Water Quality Monitoring in Michigan, 1996-2006: A Decade of Program Evolution

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Presentation Objectives

- Background on Michigan Water Quality Monitoring
- Monitoring Strategy Development
- Program Evolution From 1996-2006

Early Monitoring Program Focus

Monitoring Objectives

- Identify severe problems/violations
- Focus on point sources to determine whether MI Water Quality Standards were met

Monitoring Activities

- Emphasis on chemical monitoring
- Acute toxicity testing
- Water fixed station network

Monitoring Program Criticisms

- Monitoring program reviewed and criticized
  - State Auditor General
  - MI Environmental Sciences Board
  - MI Mercury Pollution Prevention Task Force
- Criticism: State unable to determine whether water quality was changing (trend assessment)
- Criticism: Monitoring not evolving to address critical issues
- State legislation required monitoring strategy development

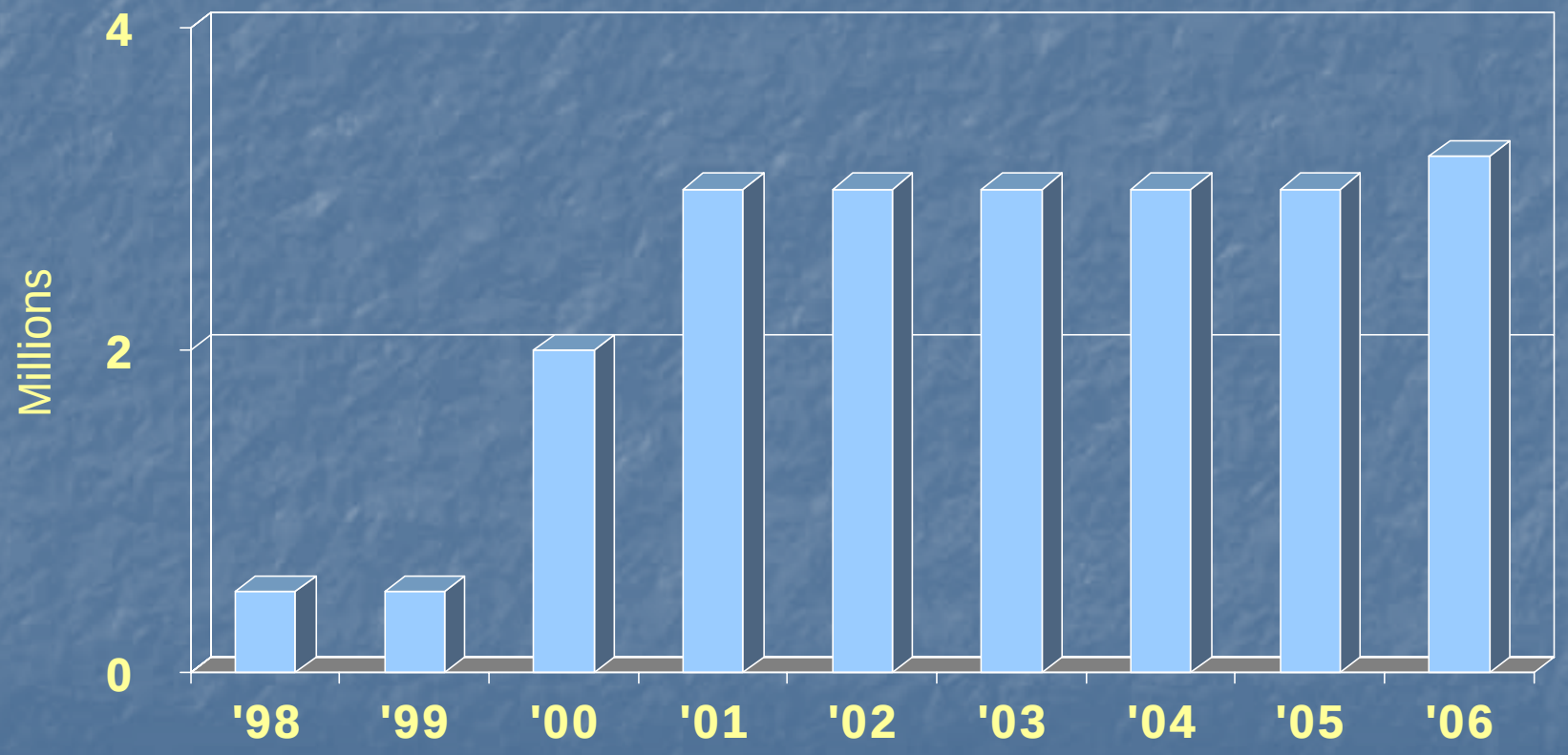
Monitoring Goals

- Assess the current status and condition of individual waterbodies and determine whether MI Water Quality Standards are being met
- Measure temporal and spatial water quality trends
- Provide data to support DEQ water quality protection programs and evaluate their effectiveness
- Detect new and emerging water quality problems

Water Quality Monitoring Strategy - 1997

- Fish Contaminants
- Water Chemistry
- Sediment Chemistry
- Biological Integrity & Physical Habitat
- Wildlife Contaminants
- Beach Monitoring
- Volunteer Monitoring
- Inland Lake Quality
- Stream Flow

Funding Increase For Water Quality Monitoring Since 1998



Monitoring Strategy Update – 2005

- Required by EPA
- Goals are same as 1997, but some shift in emphasis
- Expanded objectives
- Design modifications
- Additional waterbody types
- More emphasis on data management/communication
- Staff responsibilities and expertise

Program Evolution 1996-2006 - Goals and Objectives

- Increased emphasis on measuring water quality protection program effectiveness

  - Nonpoint source
  - Sediment remediation
  - TMDL development/effectiveness
  - Concentrated Animal Feeding Operation NPDES permits

- Increased emphasis on detecting emerging issues

  - Chemical: PFOS, PBDEs, MTBE, pharmaceuticals
  - Biological: invasive species, toxic blue-green algae
  - Addressed primarily through grants due to specialized knowledge/analytical requirements

Program Evolution 1996-2006 – Sampling Design

- Until recently, monitoring occurred only at fixed stations and targeted sites consistent with the 5-year rotating watershed cycle

