NATIONAL POLICY CONSENSUS CENTER
Hatfield School Of Government

Mid-Coast Implementation Ready TMDL

Local Stakeholder Advisory Committee

Sediment TWG

Supplement to October 17, 2012 Action Items Memo

The Following is a detailed summary of questions, answers and discussion related to DEQ listing methodologies and sediment source assessment that took place at the October 17, 2012 meeting of the Mid-Coast TMDL Sediment Technical Working Group (TWG). For additional information about the meeting, please see the Action Items Memo.

Impairments, biocriteria standard, and assessment methods discussion

Ryan Michie presented an overview of water quality standards (numeric and narrative) and how they relate to TMDL development. When there are narrative standards with no established benchmarks, then benchmarks can be established during the assessment or TMDL processes. For the current sediment TMDL, the benchmarks have been established using a biocriteria methodology. There was a brief discussion among members regarding the past DEQ effort at development of a numeric turbidity standard, how it relates to the benchmark used for listing based on the narrative drinking water potability standard, and potential impacts to the TMDL process. DEQ clarified that a numeric criteria did not emerge from that process.

Shannon Hubler presented the two assessment tools whose benchmarks "sample" sites must fail in order to be listed as biologically impaired (biocriteria) due to sediment: macroinvertebrate biocriteria and biological fine sediment score stressor (FSS) identification. *(See the diagram recreated at the end of this document.)* FSS represents the preferences of percent of fine sediment (< 0.06mm) inferred from the benthic macroinvertebrate community at a site. He first reviewed the PREDATOR model that is used for macroinvertebrate biocriteria assessment. TWG members asked clarifying questions about the details of the methodology. The methods (RIVPACS models) are described on the DEQ Laboratory website and are a standard method for assessing biological condition worldwide. The TWG discussed reference site selection and how sites relate to model performance. Some TWG members will participate in a call to explore reference site selection and reference condition in greater detail. Participants will submit specific questions in an email thread in advance of the call.

Shannon then reviewed the Stressor Identification ("Stressor ID") protocol, which is based on biological observations of macroinvertebrate abundances and tolerances to fine sediment FSS. The non-reference site FSS must exceed the reference site FSS by a factor of 2.2 for sediment to be identified as the stressor (see presentation for details).

One question focused on how the erodibility was determined; DEQ clarified that when it examined the lithology in the areas of interest, it found that the primary categories were: resistant and erodible. The lithology rather than soil type was classified to determine these two categories of erodibility that were used in the model to determine % erodibility. Specific lithologies were classified as either erodible or resistant by a registered geologist. DEQ will provide more specific information about the procedures used to calculate erodibility.

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There was extensive discussion and some confusion about the basis for each of the current and proposed 303(d) listings. DEQ agreed to present additional clarifying information before the next meeting.

There were also questions on how a stream in a wilderness area could be listed as impaired under the biocriteria. There was discussion that natural events could have resulted in impairment or that statistically there will be false positives and false negatives using any method. DEQ clarified that the best mechanism to address the several existing site specific anomalies are through the TMDL process, not the listing process and the group agreed to track the issue.

Specifically, one member asked for clarification on biocriteria & sediment listings and referenced a letter from Jennifer Wigal to EPA. DEQ (and EPA) clarified that:

- EPA proposed 25 biocriteria listings (Category 5) for 2010 303(d) list, based on DEQ's PREDATOR model results. EPA did not propose sediment listings for the MidCoast.
- DEQ used the PREDATOR and Stressor ID methodology to assess which biocriteria impairments are linked to sediment as a stressor and noted that there may be other stressors
- None of the listings shown on the spreadsheet that was provided to the TWG are sediment listings; these address only biocriteria and show results of the Stressor ID analysis for each segment (in the last column)
- DEQ will use its narrative standards to determine sediment listings

DEQ referred TWG members to the memo provided in the meeting materials (*Questions and answers about sediment standards and use of biocriteria benchmarks*) for a description of the different narrative standards, associated benchmarks and current listings. DEQ also walked through the spreadsheet provided in the materials to address the biocriteria segments.

