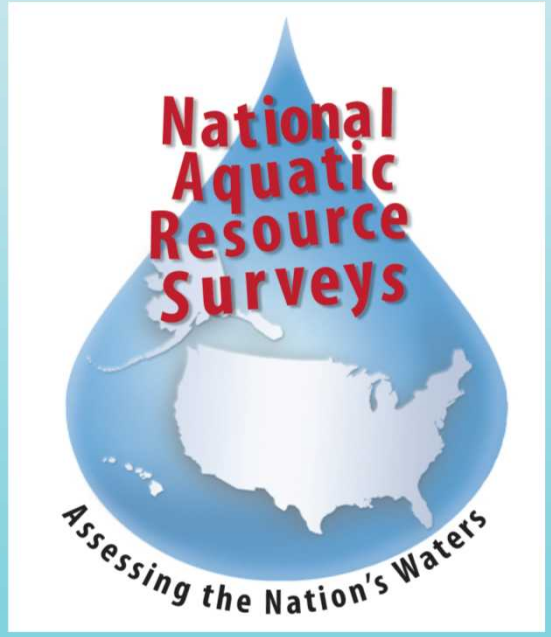
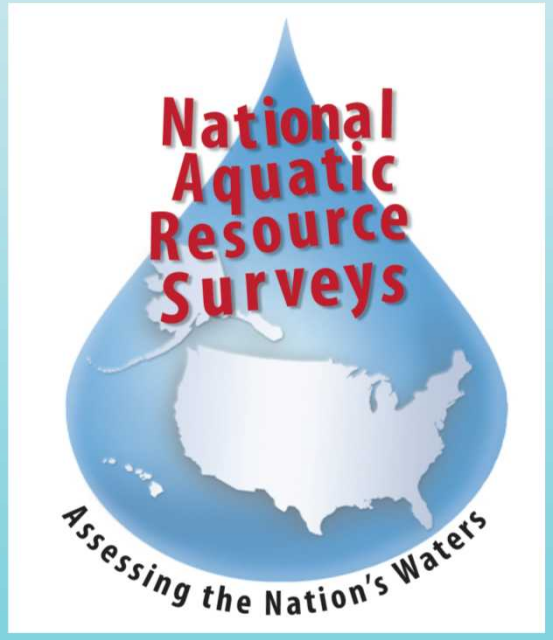
Lessons Learned from the National Aquatic Resource Assessments (2004-2012)



Dennis McCauley, Great Lakes Environmental Center, Inc.,
Ellen Tarquinio, Marsha Johnson, US EPA Office of Water

Lessons Learned from the National Aquatic Resource Assessments (2004-2012)



What is a Survey of the Nation's Waters?

A series of water surveys being conducted by states, tribes, the U.S. Environmental Protection Agency, and other partners

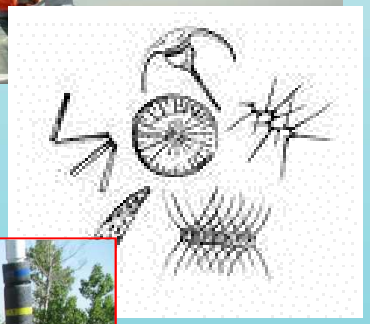
- 2004- 1,200 wadeable streams,
- 2007- 1,028 Lakes, representing approximately 49,546 Lakes
- 2008/2009- 2,081 wadeable and non-wadeable rivers and streams
- 2010- 1,400 Coastal Sites (including Great Lakes and Great Lakes Embayments)
- 2011- 1,258 wetlands
- 2012 NLA Initiation (approx. 1,275 sites)

NARS Purpose

Generate statistically-valid and environmentally relevant reports on the condition of the Nation’s lakes and reservoirs

