Iowa DNR PFAS Action Plan – Surveillance and Results

Matthew Graesch, P.G. and Claire Hruby, Ph.D.

DNR Action PFAS Plan

- Goal: Identify and Minimize Exposure of Iowans to PFAS in Public Drinking Water

Initial Actions Taken

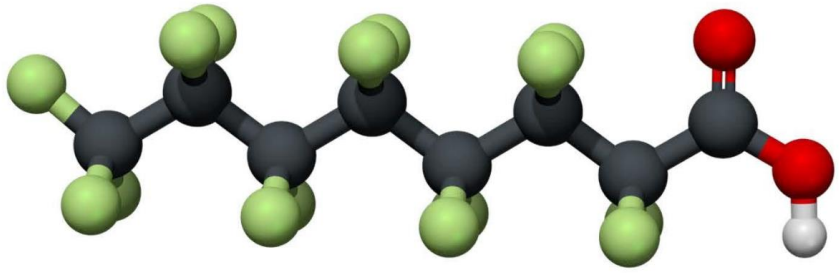
- Develop a surveillance project to evaluate the presence or absence of PFAS in Iowa drinking water

IOWA DEPARTMENT OF NATURAL RESOURCES

LEADING IOWANS IN CARING FOR OUR NATURAL RESOURCES

KAYLA LYON, DIRECTOR

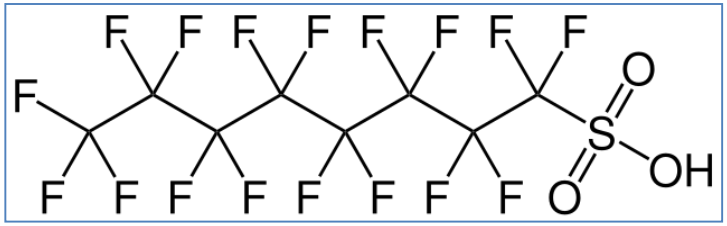
PFAS Action Plan



An example of a family of Perfluoroalkyl Substances: Perfluorooctanoic acid

January 23, 2020

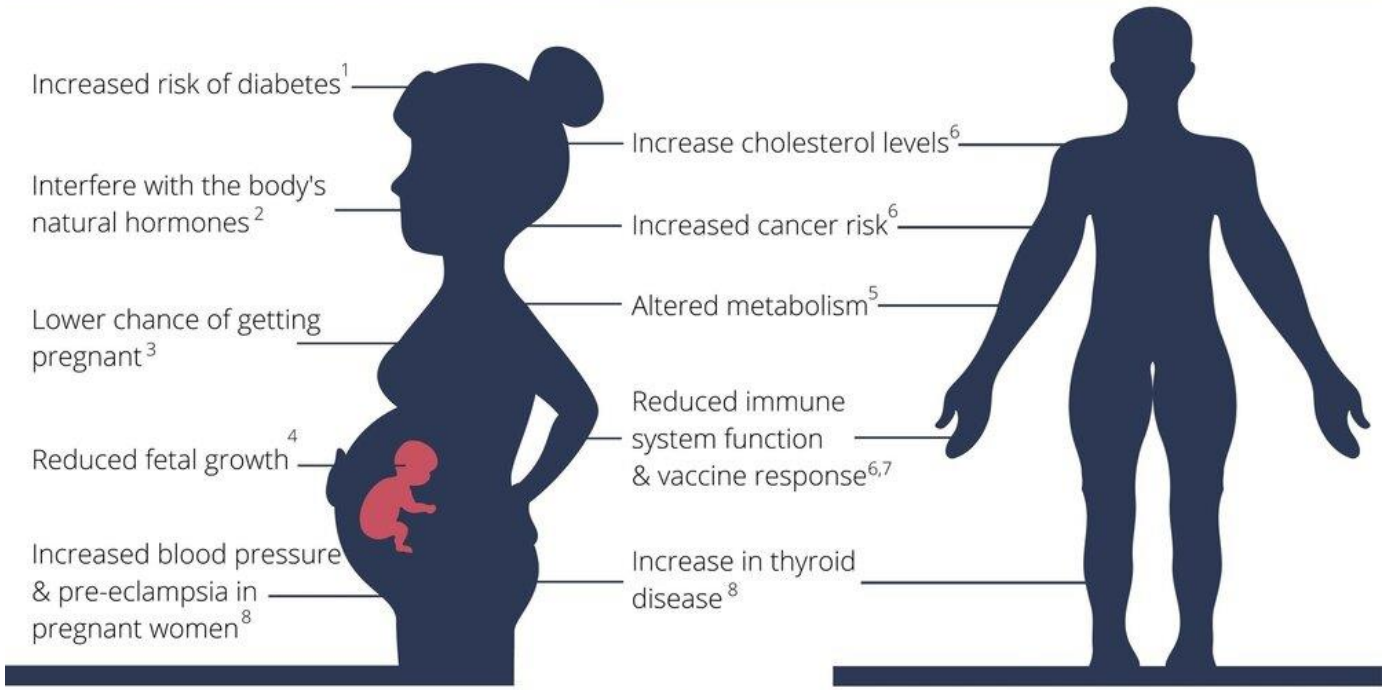
PFAS: Background



Per and poly-fluoro alkyl substances (PFAS)

- More than 12,000 compounds
- Persistent in environment
  - Do not degrade
  - C-F bond is one of the strongest known
  - Accumulates in the environment and in organisms
- Mobile - atmosphere, surface water, soil, etc.
- Exposure is considered a health risk
  - Known or suspected toxicity, especially for PFOS and PFOA
  - Very long half-lives (several years) in humans

HOW DO PFAS AFFECT YOUR HEALTH?



While the knowledge of potential PFAS health effects has grown, many questions remain unanswered. Continued research is needed to better understand the effects of PFAS exposure.[2]

Figure and citations from https://www.wehnonline.org/pfas

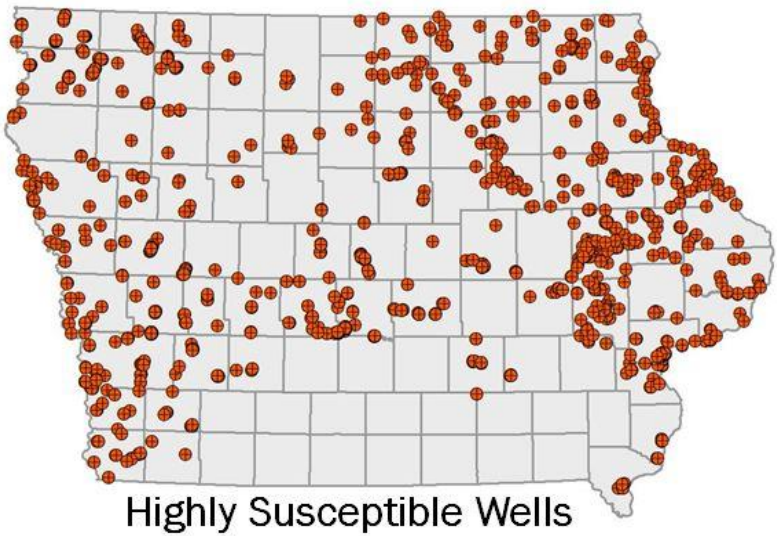
PFAS: Health Advisories for Drinking Water

- Until June 2022, EPA health advisory was 70 ppt for PFOA+PFOS
- Current EPA health advisories:
  - Interim Health Advisory for PFOA = 0.004 parts per trillion (ppt)
  - Interim Health Advisory for PFOS = 0.02 ppt
  - Final Health Advisory for GenX chemicals = 10 ppt
  - Final Health Advisory for PFBS = 2,000 ppt
- Proposed EPA PFAS Rule by end of 2022
- Final Rule planned for late 2023

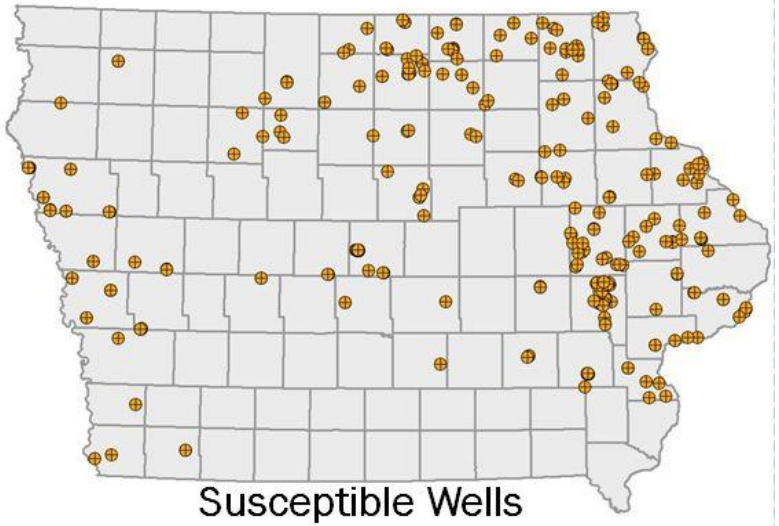
Iowa DNR PFAS Study Design and Justification

- Raw water samples to assess patterns related to source susceptibility and to inform supplies about where PFAS are entering their systems
- Treated water to assess what is actually going to drinking water users and to prepare for anticipated federal standards
- Unique: Our study is unlike those from most other states. We have collected matching sample pairs of raw water and finished drinking water from each location
- All surface water supplies– susceptibility to potential sources across watersheds and atmosphere
- Groundwater – focus on higher vulnerability aquifers in close proximity to potential PFAS sources
- Targeted and iterative approach – biggest bang for the buck, learning as we go and when warranted, returning to some locations to gather more data or help communities in need.

