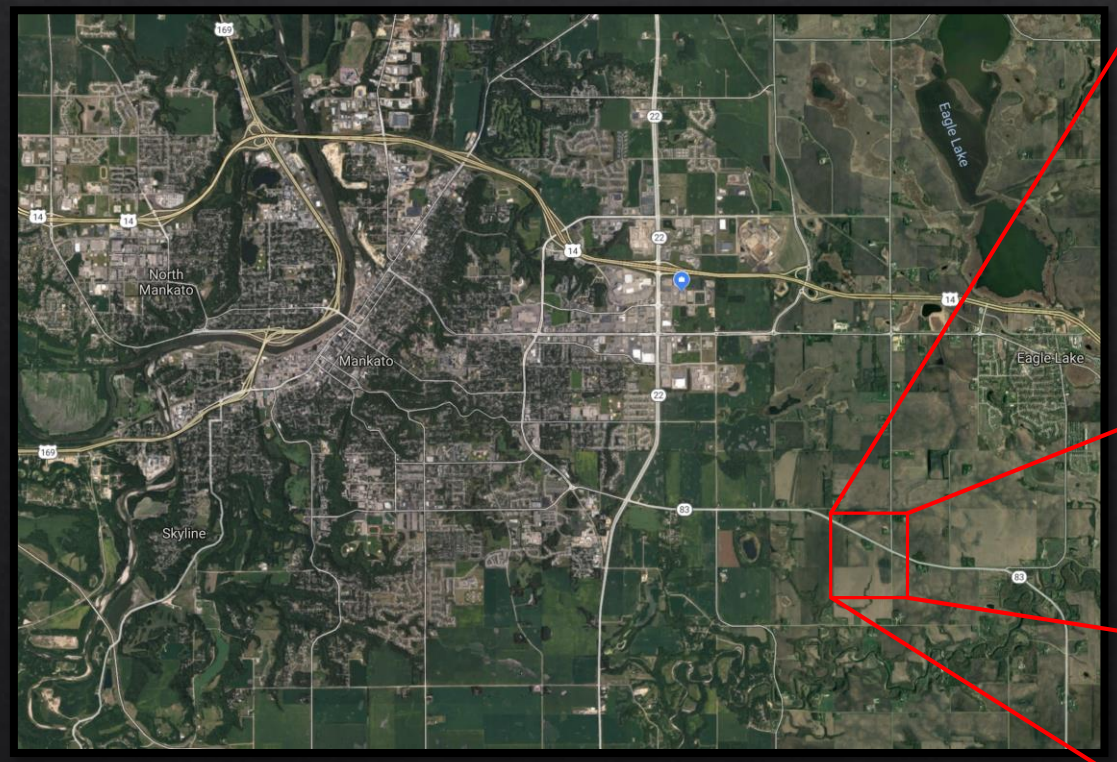
Wetland Delineation using GIS

Tyler Dardis

Study Area

- The site is located at the intersection Highway 83, and 594th Avenue, just east of Mankato, MN.



Data Sets Used

- To provide enough evidence that the site is a wetland, many different sources of data are used to delineate whether it is a wetland. These data sets span from 1800's PLATs to modern day satellite and aerial imagery.
- Data used:
  - County Soil Survey (SSURGO)
  - Historical PLAT maps
  - National Wetlands Inventory (NWI)
  - LiDAR derived hill shade/DEM
  - Historical/Modern Air Photographs
  - Stereo Pairs

Digitizing the proposed Wetland

- Use of Stereo pairs, Historical aerial photographs, and LiDAR DEM.
- Goal is to find the "Ordinary High Water Level" (OHWL).This is the considered the boundary of a wetland, and one of the notable changes is from aquatic vegetation and non-aquatic vegetation. (Air Photo)
- 3D/Stereo viewing is very powerful to see the basin, and elevation change of a wetland. (LiDAR and Stereo Pairs)