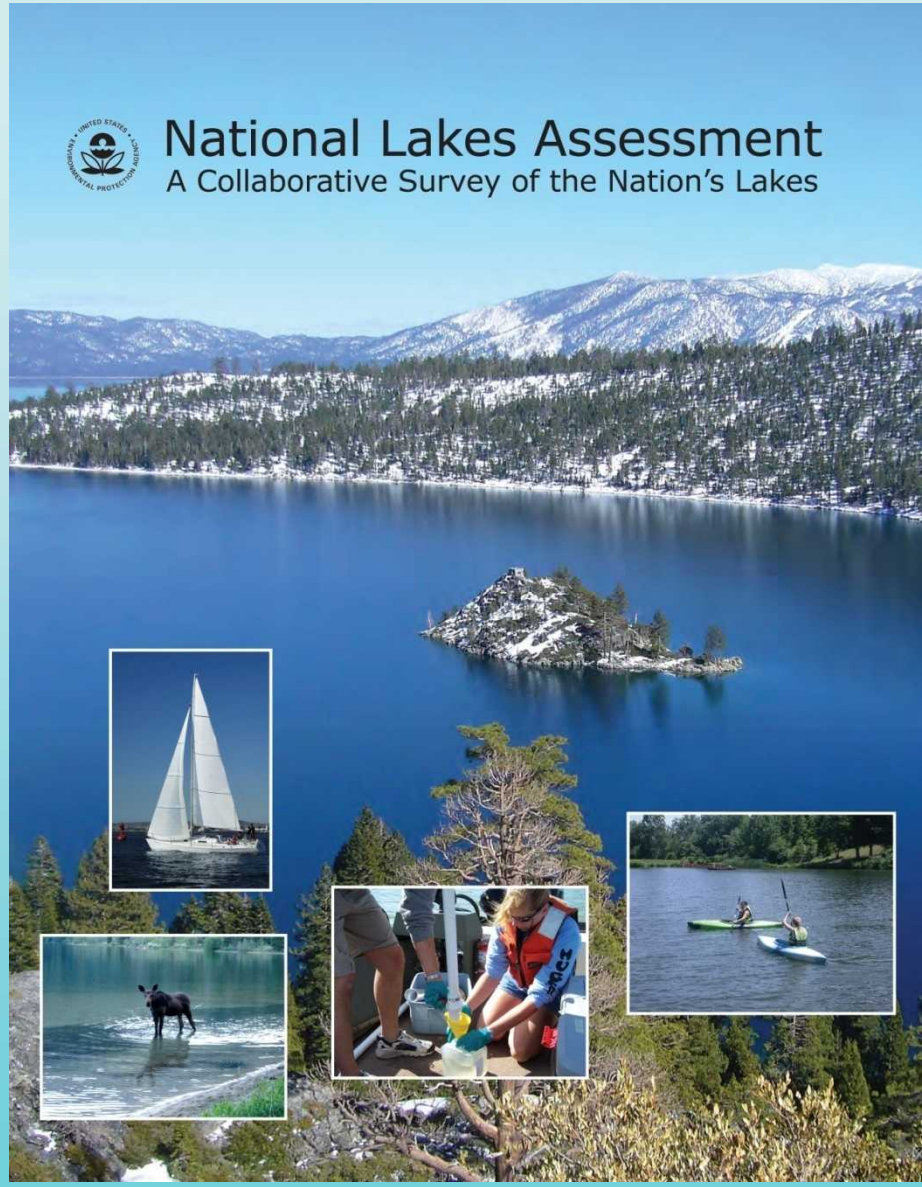
From a Logistical Perspective

1. Support the Development of QAPP's, FOM, LOM, Site Evaluation Guidelines and Quick Reference Guides
2. Prepare Training Materials
3. Conduct Train the Trainer Workshops
4. Conduct Regional State and Tribal Crew Training
5. Facilitate the Supply of Approximately 60-80 Field Crews each NARS year
6. Help Answer Sampling Questions
7. Replace Lost Equipment
8. Initiate Site and Sample Tracking
9. Other Duties as Assigned