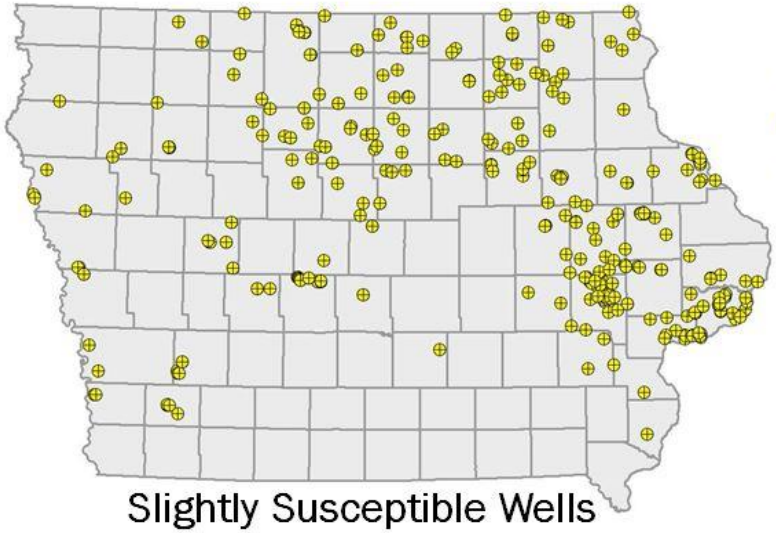
Over 7000 public water supply wells in Iowa



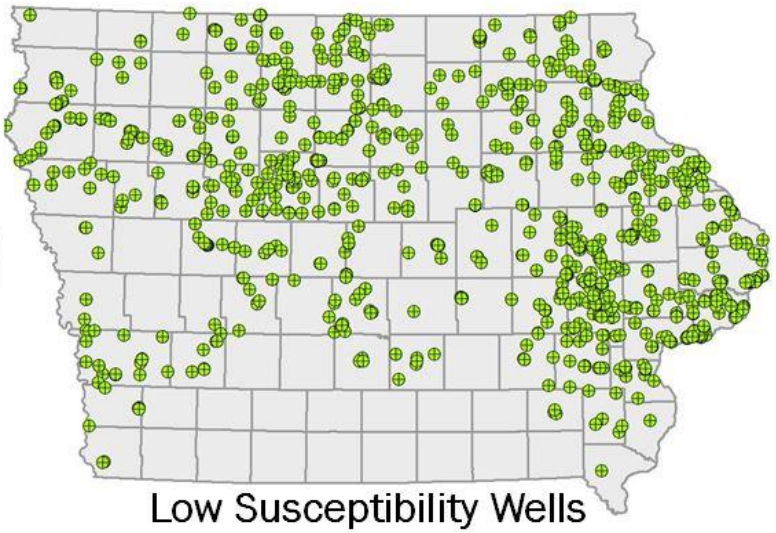
Highly Susceptible Wells



Susceptible Wells



Slightly Susceptible Wells

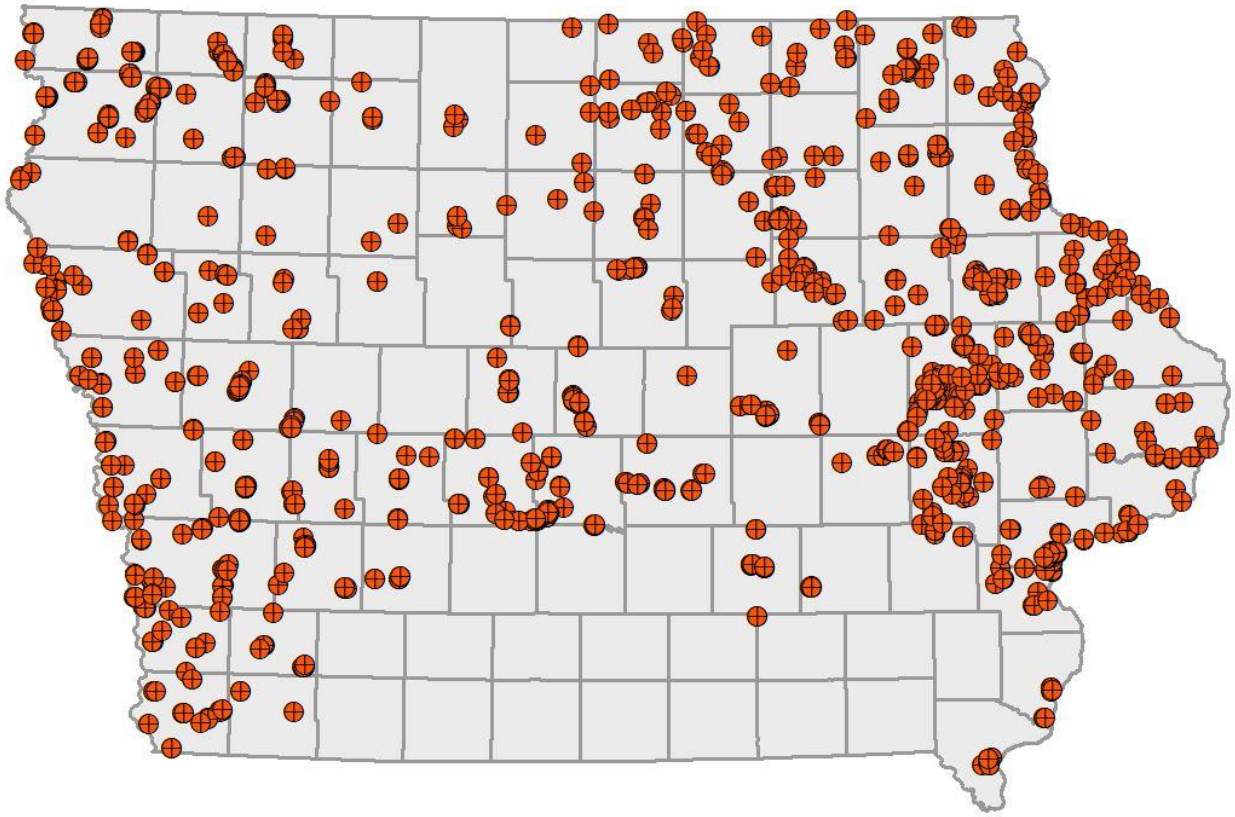


Low Susceptibility Wells

Well Prioritization

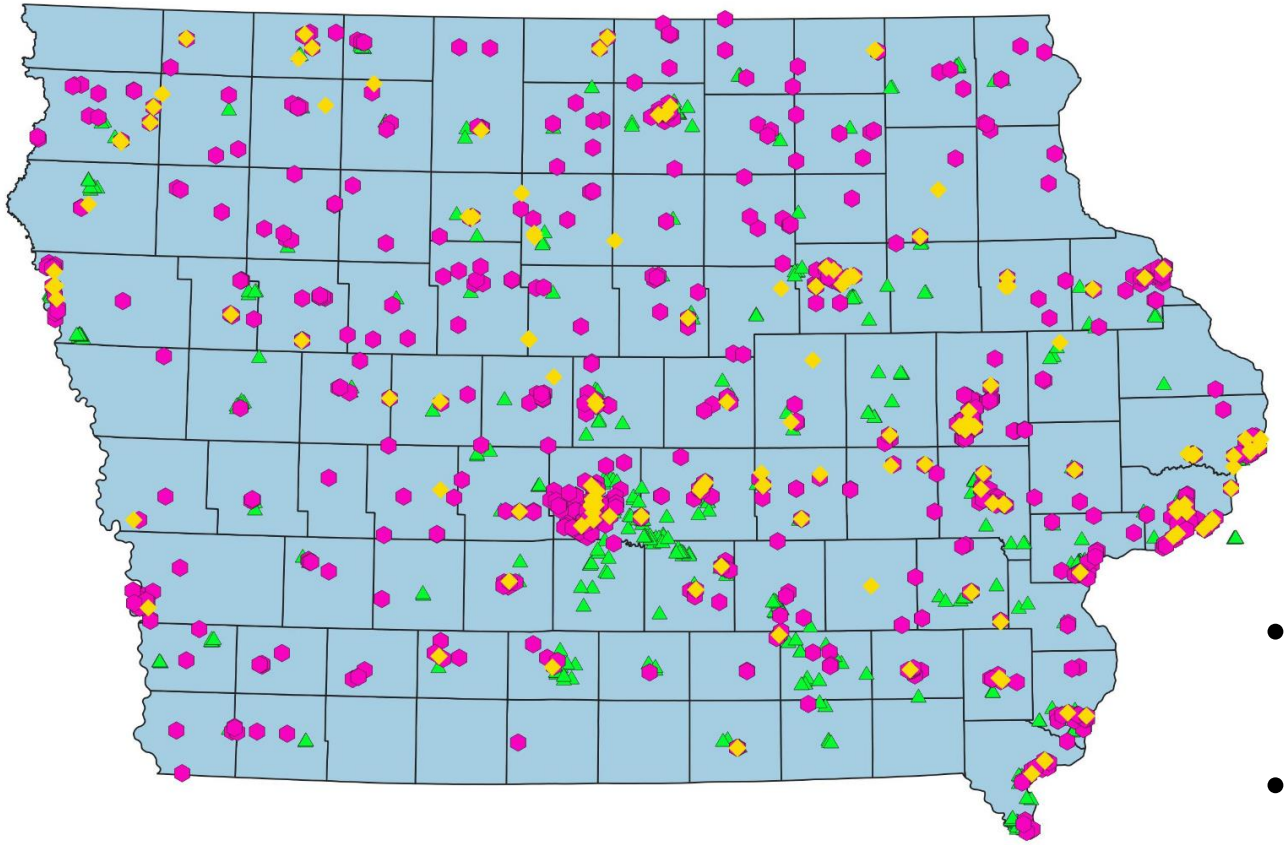
Sampling efforts concentrated on "highly susceptible" public wells

- Alluvial
- Buried sand/gravel
- Shallow
- No confining layer
- Karst
- Under the influence of surface water



Active Highly Susceptible Public Wells in Iowa

Potential PFAS Sources



- Data from EPA ECHO and from EPCRA revealed ~1,000 potential unique locations where PFAS chemicals may be stored and/or used.
- DNR Biolsolids app sites
- Represent current or recent use only.

