



Assessment of Agricultural Subsurface Drainage Tile on Wetland Hydrology and Ecosystem Services in the Prairie Pothole Region

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USGS – Northern Prairie Wildlife Research Center

Cooperating agencies:

U.S. Geological Survey (USGS):

- Northern Prairie Wildlife Research Center (NPWRC)
- North & South Dakota Water Science Centers

U.S. Fish & Wildlife Service (USFWS):

- Chase Lake Prairie Project (ND)
- Partners for Fish and Wildlife (SD)
- Habitat and Population Evaluation Team (HAPET; ND)
- Plains and Prairie Potholes LCC

ND Department of Health

Project Coordinator: Ray Finocchiaro, Ecologist, NPWRC, Jamestown, ND.



Assessment of Agricultural Subsurface Tile Drainage on Wetland Hydrology & Ecosystem Services in the PPR.

Goals:

- Provide a spatial overview of tile distribution & regional assessment of potential effects on wetland hydrology.
- Assess in situ hydrological field data on tiled wetlands that use the minimal impact protective practices (i.e., set-backs)



Research Approach

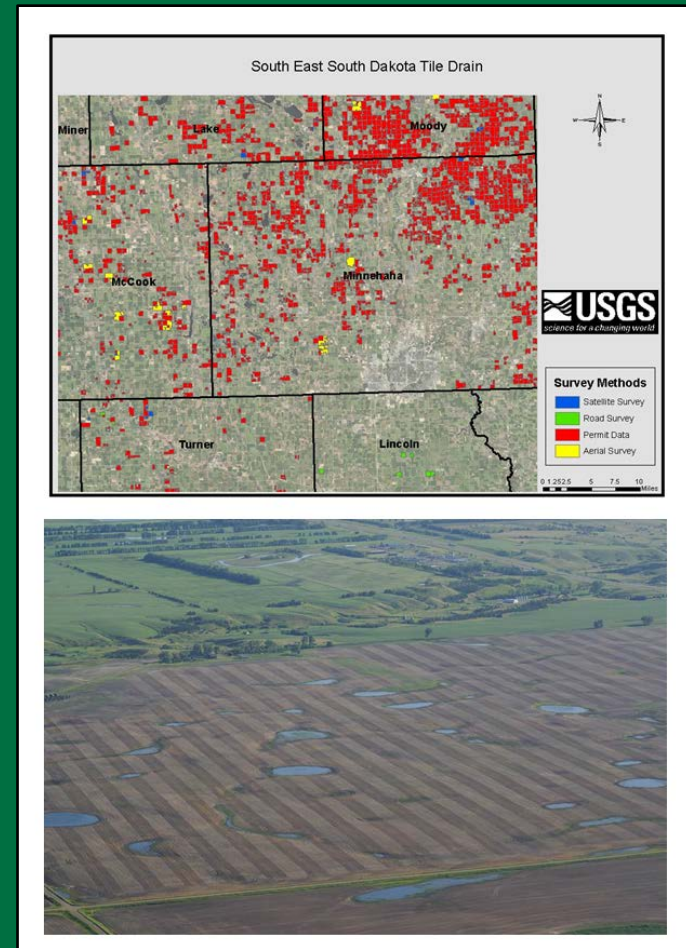
2-prong approach:

1) Spatial (GIS) component

- Characterization
- Projections
- Model effects

2) Field component

- Catchment water balance
- Tile discharge
- Tile effects on wetland hydrology



Field study

Objectives -

- Assess NRCS setbacks
- Monitor water balance
- Tile discharge
- **Potential effects of tile on catchment hydrology**
 1. Direct measurements
 2. Site comparisons
 3. Model



Field design

- 4 catchments
 - Size, soils, etc.
- 2 tiled, 2 “control”
- Monitor:
 - Direct inputs (weather)
 - Water levels
 - Tile discharge
 - Soil Moisture & Temp
- Model:
 - Indirect inputs (runoff)
 - Hydrology



