



# UCMR4: What Are We Seeing, and what are some issues?

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# What's the UCMR?



- **Unregulated Contaminant Monitoring Rule**
- **Contaminant Candidate List (CCL) – Parameters with known or suspected health effects that may be regulated in the future**
- **Occurrence Data – UCMR**
- **It's the first step towards potential regulation (or non regulation).**

# Data, Data, Data...



- UCMR 4 will ultimately generate more than **1 million sample data points**
- Plus a lot of batch QC data
- And information on “matrix” impacts on methods, to really know how rugged the methods are.

# A Lot of Methods Means Lots of Opportunities for Analytical Issues



- **There are 3 unique methods for cyanotoxins.**
  - 544, 545, 546 – all “NEW” methods
- **There are 4 unique methods for chemicals.**
  - 200.8, 525.3 (SEMI-NEW), 530 (NEW), 541 (NEW)
- **There is 1 method for HAA9**
  - 552.3 – SEMI-NEW
- **There are 2 methods to do Br and TOC.**
  - 300.0 (or 300.1) and SM5310C (or SM5310B)

# “Non-Analytical Issues”



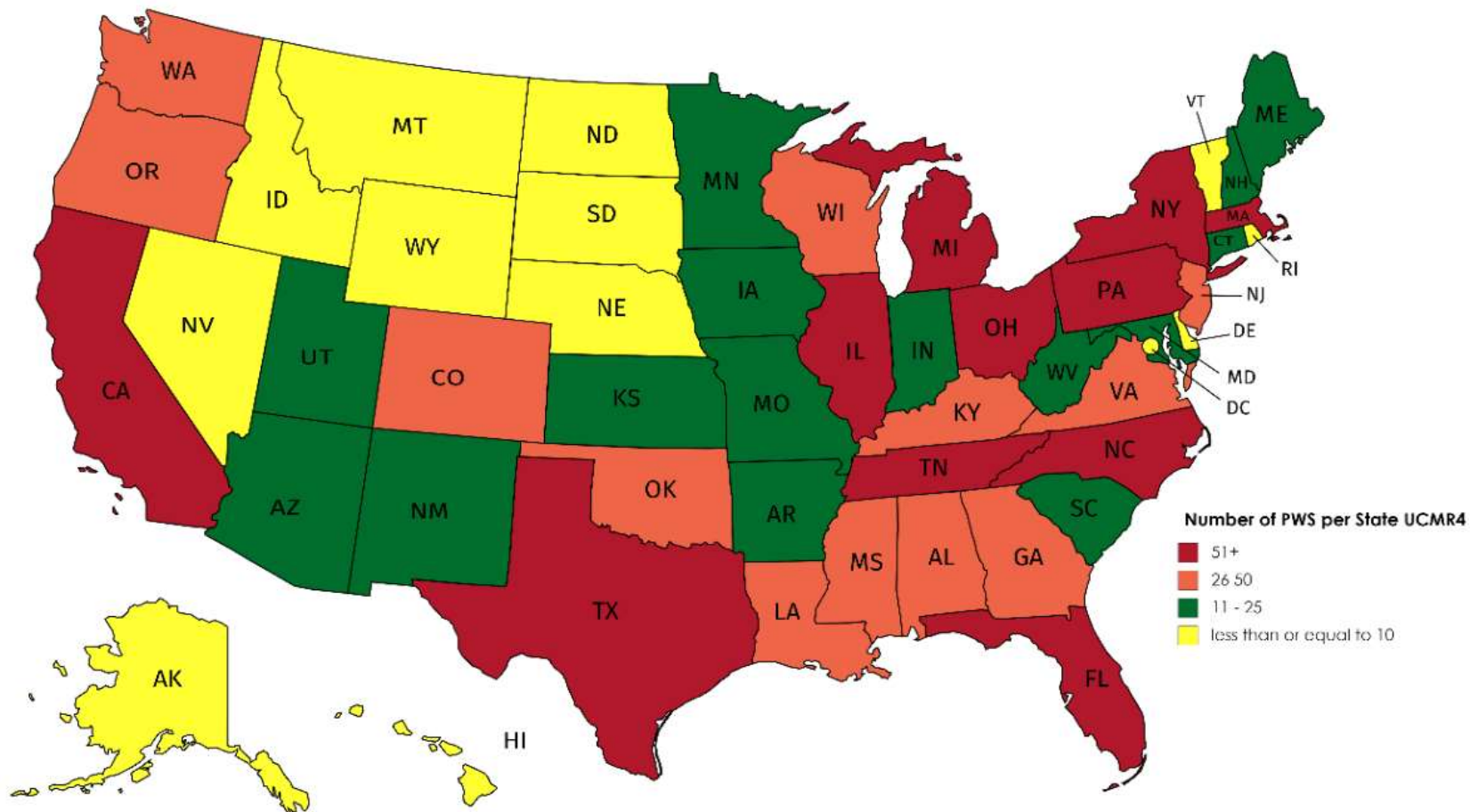
- The first 3 months of UCMR 4 were “difficult” because the methods had not been thoroughly validated by EPA and others and rules for acceptance limits changed.
- ALL labs are facing challenges with uploads.
- SOME labs are NOT following the requirements and finding out during upload

