

# 1,2,3-TRICHLOROPROPANE: INSIGHTS FROM DATA MINING OF OCCURRENCE AND CLEANUP SITE DATABASES

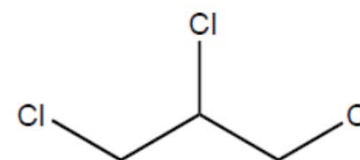
*Margaret Gentile*, Erica Kalve, and Shandra Justicia-Leon  
Arcadis US, Inc.

Eleventh International Conference on the Remediation of  
Chlorinated and Recalcitrant Compounds

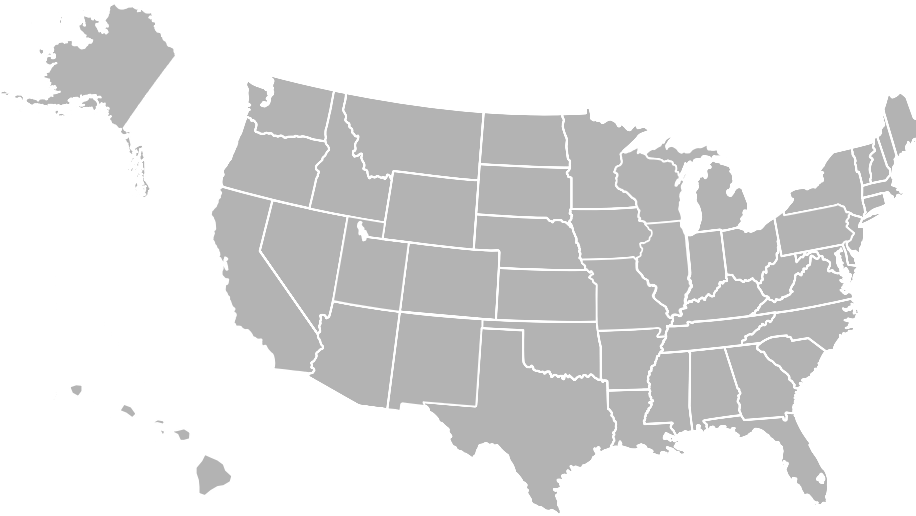
April 10, 2018

# 1,2,3-trichloropropane (TCP)

- Contaminant in the environment from
  - ❖ Agricultural use as fumigant
  - ❖ Industrial use as solvent, paint remover, degreasing agent
  - ❖ Chemical manufacturing use as intermediate
- Moderate solubility, separate phase partitioning properties, and tendency to sorb (similar to TCE)
- Classified by US EPA as “likely to be carcinogenic to humans”

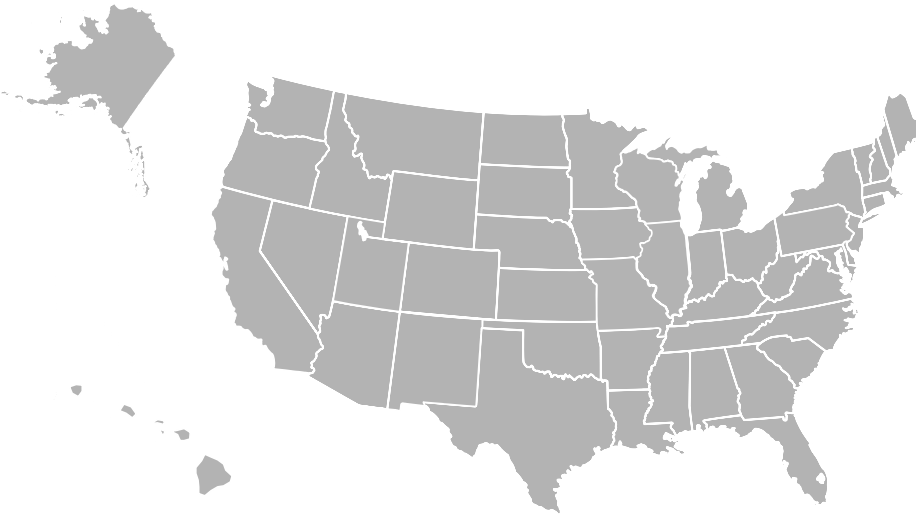


# Emerging Regulations



Eleventh International Conference on  
Remediation of Chlorinated and Recalcitrant Compounds

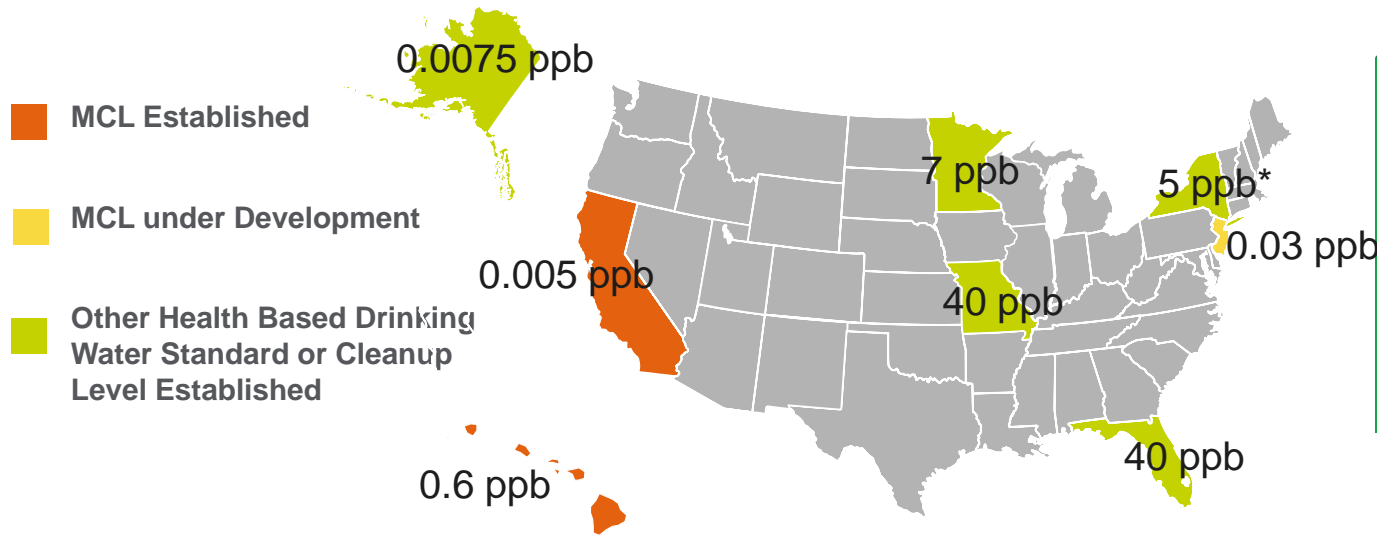
# Emerging Regulations



**Federal Level: TCP was placed on the Candidate Contaminant List 4 in 2015**

**Tap water screening level for cancer:  
0.00075 ppb (0.75 ppt)**

# Emerging Regulations



**Federal Level: TCP was placed on the Candidate Contaminant List 4 in 2015**

**Tap water screening level for cancer: 0.00075 ppb (0.75 ppt)**

\*for all principal organic contaminants

**Drinking water standards and guidance levels vary by orders magnitude**

# What can we learn from mining public databases?

Where does TCP occur in groundwater?

