

National Aquatic Resource Surveys



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National Aquatic Resource Survey Background

- **Address key gaps cited by GAO and other independent reviews**
- **Report on the condition of the Nation's waters**
 - Statistical survey design to ensure unbiased representativeness
 - Meets CWA requirement to report on extent of CWA goals in partnership with States
- **Five water resource types**
 - Wadeable streams, non-wadeable streams, lakes, wetlands, & coastal estuaries on rotating schedule
- **Promote State and Tribal capacity for monitoring and assessment**
 - Opportunity for regional and state-scale surveys
 - New monitoring approaches and assessment tools

National Aquatic Resource Surveys

- Promote collaboration across jurisdictional boundaries
- Achieve a robust, statistically valid data set for better management of water resources
- Develop baseline information to evaluate progress

National Water Resource Survey Schedule

	FY09	FY10	FY11	FY12	FY13	FY14	FY15
Lakes	Report	Research	Design	Field	Lab	Report	Research
Rivers & Streams	Field	Lab	Lab	Report/ Design	Field	Field	Lab
Coastal	Design	Field	Lab	Report	Report	Design	Field
Wetlands	Research	Design	Field	Lab, Data	Report	Research	Design



National Lakes Assessment

*Water Quality, Recreational Suitability, and Ecological Integrity of
Lakes and Reservoirs*



National Lakes Assessment: Unprecedented Effort - 2007

- First-ever nationally consistent assessment of the nation's lakes and reservoirs
 - 1,028 unique lakes sampled, representing the condition of about 50,000 lakes nationwide
 - Consistent sampling and analysis procedures to ensure comparability of results across the country
 - Over ½ million data points analyzed
- Groundbreaking science – first-ever national assessment of
 - Biological condition
 - Trophic status
 - Microcystin
 - Habitat condition
- Comparable to 1972 National Eutrophication Survey to document trends

National Lakes Assessment – 2007

Selected Indicators

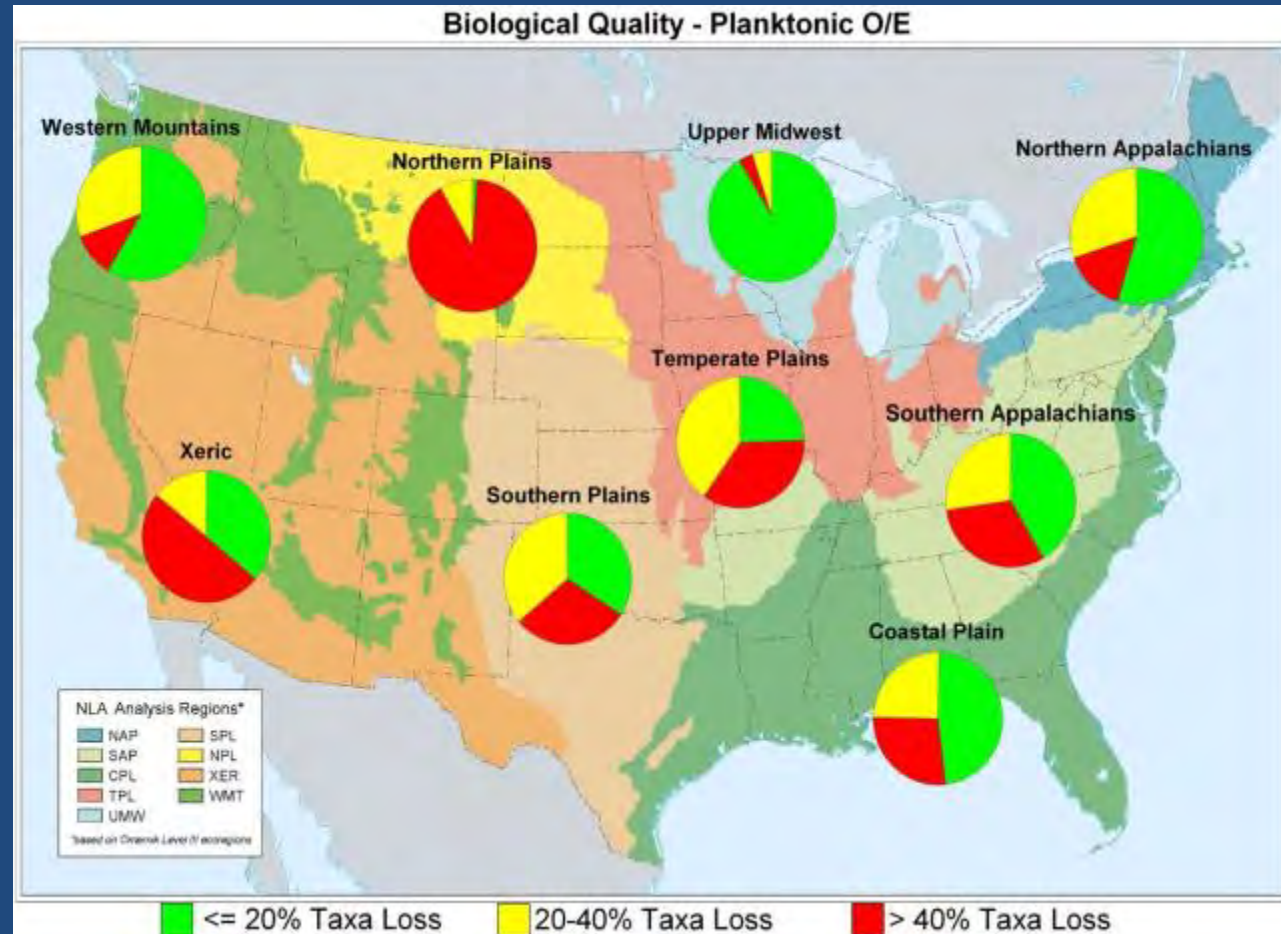
- Biological Integrity
 - Index of Taxa Loss
 - Index of Biotic Integrity
- Trophic State
- Recreational Use
 - Risk of cyanotoxin exposure
 - Occurrence of microcystin
 - Enterococci
 - Fish tissue (parallel study)
- Habitat Quality
 - Lakeshore Vegetation Cover
 - Littoral Quality
 - Human shoreline disturbance
- Chemical stressors
 - Water quality
 - Phosphorus
 - Nitrogen
 - DO, pH, Temperature, Conductivity
 - Sediment mercury

