Wetland Monitoring and Assessment in Grand Portage (MN)

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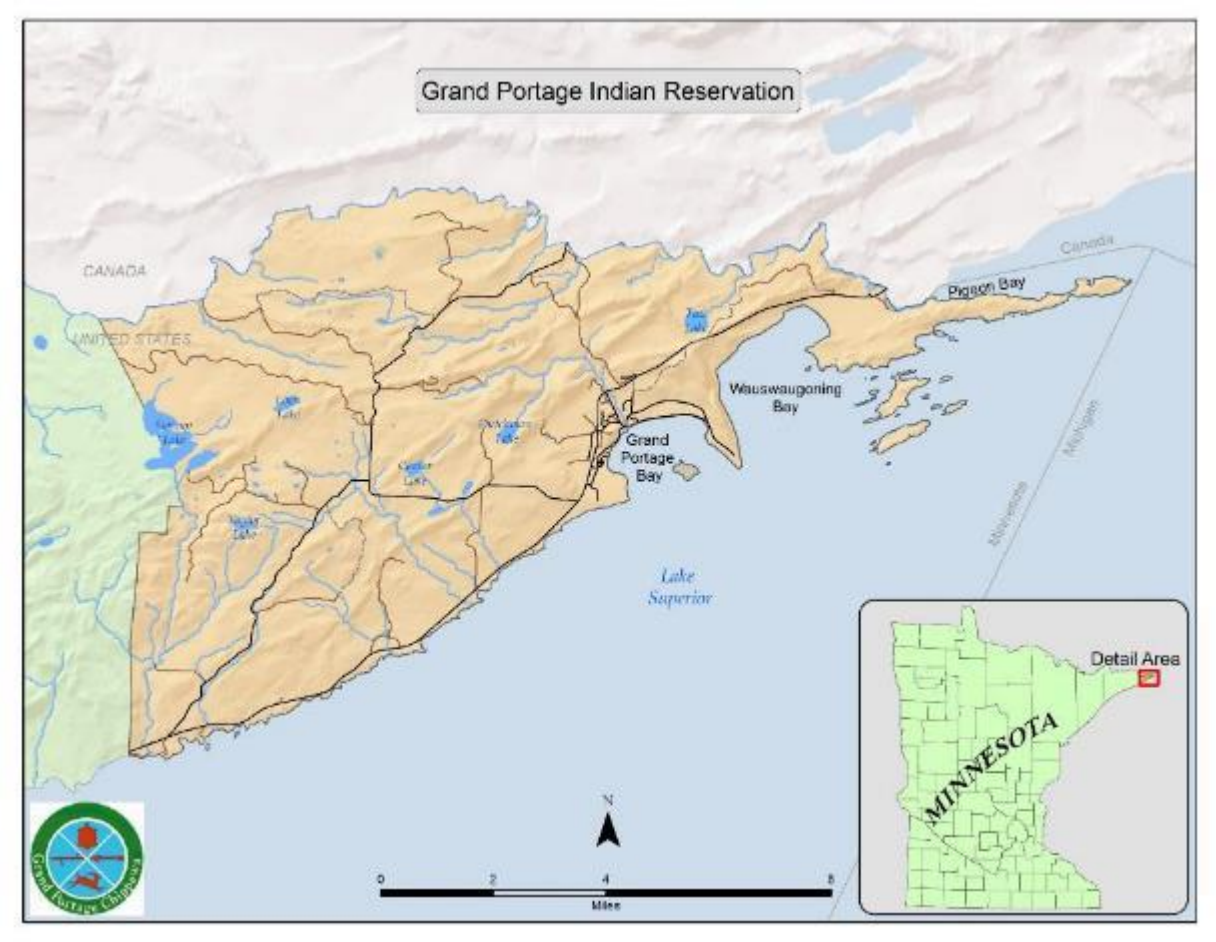
Grand Portage Reservation

Surface Area of the Grand Portage Reservation	**48,400 acres**
Acres of Wetlands within the Reservation*	**~7,800 acres**
Freshwater Forested Wetland	56%
Freshwater Shrub Wetland	19%
Freshwater Emergent Wetland	12%
Lake	6%
Riverine	4%
Freshwater Pond	3%

