PFAS Monitoring in Orange County & Upper Santa Ana River Watershed

Chino Basin Colloquium

May 2, 2019

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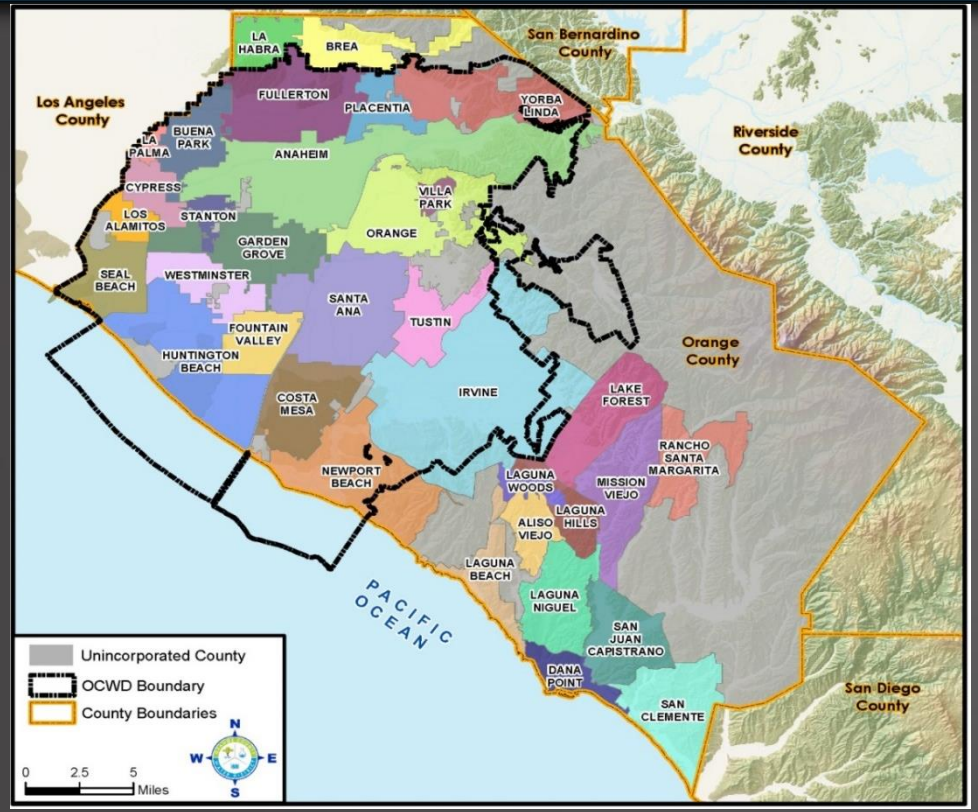
Orange County Water District

Outline

- OCWD Introduction
- Initial PFAS Monitoring in Orange County
- HAL's, NL's, and Other Guidelines
- Upper Santa Ana River Watershed Monitoring
  - Santa Ana River
  - Tributaries
  - Wastewater Treatment Facilities
  - OCWD Watershed Monitoring – SAR, Tributaries, & WWTP
- Future PFAS Monitoring

