Former Badger AAP RAB Meeting

October 7, 2021

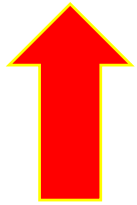
Agenda

- Co-Chair Statements
- Badger Groundwater Activities Update
- USAEC Update
- USGS Groundwater Modeling Update
- Settling Pond 2 Site Inspection Update
- WDNR Update
- WDHS Site Evaluation Program Activities at BAAP
- Questions

Co-Chair Statements

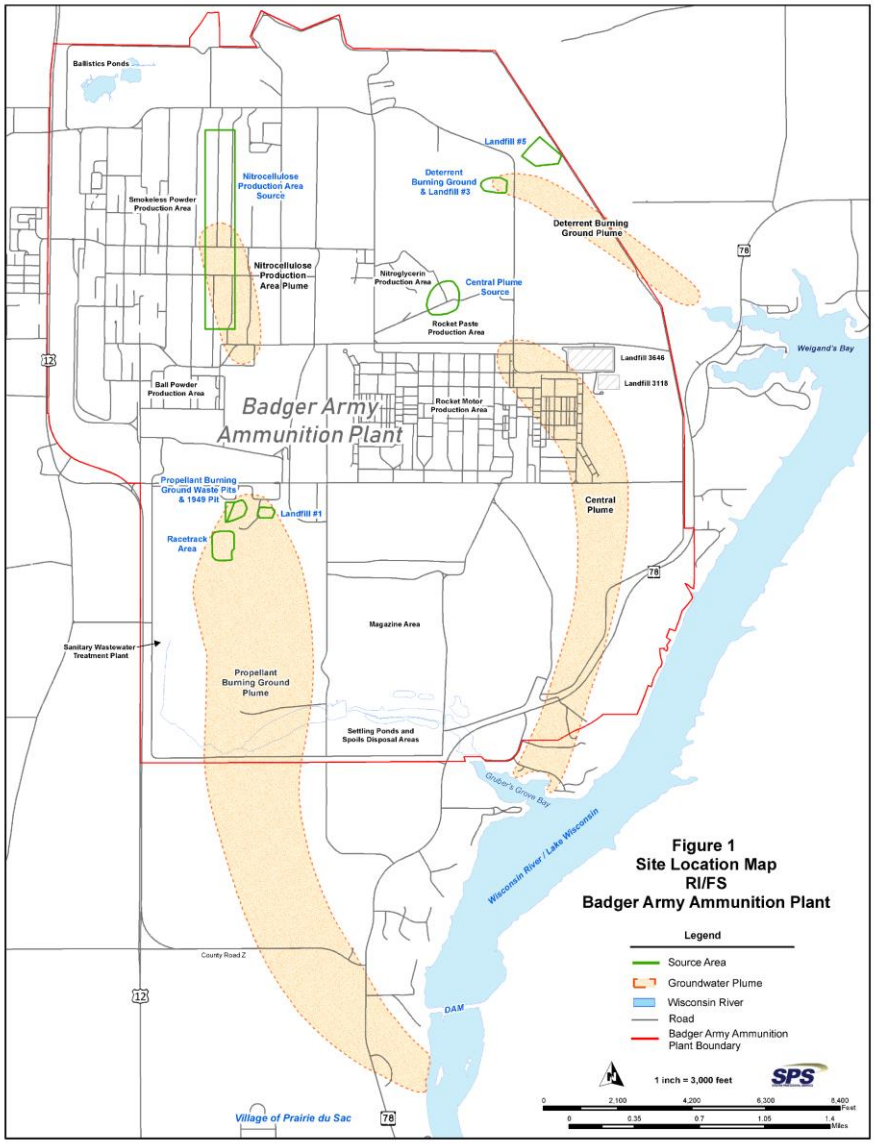
- Community Chair
  - Michele Hopp

- Army Chair
  - Bryan Lynch
  - 210-466-1351
  - 210-793-7881
  - Bryan.P.Lynch.civ@**army**.mil



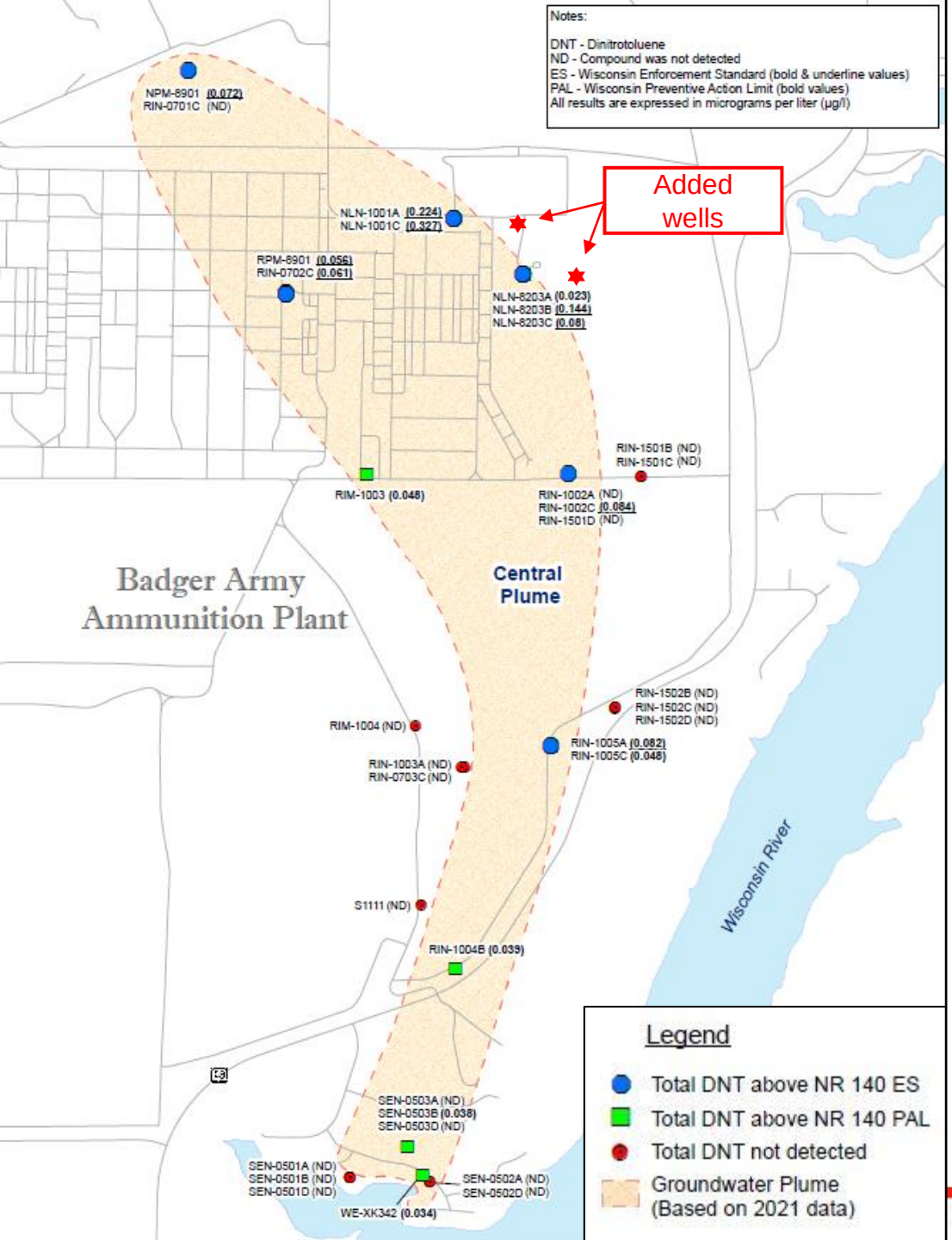
NEW!!!