Key NLA 2007 Findings

- Condition of the nation's lakes
 - 56% support healthy biological communities
 - Microcystin detected in 30% of lakes; more than 25% of lakes pose moderate or high risk of exposure to algal toxins
 - Parallel study finds that 49% of the nation's lake have fish tissue mercury concentrations that exceed health based limits
- Key stressors affecting quality
 - 36% of lakes have poor shoreline habitat; 3 times more likely to have poor biology
 - 20% percent of lakes have high levels of nitrogen or phosphorus; 2 times more likely to have poor biology
- Trends of National Eutrophication Survey (NES) Lakes (1972→2007)
 - 50% of NES lakes showed decreases in phosphorus concentrations

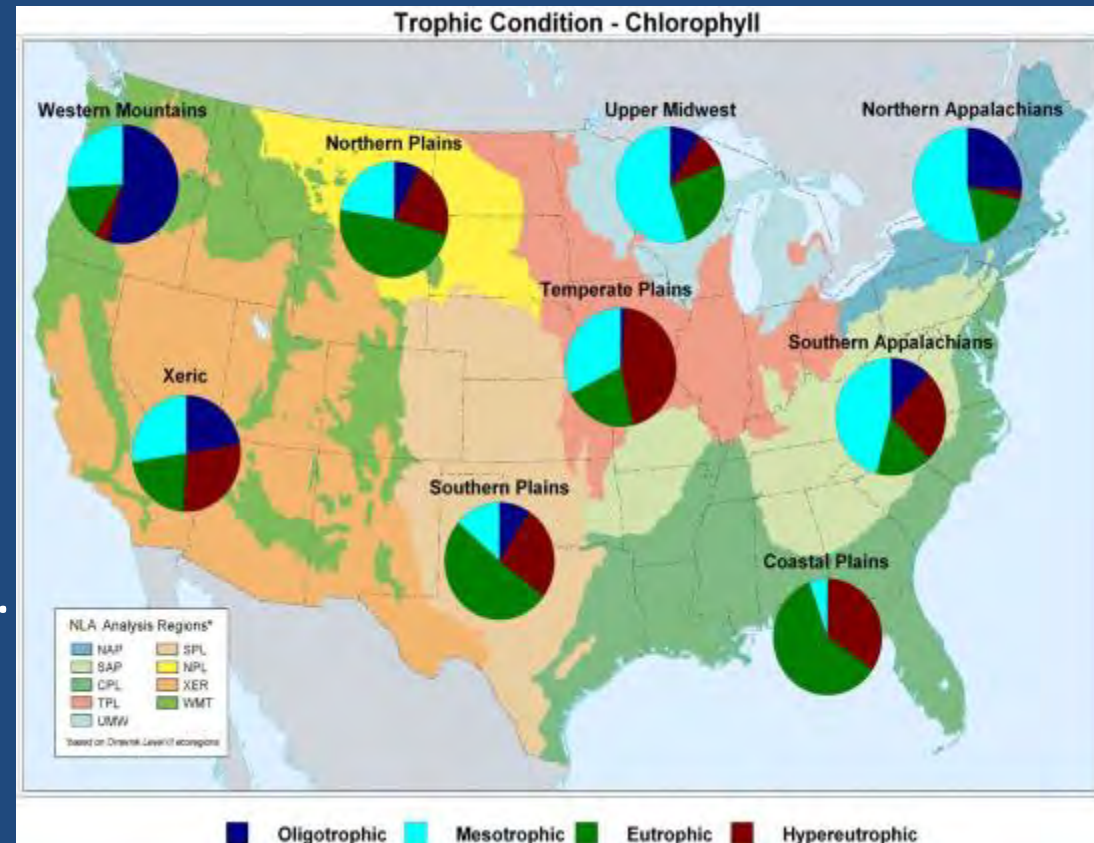
Biological Condition of the Nation's Lakes Varies across the Country

- National Summary:
 - 56% good
 - 21% fair
 - 17% poor
- Assessment thresholds based on regionally explicit reference expectations.

