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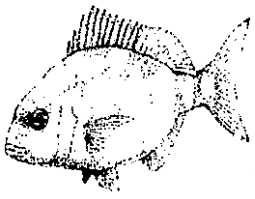

Specialists in:
Marine and Freshwater Research, Survey and Monitoring

Biological report on a proposed marine farm at

Parea Point, East Bay

Research, Survey and Monitoring Report Number 235

A report prepared for:

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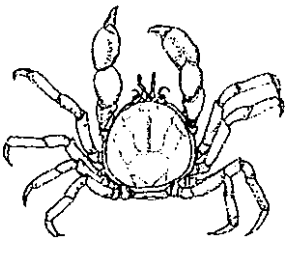

JUNE, 1999

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June, 1999

SUMMARY.

1. The aims of the study were to provide a biological description of the benthos within and adjacent to a proposed marine farm located at Parea Point, East Bay. Potential threats to any subtidal ecological values posed by the proposed activity were also discussed.

2. The soft shore communities recorded from the present study were dominated by species that occur on subtidal shores swept by light tidal currents in East Bay, Marlborough Sounds (Dell 1951; Estcourt 1967; McKnight 1969, 1974; Roberts and Asher 1993; McKnight and Grange 1991; Davidson and Duffy, 1992; Davidson, 1995; Davidson and Brown 1994; Duffy *et al.* in prep; Chadderton *et al.*, in prep. Chadderton and Davidson in prep).

3. Two transects and one free diver swim was conducted from areas within and adjacent to the proposed marine farm.

4. Combinations of bedrock, pebble and cobble material extended offshore from low water to 40 m distance at transect 1 and 90 m distance at transect 2. Beyond hard substrata areas the benthos was dominated by soft sediment (ie. fine sand/silt base with a dead whole shell component).

5. Scallops and horse mussels were relatively uncommon from the study area.

6. Giant lampshells and a smaller species were recorded during the present study.

7. It is recommended that the marine farm not be located within the small bay where transect 2 was installed. It is also recommended that the proposed area be located no closer than 90 m distance from shore at transect 1 or the small promontory immediately north of the adjacent salmon farm. These adjustments would ensure that the marine farm would not be located over hard shore habitats or dense beds of lampshells

8. Based on ecological grounds, no other adjustments to the proposed marine farm are recommended.

1.0 INTRODUCTION

The aims of the study were to provide a biological description of the benthos within and adjacent to a proposed marine farm located at Parea Point, East Bay. Potential threats to any subtidal ecological values posed by the proposed activity were also discussed.

2.0 STUDY AREA

Parea Point is the western entrance to Otanerau Bay located in the south-west corner of East Bay. Depths in the offshore areas around Parea Point range between 35 m to 42 m, but rise to shallower depths around the shore edge (see NZ Navy Chart NZ 615).

The proposed marine farm site is located immediately west of Parea Point. The intertidal shore is dominated by bedrock, boulder and cobble substrata substratum.

3.0 BACKGROUND

The Marlborough Sounds lie at the northern end of the South Island, with Cook Strait to the north and east and Golden Bay and the West Coast to the west. The Marlborough Sounds were formed by a submergence of river valleys. The Sounds consist of approximately 1500 km of bays, passages, peninsulas, headlands, estuaries and beaches, often with an adjacent steep terrestrial topography. The Sounds are a resource of major environmental importance. In a nationwide report by the Department of Conservation, the Marlborough Sounds as one ecological unit was identified as having national conservation importance. Within the Sounds, areas have been ranked ranging from areas of international to regional biological importance (Davidson *et al.*, 1990; Davidson *et al.*, 1995). These values have been included in the Marlborough District Council's draft Marlborough Sounds Regional Plan.

Multiple use (marine farming, fishing, boating, housing, waste water disposal, port development, forestry, agriculture) all have the potential to degrade the marine environment of the Sounds. Marine farming for example, can have considerable impact on the environment through habitat modification or lowering of water quality (Kaspar *et al.*, 1985; Gowan and Bradbury, 1987; Kaspar *et al.*, 1988; Gowan *et al.*, 1990; Silvert, 1992; deJong 1994). It is therefore important that all new marine farm and farm extension proposals adequately identify natural values within and adjacent to a proposed marine farm.

4.0 MATERIALS AND METHODS

The area was investigated on the 27th May 1999. Two transects were extended from the shoreline into the proposed marine farm area (Figure 1). Each transect consisted of a lead-line marked at 5 m intervals. A free swim was conducted along the inshore portions of the proposed marine farm area.

Densities of horse mussel (*Atrina zelandica*) and scallop (*Pecten novaezelandiae*) were collected from 10 x 1 m^2 quadrats installed at various intervals along transects lines. Brachiopods (*Magasella sanguinea, Neothyrus lenticularis*) abundance estimates were collected from areas where brachiopods were most common.

All depths presented in this report are adjusted to datum. Data collected during the study follow the Department of Conservation guideline outlining procedures for the investigation of marine farm areas in the Marlborough Sounds (Department of Conservation, 1995). Observations on water current direction and relative speed were collected at a variety of depths between 4.00 p.m. to 5.30 p.m. These observations were collected during the outgoing and early incoming tide.

5.0 RESULTS AND DISCUSSION

5.1 Water currents, free swim and observations

Observations from within the proposed farm area suggested that:

1) depths increase steadily within increasing distance from shore in eastern areas, but declined in offshore areas near the opposite shore in the bay. Offshore areas were 29 m to 42 m, while the inshore boundary was between 28 m depth;

2) areas offshore of 90 m distance from shore were dominated by fine sand and silt substrata with a component of broken and whole dead shell;

3) cobble and pebble sized substrata were recorded in inshore areas;

4) horse mussels and scallops were present, but were relatively uncommon;

5) lampshell were observed from the western end of the proposed marine farm area;

6) no reef or outcropping rock substrata was recorded within the proposed marine farm area.

No tidal currents were observed during the present study. Based on the species observed from the site, it is expected that tidal currents remain predominantly light for much of the time.

5.2 Profiles

The habitats and communities observed from both transects were comparable, but the distances from shore where habitats occurred varied.

The shore was initially characterised by combinations of bedrock, boulder, cobble and pebble substrata that extended offshore to approximately 40 m distance at transect 2 and 90 m distance at transect 1 (Figures 2 and 3). Beyond hard substrata the benthos was characterised by a zone of dead whole shell and broken shell material over a base of silt and fine sand substrata. This material extended to the offshore extent of transects.

From transects and the free swim a total of 35 conspicuous surface dwelling species of invertebrate, 2 ascidians, 5 species of algae and 8 species of bony fish were observed. A list of species recorded from the site are displayed in Table 1. The shore profiles have been plotted in Figures 2 and 3.

5.3 Fish

Eight species of bony fish were recorded during the investigation. The number and composition of fish species were representative of sheltered shores over much of the Marlborough Sounds. Blue cod were observed from the hard shore areas. No fish digging holes were observed. A variety of triplefins were common from rocky shore areas.

5.4 Scallops (*Pecten novaezelandiae*)

Scallops were recorded from within the proposed marine farm area but were uncommon (ie. one scallop observed).

5.5 Horse mussels (*Atrina zelandica*)

Two horse mussels were recorded from along transects. This density is below the Department of Conservation trigger level (ie. 0.2 individuals per m^{-2}).

5.6 Lampshells (*Magasella sanguinea, Neothyrus lenticularis*)

Small lampshells (*Magasella sanguinea*) were observed offshore at transect 2 (ie. towards the bay head). It was estimated that their density was above the Department of Conservation trigger level of 20 individuals per m^{-2}). Small lampshell were uncommon at the eastern transect (Figure 1).

Giant lampshells (*N. lenticularius*) were recorded offshore of 60 m distance at transect 2. No *Neothyrus* were recorded from the eastern transect. Estimated abundance was between 1 and 2 individuals per m^2.

