

White Earth Natural Resources Attorney General Water Task Force

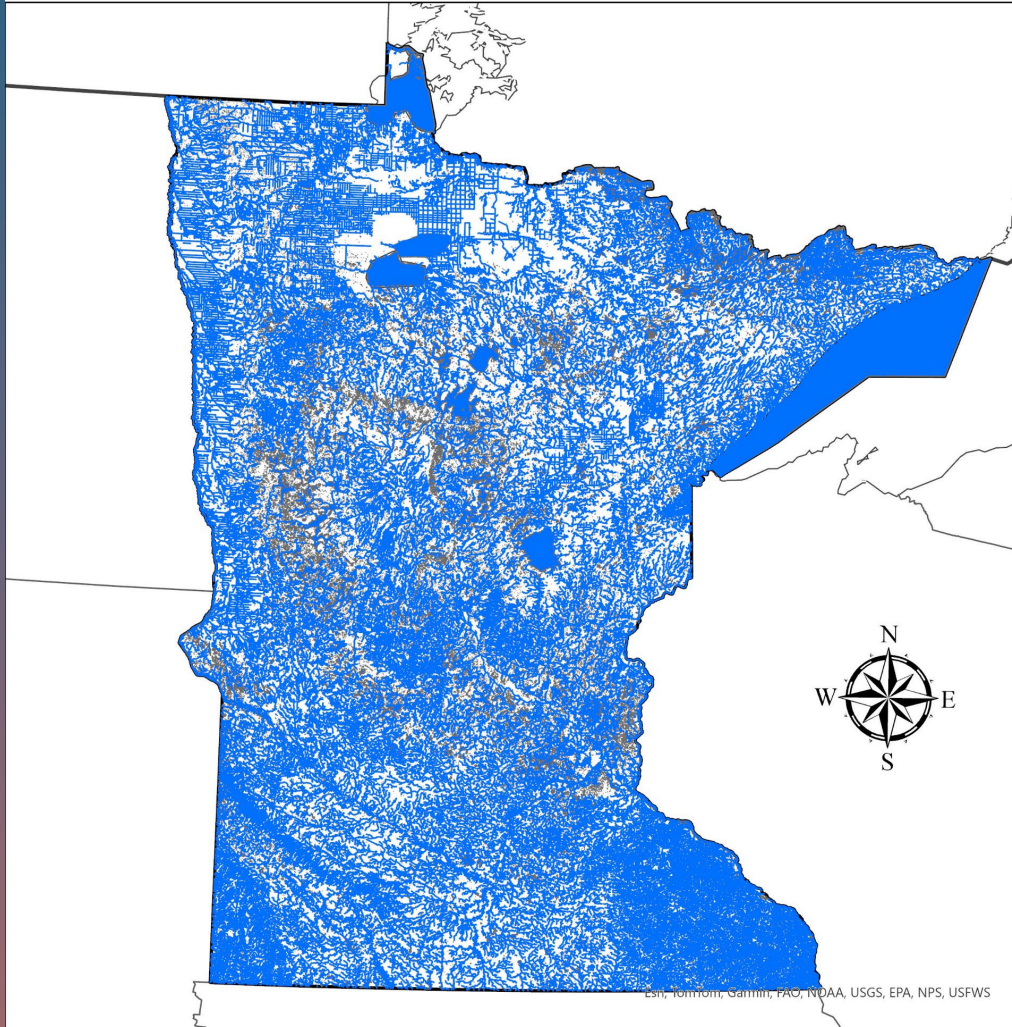
Renee Keezer

Water Resources Manager

10/07/2025



Minnesota Water Resources



Data Projection: NAD 1983 UTM Zone 15N
Data Layers: USGS National Hydrography
Dataset
Minnesota: MN Geospatial Data Commons

0 37.5 75 150 Miles

Legend

Author: Renee Keezer
White Earth Natural Resources
September 2025

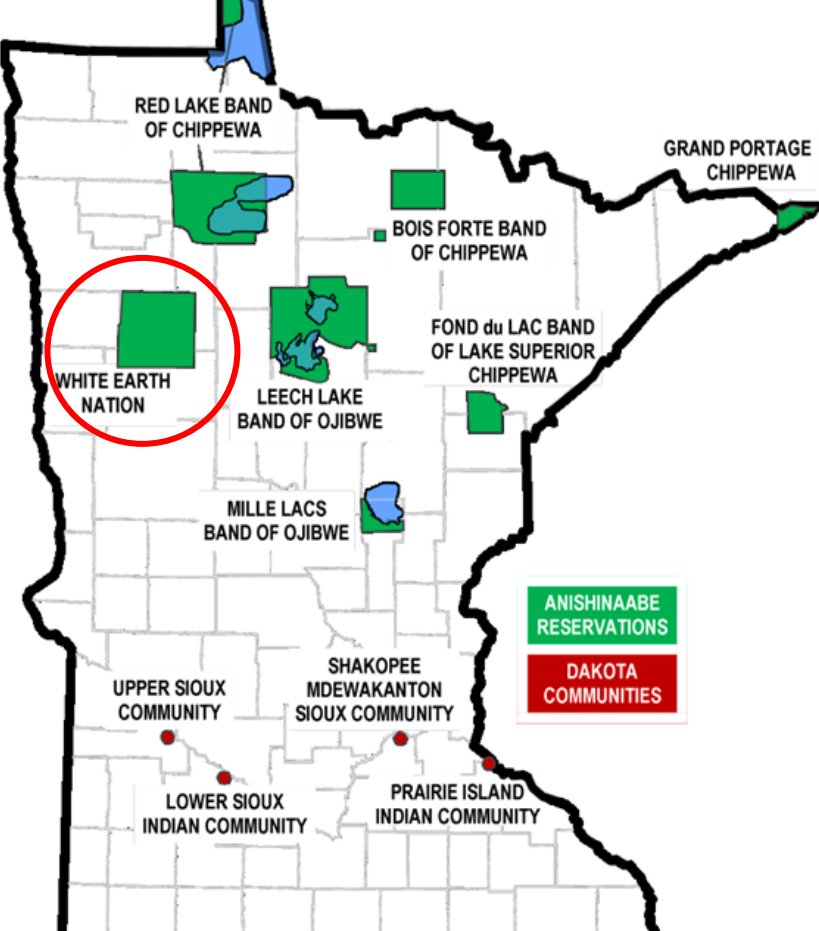
state_of_minnesota

Waterway

Waterbody

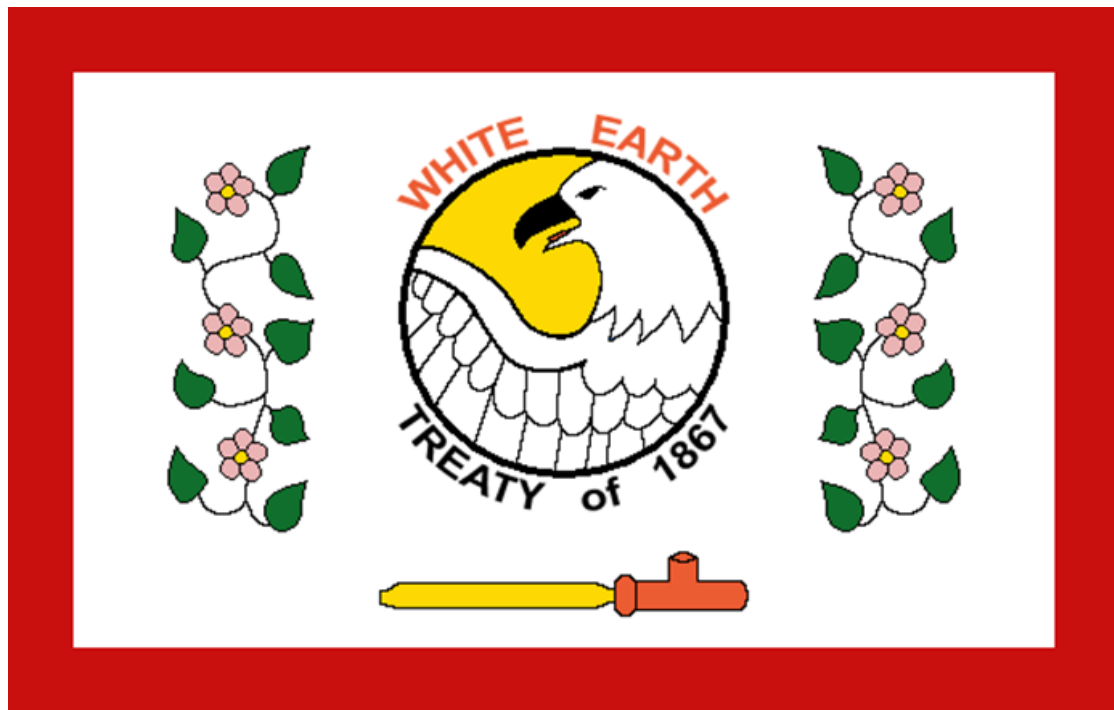
AGENDA

- White Earth Background
- Water Protection Success Story
- MN DNR Roundtable Presentation
- Water Conservation/Protection Plan
- Modeling Priority Areas
- Expected Outcomes

