

Session 3

Contaminants of emerging concern in Chino Basin: What do we face in the future (PFAS and 1,4-dioxane)

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PFAS monitoring in Orange County and the Upper Santa Ana River Watershed.

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PFAS occurrence and implementation of the new PFAS guidelines for California water systems

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Eurofins Eaton Analytical

Chino Basin Water Quality Colloquium

May 2, 2019





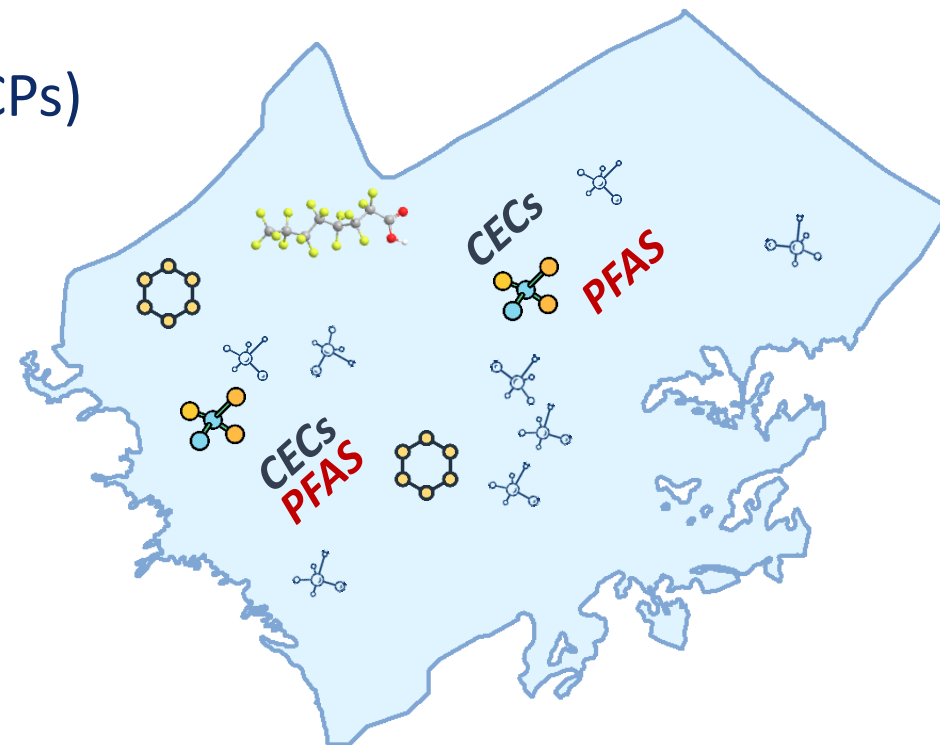
Contaminants of emerging concern in Chino Basin: What do we face in the future (PFAS and 1,4-dioxane)



Chino Basin Water Quality Colloquium
May 2, 2019

CONTAMINANTS OF EMERGING CONCERN

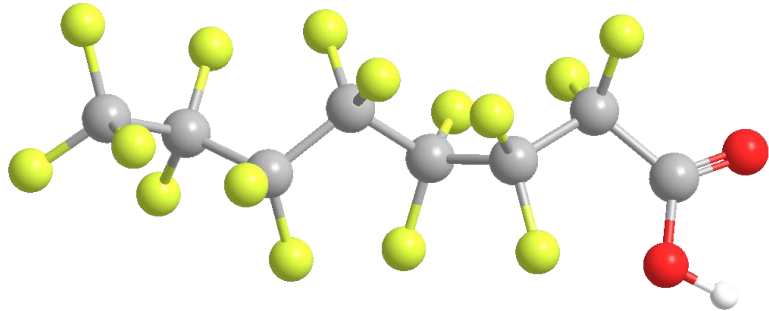
- Contaminants of Emerging Concern (CECs)
 - Pharmaceuticals and Personal Care Products (PCPs)
 - Endocrine Disrupting Compounds (EDCs)
 - Pesticides
 - Nanomaterials
 - Microplastics
 - N-Nitrosodimethylamine (NDMA)
 - 1,4-dioxane
 - Per- and Polyfluoroalkyl Substances (PFAS)
- CECs – Not commonly monitored for - potential health risks – no drinking water MCLs – researched – EPA’s contaminant candidate lists – MCL near or distant future?



PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS)

What are PFAS Compounds?

- Class of synthetic compounds formed from carbon chains with fluorine attached



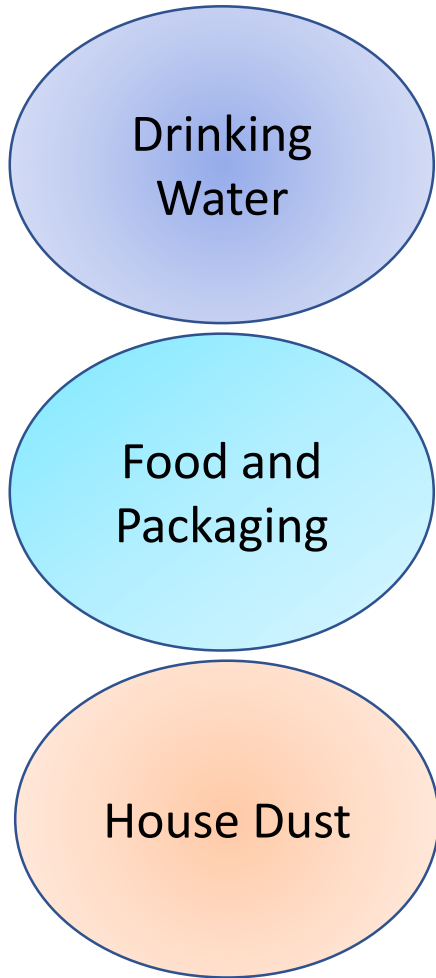
C – F Bond

Persistent in the Environment

- Over 4,000 PFAS compounds used for:
 - Nonstick Coatings
 - Stain Resistant
 - Water proofing
 - Friction Reduction Coatings
 - Aqueous Film Forming Foams (AFFF)
- ❖ AFFF foam used for fire fighting practice at airport and Air Force bases – 1970s through early 2000s

PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Exposure to PFAS and Health Effects



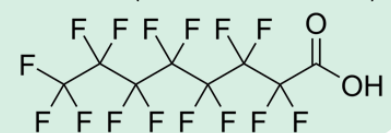
- Widespread exposure to humans; used since 1940s
- Some are being researched for health effects
- Linked to many health issues, including cancer, developmental problems for infants, and problems during pregnancy.
- Two PFAS that were widely used are:
 - **PFOA** (perfluorooctanoic acid)
 - **PFOS** (perfluorooctane sulfonic acid)

PFAS

PFOS (Perfluorooctanesulfonic acid)



PFOA (Perfluorooctanoic acid)

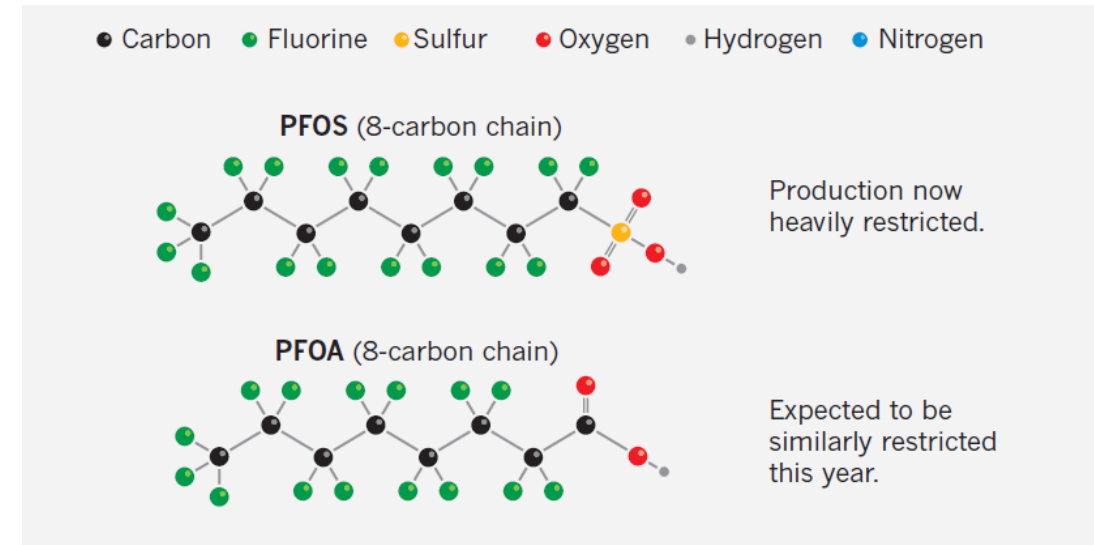


PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS)

PFOA and PFOS

- In **2009** EPA published provisional drinking water Health Advisory Level (HAL) for PFOA and PFOS:
 - **PFOA = 400 ngl** (400 ppt)
 - **PFOS = 200 ngl** (200 ppt)
- In **2012** the EPA published UCMR 3 which included six PFAS including PFOA and PFOS:
 - PFOA DLR = 20 ngl
 - PFOS DLR = 40 ngl

HAL: Non-enforceable and non-regulatory. Health-based hazard concentrations above which action should be taken to reduce exposure to a unregulated contaminant in drinking water.