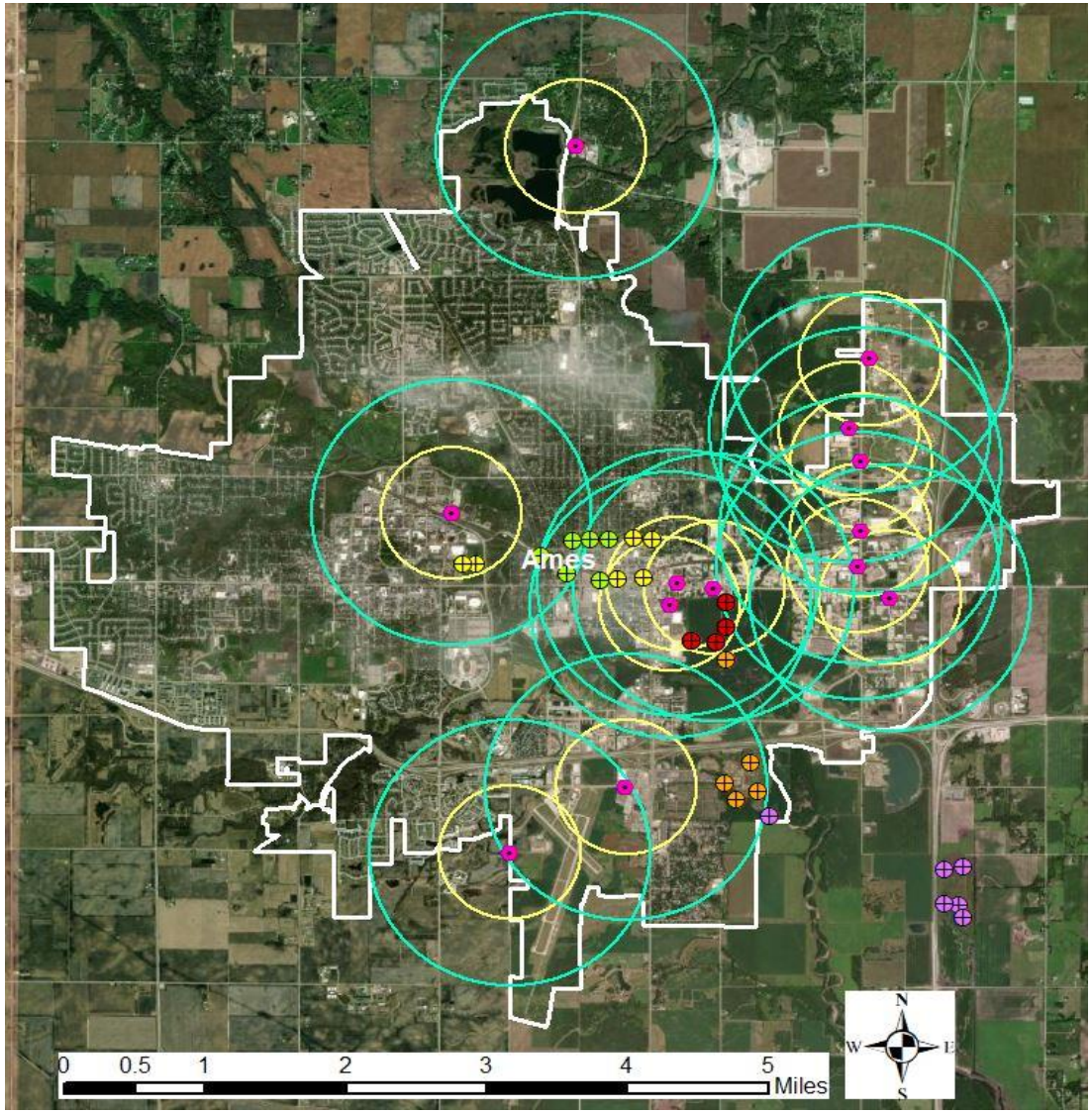
Scoring Public Wells to Maximize Efficiency

Confining bed thickness	Aquifer vulnerability risk	Susceptibility designation
None (surface intake)	4	Highly susceptible
<25 ft.	4	Highly susceptible
25 to 50 ft.	3	Susceptible
50 to 100 ft.	2	Slightly susceptible
>100 ft.	1	Not susceptible

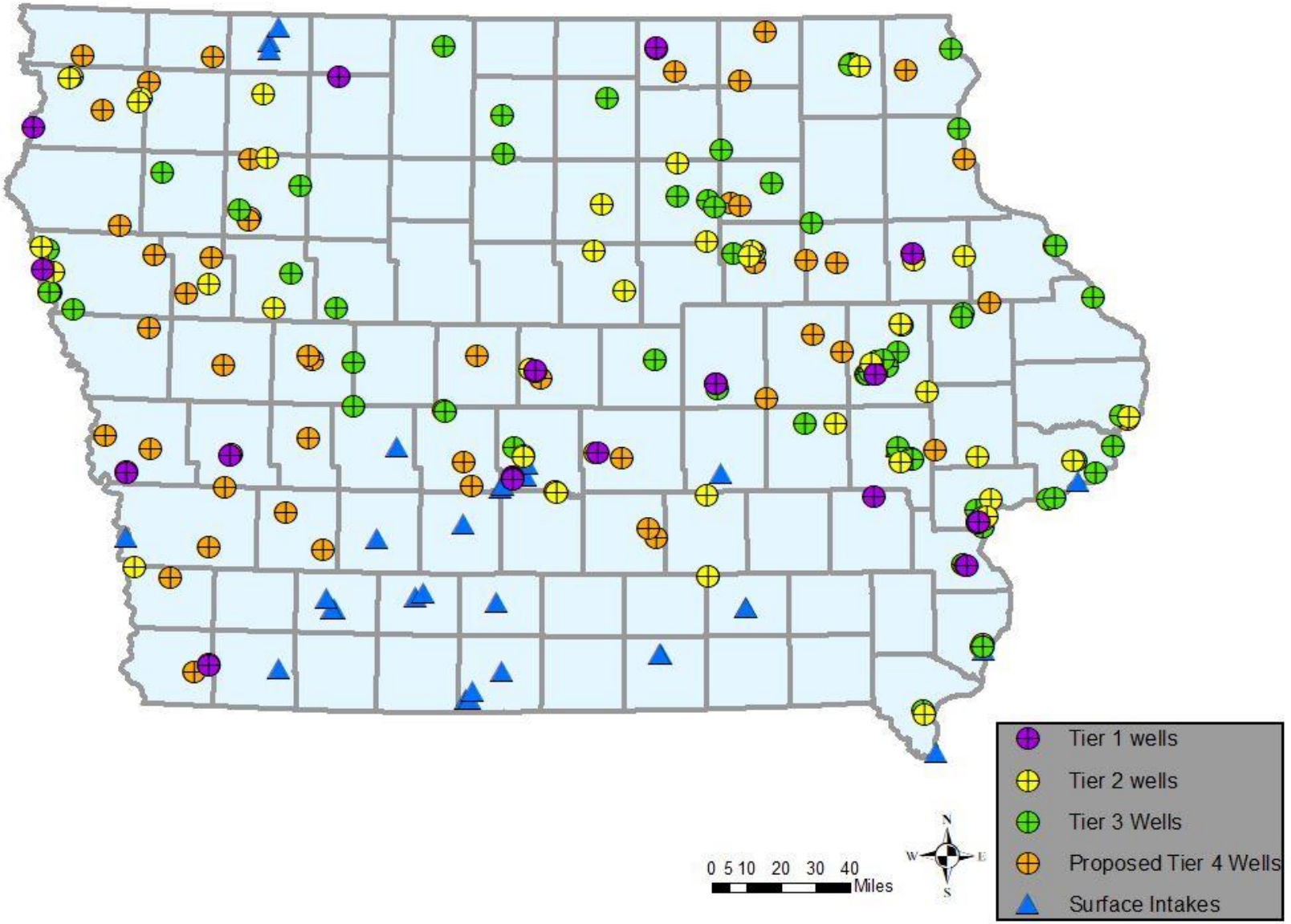
Distance from PFAS Source	Wellfield risk	Susceptibility designation
<1/2 mile	3	Highly susceptible or Susceptible
½ to 1 mile	2	Moderate susceptibility
>1 mile	1	Low susceptibility