# What are We ACTUALLY Seeing: Out of a **Small** Data Set



- ~ 1000 PWS with results so far
- ~4,000 sample results for chemistry
- ~6,900 sample results for HAA9
- ~ 6,000 sample results for total microcystins and anatoxin-a/cylindrospermopsin

# Number of PWS per State reporting so far



# What Are We Actually Seeing in UCMR 4?"



- **Germanium – some hits, but not a lot**
- **Manganese – frequent and some above MCL**
- **HAA...precursors –**
  - **TOC**
  - **Bromide**
- **HAA – mostly below MCL, as expected**



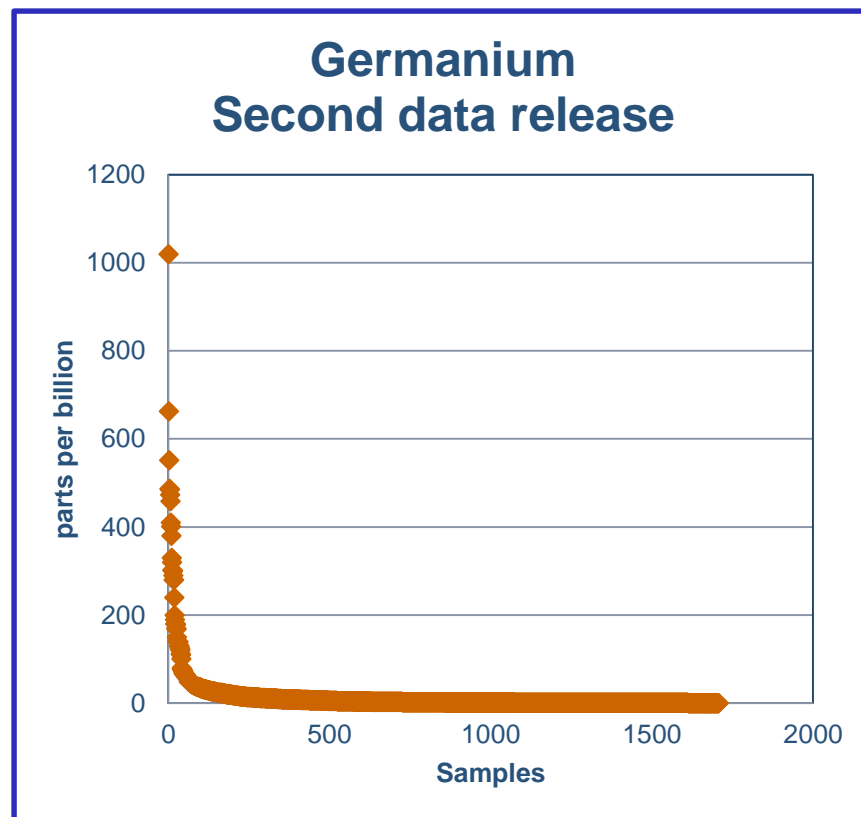
# Germanium detected in 333 out of 4757 samples (7%)



