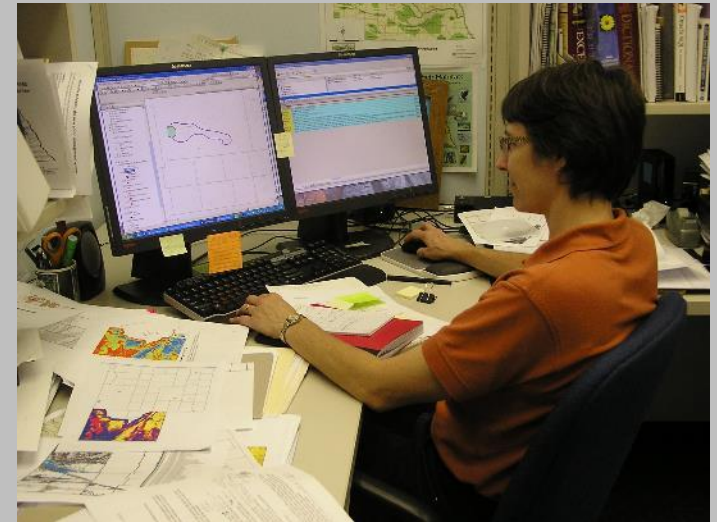


# Pre-site visit: Landscape/GIS assessment

Presented by: Ted LaGrange (NGPC)



Ritch Nelson (NRCS)



- Understanding wetland and watershed alterations
- Assessment tools and techniques



# Wetland Loss

- **Impacts within the wetland**
  - **Drainage and/or filling**
    - **Land leveling**
  - **Stream/river straightening**
  - **Long-term inundation**
  
- **Impacts within the watershed**
  - **Water Diversion/addition**
  - **Sedimentation**
  - **Stream/river straightening**

**Filling**



**Land Leveling**



# Drainage Tile





# Drainage Tunnels



# Culturally-accelerated Sedimentation



# Pits of many names--- Concentration, Reuse, Irrigation, Drainage





# Surface Drainage Ditches

These can directly drain a wetland, or provide a place for tile outlets





**Surface Drainage Ditches in Sandhills wet meadow**

1941

Source: UNL Digital Commons



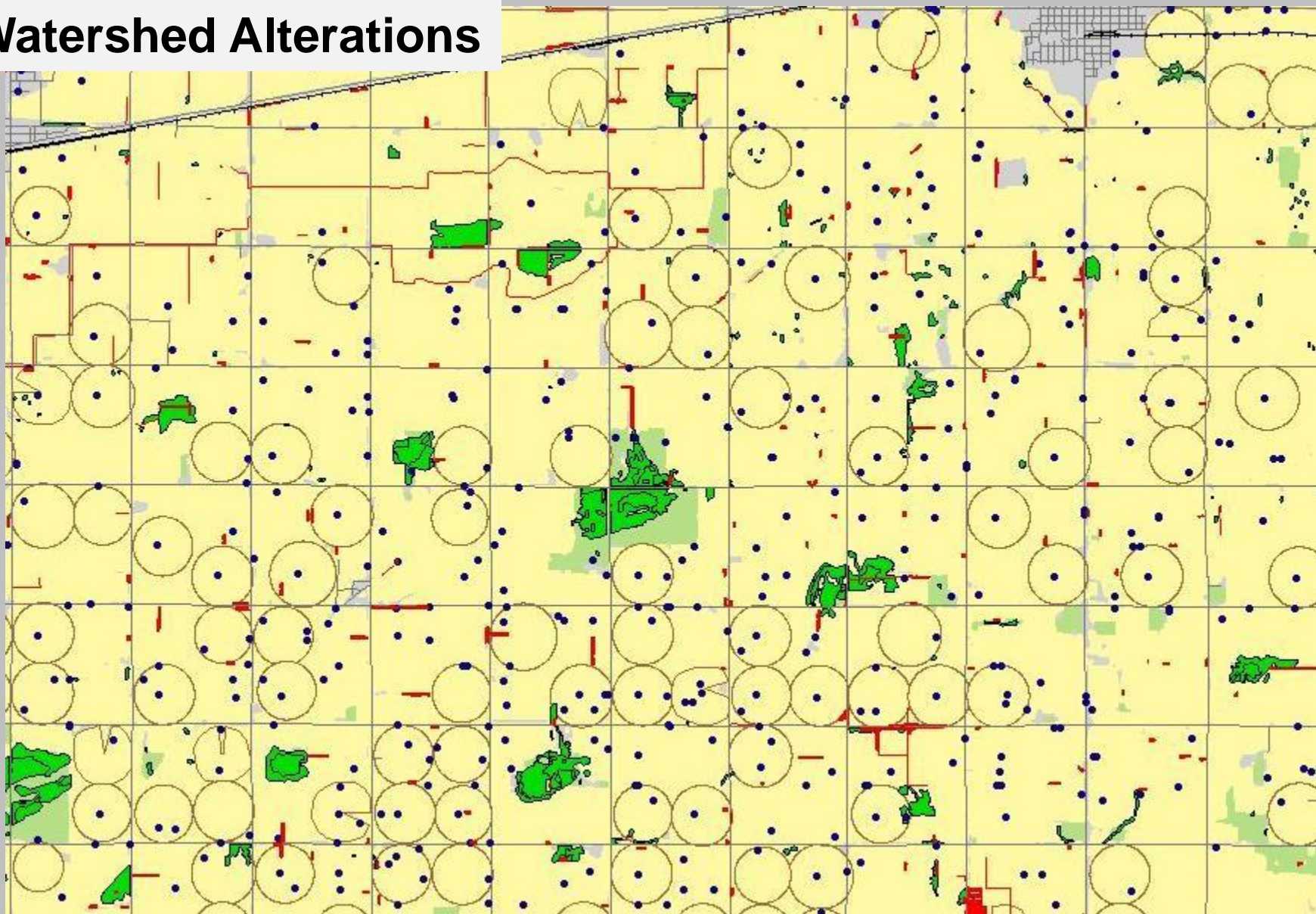
## Stream/River Straightening



# Down-cut (incised) stream in the Sandhills



# Watershed Alterations



- Row Crops
- Center Pivots
- Palustrine Wetland
- Excavated Pits and Ditches
- Well
- Grassland

