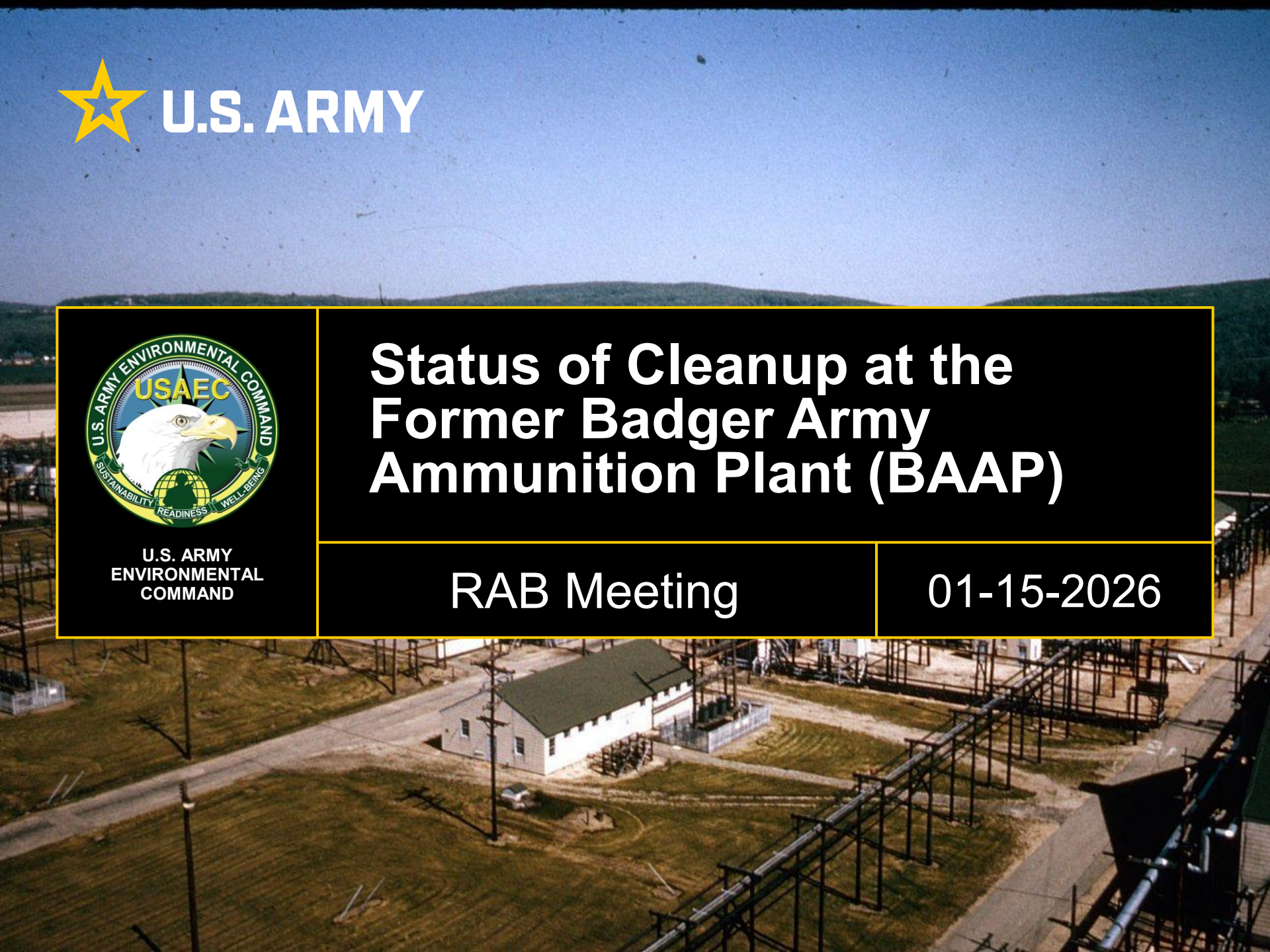

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U.S. ARMY ENVIRONMENTAL COMMAND

Status of Cleanup at the Former Badger Army Ammunition Plant (BAAP)

RAB Meeting

01-15-2026

Agenda – January 15, 2026

- Welcome and Opening Remarks
- Roll Call
- Review of the Minutes from July 2025 RAB
- Groundwater Sampling Update
- Groundwater Sampling Plan
- Project Management Updates
- USGS Groundwater Transport Modeling Study
- Future Meeting Dates

Welcome/Opening Remarks

To be determined from Co-chair

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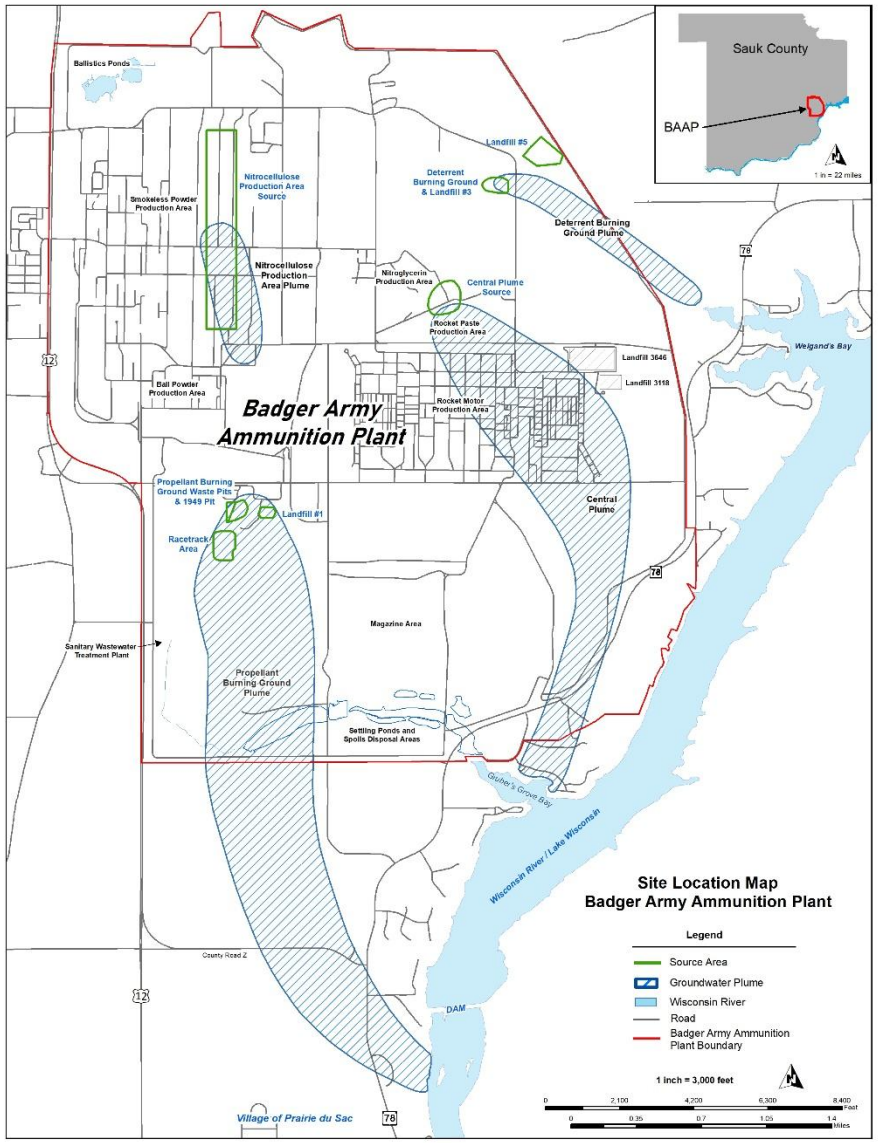
Groundwater Sampling Update



- June 2025 - Completed annual groundwater sampling of 51 monitoring wells and 3 residential wells. Sampling was conducted in the Central & DBG Plumes (WDNR submission - July 2025)
- August 2025 - Groundwater sampled in 64 residential wells - Annual event (WDNR submission - Sept 2025)
- September 2025 - Completed semi-annual groundwater sampling of 134 monitoring wells. Sampling conducted in the DBG, Nitrocellulose & PBG Plumes (WDNR submission - Nov 2025)
- November 2025 - Completed semi-annual groundwater sampling of 13 monitoring wells and 3 residential wells. Sampling was conducted in the Central & DBG Plumes (WDNR submission - Dec 2025)

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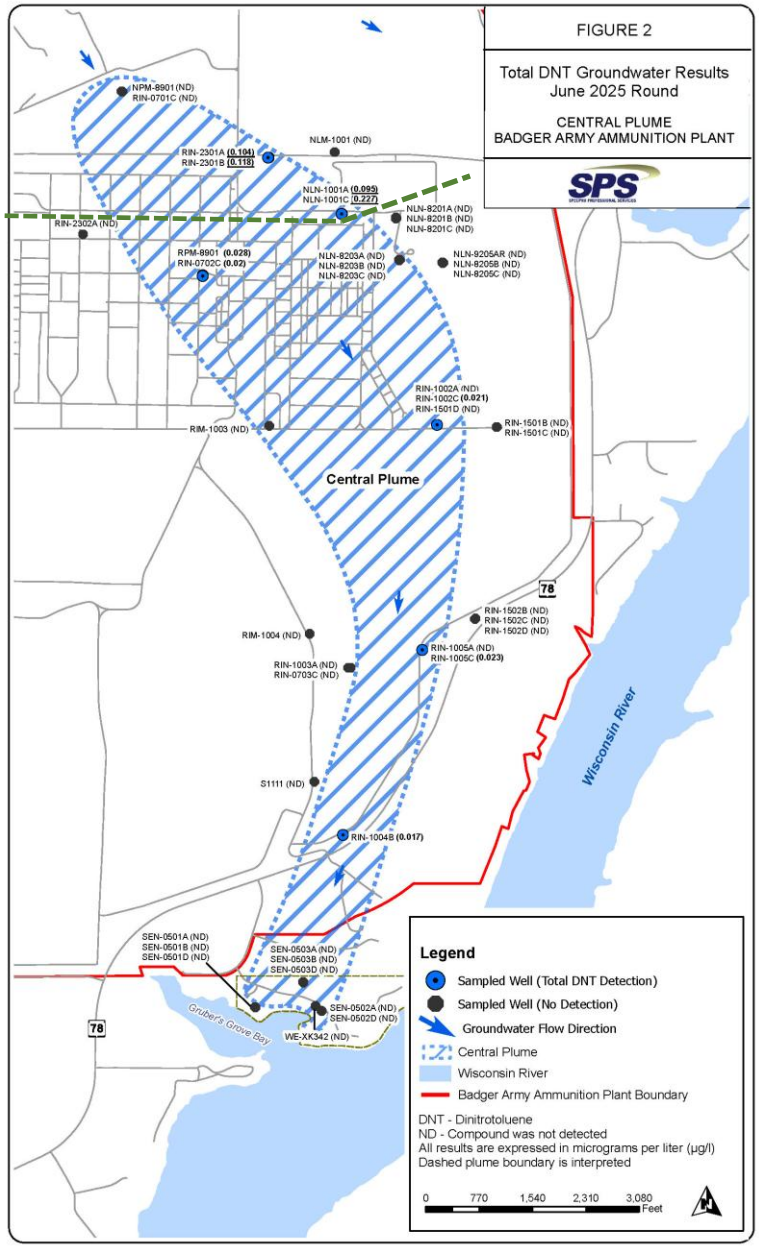
Dinitrotoluene (DNT) Groundwater Results Central Plume - June 2025

DNT > NR 140 ES

DNT < NR 140 ES

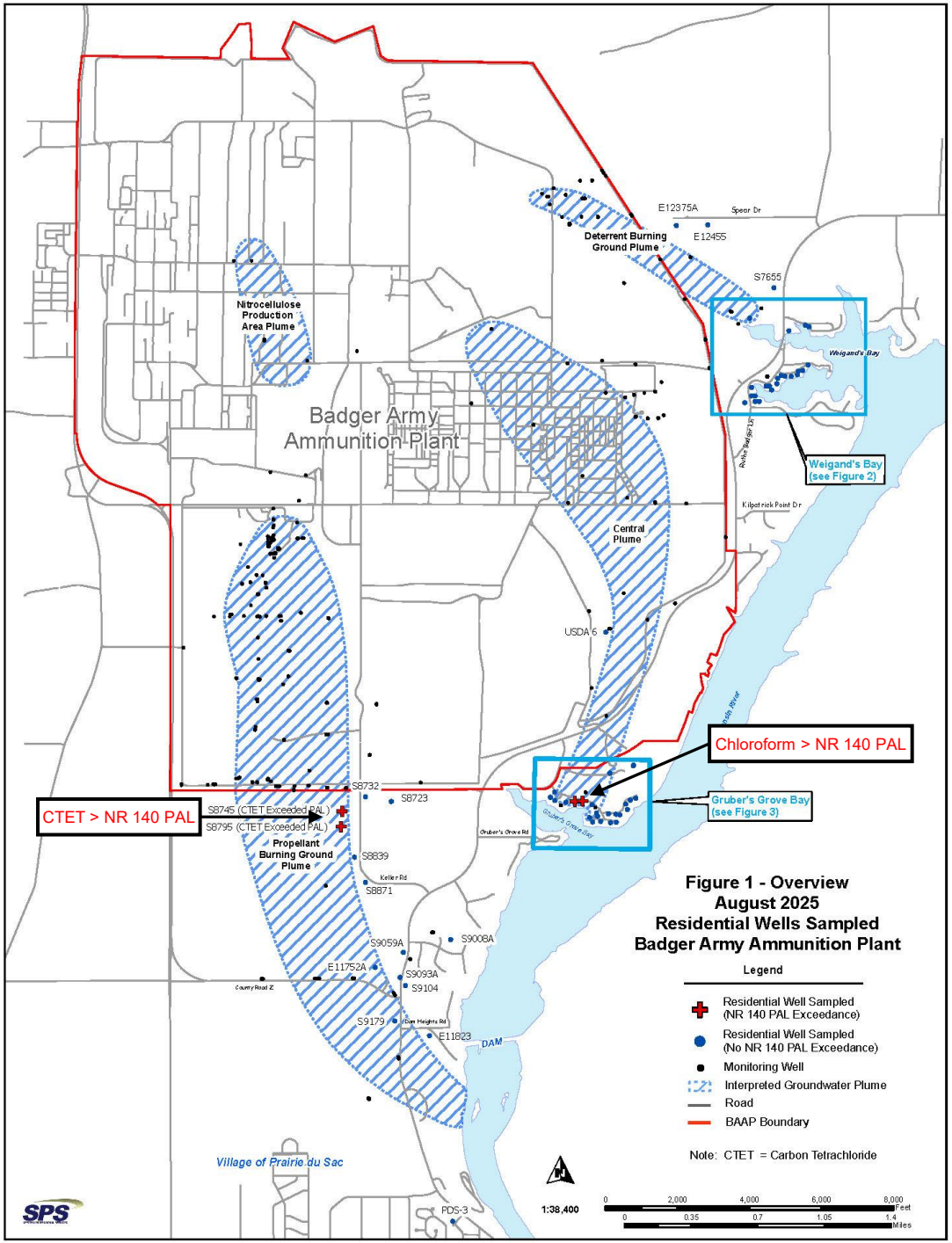


- 43 Monitoring wells sampled (Annual)
- One residential well sampled (Quarterly)
- DNT concentrations in the northern part of Central Plume have increased
- Decreasing DNT concentrations in the southern part of Central Plume
- DNT not detected in Water's Edge Subdivision

