Davidson Environmental Limited

Ecological report for validation of an offsite marine farm (site 8415) located in Port Underwood

Research, survey and monitoring report number 628

A report prepared for:
PALMS LTD.
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1.0 Introduction

The aim of the present study was to describe the habitats from (1) the consent area not presently occupied by marine farm structures and (2) areas where marine farm structures are located outside the consent.

The marine farm (site 8415) is located in inner Port Underwood (Plates 1 and 2). This report was commissioned by PALMS Ltd. on behalf of the farm owner.

Plate 1. Marine farm site 8415 located in inner Port Underwood. Grey area is the consent area and pink area is the location of surface structures.

Plate 2. Looking southward along the backbone lines of marine farm site 8415.

2.0 Background information

2.1 Study area

The marine farm under investigation is located along the eastern shoreline of Opihi Bay, Port Underwood (Plates 1 & 2). Opihi Bay is the eastern bay at the head of the western arm of Port Underwood. This site relates to an area on the eastern coast of the bay. Opihi Bay has a coastline length of approximately 1540 m and covers an area of sea of approximately 29.8 ha. Opihi Bay is approximately 725 m wide across the mouth. Opihi Bay is approximately 8.2 km from the entrance to Port Underwood.

2.2 Historical reports

First Wave Consultants Ltd. (1995) investigated the area for a proposed farm.

The authors stated:

"The intertidal area consists of rock/cobble in the form of a ledge and cobbles, extending to 10-15 m offshore (3-3.5 m depth). Past this point, the transition to mud is relatively rapid with firm mud and some small cobbles (to 6 m depth) becoming increasingly silty further offshore (9-10 m depth). Between MLW and 50m offshore (to 6 m depth), the most distinguishing feature of the site was the presence on a zone of drift and attached (predominantly red) algae covering approximately 80% of the rock and mud substrates. The greatest diversity of species was found over the rock and cobbles with a band of native flat oysters along the shallow subtidal, kina (common) at the base of the rock, tubeworms, a nudibranch, sponges, ascidians, shield shell, green and blue mussels, barnacles, a conger eel and triplefins, various whelks, tiger and top shells, crabs and butterfly chiton recorded. Beyond the algal zone, the substrate was a soft, grey, silty, glutinous mud. The area was relatively bare with the most conspicuous features being worm holes. Species recorded were sabellid worms, occasional horse mussels, starfish, sea cucumber, ringed Dosinia, juvenile spotties and hermit crabs."

3.0 Methods

The site was sampled on 22nd December 2009. Prior to fieldwork, the consent corners were plotted onto mapping software (TUMONZ). The laptop running the mapping software was linked to a Lowrance LC X-15_{MT} GPS receiver allowing real-time plotting of the corners of marine farm surface structures and to pinpoint drop camera stations in the field. This GPS system has a maximum error of +/- 5 m.

The corners of the existing marine farm surface structures were surveyed by positioning the survey vessel immediately adjacent to the corner floats and the 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 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.

On the day of survey, high tide was 1.19 m at 1.10 pm and low tide was 0.15 m at 6.50 pm. During the survey, the tide was incoming.

3.1 Drop camera stations and site depths

A total of 10 drop camera photographs were collected during the survey. A total of four photos were collected within the existing consent inshore of structures, a further two were collected from inshore of the existing consent. Four photos were collected from areas offshore and outside of the consent but occupied by farm structures.

At each site, a Sea Viewer underwater splash camera fixed to an aluminium frame was lowered to the benthos and an oblique still photograph was collected where the frame landed.

The cover of mussel shell debris from drop camera photographs were ranked as: None = no mussel shell debris, Low = 1-30%, Moderate = 31-50%, Moderate to High = 51-75%, and High = 76-100% cover. This assessment is displayed in Table 2 of the present report.

The location of photograph stations was selected in an effort to obtain pictures of the habitats and mussel shell debris associated with sites (a) where the consent area existed but no structures have been installed and (b) in areas outside the consent where structures have been installed. Additional photographs were taken when any features of particular interest (e.g. shell debris, reef structures, cobbles) were observed on the remote monitor on-board the survey vessel. All photographs collected during the survey have been included in Appendix 1.

