

# Wetland Ecology for Planners: Examples of Variation Across the U.S.

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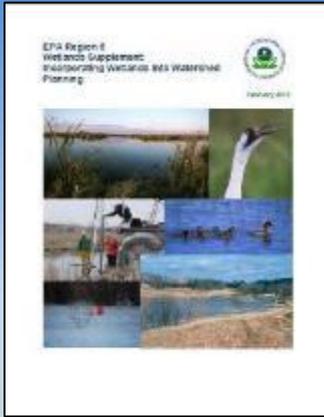
**Association of State Wetland Managers  
NRCS Wetland Training Webinar Series #4  
December 14, 2018**



# Key Concepts

Wetland inventory techniques are being used Nationwide to inform resource management decisions:

- EPA Core Elements Framework
- NWI, Wetland Status & Trends, EPA NWCA
- Current science, tools and methods
- Professional guidance and review
- Stakeholder engagement



# EPA Core Elements

Application of  
**Elements of a State Water  
 Monitoring and Assessment Program  
 For Wetlands**

April 2006

Wetlands Division  
 Office of Wetlands, Oceans and Watersheds  
 U.S. Environmental Protection Agency

Available on the web  
<http://www.epa.gov/owow/wetlands/monitor/>

	Products/Applications
<p><b>Level 1 - Landscape Assessment:</b>            Use GIS and remote sensing to gain a landscape view of watershed and wetland condition. Typical assessment indicators include wetland coverage (NWI), land use and land cover</p>	<ul style="list-style-type: none"> <li>•Targeting restoration and monitoring</li> <li>•Landscape condition assessment</li> <li>•Status and trends</li> <li>•Integrated reporting CWA 305(b)/303(d)</li> </ul>
<p><b>Level 2 – Rapid Wetland Assessment:</b>            Evaluate the general condition of individual wetlands using relatively simple field indicators. Assessment is often based on the characterization of stressors know to limit wetland functions e.g., road crossings, tile drainage, ditching.</p>	<ul style="list-style-type: none"> <li>•401/404 permit decisions</li> <li>•Integrated reporting</li> <li>•Watershed planning</li> <li>•Implementation monitoring of restoration projects, including nonpoint source BMPs, and Farm Bill programs</li> </ul>
<p><b>Level 3 – Intensive Site Assessment</b>            Produce quantitative data with known certainty of wetland condition within an assessment area, used to refine rapid wetland assessment methods and diagnose the causes of wetland degradation. Assessment is typically accomplished using indices of biological integrity or hydrogeomorphic function.</p>	<ul style="list-style-type: none"> <li>•WQS development, including use designation</li> <li>• Integrated reporting</li> <li>•Compensatory mitigation performance standards</li> <li>•Verify levels 1 and 2 methods</li> </ul>

# Inventory and Classification



- National Wetland Inventory (NWI)
- Hydrogeomorphic Method (HGM, LLWW)
- Potentially Restorable Wetlands (PRW)
- Wetland Function and Value Correlation
- Rapid Assessment Methods (RAM)
- Site Level Determination and Delineation

# Today's Presentations



Doug Norris: Variability in Wetlands Across the Country

Andy Robertson: Re-Thinking Wetland Inventory to Address Management Issues



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# Re-Thinking Wetland Inventory to Address Land Management Issues



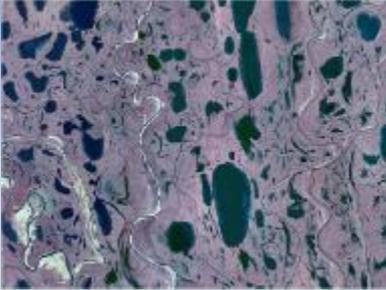
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**Andy Robertson**  
**Saint Mary's University of Minnesota**  
**December 14, 2018**



