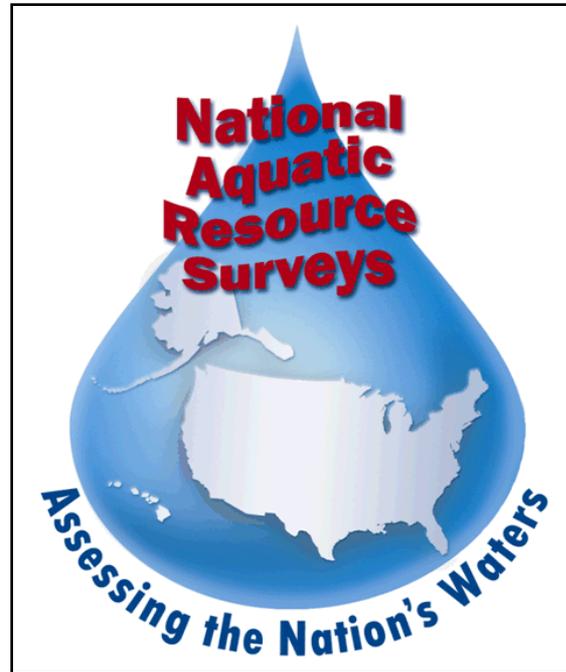


Using National Indicators to Assess Rivers, Streams, Lakes, Wetlands and Coastal Waters



National Aquatic
Resource Surveys
Team
U.S. EPA

Purpose of the National Aquatic Resource Surveys



- Assessing biological and recreational condition using indicators of condition and stress
- Documenting associations between indicators of condition and indicators of stress
- Building/enhancing state monitoring and assessment capacity



National Consistency: The NARS Approach

- Randomized design to report on condition of each resource (e.g., streams & rivers, lakes, etc.) both nationally and on a regional basis with documented confidence
 - 1,000 sites for national & regional scale reporting in lower 48
- Standard field and lab protocols
 - All indicators evaluated for credibility
 - Selected to address national and state-identified needs
- National QA and data management
- Nationally consistent and regionally relevant data interpretation and peer-reviewed reports

Types of Indicators

- **Core National Indicators** (waterbody specific) are expected to be measured in all past, current and future assessments.
 - Feasible for implementation at all national sites given time and resource constraints
- **Supplemental indicators** are used in short-term studies to address specific questions.
 - May be national or regional
- **Research Indicators** are used in studies of indicators that may become core in the future.
 - may focus on establishing whether existing measurement protocols for a core indicator can be modified or improved

What Do We Measure?

Survey Indicators: Example Indicators

- Biological
 - Macroinvertebrates
 - Plants
- Recreational
 - Pathogens
 - Fish Tissue
- Stressors
 - Nutrients
 - Excess Sediment



- Physical Habitat
 - Instream Habitat
 - Riparian Cover
- Other Measures
 - Watershed Characterizations
- Research
 - Sediment Enzymes
 - Chemicals of Emerging Concern

Indicator Selection Process

- Policy and Management Issues
 - Address three major issues:
 - Ecological
 - Recreation
 - Stressors water quality, physical habitat
 - Address multiple assessment and management questions
 - Describe baseline condition
 - Assess trends in condition
 - Diagnose stressors
 - Consider state/tribal capacity and information needs
 - Water quality criteria/assessments
 - Performance based methods for flexibility

Indicator - Selection Process

- Scientific Issues – overarching
 - Nationwide Applicability
 - Useful in Diverse Waterbody Classes
 - Sensitive to Human Disturbance
- Indicator Screening Tools/Performance Tests
 - Good range
 - Repeatability
 - Relationship to Natural Gradients
 - Responsiveness
 - Uniqueness (not redundant)



Other Key Considerations



- Field Constraints:
 - Limited time in the field- single field visit with all samples collected in one day for the majority of sites
 - Standardized methods: All trained field crews must be able to implement methods regardless of experience and region
- Lab Constraints:
 - Capacity for a labs to analysis samples with-in the turn around time