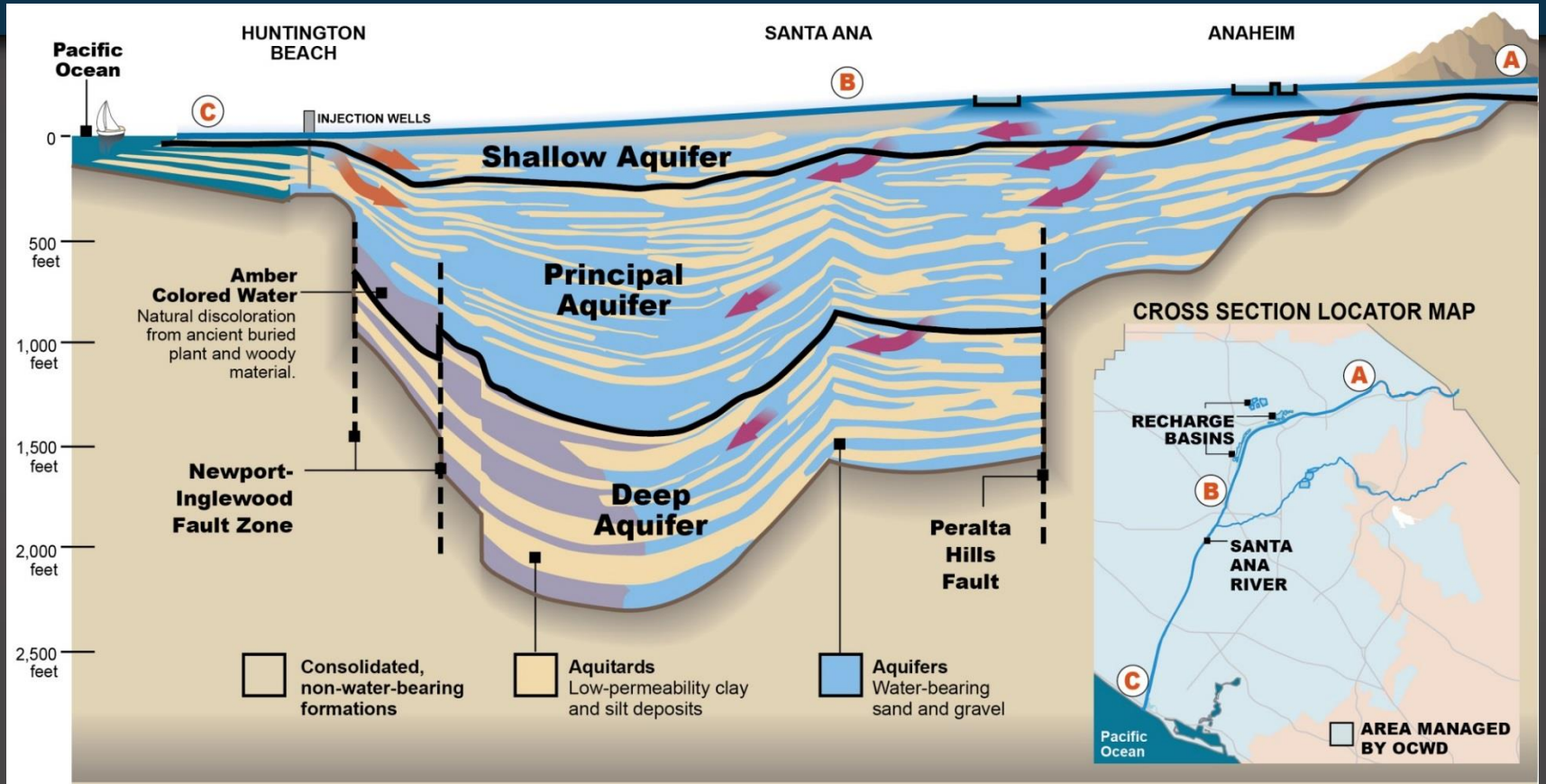
Orange County Water District

Since 1933

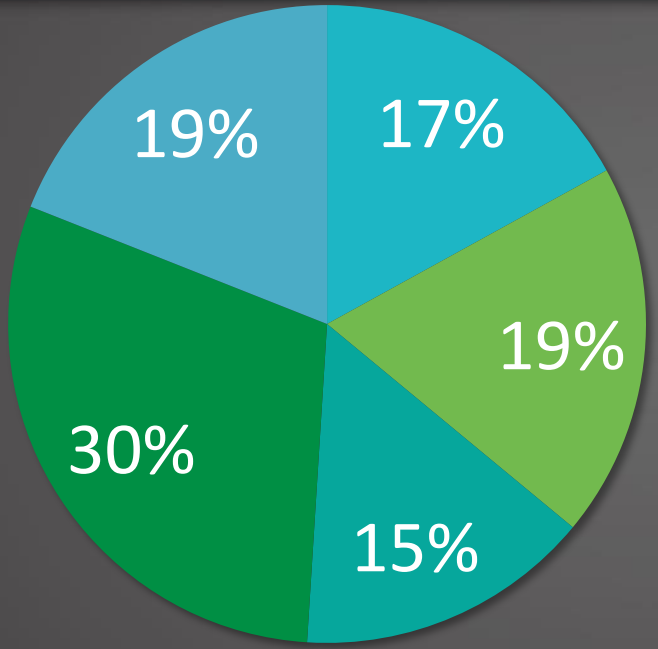


- Serve 2.5 million people
- Manage & replenish OC Groundwater Basin
- Ensure reliability & water quality
- Provides 77% of water supply
- Basin not adjudicated, SGMA Alternative submitted

Orange County Groundwater Basin



Groundwater Basin Replenishment



- Natural Recharge
- Santa Ana River Baseflow
- Stormwater
- Recycled or Reused Water
- Imported Water

Typical annual recharge
300,000 to 330,000 AFY (100 billion gallons)

Initial OCWD PFAS Testing

- Unregulated Contaminant Monitoring Rule (UCMR) 3 program (2013 - 2015)
- Required testing for drinking water systems that serve greater than 10,000 people
- OCWD laboratory developed analytical testing capability (EPA Method 537)
- **EPA-required reportable detection limits (RDL) :**
  - **PFOA = 20 ng/L**
  - **PFOS = 40 ng/L**
- UCMR3 results summary
  - 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
  - Retailer detections generally downgradient of OCWD SAR recharge area