# Resource Management Planning

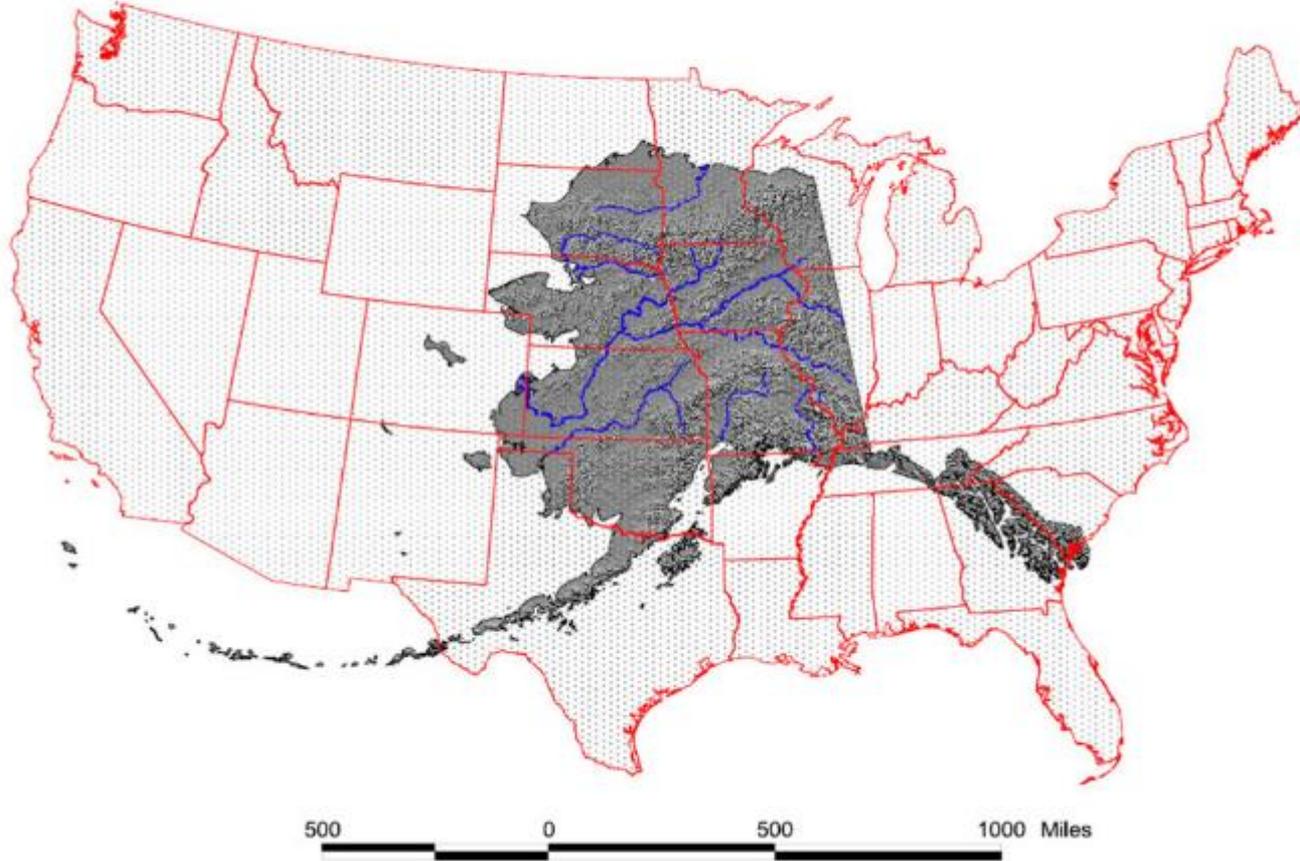


Current wetland inventory techniques for resource management decision support:

- Climate warming in Alaska
- Impacts of grazing in New Mexico
- Flood attenuation in Wisconsin

# Alaska is a Big Place!

*Alaska Superimposed over the Continental United States*



# Alaska is also the Frontline of Climate Change

Updated wetland mapping is critical:

- habitat inventory e.g. migratory birds
- coastal change: erosion, flooding, storm intensification etc.
- shallow lake draining and drying
- permafrost degradation and thermokarst
- vegetation encroachment and rapid succession

