NPS Monitoring in the 21st Century: Ohio's Vision

Jeff DeShon

Ohio EPA
Division of Surface Water
Ecological Assessment Section

1

Ohio's Clean Water Goal

To successfully achieve aquatic life use attainment in 80% of Ohio's waters by 2010.

2

Ohio EPA 319 Projects
Hierarchy of Desired Results

- Eliminate Impairments
- Restore Impaired Waters
- Reduce Pollutants
- Prevent NPS Pollution

3

Unique Features of Ohio's Water Quality Standards

- **Tiered Aquatic Life Uses**
- **Codified Biological Criteria**
- **Credible Data Law**

4

Ohio's Tiered Aquatic Life Uses

- *Exceptional Warmwater Habitat* - **preserve & maintain existing high quality.**
- *Warmwater Habitat* – **the baseline restoration goal for most streams and rivers *("default" use).***
- *Modified Warmwater Habitat* - **best attainable condition for streams under drainage maintenance or other irreversible hydromodification.**
- *Limited Resource Waters* – **irretrievable human induced conditions (e.g., virtual elimination of habitat).**

5

Biological Criteria

- **Numeric and narrative rating of biological community assemblages using indicies comprised of ecologically relevant attributes or metrics whose expectations are calibrated by "least impacted" reference site data.**
- **In Ohio, numerical biocriteria are stratified by ecoregion, aquatic life use designation, and stream or river size.**
- **Biocriteria represent a calibrated assessment tool that can foster an organized approach to goal setting in an effort to *reconcile human impacts and guide restoration efforts*.**

6

Index of Biotic Integrity (Karr 1981)

12 Metrics

- Species richness
- #Darter species
- #Sunfish species
- #Sucker species
- %Intolerant species
- %Green sunfish
- %Omnivores
- %Insectivores
- %Top Carnivores
- %Hybrids
- %Diseased individuals
- Number of Fish

Community Composition

Environmental Tolerance

Community Function

Community Condition

- 5,3,1 metric scoring categories.
- 12 to 60 scoring range.
- Calibrated on a regional basis.

7

Invertebrate Community Index (Ohio EPA 1987; DeShon 1995)

- Taxa Richness
- #Mayfly taxa
- #Caddisfly taxa
- #Dipteran taxa
- %Mayflies
- %Caddisflies
- %Tanytarsini Midges
- %Other Diptera/Non-Insects
- %Tolerant taxa
- Qualitative EPT taxa

- 6,4,2,0 metric scoring categories.
- 0 to 60 scoring range.
- Calibrated on regional basis.

8

Ohio Biological Criteria: Adopted May 1990 (OAC 3745-1-07; Table 7-15)

Huron Erie Lake Plain (HELP)

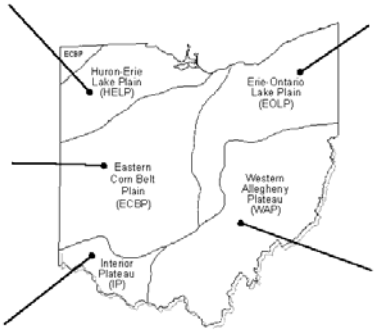
Use	Size	IBI	MIwb	ICI
WWH	H	28	NA	34
	W	32	7.3	34
	B	34	8.6	34
MWH-C	H	20	NA	22
	W	22	5.6	22
	B	20	5.7	22
MWH-I	B	30	5.7	NA

Eastern Corn Belt Plains (ECBP)

Use	Size	IBI	MIwb	ICI
WWH	H	40	NA	36
	W	40	8.3	36
	B	42	8.5	36
MWH-C	H	24	NA	22
	W	24	6.2	22
	B	24	5.8	22
MWH-I	B	30	6.6	NA

Interior Plateau (IP)

Use	Size	IBI	MIwb	ICI
WWH	H	40	NA	30
	W	40	8.1	30
	B	38	8.7	30
MWH-C	H	24	NA	22
	W	24	6.2	22
	B	24	5.8	22
MWH-I	B	30	6.6	NA



Erie Ontario Lake Plain (EOLP)

Use	Size	IBI	MIwb	ICI
WWH	H	40	NA	34
	W	38	7.9	34
	B	40	8.7	34
MWH-C	H	24	NA	22
	W	24	6.2	22
	B	24	5.8	22
MWH-I	B	30	6.6	NA

Western Allegheny Plateau (WAP)

Use	Size	IBI	MIwb	ICI
WWH	H	44	NA	34
	W	44	8.4	34
	B	40	8.6	34
MWH-C	H	24	NA	22
	W	24	6.2	22
	B	24	5.8	22
MWH-A	H	24	NA	30
	W	24	5.5	30
	B	24	5.5	30
MWH-I	B	30	6.6	NA

Statewide Exceptional Criteria

Use	Size	IBI	MIwb	ICI
EWH	H	50	NA	46
	W	50	9.4	46
	B	48	9.6	46

Credible Data Law

- In 2003, Ohio HB 43 created the Credible Data Program - in March 2006 the rules became effective (OAC 3745-4-01 though 4-06)
- Intent to encourage the collection of monitoring data by "volunteers" AND to ensure the data is valid for its intended purpose (i.e., "credible")

