

# CECs, TOrCs and (?) You

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CWEMF Pop-up Talk

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# What are CECs and TOrCs?

- Emerging drinking water and ecosystem concern:
  - Human and wildlife impacts from endocrine disruption
- **Constituents of Emerging Concern**
  - No (or emerging) regulatory standards
  - Newly (re)discovered as analytical chemistry improves
  - Also, **Trace Organic Compounds**
- Examples include pharmaceuticals, personal care products, pesticides, surfactants, flame retardants, and more.

# CECs in California

- State Water Resource Control Board has researched and acted on CECs
  - Science Advisory Panel convened in 2009
  - Recycled Water Policy Amendment approved 4/2013
- Framework approaches for risk assessment
  - San Francisco Bay Regional Monitoring Program examines probability of impairment due to CEC
  - SCCWRP piloting four-tier assessment framework
    - Screening, diagnostic, confirmatory, action

The screenshot displays the WERF website interface. At the top, the WERF logo is visible, along with navigation links: "Learn about WERF", "Search Research Publications & Tools", "Review Open RFPs", and "Register for Events". Below the navigation is a map of California with several yellow location markers. A table is overlaid on the map, showing monitoring data for various chemicals. The table has columns for Compound, CAS, Result, Unit, Endocrine?, Sample Date Range, Media Type, and Trace Or. The data rows include Bisphenol A, Triclosan, Coprostanol, Cholesterol, and 4-methyl phenol. At the bottom of the screenshot, the footer contains the text: "Water Environment Research Foundation | 635 Slaters Lane, Suite G-110 | Alexandria, VA 22314 | 571.384.2100 | email.us".

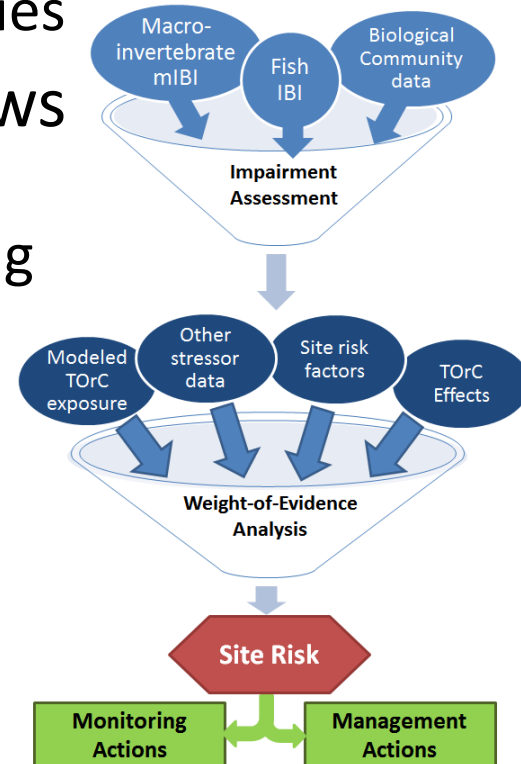
| Compound        | CAS       | Result | Unit | Endocrine? | Sample Date Range     | Media Type | Trace Or |
|-----------------|-----------|--------|------|------------|-----------------------|------------|----------|
| Bisphenol A     | 80-05-7   | 0.17   | ug/l | Yes        | 4/11/1999 - 4/11/1999 | Water      |          |
| Triclosan       | 3380-34-5 | 0.1    | ug/l | No         | 4/11/1999 - 4/11/1999 | Water      |          |
| Coprostanol     | 360-68-9  | 3      | ug/l | No         | 4/11/1999 - 4/11/1999 | Water      |          |
| Cholesterol     | 57-88-5   | 8      | ug/l | No         | 4/11/1999 - 4/11/1999 | Water      |          |
| 4-methyl phenol | -99999    | 0.08   | ug/l | No         | 4/11/1999 - 4/11/1999 | Water      |          |



# CEC6R12



- *Testing and Refinement of the Trace Organics Screening Tool*
  - Provide dischargers with a screening framework for site-specific risk assessment and future activities
- Level 1 Weight of Evidence (WoE) follows impairment assessment
  - Characterization of discharge and receiving water, monitoring data, modeling of exposure, data on effects
- Level 2 WoE evaluation for at-risk sites
  - Chemical analyses, bioassays, ecosystem monitoring

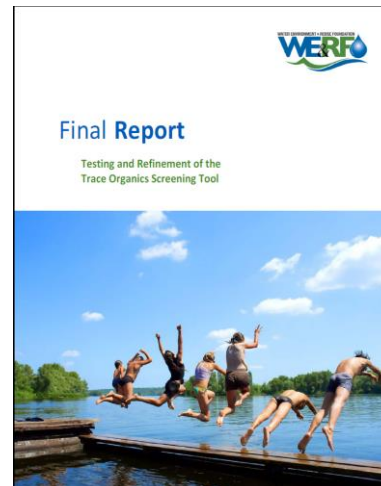


- Selected outcomes:

- Five tools developed in support of framework
- Understanding existing biological impacts and stressors is as important as developing site-specific exposure and toxicity data
- Risk framework assesses need for new field work using available data

- Next steps

- Join with SCCWRP to harmonize evaluation frameworks - with support from additional CEC/TORCs stakeholders



<https://tinyurl.com/WERF-TORCS>



| No  | Compound   | High       | Treatability          | Ubiqui- | Presence/Absence | Treatability  |                        |
|---|--|------------|-----------------------|---------|------------------|---------------|------------------------|
| <i>Nonpoint Source Indicator TORCs (selected)</i>   |  |            |                       |         |                  |               |                        |
| 15  | Fluoranthene <sup>1</sup>                        |            |                       |         |                  |               |                        |
| 16  | Atrazine   |            |                       |         |                  |               |                        |
| 17  | Bifenthrin <sup>1</sup>                          |            |                       |         |                  |               |                        |
| 18  | Chlorpyrifos <sup>1</sup>                        |            |                       |         |                  |               |                        |
| 19  | Pentachlorophenol <sup>1</sup>                   |            |                       |         |                  |               |                        |
| <i>Optional Indicator TORCs (include compounds)</i>   |  |            |                       |         |                  |               |                        |
| 20  | Miconazole <sup>3</sup>                          |            |                       |         |                  |               |                        |
| 21  | Nonylphenol <sup>1</sup>                         |            |                       |         |                  |               |                        |
| 22  | Tonalide (AHTN) <sup>1</sup>                     |            |                       |         |                  |               |                        |
| 23  | Triclocarban <sup>2,3</sup>                      |            |                       |         |                  |               |                        |
| 24  | Bis(2-ethylhexyl) phthalate <sup>3</sup>         |            |                       |         |                  |               |                        |
| 25  | Tri(2-chloroethyl)phosphate <sup>3</sup> (TCEP)  |            |                       |         |                  |               |                        |
| 26  | 17 $\alpha$ -Ethinylestradiol (EE2) <sup>2</sup> |            |                       |         |                  |               |                        |
| 27  | Testosterone <sup>2</sup>                        |            |                       |         |                  |               |                        |
| 28  | Permethrin <sup>1,3</sup>                        |            |                       |         |                  |               |                        |
| 29  | Trifluralin <sup>3</sup>                         |            |                       |         |                  |               |                        |
| 30  | Vinclozolin <sup>1,3</sup>                       |            |                       |         |                  |               |                        |
|   |  | 30471-44-8 | Pesticide             |         | NA               |               |                        |
|   |  | No         | Compound              | CAS #   | TORC Class       | High Priority | Treatability Indicator |
| <i>Recommended Indicator TORCs (use all compounds in assessments and as many as possible in monitoring)</i> |  |            |                       |         |                  |               |                        |
| 1   | N,N-diethyltoluamide (DEET)                      | 134-62-3   | Personal care product |         |                  |               |                        |
| 2   | Triclosan  | 3380-34-5  | Personal care product | Y       | Y                | Y             |                        |
| 3   | Carbamazepine                                    | 298-46-4   | Pharmaceutical        |         |                  | Y             |                        |
| 4   | Fluoxetine                                       | 54910-89-3 | Pharmaceutical        |         |                  | Y             |                        |
| 5   | Gemfibrozil                                      | 25812-30-0 | Pharmaceutical        |         |                  | Y             |                        |
| 6   | Ibuprofen  | 15687-27-1 | Pharmaceutical        |         |                  | Y             |                        |
| 7   | Meprobamate                                      | 57-53-4    | Pharmaceutical        |         |                  | Y             |                        |
| 8   | Sulfamethoxazole                                 | 723-46-6   | Pharmaceutical        |         |                  | Y             |                        |
| 9   | Trimethoprim                                     | 738-70-5   | Pharmaceutical        |         |                  | Y             |                        |
| 10  | Bisphenol A                                      | 80-05-7    | Other                 | Y       | Y                | Y             |                        |
| 11  | Caffeine   | 58-08-2    | Other                 |         |                  | Y             |                        |
| 12  | Androstenedione                                  | 63-05-8    | Hormone               | Y       |                  | Y             |                        |
| 13  | 17 $\beta$ -Estradiol (E2)                       | 50-28-2    | Hormone               | Y       |                  | Y             |                        |
| 14  | Estrone  | 53-16-7    | Hormone               | Y       | Y                | Y             |                        |

Notes: NA = not included in Dickinson's analysis.

<sup>a</sup> Included as a high priority TORC by SCCWRP rather than the WERF Phase I research team.

<sup>1</sup> TORC compound moved to Optional status because it requires a different extraction and/or analytical method.

<sup>2</sup> TORC compound moved to Optional status because frequency of detection is less often than compounds on the recommended list.

<sup>3</sup> TORC compound moved to Optional status because it lacks a meaningful effects threshold concentration.