# Coastal Erosion and Inundation





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# Rapid Wetland Change



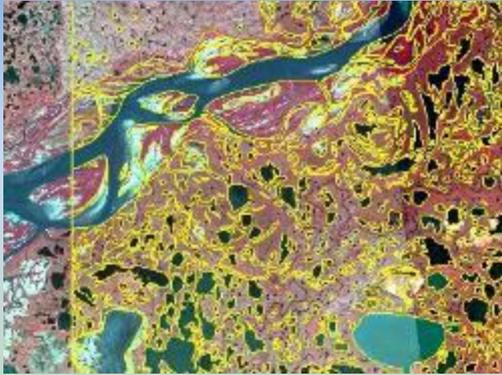


# Permafrost Degradation

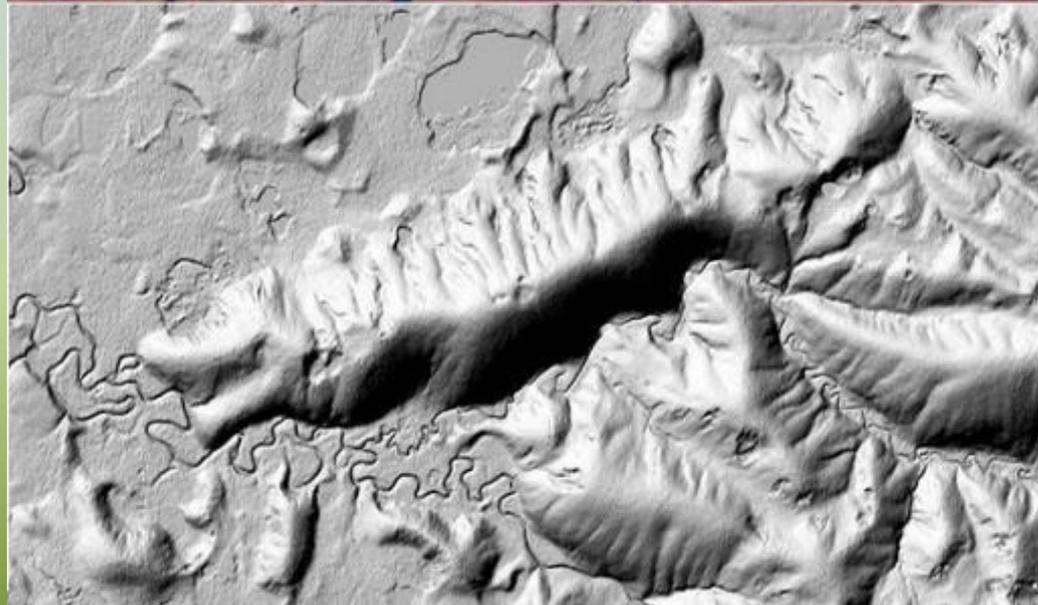
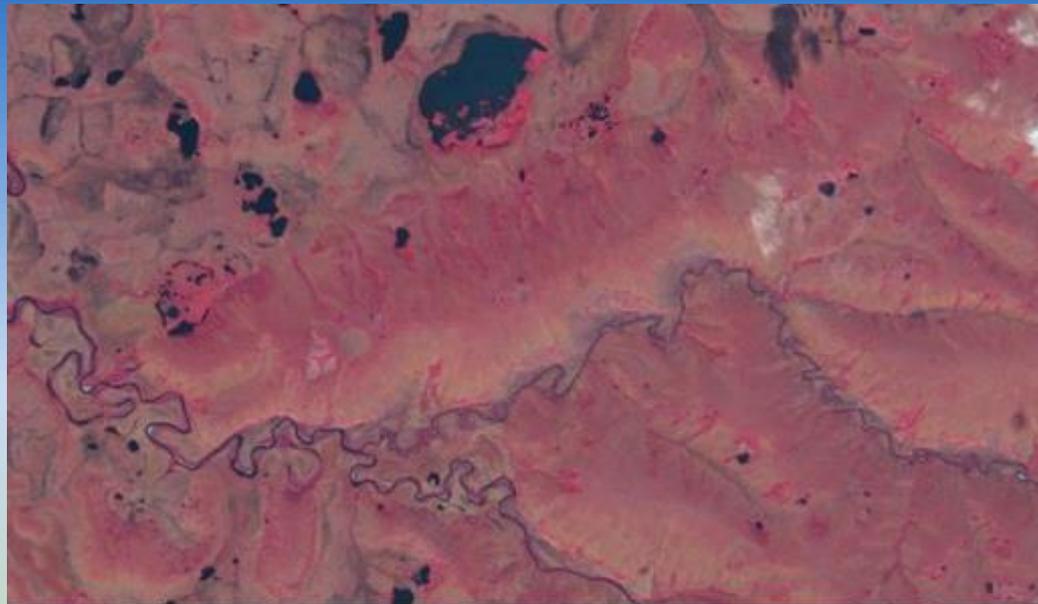
# Vegetation Encroachment