# Watershed diversions



# Urban Expansion



2010

1934



1935



1946



1955



**Missouri River alterations, Cottier Bend by Indian Cave State Park**



# River Diversions



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

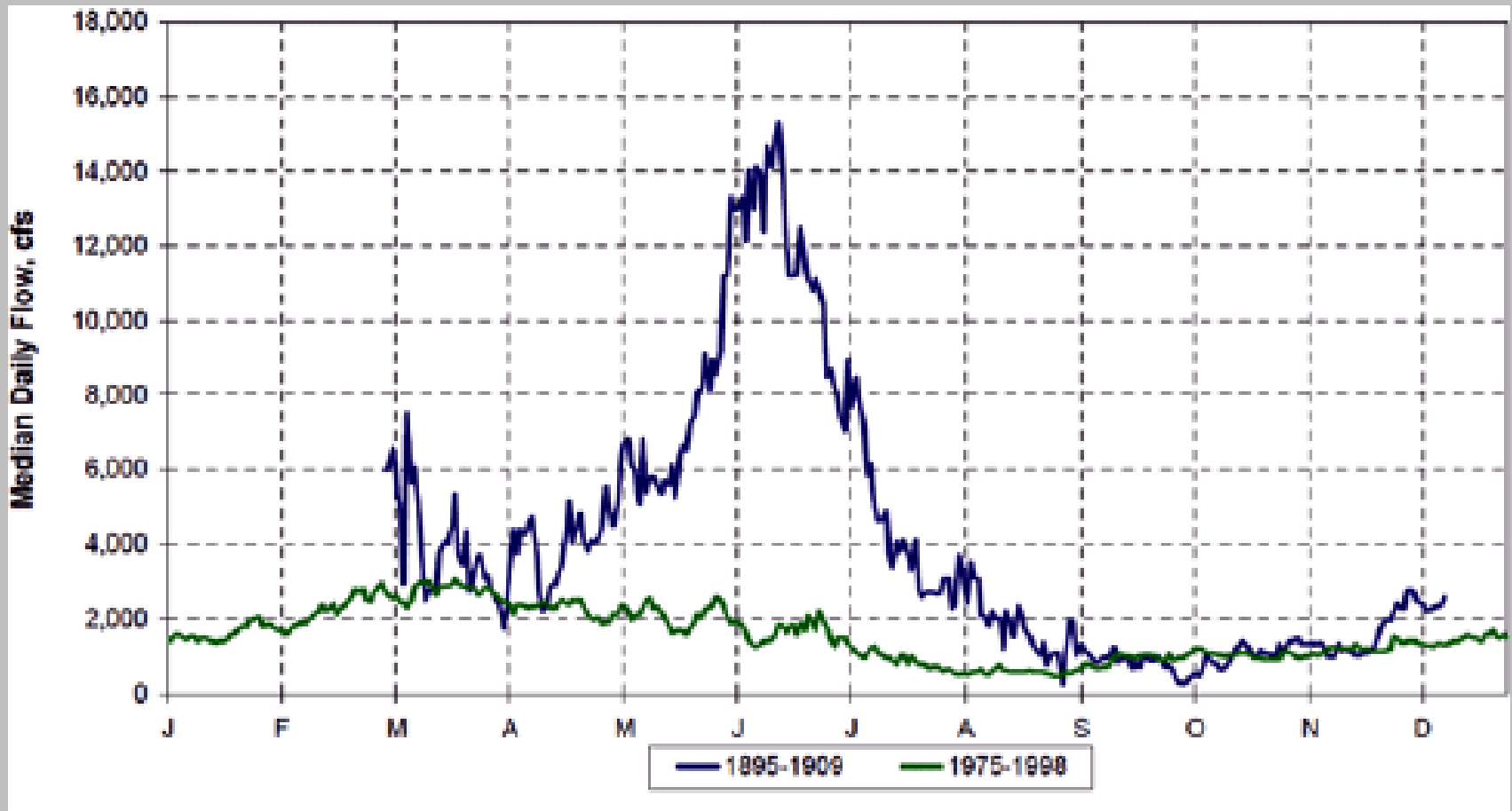
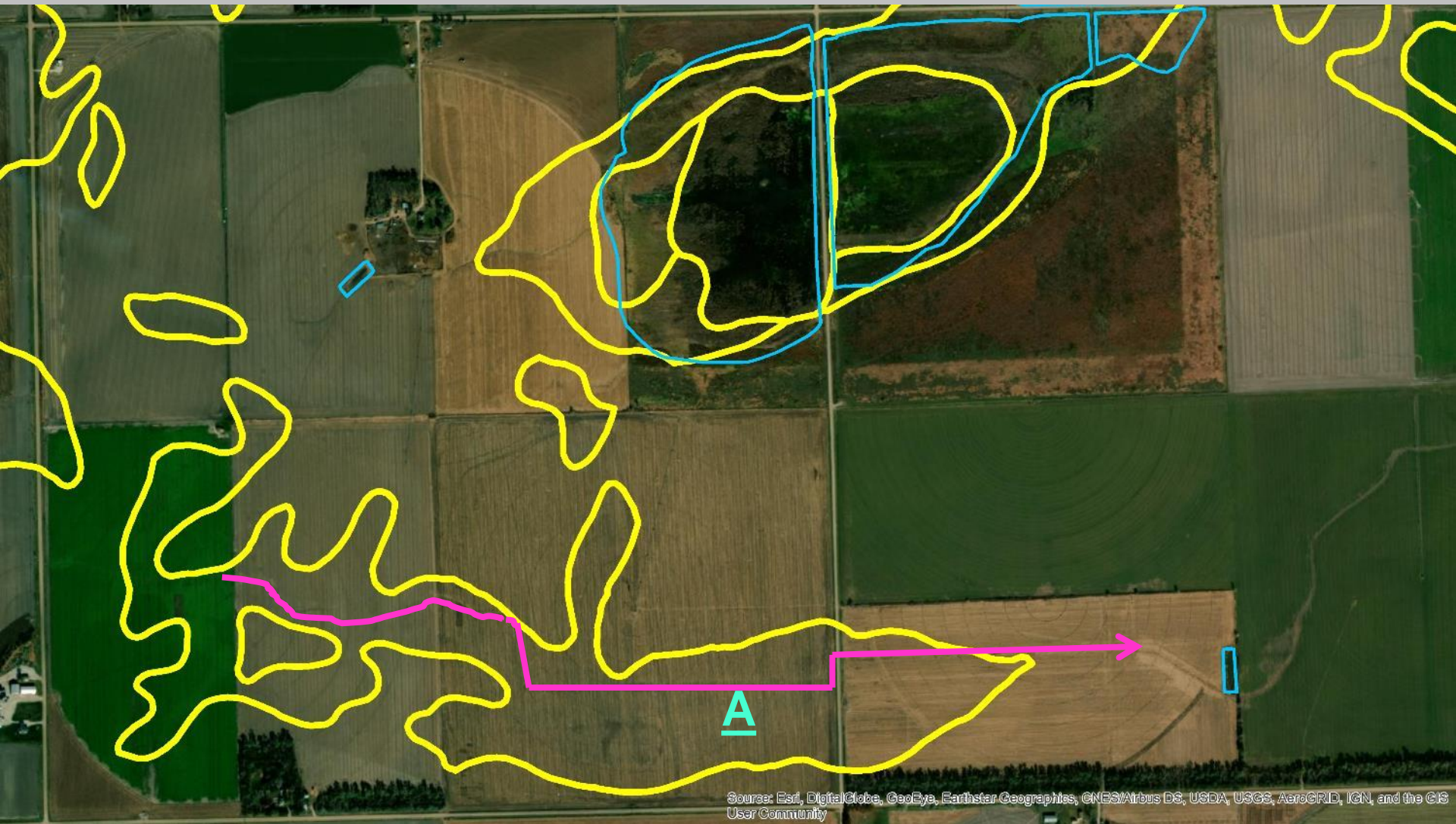


Fig. 1. Median daily flows of the Platte River at Duncan, Nebraska, ~69 km east of the central Platte River, in 1895-1909 and 1975-1998. Source: U.S. Department of the Interior (2006a).