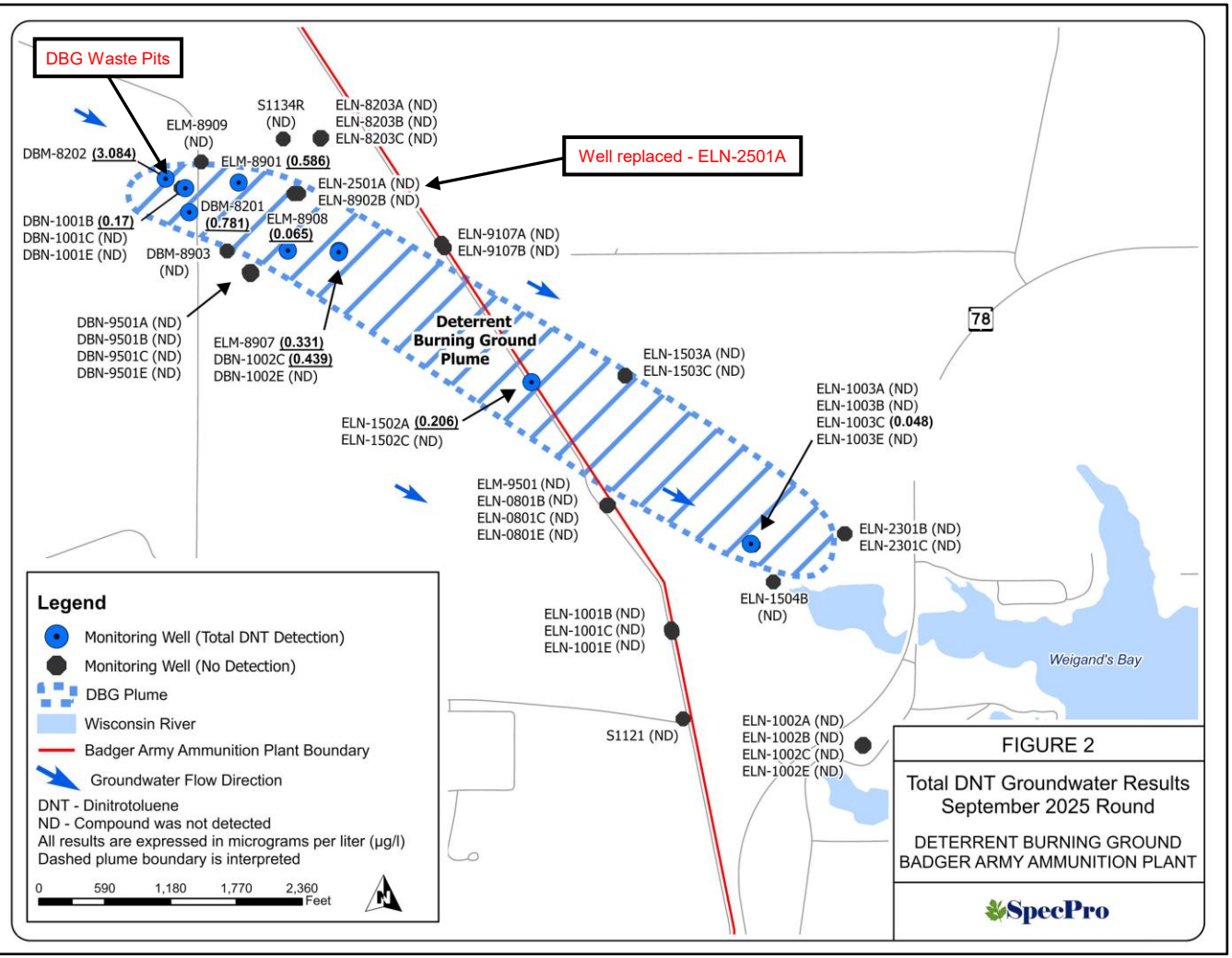
DNT NR 140 ES = 0.05 micrograms per liter (µg/L)
DNT NR 140 PAL = 0.005 micrograms per liter

Residential Well Sampling August 2025

- 64 Residential wells sampled
- Dinitrotoluene (DNT) not detected in all 64 wells
- Carbon Tetrachloride (CTET) > NR 140 PAL in two wells - PBG Plume
- Chloroform > NR 140 PAL in two wells – Central Plume

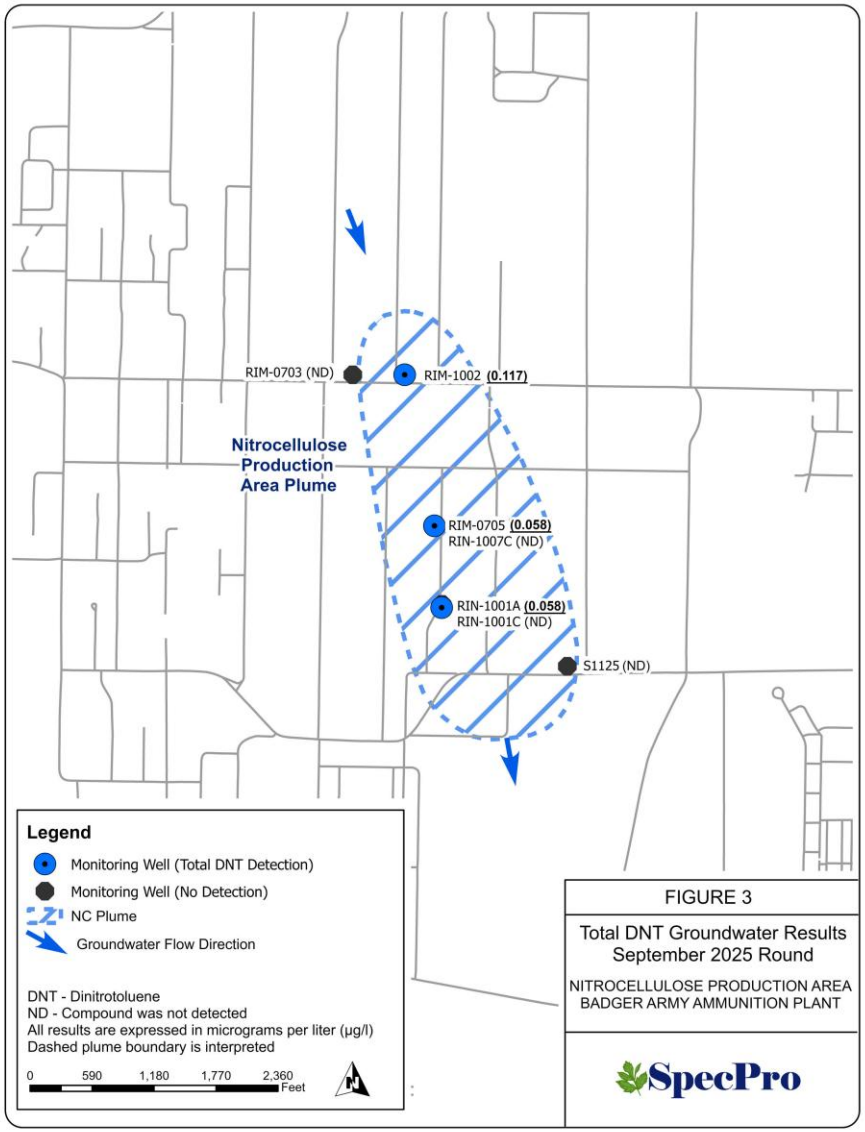


Dinitrotoluene Groundwater Results
Deterrent Burning Ground Plume - September 2025



- 47 Monitoring wells sampled
- DNT > NR 140 ES or PAL in nine wells
- Highest DNT concentration in DBM-8202 = 3.084 µg/L (DBG Waste Pits)
- Decreasing DNT concentrations downgradient of DBG Waste Pits

Dinitrotoluene Groundwater Results
NC Area Plume - September 2025



- Seven Monitoring wells sampled
- DNT > NR 140 ES in three wells
- Highest DNT concentration in RIM-1002 = 0.117 µg/L
- Stable DNT concentrations

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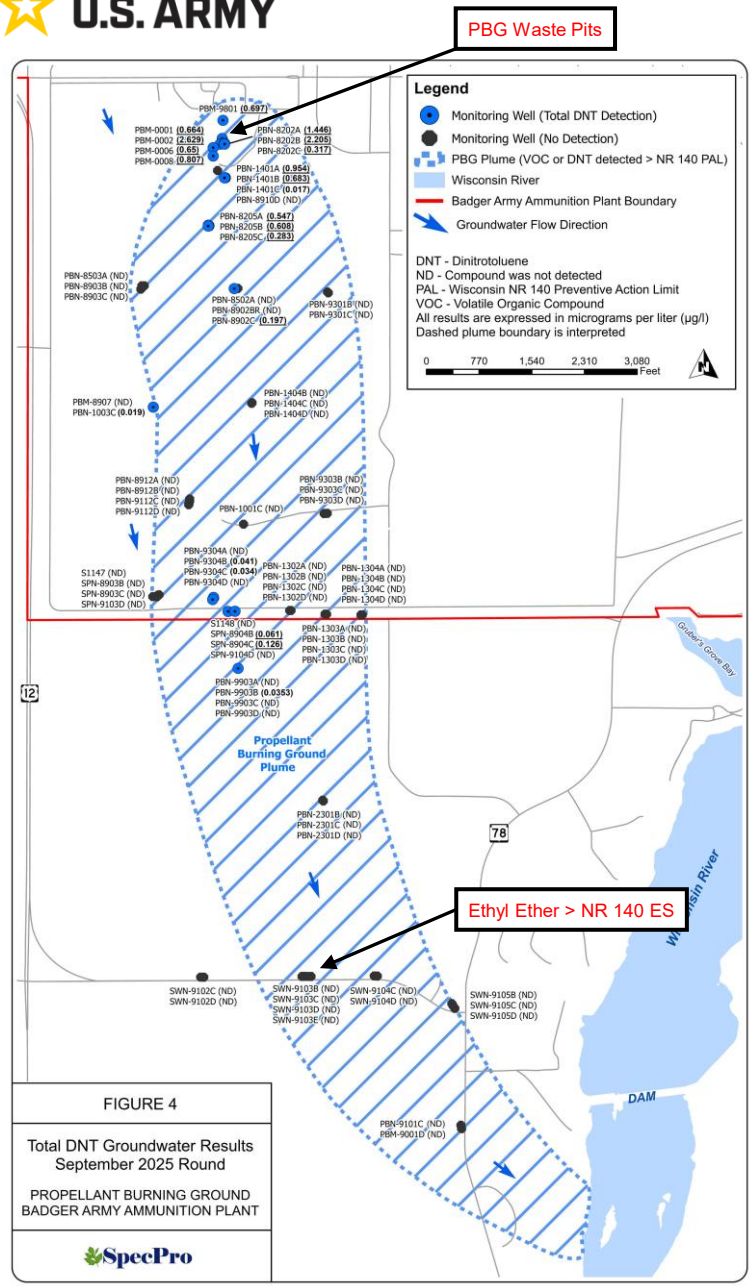
Groundwater Results
Propellant Burning Ground Plume - September 2025



- 80 Monitoring wells sampled
- DNT > NR 140 ES in 16 wells
- DNT > NR 140 PAL in 6 wells
- Highest DNT concentration in PBM-0002 = 2.629 µg/L (PBG Waste Pits)
- Since 2024, DNT concentrations are stable or decreasing
- CTET > NR 140 ES in 4 wells (PBN-8502A, PBN-9903C, PBN-9101C & PBM-9001D) [CTET decreasing since September 2017]
- Ethyl Ether > NR 140 ES in SWN-9103D [above NR 140 ES since April 2023]

