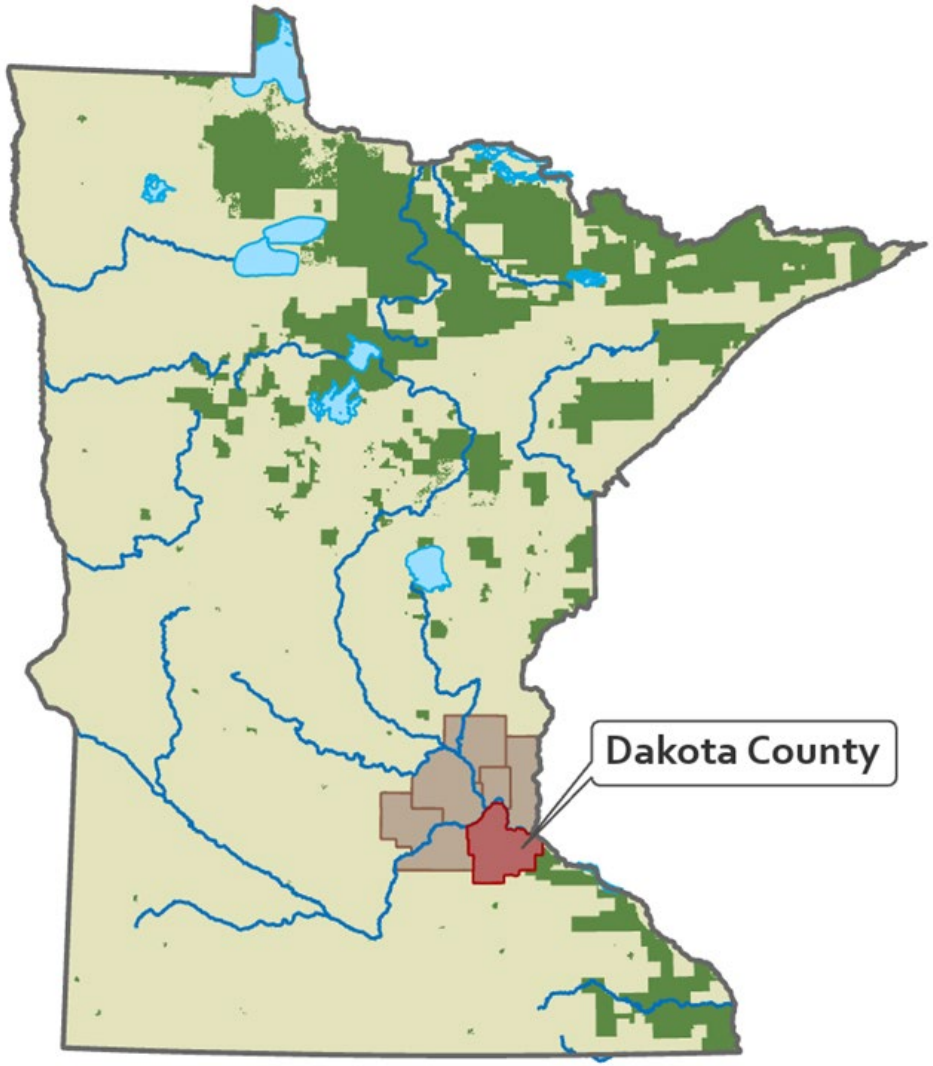
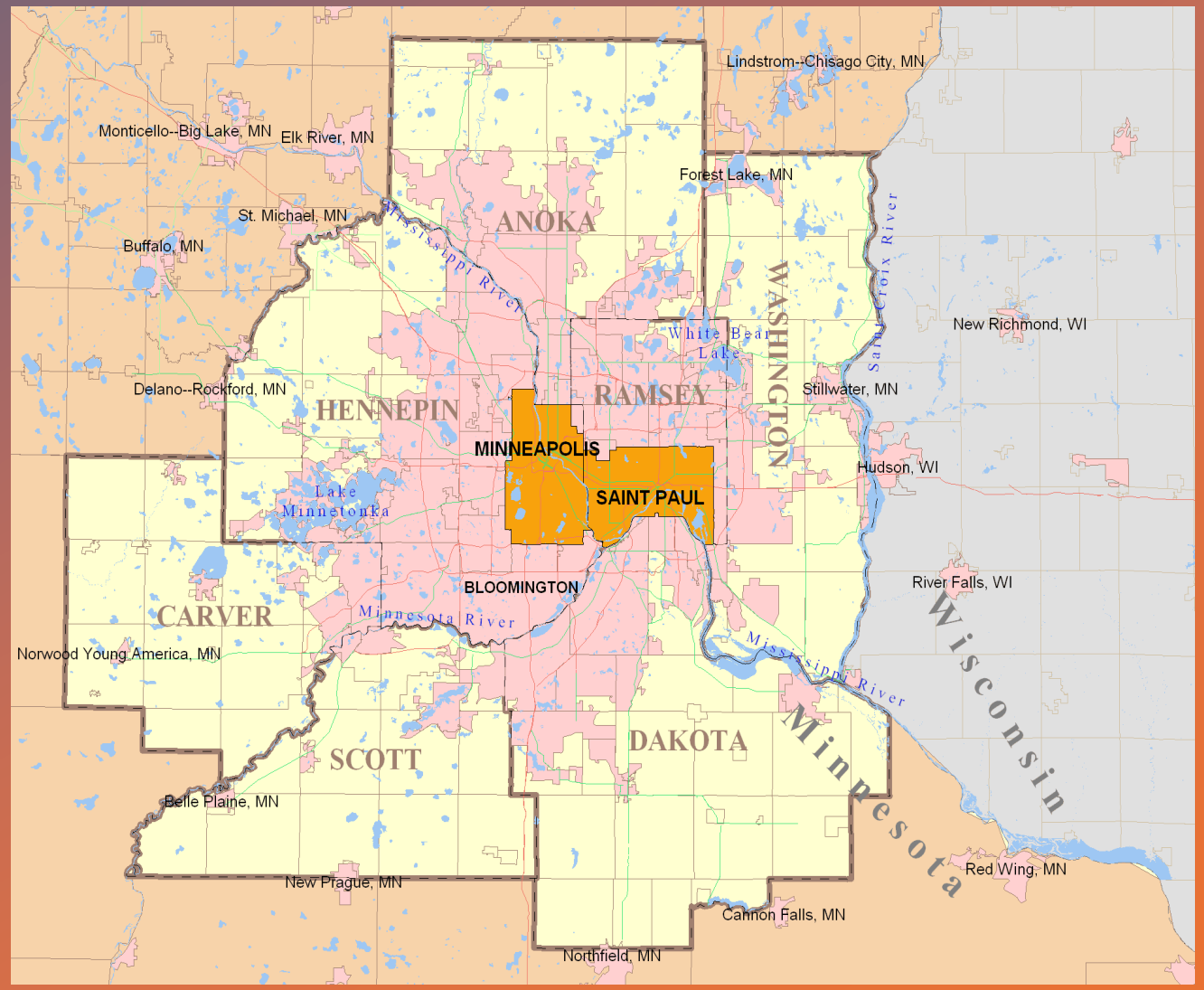
Dakota County's Cross-Agency Approach to Emerging Contaminants

Cathy Undem, PG
Vanessa Demuth, PG

Dakota County





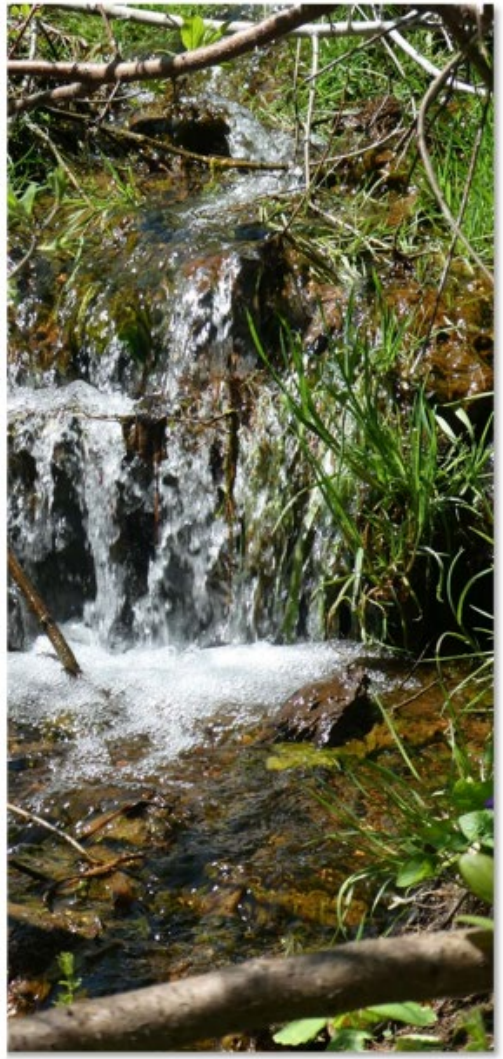
Cross-Agency Approach

- **Collaboration**
  - ✓ Groundwater Plan
  - ✓ Emerging Contaminants Workgroup
  - ✓ Partnerships
- **Results of Collaboration**
  - ✓ Data Collection
  - ✓ Data Analysis
  - ✓ 2026 and beyond

Groundwater Plan

Plan Goals:

- Water quality
- Water quantity
- Education
- Governance



Dakota County, Minnesota Groundwater Plan 2020-2030

Adopted January 2021

PROTECT OUR WATER

Dakota COUNTY

Groundwater Plan

County Roles:

- **Drinking Water Testing, Education, Outreach**
- **Groundwater Quality Research**
  - Ambient Groundwater Quality Study 1999-2019
  - WIISE Study 2015-2016
  - MDA/County Township Testing
  - Hastings Area Nitrate Studies
  - ACRE
  - Community Focused Sampling
  - MN Dept of Health At-Risk Testing

Groundwater Plan

Emerging Issues Mentioned 18 times in the plan

Identify
Research
Advocate
Testing
Outreach
Education
Monitor
Document
Public awareness

Plan ⟹ Implementation

- ✓ Plan
- ✓ Goals
- ✓ Strategies
- ✓ Roles
- ✓ Studies – data
- ✓ Emerging issues identified

? Implement ?

