NIWA

Taihoro Nukurangi

Benthic survey of proposed expansion to marine farm Licence 241, Kingfish Bay, Port Underwood

NIWA Client Report: MUS00415/3
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INTRODUCTION

This report outlines the results of a field survey of the benthic environment of the proposed expansion to marine farm Licence 241, Kingfish Bay, Port Underwood. Facing south, Port Underwood is a large bay along the coast of northern Blenheim. There are numerous marine farms in this area which produce mainly mussels *Perna canaliculus*. This area has a tidal range of about 1.2 m and is characterised by having a fairly high sediment load, which is likely to be derived from the Wairau River and driven north during southerly swells. Generally the marine benthic environment around the bay comprises rocky shorelines sloping steeply to a mud substrate within 50 m from the shore to maximum depths of 17-18 m near its centre.

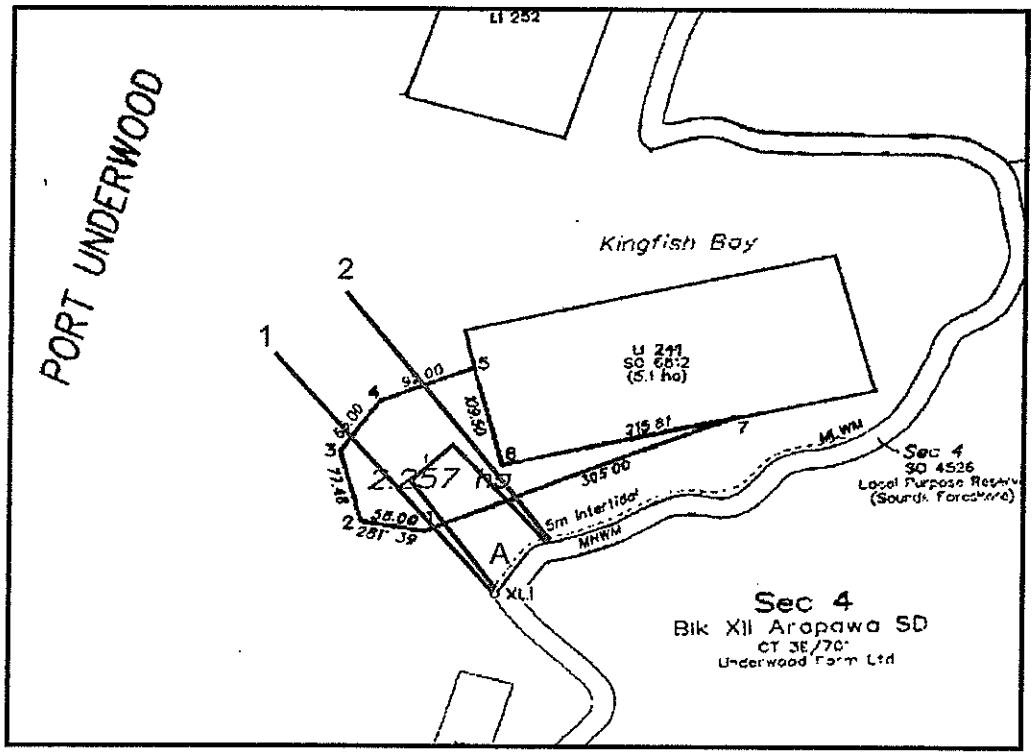

Figure 1. Site of proposed expansion to marine farm Lic. 241, Kingfish Bay, Port Underwood. 1 & 2 (Red) = echo-sounding transects. The blue line (A) indicates the dive transect.

METHODS

The survey was undertaken during September 1999. The 2.257 ha proposed marine farm expansion extends out in a coffin shape from the south western and southern boundary of Licence 241 (Fig. 1).