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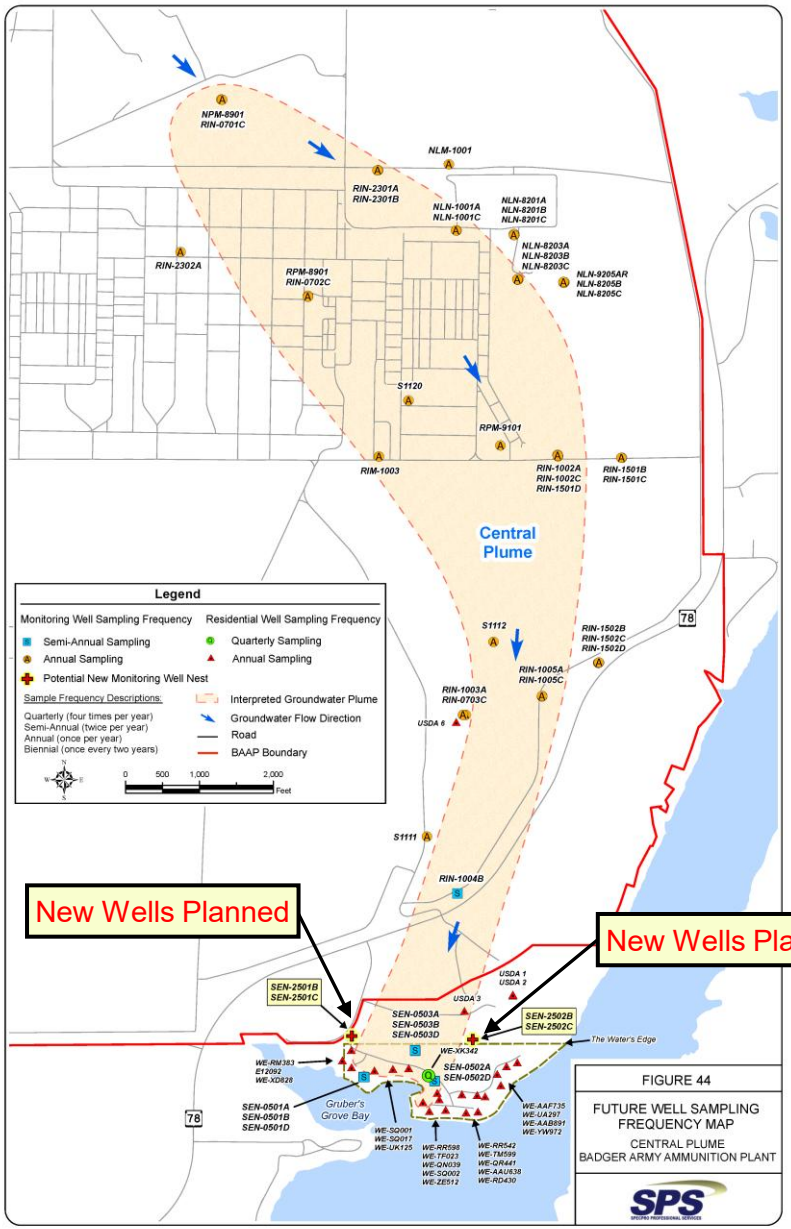
Groundwater Sampling Plan 2026
Central Plume



- 45 Monitoring wells included
  - DNT & VOCs (8 wells)
- 25 Residential wells included
  - DNT & VOCs (8 wells)
- Army proposed to install 4 new monitoring wells

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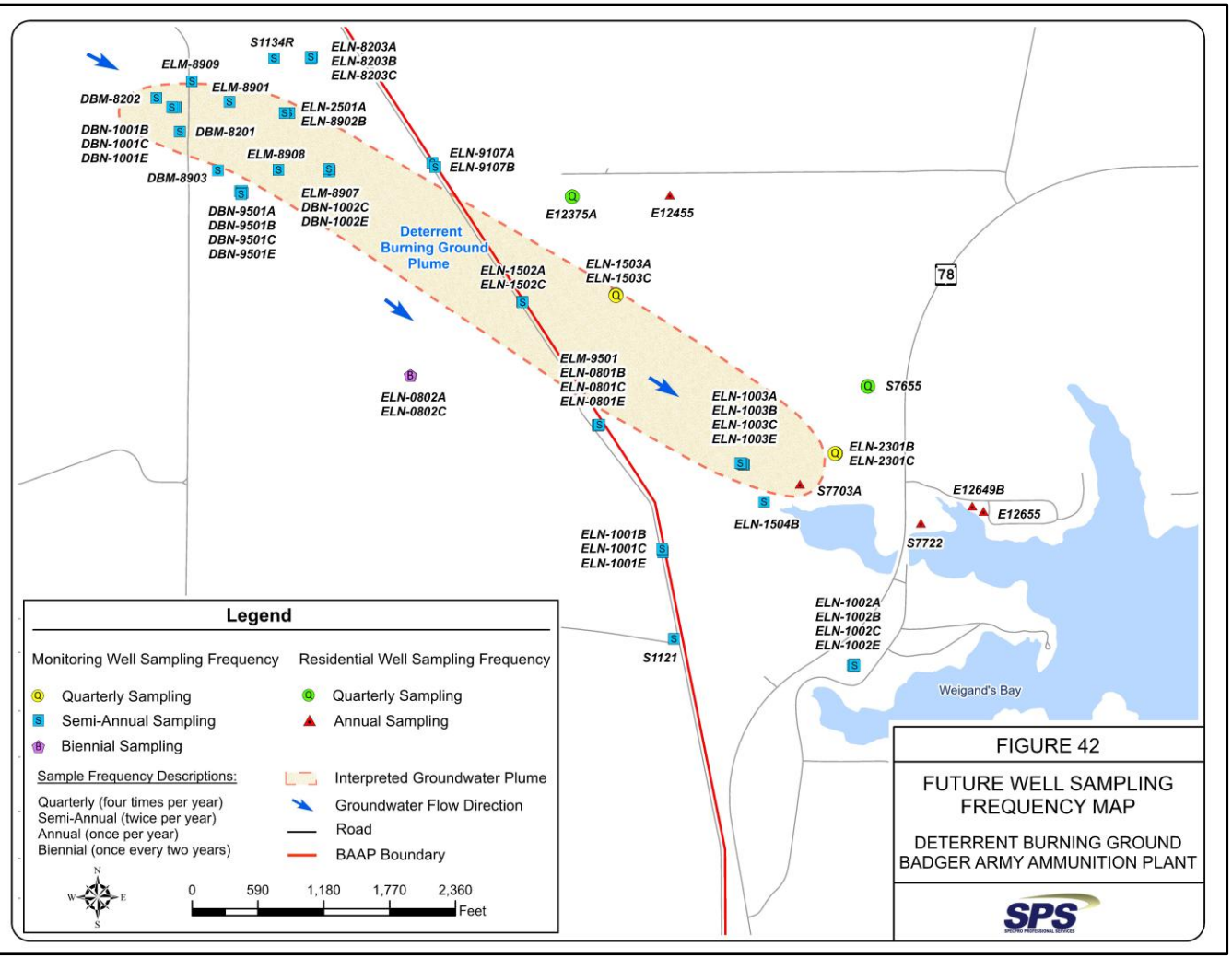
Groundwater Sampling Plan 2026
Deterrent Burning Ground



- 49 Monitoring wells included
  - DNT, VOCs & Sulfate (16 wells)
- 7 Residential wells included
  - DNT & VOCs

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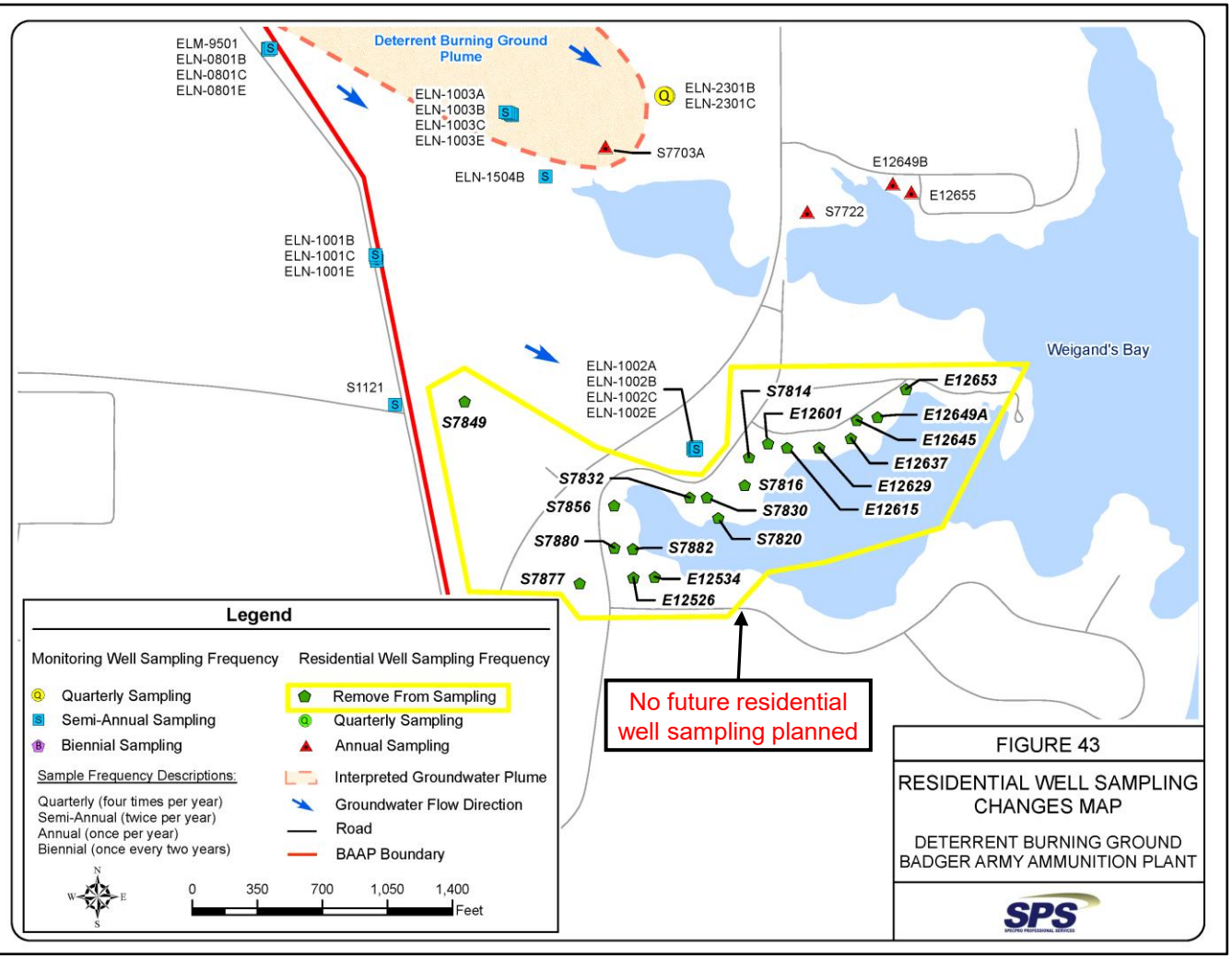
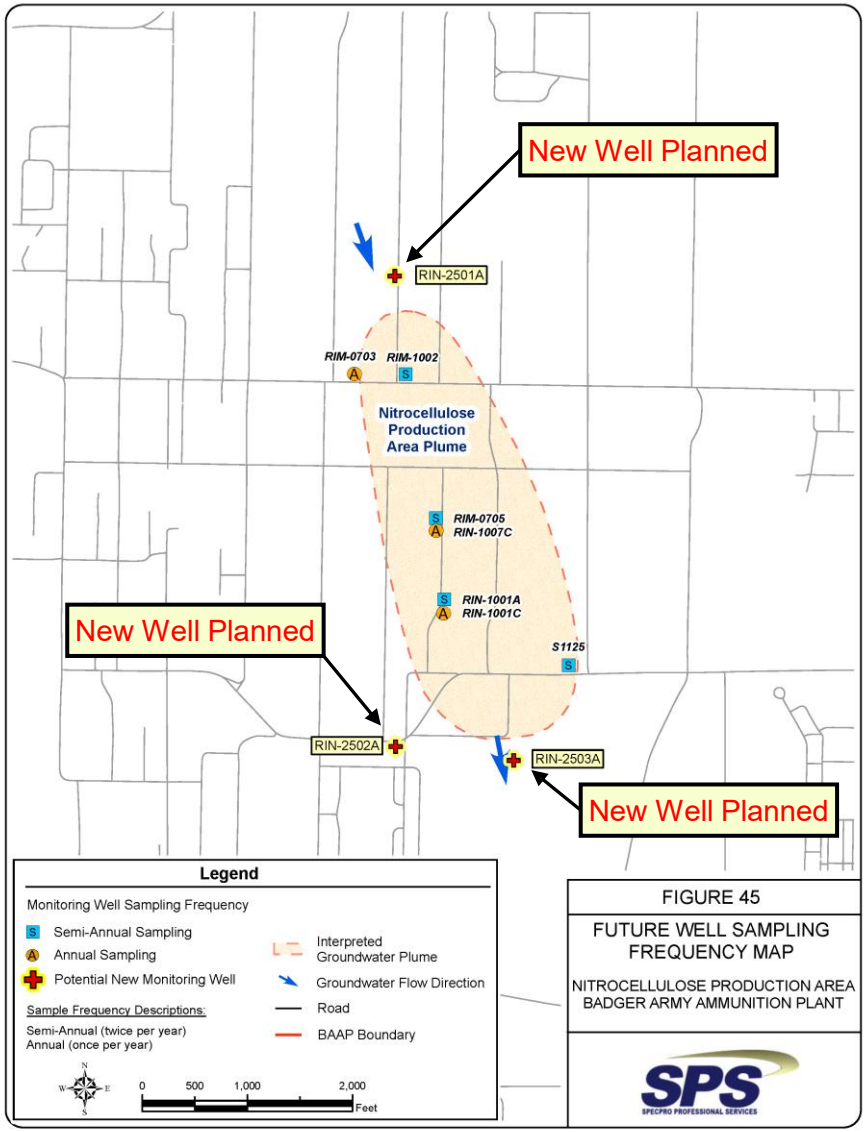
Groundwater Sampling Plan Changes
Deterrent Burning Ground



