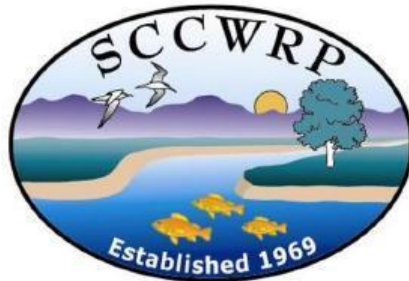


Charles Wong, Ph.D., *Department Head Chemistry*
Southern California Coastal Research Project

Constituents of Emerging Concern (CECs) in the Los Angeles River

Constituents of Emerging Concern (CECs) in the Los Angeles River

Charles S. Wong, Ph.D.
Department Head Chemistry
Southern California Coastal Water Research Project Authority
charlesw@sccwrp.org
9/19/23



Things we'll discuss

- What are CECs, and why do we care?
- What is the State of California doing about CECs?
- What are some of the things we know about CECs in the Los Angeles River?

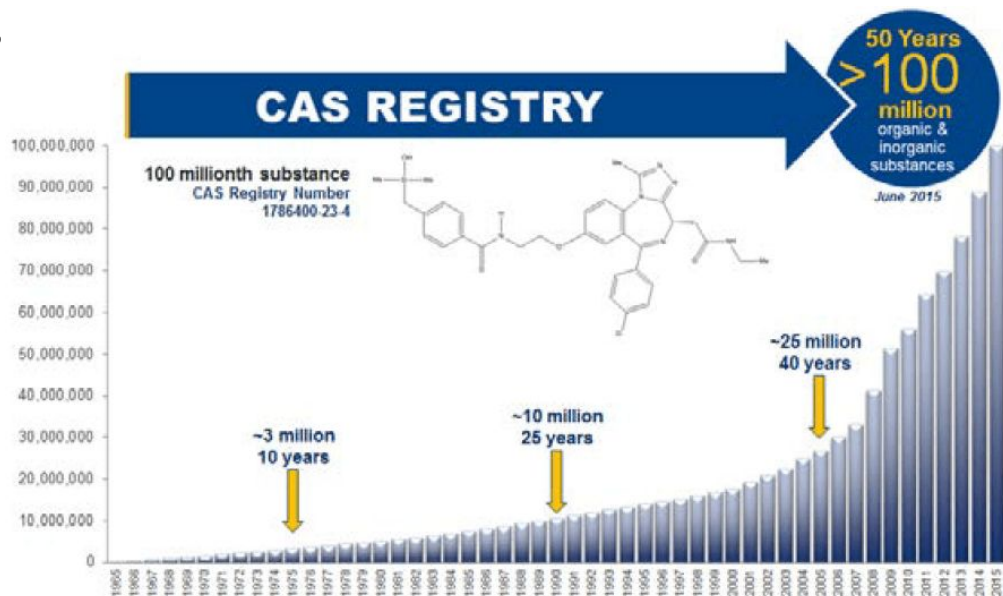
What are CECs?

- Contaminants which don't have regulatory standard
- Typically, large data gaps in environmental occurrence, sources, behavior, effects
 - New ones (e.g., replacement flame retardants, many polyfluorinated alkyl substances or PFAS)
 - Existing ones for which ability to detect becomes available (e.g., pharmaceuticals)

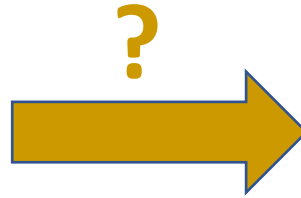
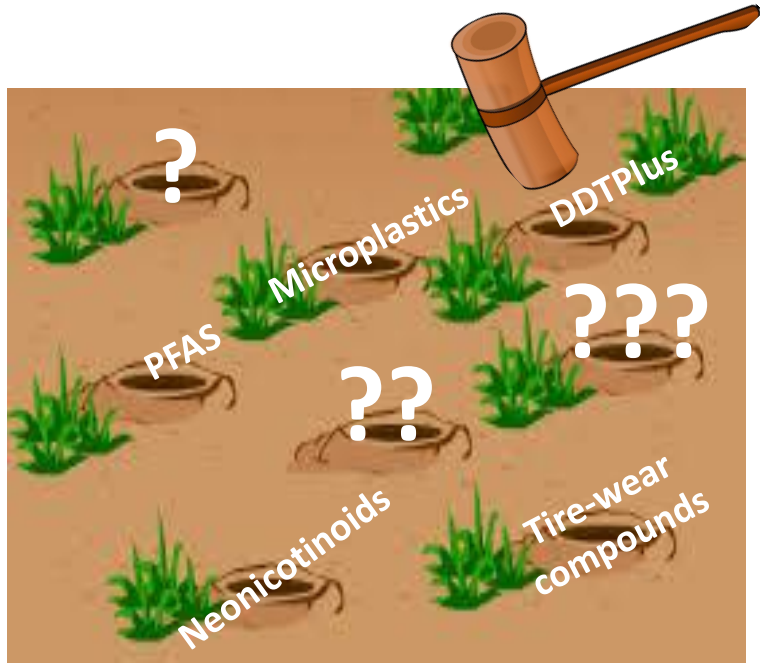