2016 – 2018 PFAS HAL's, NL's, & Other Guidelines

- May 2016 EPA Health Advisory
  - Health Advisory: **70 ng/L (parts per trillion) for PFOA + PFOS**

- July 2018 SWRCB DDW Interim Water Notification Levels & Response Level
  - Notification Levels (NL): **PFOA = 14 ng/L; PFOS = 13 ng/L**
  - Response Level (RL): **PFOA + PFOS = 70 ng/L (same as EPA HA)**

EPA
United States
Environmental Protection
Agency

Other DDW Notification & Response Level chemicals

Chemical	Notification Level	Response Level
1,4-Dioxane	1 µg/L	35 µg/L
NDMA	10 ng/L	300 ng/L
TBA	12 µg/L	1200 µg/L
Boron	1 mg/L	10 mg/L

Other Drinking Water Limits /Guidelines

State	PFOA (ng/L)	PFOS (ng/L)	Comments
AZ, AL, CO, ME, MA, MI, NY, RI, WV	70	70	Adopted HAL from 2016
California	14	13	Interim Notification Levels
Connecticut	70		Action Level: Combined Results - PFOA, PFOS, PFHxA, PFHpA, PFNA
Minnesota	35	27	Health Based Guidance
Nevada	667	667	Basic Comparison Levels
New Hampshire	38	70	Proposed MCL's: PFOA+PFOS = 70 ng/L PFHxS = 85 ng/L PFNA = 23 ng/L
New Jersey	14	13	Proposed MCLs MCL - PFNA: 13 ng/L
North Carolina	NA	NA	Health Goal for GenX = 140 ng/L
Vermont	20		Proposed MCL Combined Results - PFOA, PFOS, PFHxS, PFHpA, PFNA
CDC ATSDR	78 / 21	52 / 14	Minimum Risk Levels (Adult / Child) PFHxS = 517 / 140 ng/L PFNA = 78 / 21 ng/L
US EPA	70		Health Advisory Level (PFOA & PFOS Combined)

OCWD Actions since 2016 EPA HA

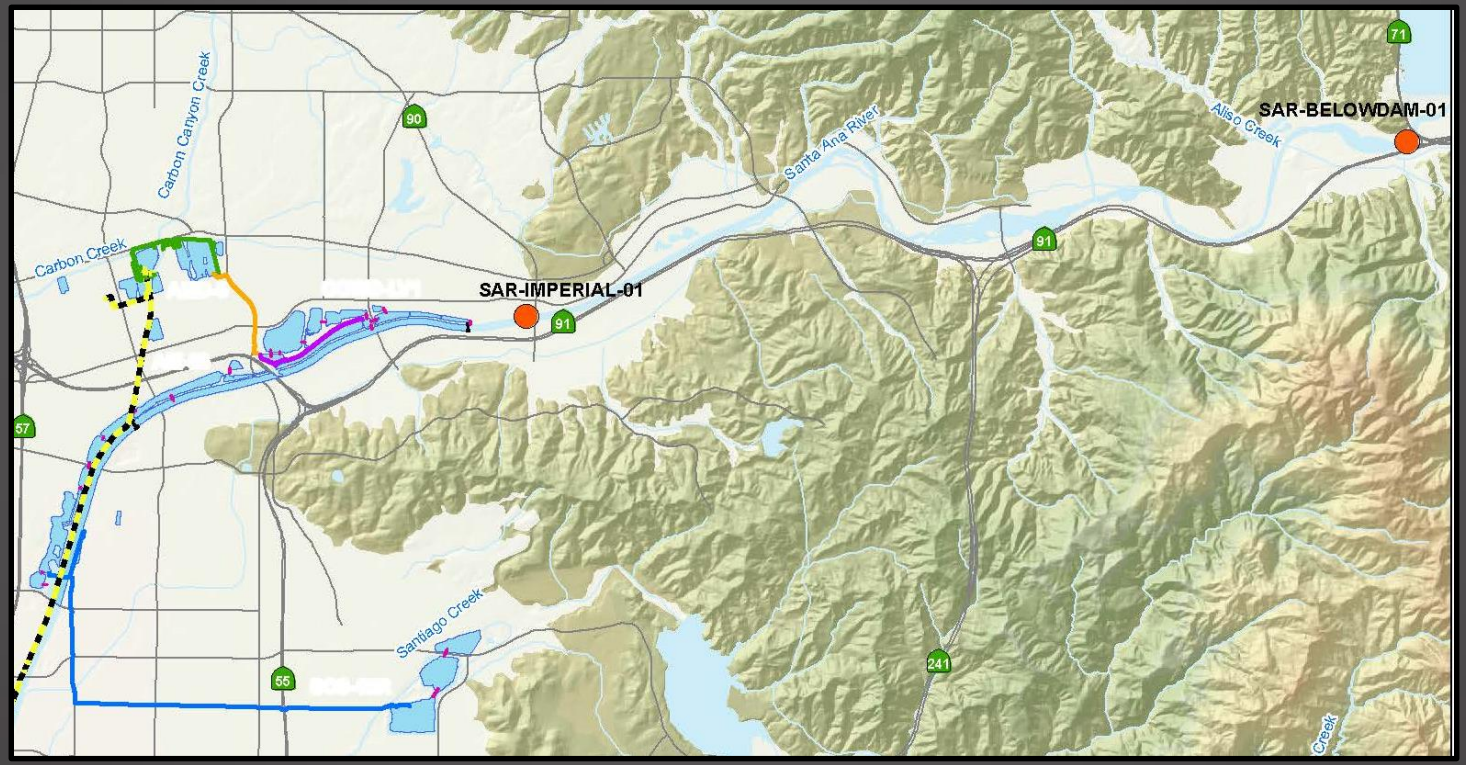
- Improved lab method (EPA Method 537)
  - **Reduced RDL to 4 ng/L for PFOA & PFOS** (Aug 2016)
  - Expanded target list from 6 to 15 PFAS compounds (Spring/Summer 2018)
- Expanded testing to identify sources to OC Groundwater
  - OCWD groundwater monitoring wells (incl. North Basin & South Basin areas)
  - Groundwater near former El Toro Marine Corps Air Station (MCAS)
  - Retailer drinking water well testing and coordination as requested
  - GWRS recharge/injection & MWD OC-28 raw imported water recharge
  - Santa Ana River (Main river, stormwater, WWTPs/POTWs, tributaries)
- Affected retailers operated systems to avoid serving water > 70 ng/L EPA HA