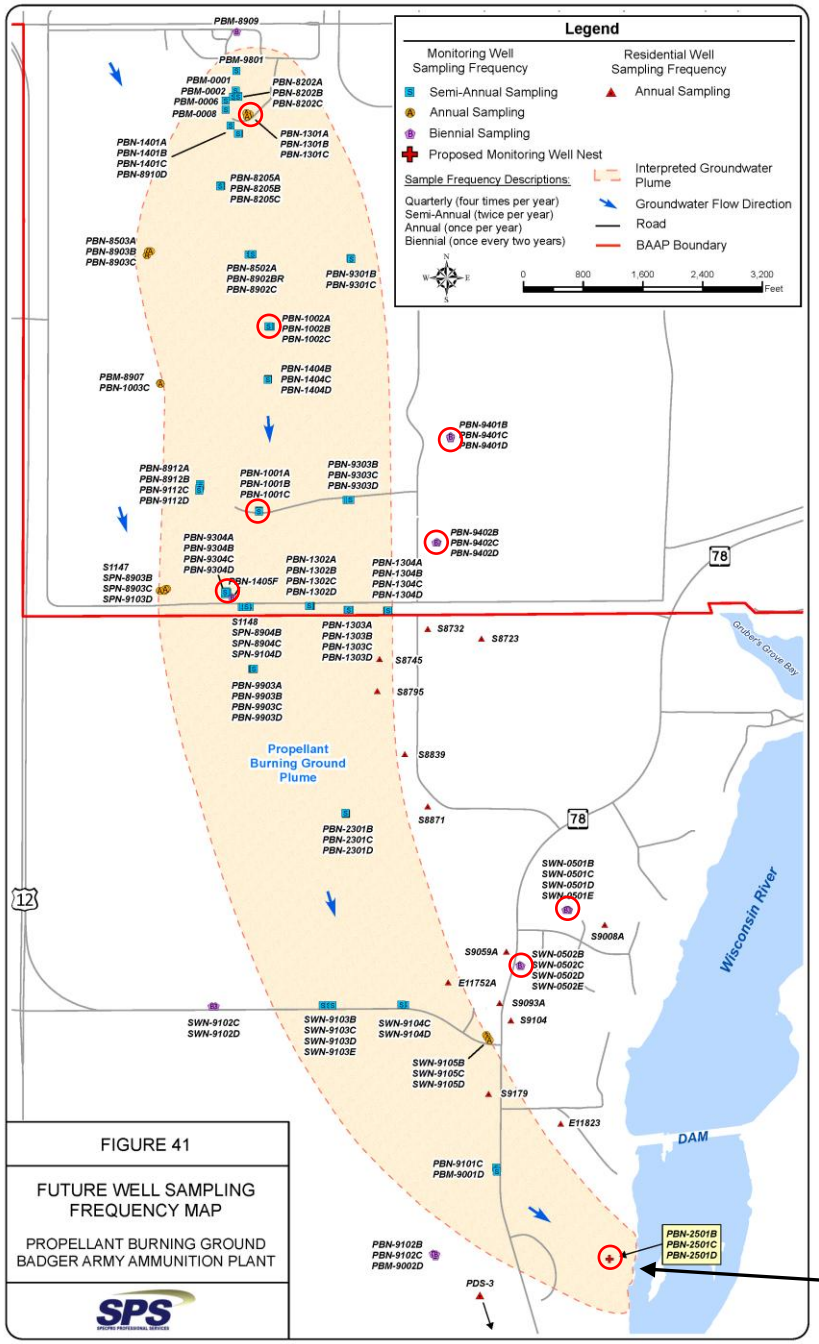
- 19 Residential wells will no longer be sampled
- Sampling frequency was reduced due to the low risk of BAAP contamination
- Army had performed DNT & VOC sampling since 2007

Groundwater Sampling Plan 2026
NC Area Plume



- 7 Monitoring wells included (DNT)
- Army proposed to install 3 new monitoring wells

Groundwater Sampling Plan 2026
Propellant Burning Ground



- 107 Monitoring wells included
  - DNT, VOCs & nitrate (15 wells)
- 14 Residential wells included
  - DNT & VOCs
- Army added 25 existing monitoring wells
- Army proposed to install 3 new monitoring wells

New Wells Planned

Project Management Updates

Proposed Plan for Site-Wide Groundwater

- Subject to available funding, the Army is considering conducting Bench and Pilot scale testing of the proposed remedy.
- Record of Decision will be delayed; Army provided responses to public comment received in July 2025. Will be included in the Administrative Record.

Gruber Grove Bay Data Gap Investigation

- Draft DGI Report submitted to WDNR April 10, 2025
- WDNR comments received June 27, 2025
- Final Draft DGI report with responses to WDNR comments submitted August 22, 2025.
- WDNR comments received September 16, 2025
- Final DGI Report with responses to WDNR comments submitted December 12, 2025.
- Feasibility Studies will be completed after DGI completion

PFAS Remedial Investigation

- Contract acquisition subject to funding availability

Project Management Updates

Settling Pond Site Inspection

- Included Final Creek, Settling Ponds 1 & 3, and Spoils Disposal Areas I, II, III, IV, & V
- Site Inspection found the presence of soil contamination
- Site Inspection Sampling Summary sent to WDNR on April 10, 2025
- Army currently reviewing Draft Site Inspection Report
- Site signs were installed during early July 2025
- Draft Supplemental Inspection (SI) report submitted to WDNR November 21, 2025

Long-Term Management Acquisition

- 5-year contract awarded September 25, 2025 to continue with landfill inspections and sampling, cap maintenance, and on and off-post groundwater sampling

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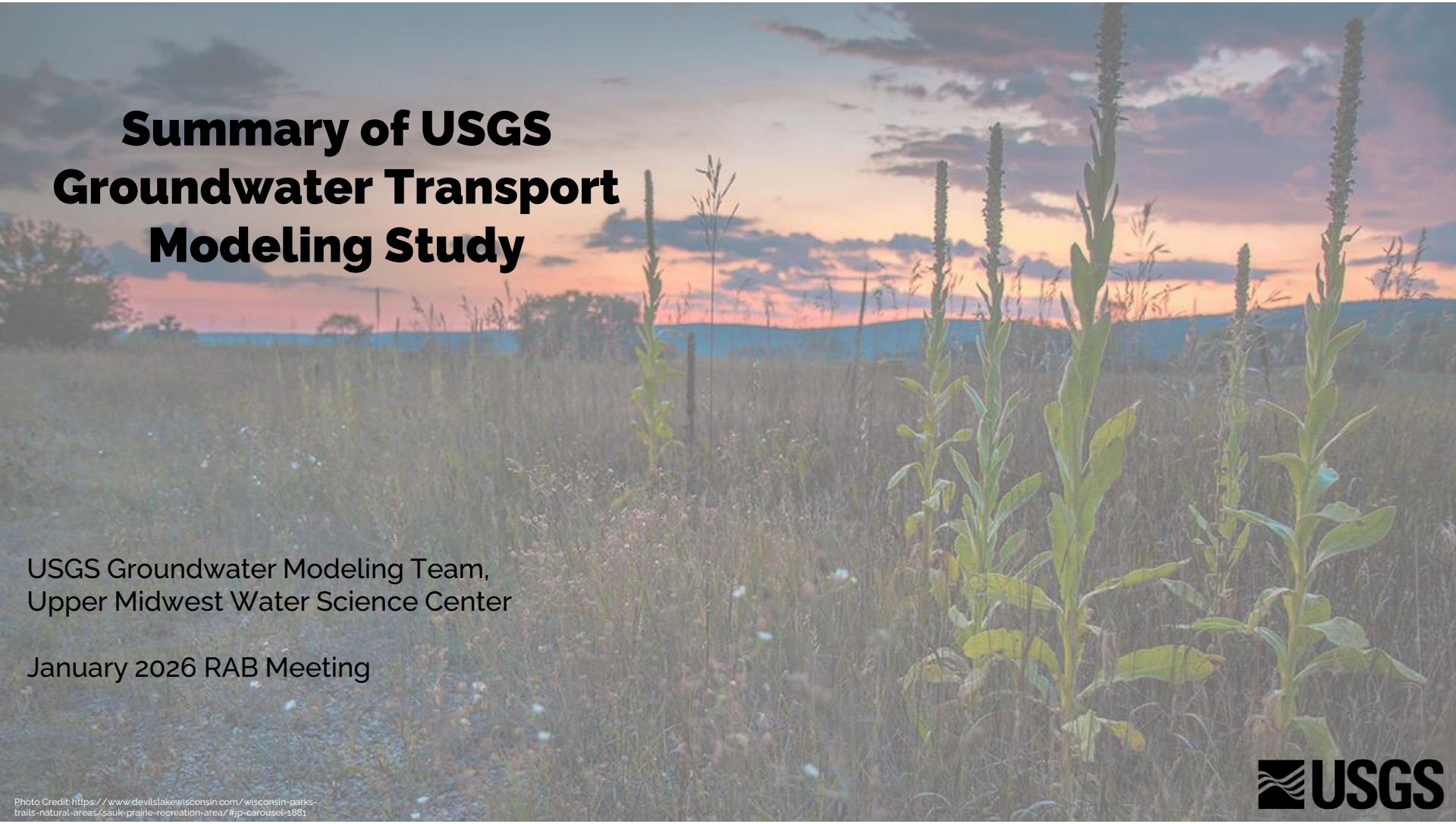
Summary of USGS Groundwater Transport Modeling Study



USGS Groundwater Modeling Team,
Upper Midwest Water Science Center

January 2026 RAB Meeting

Photo Credit: https://www.devilslakewisconsin.com/wisconsin-parks-trails-natural-areas/sauk-prairie-recreation-area/#jp-carousel-1881

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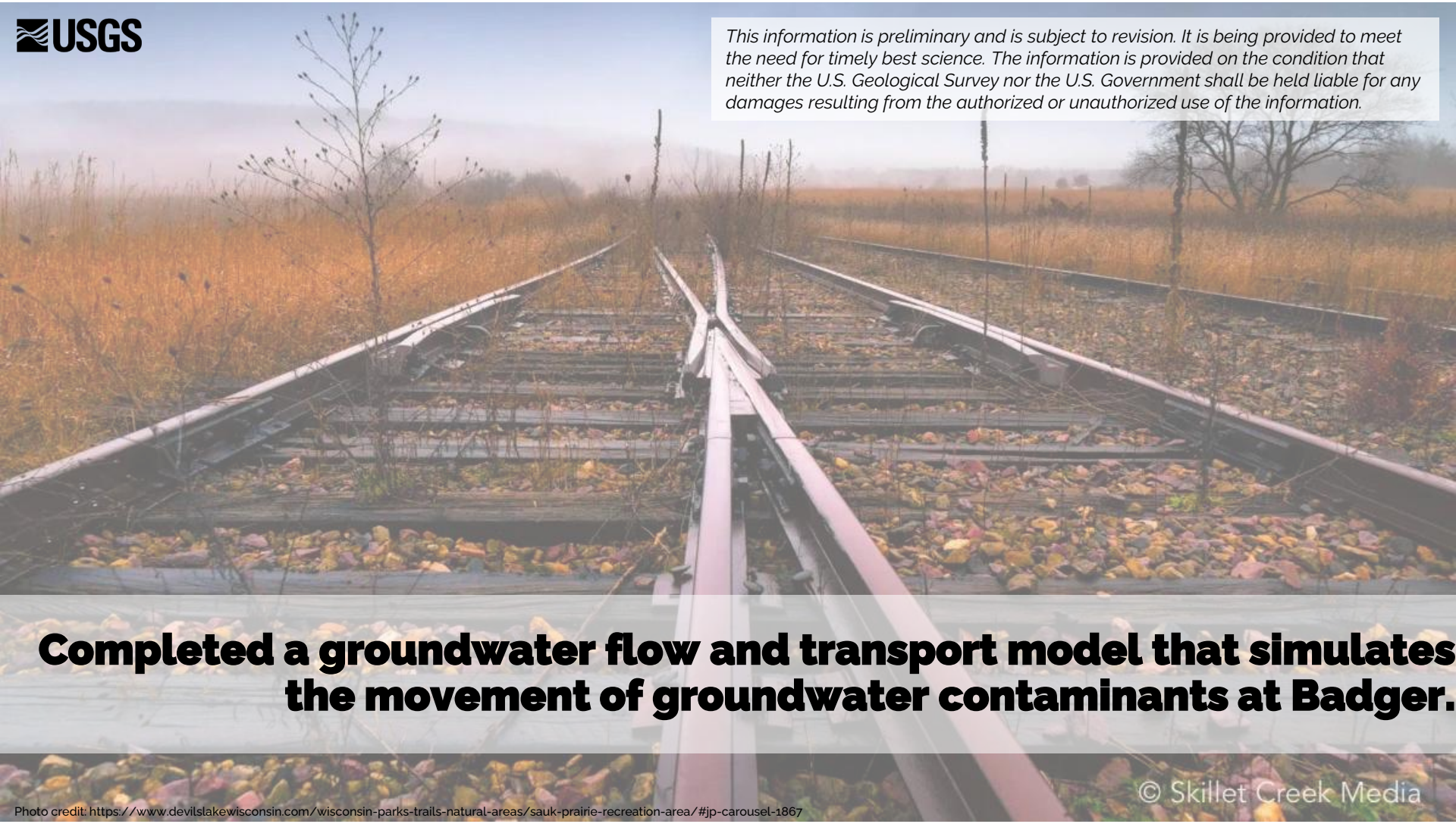
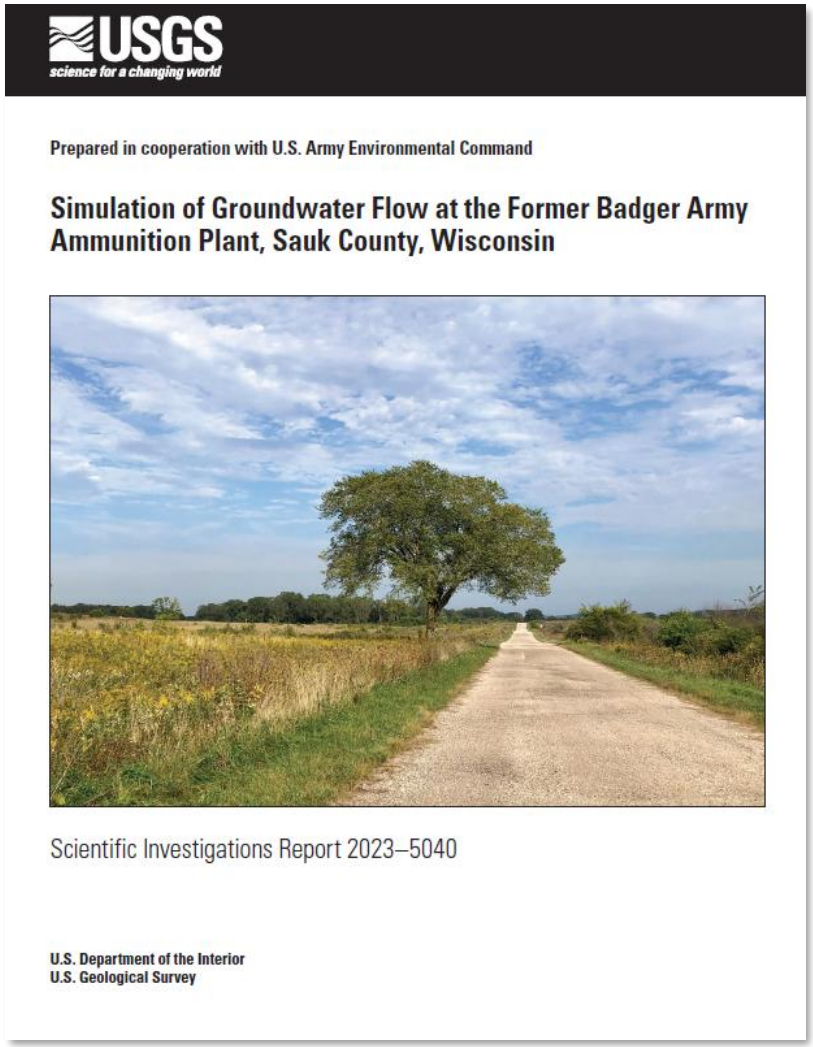
This information is preliminary and is subject to revision. It is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information.