Composite Score	Number of Active Wells
2	872
3	418
4	348
5	1076
6	131
7	105

Well Selection: Vulnerability and Proximity



Tiers 1, 2, 3, and 4 Sampling Sites




PANORA


SLOAN


RUSSELL


KEOKUK

Sampling Method

- Samples were taken from each Tier 1, 2, and 3 site of both pre-treatment and finished water
  - Representative sample within normal pumping rates
  - Pumps run for 30 minutes, taps flushed prior to collection
  - Surface water samples through sample tap or direct sample

- Standard Operating Procedure (SOP)
  - PFAS-free clothing, personal-care products, PPE, etc.
  - No food or food packaging within the sampling zone
  - Bottles provided by lab
  - Clean-hands/Dirty-hands protocol (2 sample collectors)
  - New powderless nitrile gloves for each sample
  - Labeled bottles and chain-of-custody with ultra-fine sharpies
  - Sample bottles placed in Zip-loc bags, placed on ice, and shipped

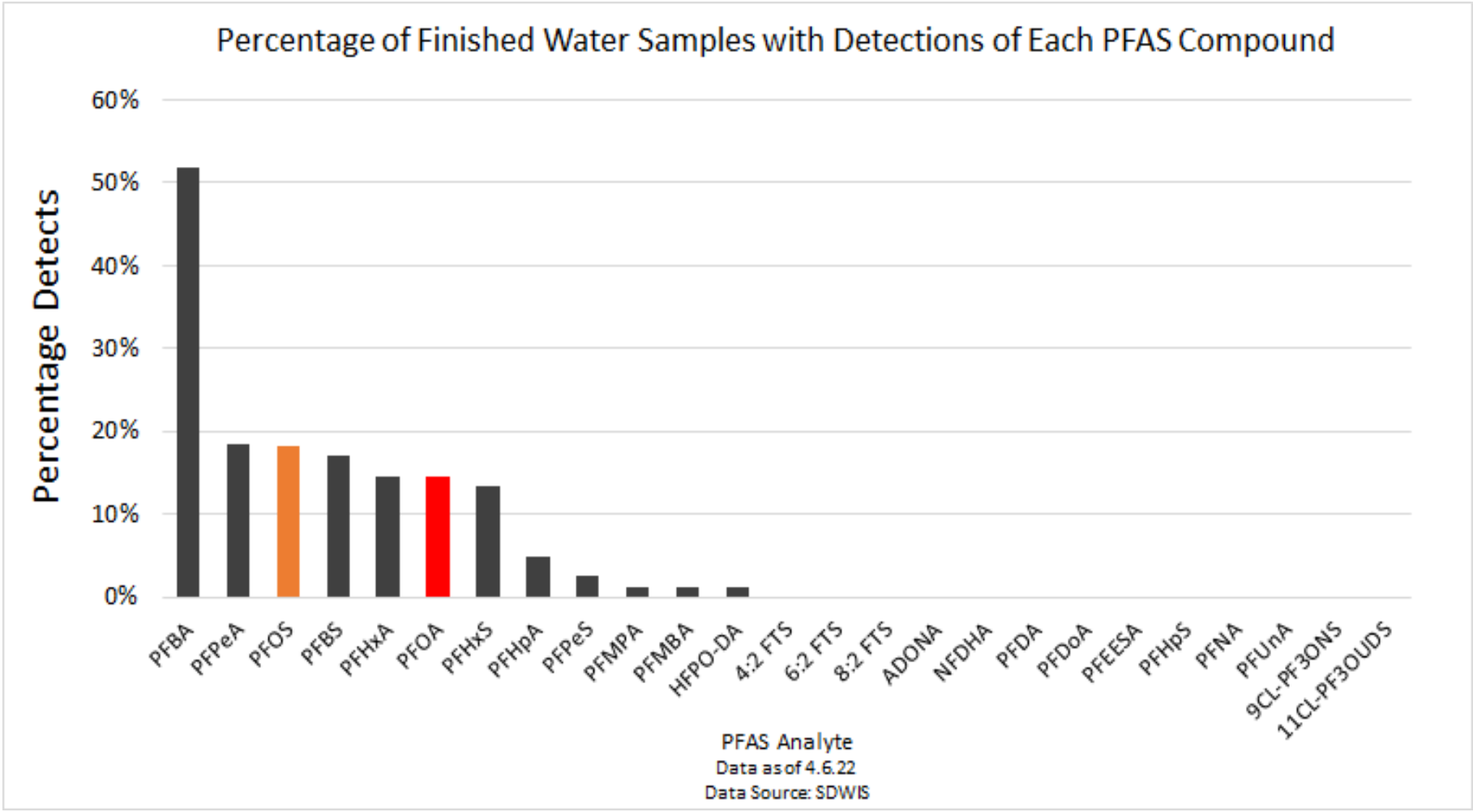

DNR


Specials of the week
(Especiales de la semana)
Lunch: Taco Salad
beef or chicken $6.00
Almuerzo: Taco Salad de $6.00
Carne o pollo
Dinner: Quesadilla
With chorizo and steak or chicken. Served with rice, lettuce, sour cream & pico de gallo.
Cena: Quesadilla $9.75
de chorizo con pollo asado o carne asada, con arroz, lechuga, crema, & pico de gallo.
$9.75