GWRS & MWD OC-28 results

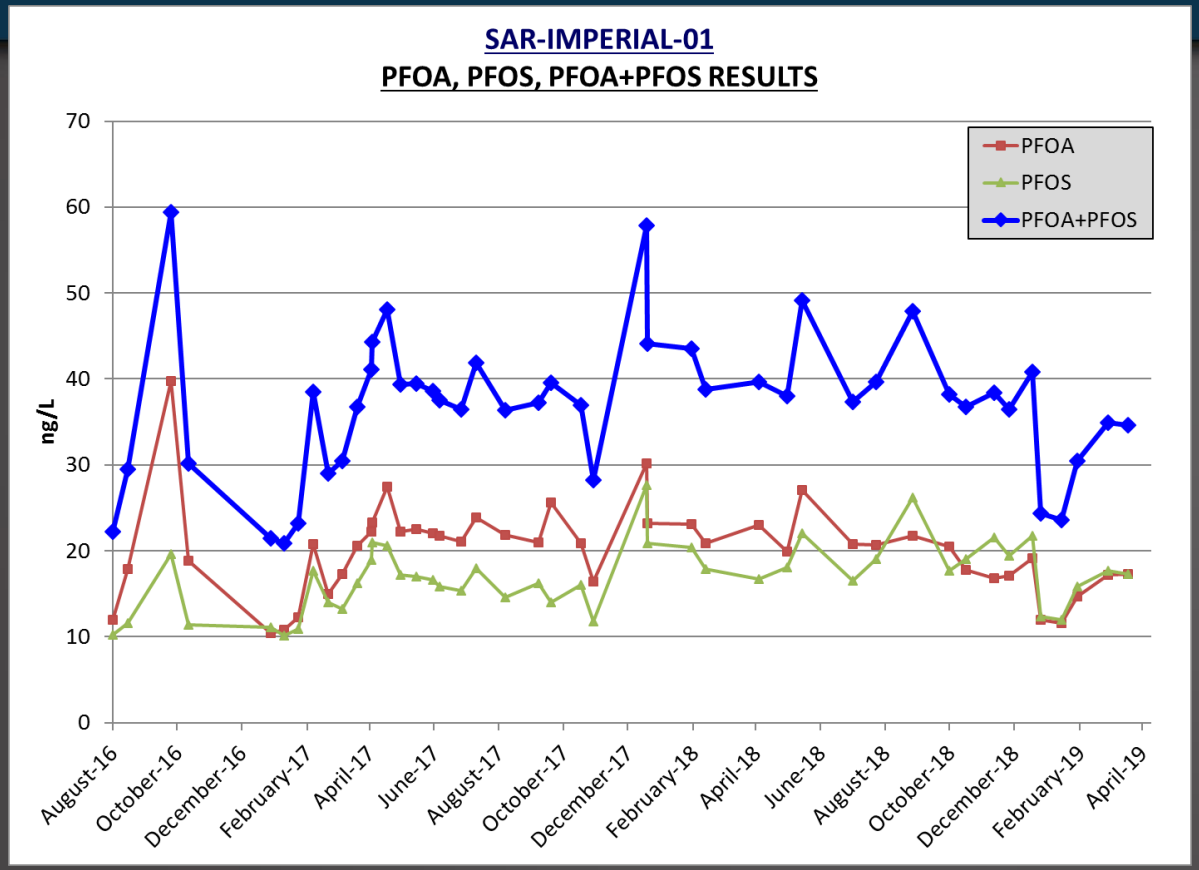
- OCWD Groundwater Replenishment System (GWRS)
  - **OCSD Secondary Effluent Source Water** = 25 – 38 ng/L PFOA + PFOS
  - **GWRS Final Product =** All results non-detect for PFOA & PFOS
  - Reverse Osmosis is known to be excellent treatment barrier
  - PFAS testing is included in quarterly final product monitoring program