Groundwater Sampling Update



- June 2021 - Groundwater sampled in 38 monitoring wells in Central & DBG Plumes (WDNR submission – July 2021)
- August 2021 - Groundwater sampled in 57 residential wells - Annual event (WDNR submission – Sept 2021)
- September 2021 - Completed semiannual groundwater sampling of 126 monitoring wells (results pending). Sampling was conducted in the DBG, Nitrocellulose & PBG Plumes.
- November 2021 - 14 monitoring wells in Central & DBG Plumes

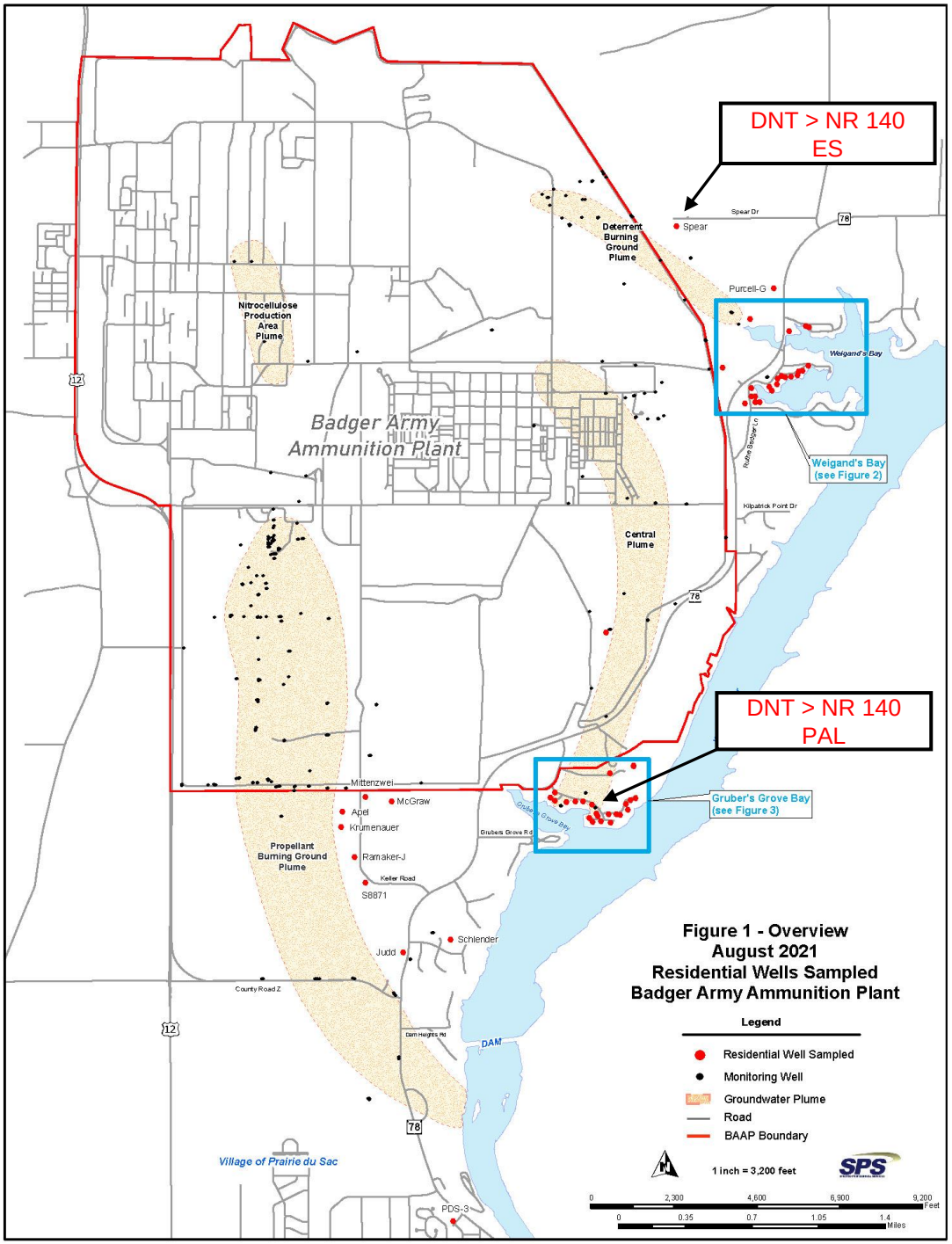
Dinitrotoluene Groundwater Exceedances
June 2021 - Central Plume
Badger Army Ammunition Plant



- 33 Monitoring wells sampled
- DNT concentrations increasing in northern section of plume – NLN-1001A/C & NLN-8203B
- DNT concentrations stable downgradient (south)
- WDNR requested 6 wells be added to annual sampling near the closed landfill – June 2022

Residential Well Sampling

August 2021



- 57 Residential Wells sampled
- Army added 3 new wells
- 2,4-2,6-Total DNT exceeded NR 140 ES in one well
  - Well resampled in August and no DNT detected
  - Will continue monitoring more frequently
- 2,6-DNT & Total DNT exceeded NR 140 PAL in one well – well has history of DNT detections

USAEC Update

- Groundwater RI/FS
  - Finalized and submitted 02 June 2021
- Proposed Plan/Decision Document
  - Awarded contract – Anticipate draft PP winter 2021
- PFAS PA/SI
  - Awaiting approval to finalize – document has not changed since last presentation
  - Preparing to submit Non-Source Letter to WDNR
- USGS Groundwater Transport Model
  - Ready to Execute – Awaiting Funding
- 60% Design to Dredge Gruber's Grove Bay
  - Finished Contract Package – Awaiting Funding
- DNT Treatability Study for Nitrocellulose Plume
  - Finished Contract Package – Awaiting Funding
- Expanded Site Inspection of Settling Pond Area
  - Initiated Contract Package
  - Coordinating effort with WDNR
- Questions