PFAS IN CHINO BASIN

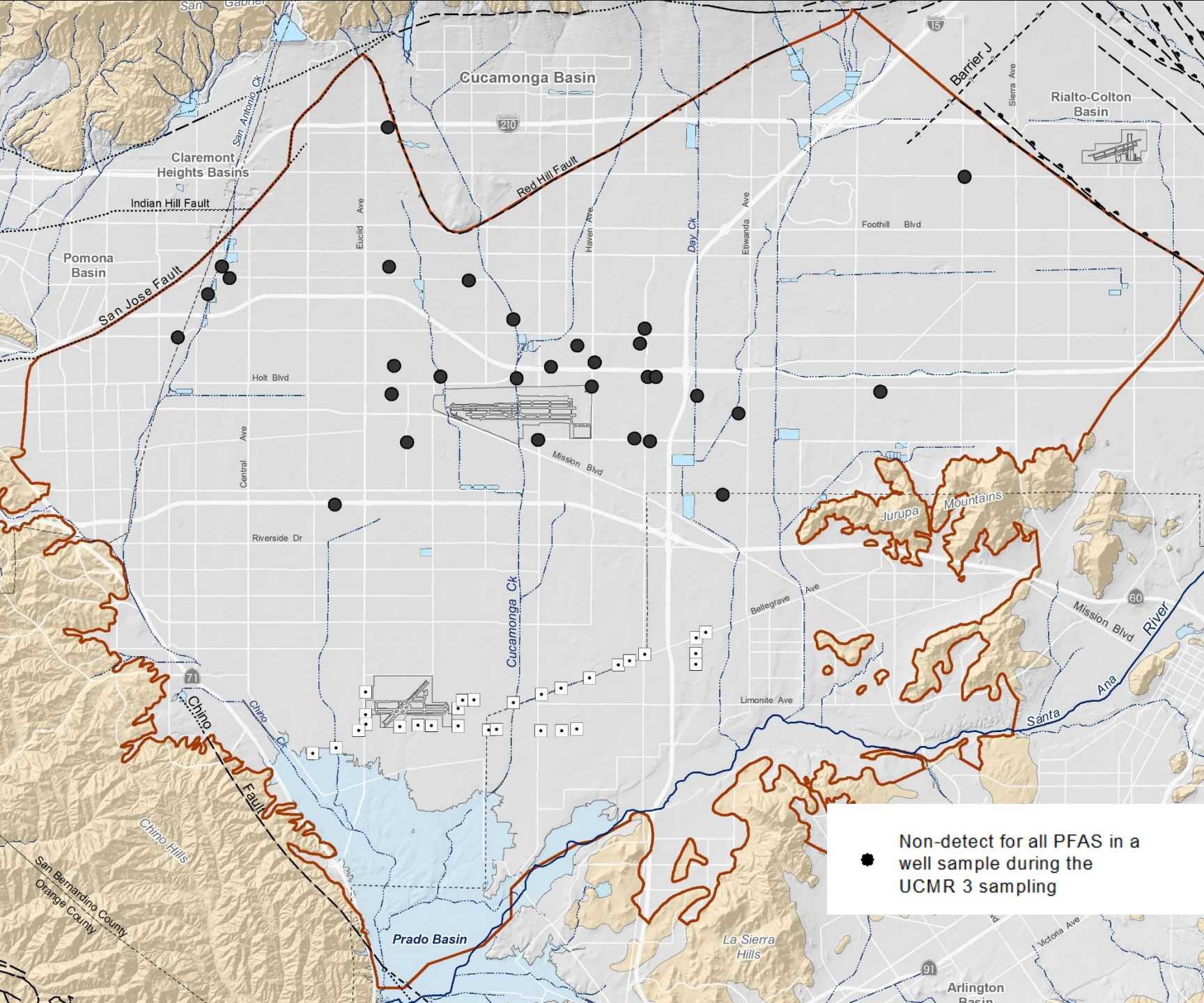
PFAS Monitoring for UCMR 3 2013-2015

DLRs:

- PFOA = 20 ngl
- PFOS = 40 ngl

30 Wells: ND for PFOA, PFOS, & four other PFAS

50 Distribution Samples:
All but one were ND
(one PFOA = 26 ngl)



● Non-detect for all PFAS in a well sample during the UCMR 3 sampling



PFAS IN CHINO BASIN

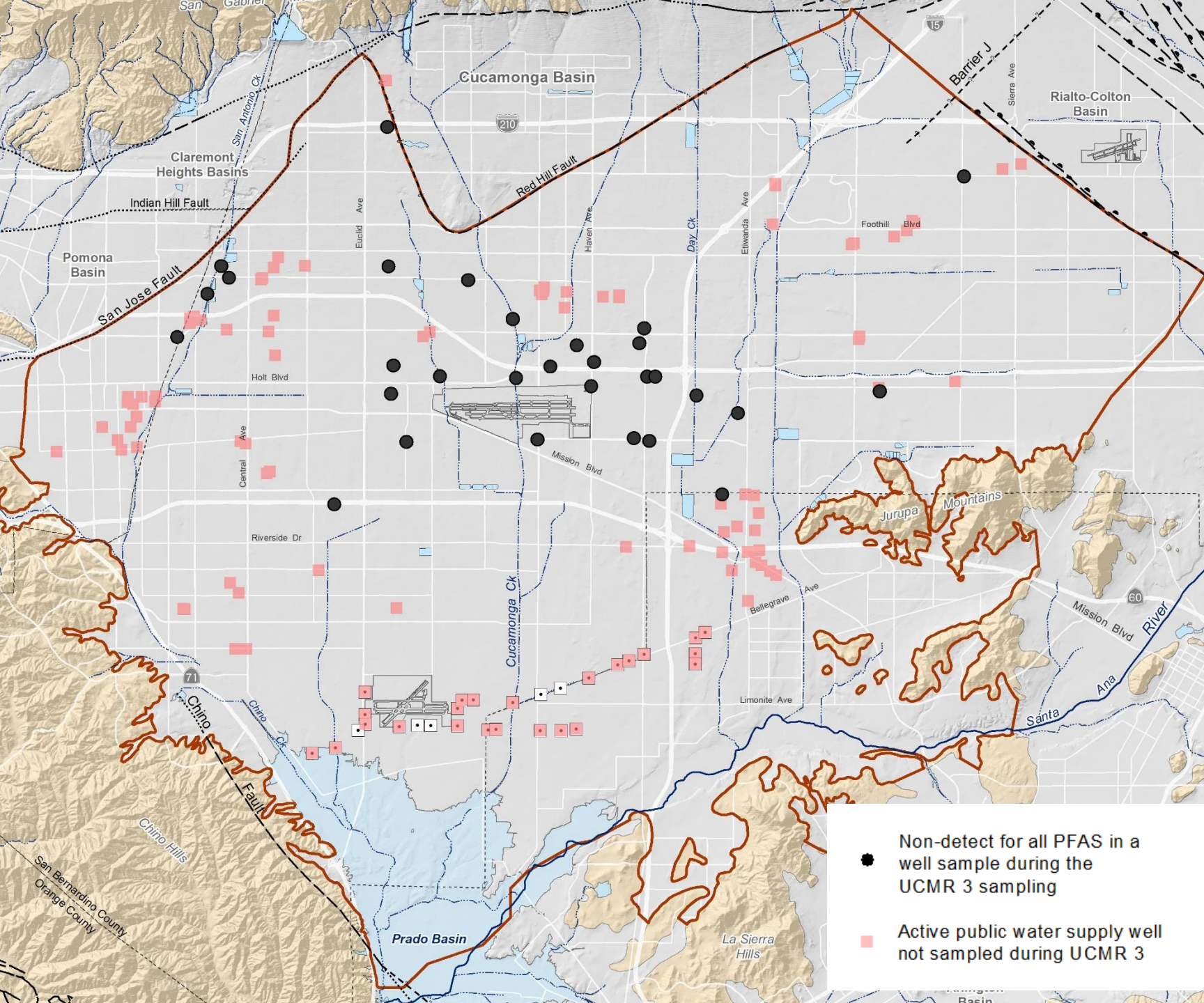
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PFOA and PFOS

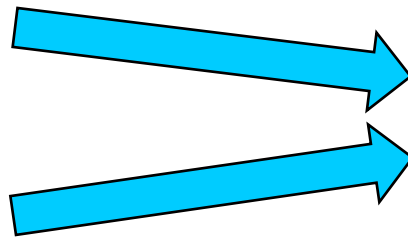
- In **2016** EPA revised Health Advisory Level (HAL) for PFOA and PFOS:

Individually

Combined

PFOA = 400 ngl

PFOS = 200 ngl



PFOA + PFOS = 70 ngl

- State-wide, detected results of PFOA/PFOS from UCMR 3 that were below the 2009 HALs for PFOA/PFOS were now above the new 2016 HAL (not applicable to Chino Basin).

