Shifting the Paradigm of Environmental Monitoring to Fully Protect the Next Generation

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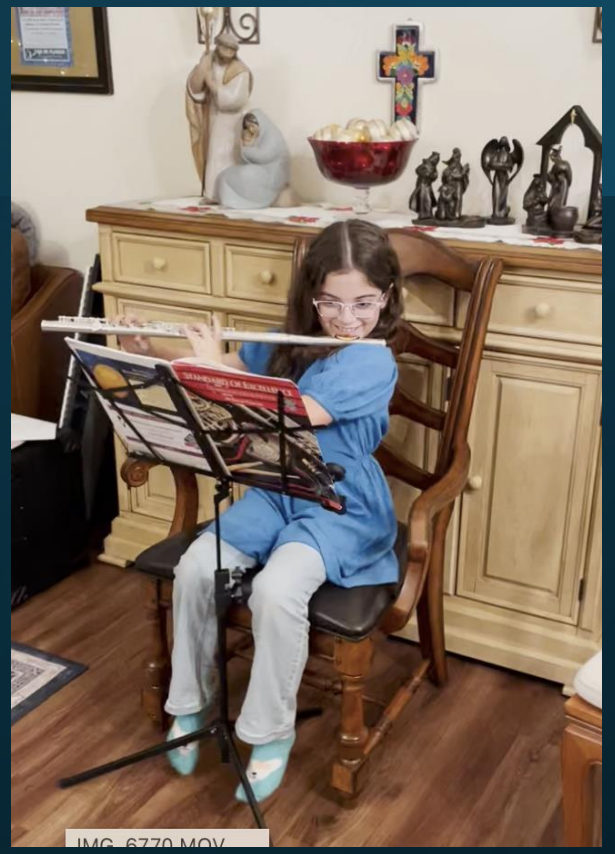
Who is the next generation?

Do you hope they have it better than you?

NEMC - Chicago 2016

Next Generation to Me



Human Health Hits Close to Home

MY CHILD HAS LEAD IN HER BLOOD

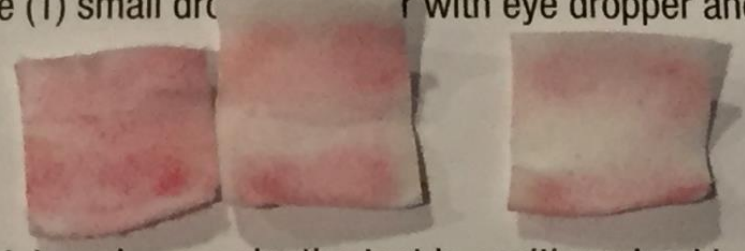
NO PROCESS IN OUR HOME WAS TARGETING LEAD

A REACTIVE PROCESS — NOT PROACTIVE

Source Found

Pb

1. Add two (2) teaspoons of white wine vinegar in item to be tested. Let item sit overnig
2. The following morning, remove one (1) small dro r with eye dropper and p test pad. Wait two (2) minutes.
3. Proceed to Test Results.



TEST RESULTS

- If the test pad or test surface turn pink, red or purple, the test is positive - lead is pre Many factors can affect the intensity of the lead test pad color development. Howeve the developed color, the higher the lead content of the surface being tested.
- If there is no color change, the test is negative and no leachable lead has been dete
- Once a test pad has been moistened, all testing must be completed within two (2) n
- Test pads are not reusable.

PRECAUTIONS - PLEASE READ CAREFULLY

1. Keep all ***PRO-LAB®*** test kit items and any lead-containing items out of the reach of chi
2. If you wish to test the same item twice, WASH the item with ordinary all-purpose before retesting.

Conference Theme

“Building a Quality Culture as the Foundation for Reliable Data”

Core Values Drive What We Do

Doing the Right Thing

Finding Better Ways

Owning It

Values Require Modeling

Like teaching kids values

Quality culture must be modeled — top down and across levels

Challenge to Our Community

Are we truly doing the right thing in monitoring?

Or simply what's required?

Are We Fully Protecting Human Health?

Regulation ≠ Full protection

Requiring Accreditation ≠ Full protection

What about the whole exposome?

Incompatible Attitude With Core Values

"We only care about what's regulated"

This mindset ≠ protection

Today's emerging = tomorrow's regulated

Am I Alone?

