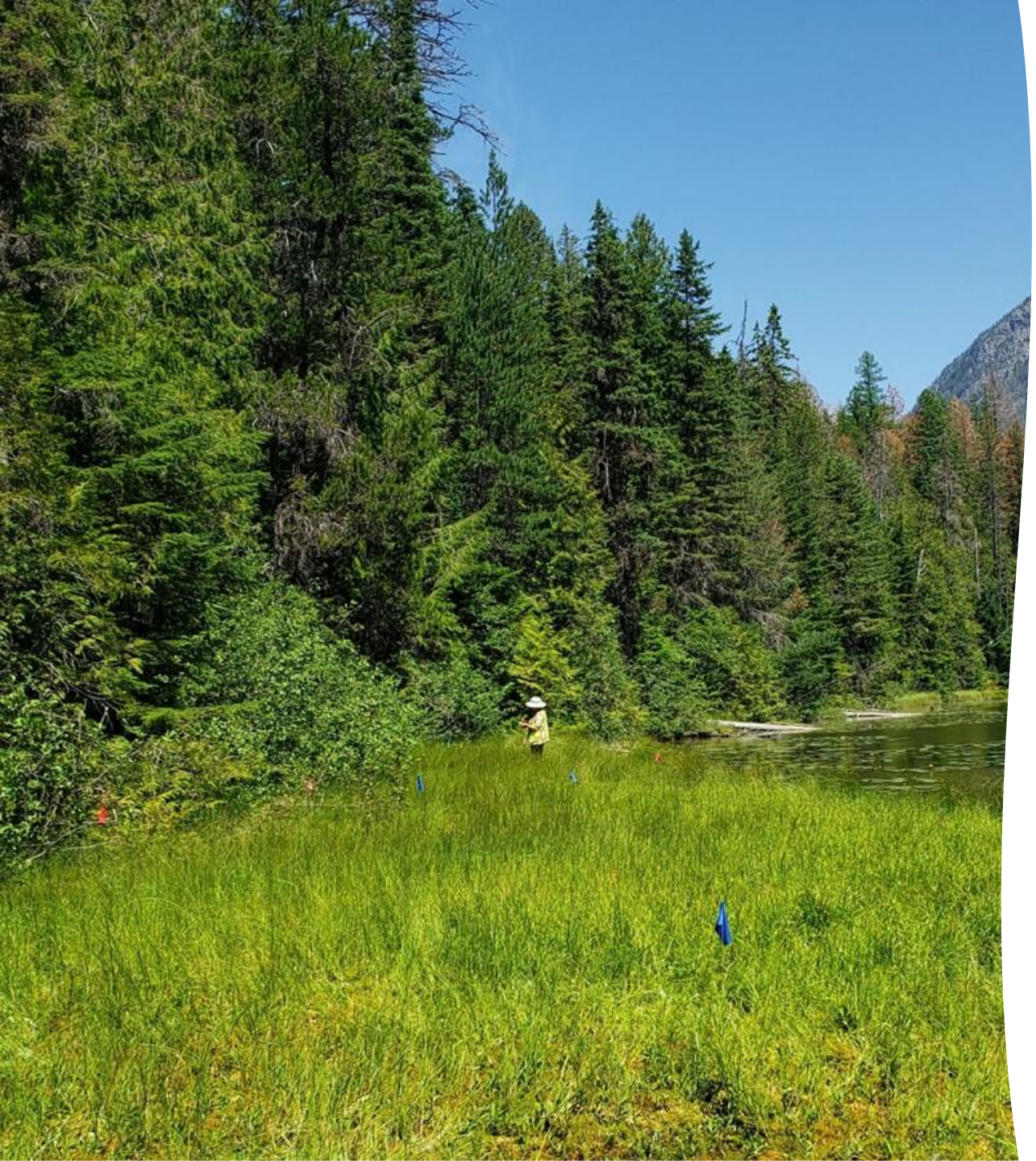
Results/Perspectives from the National Wetland Condition Assessment: The Third Collaborative Survey of Wetlands in the United States