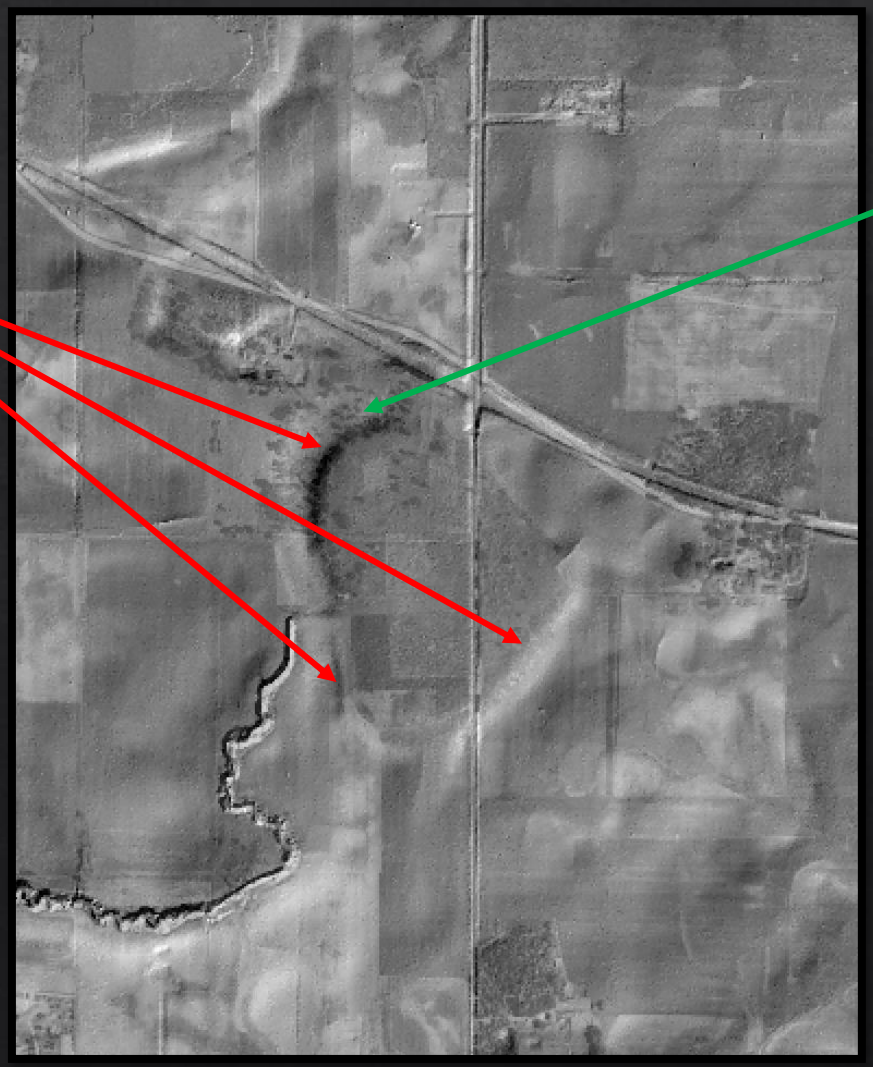
N

Delineated Wetland

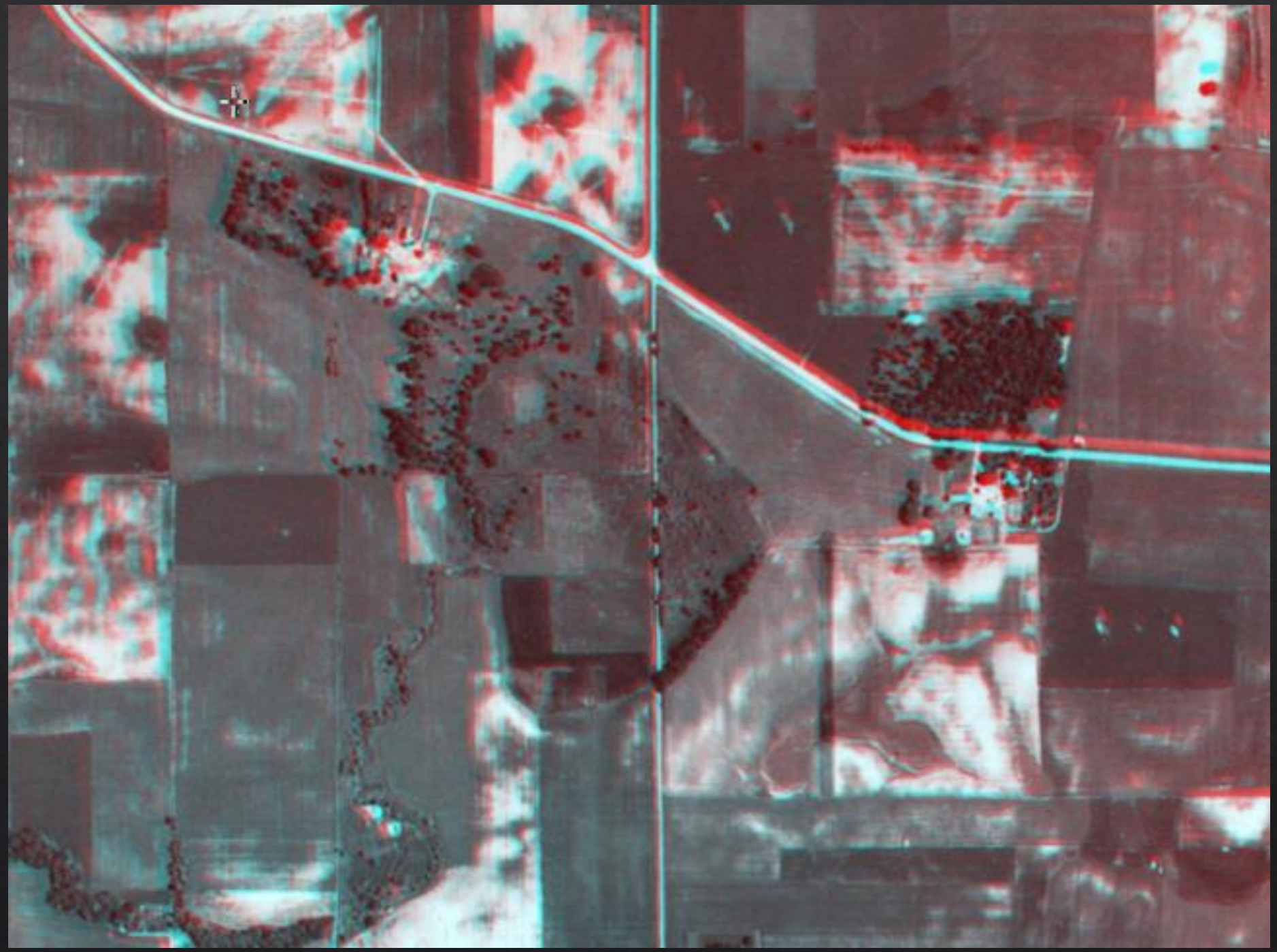
LiDAR Hill shade (2005)

