

CON499: APPLICATION FOR A RESOURCE CONSENT UNDER THE RESOURCE MANAGEMENT ACT 1991

If you need help in filling out this form please contact our Customer Services staff on (03) 353 9007 or toll free on (0800) 324 636. They will be able to provide some general assistance.

Email the completed application to: ecinfo@ecan.govt.nz
Or send to Environment Canterbury, PO Box 345, Christchurch 8140

Information

Section 88 of the Resource Management Act 1991 specifies the requirements for applications for resource consents, and requires that each application includes a description of the activity, a planning assessment, and an assessment of the actual and potential effects of the activity on the environment, amongst other things. We recommend you read [Section 88](#) and [Schedule 4](#) of the RMA prior to completing this form.

Completing all the questions in this application form in full:

- May satisfy the requirements of the Resource Management Act 1991 for an application for resource consent. Environment Canterbury will inform you if further information is required.
- Will assist with the prompt processing of your application. Any omissions in this form may result in your application being returned (under Section 88(3) of the RMA) and may result in additional costs while the required information is obtained.

Charges

Your application must be accompanied with the deposit charge specified in the "Summary of Resource Consent Charges" or at <http://ecan.govt.nz/advice/resource-consents/applying-resource-consent/Pages/resource-consent-processing.aspx>. The deposit may not cover all charges related to the auditing of the application. The applicant may be invoiced for additional charges. If an application is declined, all charges must still be paid.

All accounts are payable by the 20th day of the month following the date of invoice. If the account is not paid within 30 days after the due date, our debt collection agent may charge you a fee equal to 25% of the unpaid portion of the account, but no less than \$25.00. Where the total debt collection costs, legal and other costs arising from the collection of any amount owing exceeds the debt collection fee charged, our debt collection agent is also entitled to recover such additional costs. All Environment Canterbury charges must be met by the applicant. This may include time spent discussing issues with the applicant and any other parties involved in the process.

Name of person/company/organisation that is paying the deposit	Pigeon Bay Aquaculture Limited
Method of payment: cheque/internet banking/paid in person at Environment Canterbury office	Cheque
Date payment is made	17 March 2017
Payment reference e.g. applicant name	

When you have completed this form

To submit your application and the relevant fixed charge or deposit, you need to either email it to ecinfo@ecan.govt.nz, or send it to: **Environment Canterbury, PO Box 345, Christchurch 8140.**

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FILE REF: 6062 40000	EC - C-10
DOCUMENT No.:	
21 MAR 2017	
46391	
Catherine Degraff	
EC 112854	
Receipt number:	
Charges paid:	CRC:

1 APPLICATION DETAILS

Please complete all questions and sign and date the form.

1.1 Applicant(s) details

Surname:	First names (in full):	Mr
Surname:	First names (in full):	Mr
OR Registered Company name and number:	Pigeon Bay Aquaculture Limited 845820	
Postal address:	Postcode:	8146
Billing address (if different):	Postcode:	
Phone (home):	Phone (work):	
Cell phone:	Email address:	simonaa@nrfc.co.nz
Contact person:	Simon Acton-Adams	

Are you an Environment Canterbury staff member, an Environment Canterbury Commissioner, or a family member of either? ☐ Yes ☒ No

1.2 Consultant/Agents details (if applicable)

Contact person:	Company:
Postal address:	Postcode:
Phone (work):	Cell phone:
Email address:	

1.2.1 During the processing of your application who will be the contact person for making decisions? ☐ Applicant ☒ Consultant / Agent

Note: All correspondence during the consent application process will be directed to this contact person, unless instructed otherwise. Final decision documents will be sent to the applicant.

1.2.2 Who will be the contact person for compliance monitoring matters? ☒ Applicant ☐ Consultant / Agent

1.3 Names and addresses of the owner and occupier of the site to which this application relates

(You only need to include this information if it is **different** to that of the applicant(s). If you do not own the land to which this application relates to, you will need to provide written approval from the land owner or they may be considered an affected party.)

Owner:	Phone:
Postal address:	Postcode:
Occupier:	Phone:
Postal address:	Postcode:

1.4 Location of the proposed activity

Site address: **Big Bay Banks Peninsula**

Locality
(City/District):

Map reference
NZTM:

Area of property
(ha):

Legal
description:

Note: The legal description can be found on the certificate of title, valuation notice, subdivision plan or rate demand for the site. Please include a copy of one of these with your application.

1.5 Consents from local authorities

1.5.1 Under which territorial authority is the land situated:

- | | | | |
|---|---------------------------------------|---|-------------------------------------|
| <input type="checkbox"/> Ashburton DC | <input type="checkbox"/> Kaikōura DC | <input type="checkbox"/> Timaru DC | <input type="checkbox"/> Waitaki DC |
| <input checked="" type="checkbox"/> Christchurch CC | <input type="checkbox"/> Mackenzie DC | <input type="checkbox"/> Waimakariri DC | |
| <input type="checkbox"/> Hurunui DC | <input type="checkbox"/> Selwyn DC | <input type="checkbox"/> Waimate DC | |

1.5.2 Do you require consent from the local authority for this proposal?

☐ Yes ☒ No

Note: You may need to consult with the relevant local authority to determine this.

1.5.3 If yes, please list:

1.5.4 If a consent is required from the District or City Council, have you applied for it?

☐ Yes ☐ No

1.5.5 If yes, what is the consent number and status?

1.5.6 Please list any permitted activities under the District or City Plan that are part of the proposal to which the application relates.

1.6 Current or previous consents

1.6.1 Do you hold or have you held any previous consents at this site for this activity or any related activities?

☒ Yes ☐ No

1.6.2 List any other consents required from the Canterbury Regional Council and indicate whether they have been applied for:

1.6.3 Is this application for a:

- ☐ New activity ☒ Existing Activity
- ☐ Change of conditions for an existing consent

1.6.4 If it is a change of conditions to an existing consent, please supply the consent reference number(s) or consent holder's name (if different from current applicant's name) and which conditions you wish to change:

CRC 011429 and CRC 063319.1

2 PRE-APPLICATION ADVICE

2.1 Have you received any advice from Environment Canterbury prior to lodging this application?

☐ Yes ☒ No

2.2 If yes, please list the pre-application number if known:

E.g. RMA165897. This number should be provided to you by the Consents Planner or Customer Services.

2.3 Please list any pre-application meetings or advice (verbal and/or written) you have had with Environment Canterbury below:

Type of advice	Brief details, including who provided the advice and the date
<input type="checkbox"/> Meeting(s)	
<input type="checkbox"/> Verbal advice	
<input type="checkbox"/> Written advice	
<input type="checkbox"/> Other (e.g. submitted draft application / AEE)	

3 DESCRIPTION OF THE PROPOSAL

Please describe fully the proposal for which consent(s) are being sought. Include details of activities associated with the proposal to which this application relates. Attach additional information as necessary – for example plans, diagrams etc. that will help to describe the activity.

This is an application to renew a Coastal Permit for an existing marine farm that has been in Pigeon Bay since 2000 together with a seaward extension (with a surrender of the inshore area) and south western extension.. A further description of the activity is included in the Schedule 4 Information attached.

4 LEGAL AND PLANNING MATTERS

4.1 What type(s) of resource consent(s) are you applying for?

☒ Coastal Permit (s12 of the RMA 1991)

- | | | | |
|---|--|---|---|
| <input type="checkbox"/> Reclaim or drain foreshore or seabed | <input checked="" type="checkbox"/> Place, alter or remove structure | <input checked="" type="checkbox"/> Disturb foreshore or seabed | <input checked="" type="checkbox"/> Deposit substance |
| <input type="checkbox"/> Planting foreshore or seabed | <input checked="" type="checkbox"/> Occupy coastal marine area | <input type="checkbox"/> Remove natural material (eg sand) | <input type="checkbox"/> Use water |
| <input type="checkbox"/> Take surface water | <input type="checkbox"/> Dam water | <input type="checkbox"/> Divert water | <input type="checkbox"/> Discharge contaminant to air |
| <input checked="" type="checkbox"/> Discharge contaminant or water to water | <input type="checkbox"/> Discharge contaminant to land | <input type="checkbox"/> Other | |

☐ Land Use Consent

- | | | | |
|---|--|--|--|
| <input type="checkbox"/> s9 of the RMA 1991 | <input type="checkbox"/> s13 of the RMA 1991 | | |
| <input type="checkbox"/> Contaminant storage | <input type="checkbox"/> High country burning | <input type="checkbox"/> Earthworks | <input type="checkbox"/> Vegetation clearance |
| <input type="checkbox"/> Activity in coastal hazards zone | <input type="checkbox"/> Fencing/grazing in waterway | <input type="checkbox"/> Planting in waterway | <input type="checkbox"/> Use, place, alter or remove structure in waterway |
| <input type="checkbox"/> Disturb bed of waterway (incl. excavation of gravel) | <input type="checkbox"/> Deposit substance in waterway | <input type="checkbox"/> Reclaim or drain waterway | <input type="checkbox"/> Place a structure within 8 metres of a waterway |
| <input type="checkbox"/> Excavation of land | <input type="checkbox"/> Other | | |

☐ Water Permit (s14 of the RMA)

- | | | | |
|---|---|------------------------------------|---------------------------------------|
| <input type="checkbox"/> Take groundwater | <input type="checkbox"/> Take surface water | <input type="checkbox"/> Dam water | <input type="checkbox"/> Divert water |
| <input type="checkbox"/> Use water | | | |

☐ Discharge Permit (s15 of the RMA)

- | | | |
|---|--|--|
| <input type="checkbox"/> Discharge contaminant to air | <input type="checkbox"/> Discharge contaminant or water to water | <input type="checkbox"/> Discharge contaminant to land |
|---|--|--|

4.2 Please classify the proposal against the relevant rule(s) in the relevant regional plan

4.2.1 Which regional plan does this activity fall under?

RCEP

4.2.2 Please list the relevant rule(s) of this plan:

4.2.3 What is the status of this activity?

- ☐ Permitted
 ☐ Controlled
 ☐ Restricted discretionary
 ☒ Discretionary
 ☐ Non-complying

4.3 Please provide a full assessment of the proposal against the above rule(s), including an assessment against each condition of the rule(s)

[See attached](#)

4.4 If you consider part of the proposal is a permitted activity, please provide a full assessment against the conditions of that rule (how do you comply with each condition?).

4.5 Please provide an assessment of the proposal against any relevant objectives, policies or other provisions of any National Policy Statements, Coastal Policy Statements, National Environmental Standards, the Canterbury Regional Policy Statement, Iwi Management Plan, and any other relevant plan or proposed plan.

[See attached](#)

4.6 The purpose of the Resource Management Act (1991) is to promote the sustainable management of natural and physical resources. Does your proposal meet the requirements of Part 2, Section 5 (view [here](#))?

☒ Yes ☐ No

PRINCIPLES

4.7 Matters of National Importance (section 6 - view [here](#))

Do you consider your proposed activity takes into account the Matters of National Importance?

☒ Yes ☐ No

4.8 Other Matters (section 7 – view [here](#))

Do you consider your proposed activity takes into account Other Matters?

☒ Yes ☐ No

4.9 Treaty of Waitangi (section 8 – view [here](#))

Do you consider your proposed activity take into account the principles of the Treaty of Waitangi?

☒ Yes ☐ No

4.10 Please provide an assessment of the proposal against any relevant objectives, policies or other provisions of any National Policy Statements, Coastal Policy Statements, National Environmental Standards, the Canterbury Regional Policy Statement, Iwi Management Plan, and any other relevant plan or proposed plan.

[See attached.](#)

5 CONSULTATION AND WRITTEN APPROVAL OF AFFECTED PERSONS

Consultation with all persons potentially affected by your activity prior to lodging your application may result in considerable time and cost savings.

Ngāi Tahu in Canterbury

Te Rūnanga o Ngāi Tahu is the statutory authority representing iwi members and includes ten local rūnanga within Canterbury, known as Papatipu Rūnanga. 'Papatipu' refers to ancestral land. Local rūnanga have the status of mana whenua with kaitiaki status (guardianship) over land and water within their takiwā (territory).

Depending on where the activity is to occur within Canterbury, the values of one or more Papatipu Rūnanga may be affected. Iwi interests as a whole may also be affected where an activity is to occur within, adjacent to, or affecting an area recognised in the Ngāi Tahu Claims Settlement Act 1998 as a Statutory Acknowledgement area. In those circumstances, Te Rūnanga o Ngāi Tahu will be involved in management of the area.

For more detail on Ngāi Tahu and assistance with answering the question below, please refer to the booklet titled [Ngai Tahu in the Resource Consent Process](#), which is also available from our Customer Services Section. You may also find our webpage [Engaging with Ngai Tahu](#) useful.

Have you consulted with the Papatipu Rūnanga and/or Te Rūnanga o Ngāi Tahu? ☐ Yes ☐ No

If 'Yes', please state who you have consulted with and attach any evidence of your consultation, including any written approvals for this application:

Note: Ngāi Tahu as an iwi, and specifically Papatipu Rūnanga representing mana whenua, are considered an affected party where effects on cultural values are minor or more than minor, in accordance with Section 95E of the RMA. Environment Canterbury MUST notify an application if the adverse effects of your proposed activity on cultural values are determined to be minor or more than minor unless you have obtained the written approval of Papatipu Rūnanga and/or Ngai Tahu for your proposal. Consultation before lodging your application is one of the best ways of identifying adverse effects.