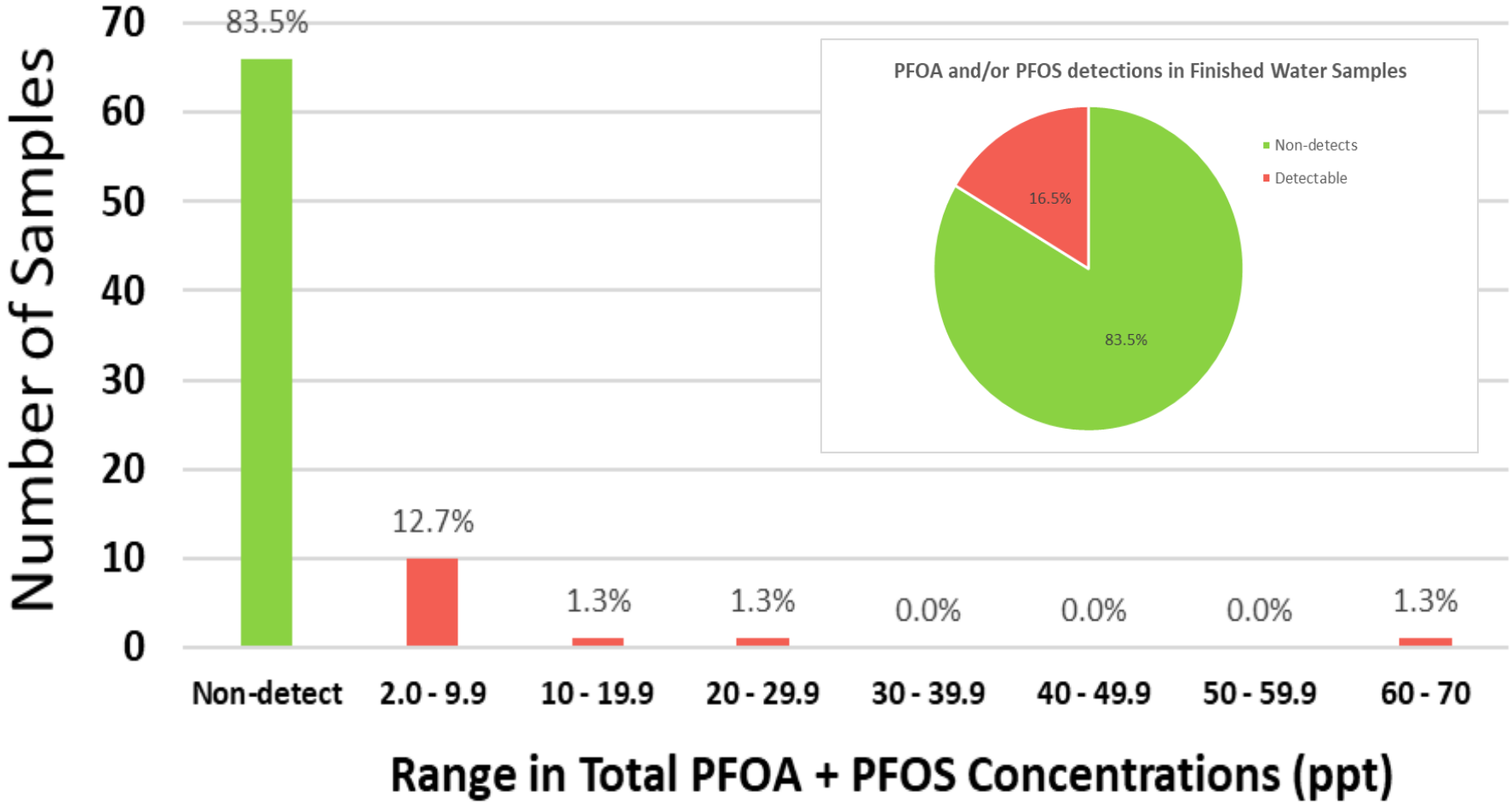
Quality Assurance

- 1 field blank per sample location
- 1 duplicate per finished water sample

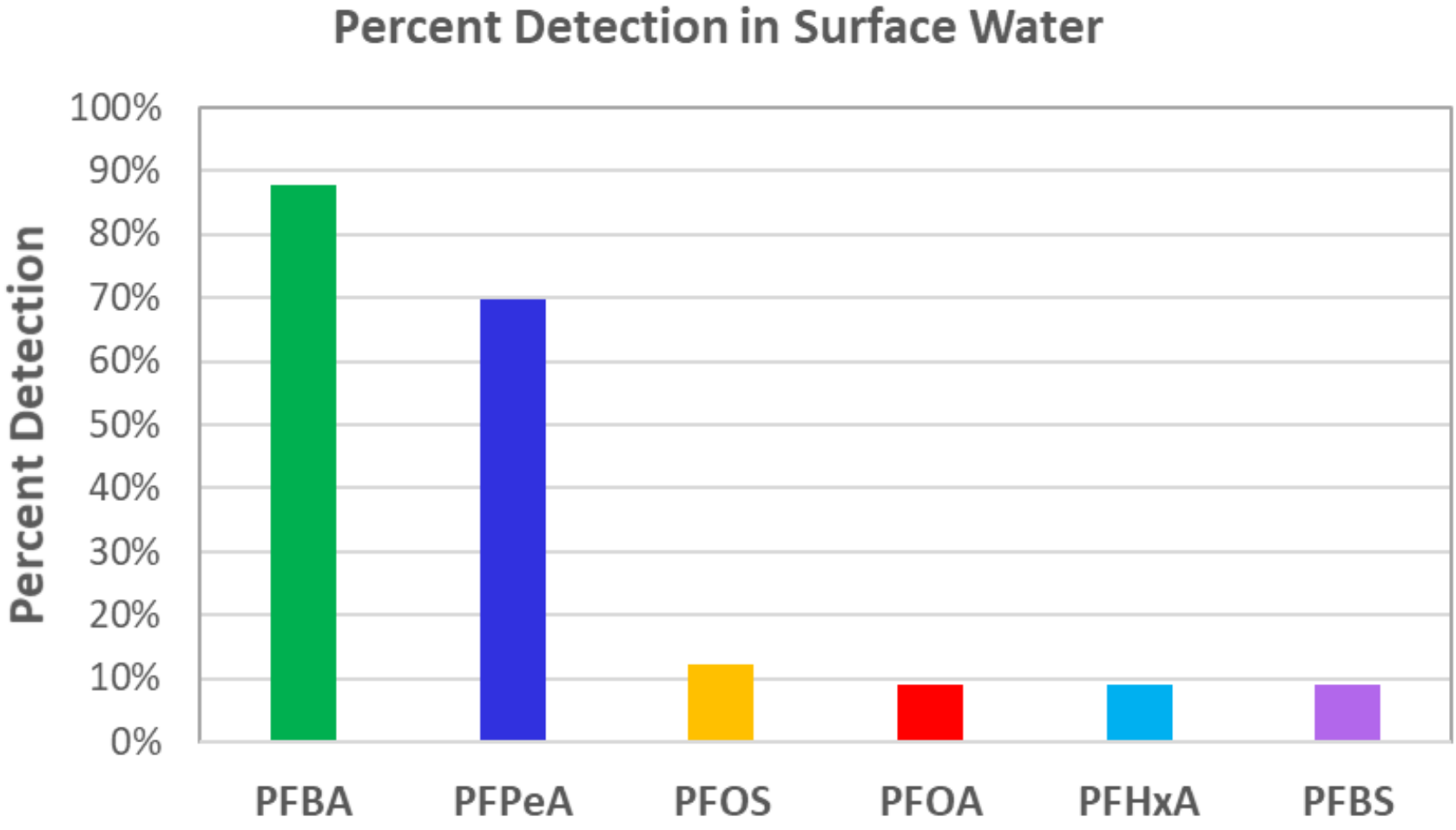
Tiers 1 and 2: PFAS Detections in Finished Water



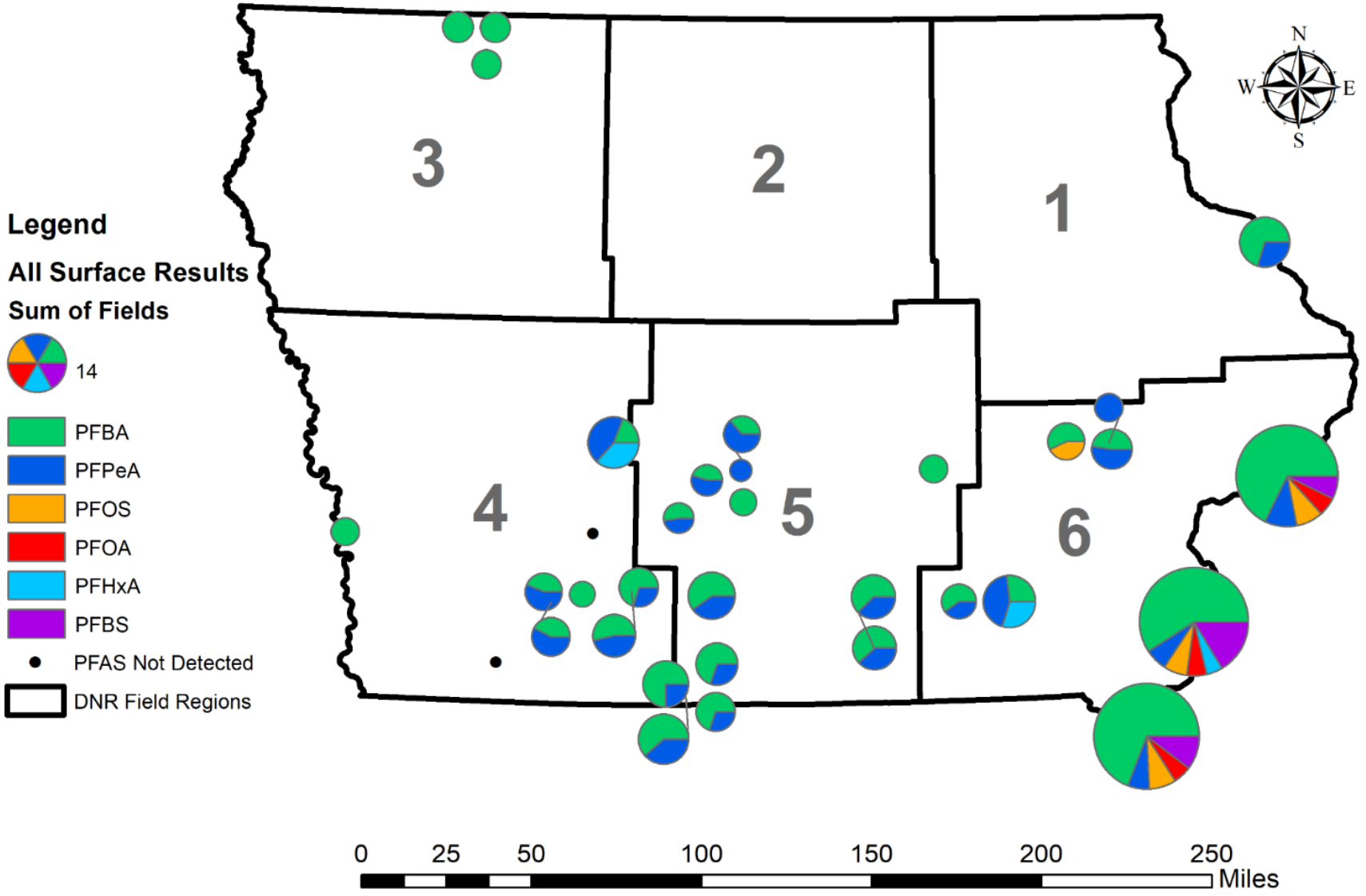
Tiers 1 and 2: Concentrations of PFOA+PFOS in Finished Water



