

5 April 2002 draft

## Summary of the BAWWG/ALUS Technical Meeting

February 26 - March 1, 2002

Baltimore, MD

### Executive Summary

*Please see attachments for list of attendees.*

The objectives of this meeting were as follows: 1) develop guidelines for tiered aquatic life use support (ALUS) in wetlands; 2) expand the scope of ecological assessment of wetlands; and 3) explore issues for implementation of tiered uses and solutions to problems that could arise. The general consensus of the meeting participants was that the tiered aquatic life use framework has the potential to be a useful and appropriate conceptual framework for wetlands, if the framework is further refined.

During the workshop, one breakout group evaluated plant data and one group evaluated invertebrate data, and they both used the ALUS framework to assign their sites to tiers. Both groups reached moderate consensus on the tiers, although the invertebrate group's consensus was greater than that of the plant group. The invertebrate group also tended to find the language in the framework more appropriate for their data than the plant group did, and they were more comfortable than the plant group with placing the Clean Water Act (CWA) integrity objective at the bottom of tier 2 and the CWA interim goal at the bottom of tier 4. After running through the first data exercise, groups suggested wording changes and offered possible example scenarios for their assemblages. In addition, the groups discussed ways in which the ALUS framework could be broadened to explicitly include other axes, such as those encompassing physical (e.g., hydrology) and chemical integrity.

Participants raised a number of issues and concerns throughout the meeting. One major issue was regarding the relatively high number of wetlands that might fall into tier 5, and thus be below the CWA interim goal, using the current framework. Many meeting participants were concerned that this framework might lead to more wetlands being "written off" because lower quality wetlands are deemed suitable for filling in many wetland management programs. The group also discussed whether a wetland's function might change more than minimally yet still be meeting the interim goal of the CWA and to what extent it is necessary to address 404-related issues while developing the ALUS framework. Some other concepts discussed included possibly adding a requirement for additional data when a site is in the "gray area" between tiers 2 and 3 and tiers 4 and 5, and holding sites to a higher threshold when less data is available for decision-making (i.e., taking a conservative approach).

At the end of the workshop, many of the participants expressed interest in continuing to work on the ALUS framework. Some "next steps" suggested by the workgroup include the following: 1) Participating in the upcoming larger ALUS workshop in March, 2002, in Annapolis, and sharing some of what was discussed at this workshop to get reaction from "streams people"; 2) Further developing the example scenarios based on available information; 3) Testing this conceptual model with new data; 4) Getting feedback from those working on assemblages other than plants and invertebrates, and asking them to develop an example scenario for their assemblage; 5) Figuring out the best way to develop comprehensive, regionally-specific lists of sensitive/tolerant taxa, and completing those lists as soon as possible (this particular item was repeatedly mentioned throughout the meeting).

*5 April 2002 draft*

**Tuesday, February 26, 2002**

**Introductions**

Doug Hoskins (U.S. EPA Headquarters; Office of Wetlands, Oceans, and Watersheds; Wetlands Division) welcomed participants, gave a brief history of the tiered Aquatic Life Use Support (ALUS) work occurring since 2000, and reviewed the objectives of this workshop.

**Tiered Aquatic Life Uses and Biological Assessment**

**Susan Jackson (EPA HQ, Office of Science and Technology, Health and Ecological Criteria Division)**

Power point presentation file available.

Jackson provided a brief introduction to the CWA and WQS. She then explained EPA's long term goal - the adoption of refined aquatic life uses and biocriteria by States and Tribes in a nationally consistent manner as part of their WQS - and how this current ALUS work is expected to help. She gave a short history of some of the ALUS work that has been done so far and showed how existing tiered aquatic life uses in Maine and Ohio relate to the ALUS framework. Maine's aquatic life uses are supposed to apply to all fresh surface waters, including wetlands, (although the application to wetlands has been inconsistently interpreted in the state). Ohio's tiered use framework currently applies only to streams, but they are working on creating a tiered use framework for wetlands (all wetlands now have a general "wetland use" in Ohio).

Some of the key points Jackson emphasized include the following: 1) The framework is conceptual; 2) the number of tiers is to be determined by each State or Tribe, depending on their needs and the discriminatory power of their approaches; 3) a "best fit" approach, rather than some sort of checklist approach, is recommended; and, 4) the framework may be quantitatively defined by many different methods.