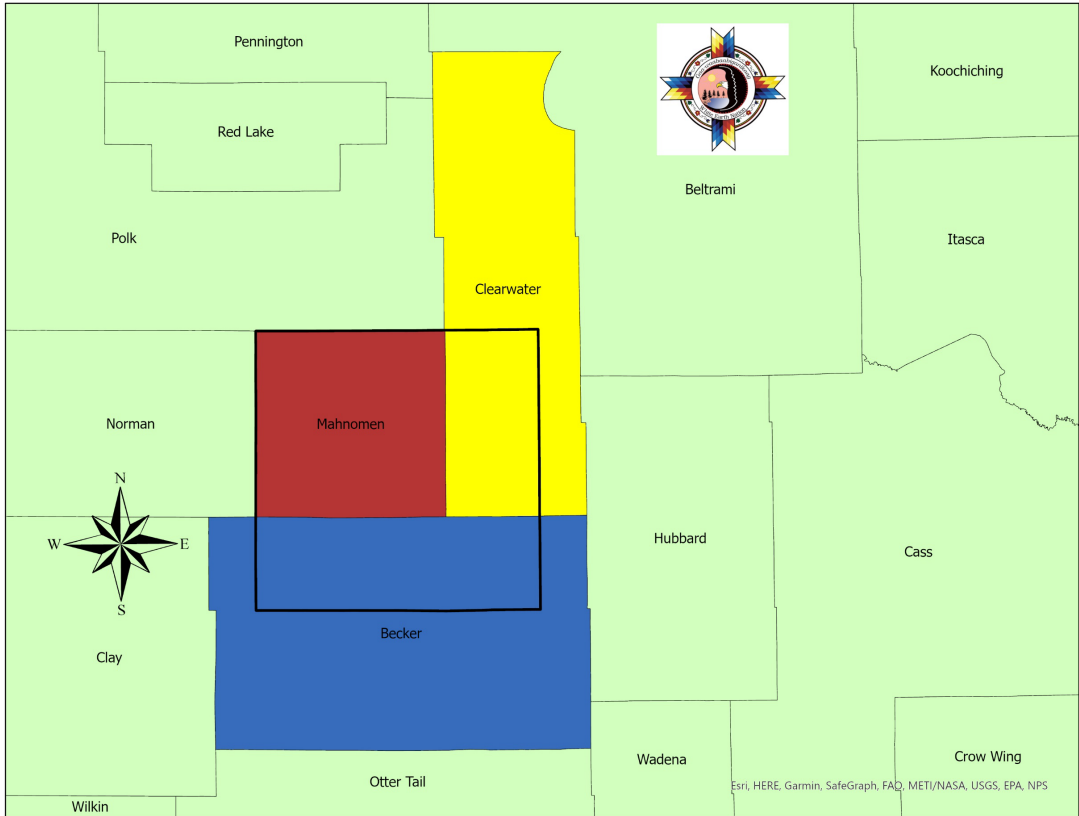


White Earth Band of the Minnesota Chippewa Tribe





White Earth County Map



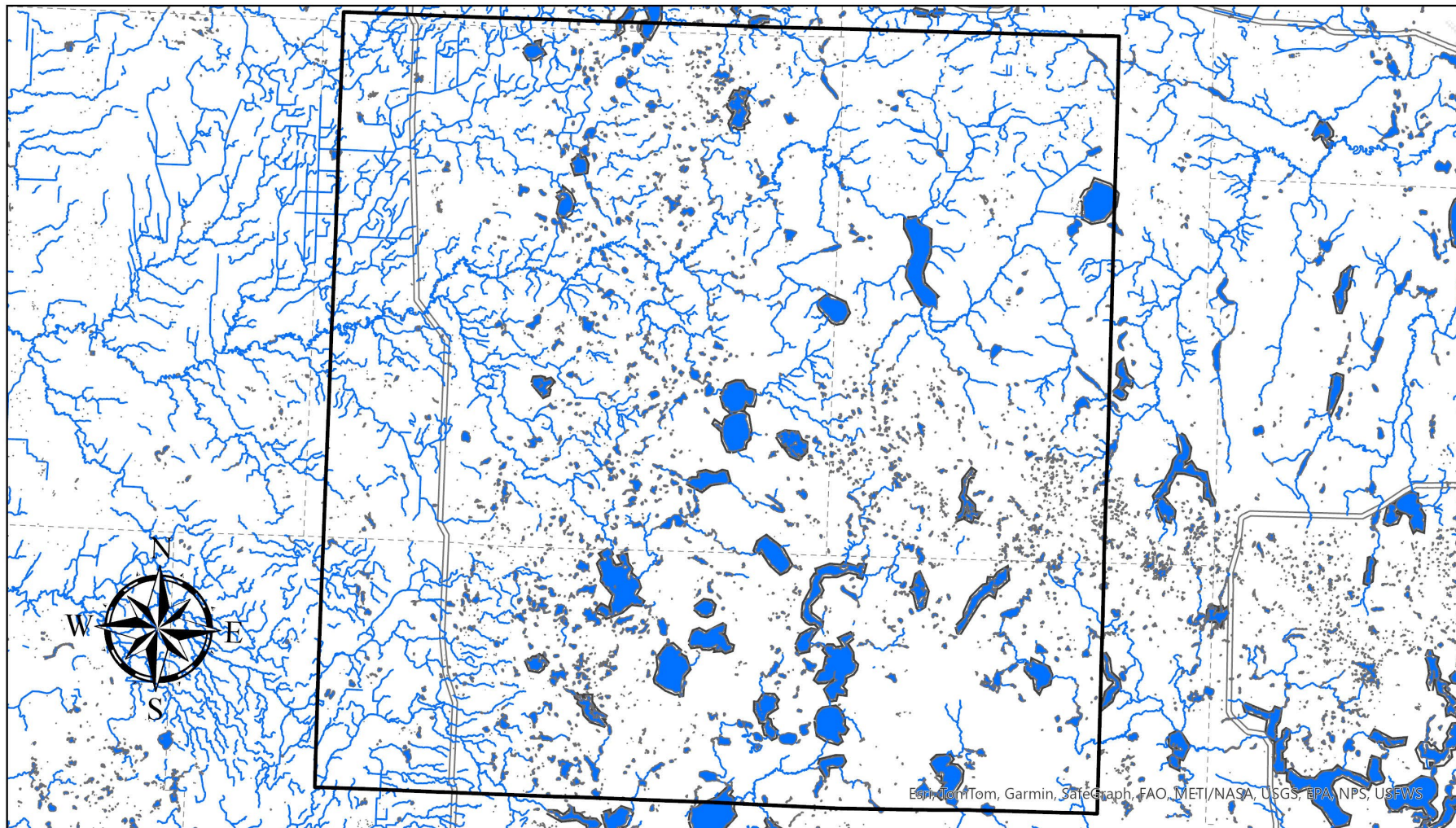
Renee Keezer
 White Earth Natural Resources
 Pesticide Coordinator
 09/21/2022

- White Earth Reservation Boundary
- Clearwater County
- Mahnomen County
- Becker County
- County Boundaries

Data Source: Minnesota Counties-Minnesota Geospatial Data Commons
 White Earth Reservation Boundary-White Earth Land Department
 NAD 1983 UTM Zone 15N



White Earth Waterbodies and Waterways



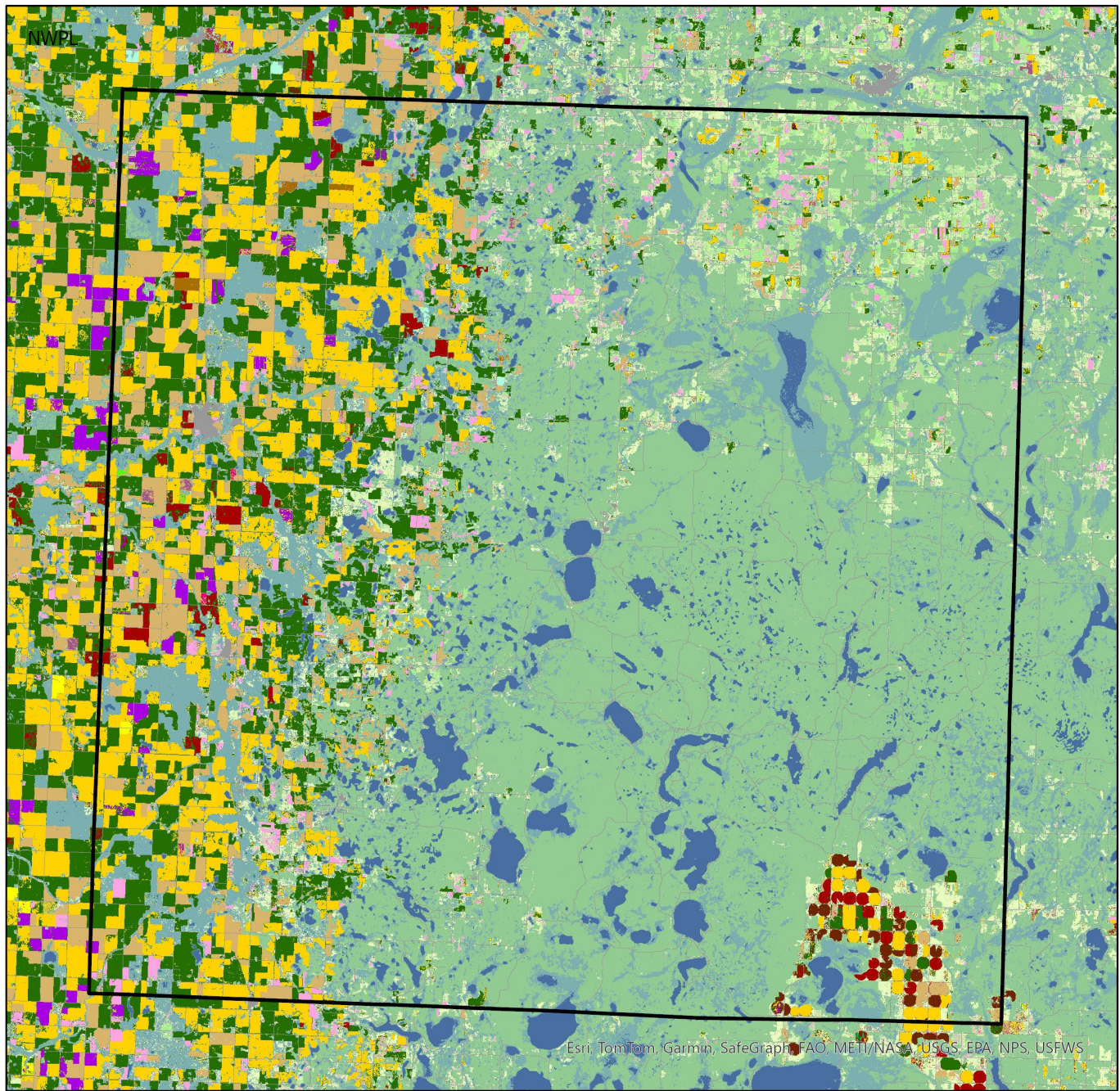
Legend

-  White Earth Reservation Boundary
-  Waterbody
-  Waterways

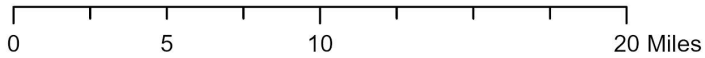
0 5 10 20 Miles

Projection: NAD 1983 UTM Zone 15N
Data Source: USGS National Hydrography Dataset
White Earth Boundary: White Earth Land Office