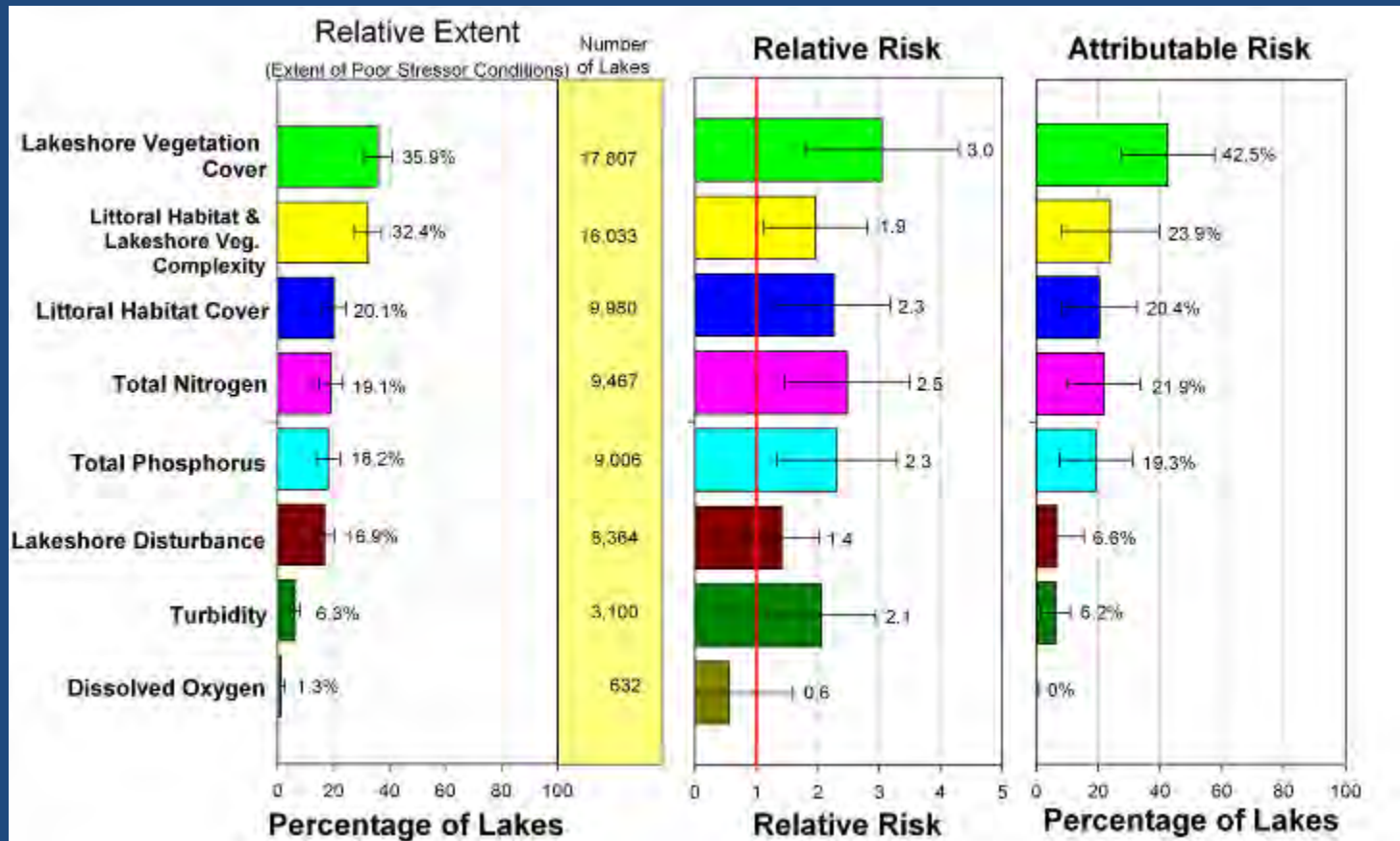


Trophic State of the Nation's Lakes

- National Summary:
 - 13% of lakes are oligotrophic (very clear)
 - 37% are mesotrophic
 - 30% are eutrophic
 - 20% are hypereutrophic (very nutrient enriched).
- Based on widely accepted Carlson Trophic State Index thresholds.



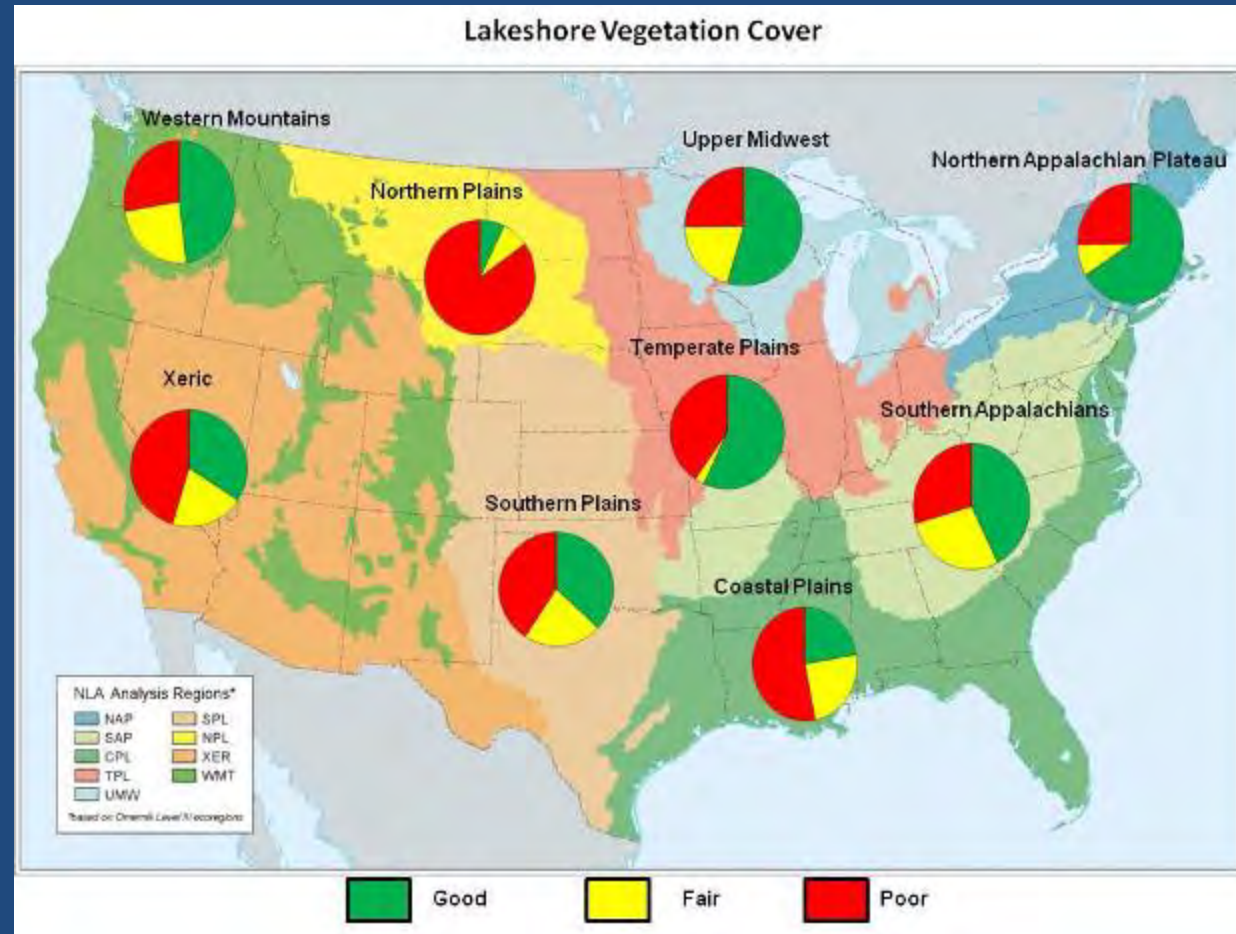
Ranking of Stressors



- Relative Extent – How common or widespread are the stressors?
- Relative Risk – When stressors occur, what is their relative impact?
- Attributable Risk – Ranks stressors based on extent and risk to estimate what percent of lakes rated poor for biology should move to good/fair if this stressor is eliminated?

Poor Habitat Quality Increases Risk of Degraded Biology 300%

- National Summary:
 - 46% of lake shorelines in good condition
 - 18% are in fair condition
 - 36% are in poor condition
- Assessment thresholds based on regionally explicit reference expectations.