**Acreage and class cover calculated based on NWI*



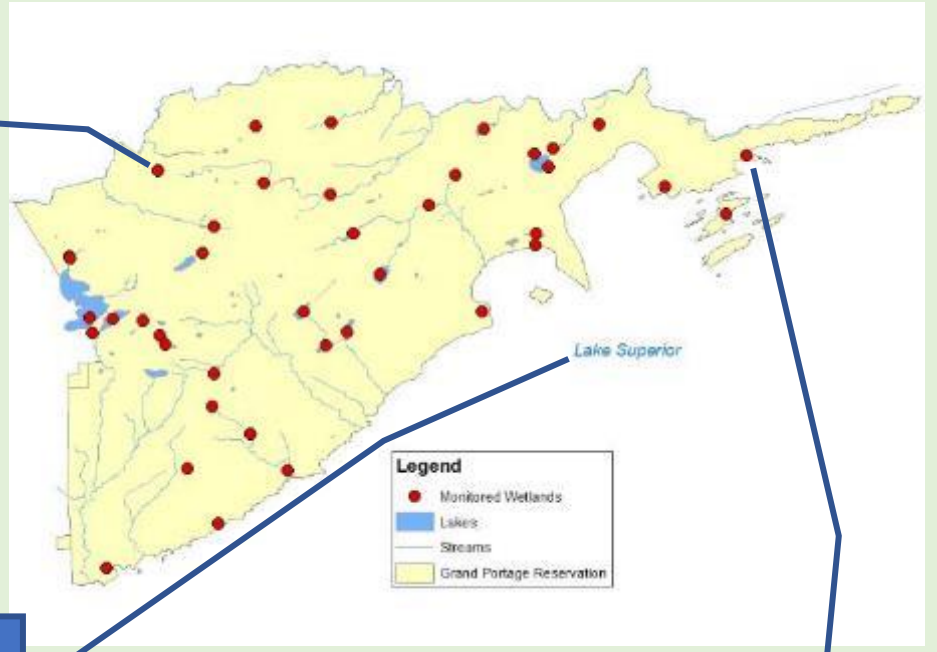
Program History

Year(s)	Project Title	Data Collected	# Of Wetlands Surveyed
2013-2014	Nutrient Criteria Development in Wetlands Used by Moose	Vegetation, Periphyton, Water Chemistry (Total and Kjeldahl Nitrogen and Total and Ortho Phosphorus, Chlorophyll a), Sediment Chemistry (Total and Kjeldahl Nitrogen and Total Phosphorus)	12
2010-2012	Development of Coastal Wetland Nutrient and Biological Criteria	Vegetation, Periphyton, Water Chemistry (Total and Kjeldahl Nitrogen and Total Phosphorus, Chlorophyll a), Sediment Chemistry (Total and Kjeldahl Nitrogen and Total Phosphorus)	6
2009		Vegetation, Water Chemistry (Chlorophyl-a, Phosphorus, Total Kjedahl Nitrogen, Total Nitrogen, Dissolved Organic Carbon)	4
2007-2008	Forested Wetlands Nutrient Criteria	Vegetation, Periphyton, Water Chemistry (Total and Kjeldahl Nitrogen and Total Phosphorus, Chlorophyll a), Sediment Chemistry (Total and Kjeldahl Nitrogen and Total Phosphorus)	14
2005-2006	Wetlands Nutrient Criteria	Vegetation, Periphyton, Water Chemistry (Total and Kjeldahl Nitrogen and Total Phosphorus, Chlorophyll a), Sediment Chemistry (Heavy metal conc.; Total N, Total P, TKN)	13
2001-2002	Wetlands Bioassessment & Biocriteria	Invertebrates, Vegetation, Water Chemistry (DO, Turbidity, pH, total Chlorides Total N, Total P, Temperature, Specific Conductance, Chlorophyll a), Sediment Chemistry (Heavy metal conc., N, P)	19