Author: Renee Keezer
White Earth Natural Resources



Author: Renee Keezer
White Earth Natural Resources



White Earth Land Use Land Cover



Legend

- | | |
|----------------------------------|--------------------------|
| White Earth Reservation Boundary | Other Crops |
| Cropland Data Layer 2023 | Peas |
| Corn | Clover/Wildflowers |
| Sorghum | Sod/Grass Seed |
| Soybeans | Switchgrass |
| Sunflower | Fallow/Idle Cropland |
| Sweet Corn | Open Water |
| Barley | Developed/Open Space |
| Spring Wheat | Developed/Low Intensity |
| Winter Wheat | Developed/Med Intensity |
| Rye | Developed/High Intensity |
| Oats | Barren |
| Millet | Deciduous Forest |
| Canola | Evergreen Forest |
| Alfalfa | Mixed Forest |
| Other Hay/Non Alfalfa | Shrubland |
| Buckwheat | Grassland/Pasture |
| Sugarbeets | Woody Wetlands |
| Dry Beans | Herbaceous Wetlands |
| Potatoes | Triticale |



Projection: NAD 1983 UTM 15N
Data Source: USDA Cropland Data Layer 2023
White Earth Boundary: White Earth Land Office

White Earth Feedlots



Legend

 White Earth Reservation Boundary

au_count

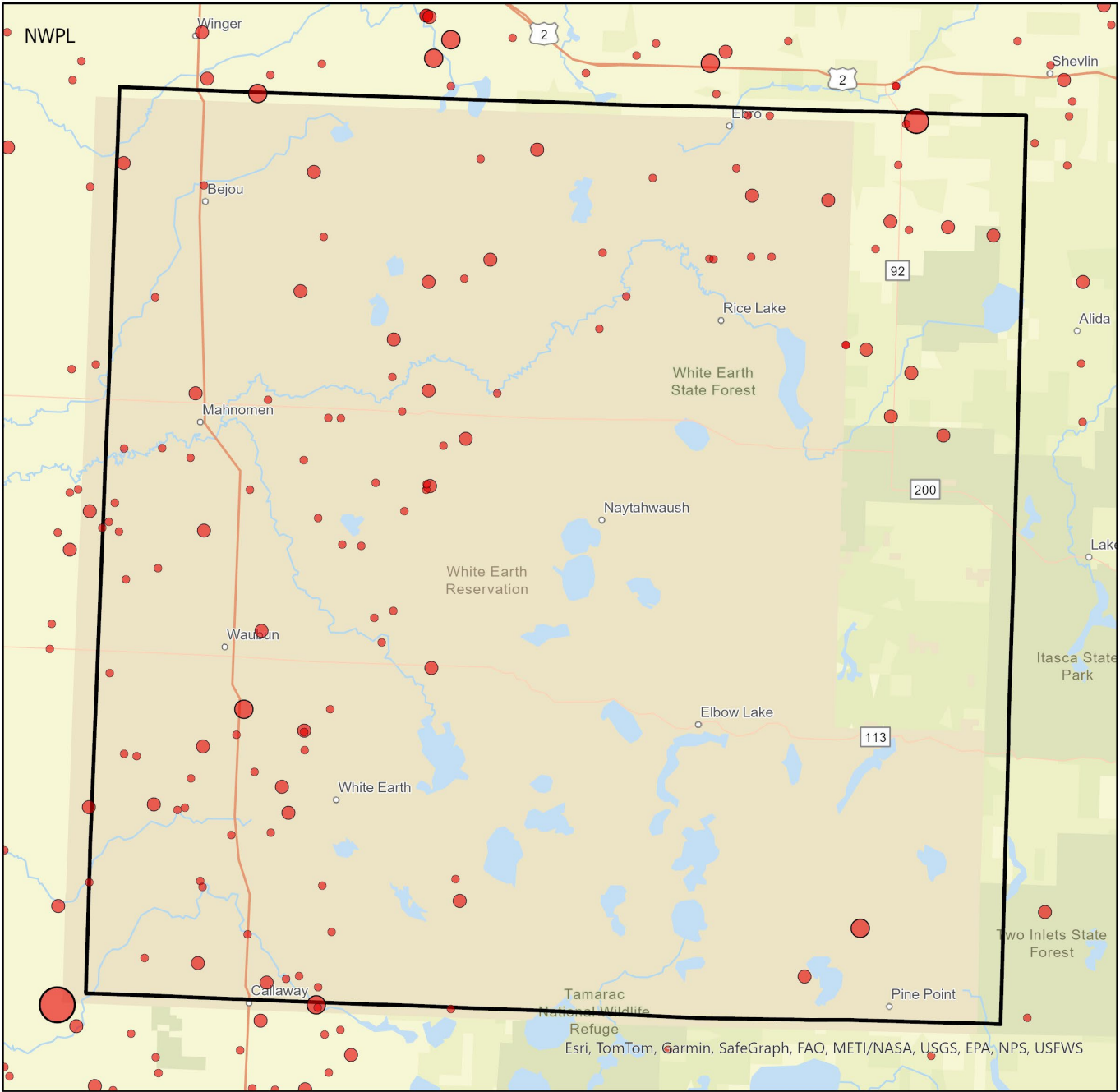
-  0.0 - 148.40
-  148.41 - 532.0
-  532.1 - 1260.0
-  1260.1 - 4190.0
-  4190.1 - 11389.0



Projection: NAD 1983 UTM 15N

Data Source: MN Geospatial Data Commons Feedlots in Minnesota

White Earth Boundary: White Earth Land Office



Author: Renee Keezer
White Earth Natural Resources

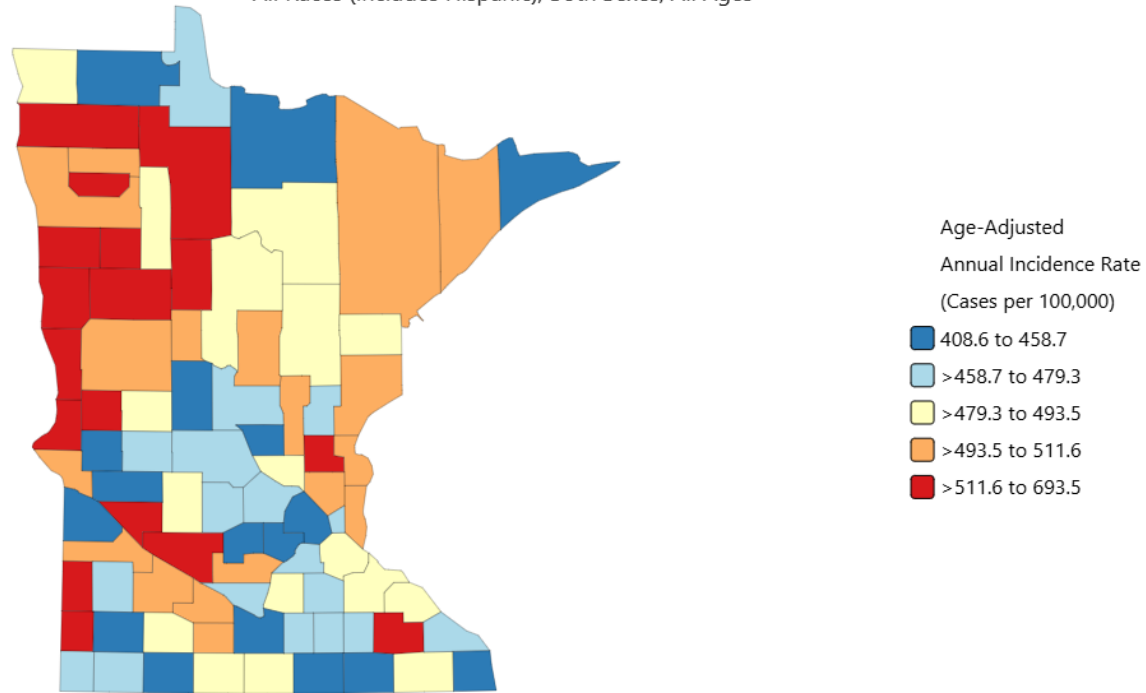
0 5 10 20 Miles

Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS

Incidence Rates for Minnesota by County

All Cancer Sites (All Stages[^]), 2017-2021

All Races (includes Hispanic), Both Sexes, All Ages



Created by statecancerprofiles.cancer.gov on 10/07/2025 10:07 am.

State Cancer Registries may provide more current or more local data.

- Incidence rates (cases per 100,000 population per year) are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ... , 80-84, 85+). Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified. Rates calculated using SEER*Stat. Population counts for denominators are based on Census populations as modified by NCI. The US Population Data File is used for SEER and NPCR incidence rates.

- Incidence data come from different sources. The Average Annual Percent Change (AAPC) is based on the APCs calculated by Joinpoint. Due to data availability issues, the time period used in the calculation of the joinpoint regression model may differ for selected counties.

Rates and trends are computed using different standards for malignancy. For more information see malignant.html.

[^] All Stages refers to any stage in the Surveillance, Epidemiology, and End Results (SEER) Summary/Historic Combined Summary Stage (2004+).

1 Source: National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database - United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Based on the 2023 submission.

6 Source: National Program of Cancer Registries SEER*Stat Database - United States Department of Health and Human Services, Centers for Disease Control and Prevention (based on the 2023 submission).

8 Source: Incidence data provided by the SEER Program. AAPCs are calculated by the Joinpoint Regression Program and are based on APCs. Data are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ... , 80-84, 85+). Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified. Population counts for denominators are based on Census populations as modified by NCI. The US Population Data File is used with SEER November 2023 data.