Table 1 Species observed from transects from Parea Point, East Bay				
Algae	**Common name**	**Invertebrates**	**Habitat**	**Common name**
Corallina spp.(3)	paint	SPONGIA		
Colpomenia sp. (1)	bubble weed	Ancorina alata (3)	rubble	grey sponge
Hormosira banksii (1)	Neptune's necklace	Aaptos aaptos (1)	rubble	ball sponge
Carpophyllum maschalocarpum (1)	narrow flap-jack	Aplysilla sulphurea (2)	rock	sulphur sponge
Carpophyllum flexuosum (1)	wide flapjack	Callyspongia sp. (1)	rock	finger sponge
		COELENTERATA		
		Actinothoe albocincta (1)	rubble/bedrock	anemone
		Culicea rubeola (2)	rock	box anemone
		Obelia sp. (3)	rubble/rock	hydroid
		GASTROPODA		
		Cryptoconchus porosus (1)	rock	butterfly chiton
		Cellana spp. (2)	rubble	limpet
		Cookia sulcata(2)	rock	Cook's turban
		Mauria punctulata (2)	rock	tiger shell
		Maoricolpus roseus (2)	sand/shell	spire shell
		Trochus viridus (2)	rubble	
		Turbo smaragdus (3)	rock/rubble	cats eye
		BIVALVIA		
		Atrina zelandica (1)	soft	horse mussel
		Chlamys sp. (1)	rock	queen scallop
		Modilarca impacta (2)	rubble	Nestling mussel
		Monia zelandica (3)	rock/rubble	window oyster
		Mytilus edulis (3)	rock	blue mussel
		Pecten novaczelandiae (1)	soft	scallop
		Perna canaliculus (1)	rock	green mussel
		POLYCHAETA		
		Brachiomma sp.(2)	sand/rubble	fan worm
		Galeolaria hystrix (2)	sand/rubble	tube worm
		Spirorbis sp. (3)	rubble/rock	Spiral worm
		Serpulid sp. (1)	soft	tube worm
		Sabellidae (2)	soft	straw worms
		CRUSTACEA		
		Pagurus spp (3)	sand	hermit crab
		ECHINODERMATA		
		Coscinasterias calamaris (2)	sand/shell	11 arm star
		Evechinus choroticus (2)	rock/rubble	kina
		Patiriella regularis (2)		cushion starfish
BONY FISHES		Pectinura maculata (2)	rubble	snake star
Notolabrus celidotus (3)	Spotty	Pseudechinus albocinctus (2)	soft	pink urchin
Hemercoetes monopterygius (2)	Opalfish	Stichopus mollis (2)	sand/silt	cucumber
Forsterygion lapillum (3)	common trip.	BRACHIOPODA	sand/rubble	
Forsterygion varium (2)	variable trip.	Magasella sanguinea (3)	shell	lamp shell
Forsterygion sp. (2)	yellow black trip.	Neothyrus lenticularis (1)	shell	giant lampshell
Forsterygion malcolmi (1)	mottled trip.	ASCIDEACEA		
Parapercis colias (2)	blue cod	Cnemidocarpa sp. (2)	rubble	saddle squirt
Pseudolabrus miles (1)	scarlet wrasse	Didemnium sp. (2)	rubble	cream ascidian

East Bay is one of four areas recognised in the Marlborough Sounds where the giant lampshell is found in relatively shallow water (site 1/24 in: Davidson *et. al.* 1995). This brachiopod appears widespread around much of East Bay on the shore slopes (pers. obs.). The western end of the small bay where the proposed marine farm site is located supported giant lampshell in comparable abundance to considerable areas around the edges of East Bay.

5.7 Hydroids and Bryozoans

Occasional hydroid trees were recorded from the reef habitats. No bryozoans mounds were observed within the study area.

5.8 Tube worm mounds (*Galeolaria hystrix*)

No tube worm mounds were observed during the present study.

5.9 Burrowing anemone (*Cerianthus* sp.)

No burrowing anemones were recorded during the present study.