One member asked the level of detail DEQ will examine the geology that will be used in classifying sites used in analysis. DEQ responded that they are unlikely to get to a site specific analysis and that they are not performing source assessment at the site specific level – rather, they are conducting the source linkage at a watershed level. Site-specific information will be particularly useful for the implementation phase.

One member observed that a reference site (Cummins Creek) was targeted for Category 5 (303(d) list), because it failed the PREDATOR screen. DEQ clarified that it was not identified as sediment impaired because it did not fail the Stressor ID. There was lengthy discussion and speculation about the possible reasons, types of disturbance and other factors at this particular site, and whether this indicates a problem with the biocriteria method or listing process in general. DEQ pointed out that all of the reference and sample sites represent a distribution of scores and a small proportion of reference sites will be on the "tail" of the distributions and may fail either screen. For Cummins Creek, DEQ confirmed that failure to meet the biocriteria screen indicates a conservative evaluation, based on data that is available and that one purpose of a TMDL is to get into the details to find out why, including natural variability.

The facilitation team reminded the group that the topic of 303(d) listings process is an important topic, but that it is outside the TWG scope of this group's work.

One member asked how sites were selected, based on the Drake (2004) appendix and factors. DEQ responded that it used a "reach scale" checklist to develop a human disturbance index (HDI) score (with one difference – i.e., that DEQ eliminated the "best professional judgment"

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factor shown in the document). In addition, DEQ employed multiple GIS screens for human activities in the watershed, including: forest fragmentation, road density, and percent urban + agriculture land use.

Other reference site issues/questions that were raised include:

- What are the characteristics of all bug sites relative to judgment of HDI?
- How do reference sites compare to "adjacent" sites (e.g., sites in nearby drainage)?
- How well does O/E track at those "adjacent" sites? Do the bugs tell us something different about reference versus disturbed sites?
- Can we explore reference vs. non-reference sites?

DEQ noted that HDI does not tell us whether natural gradients compare or how they are discriminated because it applies to the reach scale, not a larger spatial scale.

Members discussed longitude as predictor for the PREDATOR model; DEQ clarified that the primary predictor was day of year, followed by longitude. It uses grouping of sites and is a screening tool. The benchmark is established at the 90th percentile of reference distribution in order to capture the variability of reference sites and minimize the prediction of false positives and false negatives.; Reference expectations for the FSS model were adjusted for natural gradients (Precipitation, Stream Power, Elevation, % Erodible).

DEQ observed that reference sites represent a distribution across gradients, and they expect some % to be impaired (e.g., natural disturbance). One member asked how temporal variation was accounted for, if a reference site was sampled one time in 1998 and then compared to a test site in 2004. DEQ explained that the Stressor ID model was built on data from 1998-2004, and the experience from reference sites used to build model cover that time period. DEQ agreed that temporal changes in reference sites could occur and this shouldn't be a "static" model; it will be useful to go back to reference sites over time (to assess whether there is a shift in distribution).
One member pointed out that other "non-disturbance" site specific factors could result in differences (e.g., observer choices in sampling).

DEQ indicated that it can address some of these issues during source-linkage analysis; the model and choice of reference benchmarks (75th and 90th percentiles) are designed to balance risk of errors in either direction – neither too conservative nor too loose. DEQ will use the TMDL process to identify those sites/segments that get classified as impaired as a result of human actions vs. natural factors.

The facilitation team proposed that the TWG members and DEQ engage in additional conversation about reference site selection. The group agreed that DEQ should initiate an email thread to request specific questions from members.