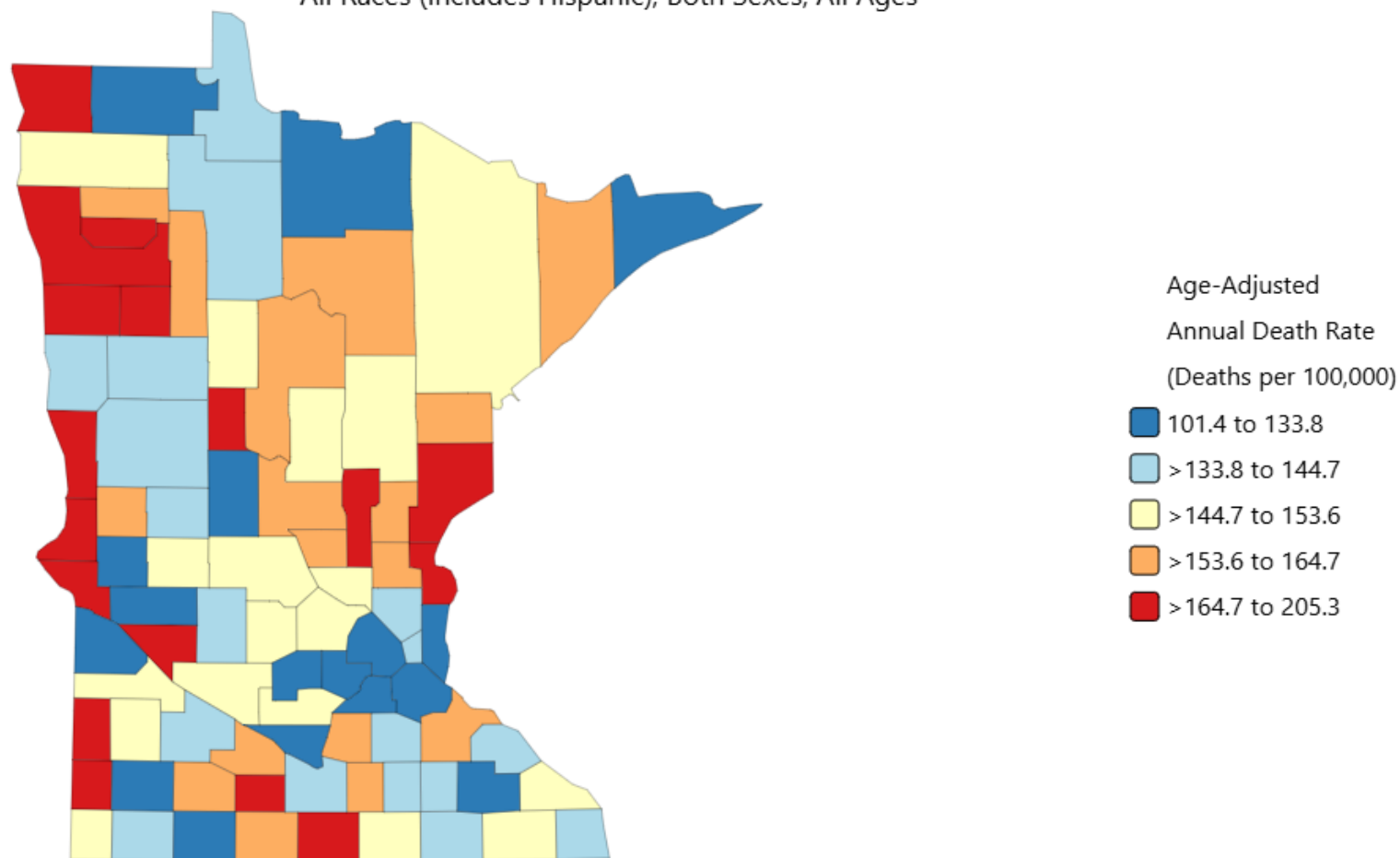
Data for the United States does not include data from Indiana.

Data for the United States does not include Puerto Rico.

Death Rates for Minnesota by County

All Cancer Sites, 2018-2022

All Races (includes Hispanic), Both Sexes, All Ages



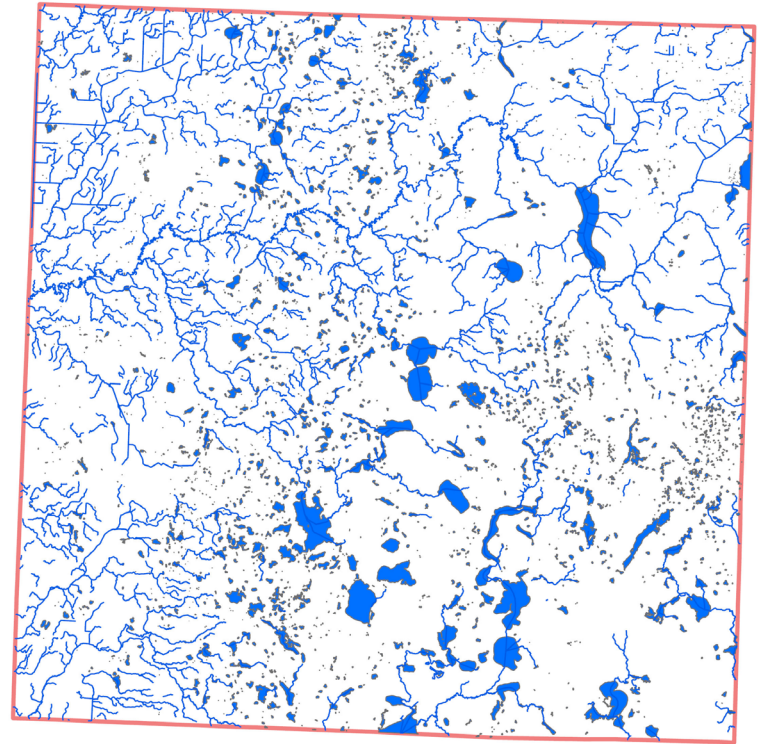
Created by statecancerprofiles.cancer.gov on 10/07/2025 10:07 am.

State Cancer Registries may provide more current or more local data.

- Death data provided by the National Vital Statistics System public use data file. Death rates calculated by the National Cancer Institute using SEER*Stat. Death rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ... , 80-84, 85+). Population counts for denominators are based on Census populations as modified by NCI.

The US Population Data File is used with mortality data.

Data for United States does not include Puerto Rico.



Boundary-White Earth
sources Land Office
ota IT Service Geospatial

0 4.5 9 18 Miles

White Earth Department



Management of Water Resources





Collaboration with MN DNR- Success Story

- Riparian Rights
- Aquatic Plant Management (APM)
- Tribal Regulations
- Conversations
- Consultations
- Coordination
- Collaboration

Table 1. Summary of permitting activity on Leech Lake (LL) reservation, 2016-2021.

Permit Type	LL2016	LL2017	LL2018	LL2019	LL2020	LL2021
Active permits	15	15	22	43	11	34
Pesticide permits	10	13	13	28	7	26
Channel permits	4	3	5	15	4	16
Mechanical permits with Wild Rice present	2	3	3	15	2	14
Pesticide permits with Wild Rice present	1	3	1	7	2	0

Table 2. Summary of permitting activity on White Earth (WE) reservation, 2016-2021.

Permit Type	WE2016	WE2017	WE2018	WE2019	WE2020	WE2021
Active permits	29	27	28	34	27	20
Pesticide permits	12	11	7	9	8	11
Channel permits	4	9	6	9	9	0
Mechanical permits with Wild Rice present	6	15	9	10	13	10
Pesticide permits with Wild Rice present	0	5	2	1	4	5

The graphic features a central white oval with a thick green border, containing the text "2025 MINNESOTA DNR ROUNDTABLE". This oval is set against a background of overlapping yellow and green shapes. To the left is a large yellow leaf with a white outline and a small yellow butterfly above it. To the right is a green leafy branch. The bottom of the graphic has a blue wavy line representing water, with two blue fish silhouettes. Above the water is an orange wavy line representing land, with two brown acorn silhouettes. The Minnesota Department of Natural Resources logo is at the bottom center.