Some participants were confused about some concepts surrounding existing uses, designated uses, and antidegradation. Jackson spent some time explaining how the ALUS framework addresses designated uses, but can "add teeth" to antidegradation policies. She also explained that a designated use can be an "existing use" (i.e., existing on or after November 28, 1975) or a use designated as a restoration goal.

There were also questions about how WQS relates to traditional wetland programs, which allow wetlands to be filled. There was some disagreement about how different the mindsets are among people dealing with wetlands versus other water body types. Several people indicated that states have different institutional barriers for wetlands than for other water body types. One state participant said that he thinks the biocondition axis makes a lot of sense, although he is not yet sure how to implement it. He also commented that education on how to implement the framework will be important to the success of this effort

**ALUS, Wetland Assessment, and the Clean Water Act**

**Doreen Vetter (U.S. EPA HQ, Wetlands Division)**

Power point presentation file available.

*5 April 2002 draft*

Vetter explained how wetland water quality standards relate to various aspects of water quality management, and she gave particular attention to the link with wetland monitoring. She also presented some information about specific on-going efforts, such as the development of guidance on Elements of an Adequate State Monitoring and Assessment Program, the formation of a National Wetland Monitoring Workgroup, etc.

There was discussion of the lawsuit by the American Littoral Society and the Sierra Club about TMDLs for wetlands in PA and DE. The settlement agreement calls for the development and implementation of wetland assessment methods. Possible lawsuits relating to inappropriate WQS for wetlands were also briefly discussed.

### **Workshop Overview**

**Jan Stevenson, Michigan State University**

Power point presentation file available.

Stevenson briefly reviewed meeting objectives, agenda and possible outcomes as well as the current conceptual framework and model for the Tiered Aquatic Life Use.

### **Biological Condition Axis: Stream Model**

**Tom Danielson, Maine Department of Environmental Protection**

Power point presentation file available.

Danielson presented information about ME's existing designated use system and how it relates to the ALUS framework currently under development. He showed some of ME's stream data and how they match quite well with the language in the ALUS framework. Despite the framework's usefulness as a conceptual and communication tool, Danielson emphasized the importance of not using it as a checklist or as a replacement for developing Indices of Biotic Integrity (IBI), etc.

During the presentation there was discussion of how ME uses its tiered uses. MDEP works closely with those working on land use, and they try to use the tiers in an antidegradation context. They also use the tiers to ratchet up water bodies if water quality improves. Usually, the appropriate class for a stream reach is clear based on a single sampling and is consistent year-to-year. They sometimes resample if the appropriate class is not obvious.

Frydenborg complimented ME's work, but pointed out the dependence on how well organisms are classified and the potential for circular logic in this kind of approach. Organisms are "good" because we see them at "good" sites; sites are good because we see "good" organisms there. Russ suggested the need for formalizing the lists of organisms that are sensitive, tolerant, etc. Jackson said that well-defined reference sites are important, and Stevenson added that we need experimental data in addition to correlational information - we need to better establish cause-and-effect relationships.

### **Application of the Biocondition Axis to Wetlands**

**Jan Stevenson, Michigan State University**

Power point presentation file available

Stevenson explained that states are basically trying to accomplish the same things, although they may use

5 April 2002 draft

different approaches (e.g., IBI, RIVPAC). Using different indicators in combination with one another can give us a more complete understanding and can give us early warning indicators so that we can avoid reaching particularly undesirable effects. Nonlinear relationships between bioindicators and stressors help with setting scientifically defensible criteria - we can look for thresholds. Stevenson used a series of graphs to review and discuss the different approaches to setting criteria: non-reference site reference approach; reference site-based approach; and effect-threshold approach.

The group discussed the extent to which human disturbance needs to enter into the workshop discussions. Those working on wetlands have historically given a lot of attention to land use. There was discomfort among some participants about focusing on the biocondition axis without concurrent focus on the human disturbance gradient. Jackson explained that the human disturbance gradient is still being considered, just more in the background for now. Prior to this meeting, it was decided that everything could not be adequately tackled at once, and the biocondition axis was a chunk that could be addressed well in a single workgroup meeting.

### **Linking HGM and IBI Assessment Approaches and Application to Tiered Aquatic Life Uses**

**Ric Hauer, University of Montana**

Please contact presenter for copy at [ric.hauer@montana.edu](mailto:ric.hauer@montana.edu)

Hauer explained some of the differences between IBI and HGM with respect to terminology, metric development, etc. (A paper by Stevenson and Hauer that discusses HGM and IBI will be published in an upcoming issue of the Journal of the North American Benthological Society.) Hauer also provided an example from Montana about the importance of habitat connectivity to functioning. The group discussed functions, values, etc., and the need for additional development of good indicators of function. Hauer emphasized the validity of linking IBI and HGM information.

