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Sidescan and dredge surveys of Block L, a proposed marine farming site in Admiralty Bay

Niki Alcock
Russell Cole
Tammy Crocker
Ralph Dickson
Andrew Hill

prepared for

Admiralty Bay Consortium

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National Institute of Water & Atmospheric Research Ltd
PO Box 893, Nelson
New Zealand
Tel: 03 548 1715
Fax: 03 548 1716

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Reviewed by:
by:

Approved for release

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INTRODUCTION

Admiralty Bay is a large embayment between D'Urville Island to the west, and the headland ending in Clay Point to the east. It is a wide bay, most of which is at depths of about 40 m, and its bottom substratum is identified as mainly mud and broken shell (Navigation Chart NZ6151). The present report details benthic biological and sidescan sampling in part of the Admiralty Bay area. There is little published work from Admiralty Bay, and the large study of the benthic fauna commissioned by Department of Conservation (McKnight & Grange 1991) does not include sites in Admiralty Bay.

A series of marine farms is proposed for the central part of Admiralty Bay by the Admiralty Bay Consortium (Fig. 1).

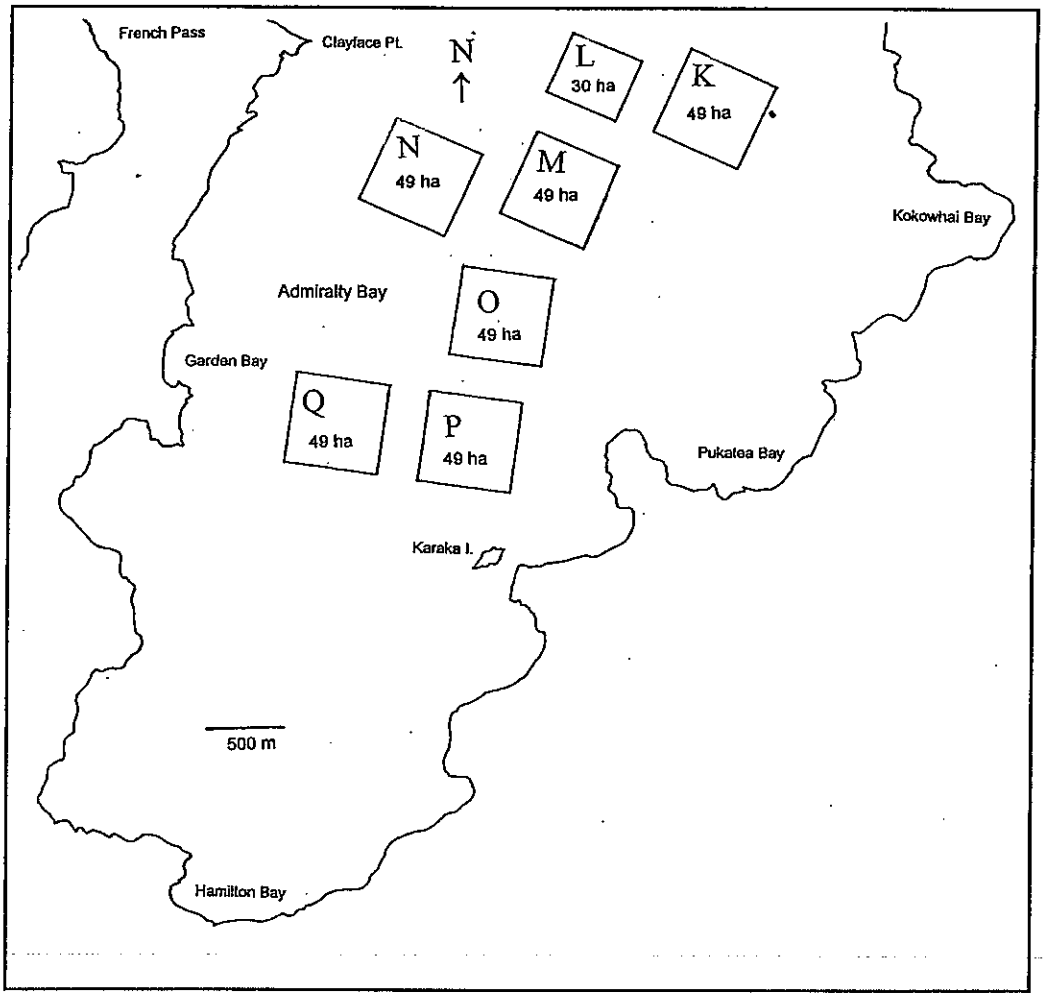

Figure 1. Sites of proposed marine farms in Admiralty Bay. Block L (indicated) lies between Clayface Point and Kokowhai Bay.

