SEPA PSA Supporting Biological Analysis

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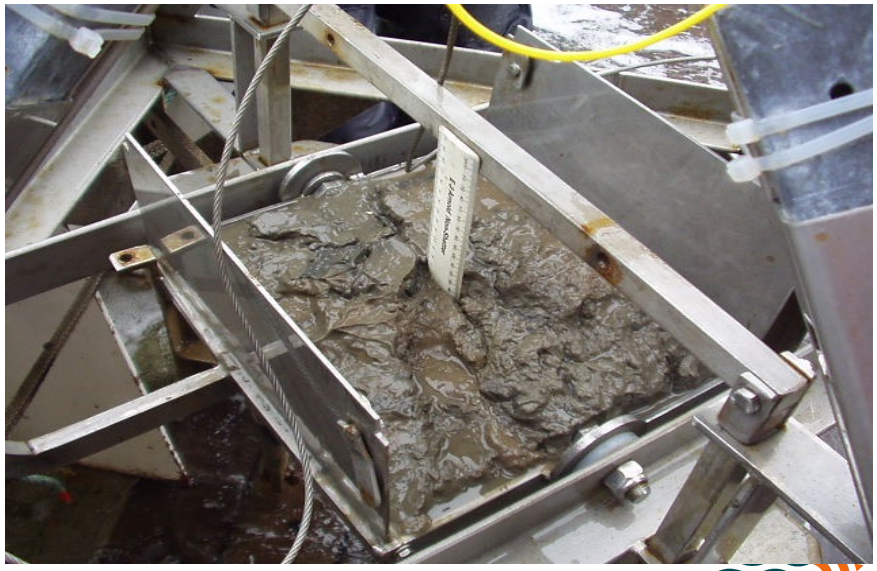
PSA Sampling

- Separate Grab
- Digital photo
- Bite depth noted
- 6cm diam. core -
- pushed full depth of grab
- Core bagged and frozen



Sampling Advantages:

- Separate grab does not compromise biology grab sample
- Photo provides visual ground-truthing of PSA
- Full depth core integrates PSA over biofaunal zone
- Frozen sample can be stored indefinitely

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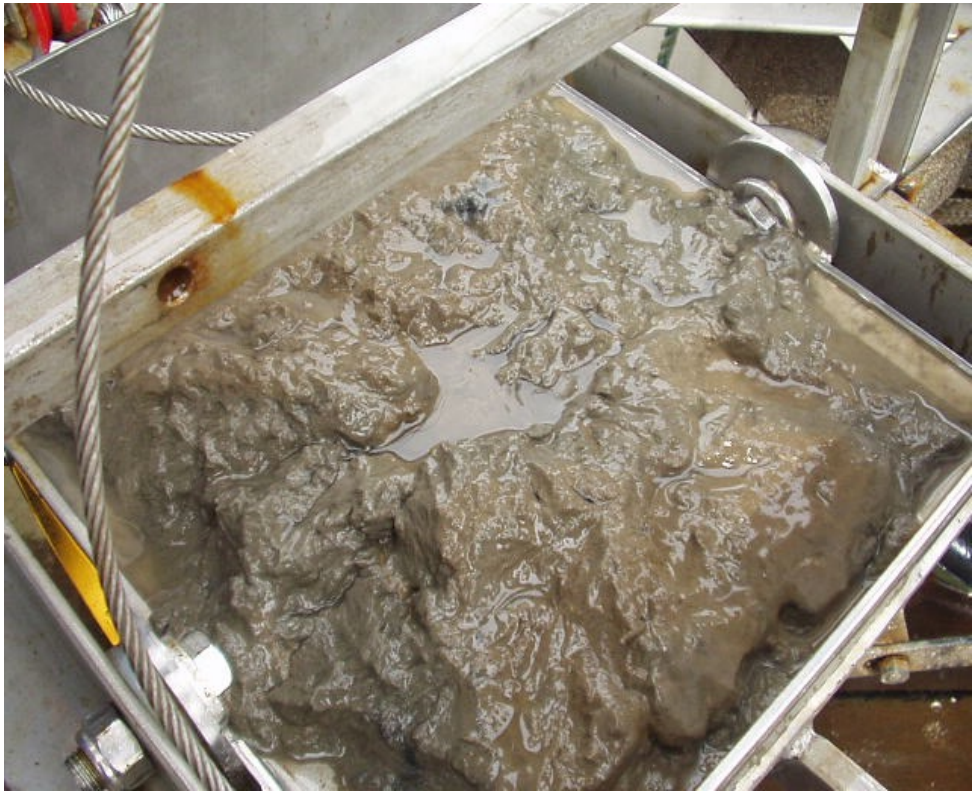
Sampling Disadvantages

