

Development of a Statewide Wetland Reference Network for Montana



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MONTANA
**Natural Heritage
Program**

Montana's source for information on native species and habitats, emphasizing those of conservation concern.



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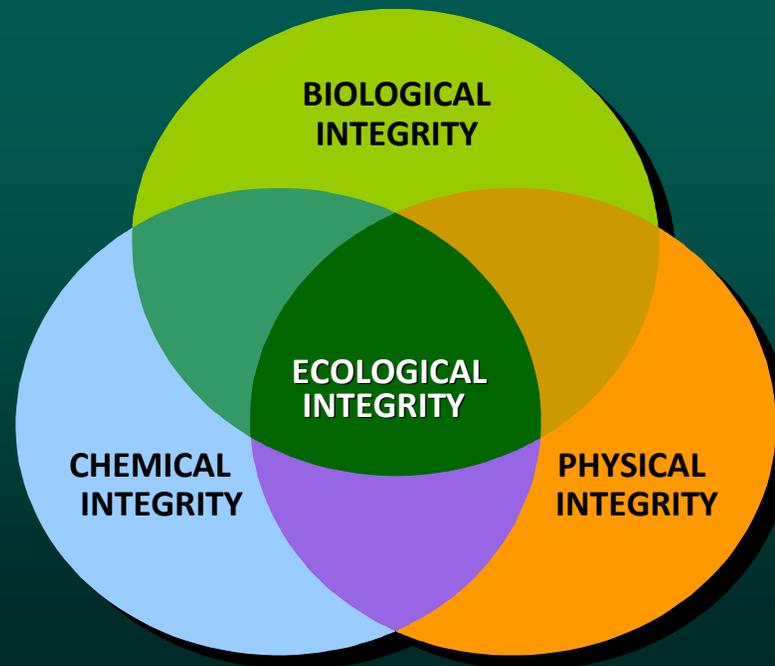
Answers Key Questions about Montana's Natural Heritage

- What species and ecosystems exist in Montana?
- Which are rare, declining, or otherwise significant?
- Where precisely are those found?
- What do they need to survive and thrive?
- Who manages those places?
- What is their condition?

Answers Key Questions about Montana's Natural Heritage

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- **What is their condition?**

- Under the Clean Water Act 305 (b) States are required to monitor and report on the quality of waters within their states, including wetlands
- **Objective:** restore and maintain the chemical, physical, and biological integrity of the Nation's waters (CWA 101(a)).
- Combination of chemical, physical, and biological integrity – ***Ecological Integrity***



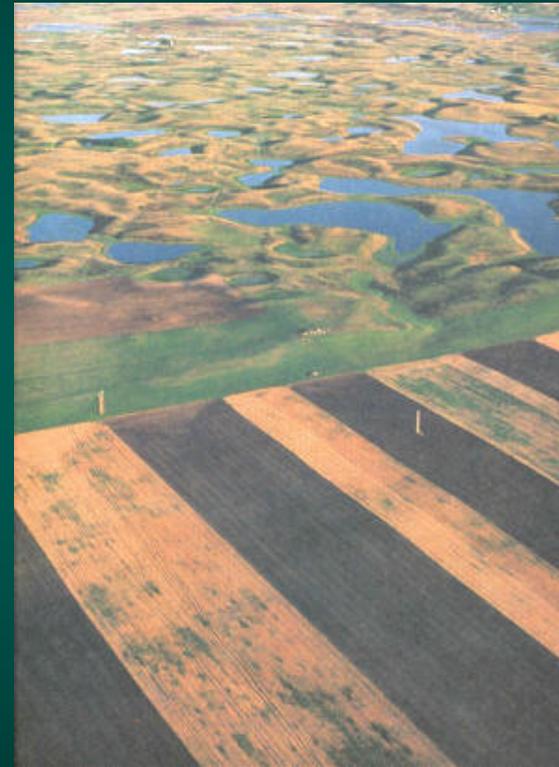
Wetland Condition



Reference Standard Wetland -an example from the Prairie Pothole Region



Impacted Wetland -an example from the Prairie Pothole Region



Purposes of Reference Wetland Networks

- Establish a basis for defining characteristic levels of integrity
- Establish range and variability of wetland attributes
- Represent a range of condition for monitoring and assessing trends