DEQ pointed out ODFW has conducted extensive analysis of its aquatic habitat inventory program data, and this includes a number reference sites which may inform the question of temporal variability in both reference and sample sites. DEQ suggested asking ODFW to present information on the AHI program to the LSAC or TWG. References to key publications mentioned:

- The Status and Trend of Physical Habitat and Rearing Potential in Coho Bearing Streams in the Oregon Coastal Coho Evolutionary Significant Unit Report Number:

OPSW-ODFW-2009-5
http://oregonstate.edu/dept/ODFW/freshwater/inventory/pdffiles/OPHabitatCoastalESU2009.pdf

- Anlauf et al (2011) Detection of Regional Trends in Salmonid Habitat in Coastal Streams, Oregon
http://oregonstate.edu/dept/ODFW/freshwater/inventory/pdffiles/TAFS140.pdf

Sediment TMDL Source Analysis Presentation

Ryan presented an overview of the source analysis rationale and potential source categories. TWG members discussed how narrative standards without benchmarks that were used in 1998 to list two areas as impaired will relate to TMDL implementation monitoring benchmarks. DEQ staff responded that areas that were listed using the biocriteria method will be assessed by the same method during implementation.

Related to a slide showing "Identifying Pollutant Sources", a member asked how far can DEQ/TWG take the Source Assessment/TMDL, given that this is an IR TMDL? DEQ responded that DEQ will take it as far as data allows and the traditional Basin scale TMDLs were used as a point of comparison. If there is sufficient data available, including that from stakeholders, the TMDL can go to site-specific scale. DEQ also indicated that it intends to build a strong Adaptive Management process into the implementation, because data is needed to do site specific evaluation and feed back into the process. The TMDL will provide a framework to obtain site specific information where not currently available. Overall, TMDL implementation will occur at watershed and site-specific scale.

DEQ noted that a sediment budget is not being done during the TMDL development because DEQ does not have the necessary data and a sediment budget is not necessary. DEQ indicated that it is not ignoring differences in sources, but is using biological indicators to distinguish natural from human sources.

One member noted that turbidity metric does not sort natural from human caused sources. In that case, DEQ indicated that the target would be to identify anthropogenic sources and minimize to the maximum extent practicable, as defined in existing law.

The members engaged in extensive discussion of targets and allocations. Questions and issues raised include:
the large range of settable solid particles sizes and which parameters (based on sizes) will be examined as the source load. Specifically, some wondered if the target is focused on < 0.06mm size particles and how DEQ would look at sources of those particles? DEQ responded that the impairment is a biological condition, not a specific particle size, and implementation would include control over the distribution of particle sizes.

Others wondered if DEQ will look at sources of fines? DEQ indicated that the FSS is used as a surrogate of watershed processes and the best representative of biological impairments. Regarding the relation among the macroinvertebrate FSS, Load Allocations and Turbidity, one member asked how the 5 NTU value used in the drinking water turbidity analysis relate to values observed at reference sites. DEQ explained that the drinking water benchmark is not related to FSS reference sites, rather the frequency of shutdowns at the Siletz water treatment plant. It was acknowledged that exceedances of 5 NTU will occur; it is the frequency of > 5 NTU that is important, and one potential target is a reduction of the frequency of >5 NTU

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exceedances. DEQ clarified that a turbidity benchmark or target is an interpretation of narrative standard used in assessment methodology and only applies to drinking water source areas. During discussion of seasonal cycles, one member observed that bugs integrate sediment processes and conditions over time related to life cycle stages; not just from prior spring input.

Regarding the sediment metric, DEQ clarified that the FSS approach measures bugs most responsive to finer particles and represents the preferences of whole community, or a shift in community composition. One member indicated that fine sediment is a surrogate for supply (from upstream), similar to a dam system. DEQ described the Siletz Tribes' data on flow-turbidity-TSS relationship and how that information could be used to develop percent reductions in "load" of TSS to address the drinking water impairment.

