Intertidal Mussel Stock Assessment Survey Methodology

Equipment

Waterproofs + wellies
Life jackets
Handheld GPS, plus spare batteries
4' cane, with 11cm ring attached to one end
11cam corer
Plastic bags
Waterproof paper labels
2 x buckets
Sieve
Digital scales
Callipers
Survey Forms
Weather Writer clipboard
Pencils

Rationale

The objective of this survey is to carry out annual surveys of the public mussel beds, to define where the mussel beds are and accurately map, using GIS, and the overall extent of each of the mussel beds. Devon and Severn IFCA will undertake a stock assessment on each of the beds to estimate the density of mussels on the beds and the total stock of marketable mussels. Results of these surveys can be compared on an annual basis. This will help inform future management of the mussel beds, and the development of shellfisheries in this part of the Devon & Severn IFCA District.

These surveys are carried out on the Taw-Torridge, Exe and Teign estuaries.

Logistics and Practicalities

These surveys are usually carried out in the spring, over March and April. The best time for the surveys is at low spring tide, when the greatest extent of the beds will be exposed.

Mud can be a serious safety risk on this survey; always work in pairs, wear tight wellies and keep an eye on the tide.

The survey methodology is very straightforward, and could be carried out by volunteers, supporting IFCA Officers, with very little knowledge of marine biology. The survey is usually carried out in pairs, but also works well with teams of three if there are enough volunteers available.

Survey Methodology

The area of the bed is recorded by walking its perimeter and marking points with a handheld GPS, which are then plotted onto MapInfo GIS software.

To determine coverage and patch density transects are walked in a zig-zag across the bed, right up to the perimeter, to provide optimum coverage through the bed. The start and end point of each transect is recorded using a handheld GPS, to be mapped later using MapInfo GIS software. A 4' bamboo cane with an 11cm ring attached to the end, so that the ring sits flat on the ground when held out to one side, is used to determine the mussel coverage for each transect. Every three paces along each transect the cane is flicked out to one side and it is recorded whether it is a "hit" if the ring contains live mussel, or a "miss" if the ring doesn't contain live mussel. On every fifth hit the contents of the ring is taken as a sample, using an 11cm diameter corer. All mussel samples from the same transect are collected together in one bag, but kept separate from those of other transects.

Once all transects are complete the mussel samples are sieved and cleaned. For each transect the number of samples taken is recorded, all mussels are measured recording sizes on the survey form, and divided into size groups; ≤25mm, 26-49mm, ≥50mm*. Each size group is weighed separately and the total weight of each group is recorded. The data collected are used to calculate the coverage, density and area of the mussel bed (Figure 1), which are then used to estimate the mussel tonnage on each bed. Size distribution is obtained from the length measurements of mussels in the retained samples. The hit/miss data is also pooled, to calculate the

average coverage and patch density for the whole bed, compensating for the possibility of some transects being longer than others.
*NB for the Exe Estuary the mussels are divided into the following size groups: 1-10mm, 11-20mm, 21-30mm, 31-40mm, 41-50mm, 51-60mm, 61-70mm, 70+mm

$$\%\ \text{cover} = \frac{\text{no. hits}}{\text{no. hits + no. misses}}$$

$$\text{Density across bed} = \frac{\text{total mussel weight/surface area sampled}}{\%\ \text{cover}}$$

Figure 1 Calculations used for mussel coverage on bed, and density of mussels across bed.

The survey method used is a procedure developed by MarinX, Dutch marine consultants. This method was chosen in place of the method which uses footfall to determine hits/misses and the throwing of a quadrat to determine coverage, as it is deemed to be more accurate. Using a pre-determined ring size for hits/misses, removes the potential for inaccuracies caused by surveyors having different sized feet. It is also easier to see whether the ring contains live mussel instead of looking at a footprint. The flicking of the ring at the end of the cane provides a random sample which is not subject to human error by trying to select a "representative" quadrat.

Relevant Documents

Mussel Transect Form

Mussel Transect form.xlsx

Size Distribution Form

Survey form size distribution.xlsx

Stock Template Form

StockTemplate.xls

Size Distribution Form (10mm size class)

Size distribution (10mm groups).xlsx

Stock Template (10mm size class)

StockTemplate (10mm size class).xls

2016 Taw-Torridge Report

Taw-Torridge Mussel Stock Assessment 20

2016 Exe Estuary Report

Exe Estuary Mussel Stock Assessment 20