1939 Air Photo

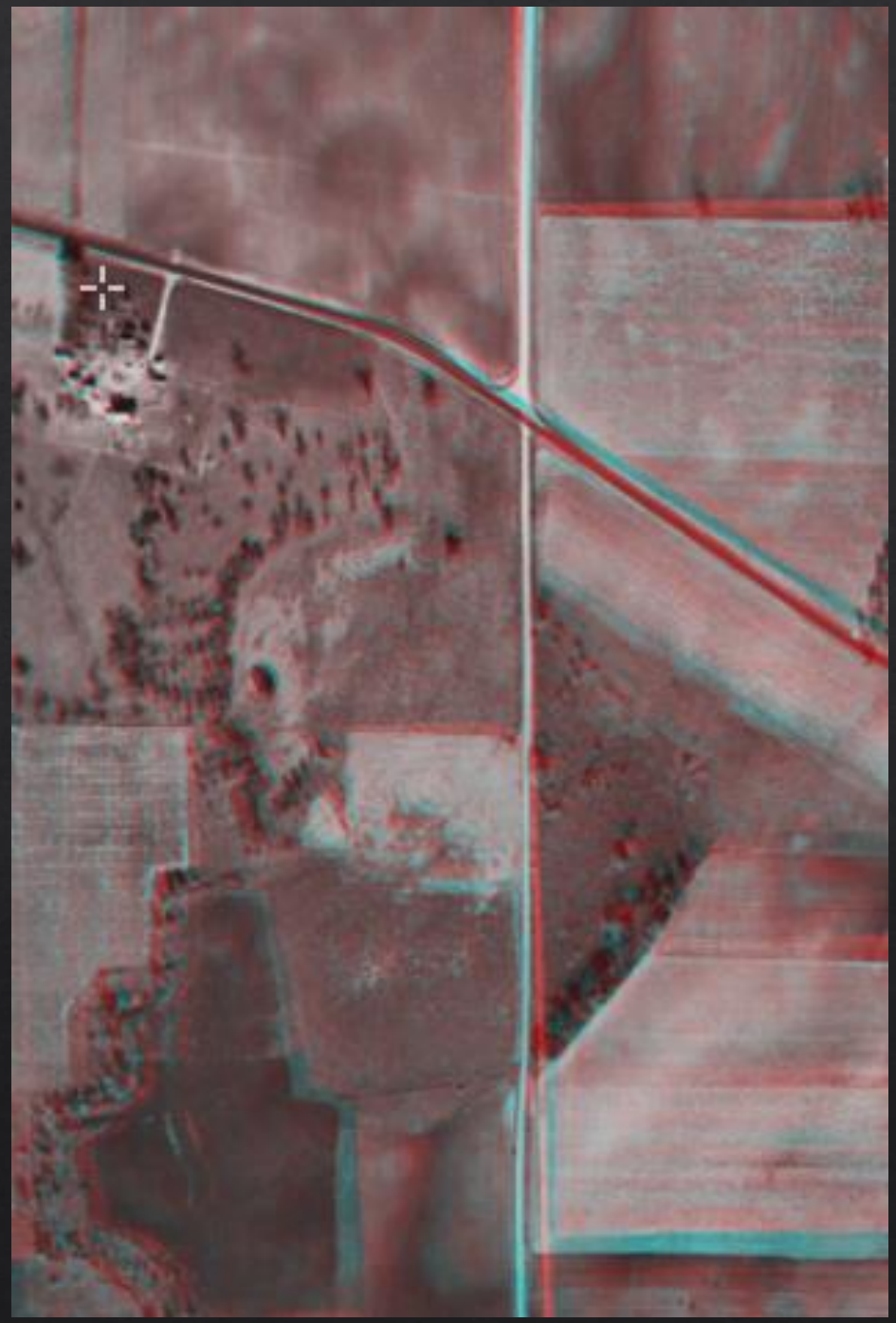
Hill shade and Aerial Image Overlay



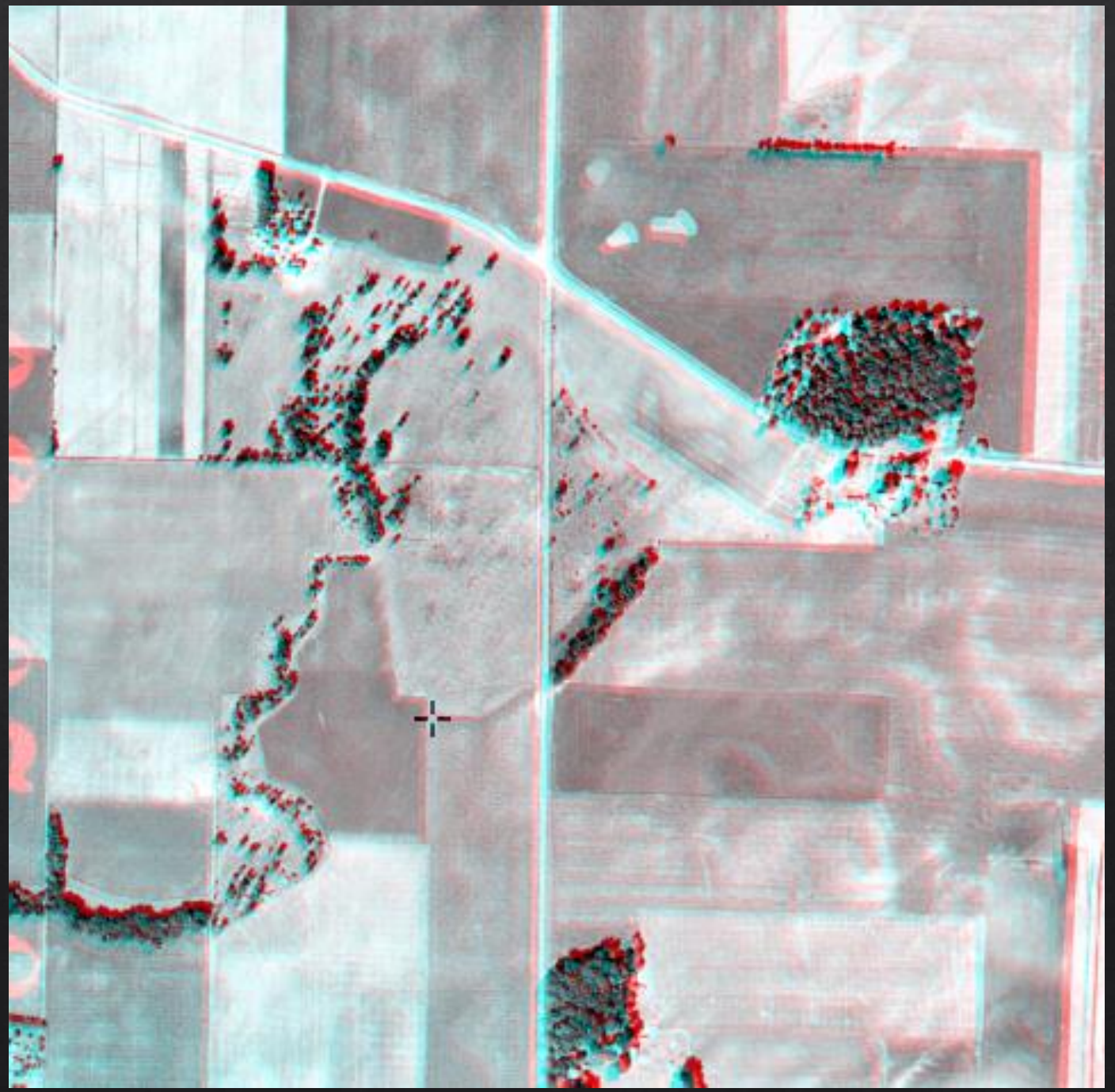
Stereo Pair (1939)



Additional Stereo Pair (1949)



Additional Stereo Pair (1950)