PFOA and PFOS

- In **July 2018** California DDW established notification levels for PFOA and PFOS, based on recommendations from OEHHA:

PFOA = 14 ngl

PFOS = 13 ngl

CA Interim Response Level

PFOA + PFOS = 70 ngl

- DDW recommends that public water supply system with concentrations of PFOA/PFOS above the response level, remove the water source from service or implement treatment.
- In CA there were over 450 public supply systems have been tested for PFOS/PFOA.

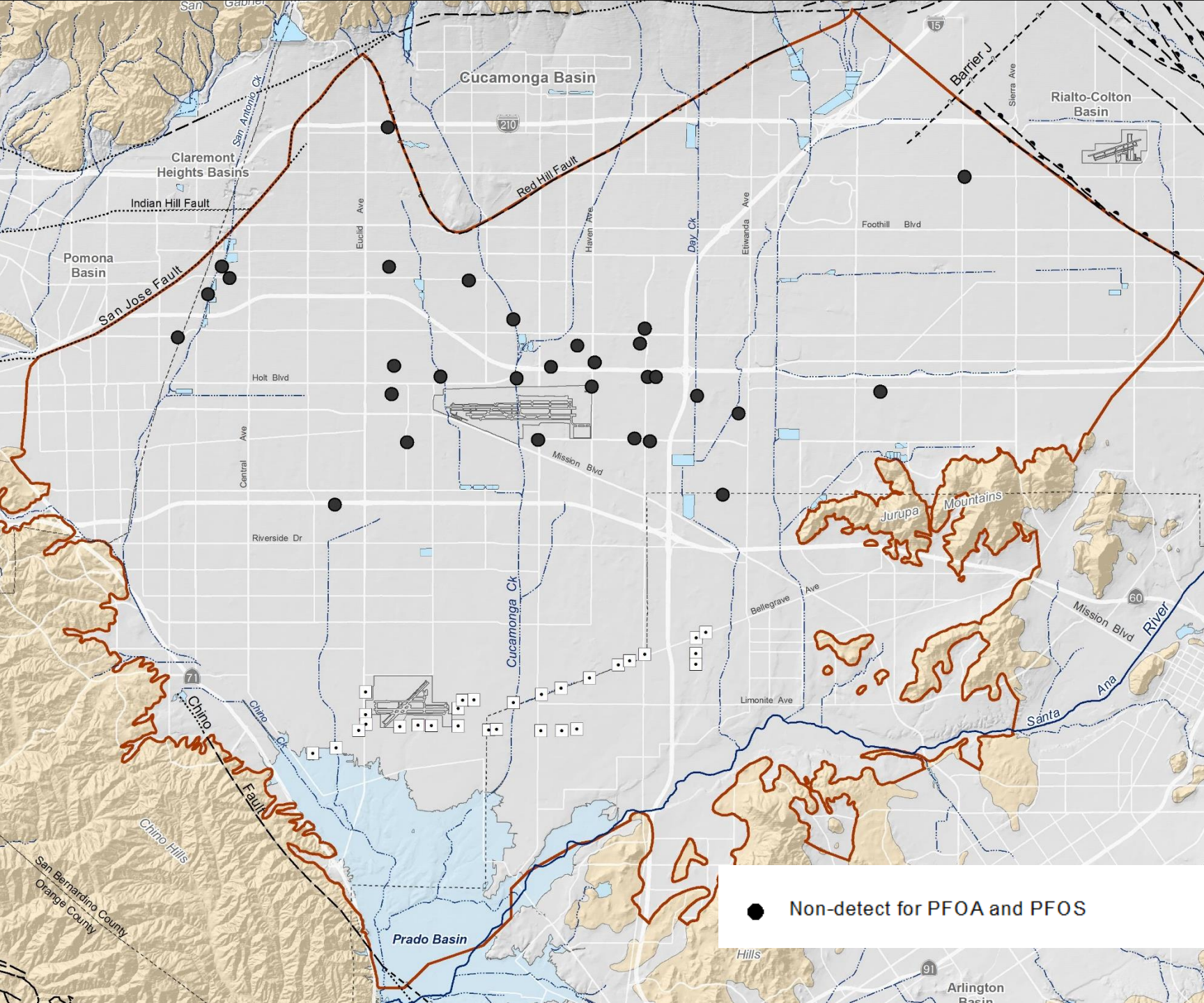
PFAS IN CHINO BASIN

PFAS Monitoring from
2013-2018

No additional monitoring
since UCMR 3

UCMR 3 DLRs:

- PFOA = 20 ngl
- PFOS = 40 ngl



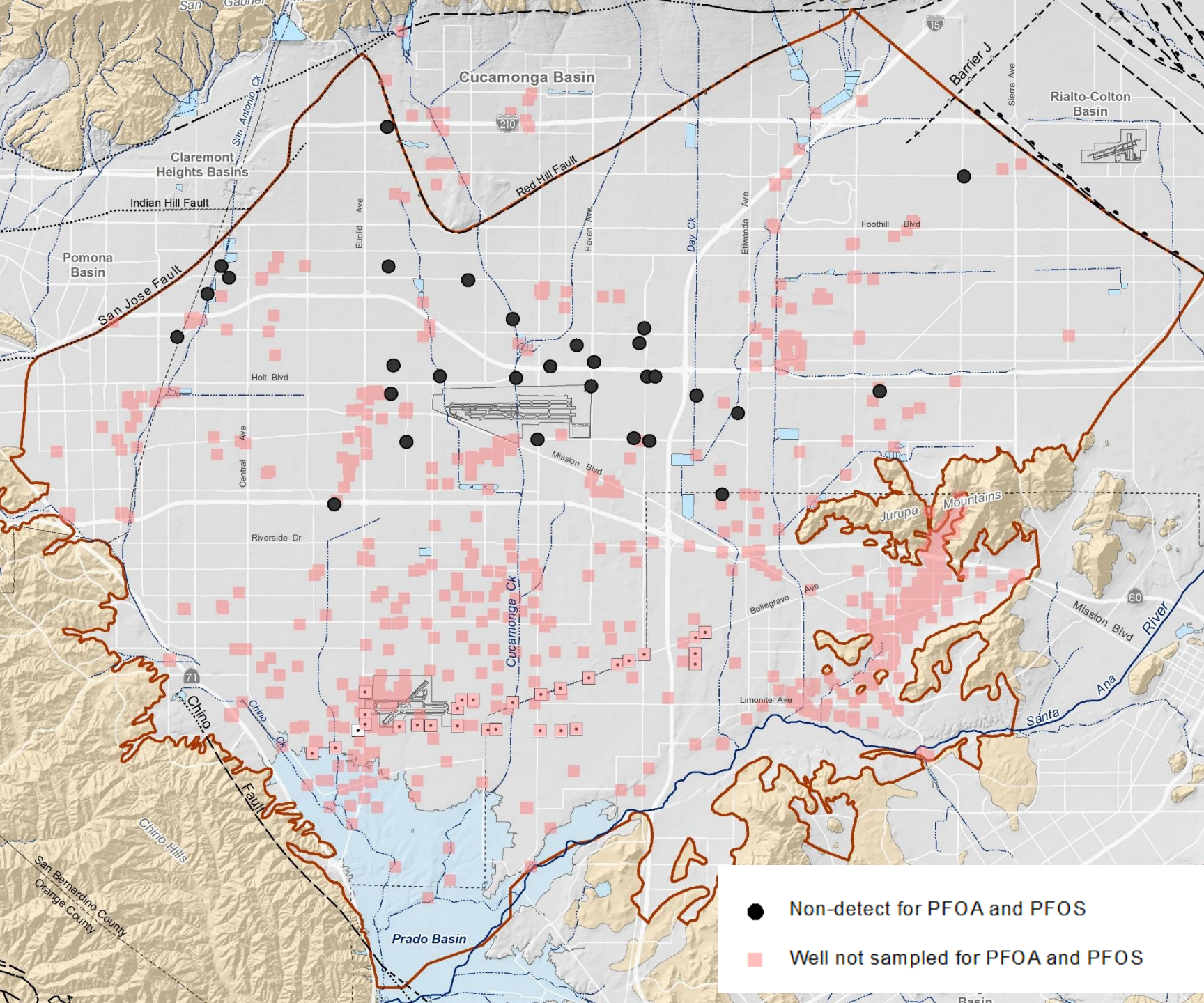
● Non-detect for PFOA and PFOS



PFAS IN CHINO BASIN

PFAS Monitoring from
2013-2018

Most wells in Chino Basin
have not been sampled for
PFAS.