A previous report (Cole et al. 1999) gave a summary of an inshore sidescan survey of the Admiralty Bay area, identifying sites that were suitable for marine farming (i.e. comprised flat featureless mud on the substratum), and also identifying rocky outcrops which marine farms should avoid. This is the sixth of a series of reports dealing with offshore blocks in central Admiralty Bay. This report describes the results of benthic dredging and sidescan sonar surveys undertaken to assess the benthic substratum and biology of one of the blocks, Block L, which is 30 ha in area and lies between Clayface Point and Whangapoto Point, at the entrance to Admiralty Bay (Fig. 1). The present survey was not designed to consider fisheries matters.

METHODS

As the sidescan survey was undertaken with differential GPS which is extremely accurate, and the plans for the sites have been drawn up in accordance with the maps obtained from that survey, we are confident that the entire area has been covered by the sidescan survey. We also compared field observations of bottom type during the dredging with the sidescan printouts to verify that the positioning had been accurate.

Dredge sampling was used to sample the fauna of the area in December 1999. The dredge used was a custom-built sampling dredge, with a 600 x 260 mm opening, and 2 mm stainless steel mesh. This enabled a much greater area to be sampled than divers would have been able to view. Three samples were taken in the area. As the dredge samples are not quantitative, the relative abundances were expressed on a qualitative scale, from 1 = rare, to 5 = extremely abundant. In general the dredge was towed for a distance of 200-400 m, which was usually sufficient to caused it to be retrieved at least ¾ full.

Samples were sorted in the laboratory, and identified to the lowest possible taxonomic level. The fauna in the samples were compared with the Department of Conservation guidelines for marine farm siting (Department of Conservation 1995), and a previous survey of the fauna of the Marlborough Sounds (McKnight & Grange 1991).

RESULTS

Sidescan survey

The sidescan survey provided complete coverage of the block. The substratum was largely uniform and featureless, with the exception of 7 small areas which returned

stronger signals in the northern, central northern, central, southwestern, and southern central parts of the area. These appeared to be true features of the substratum (rather than fish), and were mainly small (in the order of 1-2 m). There were scars (probably from the passage of trawl doors) at the central eastern edge of the area. Block L had a very uniform bottom. An example of a sidescan sonar image of this substratum type is shown in Figure 2 and the stronger signals are shown in Figure 3.