NAWM Hot Topics Webinar Series

3/25/2025

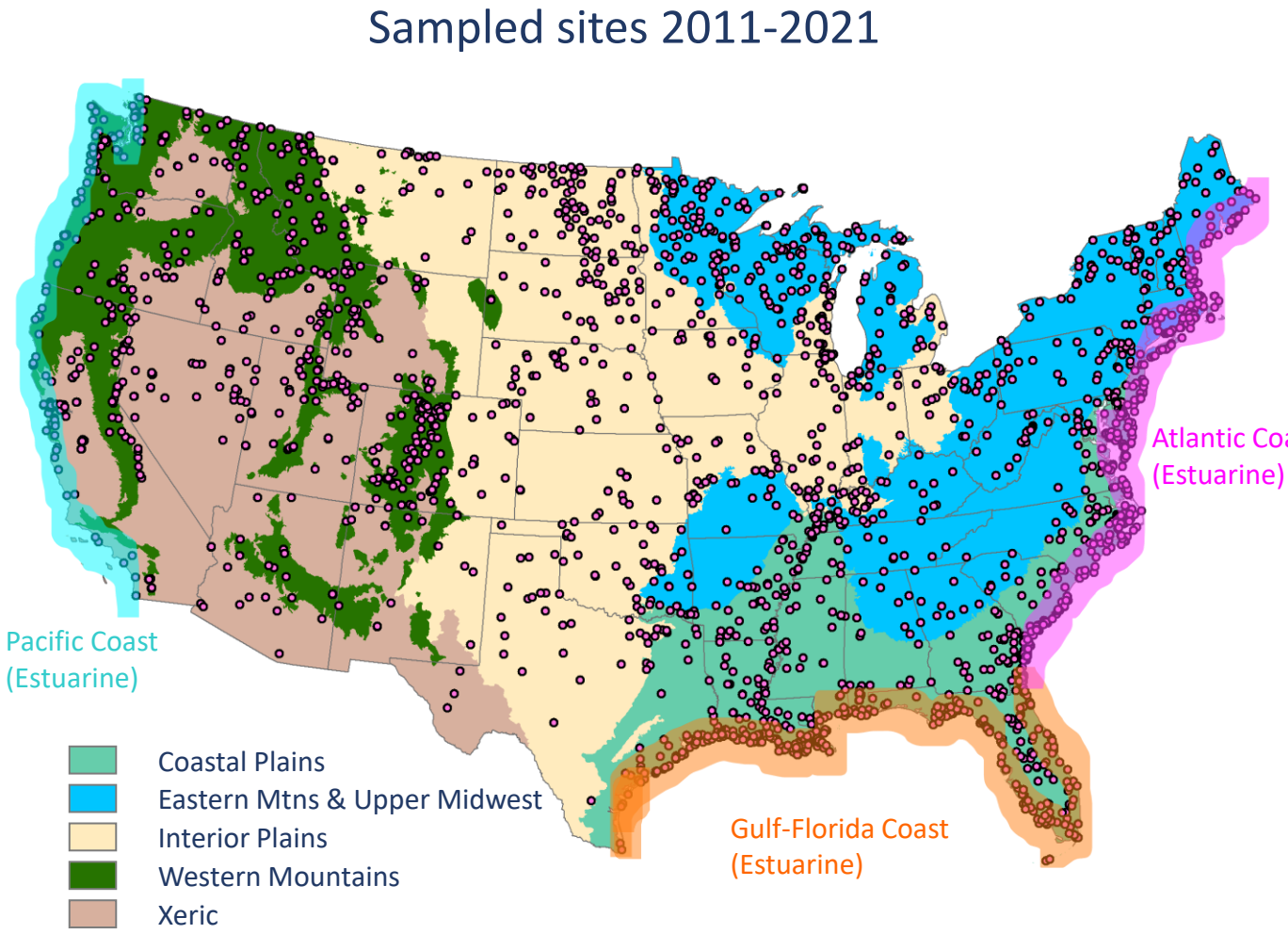


Overview of NWCA

- Statistical survey to assess and report on condition of U.S. wetlands
- Collaboration between USEPA and State and Tribal water quality and wetland agencies
- Surveys conducted every 5 years
  - 2011, 2016, 2021
- One of 4 companion surveys under USEPA's National Aquatic Resource Survey (NARS)
- Supports USEPA, State and Tribal responsibilities under Clean Water Act

Survey Components

- 1,000 sites sampled across conterminous U.S. each survey cycle
- Statistical design allows extrapolation of results to entire population of interest
- NWCA Target Population: Tidal and nontidal wetlands with rooted vegetation and, when present, shallow open water < 1m deep
- National Wetland Inventory (US FWS) maps used to identify sampling locations



Vegetation

- Presence and cover of each vascular plant species
- Cover of all vascular species by strata
- Cover of bryophytes, lichens, and algae
- Tree counts, cover, and snags
- Ground cover (water, bare ground, litter, woody debris)

Soil

- Morphology (color, texture, redox features)
- Depth to water table
- Hydric soil field indicators
- Chemical analysis
  - Metals
  - Carbon
  - Nutrients

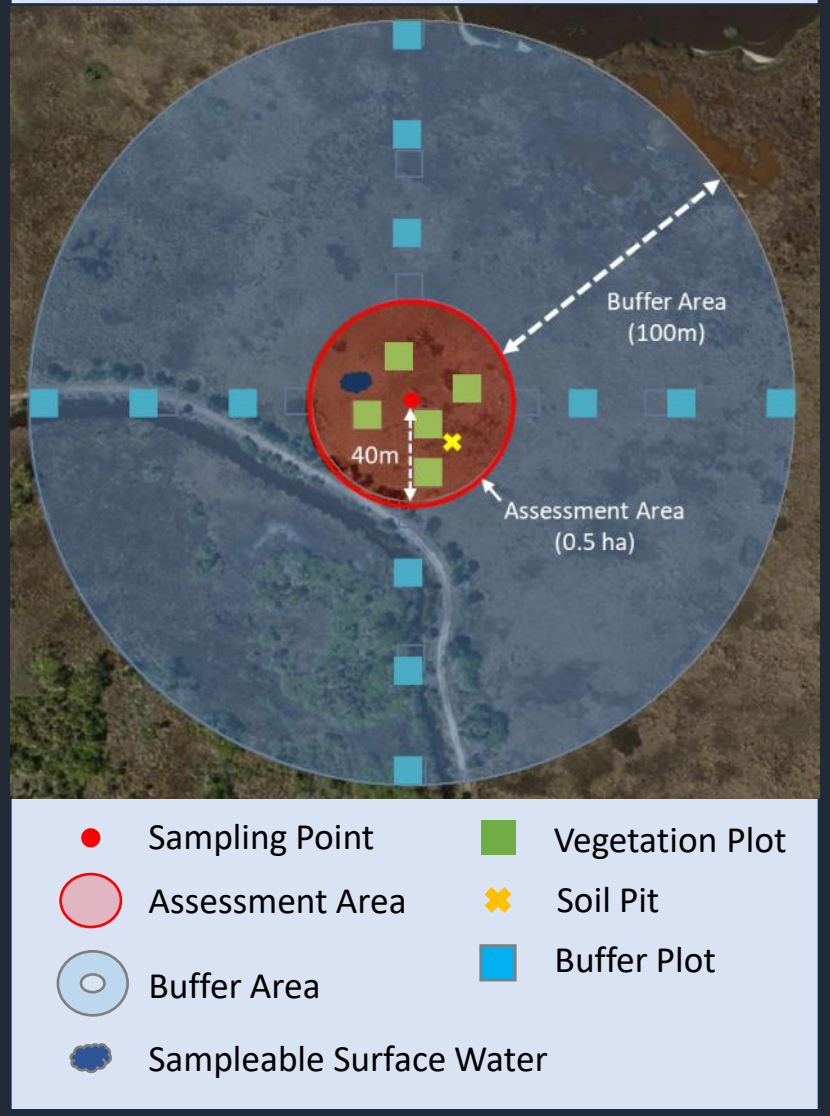
Disturbance

- Presence, severity of physical alterations
- Assessed inside core assessment area and 100m area outside

Hydrology

- Water sources
- Hydrology indicators (USACOE)
- Chemical analysis
  - Nutrients
  - Microcystin

