



SOUTHERN ENCOUNTER

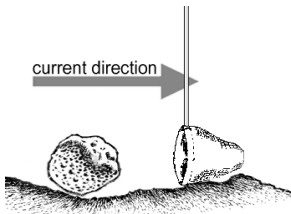
AQUARIUM & KIWI HOUSE

Southern Encounter
Aquarium and Kiwi House
Cathedral Square West
P.O. Box 5130
Christchurch
New Zealand

Telephone: 03 377 3474
Fax: 03 377 9196
Email: educ@southernencounter.co.nz
Website: www.southernencounter.co.nz

SAMPLING AQUATIC POPULATIONS

Fish are very difficult to count. Not only do they live up to thousands of metres below the sea's surface, but most move around a lot. Scientists use several sampling techniques to try and get as good a picture as possible.

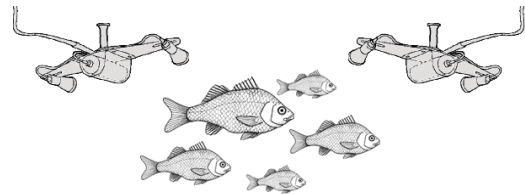


Kick Sampling

A fine net is placed immediately downstream of the sampling area and rocks in the sampling area are lifted. Small aquatic invertebrates are dislodged by the current and are collected in the net. Used to identify total *numbers* and *species*.

Problems:

- Prone to collecting non-target material such as detritus.

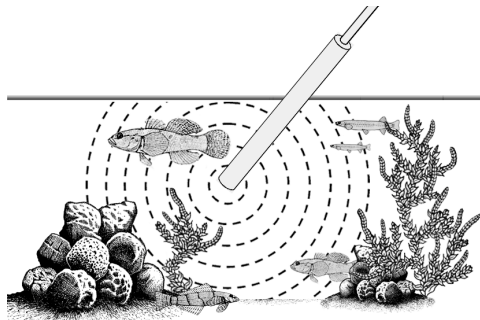


Underwater Filming

Stereo camera equipment provides three-dimensional images of spawning schools of hoki and orange roughy, taken hundreds of metres below the sea's surface. The aim is to identify fish *species* and provide information about their *size*, *density* and *orientation*. As a technique it is still in its early stages.

Problems:

- Lights may change the behaviour of the fish being studied.

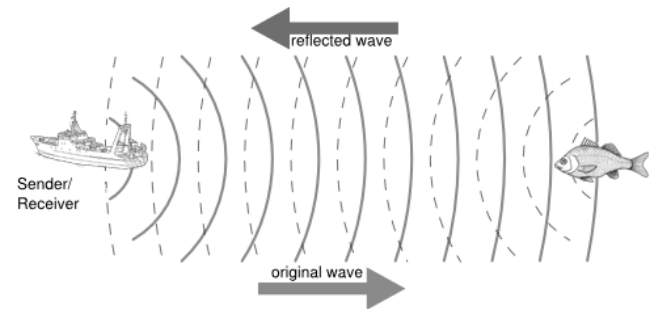


Electric Fishing

Wearing a portable battery pack, the operator walks upstream holding the anode probe and a net. The electric circuit created through the water between the anode and the stream bed stuns the animals for capture. After identification of *species*, *physical measurements*, *weight*, the animals are released.

Problems:

- Requires expensive, specialised equipment.
- Unusable in marine environments.

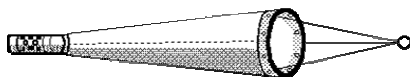


Acoustic Surveys

Acoustic surveys aim to estimate the *biomass*. The technique is mainly used for hoki, orange roughy and southern blue whiting. Sound waves sent out from the research ship strike schools of fish and are reflected back making it possible to estimate the *biomass*.

Problems:

- Signal varies depending on the size and orientation of the fish, and from a cluster or a mix of different species.

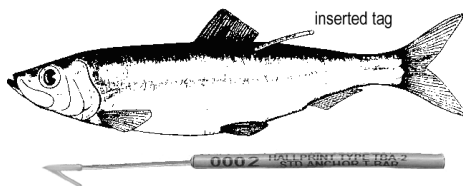


Plankton Net

A finely meshed cone with a collection container affixed to the small end. Pulled through the water either vertically or horizontally, the plankton net is used to identify total *numbers* and *species* of zooplankton and phytoplankton as well as their *position* in the water column.

Problems:

- Dependant upon accurate mesh size to catch target animals.

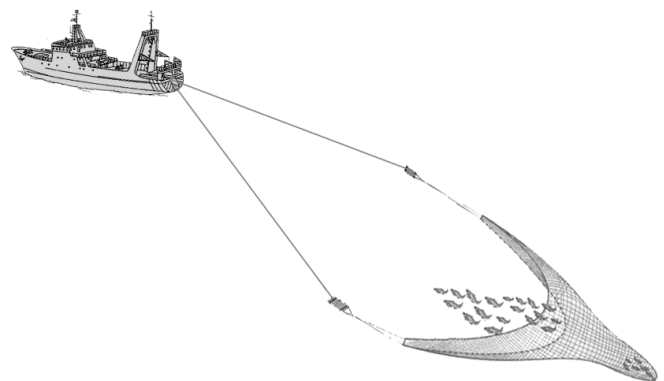


Tagging (Mark and Recapture)

Tagging is used to work out the *movements* and *age* of a range of species, such as snapper, rig, kahawai, school shark and groper. Fish are caught, their *length* and *weight* recorded, a small tag inserted, and they are returned live to the sea. A reward is offered for return of tagged fish with details about where and when caught.

Problems:

- Tags may not be returned or may come out, and some fish may die because of the tag.
- Cannot be used for deepwater species.



Trawl Surveys

These are used to estimate changes in the *total numbers* or *weight* of fish in an area for bottom-dwelling fish like orange roughy, hoki, oreo, snapper, and red gurnard. Biological details such as the *length*, *weight* and *sex* of the fish in the catch are recorded.

Problems:

- Some fish are unevenly distributed.
- Some fish escape by going over or round the net or fish may be 'herded' into the net

SAMPLING AQUATIC POPULATIONS

1. Describe in what sampling context you would use the following sampling techniques:

- a) Plankton Net: _____

- b) Kick Sampling: _____

- c) Electric Fishing: _____

- d) Trawl Surveys: _____

- e) Acoustic Surveys: _____

- f) Tagging: _____

- g) Underwater Filming: _____

2. Suggest why electric fishing is not possible in marine environments:

3. Suggest how mesh size influences the sampling efficiency of a plankton net:

4. Explain how the orientation of the fish is significant to acoustic sampling:

