UNIVERSITY of TASMANIA | IMAS INSTITUTE FOR MARINE & ANTARCTIC STUDIES

D'ENTRECASTEAUX CHANNEL SCALLOP SURVEY AND STOCK STATUS UPDATE: 2020

Sean Tracey, Graeme Ewing and Edward Forbes

September 2020

Institute for Marine and Antarctic Studies, University of Tasmania, Private Bag 49,
Hobart TAS 7001

Enquires should be directed to:
Assoc. Prof. Sean Tracey
Institute for Marine and Antarctic Studies
University of Tasmania
Private Bag 49, Hobart, Tasmania 7001, Australia
Sean.Tracey@utas.edu.au
Ph. (03) 6226 8286

Table of Contents

Background

Sixty-two sites throughout the D'Entrecasteaux Channel were surveyed annually between 2006 and 2012. Low stock levels and poor recruitment lead to the 2011 closure of the D'Entrecasteaux Channel recreational scallop fishery. A subgroup of 23 historically high scallop density sites were selected for sampling in 2017 to determine whether there was evidence of recovery that would justify a more extensive survey and consideration of re-opening the area to fishing. All sites were surveyed with a towed video camera, and a subgroup of sites were also surveyed by diver transect. Densities of commercial scallops were very low throughout the channel. Small patches of queen scallops in higher density were deemed insufficient to warrant consideration of a recreational fishery.

This report summarises the findings of a video survey conducted in 2020 to check for signs of recovery of scallop stocks in the D'Entrecasteaux Channel.

Methods

The IMAS towed video camera was deployed at the 23 sites sampled in the 2017 survey (Fig. 1). The camera unit incorporates a high-definition IP video camera, LED lighting and 2 parallel scaling lasers at a separation of 150 mm (whose beams contact the seafloor in the centre of the video field) (Fig. 2). A GoPro Hero 3 was also attached to the camera mount to provide higher resolution video. Tows were accomplished with the camera approximately one metre above the seafloor and at a speed-over-ground of around 1.2 knots. Tows were around 100 m in length, with each tow recorded as a track on the vessel GPS.

Video footage was viewed to determine the abundance of Commercial Scallops (*Pecten fumatus*), Queen Scallops (*Equichlamys bifrons*), Doughboy Scallops (*Mimachlamys asperrimus*) and other benthic taxa using video analysis software Transect Measure (SeaGIS). The start and end time of the benthic footage analysed for each site was recorded from the video time code and was used to truncate the site GPS track to determine the actual length of each transect.

Scallops and other taxa were counted only if:

1. they crossed the centre line of the video frame (i.e. a horizontal line passing through both laser points) and within 500 mm of either side of the centre point between the two scaling laser points (i.e. representing 1 m transect width) (Fig. 3)
2. they crossed the centre line from beyond the laser points (i.e. mobile species swimming across the line from behind the camera were not counted).

The density of scallops from the video survey was calculated as the ratio of the abundance of counted scallops and the transect area (ie. 1 m*transect length).

Each scallop encountered in the video footage was assessed for its suitability for size determination. A scallop was sized if it met the following criteria:

1. clearly visible margins
2. orientated such that the length measurement length (widest point of the shell, parallel to the hinge) was within 30^0 of the horizontal axis (to minimise undersize bias from the oblique camera angle)
3. within 250mm of the centre of the transect (to minimise biases from camera lens distortion).

Every video frame in which a scallop was measured, a pixel to millimetre calibration was applied using the scaling lasers (150mm) and the length (widest point of the shell, parallel to the hinge) of the scallop was measured in millimetres (Fig. 3). Overall size structure was standardised by the number of scallops in the site samples.

Segments in transects where the video field was less than 1 m wide or where the video left the seafloor sufficiently to preclude recognition of scallops were excluded from the analysis to minimise bias. These segments were excised based on their video timecodes cross referenced to the GPS track to ensure transect areas reflected valid video segments.

