



# Increasing Awareness, Understanding, and Availability of Statistical Methods for Water Quality Monitoring and Assessment

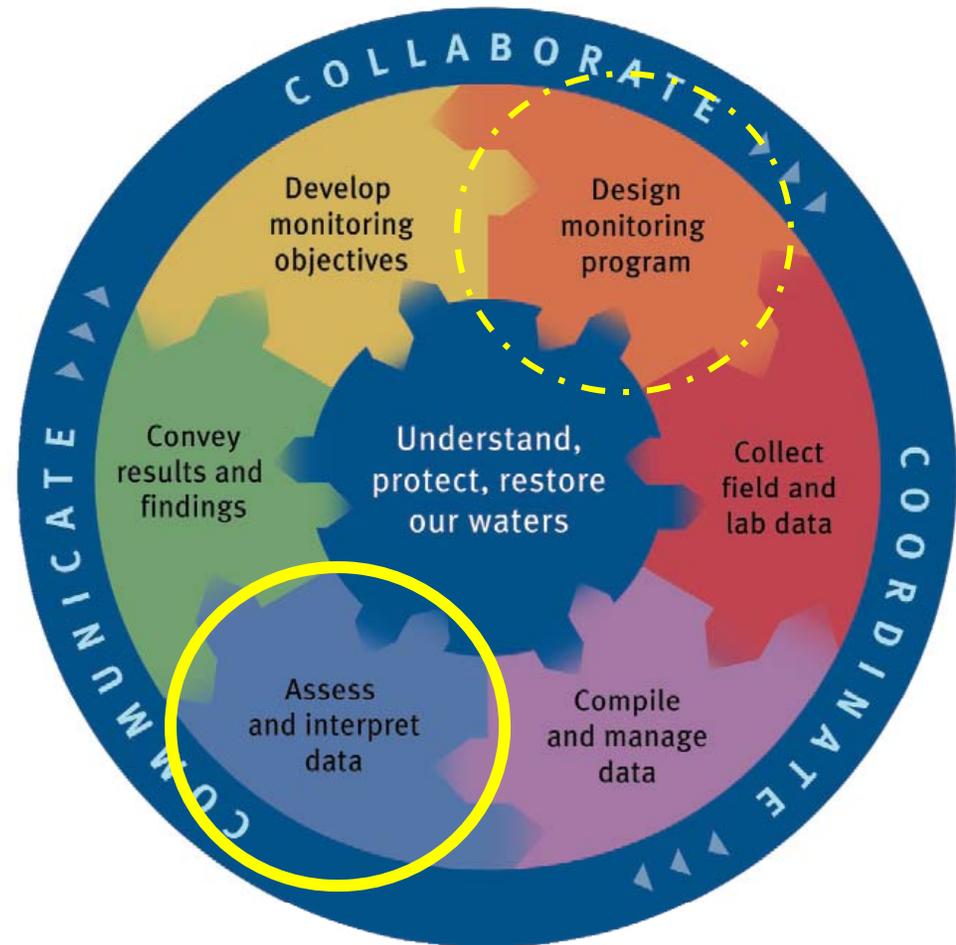
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# Need Identified by National Water Quality Monitoring Council

- Develop toolbox to support assessment & interpretation of data
- Link to various monitoring designs



National Water Quality Monitoring Council

# Response to Assessment Need

- Water Quality Statistics and Assessments (WQS&A) workgroup
  - Council formed WQS&A in 2009
  - Participants represent state (NJ, IA, UT) and federal government organizations (USGS, EPA, NPS, USDA), interstate (ORSANCO), NCAS, Battelle, Brown & Caldwell, & others
  - Conference calls in September and December 2009, April 2010
  - White paper: (<http://acwi.gov/monitoring/index.html> )

# WQSA Workgroup Objectives

- Collect & organize information on available statistical techniques & software
- Collect & organize information & guidelines on assessment methods
- Modify the National Environmental Methods Index (NEMI) database to list relevant info on statistical & assessment procedures to allow users to make informed decisions
- Future Option:
  - “Expert system” – step by step decision tree to guide water quality practitioners through detailed data analyses

