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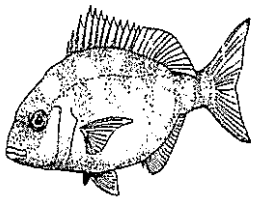

Specialists in:
Marine and Freshwater Research, Survey and Monitoring

Biological report on a proposed marine farm extension located in western Crail Bay, Pelorus Sound

Li 188

Research, Survey and Monitoring Report Number 376

A report prepared for:

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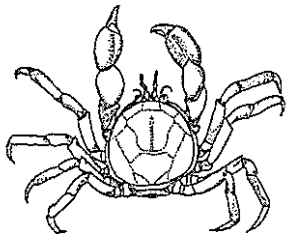

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SUMMARY

1. The aims of the study were to provide a biological description of the benthos under a proposed extension to an existing marine farm (Li 188) located along the western shoreline of Crail Bay, Pelorus Sound. The proposed extension (2.0 hectares) was located on the seaward side of the existing marine farm.

2. Potential threats to any subtidal ecological values posed by the proposed activity were also discussed.

3. The soft shore communities recorded from the present study were dominated by species that occur on subtidal shores swept by light tidal currents in the sheltered bays of central Pelorus Sound, 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).

4. Offshore areas within the application were dominated by soft sediments characterised as silt and clay substrata with a small component of shell material. This mud habitat was widespread within the proposed extension area and supported a relatively low variety of species in low abundance.

5. The shoreline was dominated by small boulder, cobble and pebble substrata. The terrestrial environment was dominated by a fringe of early regeneration scrub with a pine plantation higher on the hillsides.

6. One 150 m long diver transect was investigated within the proposed offshore marine farm extension area.

7. No scallops or horse mussels were observed from the proposed marine farm area.

8. Mussel shell debris was observed close to existing marine farm lines.

9. No species or communities were recorded above the Department of Conservation trigger levels (DoC 1995).

10. Based on ecological criteria no changes to the proposed extension presented in Figure 1 are recommended.

1.0 INTRODUCTION

The aims of the study were to provide a biological description of the benthos under a proposed extension to an existing marine farm (Li 188) located along the western shoreline of Crail Bay, Pelorus Sound. Potential threats to any subtidal ecological values posed by the proposed activity were also discussed.