- MWD OC-28 imported recharge water results ND for PFOA & PFOS

SAR Imperial Highway sample location represents "headworks" of OCWD SAR recharge system



Santa Ana River at Imperial Hwy



Aug 2016 – Present

Averages (ng/L)

PFOA: 20

PFOS: 17

PFOA+PFOS: 37

Min / Max (ng/L)

PFOA: 10 / 40

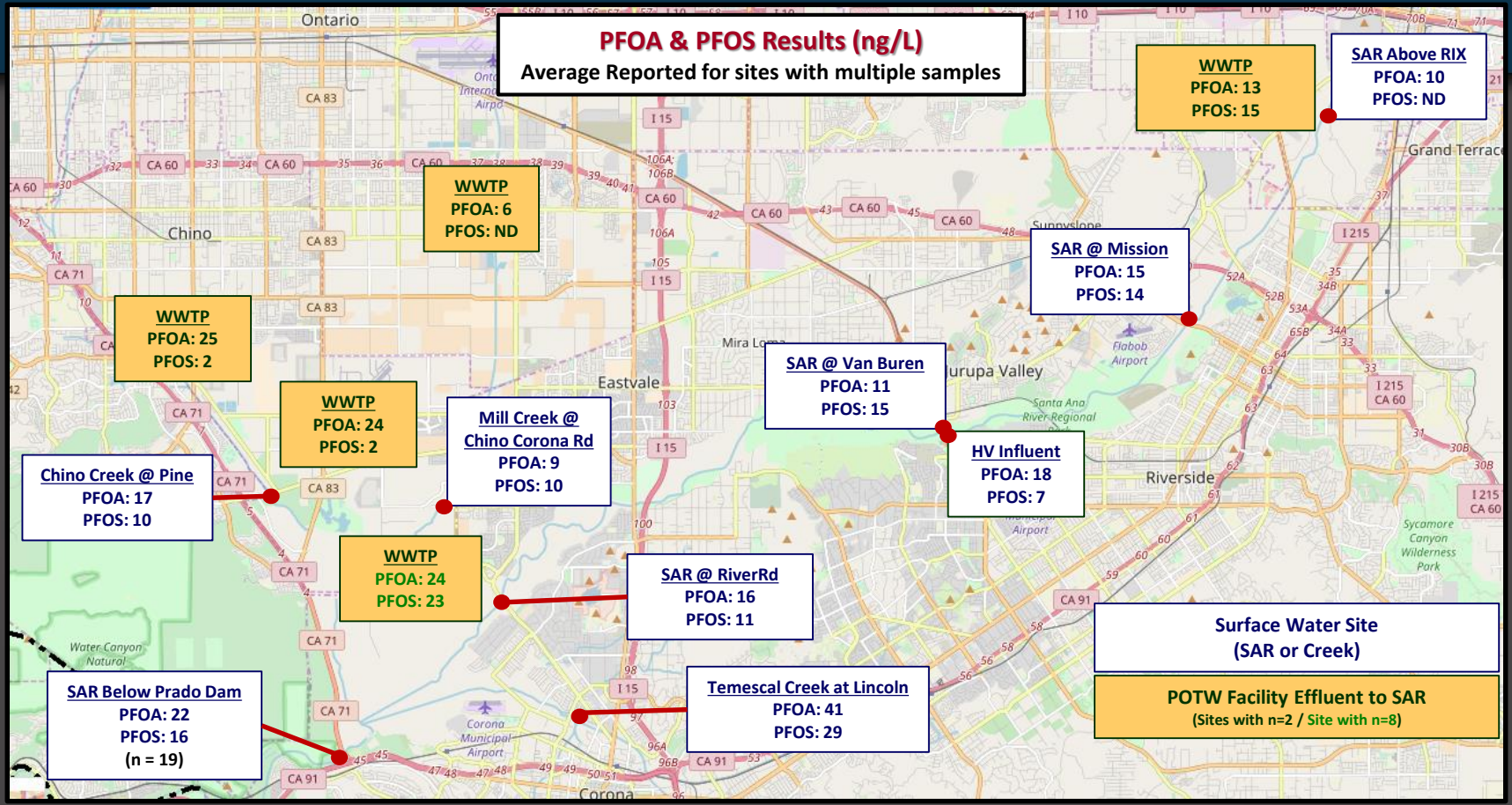
PFOS: 10 / 28

PFOA+PFOS: 21 / 59

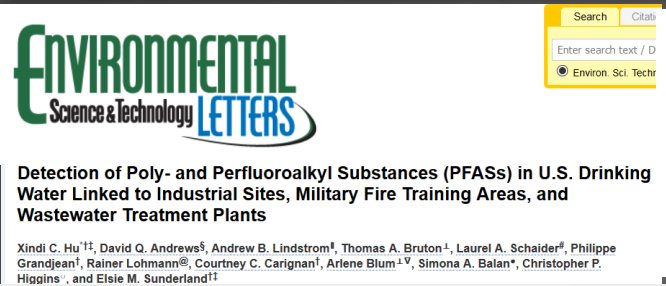
Cooperative SAR Discharger Testing

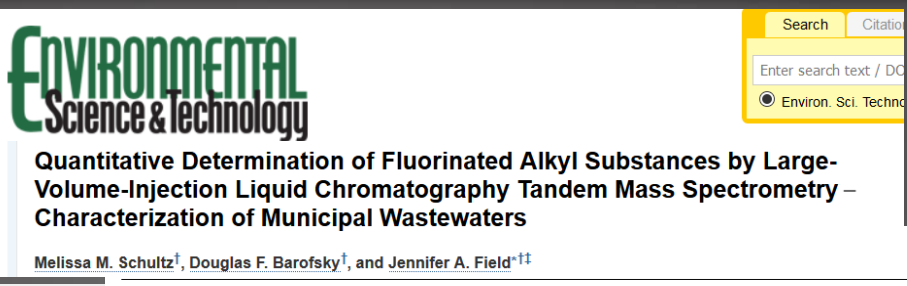
- 5 different SAR POTW effluent discharges tested