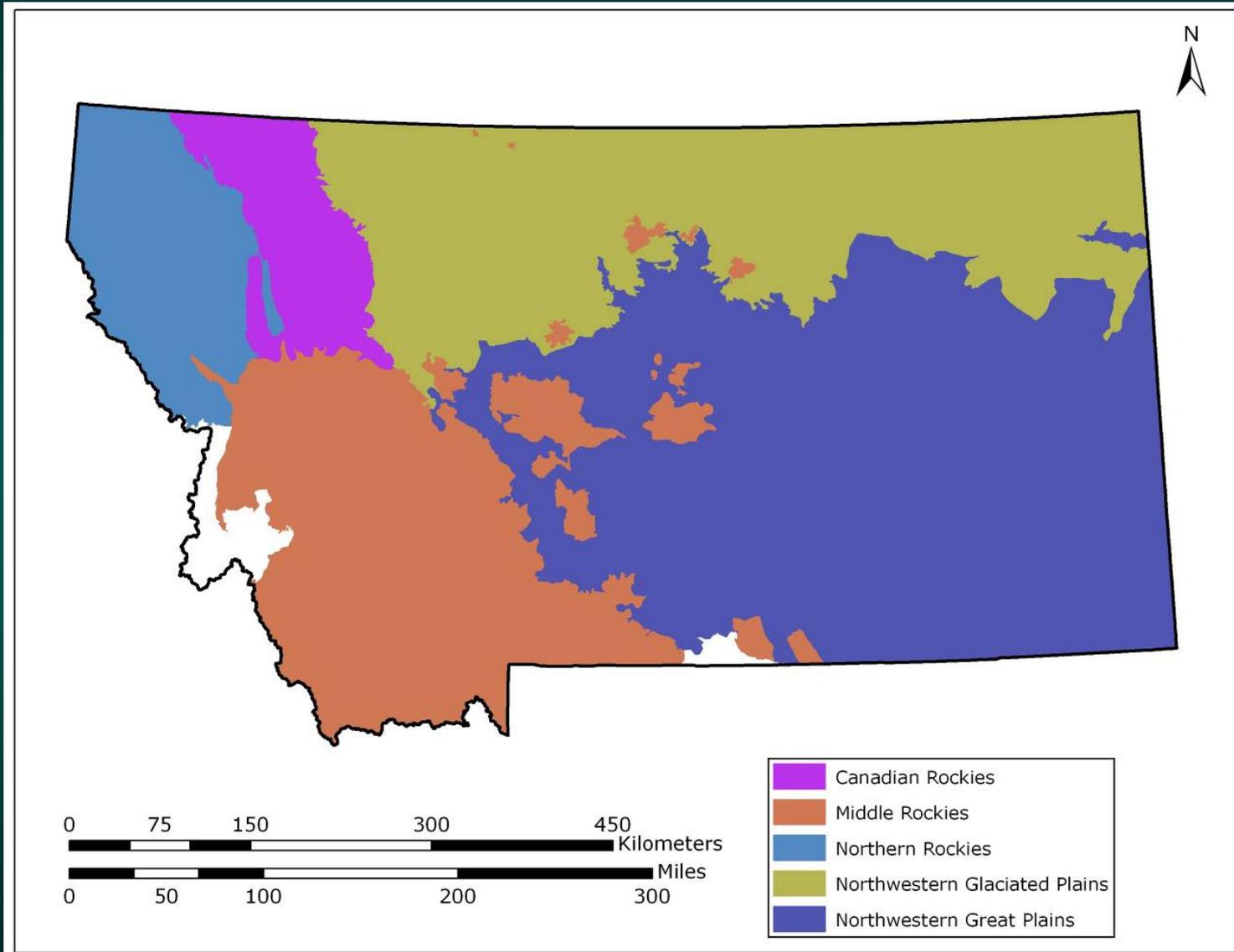


Montana's Reference Wetland Network

- Provides examples of least-disturbed condition for multiple wetland systems
- Identifies the variability in wetland attributes
- Identifies human-induced disturbances impacting wetland condition