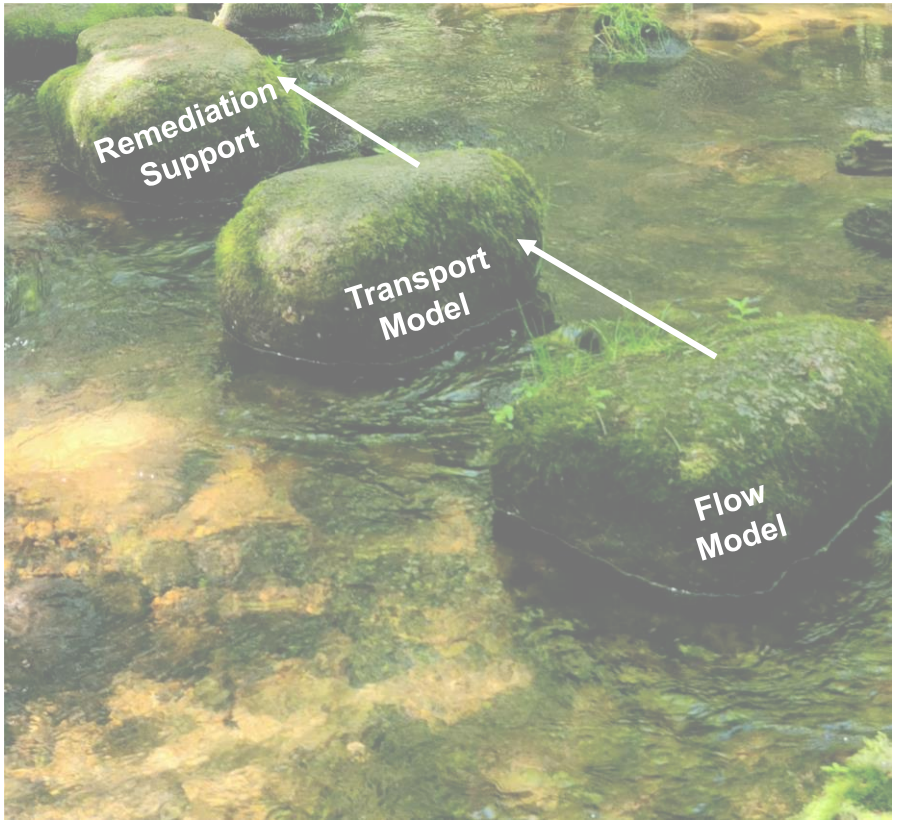
USGS Groundwater Model Update

USGS Groundwater Modeling Team, Upper Midwest Water Science Center

October 7, 2021 RAB Meeting

Current Model Status

- ✓On track with calibrated flow model by fall 2021.
- ✓Moving towards adding transport processes with goal of a calibrated transport model by fall 2022.
- ✓Ready to support remedial system design as that process moves forward concurrent to the model.
- ✓Ability to support other groundwater questions that may arise and provide context to new data collected at the site.



Model progress highlights for FY21

- ✓Simulation results being compared to water level and concentration observations from 1984-2020
- ✓Used well records in the area and other geologic information to estimate model properties
- ✓Worked with Wisconsin Geologic and Natural History Survey to estimate the depth to the top of rock for areas of the site where data were needed

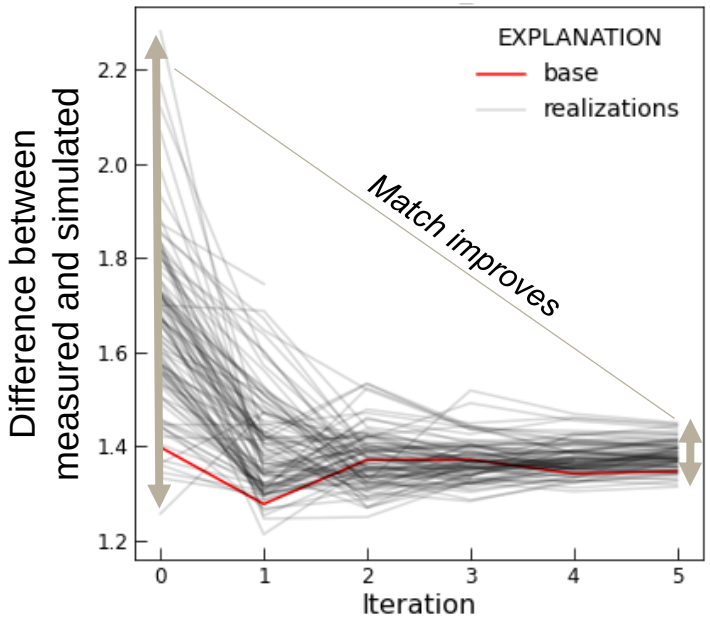
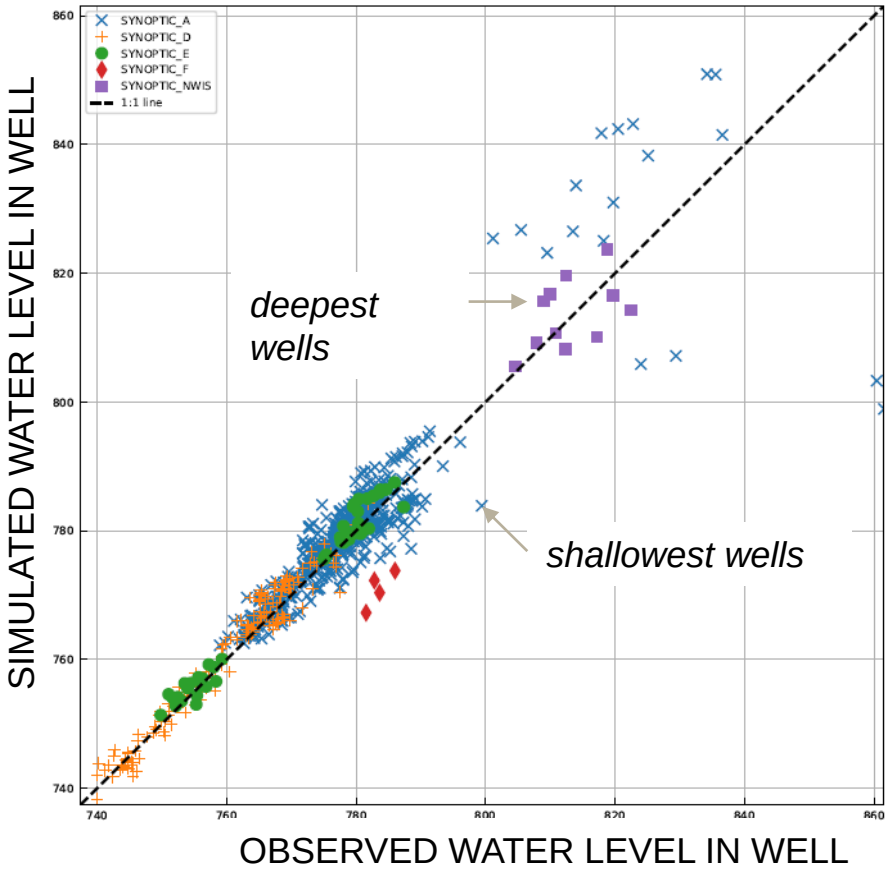
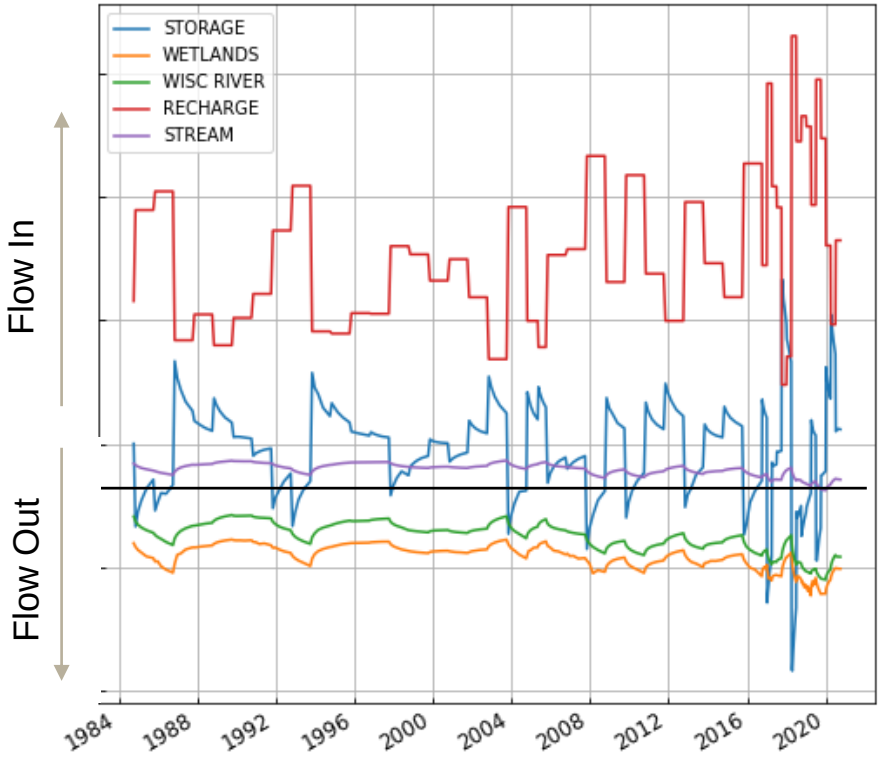


Figure showing improvement in match to shallow water levels during calibration of the model.