**MRL = 0.3 parts per Billion**

**145 out of 1,181 (12%)  
PWS with hits above the  
MRL**

**333 out of 4,757 (7%)  
samples above the MRL**



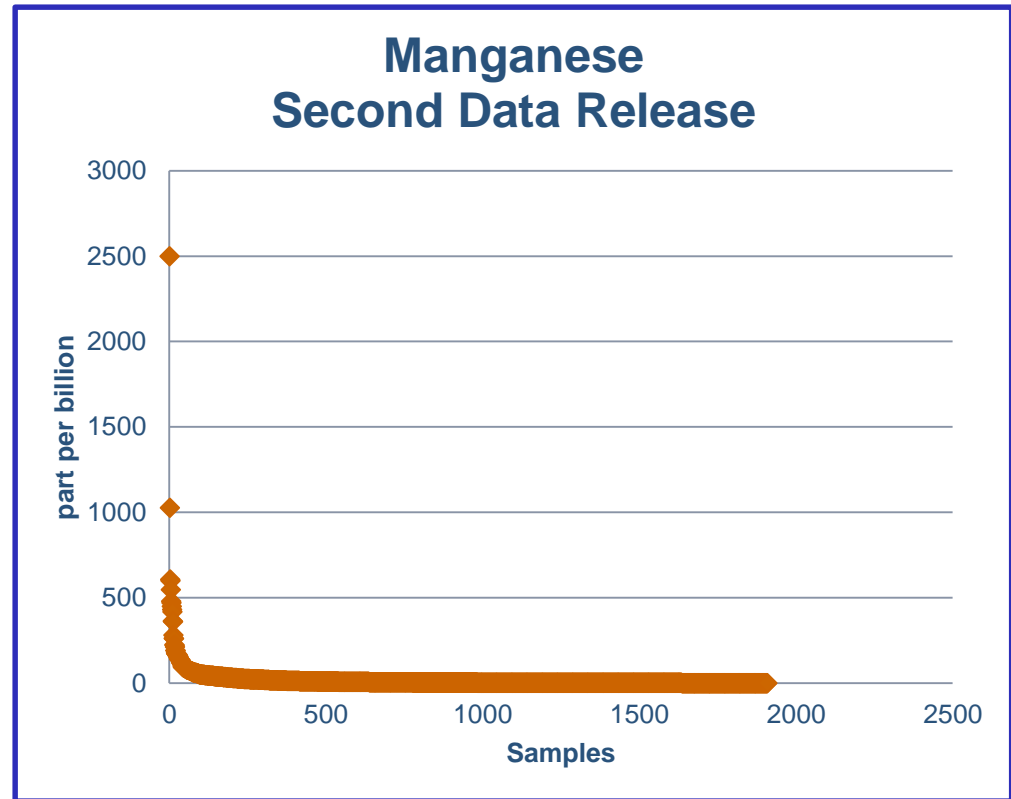
# Manganese detected in 3,283 out of 4739 samples (69%)



