REC ID
U9604S9

PROPOSED SITE: ANAKOHA BAY

Description of Benthic Environment:

This site was dived on 7 and 17 May 1996. Three transects traversing 200 metres from MLW were dived as shown on the attached map 1. The inshore boundary of the proposed farm was also swum on SCUBA (map 1). The depth sounder was used to cover the entire perimeter of the site.

For transects 1 and 2 the intertidal area was a vertical rocky face. For these transects a gently sloping rock/cobble/boulder shallow subtidal area extended for 20 metres from MLW to a depth of 4m. On transect 1 (T1), the westernmost transect, the rock gave way to a silty sand bank. The silty sand, which was slightly coarser in some patches, extended to 100m from MLW (depth 8m) where a band of dead shell overlay firm mud to 130m from MLW (depth 13m). Beyond this distance soft glutinous mud predominated.

Transect 2 (T2) was similar in substrate composition to T1. Beyond the rock/cobble/boulder substrate silty sand extended seawards on a steeper gradient than T1 to a distance of 100m from MLW (depth 19.5m). Soft mud was recorded for the remainder of the transect.

On transect 3 (T3) a rocky intertidal extended approximately 15m to MLW, a relatively narrow rocky reef then extended seawards for 50m. Between 50 and 60m from MLW the odd bedrock finger rose up to 2m in height from a firm mud substrate however no large rocks were recorded beyond the 60m mark. Between 60 and 200m on the transect the substrate changed gradually from firm mud to soft mud.

Transects 1 and 2

Over the shallow rock/cobble/boulder substrate of T1 and T2 species typical of hard shores were recorded: chiton, cat's eyes, a mixed sub-littoral fringe of algae, mussels, paua, barnacles, limpets, spotties, blue moki (rare), sea tulips and kina. Of the fauna, only barnacles and blue mussels were common, the other species were more sparsely distributed.

Throughout the soft substrates on T1 and T2 heart urchins, sea cucumbers, ascidians and cushion stars were recorded as occasional; hermit crabs, biscuit stars, scallops, wandering sea anenomes, spiny murex and one finger sponge were all recorded as rare. With one exception (see next paragraph) the silty sand was sparsely populated.

On T1 a dense bed of ringed dosinia formed a distinct zone stretching from 45-90m off MLW. Some pipis (occasional) were also amongst the dosinia. The dosinia were not recorded on T2 or T3.

Horse mussels densities were measured to assess whether trigger levels were reached. The *Atrina* were counted from 1 metre either side of the transect over a distance of 5m as the diver swam along. In this way 10 m^2 quadrats were counted wherever *Atrina* were encountered on the transects. The trigger level for horse mussel densities is 0.2/m^2.

On T1 horse mussels were noted 100 - 125m from MLW with densities < 0.2/m^2. On T2 horse mussels were recorded between 60-90m from MLW their distribution was rather patchy however, averaging only 0.1/m^2. On T2 the *Atrina* provided a substrate for the attachment of the large red brachiopod (<1/m^2) and an epiphytic red algae. These numbers of horse mussels do not constitute horse mussels "beds". No trigger levels were reached.

Transect 3

As expected the reef area contained a diverse array of flora and fauna. The green seaweed *Caulerpa geminata* and the browns *Carpophyllum flexuosum* and *C. maschalocarpum* (all occasional) formed part of the shallow subtidal. Over the reef, blue mussels were common; barnacles, cat's eyes, starfish, chiton, paua, sponges, tubeworms, kina, shield shell, sea anenomes, sea cucumbers and limpets were all occasional. One conger eel was recorded along with blue cod, triplefins and spotties.

On the soft substrate (beyond 60m from MLW) the fauna was relatively sparse with the large red brachiopod (<5/m2) and horse mussels (<0.2/m2), both below trigger levels as identified in the DoC guidelines for ecological investigations. Other species, all recorded as occasional, were the wandering anenome, nesting mussels, green mussels and sea cucumbers. The shield shell, hermit crab, 11 arm and cushion star, native flat oyster and opal fish were recorded as rare.

Inshore Boundary

Following the transect dives the applicant has moved the inshore boundary of the western portion of the proposed farm from 50 to 100m from MLW. This removes the farm altogether from the bed of ringed dosinia and provides a buffer for its seaward extent. This adjustment also removes the farm from the majority of the area where horse mussels were located. Some horse mussels were recorded between 100-125m from MLW on T1 however densities did not exceed the trigger level. In addition, anchor warps would be installed in this area should the farm proceed.