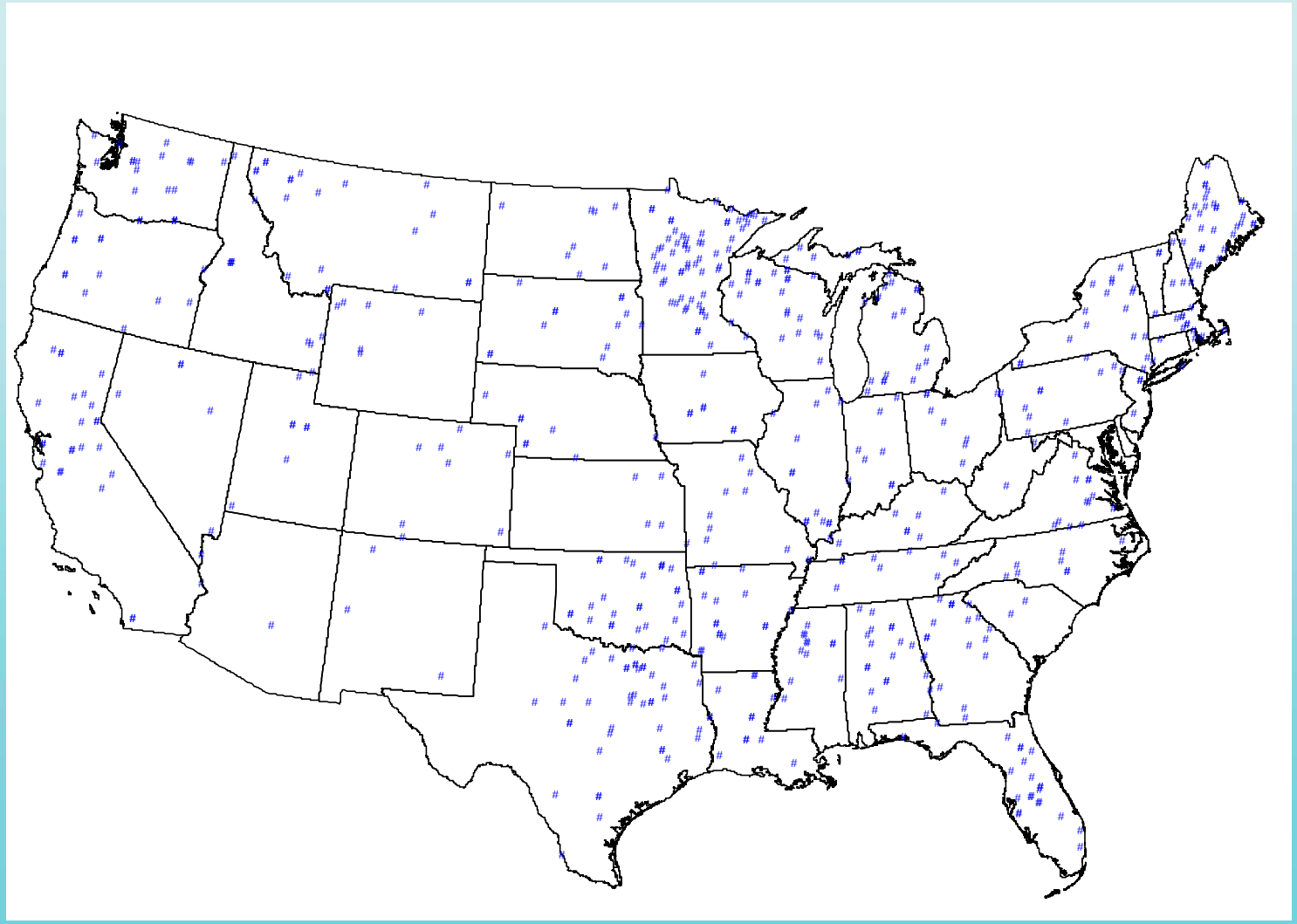


National Lakes Assessment

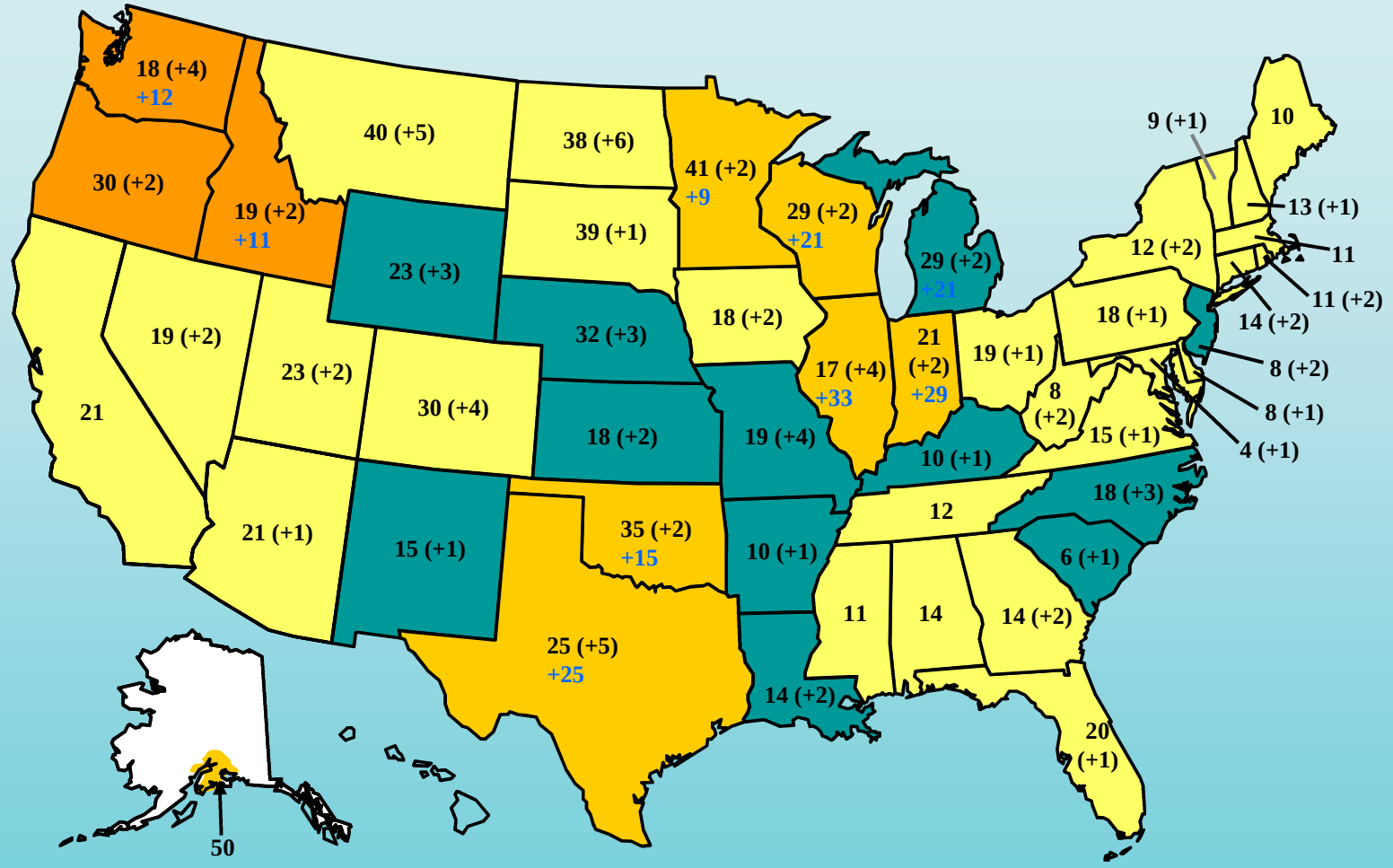
A Collaborative Survey of the Nation's Lakes



Typical Sampling Design



Probability Sampling – National Lakes Survey (909 lakes + 176 extra)
(90 Repeat visits in parentheses)



States requiring in-kind services (contractors) for sampling (227 lakes)

States confirming that they will sample their lakes

States doing a state-wide draw of lakes (extra lakes in blue)

States doing a region-wide draw of lakes (extra lakes in blue)

Revisits and Field Duplicate Design

First 10% of Lakes on list

On either Visit 1 or Visit 2, collect duplicate samples

Visit 1

Space revisits as far apart as practical

Visit 2

Primary Sample (P)
Chlorophyll
Phytoplankton
Microcystin
Water Chem
Zooplankton
Mercury
Sediment Core
Physical Habitat
Benthos
Enterococci

Filter Blank (F)
Enterococci

(Potential for contamination)