“I contend that NTA has now reached the proper maturity for general adoption as a front-line analytical technique rather than as an add-on method. It is mature enough to be a standard technique in any assessment of waste streams, biota samples, and environmental media”

- Mark Strynar, USEPA ORD

We Are Not Fully Protecting

History: We've missed what we don't look for

Entire class of contaminants have slipped through

PFAS - Example of a Missed Class

TOO POLAR FOR ANALYTICAL TECHNIQUES

MISSED FOR DECADES — HIDING IN PLAIN SIGHT

REQUIRES NEW APPROACH

The Conundrum

“Targeted Methods Alone are Insufficient to Fully Protect Human Health and the Environment”

Why/How Did We Really Miss Them?

We tolerate emerging contaminants

Monitoring paradigm = “targeted chemicals”

Targeted methods DO protect human health/environment

The Regulatory Gap

UCMR: 30 analytes every 5 years in drinking water

Toxic Substances Control Act (TSCA)

Accreditation: Specific methods, matrices, targets

Valid ≠ Sufficient

Core Values

We Must Find a Better Way

We Must Do The Right Thing

We Must “Own It”

NTA Defined


THE ACTIVE PURSUIT OF DISCOVERING CHEMICALS
YOU ARE NEVER 'DONE'

The framework by which a defined chemical space is investigated within a sample without a priori knowledge for the primary purpose of chemical discovery

1

Framework

2

Chemical Space

3

Little Knowledge

4

Chemical Discovery

Typical Application

Semivolatile Organics

Highly Polar Chemicals

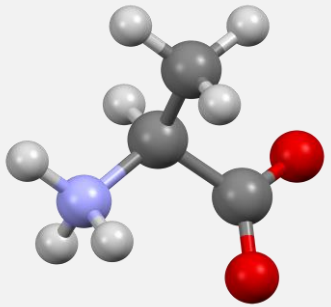
Non-targeted screening in Europe

Two Main Modes

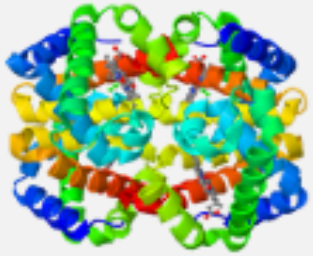
Contaminant Discovery
(forensics, source)