Emerging Contaminants Workgroup

Purpose: To coordinate interdepartmental efforts to identify, monitor, communicate, and respond to emerging environmental and public health contaminants affecting Dakota County

Objectives:

- Build and maintain a shared understanding of Contaminants of Emerging Concern (CEC) and data trends.
- Identify research, regulatory, monitoring, and communication gaps and opportunities.
- Inform county policy positions and recommendations.
- Create consistent messaging and accessible outreach materials for residents and leadership.
- Strengthen partnerships with state, federal, and community entities.

Emerging Contaminants Workgroup

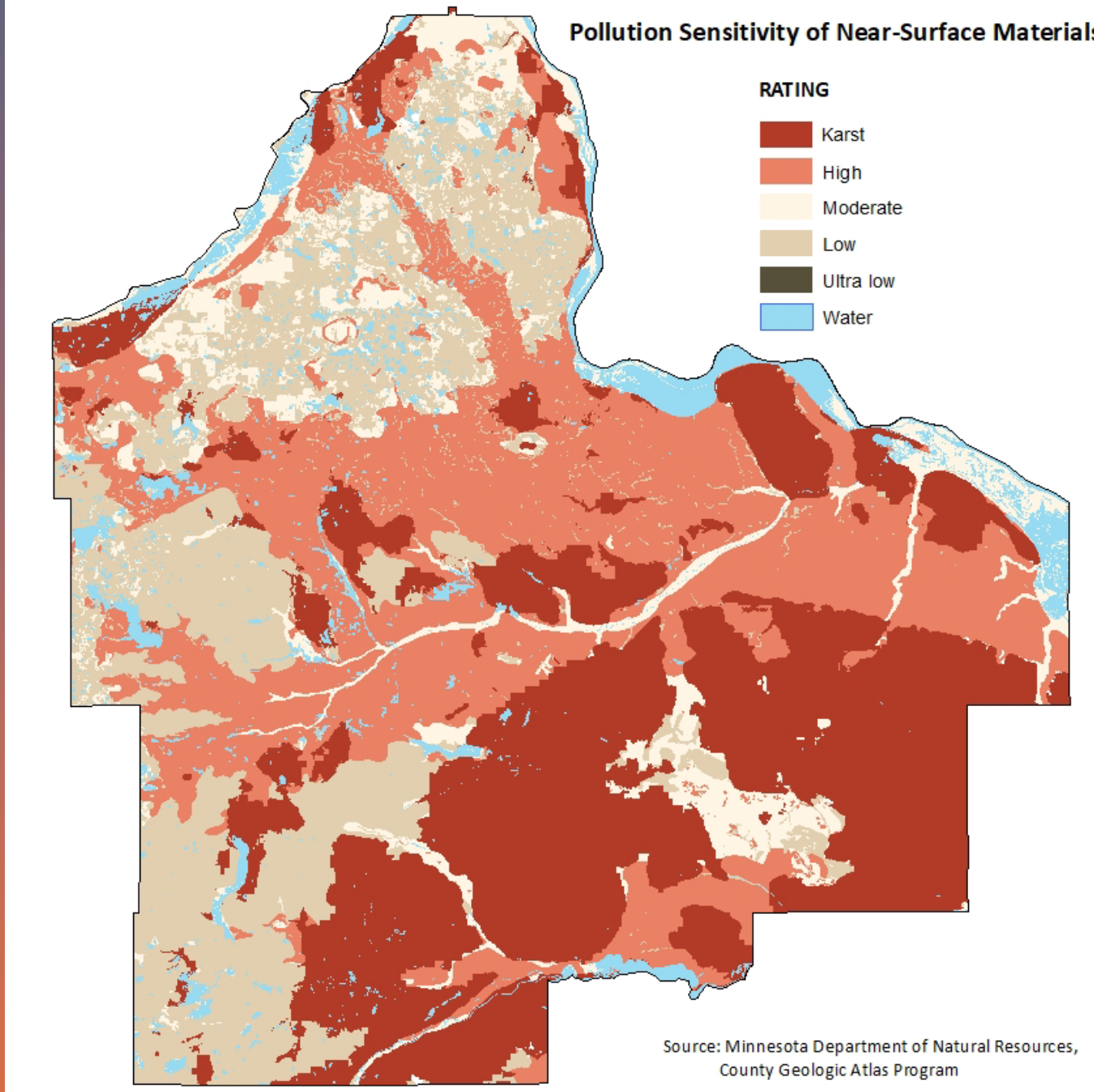
Goals:

- Enhance Public Awareness and Understanding
- Strengthen Collaboration and Partnerships
- Serve as a Central Technical & Communication Resource
- Support Data-Driven Decision-Making

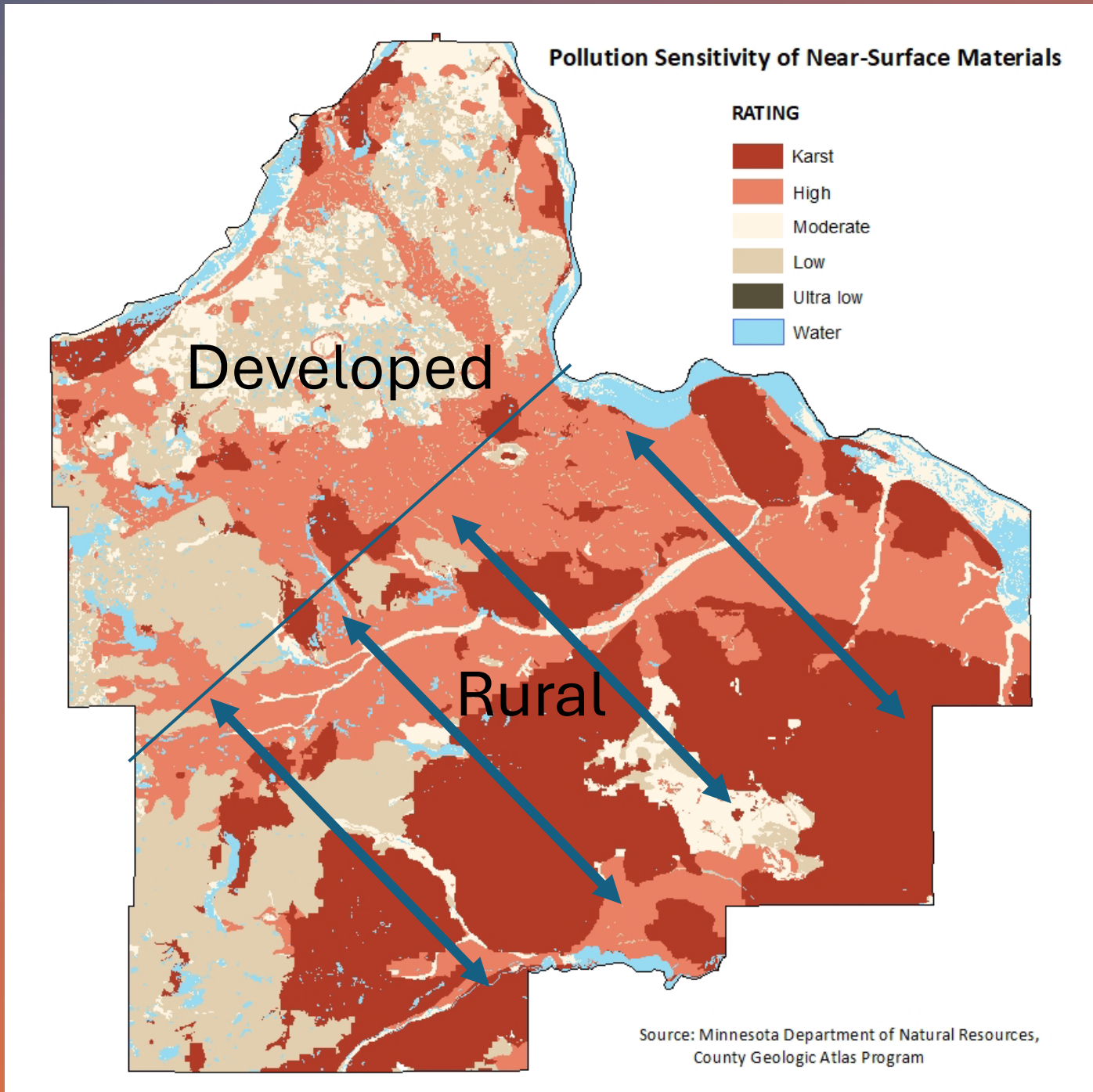
Dakota County Environmental Resources	Brad Becker	Water Resources Manager	Strategy & Leadership Liaison
Dakota County Environmental Resources	Cathy Undem	Environmental Specialist, Water Resources	ECW Project Manager; Environmental Assessment Program Manager, Professional Geologist
Dakota County Environmental Resources	Ben Hoyt	Environmental Specialist, Water Resources	Adv. Septic Inspector, On-site Wastewater, Registered Sanitarian
Dakota County Environmental Resources	Katie Pata	Environmental Specialist, Water Resources	Communications, Outreach, Education
Dakota County Environmental Resources	Vanessa Demuth	Environmental Specialist, Groundwater Protection	Drinking Water & Groundwater Quality, Registered Sanitarian, PG
Dakota County Environmental Resources	Valerie Neppl	Groundwater Protection Unit Supervisor	Strategy & funding for Groundwater Plan implementation
Dakota County Environmental Resources	Terry Muller	Environmental Specialist, Waste Regulation	Soil, water and hazardous materials. Licensed solid waste inspector.
Dakota County Public Health	Liz Robertson	Public Health Supervisor, Environmental Health	Health Risk Communication, Drinking & Groundwater Quality, Public Outreach
Dakota County Public Health	Katrina DeVore	Program Coordinator, Environmental Health	Community Outreach, Health Risk Communications
Dakota County Public Health	Dawn Plumer	Program Specialist Environmental Health	Public Health Lens
Dakota Co SWCD/ Lower Mississippi River WMO	Joe Barten	SWCD Program Management Supervisor /LMRWMO Admin	Surface Water & Stormwater Management, Watershed Planning
Vermillion River Watershed Joint Powers Organization	Kelly Perrine	Senior Watershed Specialist	Surface Water, Stormwater, Wetland and Fisheries Management; Watershed Plan Development
Vermillion River Watershed Joint Powers Organization	Brita Moore-Kutz	Communications and Outreach Specialist	Environmental and Agricultural Communications