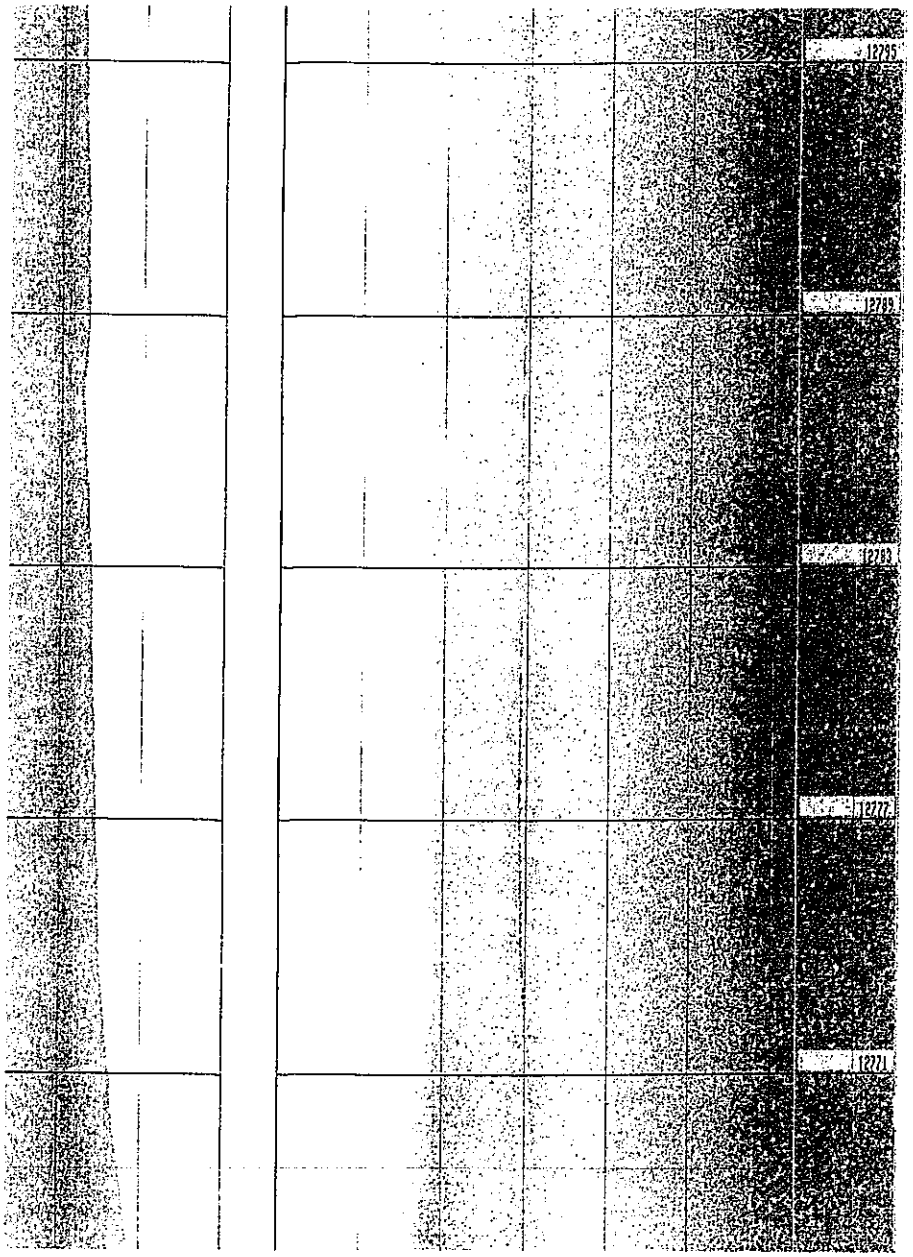

Figure 2. A representative section of sidescan printout from Block L, Admiralty Bay.

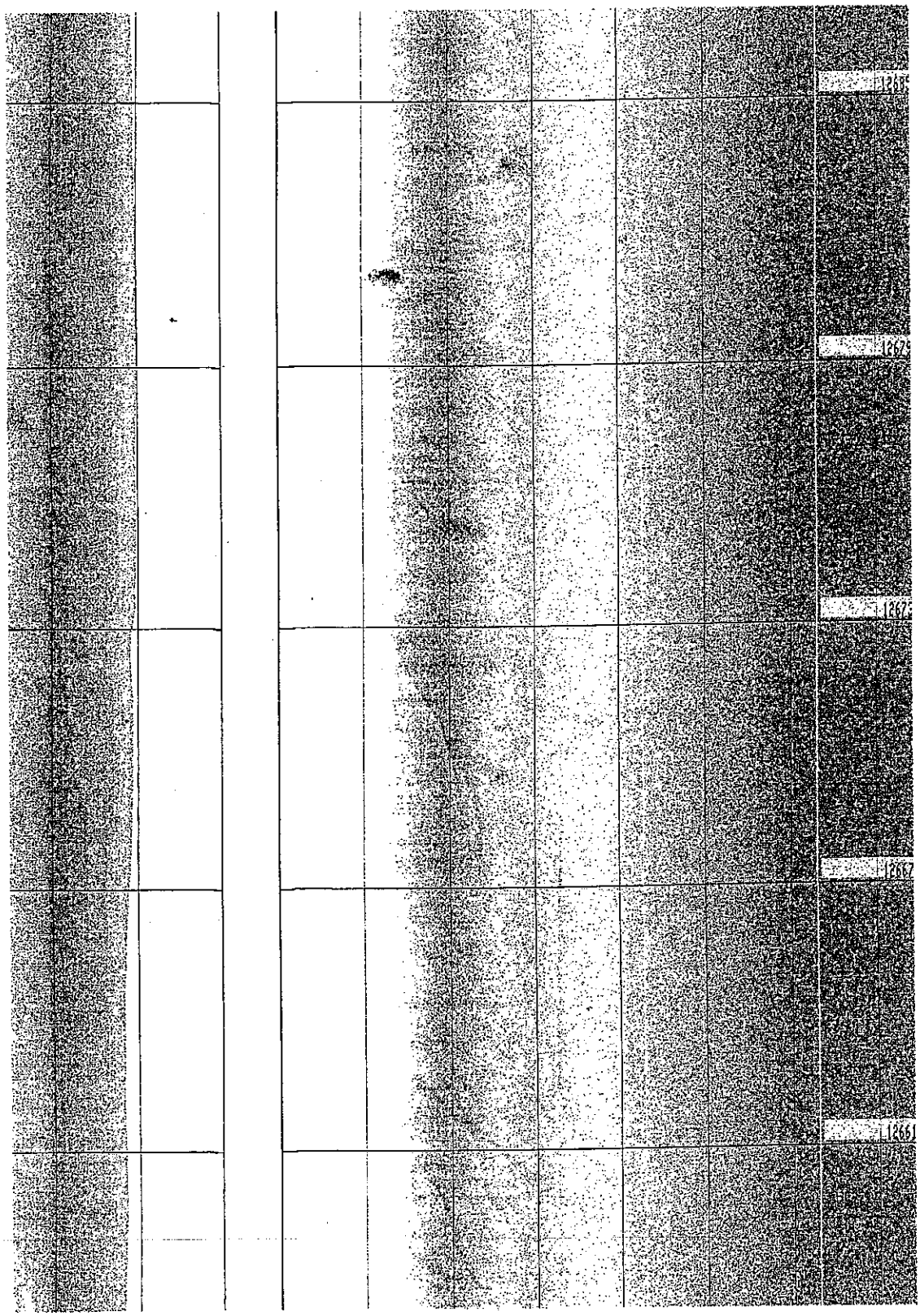

Figure 3. Section of sidescan printout showing dense patch structures, which may be bryozoans, and linear marks on the bottom, which are probably trawl tracks.