Completed a groundwater flow and transport model that simulates the movement of groundwater contaminants at Badger.

Photo credit: https://www.devilslakewisconsin.com/wisconsin-parks-trails-natural-areas/sauk-prairie-recreation-area/#jp-carousel-1867


USGS
science for a changing world

Prepared in cooperation with U.S. Army Environmental Command

Simulation of Groundwater Flow at the Former Badger Army Ammunition Plant, Sauk County, Wisconsin

Scientific Investigations Report 2023–5040

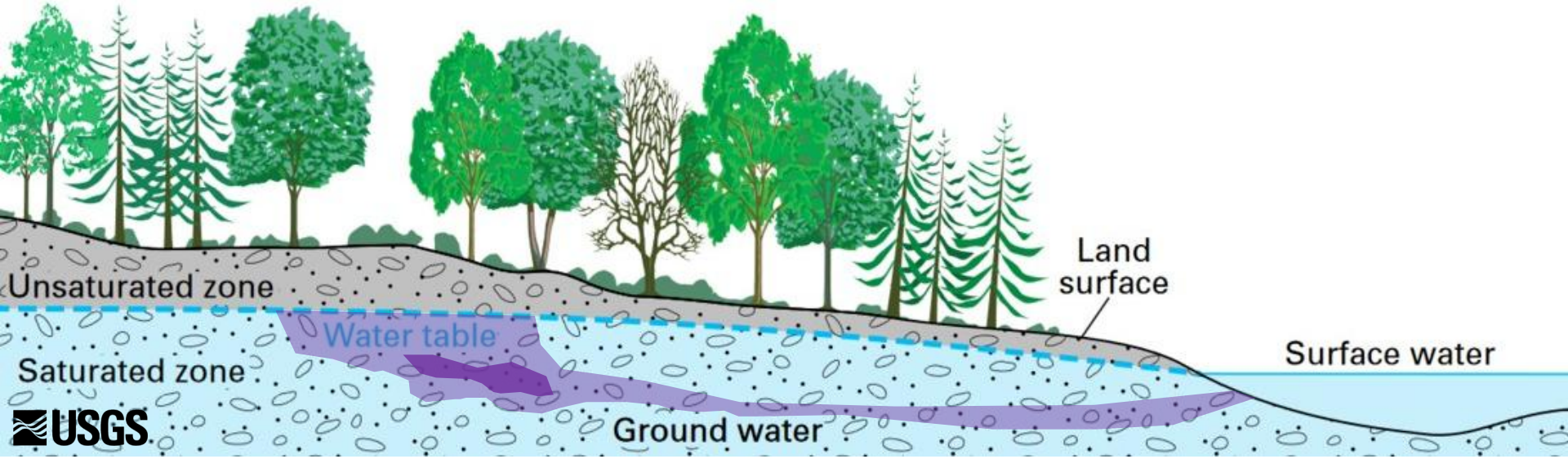
U.S. Department of the Interior
U.S. Geological Survey

Transport model builds upon previous USGS flow modeling work

- Flow model that characterizes the groundwater flow system at Badger
  - Where is groundwater moving?
  - How does groundwater interact with the Wisconsin River?
  - How does the flow of groundwater control plume movement?
- This is the foundation of the groundwater transport model
  https://pubs.usgs.gov/publication/sir20235040

What is a groundwater transport model?

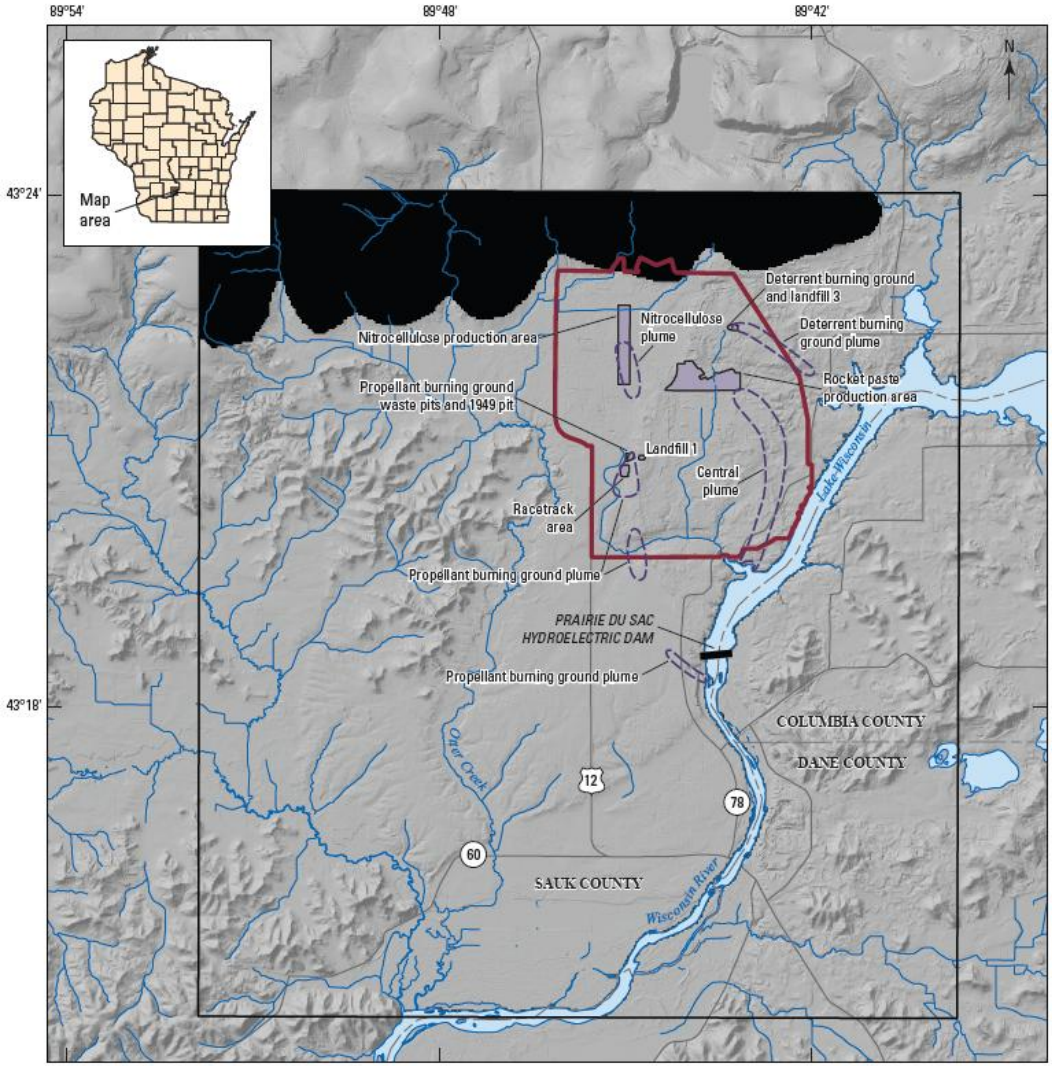
- A groundwater transport model uses mathematical equations to simulate how a contaminant moves through the groundwater and interacts with the surrounding aquifer materials



What were the goals for the Badger model?

The Badger model is a tool that can help answer questions like:

1. Where is the contamination most likely to be, and are the current monitoring wells in the right places to track it?
2. What might the contamination look like in the future—20 years from now?
3. If a bioremediation treatment was used, how much could it reduce contamination?



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How was the model developed?

Photo credit:
https://www.devilslakewisconsin.com/wisconsin-parks-trails-natural-areas/sauk-prairie-recreation-area/

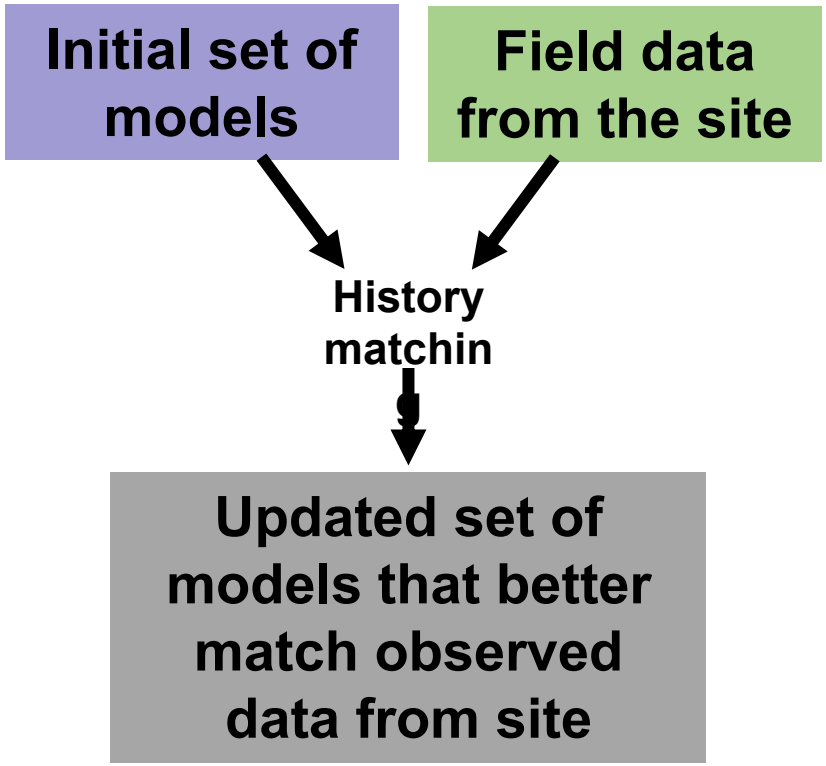
Model Development Process

1. Built an initial model using best available information for the site.

2. Refined the model through "history matching"

   - Tuned model parameters to improve the agreement between field data and model predictions

   - Used many different types of site data including:
     - Contaminant concentrations at wells
     - Plume geometry
     - Historical estimates of total dissolved mass



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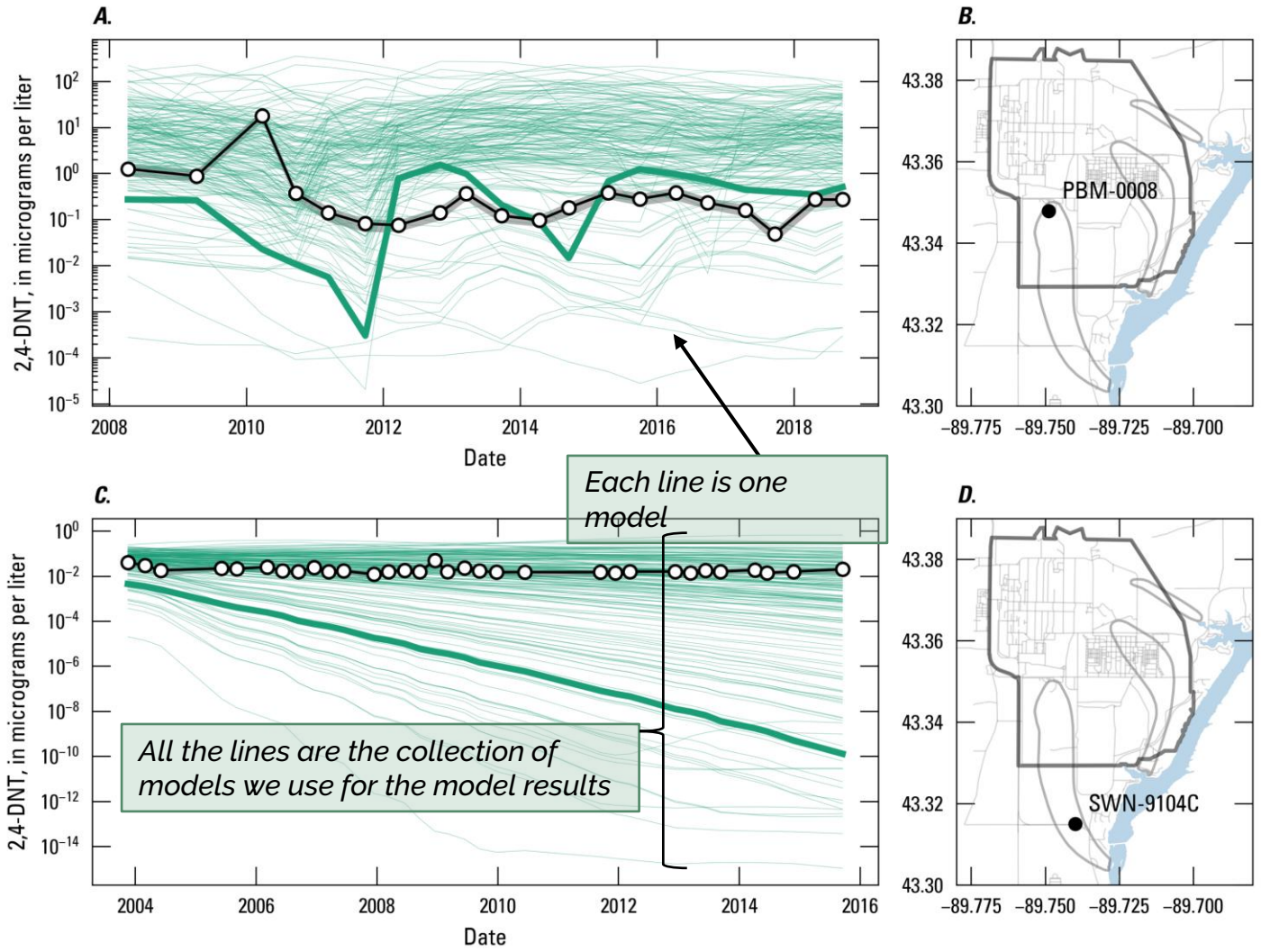
Preliminary Information-Subject to Revision. Not for Citation or Distribution.