Non-notified applications

Non-notified consents are for activities which have minor adverse effects on the environment. For your activity to be considered on a non-notified basis you must determine whether there are any persons potentially affected by your proposed activity and if there are, you must consult them and obtain their written approval (e.g., Iwi, Fish and Game Council, Department of Conservation, Owners of nearby structures/infrastructure (e.g. NZTA), Other consent holders, Neighbouring land owners and occupiers,. If you are unsure who may be an affected party, please call us. Non-notified consents are significantly cheaper and quicker to process.

Limited notified and fully notified applications

Notified consents (either limited notified or fully notified consents) are for activities which do not meet requirements in the RMA for processing on a non-notified basis.

If your assessment of effects has shown that adverse effects on the environment are likely to be more than minor and/or there are people who may be adversely affected from whom you are unable to obtain written approval, you may wish to request that your application be publicly notified. This will avoid possible delays in the processing of your application.

The final decision to notify or not notify an application will still be made by Environment Canterbury.

Please note that an application cannot be notified unless there is sufficient information for the notice that makes it clear what is being applied for, and how it might affect the environment (including people).

I request that my application is notified. ☐ (check box)

Please provide any consultation details and written approvals obtained in the space provided below.

5.1 Consultation details

☐ Yes ☐ No

5.1.1 Have you consulted with iwi?

5.1.2 If yes, who did you consult?

[See attached.](#)

5.1.3 Who else have you consulted?

5.1.4 What was their response?

5.1.5 How have you addressed any concerns they may have had?

5.2 Written approval of affected parties

If you have obtained the signature of affected persons please give their details below. Please note that for us to accept the approvals they must each complete and sign form [CON510](#). Please attach the completed forms to this application.

Name	Address	Contact details (phone, email etc)
E Aitken	Adjoining owners	
C Chamberlain	Double Bay	
	Banks Peninsula	

6 ASSESSMENT OF ACTUAL & POTENTIAL EFFECTS OF THE PROPOSAL ON THE ENVIRONMENT

You must include an assessment of the effects of your proposal on the environment in this part of your application.

[Section 88](#) of the Resource Management Act 1991 requires that each application includes an assessment of the actual and potential effects of the activity on the environment. This assessment must be prepared in accordance with the [Fourth Schedule](#) of the Resource Management Act. A copy of this schedule is available [online](#) or from Customer Services.

The assessment of effects will differ for each application depending on the type and scale of the activity. Consultation is one of the best ways of identifying adverse effects. Please contact Customer Services with any questions on ecinfo@ecan.govt.nz or via phone on (03) 353 9007 or 0800 324 636 (0800 EC INFO).

For further assistance in preparing this assessment, you may find the Ministry for the Environment Publication "[A guide to preparing a basic assessment of environmental effects](#)" useful.

[See attached](#)

7 OTHER INFORMATION REQUIRED BY REGIONAL PLANS OR REGULATIONS

Regional plans or regulations may specify other information that must be provided as part of your application. Please provide this information here.

[See attached](#)

8 OTHER INFORMATION

8.1 Duration requested

8.1.1 Please specify the duration sought for your consent(s): 20 years months.

Note: The maximum duration allowed under the Act is 35 years.

8.2 Start date

Note: Resource consents lapse five years after their commencement date unless the consent has been given effect to or an application is made to Environment Canterbury to extend this period prior to the lapse date.

8.2.1 When do you propose to start the activity?

(date/month/year)

8.3 Additional notes to applicants

- Your application must be publicly notified unless Environment Canterbury is satisfied that the adverse effects on the environment will be minor and written approval has been obtained from every person Environment Canterbury considers may be adversely affected by the granting of your application (unless Environment Canterbury considers it unreasonable to require the obtaining of every such approval).
- Section 128 of the Resource Management Act 1991 sets out the circumstances in which Environment Canterbury may review the conditions of a resource consent. Under Section 128(c) Environment Canterbury may undertake a review at any time if the application contained any inaccuracies which materially influenced the decision made.
- **The information you provide with your application, which includes all associated reports and attachments, is official information. It will be used to process your application and, together with other official information, assist in the management of the region's natural and physical resources. Access to information held by Environment Canterbury is administered in accordance with the Local Government Official Information and Meetings Act 1987, and Privacy Act 1993. Your information may be disclosed in accordance with the terms of these Acts. Public access is also provided to consent information via Environment Canterbury's website. Environment Canterbury may withhold access to information in certain circumstances. It is therefore important you advise Environment Canterbury about any concern you may have about disclosure of any of the information, which includes all associated reports and attachments, you have provided in this application (e.g. protection of personal information, trade secrets, commercially sensitive material, information which, if released, may cause serious offence to tikanga Maori, or any other information you consider should not be disclosed. While Environment Canterbury may still have to disclose information under the above legislation, it can take into account any concern you wish to raise.**

Please describe any concerns here:

8.4 Errors and omissions

When you receive your Resource Consent Documents please check that the details are correct. You have a 15 working day period after the decision is notified to allow you to object or advise of errors or omissions without cost.

9 APPLICANT SIGNATURE AND DATE

I/we **have read** all of the information on this application form and I understand all of the notes and that I am liable to pay all actual and reasonable charges relating to the processing of this application.

I/we **also understand** that if the application is granted, I will be liable to pay all actual and reasonable charges related to compliance monitoring of the consent.

Signature of **applicant**

Date

Full name of person signing – please print

or **Duly Authorised Person**

Signature of **applicant**

Date

Full name of person signing – please print

or **Duly Authorised Person**

Note: Environment Canterbury must have written authorisation to process your consent application. Both the consultant (if used) and the applicant must sign this section.

- Where there are multiple people applying for consent, all persons must sign this form.
- If a company is the applicant, at least one director must sign this form.
- Anyone else who is applying for consent on behalf of another person, group of people or a company (e.g. a manager applying on behalf of a company) can sign this form and submit the application. However, written authorisation from the persons or company on behalf of which the consent is being applied for must be supplied with this application.

10 CONSULTANT SIGNATURE AND DATE

Signature of **consultant**

Date

Full name of person signing – please print

CHECKLIST

Please ensure you:

- ☒ Complete all parts of this application form.
- ☒ Include an assessment of effects of the activity on the environment, set out in Section 6 of this application form.
- ☒ Include a site plan.
- ☒ Include a copy of the certificate of title, rates demand, subdivision plan or valuation notice for the site your application relates to.
- ☒ Sign and date this application form (both applicant and consultant if one is used).
- ☒ Include the appropriate charge as set out in the "Summary of Resource Consent charges".

Consider consulting local Rūnanga:

☐ If your proposed activity occurs:

- (a) Within a statutory acknowledgement area
- (b) Within a silent file area
- (c) Close to a site of cultural significance, or
- (d) Otherwise affects a site of cultural significance.

11 LOCATION PLAN

Please complete this plan showing the site with the location of the proposed activity and indicate any relevant identifying features such as buildings, roads, rivers, etc. or other relevant details, or alternatively, attach a plan or map to this consent application. <http://canterburymaps.govt.nz/> is a good tool to utilise when applying for a resource consent.



RESOURCE MANAGEMENT ACT 1991

Schedule 4

Information required in application for resource consent

1. Information required in all applications

- (1) An application for resource consent for an activity ("the activity") must include the following:

(a) *A description of the activity:*

To undertake the activity of marine farming for the purposes of growing greenshell mussels (*perna canaliculus*) and blue mussels (*mytilus galloprovincialis*) including the ongoing occupation of part of the Coastal Marine Area, any necessary disturbance of the sea bed, any necessary erection and placement of structures and the incidental deposition of shell material and other natural material as a consequence of continuing to operate the marine farm.

This application effectively has three parts to it:

- (a) To renew the current activity carried out pursuant to CRC 011429 and CRC 063319.1 (current expiry date 18 September 2018)
- (b) To extend seawards the area of occupation while surrendering the inside area to enable the farm to physically occupy the area originally intended for it to occupy but which was prevented as a result of historic survey anomalies.
- (c) Extend the marine farm with an additional block of long lines to the south west.

All in accordance with the various plan accompanying this application as set out below.

Coastal Permits Required

The Application is for Coastal Permits to authorise:

- (a) The occupation of part of the Coastal Marine Area ("CMA").
- (b) Any necessary erection and placement of structures.
- (c) Any necessary disturbance of the seabed.
- (d) The incidental deposition of shell material and other natural material as a consequence of continuing to operate the marine farm.

The location, permit area, all structures that are intended to be used are all set out in:

- Locality Map – **Attachment 1.**
- Area Plan – **Attachment 2.**
- Structures Layout Details – **Attachment 3.**

In addition to the above, attached are:

1. A copy of the *Benthic Survey for a marine farm permit renewal and extension: Big Bay, Banks Peninsula*, NIWA October 2015.
2. A copy of the report "Chlorophyll Data Analysis" prepared by NIWA December 2015 which relates to a number of sites including this site.

The Applicant

The Applicant is Pigeon Bay Aquaculture Limited which was incorporated on 19 March 1997 for the purposes of marine farming on Banks Peninsula. It is essentially a joint venture entity, the principals of which are Simon Acton-Adams (a marine farmer with more than 30 years' experience) and Edward Aitken who is a pastoral farmer residing in Pigeon Bay and has been involved in marine farming since the late 1990's.

Pigeon Bay Aquaculture Limited established the first mussel farm on Banks Peninsula in Pigeon Bay dating from 1997.

History of Marine Farming at Subject Site

The Applicant originally applied for resource consent at the subject site in early 2001. The original application was declined by Environment Canterbury in June 2002. The Applicant lodged an appeal with the Environment Court and the Environment Court overturned the decision of Environment Canterbury granting consent to the activity on 17 June 2003 (See Environment Court decision number C179/2003) *Pigeon Bay Aquaculture v Canterbury Regional Council*.

The marine farm was developed the following year.

Upon installation it was discovered that there is a mismatch between Land Information New Zealand (LINZ) data on title boundaries and the coastline. There appears to be historic survey data errors which have never been properly rectified.

Accordingly when the lines were installed in accordance with the survey information accompanying the original application the inner lines could not be installed because they would be too close to the shoreline. Attached to this application is an aerial photograph showing the existing lines, the shore line, and the boundary lines (**Attachment 4**). As can be seen, the data errors of the boundary lines and shoreline are out by more than 30 metres immediately inshore of the lines. That means that there have only been 5 lines installed on the northern block and three lines on the southern block.

Accordingly part of the application is to adjust this anomaly based on the LINZ

survey data errors and to move the farm further seawards. To balance this adjustment the inshore area of the existing resource consent is being surrendered. The end result is that the farm (as adjusted) will occupy the space it should always have been allowed to occupy but for the LINZ survey data errors.

(b) A description of the site at which the activity is to occur:

The existing site lies in Big Bay on Banks Peninsula. Big Bay is the eastern arm of Double Bay. Blind Bay is the western arm.

There are only three land owners of the land in Double Bay and they are:

- (a) EJC Aitken and MJ Tavendale. This is a family trust which owns all of the land on the eastern side of Big Bay through and including Little Pigeon Bay to Pigeon Bay. Edward Aitken is one of the principals of Pigeon Bay Aquaculture as identified above.
- (b) Earthsea Double Bay Limited. This company owns the land in the middle of the bay (approximately 140 Ha). Both the western side of Big Bay and the eastern side of Blind Bay.
- (c) Chris and Jacqui Chamberlain who own all of the land in Double Bay (Big Bay) on the western side (Blind Bay) all the way through to Port Levy.

There is a bach at the head of Big Bay on the valley floor owned by Earthsea Double Bay Limited. The bach is surrounded by mature trees and is set back some 200 metres from the shore. The bach is the old farm house for the farm in the bay. In front of the house were the old stockyards for the farm and farm buildings. One of these has been converted to a rustic bar/day room. It does not have any known permits, is wholly on the foreshore reserve and cannot be used for accommodation. On the western face of the hill separating the two bays is a commercial lot of planted pine trees.

There is a four wheel drive farm track into the southern part of the bay. This is on Earthsea Double Bay land. There is no right of way over the track. There is both a sign at the end of the road indicating the road is private and a locked gate. This private road connects with a public track from Pigeon Bay. Although the track does physically go to Port Levy it passes over Chamberlain land and is in turn private. It is only four wheel drive access only, and is therefore a dead end track. The public part of the track is high on the hill at the back of Double Bay and would be some 2.5 kilometres from the sea at the closest point and any view of the site of the marine farm would be restricted and very distant.

While there are some paper roads in the bay, none of these are formed and are unlikely to be formed.

Therefore, there is no public access by road to the sea in either bay. There are no public walking tracks into the bay. The only way that the public can get into the bay is by sea.

The coast line around that part of Banks Peninsula is rugged and would preclude anybody accessing the bay around the coastline.

Unlike other parts of Banks Peninsula, there are no recognised walking tracks into

any part of the bay (whether public or private).

The Earthsea Double Bay land is grazed and farmed along with the adjoining land and accordingly the whole of this area is farmed by two people (Chris Chamberlain and Edward Aitken).

The northern side of Banks Peninsula is exposed to open sea conditions and accordingly recreational boating in the area is restricted to kindly sea conditions.

