



Coeur d'Alene, Idaho  
31 March – 4 April, 2003

## Wetlands Biological Assessments and Criteria

---

### Course Presenters and Contributors

Chris Faulkner, Doreen Vetter, Randy Apfelbeck, Rob Brooks, Jeanne DiFranco, Siobhan Fennessy, Russ Frydenborg, John Mack, Mick Micacchion, Kathy Mulder, Jan Stevenson, Denice Wardrop, Cathy Cresswell

National Biological Assessment  
and Criteria Workshop

Advancing State and Tribal Programs



Coeur d'Alene, Idaho  
31 March – 4 April, 2003

**WET 101**

# *Introduction to Wetland Biological Assessment*

---

*Presented by*  
**Jan Stevenson**  
**Michigan State University**

# Wetland 101 Outline

- I. Introduction to Wetland Biological Assessment
- II. Using Biological Assessments to Evaluate Wetland Quality:
  - Wetland Classification
  - Assemblage Selection and Index Development
- III. Refining Water Quality Standards Through an Aquatic Life Use Support (ALUS) Framework
- IV. Monitoring and Assessment Data Use and Application:
  - *Establishing Common Measurement Endpoints for Ambient Assessments*
    - \* Montana case study - credible data law, tiered uses using bio/phys/chem data to determine tiers, 303(d) listing
    - \* Juniata case study - randomized design, reporting wetland condition on watershed basis, disturbance gradient
  - *Mitigation Evaluations and Restoration Performance*
    - \* Ohio Mitigation Study
- V. Future Directions

# Ecological Assessment: 2 Basic Questions

1. Is there a problem with valued ecological attributes?
2. What contaminants, habitat alterations, and human activities are causing the problem?

(the same for wetlands as streams, lakes, and other ecosystems)

# Valued Ecological Attributes of Wetlands

- High functional performance (hydrologic storage, nutrient retention, productivity)
- Natural balance of flora and fauna (i.e., biotic integrity)
- Support of endangered species
- Aesthetics

# Valued Ecological Attributes

- High functional performance (hydrologic storage, nutrient retention, productivity)
- Natural balance of flora and fauna (i.e., biotic integrity)
- Support of endangered species
- Aesthetics
- **Recreational contact (microbial contact)**
- **Drinkable (taste and odor)**

# Is there a problem, e.g. a deviation from desired condition?

“chemical, physical, & biological integrity”

