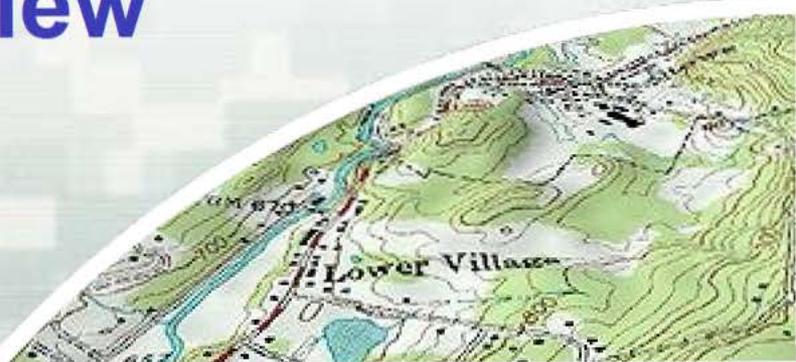


Assessment Methodology Introduction and Overview

United States Army Corps of
Engineers, ERDC



US Army Corps of Engineers
BUILDING STRONG[®]



An assessment methodology...

- Assesses *functional* gains and losses of potential impacts to aquatic ecosystems
- Evaluates and expresses the complex ecological state of a particular site using observable field indicators to inform ecosystem management



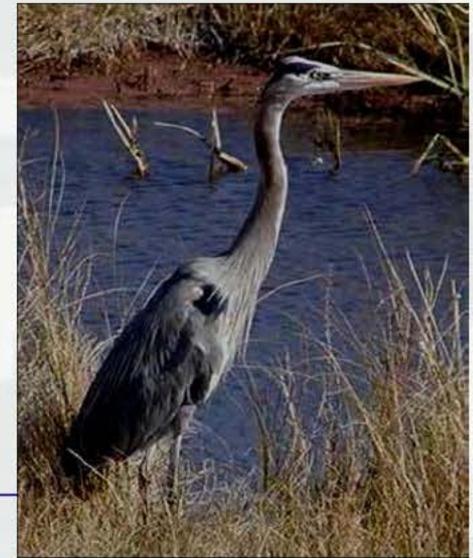
Assessment Method Mandates

- Section 404 of the Federal Water Pollution Control Act of 1972
 - ▶ ...support and maintain a balanced integrated, adaptive community of organisms having a species composition, diversity, and *functional* organization comparable to the natural habitat of the region
- 1980's "no net loss" policy
- 2008 Mitigation Rule
 - ▶ Compensatory mitigation offset loss of aquatic resource *function* by permitted impacts



What Are Functions?

- Physical, chemical and biological processes or activities that take place in aquatic ecosystems
- “Things that streams or wetlands do”



Functions versus Values

- Values are beneficial goods and services resulting from stream or wetland functions
- “Value” is the relative importance of something to society (individual or group)



Aquatic Ecosystem Functions and Values

Hydrologic Functions

dissipate flow, transport
water downstream



Biogeochemical Functions

chemical retention, removal,
transformation



Habitat Functions

support plant and animal
communities



Flood Damage Reduction
Base Flow Maintenance
Aquifer Recharge
Water Quality Improvement
Nutrient / Carbon Sink
Ecosystem Support
Outdoor Recreation
Biodiversity
Hunting / Fishing / Gathering
Aesthetics
Wood Products
Educational Activities

Use Assessment Methods to...

- Characterize baseline info at impact and mitigation sites
- Add in alternative analysis/permitting
- Avoidance and minimization
- Determine mitigation requirements
 - ▶ Identify ecological performance standards
- Determine mitigation banking credits
- Monitor and quantify success of restoration and mitigation projects



Types of Assessment Methods

- **Functional**
 - ▶ Capacity to perform individual functions
 - ▶ Qualitative measure: repeatable measurements; numerical values
 - ▶ HGM

- **Conditional**
 - ▶ General evaluation often aggregates multiple functions
 - ▶ Quantitative measure: narrative statements; high, medium, low
 - ▶ RAMs (Rapid Assessment Method)
 - ▶ IBIs (Indices of Biotic Integrity)



Types of Assessment Methods

- Reference Based (Objective)
 - ▶ Use data to support output
 - ▶ HGM
- Expert Method (Subjective)
 - ▶ Based on element of opinion
 - ▶ Best Professional Judgment (BPJ)
- Combination



Assessment Method Attributes

- Adequate sensitivity capable of detecting changes
- Easily attained in a short period of time (<1 day)
- Repeatable results
- Scientifically sound
- Not dependent on expertise
- Insensitive to seasonality



Assessment Method Comparison

Method	Func Cond	Subj Obj	Rapid	Repeat	Science	Expertise	Sensitivity	Year Round
RAMS	C	S	X			X		X
HGM	F	O	X	X	X		X	X
IBI	C	O		X	X	X	X	
BPJ	C	S	X			X		X



Assessment Method Comparison

Method	Advantages	Disadvantages
RAM	Quick, inexpensive to develop, easy to perform	Aggregates functions, user biased, variable results
HGM	Rapid, repeatable, data based, singles out functions, defensible	Expensive to develop
IBI	Community reflects multiple aspects of ecosystem condition, very sensitive to degradation	Expensive to develop, species identification knowledge required, aggregates functions, does not identify impacts
BPJ	Quick and easy	User biased, variable results



Components of an Assessment Method

- Development input
 - ▶ Individual resource managers or large team
 - ▶ Interdisciplinary experts
 - ▶ Interagency
- Clearly defined goals
 - ▶ Purpose and intended applications
- Ecosystem classification
 - ▶ Reduce variability (hydrology, vegetation, topography) to increase ability to detect differences among sites
 - ▶ Increases accuracy and repeatability by defining target ecosystem and specific functions performed



Components of an Assessment Method

- Geographic Extent
 - ▶ Area of intended application; ecological or geopolitical region
- Rapid Application
 - ▶ One day or less
- Data Based
 - ▶ Field data or available literature
 - ▶ Repeatable measurements
 - ▶ Reference standard
 - areas exhibiting undisturbed, most natural state



Components of an Assessment Method

- Peer Review
 - ▶ Technical accuracy, defensibility, encourages collaboration
 - ▶ Federal, State, Tribal, local agencies, academia, private sector
- Field Testing
 - ▶ Ensure efficient application and consistent results
 - ▶ Timeliness, clear instructions
- Documentation
 - ▶ Decision making process
 - ▶ Modifications
 - ▶ Defensible



Questions?