**MRL = 0.4 parts per Billion**

**987 of 1,183 (83%) PWS with hits above the MRL**

**19 of 1183 (1.6%) PWS above 300 ppb, secondary MCL**



# HAA indicator TOC average = 1.32 mg/L

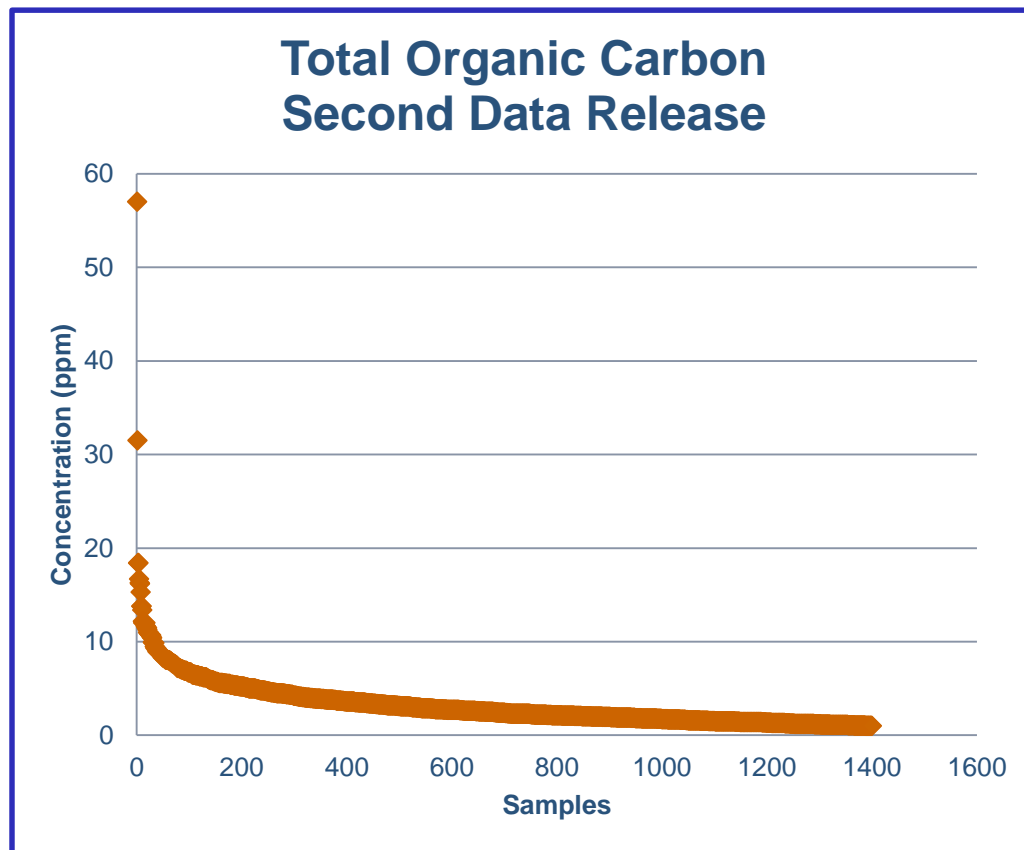


**MRL = 1 parts per million (ppm)**

**1399 samples with hits above the MRL**

**Highest result = 57 ppm**

- **> 5 ppm → 14%**
- **2 – 5 ppm → 48%**
