Building a Water Quality Monitoring Program for Alabama Lakes

Alabama Department of Environmental Management
Presentation Outline

- Brief Review of WQ Monitoring Programs
- Review of our Reservoir Monitoring Program
- The Good, The Bad, and The Ugly
- Concluding Statements
The River State

- 14 Basins
- 629 Subwatersheds
- 77,248 stream miles
- 490,472 acres in 43 reservoirs and lakes
- 3,600,000 acres of freshwater wetlands
- 390,398 acres of estuaries, tidal waterways, and bays
Monitoring Programs

- Coastal Monitoring Program
- Fish Tissue Monitoring Program
- Rivers & Reservoirs WQ Program
- Ecoregional Reference Program
- Alabama Monitoring and Assessment Program
- Point Source Assessments
- NPS Assessments
- Special Monitoring Programs
Monitoring Objectives

- Status and trends
- Impaired waters
- Causes and sources
- Management programs
- Identify high quality waters
- Evaluate program effectiveness
- Establish water quality standards
Monitoring Strategy

Monitoring conducted on a 5 year basin rotation

Coordination and collaboration among monitoring program and agencies

Tiered/phased monitoring

Adaptive program design

River Basin Groups
- Black Warrior-Cahaba (1997)
- Tennessee (1998)
- Southeast Alabama (1999)
- Alabama-Coosa-Tallapoosa (2000)
- Escatawpa-Mobile Bay-Tombigbee (2001)
EPA Evaluation: ADEM Program

• Well-rounded program

• Adaptive management approach  
  – optimal use of resources  
  – consistent with TMDL process

• Clearly defined progression  
  – screening-level to intensive monitoring

• Rotational basin approach  
  – shifts monitoring efforts to targeted waters according to current needs

• Monitoring resources: increase by at least 30%
Reservoir Water Quality Monitoring Program
Bankhead Reservoir:
Warrior Basin
Dannelly Reservoir: 
Alabama Basin
West Point Reservoir: Chattahoochee Basin
Demopolis Reservoir: Tombigbee Basin
Jordan Reservoir: Coosa Basin
Reservoir Monitoring Timeline
1985-1996

• 1985: Statewide Survey I: EPA & ADEM
• 1989: Statewide Survey II: ADEM & AU
• 1990: ADEM RWQM Program
  Clean Lakes Program Phase I
• 1994: GA/AL Water Allocation Surveys
ADEM Reservoir Water Quality Monitoring Program

- Established in 1990.
- All publicly-accessible, multi-use reservoirs
- Objectives:
  - develop an adequate water quality database
  - establish trophic status trends
  - satisfy Section 314(a) of the Clean Water Act
ADEM Reservoir Program 1990-1996

- Two-year rotation
- Spring and summer
- Mainstem stations only
- In situ measurements
- Photic zone sample collection
- Nutrient, chlorophyll a analysis
- Bacteriological samples
- Phytoplankton community analysis
- 1994: GA/AL Water Allocation Surveys
Reservoir Monitoring Timeline
1997-2004

• 1997: Basin Intensive Surveys begin

• 1998: Clean Lakes Studies end

• 2001- 04: Nutrient Criteria /Compliance begin
ADEM Reservoir Program
2004

• Three concurrent sampling rotations
  – Intensive surveys
    • 5 year basin rotation
    • Monthly/algal growing season
  – Critical Period
    • 2 year
    • August only
  – Compliance Monitoring
    • Lake-specific nutrient criteria
    • Monthly/algal growing season
    • Rotation to TBD
Intensive Survey Methods

- Monthly: April-October
- Basin lakes sampled within one-week
- Same time of day, month each year
- Five-year rotation
- Mainstem, trib embayments, rivers
- In situ measurements.
- Photic zone sample collection.
- Nutrient, chlorophyll a analysis.
- Algal Growth Potential Tests (AGPT).
- Bacteriological samples
Critical Period

Methods

- August only
- Two-year rotation
- Basin lakes sampled within one-week
- Same time of day, month each year
- Mainstem stations only
- In situ measurements.
- Photic zone sample collection.
- Nutrient, chlorophyll $a$ analysis.
- Bacteriological samples
- Diel monitoring: multiprobe (Aug only)
Compliance Monitoring Methods

- Monthly: April-October
- Basin lakes sampled within one-week
- Same time of day, month each year
- Rotation TBD
- Mainstem stations only
- In situ measurements
- Photic zone sample collection
- Nutrient, chlorophyll a analysis
ADEM Reservoir Program Changes

• Added
  – Basin rotation intensive surveys
    • Tributary embayments
    • Rivers
  – Nutrient Criteria/Compliance monitoring
  – Diel monitoring by multiprobe.

• Dropped
  – Spring sampling
  – Phytoplankton community analysis

• Continued
  – Summer (critical period) 2-year rotation
  – Sampling regime at each station
Rivers & Reservoirs: Physical/Chemical WQ Assessments
Rivers & Reservoirs: Physical/Chemical WQ Assessments
Rivers & Reservoirs: Biological WQ Assessments
The Good
-----
The Bad
-----
The Ugly!
The Good

- Expert mentor
- Internal Support
- Baseline data
- Clean Lakes Program
- Simplicity
- Consistency
- Dedication

= Successful program
The Bad

• Limited funding
• Limited staff
• Large state
• 14 River basins

= Less data
The Ugly!

- Inconsistent funding
  - Loss of Clean Lakes Program
  - Inconsistent Section 319 funding
- Personnel turnover

= Ugly Situation
Future Needs

1. Dedicated monitoring funds
2. Personnel
3. Tributary loading studies
4. Expand diel monitoring
4. Expand AGPT
5. Reinstitute phytoplankton analysis
Conclusion

• Measures of program success
  – Application of data
    • Can you use it?
    • How you use it
  – Quality of data
  – Quantity of data
Conclusion

• Requirements for program success
  1. Adequate, consistent funding
  2. Substantial effort (Hard work)
  3. Consistent effort over time
  4. Significant level of expertise, training, and oversight.
Conclusion

There are no shortcuts or quick fixes!