Are there data gaps in occurrence information due to varying reporting limits?

What are the magnitude of impacts?

Are groundwater plumes delineated to varying regulatory levels?

How large are the groundwater plumes?

# Occurrence in Public Water Supply Datasets



## The Third Unregulated Contaminant Monitoring Rule (UCMR 3)

- Data collected between 2013 and 2015
- Analytical Method: USEPA 524.3
- Method Reporting Limit: 0.03 ppb (30 ppt)



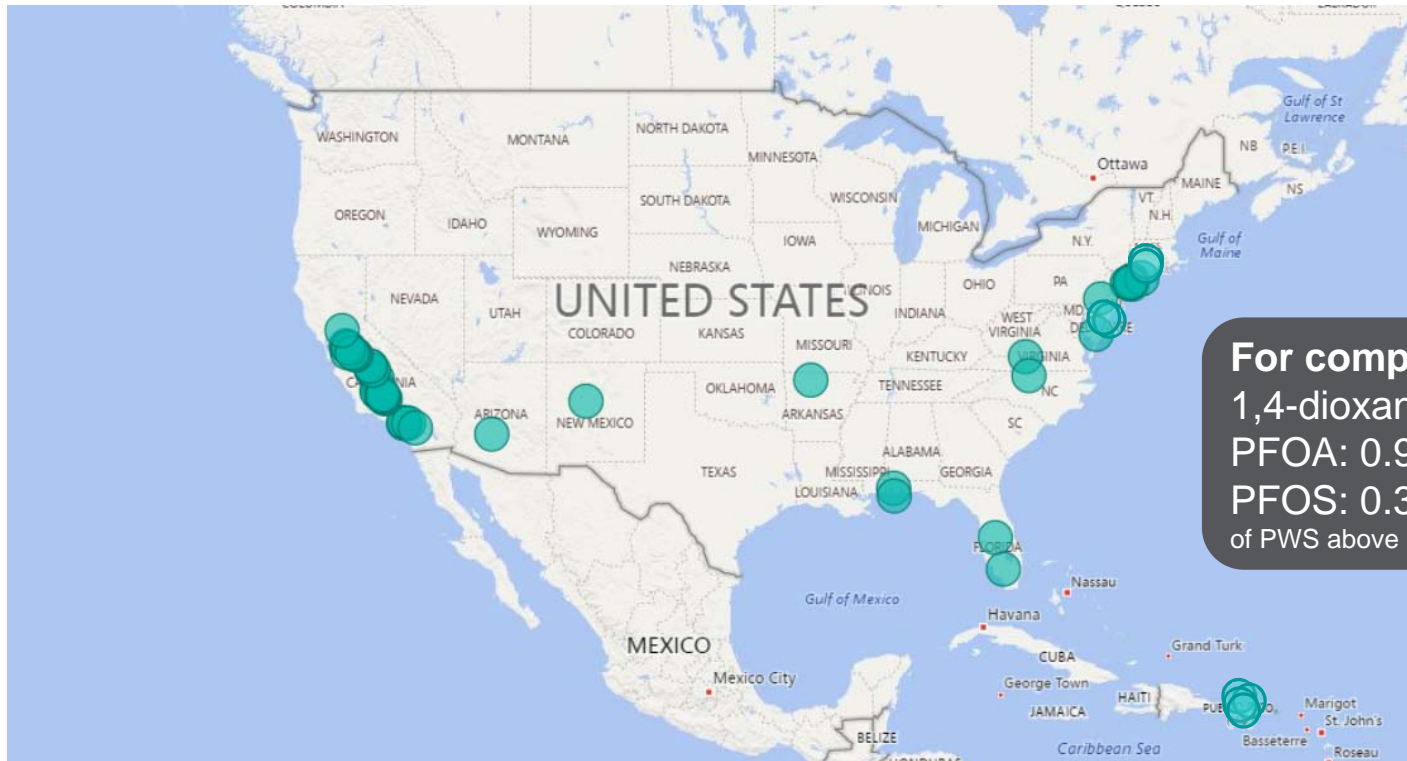
## UCMR

- Data collected between 2001 and 2016
- Analytical Method: SRL 524 with selected ion monitoring or ion trap in selected ion storage mode
- Method Reporting Limit: 0.005 ppb (5 ppt)

# USEPA UCMR3 Detections

Detections above MRL (30 ppt) (also above reference concentration of 0.4 ppt)