Pollution Sensitivity of Near-Surface Materials

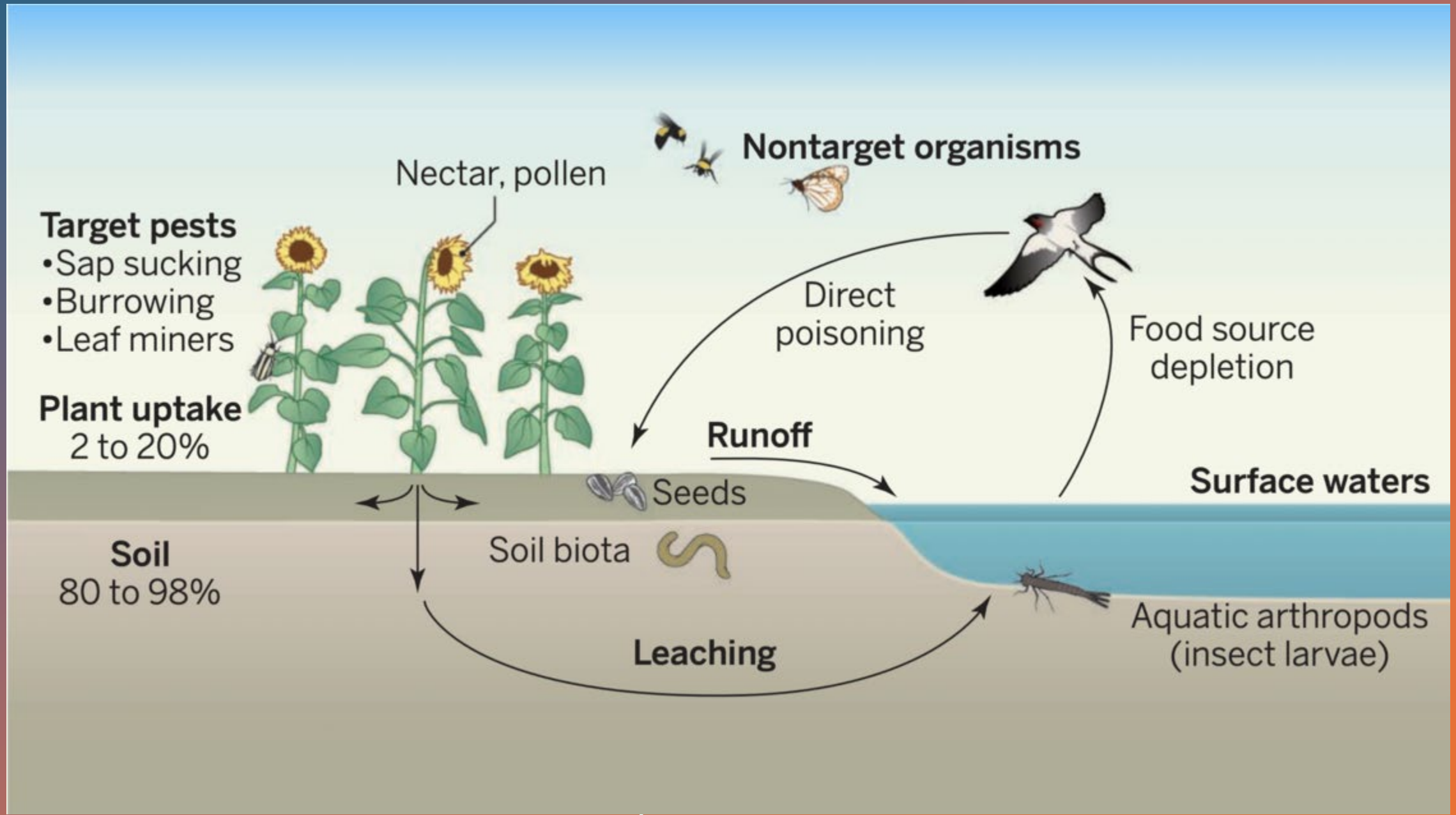
62% of the County is Karst or Highly Sensitive to Pollution