Standard Sampling Layout

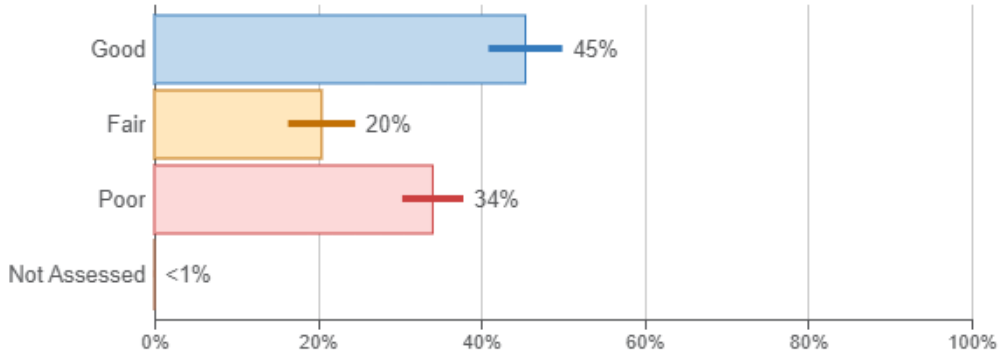


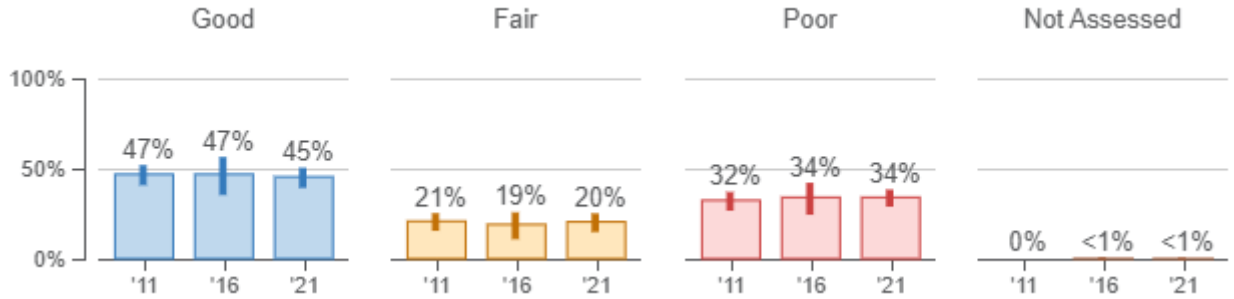
NWCA Indicators

Category	Indicator	Data	Benchmark	21 Est	Change	Notes
BIO	Vegetation	Field/ancillary	NWCA reference	y	11-21	
BIO	Nonnative Plants	Field/ancillary	Fixed-BPJ	y	11-21	
PHYS	Vegetation removal	Field	Fixed-BPJ	y	--	Protocol change in 21
PHYS	Vegetation replacement	Field	Fixed-BPJ	y	--	Protocol change in 21
PHYS	Flow Obstruction	Field	Fixed-BPJ	y	--	Protocol change in 21
PHYS	Water addition-subtraction	Field	Fixed-BPJ	y	--	Protocol change in 21
PHYS	Soil hardening	Field	Fixed-BPJ	y	--	Protocol change in 21
PHYS	Surface modification	Field	Fixed-BPJ	y	--	Protocol change in 21
PHYS	Physical alterations sum	Field	Fixed-BPJ	y	--	Protocol change in 21
CHEM	WQ Nitrogen	Lab	NWCA reference	y	16-21	Protocol change in 16
CHEM	WQ Phosphorus	Lab	NWCA reference	y	16-21	Protocol change in 16
CHEM	Soil Heavy Metals	Lab	NWCA reference	--	--	Data delay
HHEALTH	Microcystin	Lab	Fixed-EPA std	y	16-21	Protocol change in 16

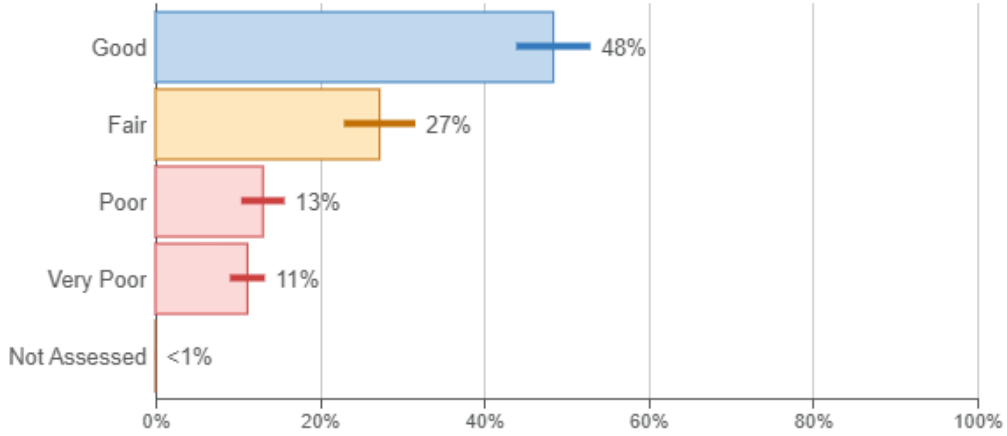
National Results - Biological Indicators

Vegetation Indicator (% wetland area)

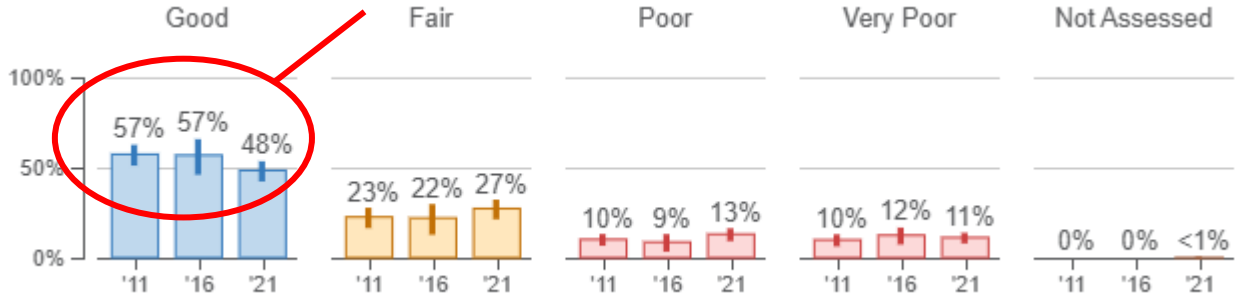




Nonnative Plant Indicator (% wetland area)