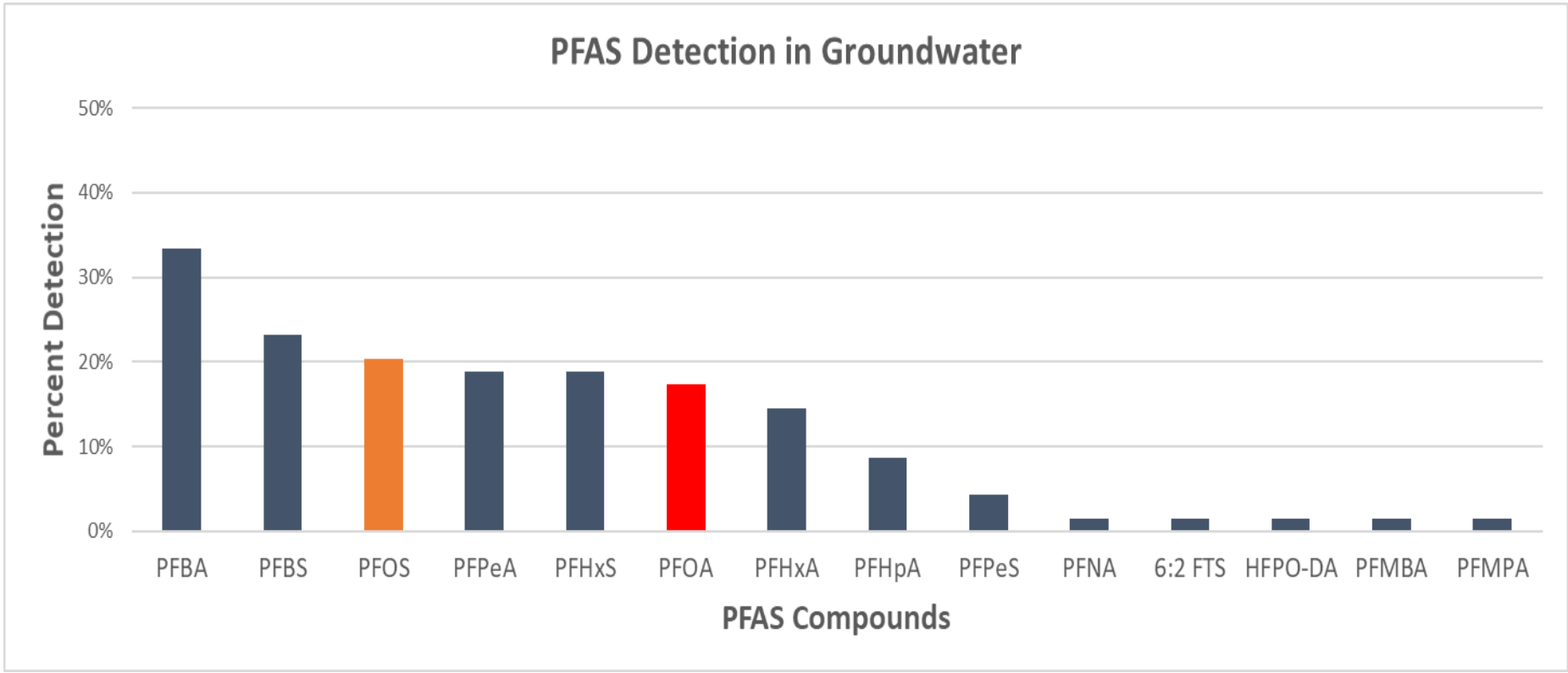
Raw Surface Water PFAS Detections



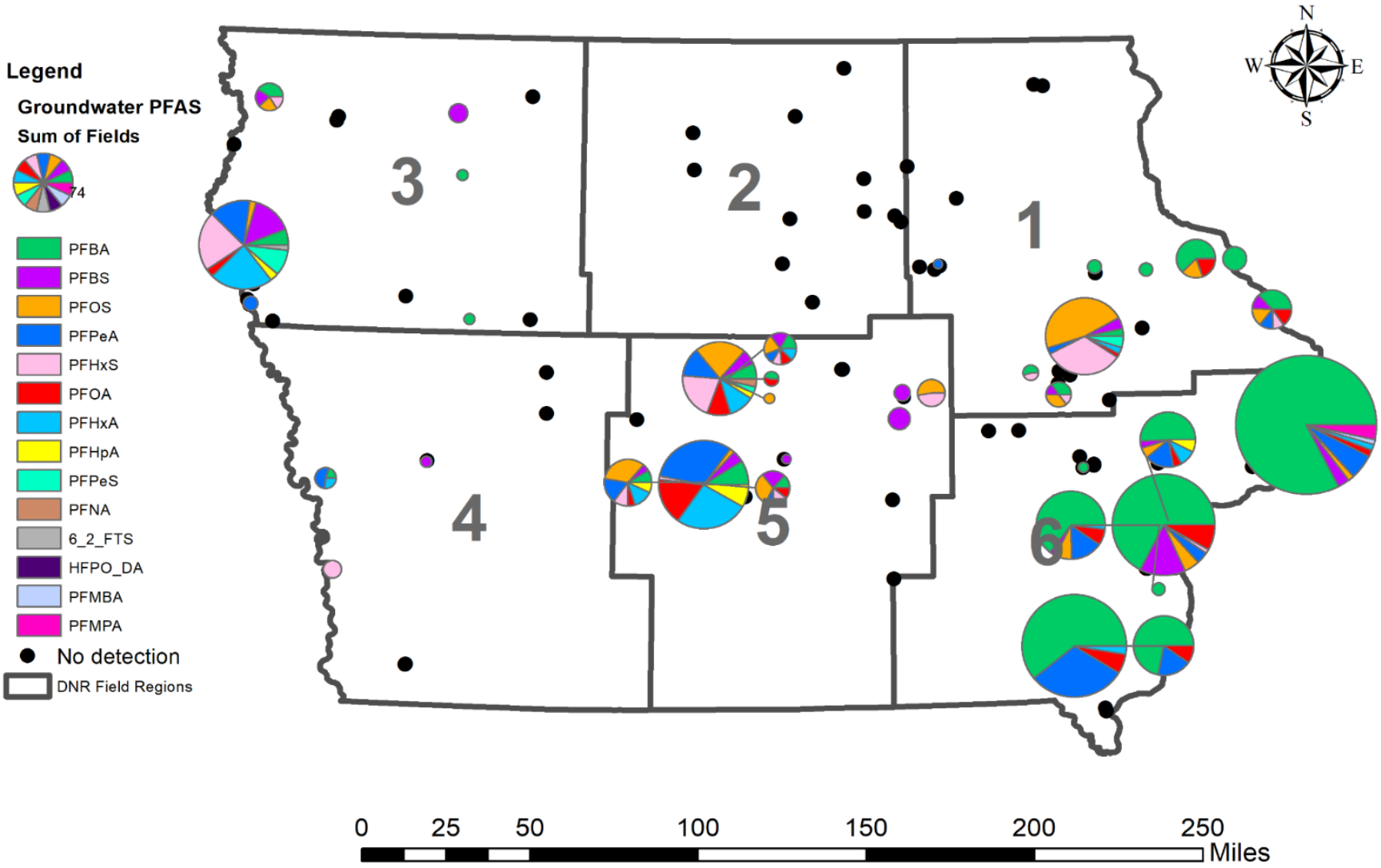
PFAS in Surface Waters (untreated river and lake water)



Raw Groundwater PFAS Detections



Raw Groundwater PFAS Detections

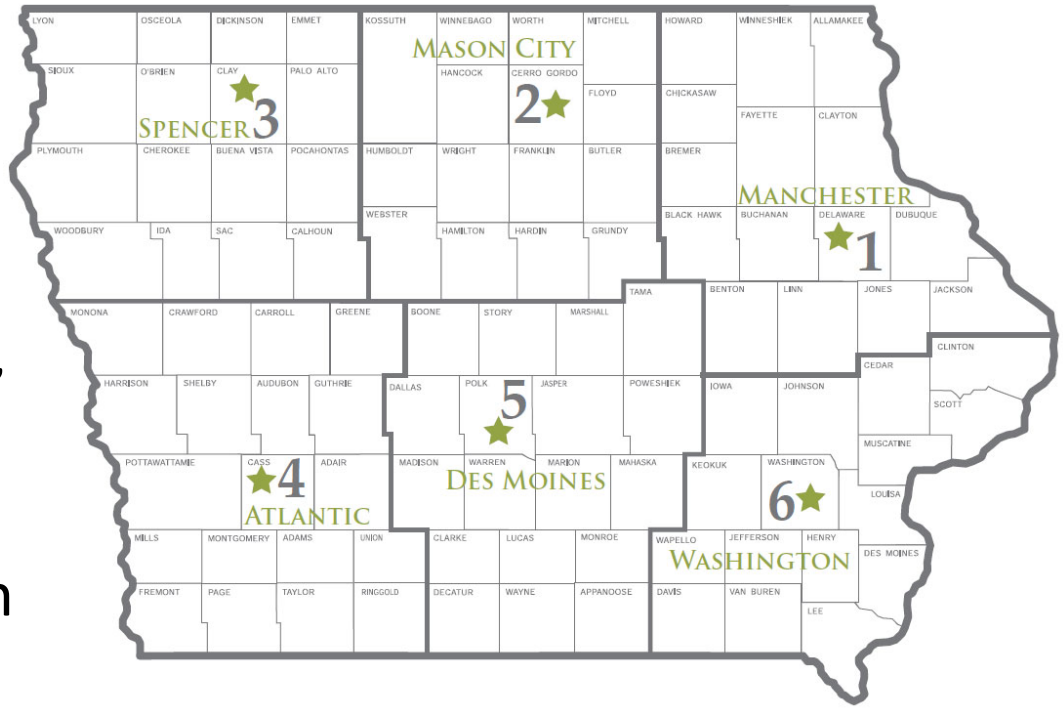


Take-Home Messages Thus Far (~600 sample results)