Pollution Sensitivity of Near-Surface Materials

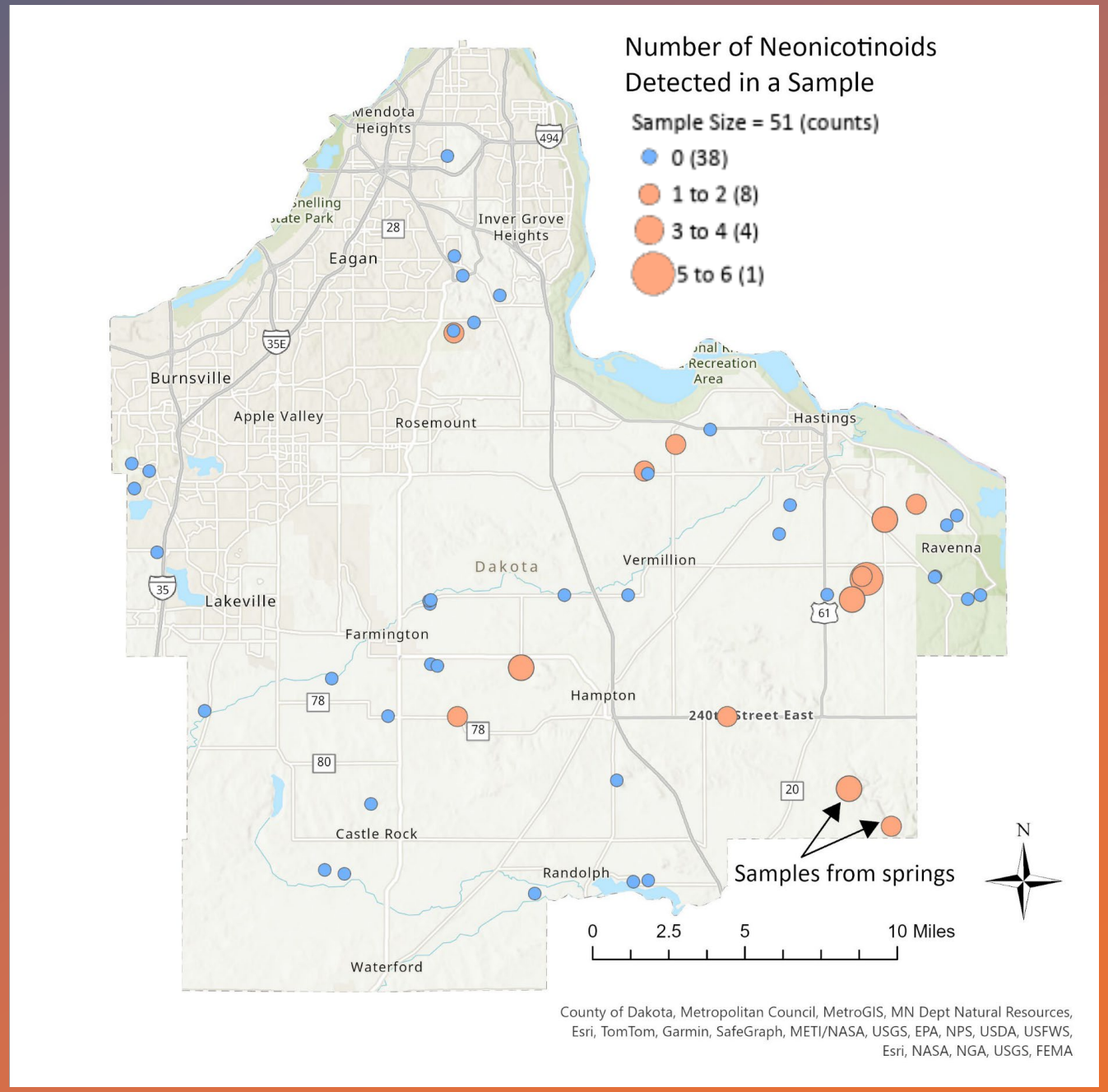


Neonicotinoid Insecticides

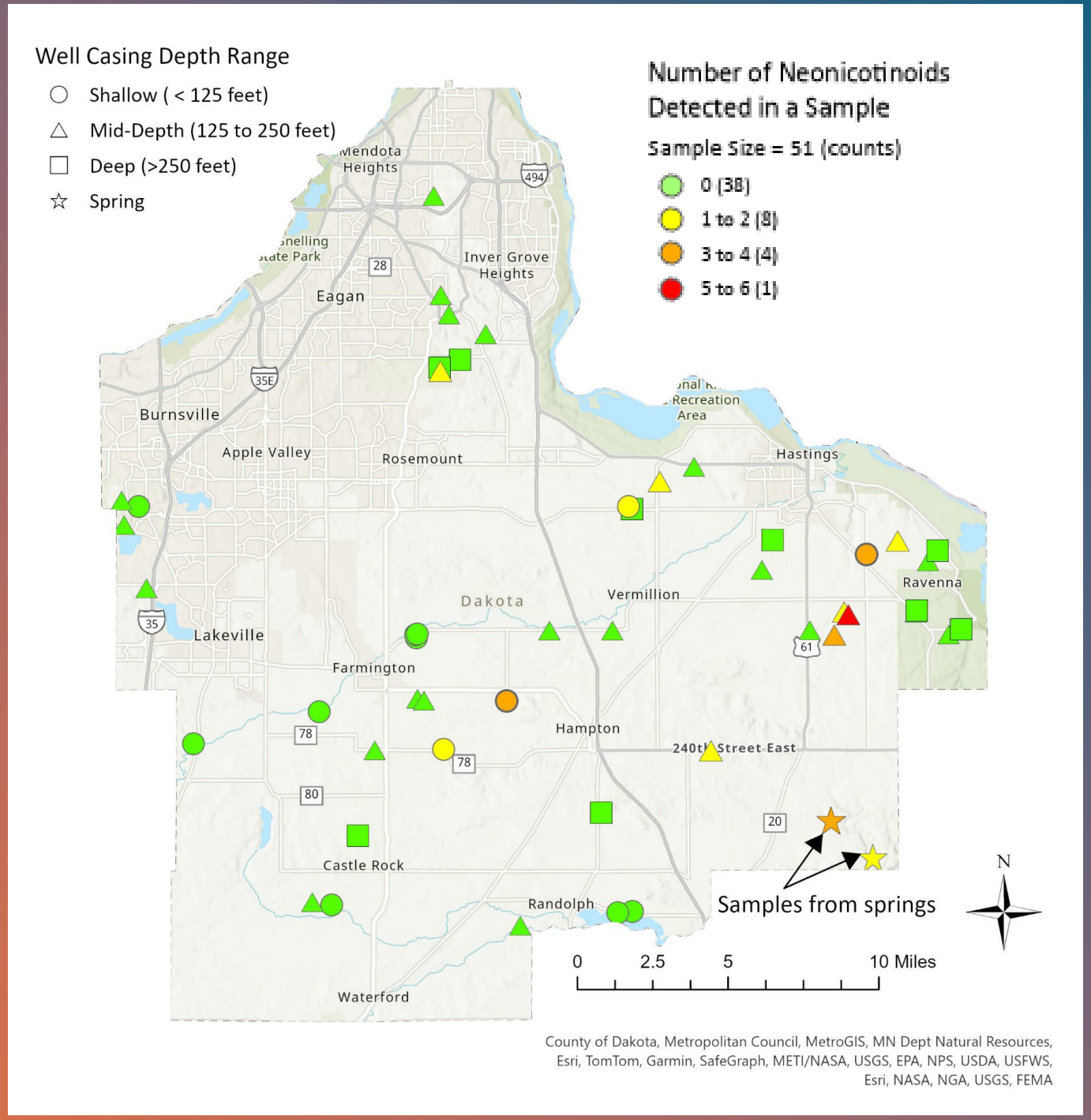


Neonicotinoids

- Samples collected by DNR for GW Atlas Part B
- 51 samples collected
  - 47 drinking water wells
  - 2 environmental wells
  - 2 springs
- 6 parent neonics and 8 degradates analyzed
- Neonics detected in 25% of samples
- None over drinking water guidelines



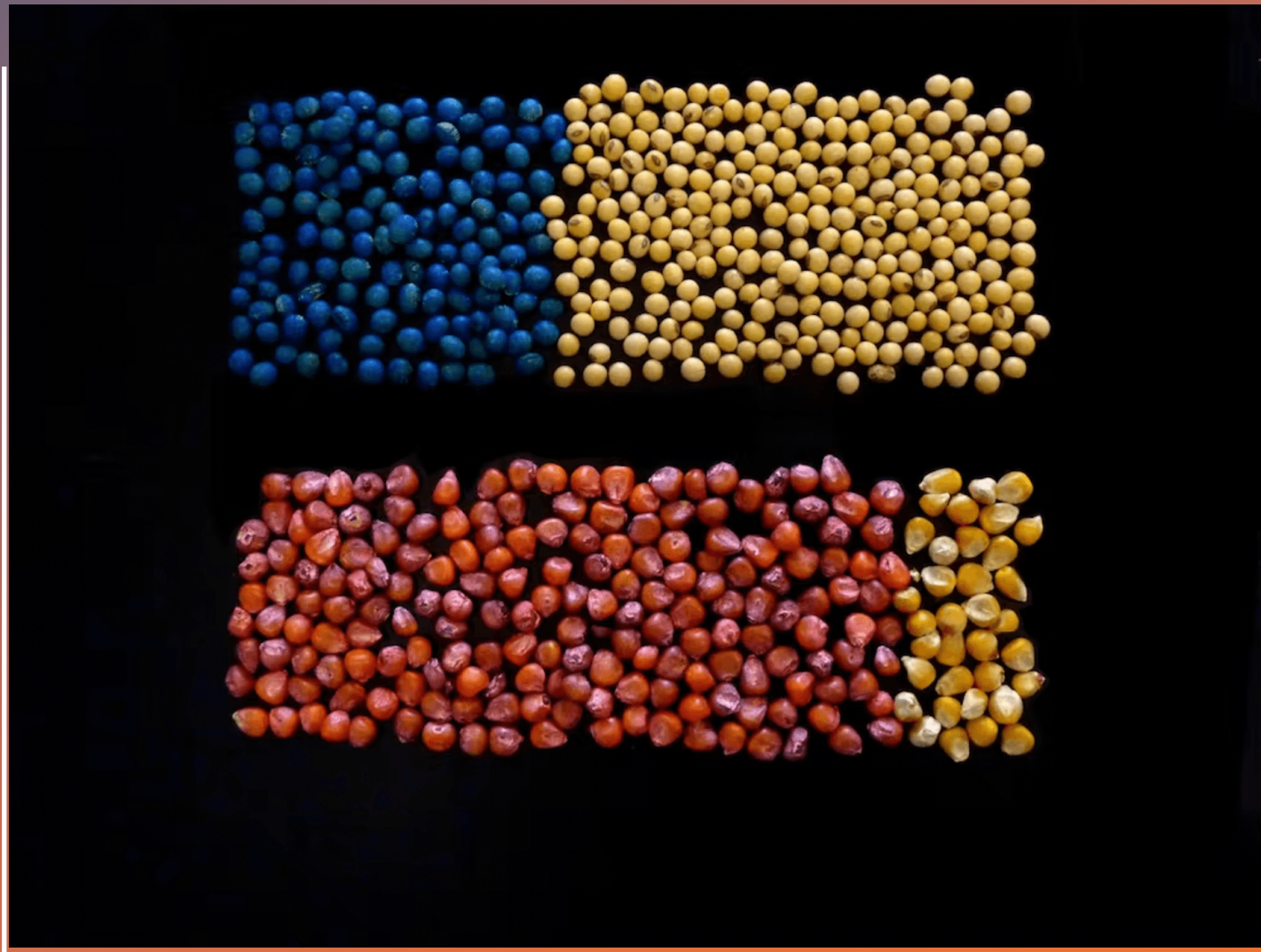
Number of Neonics by Well Casing Depth



Neonicotinoids

Neonics were detected in 13 wells

- Imidacloprid (introduced 1994) in 5 wells
- Thiamethoxam (introduced 2000) in 5 wells
- Clothianidin (introduced 2003) in 12 wells



Blue treated soybean seeds. Red treated corn seeds.

Neonicotinoids

Neonics were detected in 13 wells

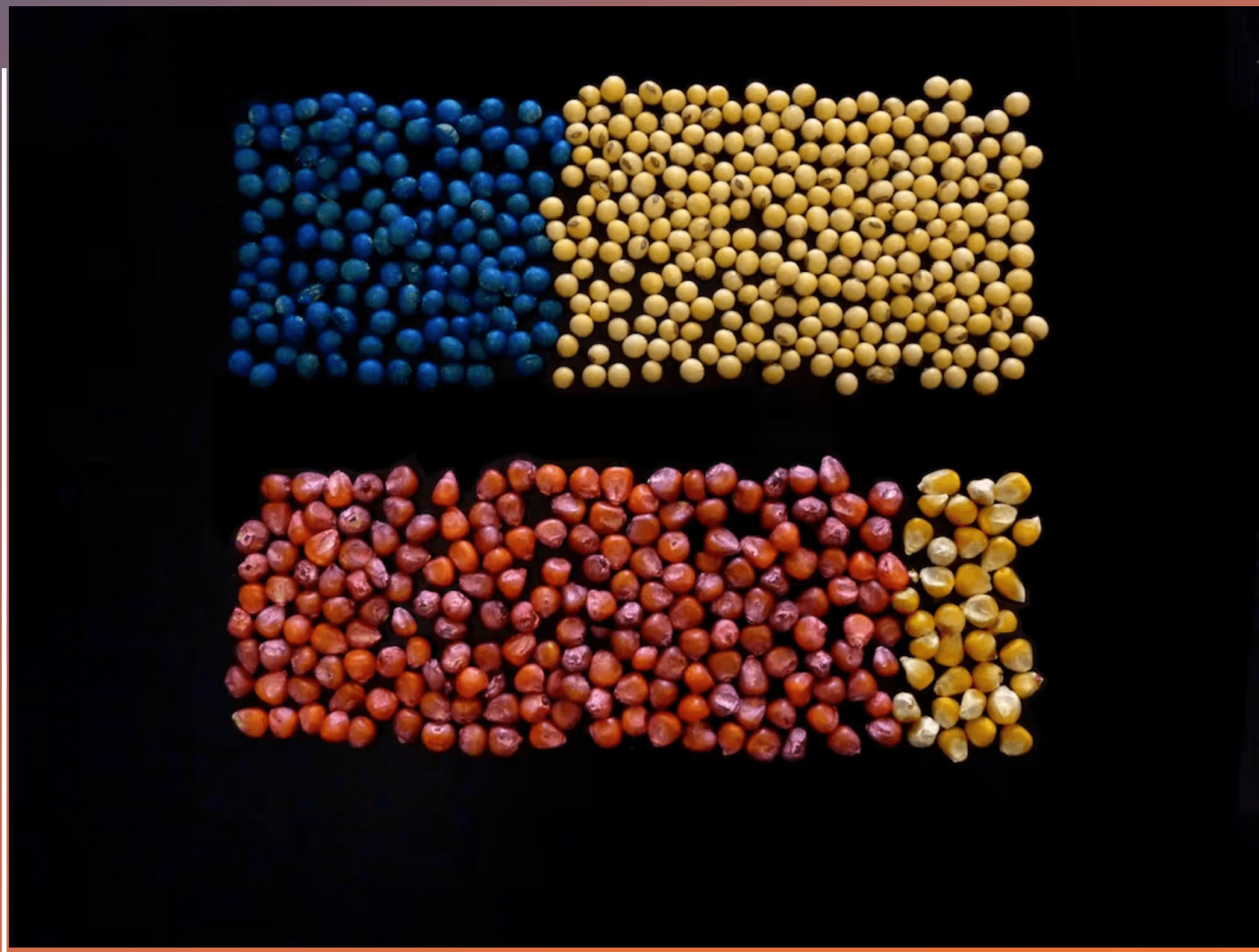
- Imidacloprid (introduced 1994) in 5 wells
- Thiamethoxam (introduced 2000) in 5 wells
- Clothianidin (introduced 2003) in 12 wells

- **All three are banned in the EU for outdoor use due to their lethal effects on pollinators**

- **One coated corn seed can contain enough active ingredient to kill a quarter-million bees or more**

- Highly Toxic on MN Department of Agriculture's (MDA) Bee Toxicity Table

- MDA's Current List of Pollinator Lethal Pesticides



Blue treated soybean seeds. Red treated corn seeds.