# Modern Wetland Inventory Techniques

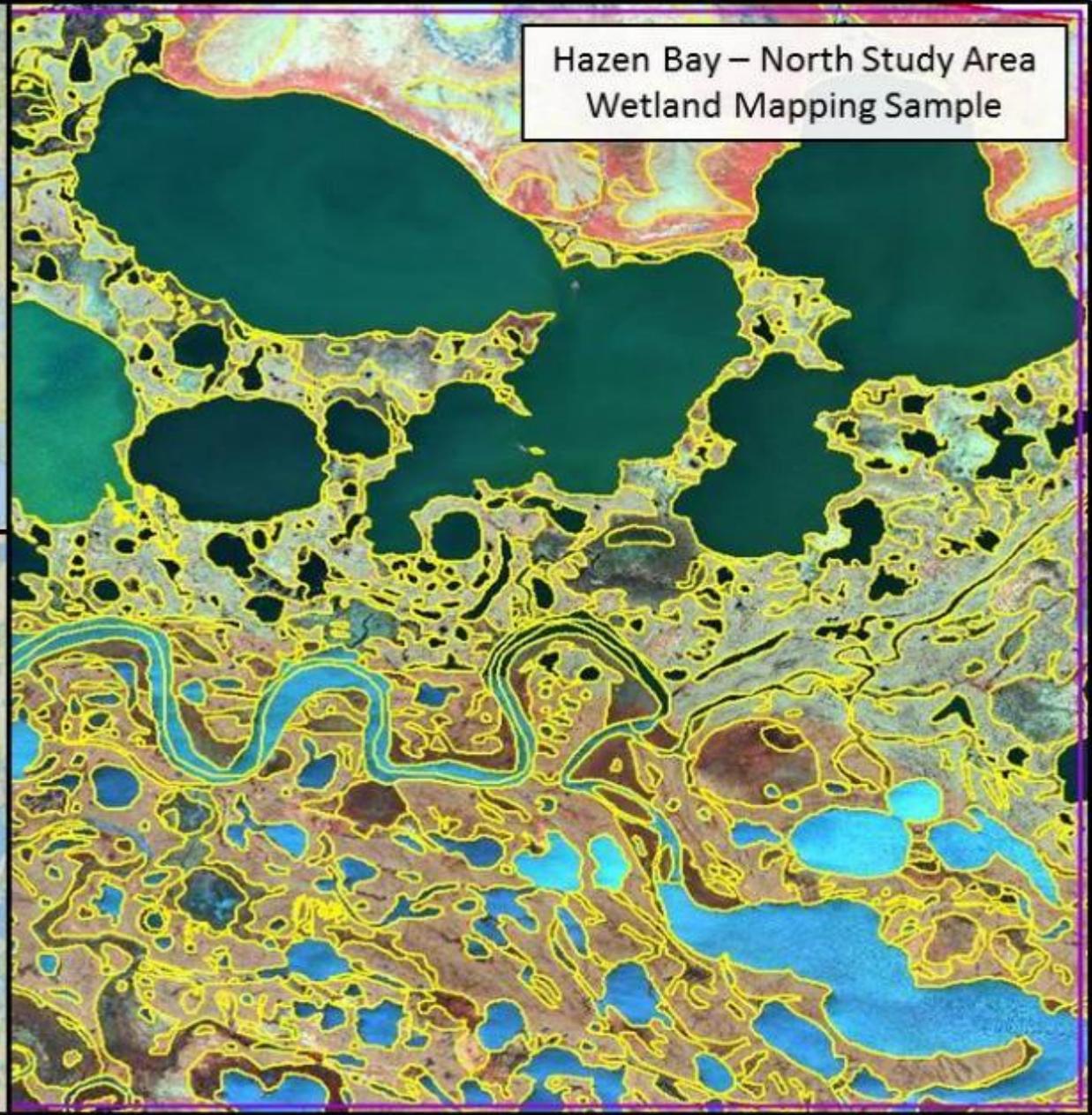
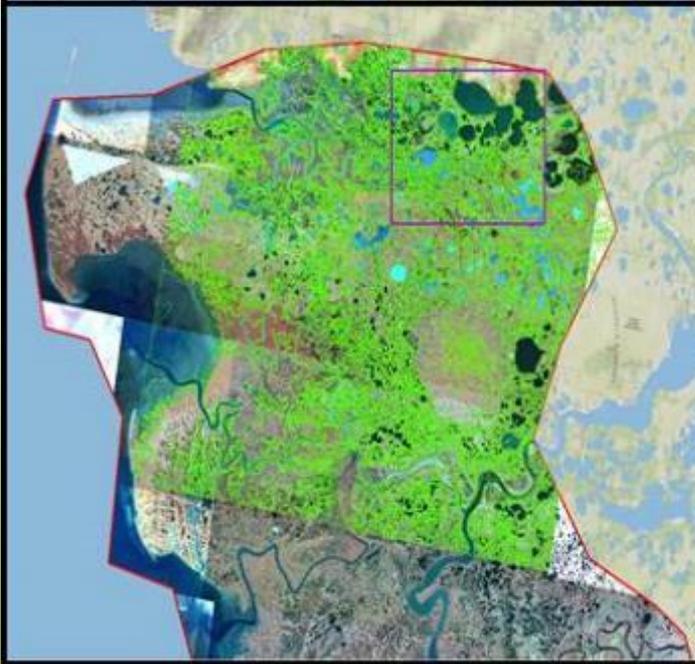


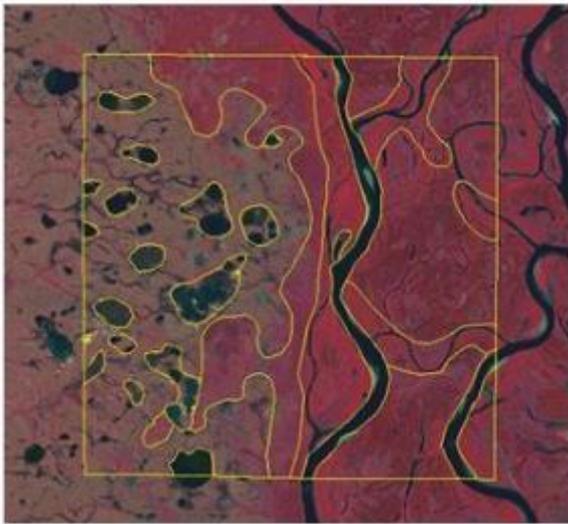
- Automated image classification
- Use of as much collateral data as possible including:
  - local vegetation surveys
  - LiDAR/IfSAR data
  - SSURGO, STATSGO
  - surficial geology mapping
- Modeling using CART tools
- Pre and post mapping field investigation