Calibration Example



Groundwater Budget

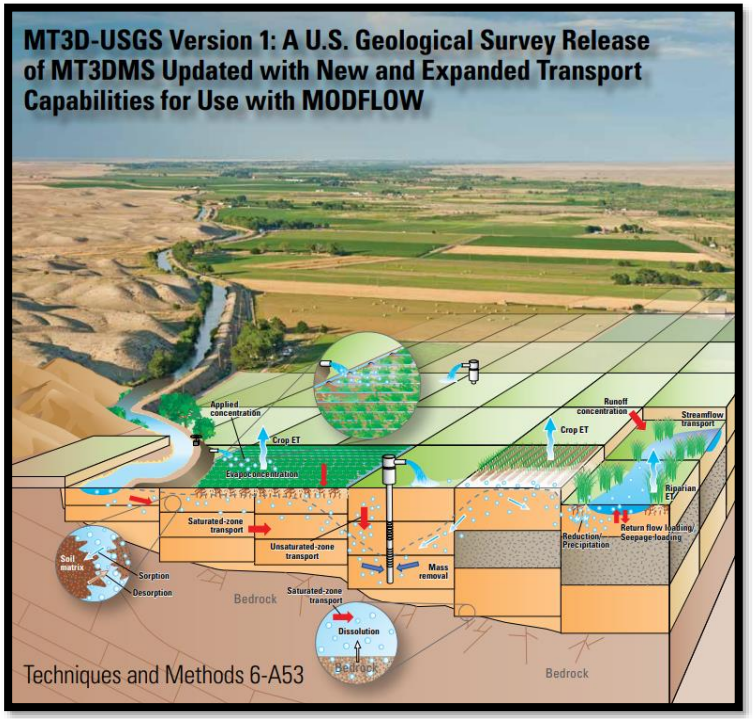


USGS science for a changing world

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

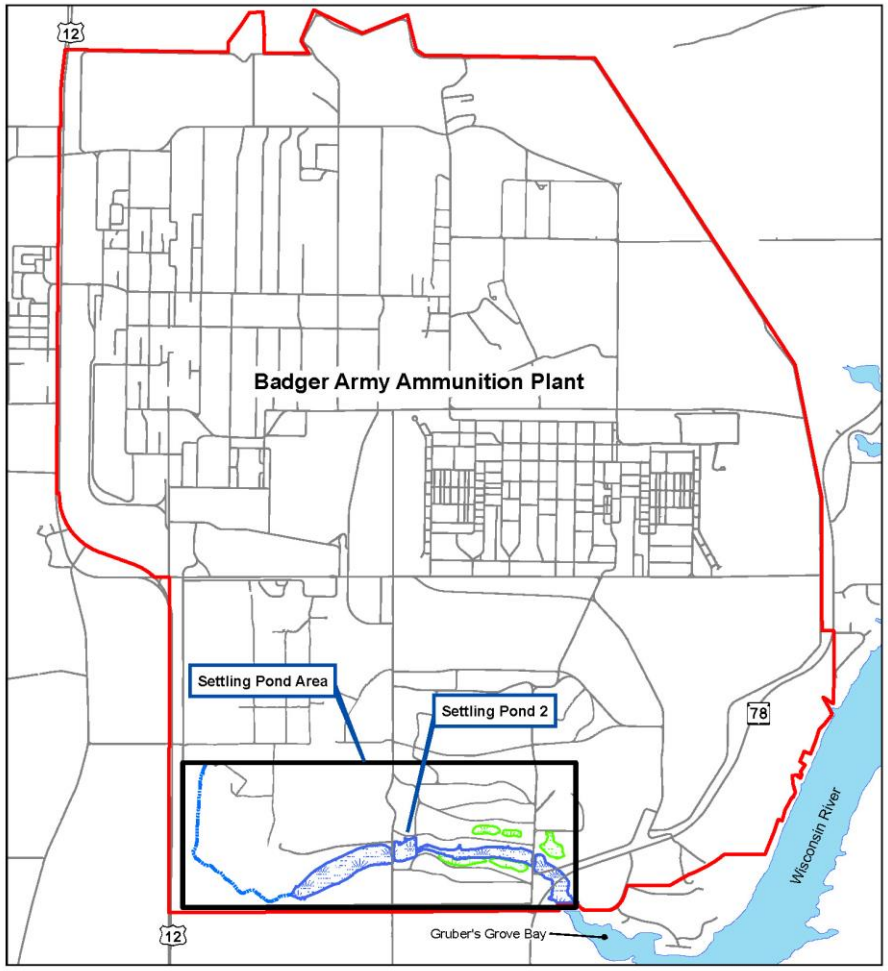
Transport plan for FY22

- ✓**Transport models simulate the movement and fate of contamination in the groundwater system**
- ✓**The transport model will build on the results of the flow modeling**
- ✓**Tool to help evaluate treatment options and optimize performance**
  - How the system might respond to a selected treatment option
  - Evaluate design of treatment option (like well configuration)
  - Inform future monitoring
- ✓**Quantify prediction uncertainty**




Questions?

Settling Pond 2 Site Inspection



Legend

- Badger Army Ammunition Plant Boundary
- Road
- Final Creek
- Settling Pond
- Spoils Disposal Area

Figure 1
Site Location Map
Site Inspection
Settling Pond 2
Badger Army Ammunition Plant

