Habitat Monitoring & Assessment

- Understand stressors on the biological community for assessment & listing purposes:

- Flow regime
- Habitat structure
- Chemistry
- Energy / food resources
- Biotic interactions

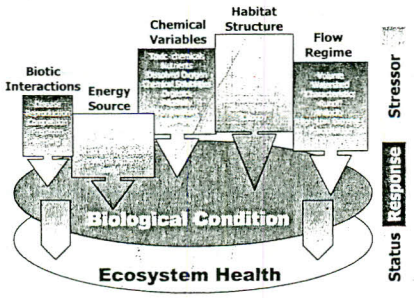

Figure 1. Five classes of environmental variables that affect water resource integrity and overall biological condition (modified from Karr et al. 1986).

Habitat assessments – Historical overview

- USEPAs visual-based Rapid Bioassessment Protocol for Habitat assessment used 1992-6
- USEPAs new habitat assessment methods used in Western EMAP study
- Shift to more quantitative methods in 1997 with "Stream Ecosystem Monitoring (SEM)" approach

SEM Habitat assessment approach

- Addresses 5 major categories of stressors by collecting quantitative and qualitative habitat data with some chemistry data

Physical Habitat structure

- Pebble count (%fines)
- Embeddedness
- 5-parameter Habitat Assessment Index
- Riparian vegetation evaluation

Habitat Assessment Index

- Riffle Habitat Quality
- Extent of Riffle Habitat
- Embeddedness in Riffles
- Sediment Deposition
- Bank Stability

Habitat assessments

- Good 15 - 20
- Impaired 8 - 14
- Very Impaired 0 - 7

ADEQ Bioassessment references

- ADEQ. 2001. Quality assurance program plan for the Biocriteria Program. Arizona Department of Environmental Quality, Phoenix, AZ.
- Lawson, L.L. 1998. Stream ecosystem monitoring procedures manual for surface water quality monitoring. Arizona Department of Environmental Quality, TM98-8. Tucson, AZ.
- Lawson. 1999. Diatom classification in AZ.
- Gerritsen, J. and E.W. Leppo, 1998. Development and testing of a biological index for warm water streams of Arizona. Tetra Tech, Inc. Owings Mills, MD.
- Leppo, E.W. and J. Gerritsen. 2000. Development and testing of a biological index for cold water streams of Arizona. Tetra Tech, Inc. Owings Mills, MD.
- Spindler, P.H. 2001. Macroinvertebrate community distribution among reference sites in Arizona. Arizona Department of Environmental Quality OFR 00-05. Phoenix, AZ.
- Spindler, P.H. 2004. Stream channel morphology and macroinvertebrate community associations in the San Pedro River and Verde River Basins of Arizona, 1999-2002. Arizona Department of Environmental Quality OFR 04-01. Phoenix, AZ.

USEPA Bioassessment references

Barbour, M.T., J. Gerritsen, B.D. Snyder, J.B. Stribling. 1999. Rapid Bioassessment protocols for use in wadeable streams and rivers: periphyton, benthic macroinvertebrates, and fish, Second edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

Klemm et al. 1990. Macroinvertebrate field & lab methods (See USEPA citation below)

Lazorchak et al. 1998. EMAP field operations & methods for measuring ecological conditions of wadeable streams.

USEPA. 2000. Stressor identification guidance document…

USEPA. 2002. Summary of biological assessment programs & biocriteria development for States, Tribes...

Bioassessment websites

- www.adeq.state.az.us/environ/water/assessment/bio.html
- www.epa.gov/ost/biocriteria/index.html
- www.csg.org/CSG/Policy/environment/national+biological+assessment+and+criteria+workshop.htm
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