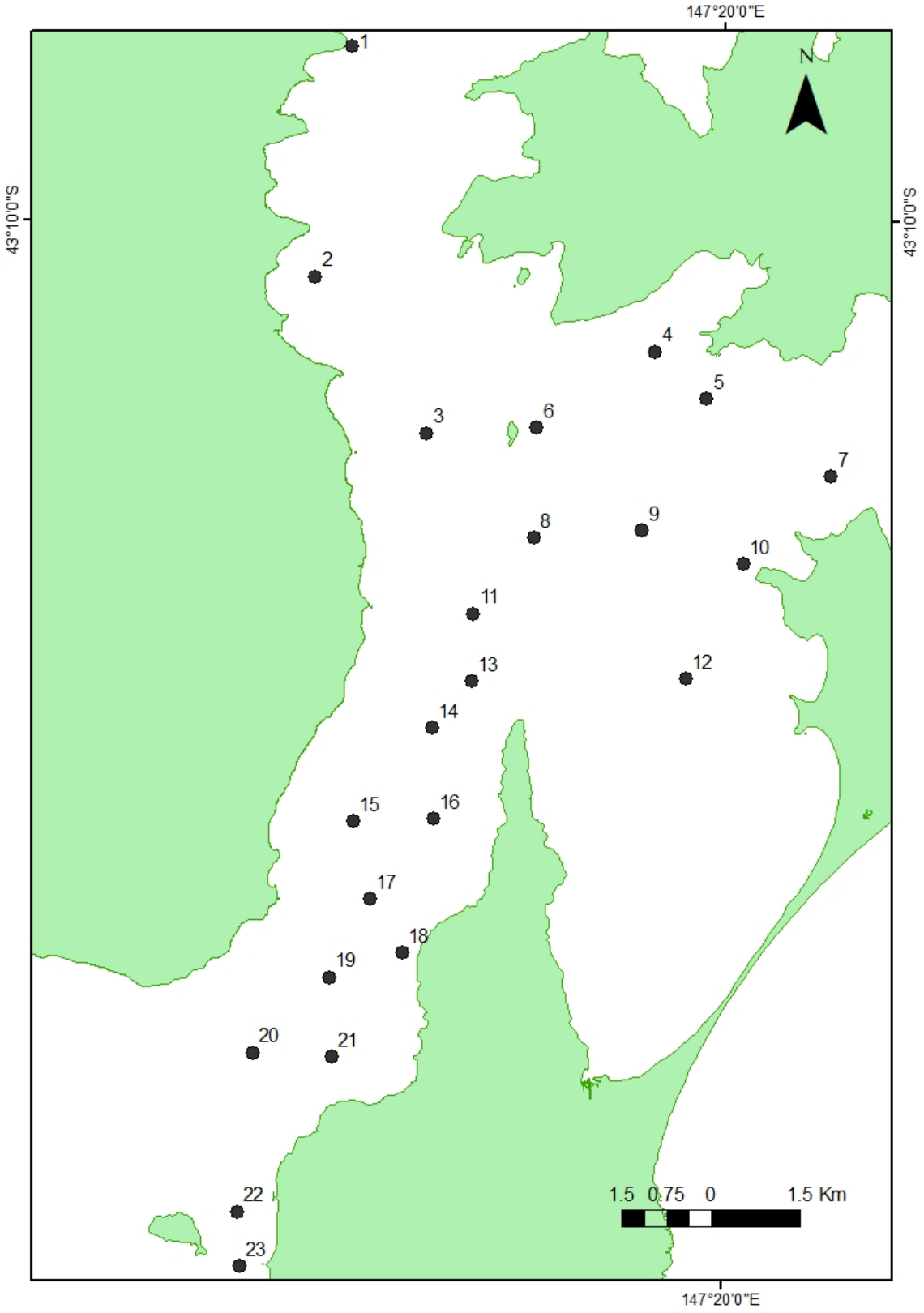

Fig. 1: D'Entrecasteaux Channel survey sites.

Fig. 2: IMAS towed video camera unit.