Biological sampling

Details of the samples taken are given in Table 1.

Table 1. Details of dredge samples, taken between 1700 and 1800, 10 December 1999.

Sample	Start depth (m) and position	Finish depth (m) and position
A	52.0 m 40° 55.375' S 173° 52.954' E	 40° 55.722'S 173° 52.023' E
B	42.5 m 40° 56.255' S 173° 52.610' E	 40° 56.151' S 173° 52.851' E
C	45.4 m 40° 55.556' S 173° 53.717' E	 40° 55.629' S 173° 53.459' E

A total of 20 taxa was found. The species most consistently abundant in this area was the heart urchin *Echinocardium*, while the Japanese file shell *Limaria* was also moderately abundant. The ribbed brachiopod *Magasella sanguinea* was moderately abundant in 2 dredge tows, and the bryozoan *Celleporaria agglutinans* was present in one tow also, although the colonies obtained were very small. Sample B contained very little, suggesting either that the dredge was not sampling properly, or that the fauna was patchily distributed within the block. The 2 samples that contained moderate numbers of taxa were comparable in species richness and the relative abundances of the species among those species with most of the other sites which were sampled.

Table 2. Faunal abundances in 3 dredge samples from Block L, between Clayface Point and Whangapoto Point, Admiralty Bay. Abundances are tabulated in qualitative categories, from 1 = rare, to 5 = very abundant.

			Dredges		
Group	Species	Common name	A	B	C
Bivalvia	*Nucula strangei*	Nutshell	2	1	-
Bivalvia	*Nemocardium pulchellum*	Strawberry cockle	-	-	-
Bivalvia	*Cuspidaria fairchildi*		2	-	1
Bivalvia	*Leptomya retiaria*		1	-	1
Bivalvia	*Dosinia greyi*		1	-	-
Bivalvia	*Limaria orientalis*	Japanese file shell	3	-	5
Bivalvia	*Chlamys zelandiae*		-	-	2
Bivalvia	*Venericardia purpurata*		1	-	-
Brachiopoda	*Magasella sanguinea*	Ribbed brachiopod	2	-	3
Bryozoan	*Celleporaria agglutinans*		-	-	2
Crustacea	*Pagurus* sp.	Hermit crab	-	-	1
Crustacea	*Ebalia laevis*		-	-	2
Crustacea	*Acanthophrys filholi*	Camouflage crab	1	-	1
Echinoidea	*Echinocardium cordatum*	Heart Urchin	2	2	5
Gastropoda	*Amalda mucronata*	Olive shell	-	-	1
Holothuroidea	*Stichopus mollis*	Sea cucumber	1	-	-
Polychaeta	*Glycera* sp.		-	-	2
Polychaeta	*Spiochaetopterus* sp.		2	-	-
Polychaeta	*Lepidonotus* sp.	Sea mouse	-	-	1
Porifera	Unident	Sponge	-	-	1
		Number taxa found	11	2	14

CONCLUSIONS

The substratum in Block L comprises mud and shell, which is occupied mainly by a predictable fauna of species which are widely distributed and generally common in the Marlborough Sounds. The site will be subject to moderate wave action on occasion, which engineering of the farm will have to accommodate. The occurrence of *Celleporaria agglutinans* is noteworthy, although the abundances were very low (2 small colonies). *Magasella* occurred at the site at moderate abundances, but in our experience it is moderately abundant in many parts of the Marlborough Sounds. The "footprint" of the farm is likely to be larger than usual, because of the depth of the site, and associated with this the impact is likely to be less severe, as shell and pseudofaeces will disperse over a wider area. A balancing consideration is that the

depth will require long warps, so that a proportionally smaller central area will be occupied by the farm. This will mitigate the effects of pseudofaeces and shell-drop. The benthic fauna beneath the farm may be altered by shell drop and perhaps enhanced abundance of 11-armed starfish in those areas. In light of the occurrence of unidentified dark patches in the sidescan printout, we recommend that further sampling be undertaken to identify the source before attempting to develop the site.

REFERENCES

Cole, R.G., Grange, K.R., Hill, A. 1999. Benthic survey of areas of Admiralty Bay. NIWA Client Report MUS00404 / 1, 10pp.

Department of Conservation (1995). Guidelines for ecological investigations of the proposed marine farm areas in the Marlborough Sounds. *Department of Conservation Occasional publication No. 25.* 21p.

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add to "Potential sites to investigate" & would like in this file.