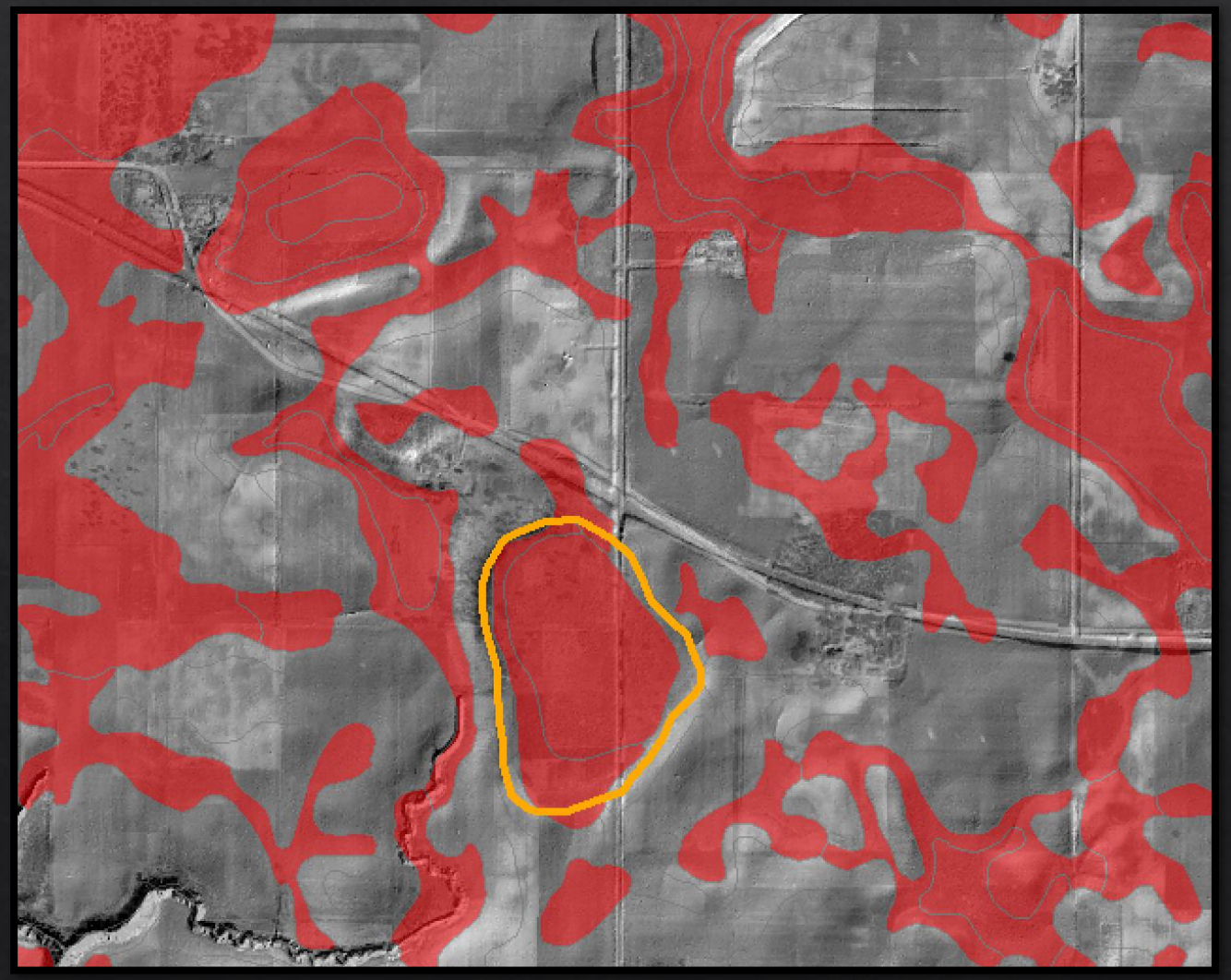
Is it on the NWI?

NO!

Hydric Soils?

YES!

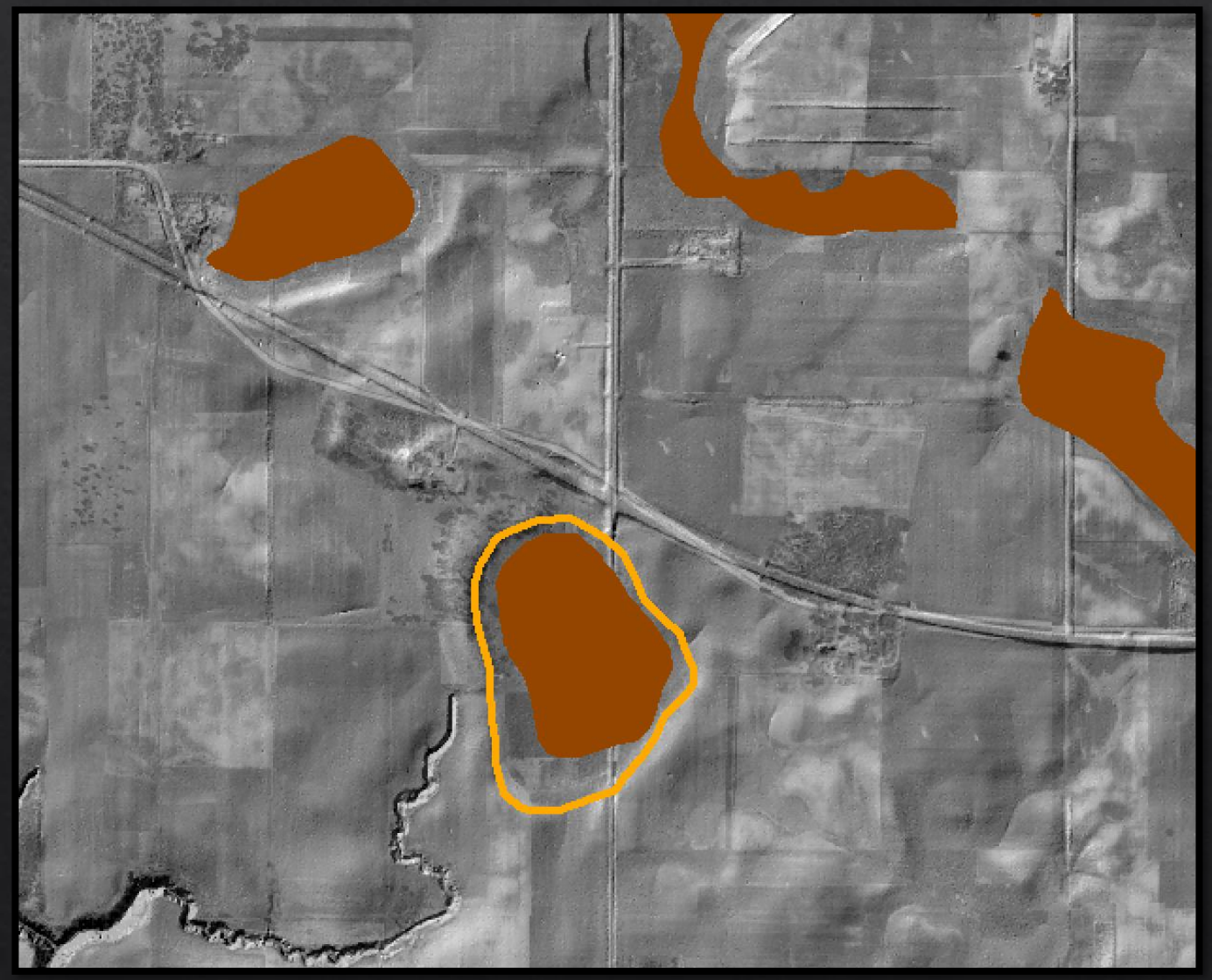
Saturated, wet soils!