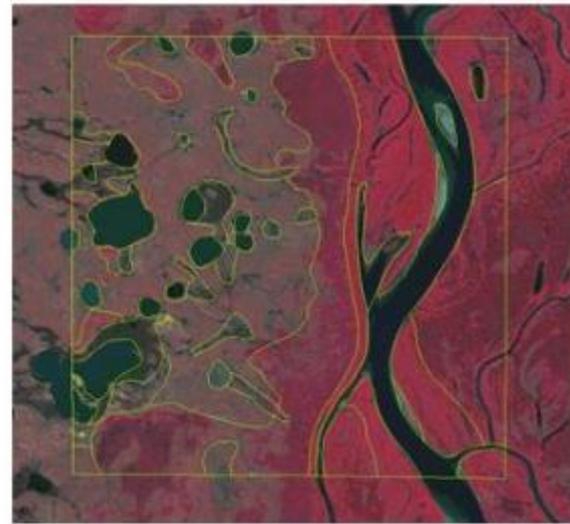


Hazen Bay – North Study Area  
Wetland Mapping Sample





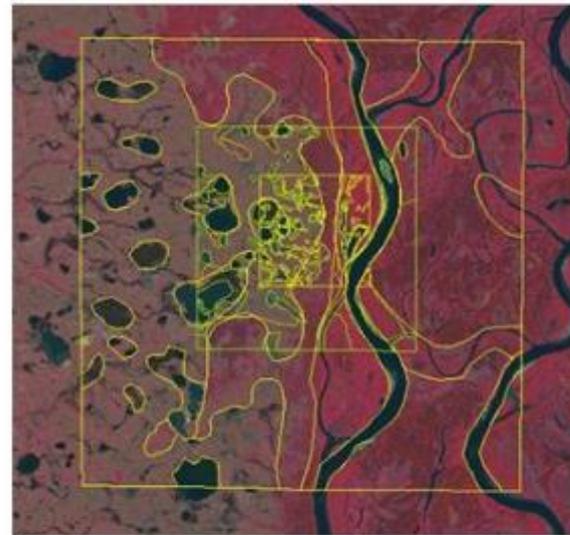
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Combined

# New Mexico Wetland Jewels



# What are Wetland Jewels?



- Comprised of either a single wetland or a complex of several wetlands occurring in a discrete geographic area.
- Provide several important ecological functions to the terrestrial and aquatic landscape as well as to downstream communities.
- A tool to build ecological and community resilience in the face of climate change.

# Why Protect Wetland Jewels?

Wetland Jewels are a keystone element of action to foster resilient, interconnected, landscape-scale ecological and community systems.

- maintain stream flow essential for irrigation and wildlife
- create habitat for wildlife
- provide clean water for downstream communities
- mitigate the risk of flooding
- Reduce climate impacts – drought, earlier runoff, wildfire



# Why Protect Wetland Jewels?

They are the sponges of our watersheds. They store and release clean cool water over time to nourish our forests and downstream ecosystems and communities.

Acequias: An acequia is a man made irrigation ditch that brings water from a river or stream to a parcel of land through earthen and sometimes concrete culverts.



# Identifying Wetland Jewels

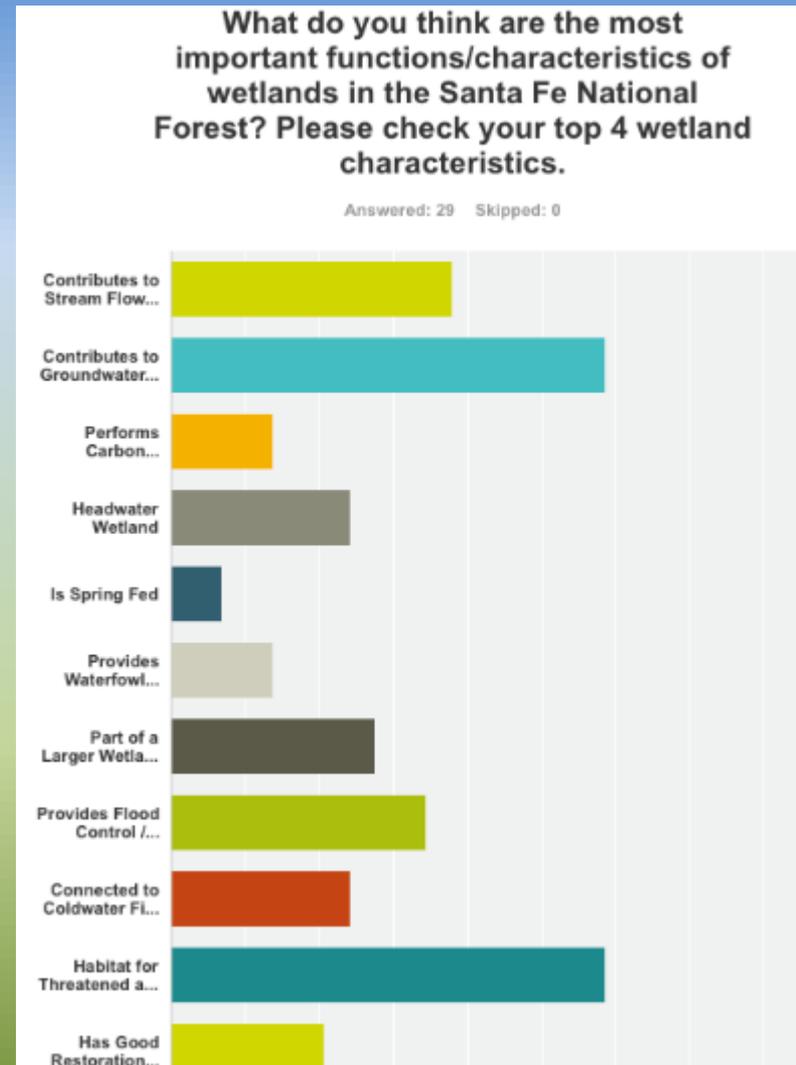
- First Step: setting the project area.
  - Carson and Santa Fe National Forests undergoing Forest Plan Revisions - only happens every 30 years.
  - Project area – lands within the two National Forests.
- Second Step: stakeholder engagement to determine priority ecological wetland functions.