- **< 2 ppm → 38%**



Data only includes samples with detections

# HAA indicator Bromide average = 172 $\mu\text{g}/\text{L}$

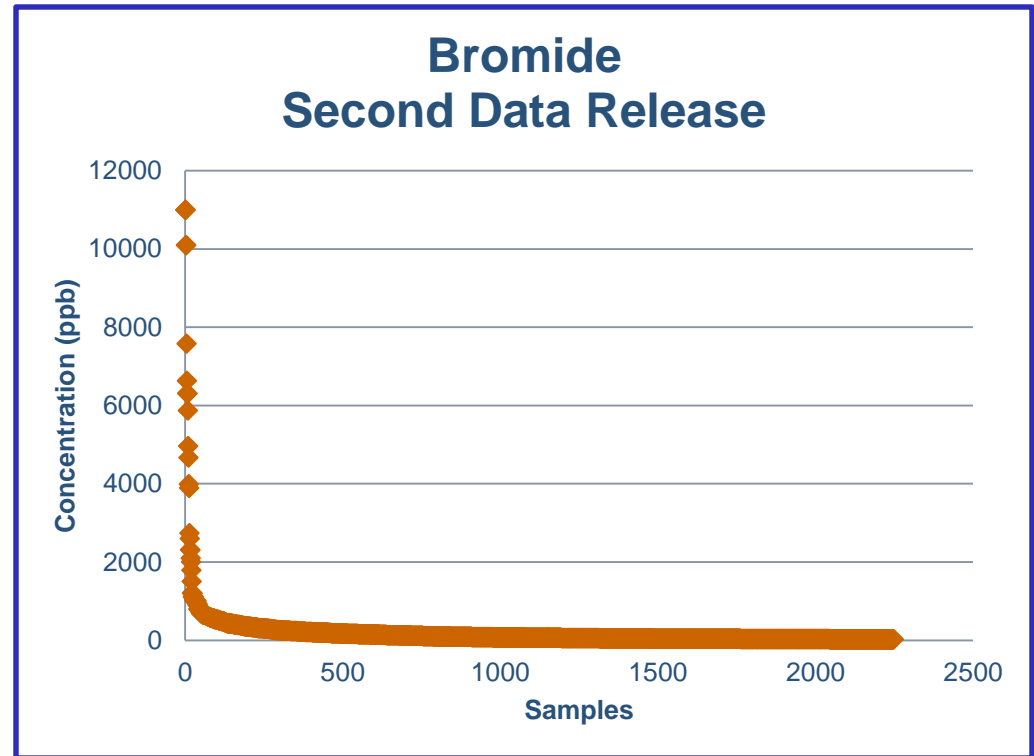


**MRL = 20 parts per billion (ppb)**

**2249 samples with hits above the MRL**

**Highest result = 11,000 ppb**

- **> 1000 ppb → 1.6%**
- **100 – 1000 ppb → 33%**
- **< 100 ppb → 65.4%**