There are no moorings in the bay and it is not recognised as having or being an area that is suitable for anchorage. There is an historic and derelict finger jetty on the eastern side of Big Bay. It would be unsafe to use this, and will date from the days when there was a visiting vessel to the bay relating to the old farmhouse.

While recreational vessels do enter the bay from time to time, activity is restricted by sea conditions and there are better and more accessible areas in Lyttleton Harbour, Port Levy, and Pigeon Bay which recreational boaties can and do enjoy.

Accordingly little has changed in Big Bay since the original application was lodged in 2001.

The adjoining land will remain as farming land for the foreseeable future. There is no planning instrument for the land or sea in that area which indicates any proposed change from the existing activity.

A series of photos accompany the application and as follows:

- **Photo 1** view from the subject site looking back towards the bach in Big Bay
- **Photo 2** view from the beach in Big Bay towards the subject site
- **Photo 3** view looking down into Big Bay from Aitken land. The bach is obscured in amongst the trees on the valley floor. The pine plantation is partially shown along with the private road down into the bay.
- **Photo 4** view on valley floor looking towards bach
- **Photo 5** closer view towards bach
- **Photo 6** view from bach towards subject site. Not absence of view of subject site
- **Photo 7** view of unconsented day room/bar on foreshore reserve
- **Photo 8** sign on private road
- **Photo 9** locked gate on private road
- **Photo 10** view from end of public 4wd track. Note absence of view of subject site
- **Photo 11** derelict and disused finger jetty in Big Bay

(c) *The full name and address of each owner:*

The seabed is Crown land. The only occupant at present is the Applicant under the existing resource consents.

The adjoining land owners are:

- EJC Aitken and MJ Tavendale.
- Earthsea Double Bay Limited.
- Chris and Jacqui Chamberlain.

(d) *A description of other activities that are part of the proposal to which the application relates:*

Not applicable.

(e) *A description of any other resource consents required:*

Not applicable.

(f) *An assessment of the activities against matters set out in Part 2:*

Section 5 – Purpose

The Application does achieve the overarching purpose of the RMA in that it enables the provision of social economic and cultural wellbeing while achieving sustainable management of resources, safe guarding the life supporting capacity of water and avoiding remedying or mitigating adverse effects of the activity on the environment.

Section 6 – Matters of National Importance

The proposal only envisages a modest increase in development over that which was originally granted approval for and so the natural character of the coastal marine area will be preserved and protected from inappropriate use and development.

There are no identified outstanding natural features and landscapes at the subject site.

There is no significant indigenous vegetation or significant habitat of indigenous fauna at the subject site other than being generally a marine mammal sanctuary. This matter will be dealt with separately later in this document.

The marine farm does not exclude public access. People in vessels can enter into and tie up to the structures within the marine farm. As marine farming has become more understood and accepted by the boating public skippers are aware that they can utilise the area. They can also pass inshore or offshore in immediate proximity. There are no other marine farms in Double Bay. The closest other marine farms on Banks Peninsula are in the unnamed bay towards Port Levy to the west and in Pigeon Bay to the east.

The process in originally applying for consent did not identify any particular wahi tapu or other taonga that would be adversely affected by the marine farm.

There is no known historic or heritage place at or near the subject site which needs protection.

As fishing can still occur within the site and around the site, protected customary rights are not seen to be affected.

Section 7 – Other Matters

Only those matters in section 7 that are relevant are addressed in this assessment. The proposal consists of the farming of a native species of shellfish which is found in the area. There is nothing added to the water column and the shellfish rely solely on nutrients in the water column. The activity is an efficient use and development of natural and physical resources. The activity is existing and has been carried out at the site for a number of years. The activity has been subject to rigorous monitoring which has not lead to any concerns being identified. Amenity values will not be diminished by granting consent. None of the intrinsic values of the ecosystems that are present at the subject site will be adversely affected and the quality of the environment will not be diminished. While nutrients in the water column are a finite resource, in the assessment of NIWA set out in the reports attached hereto the activity is both sustainable and will not reduce the nutrients in anything more than in a minor way.

Section 8 – the Treaty of Waitangi

The allocation of water space for aquaculture in the CMA and Crown obligations under the Treaty are dealt with by Fisheries legislation.

(2) Assessment under (1)(g)

Aquaculture in a number of the bays on Banks Peninsula is effectively an excluded activity. A number of the bays around the Peninsula have been identified as being intended to be maintained in their current natural state free of additional structures. Port Levy, Pigeon Bay and Menzies Bay have been identified in the Regional and Coastal Environment Plan (RCEP) as having such status. Big Bay (and Blind Bay) has not been identified as requiring any such protection.

There are also a number of specific sites that are identified around the Peninsula as having protected recreational, cultural or historic values. There are no such identified sites in Big Bay (or Blind Bay) in the RCEP. There are a number of these sites in Lyttleton Harbour, Port Levy and Pigeon Bay.

The RCEP also identifies appropriate mooring areas. There are none for Big Bay.

Status of the Activity under the Regional Coastal Environment Plan for the Canterbury Region (RCEP)

The activity consists of the on-going occupation of the CMA together with a modest extension. The activity also provides for on-going placement of the marine farming structures (including new structures) and any disturbance of the sea bed for the new structures and if during the term of the coastal permit there needs to be replacement of existing structures. There is also the on-going deposition of shell material and other natural material from the operation of the marine farm.

As far as occupation is concerned, given that public access is not actually excluded and the area of the marine farm is not greater than 50 hectares, the applicable rule in the RCEP is rule 8.23 which makes occupation a *discretionary* activity.

The structures largely already exist. New lines will be erected in the extension to the south west and seawards of the existing lines. Erection of structures is a *discretionary* activity under

Rule 8.2 of the RCEP.

Disturbance of the seabed necessary for the erection of the new structures (and from time to time replacement of existing structures) is a *discretionary activity* under Rule 8.7.

Overall Status of Activity

Given that the proposed activities are *discretionary* as described above, then as a result of the necessary bundling of the activities then the overall assessment of the activity is required to be made as a *discretionary activity* under s.104B RMA.

When the Environment Court dealt with the Appeal, it found that overall assessment was as a *discretionary activity*.

(a) Any relevant Objectives, Policies or Rules

The relevant Rules of the RCEP have been referred to in the immediately preceding paragraph. This paragraph examines the policies and objectives of the RCEP as they relate to the proposal. The relevant objectives and policies are to be found at 8.2 Issue Resolution RCEP.

Objective 8.1

This object is to enable the use of the CMA provided that conflicts between users, peoples wellbeing, health and safety and amenity and natural character are preserved. For the reasons given above, the proposal does not offend this objective.

Policy 8.1

This relates to *permitted* activities and is not relevant.

Policy 8.2

This policy simply provides the framework for regulation of activities in the CMA.

Policy 8.3

This policy sets out to protect and preserve natural character. This is not being undermined by the proposal. The policy also sets out to protect characteristics of special value to Tangata whenua, to preserve public use and enjoyment of the coast including public access to and along the CMA and to preserve open space amenity of the coast. None of these matters are adversely affected. As to the imperative to consider cumulative effects, the nearest other marine farming is in the unnamed bay towards Port Levy to the west and in Pigeon Bay (to the east), both of which are removed some distance from the existing marine farming in Big Bay. There is no adjoining land administered by the Department of Conservation and the adjoining land is already in agricultural use. The application does fall within a marine mammal sanctuary. That issue is addressed later in this document.

Lastly the proposal will not affect any dynamic coastal processes and it will not adversely affect any natural feature. There is no existing network utility infrastructure at or near the subject site.

Policy 8.4

This policy relates to reclamation and is not relevant.

Policy 8.5

This policy addresses occupation. Turning to the matters particularly to be considered under the policy, there is no recognised anchorage or navigational channel in, through or near the subject site. As far as public recreational use is concerned, that is not excluded. The site is more exposed than some of the larger bays of Banks Peninsula. The proposal is not within a designated Port Operational Area. During the previous process of application and granting of consent no particular cultural historic scenic amenity Tangata Whenua or natural value of the area was identified. As to the natural character of the coastal environment both within and outside the immediate location, only a modest extension is sought over and above that which has already been granted permission.

Because this is an existing site at which marine farming has occurred for a number of years, consideration of an alternative site is not considered appropriate. The Applicant is choosing this site because the activity is already occurring there. As it is already occurring there, the natural character of the area is not being further compromised.

A 20 year term is considered to be a reasonable period of occupation which will meet the purposes for which occupation is sought.

Policy 8.6

This policy relates to a future coastal occupation charging regime.

Policy 8.7

This policy is an imperative to prevent activities which have potential to have a significant or irreversible adverse effect on natural or cultural values of an Area of Significant Natural Value or on the natural cultural values of areas of the coastal environment adjacent to an ASNV. There is no ASNV at the subject site or nearby.

Policy 8.8

This policy relates to the Ports of Lyttleton and Timaru and is not relevant.

Policy 8.9

Again, this policy relates to the Ports of Lyttleton and Timaru.

Policy 8.10

This policy relates to various specified areas of the CMA, none of which relate to the subject site.

Policy 8.11

This policy relates to structures in the CMA not being used for habitation or overnight accommodation. That does not apply to the proposed activity.

Policy 8.12

This relates to unauthorised or unutilised resource consents. That does not apply to the current proposal.

Policy 8.13

This relates to boatsheds and swing moorings which are not relevant.

Policy 8.14

This relates to coastal protection works which are not relevant.

Policy 8.15

This refers to areas of Banks Peninsula listed in Schedule 5.13 and the ASNV's. The proposal is not caught by this policy.

Given that the RCEP sets out to protect a whole series of particular bays on Banks Peninsula, it is noteworthy that there is no such protection sought for Big Bay. That must mean it is a relevant matter in determining this application.

Canterbury Regional Policy Statement**Issue 8.1.5 – Provision of Appropriate Access**

This issue is there to ensure that access to and along the CMA is preserved. For the reasons given above, that issue is not unduly affected by the proposal. Furthermore, any explanation to this issue, it is said:

"There must also be access to and along the CMA for commercial purposes such as for ... aquaculture ..."

Objective 8.1.6 – Adverse Effects of Human Activities on the Water Quality of the CMA

That is not directly relevant here because the proposed activity does not cause point or non-point discharges of contaminants entering the CMA. However in the explanation of the issue it is said:

"Contaminants ... can cause adverse effects on marine life ... and on commercial undertakings such as ... aquaculture."

Objective 8.2.1

This objective relates to development of coastal strategies.

Objective 8.2.2

This objective is directed to providing a framework for appropriate occupation, use and development of the CMA while managing the effects of those activities. Aquaculture in the sense of marine farming can only occur in the CMA. It is an appropriate activity at the subject site and the adverse effects of it at the site are no more than minor.

Objective 8.2.3

This objective is enabling a regionally significant infrastructure and other commercial maritime activities, one of which is expressly referred to as aquaculture. The CRPS is recording that aquaculture in the CMA is appropriate and needs to be supported.

Objective 8.2.4 – Preservation, Protection and Enhancement of the Coastal Environment

This objective is directed to preserving natural character from inappropriate use and development and seeing that various named values are restored or enhanced. Marine farming at the subject site is an appropriate activity and there is nothing in this objective which is contrary to what is the proposed activity.

Objective 8.2.5 – Provision of Access

Again, access to and along the CMA is not undermined by the proposed activity in anything other than the inconvenience of a slight adjustment in course to pass seaward

or landward of the existing marine farm. But the farm is not on or near a recognised navigational route.

Objective 8.2.6 – Protection and Improvement of Coastal Water

Again, this is directed towards quality of coastal water. A marine farm by its very nature needs high quality water. The harvested product must be fit for human consumption.

Objective 8.3.1- Improving Understanding of the Coastal Environment

This policy is about improving knowledge and understanding of the CMA.

Objective 8.3.2 – Providing Integration of Management

This policy relates to management of the coastal environment.

Policy 8.3.3 – Management of Activities in the Coastal Environment

This policy is about enabling a framework for the use and occupation of the CMA while avoiding, or where that is not practicable, remedying and mitigating adverse effects. None of the stipulated adverse effects will be anything more than minor and therefore the policy is met because it is “enabling”.

Policy 8.3.4 – Preservation of Natural Character of the Coastal Environment

This policy is directed at protecting outstanding natural features of landscapes, protecting indigenous ecosystems, promoting natural character, in particular where there are coastal land forms and landscapes that are significant, representative or unique, avoiding new development adjacent to coastal marine area that will compromise areas of high natural character. The subject site is not an outstanding natural feature, nor is it an outstanding natural landscape. There is no indigenous ecosystem which is going to be put at peril by the proposal. The coastal land forms and landscapes are not adversely affected. Natural character will not be compromised. In particular under this policy the CRPS says:

“Natural character and the values associated with that natural character ... provide opportunities for commercial activities such as tourism, aquaculture, energy and fishing.”

Policy 8.3.5 – Maintenance and Enhancement of Public and Ngai Tahu Access

The proposal does not unduly interfere with either of these matters.

Policy 8.3.6 – Regionally Significant Infrastructure

This policy is not relevant.

Policy 8.3.7 – Improve Water Quality in Degraded Areas

This policy is not relevant.

Policy 8.3.8 - Discharge of Contaminants to Coastal Water that is a Natural State

This policy is not relevant.

Policy 8.3.9 – Direct Discharge of Sewerage into the Coastal Marine Area

This policy is not relevant.

