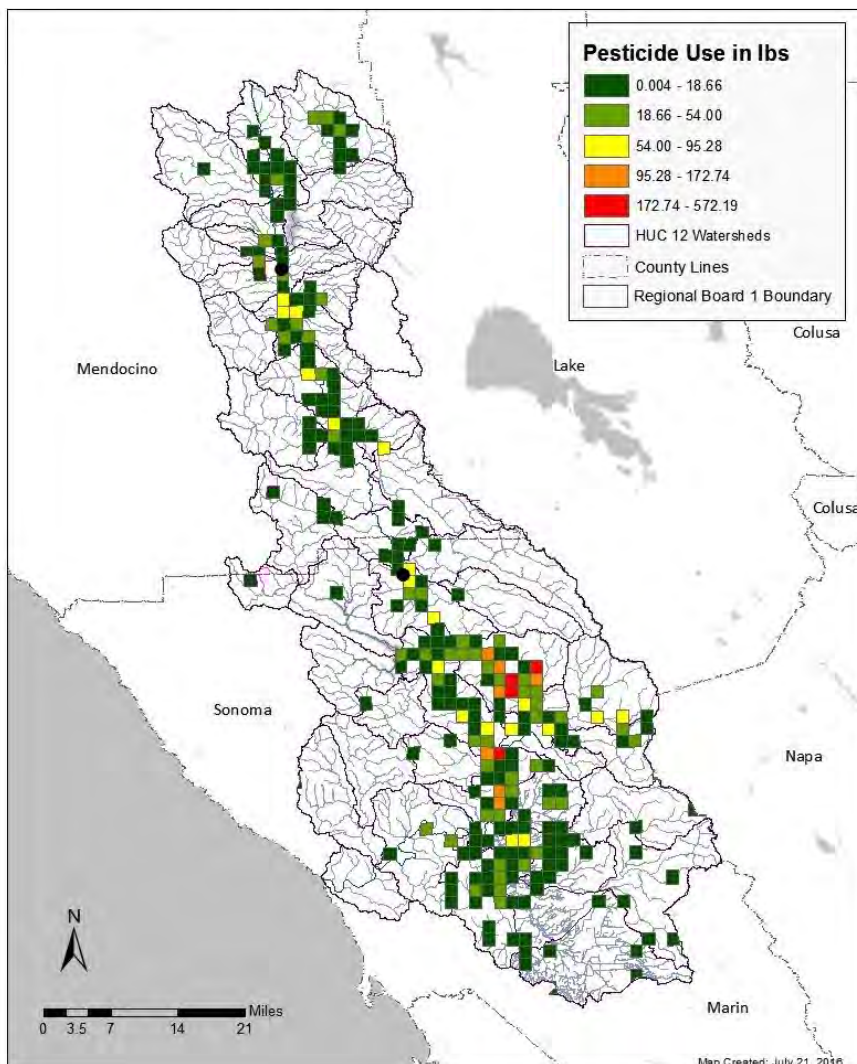
# Leveraging Outside Expertise



Wu et al. 2017. From sediment to top predators: Broad exposure of polyhalogenated carbazoles in San Francisco Bay (USA). *Environmental Science & Technology* 51:2038.



# Modeling to Refine Understanding



Understand, Predict:

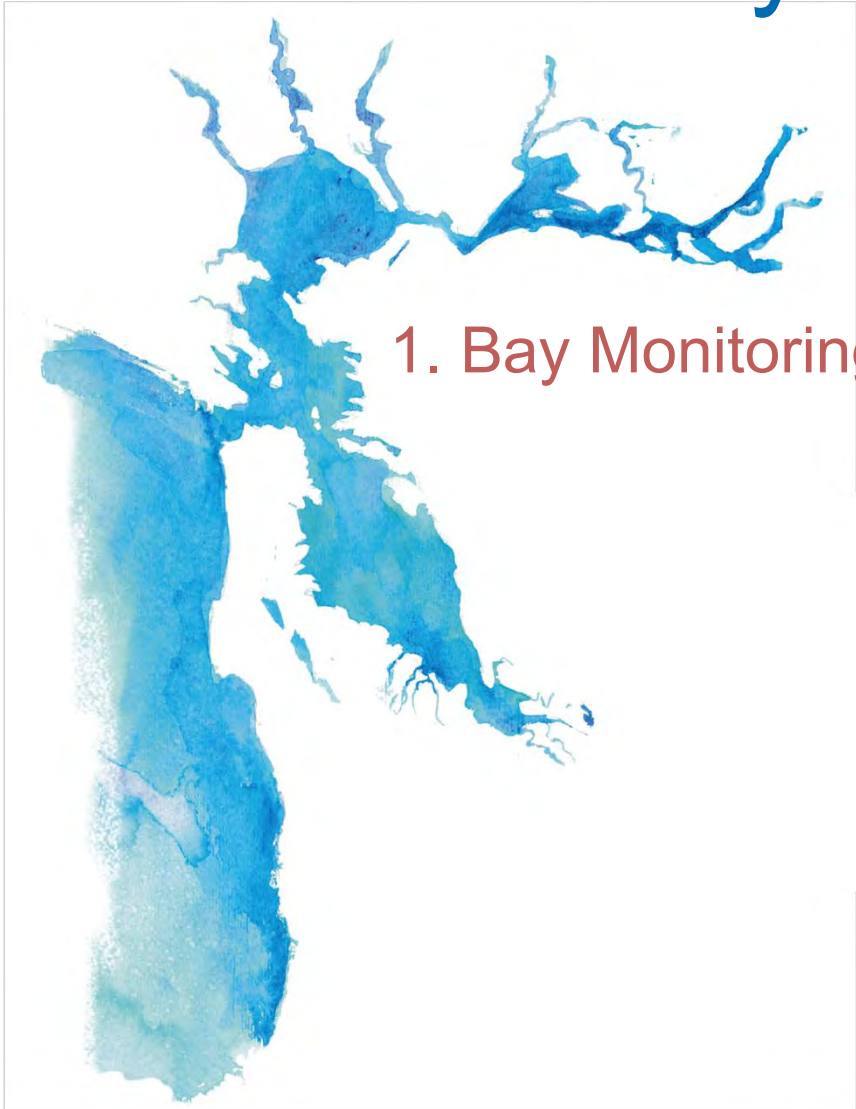
- Sources/uses
- Transport
- Fate
- Toxicity

**Imidacloprid** use in  
Russian River  
watershed, 2012-2014

DPR Data for Surface  
Water Monitoring  
Prioritization Model



# Screening the Bay, Then Pathways



1. Bay Monitoring



2. Pollution Pathways



Wastewater



Stormwater



# Establishing a CEC Strategy

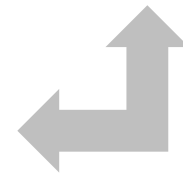


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# Questions?

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