Data only includes samples with detections

# HAA5 detected in 6,668 out of 6,862 samples

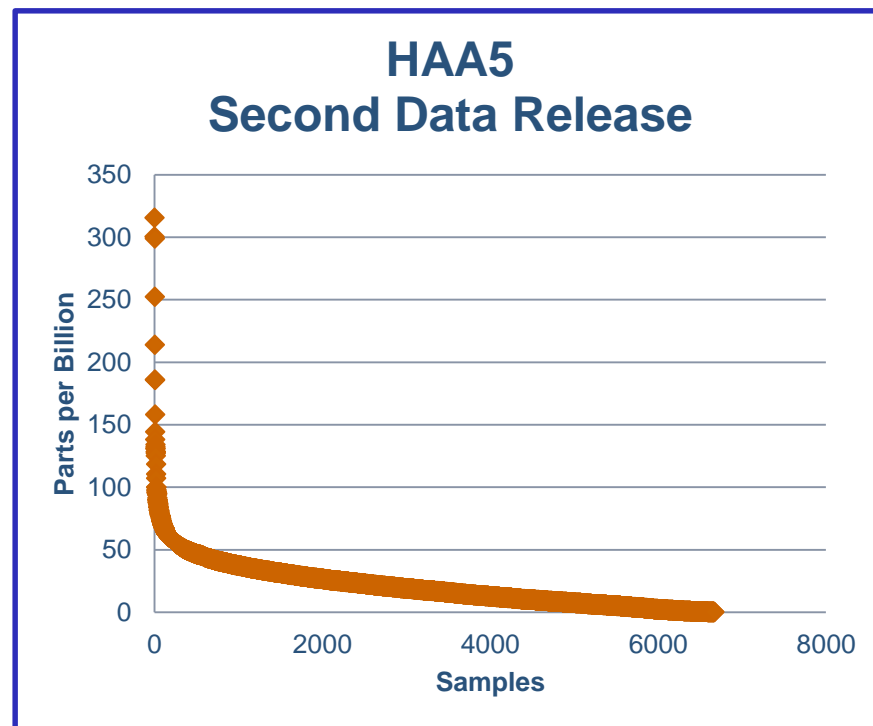


MRL = 0.2 parts per billion (ppb)

Higher than 60 ppb MCL\*:

- 178 samples (2.6%)
- 79 PWS (7.4%)

Highest result = more than 300 ppb



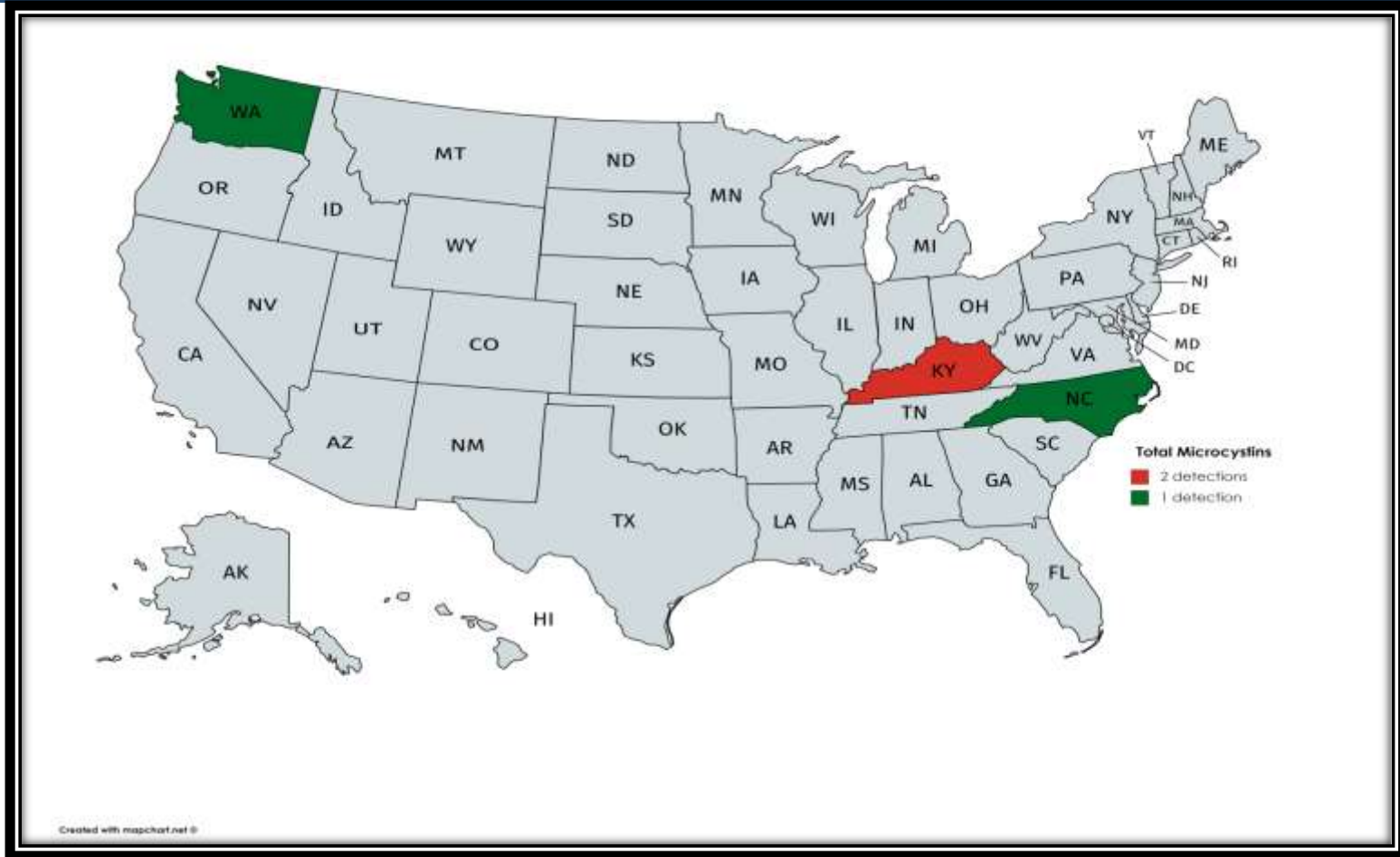
\*Results are not reflective of compliance with DBPR