2.0 STUDY AREA

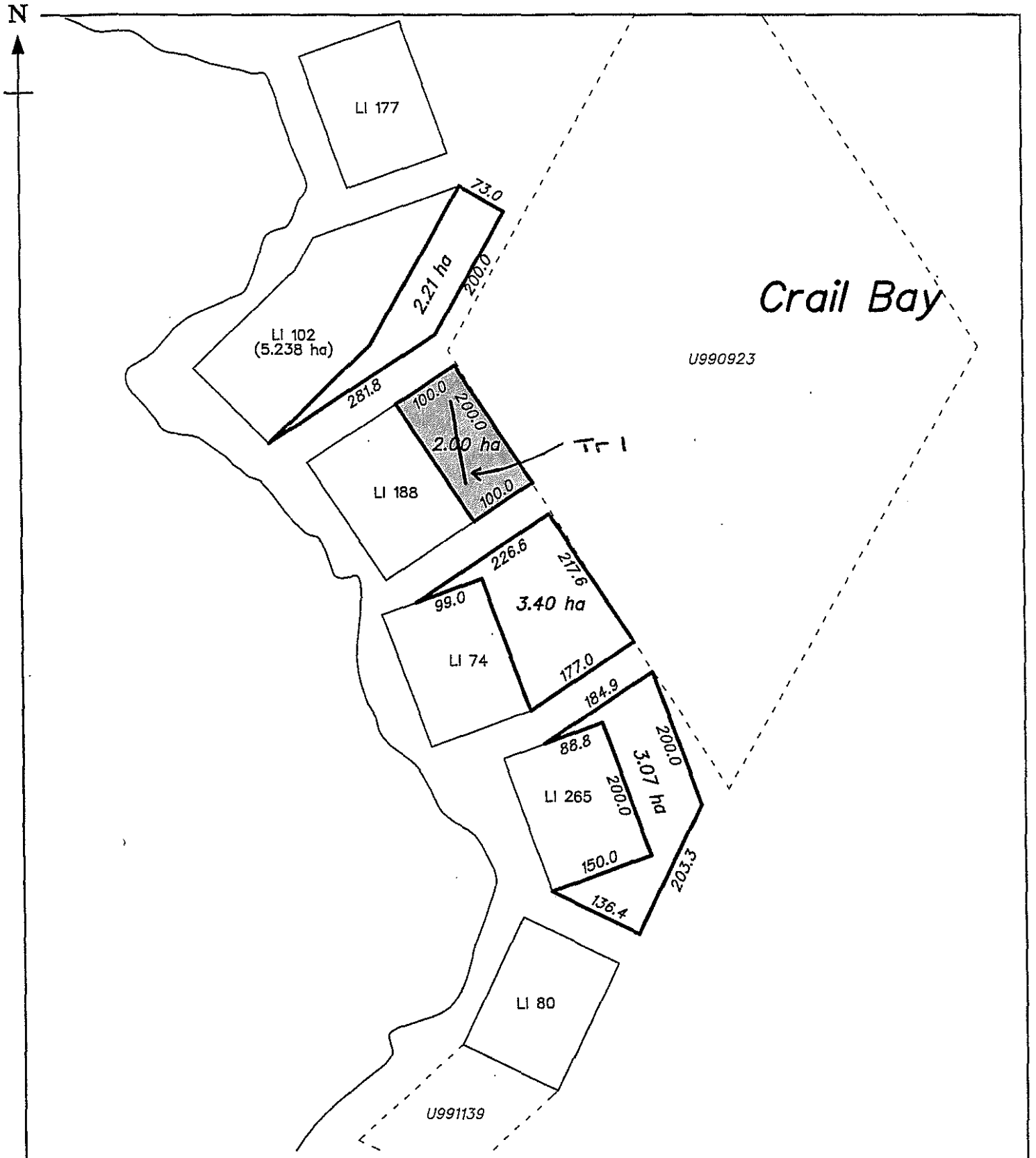
The study area was located on the western shore of Crail Bay (Figure 1). Crail Bay is one of three relatively large bays located at the eastern end of Tawhitinui Reach. The bay is some 7 km in length and up to 3.4 km wide. The offshore depths of the bay range from 12 m to 33 m (see NZ Navy chart 615). The shoreline and terrestrial environment are typical of many of the bays inside Pelorus Sound. The hillsides are clad in combinations of pine plantation, regenerating forest, scrub and pasture.

The proposed marine farm extension was located centrally along the western shoreline of Crail Bay (Figure 1). The shoreline was dominated by small boulder, cobble and pebble substrata. The terrestrial environment was dominated early regeneration scrub with a pine plantation higher on the hillsides.

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.



Proposed Coastal Permit

Being Extensions to Lic's 74, 188 & 256

Marlborough Mussel Co

NOTE: The position of this application has not been surveyed.

MARLBOROUGH DISTRICT COUNCIL

SCALE 1:7500

100 0 100 200 300 400 500 600 metres

Datum: New Zealand Map Grid

Prepared by; DRAUGHTING *Plus*

Date 31/10/00

MF_952b.gcd

Figure 1 Location of dive transect.

4.0 MATERIALS AND METHODS

The 2.0 ha proposed offshore extension was investigated on the 25th October 2000. One 150 m long diver transect was investigated within the study area. Divers recorded densities of horse mussel (*Atrina zelandica*) and scallop (*Pecten novaezelandiae)* from 10 x 1 m^2 quadrats installed at various intervals along the transect. Brachiopod (*Magasella sanguinea*) abundance estimates were collected from areas where brachiopods were most abundant.

The transect line consisted of a lead line rope marked at 5 m intervals by coloured and labeled tags. Transects were not plotted in the present report as depths, substrata and associated species remained relatively consistent along their length.

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 12.30 p.m. to 2.00 p.m. These observations were collected during the outgoing tide.