New Zealand Coastal Policy Statement 2010

This is a higher level document which generally seeks to enable activities in the coastal environment while ensuring that the effects of those activities are avoided or mitigated and seeks out to preserve and restore natural character, to protect natural features and natural landscape, to protect historic heritage, public open space, to protect water quality, monitor sedimentation, to restrict the discharge of contaminants, to identify coastal hazards and restrict activity in relation to the coastal hazard risk. None of these matters are anticipated to be intended to be restricted by the current proposal.

Specifically, there is now a policy (Policy 8) in relation to aquaculture which requires that the "significant, existing and potential contribution of aquaculture to the social economic and cultural wellbeing of the people and communities be recognised by making provision for aquaculture in regional coastal plans". Given that aquaculture at the subject site is a *discretionary* activity, this policy is met.

- (b) *Any relevant requirements, conditions or permissions in any Rules in a document.*

The relevant rules in chapter 8 of the RCEP have been identified above. In relation to *discretionary* activities, the RCEP does not provide any express requirements, conditions or permissions.

- (c) *Any other relevant requirements in a document (for example, in a national environmental standard or other regulations)*

There are no other documents that need to be referred to.

The Assessment of the Activities Effects on the Environment is provided separately and later in this document.

2. Additional Information required in some applications

This application is affected by section 1652H(1)(c). Accordingly an assessment of the value of the investment of the existing consent holder is set out below (for the purposes of section 104(2A).

The Applicant has invested a significant sum of money in the existing long lines at the subject site.

In broad terms, the investment is as follows:

- Anchors
- Longlines
- Crop

If a new consent is not granted then at the expiry of the existing consents, the Applicants investment will be lost.

Assessment of Environmental Effects

3. Information Required in Assessment of Environmental Effects

- (1) An assessment of the activity's effects on the environment must include the following information:
 - (a) *If it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity.*

A renewed term for a marine farm at the subject site together with a modest extension will not lead to any significant adverse effect on the environment and therefore a consideration of any possible alternative locations or methods for undertaking the activity is not necessary.

- (b) *An assessment of the actual or potential effect on the environment of the activity.*

Various potential effects are examined in the subsequent paragraph, both adverse and positive.

Marine Mammals

There is no documented record of marine mammal entanglement in a marine farm on or about Banks Peninsula. Marine mammals are not physically excluded from the subject site. Banks Peninsula has a resident population of Hector's dolphins and is subject to a Marine Mammal Sanctuary under the Marine Mammals Protection Act 1978. A report was provided to Ecan by Martin Cawthron (30 May 2002). That reported that densities of dolphins in the area generally were lowest in comparison to other areas around Banks Peninsula. Prior to commencement of erection of the marine farm at the subject site, a base line survey and subsequent logging of Hector's dolphin activity in the area was required. The observations of those reports has been provided to Council. Recorded sightings of Hector's dolphins in the immediate area were rare. That tends to confirm that the subject site is not a valuable part of their habitat and continued occupation of it by a marine farm is not going to have an adverse effect on the dolphins or their habitat. The Environment Court in its decision in relation to the original application did not consider that a marine farm at the subject site posed any undue risk to dolphins.

Sea Birds

There is now a body of literature which indicates that seabirds are not excluded from mussel farms and indeed find the mussel buoy a useful place for a temporary roost. Bird droppings on mussel buoys are a constant reminder of their use for that purpose. In the Marlborough Sounds, even the rare (and timid) King Shag finds mussel buoys a useful resting place while foraging. And a place free of predators. Dr Chris Challies made an assessment of the potential effect of the proposed activity on seabirds in relation to an adjoining site (report dated 13 December 2000). His conclusion was that a marine farm at that site was unlikely to have a significant effect on the wellbeing of any seabird species currently using the area. That is also relevant to the current subject site. There is no evidence during the course of the existence of the marine farm that there is any concern relating to an adverse effect on seabirds. The Environment Court did not consider there was any particular adverse effect on seabirds.

Navigation

The existing marine farm is not on a recognised navigation route, nor near a recognised mooring area. It has a lighting plan which enables it to be seen at night by approaching vessels. This was not considered to be an issue in relation to the Environment Court decision on the original application. No problems have arisen since the farm was installed.

Public Access

The public is not physically excluded from utilising the CMA where the marine farm is. Recreationalists can enter the farm without fear of adverse consequences. The recreational public is now much more educated about these matters and do these days have concerns over access.

Fishing

Similarly the existing marine farm does not actually exclude fishing and a recreational fisher can tie up to the structures during the activity of fishing.

It is not considered by the Applicant that any commercial fishing operation is adversely affected by the existing marine farm.

Recreational Activity

There is no recognised recreational activity occurring at the subject site such that will be adversely affected. This site is relatively exposed and there are ample opportunities nearby for water based recreational activities to occur in protected areas.

Visual effects and Amenity Values

As stated above, the only public access to the bay is by sea and because of the open sea nature of the exposed coast line, access even by sea for the public is restricted. However, at sea level visual effects are restricted to proximity to the farm. At sea level, a view at anything over 1.25 km has no visual effect. While there is elevated land within the bay, there are no houses, dwellings or viewing platforms on that elevated land. The bach in the trees at the head of the eastern arm of the bay either has no view of the subject site. The attached photos make that point evident that issue. In any event, the proposal is largely the continuation of an existing activity. The extension seawards is compensated by the removal of the inside area to enable the farm to occupy the area originally intended. The new block of long lines at the southern end of the extension will be viewed against the background of the existing farming and will not add any undue adverse effect to the effect that is already created. Even when assessed on a cumulative basis the effect will be no more than minor.

Landscape

There is no outstanding natural feature or outstanding natural landscape in the immediate area. The proposed activity is not of a scale or at a location which adversely affects the landscape or character of Banks Peninsula. The original proposal was subjected to rigorous scrutiny in relation to landscape and amenity values. Various reports were produced. The Environment Court in its decision found that granting permission to the original application would not create adverse effects that were anything more than minor. This application is largely for a renewal together with a modest south western extension of the existing activity. These will not unduly or adversely affect the landscape values within the bay.

Benthic Effects

This matter is separately addressed by the report of NIWA. There is nothing in that report which raises any concerns. That report is able to draw upon the comparison with the two earlier surveys of the subject site. Reports were produced at the time of the original application by NIWA. So the information (both as a baseline) and during the course of the first term is well documented.

Nutrient Depletion

There is the separate NIWA report which indicates that nutrients depletion is not of a concern.

Coastal Processes

There is no evidence of any measurable effect of the existing farm on coastal processes. It is separated from the shore and has only localised effects of a minimal nature on current.

Biosecurity

The Applicant is a member of the mussel industry ECOP. Compliance with the ECOP is designed to minimise biosecurity risks. It is in the farmers interests to ensure that a high standard is maintained.

Anchoring

The anchoring systems are suitable for the subject site. They have worked well during the first term of consent.

Cultural Values

The area is of significance to Ngai Tahu. That is recognised by the RCEP.

There was consultation with Ngai Tahu at the time of the original application and during the approval process of the RCEP. There was further consultation regarding the current application. In the circumstances the Applicant does not believe that there will be more than a minor cultural impact. In addition, once lodged with Ecan, the Applicant will undertake further consultation with Iwi.

Noise

Human activity at this site only occurs during installation, maintenance and harvest. Most of the time there is no human presence at the site. There is no noise in the absence of human presence. During the human presence there can be mechanical noise. However that noise is confined to the area of the vessel undertaking the installation, maintenance or harvest. Human presence on the land that adjoins the subject site is infrequent. However it is of such distance that hearing it would be difficult. Certainly the noise would barely be audible to the human ear.

Cumulative Effects

There is a significant distance between the closest adjoining marine farms in Pigeon Bay and in the bay to the east of Beacon Rock.

Marine farming on Banks Peninsula is still very much an activity that is only carried out in isolated pockets. Most visitors to Banks Peninsula would be completely unaware of the existence of marine farming.

Positive Effects

There is no doubt that having a marine farm at the subject site has positive economic effects. The harvested product off the farm is currently supplied to Talleys Group Limited, Aroma NZ Ltd based in Bromley Christchurch and Ikana Ltd based in Hornby Christchurch. The product is mainly exported and provides foreign exchange. The existing marine farm in conjunction with the other marine farms in the wider group provides employment opportunities for those maintaining the farms and harvesting the product of the farm together with those that process the product from the farms. The effects of the activity are less than minor and there is a significant positive effect from continuing to allow the existing marine farm at the subject site.

- (c) *If the activity includes the use of hazardous substances and installations in assessment of any risks to the environment that are likely to arise from such use:*

Not applicable.

- (d) *If the activity includes the discharge of any contaminant a description of the nature of the discharge, the sensitivity of the receiving environment and any possible alternative methods of discharge.*

Not applicable.

- (e) *A description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect.*

Not applicable.

- (f) *An identification of those persons interested in or affected by the proposal, the consultation undertaken, and any response to the views of those consulted.*

Contemporaneously with the lodging of this application the adjoining land owners and Iwi are being consulted. There are accompanying the application affected person approval forms from the Chamberlains and the Aitkens.

- (g) *If the the scale or significance of the activity's effect are such that monitoring is required, a description of how, once the proposal is approved, effects will be monitored and by whom.*

Not applicable.

- (h) *If the activity will or is likely to have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity.*

Not applicable.

- (2) *Requirement to include information in the assessment of environmental effects is subject to the provisions of any policy statement or plan.*

See above.

4. Matters that must be Addressed by an Assessment of Environmental Effects

- (1) An assessment of the activity's effects on the environment must address the following matters:

- (a) *Any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:*

This is an application largely for an ongoing activity with some modest extension. It is not considered that anybody will suffer any identified adverse effect that is more than minor or one which those persons are not already exposed to and used to. Big Bay does not have easy public access and accordingly it is not considered that there will be any effect on the wider community.

Accompanying the application are affected person consents from:

- The Chamberlains
- The Aitkens

- (b) *Any physical effect on the locality, including any landscape and visual effects:*

The activity already occurs at the subject site. The application for seaward extension is simply to ensure that the original site as envisaged becomes properly able to be utilised. There is in addition a modest increase in activity by the installation of a southern block of longlines. It is not considered that there will be any significant physical effect arising.

- (c) *Any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:*

This aspect has been examined above.

- (d) *Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations:*

There is no particular aesthetic, recreational, scientific, historical, spiritual or cultural value or special value of the subject site such that the effect of the ongoing presence of the marine farm at the subject site has been examined.

- (e) *Any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:*

Not applicable.

- (f) *Any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations:*

Not applicable.

- (2) The requirement to address a matter in the assessment of environment effects is subject to the provisions of any policy statement or plan.

This has been addressed above.

Conditions

There are an existing suite of conditions which apply to the existing consents.

There are some comments that should be made in relation to those conditions and they are as follows:

- (a) The original suite of conditions addressed a green fields application where the effects of marine farming on Banks Peninsula were not well understood or known because of the absence of marine farming in the area.
- (b) Marine farming is now a well-established activity in the area and their effects are known and understood. Therefore some short-form and repetitive reporting asked for in earlier consents is no longer necessary.



Topomap 50 Sheet: BX25

Base Topographical Data sourced from Land Information New Zealand Data. Crown Copyright Reserved.

Locality Map

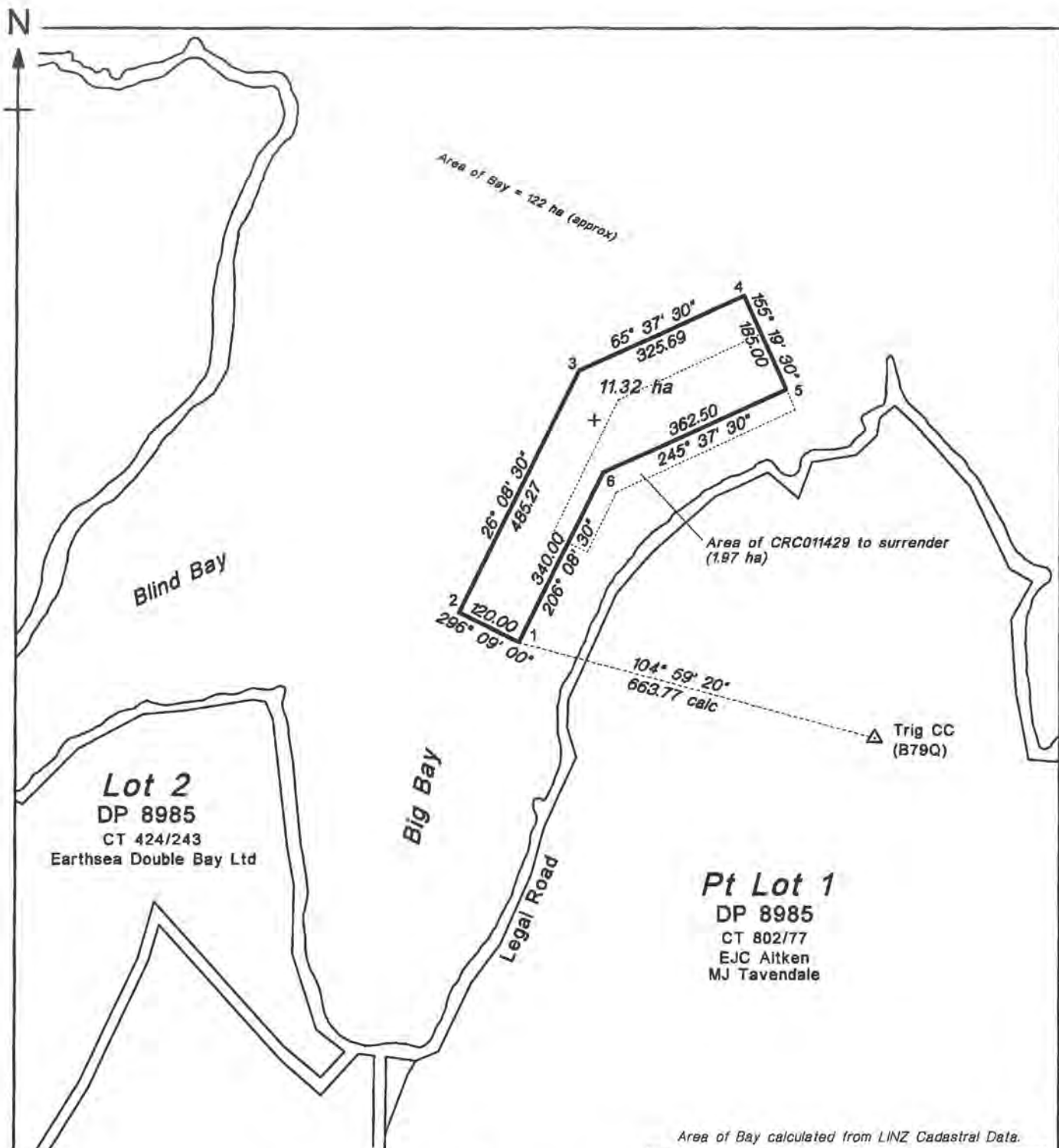
Proposed Coastal Permit
Being Renewal & Extension to CRC011429



