

# Emerging Constituents and PFAs Sampling Results – Aug. 2019

Mark R. Norton PE  
Water Resources & Planning Mgr.  
Commission I December 17, 2019  
Item No. 5.A.



In 2008, a voluntary agreement was established between regulators and regulated community in place of a new regulation



# Development of Sampling Program for Emerging Constituents



# Consultant and Regulatory Support

- Tim Moore, Risk Sciences

- Facilitation
- Media Interaction
- Regional Bd Presentations

- SAWPA

- Workgroup administrator
- Media Interaction

- Regional Board, State Board and USGS at table



# 21 Water & Wastewater Agencies and Regional Board Sign Agreement to Sample ECs

Who participates:

- Water Wholesalers
- Water Retailers
- Wastewater Treatment Operators
- Regional Board Staff
- DDW Staff
- USGS Staff
- Analytical Lab Staff
- NWRI Staff
- Environmental NGOs



# Emerging Constituents (EC) Program Task Force

*SAWPA authorized TF agreement - 2012*

## Description

- Complies with Regional Board Resolution under Cooperative Agreement for Imported Water Recharge
- Completed 2010-2013 Voluntary Annual Sampling reports for emerging constituents
- Implements safe tap water public outreach program based on SAWPA commission direction to respond to Environmental Working Group misinformation

## Benefits

- Assisted state and federal agencies in determining most effective measuring and detection practices
- Avoided need to conduct long term EC monitoring costs on 100s of other ECs
- Watershed evaluation of ECs helped frame discussion on ECs at State level to our benefit
- Corrects misinformed media exposure through outreach

### 2013 Sampling Report for Emerging Constituents in the Santa Ana Region

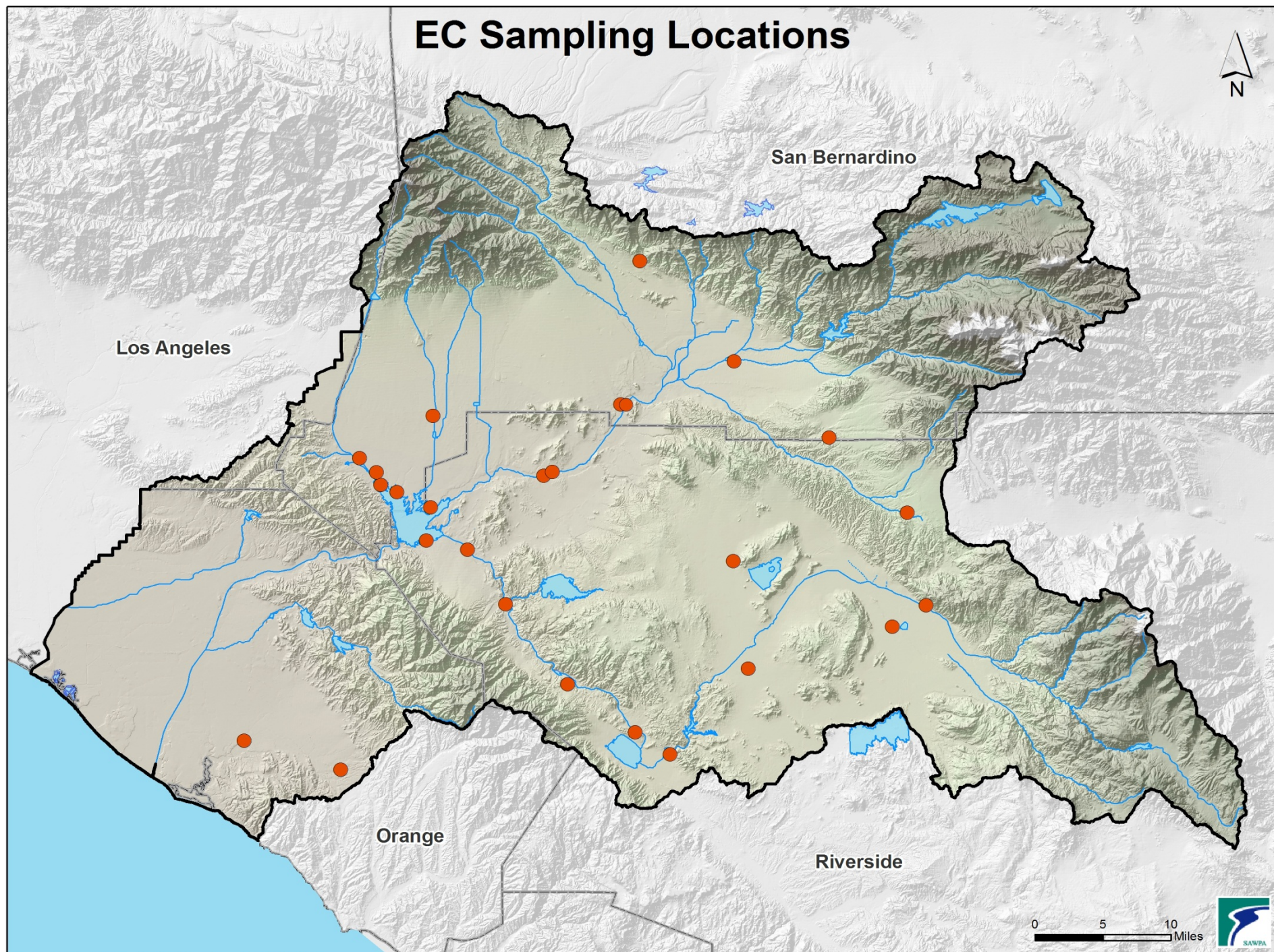


Santa Ana Watershed Project Authority



April, 2014

# EC Sampling Locations



# EC Sampling Program conducted from 2010-2013

Table 1: Summary of Results for 26 Samples Analyzed in 2013

| Compound             | Primary Use          | Frequency of Detection | Reported Range <sup>2</sup> | Common Dose |
|----------------------|----------------------|------------------------|-----------------------------|-------------|
| Caffeine             | Food Additive        | 42% (11 of 26)         | ND – 0.000407 mg/L          | 100 mg      |
| DEET <sup>3</sup>    | Insecticide          | 81% (21 of 26)         | ND – 0.000270 mg/L          | 270 mg      |
| 17 $\beta$ Estradiol | Natural Hormone      | 0% (0 of 26)           | Never Detected              | 1 mg        |
| Gemfibrozil          | Anti-cholesterol     | 31% (8 of 26)          | ND – 0.002000 mg/L          | 600 mg      |
| Iopromide            | Xray Contrast Agent  | 58% (15 of 26)         | ND – 0.000680 mg/L          | 500 mg      |
| Sucralose            | Artificial Sweetener | 100% (26 of 26)        | 0.000670 - 0.100000 mg/L    | 5,000 mg    |
| Triclosan            | Antiseptic           | 58% (15 of 26)         | ND – 0.001000 mg/L          | 1 mg        |

Note: "mg/L" = milligram per Liter; 1 mg/L is one part per million. "ND" = Not Detected.



One part per trillion (ppt) = one single drop in about 20 Olympic sized swimming pools

## What's a nanogram?

A nanogram is one one-billionth of a gram. In liquid, nanograms are measured by parts per trillion (ppt).

