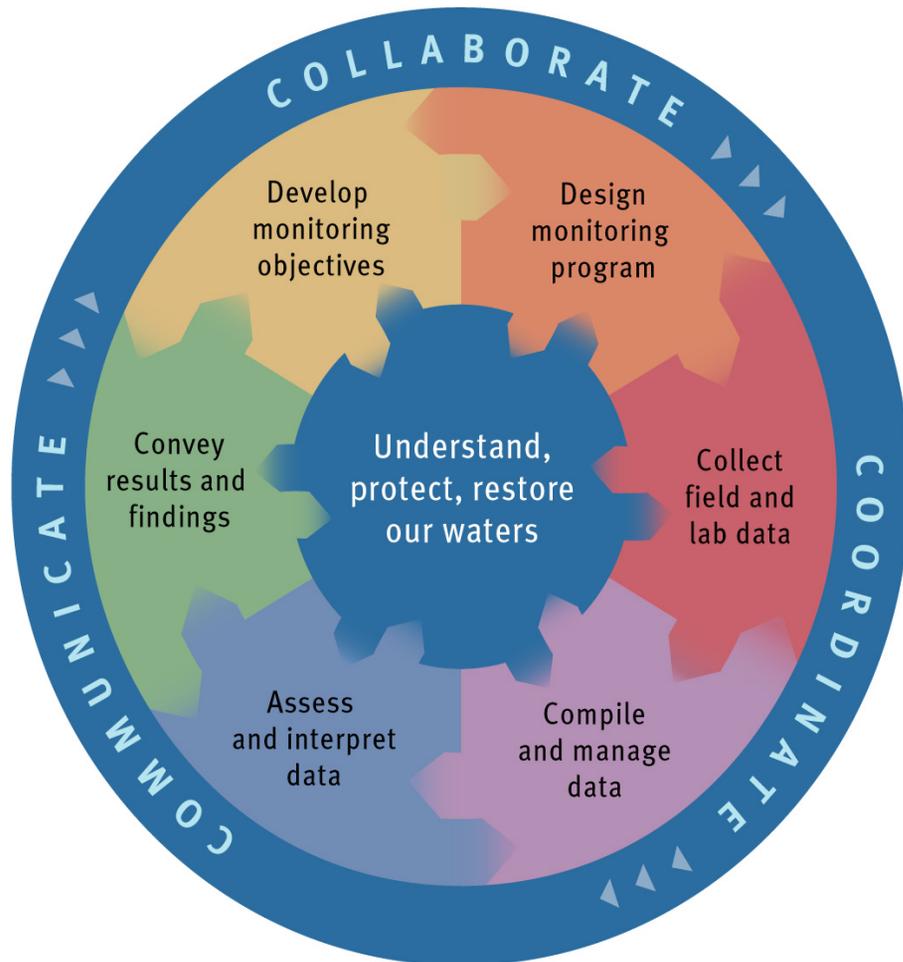


# Towards a Joint Federal, State, and Tribal Nation Monitoring Partnership for Aquatic Resource Surveys: A Statistician's Perspective

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# National Water Quality Monitoring Council: Monitoring Framework



- View as information system
- Monitoring pieces must be designed and implemented to fit together
- Comprehensive monitoring strategy can become central organizing approach
- Assessment monitoring requires consistent framework by federal, state, and tribal nation partners
- Reference: Water Resources IMPACT, September 2003 issue



# NARS Partnership: Collaboration and Cooperation Topics

- **Objectives - Monitoring included in partnership**
- **Monitoring Survey Design Requirements**
  - Target population - Aquatic resource definitions
  - Sample frame - Aquatic resource GIS data layers
  - Scale - Geographic and aquatic resource reporting units
  - Survey design - site selection
- Indicators - Field measurements, laboratories,
- Operational implementation – Training, site evaluation, audits, information management
- Reporting - data analysis and interpretation
- Infrastructure development – Federal, state, tribal nations’ technical capacity and organizational commitment

## Monitoring Partnership Collaboration

- Harmonize monitoring in general
- Integrate probability-based monitoring (NARS) in particular
  - Harmonize objectives
  - Harmonize target population definitions
  - Integrate sample frames
  - Integrate survey designs
- Harmonize assessment and reporting

# NARS Survey Design & Analysis Challenges

- Identify partners objectives
- Incorporate partners target population perspectives
- Integrate partners sample frames
- Harmonize survey designs
- Harmonize response designs for indicators
- Incorporate site evaluation best practices
- Harmonize partners site assessments
- Consistent population estimation for assessments

# NARS Partnership: Potential Monitoring Objectives

- **Potential monitoring needs included**
  - National Aquatic Resource Assessments
  - State 305(b) biennial report
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  - State of the Environment Reports
  - Consolidated Assessment and Listing Methodology
  - Establishing biological criteria for all aquatic resource types
  - Effectiveness of water quality programs
  - Aquatic ecosystem services assessment
- **Identify objectives not included**
  - TMDL
  - Site-specific assessment and restoration
  - NPDES permits

# NARS Partnership Aquatic Resource Definitions

- Know partner target population definitions
- Agree on core definition for national assessments
- More inclusive definition possible for individual partners
- More restrictive definition: requires commitment by partner to use core definition for national assessments
- Cost-effective integration enhanced when partners use same definition

## NARS Partnership Reporting Units

- Partners agree on reporting units used in national assessments
- Partners may have other reporting units of interest
- Harmonization of reporting units leads to more cost-effective integrated survey designs

# NARS Partnership

## Potential Geographic Reporting Units

- National Aquatic Resource Assessment reporting units
  - Ecoregions
  - Hydrologic regions
  - Geopolitical: EPA regions, states, Urban/rural,...
- Partner reporting units
  - State: basins within state, ecoregions within state
  - National Estuary Programs, IOOS regions
  - National forests, national parks, conservation reserve

# NARS Partnership

## Potential Aquatic Resource Reporting Units

- Lakes and Reservoirs: Public access, private access, Lake area categories
- Rivers and Streams: Wadeable, boatable, intermittent/ephemeral
- Coastal waters: estuaries, near shore waters, offshore waters, tidal fresh, Great Lakes
- Wetlands: Cowardin-based classes, HGM classes

# **NARS Partnership Potential Special Category Reporting Units**

- All 303(d) listed resources
- All aquatic resources under TMDL implementation plan
- All pristine waters of United States
- All streams and rivers with fish advisory
- All drinking water supply aquatic resources
- Acid-sensitive waters

# NARS Partnership Sample Frames

- Partners agree on national assessment sample frame
- Partner sample frames
  - National sample frame
  - Own sample frame linked to national
- Sample frame continuous improvement
  - Reduces site evaluation costs
  - More accurate representation of target population

# Historical Perspective on Survey Design for Monitoring

- Prior to 1990
  - No national survey design
  - Monitoring programs by partners
    - Use independent survey designs
    - Use alternative monitoring design
- 1990-2008:
  - National survey design with state input for NCA, WSA, NLA, NRSA
  - Limited substitution of state survey designs
- Future NARS Partnership
  - Integrated survey design for Partnership

# **NARS Partnership Integrated Design Development**

- Coordinate, collaborate, and communicate
- Hard work – requires commitment
- Process as important as product
- Creating takes time – think phases
  - Phase I: First cycle of NARS
  - Phase II: Integrated NARS
    - Begins 2010 with NLA planning
    - Start process now