In order to provide a buffer to the reef identified in the south east section of the proposed farm the inshore boundary for this section lies 85m from MLW (100m off the high tide mark).

A dive of the inshore boundary covered:

(i) on the western section of the farm (100m from MLW) - a silty sand substrate. No further beds of ringed dosinia were recorded. Some horse mussels were noted however were very sparsely distributed and in numbers well below the trigger level.
(ii) on the south east section of the farm (85m from MLW) - a sloping bank of firm mud with very few species present.

No extensions of the rock/cobble/boulder or reef habitat were noted.

Conclusion

Although both brachiopods and horse mussels were recorded from the transects, they were not in any great numbers or "zone" forming. No trigger levels were reached (refer DoC guidelines for ecological investigations).

The more diverse and productive rock/cobble/boulder substrate of T1 and T2 is well inshore of the proposed farm. The applicants have moved the inshore boundary off the shallower silty sand area in order to protect and provide a buffer to the identified ringed dosinia bed at the western end of the site. This movement also removes the farm from the majority of the area where horse mussels were identified. The proposed farm also lies approximately 25m offshore from the reef habitat identified on T3.

By far the majority of the proposed farm lies over a sparsely populated soft mud substrate. It is therefore suggested that no species or habitats of ecological significance would be adversely effected by the development of a marine farm at this site.

Diver: Tim Edwards, BSc
Date: 7/5/96
Location: ANAKOHA BAY

SPECIES LIST: TRANSECTS 1 & 2

Common Name	Species	Abundance
ALGAE		
Pink paint and encrusting Coralline Turf	*Corallina spp.*	2
Flapjack	*Carpophyllum maschalocarpum*	3
Brown Algae	*Cystophora sp.*	2
Red Algae, epiphytic	*Chondria macrocarpa*	2
Red Algae	*Gigartina dilatata*	1
Green Algae	*Ulva sp.*	2
ECHINODERMATA		
Kina	*Evechinus chloroticus*	2
11 arm star	*Coscinasteras calamaris*	1/2
Cushion Star	*Patiriella regularis*	2
Sea Cucumber	*Stichopus mollis*	2
Biscuit Star	*Pentagonaster pulchellus*	1
Heart Urchin	*Echinocardium australe*	2
POLYCHAETA		
Tubeworm	*Pomatoceros sp.*	1
COELENTERATA		
Sea anenome	*Actinothoe sp.*	2
Wandering sea anenome	*Phylctenactis tuberculosa*	1/2
FISHES		
Spotties	*Notolabrus celidotus*	2
Blue Cod	*Parapercis colias*	2
Opal fish	*Hemercoetes monoptygius*	1
Blue Moki	*Latridopsis ciliaris*	1
MOLLUSCA		
Cat's Eye	*Turbo smaragdus*	2
Paua	*Haliotis iris*	2
Paua	*H. australis*	2
Scallop	*Pecten novaezelandiae*	1
Horse Mussel	*Atrina zelandica*	1/2
Green Mussel	*Perna canaliculus*	1
Blue Mussel	*Mytilus edulis*	3
Nesting Mussel	*Modiolarca impacta*	2
Chiton	*Sypharochiton pellliserpentis*	2
Butterfly Chiton	*Cryptoconchus porosus*	1
Limpet	*Cellana radians*	2
Large Ostrich foot	*Struthiolaria papulosa*	1
Large Trumpet shell	*Charonia lampas capax*	2
Ringed Dosinia	*Dosinia subrosea*	3
Pipi	*Paphies australis*	2
Native Flat Oyster (one individual on *Atrina*)	*Ostrea lutaria*	1
Spiny Murex	*Poirieria zelandica*	1
Frilled venerid	*Bassina yatei*	1
ASCIDEACEA		
Sea squirts	*Cnemidocarpa bicornuta*	2
Sea tulip	*Boltenia pachydermatina*	2
BRACHIOPOD		
large red brachiopod (on horse mussels)	*Magasella sanguinea*	<1/m2
CRUSTACEA		
Half Crab	*Petrolisthes elongatus*	3
Hermit Crab	*Pagurus novaezelandiae*	1/2
Barnacle, small common	*Elminius modestus*	3
SPONGES		
Finger sponge	*Callyspongia sp.*	1

1. Abundance levels adopted from DoC Guidelines
   1=rare, 2= occasional, 3= common