Geospatial / Treatment
Relationships

NTA Across Disciplines



METABOLOMICS



PROTEOMICS

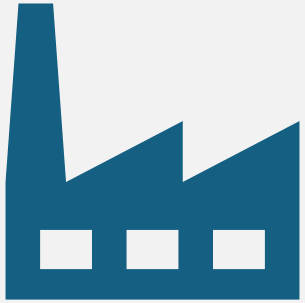
GENOMICS

EXPOSOMICS

Who Is Doing Environmental NTA

EPA

ACADEMIA



COMMERCIAL LABS

Our Role in NTA

COMMERCIAL LABS SCALABILITY

WE MUST OWN IT

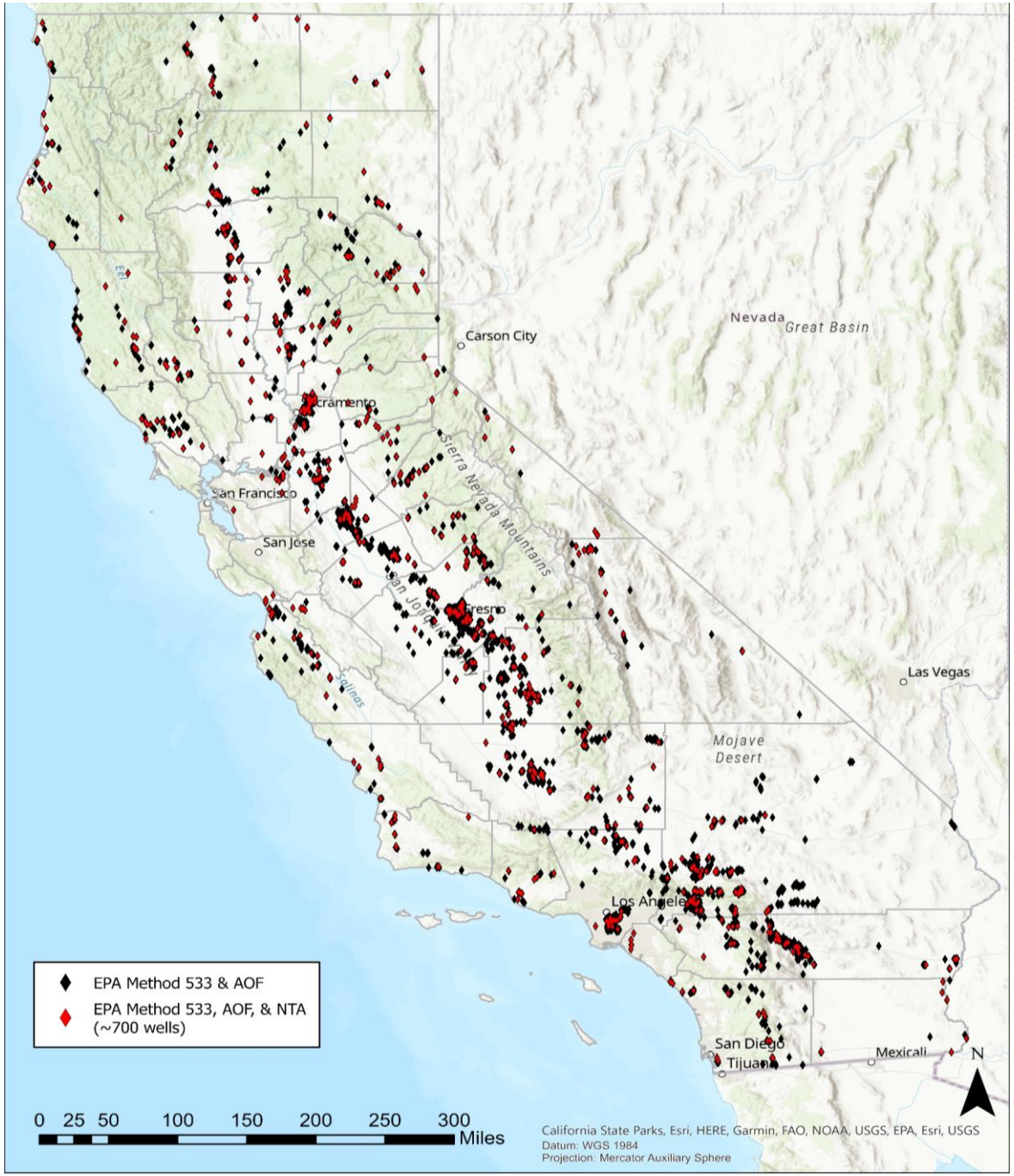
Project Overview
ORDER DW 2024-0002-DDW

State of CA + EPA ORD

Began April 2024

Drinking water → small, disadvantaged systems

Geographical Distribution



Project Methods

EPA 533

In-house ultrashort PFAS + PF6

AOF-DW analysis – LCMRL of 0.8ug/L

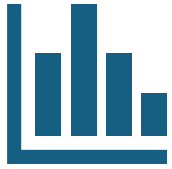
Fully generalized NTA

Cyclic Nature of NTA Data

Quality Metrics for NTA

Batch Controls
(BLK, BS, MS)

Instrument
Performance
(ppm mass error)