- PSA Grab may not be representative of biology grab
- Photo only shows surface sediment – may be different below
- Core subsample may not be representative of whole grab – bias to exclude large shells and stones
- Frozen cores can be compromised when someone turns the freezer off!

PSA Heaven

Homogenous mud and sand

- A spatula full of homogenous mud would probably be representative!



PSA Hell – Mixed sediments

- Which bit should be subsampled?
- Which bit is representative?
- Need a steel core and a big mallet?

PSA sample prep.

- Thaw and homogenise PSA sample

- Subsample 30gm for Laser Analysis
- Subsample 100gm for Sieve Analysis

- Present laser subsample straight to laser by spatula (pre-sieve wet at 1mm if needed)
- Freeze dry sieve subsample for dry sieving

PSA Analysis

- Laser subsample analysed at half-phi intervals
- Sieve subsample analysed at whole phi intervals – plus dry portion < 1mm.

- Laser and Sieve data combined
- Laser proportions applied to dried <1mm portion from sieving!

Analytical Advantages: minimises analytical work

- Presenting fresh/wet subsamples to laser is quick and easy.
- Use of whole phi sieves only saves a lot of extra work.
- Avoids laborious multiple sieving of fine factions below 1mm

Analytical Disadvantages

- Combining Laser and Sieve data measured by different techniques may not be valid
- Using laser <1mm data to represent proportions of <1mm dry sieved fraction may be invalid.
- Combining half-phi data (from Laser) with whole phi data from sieves can be confusing!

PSA Analysis QC

- Laser – Standard Sand sample run at beginning and end of batch of test samples
- If standard is out of range then discard test results – clean machine and re-analyse.

- Sieve – 1 of each batch of 10 test samples is re-analysed.

  QC ranges to be within 90% original

- If QC sample fails then discard batch and start again!

PSA QC – Pros and Cons

- QC increases confidence in data!

- QC fails may generate a lot of extra work as whole batches require re-analysis!
- May be insufficient remaining sediment to run re-analysis.
- Need to collect and store larger PSA samples in case of AQC fails.

Data Processing

- Sieve and laser data combined on a customised spreadsheet (Where did it come from??)
- Automated calculation of PSA distribution curves and Mean, Median, Sorting, Skewness, and Kurtosis values
- Raw and derived PSA data archived in NEMS (SEPA national database - **just as soon as we get this bit working?)**
- PSA data from CSEMP samples exported to MERMAN (**just as soon as we get this bit working?)**

Data Processing Disadvantages

- Do not currently use Malvern package to combine and analyse data
- Data export from Malvern is by hand copying printed export sheets.
- copying to spreadsheet prone to errors
- Customised spreadsheet not validated – may differ in detail from Malvern or Gradistat versions!
- Data has to be re-exported by hand copying from spreadsheet for archiving in NEMS database

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Data Processing Advantages

- NONE!
- This is a really bad way to do things!!

- Can we fix it? Yes we can!

Why do we want PSA data?

- CSEMP Surveys: Data submission to Merman to allow correlation of PSA and biological parameters for long term trend analysis of benthic communities.

- WFD Surveys: Validation of benthic habitat type.
- Are we confident that habitat type is appropriate for utilisation of the WFD Infaunal Quality Index tool?