Plotted by zip code

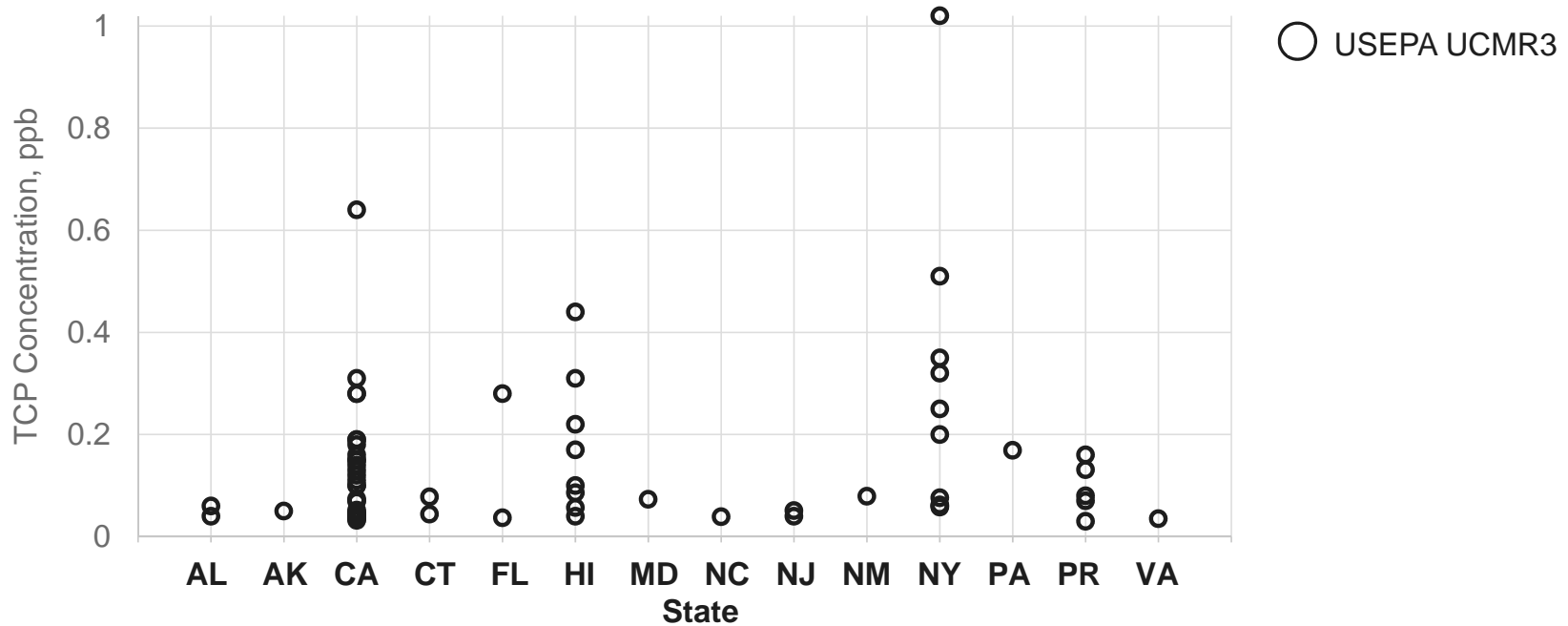


For comparison  
1,4-dioxane: 7%  
PFOA: 0.9%  
PFOS: 0.3%  
of PWS above reference concentrations