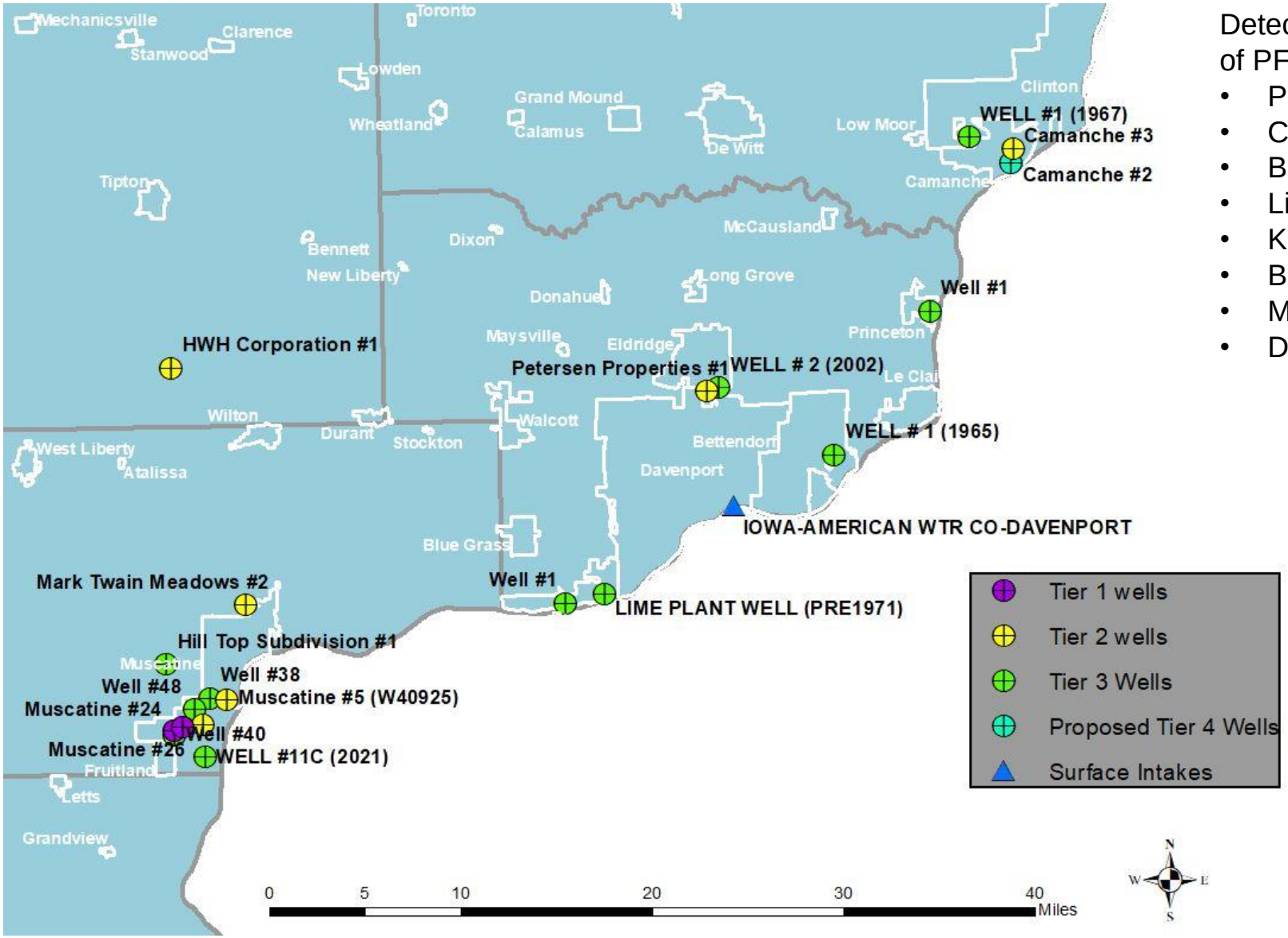
- Certain PFAS are nearly ubiquitous in Iowa surface waters, likely from atmospheric sources such as rainfall, snow, and particulates
- Despite ubiquity, PFAS in surface waters tend to have simple mixtures and low number of unique species (simple fingerprint)
- Deeper bedrock, and confined bedrock aquifers sampled in the study were essentially unaffected by PFAS
- Alluvial, buried sand and gravel, and shallow, unconfined bedrock aquifers are more likely to host PFAS (especially alluvial along major rivers)
- Groundwater aquifers were far less likely to test positive for PFAS compared to surface waters, but tended to have many species of PFAS (complex fingerprint)
- Overall, surface waters reflect a trend toward non-point sources, while groundwater tended to indicate point sources (with the exception of Mississippi River alluvium)
- Cross contamination is not a problem as long as protocol is consistent

Public Water Supplies on Quarterly PFAS Monitoring

- **Field Office 1** - Cedar Rapids, Central City, Dubuque
- **Field Office 2** - none
- **Field Office 3** - Spencer, Rock Valley, Sioux City
- Field Office - Harlan
- **Field Office 5** - Colfax, Ames, West Des Moines, Tama
- **Field Office 6** - Burlington, Camanche, Iowa City, Keokuk, Kammerer MHP, Muscatine, Iowa American Davenport, Bayer Crop Science (Muscatine)



Scott County Vicinity Wells Sampled by Iowa DNR



Detections of PFAS:

- Princeton
- Camanche
- Buffalo
- Linwood
- Kammerer
- Bayer Chem.
- Muscatine
- Davenport

3M Agrees to EPA Order to Sample and Provide Treatment for PFAS Contamination in Drinking Water near Cordova, IL Facility

EPA Enforcement Part of Agency Strategy to Characterize and Address PFAS Releases from Major Manufacturers

November 3, 2022

Contact Information
EPA Press Office (press@epa.gov)

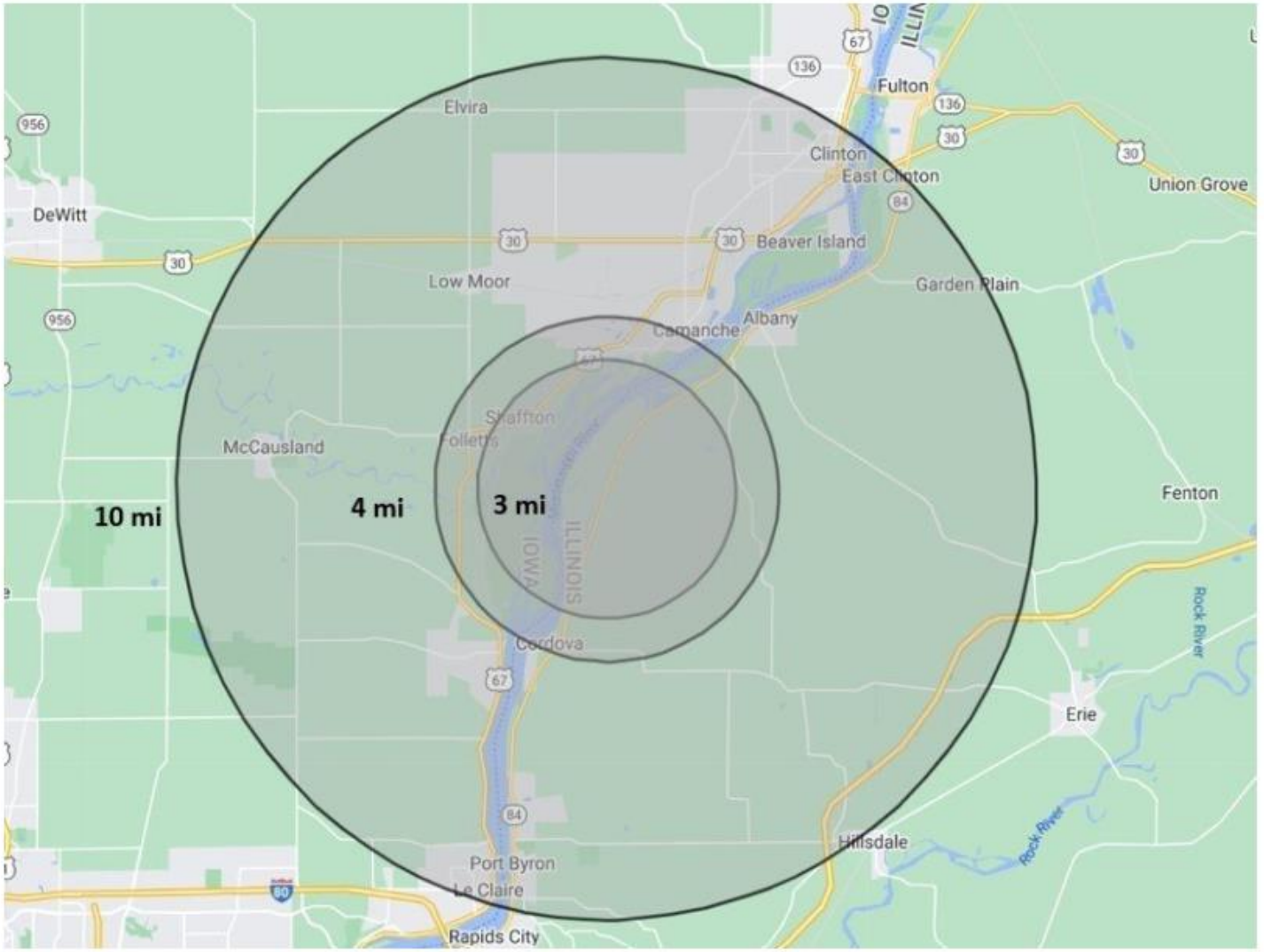
WASHINGTON – Today, the 3M Company agreed to a U.S. Environmental Protection Agency (EPA) order to sample and provide treatment to address contamination from per- and polyfluoroakyl substances (PFAS) found in drinking water in the vicinity of 3M's Cordova, IL facility. Recent sampling results provided by 3M indicate the widespread presence of a mixture of at least 19 different PFAS chemicals in drinking water within a 3-mile radius of the Cordova facility. Given the unique circumstances affecting this community, including more than five decades of PFAS discharges and the many types of PFAS chemicals found, EPA has concluded that the situation constitutes an imminent and substantial endangerment under the federal Safe Drinking Water Act.