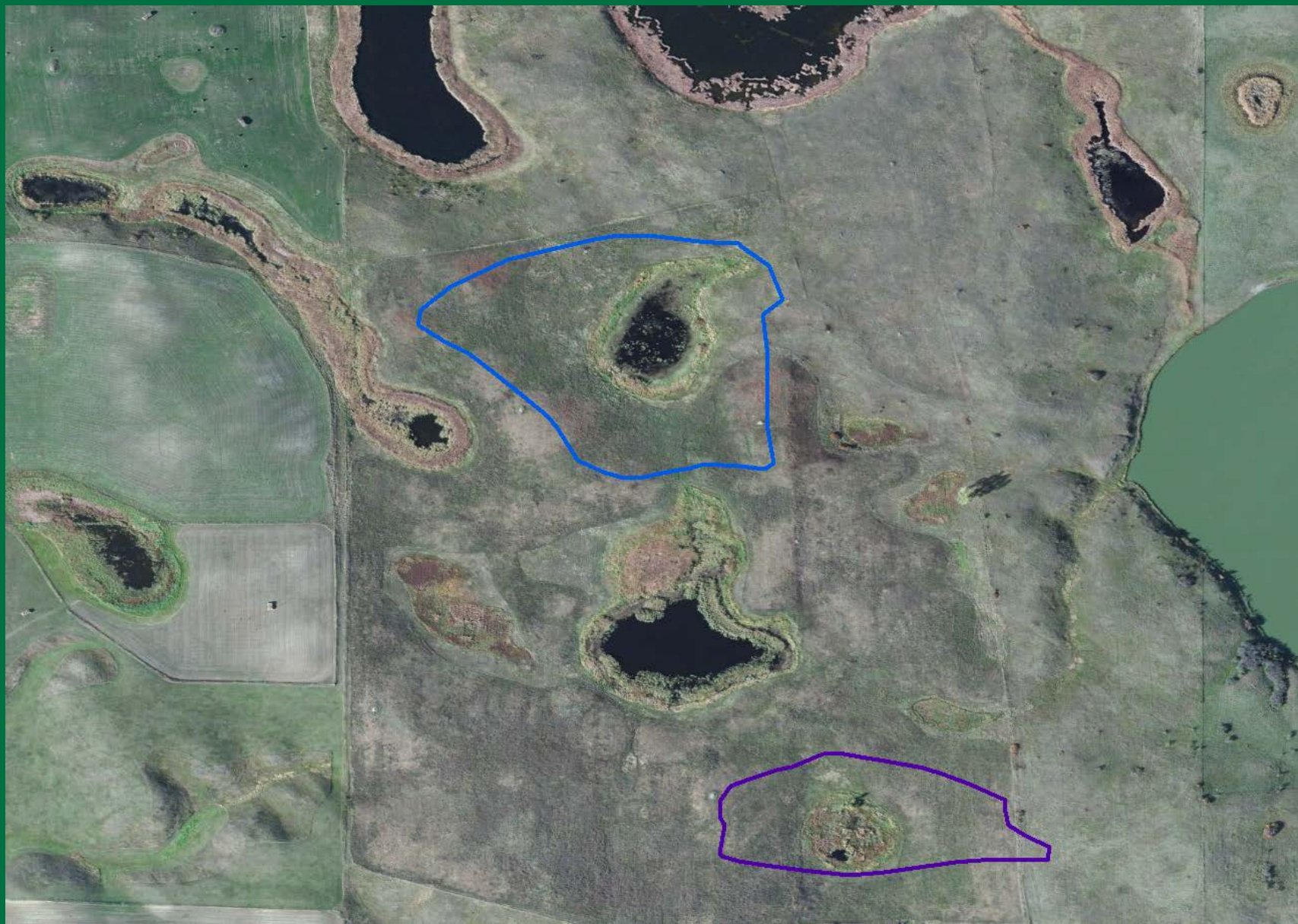
Beck WPA; Stutsman County, ND



Roosevelt WPA; Stutsman County, ND



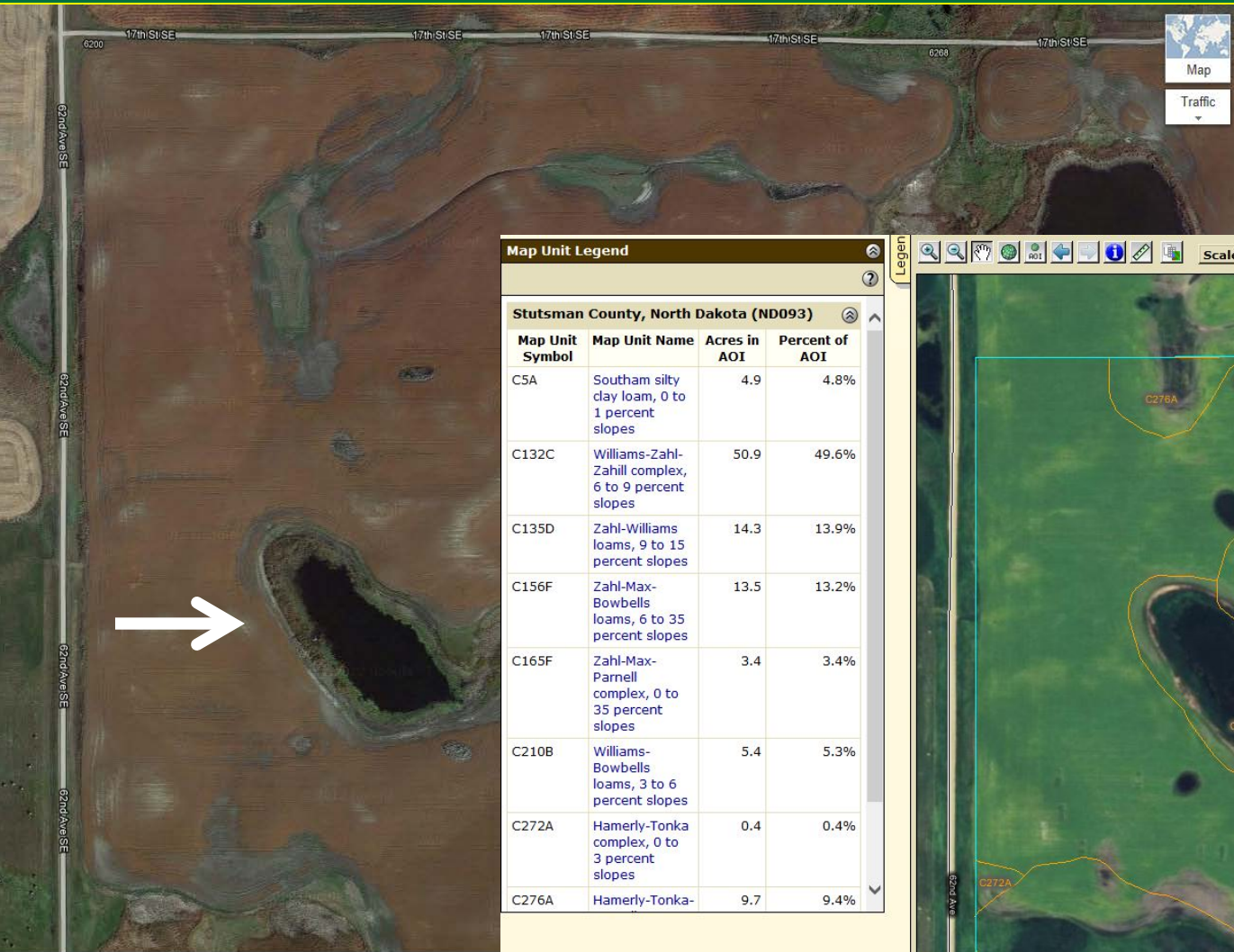