Why are CECs a problem?

- Ever-increasing numbers of CECs
- Limited and rapidly changing knowledge of occurrence, fate, effects, and even ability to measure
- Unclear regulatory landscape



Dealing with CECs is a moving target

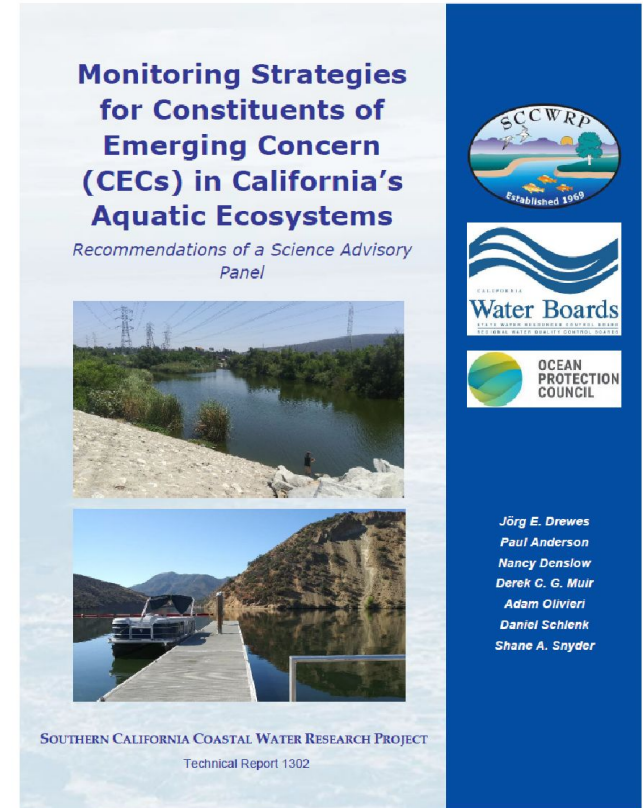


What is the State of California doing about CECs (including in the Los Angeles River)?

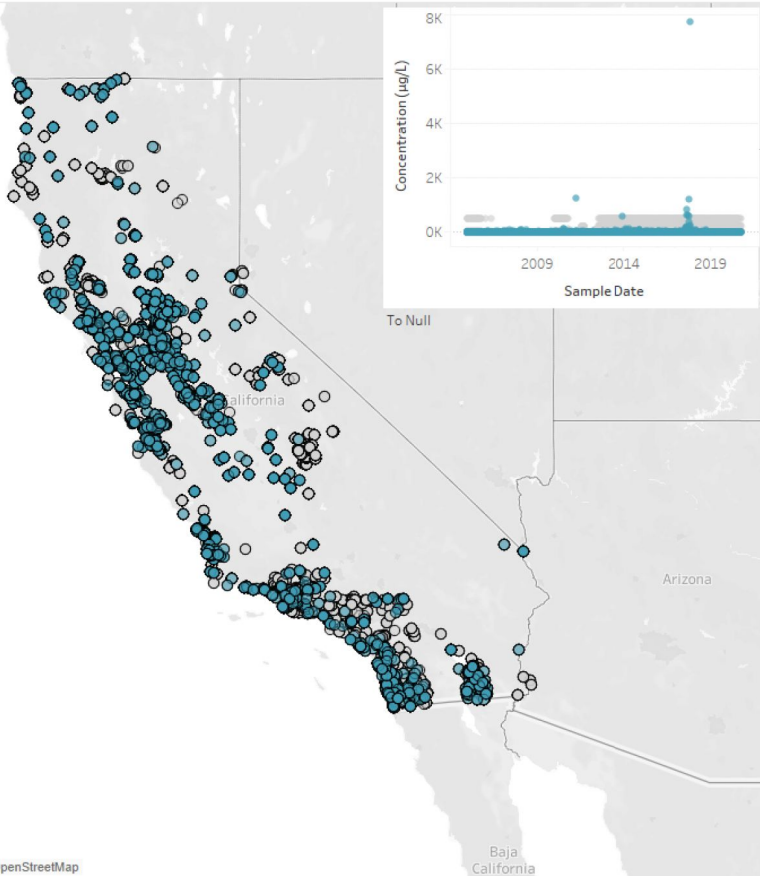
- State of California formed a CEC Scientific Advisory Panel for ambient waters a decade ago to figure out strategy for dealing with CECs
 - Worldwide experts in environmental chemistry, biochemistry, toxicology, ecotoxicology, human health, risk assessment, engineering
- 2012 Panel developed a risk assessment framework to prioritize chemicals to be monitored
 - Framework emphasized chemical occurrence, and chemical toxicity
 - How much is out there, and is it too much?
 - Answers determine priority of what to do (monitoring, special studies, other actions)
- Framework subsequently adopted by State
 - Used in assessing potential for issues with CECs in case studies