Prepared
27 February 2015

Scale 1:50,000
500 0 500 1000 1500 2000 2500 3000 3500 Meters

MF_2390



Area of Bay calculated from LINZ Cadastral Data.

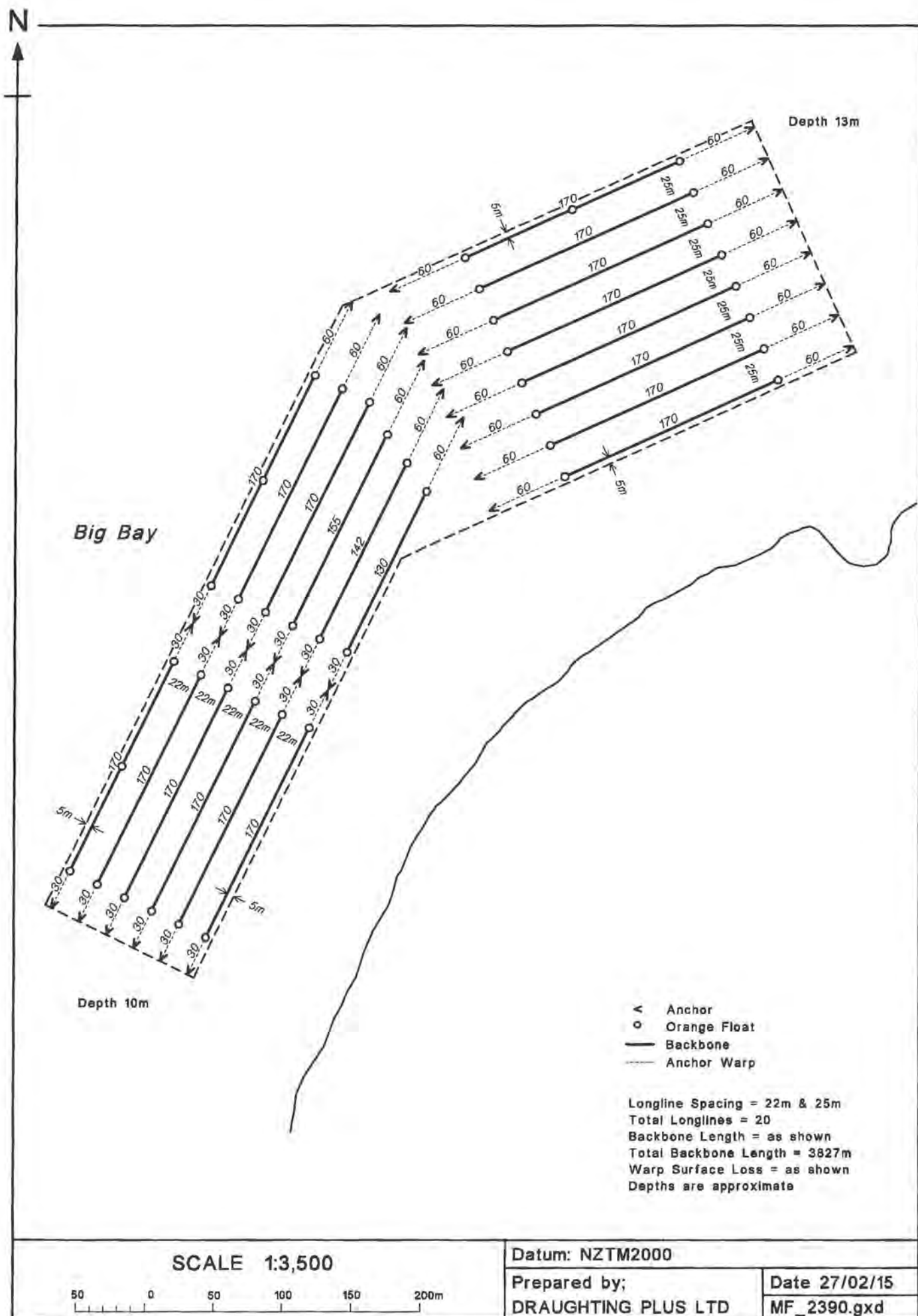
Proposed Coastal Permit Being Renewal and Extension of CRC011429 Pigeon Bay Aquaculture Ltd

NOTE: The position of this application has not been surveyed.
Coastline from Land Information NZ Cadastral Data

SCHEDULE OF COORDINATES		
DATUM: NZTM2000		
Point	East	North
1	1590688.37	5170525.23
2	1590580.65	5170578.11
3	1590794.47	5171013.74
4	1591091.13	5171148.15
5	1591168.37	5170980.04
6	1590838.18	5170830.44
Centroid	1590822.37	5170924.83
Trig CC	1591329.55	5170353.55

BANKS PENINSULA DISTRICT

SCALE 1:10,000		Datum: NZTM2000	
200	0	100	200
300	400	500	600
700m			
Prepared by: DRAUGHTING PLUS LTD		Date 27/02/15 MF_2390.gxd	

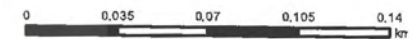




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Scale: 1:2,923 @A4

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Photograph 1

Photograph 2



Photograph 3





Photograph 4



Photograph 5



Photograph 6



Photograph 7

Photograph 8





Photograph 9

Photograph 10





Photograph 11

Benthic Survey for a marine farm renewal and extension: Big Bay, Banks Peninsula

Prepared for Pigeon Bay Aquaculture Ltd.

October 2015



Prepared by:
Stephen Brown

For any information regarding this report please contact:

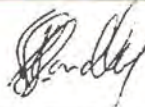

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20 October 2015 3.05 p.m.

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Executive summary

NIWA was engaged by Pigeon Bay Aquaculture Ltd to survey the seabed at mussel farm site CRC011429 near Big Bay, Banks Peninsula in order to:

1. provide information to support a resource consent application for a renewal and extension of the area of the farm, and
2. provide a baseline for benthic monitoring of the new farm configuration.

Sediment physicochemical characteristics and faunal species were sampled at three sites within the proposed extension area to describe the present benthic conditions, and side-scan sonar was used to determine whether there were any seabed features or habitats of special significance such as rocky reefs in the vicinity of the proposed extension. Samples were also taken at three positions beneath the existing 10 year old farm to predict what effects can be expected on the seabed within the new extension area after installation of farm structures.

No benthic features of special interest were identified in the vicinity of the proposed marine farm extension. The substratum beneath the extension area is muddy sand habitat populated by a species assemblage that is common in shallow subtidal soft sediment in the Canterbury region. A side-scan sonar survey did not detect any special topographical features (such as bedrock reef habitat) in the vicinity of the extension area. Key indicators measured within the 10 year old existing farm did not exhibit any significant detrimental impact to the seabed attributable to the farming activity. Based on conditions measured beneath the existing farm, the likely effects on the seabed beneath the proposed extension would be some accumulation of shell material, and some changes to the faunal species assemblage.

Baseline monitoring was conducted at 'test' (50 m from proposed boundary) and 'control' (250 m from proposed boundary) sites established along three transects extending to the north, west and south of the proposed new consent area (the extension). Key ecological indicators including sediment grain size, sediment organic content, sediment smell and colour, depth of sediment redox layer, and faunal community composition were sampled as a baseline against which results of future monitoring survey results can be compared to enable detection of potential effects on the benthos. The design of the monitoring survey is consistent with other marine farm monitoring programmes already established in the region.

In applying for the extension, the applicant is seeking to shift the inshore boundary of the existing consented area further offshore. This will mitigate any potential impacts from the farming activity on nearshore habitats that are likely to be more sensitive to depositional effects compared to the soft sediment habitats further offshore.

The results of this survey indicate that the siting of a mussel farm within the proposed extension area is unlikely to cause significant detrimental ecological effects to the benthos.

1 Introduction

Pigeon Bay Aquaculture Ltd currently has an existing consent (CRC011429) to farm an area of 6.16 ha at the north-eastern end of Big Bay (Fig 2-1). They are proposing to renew the consent and to shift the boundaries of the farm further offshore and increase the area of the farm to 11.32 Ha. NIWA has been engaged to conduct a benthic survey to provide information to support the resource consent application for renewal and extension of the area of the farm, and to provide a baseline for benthic monitoring of the new farm configuration.

The main environmental effects expected beneath a mussel farm in a semi-sheltered embayment such as Big Bay, are moderate levels of organic enrichment caused by deposition of mussel faeces and pseudofaeces, some accumulation on the seabed of mussels and other species growing on the farm structures, and some changes to the species assemblages living on and within the sediments. A monitoring programme has been underway at the original site, beginning with a baseline survey conducted in 2005 (Hopkins and Butcher 2005), prior to commencement of the farming activity. The most recent survey conducted in 2012 (Brown 2012), 7 years after establishment of the farm, concluded that there was no indication of significant effects to the seabed resulting from the marine farming activity.

The present survey was designed to describe the benthic characteristics in the vicinity of the proposed extension to aid in assessing its suitability for marine farming, and to establish sampling sites as a baseline for future monitoring of effects.

2 Methods

The survey was carried out on 3 and 4 September 2015 under the leadership of NIWA staff accompanied by industry personnel aboard an industry vessel. All grab sample locations and sled tracks were located and recorded using a handheld Garmin GPS unit.

2.1 Side-scan sonar

In order to identify potential features of interest in the vicinity of the extension, side-scan sonar swaths, each 60 m wide (30 m either side of the vessel) were made around the boundaries of the proposed extension using a high-frequency (675 kHz) Triton towfish. The position of the side-scan sonar was automatically recorded every 2 seconds along each swath from a GPS and saved in real time to a laptop on board the vessel using SeaNet Pro software and post-processed with Triton Perspective software to produce geo-referenced images that could be opened in ArcMap v9 GIS or Google Earth, where locations of features of interest could be determined

2.2 Grab sampling

A benthic grab (bite area ca 0.13 m², maximum bite depth 22 cm) was used to obtain samples to describe sediment physicochemical characteristics, and infaunal species assemblages at:

- three sites within the proposed extension area (Ext 1 – Ext 3; to characterise benthos within the extension),
- three sites within the existing farm (In1 – In 3; to gauge what changes are likely to occur following the development of the extension),

- 2 positions in each of 3 transects to the north (Nt, Nc), west (Wt, Wc), and south (St, Sc) of the extended farm area, as sample sites for baseline and future monitoring, to enable comparison of test (t) sites located 50 m from the boundary against control (c) sites located 250 m from the boundary. Three replicate grab samples were obtained at each of the 6 monitoring sites.

Sample positions are shown in Figure 2-1 and listed in Appendix A..