Collect filter blank on the visit where duplicate samples are NOT collected

Primary Sample (P)
Chlorophyll
Phytoplankton
Microcystin
Water Chem
Zooplankton
Mercury
Sediment Core
Physical Habitat
Benthos
Enterococci

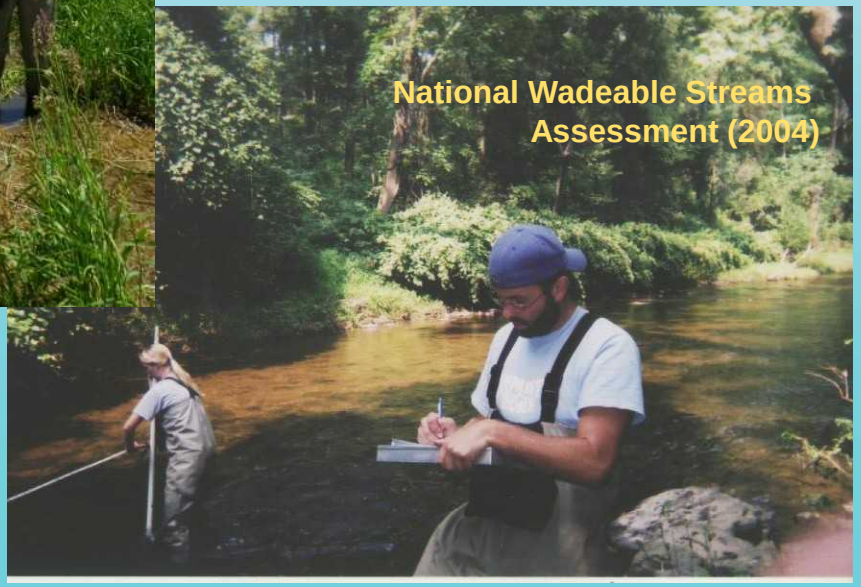
Field Duplicate (D)
Chlorophyll
Phytoplankton
Microcystin
Water Chem
Zooplankton
Enterococci

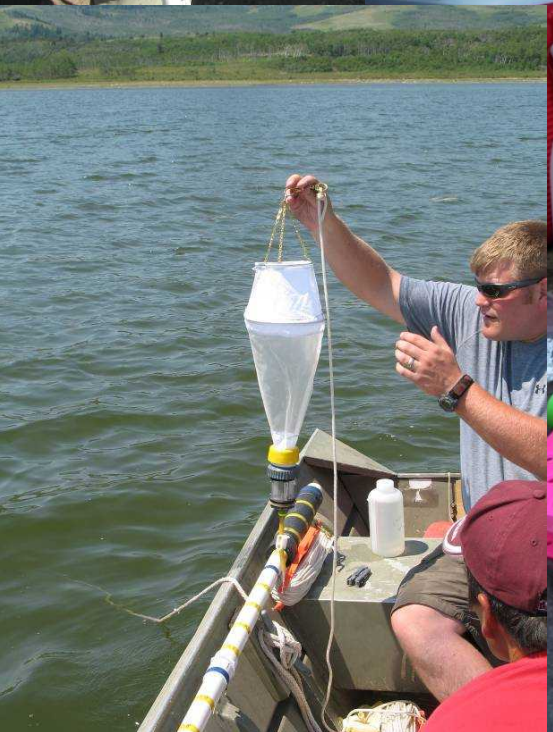
Duplicates= “measurement” variation
Revisits= “measurement” variation + index period variation


NLA was the first one to jump into the pond…
1st guy in the pool…
1st boat in the water…
1st toe in the water…


NLA
NRSA
NCCA
NWCA

National Aquatic Resources Surveys (NARS)





From the Yukon to Puerto Rico

NARS Logistics

Critical logistics elements (from Baker and Merritt, 1990)

Logistics Plan Component	Required Elements
Project Management	Overview of Logistic Activities Staffing and Personnel Requirements Communications
Access and Scheduling	Sampling Schedule and Site Access Reconnaissance
Safety	Safety Plan Waste Disposal Plan
Procurement and Inventory Control	Equipment, Supplies, and Services Requirements Procurement Methods and Scheduling
Training and Data Collection	Training Program Field Operations Scenario Laboratory Operations Scenarios Quality Assurance Information Management
Assessment of Operations	Field Crew Debriefings Logistics Review and Recommendations

National Aquatic Resource Assessment Shipment of field sampling kits

Logistics Planning

- Equipment procurement (i.e., what equipment is necessary and what EPA may consider providing the field crews);
- Logistics of shipping equipment and site kits to the field crews;
- Sample tracking forms, sample labels and tracking sampling progress.