### **Tiered Uses, Wetland Response, and the Human Disturbance Gradient**

**Denice Wardrop, Pennsylvania State University, and Siobahn Fennessy, Kenyon College**

Power point presentation file available.

Fennessy showed some relationships between land use and wetland structural and functional indicators. Wardrop showed data from Pennsylvania illustrating that different wetland types respond differently to stressors.

### **Conceptual Application: A Case Study from Florida**

**Russ Frydenborg, Florida Department of Environmental Protection**

Power point presentation file available.

In FL, they have been using the Landscape Development Index (LDI), based on estimated nonrenewable energy use on the land within 100 m of the water body of interest. They are finding the index works well as an independent measure of a disturbance gradient and allows them to distinguish between reference and impacted sites. They are developing multimetric indices for algae, macrophytes, and macroinvertebrates in wetlands, and they hope to eventually add wetlands into their rotating basin monitoring program, although that may not happen if the state experiences large staff cuts as expected.

In the subsequent discussion, Rob Brooks (Pennsylvania State University) expressed some concern about the level of effort needed to use the ALUS framework. States may not have the resources to do many

*5 April 2002 draft*

intensive wetland assessments anytime soon. Landscape-level and rapid assessment-level assessments can be done with relatively little effort. These approaches can be calibrated with the more intensive studies, but intensive studies will be necessary to meet some objectives.

Ainslie explained that in Region 4, they are trying to develop the GIS capabilities for broad level assessments. They want to offer states a completed prioritization scheme. He thinks that the ALUS framework is applicable to their work. The group discussed remote assessments and their usefulness. Jeanne DiFranco (Maine Department of Environmental Protection) emphasized that landscape level evaluations are predictive tools, not really assessment tools. Vetter said that landscape-level assessments may be able to predict condition with about 70% accuracy - that may be good enough for some decisions. Hauer added that rapid advancements in technology may soon improve what can be done with remote sensing.

### **Ohio's Wetland Program** **Siobahn Fennessy, Kenyon College**

Ohio's program includes narrative and numeric (chemical) criteria that apply to wetlands, a "wetland designated use," and an antidegradation categorization rule that applies to wetlands. They also recently (i.e., post-SWANCC) added an isolated wetland state permitting rule. They are developing a tiered aquatic life use system for wetlands, with Indices of Biotic Integrity calibrated for each wetland class.

Because some of Ohio's designated uses are below the CWA interim goal, when they report against uses (e.g., for 305(b) purposes) they may show that almost 100% of waters meet their uses. The biocondition axis may help with communicating where the water bodies in Ohio really are along the condition gradient. The group discussed the potential for using historical information for places in which the best sites are too degraded to serve as good reference sites.

### **Roundtable Discussion**

Discussion focused on several issues including the states' ability to implement the framework, the need to focus on framework development and not implementation, the need for ALUS to apply to any waterbody type, the benefit of focusing on an aquatic life use which represents a comparatively sensitive designated use type, and the need to put the framework into a simple package to be used to market idea to states with differing interests and resources.

**Wednesday, February 27, 2002**

### **Application of Tiered Aquatic Life Uses to Wetland Management**

**Bill Ainslie, U.S. EPA Region 4**

Power point presentation file available.

Ainslie reviewed the basic elements of water quality standards and Section 404, and then discussed the applicability of wetland water quality standards within the 404 (b)(1) Guidelines. Ainslie explained that IBI and HGM essentially measure the same thing, but HGM is just more explicit in addressing some functions.

5 April 2002 draft

The group discussed 401 and 404 issues, such as the extent to which ALUS could come into play, e.g., in steps 2 and 3 of the 404(b)(1) guidelines. The group also explored the possible use of ALUS for defining "significant degradation," e.g., mitigation wetlands must achieve the tier of the lost wetlands, and the highest quality wetlands should not be filled because they can't be replaced. Several people suggested that good WQS for wetlands should help with state 401 certification decisions. Jackson added that a companion piece may be needed for the ALUS guidance - discussing what monitoring is adequate for using the conceptual model in a way that minimizes challenges to the data. There was broad agreement on including physical and chemical parameters along with the biological variables in order to more comprehensively address traditional wetland functions. In addition, there was a suggestion to develop case studies of how ALUS could be used (e.g., for permitting).