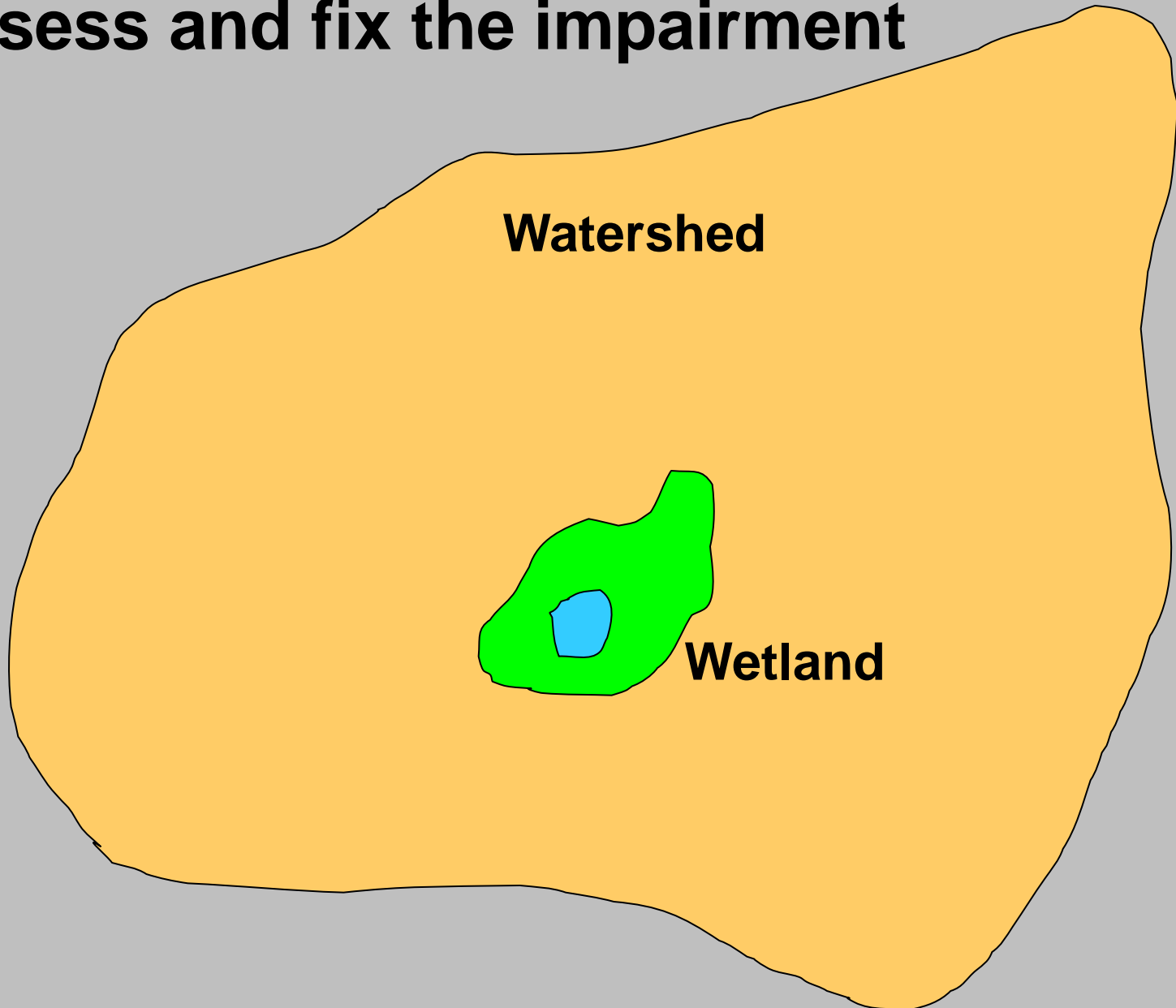


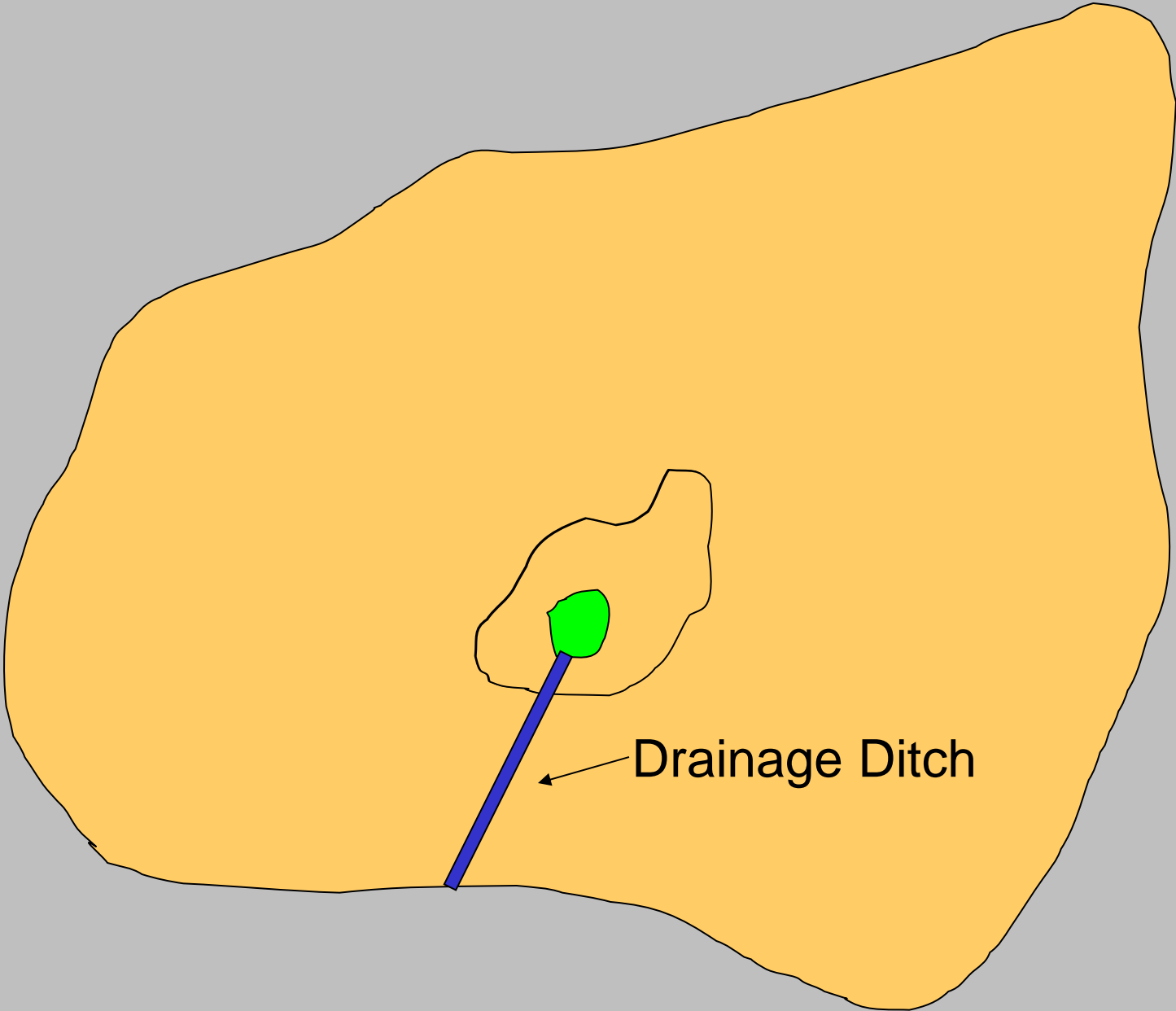
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Hydric Soils
- NWI