Histosols?

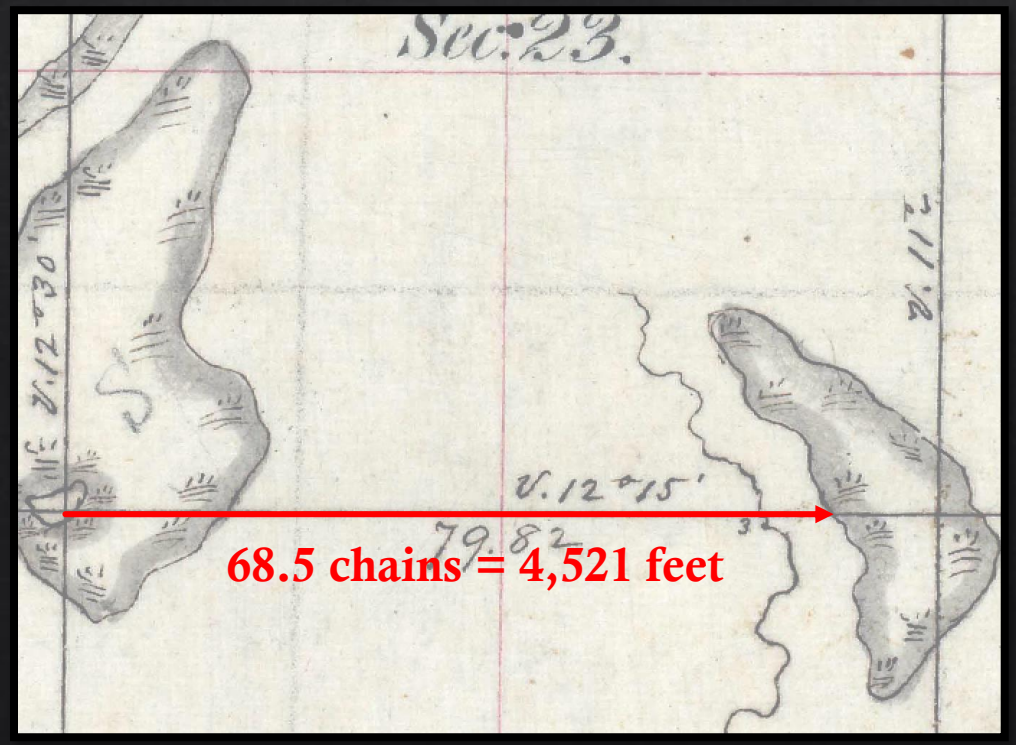
YES!

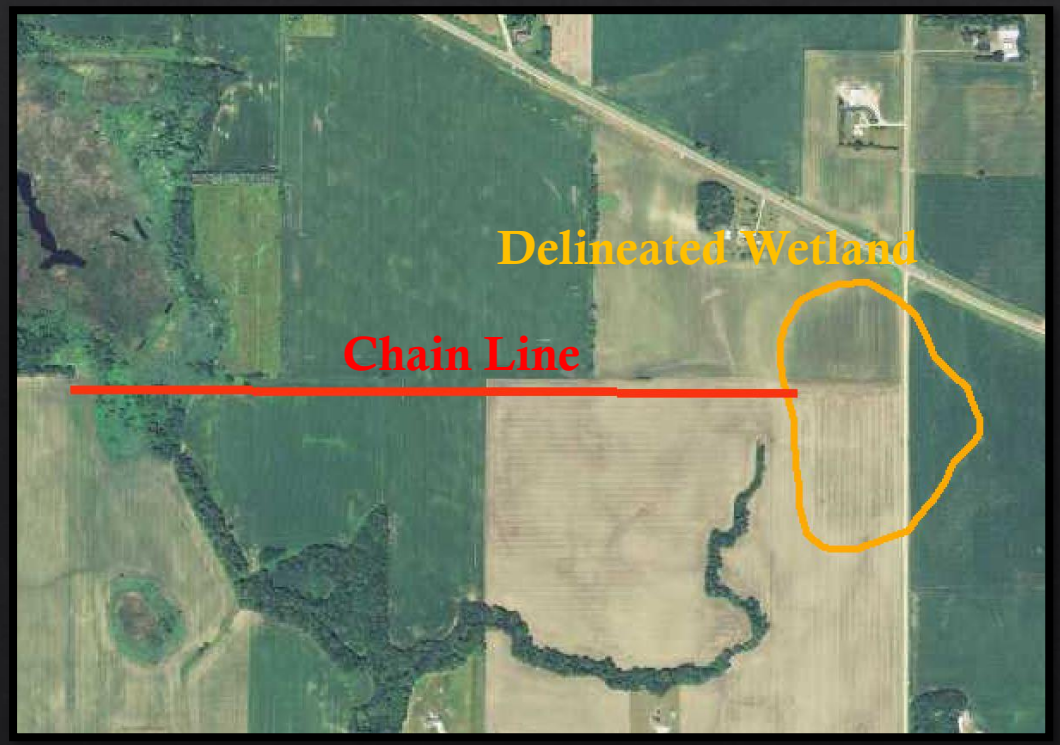
Characteristic of wet, boggy conditions;
Loaded with organic material and decaying matter



Using 1800's PLAT Maps

- Using a PLAT from 1854-55, a wetland was identified at being 68.5 chains from the surveyor's section corner. Each chain equals 66 feet.
- Comparing the surveyor's findings to modern thoughts of where the wetland is; **it matches!**





Use of WMS

- Using a Web Mapping Service (WMS) from the State of Minnesota, we are able to get aerial/satellite imagery at the click of a button. Due to this service, we are able to look at many of the years between 1991 and 2017 for photographic evidence of wetland characteristics.
- All photos will be shown, with the 5 best selected for confirmation use in delineating a wetland.

