Biological report for an off-site marine farm (Li 210) located in southern Forsyth Bay

Research, Survey and Monitoring Report Number 528

A report prepared for:

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September 2006





Bibliographic reference:

Davidson, R.J. and Richards, L.A. 2006: Biological report for an off-site marine farm (Li 210) located in southern Forsyth Bay. Prepared by Davidson Environmental Ltd for Talleys Fisheries Ltd. Survey and Monitoring Report No. 528.

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1.0 Introduction

The aim of the present study is to describe biological habitats in relation to a 9.34 ha off-site marine farm licence (Li 210) located in southern Forsyth Bay (Plates 1 and 2, Figure 1). The owners, Talleys Fisheries Ltd, have commissioned the present report to provide information on the present location of surface structures and the biological issues related to potential adjustments of the consent area (Figure 1).

At present there are offshore backbones, warps and anchors located outside the consent (Figure 2, Plate 2). The present study investigates habitats from the inshore unoccupied area of the original consent and also reports on the offshore areas occupied by farm structures not located within the consent.

2.0 Study area

The present 9.34 ha site is located along the southern shoreline of Forsyth Bay adjacent to Piripaua Neck (Figure 1). Piripaua Neck is a narrow section of land separating Forsyth Bay in the north and Beatrix Bay to the south.

Forsyth Bay is a large, north-facing bay in outer Pelorus Sound. Forsyth Island makes up part of the eastern shoreline of Forsyth Bay and Allen Strait on the eastern side of the bay provides a link with Anakoha and Guards Bays. Forsyth Bay is approximately 54 km by sea from Havelock. Forsyth Bay has a coastline length of approximately 21.5 km (measured from Kaitira to the southern headland of Orchard Bay, Forsyth Island) and covers an area of sea of approximately 1810 ha. Forsyth Bay is roughly 5.7 km long, and up to 4.2 km wide.



Plate 1. Li 210, looking eastward across the inshore lines.



Plate 2. Location of consent (grey) and approximate location of surface structures of Li 210 (pink).



N U941501 LI 255 Forsyth Bay LI 213 LI 185 Pt Sec 7 Bik XIII Orieri SD CT 3D/989 ui Station & Island Resort Ltd LI 261 3.34 ha LI 235 857313 2/5% 100 0 LI 210 Piripaua Neck Sounds Foreshore Reserve Trig S Legal Road Pt Sec 2 SO 279 CT 58/888 AM Scholefield SCHEDULE OF COORDINATES Datum: New Zealand Map Grid North East 2596142.5 2596161.7 6020729.1 1 6020928.1 23 6020957.0 2595863.1 4 6020758.0 2595843.9 5 6020893.1 2595751.8 6 6021000.9 2595929.1 7 6020977.9 2596166.5 8 6020903.5 6020966.0 2596232.6 2596030.1 Centroid 6020566.7 2596494.3 Trig S Proposed Extension to Coastal Permit LI 210 TALLEYS FISHERIES LTD 300 400 500 600 0 100 200 700 800 900 1km 100m SCALE 1:10,000

Figure 1. Existing consent boundary for Li 210, Forsyth Bay.



3.0 Background

Davidson and Brown (1999) conducted a biological report for the extensions to the parent farm. The authors reported that:

"The eastern transect was dominated by boulders, cobbles and pebbles offshore to 110 m distance from shore. Beyond 110 m, the shore was dominated by shell and fine sand and, at greater depths, shell over a base layer of silt. At transect 2 (western extension), a relatively narrow strip of cobbles and pebbles was replaced by medium sand that extended between 70 m distance from shore. With increasing depth, the proportion of shell increased. By 90 m distance from shore, the shell disappeared and was replaced by fine sand/silt and at greater depth very fine sand and silt.

From transects and free swims from areas within and adjacent to the proposed marine farm, a total of 22 conspicuous species of invertebrate, 7 algae, 1 ascidian and 7 species of bony fish were observed. The number and composition of fish species were representative of habitats in the sheltered areas of the outer Marlborough Sounds. Most regularly observed fish were opalfish, spotty, blue cod and triplefins. Blue cod were observed from the hard shore areas.

Two scallops were recorded within a total of 25 quadrats of 10 m x 1 m size sampled within the proposed extension areas. Mean density was: mean = 0.008 per m², SE = 0.005. These densities were below the Department of Conservation guideline threshold for values of ecological or scientific interest (> 0.1 individuals per m²). One horse mussel was recorded from along the eastern transect.

A strip between 50 m to 90 m distance from shore within the proposed western proposed extension supported noticeably higher density of horse mussels than areas further from shore. Density of mussels between 50 m to 90 m distance from shore was: mean = 0.18 per m², SE = 0.042. This density were below the Department of Conservation guideline threshold for values of ecological or scientific interest (> 0.2 individuals per m²). The density of horse mussels further from shore was: mean = 0.09 individuals per m², SE = 0.03.

Lampshells (*Terebratella sanguinea*) were observed from between 70 m to 140 m distance along the eastern transect. Estimated densities from areas where lampshells were most common were in the order of approximately < 1 individuals per m². These brachiopod densities were below the Department of Conservation guideline threshold for values of ecological or scientific



interest (> 20 individuals per m²).

Soft bottom substrata and associated communities dominated offshore areas under the proposed marine farm. These offshore areas supported a relatively low variety of species often in low abundance compared to inshore areas. The inshore 110 m distance of the eastern proposed extension supported cobble material over a shell and silt base. This habitat supported a greater variety of species than offshore areas and may be utilised by fish, particularly blue cod. Shell debris would alter these inshore habitats and smother the sessile species that represent food for fish species."