**Wetland A is completely drained**

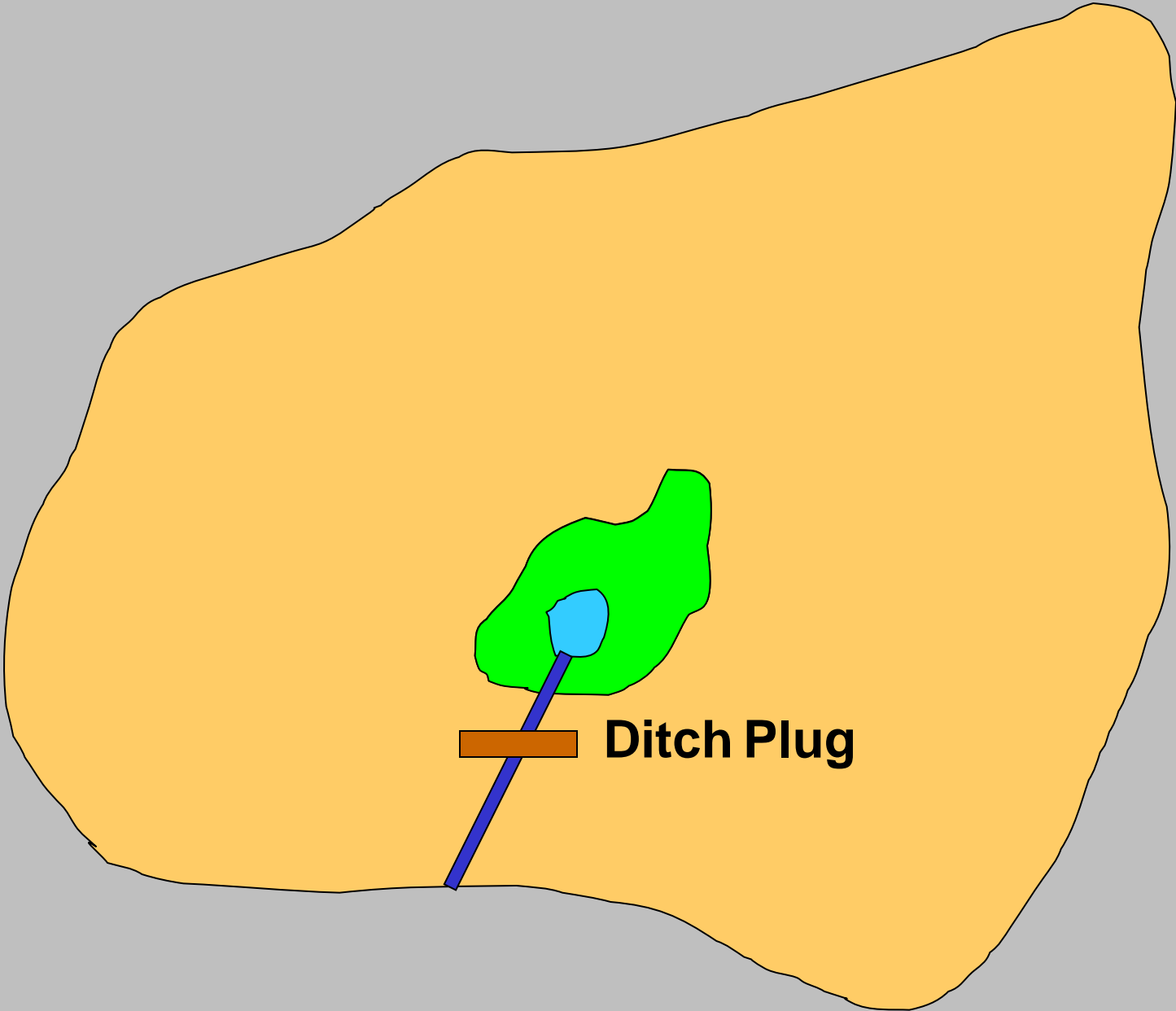
# Assess and fix the impairment





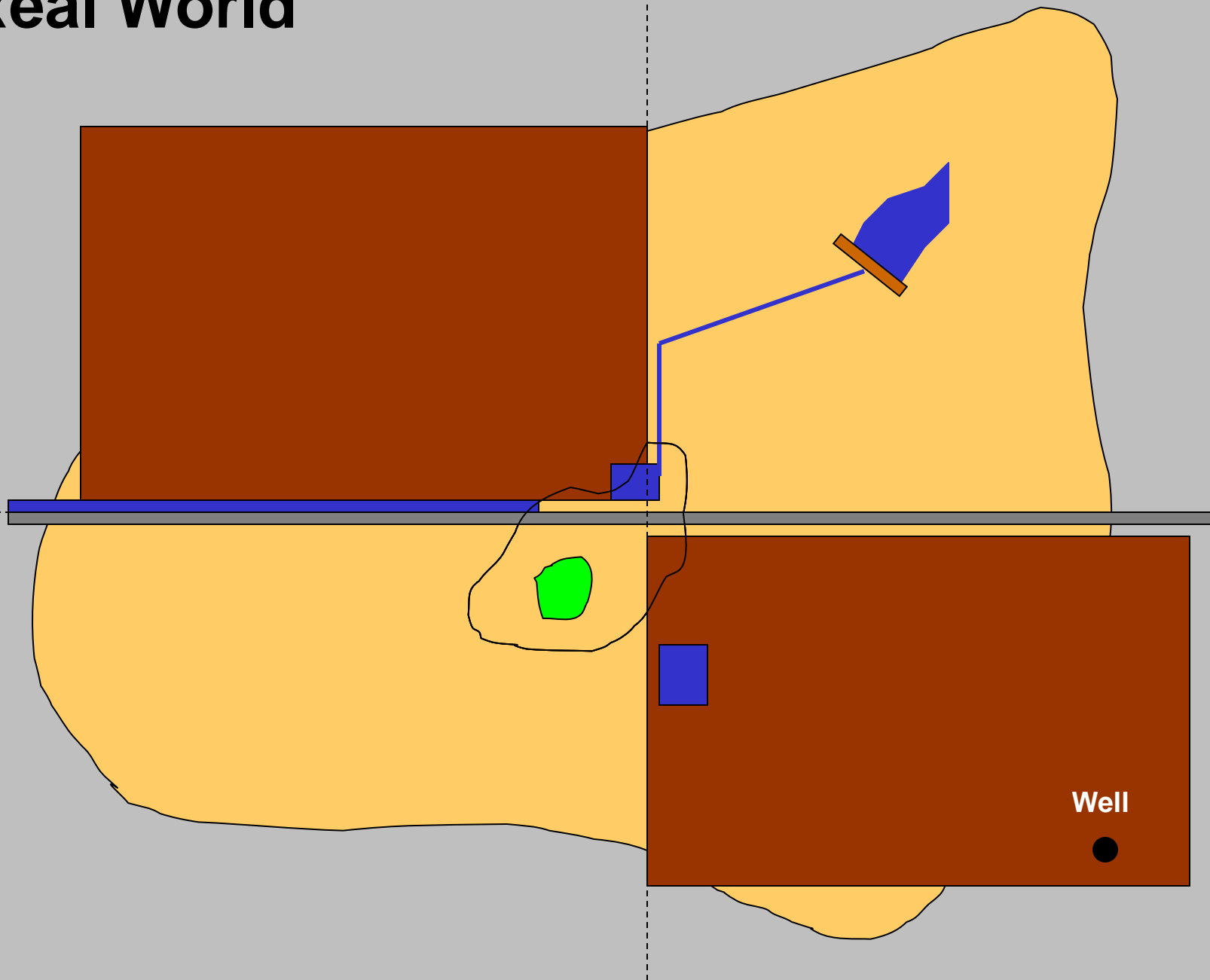
Drainage Ditch





**Ditch Plug**

# Real World



# How to conduct in-office inventories of site information





**It is important to emphasize that although in-office inventories are helpful and needed, you still need to visit the field with the landowner.**

- **You will learn a lot by visiting with the landowner (they know their property best) both from a conservation and an agricultural perspective, and you may also observe some things that are not able to be looked at using GIS and other off-site tools.**



*Photo by Joanna Pope, NRCS*

## Some assessment tools:

- **Aerial Photographs**
  - new, old, wet-period
  - **“Using only current information doesn't allow us to fully recover wetland acres because the restoration work only focuses on what is present, not what WAS present”.**
- **Soil Surveys**
- **National Wetland Inventory (NWI)**
- **Topographic maps**
  - **LiDAR**
- **Ownership**
- **Infra-structure**
  - **Roads, power lines, pipelines, etc.**
- **Many others**
  - **Floodplain maps**
  - **Natural Heritage Program and T&E data**
  - **etc.**

*Laurel Badura, USFWS*

# Wetland Determinations – Pros/Cons

- Provides information
- Information is “Cloudy”
  - Quality of Determination
  - Timeline of Determination
  - Interpretations of Labels
- New Determination?
  - Timely Response
  - Team Workload
  - Data for Permitting
  - Landowner Hesitancy