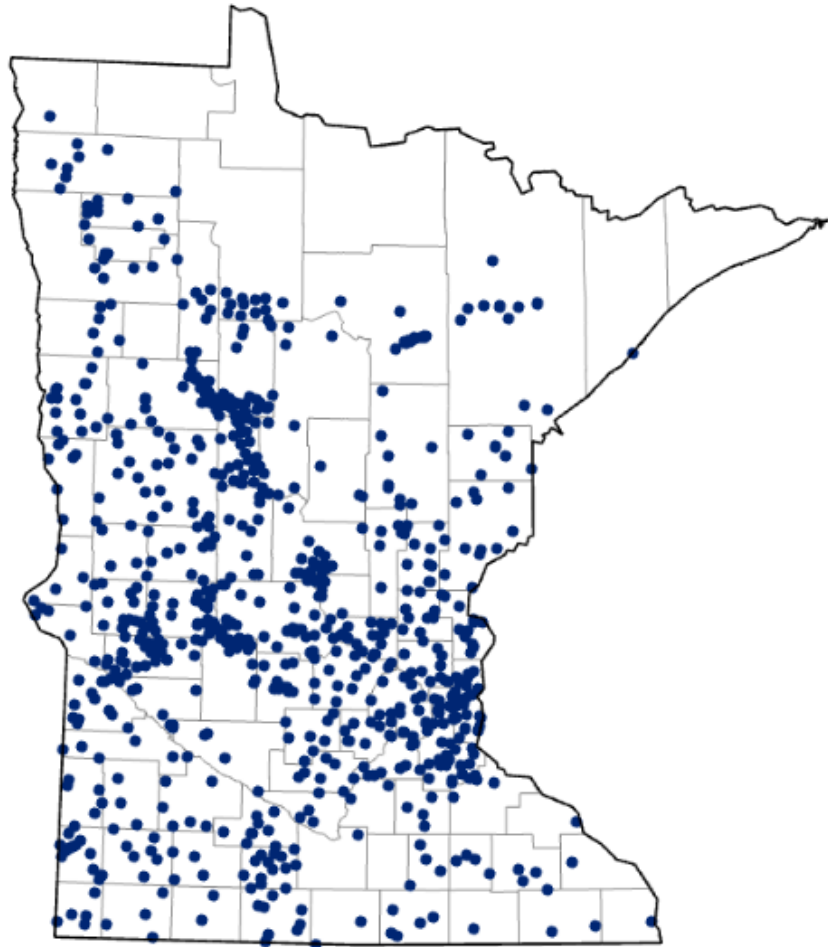
2025
MINNESOTA DNR
ROUNDTABLE



Groundwater Level Trends



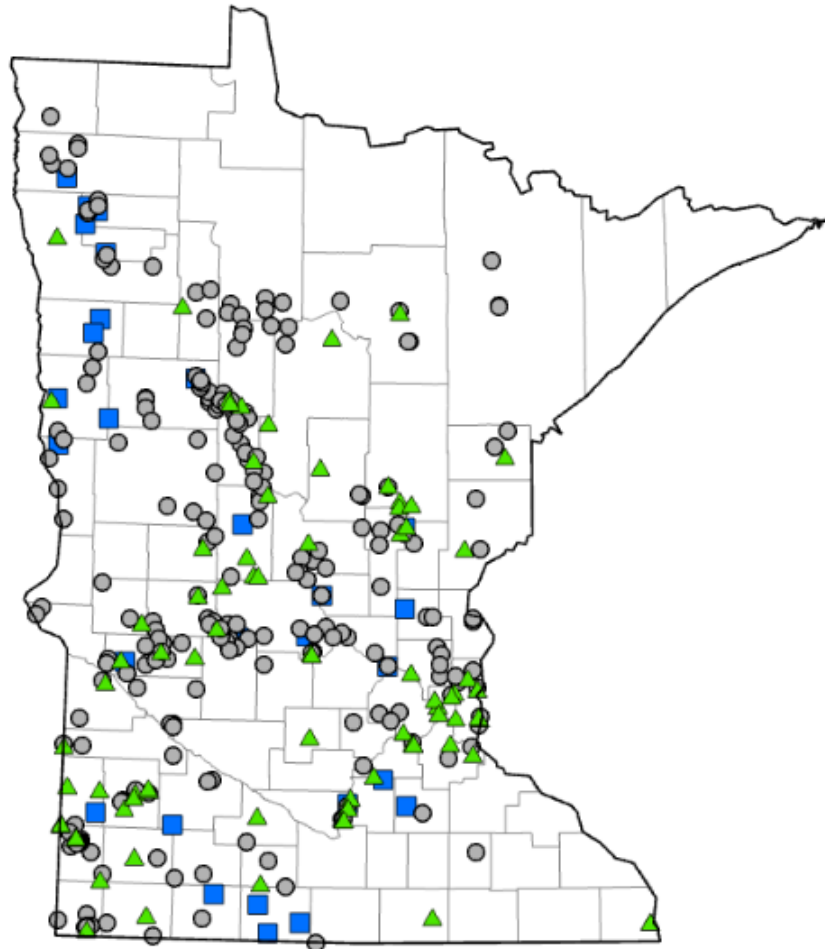
2025
MINNESOTA DNR
ROUNDTABLE



DNR observation wells



2025
MINNESOTA DNR
ROUNDTABLE



Groundwater trends

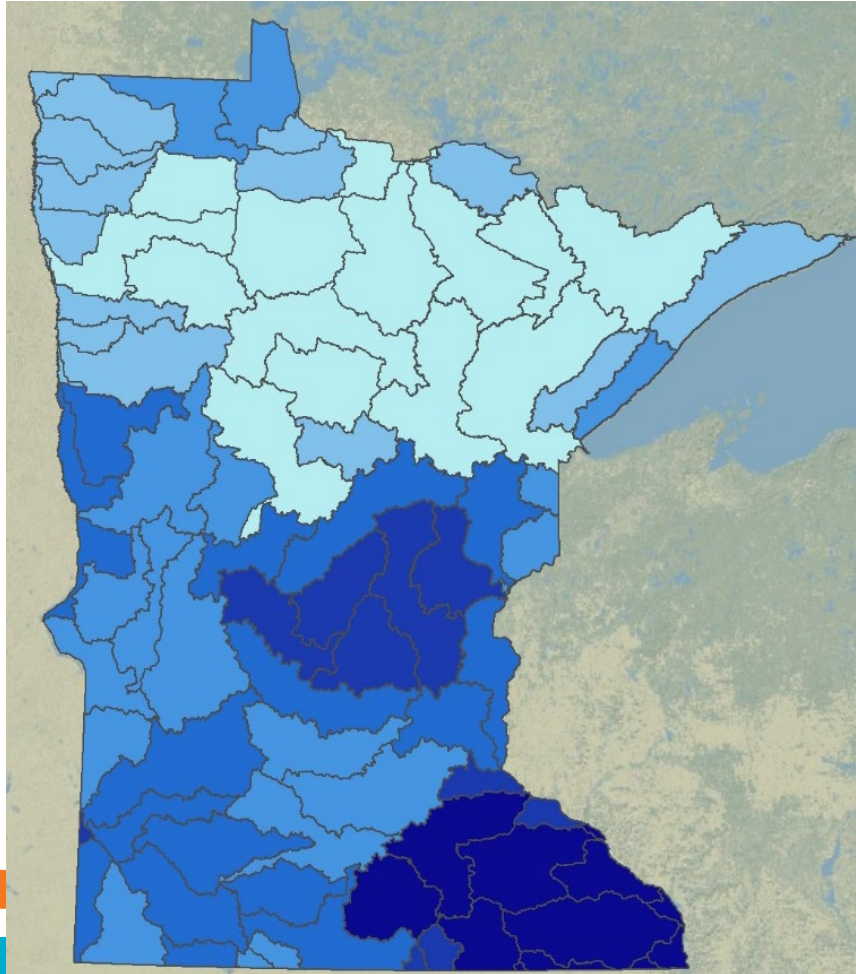
Water level

Direction

- ▲ Upward: 23%
- Downward: 7%
- No change: 70%

2025
MINNESOTA DNR
ROUNDTABLE