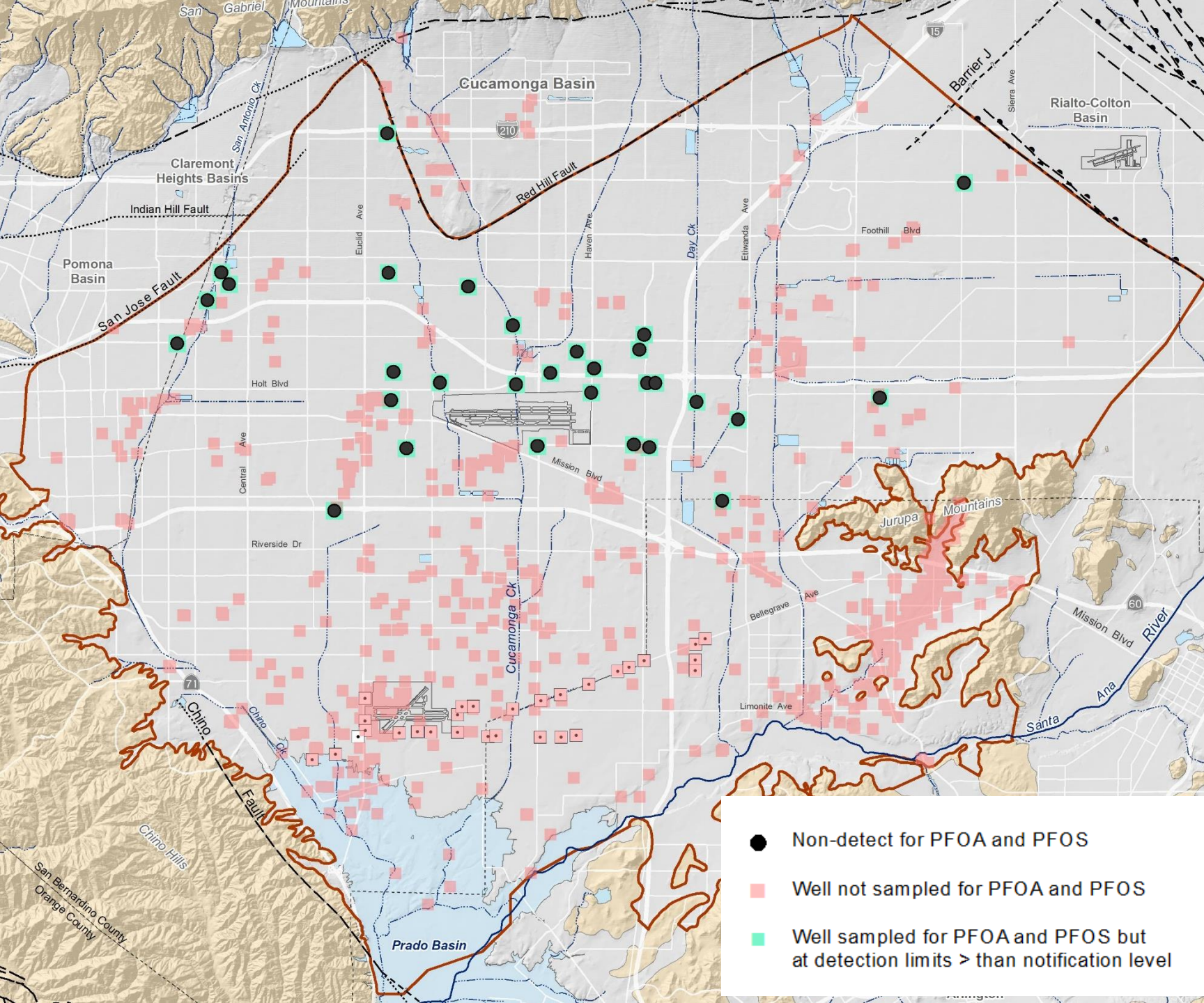
PFAS IN CHINO BASIN

PFAS Monitoring from 2013-2018

The DLRs for the UCMR 3 monitoring for PFOA/PFOS were higher than CA 2018 NLs:

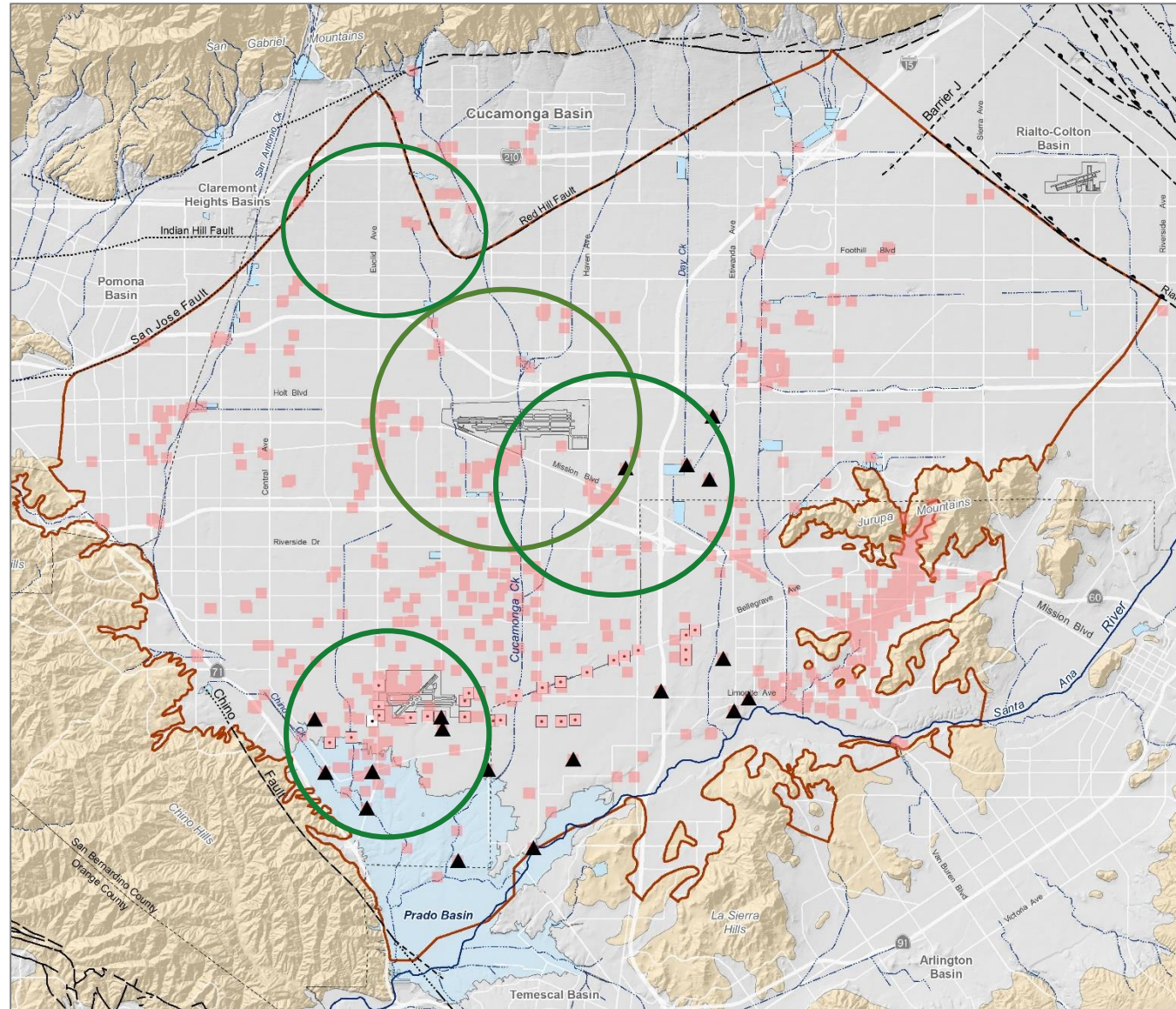
- PFOA **14** ngl (DLR = **20** ngl)
- PFOS **13** ngl (DLR = **40** ngl)

The occurrence of PFOA/PFOS in groundwater at concentrations above or below the NLs is unknown.



PFAS FUTURE SAMPLING IN GROUNDWATER

- Improved laboratory methods with lower detection limits
- 2019 Sampling by Watermaster
 - 18 monitoring well locations
 - One time sample event
- Sampling pursuant to the State Board March 6, 2019 public hearing on PFAS.
 - DDW outlined immediate actions for mandatory monitoring of at risks wells
 - Phased approach



PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS)

- In February 2019 the *EPA's PFAS Action Plan* was published
- Outlines concrete steps to address PFAS and protect human health
- Proactive, cross-agency approach to address PFAS

DRINKING WATER

EPA is moving forward with the Maximum Contaminant Level (MCL) process for PFOA and PFOS—two of the most well-known and prevalent PFAS chemicals. The Agency is also gathering and evaluating information to determine if regulation is appropriate for a broader class of PFAS.