Fipronil

Phenylpyrazole insecticide class

Introduced in 1996

Product used on crops, grass and pets

2007 Fipronil in one private drinking water well

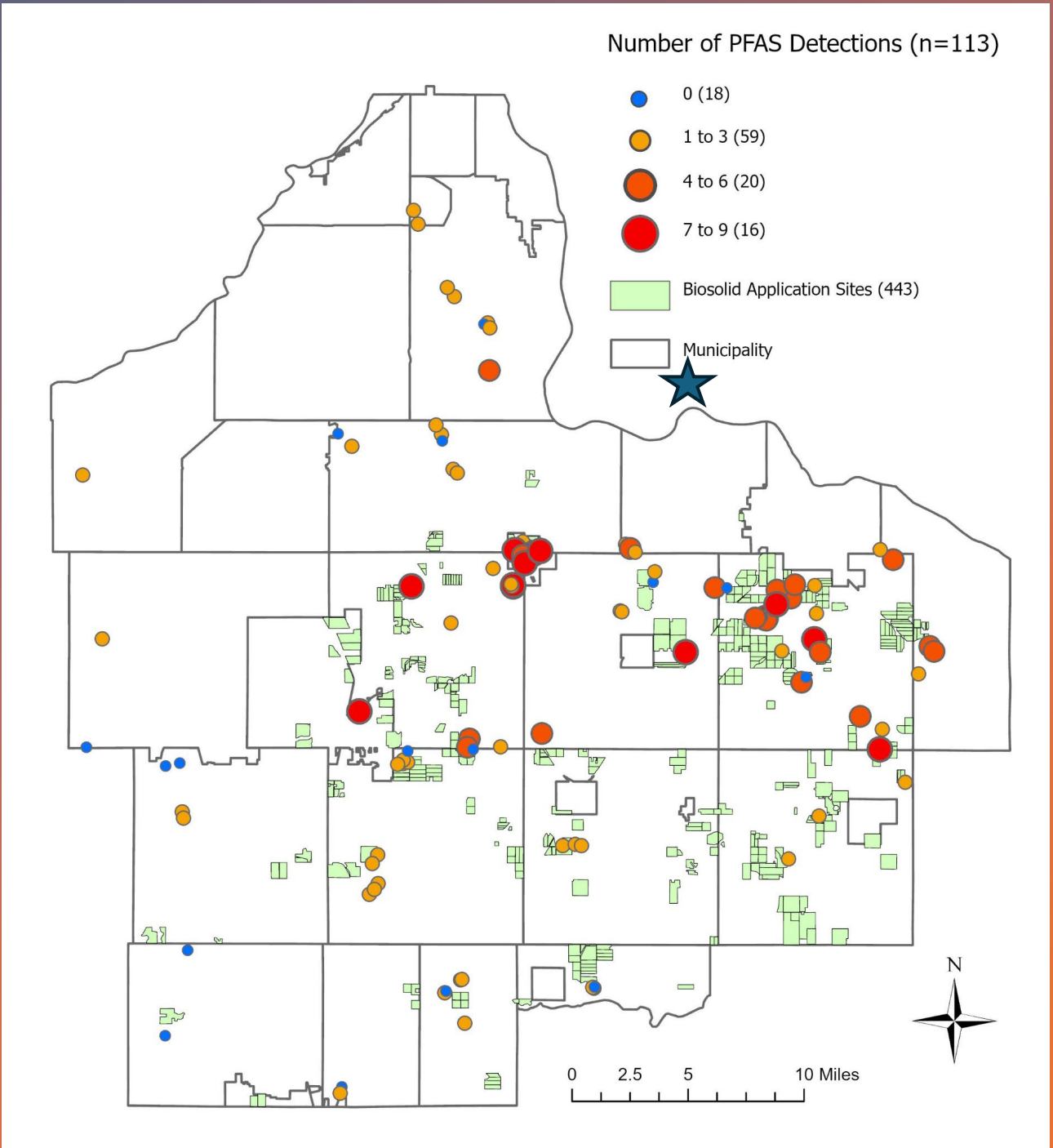
2011 Fipronil degradates in two private drinking water wells

2025 No detections of Fipronil or the 3 degradates

No drinking water guidelines established

Per- and Polyfluoroalkyl Substances (PFAS)

Number of Detections in Private Drinking Water Wells 2018-2024



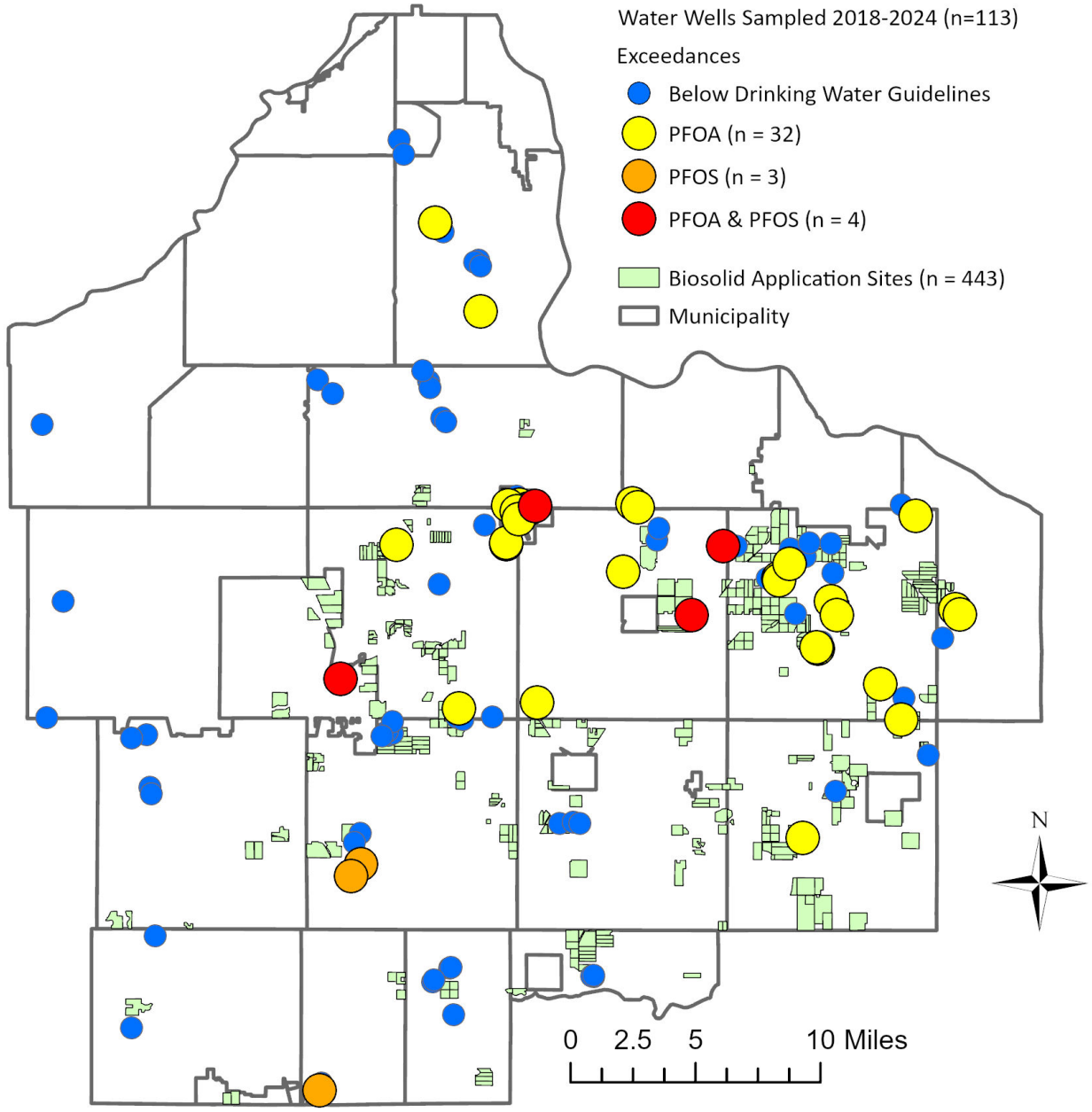
PFAS Exceedances in Private Water Wells 2018-2024

PFAS detected 80% of the wells

39 wells (35%) exceed the MN Department of Health Guidance

- 32 wells exceed 0.24 ng/L for PFOA
- 3 wells exceed 2.3 ng/L for PFOS
- 4 wells exceed for PFOA & PFOS

PFBA, PFPeA, & PFHxS in wells were significantly correlated to the distance to a known biosolid application site.