Trends:

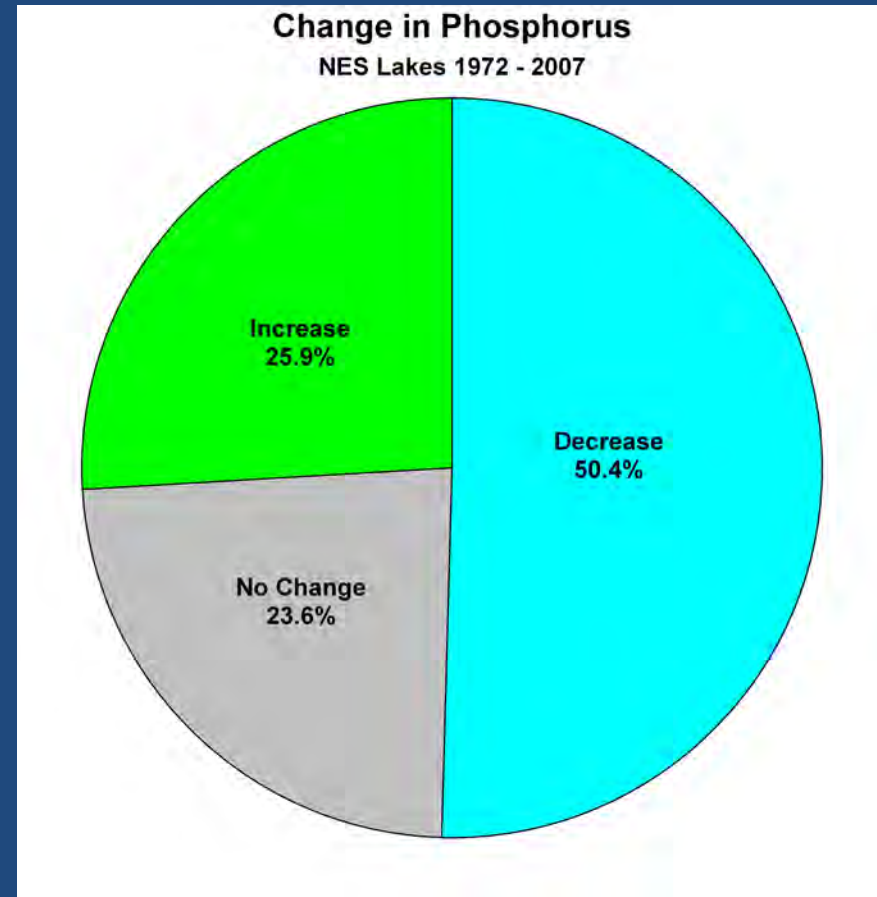
National Eutrophication Study and NLA

Subset of wastewater-impacted
NES lakes revisited

Phosphorus Trends:

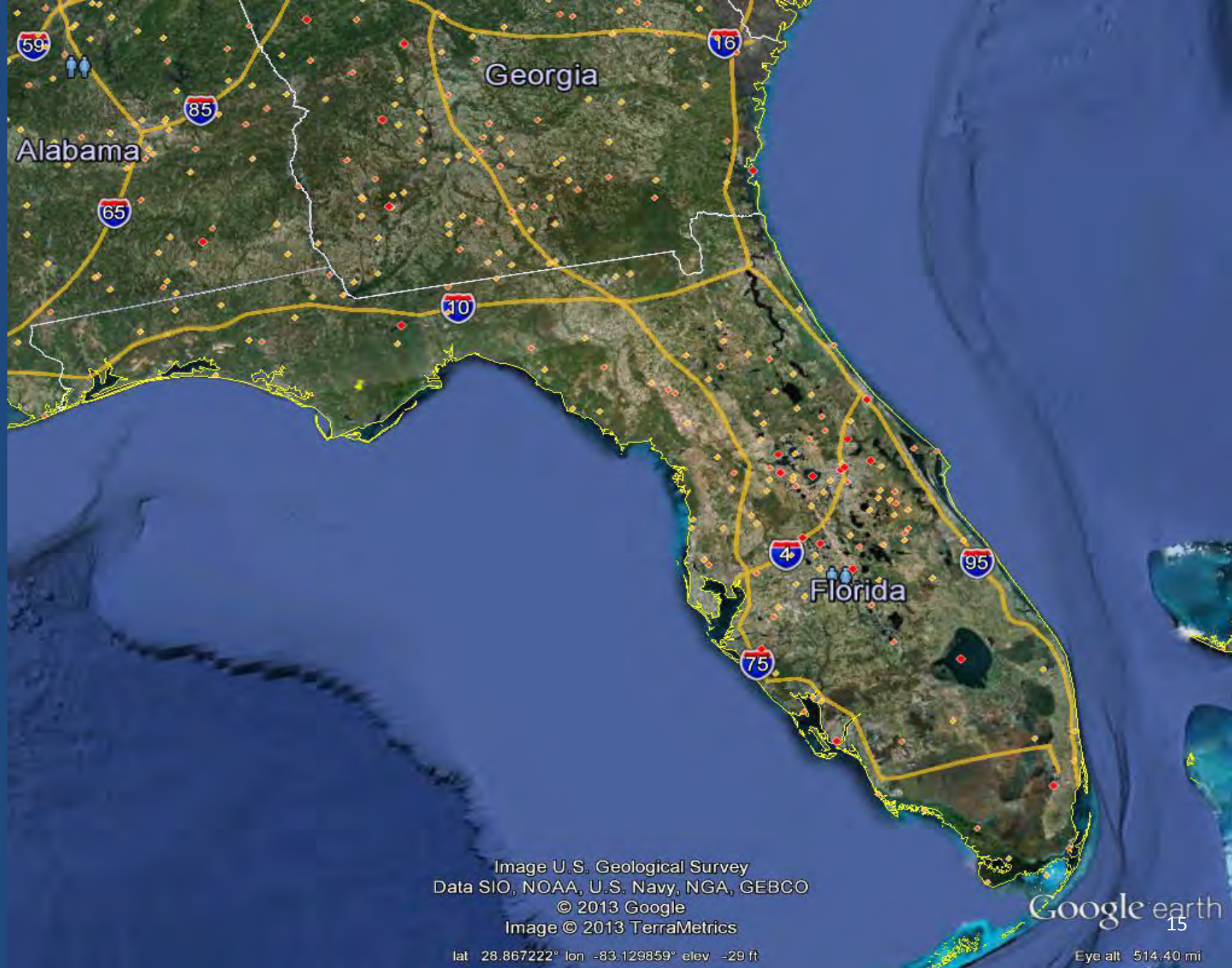
- 24% of lakes showed no change
- 50% of lakes showed decreased levels

Finding implies success of WWTP
improvement and other phosphorus
control initiatives.