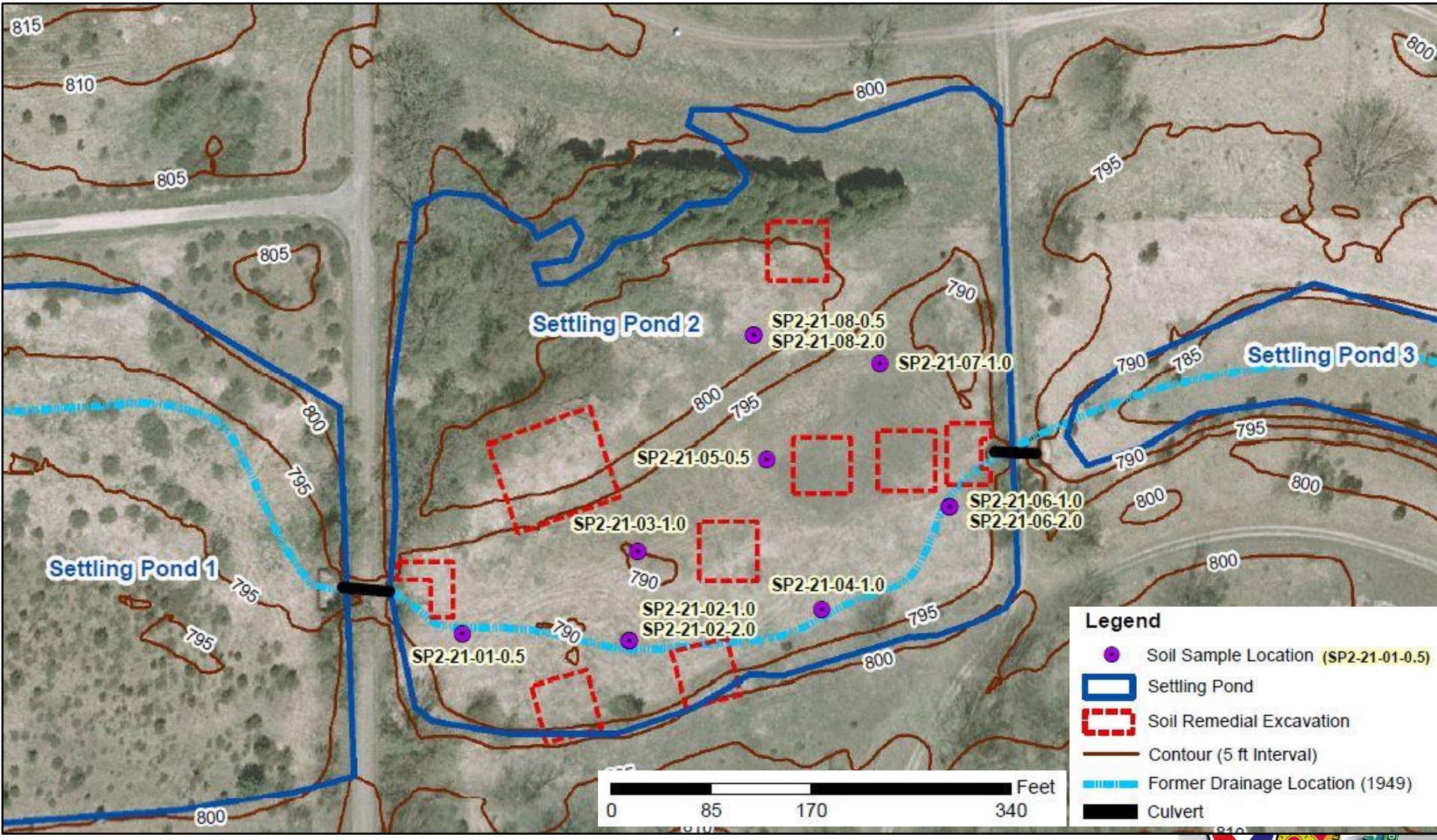
1 inch = 2,500 feet

0 1,750 3,500 7,000 Feet

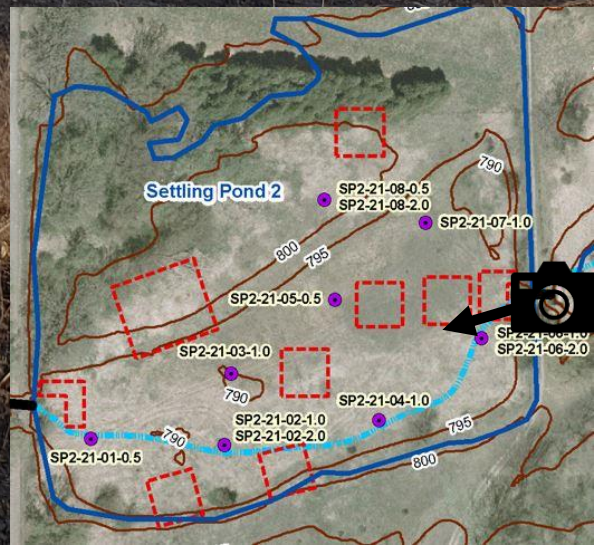
Objective - Determine the presence of potential soil contamination.

- 11 Soil Samples collected in June 2021
- Lab Analyzed for:
  - Explosives (e.g., 2,4-DNT, 2,6-DNT & NG)
  - Flashpoint
  - SVOCs
  - VOCs
  - Metals
  - Nitrocellulose
- BAAP propellant manufacturing chemicals were present in shallow soil