Sampling Locations

4 Farm fields with no known history of biosolids

7 Farm fields with biosolid application

8 samples in the Vermillion River or tributaries

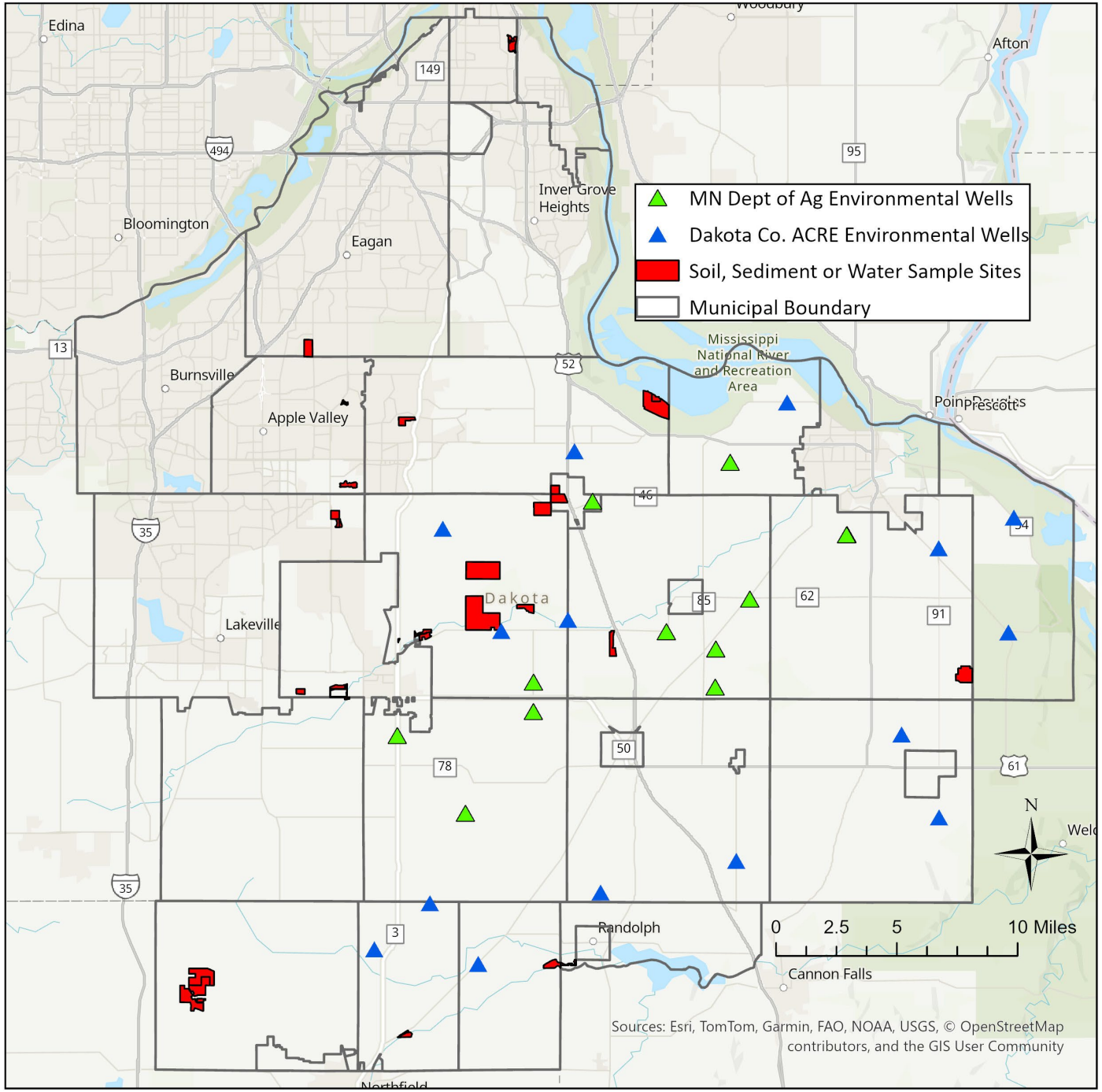
1 sample Cannon River

5 Lakes or ponds with fishing piers

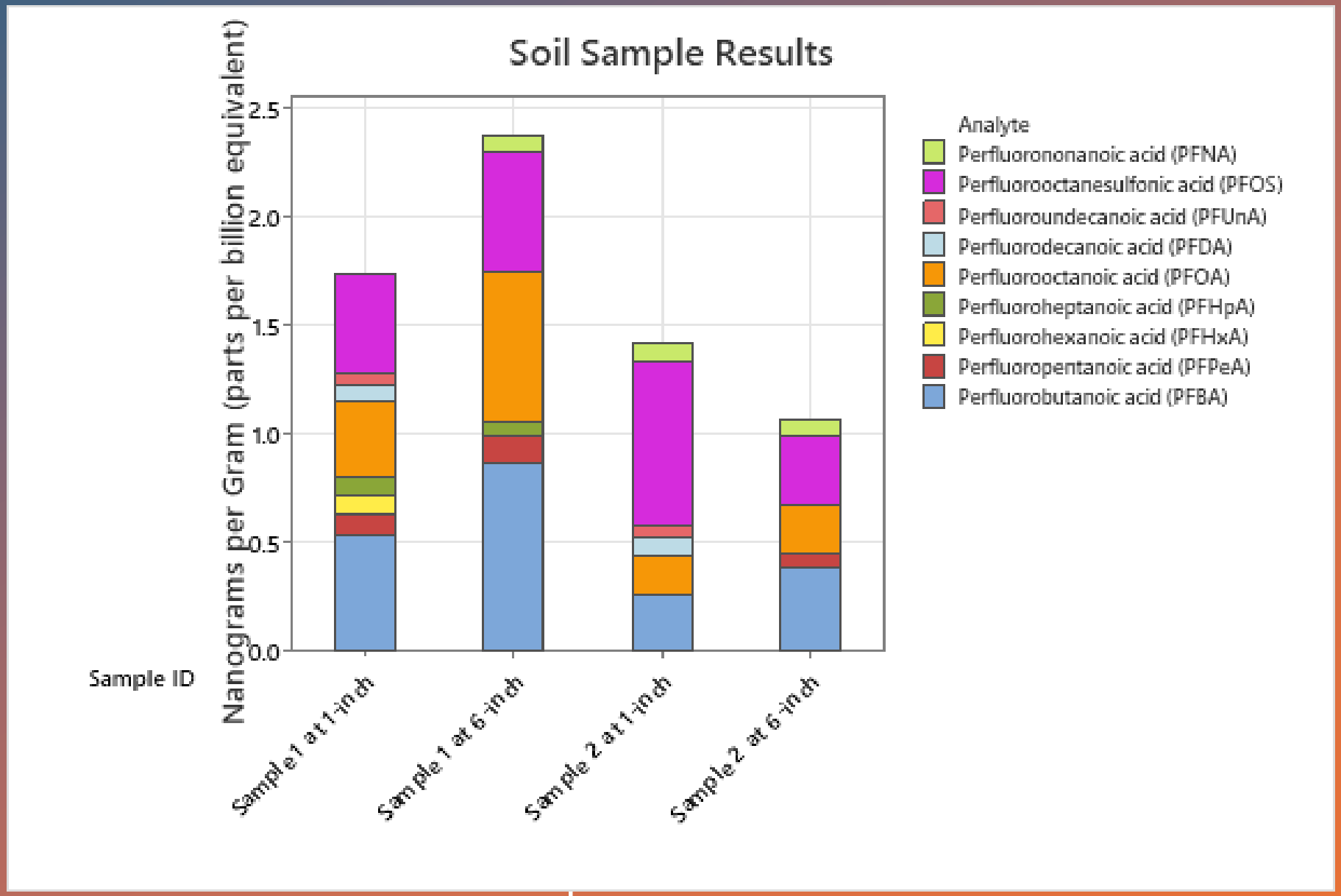
12 MN Dept of Agriculture environmental wells