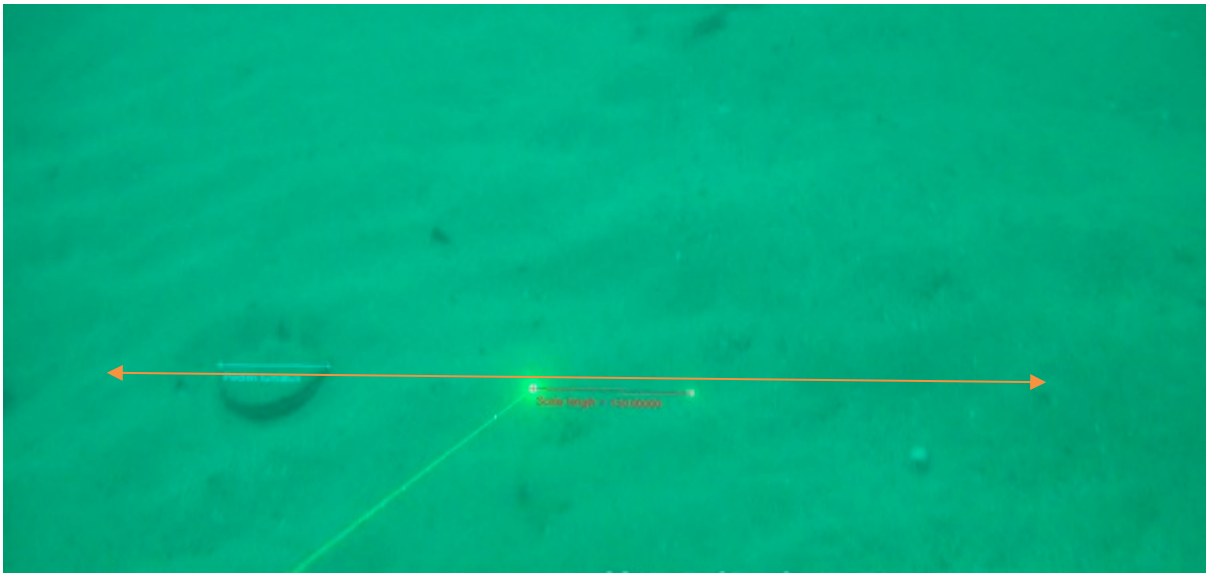

Fig. 3: Frame from video footage showing scaling lasers (green dots), pixel to millimetre calibration (red line), video centre line (orange line), transect length (orange line is 1000mm long and centred at the centroid of the scaling lasers), and a scallop width measurement (blue line) orientated at 10˚ to the centre line.

Results/Discussion

The towed video method provided footage of sufficient resolution to allow species identification and size measurements of scallops for all sites; with an average transect area of 107 m^2 per site.

Scallop densities

Commercial Scallop densities were very low throughout the Channel, with mean densities of 0.04 and 0.01 scallops per m^2 based on all sizes classes and those > 100 mm, respectively (Table 1; Fig. 4).

The densities of Queen Scallops were also very low at the mid-Channel sites (sites 1 to 12, Fig. 1), with mean densities of 0.01 and 0.001 scallops per m^2 for all size classes and those > 100 mm, respectively (Table 1; Fig. 5). The density of Queen Scallops in areas of higher current flows (Middleton to Gordon, sites 13 to 21) were moderate with mean densities of 0.5 and 0.16 scallops per m^2 for all size classes and those > 100 mm, respectively. Sites between Satellite Island and Alonnah (sites 22 and 23), yielded high mean densities of 4.3 and 1.1 scallops per m^2 for all size classes and those > 100 mm, respectively.

The density of Doughboy Scallops was very low at all sites.

Table 1: Scallop densities (scallops per m^2) by site.

Site	Transect Area (m^2)	Total density (abundance/m^2)		Legal sized density (abundance>100mm/m^2)	
		Commercial	Queen	Commercial	Queen
1	110	0.000	0.00	0.000	0.00
2	104	0.000	0.00	0.000	0.00
3	102	0.186	0.00	0.093	0.00
4	108	0.019	0.00	0.000	0.00
5	107	0.019	0.00		0.00
6	106	0.057	0.00	0.000	0.00
7	110	0.064	0.00	0.021	0.00
8	114	0.026	0.00	0.013	0.00
9	137	0.000	0.00	0.000	0.00
10	108	0.000	0.02	0.000	0.00
11	105	0.010	0.14	0.000	0.02
12	104	0.231	0.00	0.058	0.00
13	101	0.030	0.88		0.29
14	102	0.000	0.63	0.000	0.04
15	108	0.046	0.43		0.06
16	102	0.000	0.56	0.000	0.19
17	107	0.037	0.67		0.26
18	109	0.018	0.33		0.12
19	104	0.000	0.81	0.000	0.26
20	106	0.000	0.32	0.000	0.12
21	108	0.009	0.14		0.09
22	104	0.000	4.54	0.000	1.40
23	108	0.148	4.13		0.76

