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DRAFT MANUAL FOR BOTTOM TRAWL SURVEYS IN THE CONVENTION AREA

1. INTRODUCTION

Research vessel surveys should ideally provide the following information:

- standing stock biomass for all species (exploited and unexploited);
- length and age structure from the exploited stocks;
- length/age-weight relationships;
- maturity ogives;
- year class strengths of pre-recruits.

To date, bottom trawl surveys in the Convention Area have been national surveys with varying degrees of comparability among surveys and nations. The objective of this Manual is to increase comparability between these surveys by standardising fishing methods, survey methods, sampling of catches, and recording and analysis of data. This Manual incorporates results of earlier deliberations of the Working Group, such as in SC-CAMLR IX, Annex 5, p. 249 to 254, and the CCAMLR Workshop on Bottom Trawl Survey Design.

2. THE SURVEY TRAWL

Survey results are critically dependent on the size, construction and rigging of the trawl. The trawl should preferably be a commercial sized trawl with a codend lining of max mesh size of 40 mm. As it is unlikely that a standard trawl will used by all nations, a full description of the net, and ground tackle including doors, should be provided as indicated in Figures 1 and 2.

It is crucial to achieve a good bottom contact of the whole groundrope, and this should be checked regularly. A proper contact could be indicated by inspecting for wear on bobbins and chains.

3. SURVEY DESIGN AND FISHING POSITIONS

The survey should cover the main geographical and bathymetric range of the target species within a given statistical subarea. It should follow a random survey design stratified by depth and, if known, fish density. The areas of seabed within selected depth ranges in the Atlantic Ocean sector are set out in Tables 1.A to 1.O. Fishing positions have to be chosen randomly in the first survey, but may be used as known clear tow stations during subsequent surveys. To reduce or avoid covariance between fishing stations in adjacent strata, fishing stations should be separated by at least 5 miles. Fishing must not be directed towards fish shoals located by sonar or echosounder. The survey design and the method of stratification needs to be carefully described.

If an adaptive ('encounter-response') survey design is used, in which acoustic equipment is utilised to identify high density and low density regions, the acoustic equipment should be described in detail.

4. STANDARD FISHING METHOD

Standard fishing speed measured as trawl speed over the ground should be used. The actual ground speed and distance towed should be monitored and reported.

Each haul should last 30 minutes. Start time is defined as the moment when the net settles on the bottom or in case of a continuous recording of net parameters, when vertical net-opening and wing spread indicate that the net is in its stable fishing configuration. Stop time is defined as the start of hauling. Hauls of less than 15 minutes duration should not be included for subsequent estimate of standing stock of the data.

Vertical net-opening, wing spread and door spread should be monitored at 30 second intervals.

Trawling should be carried out only during daylight hours, i.e. between sunrise and sundown.

Any incidental mortality of marine mammals or birds must be recorded.

All fishing gear lost during the course of the survey must be logged and reported.

5. ANALYSIS OF THE CATCH

Fish in the catch should be sorted into species and the total weight and total number of each species recorded. In case of large catches, a representative subsample should be sorted. Attention must then be given to a possible uneven distribution of species and/or size classes in the hold.

In order to assess the impact of bottom trawling on benthic communities the catch of benthos should be weighed.

6. BIOLOGICAL SAMPLING

Representative length distributions should be recorded for all exploited species (high priority) and all other species (if time permits). The size of a representative sample is difficult to define but usually contains a minimum of 100 fish measured. Length is defined as total length (Figure 3) measured to the nearest centimetre below.

Concurrently with length measurements sex and maturity data should be collected. Maturity stages should be classified according to the maturity scale given in Table 2. Otoliths (and scales for nototheniids) should be collected on a survey area basis, or in the case of the presence of two or more stocks according to their stock boundaries. For the commercially exploited species a minimum sampling level of 10 otoliths per sex and 1 cm length class should be maintained. For the smaller size groups, that presumably contain only one age class, the number of otoliths per sex and length class may be reduced.

7. INFORMATION TO BE REPORTED TO CCAMLR

7.1 Survey Design and Data Collection

- Survey area
- Geographical boundaries: latitude and longitude
- Map of area surveyed including location of fishing stations (and preferably bathymetry)
- Scientist in charge

7.2 Description of Vessel

- Name of vessel
- Vessel size (length, GRT, HP)
- Vessel type
- Included in CCAMLR register of commercial or research vessels.

7.3 Description of Fishing and Other Gear

- Description of gear used, e.g. bottom or semi-pelagic trawl, including construction drawing and rigging diagram (see Figures 1 and 2)
- Auxiliary gear (dan leno assembly, etc.)
- Type of mesh (diamond, square, other)
- Mesh size in cod end (mm) (measurements according to standards set out in the CCAMLR Inspection Manual).

7.4 Description of Acoustic Equipment

- Operating frequency
- Calibration method
- Calibration details, e.g.
    - Source level
    - Pulse length
    - Directivity index
    - Receiving sensitivity
    - Calibration constant (source level plus receiving sensitivity)
    - TVG correction details

7.5 Survey Design

- Survey design (random, systematic, etc.)
- Target species
- Stratification (according to depth zones, fish density, etc.)
- Details of sources of stratification
- Haul duration
- Number of stations planned and carried out
- Locations and map of fishing stations

7.6 Methods of Survey Data Analyses

for example:

- Swept area method
- Statistical properties of the estimator

7.7 Data to be Reported to CCAMLR

Haul-by-haul data including

Date and time
Designated stratum for the haul
Start and end position of trawl
Method of position fixing (e.g., GPS)
Duration of haul
Mean trawling depth
Wire out
Distance trawled over ground
Net mouth opening (vertical-horizontal)
Catch by species in weight and numbers
Length frequency distributions of exploited species
Benthos weight
Maturity stage information
Feeding information
Other (e.g., parasitic infestation, lesions, etc.)

Combined for rectangle subarea:

Length/weight-age information of exploited species
Incidental mortality of mammals and birds
Fishing gear lost

Data should be reported to CCAMLR using Formats C1, C4, B2, B3 and B4.