  - IEUA: CCWRF, RP1/RP4, RP5
  - WMWD: WRCRWA Plant
  - SBMWD: RIX
- 2 coordinated events at all 5 POTW sites (05/10/17 & 02/21/18)
- Arranged sample collection with POTW staff (Management/Operations)
- Results from WWTP samples have been provided to POTW contacts
- SARDA Presentation of OCWD PFAS results on 10/11/18

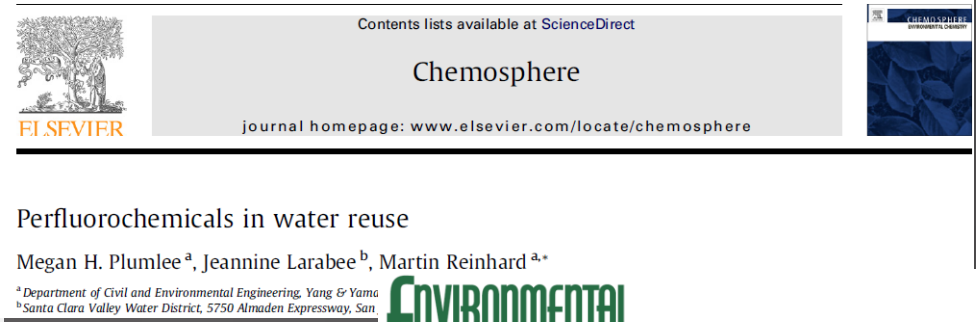
Upper SAR Watershed Monitoring

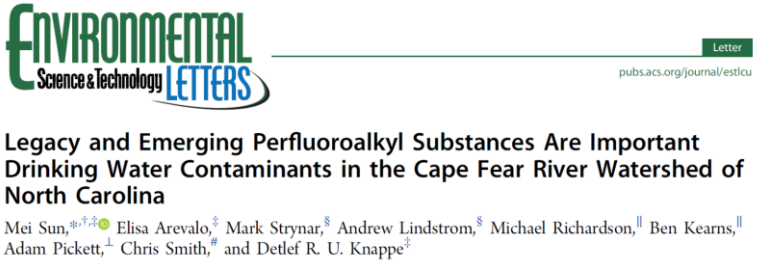


Occurrence of PFAS compounds in wastewater has been studied extensively in literature