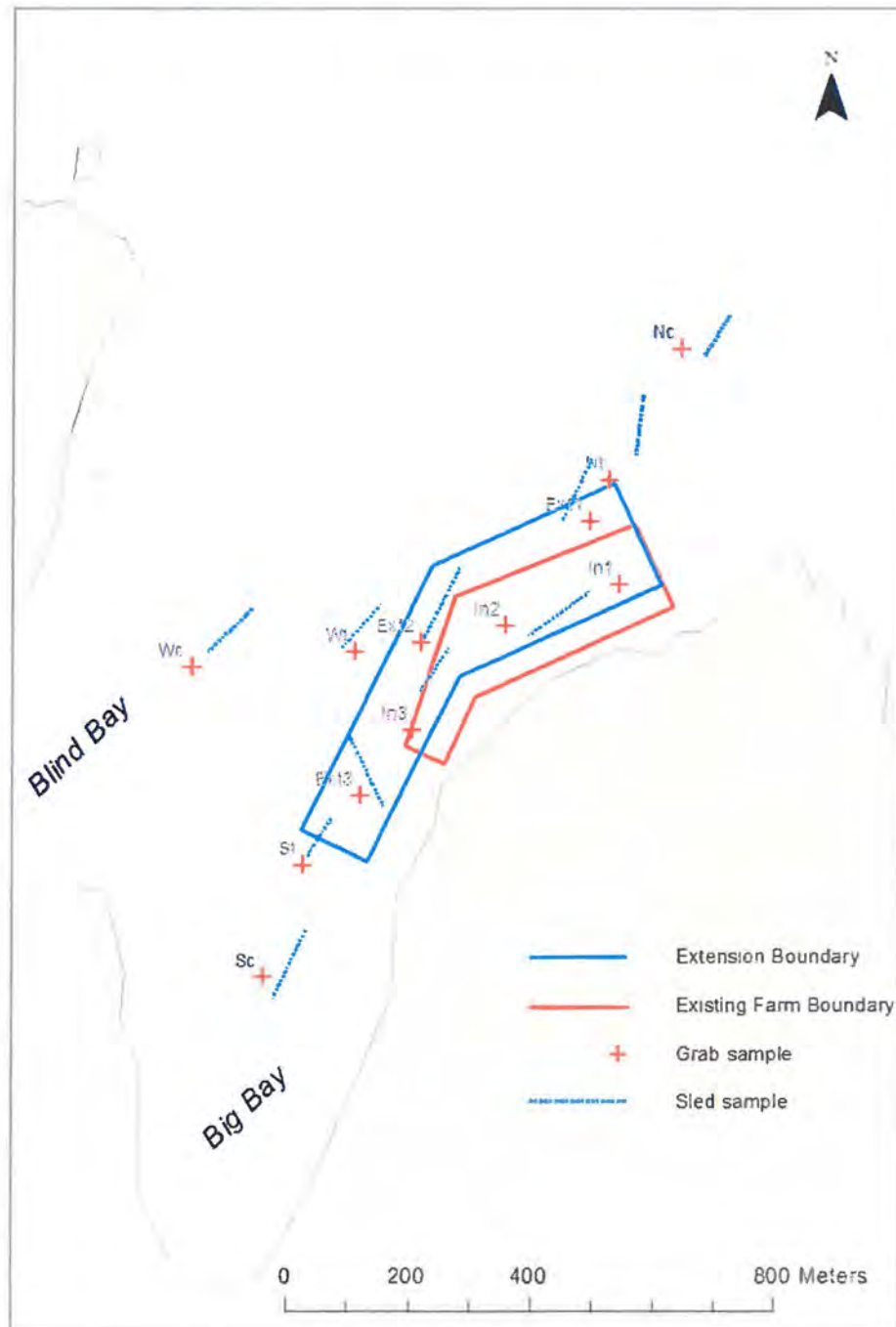


Figure 2-1: Sample positions.

2.2.1 Sediment Physicochemistry

From each grab sample, two core (5 cm diameter) sub-samples were taken to 10 cm depth, and the sediment colour and smell, and the depth of the oxygenated layer was noted. The top 3 cm of the first core from each of the replicate grabs was composited and returned to the laboratory for analysis of sediment grain size. The top 3 cm of the second core from each replicate grab was retained separately for analysis of organic matter content.

Grain-size distribution was determined by oven drying each sediment sample at 100°C overnight and washing a weighed subsample through stacked 200 µm and 63 µm sieves. The fraction retained on each sieve was dried and weighed and the weight of material passing the 63 µm sieve obtained by subtraction from the original weight. Dry weights for each fraction were expressed as percentages of the total dry weight.

The amount of organic matter in the sediments was determined by freeze-drying each sample, grinding, and combusting in a furnace at 500°C for 4 hours, and reweighing (Loss on ignition or LOI). The weight of organic matter was determined by subtracting the combusted weight from the original (freeze-dried) weight and expressed as a percentage.

2.2.2 Infauna

To sample the infaunal community (small-bodied animals living within the sediment), a single sediment core (15 cm diameter x 10 cm deep) was subsampled from each replicate grab sample. The contents were transferred to a mesh bag (mesh size 0.5 mm), and sieved by gently washing the bag in seawater. Following sieving, the infaunal samples were preserved in a solution of 70% ethanol in seawater and transported back to the NIWA lab for taxonomic identification and counting.

A multivariate analysis was performed whereby quantitative infaunal data were expressed as matrices of Bray-Curtis similarities among sites, and then subjected to non-metric multidimensional scaling analyses (nMDS, Field et al. 1982, PRIMER 6 2006). This method compares multivariate observations of the species composition at each site, such that if two sites showed a similar assemblage of organisms, then the corresponding points on the resulting nMDS plot would lie close together.

2.3 Benthic sled – Epifaunal assemblages

A benthic sled (mouth width 600mm, mesh size 2mm) was used to sample the assemblage of conspicuous benthic epifauna (large bodied sediment surface-dwelling species) (sled tow positions are shown in Figure 2-1). After each sled tow (tow length approximately 100 m), sediments were rinsed from the sled contents and the macrofauna retained within the 2 mm mesh of the sled was preserved in 70% seawater and returned to the NIWA laboratory for sorting. Only large-bodied sediment surface-dwelling species retained by a 10 mm mesh during the sample sorting process were included in the analysis.

3 Results

3.1 Side-scan sonar

Location of side-scan swathing is shown in Figure 3-1. Side-scan imaging indicated that the seabed in the vicinity of the proposed extension is relatively flat, with a substratum comprised of soft sediment (sand and mud). The side-scan did not show any significant benthic features or habitats such as

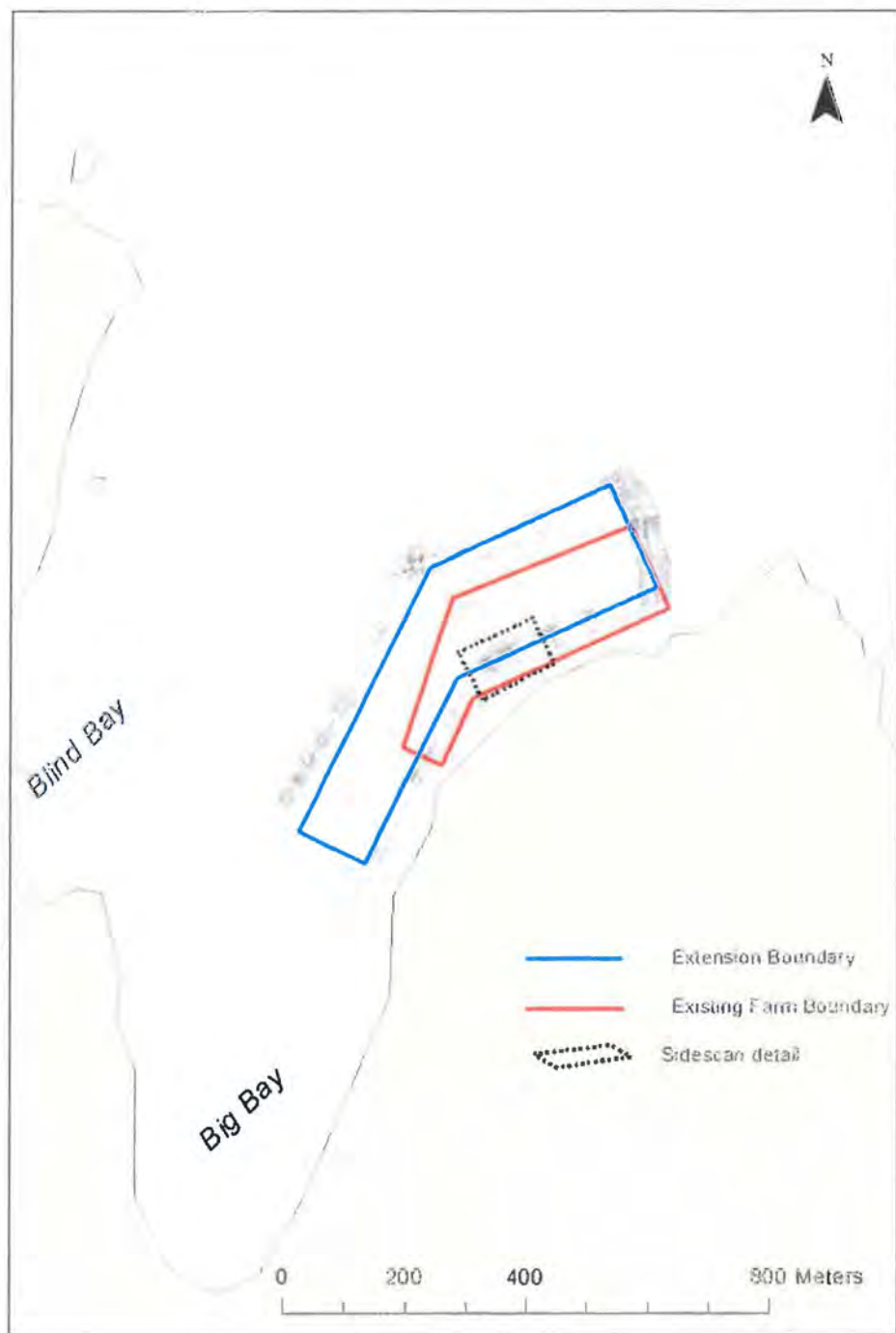


Figure 3-1: Side-scan swaths (depicted as pale grey bands).

bedrock reef. An area of sand ripples with some scattered cobble inshore of the proposed extension boundary was apparent from the side-scan image as shown in Figure 3-2.

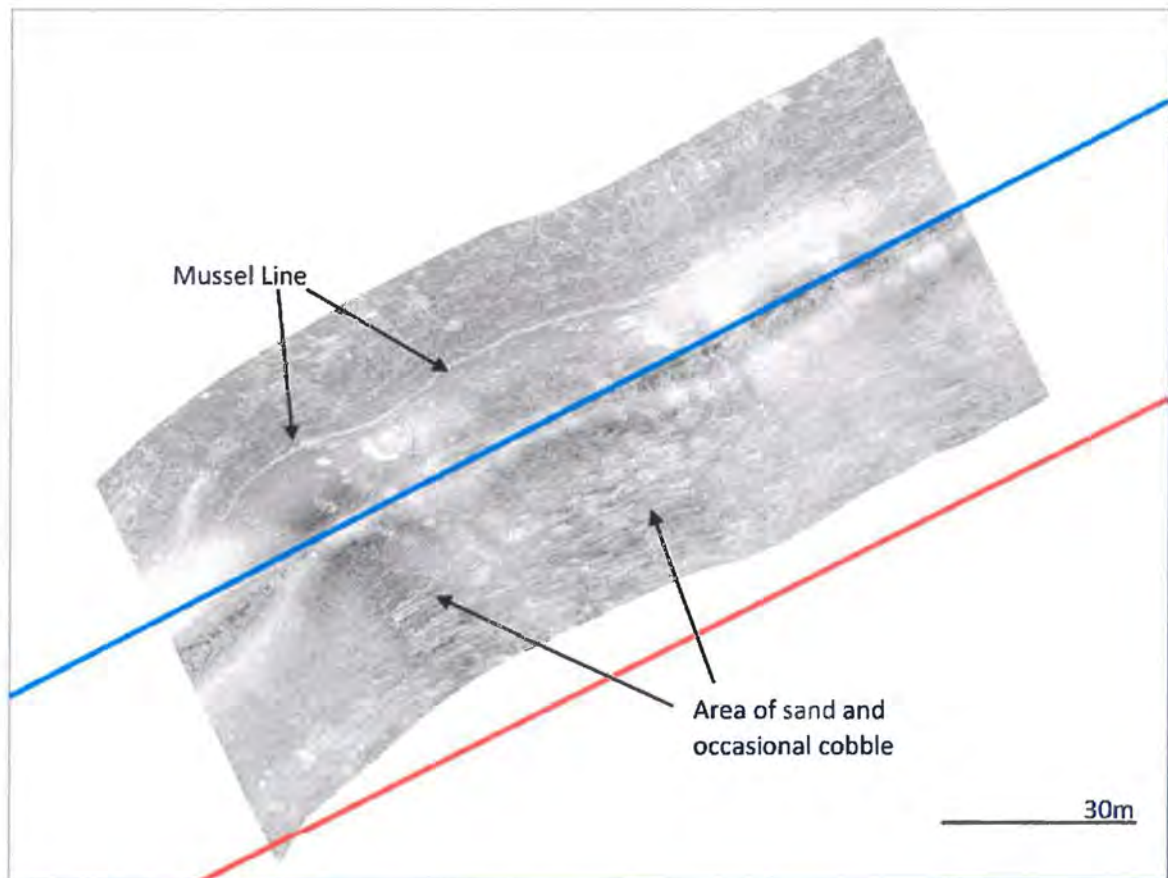


Figure 3-2: Detailed segment of side-scan swath (area enclosed within dotted line in Figure 3-1). Blue line represents inshore boundary of the proposed extension and red line represents inshore boundary of original consented area

3.2 Sediment physicochemical characteristics

3.2.1 Sediment grain size

Sediments at all grab sample locations were predominantly sand (particle size 63-200 μm) and mud (particle size < 63 μm), with a small component of gravel (particle size > 2 mm) (Figure 3-3). The relative proportion of sand and mud varied widely among sites. This indicates that the area is likely to be periodically subjected to moderate to strong hydrodynamic forces (waves and currents).