**TCP detected in 65 public water supplies tested (1.3%)**

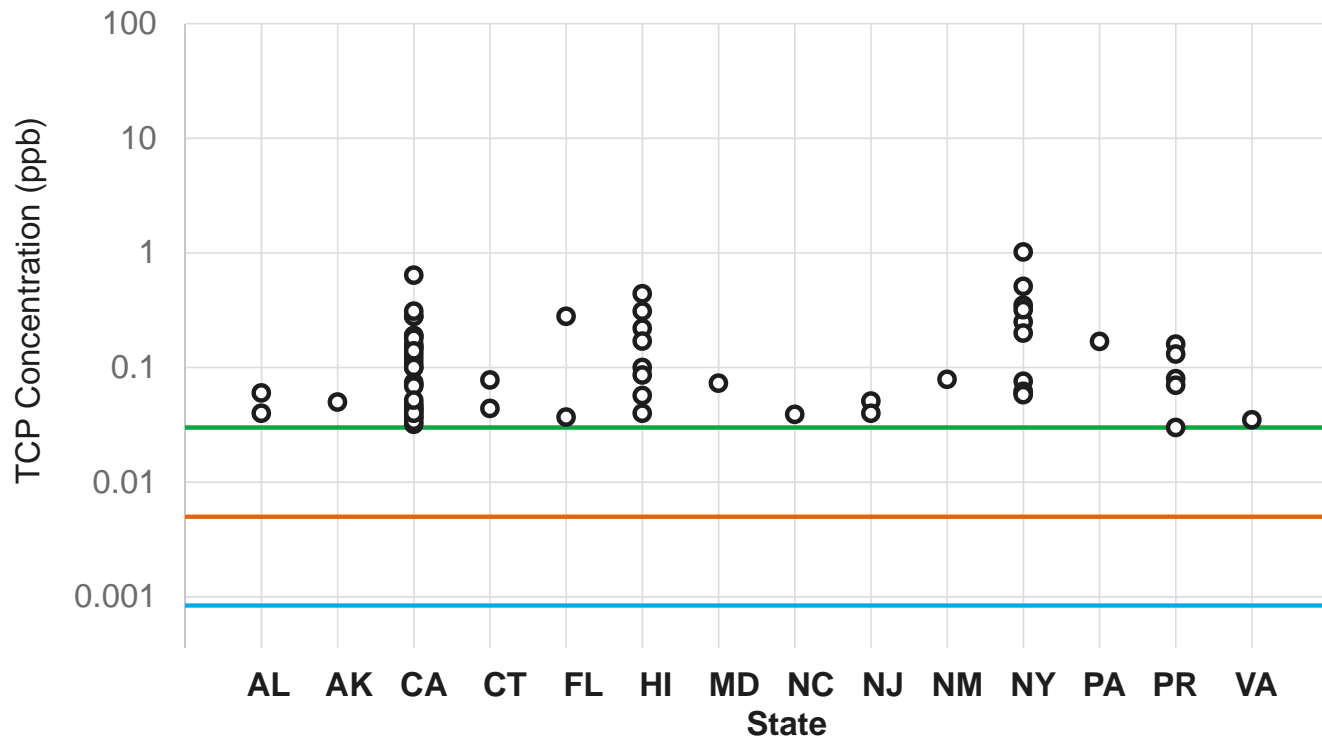


# Drinking Water: USEPA UCMR3



○ USEPA UCMR3

# Drinking Water: USEPA UCMR3



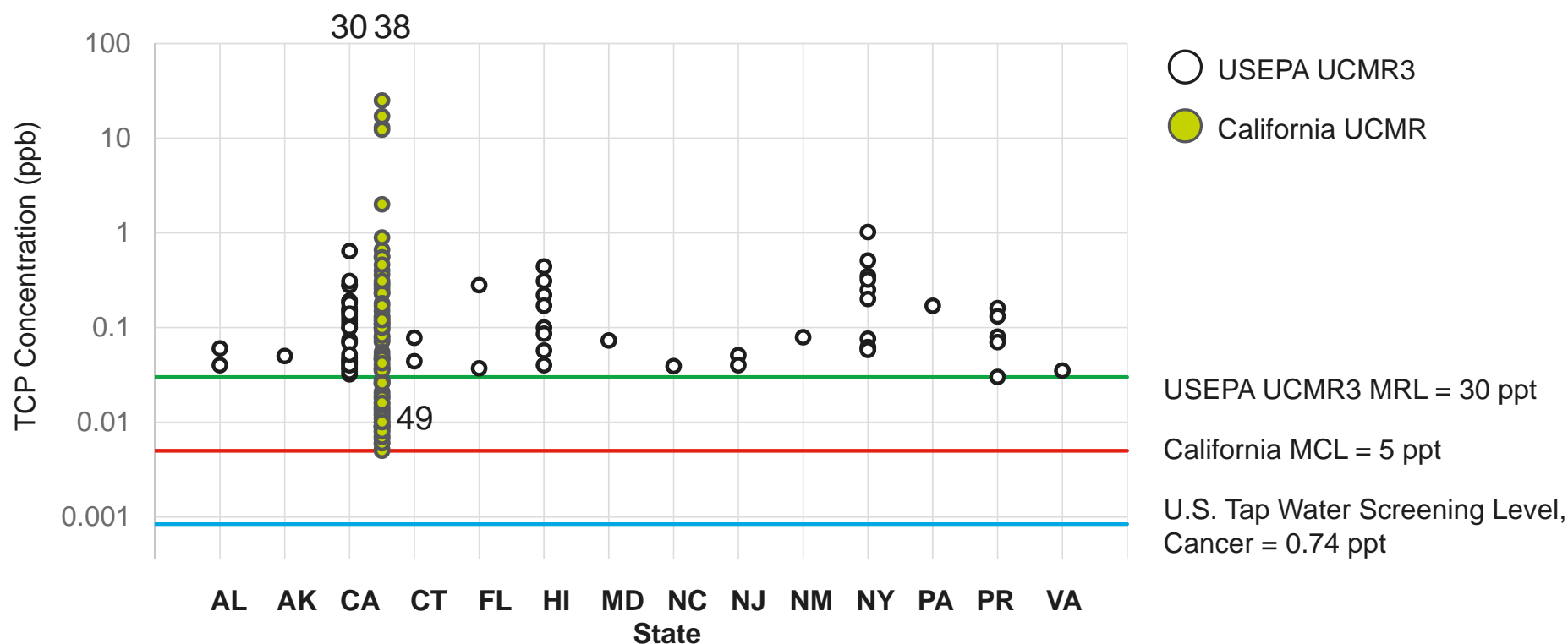
○ USEPA UCMR3

USEPA UCMR3 MRL = 30 ppt

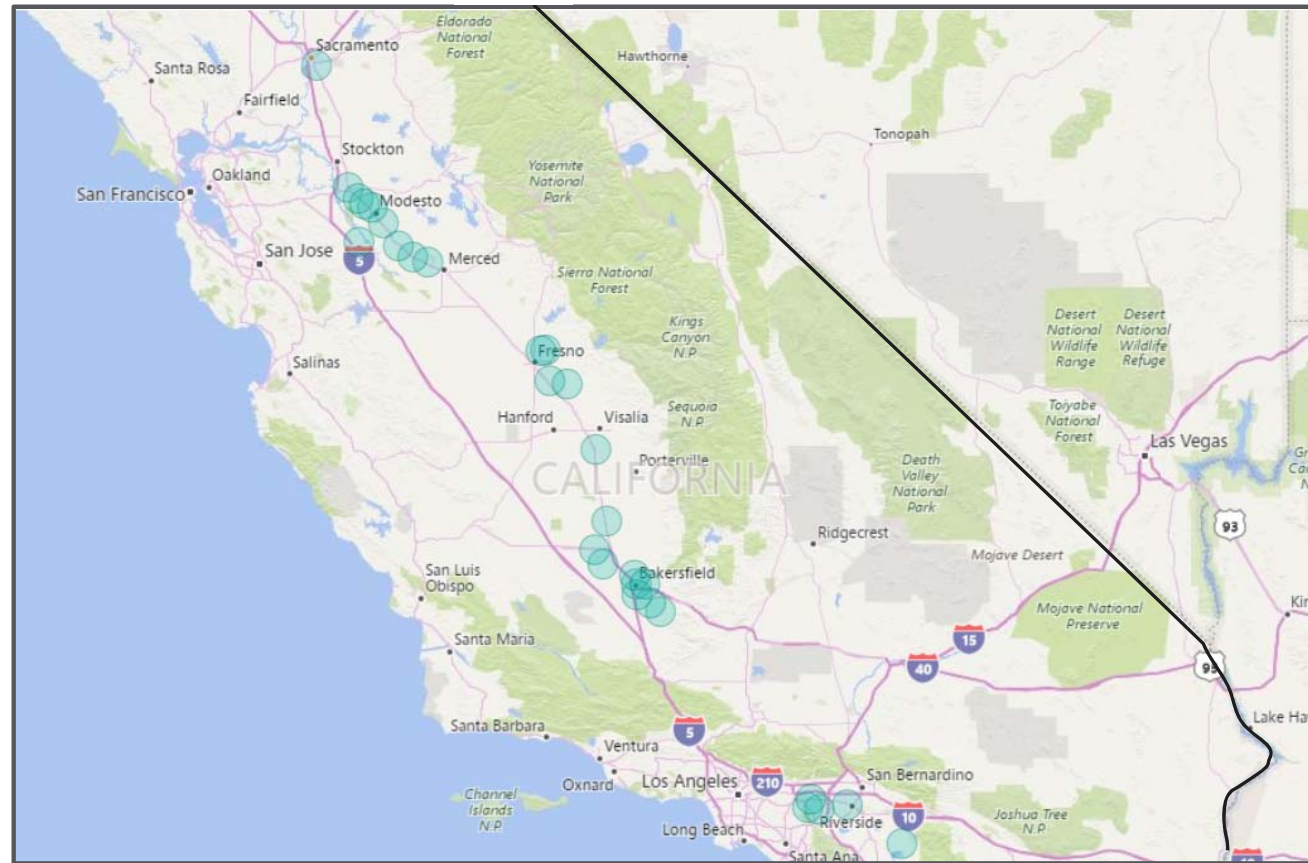
California MCL = 5 ppt

U.S. Tap Water Screening Level,  
Cancer = 0.74 ppt

# Drinking Water: USEPA UCMR3 vs California UCMR

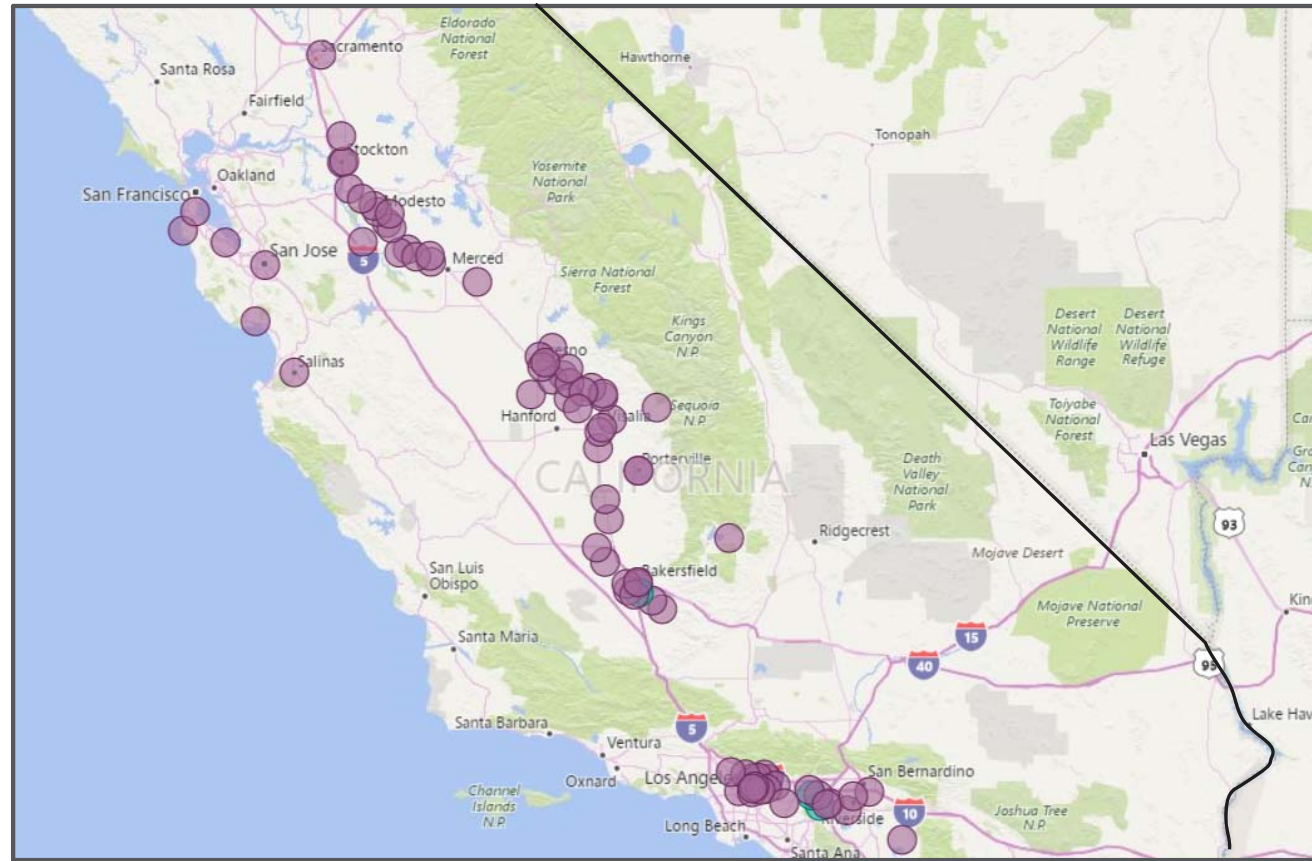


# USEPA UCMR3 Detections in California



Eleventh International Conference on  
Remediation of Chlorinated and Recalcitrant Compounds

# California UCMR Detections



Eleventh International Conference on  
Remediation of Chlorinated and Recalcitrant Compounds

# California Geotracker

**STATE WATER RESOURCES CONTROL BOARD**  
**GEOTRACKER**

Tools Reports UST Case Closures Information

