

CLARIFICATION

SPECIES SUBSTITUTION FOR THE 10-DAY AMPHIPOD BIOASSAY

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INTRODUCTION

The PSDDA program currently specifies the use of *Rhepoxynius abronius* as the test species for the 10-day amphipod bioassay. Over four years of PSDDA program experience have shown this organism to be a reliable bioassay species for assessing biological effects of dredged material. However, this experience has also shown this organism to be sensitive to dredged material exhibiting high percentages of fine-grained sediment. Additionally, the PSEP amphipod bioassay protocol states "*Rhepoxynius abronius* is appropriate for sediments with interstitial water salinity of > 25 parts per thousand (ppt)". It recommends the use of *Eohaustorius estuarius* to assess sediments when interstitial water salinities are below 25 ppt.

PROBLEM IDENTIFICATION

The quantitative relationship of *Rhepoxynius abronius* survival in reference sediments of varying grain sizes has been described by DeWitt et al (1988). For example, a regression equation (upper 95 percent confidence limit) describing this relationship predicts a mortality of 23.7 percent with 70 percent fines (DeWitt et al, 1988).

Regulatory experience with *Rhepoxynius* exposed to sediments of varying grain size distributions has confirmed its sensitivity to sediments exhibiting high percentages of fine-grained sediments (i.e. greater than about 60 percent clay/silt). This sensitivity to fine-grained sediments can lead to false positive results in dredged material quality assessments. False positive results confound regulatory interpretations, especially when reference sediment performance guidelines are exceeded, and ultimately lead to a PSDDA agency decision to either retest or apply best professional judgment to the interpretation of dredged material suitability for unconfined open-water disposal.

Assessing dredged material in tidally-influenced rivers, where interstitial salinities fall below 25 ppt may lead to test performance problems with *Rhepoxynius*, unless interstitial salinities are adjusted as recommended by PSEP (higher than 25 ppt) prior to initiating the test.

A number of amphipod species in addition to *Rhepoxynius* are approved in national guidance for dredged material testing under the Ocean Dumping testing manual ("Greenbook") and the draft "Inland (404) Testing Manual". Two of these species have been used in Puget Sound previously, have ASTM protocols (ASTM 1991), and appear to be less sensitive to fine-grained sediment than *Rhepoxynius*. These are *Ampelisca abdita* and *Eohaustorius estuarius*. *Ampelisca* has been utilized over the past year in non-PSDDA areas such as Grays Harbor to assess dredged material with high percent fines (approaching 95 percent) in lieu of *Rhepoxynius*. The results of these tests were satisfactory in assessing the suitability of dredged material for unconfined open-water disposal. *Eohaustorius* is common in Pacific Coast estuaries, and would be a suitable species to test fine-grained dredged material when interstitial salinities are lower than 25 ppt.

PROPOSED ACTION/MODIFICATION

The PSDDA program will allow the flexibility to substitute *Ampelisca abdita* for *Rhepoxynius* when

testing dredged material exhibiting high percentages of fines (i.e. greater than 60 percent). In estuaries, where interstitial salinities range from 2 to 25 ppt, the estuarine amphipod *Eohaustorius estuarius* may be substituted for *Rhepoxynius* when testing fine-grained dredged material. However, *Rhepoxynius* will remain the preferred amphipod species for coarser-grained sediments. Any proposed species substitutions for the amphipod bioassay must be coordinated with the Dredged Material Management Office, and approved by the PSDDA agencies, prior to testing.

REFERENCES

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