Contaminants of Emerging Concern (CECs)

New York Times, September 30, 2014:

An Ecosystem Mystery: What Is It?

The number of chemicals entering our environment is growing at an exponential rate.

U.S. Environmental Protection Agency
Office of Inspector General:

More Action Is Needed to Protect Water Resources from Unmonitored Hazardous Chemicals

September 29, 2014
RMP CEC Strategy: Three Elements

1. CEC monitoring, evaluating risk

2. Sharing expertise, learning from others

3. Non-targeted monitoring (bioassays, broadscans)
<table>
<thead>
<tr>
<th>Tier</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>Unclear</td>
<td>Alternative Flame Retardants, Fluorinated Chemicals, Pesticides, Plasticizers, Many, many others</td>
</tr>
<tr>
<td>Tier 2</td>
<td>No Impact</td>
<td>HBCD, Pyrethroids*, Pharmaceuticals, Personal Care Product Ingredients, PBDDs and PBDFs</td>
</tr>
<tr>
<td>Tier 3</td>
<td>Low Impact</td>
<td>PFOS, Fipronil, Nonylphenol, PBDEs</td>
</tr>
<tr>
<td>Tier 4</td>
<td>Moderate or High Impact</td>
<td>None currently</td>
</tr>
</tbody>
</table>

*Pyrethroids* indicate a specific category within the products mentioned.
PFOS

Chemical permeating bay seals
Scientists stymied by marine mammals’ contamination with substance 3M Co. agreed to stop making in 2002

2014

2015

AXYS pro bono findings:
Precursors can degrade into PFOS, PFOA

2014

2015
Fipronil
Nonylphenol

EPA Proposes
Significant New Use Rule
October 1, 2014

Comments due December 1
PBDEs

BDE-47 Concentration (ng/g dry weight)

- Rivers
- San Pablo Bay
- Central Bay
- South Bay
- Lower South Bay

Years:
- 2002
- 2004
- 2006
- 2008
- 2010
- 2012
Alternative Flame Retardants

- Ambient Bay water
- Stormwater
- WWTP effluent
- Sediment
- Bivalves
- Seal blubber

Da Chen
Southern Illinois University

Triphenyl phosphate (TPhP)
Microplastics
(less than 5 mm)

Sherri Mason
SUNY Fredonia
Microplastics
(less than 5 mm)

Photos: Eric Dunlavey
Siloxanes (pro bono)
Hindered Phenols (pro bono)
Quaternary Ammonium Compounds (pro bono)

Benzalkonium chloride (C12) & Ditallow dimethyl ammonium chloride (C18)

Bruce Brownawell
Stony Brook University
2. Sharing expertise, learning from others
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Non-targeted monitoring (bioassays, broadscan)

- new contaminants
- natural products
- selected legacy POPs

Graph showing ng/g wet weight for Bodega, South Bay, Oakland, and Boston.
CECs in San Francisco Bay

1. CEC monitoring, evaluating risk
   - PFCs / precursors
   - Fipronil / degradates
   - PBDEs
   - Alternative flame retardants
     - TPhP (triphenyl phosphate)
   - Microplastics
   - Hindered phenols
   - Quaternary ammonium compounds

2. Sharing expertise, learning from others
   - Collaborations
   - Pro bono partners
   - New targets, new directions

3. Non-targeted monitoring (bioassays, broadscans)
   - New targets, new directions
Thank you

Rebecca Sutton, Ph.D.
RebeccaS@sfei.org
@beckysuttonphd