2006 Aerial Monitoring Flight

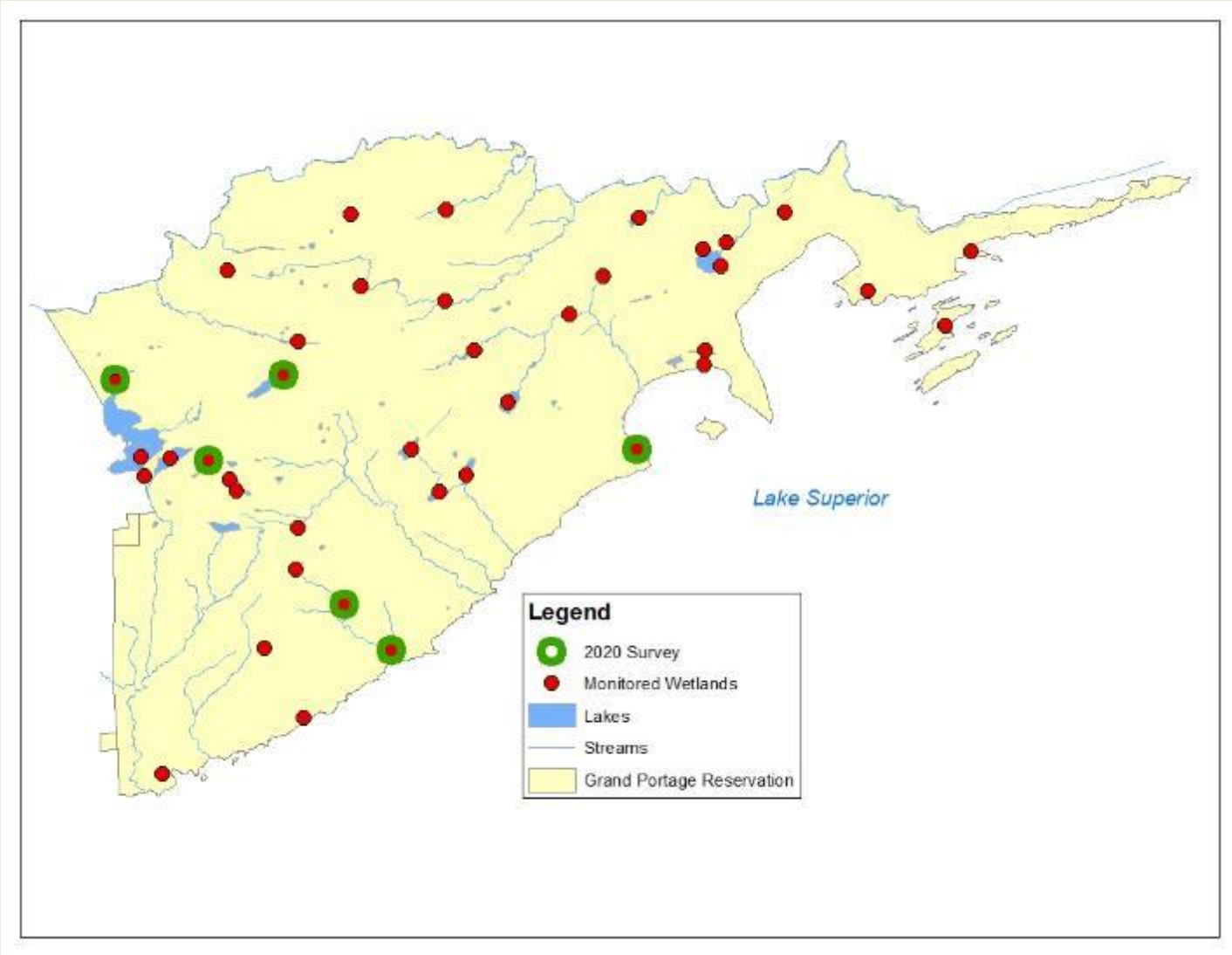
Program History

- 2018 – 2-year WPDG awarded
- 2019 – Wetlands Specialist hired
  - Revisiting previously monitored wetlands
  - Learning from coworkers



2020 Pilot Study

- Vegetation
  - MPCA Rapid FQA
  - Timed meander
  - Rapid species list + cover estimations
  - Abundance weighted Coeffient of Conservatism score (*w*C) for each plant community
- Invertebrates
- Water Chemistry
- Soil Chemistry