- **Best Years:**
  - **2017, 2013, 2010, 2009, 1991**

Delineated Wetland

2017*

Areas of Stress/
Flooded Crops

N

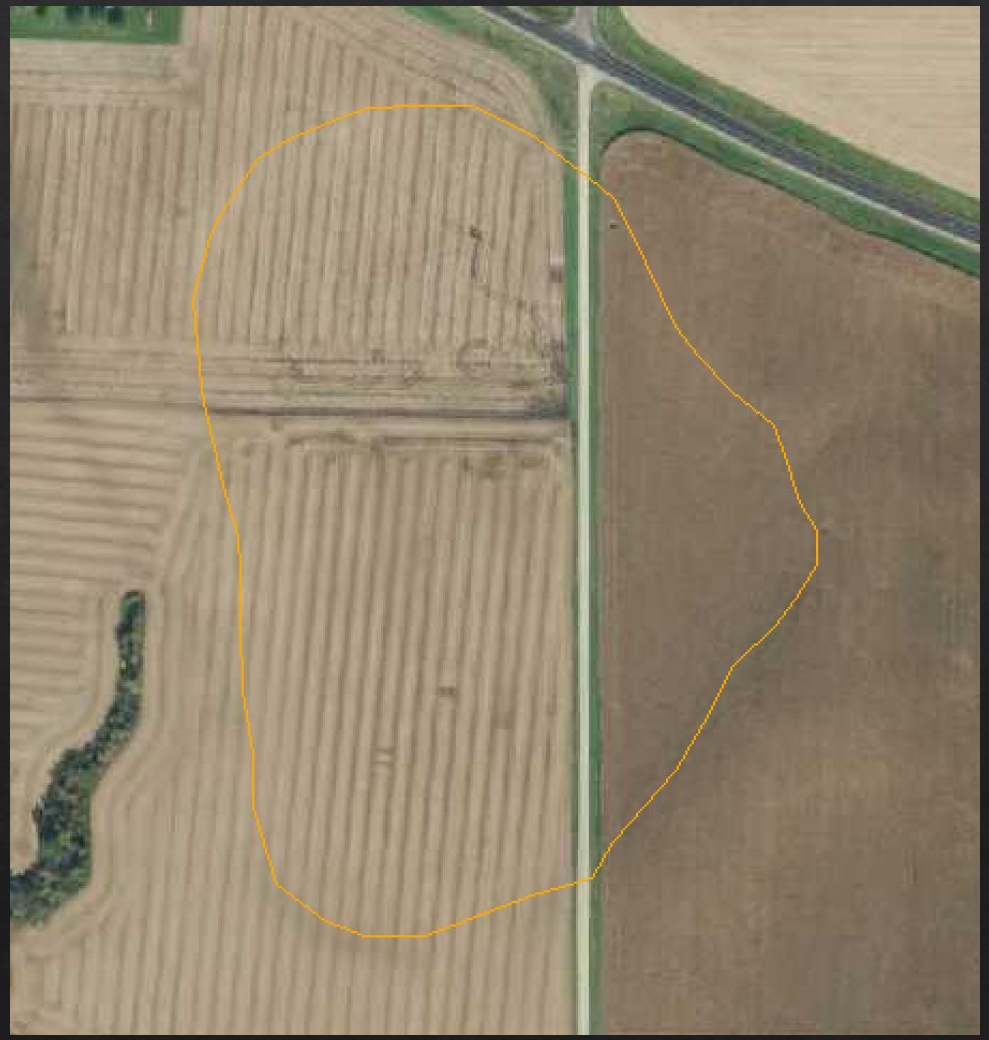
Color

False Color

Delineated Wetland

2015

N



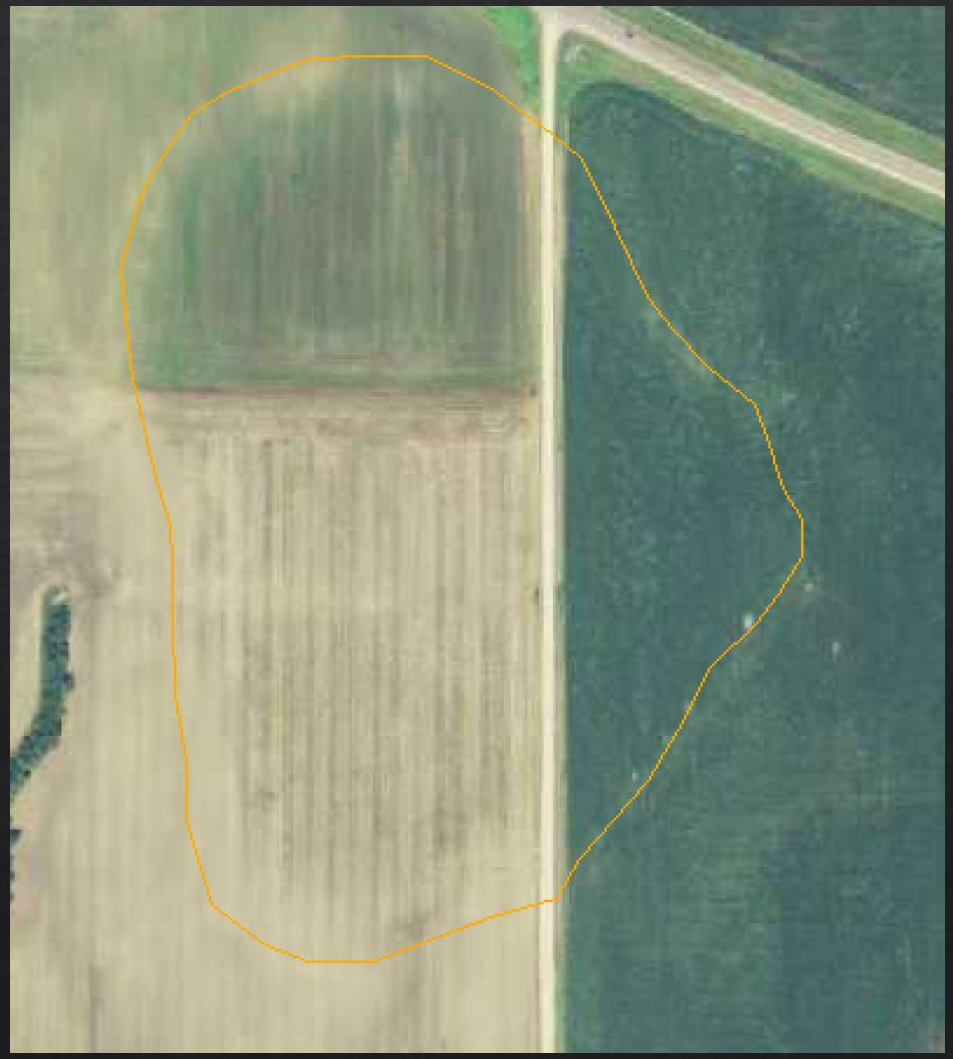
Color

False Color