15 Dakota County owned environmental wells

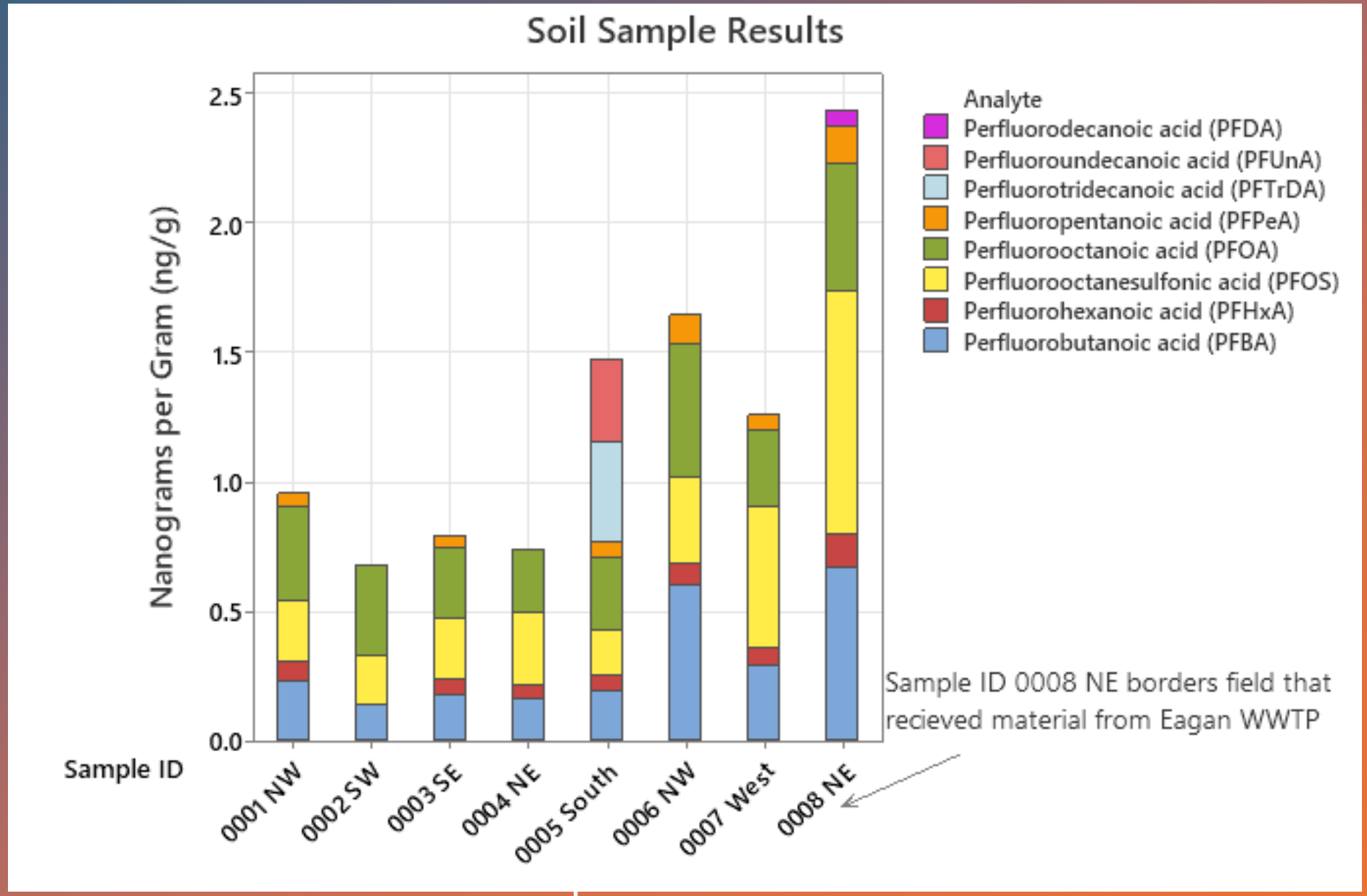
1 Reference Site for background levels



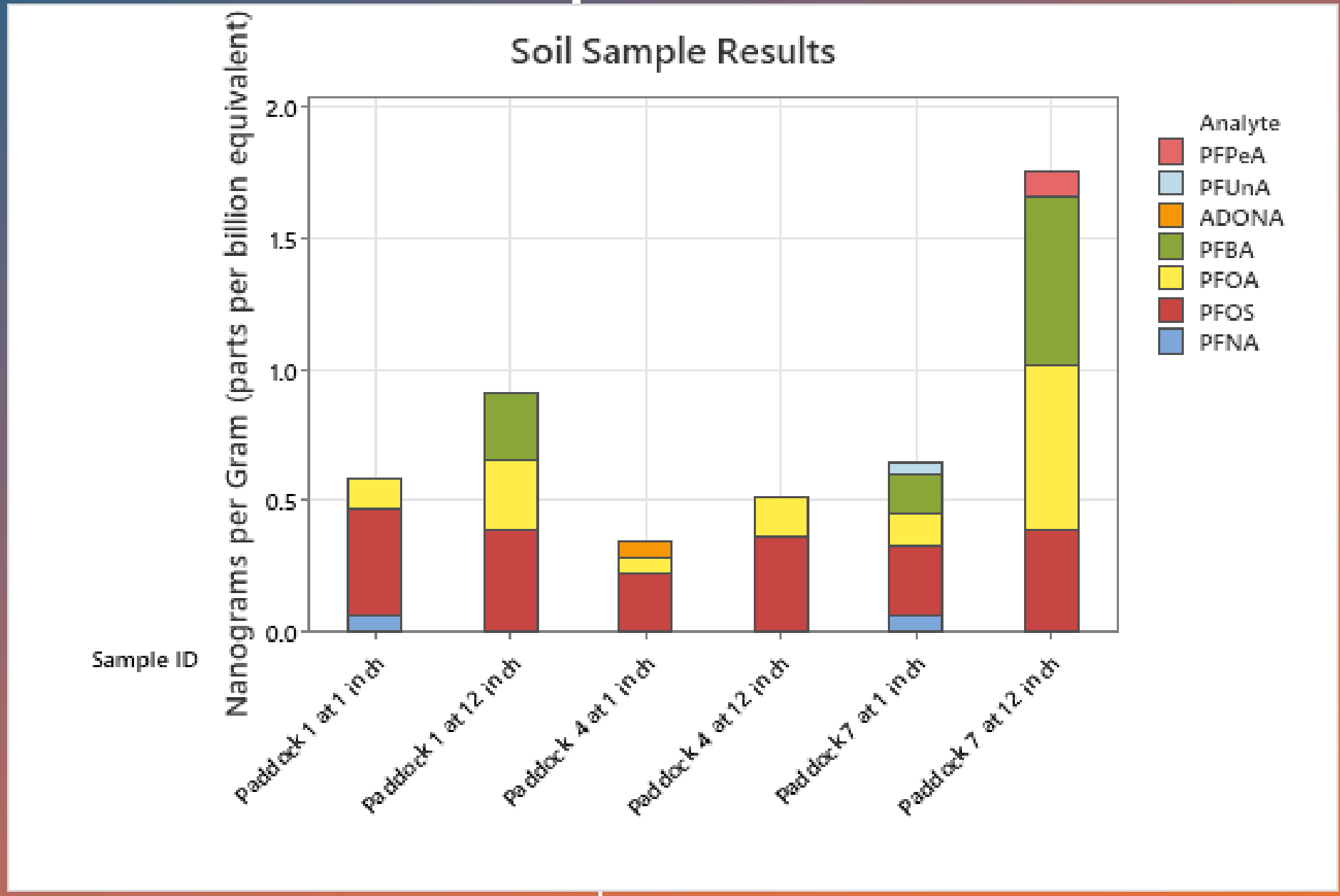
PFAS in Reference Site Samples



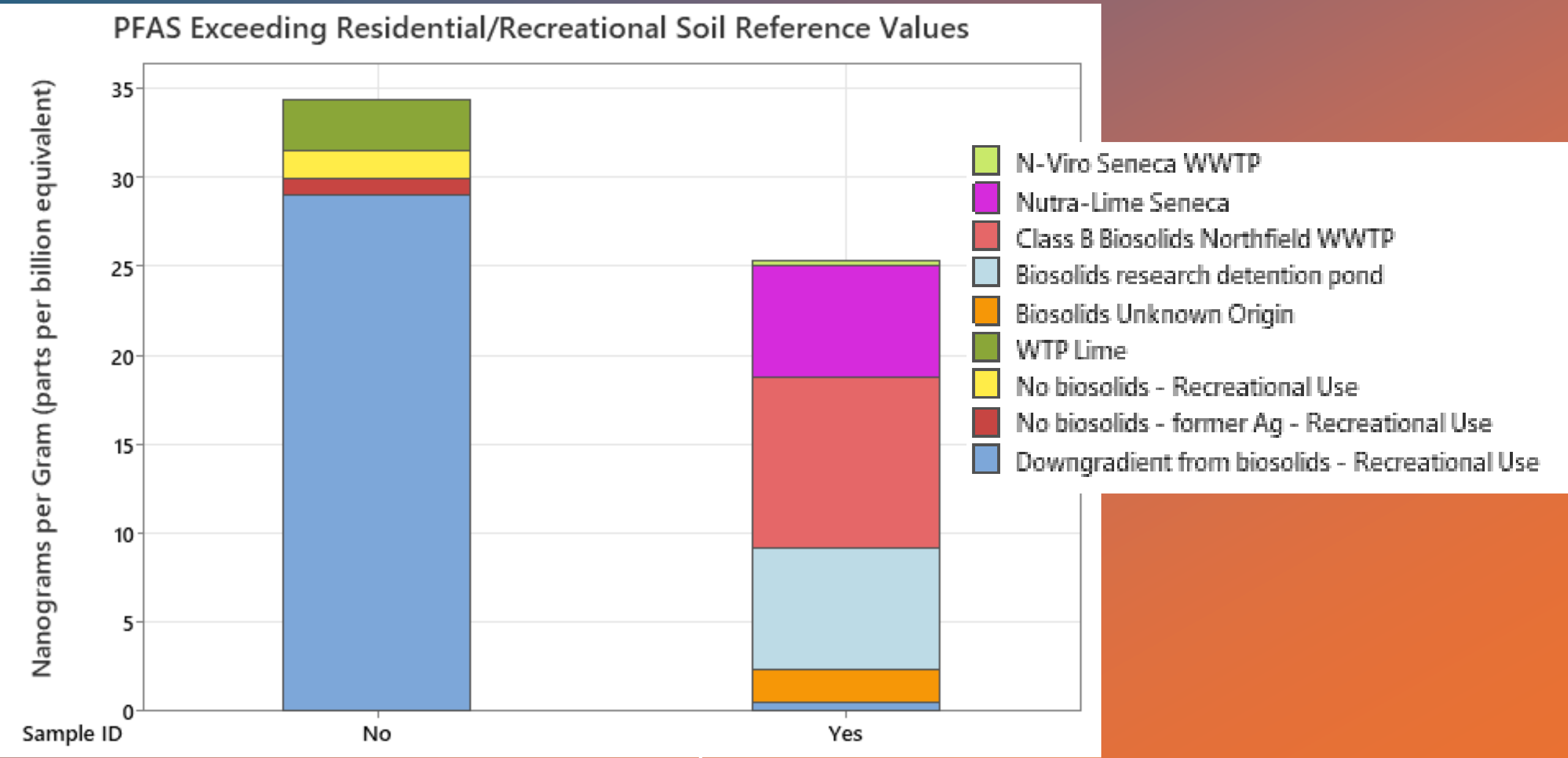
PFAS in Ag Field with No Biosolids, Lime Applied



