

## STAFF RESPONSE

### Oregon Roundtable on Sustainable Forests Preliminary Evaluation of Indicator of Sustainable Forest Management



#### Indicator D.b.: *Biological integrity of forest streams*

Current desired trend/target:

Index of biotic integrity values in forested Oregon watersheds are stable or improving.

The following is a response by Oregon Department of Environmental Quality technical and policy staff to the March 9, 2011 Oregon Roundtable on Sustainable Forests preliminary evaluation of Indicator of Sustainable Forest Management D.b.: *Biological Integrity of Forest Streams* (this evaluation can be accessed at: [http://www.oregon.gov/ODF/indicators/docs/Draft\\_D\\_b\\_Evaluation.pdf](http://www.oregon.gov/ODF/indicators/docs/Draft_D_b_Evaluation.pdf))

The current data report for this indicator can be accessed at:  
<http://www.oregon.gov/ODF/indicators/indicatorDb.shtml>.

This report reflects the changes described below with the exception of pending changes to the report graphics to remove graphics related to fine sediment stress and temperature stress.

#### Key Roundtable findings

- The science is clear but it remains unclear to some how to interpret the data and what conclusions can be drawn from the information.
- Improve terminology and maybe get away from using the term “disturbance” altogether. Perhaps “degree of variance from reference conditions.”
- Increased sample sizes would be an improvement, particularly in Eastern Oregon. Increased probabilistic sampling will improve statistical strength.
- Report raises unanswered questions about what is happening on family forestlands that is different than other forest ownership classes. Better identify ownership--more detailed analysis needed.
- Strength of protocol will be better known once a trend can be established.
- No trend is available. Future data collection is needed to establish a trend.
- Need to provide criteria on what numbers would have to be to be considered in “good” or “poor” condition.
- Recommend changing the trend rating to “not available.”
- Need to provide criteria on what numbers would have to be to be considered an “improving” or “deteriorating” trend.
- Concern about reduction in funding for continued future data collection.

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- The report should be simplified for better reader comprehension.

### **Changes Made to the Indicator Report in Response to Key Roundtable Findings**

Terminology regarding “least disturbed” and “most disturbed” have been replaced with new terms (see below).

Text under “Condition” related to temperature stress and fine sediment stress has been deleted.

Once new graphics have been prepared, the online report will be modified to only show results related to the PREDATOR analysis.

### **Staff Responses to Roundtable Comments**

- **Improve the terminology:** We agree that the terminology can be a hurdle to overcome in our portrayal of the biological conditions to the public. To date, we have been unsuccessful in using language deemed to be acceptable by all. To that end, we propose using the following condition classes (and definitions):
  - equivalent to reference richness (little reference taxa loss or modest reference taxa gained)
  - increased richness (considerably more reference taxa than expected)
  - modestly decreased richness (modest reference taxa losses)
  - considerably decreased richness (considerable reference taxa loss)
  - Other iterations of the condition terminology ODEQ has used at one point or another include:
    - Good, Fair, Poor (some people do not like the “values” associated with these words)
    - Not impaired, slightly impaired, impaired (again, the “value” of impaired causes some folks heartburn)
  - Hopefully these new terms are more palatable to all. With these newer terms it becomes clearer that a site shares a degree of similarity in the types of aquatic bugs found at the most appropriate reference sites.
    - Observed differences then should be examined to determine if they are due to natural causes (natural sources of disturbance [landslides, fires, etc.], inaccurate modeling or sampling) or human activities (anthropogenic disturbances).
    - ODEQ would determine the relative contribution of human disturbances by screening for all human activity types affecting the site (watershed and local scales). If human activities are beyond levels observed at regionally appropriate reference sites, then the site would be considered impaired by human disturbances.
- **Deficiencies in the current data and analyses:** There is no doubt that the dataset was not sufficient to adequately represent conditions of forest lands across Oregon. Additionally, there was some concern about the determination of ownership.
  - Conditions in Western Oregon are likely characterized fairly accurately, due to large

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sample sizes and mostly random site selection. This was not the case for Eastern Oregon forest lands, as sample sizes were much smaller and dominated by publicly owned lands. This assessment of forest lands relied entirely on “found data”, that is, we used all data ODEQ had already surveyed and summarized. None of the biomonitoring projects at ODEQ have ever been established with the intent of characterizing forest lands exclusively. ODEQ proposes that future biomonitoring projects stratify by landuse types so that we can accurately describe the conditions across the landscape.