**MAXIMUM GROUNDWATER CONTAMINANT CONCENTRATION REPORT - ONLY DATA FROM ESI IS INCLUDED** 305 RECORDS FOUND [EXPORT TO EXCEL](#) PAGE 1 OF 4

The data in this report comes from [EDF](#) formatted data that is uploaded electronically to the [GeoTracker ESI](#) system.  
There may be cases not reflected in this report where maximum concentrations occurred prior to 2001, when the ESI upload requirements began.

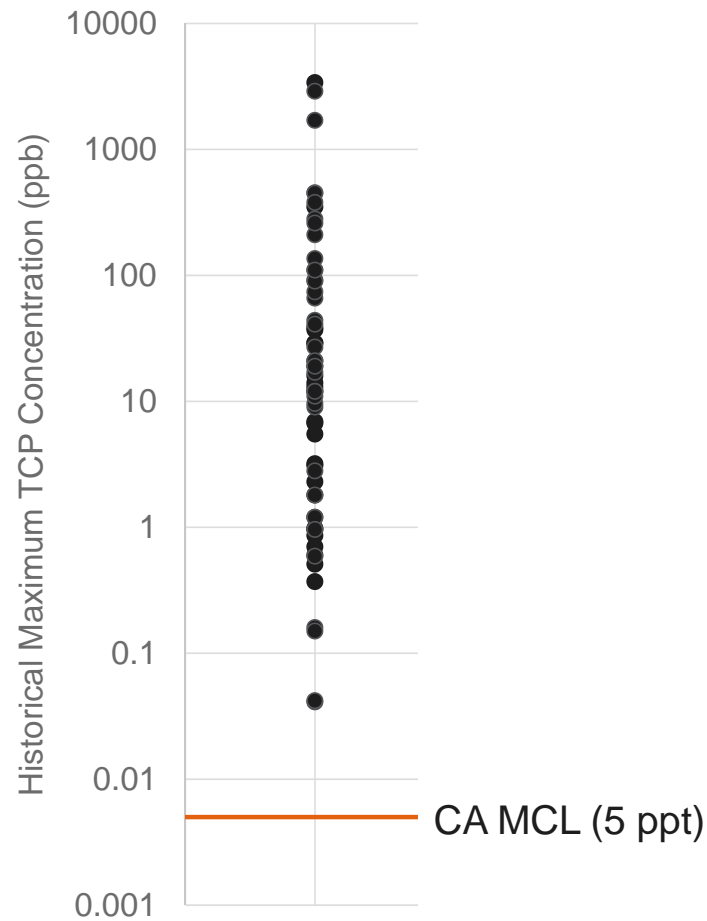
NAME	PROJECT TYPE	STATUS	ADDRESS	CITY	COUNTY	CASE NUMBER
LEAD AGENCY	CASEWORKER	CHEMICAL	VALUE	IN THE PAST	GO	
		1,2,3-Trichloropropane [MCL = .005 UG/L]	>	0 ANY TIME		

Only includes sites with electronic data with regulatory oversight by CA State Water Resources Control Board  
Does not include sites under oversight of Department of Toxics and Substances Control (DTSC) or EPA