Beck WPA: catchment boundaries



Roosevelt WPA: catchment boundaries



Private Land: catchment



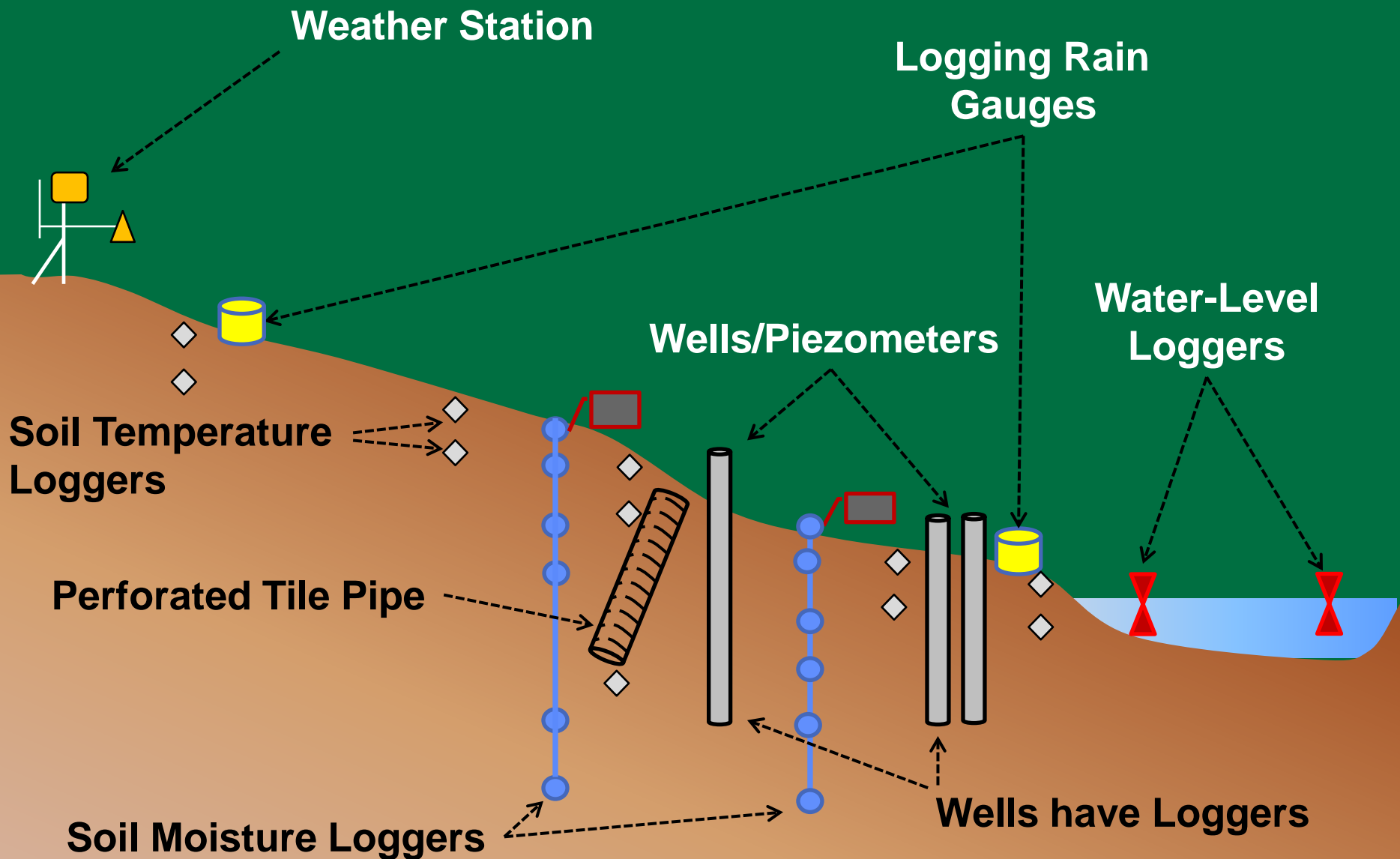