The next step in the Safe Drinking Water Act process for issuing drinking water standards is to propose a regulatory determination. This provides the opportunity for the public to contribute to the information the EPA will consider related to the regulation of PFAS in drinking water.

MONITORING

EPA will propose nationwide drinking water monitoring for PFAS under the next UCMR monitoring cycle.

Monitoring results will improve understanding of the frequency and concentration of PFAS occurrence in drinking water, which can be used to inform regulatory action.

RESEARCH

EPA is rapidly expanding the scientific foundation for understanding and managing risk from PFAS.

Improved detection and measurement methods, additional information about PFAS presence in the

PER-AND POLYFLUOROALKYL SUBSTANCES (PFAS)

- State Water Board Policy for Water Quality Control for Recycled Water (RW Policy) – initiated PFOA/PFOS sampling in 2018
- **August 27, 2018** revisions were made to an amendment to include PFOA/PFOS to the CEC list for recycled water monitoring

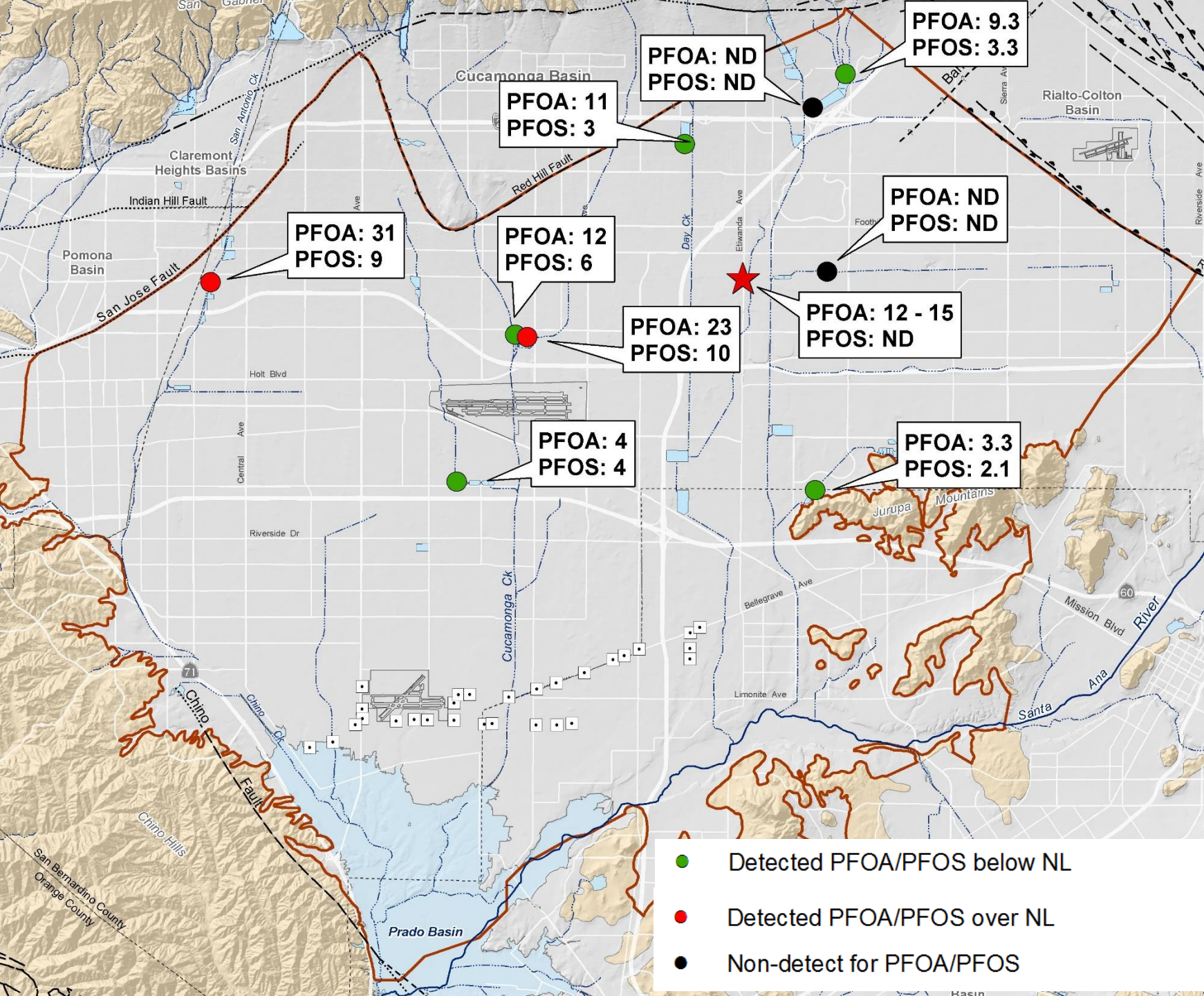


PFOA/PFOS IN CHINO BASIN RW POLICY MONITORING

PFOA/PFOS Sampling
Pursuant to the RW Policy

Monitoring of recycled water
recharge and blending
sources for recharge

- 10 sources sampled:
- 3 - PFOA **above** NL
(15-31 ngl)
 - 5 - PFOA/PFOS **below** NL
(3-12 ngl)
 - 2 - PFOA/PFOS non-detect