9 percentage point change 2011-2021

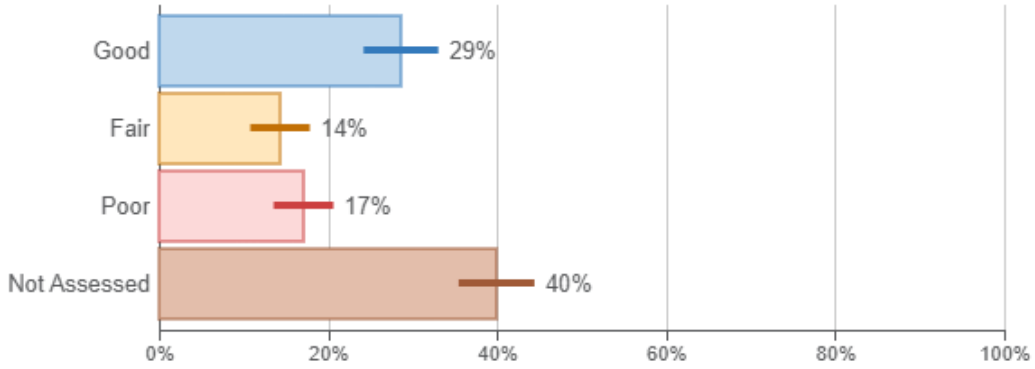


Bar represents the point estimate for each condition category

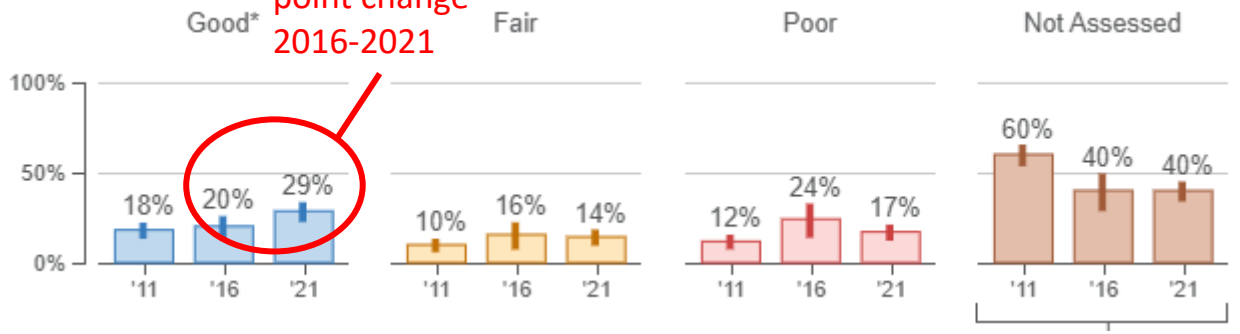
Dark line represents the confidence interval, or margin of error around the point estimate

National Results - Chemical Indicators

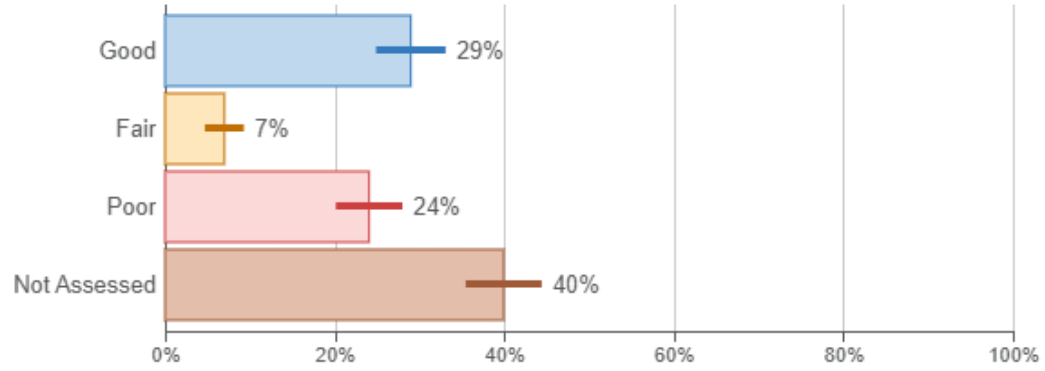
WQ Nitrogen Indicator (% wetland area)

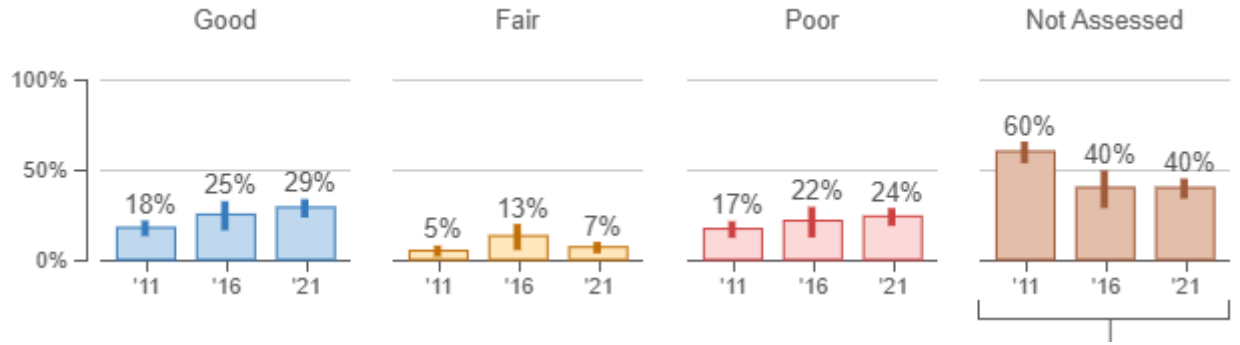


9 percentage point change 2016-2021



WQ Phosphorus Indicator (% wetland area)