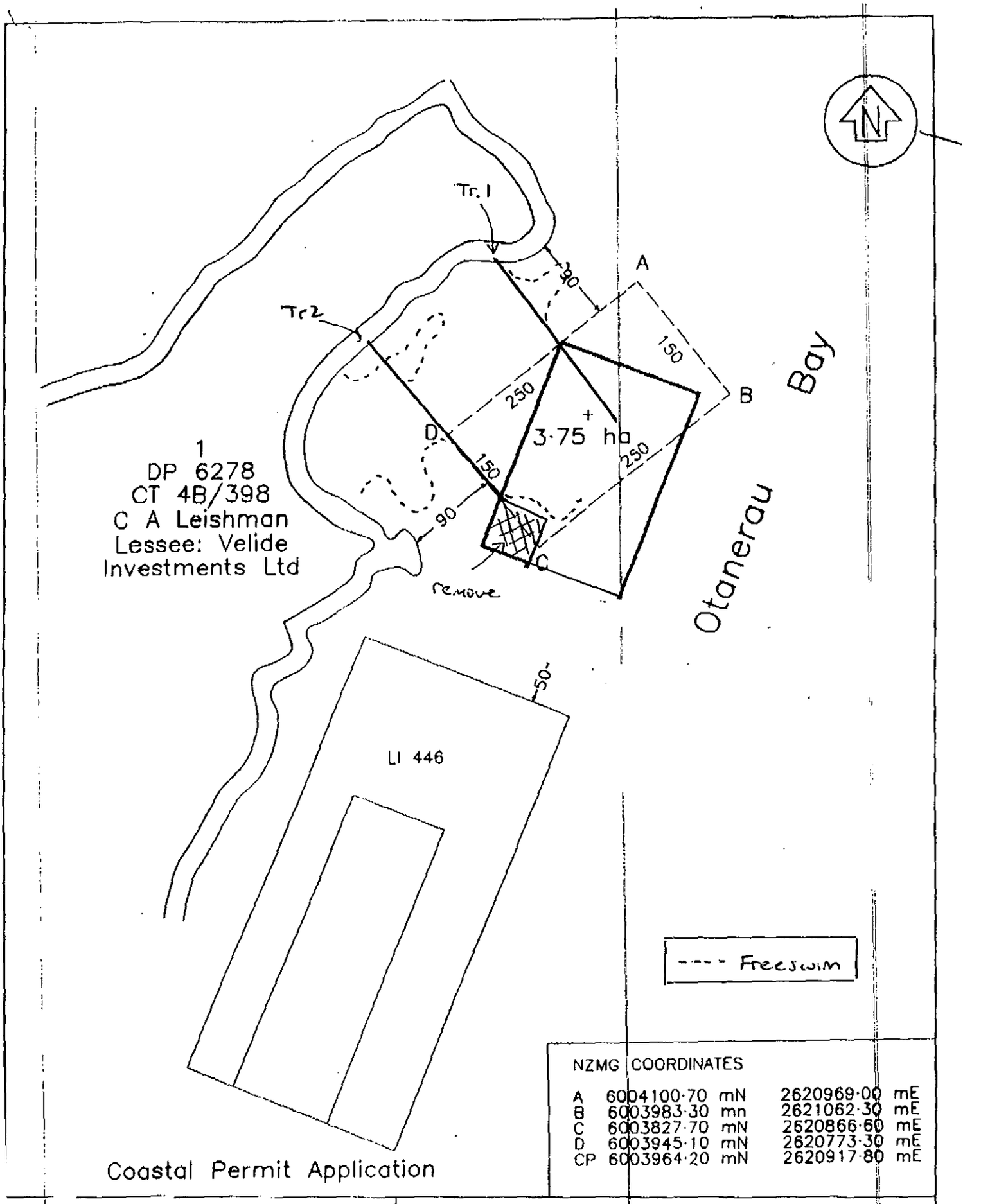
6.0 POTENTIAL IMPACT OF A BIVALVE MARINE FARM

The impact of shell and sediment deposition on the benthos under a mussel marine farm results in a shift from the initial ecological state to a new state. The degree of change depends on the habitat type and communities present prior to mussel material deposition. In general, a build up of mussel shell on a mud bottom will result in an increased diversity of species living on the surface and a decrease of infaunal species due to increased sedimentation (Kaspar *et al.* 1985; deJong 1994). On a rocky bottom, a decrease in species diversity as a result of shell and sediment deposition would be expected.

Soft bottom substrata and associated communities dominated the area under the proposed marine farm offshore of 40 m to 90 m distance from low water. This relatively uniform silt and fine sand base material with a component of broken shell and dead whole shell was widespread over offshore parts of the proposed marine farm area. In an area located west of the modified marine farm the substratum supported the giant lampshell (*N. lenticularis*) and small lampshell (*M sanguinea*). It is unknown what impact a mussel farm would have on these species located west of the proposed farm, but it is probable that tidal currents would carry sediment along shore rather than into the bay.

7.0 SUGGESTED ADJUSTMENTS TO THE PROPOSED BOUNDARIES

It is recommended that the marine farm not be located within the small bay where transect 2 was installed. It is also recommended that the proposed area be located no closer than 90 m distance from shore at transect 1 or the small promontory immediately north of the adjacent salmon farm. These adjustments would ensure that the marine farm would not be located over hard shore habitats or dense beds of lampshells. Based on ecological grounds, no other adjustments to the proposed marine farm are recommended.