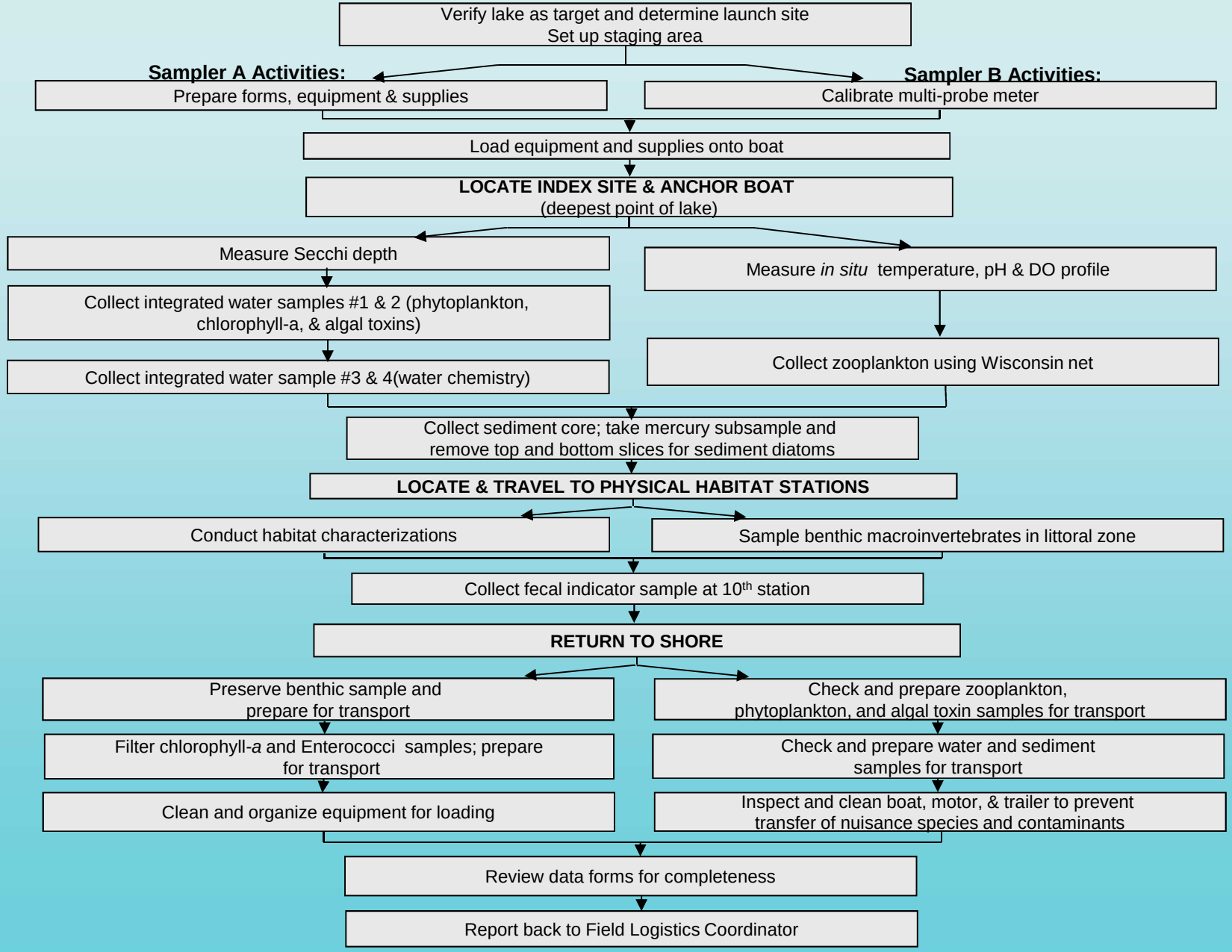
Feasibility

- Time budget for field operations (i.e., can a field crew accomplish all of the sampling in one day?);
- CONDUCT A PROOF OF CONCEPT TRIAL
- Feasibility of processing samples;
- Identification of the index period and the geographical selection of the index period;
- Other practical considerations.