# Stakeholder Engagement

Facilitated stakeholder engagement meetings and outreach:

- Discussions and educational materials used to ensure understanding
- A Dot-Voting approach was used to gain consensus
- Online Survey Monkey was shared over social media
- Results were tallied and presented for final consensus



# Stakeholder Engagement

Final Priority Functions Included:

- Contributes to Streamflow
- Groundwater Recharge
- Fish and Aquatic Invertebrate Habitat
- Threatened and Endangered Species
- Surface Water Detention
- Waterfowl Habitat
- Beaver Habitat Headwater
- Restoration Potential
- Carbon Sequestration
- Headwater



# Forest Planning

- Prioritize maintenance and restoration action.
- Prohibit activities (motorized recreation, mining, new roads, transmission lines)
- Prioritize reclamation of non-system roads/trails
- Evaluate the suitability of livestock grazing and identify opportunities to leverage Wetland Jewel protections to improve rangeland health and productivity.
- Develop, implement, and enforce amplified standards and guidelines.



# Restoration/Stakeholder Engagement

- The Wetland Jewels Project has provided a good framework for obtaining restoration funding.
- Numerous volunteer restoration projects have already occurred







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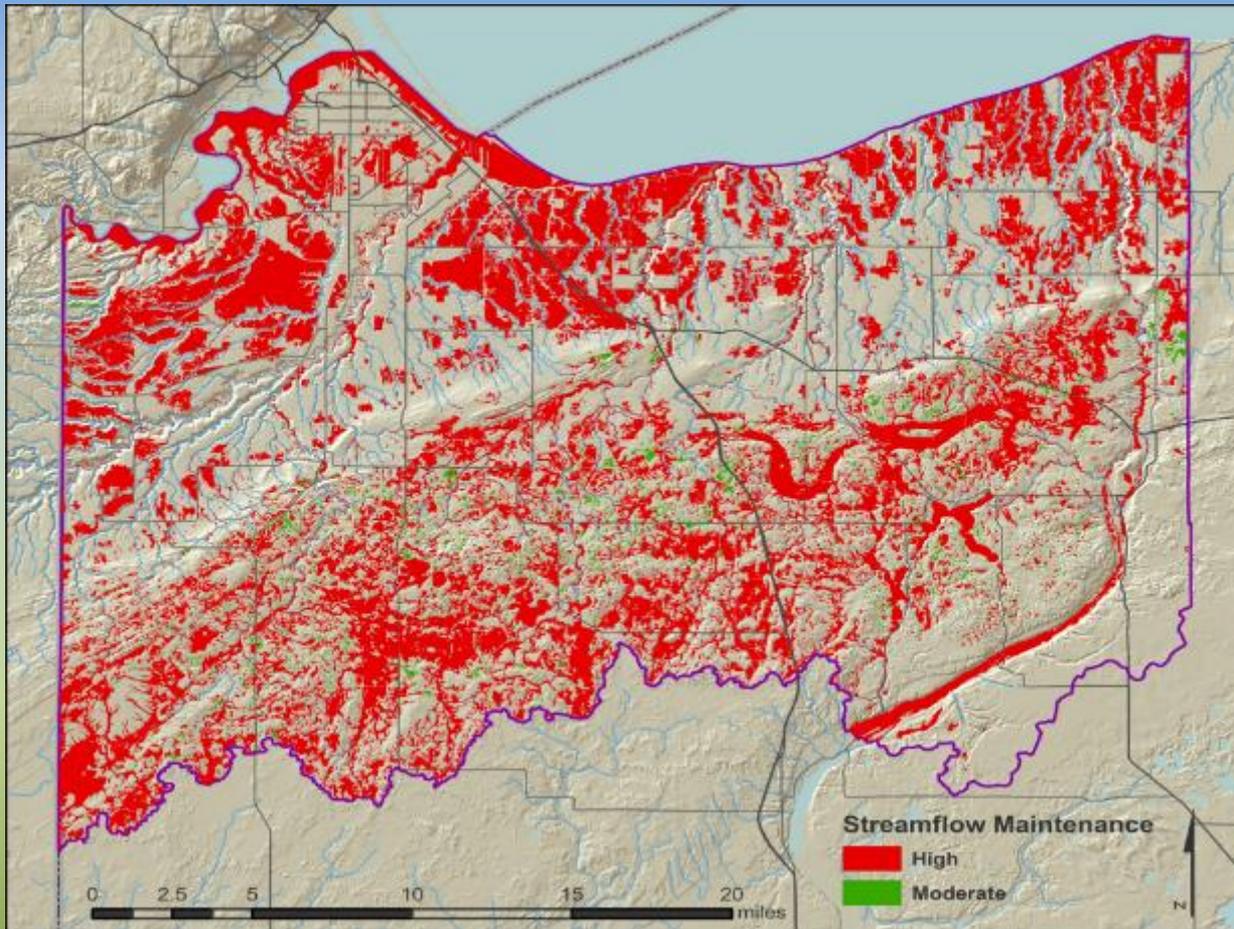
# Wisconsin – Flood Attenuation