History Matching Example – 2,4 DNT



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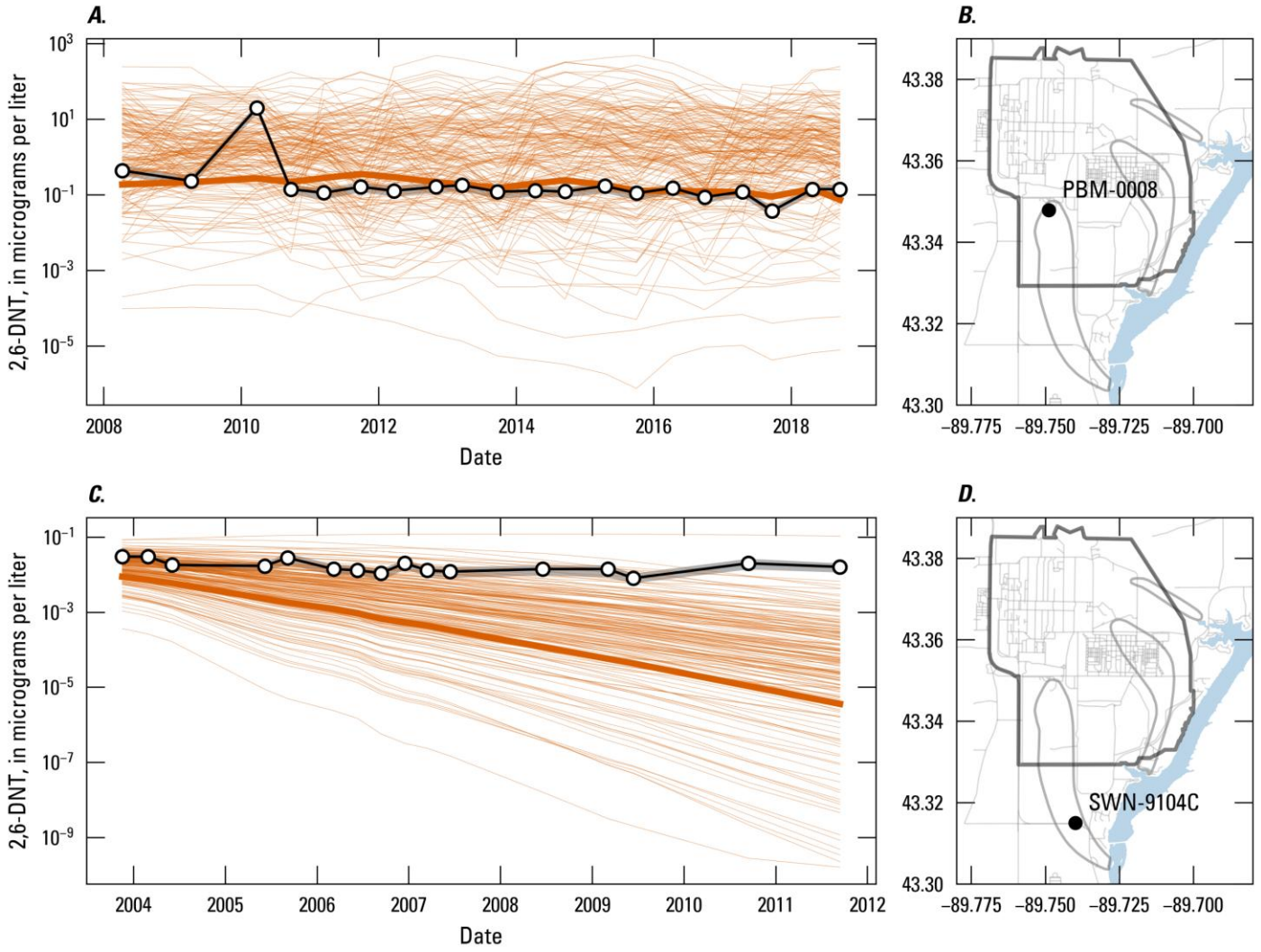
History Matching Example – 2,6 DNT



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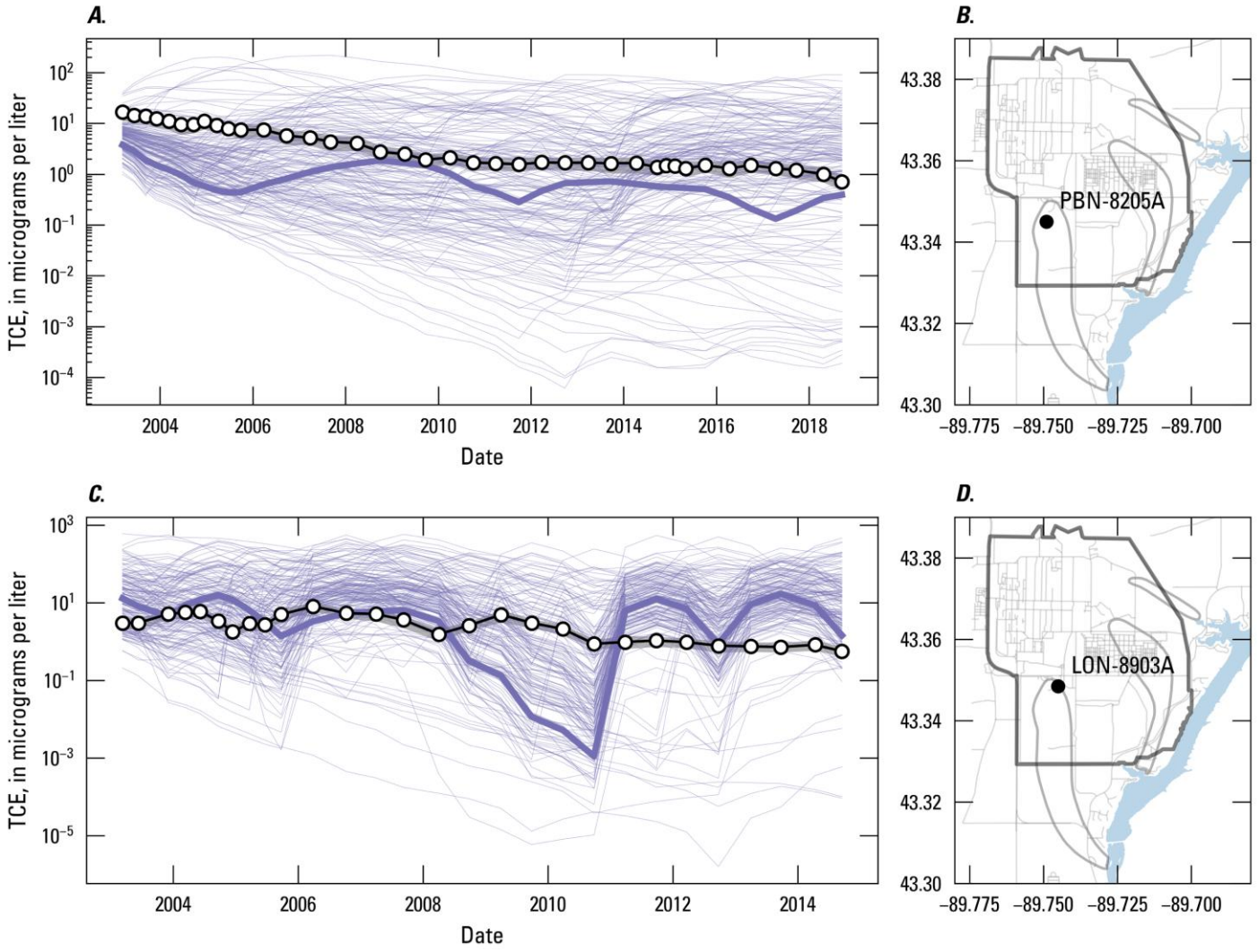
History Matching Example– TCE



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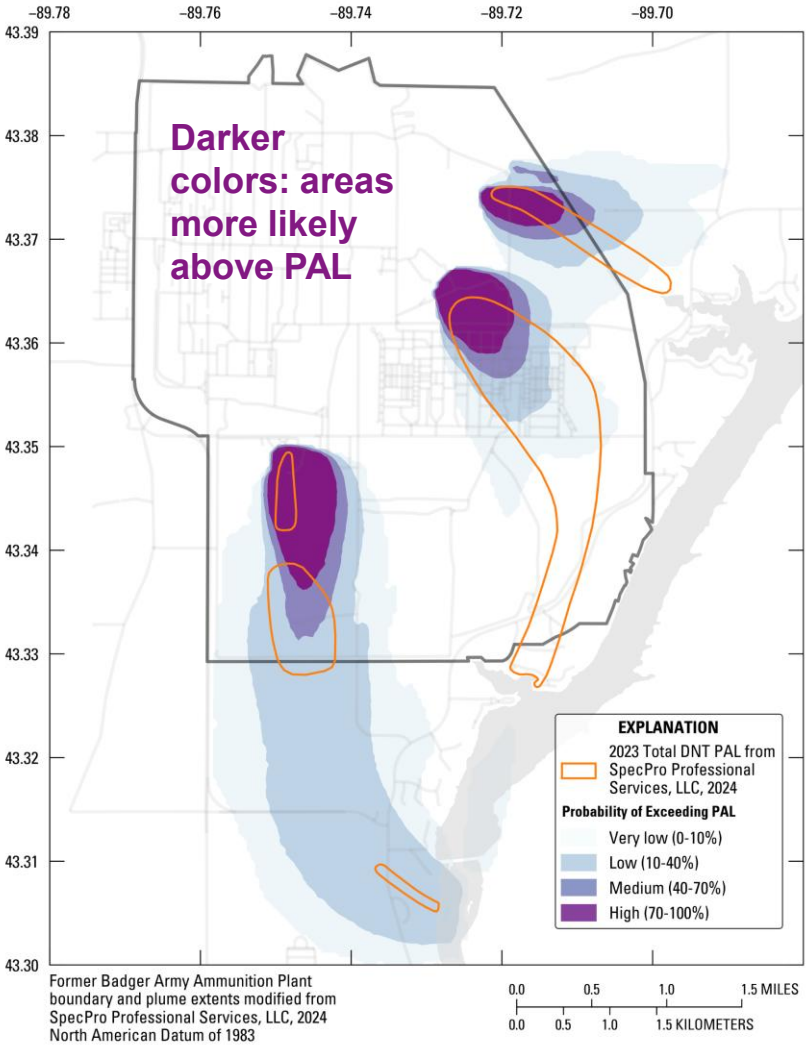
Simulated Plume Footprints

Photo credit: Martha Nielsen, USGS



Probability of 2,4 + 2,6 DNT exceeding the Total DNT PAL at the end of history matching

1. Determine area of plume exceeding the Preventive Action Limit (PAL) for each model
2. Compute probability of PAL exceedance using all models
3. Model simulates two of the six DNT isomers (2,4- and 2,6-DNT). Their sum approximates Total DNT behavior but under-simulates the total mass relative to a true total DNT
4. Central plume more uncertain – fewer monitoring wells, poorly defined source. Uncertainty in DBG flow field.
5. Probability map can be used to assess well network

Preliminary Information-Subject to Revision. Not for Citation or Distribution.

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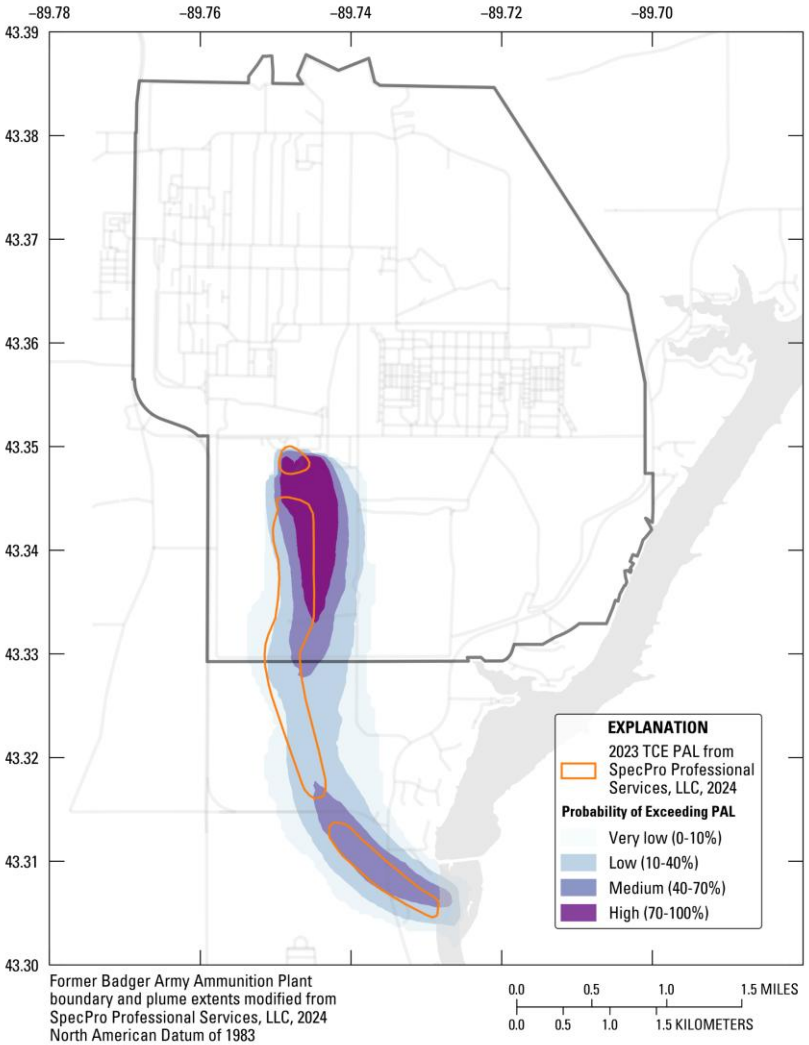