Two parallel transects were run out from the southern point of Kingfish Bay on bearings of 270-280°. Along these transects the depth was recorded from our vessel's 3D echo-sounder and concurrent distances from shore were measured using a laser range-finder (accurate to within 1 m up to distances of 400 m). The raw data were then plotted as a 2-D contour plot showing the different substrate types. The proposed marine farm boundaries were also plotted as an aid to describing where the farm will lie in relation to the biological communities. In addition the vessel was driven along the inshore boundary of the proposed farm looking for conspicuous rock outcrops on the sounder.

Conspicuous benthic species and their relative abundances were recorded by biologists from a U shaped scuba transect. In addition a Hi-8 video tape was recorded along both dive transects, which was later analysed for species composition.

RESULTS

Depth profiles

The survey was undertaken 2 hours before low tide. The intertidal shore comprised a low-lying rocky platform which extended out approximately 25 m from high tide mark for transect A and about 20 m for transect B. As the two transects were similar in profile only Transect 1 is presented (Fig. 2). The seafloor gradually sloped away to between 9-11 m depth on the inshore boundary of proposed extension, and then continued down to a maximum and constant depth of 17 m at 90 m from shore for transect A, and 14 m depth at 70 m from shore for transect B. No rock outcrops were found on the echo-sounder run along the inside boundary of the site.

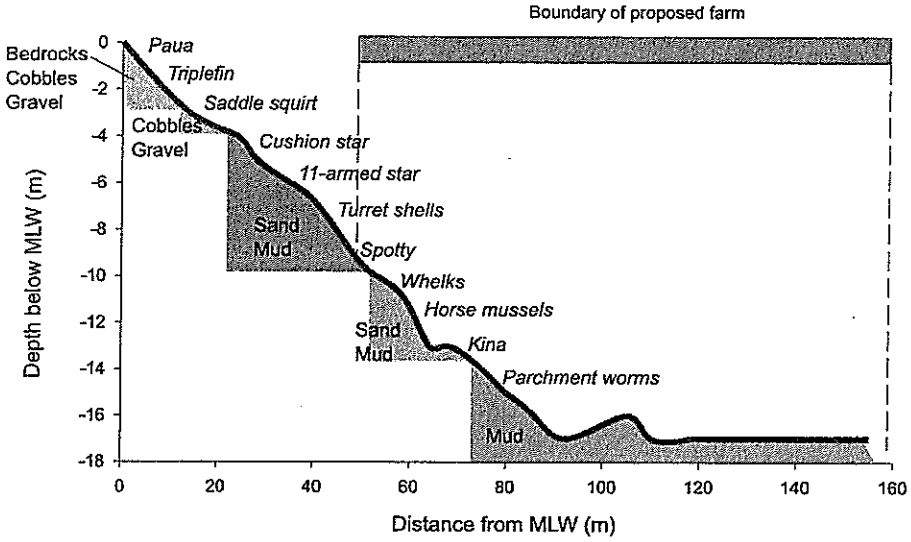

Figure 2. Generalised depth profile across the site showing major sediment zones and boundary of the proposed expansion to marine farm Licence 241, Kingfish Bay, Port Underwood.

Habitat zones

The intertidal rocky platform extended down to about 2.5 m where it was interspersed with cobbles and patches of gravel which extended out to about 4 m depth. From this depth sand and mud dominated, with a notable dense cover of zone forming red seaweeds. By 10 m these seaweeds became less dense and out past 14 m the substratum was mainly mud.

Conspicuous species

Up in the shallows, at least four species of seaweed and kelp formed a dense canopy in the cobble and rocky zone (Table 1). Below this, paua, top shells and cats-eye snails were seen grazing on the rocks. In the lower intertidal area there were patches of blue mussels and fish (triplefins and spotties) swimming around amongst the seaweed fronds. Down on the gravel patches sea cucumbers, cushion star, saddle squirts and turret shells were recorded.

As the sediments became more sandy below 4 m, red seaweeds formed a fairly dense cover (estimated at about 50%). Amongst this seaweed, large solitary fan worms were

observed and 11-arm starfish were seen foraging for shellfish. Sea cucumbers, *Scutus*, turret shells and saddle squirts were also seen.