Preparing for training

- Transition of existing methods into training materials;
- Training Logistics: staging the components in a training course to maximize experiential learning.

Example Field Sampling Scenario



“So where are your samples?”

Field Logistics Coordinator

Important duties during assessment

- Review submitted status forms and tracking forms for potential errors and omissions
- Contact teams directly with corrections or questions.
- Weekly cross check between the status and sample portions of the tracker database to identify samples that may be being held longer than the designated holding period. FLC contact teams directly to correct issues.
- An open line of communication would be established between the FLC and the labs to determine if the samples are arriving in good condition. If problems are noted with samples.
- FLC will follow up with the field crew to provide corrections and help avoid similar issues with future samples.
- Providing immediate feedback to teams should result in a continually diminishing amount of errors.

So What Did We Learn?

Lessons Learned

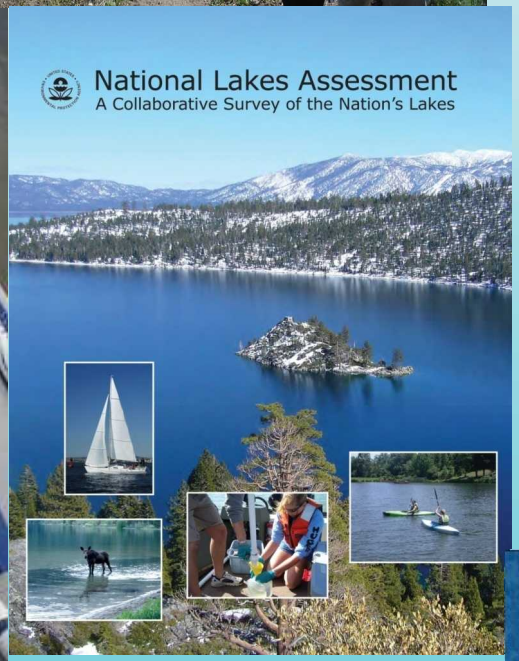
- Access and Permission
- Local Knowledge
- Site Recon
- Scheduling
- Adaptive Training
- Field Conditions
- Information Management and Sample Tracking

Achieving the Objectives

- Probability design means we can extrapolate beyond the sample to the national population of surface water and wetlands that meet our sampling criteria

  But only if we stick to the rules!

  - Non-target or otherwise not sampleable sites must be substituted in a specific order, and
  - All sites on the list must be accounted for, even if not sampled
  - Even if you know a better way to do it, stick to the protocols to maintain consistency across waterbodies and regions
    - Clearly note any deviation you have made and why
  - We don’t know what you found if you don’t write it down on a data form

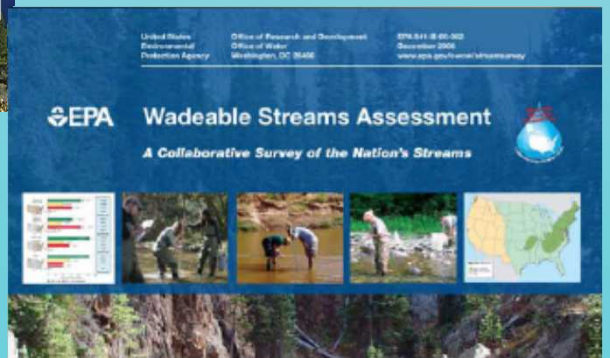


"invaluable to the success of this precedent-setting national effort"

"highest priorities for EPA's National Water Program"

"…With your help, over 1,300 lakes were sampled all across the country in the space of just four months --

-- a phenomenal accomplishment!..."



Managerial Insight- “Never send four 22 year olds into the field alone”