Probability of TCE exceeding the PAL at the end of history matching

Simulated TCE in PBG in good agreement with site conditions

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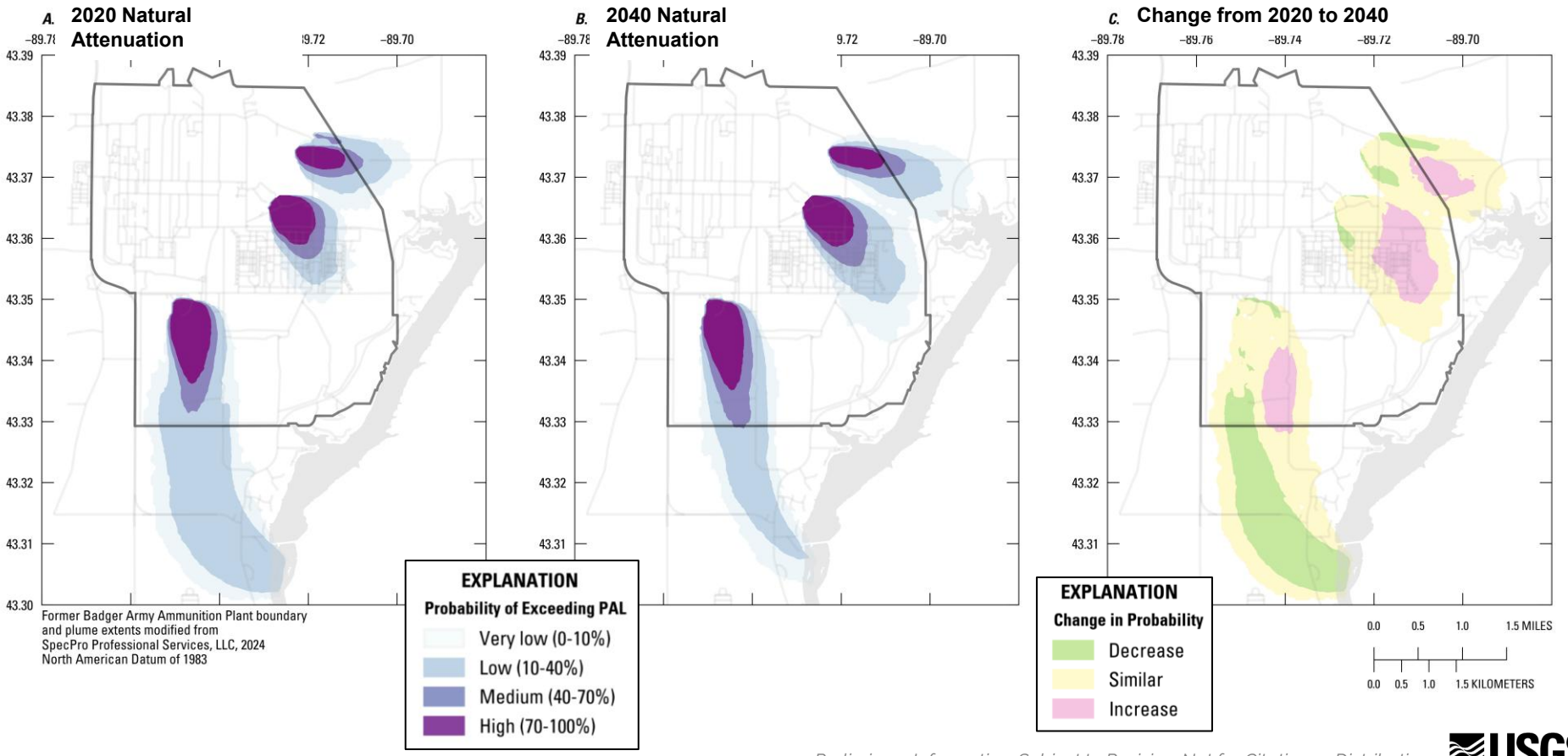
Photo credit: https://www.devilslakewisconsin.com/wisconsin-parks-trails-natural-areas/sauk-prairie-recreation-area

How might the DNT plumes look in 2040 without remediation?



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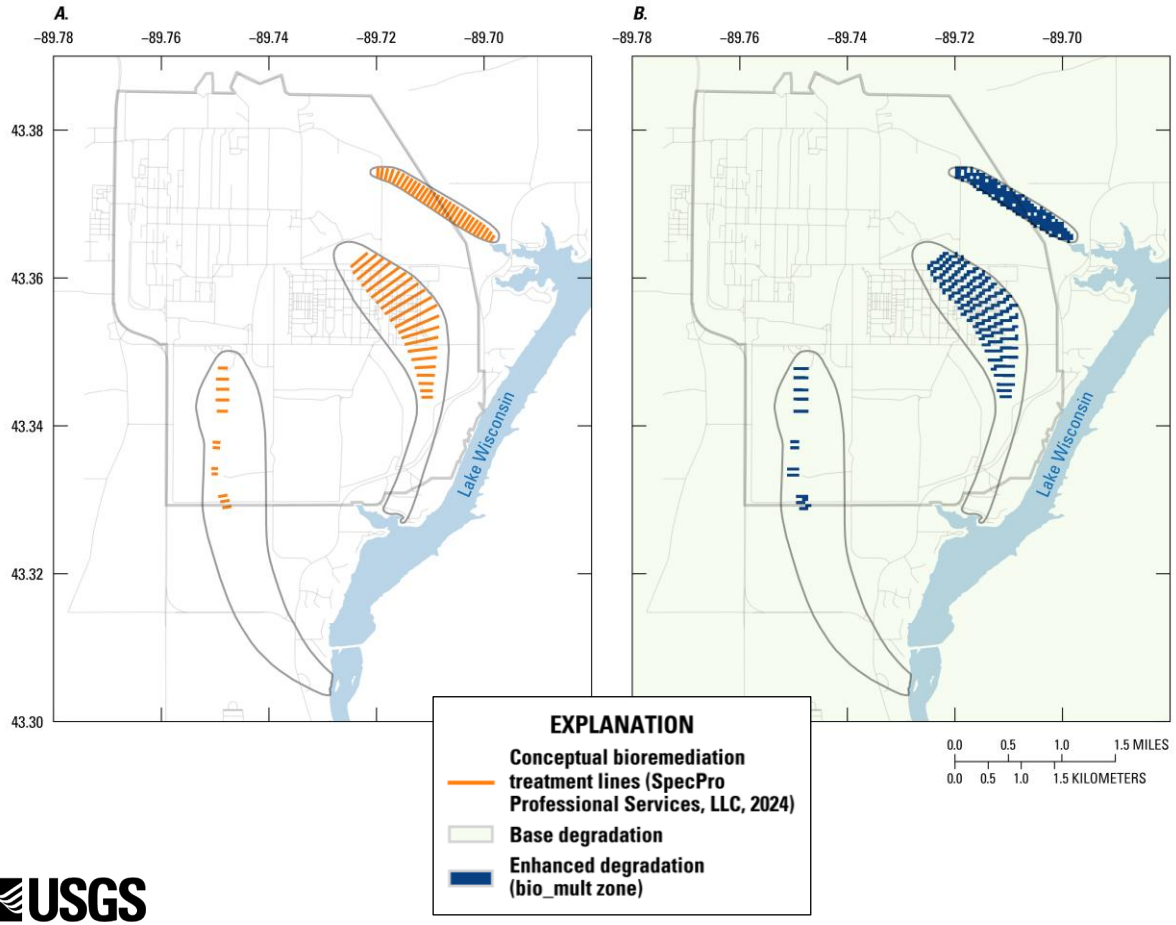
Understanding the effects of bioremediation



- Simulated bioremediation scenarios as a proof-of-concept analysis
- Conceptual treatment system design from the Proposed Plan for Site-Wide Groundwater
- Used best available literature information on DNT degradation
- Modeled high- and low-effectiveness scenarios to understand the range of possible responses to treatment
- Model could be easily updated as part of the treatment design process

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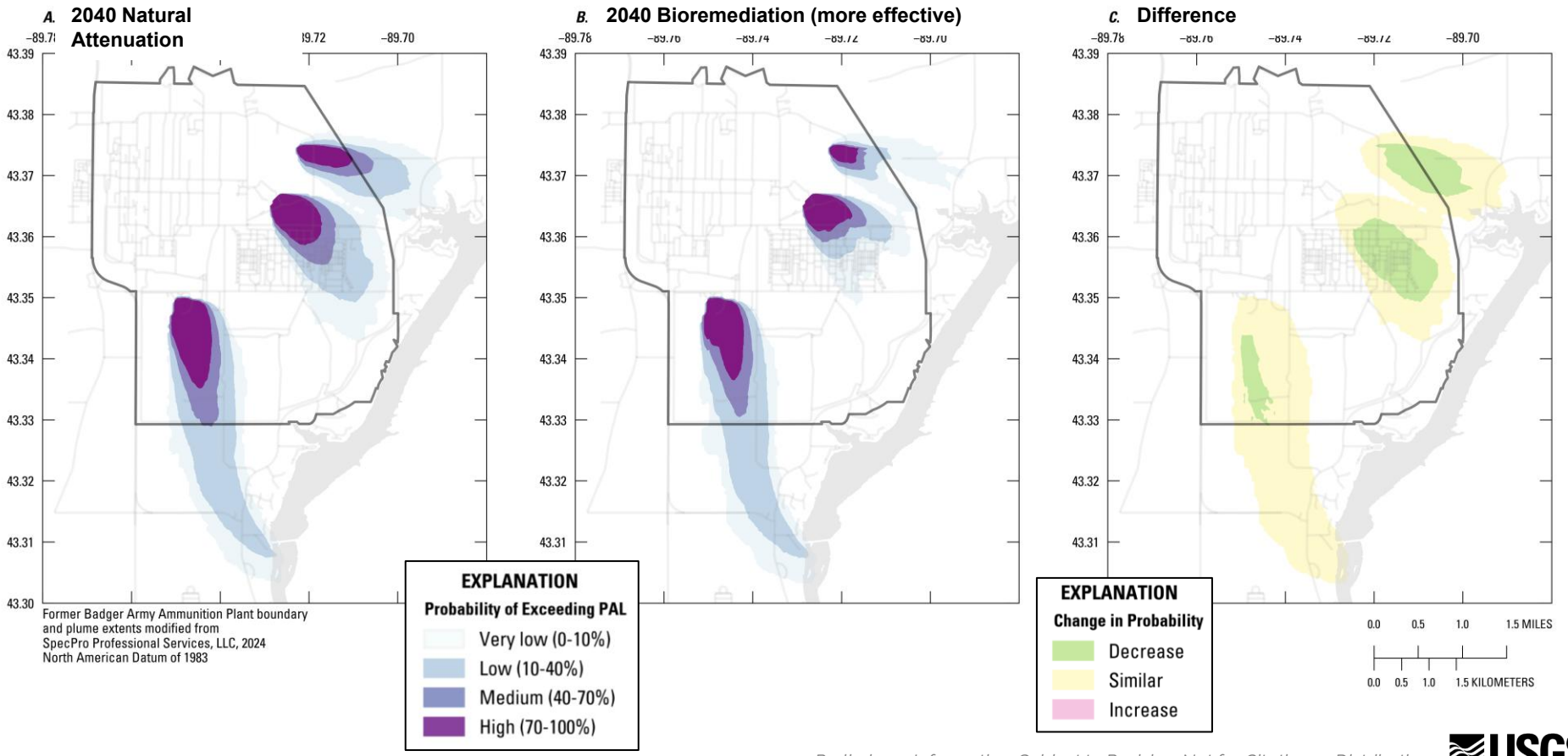
How might the DNT plumes look with *more effective* bioremediation?



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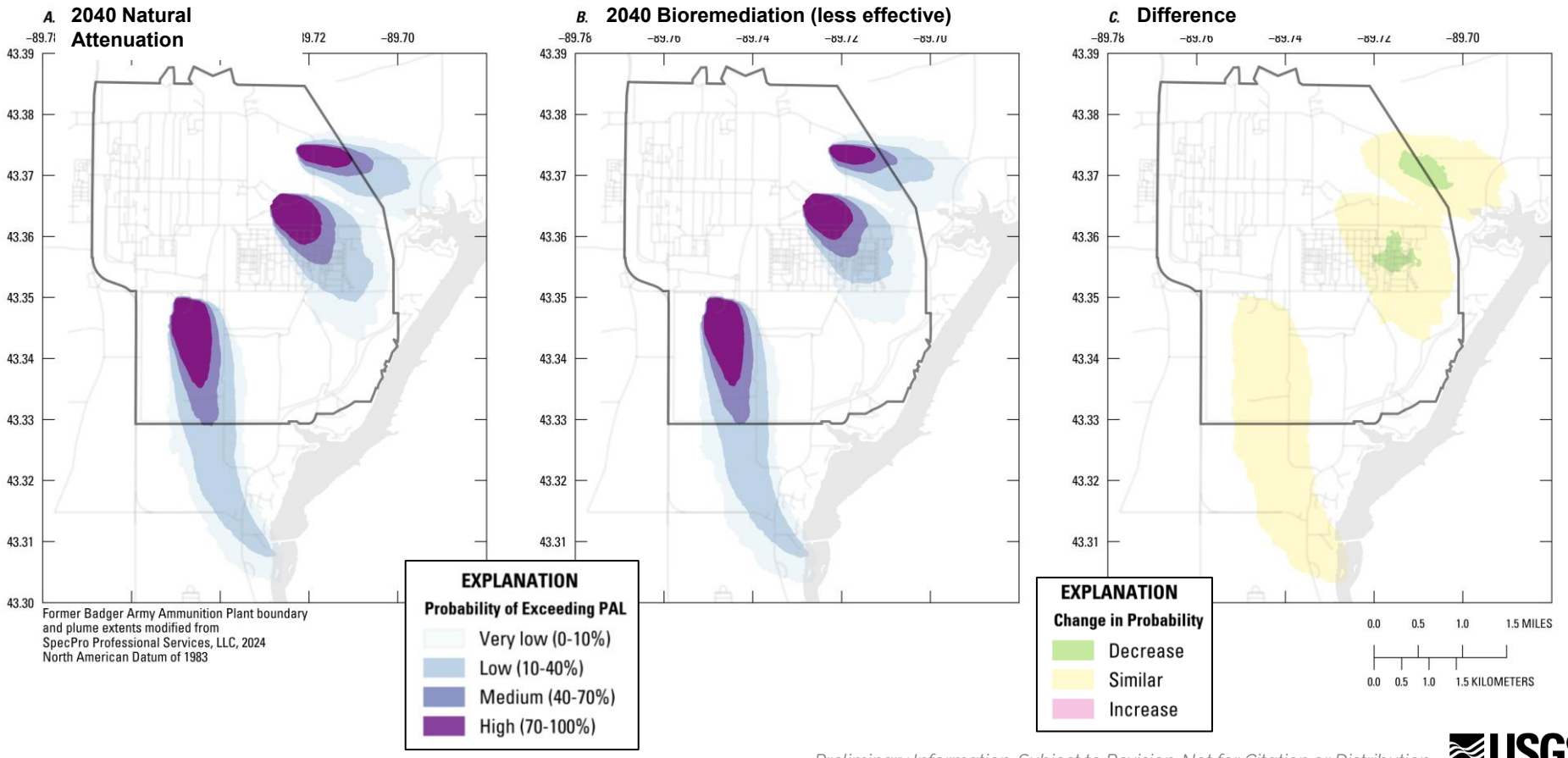
How might the DNT plumes look with *less effective* bioremediation?