SCCWRP-led Panel framework strategies CECs

- State reconvened a new Panel in 2020 to update CEC management strategy
 - Deal with sparse available data that 2012 Panel faced
 - Incorporate advances in knowledge and technology since then
- Reconvened 2020 Panel's Report affirms framework as sound
- 2020 Panel provides guidance on how to improve data to support decision-making



State Water Board's CEC dataset



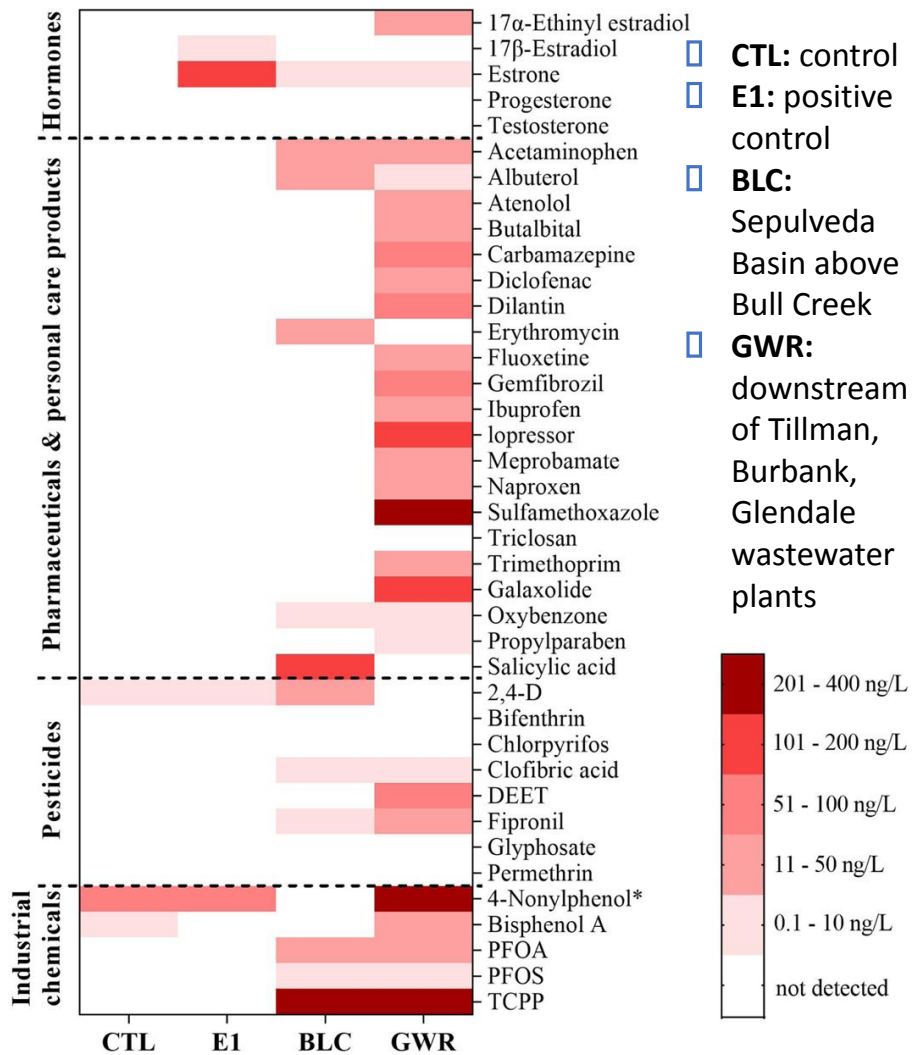
- 2012 Panel's recommendations led State Water Board to collate statewide monitoring database of CECs
- 2020 Panel provided guidance on how to make submitted data better, and dataset more usable