# Groundwater Detections in CA

63 sites with ongoing  
detections

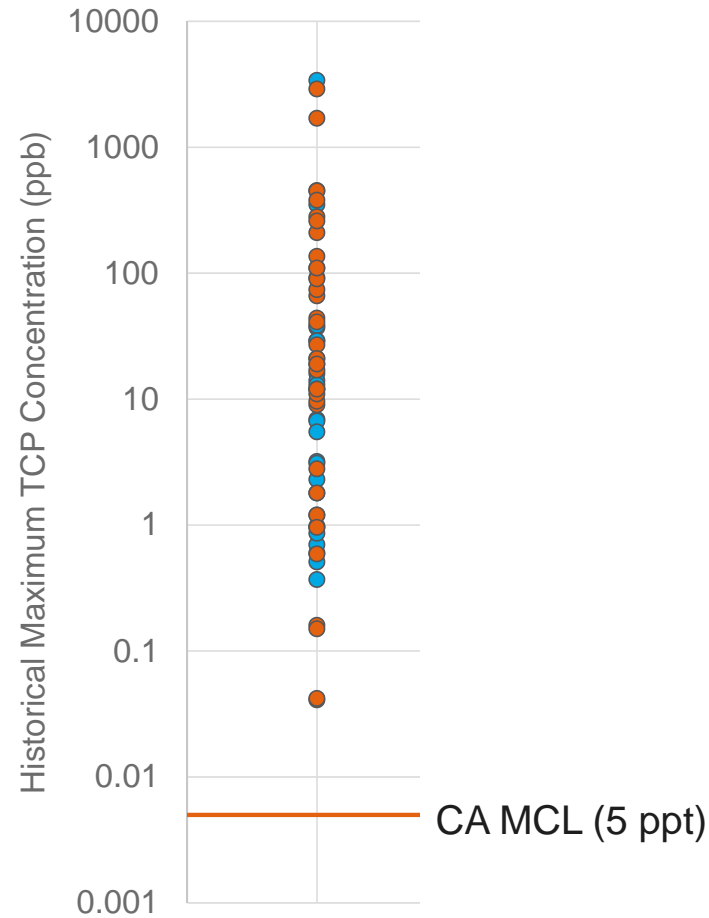
294 sites with historical detections  
that are ND in recent events



# Groundwater Detections in CA

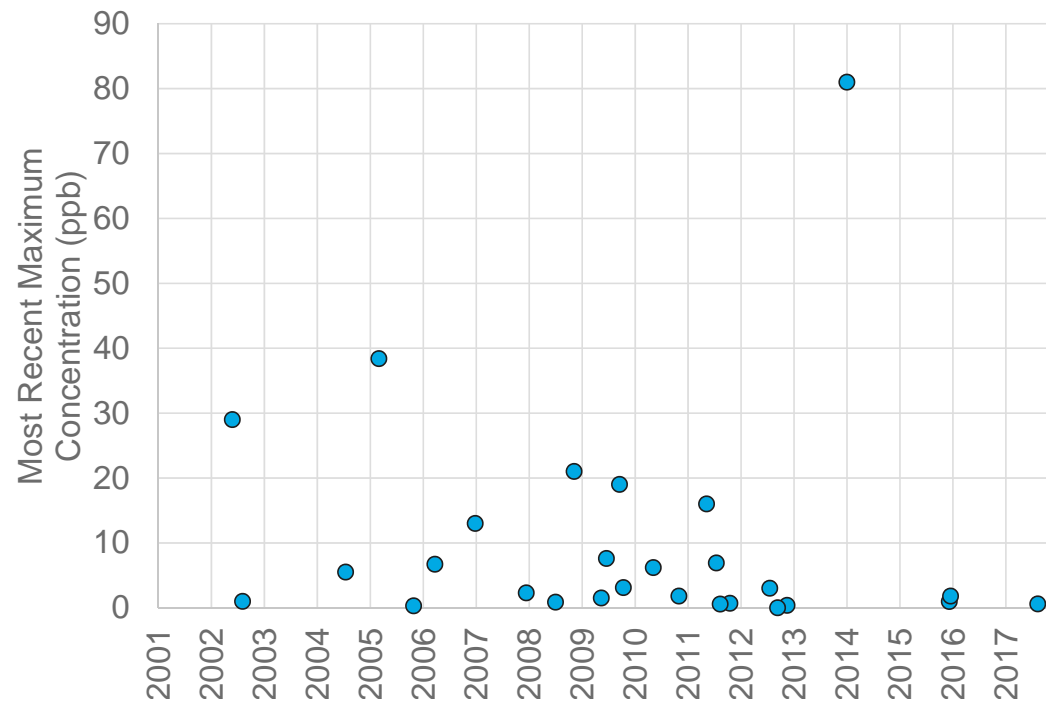
## 63 sites with ongoing detections

- 27 sites: have not been sampled since before 2015
- 36 sites: ongoing monitoring 2015-2017