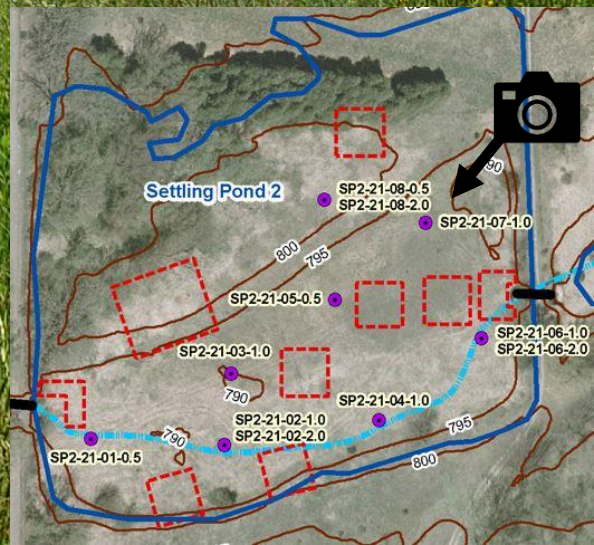
Settling Pond 2 Site Inspection



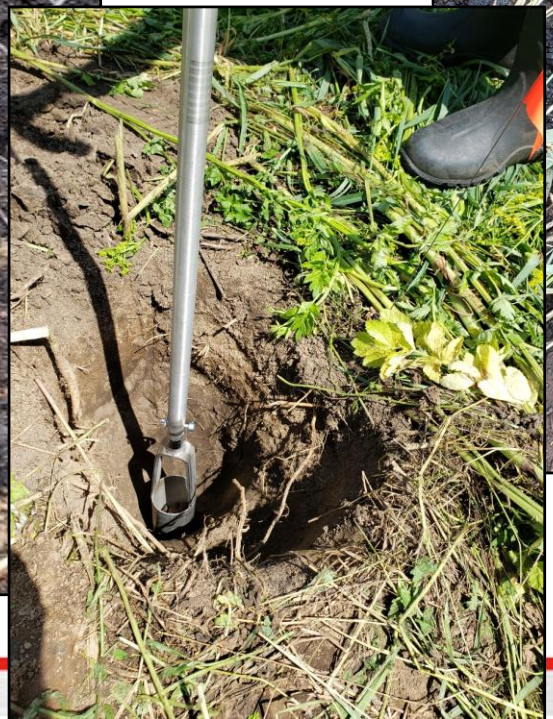
Settling Pond 2 - 2020



Settling Pond 2 – Summer 2021

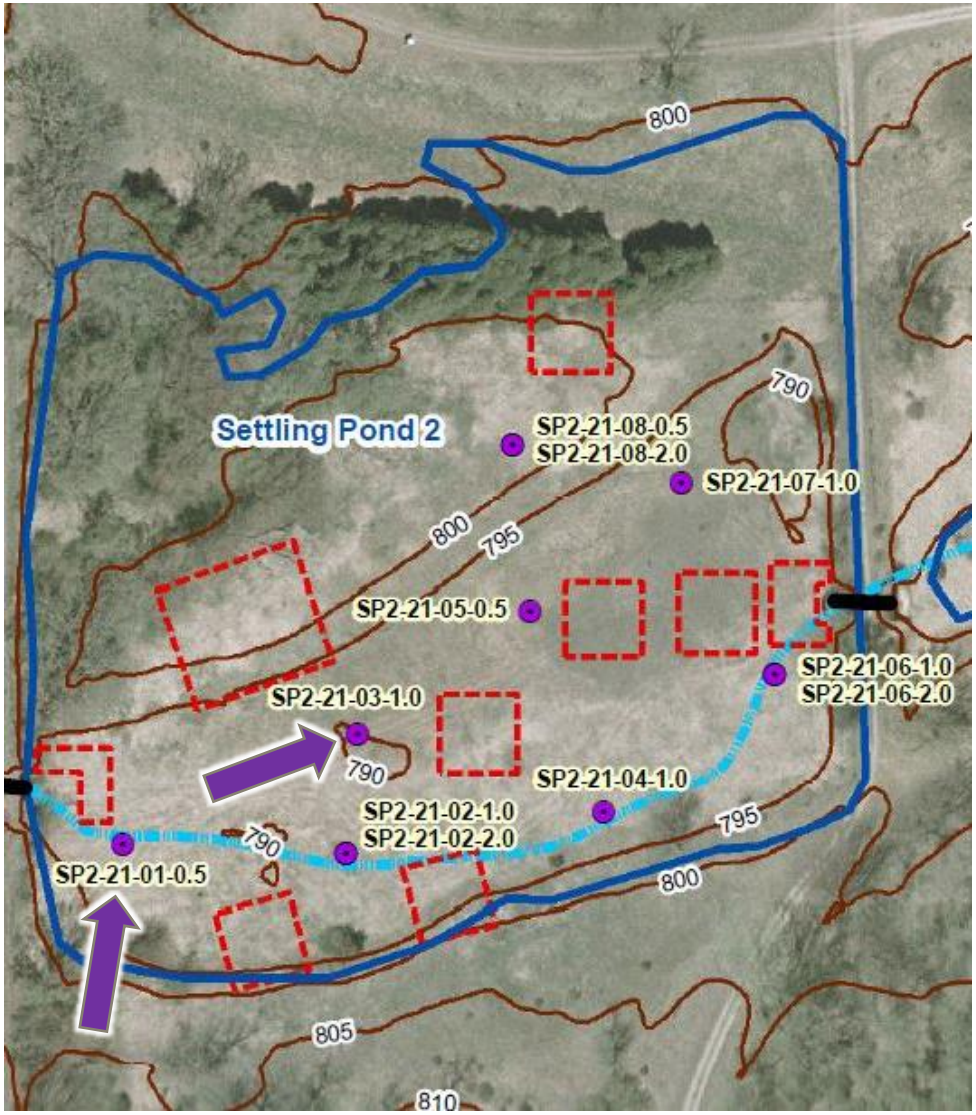


Settling Pond 2 - Soil Sampling



Bryan Lynch210-466-1351/ Bryan.P.Lynch.civ@army.mil

Settling Pond 2 - Soil Results

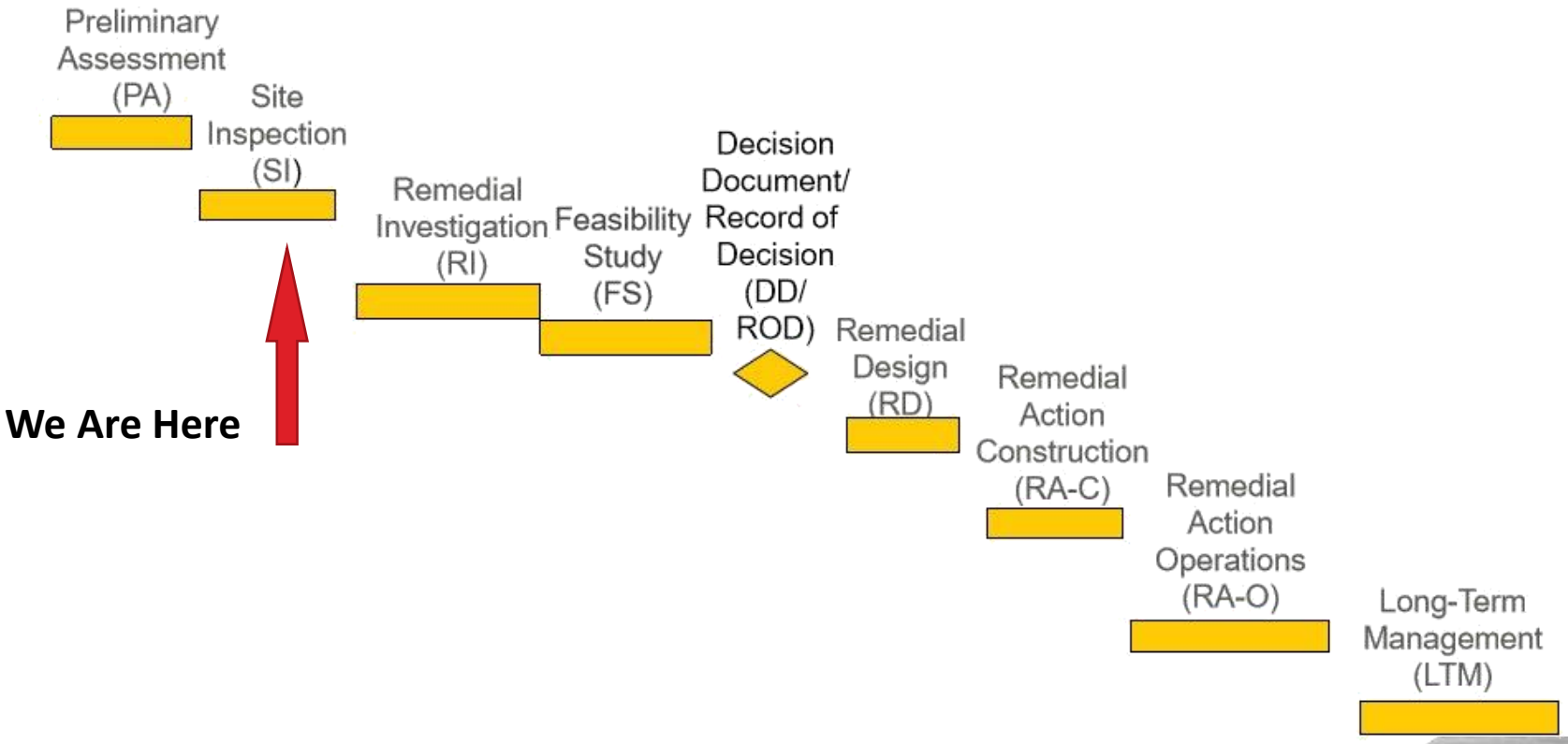


- Shallow samples 01 and 03 had highest detections
  - 2,4 and 2,6-DNT
  - Benzene
  - Di-n-butylphthalate
  - Diphenylamine
  - Nitrocellulose
  - Nitroglycerin
- Arsenic and Mercury were elevated in a few samples
- Soil was not ignitable nor will it spontaneously combust, based on a lab burn test
- Deeper samples (2 ft) had less detections than shallow soil