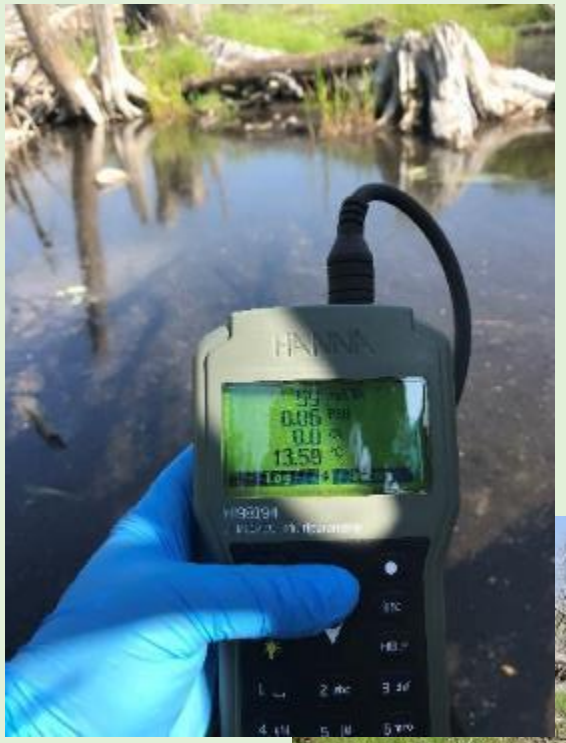


2020 Pilot Study

- Vegetation
- Invertebrates
  - Dipnet
  - Light trap
    - 2 nights/wetland
  - Pitfall trap
    - Array of 4 traps
    - 7-day period
- Water Chemistry
- Soil Chemistry