Study Area



Northwestern Glaciated Plains Ecoregion



- Great Plains Prairie Pothole
- Western Great Plains Saline Depression
- Western Great Plains Closed Depression
- Western Great Plains Open Freshwater Depression



Northwestern Great Plains Ecoregion



- Western North American Emergent Marsh
- Western Great Plains Closed Depression
- Western Great Plains Open Freshwater Depression



Middle Rockies, Northern Rockies, & Canadian Rockies Ecoregions



- Western North American Emergent Marsh
- Rocky Mountain Subalpine-Montane Fen
- Rocky Mountain Alpine-Montane Wet Meadow



Methods

- Selected sites based on wetland sites described in the literature and input from other ecologists
- Classified each wetland by:
 - ecological system
 - Cowardin system, class, and water regime
 - hydrogeomorphic features

Methods

Level 2 - Rapid assessment

Attributes measured within a 0.5 hectare assessment area and its 200 meter envelope:

- Landscape context – connectivity, buffer size and condition
- Vegetation structure – relative cover of native plant species; cover of invasive exotic species; patch interspersion
- Physicochemical – soil surface integrity; water quality
- Hydrology – water source; hydroperiod; hydrologic connectivity
- Stressor checklist – list of anthropogenic stressors that correspond to field indicators

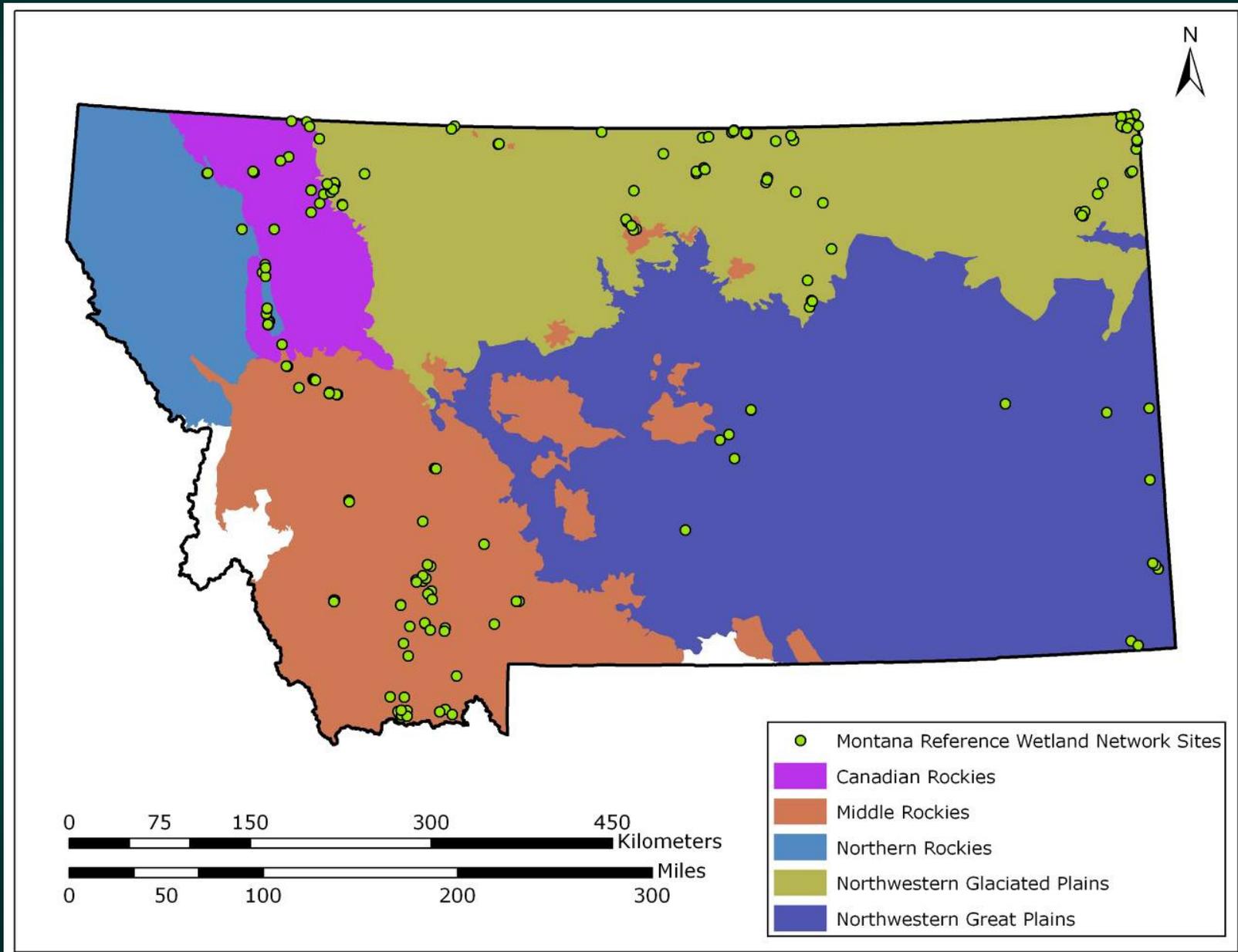
Methods

Level 3 - Intensive assessment

Measured within a 0.05 hectare plot:

- Plant species cover and composition
- Ground cover
- Use data to calculate multiple vegetation metrics to conduct a floristic quality assessment (FQA)