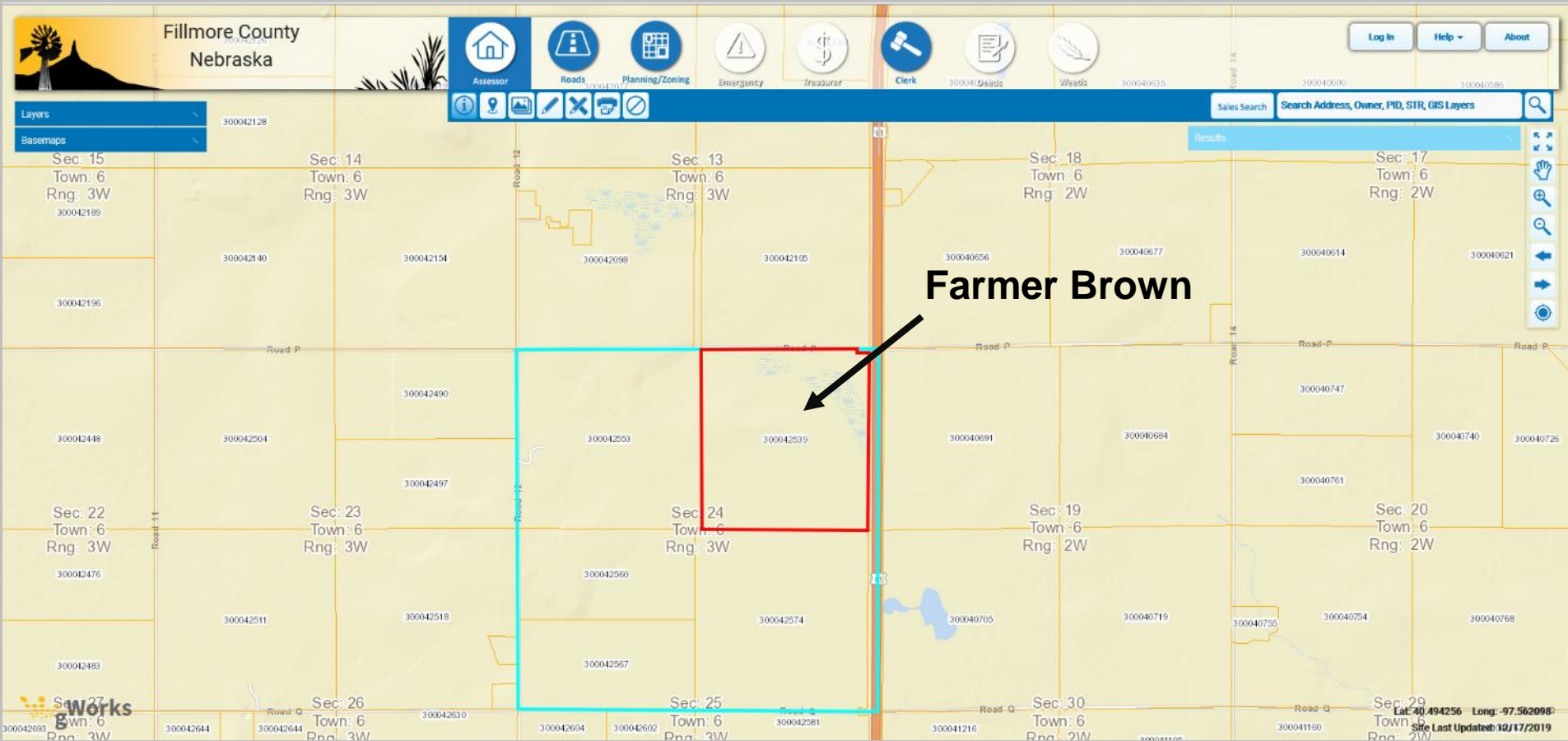


# Soils Site Assessment

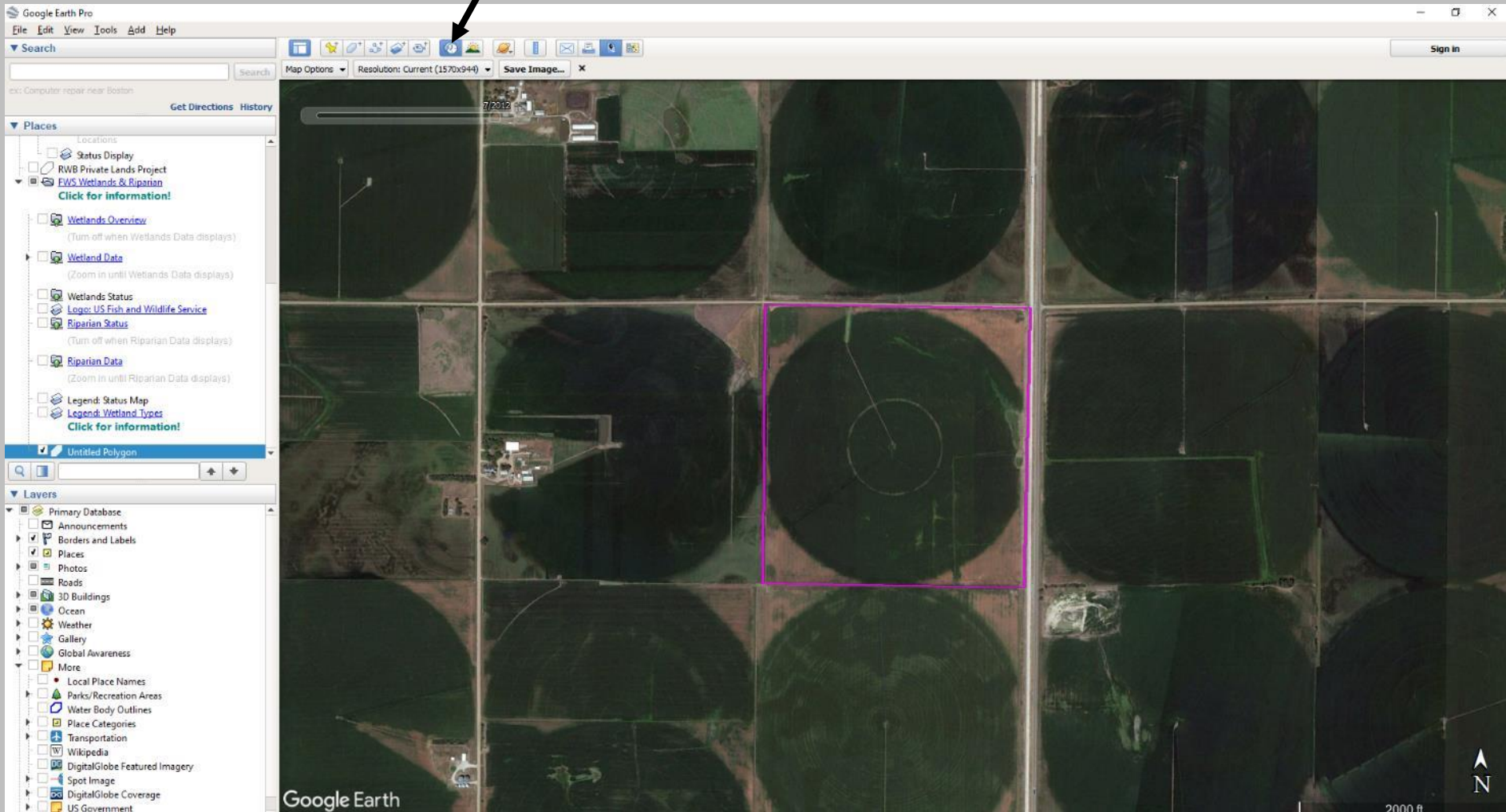
- An on-site soils assessment is still highly important
  - Identify existing wetlands
  - Determine soils suitable for wetland restoration
  - Document locations and characteristics of soil features (fill, sedimentation, clay or sand lenses, soils useful for ditch plugs, etc.)