‘Slow The Flow’ in Lake Superior’s South Shore Watersheds:

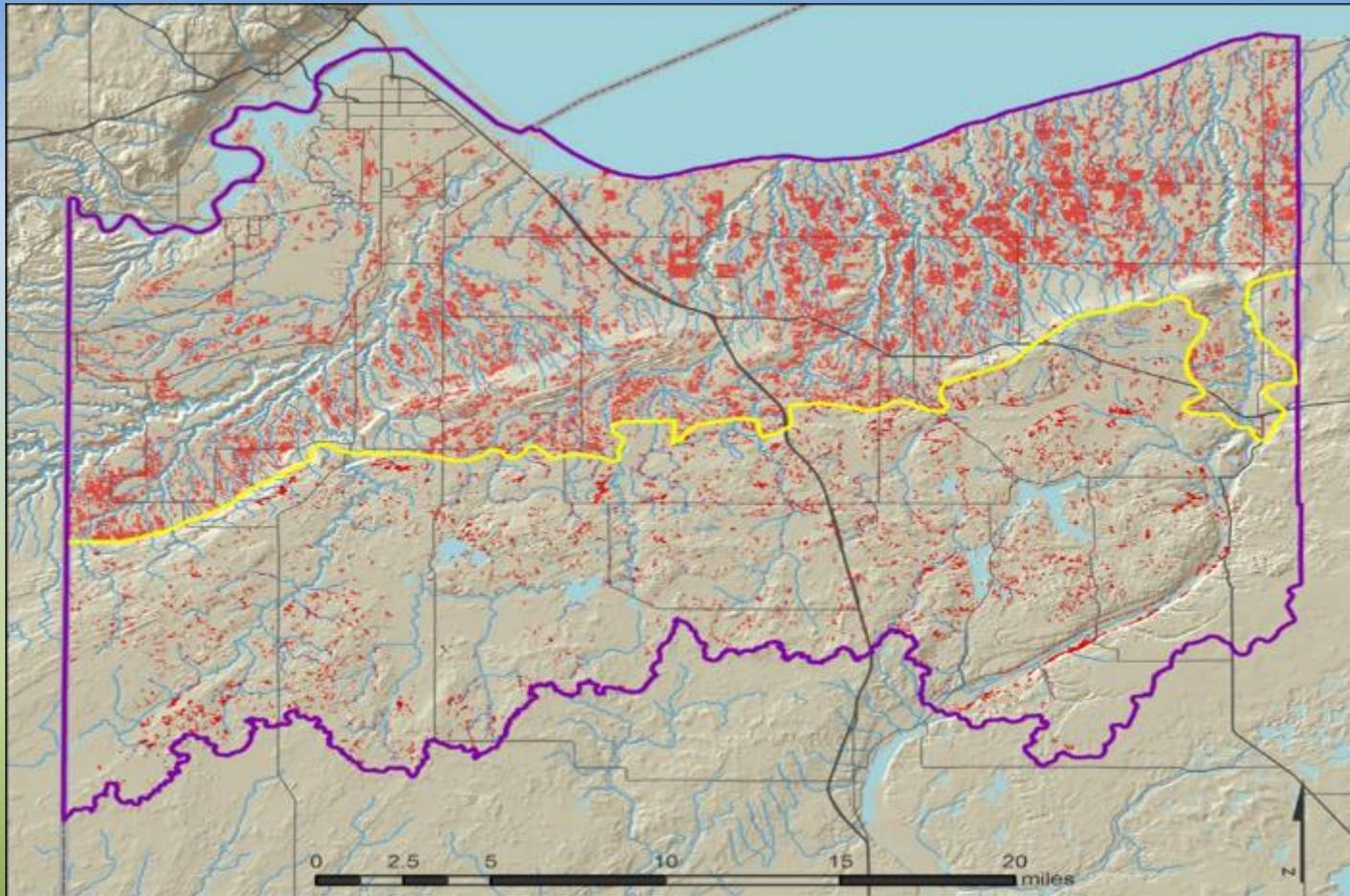
- Clay-rich glacio-lacustrine soils along the current coast
- Transitions to sand and gravel dominated soils inland
- Steep topographic transition from clay plain to coarse sediment uplands
- Increase in peak discharge due to wetland loss, deforestation, agriculture and stream incision

# Create Enhanced Wetland Inventory



- National Wetland Inventory (Cowardin)
- Hydrogeomorphic Metrics (LLWW)
- Wetland Functional Correlation (WFA)
- MMU of  $\frac{1}{4}$  acre