1,4-DIOXANE IN CHINO BASIN

1,4-Dioxane monitoring
1998 -2018

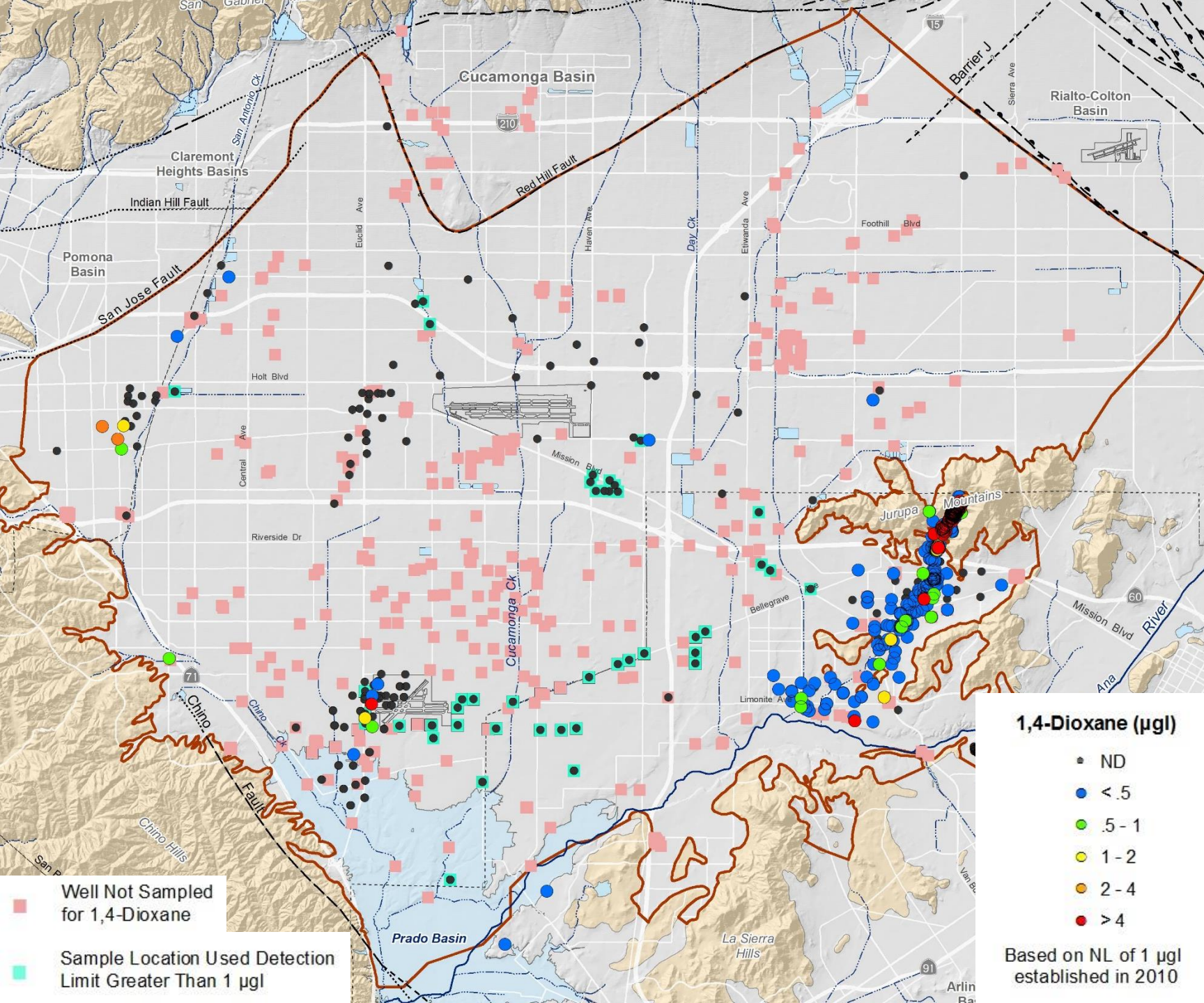
2010 CA NL from 3 to 1 $\mu\text{g/l}$

Includes UCMR 3 (DLR = 1 $\mu\text{g/l}$)

Historically monitoring is
limited for 1,4-Dioxane:

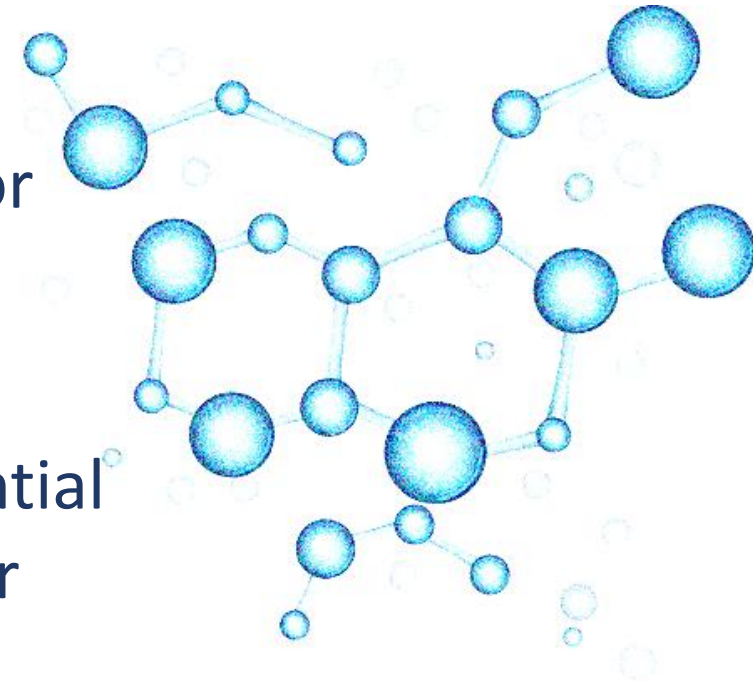
- not sampled for
- using DLR > 1 $\mu\text{g/l}$

The occurrence of 1,4-Dioxane
in groundwater at
concentrations above or below
the NL is unknown for most the
CB



CONCLUSIONS

- Increased regulatory attention and monitoring requirements that have occurred for PFOA, PFOS, and other PFAS over the past year; and it is unknown at this time the occurrence and magnitude of these compounds in Chino Basin groundwater.
- Monitoring for 1,4-dioxane and other CECs is limited or nonexistent in Chino Basin groundwater.
- Monitoring (voluntary or required) is necessary to address concerns about occurrence of CECs and potential contamination in preparation for future drinking water standards.





Thank you

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