# Assessor and/or Common Land Unit (CLU) data



# Google Earth--- historical imagery





2014



2010





Google Earth



2000 ft

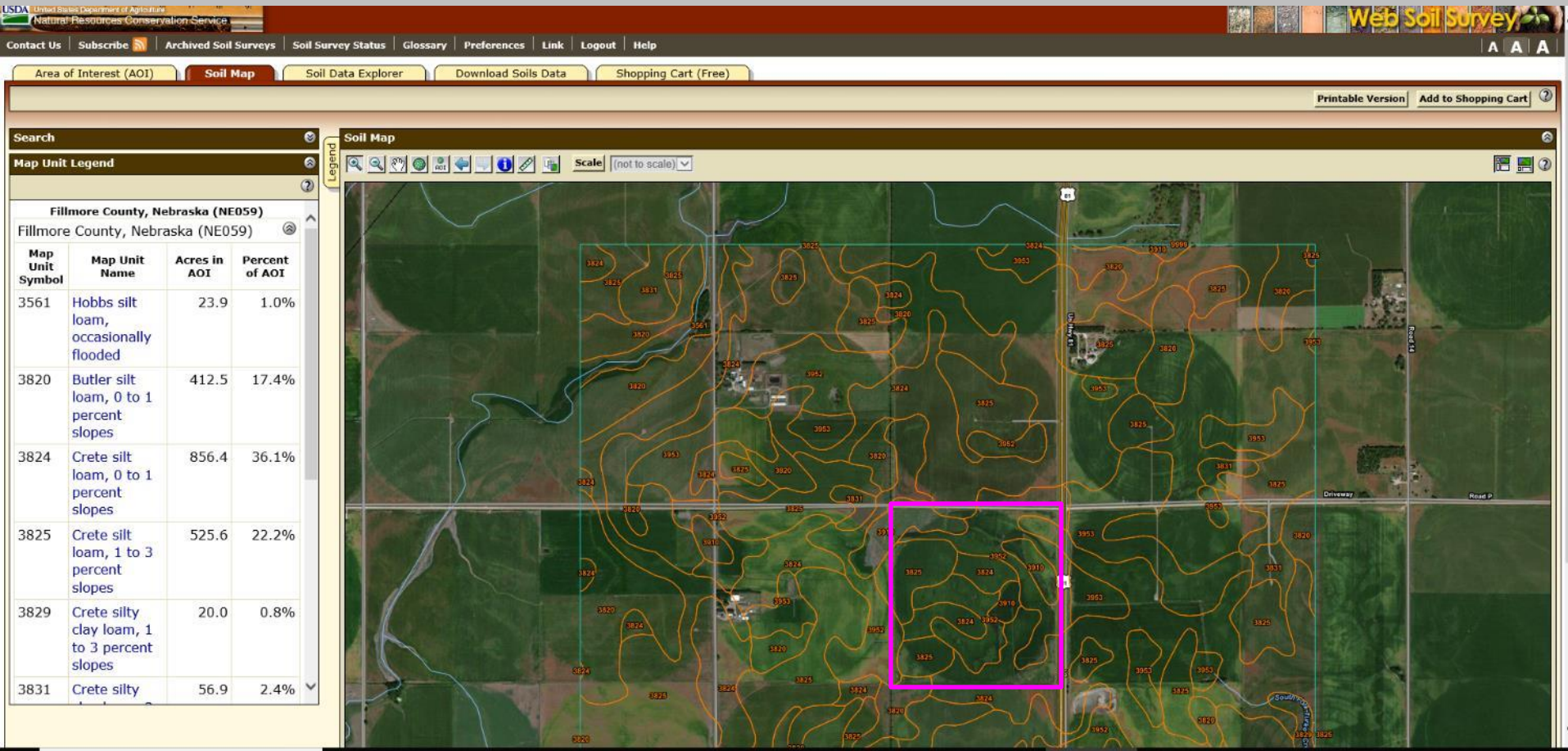
1993

# Google Earth--- KMZ files

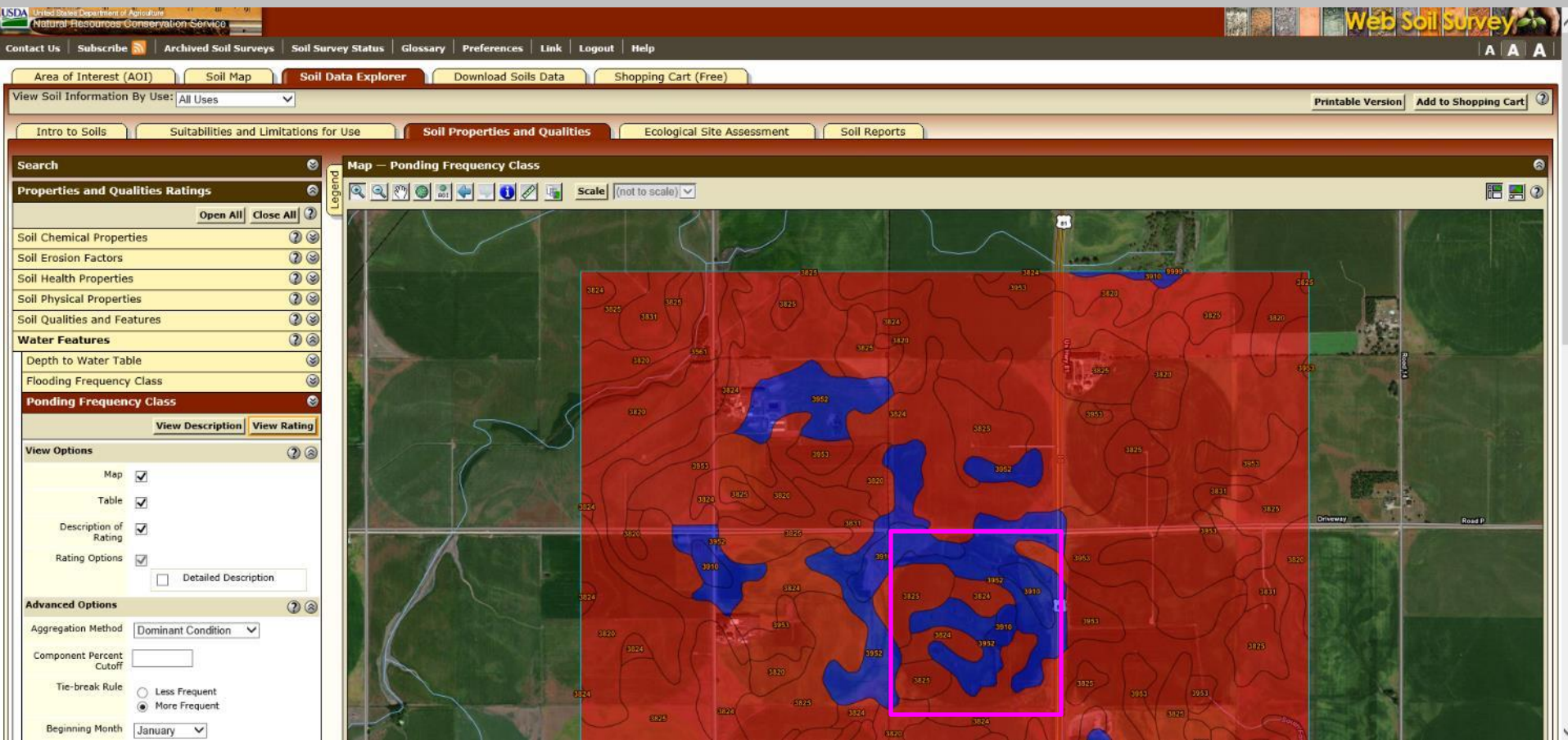
SSURGO | ne059 | 0.43 seconds | 0.07 cache ratio | BBOX:(-97.6317, 40.4625) (-97.5696, 40.4911) | 4142 acres



# Web Soil Survey



# Web Soil Survey--- ponding frequency



Can also examine flooding frequency, depth to water table and many other variables.



United States  
Department of  
Agriculture

Soil  
Conservation  
Service

In cooperation with  
University of Nebraska,  
Conservation and Survey  
Division

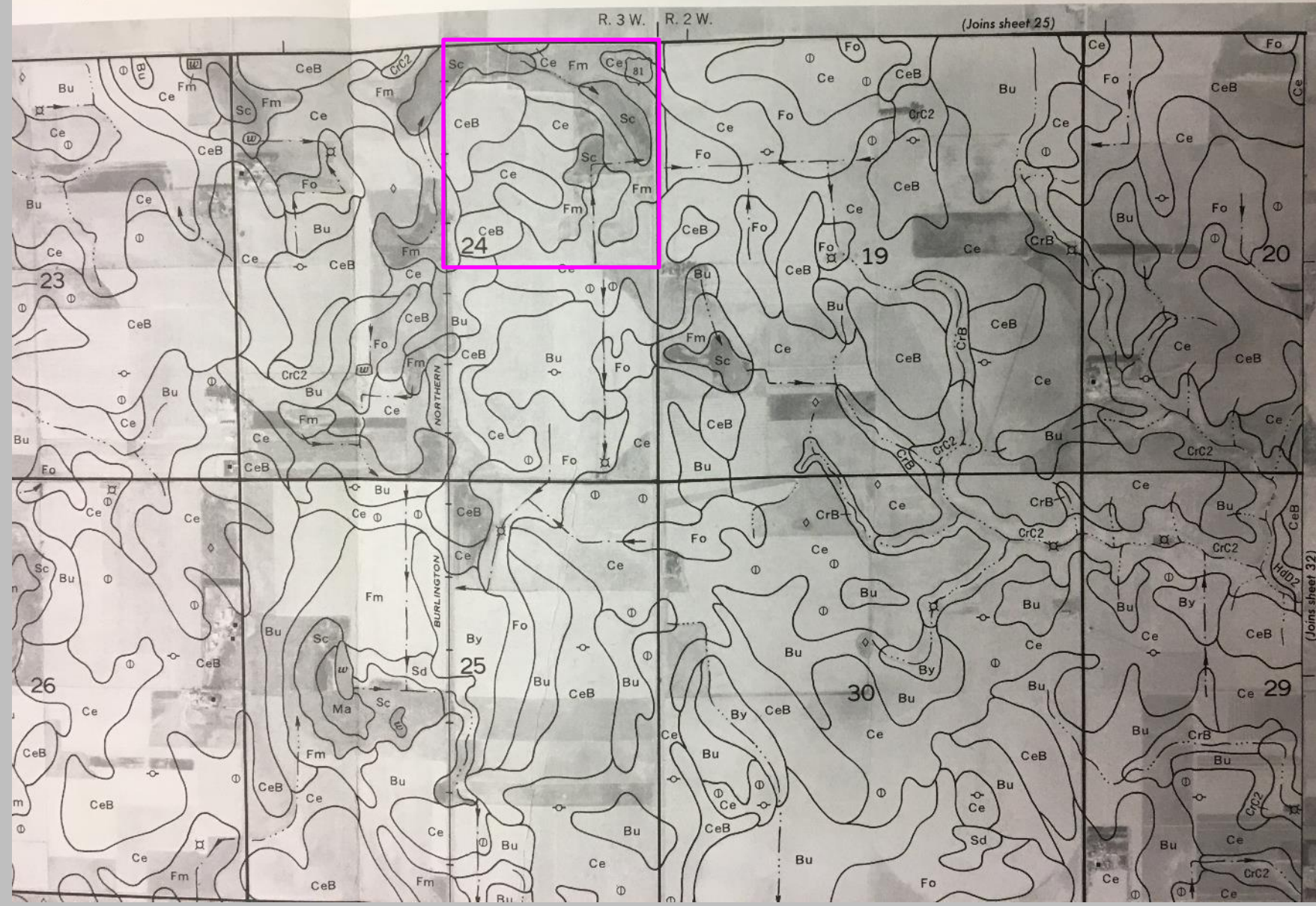
# Soil Survey of Fillmore County, Nebraska



**1986**

R. 3 W. R. 2 W.

(Joins sheet 25)



1 MILE

1 KILOMETER

(Joins sheet 32)

0

0

1/4

0

0.5

1

2

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS—MILTON WHITNEY, Chief.  
IN COOPERATION WITH THE UNIVERSITY OF NEBRASKA; G. E. CONDRA,  
DIRECTOR, NEBRASKA SOIL SURVEY.