Sediments taken from within the farm boundaries (In) contained a higher proportion of shell gravel derived from fragments of mussel shell dropping from the mussel lines.

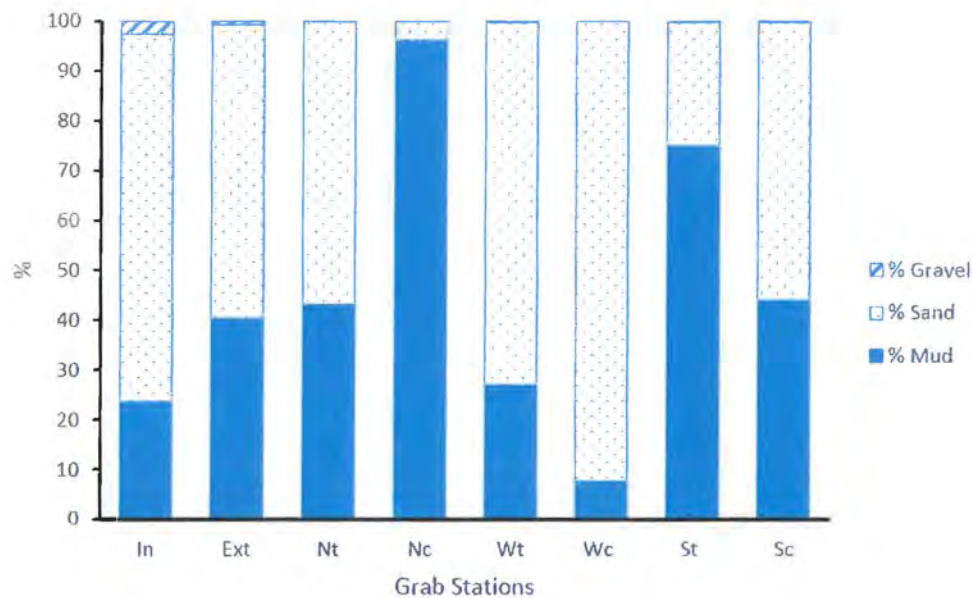


Figure 3-3: Percentage of each sediment grain size fraction in samples from each site. In= In farm, Ext = Extension, N, W, S = North, West, South, t = test, c = control.

3.2.2 Sediment organic content (loss on ignition or LOI)

Mean organic matter content of replicate samples from each grab site ranged from 1.47% at site Wc to 3.17% at site Nc (Figure 3-4). The organic content of sediments measured at all sites during a baseline survey conducted prior to deployment of farm structures at the existing site in 2005 ranged between ~1.5% and ~4% (Hopkins and Butcher 2005), which was very similar to the values measured in the present survey. It is notable that the organic content of sediment samples taken beneath existing farm lines (site In) was not elevated compared to samples taken from other sites (Figure 3-4).

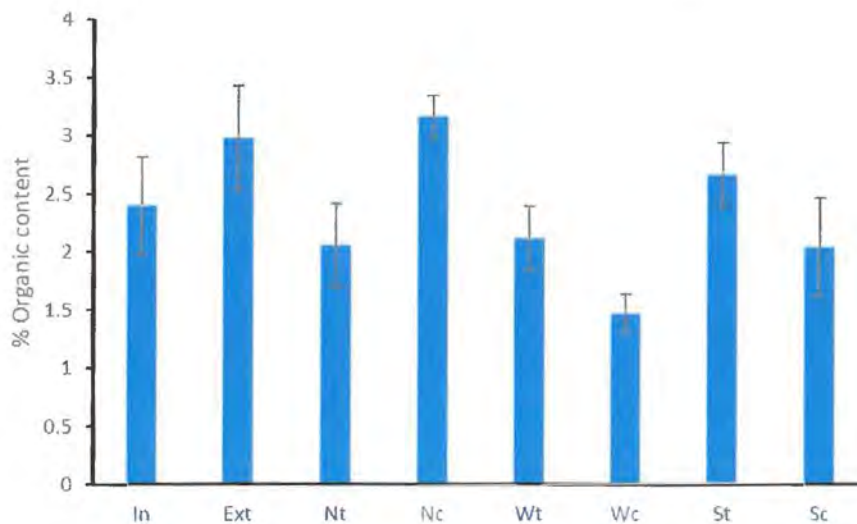


Figure 3-4: Graph of mean percent organic matter (LOI) in samples from each site. Error bars represent 95% CI. In= In farm, Ext = Extension, N, W, S = North, West, South, t = test, c = control.

The organic content of samples is moderately correlated ($R^2 = 0.58$) with the relative proportion of fine grained mud in the samples (Figure 3-5). Samples taken from the North Control (Nc) site had the greatest mud content and the highest organic content while samples taken at the West Control (Wc) site contained the lowest proportion of mud and exhibited the lowest organic content.

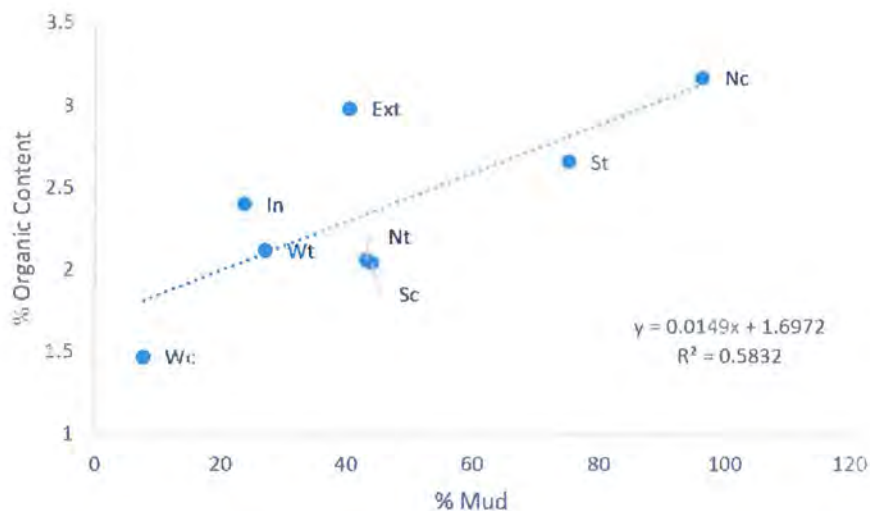


Figure 3-5: The percentage of fine-grained sediment (mud) in the sediment samples vs organic content.

3.2.3 Sediment colour, smell, and redox potential discontinuity (RPD) layer

Sediment samples taken from the seabed beneath farm structures appeared to be slightly darker coloured than samples from other sites (Figure 3-6). However none of the sediments were black in colour, and the in-farm sites did not exhibit unusually high organic content. Sediments from all of the other sites were grey/brown which is indicative of well oxygenated, non-impacted sites. Similarly, none of the samples exhibited any strong sulphurous or 'rotten egg' smells associated with highly organically-enriched sediments.

The distance from the sediment surface to the sediment redox potential discontinuity layer (depth of oxygenated layer of sediment) was variable and was not distinct at most sites. This observation, together with the observed variation in sediment grain size composition among sites is further indication that the overall area is subjected to complex and moderate to strong disturbance from hydrodynamic forces. Due to the inherent imprecision in visual measurement of the depth of the redox potential discontinuity layer, particularly at this site, results from that indicator were not quantitatively analysed.



Figure 3-6: Examples of sediment cores from within the extension (left), within the existing farm (middle), and from the South test (St) site (right).

3.3 Infaunal species assemblage

A total of 67 different taxa was identified from grab samples (Appendix B). The most commonly occurring infaunal species from grab samples were small-bodied crustaceans from the orders Amphipoda and Cumacea, representatives from several families of polychaete worm (including Nephtyidae, Spionidae and Sigalionidae), and the stalk-eyed mud crab (*Hemiplax hirtipes*). The most commonly sampled gastropod molluscs were an ectoparasite (*Odostomia* sp.) and a small shell borer whelk (*Xymene plebeius*), and the most common bivalves were the introduced window shell (*Theora lubrica*) and the nut shell (*Nucula nitidula*).

Figure 3-7 shows the number of taxa (species richness) and Figure 3-8 shows the abundance of individual animals within samples at each grab site. Species richness was similar among all sites including the existing farm site. The total abundance of animals sampled varied considerably among sites. This was mostly driven by very high abundances of some animals with very patchy distribution, such as Cumaceans at the North Control (Nc) site and Ampharetid polychaetes at the Western test (Wt) site. Samples taken from within the farm (In site) appeared to have slightly lower species abundances than the other sites.

The nMDS analysis (Figure 3-9) showed some evidence for grouping of samples according to site. In particular samples taken from beneath the existing farm lines (In) formed a distinct group as did the samples at the West test (Wt) site. The Pearson correlation overlay (Figure 3-6) shows which species are correlated with those patterns. For example, the In-farm sites (In) are associated with higher numbers of Owenidae (a tube-dwelling polychaete) than samples from other sites, and samples from the West test site contained relatively high numbers of Ampharetid and Spionid polychaetes. These patterns likely reflect the patchy distribution of those species rather than any significant effect from the farming activity, because a wide diversity of species common to most of the other sites was also found in samples taken from beneath the farm.

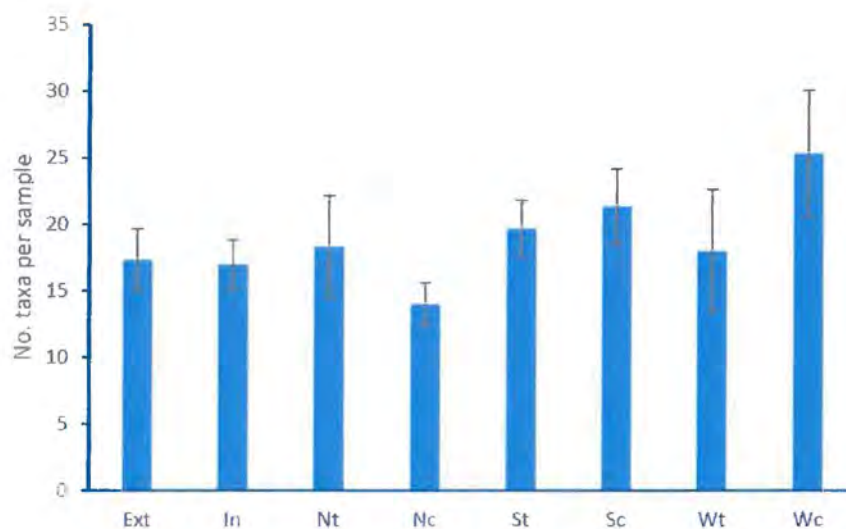


Figure 3-7: Mean number of taxa found in samples from each site. Error bars represent 95% confidence intervals (n = 3).

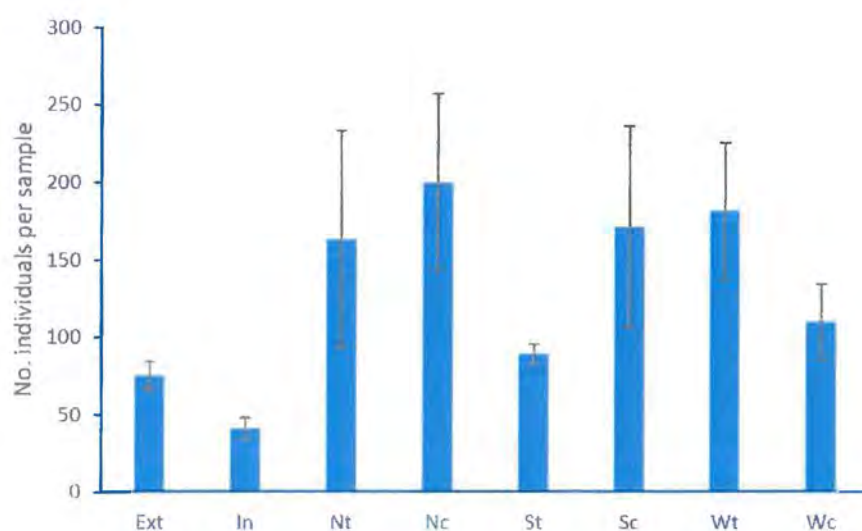


Figure 3-8: Mean abundance of infaunal individuals at each site. Error bars represent 95% confidence intervals (n = 3).