### **Data Exercise**

#### *Invertebrate group*

Main points that came out of the breakout group's evaluation of the data sets and subsequent discussions include the following:

- 1) ALUS seems to apply well to wetlands, based on invertebrate data from FL, MN, and ME. However, other assemblages should be evaluated carefully too.
- 2) Seemingly bigger jumps between tiers 2 and 3 and between tiers 4 and 5 are okay. Between these tiers could be big "gray areas" - if the site falls into a gray area, then more data may be needed before assigning a tier.
- 3) The breakout group discussed whether ecosystem function attributes really belongs in the list of biological attributes or whether some of those functions would fit better along another axis.

#### *Plant group*

Using metrics rather than raw data, the group found more agreement. The group went through each of the tiers and suggested changes to make the wording better apply to wetlands

Main points that came out of the breakout group's evaluation of the data sets and subsequent discussions include the following:

- 1) In general, the group gave the axis a "thumbs up."
- 2) It is important to include bird/other wildlife/etc. people in the future to make sure this works for them too
- 3) Plants may be different enough to need their own table of attributes. The group thought it would be useful to first consider a very detailed approach to plants, and then see if that detailed plant axis could be condensed into the same biocondition axis as that for fish, etc.
- 4) It wasn't necessary to translate each of the attribute terms to wetlands "1 for 1" to use the tiers.
- 5) There was a lack of information to know whether they really have tier 1's or tier 6's.

#### *General discussion*

When the ratings of the plant group and the invertebrate group for the same sites were compared, the groups came up with a basically similar patterns, although they sometimes differed by 1 tier in the assignment. It was suggested that in such cases, more data would be needed to determine the appropriate tier.

*5 April 2002 draft*

People tended to be hesitant to call a site a "1" based on just the data in front of them. It was suggested that for future similar data exercises, participants would be told what tier the top site likely was (i.e., so everyone has an idea of what a "1" is supposed to look like for the particular water body type and region.) The group felt that the limited number of people with expertise in each of the breakout groups limited how productive the exercise was. It also was suggested that data providers include calculations of "metrics" that go along with the biocondition axis (e.g., # sensitive taxa). The consensus was that work still needed to be done on the ALUS framework, but overall it seemed to work.

## **Thursday, February 28, 2002**

### **Invertebrate breakout group discussion**

(see attachment for attribute matrix work)

Group members included MacIntosh, Bliel, Brooks, DiFranco, Faulkner, Frydenborg, Hauer, Jackson, Raffini, Tillman, and Yuan

The group agreed that human values/ecosystem services should not be a part of the biocondition axis, although they might eventually play a role in communication to the public. The group also talked about the need to stay focused on "departure from natural" as the way to assign tiers. The group spent some time debating some wording issues (e.g., evident vs. moderate), and some people believed that a non-native dominated system should be lower than tier 3. They suggested that the exception to the rule should be noted if necessary (e.g., stocked salmonids), but not made the rule. There was discussion of the concept that human disturbance is the only truly independent variable, and that others, like hydrology, may be dependent or independent, depending on how one is looking at things.

### **Plant breakout group discussion**

(see attachments for attribute matrix work and specific language suggestions)

Group members included Ainslie, Fennessy, Hoskins, O'Neill, Rider, Schweisberg, Stevenson, Vetter, Wardrop, and Wigand

The group discussed how reference was being defined for this framework. Stevenson answered that they are thinking about pre-Columbian with minimal human impact. There were some questions about whether records of that historical condition are available and practical to use. There was some discussion about what a tier 6 looks like. Are tier 6 sites irretrievable? The group discussed what the tiers meant and which attributes helped make the decision between certain tiers. For example, the landscape attributes seemed to be more important for deciding among lower tiers. Many in the group expressed the view that it is uncommon for wetlands to have changes in structure without similar changes in function. There was some discussion about how to deal with function and define function. Some ideas included looking at functions based on how they change with structure and the possible use of existing systems, e.g., HGM, to help. Wigand suggested using a term like "life-support functions" to include functions like habitat, food supply, and water quality.

*5 April 2002 draft*

### **Whole group discussion**

The group discussed whether structure started changing before function or whether they changed simultaneously. The plant group said that there may not be as much functional redundancy in plants as animals. They also discussed how to account for the function of plants as habitat structure.

Not everyone was comfortable with there being so many tier 5 wetlands. People were struggling with wanting to “call it as it is” and ensuring that we don’t needlessly doom some wetlands to getting filled because they are “low quality.” Wigand suggested that the language could be changed for the tiers to allow for greater changes in structure and function at the higher tiers.