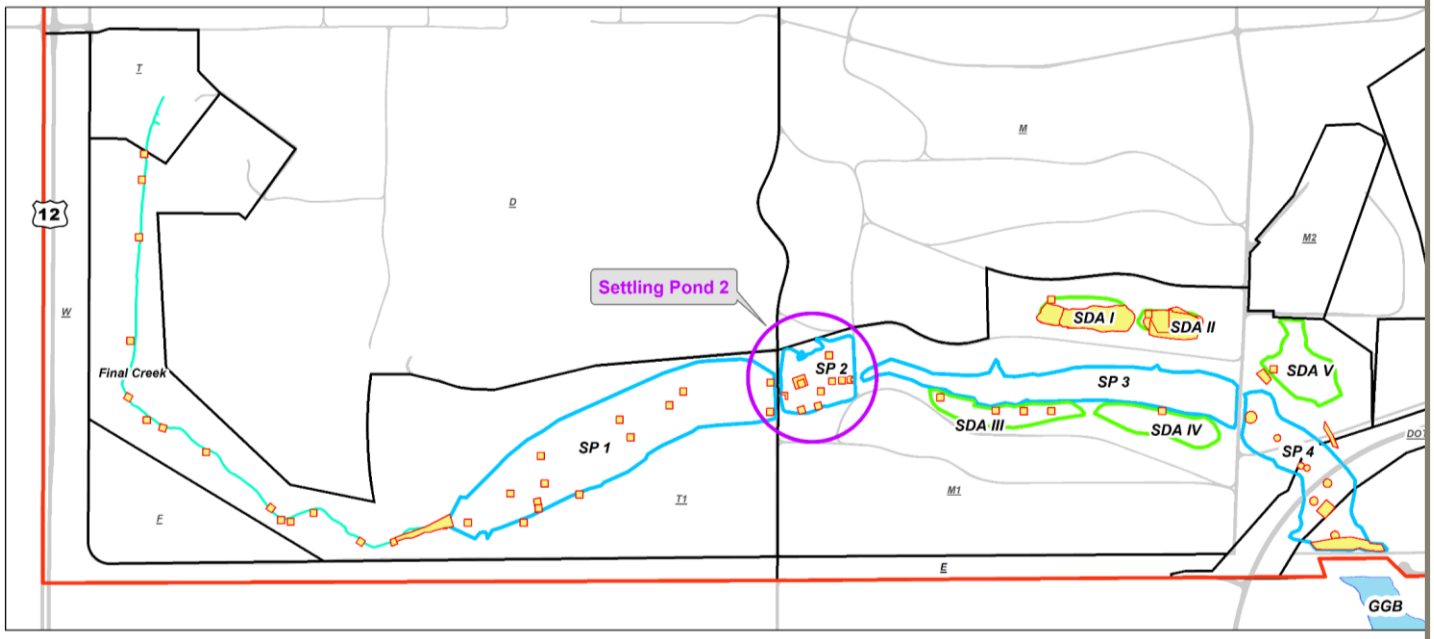
Path Forward - Settling Ponds

CERCLA PROCESS

Comprehensive Environmental Response, Compensation and Liability Act



Expanded Settling Ponds Site Inspection



Legend

- BAAP Boundary
- Road
- Parcel Boundary
- Parcel
- Previous Soil Excavations
- Final Creek
- Settling Pond (SP)
- Spoils Disposal Area (SDA)

Final Creek, Settling Ponds, and Spoils Disposal Areas
Badger Army Ammunition Plant

0 625 1,250 2,500 Feet

- Future soil sample locations have not been determined
- Focus on highest potential contamination areas
- Red/yellow boxes indicate previous soil excavations by Army (avoid excavations)
- Soil samples may be collected in:
  - Final Creek
  - SP 1 & 3
  - SDA I, II, III, IV & V
- SP 4 will not be sampled, separate closed site

WDNR Update

Questions/Concerns

Luke Lampo

Hydrogeologist – Remediation and Redevelopment Program
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, Wisconsin 53711
Phone: (608) 206-5809
luke.lampo@wisconsin.gov

Site Evaluation Program Activities at BAAP

Curtis Hedman, PhD
Toxicologist
October 7, 2021

WI DHS Site Evaluation Program

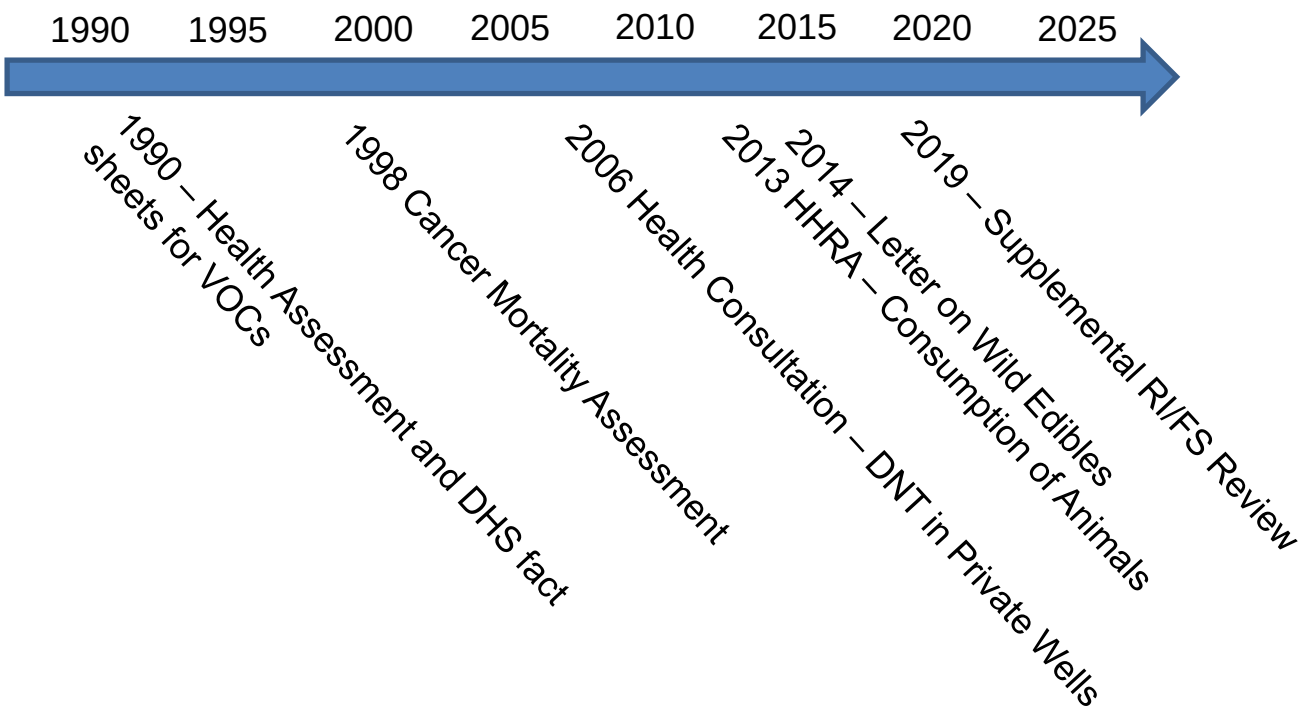
Evaluating site data and scientific literature to perform human health risk assessments (HHRAs)

Identify exposure pathways at specific sites

Make recommendations to prevent or reduce exposure

Educate affected communities and local health professionals about site contamination and potential health effects

Timeline of WI DHS Activities



Ongoing Work

- Review data sets
- Follow up on ES and RCL exceedances
- Consult on public health aspects of site activities
- Remain available for citizen comments and inquiries

Orange Smoke from 2020 Fire – Human Health Considerations

Disclaimer: The views expressed in the following slides are those of the author and do not necessarily reflect the views or policies of any State or Federal agencies.