# Identify Potentially Restorable Wetlands

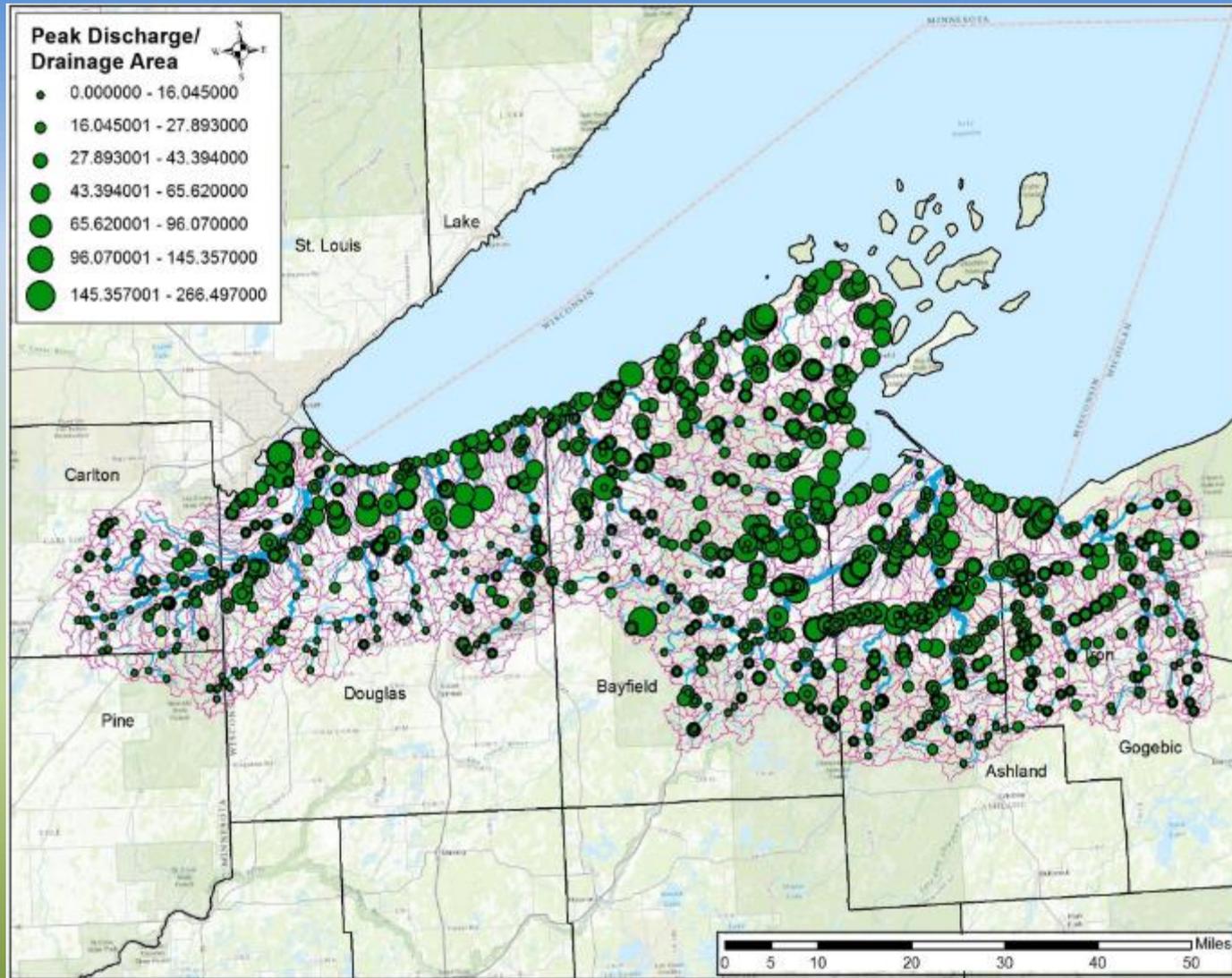


- SSURGO
- CTI
- POE
- Hydro

# Map Hydrologic Connectivity



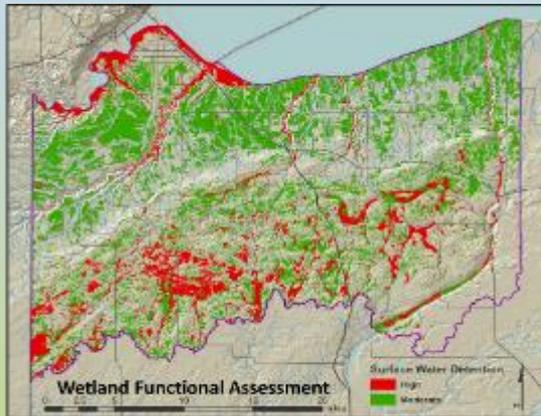
# Calculate Peak Discharge by Watershed



# Turning Science into Practice

## Proposed Management Actions:

- Increase watershed storage through wetland restoration
- Improve in-channel and upland surface roughness
- Implement agricultural BMP's... crop diversity, contour tillage, livestock
- Establish Riparian Management Zones
- Establish and maintain percent open land targets in 'flashiest' watersheds



Above: Distribution of PRWs that can provide flood attenuation functions in Douglas Co. Analysis and image provided by St. Mary's Geospatial Services.

For example, work with landowners not managing for row crops to identify opportunities for conversion to wetlands or forest cover





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# Questions

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