NZMG COORDINATES

A	6004100·70 mN	2620969·00 mE
B	6003983·30 mn	2621062·30 mE
C	6003827·70 mN	2620866·60 mE
D	6003945·10 mN	2620773·30 mE
CP	6003964·20 mN	2620917·80 mE

Coastal Permit Application

AysonandPartners
REGISTERED SURVEYORS
Consultants in Surveying
Resource Management
Subdivision and Land Development
Davidson Ayson House
4 Nelson Street, P.O. Box 256
Blenheim, New Zealand
Ph 03 578 7029 Fax 03 578 7028

PLAN OF PROPOSED MARINE FARM
SCHWASS FAMILY TRUST P/SHIP

SCALE	DATE	LB/FB		JOB NO.
1:5000	JUNE 99			9033

Figure 1b Parea Point application area and location of free swims and transects.

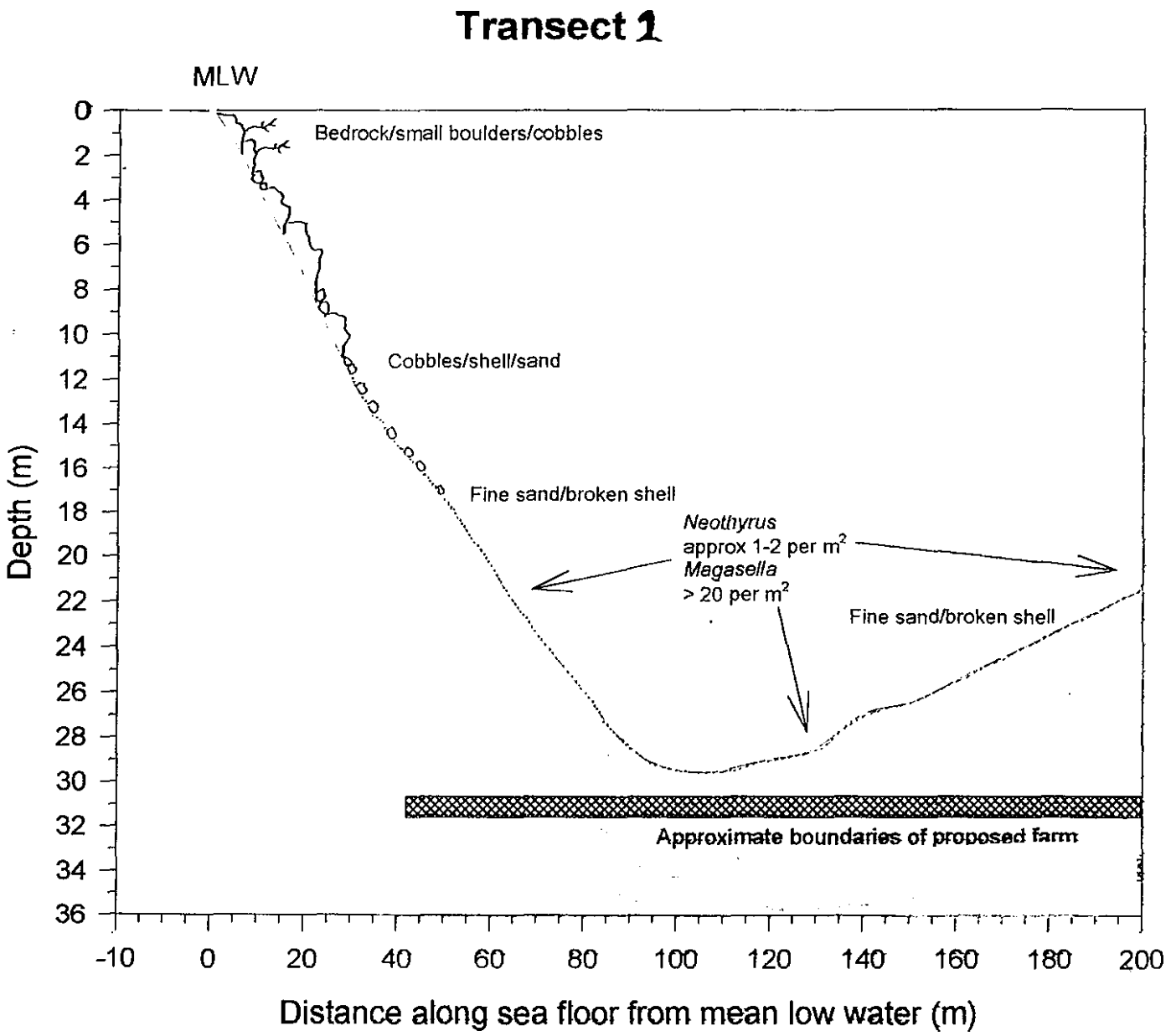


Figure 3: Subtidal shore profile and substratum from an area proposed as a marine farm at Parea Point, East Bay.