Results

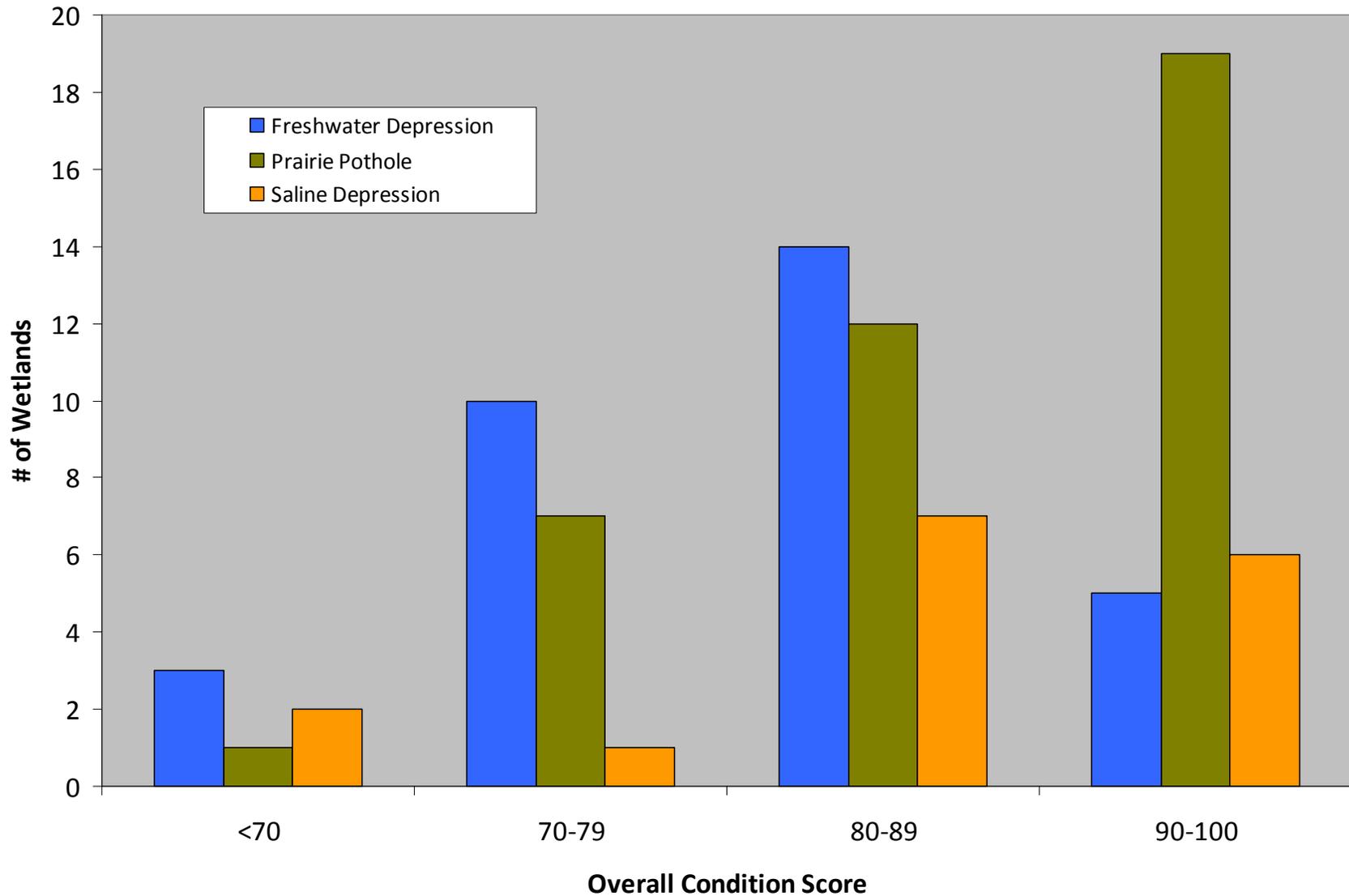


Results

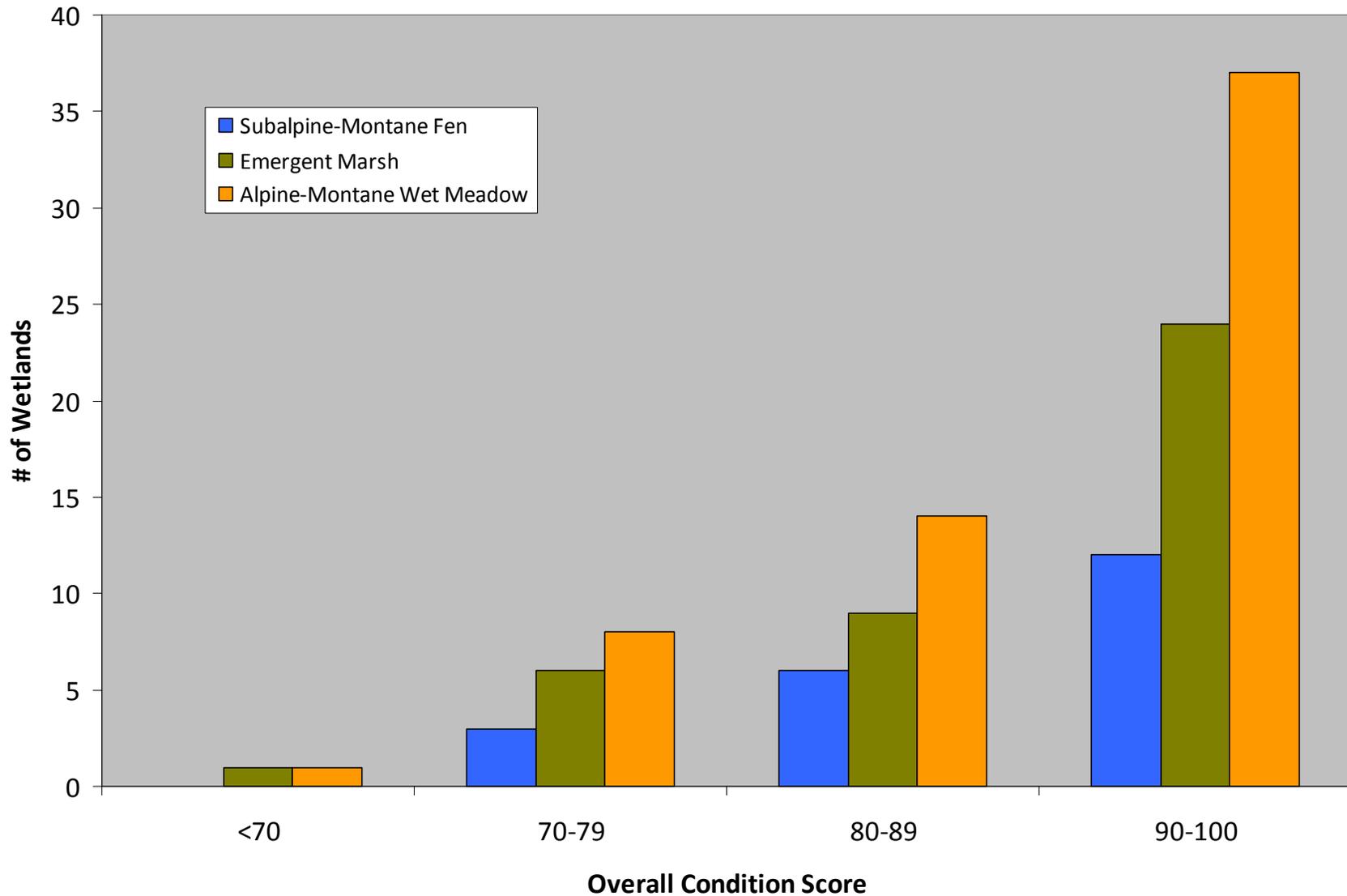
Wetland Condition Score Categories

- at or near expected reference standard (scores = 90-100)
- least impacted (scores = 80-89)
- moderately impacted (scores = 70-79)
- severely impacted (scores < 70)

Results – Great Plains Wetlands



Results – Montane Wetlands



Results

Northwestern Glaciated Plains and Northwestern Great Plains Wetlands

Most Common Stressors

- livestock grazing
- roads
- buffer condition
- landscape connectivity
- altered hydrology



Results

Middle Rockies, Canadian Rockies, and Northern Rockies Wetlands

Most Common Stressors

- livestock grazing
- altered hydrology
- roads



Wetland Reference Network Uses and Applications