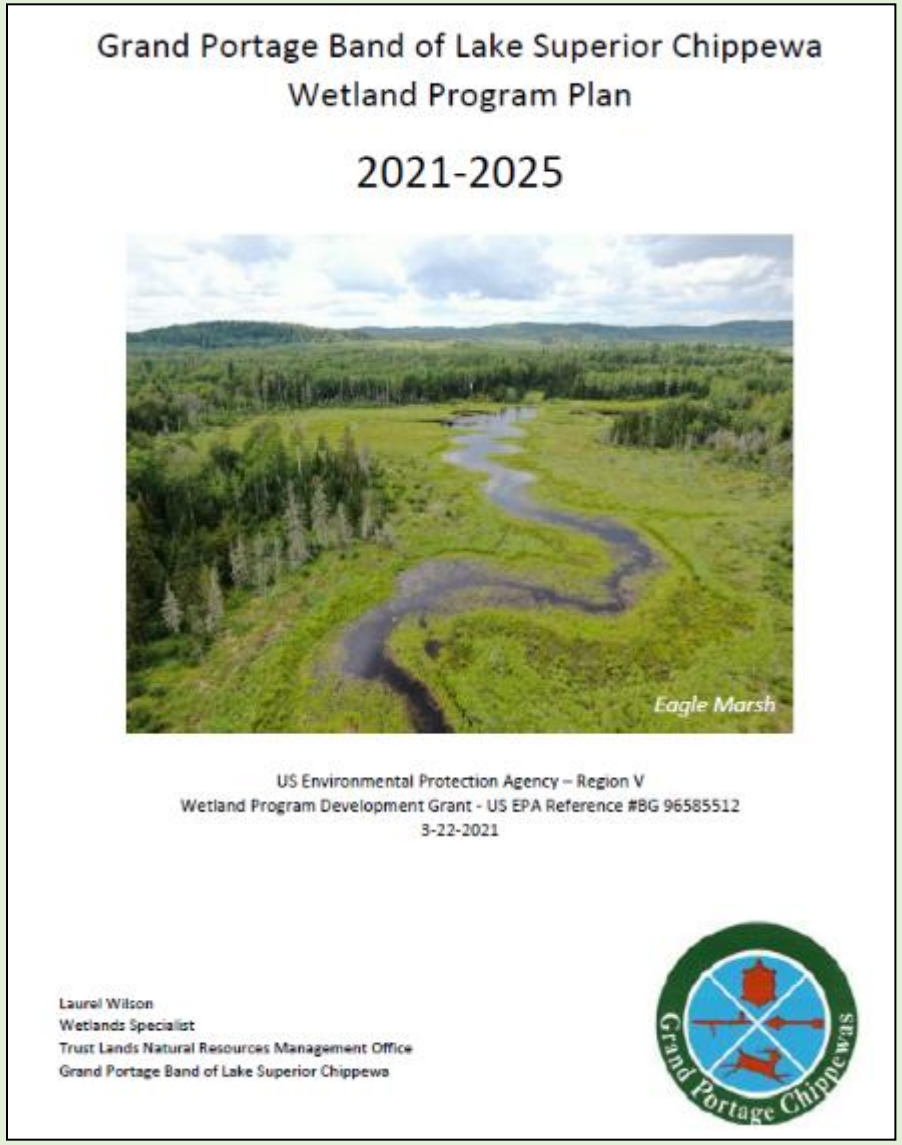
2020 Pilot Study

- Vegetation
- Invertebrates
- Water Chemistry
  - Temperature, Dissolved Oxygen, pH, Conductivity
  - Total Chloride, Chlorophyll-a, Nitrogen (Nitrate + Nitrite and Kjeldahl), Total Organic Carbon, Total Phosphorus, Total Suspended Solids
- Soil Chemistry
  - Nitrogen (Nitrate + Nitrite and Kjeldahl), Total Organic Carbon, Total Phosphorus, Total Solids



Core Wetland Quality Indicators

- Vegetation
  - MPCA Rapid FQA
- Invertebrates
  - Dipnet
  - Light trap
  - Pitfall trap
- Water Chemistry
  - Temperature, Dissolved Oxygen, pH, Conductivity
  - Total Chloride, Chlorophyll-a, Nitrogen (Nitrate + Nitrite, Kjeldahl), Total Organic Carbon, Total Phosphorus, Total Suspended Solids
- Soil Chemistry
  - Nitrogen (Nitrate + Nitrite, Kjeldahl), Total Organic Carbon, Total Phosphorus, Total Solids



-Wetland Program Plan approved March, 2021

-Includes Wetland Monitoring Strategy

- Goals and Objectives
- Monitoring Design (Current & Future Efforts, Timeline)
- Core & Supplemental Quality Indicators

Goal 1 – Wetland Quantity

Goal 2 – Wetland Quality

Goal 3 – Coordination + Collaboration

2. MONITORING GOALS AND OBJECTIVES

The following monitoring goals and objectives have been identified for the Grand Portage Wetland Monitoring Strategy:

Goal 1. To determine the total wetland acreage or wetland quantity in Grand Portage.
Objective 1.1. To review and verify available wetland mapping data.
Objective 1.2. To develop a mapping system for tracking and updating wetland data.

Goal 2. To determine wetland quality in Grand Portage.
Objective 2.1. To determine priority wetlands for monitoring based on wetland function and mapped critical habitat.
Objective 2.2. To establish baseline wetland conditions in priority wetlands based on selected core indicators.
Objective 2.3. To determine reference conditions for all wetland types.