Major NARS Accomplishments

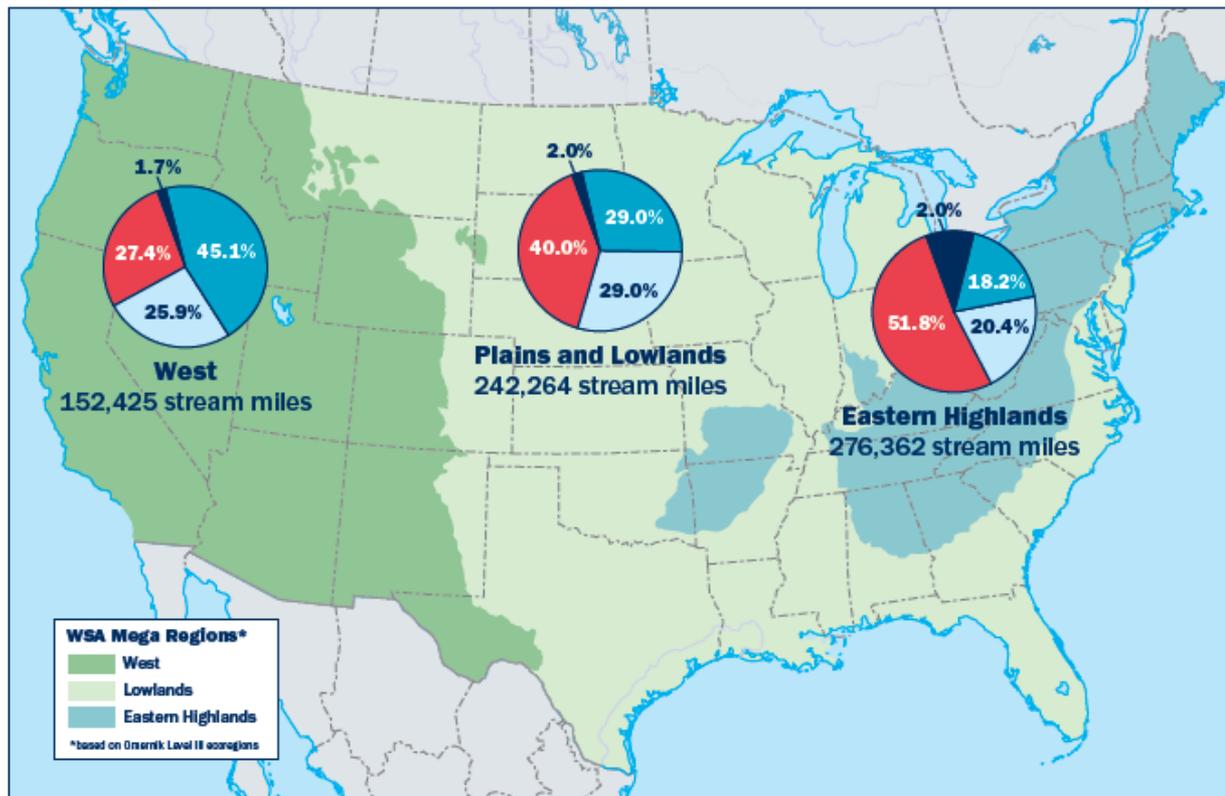
- Nationally consistent and scientifically defensible reports on:
 - Coastal waters (2001, 2005, 2008)
 - Wadeable streams (2006)
 - Lakes (2010)
- Linking results to policy issues
 - Nutrients in the Mississippi River Basin
 - Gulf of Mexico (including a baseline for some of they key oil-related constituents)
 - National Lake Assessment habitat findings
- Expanding monitoring to cover more waterbody types across the country; advancements in developing/refining methods
 - Rivers and Streams (training and sampling 2008 and 2009)
 - Wetlands (testing, training and sampling 2009 - 2011)



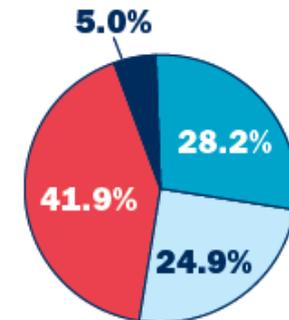
Wadeable Streams Assessment

Condition of the Resource

The most important stressors measured in streams are nutrients and excess sedimentation. Streams with these problems are 2 times more likely to have poor biology.



National Summary



Biological Condition of Wadeable Streams





Mississippi River Basin – Nutrients

Percentage of Streams with Nitrogen Exceeding NARS Regional Thresholds*



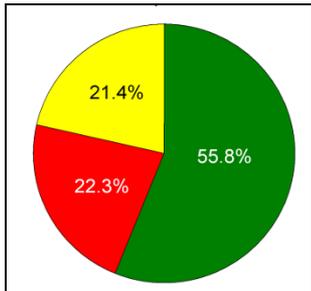
*Developed using OST guidance on developing reference-based nutrient criteria

Biological Condition of the Nation's Lakes

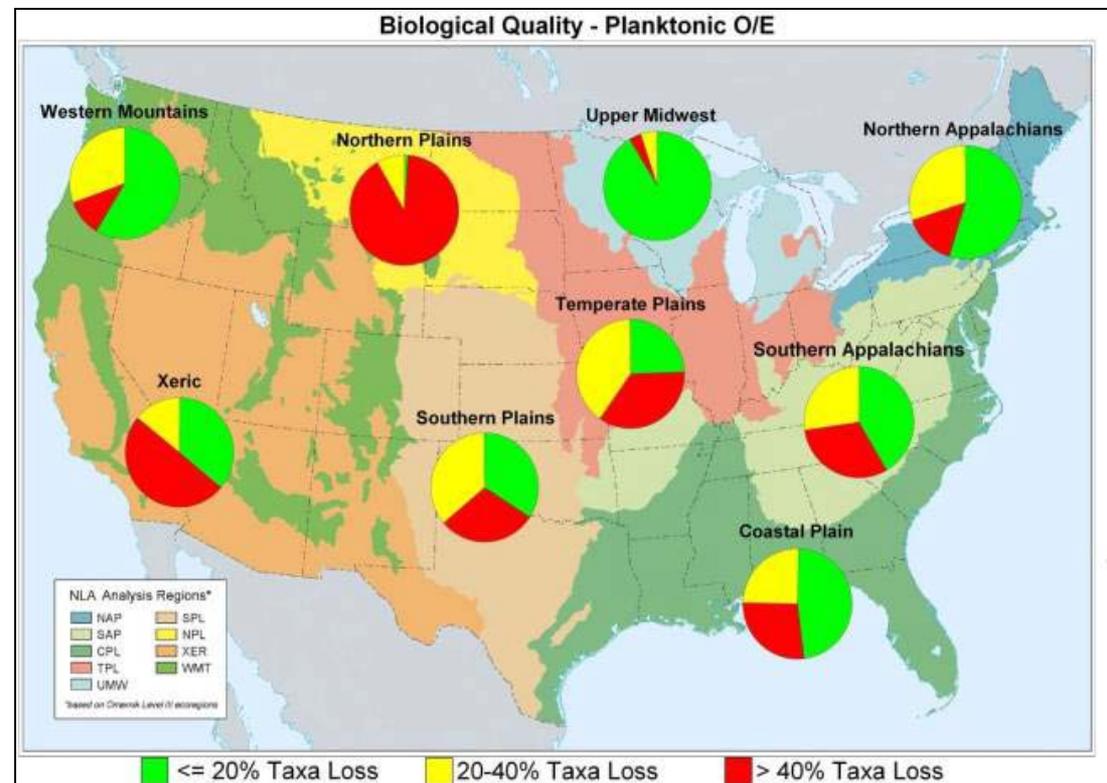
The most important stressors measured in lakes are poor lakeshore habitat and nutrients. Lakes with these problems are about 2.5 to 3 times more likely to have poor biology.