Some SCCWRP-led studies on CECs in the LA River

- SCCWRP has completed several studies on understanding how much CECs are in the LA River, and what their effects may be
 - Mehinto et al. (2021) *Environmental Toxicology and Chemistry* 40, 402-412
 - Maruya et al. (2022) *Heliyon* 8, e09534
- These involve several different types of environmental media
 - Sediments, water, and treated wastewater effluent
 - Caged fish
- And encompass different types of relevant measurements (as recommended by CEC Panels)
 - Chemical analysis to determine concentrations
 - Bioanalytical cell assays to determine effects

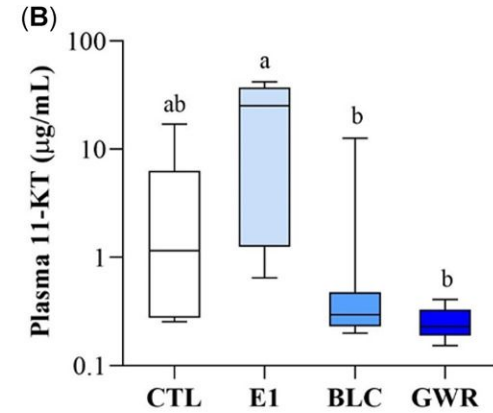
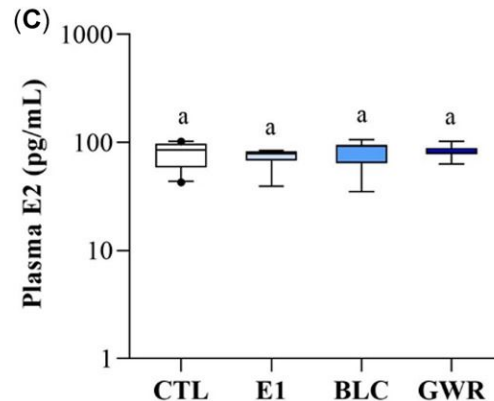
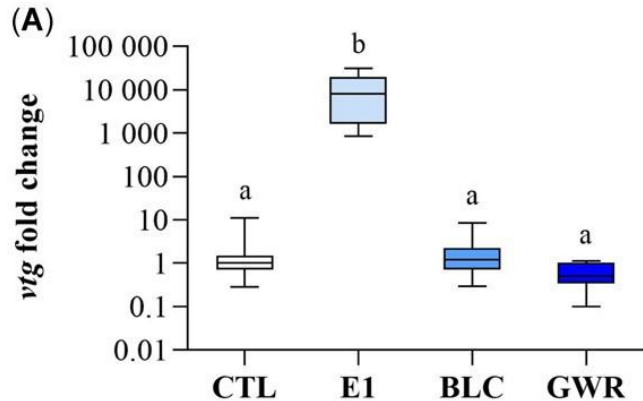
CECs in LA River water

- Some CECs present at BLC, most likely from urban runoff
- Many more CECs at greater concentrations present downstream of wastewater treatment plants
- No CEC exceeded monitoring thresholds, based on 2012 Panel recommendations



Any endocrine disruption in fish caged in LA River?

- No difference in estrogen levels of caged male fathead minnows in LA River from negative control
- No difference in vitellogenin levels or genes
 - Vitellogenin is an egg yolk protein
 - Feminization of (male) fish causes levels to go up



- **CTL:** control
- **E1:** positive control
- **BLC:** Sepulveda Basin above Bull Creek
- **GWR:** downstream of Tillman, Burbank, Glendale wastewater plants

Summary

- CECs can a problem!
 - More and more appear over time
 - Some may be problematic
 - Not easy to measure or deal with

- State of California has strategy to prioritize what CECs are of biggest concern
 - Based on what's out there, and how much is too much

- CECs in LA River are present, but levels of known compounds don't appear to feminize fish
 - Continued monitoring and research helpful to ensure good water quality