- Private Non-industrial forests had higher percentages of sites in the “considerably decreased richness” biological condition (formerly “most disturbed”), compared to all other forest land ownership classes. There was considerable discussion about the potential reasons for these differences, as well as suggestions for ways to improve upon ownership determinations. ODEQ agrees that the methodology for determining ownership was coarse and imperfect. This was the most contentious aspect of this project and the final methodology was accepted after much debate. In the end, the time, resources, and initial intent of this report precluded more detailed and likely more accurate ownership determinations. ODEQ recommends future work along these lines explore more accurate GIS layers to identify ownership, potentially using aerial photos to more precisely filter out those land uses not considered target, or to more accurately parse out additional forest land use classes of interest (Christmas tree farms, nurseries were specifically mentioned).
- **Deficiencies in future data and analyses:** Without a doubt, this indicator is “imperiled” in regards to its ability to describe conditions of forest lands in the future. In this report we assessed the biological conditions of 1025 sites, monitored from 1999 – 2008. Current ODEQ funding supports the monitoring of about 50 sites—every five years.
  - Obviously other data sources must be explored in order for this to be a useful indicator.
    - Federal forest lands are likely to be adequately monitored by the USFS’s PIBO and AREMP programs. (Time and funding constraints precluded us from incorporating their data into this current analysis.)
    - To our knowledge, no systematic biomonitoring program exists for other forest ownerships.
    - ODEQ can offer in-kind support for monitoring design, training in field methods, and direct assessment and interpretation. Still, a significant investment will need to be made in actual monitoring and sample processing for private forest lands.
  - Given the lack of consistent funding for monitoring biological conditions on forest lands, future assessments of “Strategy D: Protect, maintain, and enhance the soil and water resources of Oregon's forests” are likely to be less than adequate. Not that adequate funding exists for either indicator D.a. or D.b., but if it comes to prioritizing one over the other, ODEQ recommends indicator D.b. receive the highest priority.
    - While the indicator used for “D.a. Water Quality of forest streams” (the

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Oregon Water Quality Index) is a fine tool to assess general water quality, it does have its limitations—especially in regards to forest streams which typically occupy the upper parts of Oregon’s watersheds and river basins. The OWQI was developed to assess conditions on larger rivers. The OWQI is at its best with long term, consistent monitoring at specific sites—something that would be expensive and difficult to implement across Oregon’s forested landscape.

- The models used to determine biological condition are based on samples taken from smaller streams across the state, and are thus more likely reflective of natural conditions of forested streams. Biological communities are shaped by the daily, seasonal, and annual variability of habitat and water chemistry. Thus, a single sample is much more likely to represent the true conditions of a stream than a single water quality sample. Also, biological communities respond to all potential stressors in the stream, while the OWQI has limited ability to detect stresses due to toxics, sedimentation, etc.
- **Need to provide criteria for condition classes:** We have no problem with presenting the criteria. The only real question is where the criteria should be presented. It was left out of the summary report because the benchmarks for biological condition were considered to be finer details that could be referenced (see link for “Hubler 2008” in the Reports and References section). Because there are multiple models for assessing biological condition, a table is necessary to present the benchmarks for each condition state and model. We leave the final decision on where to post this information (in the summary or in the reference) to ODF staff.
  - If brief statements are desired, here are ODEQ’s suggestions:
    - “sites considered ‘considerably decreased from reference’ exhibit between 15-22% reference taxa loss or more”
    - “sites considered ‘modestly decreased from reference’ exhibit between 9-14% or 8-21% reference taxa loss, depending on model region”
    - “sites considered ‘equivalent to reference’ exhibit less than 7-8% reference taxa loss”