- Sampling and analytical improvements were incorporated into the water chemistry sampling at fixed stations
  - flow stratification
  - clean sampling techniques
  - low-level analyses

- Probability sampling added to the water fixed station effort in 2005

- Probability sampling incorporated into biological watershed surveys in 2006

- More intensive studies in recent years to document program effectiveness and support TMDL development

Program Evolution 1996-2006 – Waterbody Types

- EPA is encouraging states to assess all waterbody types
- Biological assessment has been confined to wadeable streams and rivers
- A biological assessment procedure for non-wadeable rivers was developed and tested from 2002-05. Implementation will begin in 2006
- Nearshore Great Lakes (benthos, zooplankton)
- Historically, little wetland quality monitoring occurred in Michigan. A wetland monitoring strategy is being developed, which identifies a tiered monitoring approach to assessing water quality

Program Evolution 1996-2006 – Data Management & Communication

- All water and sediment data are entered into STORET
- Biological data will be entered in the future
- Internal databases also used to house data – improves ability to analyze and share data
- Two searchable databases available to public on DEQ's web site – beach data and fish contaminant data
- Most monitoring reports are available on the DEQ web site
- On-line GIS system incorporating all DEQ monitoring data will be available by January 2007

Program Evolution 1996-2006 – Staff Responsibilities & Expertise

- Identify more subtle impacts/trends
- Requires more sophisticated study designs and statistical analysis
- Grant and contract management
- Ability to work with DEQ water protection programs
- Identify opportunities to leverage resources with other agencies

Summary

- Maintain overall program framework and goals
- Flexibility to respond to new questions/issues
- Incorporate improved study designs and sampling/analytical methods
- Opportunities to expand monitoring to additional waterbody types
- Improved data management and communication
- Staff required to cooperate with other agencies and leverage resources

Future Challenges

- Better data integration across media, watersheds, and agencies
- Detection of more subtle temporal and spatial trends
- Maintain staff expertise and staff willingness to accept change
- Maintain consistent, long-term funding
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- Web site: www.michigan.gov/deq, click on “Water”, “Water Quality Monitoring”, and “Assessment of Michigan Waters”