Preparation of Study Sites







Catchment Instrumentation

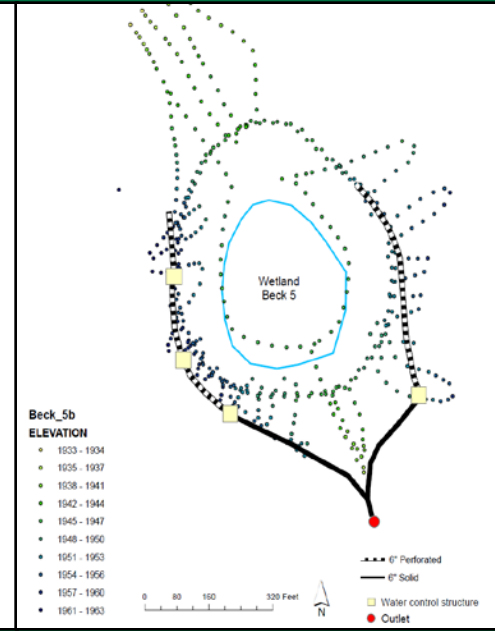
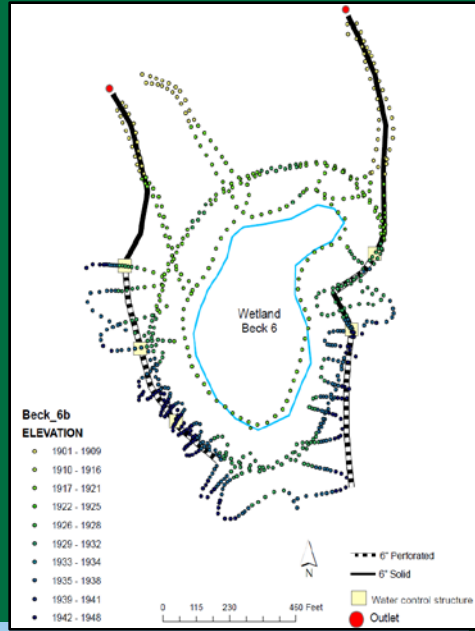