# Non-Regulated HAA detections



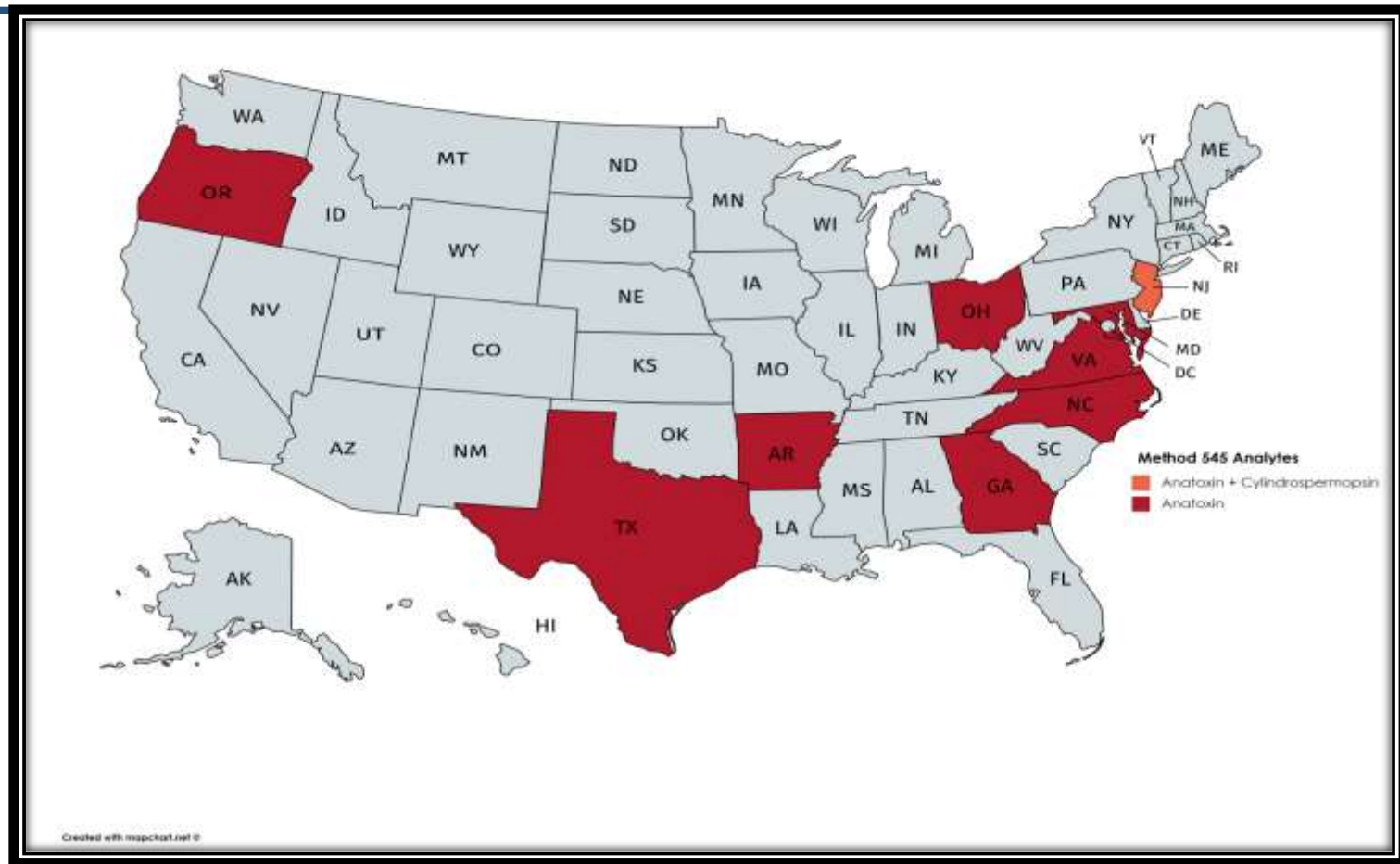
- **HAA6Br**
  - Detected in 6,556 out of 6,874 samples (~95%)
  - 97% PWS with at least one above MRL
- **HAA9**
  - Detected in 6,659 out of 6,845 samples (~97%)
  - 98% PWS with at least one above MRL