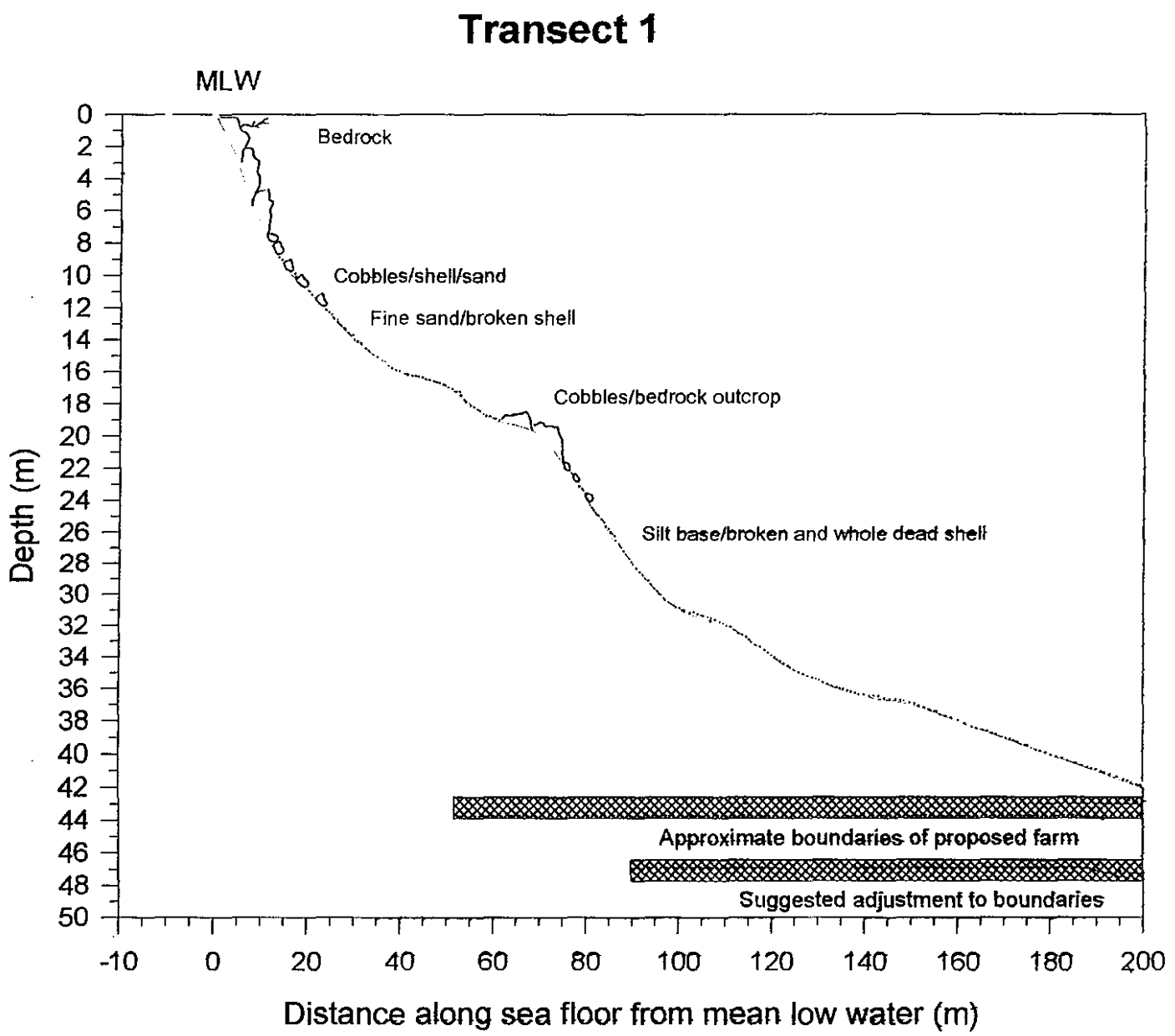


Figure 2 Subtidal shore profile and substratum from an area proposed as a marine farm at Parea Point, East Bay.