---

SOIL SURVEY OF FILLMORE COUNTY,  
NEBRASKA.

RAYMOND J. POOL

BY

A. H. MEYER, OF THE U. S. DEPARTMENT OF AGRICULTURE,  
IN CHARGE, AND C. E. COLLETT AND N. A. BENGTON,  
OF THE NEBRASKA SOIL SURVEY.

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THOMAS D. RICE, INSPECTOR, NORTHERN DIVISION.

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[Advance Sheets—Field Operations of the Bureau of Soils, 1916.]

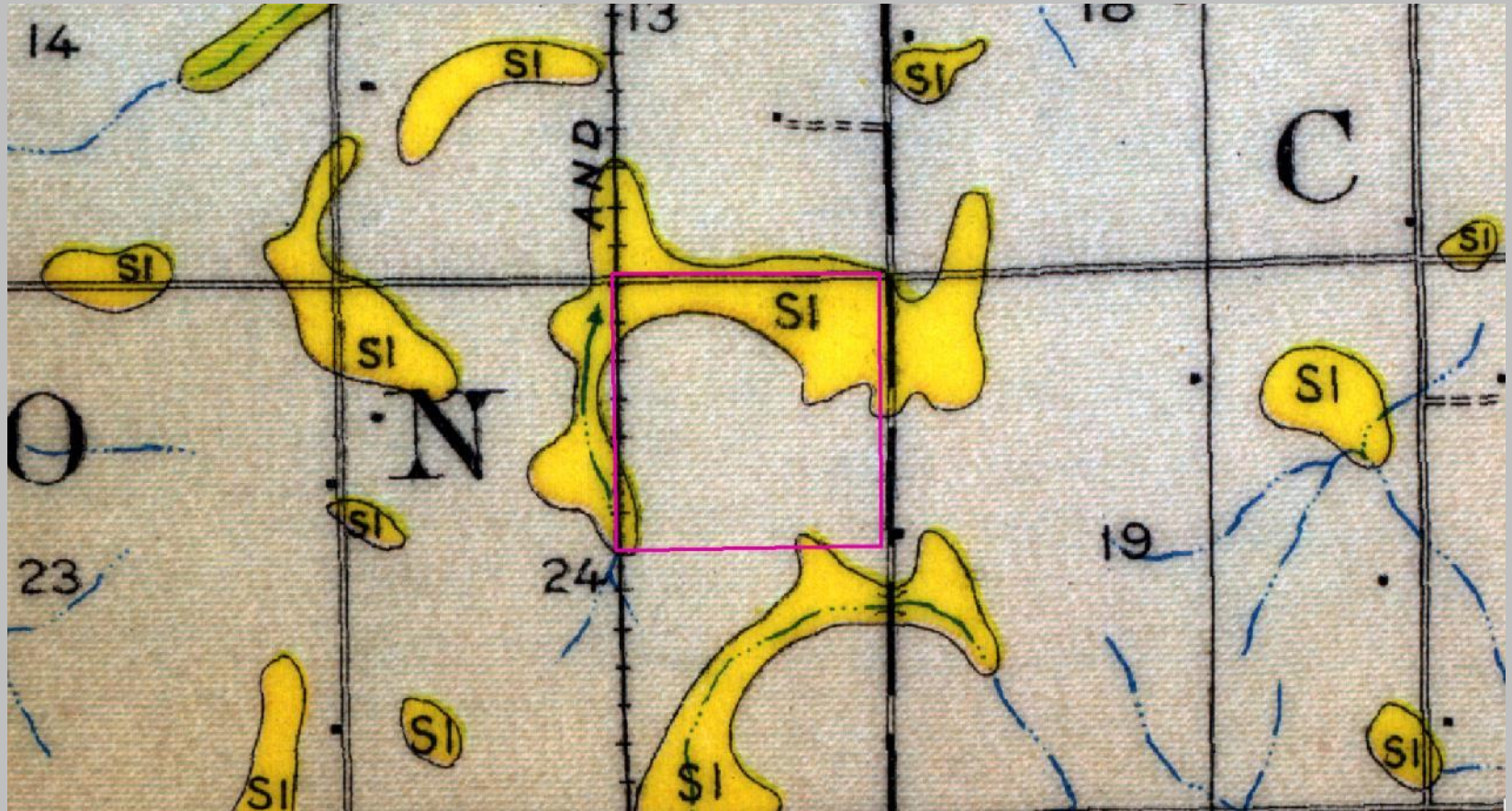


WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1918.