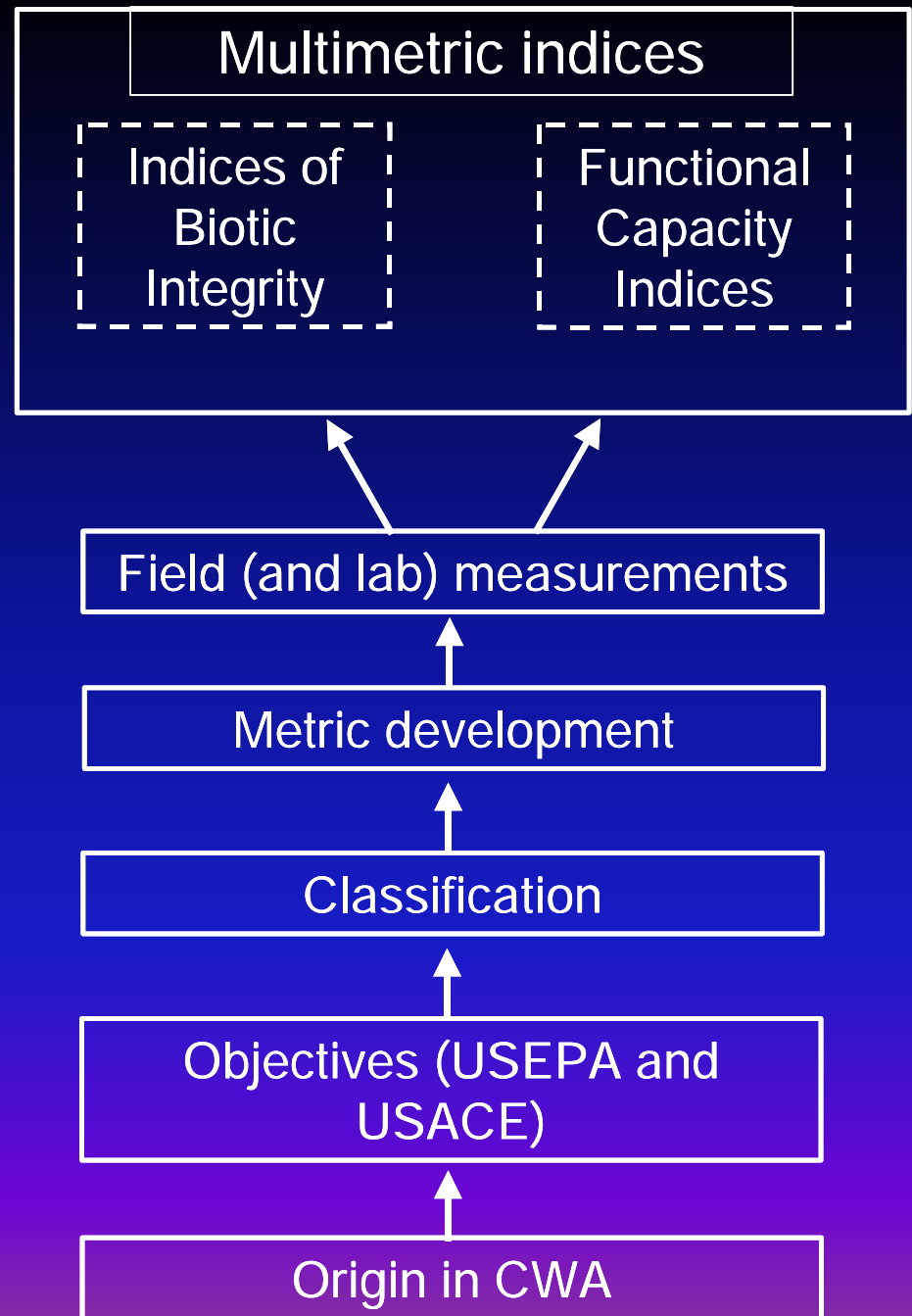
- Natural (*High*) functional performance (hydrologic storage, nutrient retention, productivity)
- Natural balance of flora and fauna (i.e., biotic integrity)
- Follow from support of ecological integrity:
  - Support of endangered species
  - Aesthetics

# ... restore and maintain the chemical, physical, and biological integrity of the waters ...

- Clean Water Act Goal
- Historically assessed by:
  - HGM Functional Assessments
    - US Army Corps of Engineers
    - 404 permitting
  - IBI-like Biological Assessments
    - US Environmental Protection Agency
    - Water quality and biocriteria requirements of CWA Sections 303, 304, 305(b), and 319



**HGM & IBI**  
**Approaches:**  
**Basically the**  
**Same**  
**(at least highly**  
**complementary,**  
**see Stevenson &**  
**Hauer, 2002)**



# Objectives & Approaches

## HGM Assessments

1. Assess wetland functions
2. Mostly measure structural attributes in field that are known to change with human disturbance
3. Calculate multimetric Functional Capacity Indices
4. Some functions are “support biodiversity”

## IBI Assessments

1. Assess “balance of flora and fauna”
2. Measure structural attributes in field and lab that are known to change with human disturbance
3. Calculate multimetric Indices of Biotic Integrity
4. Assume function maintained if structural biotic integrity supported

# Objectives & Approaches

Step	HGM (Hydrogeomorphic) Approach	IBI (Biological) Approach
Objective	Assess Function	Assess Structure
Classification	HGM Classes	HGM Classes
Measures	Structural attributes that change with human disturbance	Structural attributes that change with human disturbance
Calculations	“multimetric” functional capacity indices	multimetric indices of biotic integrity (IBI)
Assumptions	structure infers function	function supported if structure supported

# Ecological Assessment

(differs little among ecosystems)

1. Is there a problem with valued ecological attributes?

Functional & Structural Integrity

Deviation from Desired/Expected?

Compare to Criteria

2. What contaminants, habitat alterations, and human activities are causing the problem?