

PSA for biological analysis and the Green Book

A report for discussion at the NMBAQC's Particle Size Analysis for Supporting Biological Analysis Workshop, February 2009

1. Introduction

The following report outlines where Particle Size Analysis (PSA) for biological analysis is mentioned in the Green Book's main text (v12, 2007), tables (v12, 2008) and appendices (v13, 2007).

2. The 'Green Bookv12.doc'

The main text of the Green Book is a general introduction to the CSEMP monitoring program, which does not contain any specific information about the benthic community monitoring program (including PSA).

3. The 'Green Book Tables V12.doc'

PSA is mentioned in the following text and table:

'Particle Size Analysis: Sediment structure as determined by particle size analysis is used to support benthic community analysis and contaminants. The sample used to support benthic community analysis should be a representative collected from a separate grab. The full range of parameters detailed in Table 1.1 should be determined on this sample. A separate sample should be collected for particle size analysis to support the contaminants data. The fraction less than 63um should be determined on this sample.'

Table 1.2 – Sediment Grain Size Parameters.

Code	Description	Interpretation	Unit
GSKURT	Grain size kurtosis	Statistical summary	Scale
GSMEA	Grain size mean	Statistical summary	mm
GSSKEW	Grain size skewness	Statistical summary	Scale
GSSORT	Grain size sorting	Statistical summary	Scale
GSMED	Grain size median	Statistical summary	mm
GSMF>8000	Grain Size Mass Fraction >8000	Phi class which may also be used to derive broader classes (% sand, gravel etc)	%
GSMF>4000<8000	Grain Size Mass Fraction >4000<8000	See above	%
GSMF>2000<4000	Grain Size Mass Fraction >2000<4000	See above	%
GSMF>1000<2000	Grain Size Mass Fraction >1000<2000	See above	%
GSMF>500<1000	Grain Size Mass Fraction >500<1000 µm	See above	%
GSMF>250<500	Grain Size Mass Fraction >250<500 µm	See above	%
GSMF>125<250	Grain Size Mass Fraction >125<250 µm	See above	%
GSMF>63<125	Grain Size Mass Fraction >63<125 µm	See above	%
GSMF63	Grain Size Mass Fraction <63 µm	See above	%
GSMF20	Grain Size Mass Fraction <20 µm	Used for chemistry interpretation	%

4. The 'Green Book Appendices V13.doc'

PSA is mentioned in both Appendix 3 and 8, where the following text is mentioned:

a) Appendix 3. Procedural Guidelines for subtidal sediment sampling

'Particle Size Analysis sub sampling procedure: Take the sample from the surface to a minimum depth of 5 cm (a core previously used for redox analysis is acceptable). Transfer samples to containers that can withstand freezing, such as plastic bags or pots. Keep samples cool and freeze them as soon as possible. This prevents decomposition from affecting grain size. Record the method of preservation.'

b) Appendix 9. Procedural Guidelines for analysis of sediment supporting determinands

'Particle size analysis: (to be added by NMBAQC group)'

5. Concluding Remarks

The NMBAQC's PSA Questionnaire Summary Report highlights the continuing variation in sample collection methods by Competent Monitoring Authorities (CMA's), despite the Green Book stating that PSA samples should be:

- taken from a separate grab (to the biology grab sample).
- taken from the surface and to a minimum depth of 5 cm.
- kept cool and frozen as soon as possible.

Furthermore, not all CMA's are reporting the same PSA fractions and statistics despite these being specified in Table 1.2 of the Green Book.

It has also become clear through extracting PSA data from MERMAN, that very few CMAs either collect (or report into MERMAN) a separate PSA sample for supporting contaminants data and determine the fraction less than 63µm.

The Green Book needs to include more information about PSA for supporting biological (and contaminants) analysis in order for CMA's to conduct their benthic infaunal monitoring (including PSA) in a more consistent manner. In particular, the methods detailed in the 'Tables' of the Green Book, should be transferred (or at least repeated) in the Procedural Guidelines for subtidal sediment sampling (Appendix 3). This Appendix should also include more clearly defined and detailed descriptions of sediment collection methods. In conjunction with this, the procedural guidelines for analysis of sediment supporting determinands (Appendix 9) should specify PSA lab methods as agreed upon by the NMBAQC.