An olympic-sized swimming pool holds at least 660,000 U.S. gallons of water:

6 feet,  
7 inches  
(2 meters)

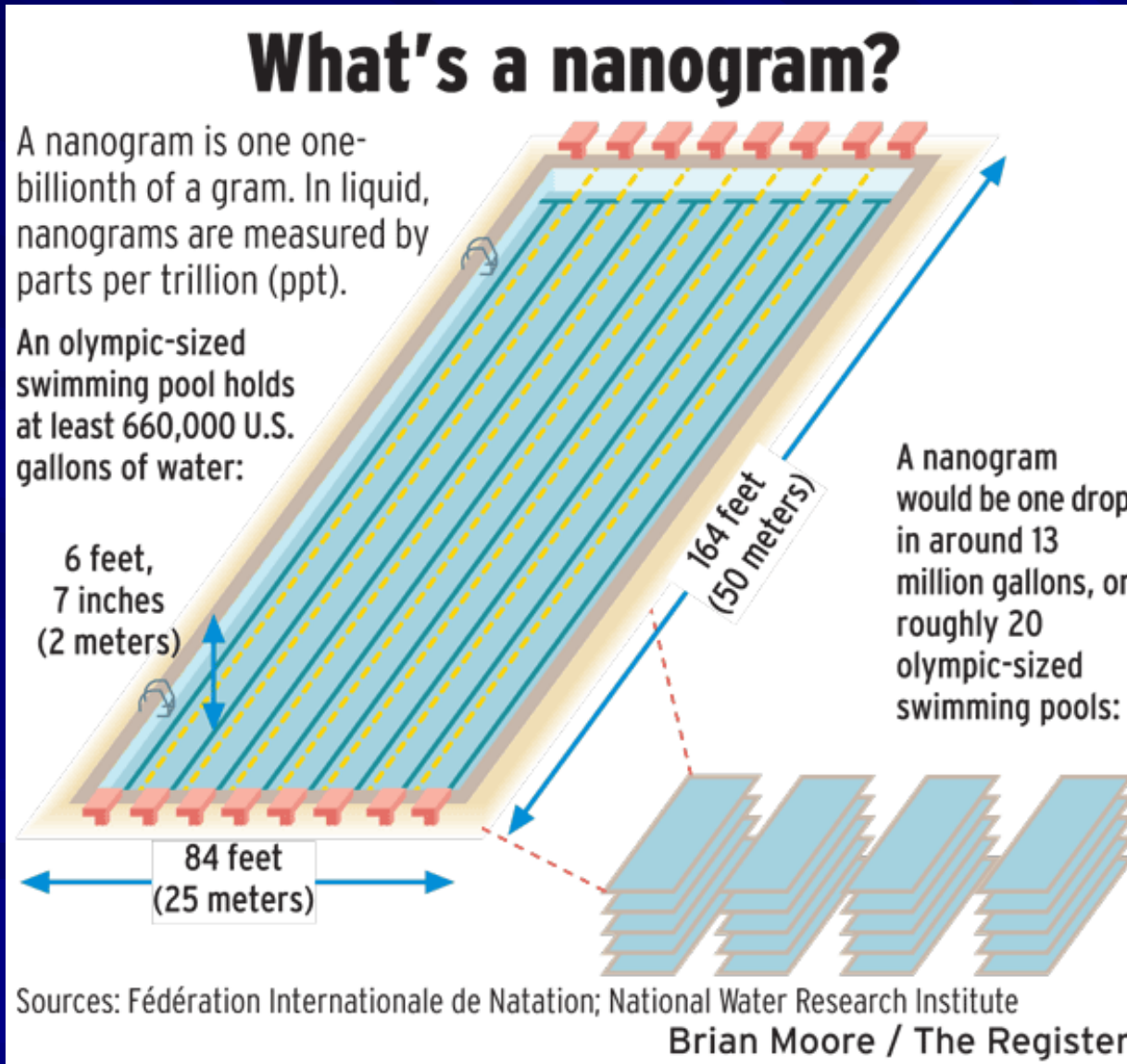
84 feet  
(25 meters)

164 feet  
(50 meters)

A nanogram would be one drop in around 13 million gallons, or roughly 20 olympic-sized swimming pools:

Sources: Fédération Internationale de Natation; National Water Research Institute