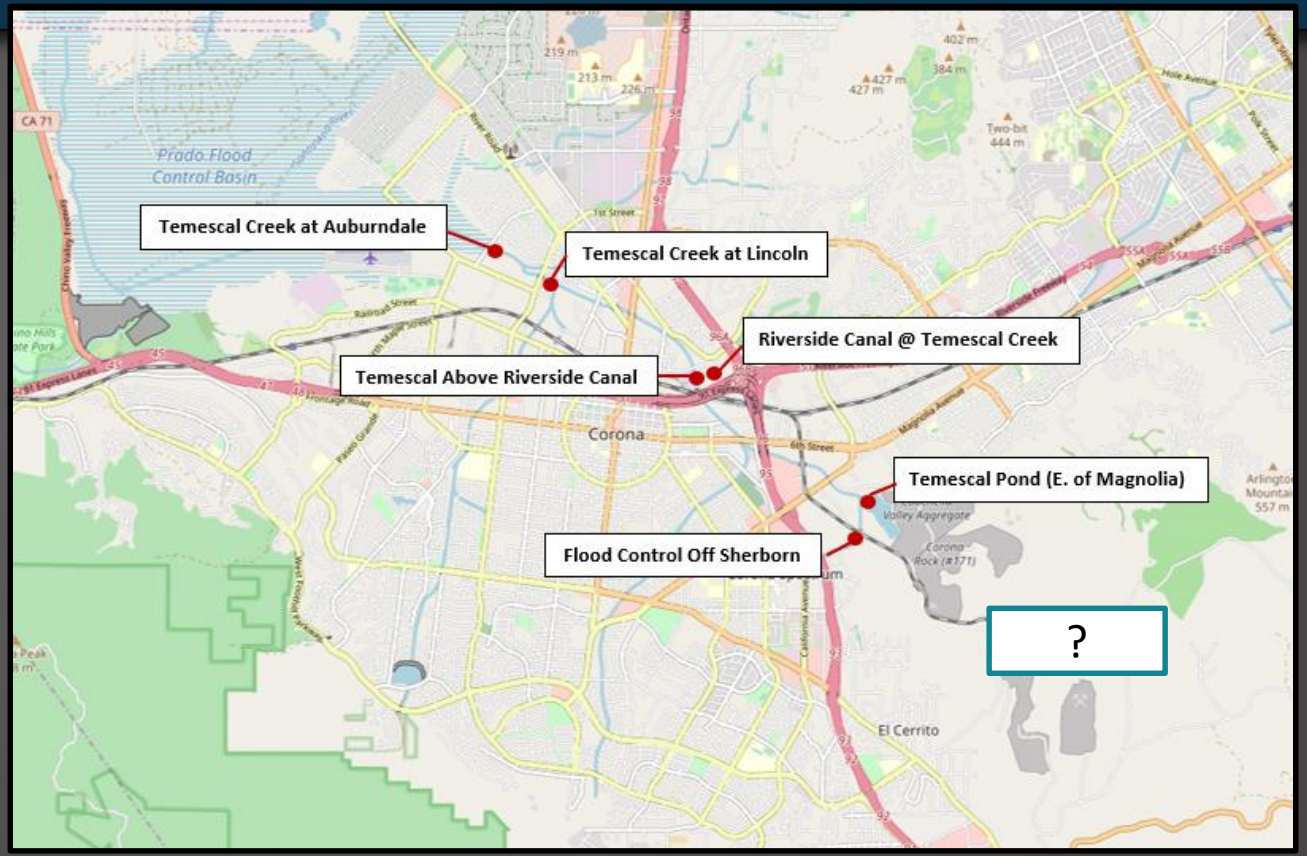




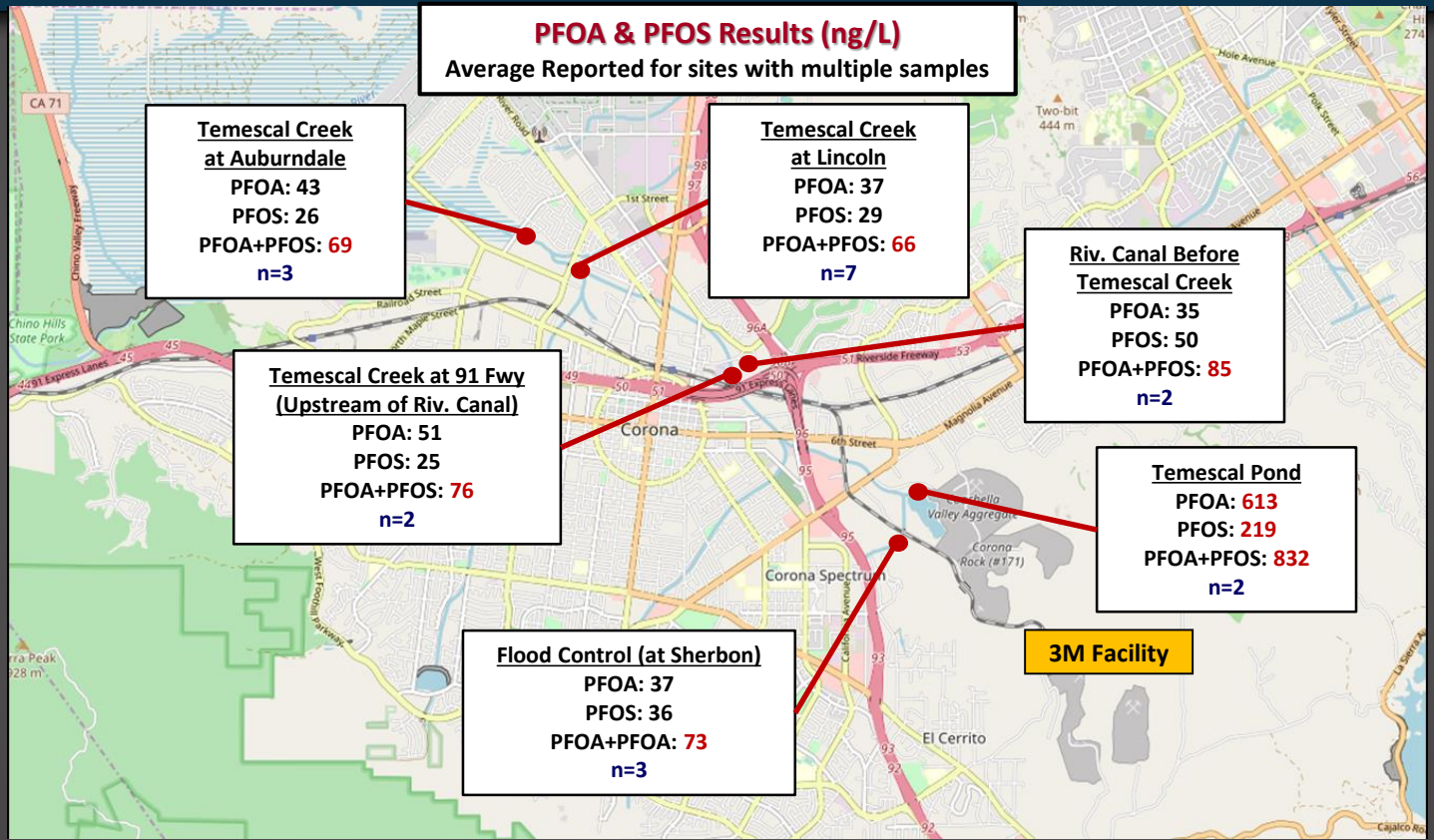


Temescal Creek Sites

- Ephemeral Flows
- Temescal Pond: Low WL
- Sample Date Range:
  Feb. 2017 – Dec 2018



Temescal Creek Sites - Results



Ongoing OCWD Monitoring

- OCWD continues to perform PFAS monitoring at both groundwater and surface water sampling locations
- OCWD continues monitoring of Santa Ana River
- Some water systems in OC received DDW Monitoring Orders
- Ongoing monitoring at military sites (El Toro MCAS, Tustin MCAS, etc.)
- GWRS and MWD OC-28 raw imported water continue to be tested

SUMMARY – OCWD PFAS Monitoring

- 3-5 Affected OC Retailers based on 2013-2015 UCMR3 results
- Monitoring Order testing could result in additionally affected systems
- GW monitoring **to date** has not revealed OC industrial point sources
- GWRS and current MWD OC-28 recharge not a source
- Detections in Santa Ana River Greater Than NL
  - Main river
  - Multiple WWTPs (POTW) discharges
  - Tributaries (e.g, Temescal Creek, Chino Creek)

Managing PFOA & PFOS in SAR

- Groundwater Recharge **(GWR)** is a designated beneficial use for SAR