As we swam deeper, the red seaweeds became sparse and patches of muddy sand and drift brown seaweeds became present. Occasional large kina were seen on this seaweed along with a few horse mussels and large whelks. Below 14 m, as the sediments became finer, the dominant species were small solitary parchment tube worms.

Table 1. Conspicuous species recorded in each habitat and depth strata from the dive transect of proposed expansion to marine farm Lic. 241, Kingfish Bay, Port Underwood. C= common.

Species	Common name	Bedrock/ Cobbles/ Gravel 0-2.5 m	Cobbles/ Gravel 2.5-4 m	Sand/ Mud 4-10 m	Sand/ Mud 10-14 m	Mud 14-17 m
Atrina zelandica	Horse mussel				✓	
Branchiomma sp.	Sabellid fan worm (purple-banded)			✓		
Buccinulum sp.	Whelk				✓	
Carpophyllum flexuosum	Brown alga	✓	✓	✓	Drift	Drift
Cnemidocarpa bicornuata	Saddle squirt	✓	✓	✓		
Colpomenia sinuosa	Brown bubble seaweed		✓			
Coscinasterias muricata	11-armed starfish			✓		
Cystophora sp.	Brown divariacating seaweed	✓	✓			
Ecklonia radiata	Brown leafy seaweed	✓	✓			
Evechinus chloroticus	Kina				✓	
Forsterygion lapillum	Common triplefin	✓				
Haliotis iris	Paua	✓				
Macrocystis pyrifera	Bladder kelp	✓	✓			
Maoricolpus roseus	Turret shell		✓	✓		
Mytilus edulis	Blue Mussel	✓				
Notolabrus celidotus	Spotty	✓	✓	✓	✓	
Patiriella regularis	Cushion star	✓	✓	✓	✓	
Scutus sp.		✓		✓		
Spiochaetopterus sp.	Small parchment tube worm					✓ C
Stichopus mollis	Sea cucumber	✓	✓	✓	✓	
Trochus viridis	Top shell	✓				
Turbo smaragdus	Cats eye snail	✓	✓	✓		
Ulva lactuca	Sea lettuce		✓	✓		
Unidentified red seaweeds	Red seaweeds			✓50%	✓	
Total no.	**24**	14	12	12	**8**	**2**

CONCLUSIONS

The site in question is fairly typical of much of Port Underwood. Most of the species were present shallower than 10 m depth, and they are fairly ubiquitous species found throughout most of the Marlborough Sounds, with the exception of some of the larger brown seaweeds. Generally very few large beds of seaweeds are found in the inner Marlborough Sounds, but Port Underwood appears to support quite a diverse seaweed flora.

The species which could be impacted by the proposed farm expansion and those which are in densities which should trigger a further study by the DOC guidelines (DOC 1995) are the bed of dense red seaweeds between 4-10 m depth. However, as the greatest density of these seaweeds occurs above 10 m depth the majority of the plants are inshore of the inner boundary of the proposed extension. As the impacts of mussel farming are likely to be limited to within 10's of metres from the farm, the greater portion of these beds would remain unaffected. Moving the inner boundary out to 75 m from the shore would ensure their further protection if deemed appropriate.

Another species that may raise concern occurring below this depth is the relatively common parchment tubeworm *Spiochaetopterus* sp. which was mostly found on the sloping mud between 14-17 m. This species could not be fully identified and could be a new species endemic to New Zealand with a wide distribution (C. Glasby NIWA *pers. comm.*). As this species appears to bind the sediment together and produces elongated tubes, it is not expected that they will be significant adversely impacted by marine farming activities unless they become smothered from mussel shell-drop.

REFERENCES

Department of Conservation. 1995. Guidelines for ecological investigations of proposed marine farm areas. *Occasional Publication 25, Nelson/Marlborough Conservancy.*

ACKNOWLEDGEMENTS

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