Courtesy B. Gosack, MN DNR WHAF program

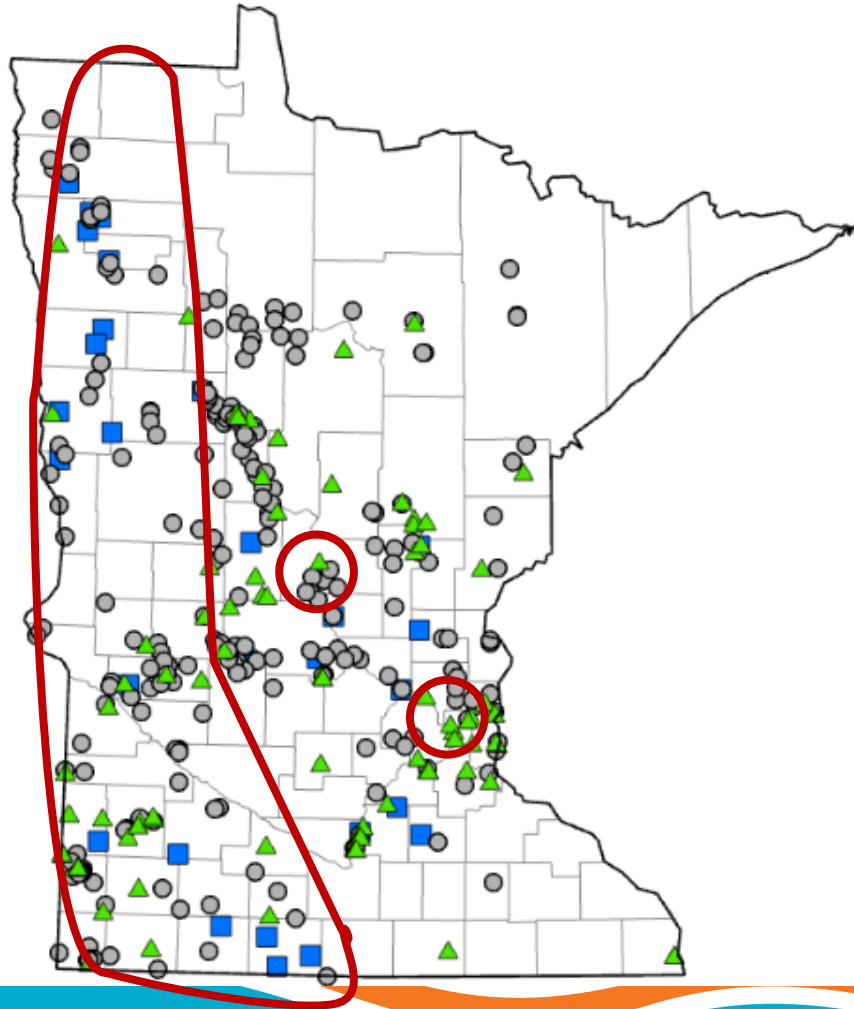


Precipitation annual change, compared to 20th century

Difference from
20th Century



2025
MINNESOTA DNR
ROUNDTABLE



Groundwater trends

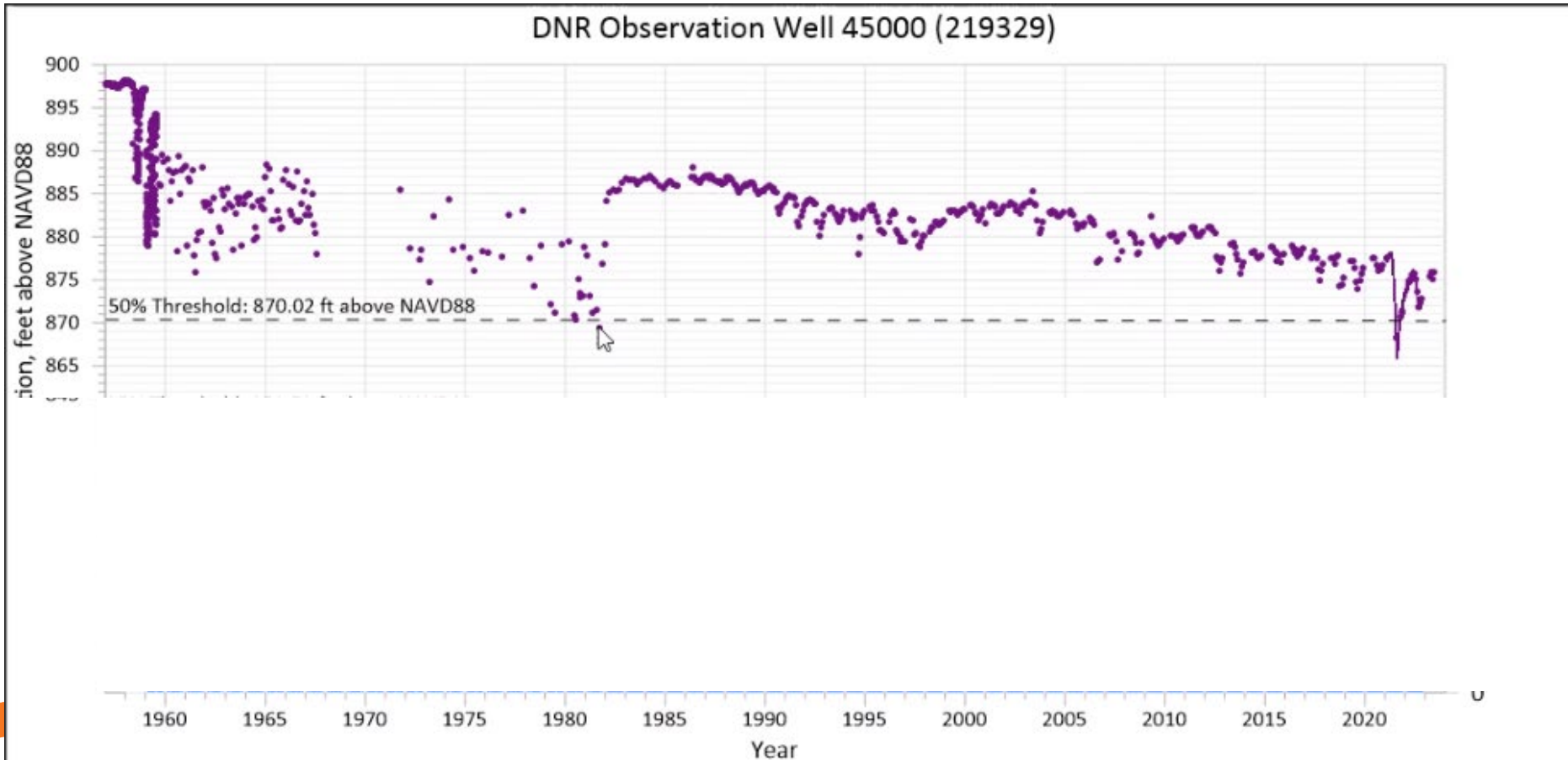
Water level

Direction

- ▲ Upward: 23%
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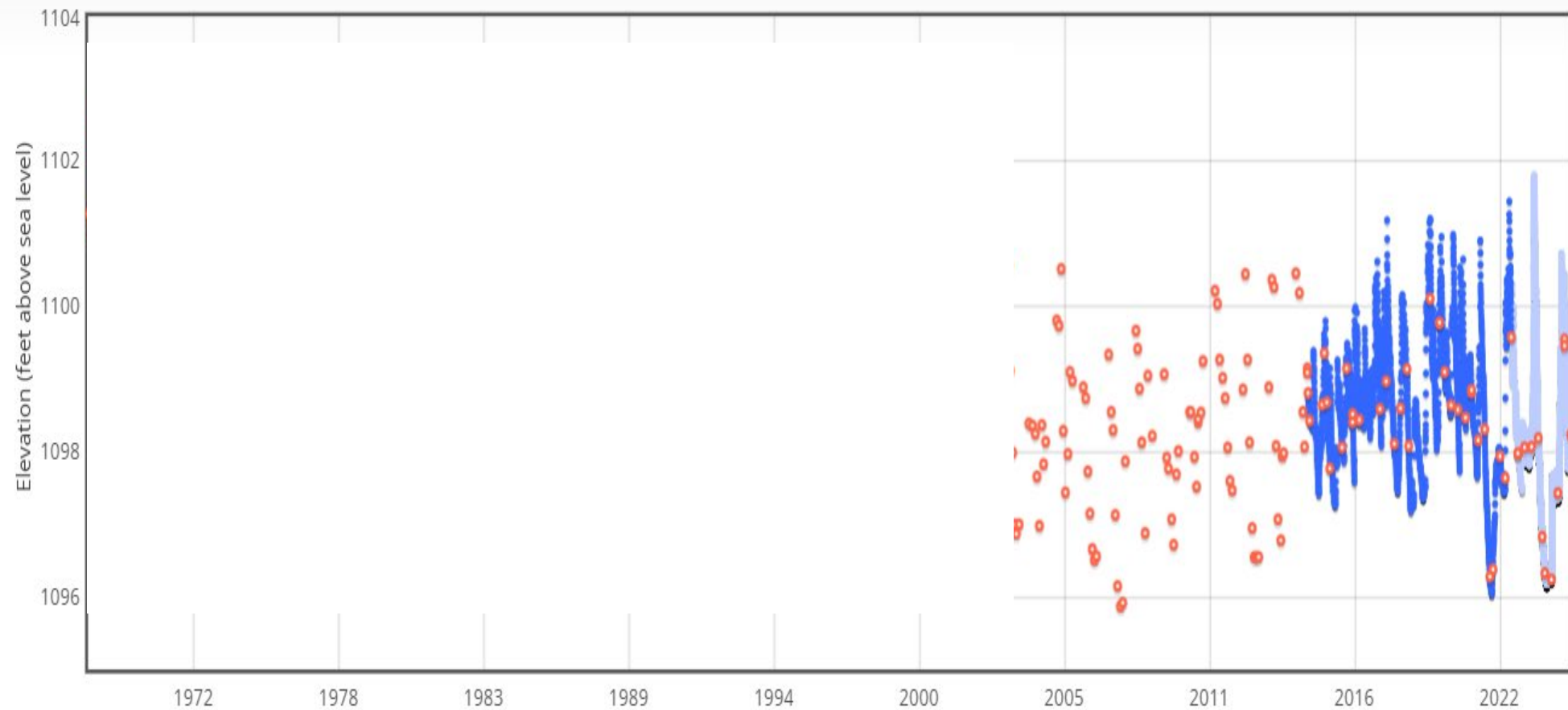
2025
MINNESOTA DNR
ROUNDTABLE