- SAR replenishes groundwater in not only OC, but also via losing reaches upstream
- How do Notification Levels inform response to PFOA & PFOS in WWTP discharges?
- Groundwater Recharge Reuse Project (GRRP) Regulations
  - Require quarterly monitoring for Notification Level compounds
  - If results > NL for 4-16 weeks, must notify DDW & RWQCB
- PFOA & PFOS included as health-based CECs in new SWRCB Recycled Water Policy
- Phase 3 of SWRCB PFAS investigation plan likely to include POTWs

SAWPA EC Task Force Monitoring

- Working Group: OCWD, SAWPA, SARDA, and RWQCB
- Sites to be included
  - SAR Wastewater Treatment Plant discharges
  - SAR surface water sites
  - SAR Tributaries
- Monitoring to Include:
  - PFAS compounds and additional emerging contaminants such as 1,4-dioxane, NDMA, NMOR, Pharmaceuticals, etc.

Potential Regulatory Actions

- OEHHA could modify “interim” DDW NL
- SWRCB DDW & OEHHA may develop PHG leading to California MCL
- EPA Groundwater Clean-up / CERCLA hazardous waste
- EPA MCL?
- Longer term
  - how to handle the other *4000-6000* PFAS compounds (including the “safer” replacements)
  - China continues to manufacture PFOA & PFOS

END