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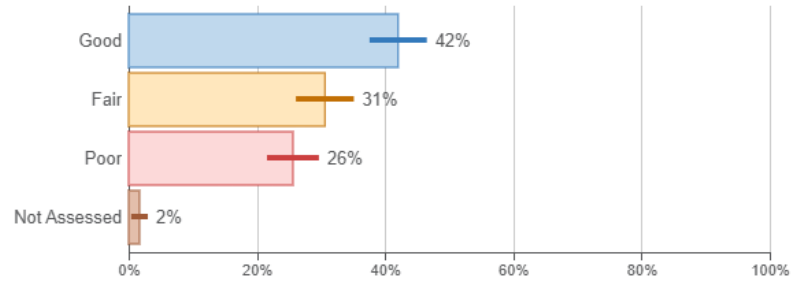
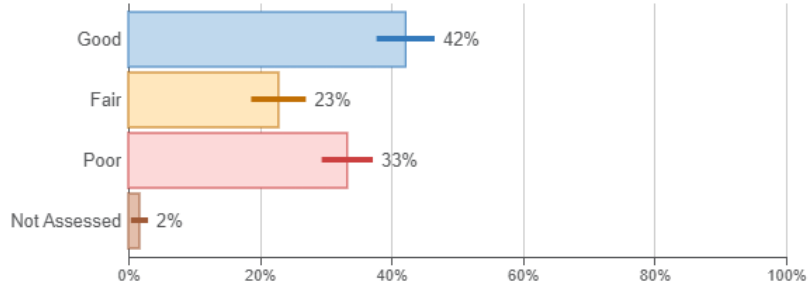
National Results - Physical Indicators

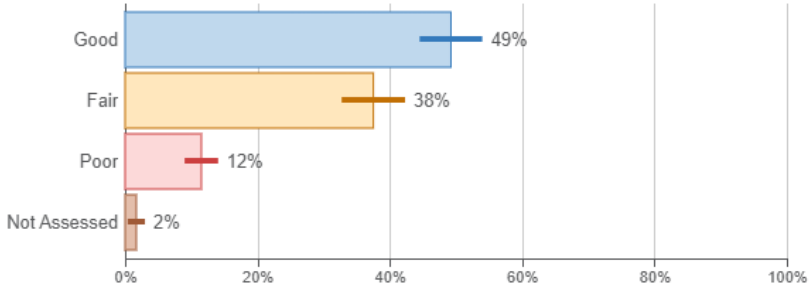
Veg Removal Indicator (% area)



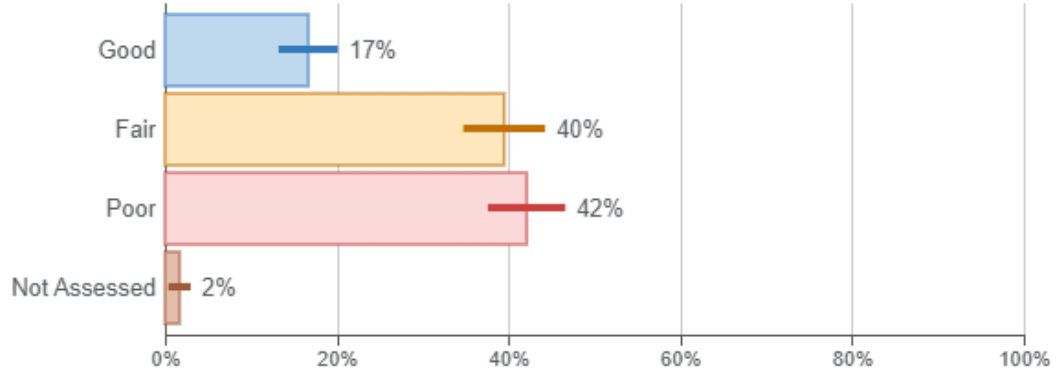
Veg Replacement Indicator (% area)



Soil Hardening Indicator (% area)



Physical Alterations (Sum) Indicator (% wetland



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Dark line represents the confidence interval, or margin of error around the point estimate

Estimated Risk to Biota Associated with Stressors

In Relation to: Vegetation | National (All Wetlands)

Communicating Findings

Web Report

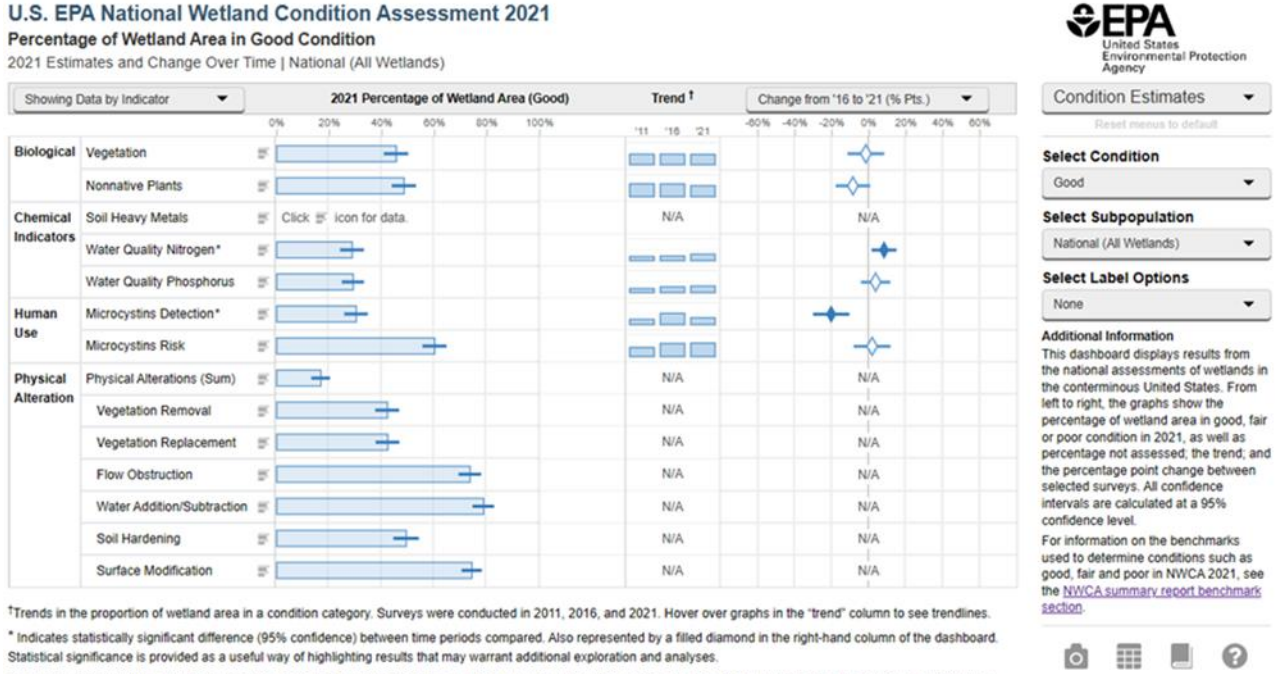
National Wetland Condition Assessment 2021