Western Minnesota

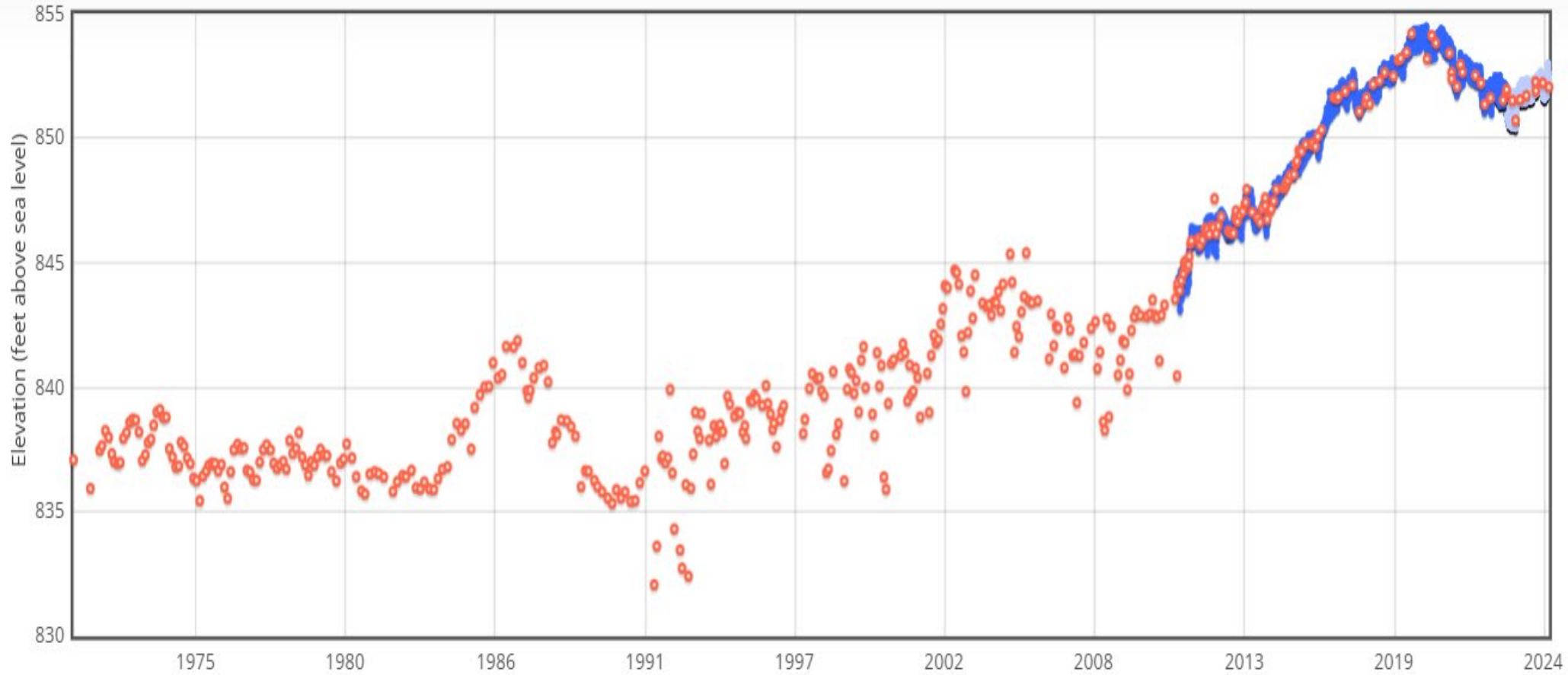


2025
MINNESOTA DNR
ROUNDTABLE

Central Minnesota



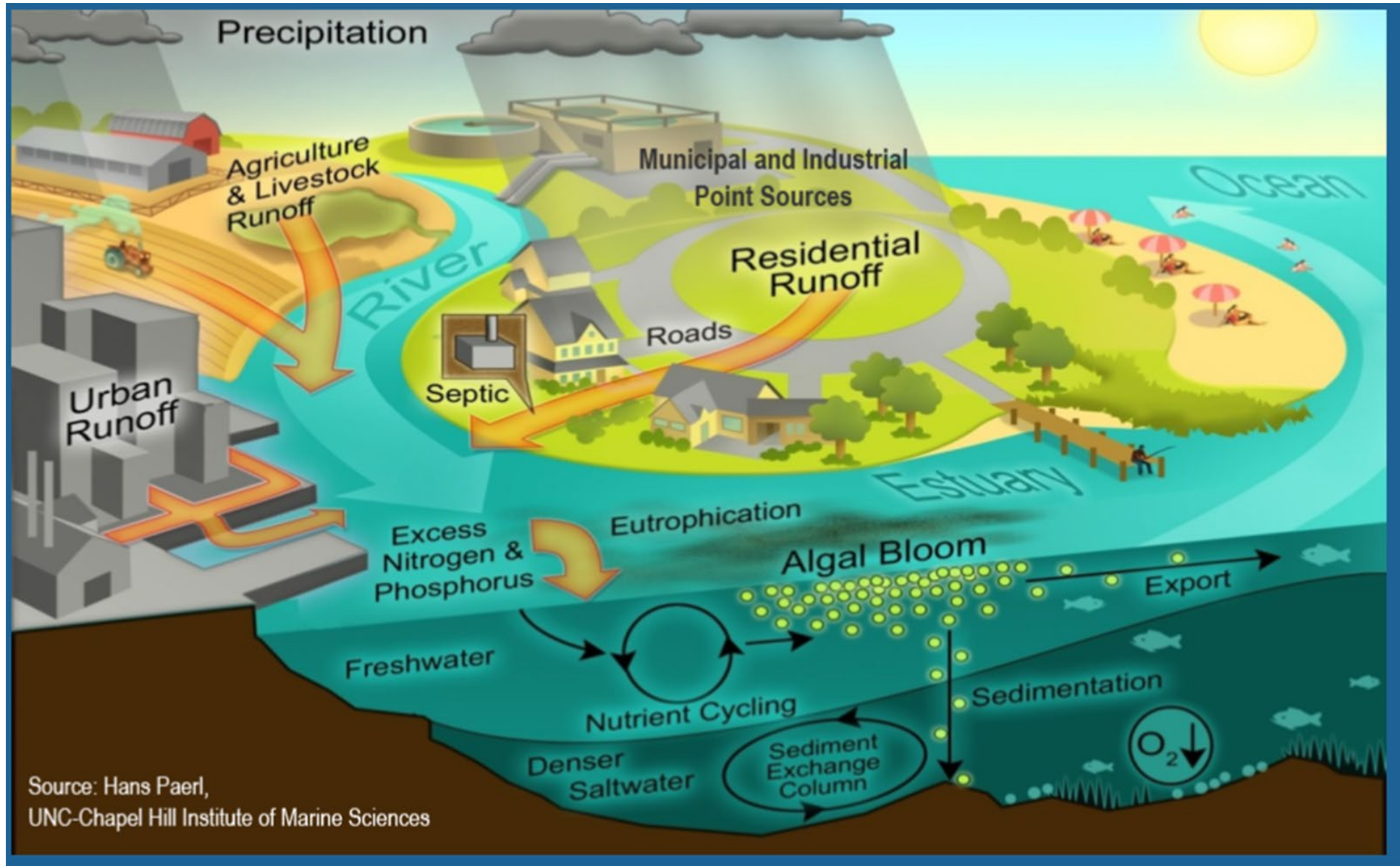
2025
MINNESOTA DNR
ROUNDTABLE



Metro
area

2025
MINNESOTA DNR
ROUNDTABLE

Water Conservation/Protection Plan



Scope

- Protecting freshwater ecosystems and overall water quality
- Conservation practices
 - Water consumption
 - Reusing Water
 - Discharges
 - Restoring Natural Habitats that support Water Quality
 - Conservation easements
 - Erosion Control
 - Sustainable Land Management
 - Managing Water Resources
 - Adapting to Climate Change



The Marine Protection Atlas

integrates science-based assessments that measure progress toward protecting **30%** of the global ocean in fully and highly protected areas by **2030**.

[Start Exploring the Atlas Now](#)EEZ data: marineregions.org; MPA data: MPAtlas, WDPA/ProtectedPlanet

3.1 % of the ocean

is **fully** or **highly** protected according to *The MPA Guide*
as of most recent assessment on 2025-09-25

9.6 % of the ocean

is protected according to WDPA / ProtectedPlanet
as of September 2025

Percent of global ocean by *MPA Guide* protection status:



	zones	area (km ²)	% of total marine area
Implemented or actively managed:	814	21,673,285	6%
● Fully Protected	267	5,793,688	1.6%
● Highly Protected	161	5,598,235	1.5%
● Lightly Protected	209	1,214,010	0.3%
● Minimally Protected / Incompatible	171	8,970,219	2.5%
● Unknown / To Be Determined	6	97,133	< 0.1%
Designated:	351	11,416,533	3.1%
● Unknown / To Be Determined	351	11,416,533	3.1%
Proposed / Committed:*	234	10,533,657	2.9%
● Proposed / Committed	234	10,533,657**	2.9%
Total Assessed:	1,399	43,623,475	12%

Stage of Establishment

- **Actively Managed:** Management of the area is ongoing with periodic review and changes made as needed to achieve conservation goals.
- **Implemented:** MPA is acknowledged to be "in force" on the water with plans for management activated.
- **Designated:** MPA is established / recognized through legal or traditional means, with defined boundaries and clearly stated goals and processes to define allowed uses and associated regulations or rules to control impacts.
- **Proposed / Committed:** The intent to create an MPA is publicly and formally announced.

Level of Protection

- **Fully Protected:** No extractive or destructive activities are allowed; all abatable impacts are minimized.
- **Highly Protected:** Only light extractive activities are allowed, with all other abatable impacts minimized.
- **Lightly Protected:** Some protection exists but moderate to significant extraction and impacts are allowed.
- **Minimally Protected / Incompatible:** Extensive extraction and other impacts are allowed, but the site may provide some conservation benefit to the area.

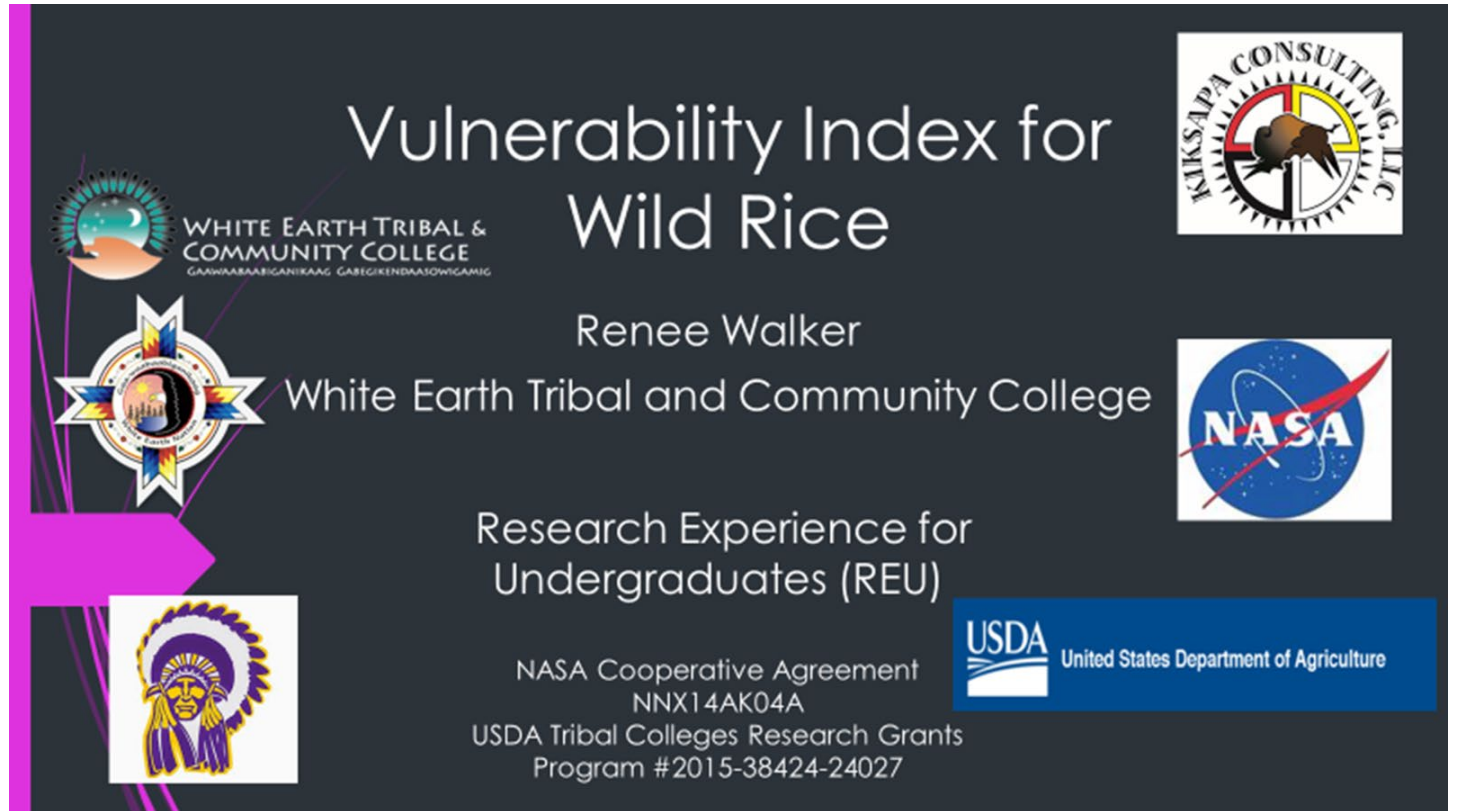


BWCA and the Wilderness Act

- Wilderness Act 1964
- BWCA Wilderness Act of 1978
- Not a National Park-wilderness area
- Property Clause of US Constitution
- State Trust land within BWCA-set aside by Congress 1858
- Federal Government to procure State School Trust Land by 2026
- Public Trust Doctrine

Modeling

- Vulnerability Index
 - Hydrology
 - Slope
 - Land Use/Land Cover
 - Buffers
 - Hydrologic Soil Types
- Reclassify
- Priority Areas



A presentation slide titled "Vulnerability Index for Wild Rice" by Renee Walker at White Earth Tribal and Community College. The slide features several logos: White Earth Tribal & Community College, Waksapa Consulting LLC, NASA, and USDA. It also mentions a NASA Cooperative Agreement (NNX14AK04A) and USDA Tribal Colleges Research Grants (Program #2015-38424-24027). The slide is decorated with a pink arrow and a Native American headdress logo.

Vulnerability Index for Wild Rice

Renee Walker
White Earth Tribal and Community College

Research Experience for Undergraduates (REU)

NASA Cooperative Agreement
NNX14AK04A
USDA Tribal Colleges Research Grants
Program #2015-38424-24027

Logos: White Earth Tribal & Community College, Waksapa Consulting LLC, NASA, USDA United States Department of Agriculture.