- Allow for rapid comparison of wetland condition both within and across wetland systems
- Can diagnose potential causes of wetland degradation
- Provide examples of multiple wetland systems in varying levels of condition across Montana
- Highlights areas to focus and prioritize conservation, acquisition, and restoration efforts
- Characterize examples of least disturbed condition
- Validate and calibrate our wetland assessment methods

Wetland Reference Network: Future Work

- Continue adding to network
- Refine disturbance gradient
- Collect more Level 3 data
- Develop regional networks



Wetland Databases

The screenshot displays the Montana Natural Heritage Program website. At the top, the 'mt.gov' logo and 'MONTANA NATURAL HERITAGE PROGRAM' are visible. A navigation menu includes 'Home', 'Animals', 'Plants', 'Ecology', 'Publications', 'Data', and 'About'. A search bar is located on the right. The main content area features a map titled 'Herbageous Wetland Reference Network' with a legend on the left. The legend lists 'EPA Level III Ecoregions' and 'Ecological Systems' with corresponding color-coded markers. The map shows various wetland sites across Montana, with labels for cities like Lethbridge, Great Falls, and Billings. A sidebar on the left contains 'Project Links' (Help Document, Metadata, System Crosswalk) and a 'Wetland Reference Sites' section with a small landscape image. The bottom of the page has a footer with 'Privacy & Security', 'Accessibility', 'Contact Us', and 'Search' links, along with the 'mt.gov' logo.

Montana Herbageous Wetland Refer...