National Lakes Assessment 2012

- Sampling of over 900 lakes completed in 2012
- Currently processing field data and laboratory samples
- Florida had 16 sites sampled for this survey with two QA resample events
- Report due in 2014



National Lakes Assessment – 2012

Indicators

- Biological Integrity
 - Zooplankton
 - Phytoplankton
 - Macroinvertebrates
- Sediment cores for sediment diatom analysis
- Recreational Use
 - Risk of cyanotoxin exposure
 - Occurrence of microcystin
 - Fish tissue (parallel study)
- Habitat Quality
 - Lakeshore Vegetation Cover
 - Littoral Quality
 - Human shoreline disturbance
- Chemical stressors
 - Water quality
 - Phosphorus, nitrogen
 - Temp, DO, cond., pH
 - Chlorophyll a
 - turbidity, color
 - Sediment mercury
 - Pesticide screen

National Rivers and Streams Surveys



National Rivers and Streams Surveys

- Wadeable Streams Assessment – 2004/05
 - 1392 waterbodies sampled
 - Report released in 2006
- National Rivers and Streams Assessment -2008/09
 - Approximately 1800 sites sampled – 29 in FL
 - Report to be released February 2013
 - Public Webinar on the report planned for March 2013

Selected Indicators 2008/9

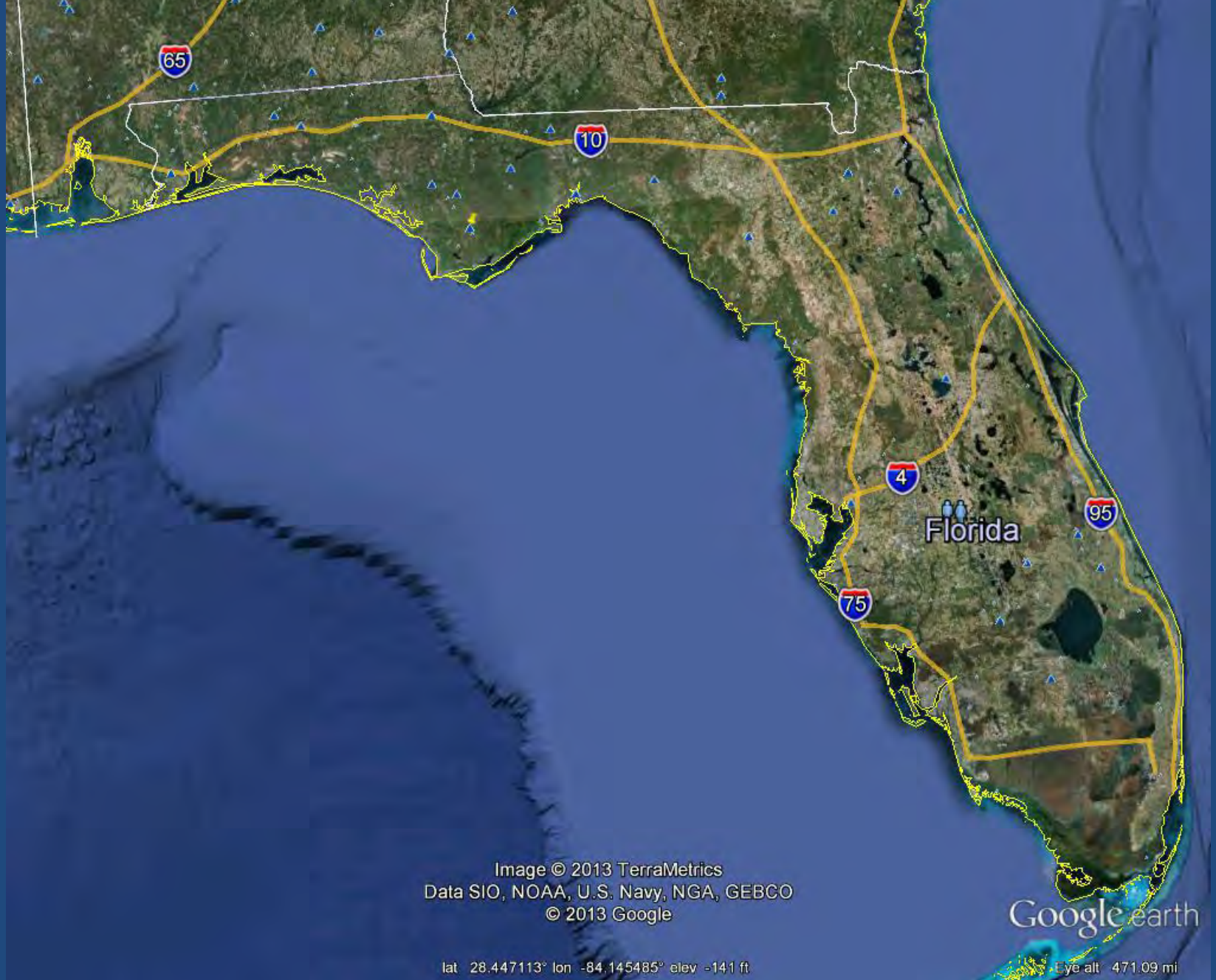
- Water Column
 - Salinity
 - Temperature
 - pH
 - DO
 - PAR
 - Secchi depth
 - DIN, DIP, TN, TP
 - chl *a*
 - *Enterococci*

- Sediment
 - TOC
 - % silt/clay
 - Chemistry
 - Toxicity
 - Benthic macrofauna
- Fish
 - Whole fish tissue



NRSA 2013-14

- Approximately 1800 sites (Approximately 40-50% revisit sites from 2008/09)
- Florida Sites
 - Revisits to 2008/09 sites
 - 3 Rivers
 - 9 streams
 - New site visits
 - 2 major rivers
 - 2 Rivers
 - 2 large streams
 - 5 small streams