Sauk Prairie Recreation Area Burn Event

Late August, 2020 –

A 100-acre prescribed burn was conducted in the Sauk Prairie Recreation Area on Wednesday, August 26, 2020. The burn ignited unknown substances in the subsurface, which a hazmat team recommended allowing to burn out.

Image from: www.cswab.org

Decomposition Mechanisms of Dinitrotoluene

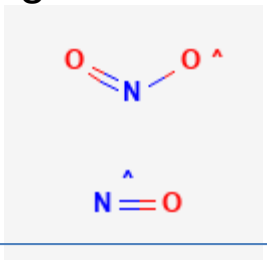
GENZO TANAKA, CHARLES WEATHERFORD
Department of Physics, Florida A&M University, Tallahassee, FL 32307

Received 30 April 2008; accepted 11 June 2008
Published online 6 August 2008 in Wiley InterScience (www.interscience.wiley.com).
DOI 10.1002/qua.21849

International Journal of Quantum Chemistry, Vol 108, 2924–2934 (2008)

Major DNT decomposition products are thought to be:

1. Nitrogen dioxide (NO2) – red-brown gas
2. Nitric oxide (NO) – colorless gas



Chemical images from: https://pubchem.ncbi.nlm.nih.gov/

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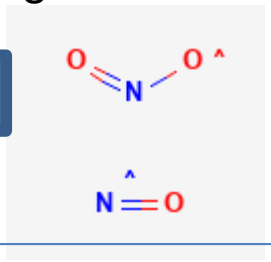

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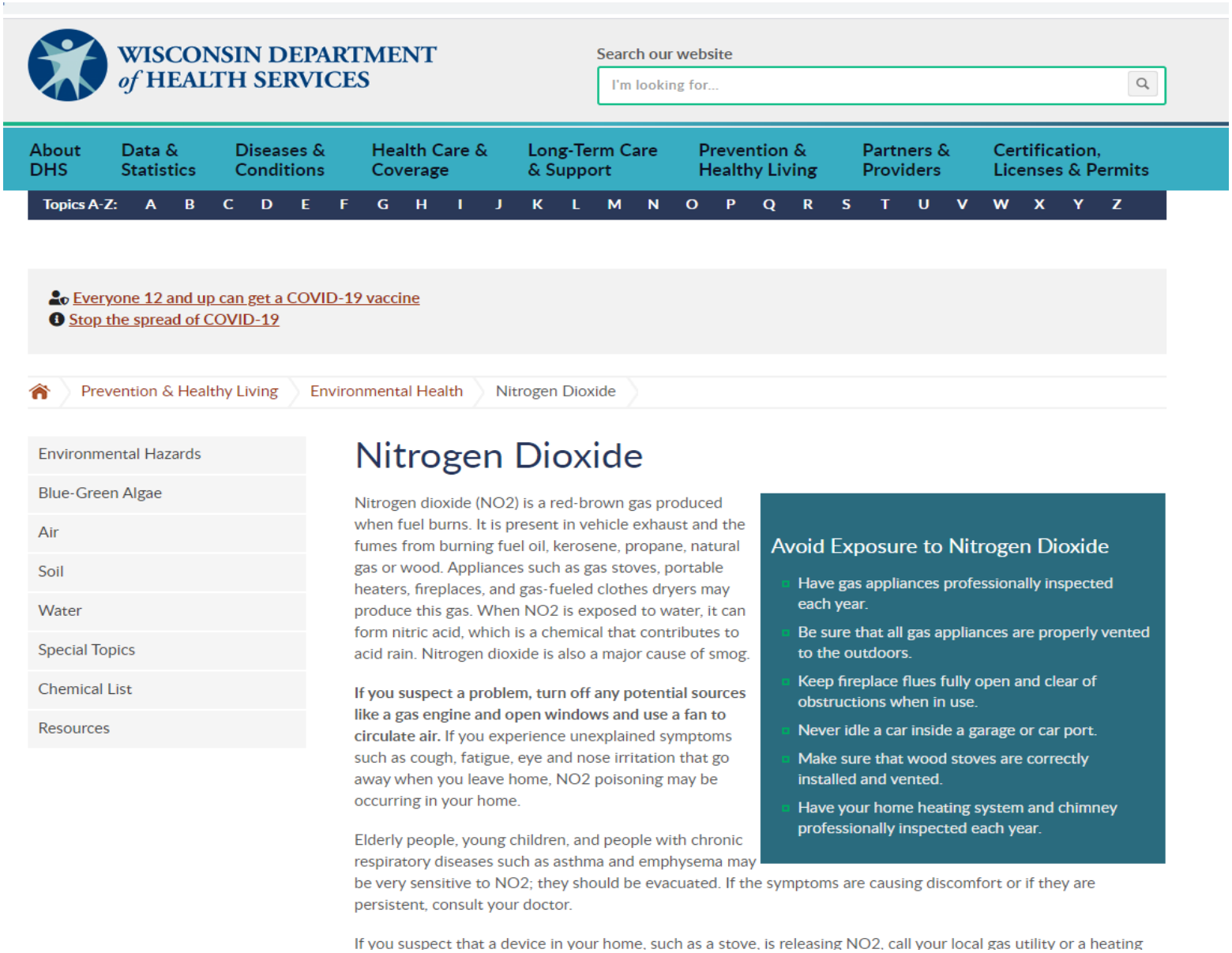

https://www.dhs.wisconsin.gov/chemical/no2.htm

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

NITROGEN OXIDES (nitric oxide, nitrogen dioxide, etc.)

CAS #10102-43-9 (nitric oxide);
CAS #10102-44-0 (nitrogen dioxide)

Division of Toxicology ToxFAQs™ **April 2002**

This fact sheet answers the most frequently asked health questions (FAQs) about nitrogen oxides (nitric oxide, nitrogen dioxide, etc.). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Everybody is exposed to small amounts of nitrogen oxides in ambient air. Higher exposure may occur by burning wood or kerosene or near gas stoves or if you smoke. Exposure to high levels of nitrogen oxides can damage the respiratory airways. Contact with the skin or eyes can cause burns. Nitrogen dioxide and nitric oxide have been found in at least 9 and 6 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA), respectively.

https://www.atsdr.cdc.gov/toxfaqs/tfacts175.pdf

Last web content review = March 25, 2014

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Nitrogen Oxides and Human Health

- Irritants of the eyes, nose, throat, and lungs
- Higher exposures
  - Severe coughing, choking, headache, nausea, abdominal pain, and shortness of breath
  - Symptoms may continue after the exposure has ended, causing difficulty in breathing for weeks

Nitrogen Oxides and Human Health

- The US Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified nitrogen oxides for potential carcinogenicity

Summary

- Production of nitrogen oxides from near soil subsurface decomposition of DNT is a plausible explanation for orange colored smoke plume observed during the 2020 burn event
- Nitrogen oxides present a short term irritant health risk
- Nitrogen oxides are not classified as carcinogenic to date

Thank You

curtis.hedman@wi.gov

End of Brief

QUESTIONS?!?