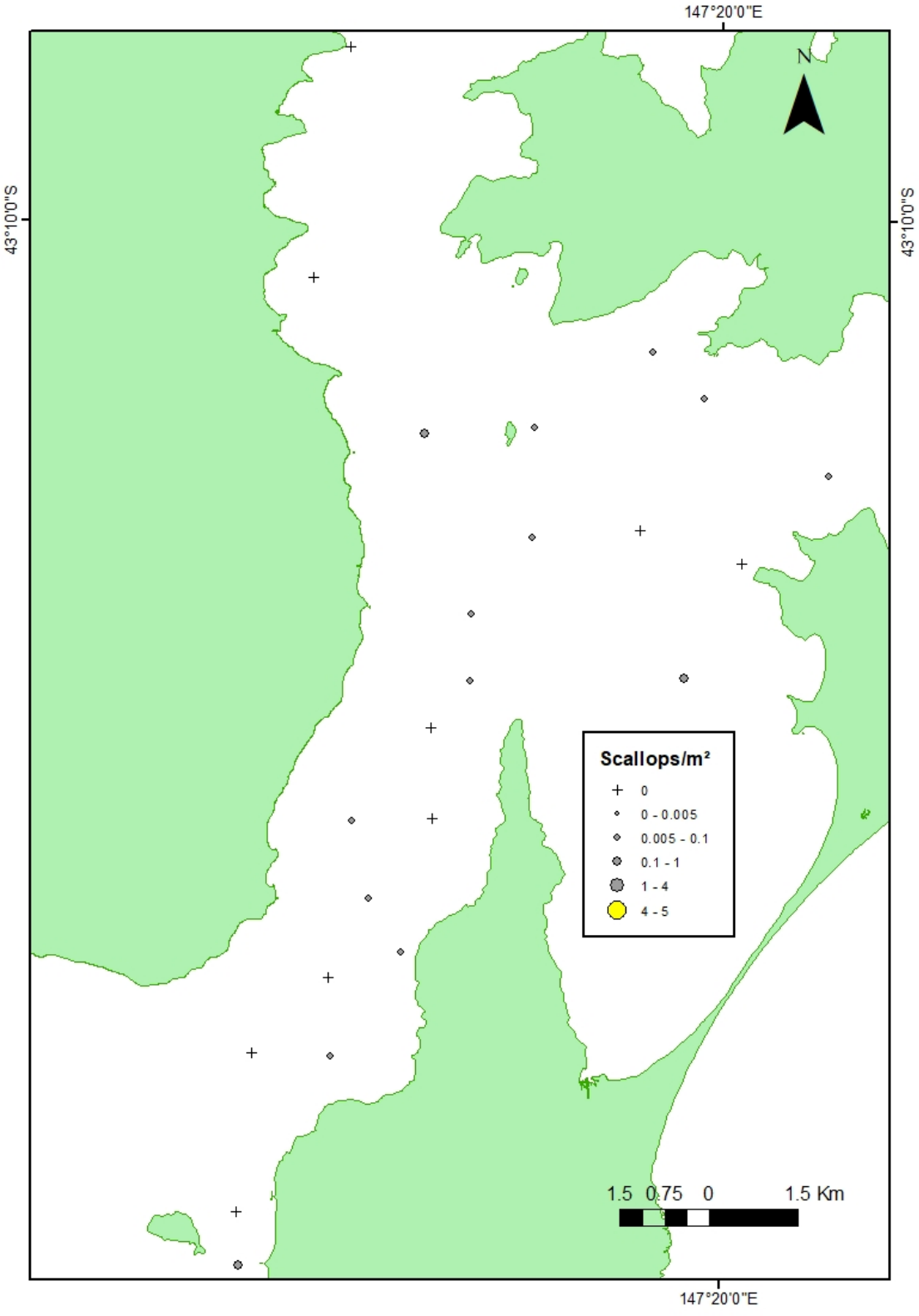

Fig. 4: Commercial Scallop densities (abundance per m^2) by site.

