Appendix B. Fishery-Independent Abalone Survey (FIAS) Protocol

Objective

A direct assessment survey method which will yield an unbiased annual index of abalone abundance for each fishery management zone (A to G). Changes in this index with time will be used to assess the state of the resource, and provide an alternative research tool to the presently used fishery-dependent methods. Simultaneously collected length-frequency data will permit qualitative evaluation of the population structure.

The Index

Given the requirement for repeatability, even with a completely different diving team, transects are favoured since this method is likely to be less affected by variables such as diver experience & sea conditions. The transects will be perpendicular to the shore, at fixed positions, evenly spaced within each survey area (fishery TAC zone). The actual inter-transect spacing per zone was determined by the combination of coastline length and number of transects. Frequency of the surveys per zone to be annual.

Transect length and number

Data from previous diving surveys giving abalone counts per 10 m transect sector were analyzed to determine the effect of varying transect length and number of transects on the coefficient of variation (CV). It was decided that a 30 m transect would prove the most practically manageable length, while still providing the required CV. A reasonable logistical target was agreed to be a maximum of 20 transects per zone.

In addition, in order to cater for concerns over the lack of information on stocks in the deeper water, it seemed appropriate to include one deeper (+6m) transect of 50 m length swum per every 5 shallow transects to provide some data on this stratum. This was done by starting at transect number two (for any zone) and doing "deep" transects every 5th station (# 2, 7, 12, 17). The need has arisen to increase the sampling of the deeper water due to data limitations (no CPUE data) brought about by the closure of the commercial fishery. Therefore from 2009, in addition to the "deep" stations that are routinely sampled, all other even numbered stations will be included. The "deep" transects will therefore include station numbers: 2, 4, 6, 7, 8, 10, 12, 14, 16, 17, 18 & 20.

Depth range

Given that 77% of the surface-visible kelp lies within the 0-5m depth range, and that this is also where the highest abalone densities were encountered historically, the survey strategy is concentrated within this range. Because the very shallow (<2 m) sector poses significant logistical problems due to swell effects, the depth range 3-4 m will be targeted. This will be assumed to be representative of the abalone population as a whole. In addition, transects will also be carried out in deeper water (+6m) as indicated above.

Transect Positioning

In the absence of any indication that abalone abundance was likely to be correlated in any way with coastal features, other than the occurrence of kelp beds, a regular spacing strategy was adopted for placement of the transects. Using a cartographic digitising program and known latitude and longitude reference points the lat/long positions of each survey station were determined. These are then located in the field using a Global Positioning System (GPS). Once as close as possible to the GPS position, the boat is moved inshore or offshore until anchored at a start depth of 2 m below Mean Low Water Spring (SAN Tide Tables) which is determined using the echo sounder.

Transects

Two divers attach the 30 m/50 m (depending on depth) line to the anchor, or a kelp stipe, and swim offshore perpendicular to the coastline (on a compass bearing). They swim on either side of the line, counting and measuring abalone within a 1 m swathe on either side of the line. The width of 1 m is checked occasionally using the custom-designed sliding weight with a line of 1 m attached. The abalone are measured as encountered, and shell lengths (mm) are recorded within each 10 m sector. In high densities, in order to reduce measuring time, a maximum total of 40 abalone are measured, (the first 20 in the 1st 10 m sector, and the next 20 of the last 10 m sector are measured, per diver). The remaining abalone larger than 100 mm shell length are just counted.