2013/14 NRSA Current Status

- Site selection has occurred
- Indicators have been selected
- Training is being scheduled
- Sampling to begin in May/June

Core Indicators – 2013/14

- Water Column
 - Conductivity, Temperature, pH, DO
 - Basic Anions & Cations
 - TN, TP, NH₄, NO₃
 - Alkalinity
 - DOC, TOC, TSS
 - Chl *a*
- Benthic assemblage (littoral)
- Fish assemblage
- Physical habitat assessment

Supplemental Indicators – 2013/14

Microsystin

Enterococci

Fish Tissue Plug

Fish Tissue Fillet

National Coastal Condition Assessments



Key Questions Being Asked by These Surveys

- What percent of the Nation's coastal waters are in good, fair, and poor condition for key indicators of ecological health and human influence?
- What is the relative importance of key stressors such as nutrients and pathogens?
- What are the trends in marine coast lines and the baseline conditions of the Great Lakes nearshore area?

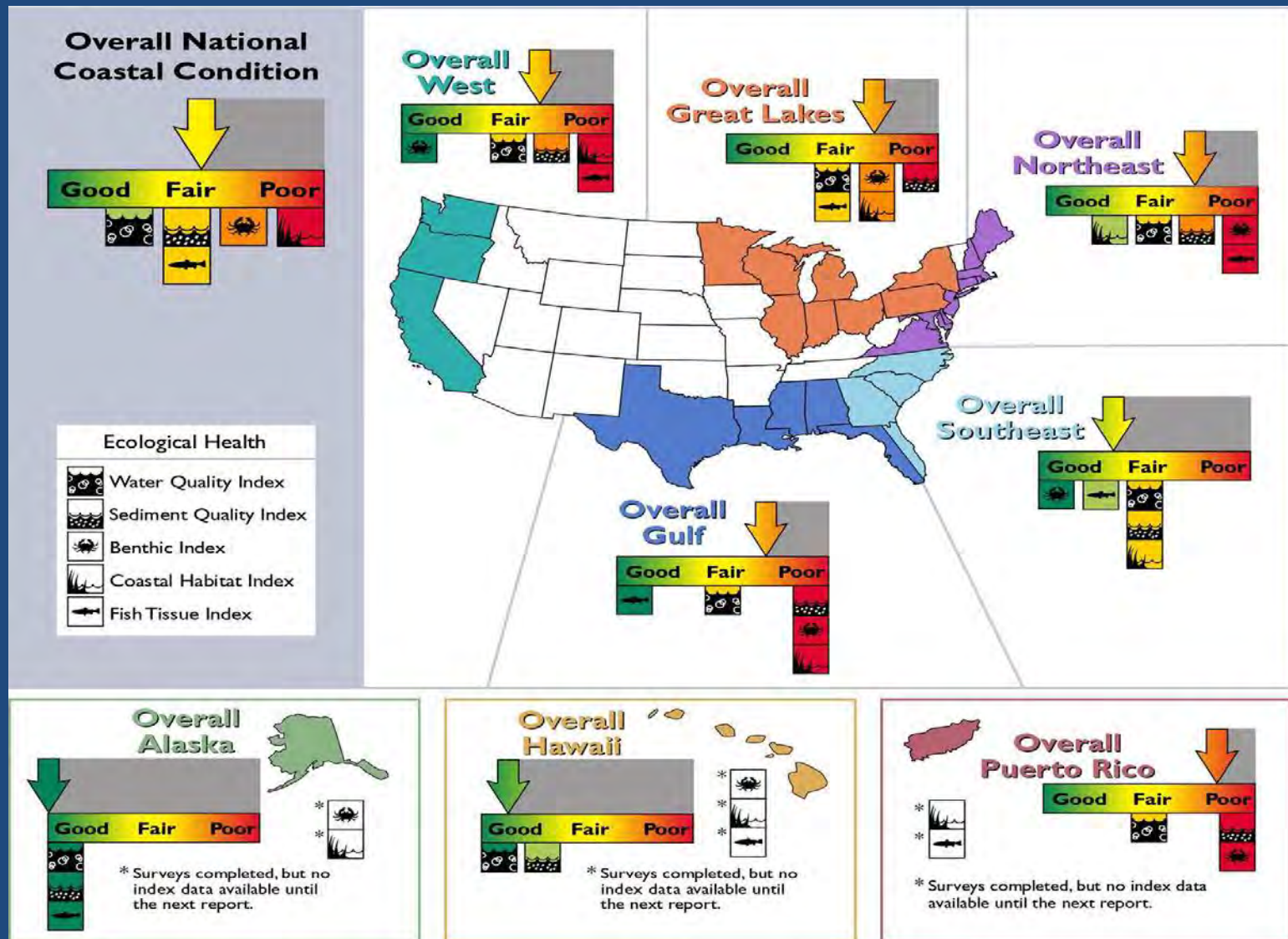
National Coastal Condition Reports

- NCCR I (2001)
 - Data from 1990 to 1996
- NCCR II (2005)
 - Data from 1997 to 2000
- NCCR III (2008)
 - Data from 2001 to 2002
- NCCR IV (2012)
 - Data from 2003 to 2006