10

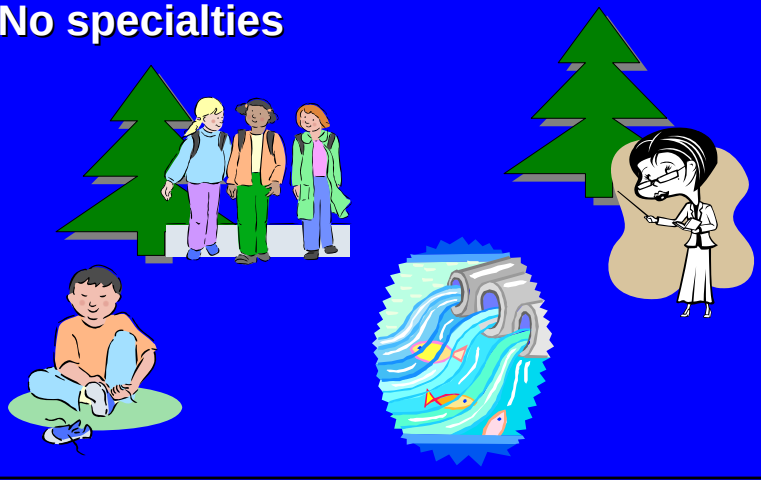
Credible Data In General

- Credible Data can be 3 Levels
- Credible Data covers 4 Specialties
  - Fish
  - Macroinvertebrates
  - Physical Habitat
  - Chemical Water Quality

11

Credible Data Level 1

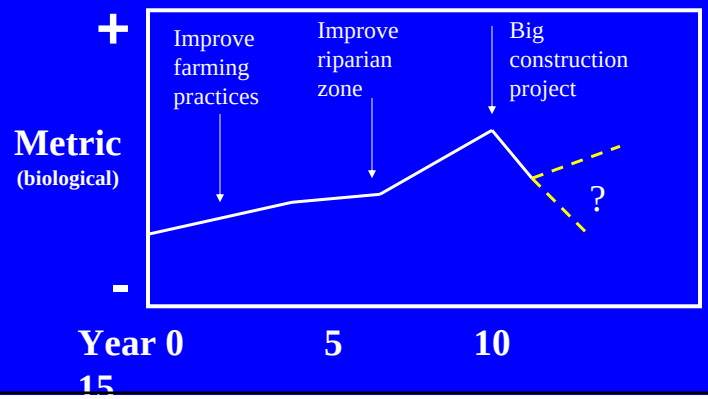
- Outreach and educational purposes
- No specialties



12

Credible Data Level 2

- Evaluate effectiveness of pollution controls and/or long term water quality trends
- Screening for water quality problems



13

Credible Data Level 3

- Regulatory purposes (use designations, use attainment, TMDLs, etc.)*
- Equivalent to Ohio EPA methodology and data quality

*Some data is credible by rule or otherwise exempt – e.g., permit data and enforcement data

14

Ohio EPA 319 Projects
Hierarchy of Desired Results

- Eliminate Impairments
- Restore Impaired Waters
- Reduce Pollutants
- Prevent NPS Pollution

15

All section 319(h) grant funded projects must also include an environmental monitoring component …

-Excerpted from Ohio EPA FFY2007 RFP

16

Subgrant Funds for Monitoring

Grant Cycle	Monitoring
FFY05	$304,538
FFY06	$508,330
FFY07	$271,294

17

FFY08 Ohio EPA RFP Monitoring Guidance

Starting with FFY08 Ohio EPA will do all of the environmental monitoring for section 319(h) funded projects.

18

Ohio EPA 319 Program
Monitoring Team Activities

Habitat Assessment | Macro. Assessment | Fish Assessment

Plus Additional Water and Sediment Sampling as Needed

~75 Sampling Sites/Year

3-5 Sites/Project

15-20 Projects/Year

19

Ohio EPA 319 Program
Fully Dedicated Monitoring Team

$100,000/year Environmental Specialist (FISH)

$100,000/year Environmental Specialist (BUGS)

+

$5,000/year 1 Seasonal Intern

$20,000/year Analytical Costs, etc.

Total Annual Cost: $225,000
($10,000-15,000 per Project)

20

Monitoring Team Outputs

For Each Project:

- Monitoring Plan
- Field Work
- Laboratory Analyses
- Data Analysis and Assessment
- Baseline & Post Project Monitoring Reports

21

Benefits

- Cost Savings
- All Level 3 Credible Data
- All Data STORET Compatible
- One QAPP for All Projects
- Project & Watershed Specific

22

Ohio EPA 319 Projects

Start-Up Monitoring Sequence

2008	2009	2010	2011
Baseline FFY08 319 Projects NRSA Sampling	Baseline FFY09 319 Projects NRSA Sampling	Post-Project FFY08 319 Projects Baseline FFY10 319 Projects	Post-Project FFY09 319 Projects Baseline FFY11 319 Projects

23

Goal-Eliminate Impairments

Cuyahoga River, Kent, Ohio

BEFORE Modification

AFTER Modification

Improved IBI Scores from 28 to 44*
Improved MIwb Scores from 8.2 to 8.9*
After Modification ICI Score 36*
Increased QHEI Scores from 51 to 80
Meets WQS Biocriterion

24

GOAL-Eliminate Impairments

Cuyahoga River, Munroe Falls, OH

BEFORE Modification AFTER Modification

Improved IBI Scores from 30 to 32
Improved MIwb Scores from 6.2 to 8.4*
Improved ICI Scores from 18 to 50*
Increased QHEI Scores from 48.5 to 71.0
*Meets WQS Biocriterion

25