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Montana's Official State Website

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Project Links

- Help Document
- Metadata
- System Crosswalk

Wetland Reference Sites

- EPA Level III Ecoregions
- Ecological Systems
 - Great Plains Prairie Pothole
 - Inter-Mountain Basins Greasewood Flat
 - Northern Rocky Mountain Wooded vernal Pool
 - Northwestern Great Plains Riparian
 - Rocky Mountain Alpine-Montane Wet Meadow
 - Rocky Mountain Subalpine-Montane Fen
 - Western Great Plains Closed Depressional Wetland
 - Western Great Plains Open Freshwater Depression Wetland
 - Western Great Plains Saline Depression Wetland
 - Western North American Emergent Marsh

Herbageous Wetland Reference Network

Refresh Map View in Google Maps

Map Satellite Hybrid Terrain Earth

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Powered by 100 mi 200 km

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mt.gov
Montana's Official State Website

<http://mtnhp.org/ecology/assess/state/>

- Project Links**
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Herbeaceous Wetland Reference Network Refresh Map View in Google Maps

Map Satellite Hybrid **Terrain** Earth

62208AM Wetland Site

Site ID	62208AM
Owner	USFWS
System	Western Great Plains Open Freshwater Depression Wetland
Date	6/22/2008
Landscape Context Score	75
Relative Size Score	100
Biotic Score	33
Hydrology Score	92
Physicochemical Score	63
Overall Condition Score	73
FQI	3
Adjusted FQI	23
HGM	Depressional
Level III Ecoregion	Northwestern Great Plains
Site Photo	http://mtnhp.org/Ecology/WetlandPhotos.aspx?siteid=62208AM
System Description	http://fieldguide.mt.gov/displayES_Detail.aspx?ES=9218
GIS Metadata	http://mtnhp.org/ecology/assess/State/MRN_meta.htm
Help	http://mtnhp.org/ecology/assess/State.H

Map data ©2010 Europa Technologies, Google, Terms of Use

http://mtnhp.org/ecology/assess/state/

Field Guide to Wetland Ecological Systems

Montana Field Guide

 MONTANA FIELD GUIDE

Montana's Official State Website

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Wetland and Riparian Systems

Bog or Fen

Rocky Mountain Subalpine-Montane Fen
Rocky Mountain Subalpine-Montane Fen
Provisional State Rank: S4

Depressional Wetland

Great Plains Closed Depressional Wetland
Western Great Plains Closed Depressional Wetland
Provisional State Rank: S3

Great Plains Open Freshwater Depression Wetland
Western Great Plains Open Freshwater Depression Wetland
Provisional State Rank: S3

Great Plains Prairie Pothole
Great Plains Prairie Pothole
Provisional State Rank: S3

Great Plains Saline Depression Wetland
Western Great Plains Saline Depression Wetland
Provisional State Rank: S4

Rocky Mountain Wooded Vernal Pool
Northern Rocky Mountain Wooded Vernal Pool
Provisional State Rank: S4

Flats, Plateaus, and Riverbanks

Done

[Home](#) - [Other Field Guides](#)[Ecological Systems](#)[Wetland and Riparian Systems](#)

Great Plains Prairie Pothole



Great Plains Prairie Pothole

Provisional State Rank: [S3](#)[Ecological Systems
Map Viewer](#)[NatureServe
Ecological Systems](#)

General Description

Prairie potholes occur in shallow depressions scraped out by glaciers in the northern Great Plains of Montana. The region is characterized by a glacial landscape of end moraines, stagnation moraines, outwash plains and lake plains. The glacial drift forms steep to slight local relief with fine-grained, silty to clayey soils. Limestone, sandstone, and shales are the predominant parent materials, and highly mineralized water can discharge from these rocks. The hydrology of this system is complex, and the concentration of dissolved solids results in water that ranges from fresh to extremely saline, with chemical characteristics varying seasonally and annually. Most prairie potholes and associated lakes contain alkaline water, which accumulates rapidly in during spring months,

Acknowledgments

- U.S. EPA
- MTNHP
- USFS, BLM, MTDNRC, MTFWP, NRCS, USFWS
- MTDEQ
- Field Crews



Questions?

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