Freshwater Sediment Standards
National Peer Reviewer Responses to Specific Questions

Peer Reviewers

Alan Burton, University of Michigan

Jay Fields, NOAA

Chris Ingersoll, USGS

Dave Mount, EPA

At Ecology's request, these four national experts in freshwater bioassays and development of screening values reviewed the draft *Development of Benthic SQVs for Freshwater Sediment in Oregon, Washington, and Idaho* Report. In addition to reviewing the report, they were asked specific questions. Below are responses to two questions that assist in answering questions from the Science Panel.

REVIEW OF BIOLOGICAL CRITERIA

Instructions to reviewers:

While reviewing the biological criteria, Ecology asks that reviewers consider the technical and scientific aspects of using bioassays including bioassay organisms and endpoints. Please refer to the document titled *"Overview of biological freshwater sediment standards."* The suite of bioassay species and endpoints were selected based partly on regional availability and familiarity with these organisms.

Question to reviewers:

- Is the proposed bioassay suite appropriately sensitive to protect the freshwater macro benthic community (i.e., typical taxonomic structure and functions such as a prey base to endangered species like salmon)?

Responses:

BURTON: *It's the best you can do at present. Consider adding snails and mussels in the future as they are important and sensitive. Hopefully these document and related policy will be reviewed every couple of years as the science advances.*

FIELDS: Are one species of amphipod and one species of midge sensitive representatives of the freshwater macro benthic community (communities)? These bioassays represent endpoints that are currently well-standardized and have matching chemistry and toxicity data available, but no information was presented to assess whether the endpoints used are "appropriately sensitive" or representative of the freshwater macrobenthic community It would be preferable to have additional taxa and sublethal endpoints represented.

INGERSOLL: Yes, but whole-sediment mussel testing should be considered as this method becomes standardized (ongoing research at our laboratory).
MOUNT: I don't know that there is a great deal of hard evidence that can be brought to bear on this question, but I think it is an accepted presumption that this is true.

Ecology Note: Ecology can allow use of additional species where they are relevant – notably, mussel toxicity assays are being run for some cleanup sites where freshwater mussels are a species of concern. Plus, note that the PNW doesn't have the diversity of species that dominates most areas east of the Rockies.

Question to reviewers:

- From your experience, are there other freshwater bioassays/species that provide consistent, reproducible and sensitive results that should be considered for developing biological criteria?

Responses:

BURTON: It's the best you can do at present. Consider adding snails and mussels in the future as they are important and sensitive. Hopefully these document and related policy will be reviewed every couple of years as the science advances.
FIELDS: I am not aware of other species that have the same level of method standardization and testing, but USGS is developing freshwater mussel tests that should prove useful.
INGERSOLL: Mayfly testing (ASTM E1706) and mussel testing (ASTM E2455).
MOUNT: None that have the depth of experience and interpretation behind them. An exception is that I don't see why weight is not included as an endpoint for 10-d *Hyalella* tests (or better yet, combined with survival to calculate a 10-d biomass endpoint). This is not to say that additional tests might not be added in the future as additional work is completed.

Ecology Note: Ecology can allow use of additional species where they are relevant, which may include the mayfly larval test (ASTM E1706); however the mussel test method E2455 is a water-only exposure (sediment testing is still being standardized). Additionally, Ecology is looking into adding a total biomass endpoint for both *Hyalella* and *Chironomus*.