- **National Summary:**

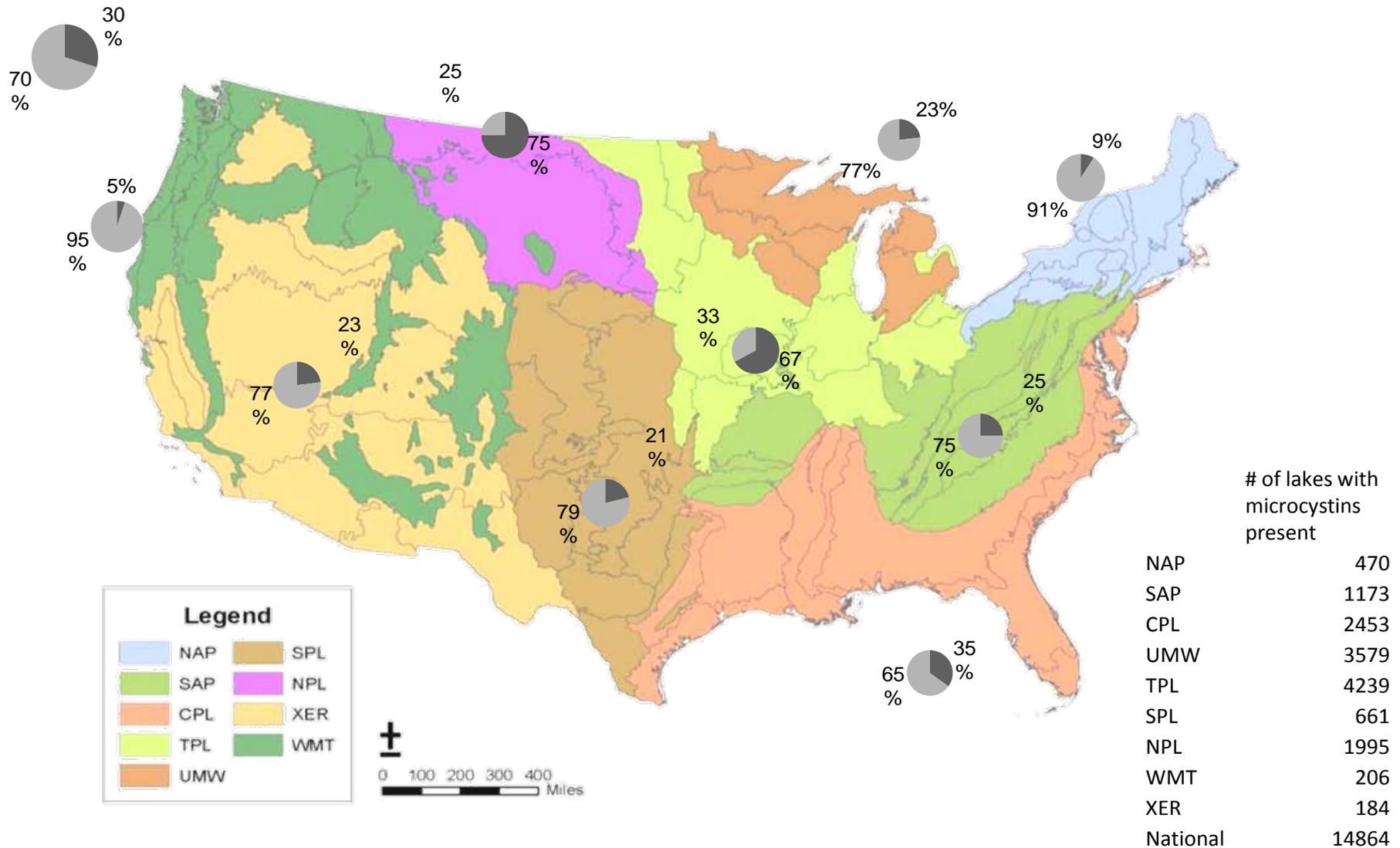
- 56% good
- 21% fair
- 17% poor



- **Assessment thresholds based on regionally explicit reference expectations.**



Impact of Excess Nutrients: 30% of lakes nationally have measurable microcystins present, EPA NARS.



*Lakes greater than 10 acres only

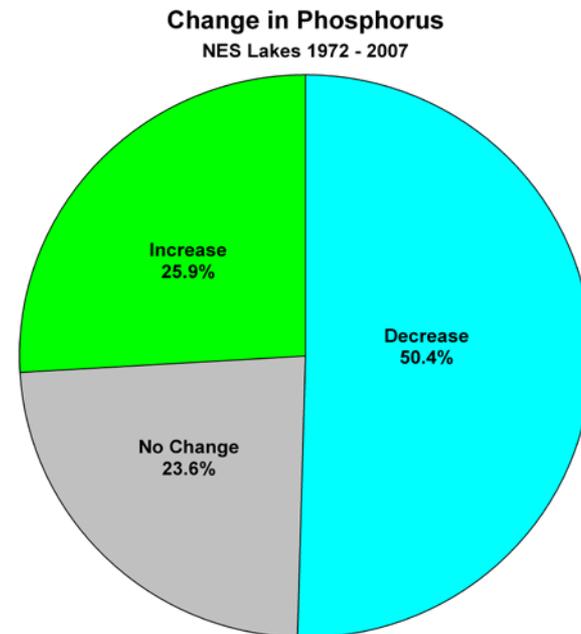
Trends: National Eutrophication Study and NLA

NES studied 800 wastewater-impacts
large recreational lakes

Subset of NES lakes revisited in NLA

Phosphorus Trends:

- 24% of lakes showed no change
- 50% of lakes showed decreased levels



Comparison of change in phosphorus
concentration of NES lakes

Status of the Surveys

- National Wetlands Conditions Assessment
 - In the field this summer
 - Field trainings in progress
- National Lakes Assessment
 - Planning for 2012 sampling
 - Completing several indicator reports from 2007
- National Rivers and Streams Assessment
 - Data analysis and reporting from 2008/2009
 - Report due in 2012
 - Initiating planning for 2013/2014 sampling
- National Coastal Condition Assessment
 - Completing lab work and QA/QC
 - Preparing for data analysis and reporting
 - Report due in 2012



National Aquatic Resource Survey Schedule

	2008	2009	2010	2011	2012	2013	2014
Rivers/ Streams	Field	Field	Lab/Data Analysis	Report	Research/ Design	Field	Field
Coastal	Research	Design	Field	Lab/Data Analysis	Report	Research	Design
Wetlands	Research	Research	Design	Field	Lab/Data Analysis	Report	Research
Lakes	Lab/Data Analysis	Report	Research	Design	Field	Lab/Data Analysis	Report

Thanks!

- EPA Headquarters Survey Team Leads
 - Ellen Tarquinio – National Rivers and Streams
 - Tarquinio.ellen@epa.gov
 - Amina Pollard – National Lakes Assessment
 - Pollard.amina@epa.gov
 - Michael Scozzafava – National Wetlands Condition Assessment
 - Scozzafava.michaele@epa.gov
 - Greg Colianni and Treda Grayson – National Coastal Condition Assessment
 - Colianni.gregory@epa.gov grayson.treda@epa.gov
 - NARS Website – including links to the Wadeable Streams and National Lakes datasets
 - www.epa.gov/aquaticsurveys