Brian Moore / The Register





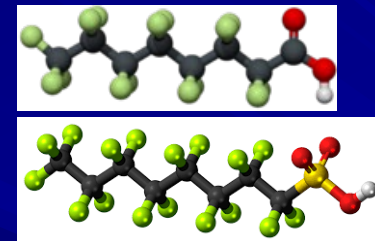
*“The concentrations we’re seeing are many, many times lower than the normal dosage of these particular drugs,” said Kurt Berchtold, former executive officer of the Santa Ana Regional Water Quality Control Board. “So we certainly don’t think there is any potential for human effects due to this.”*

Kurt Berchtold, Executive Officer, 12/9/10  
Upon sharing EC Sampling Results with  
Santa Ana Regional Water Quality  
Control Board



# New Emerging Constituents of Concern - PFOA and PFOS

- Per- and polyfluoroalkyl substances (PFAS) or alkyl acids (PFAAs)
  - **PFOA** = Perfluorooctanoic Acid ( $C_8HF_{15}O_2$ )
  - **PFOS** = Perfluorooctane Sulfonate ( $C_8HF_{17}O_3S$ )
- Key ingredients/byproducts in the production of:
  - Consumer Products: Teflon, Scotchgard, Stainmaster, Gore-Tex
  - Polymers for aircraft and electronics
  - Paper packaging and wrappers for food (e.g., microwave popcorn bags)
  - Fire fighting foams
- Initially developed in 1940s
- PFOA & PFOS phase out in USA began in 2000s



# PFOA & PFOS Properties

- Very stable, resistant to degradation
- Resistant to water, grease, and stains (lipophobic)
- Newer & more sensitive laboratory technology has revealed widespread occurrence in environment
- Found in groundwater near manufacturing sites and military bases



# Recent Regulations Regarding PFOA and PFOS

- Since 2016, US EPA has established a lifetime Health Advisory Level for PFOA + PFOS of 70ng/L.
- July 2018: State Board Division of Drinking Water (DDW) Releases Interim Drinking Water Notification Levels & Response Levels
  - Notification Levels (NL) → **PFOA = 14 ng/L; PFOS = 13 ng/L**
  - Response Level (RL) → **PFOA + PFOS = 70 ng/L (same as EPA HA)**
- Dec. 2018: State Board revised Recycled Water Policy to now require recycled water projects to analyze for PFOA & PFOS.
- Aug. 2019 State Board's DDW established notification levels at concentrations of 6.5 ppt for PFOS and 5.1 ppt for PFOA, consistent with OEHHA's recommendations



# OCWD Conducted Initial Testing for PFOA & PFOS (2013-2015)



- Within Orange County Water District service area,
  - 135 drinking water sites tested (e.g., wells, reservoirs, blending points)
  - 5 of 19 retailers had detections related to drinking water wells
  - Three retailers had one or more results > 70 ng/L 2016 EPA Health Advisory
- OCWD did not detect in their imported water sources or GWRS flows
- However, consistent detections > Notification Levels in Santa Ana River
  - Main river
  - Multiple WWTPs (POTW) discharges
  - Tributaries (e.g, Temescal Creek, Chino Creek)

# Additional EC and PFA Sampling Need Response

- OCWD made 10/11/18 presentation to Santa Ana River Dischargers Association (SARDA) about PFOA & PFOS detections
- OCWD and SARDA informed Basin Monitoring Program Task Force which includes Regional Board staff of possible new EC/PFA sampling program need
- Report of planned voluntary PFAs and EC sampling by EC Program Task Force shared with SAWPA Commission on Dec. 18, 2018



# EC Program Task Force – Aug. 2019 Sampling

- Sampling was conducted week of Aug. 26-30
- Included 20+ PFAs and many past ECs sampled
- Sampling discharges from all upper watershed wastewater trmt facilities, river flows and imported water
- Paid for by sampling agencies, report paid for by past contributions of EC Program TF