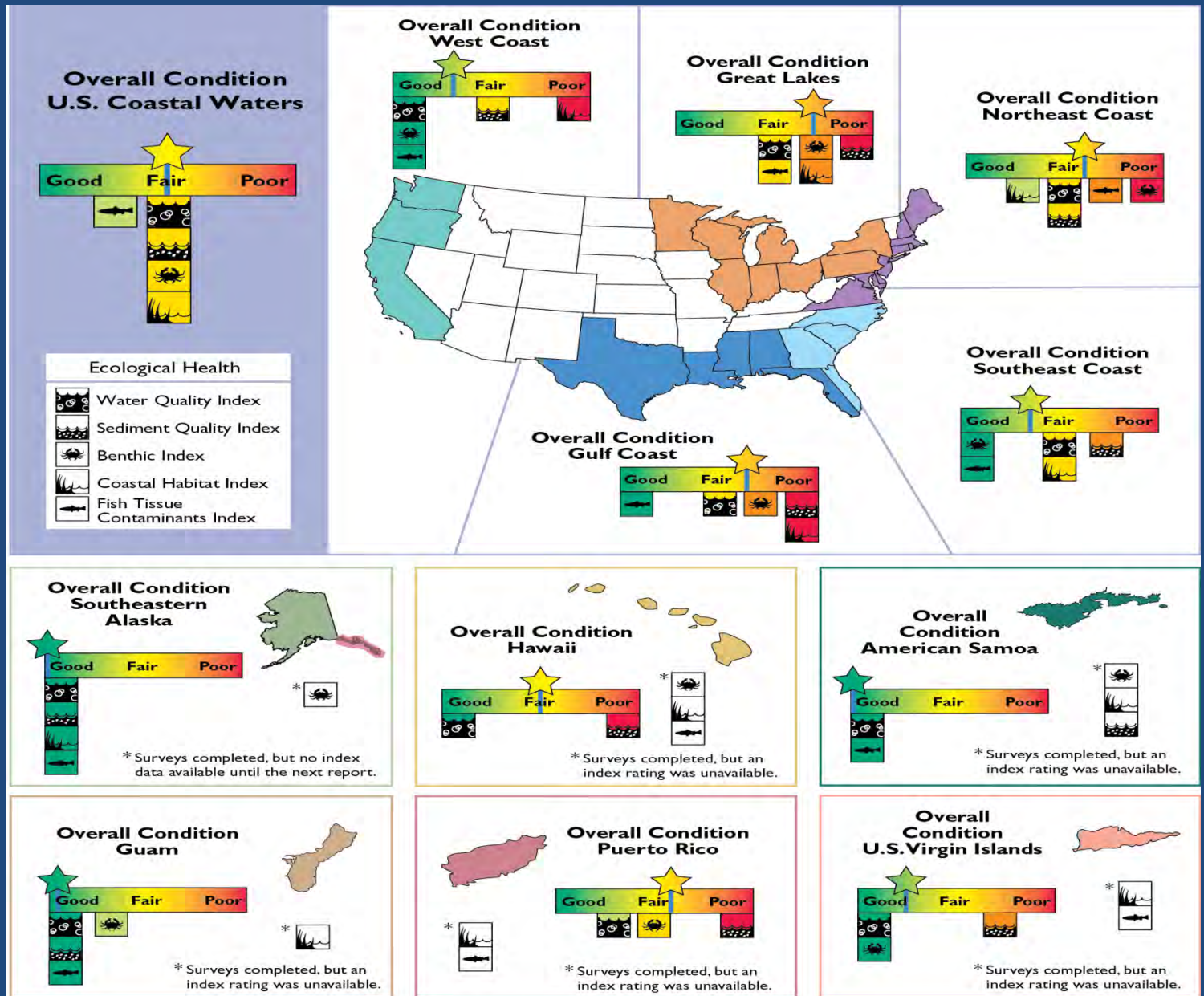
Selected Indicators

- Water Column
 - Salinity
 - Temperature
 - pH
 - DO
 - PAR
 - Secchi depth
 - DIN, DIP, TN, TP
 - chl *a*
 - *Enterococci*
- Sediment
 - TOC
 - % silt/clay
 - Chemistry
 - Toxicity
 - Benthic macrofauna
- Fish
 - Whole fish tissue
 - Fish community (limited)

National Coastal Condition Report III - 2008



National Coastal Condition Report IV- 2012



NCCA V Specifics

- Approximately 1000 sites
 - 749 coastal marine (92 revisits)
 - 250 Great Lakes (50 revisits)
 - Florida had 93 sites sampled – Conducted by FWRI led by Paul R. Carlson
- Sampling Index Period: July – September 2010
- Data management and QA verification underway
- Report scheduled for 2013



National Wetlands Condition Assessment



What is the National Wetland Condition Assessment (NWCA)?

The NWCA is a statistical survey of the condition of our Nation's wetlands. The NWCA is designed to:

- Produce a report that describes the ecological condition of the Nation's wetlands.
- Assist states and tribes in the implementation of wetland monitoring and assessment programs that will guide policy development and aid project decision-making.
- Advance the science of wetlands monitoring and assessment to support management needs.



NWCA Target Population

- Tidal and nontidal wetlands of the conterminous U.S., including certain farmed wetlands not currently in crop production.
- The wetlands have rooted vegetation and, when present, open water <1 m deep.
- A wetland's jurisdictional status under state or federal regulatory programs will not factor into this definition of target.



Data Quality Objectives

National estimates

- Estimate the proportion of wetlands ($\geq 5\%$) in the conterminous U.S. that fall below the designated threshold for good conditions for selected measures with 95% confidence.