Introduction
- Key Findings 2021
- Key Findings on Change
- NWCA Dashboard
- Find Out More

Introduction

Healthy wetlands enhance our quality of life and provide many critical services and recreational opportunities. Wetlands are among the most productive ecosystems in the world, home to an immense variety of fish and wildlife. They trap pollutants, store carbon and buffer our shorelines from waves. To learn more about EPA activities to protect and restore these vital resources, visit the EPA wetlands page.

Data Dashboard



†Trends in the proportion of wetland area in a condition category. Surveys were conducted in 2011, 2016, and 2021. Hover over graphs in the "trend" column to see trendlines.

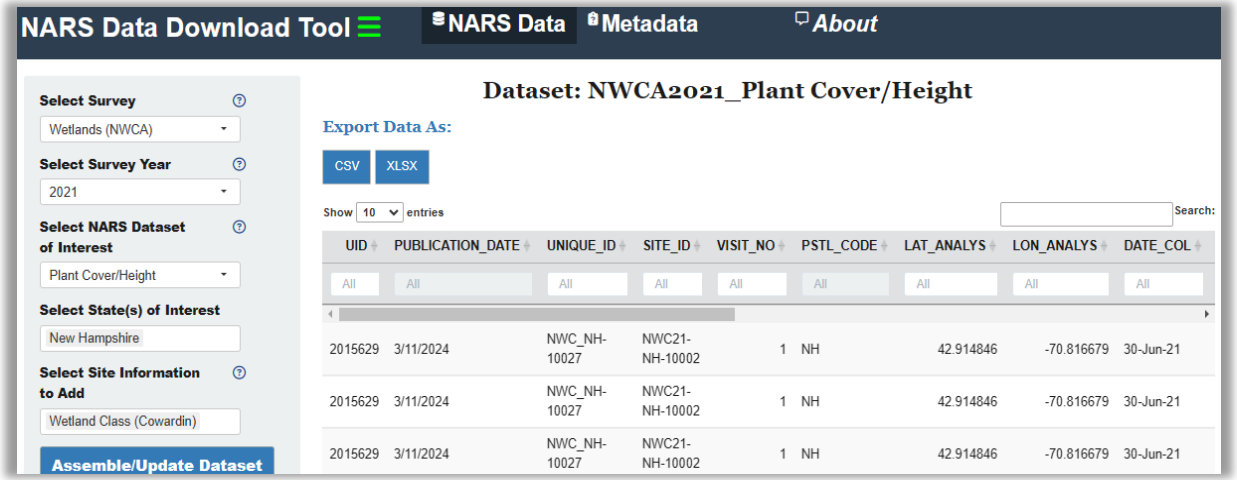
* Indicates statistically significant difference (95% confidence) between time periods compared. Also represented by a filled diamond in the right-hand column of the dashboard. Statistical significance is provided as a useful way of highlighting results that may warrant additional exploration and analyses.

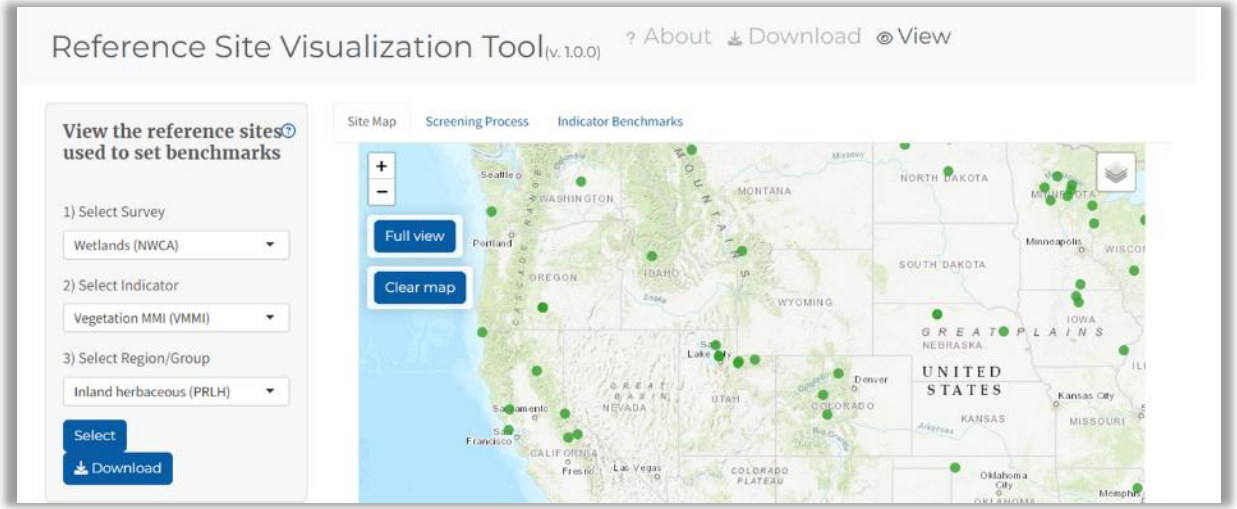
Data Interpretation Notes: (1) Values presented in tooltips and data labels are rounded. For unrounded data, please click the data-download icon in the lower right. (2) "N/A" in dashboard views indicates that data are not available. This summary explains the various reasons that data may not be available. (3) The EPA did not report results for change between two time periods (and is instead displaying "NR") when the percentage of wetland area that was not assessed increased or decreased by more than 5 percentage points. When these change estimates are not reported, trend is also not reported. This limits the likelihood of erroneous interpretation (discussed further in this document). For transparency, the dashboard in these cases still provides results for individual years, but users are cautioned to consider the effect of the not assessed data when interpreting changes in any condition category. (4) To learn more about NWCA 2021, read EPA's summary report. For detailed methodological information, see EPA's technical support document.