5.0 RESULTS AND DISCUSSION

5.1 Water Currents and Diver Observations

Observations made by divers from the application area suggested that:

1) depths along the boundaries of the proposed marine farm extension were approximately 25m to 26 m;

2) substrata present were silt and clay with a small component of shell (dead whole and broken shell);

3) no reef structures or shallow abnormalities extending into the proposed farm area were observed;

4) no outcropping rock, bedrock, boulder or cobble dominated habitats were recorded within the boundaries of the proposed marine farm extension; and

5) no scallops, horse mussels or brachiopods were observed within the boundaries of the proposed marine farm extension.

On the bottom diver recorded a light tidal current traveling along the shore in a northward direction. Based on the species observed from the site, it is expected that tidal currents remain predominantly light for most of the time.

5.2 Diver transects

The benthos was dominated by a relatively featureless mud habitat. The silt and clay benthos supported a relatively low variety of species mostly in relatively low abundance compared to inshore areas of central Pelorus Sound (Chadderton and Davidson in press).

From the diver collected transect a total of 10 conspicuous surface dwelling species of invertebrate, 2 species of algae, 1 ascidean and 3 species of bony fish were recorded. The list of the species recorded by divers has been presented in Table 1. The offshore transect has not been plotted as the depths, substratum and species observed along its length remained relatively consistent.

5.3 Fish

Three species of bony fish were recorded during the investigation (Table 1). Opal fish are widespread from mud dominated habitats in the Sounds and New Zealand. Spotty were observed in association with existing marine farm structures located at the site. One flatfish was recorded from the proposed offshore extension area. No fish feeding holes were recorded form the study area.

5.4 Scallops (*Pecten novaezelandiae*)

No scallops were recorded from along transects.

5.5 Horse mussels (*Atrina zelandica*)

No horse mussels were recorded from quadrats during the present study.

5.6 Lampshells

No lampshell species were observed from within the application area

5.7 Hydroids and Bryozoans

No large hydroid species were observed during the present study. 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.

Table 1 Species observed from an area in western Crail Bay, Pelorus Sound.

Algae	Common name	Invertebrates	Habitat	Common name
Microalgal mat (2)	slime	GASTROPODA		
Colpomenia sp. (1)	bubble weed	*Armandia australis (1)*	soft	olive shell
		Poiriera zelandica (2)	soft	spiny murex
		BIVALVIA		
		Perna canaliculus (2)	soft	green mussel
		POLYCHAETA		
		Brachiomma sp.(1)	soft	fan worm
		CRUSTACEA		
		Pagurus spp (2)	soft	hermit crab
		ECHINODERMATA		
		Amphiura rosea (1)	soft	tiny snake star
		Coscinasterias calamaris (1)	soft	11 arm star
		Echinocardium cordatum (2)	soft	sea mouse
		Stichopus mollis (1)	soft	cucumber
BONY FISHES		UCHIURA		
Rhombosolea sp. (1)	flatfish	*Urechis novaezelandiae (1)*	soft	sausage worm
Notolabrus celidotus (1)	spotty	ASCIDEACEA		
Hemercoetes monopterygius (2)	opalfish	*Cnemidocarpa* sp. (1)	soft	saddle squirt

1 = occasional, 2 = common, 3 = abundant

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. The silt and clay sediments were widespread within the application area and supported a low variety of species often in low abundance. This habitat is widespread in the Marlborough Sounds and represents the most common habitat (Duffy et al., in prep.; Chadderton and Davidson in press). This habitat represents the habitat that would be least modified by the activity of mussel farming (Kaspar *et al.* 1985; deJong 1994).

It is therefore likely that the changes that would occur as a result of production mussel farming at the proposed site would represent a relatively minor impact.

7.0 SUGGESTED ADJUSTMENTS TO THE PROPOSED BOUNDARIES

Based on ecological criteria, no changes to the proposed plan included in the present report have been recommended.as:

- the proposed offshore area was dominated soft substrata supporting a relatively low variety of species in relatively low abundance;
- the offshore habitat and community present is representative of the most widespread and common habitat in the Marlborough Sounds and
- no ecological values identified in the Department of Conservation report (DOC 1995) were recorded in offshore areas above trigger levels during the present study.

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