On a statewide basis, the condition rating for this indicator will be considered

- “good” when at least 70 percent of the sample points are “equivalent to reference richness” or “increased richness,”
- “poor” when less than 40 percent of the sample points are “equivalent to reference richness” or “increased richness” or more than 40 percent of the sample points are “considerably decreased richness” and
- “mixed or fair” under all other situations.
- **Need to provide criteria for trends:** Trends information doesn’t actually exist at this time, as the analyses haven’t been performed. Also, the only areas that these analyses could potentially be used are within the Oregon Coastal Coho ESU, as part of the Oregon Plan datasets. (Keep in mind, however, that even these macroinvertebrate data are no longer collected.) Potentially USFS AREMP and PIBO data could be trended. ODEQ uses an 80% confidence level for trends associated with our ambient water quality monitoring data, over a 10 year period. Once trend information becomes available, on a statewide basis, the trend rating for this indicator will be considered:
  - “improving” when at least 30 percent of the sample point are in an improved condition since

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the last measurement and no more than 10 percent are in a deteriorating condition, “deteriorating” when at least 30 percent of the sample point are in a deteriorated condition since the last measurement and no more than 10 percent are in an improved condition,” and “mixed” under all other situations.

- “mixed” under all other situations.
- **Clarify indicator is just using PREDATOR information and not the displayed fine sediment and temperature stress data:** Agreed. For clarity, these indicators should be removed from the summary report. The Fines Sediment Stress and Temperature Stress indices are available as an interpretive aid into potential non-point source stressors likely to strongly influence macroinvertebrate communities. The information will be retained and available for interpretation in the report provided to ODF as part of this study (Hubler et. al 2009).
- **Information about what the likely stressors are should be included:** That is provided with the stressor ID indices discussed above. For clarity, this information should be removed from the summary report, but ODEQ recommends some statement in the summary report stating that more in-depth interpretations are to be found in Hubler et. al 2009.
- **Reference Conditions--Concern about the subjective determinations of what is considered “disturbed”:** These criticisms are fair. ODEQ recognizes the need to more effectively communicate our position. Hopefully the language changes recommend above will address these concerns, but at some point “we” (ODEQ, ODF, the Sustainable Forest Management Indicator Advisory Committee, etc.) need to delve into the root causes of observed deviations from reference conditions.
  - The ultimate goal with the Reference Condition Approach is to determine if human activities are resulting in an unacceptable level of change to natural systems, in this case wadeable streams and macroinvertebrate communities. Our reference site network is based on screening for sites with the lowest levels of human activities. That is it—which sites in region are least likely to be shaped by human actions.
    - Natural disturbances are not excluded from reference sites, even though some may be caused by human actions (e.g. large intense fires as a result of fire suppression, landslides as a result of road failures, etc.).
    - Ultimately, it is through quantifiable levels of human activities that we exclude sites from our reference pool, and even here, it is according to regional levels of disturbances. In some regions, like the Cascades, our reference sites show minimal human activities. In other regions, like the Willamette Valley, our reference sites have considerable human disturbances.
    - Reference sites show the lowest levels of human activities for any given region of Oregon. We are not targeting past historic conditions, but rather what is currently attained.
  - If we observe a difference in the bug community at a test site, compared to the bug communities observed at regionally appropriate reference sites, then we need to ask “why are they different?”
    - Each site should be screened for the same human activities that were used to distinguish reference sites.

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- If a test site has higher levels of human activities than the threshold established for reference sites, there is strong evidence that human activities are responsible for the changes in the bug community.
- All sites should be screened for unique natural factors, natural disturbances, or additional human stressors not adequately screened for in the reference process (recent aerial photos).
- Most likely we will never get to “causation”, but we do need to apply a weight of evidence approach.

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