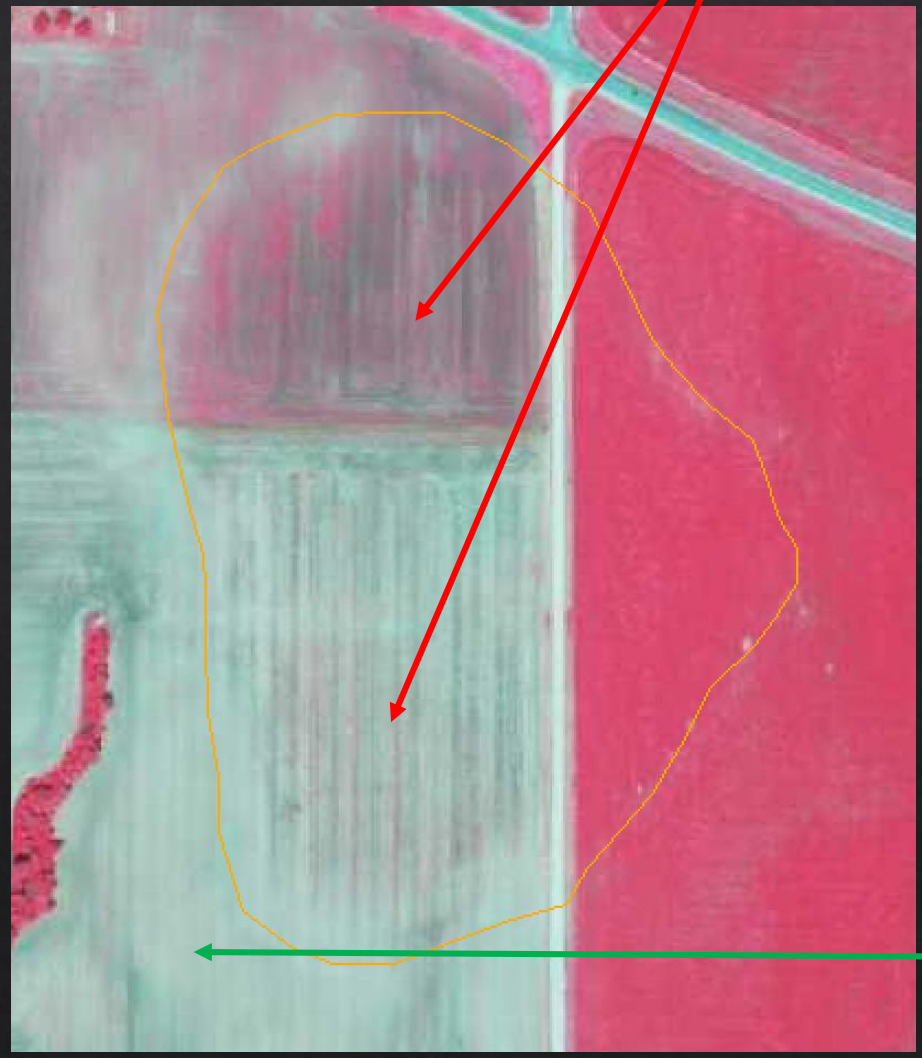
2013*

Delineated Wetland

N



Color



False Color

2010*

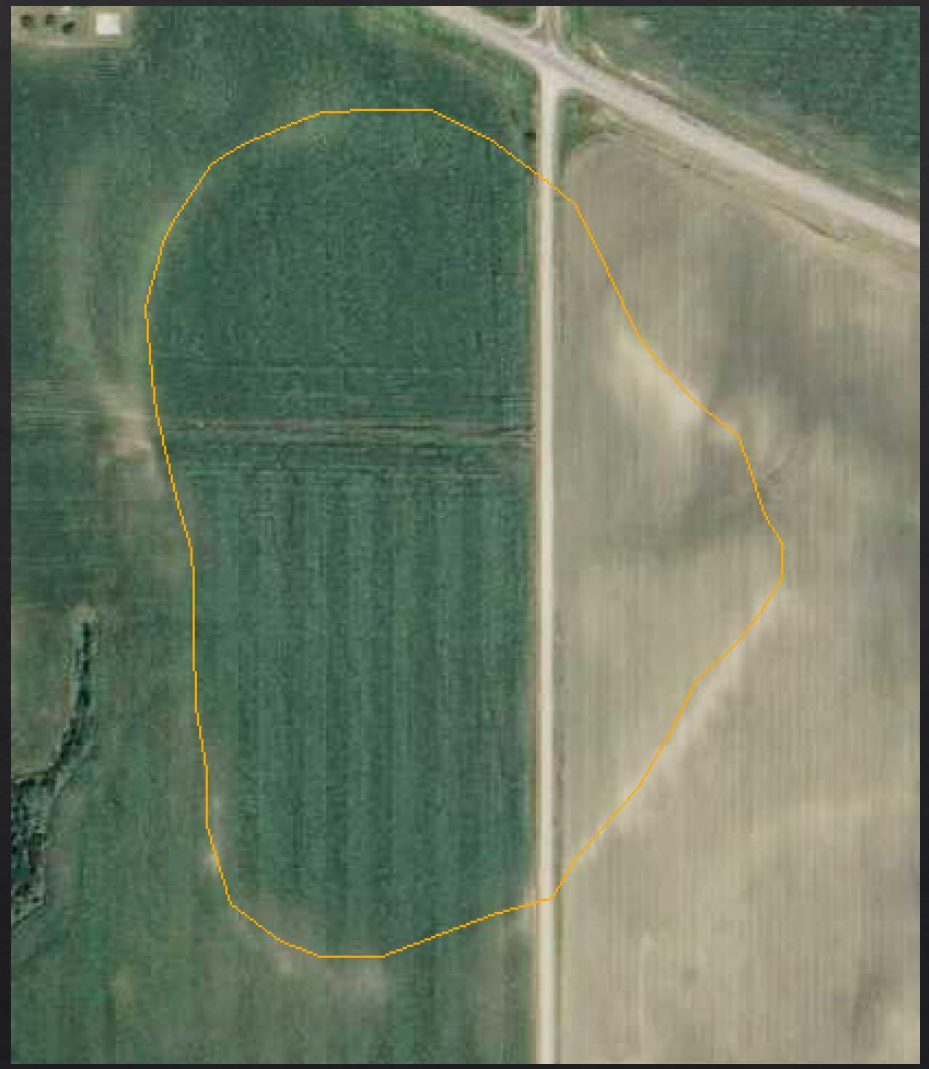

Areas of Stress/
Flooded Crops
Darker Soils
N
Delineated Wetland

2009*

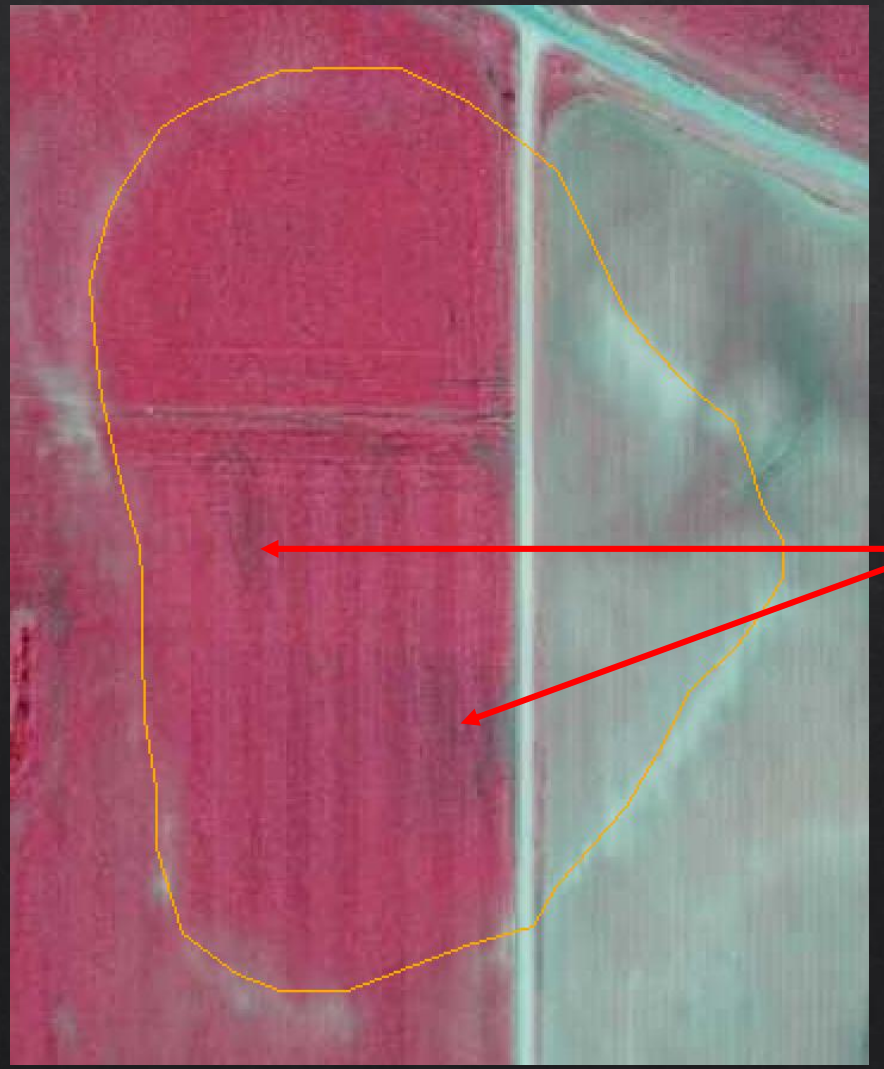
2008

Delineated Wetland