Ecoregions

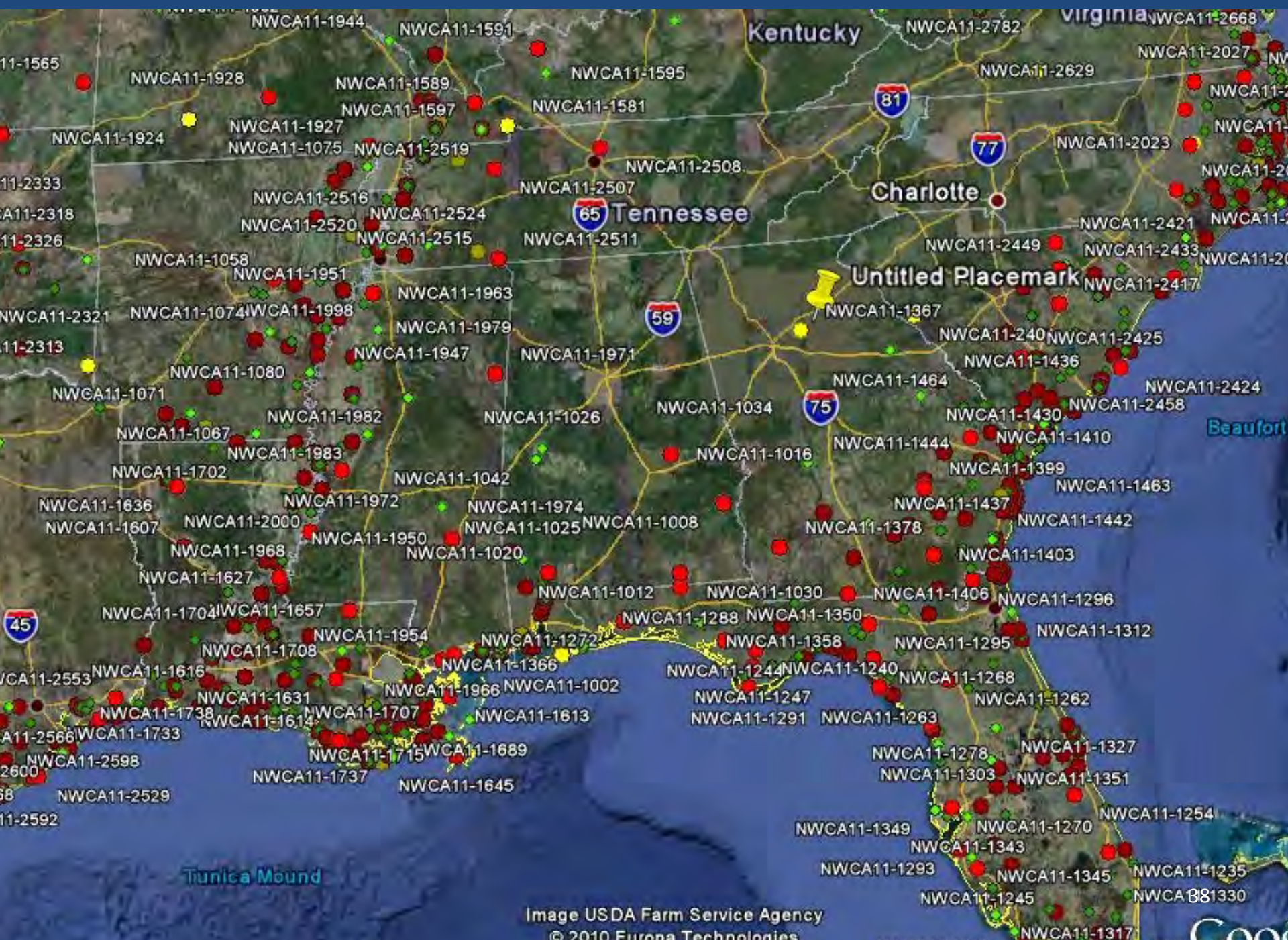
- Estimate the proportion of wetlands ($\geq 15\%$) in a specific ecoregion that fall below the designated threshold for good conditions for selected measures with 95% confidence.



NWCA Current Status

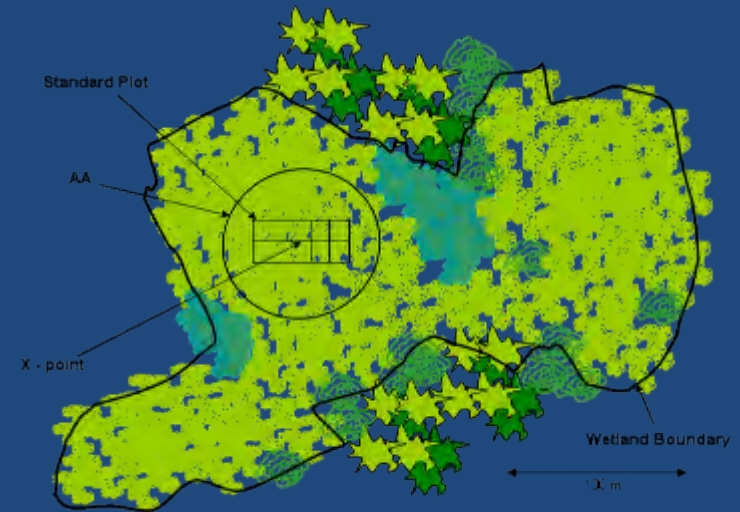
- Approximately 1250 sites
 - Florida had 67 sites sampled
 - Sampling Conducted by University of Florida Center for Wetlands led by Dr. Kelly Reiss and Dr. Mark Brown
- Sampling Index Period: April – September/October 2011
- Data processing and validation is ongoing



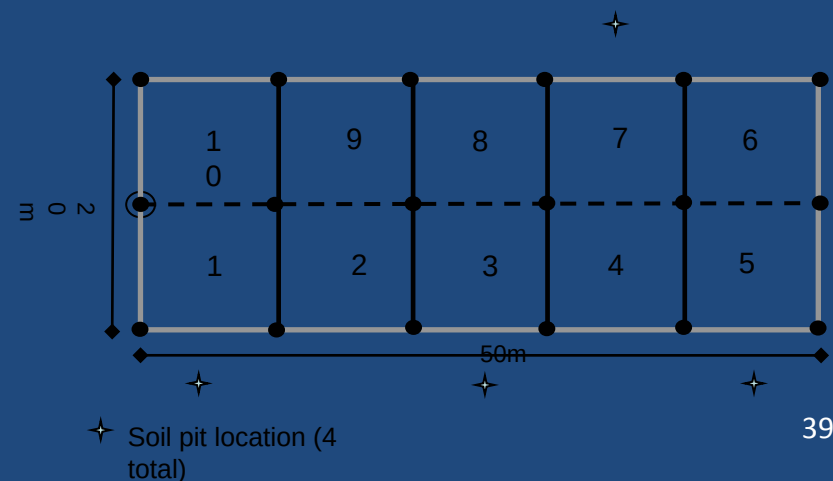


Level 3 (Intensive) Biotic and Abiotic Indicators

- ✓ Vegetation
- ✓ Soils
- ✓ Hydrology
- ✓ Water Quality
- ✓ Algae
- ✓ Stressors
- ✓ Buffer



2a Standard plot, centered in AA in homogeneous or mosaic vegetation



Level 2 Methods: USA-RAM

- Assess wetland physical habitat and identify stressors.
- Diagnose indicator performance based on buffer condition.
- Assess impact sites to determine mitigation ratios.

USA Rapid Assessment Method Attributes
Landscape
Buffer
Hydrology
Physical Structure
Biological Structure

A woman wearing a tan baseball cap, sunglasses, a white long-sleeved shirt, and a tan vest is standing in a field of tall, dry grass. She has a bright green backpack on her back. The background shows a hazy landscape under a clear sky.

State Field Crews





06/01/2011



Comments and inquiries should be directed to:

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[http://www.epa.gov/ow/monitoring/
nationalsurveys.html](http://www.epa.gov/ow/monitoring/nationalsurveys.html)