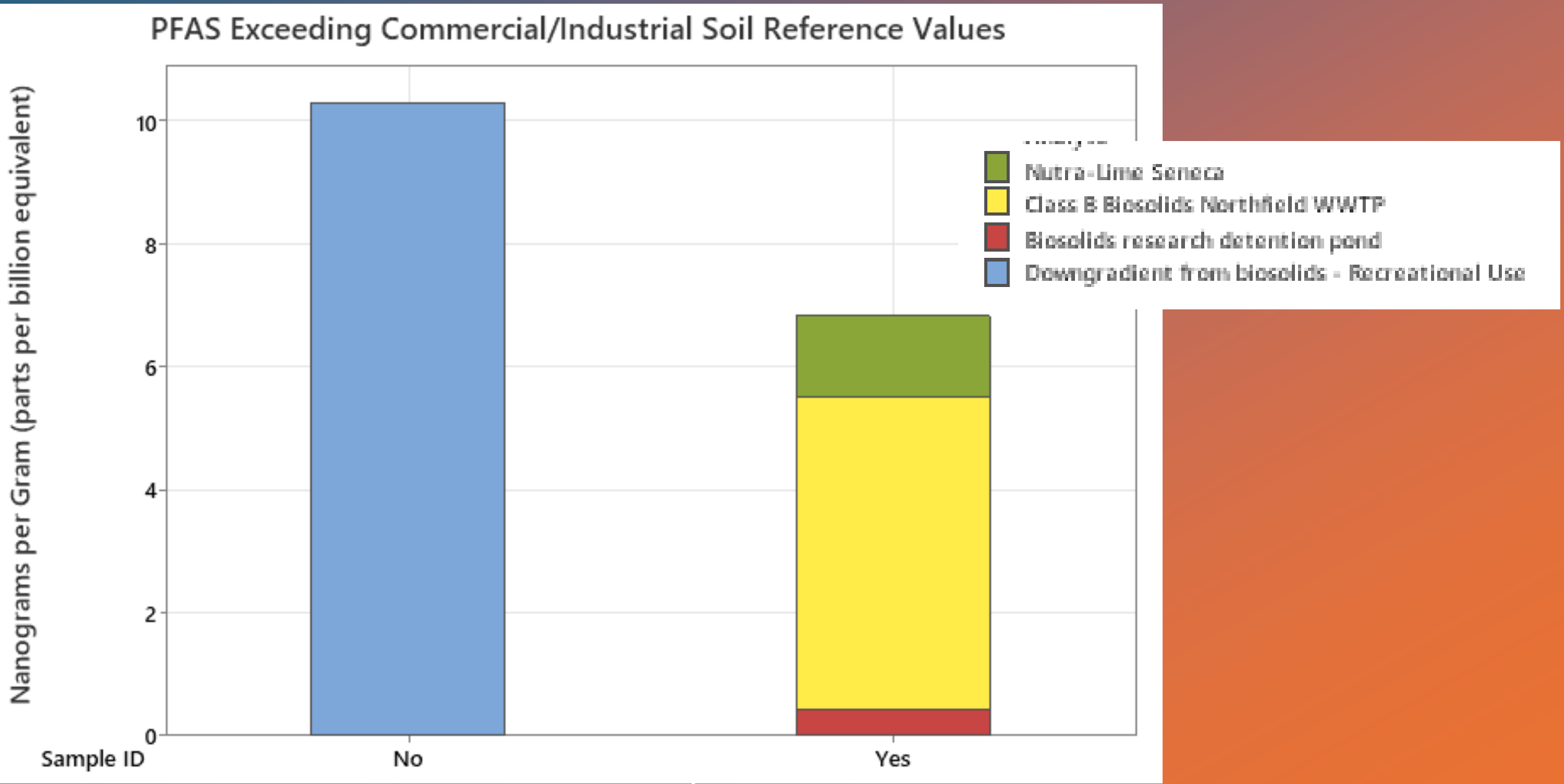
PFAS in Site Samples Near Manufacturer



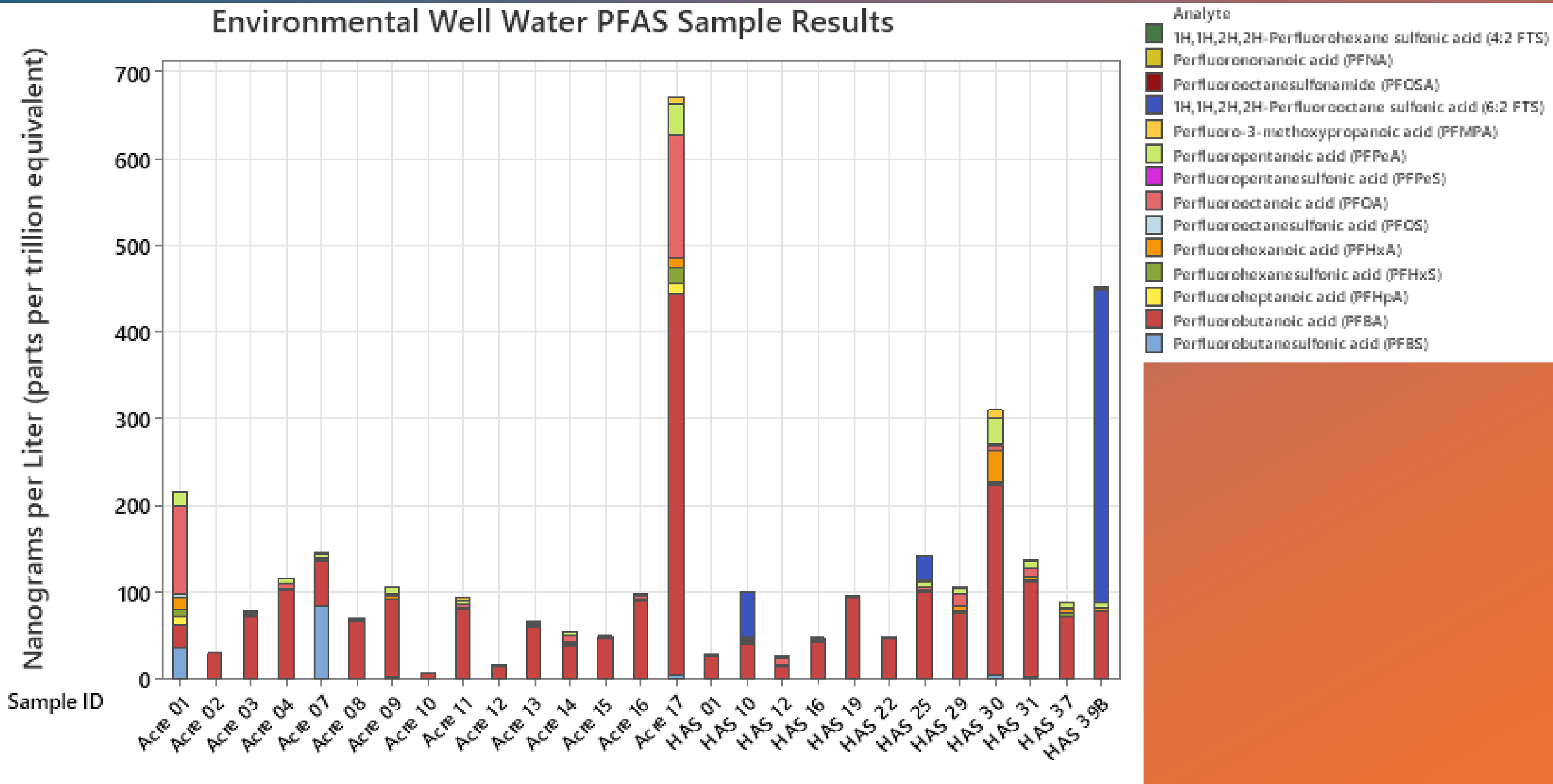
PFAS in No biosolids vs Biosolid Sites



PFAS in Non-biosolids vs Biosolids Sites



PFAS in Environmental Wells



Potential Sources of Plastic in a Well

- Plastic well casing
- Check valve
- Screen on pump intake
- Coating on electrical wires for pump
- Coating on wire leads on motor
- Shrink tube
- Electrical tape
- Plastic water lines
- Diffuser on bottom of pressure tank
- Pressure tank membrane
- Submersible well pump impellers est. 10 inside a black plastic housing

Microplastics

Drinking Water Well	Microplastics per Liter
Dakota Co 101624	0.0028
Dakota Co 207621	0.0377
Dakota Co 879807	0.0430
Dakota Co 768757	0.0442
Dakota Co 404840	0.0940
Dakota Co W05323	0.3568
Dakota Co W05323 resample	Waiting for results

Dakota Co W05323		
Particle Type	Particles Counted	Normalized Counts
PP	2	5.87
PET	4	11.74
PA	5	14.675
PC	25	73.375
PBT	2	5.87
POM	43	126.205
Total Raw	81	
Total Normalized	237.735	

Microplastics

Drinking Water Well	Microplastics per Liter
Dakota Co 101624	0.0028
Dakota Co 207621	0.0377
Dakota Co 879807	0.0430
Dakota Co 768757	0.0442
Dakota Co 404840	0.0940
Dakota Co W05323	0.3568
Dakota Co W05323 resample	Waiting for results

Dakota Co W05323		
Particle Type	Particles Counted	Normalized Counts
PP	2	5.87
PET	4	11.74
PA	5	14.675
PC	25	73.375
PBT	2	5.87
POM	43	126.205
Total Raw	81	
Total Normalized	237.735	

Microplastics

Drinking Water Well	Microplastics per Liter
Dakota Co 101624	0.0028
Dakota Co 207621	0.0377
Dakota Co 879807	0.0430
Dakota Co 768757	0.0442
Dakota Co 404840	0.0940
Dakota Co W05323	0.3568
Dakota Co W05323 resample	Waiting for results

Because of its chemical stability, POM plastic is also ideal for use in pumps, valves, and fittings that come into contact with various chemicals in industrial manufacturing and food processing applications.

Dakota Co W05323		
Particle Type	Particles Counted	Normalized Counts
PP	2	5.87
PET	4	11.74
PA	5	14.675
PC	25	73.375
PBT	2	5.87
POM	43	126.205
Total Raw	81	
Total Normalized	237.735	

Polycarbonate

Polycarbonate is extensively used by pump manufactures as it offers high impact resistance and good dimensional stability. It is commonly used to manufacture impellers, casings, etc.. Polycarbonate is normally used as a glass-filled material, however, natural clarity is sometimes a required property.

Microplastics

Drinking Water Well	Microplastics per Liter
Dakota Co 101624	0.0028
Dakota Co 207621	0.0377
Dakota Co 879807	0.0430
Dakota Co 768757	0.0442
Dakota Co 404840	0.0940
Dakota Co W05323	0.3568
Dakota Co W05323 resample	Waiting for results

Original sample - raw plastic count is 81
Resample - raw plastic count is 8

Dakota Co W05323		
Particle Type	Particles Counted	Normalized Counts
PP	2	5.87
PET	4	11.74
PA	5	14.675
PC	25	73.375
PBT	2	5.87
POM	43	126.205
Total Raw	81	
Total Normalized	237.735	

2026 and beyond

- Summary report of 2025 data
- Engage Metropolitan Council & other State Agencies
- Fill in gaps or examine anomalies from 2025 data
- Sample surface water foam on public access or fishing water bodies for PFAS
- Research impacts to plants and animals and their habitat from PFAS (turtles, bison, aquatic plants and animals)
- Interactions between biosolids, groundwater, ag products – irrigation/infiltration/uptake in plants
- Water quality changes from large quantity extraction (water quality changes in private wells, wastewater quality and use)
- Continue to track, review and comment on proposed data centers

Questions?

Contact us:

Vanessa Demuth, PG
vanessa.demuth@co.dakota.mn.us

Cathy Undem, PG
cathy.undem@co.dakota.mn.us

American Institute of Professional Geologist aipgmn.org

December 2, 2025, Technical Talk:

Multiple data centers and other large groundwater users proposed for Minnesota
Presenters: Brent Beste MNDNR and Valerie Neppl Dakota County