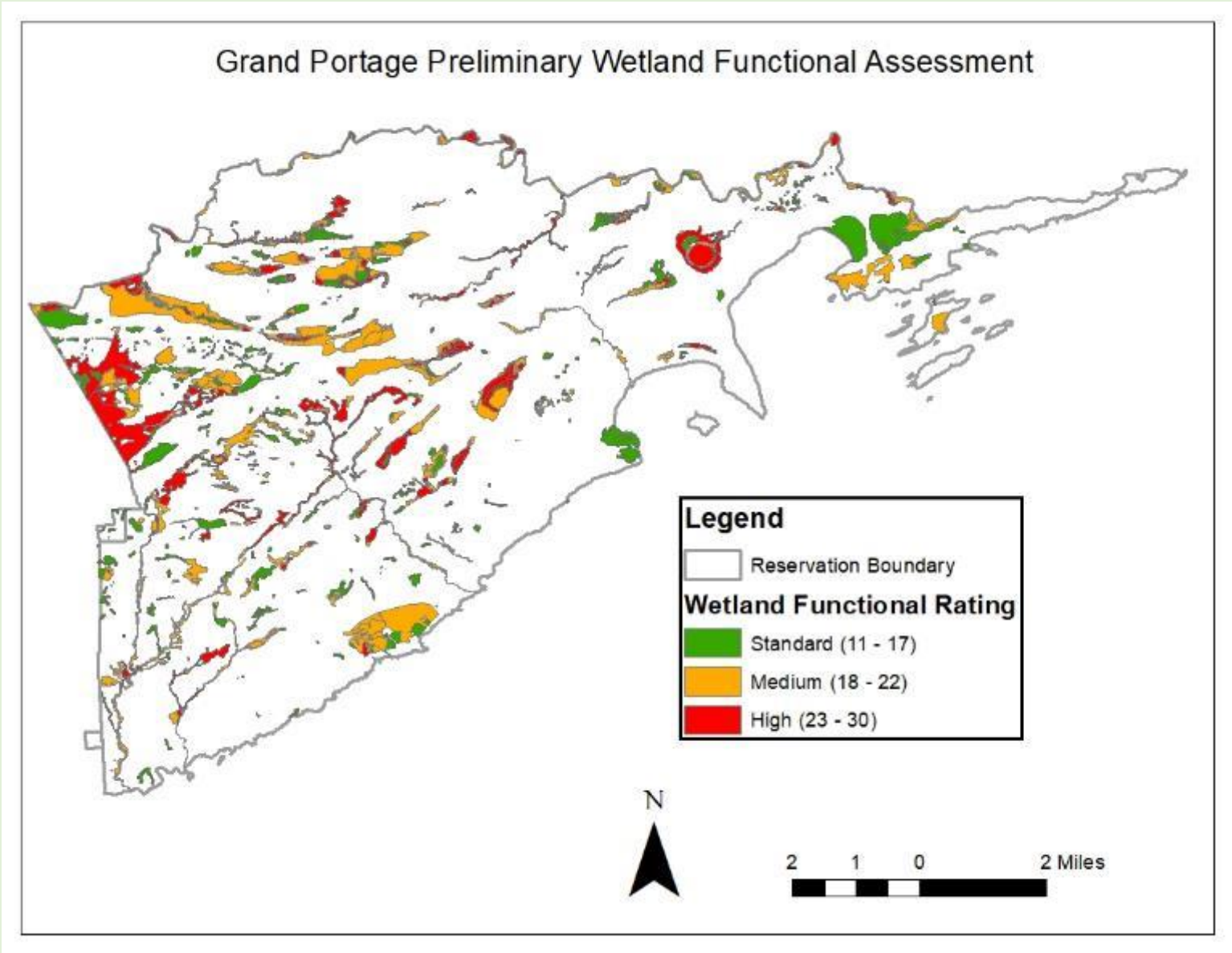
Goal 3. To ensure that wetland monitoring methods and results fit into a broader strategy within the tribe, region and state when relevant.
Objective 3.1. To collaborate with the Grand Portage Water Quality program and other programs within the Environmental Department.
Objective 3.2. To coordinate with tribal, regional and state partners (1854 Treaty Authority, US Forest Service, and Minnesota Pollution Control Agency and Minnesota Department of Natural Resources, etc.).

Monitoring Objectives & Timeline

GOAL #	OBJECTIVE	TIMELINE
GOAL 1	To review and verify available wetland mapping data.	2021-2022
GOAL 1	To develop a mapping system for tracking and updating wetland data.	2022-2023
GOAL 2	To determine priority wetlands for monitoring based on wetland function and mapped critical habitat.	2021
GOAL 2	To establish baseline wetland conditions in priority wetlands based on selected core indicators.	2022-2025
GOAL 2	To determine reference conditions for all wetland types.	2025-2028
GOAL 3	To collaborate with the Grand Portage Water Quality program and other programs within the Environmental Department.	ON-GOING
GOAL 3	To coordinate with tribal, regional and state partners.	ON-GOING