Recommended Citation: U.S. Environmental Protection Agency (USEPA). 2024. *National Wetland Condition Assessment 2021: The Third Collaborative Survey.* Interactive NWCA Dashboard. https://wetlandassessment.epa.gov/dashboard. Accessed on 9/24/2024. Last modified on 09/13/2024 10:32:16.

Tools to report, explore, visualize NWCA data

- NARS tools
  - NARS Data Download Tool
  - NARS Reference Site Visualization Tool
  - NARS Population Estimate Calculation Tool
- NWCA tools in development
  - **Observed plant viewer**
  - Soil data explorer





https://www.epa.gov/national-aquatic-resource-surveys/tools-related-national-aquatic-resource-surveys

NWCA Observed Plant Viewer – Live Soon!

~/R WORK/WetlandPlant_SearchTool_demo - Shiny

http://127.0.0.1:5366 | Open in Browser

Select a plant species:

ACER RUBRUM

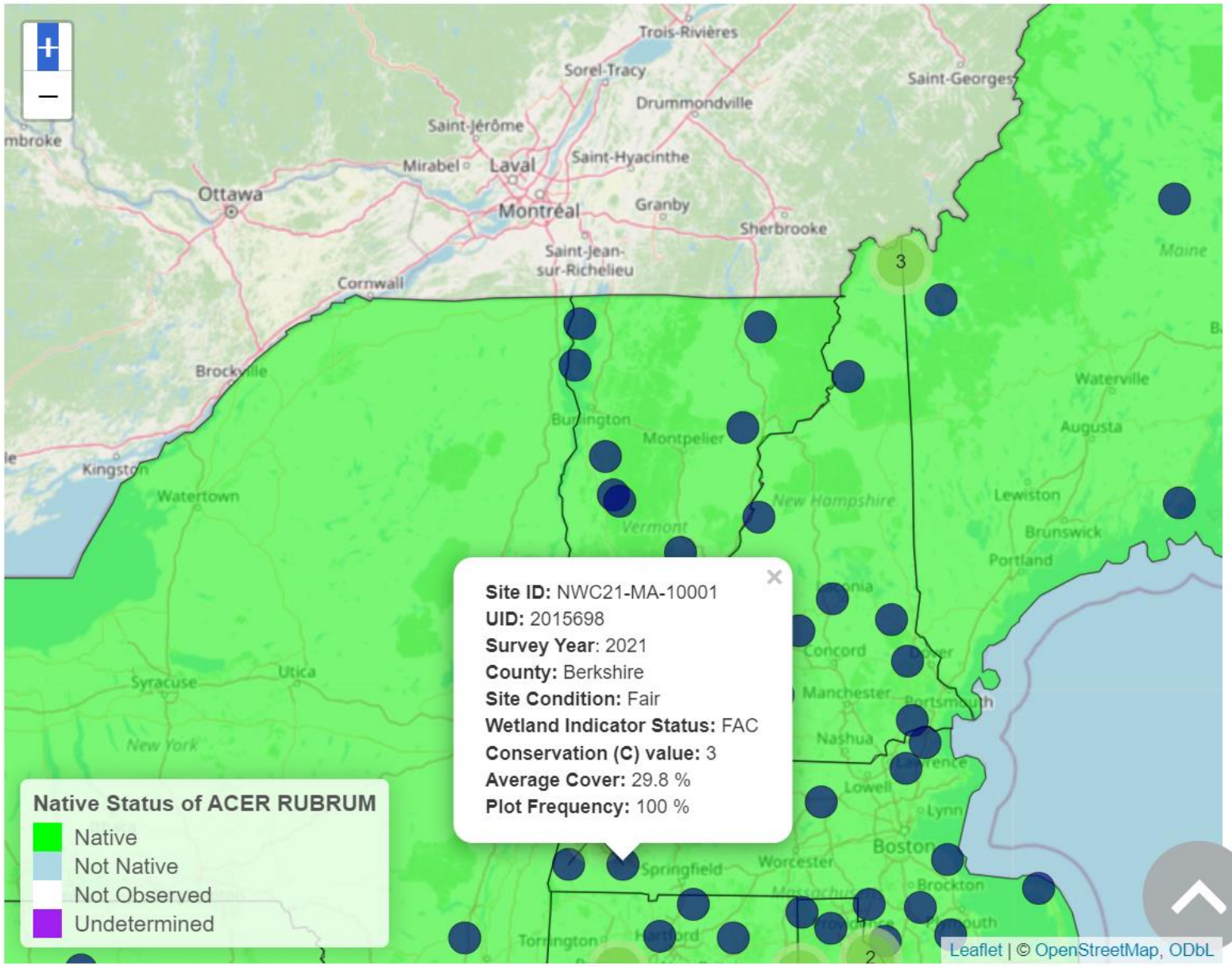
Common name: RED MAPLE

USDA Plant Profile

Percentage of sites with physical alteration disturbance:

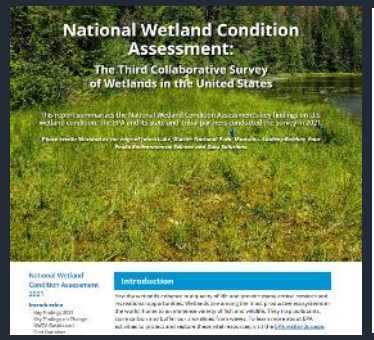
21% Low	**47%** Moderate
32% High	**0%** Not Assessed

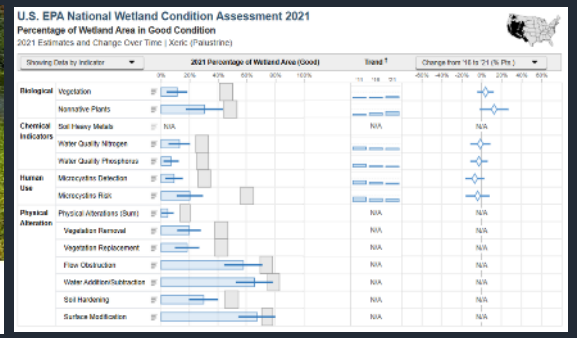
Wetland types where ACER RUBRUM is found:

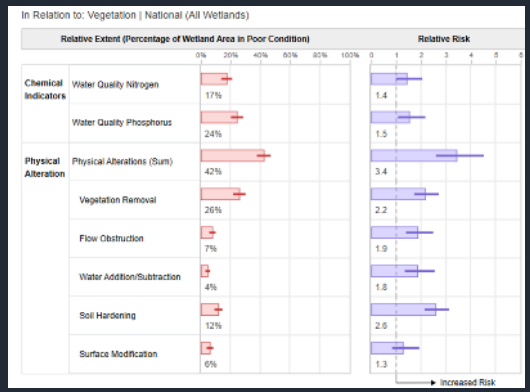


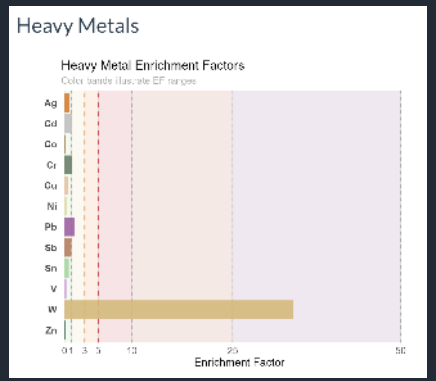
NWCA Accomplishments

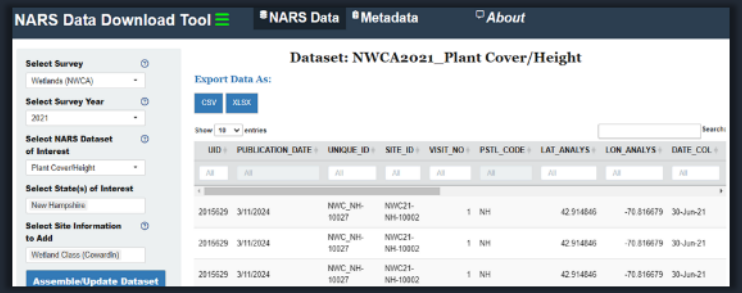
- National and regional scale estimates of wetland condition
  - 3 time series (2011, 2016, 2021); 4th on the way (2026)
  - Change and trends over time
- Development of indicators of condition/stress
  - Vegetation MMI, nitrogen/phosphorus, heavy metals
  - Benchmarks for categorization
- Quantification of stressor/condition relationships
  - Relative and attributable risk
- Wetland characterization data
  - Biological, physical and chemical data for ~3,000 sites
  - Ranges across geographies and disturbance regimes
    - Background levels of heavy metals
    - Carbon storage estimates
  - Presence of plant species of interest (rare, TES, nonnative)
- Tools to compile, assess and visualize data
  - Data dashboards
  - R Shiny applications











NWCA Website

Results, data and information on survey design, indicators, and methods available at:

https://www.epa.gov/national-aquatic-resource-surveys/nwca

Survey contact:

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Acknowledgements

- State and Tribal Agencies
- Federal Agencies
  - USDA Natural Resources Conservation Service
  - U.S. Fish and Wildlife Service
  - National Park Service
- Other collaborators
  - Contractors
  - Academic institutions
- Colleagues in EPA Office of Water, EPA Office of Research and Development, and EPA Regional Offices

Alabama Department of Environmental Management
Arizona Department of Environmental Quality
California State Water Resources Control Board
Colorado Natural Heritage Program
Confederated Tribes of the Colville Reservation
Confederated Tribes of the Umatilla Indian Reservation
Confederation of Northern Mariana Islands Bur. of Env. and Coastal Quality
Delaware Department of Natural Resources and Environmental Control
District of Columbia Department of Energy and Environment
Florida Department of Environmental Protection
Georgia Department of Natural Resources, Env. Protection Division
Guam Environmental Protection Agency
Idaho Department of Environmental Quality
Illinois Environmental Protection Agency
Illinois Natural History Survey
Indiana Department of Environmental Management
Iowa Department of Natural Resources
Kansas Department of Health and the Environment
Kansas Water Office
Kentucky Division of Water
Leech Lake Band of Ojibwe, Division of Resource Management
Louisiana Department of Wildlife and Fisheries
Maine Department of Environmental Protection
Maine Natural Areas Program
Maryland Department of the Environment
Massachusetts Department of Environmental Protection
Michigan Department of Environment, Great Lakes and Energy
Minnesota Pollution Control Agency
Missouri Department of Natural Resources
Montana Natural Heritage Program
Navajo Environmental Protection Agency
Nebraska Game and Parks Commission
Nevada Division of Environmental Protection
New Hampshire Department of Environmental Services
New Jersey Department of Environmental Protection
New Mexico Environmental Department
New Mexico Natural Heritage Program
New York Natural Heritage Program
North Carolina Department of Environmental Quality
North Dakota Department of Environmental Quality
Ohio Environmental Protection Agency
Oklahoma Conservation Commission
Oregon Department of Environmental Quality
Oregon Division of State Lands
Pennsylvania Department of Environmental Protection
Quinault Indian Nation
South Carolina Department of Health and Environment Control
Tennessee Department of Conservation and Environment
Texas Commission on Environmental Quality
Utah Department of Environmental Quality
Utah Geological Survey
Vermont Department of Environmental Conservation
Virginia Department of Environmental Quality
Washington Department of Ecology
Washington Natural Heritage Program
West Virginia Department of Environmental Protection
Wisconsin Department of Natural Resources
Wisconsin State Laboratory of Hygiene
Wyoming Department of Environmental Quality

National Park Service
U.S. Army Corps of Engineers
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. EPA Office of Research and Development
U.S. EPA Office of Water
U.S. EPA Regions 1-10
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey

Avanti
Burke Museum Herbarium
Coastal Environment
Crow Insight
Eastern Kentucky University
EnviroScience
ESS Group
Four Peaks Environmental Science and Data Solutions
General Dynamics Information Technology
Great Lakes Environmental Center
Midwest Biodiversity Institute
Moss Landing Marine Laboratories
New England Interstate Water Pollution Control Commission
North Dakota State University
Oregon State University
PG Environmental
Riparia at Pennsylvania State University
Southern California Coastal Water Research Project
University of Central Missouri
University of Florida
University of Houston-Clear Lake
University of Illinois
University of Montana
University of New Mexico
University of Wyoming
Virginia Institute of Marine Sciences