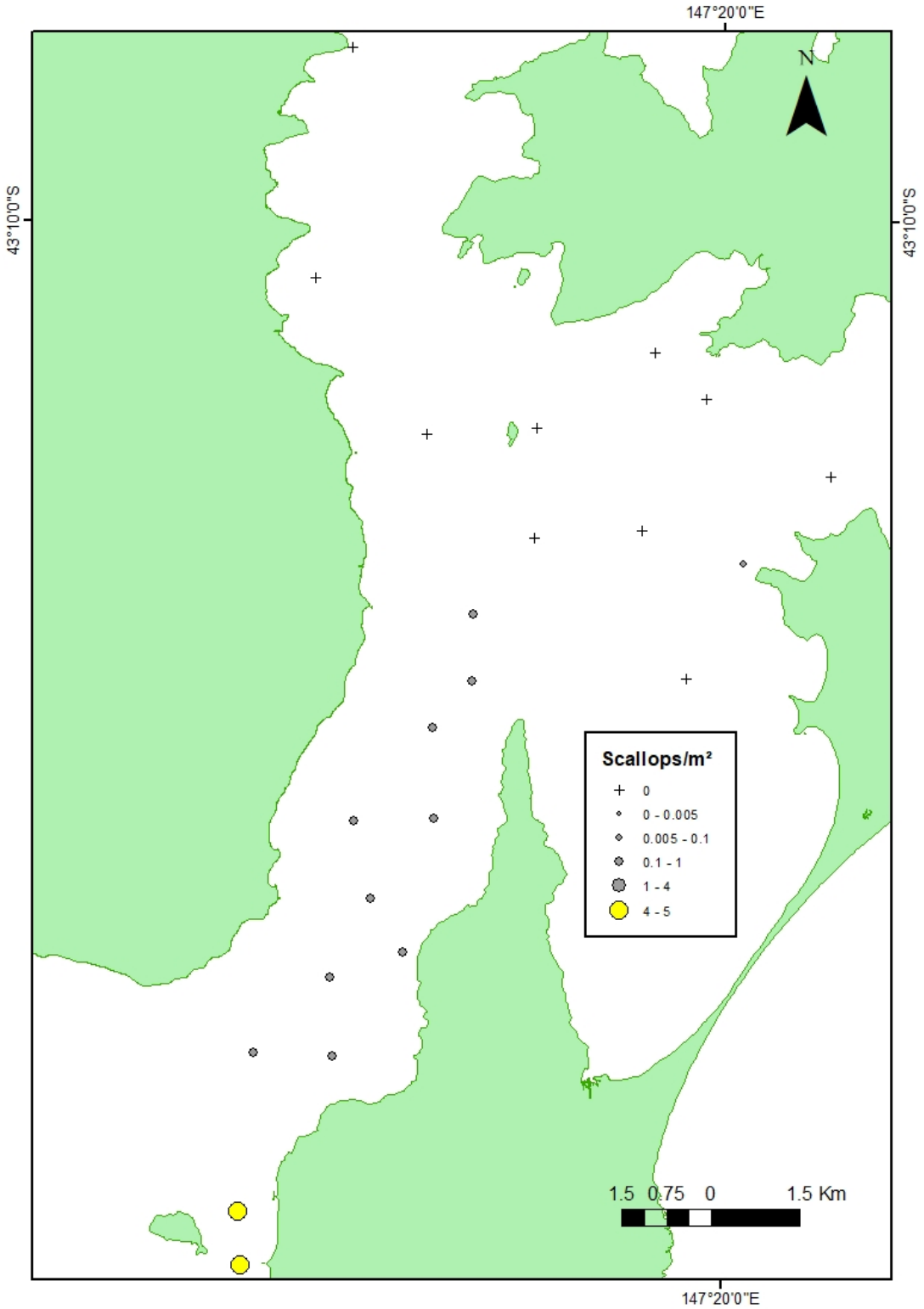

Fig. 5: Queen scallop densities (abundance per m^2) by site.

Size structure

Of the commercial scallops that were encountered in the survey (93), 33 were measured, and 3 were legal sized (>100mm).

Queen Scallops were relatively abundant in the areas of the Channel that experience higher current flows but were predominantly below 100 mm in size (N = 196, range 34 – 164 mm, mean 80 mm, 9% exceeded the MSL) (Fig. 6).