N



Color



False Color

Areas of Stress

2003

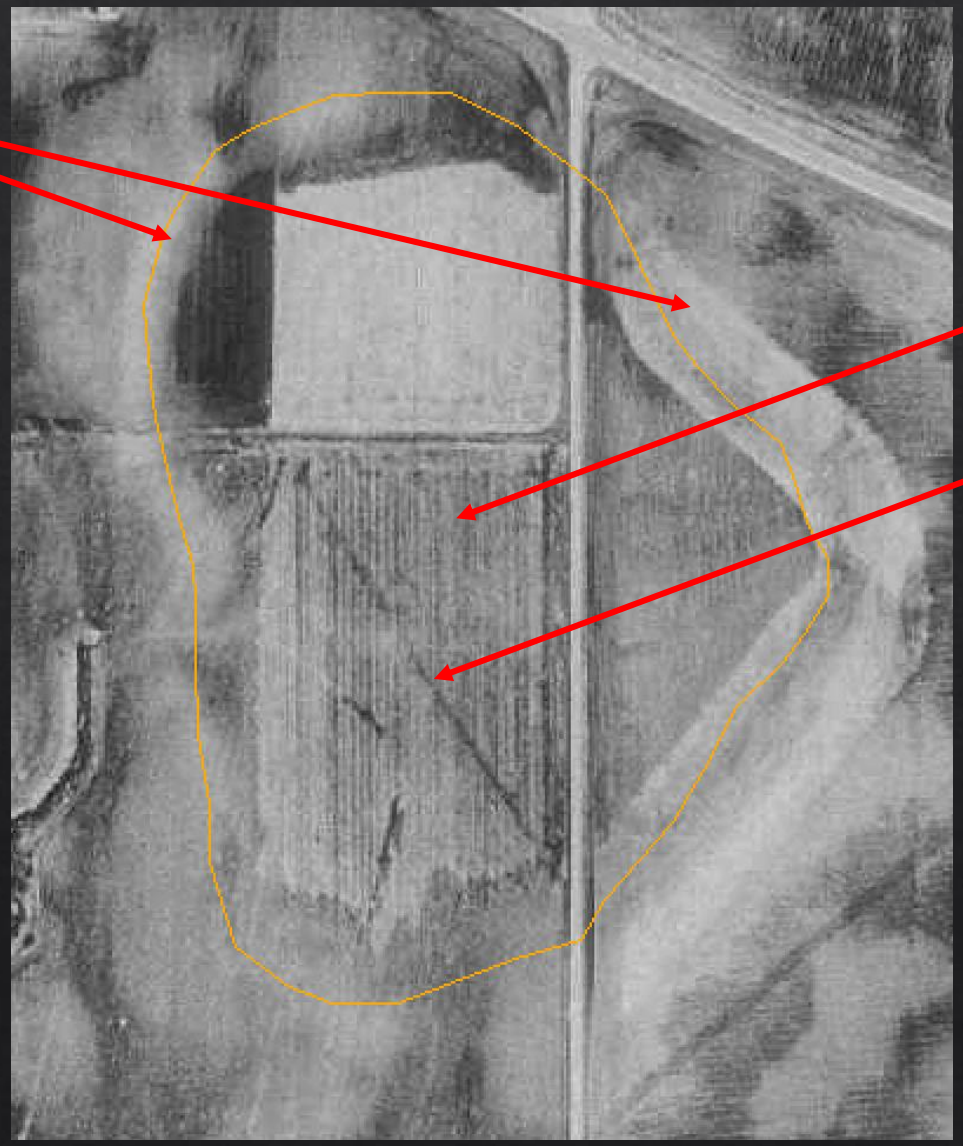
Spots of stress

Contrast in Vegetation colors

N

Delineated Wetland

1991*


Wetland Basin Slopes
Darker soils/crop lines
Possible Tile Line for Drainage
N
Delineated Wetland