# Aug. 2019 Preliminary Sampling Results

| Compound                | Primary Use                      | Frequency of Detection |      |      |      |      | 2019 Concen. (ng/L) |        |
|-------------------------|----------------------------------|------------------------|------|------|------|------|---------------------|--------|
|                         |                                  | 2010                   | 2011 | 2012 | 2013 | 2019 | MWD-Xing            | Prado  |
| Acetaminophen (Tylenol) | Over-the-Counter Analgesic       | 56%                    | 26%  | 12%  | n/a  | 9%   | ND                  | ND     |
| 1,4 Dioxane             | Cosmetics & Shampoo              | n/a                    | n/a  | n/a  | n/a  | 96%  | 849                 | 917    |
| Gemfibrozil             | Anti-cholesterol                 | 30%                    | 74%  | 77%  | 31%  | 17%  | ND                  | ND     |
| Ibuprofen (Advil)       | Over-the-Counter Analgesic       | 44%                    | 67%  | 46%  | n/a  | 26%  | ND                  | ND     |
| Iohexol                 | Xray Contrast Agent              | n/a                    | n/a  | n/a  | n/a  | 100% | 338                 | 2,020  |
| Naproxen (Aleve)        | Over-the-Counter Analgesic       | n/a                    | n/a  | 23%  | n/a  | 17%  | ND                  | ND     |
| NDMA                    | Disinfection Byproduct           | n/a                    | n/a  | n/a  | n/a  | 88%  | ND                  | ND     |
| NMOR                    | Disinfection Byproduct           | n/a                    | n/a  | n/a  | n/a  | 80%  | ND                  | ND     |
| PFOA                    | Industrial/Commercial Surfactant | n/a                    | n/a  | n/a  | n/a  | 96%  | 10.1                | 18.5   |
| PFOS                    | Industrial/Commercial Surfactant | n/a                    | n/a  | n/a  | n/a  | 36%  | 26.6                | 17.9   |
| Sucralose (Splenda)     | Artificial Sweetener             | n/a                    | n/a  | n/a  | 100% | 100% | 26,300              | 43,400 |
| Sulfamethoxazole        | Prescription Antibiotic          | 52%                    | 44%  | 69%  | n/a  | 26%  | 36.4                | 121.7  |

# Preliminary Conclusions



- Detection of common painkiller meds (Tylenol, Advil, Aleve) shows downward trend over time in all POTW effluents and no detection in the river at MWD Crossing or at Prado.
- Two prescription meds (Gemfibrozil and Sulfamethoxazole) show similar downward trend.
- Sucralose detected in 100% of samples in both 2013 and 2019. Indicator compound only.
- PFOA was in all but 1 sample tested. All of those detected values were above the state notification level for drinking water.
- PFOS detected in only 7 of the 21 effluents and only 1 of those 7 was above the state notification level for drinking water (6.5 ng/L).
- Concentration of PFOS detected in effluents was far less than the concentration of PFOS measured at MWD-Crossing or at Prado.
- PFOS & PFOA concentrations in the SAR and the POTW effluents were in the same range as OCWD has been observing for the last 3 years.
- None of the POTW effluents or river sites exceeded EPA's Health Advisory Level for the combined PFOS/PFOA concentrations (70 ng/L).
- NDMA and NMOR (disinfection byproducts) frequently detected in POTW effluent but were not detected in either of the SAR samples.
- 1,4 Dioxane also frequently detected in POTW effluents and all around the same level 600-1200 ng/L.

# Sampling Results – Next Steps

- Sampling results are still being analyzed and compiled to produce an ECs and PFAS Sampling Report by Risk Sciences to be released by Jan. 2019.
- Review comments will be requested of the EC Program Task Force.
- Responses to comments will be addressed and discussed at the EC Program Task Force.
- Report will be shared with the Santa Ana Regional Board and the SWRCB as objective data to support appropriate and science-based regulations.