# Total Microcystins, method 546, occurrence



**Individual microcystins by 544: 0 hits above Reference Concentration**  
– means total is not confirmed

# Method 545 Analytes – Algal Toxins

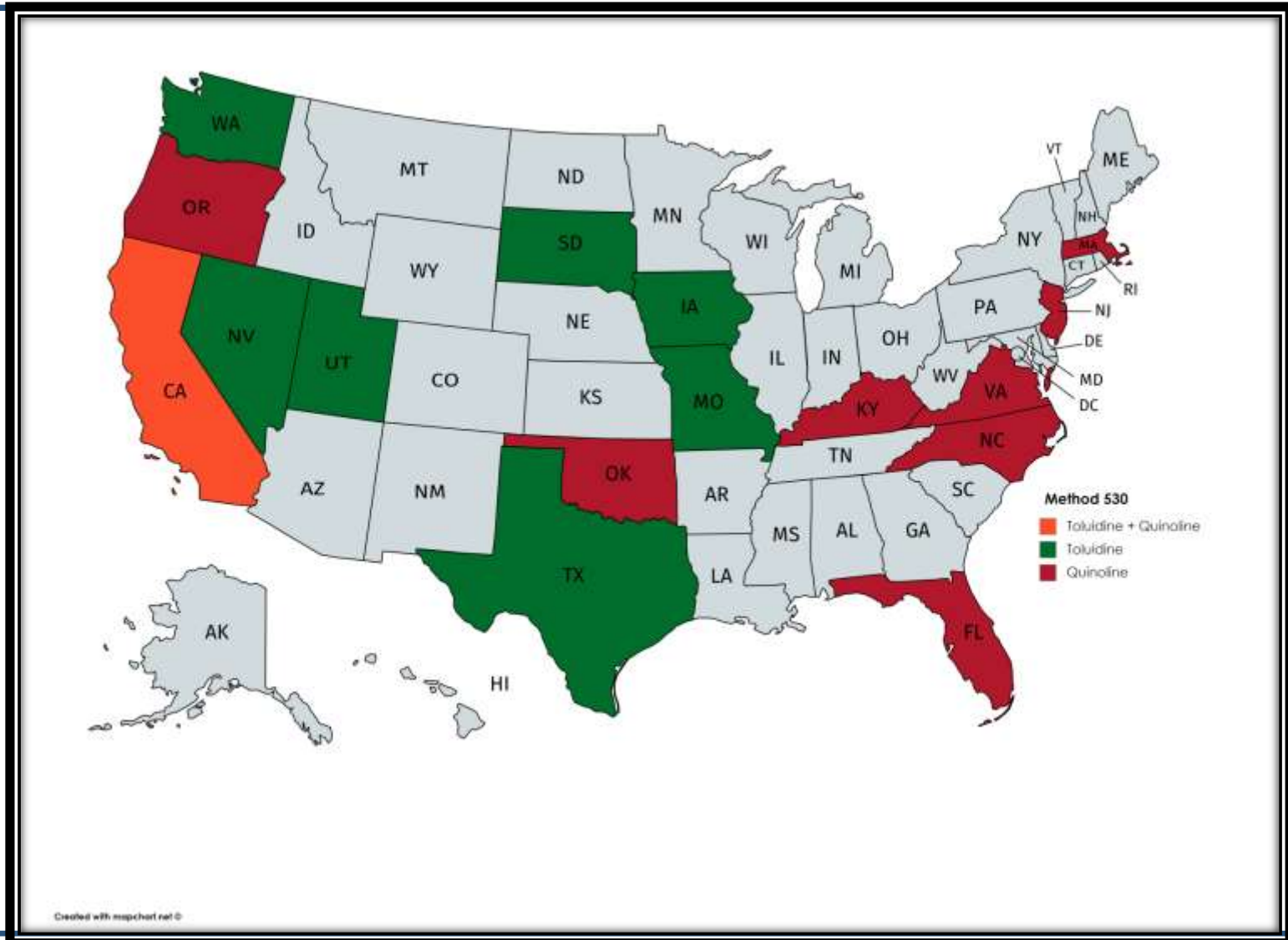


14 of 846 PWS (1.6%) above MRL for anatoxin-a

1 of 846 PWS (0.1 %) above MRL for cylindrospermopsin



# Method 530 Analytes



# Method 530 Detections by Analyte – O-Toluidine



- **O-Toluidine**
  - **MRL = 0.007 parts per billion (ppb)**
  - **14 of 4,030 (0.3%) samples with detects**
  - **10 of 1,043 (0.1%) PWS with detects**

# Method 530 Detections by Analyte – Quinoline



- **Quinoline**
  - **MRL = 0.02 parts per billion (ppb)**
  - **Note:**
    - **$10^{-6}$  cancer risk is 0.01 ppb (this is less than the MRL)**
    - **$10^{-4}$  cancer risk is 1 ppb**
  - **38 of 4,041 (0.9%) samples and 2.4% of PWS exceed the 0.01 ppb Reference Concentration**
  - **1 of 4,041 (0.02%) samples and 0.1% of PWS exceed the 1 ppb Reference Concentration**



- **1-butanol**
  - MRL = 2 parts per billion (ppb)
  - 33 of 4,055 (0.8%) samples with detects
  - 24 of 1,059 (2.2%) PWS with detects
  - No detects above the 700 ppb reference level
- **The other compounds no significant occurrence**
  - 2-methoxyethanol
  - 2-propen-1-ol

# Pesticides by Analyte – 525.3: Permethrins and Ethoprop

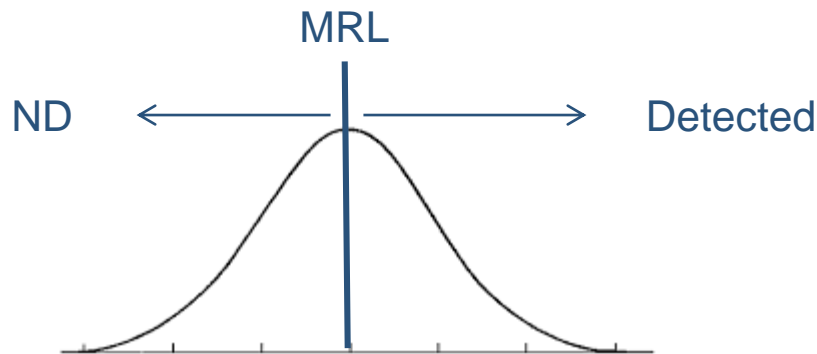


- Total Permethrins → 5 detections out of 4,093 samples (0.12%)
- Tribufos → 2 detections out of 3,982 samples (0.05%)
- Oxyfluorfen and tebuconazole each detected in 0.02% of samples

No pesticides or ethoprop detected above their reference levels



- **Some analytes the MRL  $\geq$  the Reference Limit**
  - **MRL = Minimum Reporting Limit**
  - **Expect 50 – 150 % recovery at MRL**



50% of samples at MRL will be detected

50% of samples will not be detected

# Total Cyanotoxins, the MRL and potential interferences



- **The MRL for Method 546, Total Cyanotoxins is 0.3 µg/L**
  - **Detections near MRL could be statistical error**
- **Method lists “unknown interferences” resulting in false positives**
  - **Possible 15 % high bias, or more, depending on matrix**



- **The MRL for Quinoline is 0.02 µg/L**
  - **Detections near MRL could be statistical error**
  - **For example → a 0.02 µg/L MRL acceptance is 0.01 – 0.03 µg/L**
  - **Any detect exceeds the 10<sup>-6</sup> reference concentration of 0.01 µg/L**





- **UCMR methods are limited validations specifically for UCMR**
  - Limited matrices
  - Not as “rugged” as regular SDWA method
  - Many samples “fail” preservation checks
    - Preservation reagents may not be correct
    - Specified ranges (pH) may be too narrow
    - Rapid checks may be insufficient

# Any Questions?



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