One member asked how the 1998 sediment listings (referred to as "anecdotal") would be addressed for North Fork Siuslaw and Big Elk Creek (NFS and BEC), where there is no FSS data to compare to a benchmark. DEQ explained that it will address those listings at a narrative level and work with the TWG to further develop the linkage analysis. DEQ will assess what needs to be done during implementation, depending on results of the summer 2012 macroinvertebrate data. If sample sites in the NFS and BEC are meeting biocriteria targets, or sediment isn't determined to be a stressor, the % reduction in FSS approach will not be applied. DEQ cannot take a segment off the 303(d) list based on a perception that the listing is "anecdotal". DEQ indicated that if there is good information showing that changes in management practices support the conclusion that the area is meeting intent (water quality standards), then it would be useful to document those actions. Where there are no numeric benchmarks, DEQ will accept data and information to assess condition and whether a segment is meeting WQS. DEQ reiterated that it is working off of the 1998 listings; if stakeholders have additional monitoring info or justification, they are encouraged to provide that information.

One member asked if an example of changes in management practices was the change in FPA road requirements since 1998? DEQ indicated that this was an example, but it would like to discuss this topic further with the TWG to assess whether the information is applicable at the appropriate location and scale.

Some wondered where (spatially) are % reductions needed to meet FSS targets above the impaired reach (i.e., the "red dot" shown on the map)? DEQ indicated that the reduction related to reach level (where FSS apply). The member noted that the site, or actions in the upstream area, may have already achieved the (desired) outcome during past 10 years. DEQ indicated that in order to make that connection, it would need information on what specific management actions have changed in the contributing area since data was collected.

Members discussed whether sediment source inputs are directly related to biological outcome; i.e., whether macroinvertebrate FSS instantaneously reflects up-stream conditions. One member stated that this view ignores the importance of sediment transport, storage, and other processes that occur cover longer timeframes.

It was pointed out that those sites having a poor FSS assumes there is a need to "fix things" now based on conditions from 1998-2004. DEQ referred to the current Roads approach which includes examining what actions have been done where, in order to assess how much has changed in the watershed over some time period. Through TMDL development and the adaptive management process, DEQ and stakeholders would identify what has been done, and whether is it adequate to result in a positive response to (affect) the system. This type of review can be built into an implementation process and FSS is a tool.

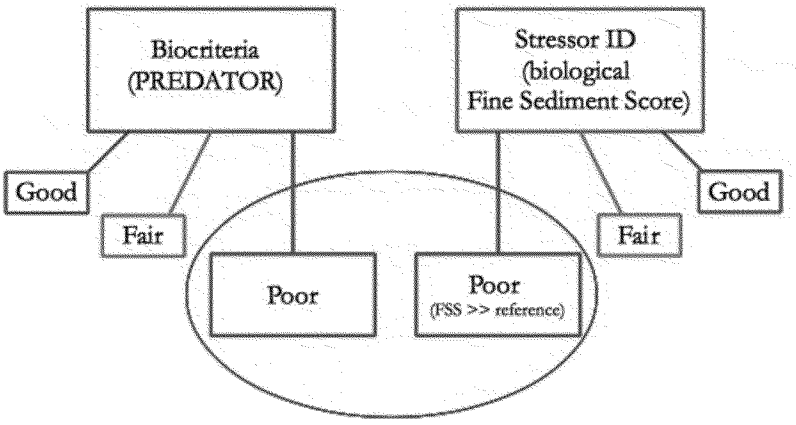
One member indicated that the time frame for sediment to work through system is variable, but riffles get reset roughly annually and bug samples are collected in places where “clean-up” (of fine sediment) occurs. The FSS approach is looking for changes in bug community, but it is not necessarily a linear relationship. The implementation process should start with reassessment before requiring management changes upstream.

DEQ indicated that it is examining a combination of management measures and in-stream conditions (FSS).
DEQ stated that it is not at the point in the TMDL process where it has determined the implementation monitoring, but it is interested in exploring that topic further with the TWG. The member indicated lack of confidence in the method (FSS) and will suggest alternatives to assessment of fine sediment problems at the appropriate time.

DEQ indicated interest in discussing additional methods, not replacement methods, for determining whether streams are meeting narrative standards later in the TMDL process.

Supplemental Information

Shannon drew a diagram during his presentation on the biocriteria standard assessment tools. Only sites that rated as “Poor” in both PREDATOR and the Fine Sediment Score were listed as biologically impaired by sediment. That diagram is recreated below:



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