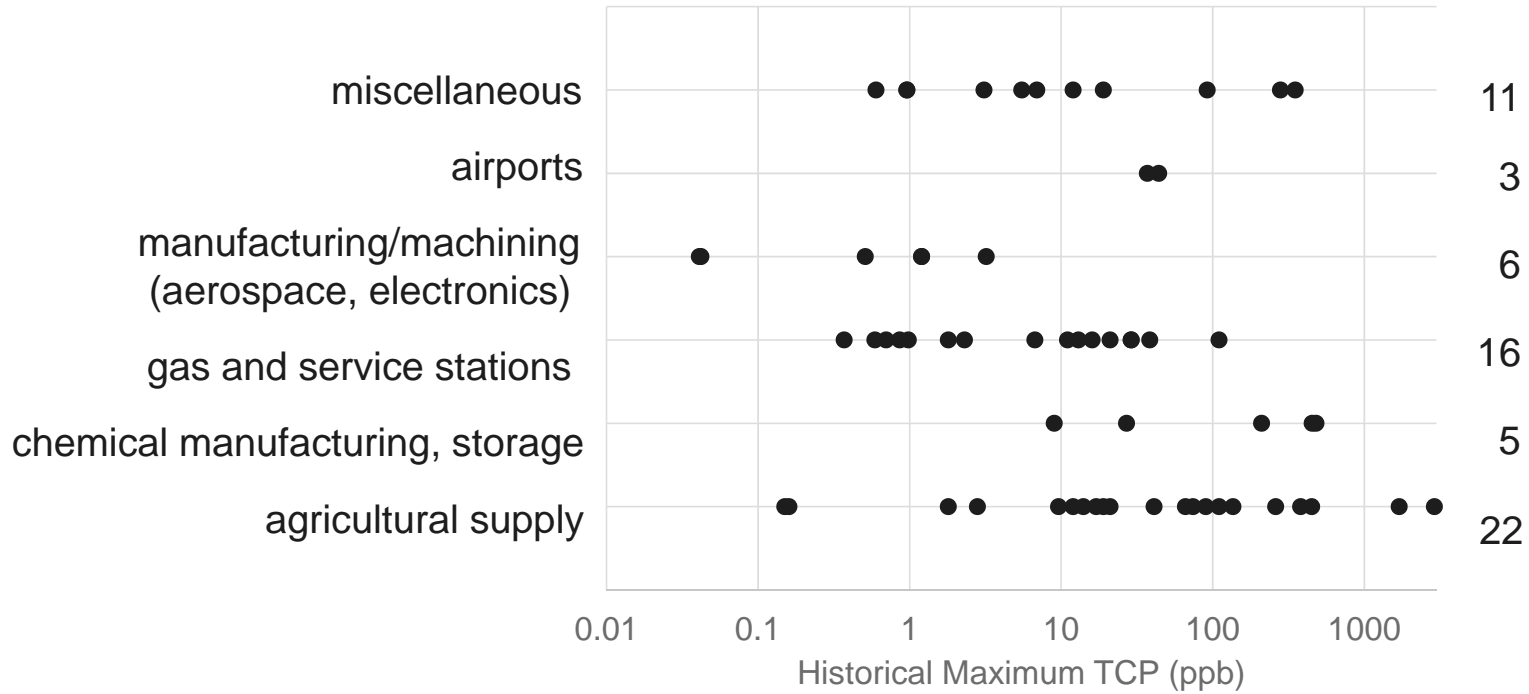




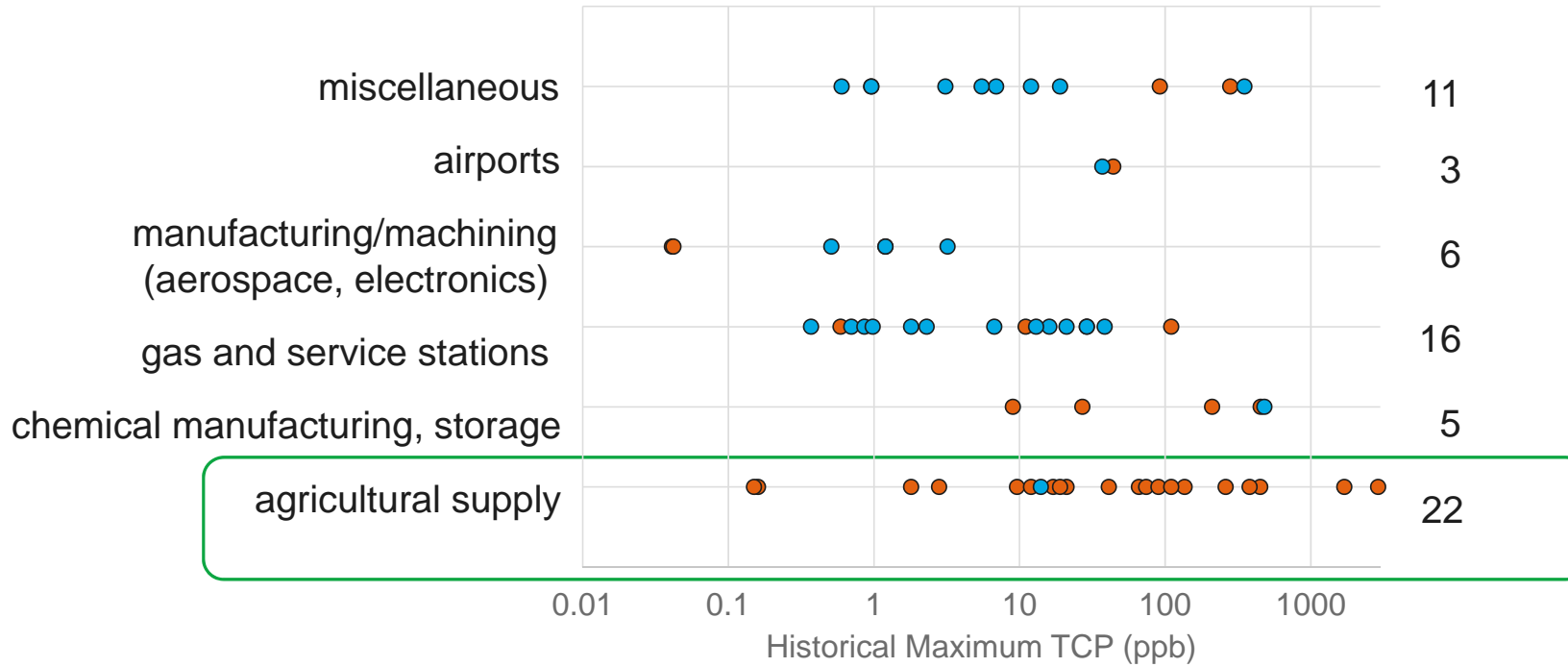
# Final Concentrations for Sites without On-going Data



# Sources

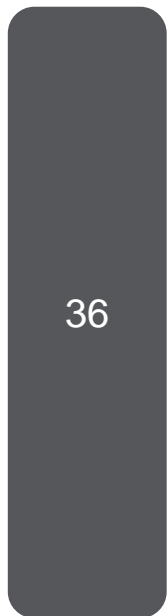


# Sources



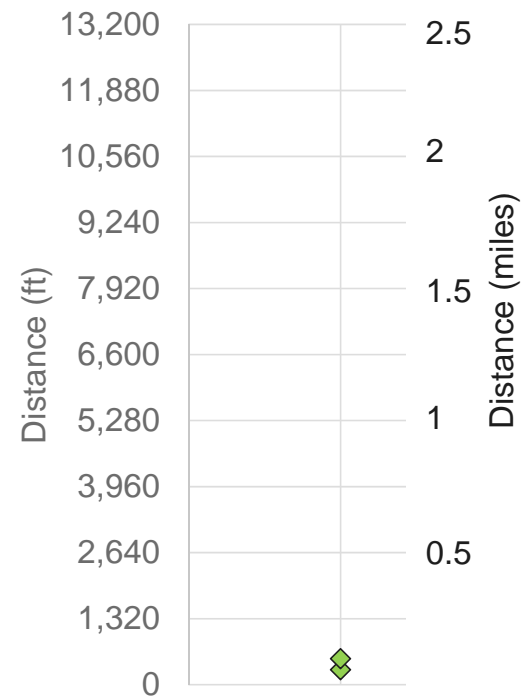
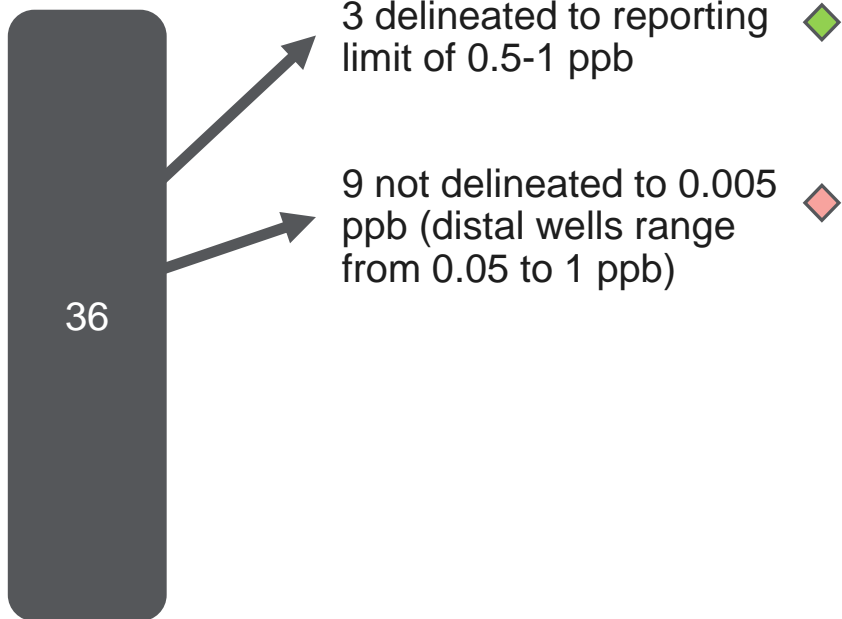
- not been sampled since before 2015
- ongoing monitoring 2015-2017