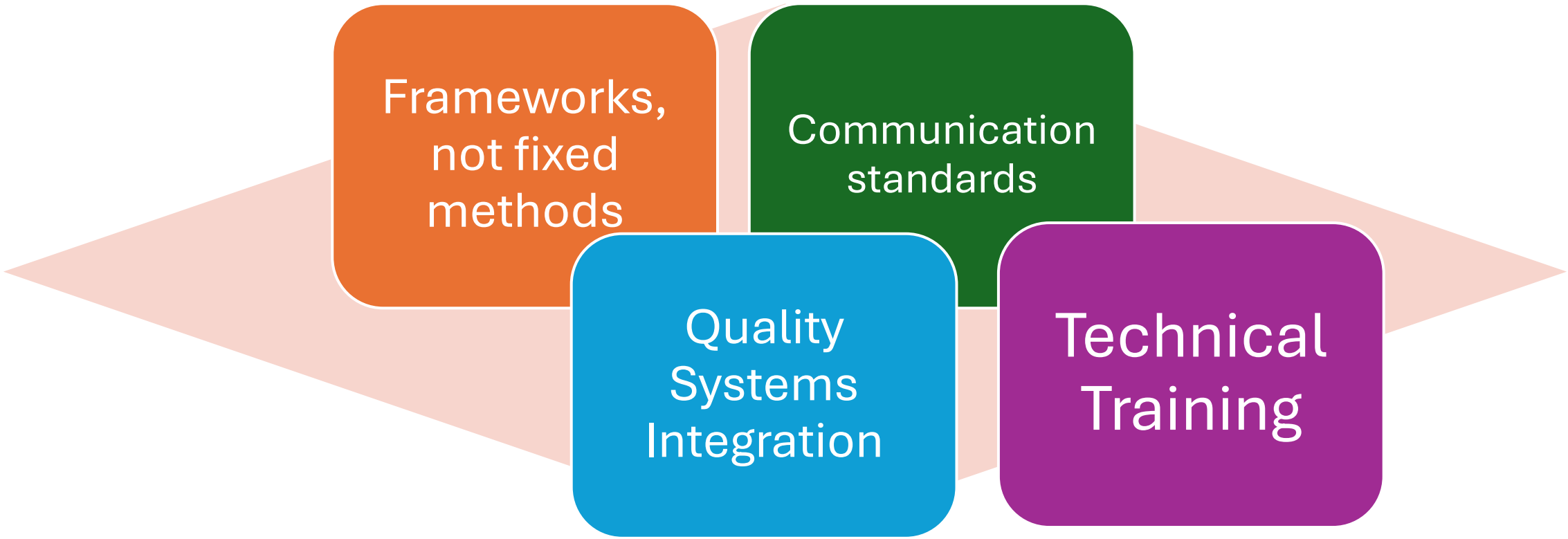


Intra-batch
Statistics
(reps)

ID Confidence
Levels
(Schymanski)

Qualified Data

What We Still Need



Opportunity Within Community

“to foster the generation of environmental data of known and documented quality ”

Open, inclusive, transparent

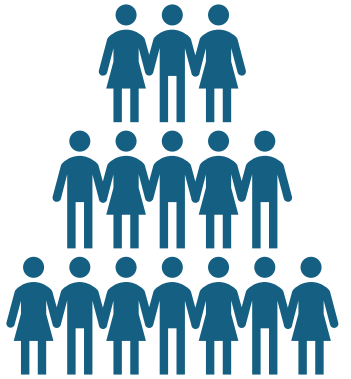
What Can You Do?

Don’t avoid NTA

Engage, contribute, improve

Final thoughts

NTA is essential for full protection



Everyone has a role (QA, Tech, Research)

Final Thoughts

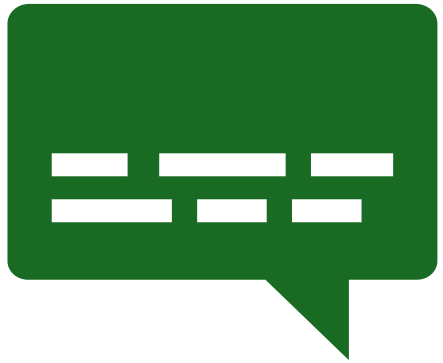
IN 2025, THE PUBLIC EXPECTS PROACTIVE

“I ONLY CARED ABOUT WHAT WAS REGULATED” DOESN’T CUT IT

LET’S PROTECT THE NEXT GENERATION — FULLY

Final Thoughts

Thank you!



Questions? Comments?
Criticisms?

References

- Ferland, T. M.; Whitehead, H. D.; Buckley, T. J.; Chao, A.; Minucci, J. M.; Carr, E. T.; Janesch, G.; Rizwan, S.; Charest, N.; Williams, A. J.; McCord, J. P.; Sobus, J. R. Examining the Effects of Analytical Replication on Data Quality in a Non-Targeted Analysis Experiment. Anal Bioanal Chem 2025. https://doi.org/10.1007/s00216-025-05940-x.
- Strynar, M. J. A Paradigm Shift in Environmental Monitoring – The Time for Non-Targeted Analysis (NTA) Is Now. Environment International 2025, 197, 109332. https://doi.org/10.1016/j.envint.2025.109332.
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