Tile plans & installation









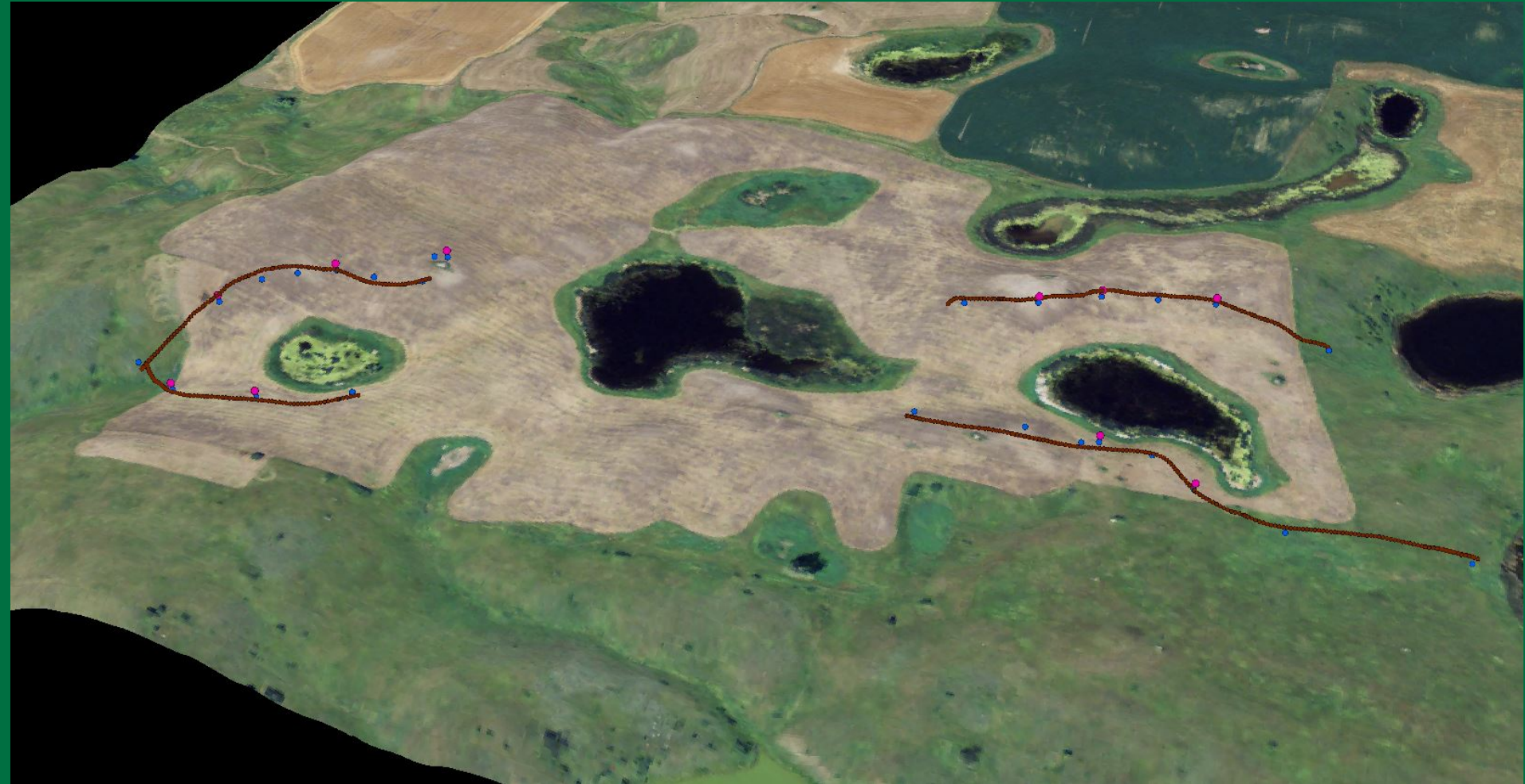
Inline Water Control Structures



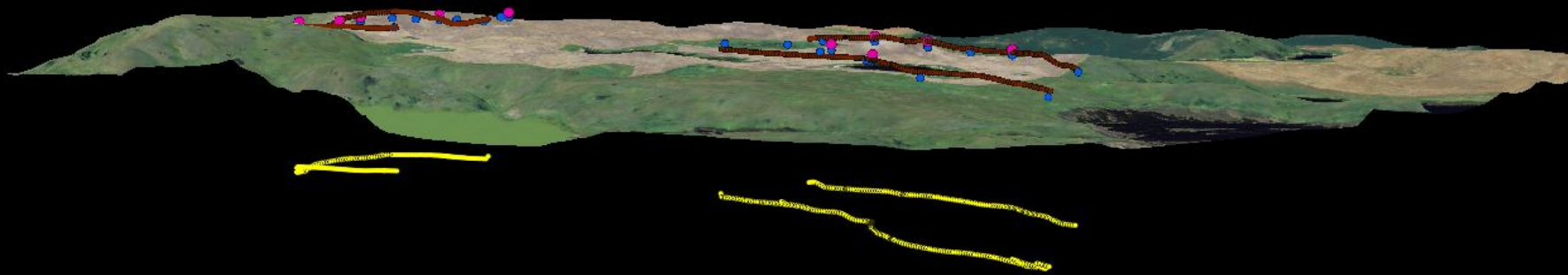
Installed Tile Pipe

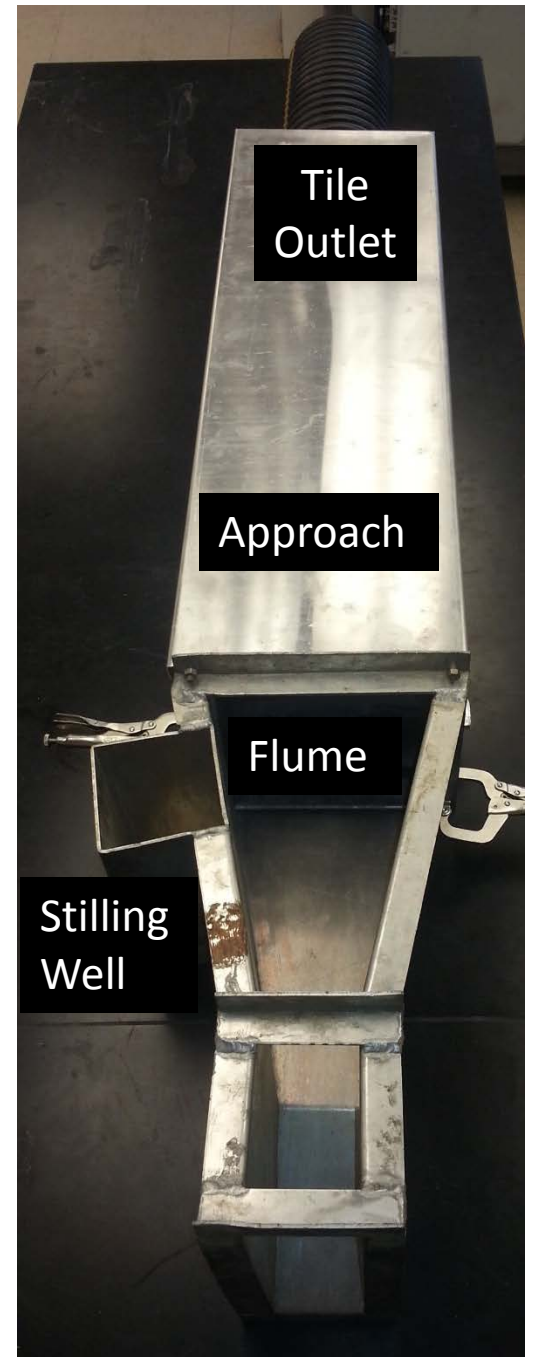