# Available Plume Length Data



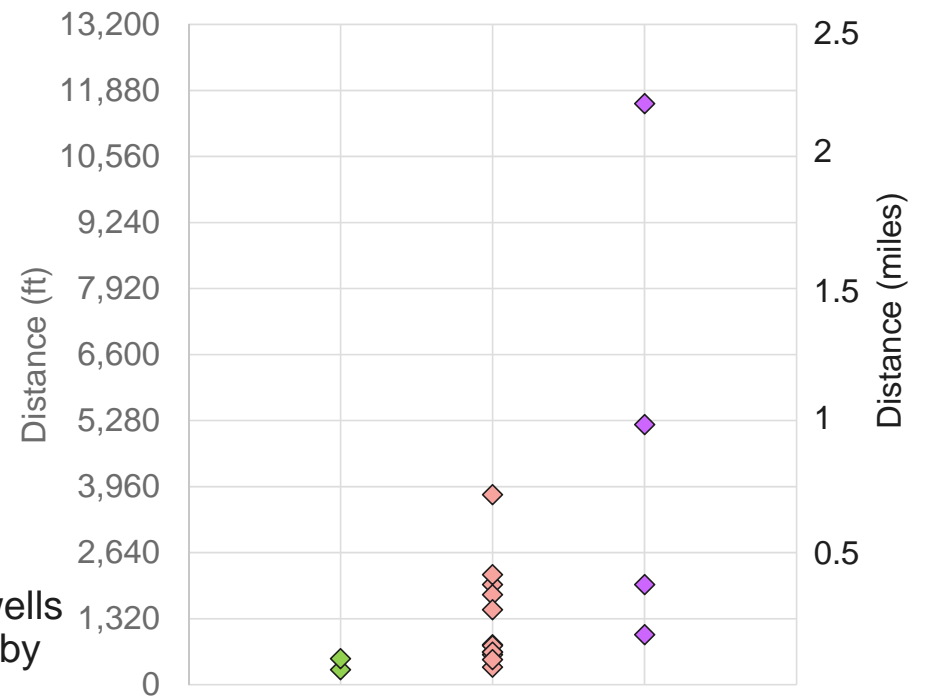
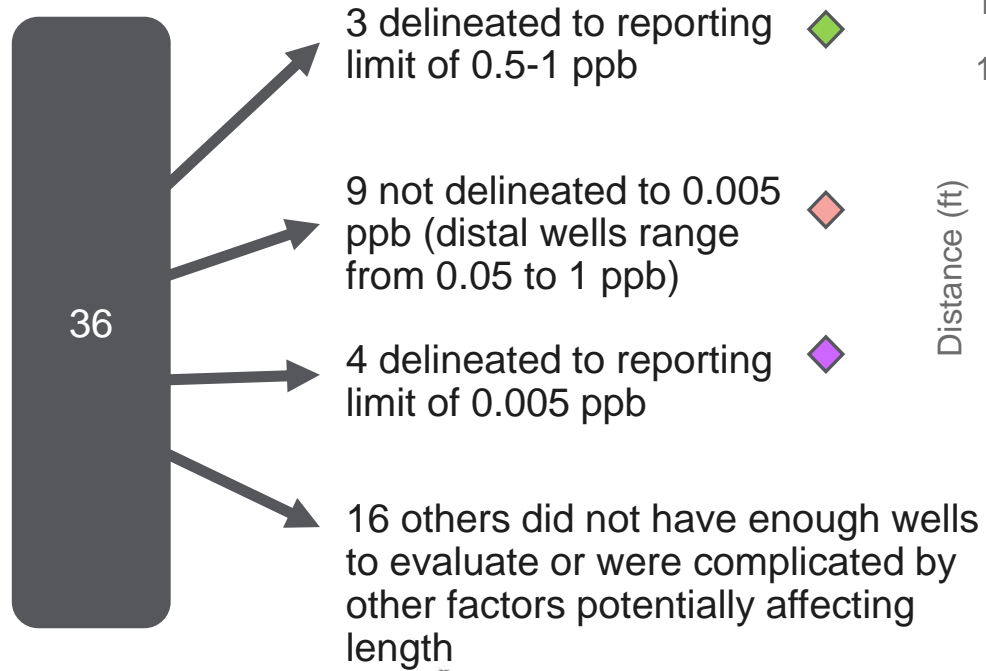
Eleventh International Conference on  
Remediation of Chlorinated and Recalcitrant Compounds

# Available Plume Length Data





# Available Plume Length Data



# Conclusions

- Our understanding of occurrence of TCP is a function of reporting limits used for monitoring
  - relevant to the varying regulatory levels issued/being considered
- Very little data available delineating groundwater plumes to the low ppt level
  - however, available data indicates plumes 1000s ft long
- TCP in groundwater best understood for agricultural supply sources, although largest plumes from other sources



## Download your free copy of our new *Advances in Remediation* e-book!

Revised, refreshed and full of cutting-edge technologies — our newest *Advances in Remediation* e-book features eight articles highlighting new insights from our scientists and engineers who are rethinking the future of site evaluation and remediation. Discover the latest innovations and advancements that could reshape how you approach your remediation projects.

Stop by booth **#610** for your complimentary copy, or visit [www.arcadis.com/Remediation2018](http://www.arcadis.com/Remediation2018)!