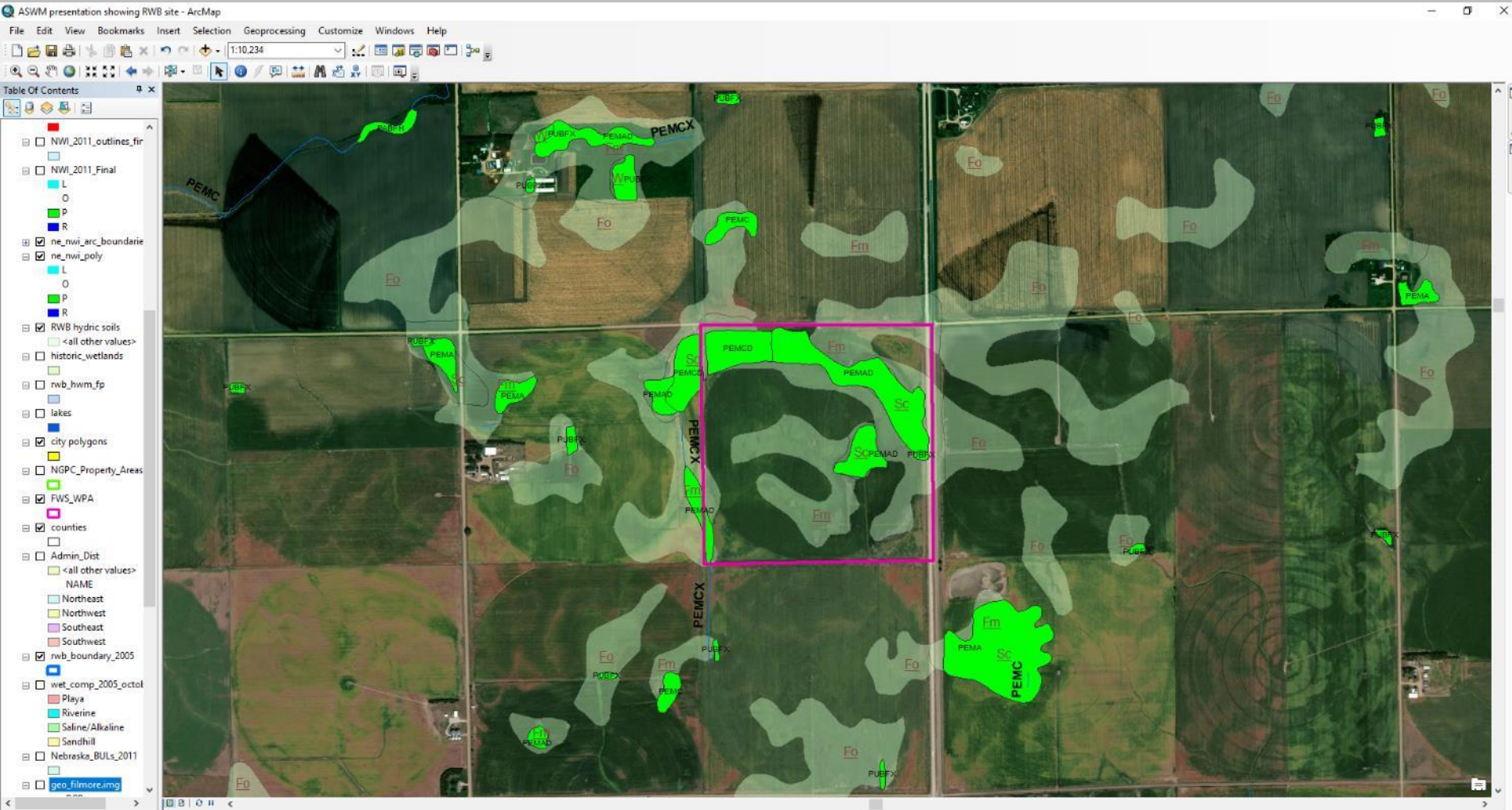
1918

# 1918 soils map

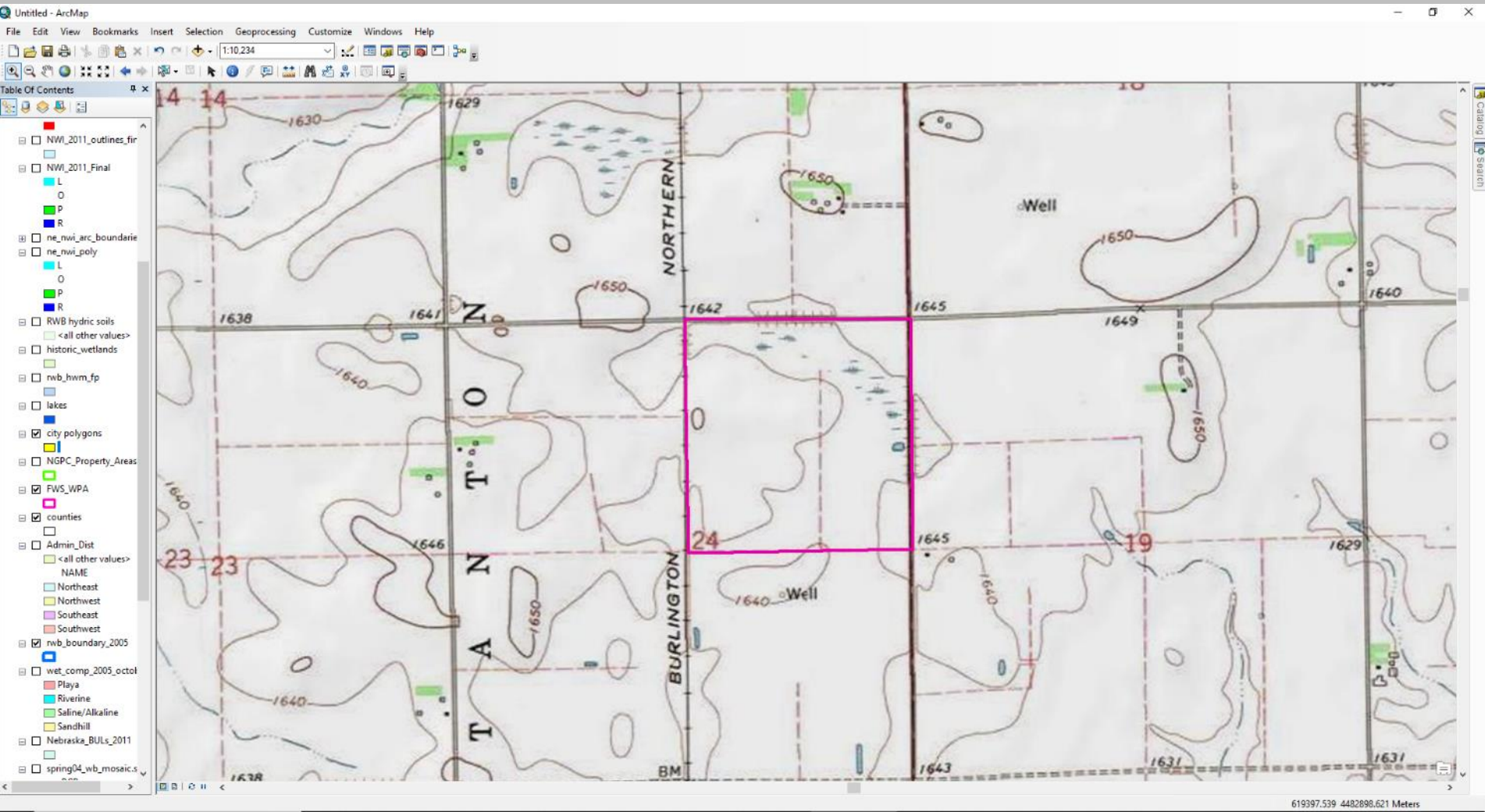




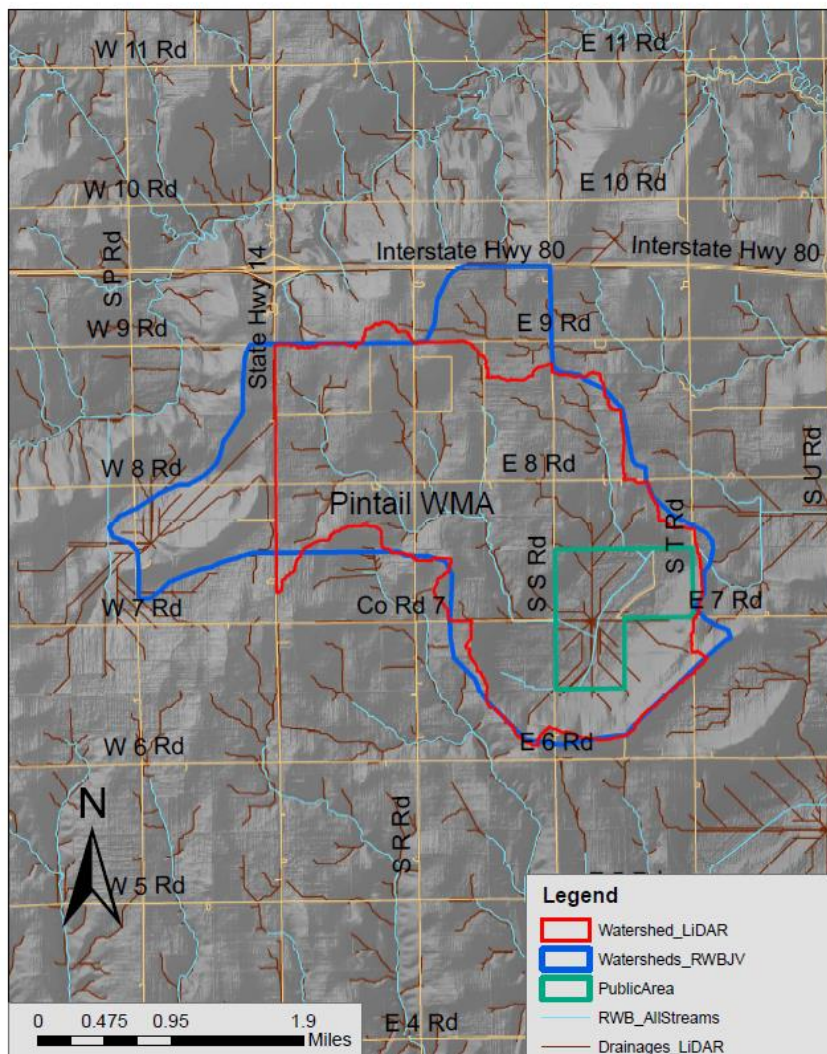
# National Wetlands Inventory (NWI)



# Topographic Maps



## Pintail WMA, Hamilton County



## **Key Summary Points:**

- **Understand that each wetland is different**
- **Understand that each landowner is different**
- **Use assessment tools and local knowledge**
- **Visit the site with the landowner/decision-maker(s)**
- **It is OK to get help from others**
- **There are often other options/programs available**



**Thank You!**



**ted.lagrange@nebraska.gov**  
**ritch.nelson@usda.gov**