4.0 Methods

The site was sampled on 12th September 2006. Prior to fieldwork, the existing consent boundaries were plotted onto mapping software (TUMONZ 2.18). The laptop running the mapping software was linked to a Lowrance LC X-15MT GPS receiver allowing real-time plotting of the corners of surface marine farm structures and to pinpoint drop camera stations in the field. This GPS system has a maximum error of 10 m distance.

The corners of the existing marine farm surface structures were surveyed by positioning the survey vessel immediately adjacent to the corner floats and their position plotted. It should be noted that surface structures can move due to environmental variables such as tidal current and wind. The plot of surface structures is therefore variable from day to day and over the duration of tidal cycles. These data should not therefore be regarded as a precise measurement of the position of surface structures, but rather an approximate position.

Depths adjusted to datum were collected from the structure corners and the existing consent corners. The tide on the survey day was 2.66 m high tide at 11.02 pm and low tide of 0.5 at 4.56 pm. The tide was receding during the survey.

Drop camera stations

A total of 12 drop camera photographs were collected from Li 210, seven from the the consent area inshore of the structures, three from the structures located offshore of the consent and two offshore of the consent and alongshore of the structures (Figure 2).

At each site, an IKELITE underwater splash camera fixed to a aluminium shaft was lowered to



the benthos and an oblique still photograph collected where the shaft landed on the benthos. The location of photograph stations within the inshore and offshore areas were selected in an effort to obtain a representative range of stations within these areas. All photographs collected during the survey have been included in Appendix 1.

5.0 Results

Depths of the consent area were between 4.3 m to 34.1 m (Figure 2, Table 1). The approximate coordinates for the marine farm surface structures have also been displayed in Table 1 and have been depicted in relation to the consent area in Figure 2. The coordinates, depths, substratum and mussel shell debris for each drop camera station have been displayed in Table 2.

Corner		Depth (m)	Coordinates
South-east	Structure corner	27.5m	2596112.2,6020846.9
North-east 1	Structure comer	34.1m	2596177.8,6020981.5
North-east 2	Structure comer	34.5m	2596176.9,6021023.5
North-west	Structure comer	33.5m	2596004.9,6021059.0
South-west	Structure comer	24.5m	2595930.0,6020891.6
1	Original consent corner	4.3m	2596142.5,6020729.1
4	Original consent corner	3.5m	2595843.9,6020758.0
5	Original consent corner	6.5m	2595751.8,6020893.1
6	Original consent corner	32.7m	2595929.1,6021000.9
7	Original consent corner	34.1m	2596166.5,6020977.9
8	Original consent corner	26.5m	2596232.6,6020903.5

Table 1. Depths (adjusted to low tide) and coordinates for consent area and the approximate location of corner surface structures for Li 210.

Table 2. Substratum and mussel debris observed from drop camera stations from Li 210.

No. & Depth (m)	Coordinates	Location	Substratum	Shell debris
1, 10m	2595788.4,6020894.1	In consent, inshore of structures	Fine sand, silt, natural shell	None
2, 16.5m	2595855.9,6020891.1	In consent, inshore of structures	Silt, natural shell	None
3, 6.5m	2595868.9,6020811.8	In consent, inshore of structures	Fine sand, silt, natural shell	None
4, 4.5m	2595881.5,6020770.0	In consent, inshore of structures	Fine sand, silt, natural shell	None
5, 5.5m	2595966.7,6020775.1	In consent, inshore of structures	Fine sand, silt, natural shell	None
6, 21m	2595998.1,6020846.7	In consent, inshore of structures	Silt and clay	None
7, 8.3m	2596037.9,6020781.7	In consent, inshore of structures	Silt and clay	None
8, 33.5m	2596229.7,6021004.5	Outside consent, alongshore of structures	Silt and clay	None
9, 34.2m	2596148.3,6021015.2	Offshore of consent, under structures	Silt and clay, mussel debris	Low
10, 34.2m	2596086.0,6021028.6	Offshore of consent, under structures	Silt and clay	None
11, 33.5m	2596016.2,6021045.0	Offshore of consent, under structures	Silt and clay, mussel debris	Low
12, 33m	2595965.3,6021034.3	Outside consent, alongshore of structures	Silt and clay	None



Figure 2. Li 210. Location of existing consent area (grey), existing surface structures (pink), and location of drop camera photographs (triangles) with photo number and depth (m).



Substratum

Substratum type is based on drop camera images (see photographs in Appendix 1). All areas photographed within the consent and offshore of the consent area were characterised by soft substratum (i.e. silt and clay in offshore areas and fine sand and silt with natural shell). Low percentage cover or no mussel shell debris was observed from photographs collected directly under the offshore marine farm structures (photos 9, 10 and 11; Table 2, Appendix 1).

Conclusions

Based on the position of surface structures recorded during the present survey, the offshore lines, warps and anchors were located offshore and outside the existing consent. A large area of the consent inshore of the existing structures is present not utilised by marine farm structures. This area is relatively shallow.

Inshore areas of the consent were dominated by coarser substratum than offshore areas. It is recommended that marine farming structures not be relocated into the shallow areas of the consent. Movement of the consent boundary offshore to encompass the existing marine farm structures would avoid inshore areas and include offshore silt and clay substratum considered suitable for consideration for marine farming activities.

References

Davidson, R.J. and Brown, D.A. 1999. Biological report on a proposed marine farm extension in southern Forsyth Bay, Pelorus Sound. Survey and Monitoring Report No. 193. Prepared by Davidson Environmental Limited for Talley's Fisheries.

Appendix 1. Drop camera photographs (Li 210).

