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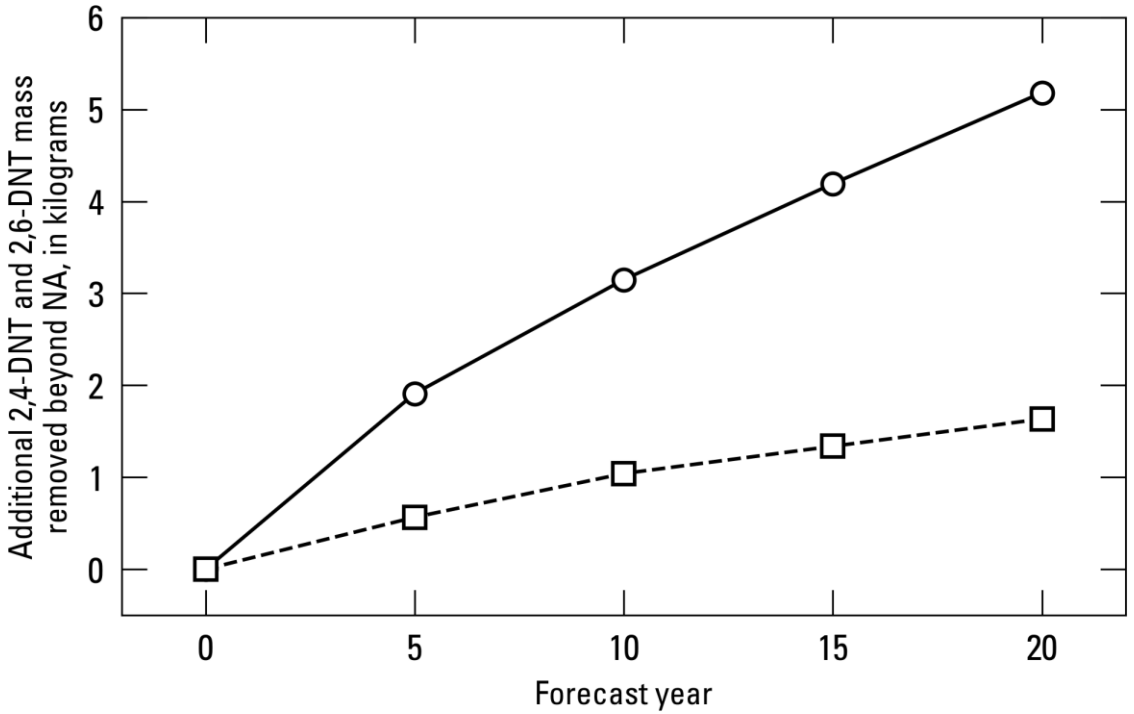
Forecasted DNT mass removal by bioremediation



- Total mass removal is dependent on the effectiveness of bioremediation treatment
- After 20 years 5x more removal if system responds better to the treatment (more effective)

Preliminary Information-Subject to Revision. Not for Citation or Distribution.

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Key Takeaways from the Model

1. **The model leverages information from field data to provide a comprehensive estimate of past and future groundwater contamination at Badger**
   - Model outputs can be used to help assess things like the monitoring well network design and likelihood for contamination in areas not currently sampled
   - The model accounts for prediction uncertainty, allowing risk-based decision making

2. **Some continued source loading was needed to match the observed field data**
   - The plumes may persist/redevelop

3. **More uncertainty in central plume predictions**
   - Limited data, less-defined source characterization

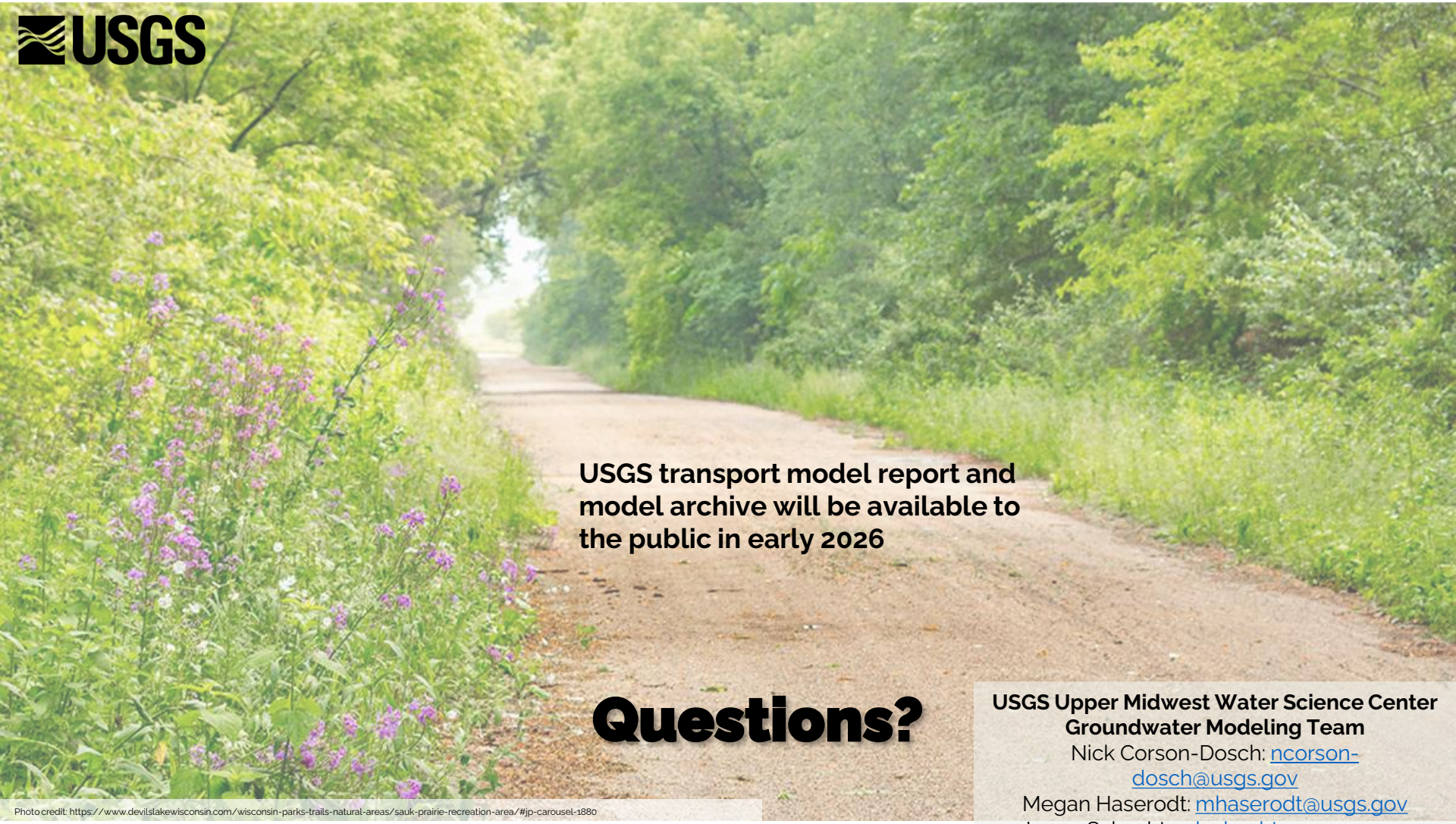
USGS

Key Takeaways from Remediation Scenarios

1. **Without treatment, there will likely be minimal reductions in the plume footprints in 20 years**

2. **The outcome of bioremediation treatment is dependent on the degradation rates achieved**
   - A pilot study could provide better estimates of this rate at Badger

3. **The model could be used in the bioremediation design process to help optimize system layouts and assess potential outcomes**



USGS transport model report and model archive will be available to the public in early 2026

Questions?

Photo credit: https://www.devilslakewisconsin.com/wisconsin-parks-trails-natural-areas/sauk-prairie-recreation-area/#jp-carousel-1880

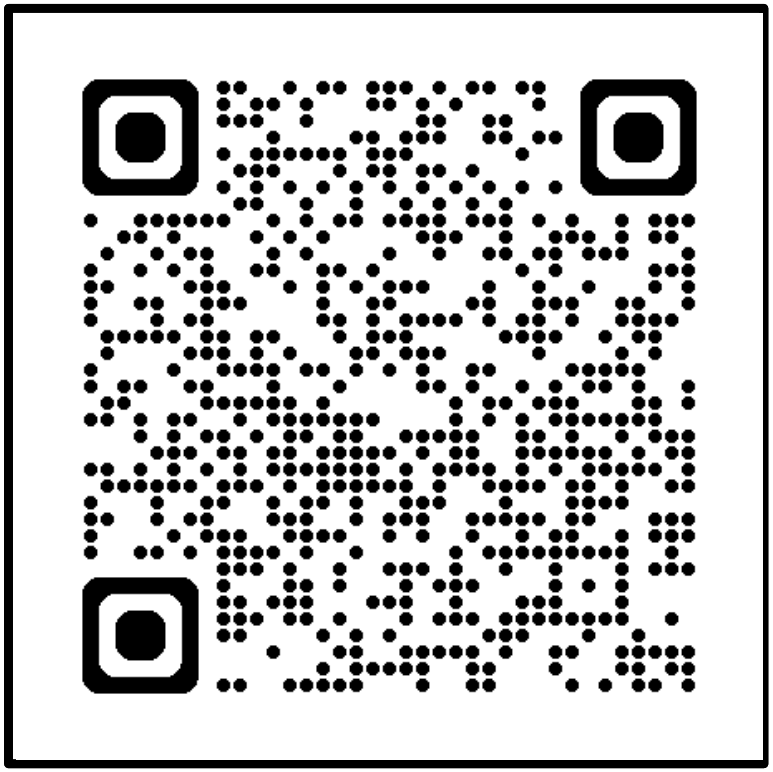
USGS Upper Midwest Water Science Center Groundwater Modeling Team
Nick Corson-Dosch: ncorson-dosch@usgs.gov
Megan Haserodt: mhaserodt@usgs.gov
Laura Schachter: lschachter@usgs.gov

Future Meetings

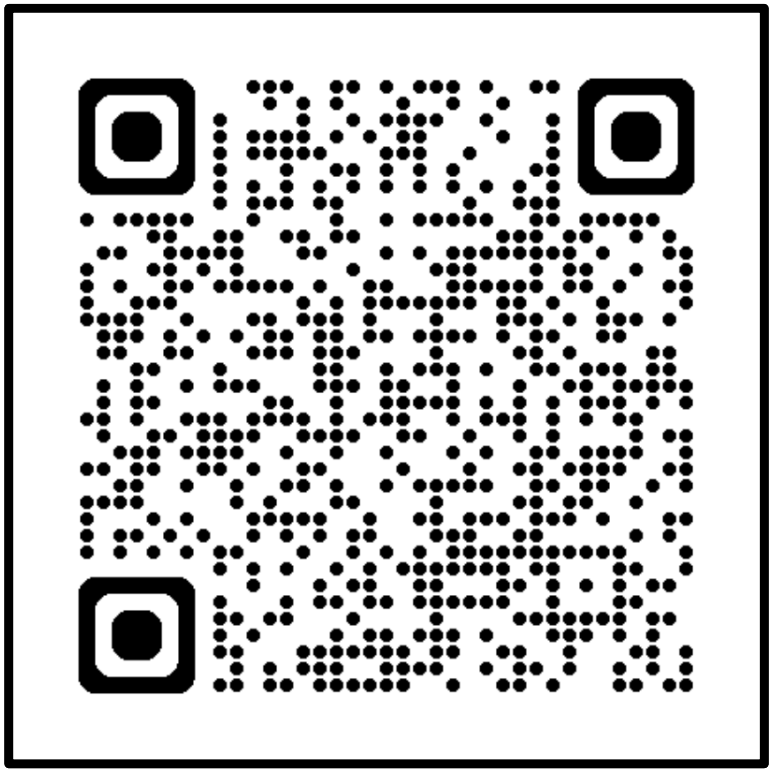
- 16 April 2026
- 16 July 2026
- 15 October 2026
- 14 January 2027

Questions??
Public Comments
Closing Remarks

RAB Resources



ASD (EI&E)
Per- and Polyfluoroalkyl Substances (PFAS)



Groundwater Quality at Former Badger Army Ammunition Plant Updates