4.0 Results

4.1 Consent corners and existing surface structures

Depths along the inshore boundary of the existing consent ranged from 5.5 m to 6.3 m, while depths for the offshore boundary of the existing consent ranged from 7.8 m to 9 m (Figure 1, Table 1).

The existing consent (light blue-grey) and the area occupied by surface structures (pink) have been plotted in Figure 1. Depths and locations of all drop camera stations have been listed in Table 2 and plotted in Figure 2.

On the day of the survey, a number of backbone lines and their associated warps and anchors were located offshore and outside of the marine farm consent area (Figure 1). An area of consent located inshore of line 1 had no farm structures.

Table 1. Depths recorded from the corners of mussel farming surface structures and consent corners. Depths adjusted to datum.

Type	No. & Depth (m)	Coordinates
Consent corner	1, 9m	2606057.2,5990333.1
Consent corner	2, 7.8m	2606097.8,5990477.4
Consent corner	3, 6.3m	2606193.9,5990450.4
Consent corner	4, 5.5m	2606153.1,5990306.1
Structure corner	9m	2606033.6,5990355.8
Structure corner	8m	2606065.2,5990482.8
Structure corner	7m	2606177.1,5990456.4
Structure corner	7.6m	2606144.5,5990330.6

4.2 Substratum

Substratum and habitat distribution relative to the consent area were based on drop camera images (Table 2, Appendix 1).

Areas under and adjacent to backbones offshore of the consent were characterised by silt and clay with variable levels of mussel shell debris (photos 7-10). Areas of the consent not occupied by marine farm structures also supported silt and clay (photos 1, 2, 5, and 6).

Areas inshore of the consent supported coarser substrata including fine sand and natural shell (photos 3 and 4).

No hard substratum was recorded from under backbones or from any area in the consent investigated.

4.3 Mussel shell debris from drop camera photographs

Low to moderate levels of mussel shell was observed from drop camera photos close to or under backbones (photos 6-10). No shell was observed from photo sites located away from backbones.