- NEMI: Searchable database - chemical, microbiological, biological, toxicity, and physical methods. <http://www.nemi.gov>

Browse Methods in NEMI - Windows Internet Explorer

https://www.nemi.gov/apex/f?p=237:12:515794285643714

File Edit View Favorites Tools Help

SightSpeed Search Ask

Browse Methods in NEMI

USDA HWQ1 Cumulative Uncertainty in Discharge and Water Quality Data USDA-ARS

**Acute Toxicity Methods**

Method Number	Method Descriptive Name	Method Source
<a href="#">E-1192-97</a>	Acute Toxicity Tests for Water with Fishes, Macroinvertebrates, and Amphibians	ASTM
<a href="#">E1367-99</a>	Sediment Toxicity Test Using Marine and Estuarine Amphipods	ASTM
<a href="#">ORNL-01</a>	Toxins in Water by Chlorophyll Fluorescence	ORNL
<a href="#">Test Method 100.1</a>	10-d Survival and Growth Test for Sediments using Hyallela azteca	EPA
<a href="#">Test Method 2000.0</a>	Acute Toxicity Test for Waters Using Fathead Minnow	EPA
<a href="#">Test Method 2002.0</a>	Acute Toxicity Tests with Effluents and Receiving Waters using Ceriodaphnia dubia	EPA
<a href="#">Test Method 2004.0</a>	Acute Toxicity Tests with Effluents and Receiving Waters using Sheepshead minnow	EPA
<a href="#">Test Method 2006.0</a>	Acute Toxicity Tests with Effluents and Receiving Waters using the Silverside	EPA
<a href="#">Test Method 2019.0</a>	Acute Toxicity Tests for Waters Using Rainbow Trout and Brook Trout	EPA
<a href="#">Test Method 2021.0</a>	Acute Toxicity Tests with Effluents and Receiving Waters using Daphnia	EPA

**Chronic Toxicity Methods**

Method Number	Method Descriptive Name	Method Source
<a href="#">1367-99</a>	Sediment Toxicity Test Using Leptocheirus plumulosus	ASTM
<a href="#">Test Method 100.3</a>	Bioaccumulation Test for Sediments Using Lumbriculus variegatus	EPA
<a href="#">Test Method 100.5</a>	Life Cycle Test for Measuring the Effects of Sediment-associated Contaminants on Midge (Chironomus tentans)	EPA
<a href="#">Test Method 1000.0</a>	Larval Survival and Growth Test using Fathead Minnow	EPA
<a href="#">Test Method 1002.0</a>	Survival and Reproduction Test using Daphnids	EPA
<a href="#">Test Method 1003.0</a>	Green Algae, Selenastrum capricornutum, Growth Test.	EPA
<a href="#">Test Method 1004.0</a>	Larval Survival and Growth Test using Sheepshead Minnow	EPA
<a href="#">Test Method 1006.0</a>	Larval Survival and Growth Test for Waters Using Inland Silverside	EPA

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www.nemi.gov

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# Some Considerations

- Audience:
  - Target a wide range of users, primarily water quality practitioners
- Query results should be more than just a list of statistical and assessment methods
  - Provide several types of queries to tailor responses to specific needs
  - Provide information on key attributes, such as level of statistical expertise required, type of monitoring design for which statistical methods are applicable
- National Environmental Methods Index (NEMI) provides a useful model (<http://www.nemi.gov>)

# Next Steps

- Key statistical & assessment questions
  - Summary statistics
  - Temporal trends
  - Threshold exceedances
  - Correlations
  - Others?
- Develop a recommendation for NWQMC/ACWI
- Expansion of NEMI to include toolbox of statistical & assessment methods
- Additional members? Contact Doug McLaughlin (douglas.mclaughlin@wmich.edu)