Tile grade verification



Tile grade verification





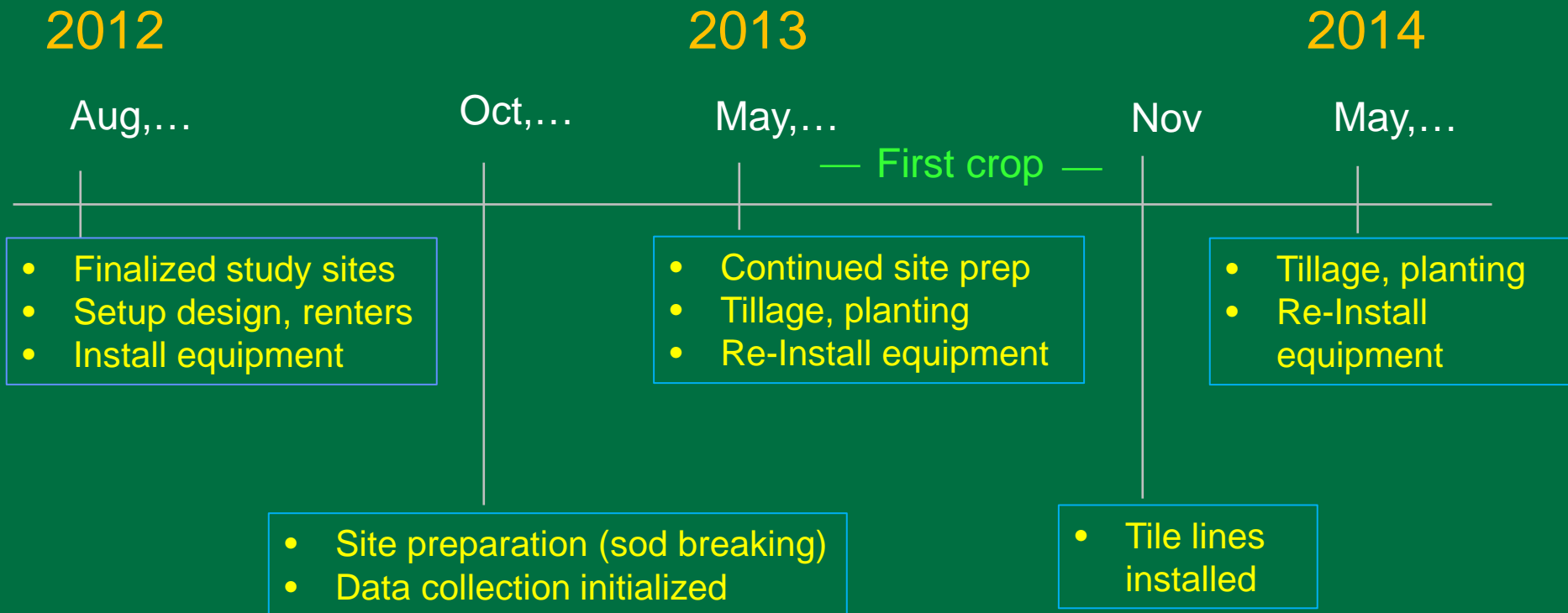
Tile
Outlet

Approach

Flume

Stilling
Well

Field Study: Event Time Line



Spatial (GIS) component

Regional characterization:

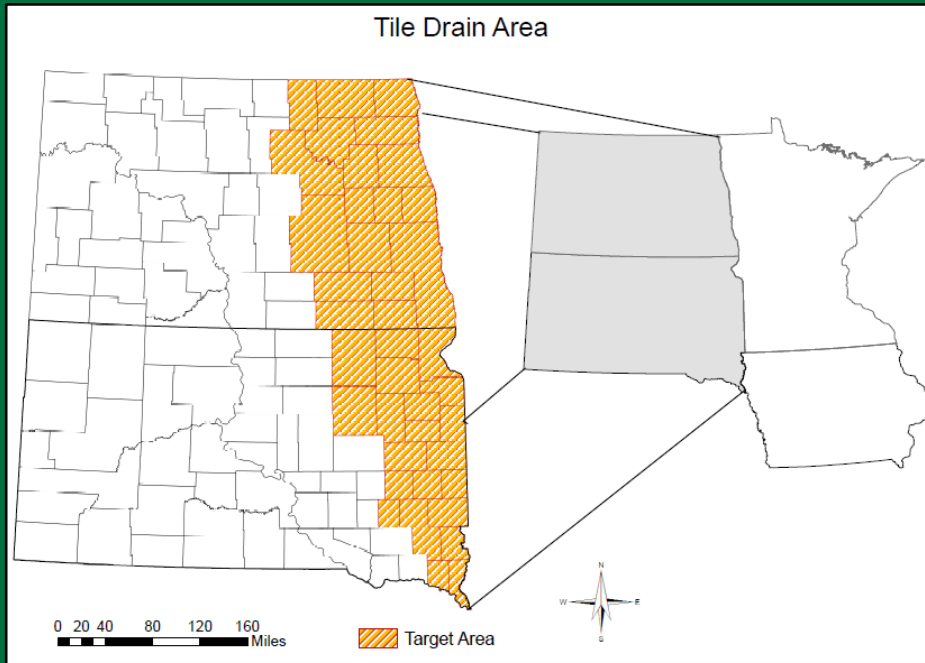
- Tile information
 - Location/distribution
 - Tile size, depth,
- Site characteristics
 - Soils (SSURGO)
 - Wetlands (NWI)
 - Crop (NASS)

Projections/modeling:

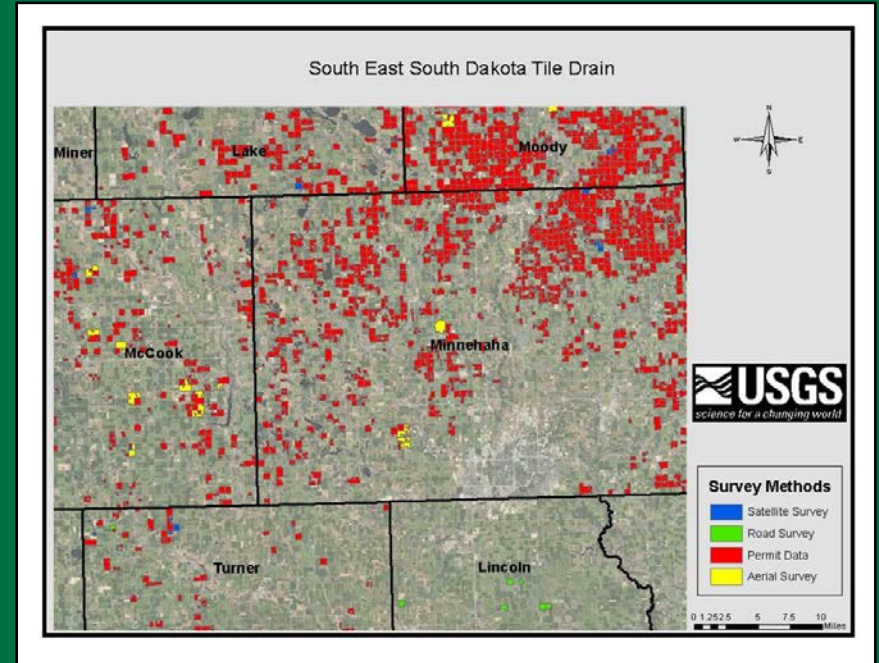
- Assessment of site characteristics
- “Determining” factors?
- Regional projection
- Model effects to ecosystem services
 - Waterfowl habitat
 - Water storage
 - C-sequestration