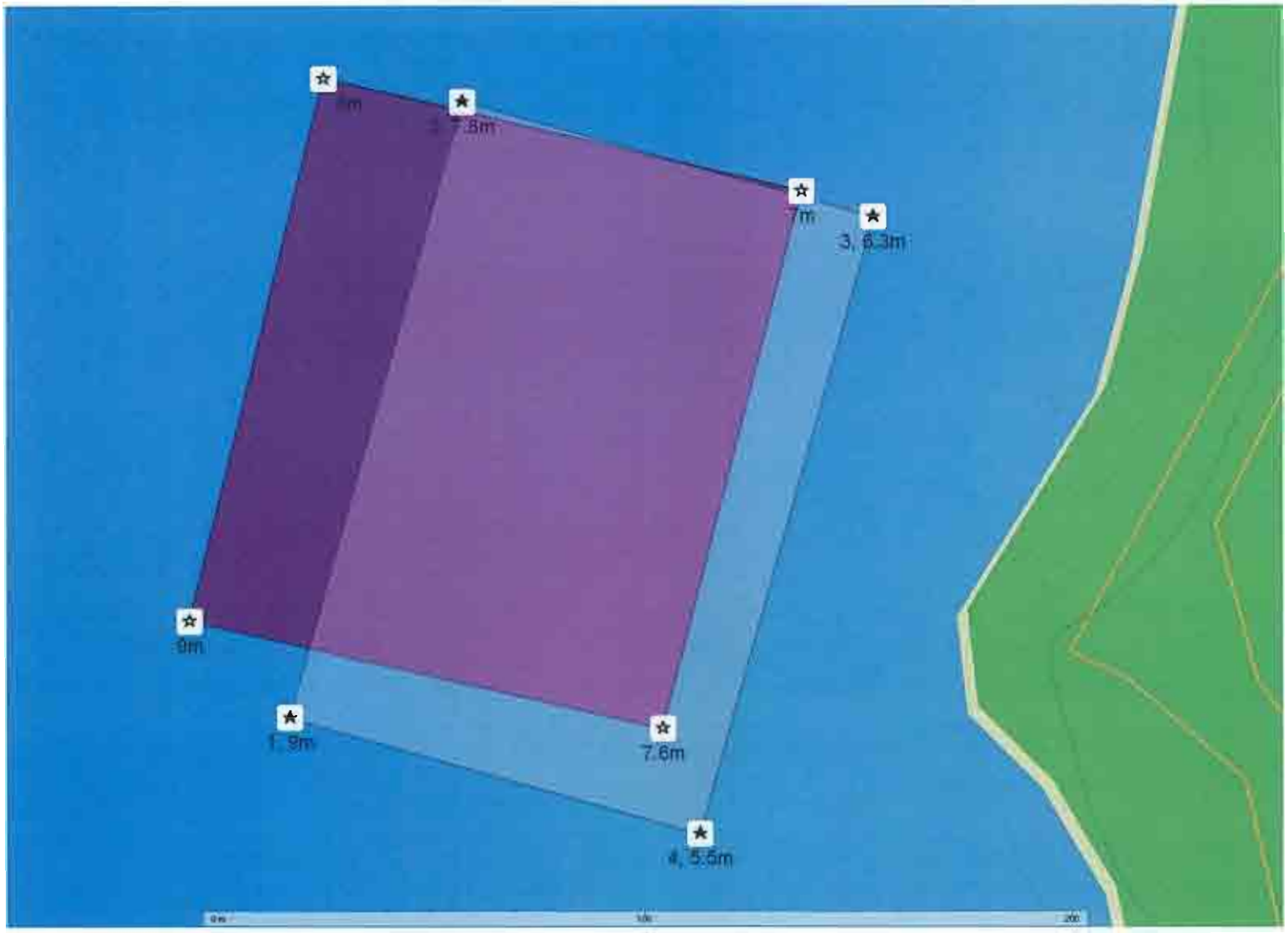

Figure 1. Depths of the existing consent corners (light blue-grey) and existing surface structures (pink) for site 8415.

Table 2. Coordinates of drop camera stations showing depths, substratum and amount of mussel shell debris. Depths adjusted to datum. Pink = under backbone growing structures, Grey = in consent, not under backbone growing structures but can be adjacent, Blue = outside consent, without growing structures. Photos ranked as: None = no mussel shell debris, Low = 1-30%, Moderate = 31-50%, Moderate to High = 51-75%, and High = 76-100% cover.

No. & Depth (m)	Coordinates	Location	Substratum	Shell debris
1, 6.4m	2606191.0,5990445.0	In existing consent, no structures	Silt & clay	None
2, 7m	2606178.6,5990422.0	In existing consent, no structures	Silt & clay, natural shell	None
3, 3.9m	2606186.9,5990389.1	Inshore of consent, no structures	Silt, fine sand, natural shell	None
4, 5m	2606172.1,5990344.3	Inshore of consent, no structures	Silt, fine sand, natural shell	None
5, 7.4m	2606148.3,5990333.3	In existing consent, adjacent backbone	Silt & clay, natural shell	None
6, 6m	2606158.8,5990368.8	In existing consent, adjacent backbone	Silt & clay, mussel shell	Moderate
7, 8.4m	2606070.0,5990475.9	Offshore consent, under backbones	Silt & clay, mussel shell	Low-moderate
8, 8.6m	2606058.4,5990442.6	Offshore consent, under backbones	Silt & clay, mussel shell	Moderate
9, 8.7m	2606047.0,5990406.1	Offshore consent, under backbones	Silt & clay, mussel shell	Low
10, 9m	2606040.0,5990375.4	Offshore consent, under backbones	Silt & clay, mussel shell	High