"I have directed EPA staff to use every enforcement tool at our disposal to require manufacturers of PFAS to address potential endangerment to the public and to compel them to characterize, control, and clean up ongoing and past PFAS contamination," **said EPA Administrator Michael S. Regan**. "Communities have suffered far too long from exposure to these chemicals. This settlement is a critical step forward in our work to protect communities from pollution and hold polluters accountable for their actions."

As part of this settlement, 3M is required to offer treatment to all private well owners within 3 miles of the facility and to the Camanche Water Supply in Iowa, in an effort to remove PFAS from the drinking water. 3M is also required to offer drinking water sampling out to 4 miles from the facility for private well owners and out to 10 miles from the facility for public water systems as well as to the Quad Cities' public water systems, using EPA protocols and conducted under EPA oversight.

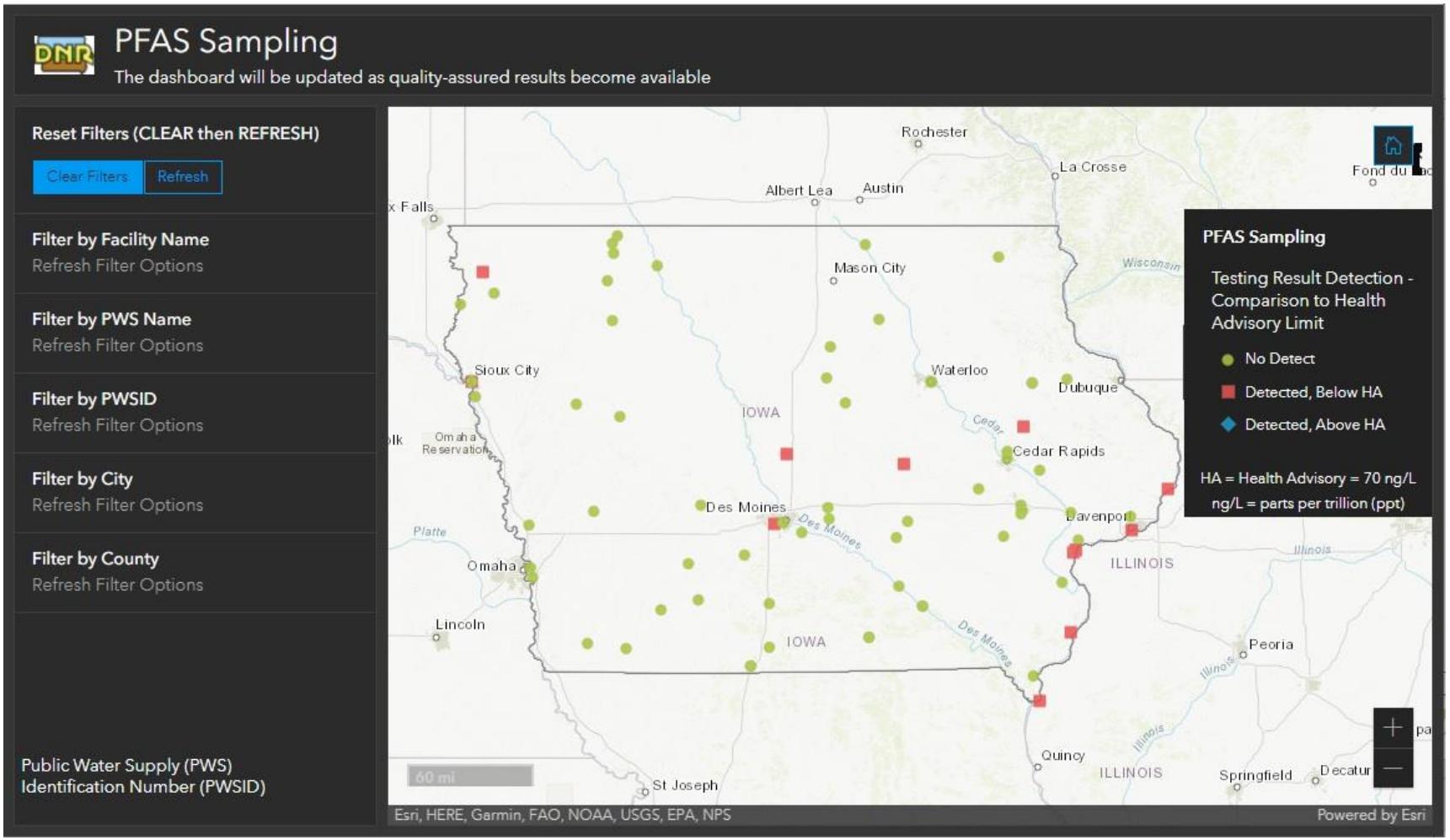
3M's sampling of the drinking water in private wells near the facility detected a range of concentrations including: perfluorooctanoic acid (PFOA) of non-detect to 25 ppt, perfluorooctanesulfonic acid (PFOS) of non-detect to 30 ppt, hexafluoropropylene oxide dimer acid (HFPO-DA), or "GenX" of non-detect to 59 ppt, and perfluorobutane sulfunate (PFBS) of non-detect to 51 ppt. 3M did not use EPA test methods for this sampling. As a result, the order issued today requires 3M to sample these wells again following EPA test methods.

3M was one of the original companies developing and producing PFAS within the United States, and their Cordova facility operations and discharges containing PFAS chemicals date back to the 1970s. 3M's agreement to the terms of the Order including completing the work required under EPA's oversight is an important step to begin addressing the problem created by decades of contamination. This settlement is part of EPA's ongoing efforts to compel major PFAS manufacturers to characterize and control ongoing releases from their facilities.

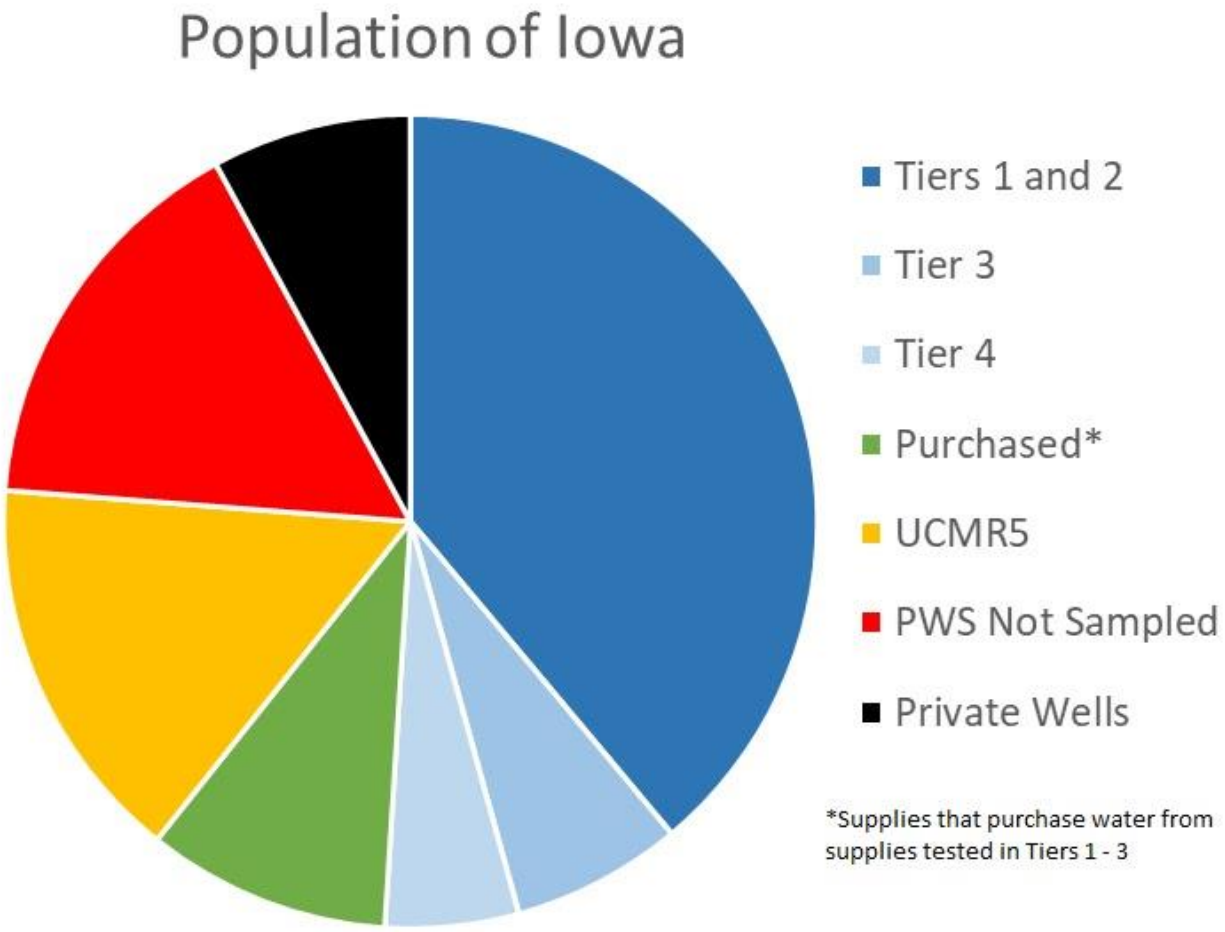


3M will offer treatment to private well owners within a 3 mile radius of its Cordova plant and sample drinking water at private wells in a 4 mile radius and drinking water systems in a 10 mile radius.

Where were PFOA and/or PFOS in Finished Water? - Interactive Map



Iowa Population Represented by Sampling



Questions?