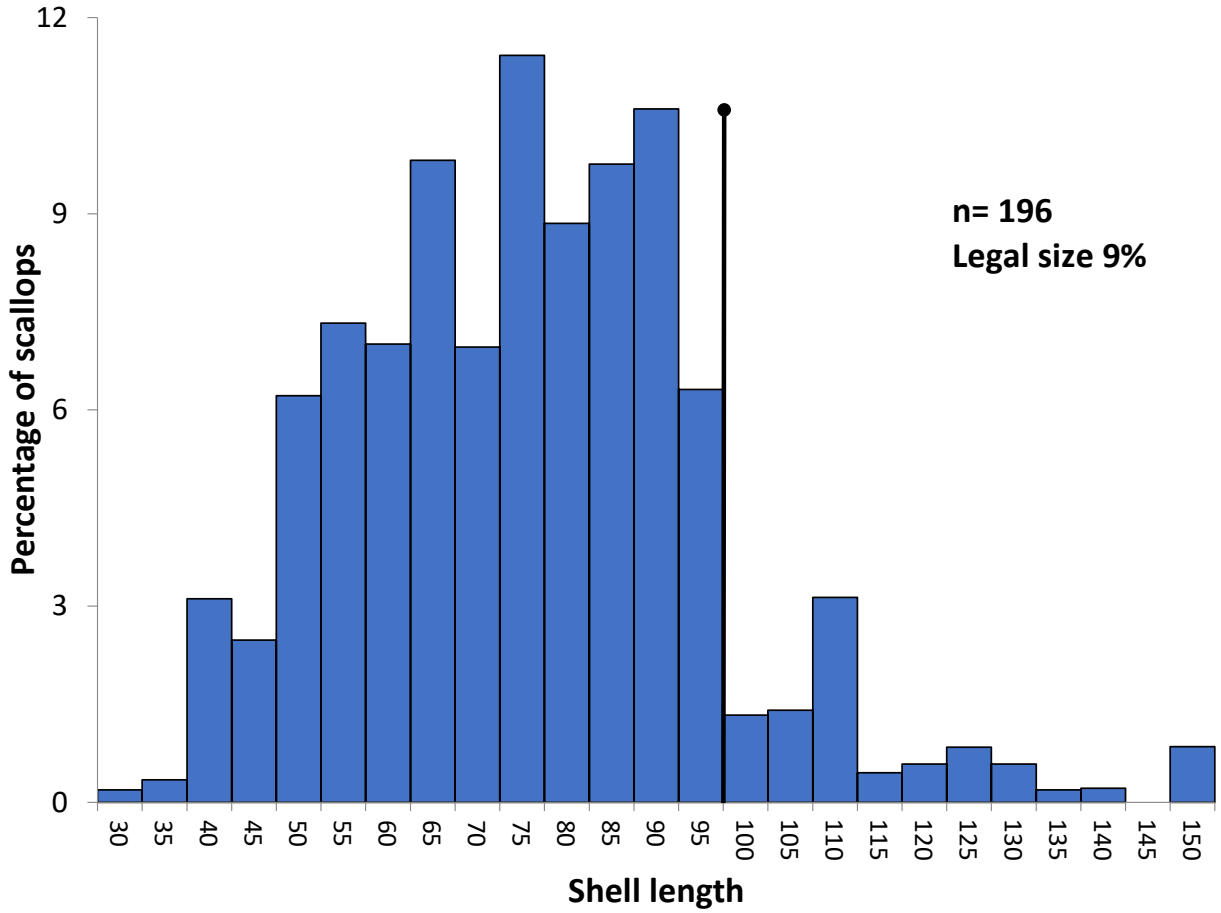

Fig. 6: Queen Scallop standardised size distribution. The vertical black line indicates the minimum legal size limit (MSL=100 mm).

Conclusions

Commercial and Doughboy Scallops remain in very low densities in the D'Entrecasteaux Channel. Genetic studies suggest that the Commercial Scallop population in the Channel is heavily reliant on self-recruitment and as such it will be necessary to rebuild the adult stock significantly before any fishery for this species could be justified.

While moderate densities of Queen Scallops are present, they appear to be restricted to small and isolated beds in the central Channel region and are primarily undersized.