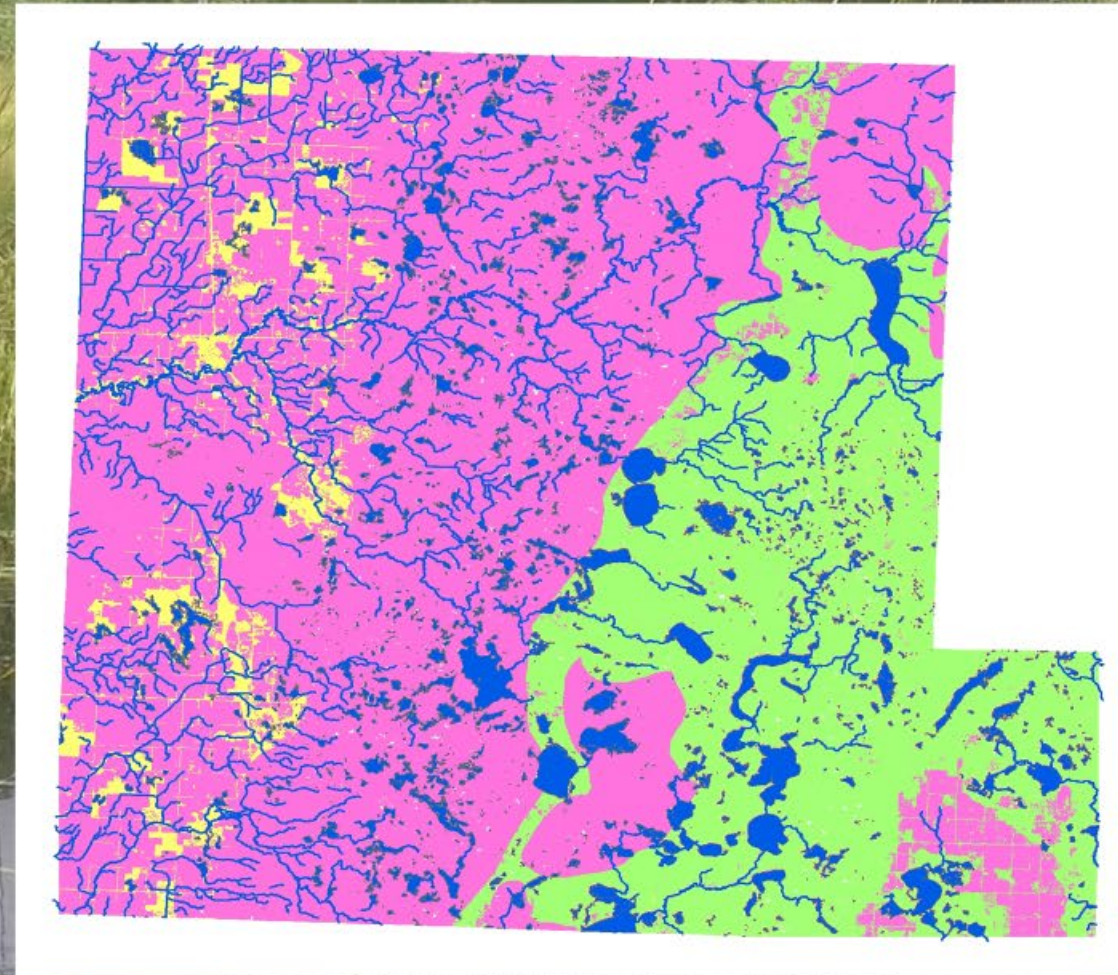
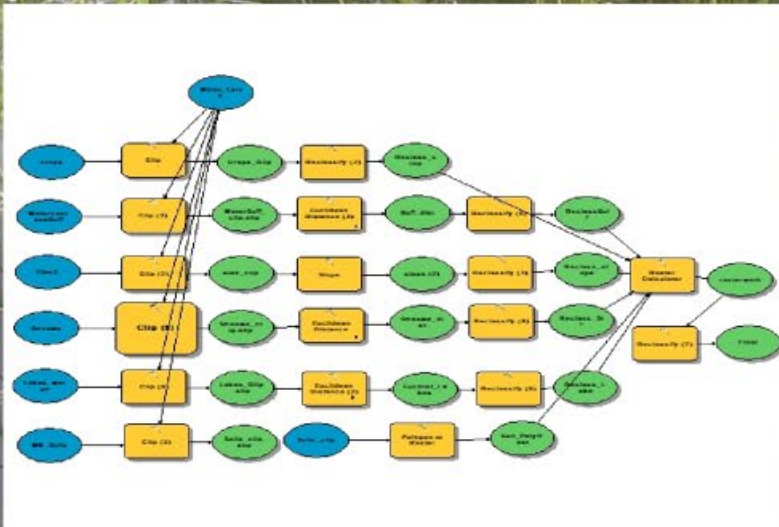
Potential Areas of Non-Point Source Pollution:

Lakes and Streams on the White Earth Reservation

Renee L. Keezer, Intermediate GIS: Fall 2019, Bemidji State University

Data used for this model includes croplands, waterbuffer zones from the MN DNR, elevation, hydrologic soil classification, lakes and streams.

Data layers were reclassified into four categories: Extremely high, high, medium, and low potential for impact. There were no areas within the study area that met all the criteria for extremely high potential.



- Low Potential
- Medium Potential
- High Potential
- Lakes
- Streams

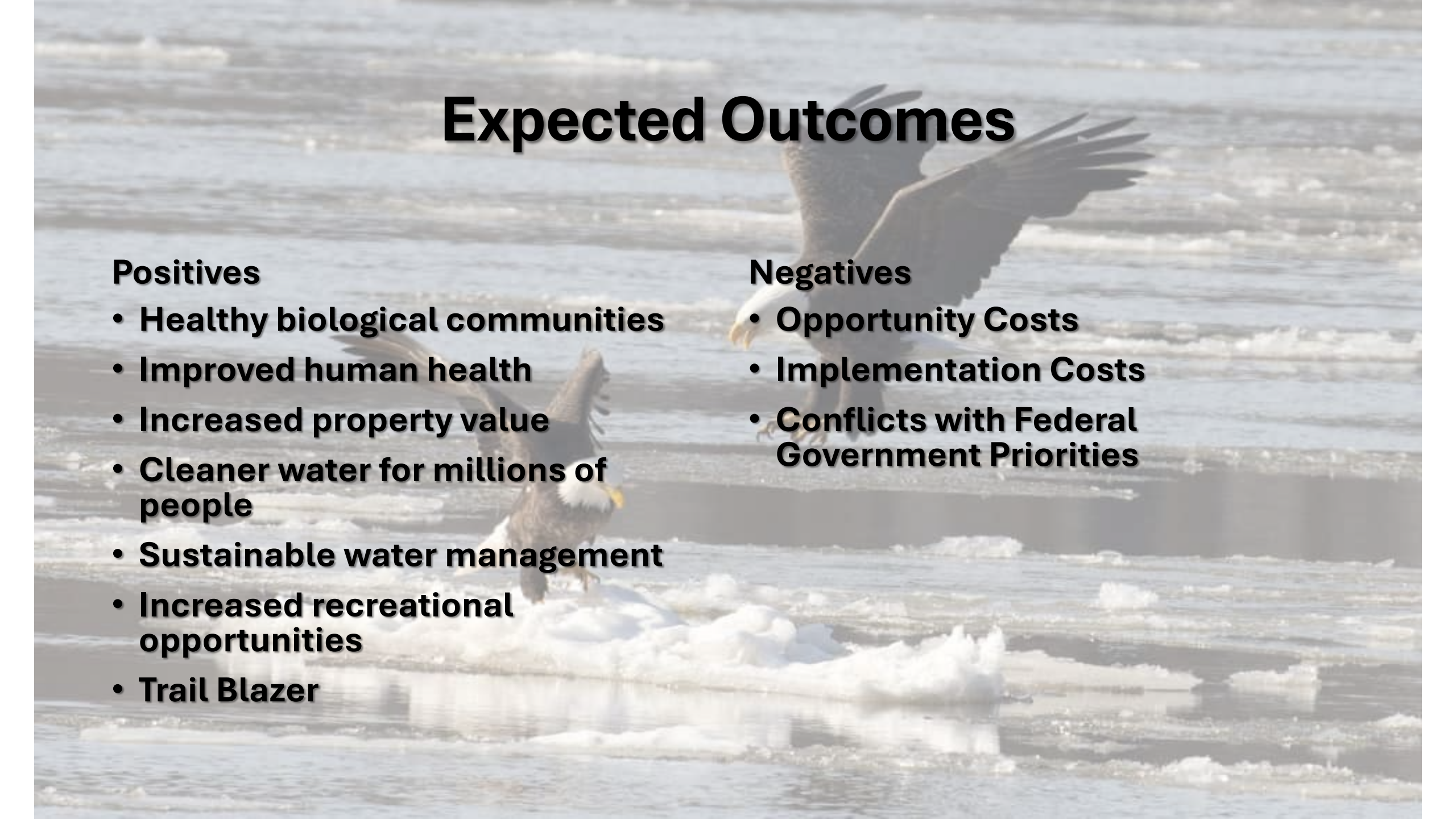
Known Margin of Error:
The raster cells are measured in 30 meter grid blocks. The Minnesota water buffers are set at 50 feet or 15.24 meters. It is not possible to split the raster cell. Parameters for reclassification were set at 30 meters thus nearly doubling the buffer area.

Data Sources: Minnesota Geospatial Commons, MN DNR, USGS, WSS
Projection: NAD 1983 UTM Zone 15N
Photo Credit: Hand Harvest Foods Dudes, Simon Zornes



For questions or comments,
feel free to contact me: email
qb1570ix@go.minnstate.edu

Expected Outcomes

The background of the slide features a photograph of two bald eagles in a cold, aquatic environment. One eagle is in the foreground, perched on a large, white ice floe. The second eagle is in the background, with its wings spread wide as if it is landing or taking flight. The water is a pale blue-grey, and there are numerous smaller ice floes scattered throughout the scene.

Positives

- **Healthy biological communities**
- **Improved human health**
- **Increased property value**
- **Cleaner water for millions of people**
- **Sustainable water management**
- **Increased recreational opportunities**
- **Trail Blazer**

Negatives

- **Opportunity Costs**
- **Implementation Costs**
- **Conflicts with Federal Government Priorities**

Questions



Contact

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