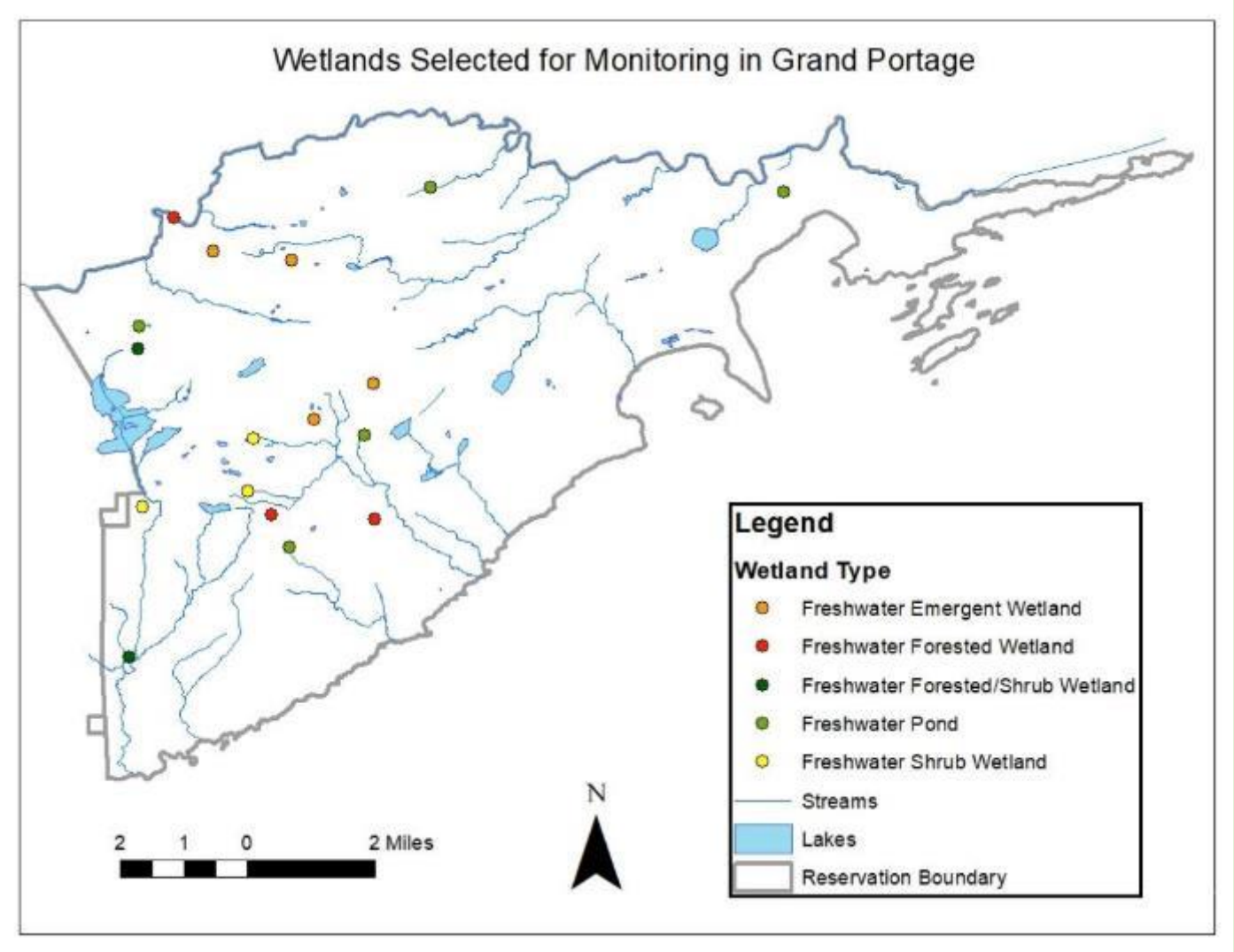
Selecting Wetlands for Monitoring

- Level 1 Assessment
  - Wetland Function
  - Culturally important species
- Wetland Type
- Monitored by Water Quality program
- Accessibility