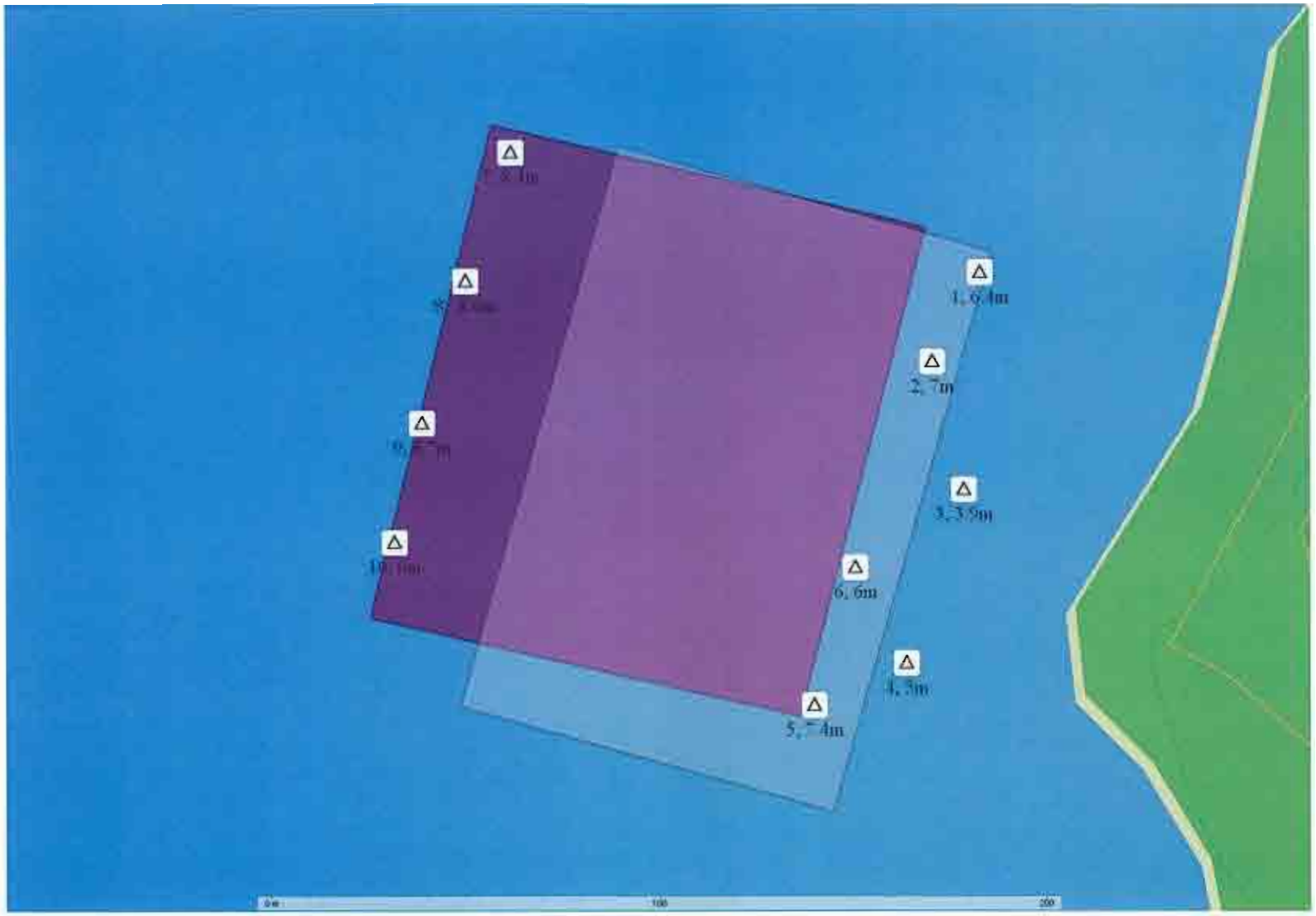

Figure 2. Location of the existing marine farm consent area (light blue-grey) and surface structures (pink). Triangles are locations of drop camera sites; numbers are the photo number and water depth (m).

5.0 Conclusions

5.1 Impact

The mussel shell debris impact zone recorded from the present site was representative of mussel farms in the Marlborough Sounds with a low to moderate level of impact under farm structures. Mussel shell debris was mostly observed under or relatively close to backbones. No impact was recorded from the inshore area of the consent that supported no structures.

5.2 Benthos

Areas under the backbones were dominated by silt and clay substrata (mud). Inshore areas free of structures were also characterised by silt and clay. Areas inshore of the consent supported coarse substratum. No hard substratum was recorded from under or directly adjacent to the backbones.

5.3 Boundary adjustments

Based on ecological data collected during the present survey, adjustment of the farm boundary to encompass the structures located offshore of the consent means structures at line 1 will be located further from the inshore coarse substrata (presently recorded inshore of the existing consent).

References

First Wave Consultants. 1995. Marine farm site description, Opihi Bay. Prepared by First Wave Consultants for First Wave Consultants.

Appendix 1. Drop camera photographs

Photo site 1

Photo site 2

Photo site 3

Photo site 4

Photo site 5

Photo site 6

Photo site 7

Photo site 8

Photo site 9

Photo site 10