The group debated whether attributes 9 and 10 should be removed from the biocondition gradient. Some people didn’t think the attributes fit, but Wardrop offered that she would use landscape connectivity to make some decisions about how to assign tiers (e.g., between tiers 4 and 5). The consensus seemed to be to leave attributes 9 and 10 in for now, although they do get at different things than the rest of the attributes.

## **Friday, March 1, 2002**

### **Morning discussion**

The invertebrate group noted that they found it difficult to detect changes in relative abundance before starting to lose sensitive taxa. Stevenson noted that the axis is idealized - it should make sense conceptually even if we can’t capture it all with our methods. O’Neill added that plant changes in relative abundance probably could be picked up with their methods.

The group discussed the pressing need for agreed-upon lists of sensitive and tolerant species. The lists should be easy to use and account for differences among regions, HGM classes, etc. The group discussed the need for experts to agree upon how the sensitivity/tolerance of species will be decided. There is already a lot of work from which to draw (e.g., work of NWI committees, Adamus). Because of the great need, a meeting on this subject probably should be scheduled for sometime within the next year.

Brooks and Hauer suggested that some of the functions of plants could be covered in axes other than the biocondition axis. For example, the structure of plants could be separated out as a physical attribute relating to habitat, and the role of plants in biogeochemical cycling could be on a biogeochemical axis. Wigand added that plants are “eco-engineers” in wetlands. The plant group wasn’t sure how much functional redundancy there is among plant taxa. They also talked about how some functions may change more quickly than others.

There was a discussion about the response of States to this framework. On the one hand, it may make it harder for them to move undetected from tiers 1 to 4, as they may be doing now. On the other hand, it may help states protect higher quality waters and allows clear incremental restoration goals. Jackson also added that this framework can be the basis for long-term efforts to build state monitoring programs. Some people are concerned that some waters may get lower use assigned (e.g., in Ohio, where some uses are below the interim CWA goal). Frydenborg said that this ALUS construct helps to structure the thinking that

*5 April 2002 draft*

BAWWG has been doing for years - the group should embrace it. Difranto added that it is important to clarify that this isn't an assessment method in itself, though. The group discussed the need to raise the bar for uncertainty - if fewer data available for making a decision, then a higher threshold is used.

Brooks showed a table with some examples of how parallel y-axes might look., with ecological integrity consisting of biological, physical, and chemical integrity and all of the interactions. He also included a column in the table to account for restoration options, depending on stressors; he thought it could be useful to provide people with information about some management options. Brooks offered that even though connectivity may not be explicitly adopted as part of WQS, it can be accounted for by establishing relationships between biota and connectivity (e.g., with this connectivity, we get this biology). Ainslie noted that some of the ideas that Brooks mentioned could be useful early warning indicators. Brooks added that some things, like landscape attributes, can be measured relatively cheaply and may be particularly useful indicators. Wigand pointed to the need for developing metrics that directly measure ecological integrity, not limiting our look at ecological integrity to the sum of the other columns.

Hauer provided an example of how tiers for hydrologic and geomorphic condition might look for western riverine systems, although the wording could be made more general to account for hydrologic and geomorphic condition of other types of system.

Stevenson raised the question about how much we need to match up the physical and chemical axes with the biocondition axis. People offered different insights on that question. For example, either physical or chemical might link to the biological axis; it doesn't have to be both (e.g., acid mine drainage). The biocondition axis may be good for designating uses, while the other axes may be good for developing management approaches. The parallel axes help people who aren't as comfortable with the biology find an area with which they are comfortable - good for communication.

The group discussed, although didn't really resolve, the concurrent versus iterative evaluation of management issues - to what extent do we need to worry about 404, etc. implications now? We don't want to derail the entire effort by getting mired in 404 issues but we also need to avoid unintended negative consequences as much as possible. If we can think about some of these issues and deal with them ahead of time, then we can perhaps minimize later problems. Difranto said that we need to be sure to communicate this work widely among water programs (e.g., NPDES, 319) - she's excited about it but some others in the state are ignoring so far.

The group wanted to continue the discussion within BAWWG and to get the reaction of the larger ALUS group to what was covered at this meeting. They also expressed interest in further developing the example scenarios based on available information and testing this conceptual model with new data. Another suggestion was to get feedback from those working on assemblages other than plants and invertebrates, and ask them to develop an example scenario for their assemblage