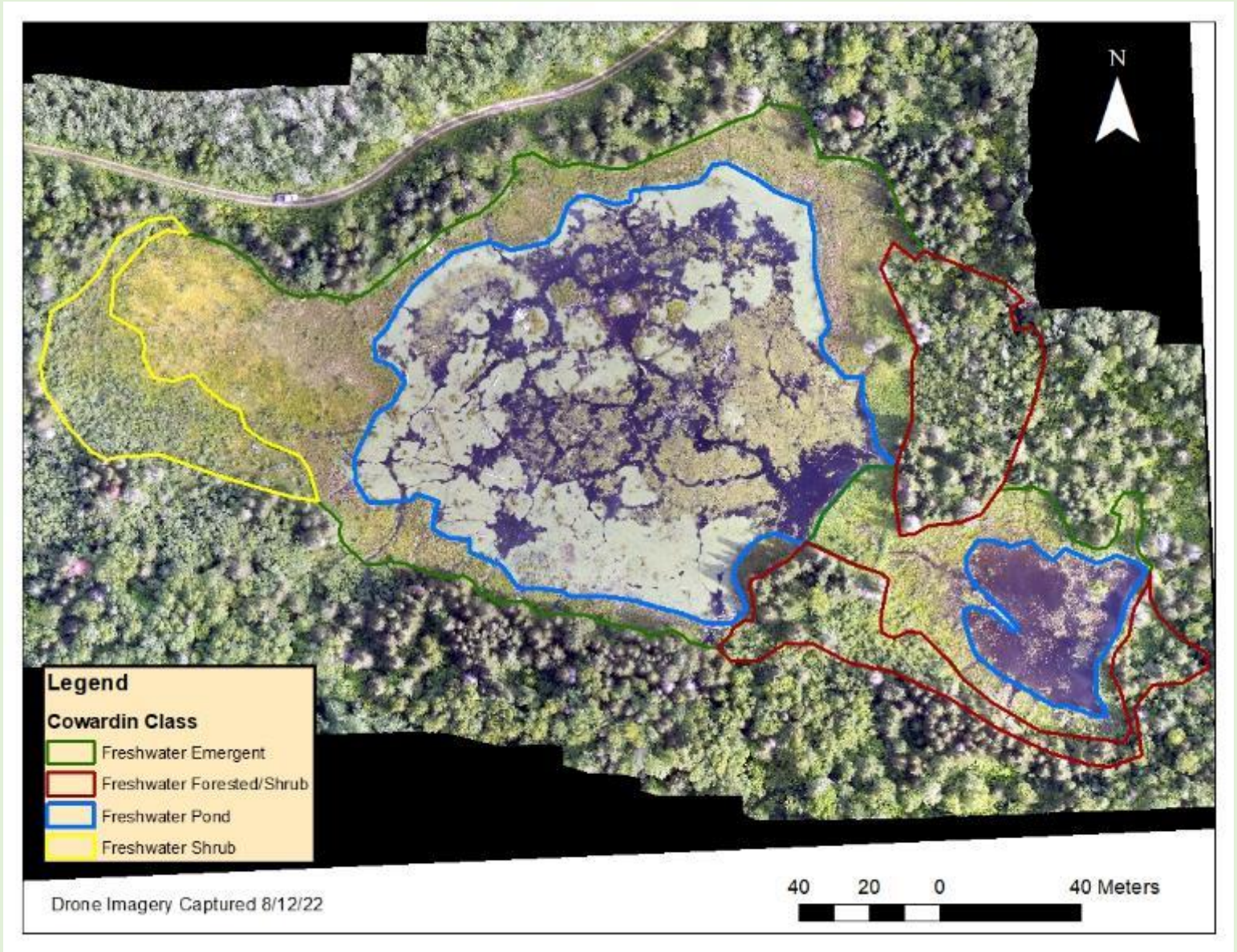


Selecting Wetlands for Monitoring

- On-going monitoring in 12 wetlands
  - 6 per year on rotating basis
  - Core indicators
- 3 randomly selected wetlands
  - Rapid FQA



Drone Mapping



Future Plans

- On-going monitoring
  - Selected wetlands
  - 3 randomly chosen annually
- Develop mapping system
- Adding MN/WI Functional Assessment protocol
- Applying for WPDG to update WPP in 2025
- Other projects
  - Vernal pool mapping
  - Wild Rice Monitoring
  - Wetland Monitoring in 1854 Ceded Territory (plant community, wild rice, and herptiles)

Thank you

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