Tile distribution

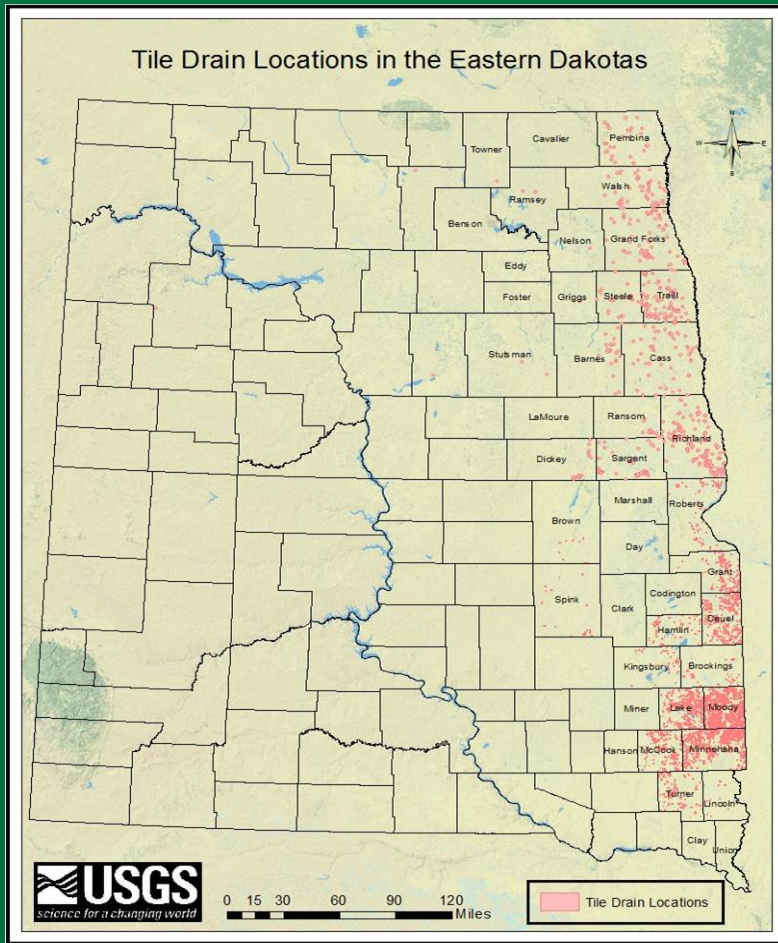
Area of interest



Survey Methods



Number of tile locations



- **North Dakota**
 - >700 (Aug 2012)
 - >900 (Nov, 2013)
- **South Dakota**
 - >4,300 (April, 2012)
 - >4,900 (Dec, 2013)
- Majority from permits
 - >80 ac affected area
- High proportion of tile undocumented
- Underestimated?

ScienceBase Catalog – tile permit data



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User Stories



FAQ's



Tutorials

Key Elements

- Data cataloging and collaborative data management platform
- Central search and discovery application
- Web services facilitating other applications
- Research community catalogs

ScienceBase Documentation Wiki

ScienceBase is an Open Source project that provides current documentation about its structure, information model, services, directory, and repository. The wiki provides guidance for using services to interact with the Science API, including JSON examples. Links to examples showing use of ScienceBase services are also provided.

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Agricultural Subsurface Drainage Tile & Wetlands Project



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Purpose

This project contains related research product materials for the assessment of agricultural subsurface drainage tile systems on wetland hydrology in the Prairie Pothole Region. For additional information about this research contact Ray Finocchiaro at Northern Prairie Wildlife Research Center, Jamestown, ND.

Provenance

Data source: Input directly

Catalog Item:

Created by: mschwartz@usgs.gov on Wed Feb 12 16:17:42 UTC 2014

Last Updated by: rfinocchiaro@usgs.gov on Wed Feb 26 19:34:48 UTC 2014

Tags

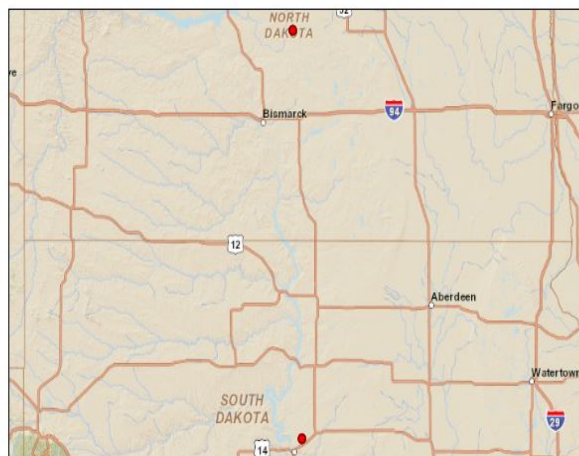
Categories:

[Project](#)

[View JSON](#) [ATOM](#) [ISO XML](#)

This project contains related research product materials for the assessment of agricultural subsurface drainage tile systems on wetland hydrology in the Prairie Pothole Region. Materials included: downloadable files of drainage tile locations based on tile drainage permits collected from state, county, and local agencies in North and South Dakota. These files can be used to develop a spatial depiction of tile systems at the quarter-quarter level of a section of the TRS system. See associated metadata for information about the data included in the files.

[Interactive Mapper](#) - [Open in Google Earth \(KML\)](#) - [Advanced Services](#)



Resources

Files stored in ScienceBase: [\(Download Attached Files\)](#)

Communities

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Child Items: (2):

- [Agricultural Subsurface Drainage Tile Locations by Permits in North Dakota](#)
- [Agricultural Subsurface Drainage Tile Locations by Permits in South Dakota](#)

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Provenance

<https://www.sciencebase.gov/catalog/item/52fb9ea6e4b00c6b800b98ff>

Communities

Northern Prairie Wildlife Research Center

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Summary

Spatial component

- GIS layers / spatial data
 - NWI,SSURGO,NASS
- >5,800 tile data points
- Tile Location Database
 - Public Access
- Report Development
 - Effects on wetland hydrology/hydroperiod
 - Regional characterization

Field component

- Install tile flumes & loggers, and other monitoring devices
- Continue data collection
 - tile effluent sampling for
 - Nutrients metal, (ND DOH)
 - pesticides (USFWS)
- Process “before tile” data

Questions?