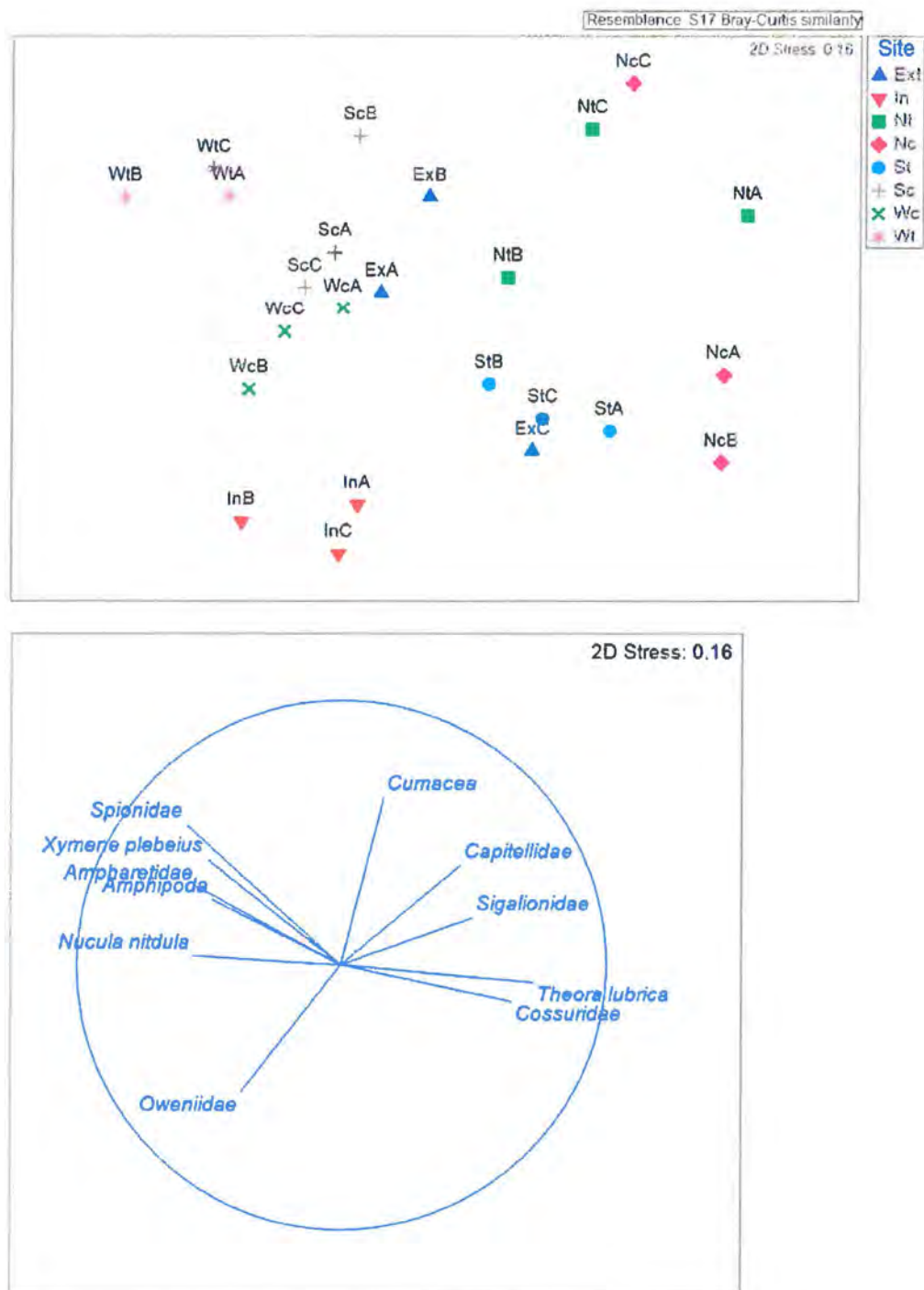


Figure 3-9: nMDS analysis of quantitative infaunal data (above) with Pearson Correlation vectors (below). Only correlations >0.5 displayed.

3.4 Epifauna - Large-bodied sediment surface-dwelling animals

A total of 20 different faunal taxa plus 4 algal taxa were found in sled samples during the survey (Table 3-1). All the species encountered in the dredge samples were common and widespread species on shallow subtidal soft sediment habitats in the Canterbury region.

Table 3-1: Epifauna and algae found in sled samples.

Group	Taxon	Sc	St	Wc	Wt	Nc	Nt	Ext 1	Ext 2	Ext 3	In 1/2	In 3
Phaeophyceae	<i>Macrocystis</i> sp.	P							P	P		
Phaeophyceae	<i>Undaria pinnatifida</i>		P									
Florideophyceae	<i>Rhodomenia</i> sp.							P		P		
Rhodophyta	Small bladed red algae				P							P
Rhodophyta	Filamentous red algae							P			P	P
Bivalvia	<i>Macra ordinaria</i>	1										
Bivalvia	<i>Perna canaliculus</i>					1					1	
Gastropoda	<i>Cantharidus tessellatus</i>								1			
Gastropoda	<i>Neoguraleus sinclairi</i>									1		
Gastropoda	<i>Striacolpus pagoda</i>	9										
Gastropoda	<i>Xymene plebeius</i>	6	11	1		27	2			2	3	
Cephalopoda	<i>Sepioloidea pacifica</i>									1		
Malacostraca	Amphipoda	3								1		6
Malacostraca	<i>Halicarcinus</i> sp.		1	1		1	16	2			2	
Malacostraca	<i>Hemiplax hirtipes</i>	1	19		5	4	2	1		1		
Malacostraca	Isopoda			2			1	1				
Malacostraca	<i>Pagurus</i> sp.		1									
Malacostraca	<i>Periclimenes yaldwyni</i>	4	1	1			2		2	1	8	1
Malacostraca	<i>Pontophilus australis</i>	2		7	2	1		2	2			
Malacostraca	<i>Tenagomysis longisquama</i>	1		20	7		3	45	18	3	2	2
Pycnogonida	Pycnogonida				1		1				1	
Hydrozoa	Hydrozoa					P	P	P				P
Asteroidea	<i>Patiriella</i> sp.	6	1									
Actinopteri	Unidentified fish A.	1						1				
Actinopteri	<i>Hemerocoetes monopterygius</i>					1				1		

4 Discussion and Conclusions

4.1 Proposed Extension

A side-scan sonar survey around the boundaries of the proposed extension did not detect any special topographical features (such as bedrock reef habitat) in the vicinity of the extension area. The substratum beneath the marine farm extension is soft sediment habitat composed of muddy sand with a small component of gravel. This type of habitat is widespread around the coastal fringe of Banks Peninsula. Biota sampled from the seabed within the extension area comprised a suite of species that are common in shallow subtidal soft sediment habitat in the Canterbury region.

Key biological and physical indicators measured from sampling the seabed within the existing farm which has been in place for 10 years did not detect any significant detrimental impact to the seabed attributable to the farming activity. Although sediments beneath the existing farm appeared darker in colour (one indicator of organic enrichment) than at adjacent sample sites, direct measurement of organic content in sediment samples did not detect any organic enrichment within the farm area compared to most other sites sampled in the survey. Macrofaunal abundance appeared to be reduced, but species richness within the existing farm boundaries was equivalent to other sites located beyond the influence of the farm. If the extension consent application is granted, the level of impact to the seabed community within the proposed extension area is likely to be similarly low.

In applying for the extension, the applicant is seeking to shift the inshore boundary of the existing consented area further offshore. This will move any potential effects from the farming activity seaward, away from nearshore habitats and associated species which are less widespread and which may be more sensitive to the depositional effects from the mussel farm compared to the soft sediment habitats further offshore (e.g. MPI 2013).

4.2 Baseline monitoring

Baseline monitoring was conducted at 'test' (50 m from proposed boundary) and 'control' (250 m from proposed boundary) sites established along three transects extending to the north, west and south of the proposed new consent area (the extension). Key ecological parameters were sampled as a baseline against which results of future monitoring survey results can be compared to enable detection of potential effects on the benthos from the marine farm extension. The design of the monitoring survey is consistent with other marine farm monitoring programmes already established in the region.

4.3 Conclusion

Based on the results of this survey, the siting of a mussel farm within the proposed extension area is appropriate and is unlikely to cause significant detrimental ecological effects to the benthos. By shifting the inshore boundary further offshore, the applicant will mitigate potential ecological effects to inshore habitats that are likely to be more sensitive to depositional effects from the marine farming activity.

5 Acknowledgements

Thanks to Louis Olsen (NIWA), Ashleigh Watts (NIWA) and Sam Helps (skipper of the vessel MV St George) for carrying out the fieldwork, and to Anna Bradley (NIWA), Megan Carter (NIWA) and Karen Robinson (NIWA) for laboratory analyses.

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Appendix A Grab Sample Positions (WGS 84, DM)

Site ID	Latitude	Longitude
In1	43 36.844	172 53.382
In2	43 36.881	172 53.243
In3	43 36.963	172 53.165
Ext1	43 36.792	172 53.330
Ext2	43 36.896	172 53.141
Ext3	43 37.032	172 53.067
Nt	43 36.745	172 53.399
Nc	43 36.635	172 53.458
Wc	43 36.922	172 52.884
Wt	43 36.904	172 53.061
St	43 37.093	172 52.997
Sc	43 37.193	172 52.948

Appendix B Macrofauna in grab samples

Class	Taxon	Ext A	Ext B	Ext C	In A	In B	In C	Nt A	Nt B	Nt C	Nc A	Nc B	Nc C	St A	St B	St C	Sc A	Sc B	Sc C	Wt A	Wt B	Wt C	Wt A	Wt B	Wt C
Bivalvia	<i>Arthritica</i> sp.	3		3	2	3			2		3	3	1		2	1		2		2				2	1
Bivalvia	<i>Cyclomactra ovata</i>																			2					
Bivalvia	<i>Divulvina cunningi</i>																			2		1			1
Bivalvia	<i>Dosinia mactrocea</i>				1																				
Bivalvia	<i>Leptomys retaria</i>	1	1	1		1														1					
Bivalvia	<i>Mactra ordinaria</i>																								2
Bivalvia	<i>Myadora</i> sp.																								
Bivalvia	<i>Nucula nitidula</i>	3		1		1				1					1	1	1			0	1	3	2	2	1
Bivalvia	<i>Perna canaliculus</i>					2																			
Bivalvia	<i>Ruditapes largillierii</i>		1			1																			
Bivalvia	<i>Tellinota edgari</i>	4				1		1	10	19	58	37	7	19	12	4	2	9	5	1	1		1	1	
Bivalvia	<i>Theora lubrica</i>	4	2	6	1			3														2			
Bivalvia	<i>Thracia vegrundis</i>																							1	1
Bivalvia	Unid. Bivalvia S.		4				1		9																
Gastropoda	<i>Arnoldia australis</i>																								1
Gastropoda	<i>Austrofusus glans</i>					1						1		1											2
Gastropoda	<i>Odostomia</i> sp.			3				3			6			8	1	20	8	1				3		2	1
Gastropoda	<i>Philine</i> sp.						1																		
Gastropoda	<i>Turbonilla</i> sp.						1	4			1					1						1		2	1
Gastropoda	<i>Xymene plebeius</i>	1						1	1	1					1		2	1	3	3	1	3	2		
Gastropoda	Unid. Gastropod A.							1																2	
Gastropoda	Unid. Gastropod B.																								1
Decapoda	<i>Hemiplax hirtipes</i>		3	1		1	1		2	2	1			2	1	5	4	4	1	4	3	5	3		1
Decapoda	<i>Ovalipes cothurnus</i>																								
Decapoda	<i>Pontophilus australis</i>																								
Decapoda	crab zoea											5								1					
Malacostraca	Amphipoda	12	3	1	6	13	6	4	4	3	4	4	3	4	9	4	65	62	41	18	14	22	20	17	29
Malacostraca	Caprellidae				5																				
Malacostraca	Cumacea	22	28	3	2			2	18	84		2 >200		3	4	3	14	55	10	32	4	7	23	10	21
Malacostraca	Isopoda		1	6			3							5	2	15	1	7						9	
Malacostraca	<i>Nebalia</i> sp.							1																1	1
Malacostraca	<i>Ogyrides dell</i>							1	1														1	3	
Malacostraca	Tanaidacea				1													11	57	20			3	4	7

Appendix B continued....

Class	Taxon	Ext A	Ext B	Ext C	In A	In B	In C	Nt A	Nt B	Nt C	Nc A	Nc B	Nc C	St A	St B	St C	Sc A	Sc B	Sc C	Wt A	Wt B	Wt C	Wc A	Wc B	Wc C	
Ostracoda	Ostracoda																		1				1	5	3	
Maxillopoda	Copepoda				1	1		5			1	1		1	1							2	2	1		
Pycnogonida	Pycnogonida	2																				1		1		
Anthozoa	<i>Virgularia gracillima</i>													1								1				
Anthozoa	Unid Anemone	1		2				1	2		2	11		1	1	1	2	1	3		2	2				
Asteroides	<i>Parisiella</i> sp.				1																					
Ophiuroidea	<i>Amphikura</i> sp.																							1		
Holothuroidea	Holothurian A					2																				
Holothuroidea	Holothurian B							2																		
Holothuroidea	Holothurian C							2																		
Actinopterygii	Unidentified fish								1							1										
Polychaeta	Ampharetidae	17	2	5	3	1	3			1						2	2	6	8	3	55 >100	142		1	7	3
Polychaeta	Capitellidae	3	1	1	1		3 >100		11 >100		18		5										4		2	
Polychaeta	Cirratulidae			4	2		2		1	2		3	2	9	5	3	1	3	3			2	2	2	3	
Polychaeta	Cossuridae			17				2	5	3	44 >100		36	18	17	18	1	4	5			1				
Polychaeta	Flabelligeridae																					1				
Polychaeta	Glyceridae		1		1				1		3			1			1	1	3				1	1	1	
Polychaeta	Goniadidae	5	2		3	3		2	7	12	7	3	3		2	4	2	10	1			4	5	1		
Polychaeta	Lumbrineridae				1		1		2			1	2	2	2	3		6	3		2	1				
Polychaeta	Magelonidae								1															3	5	
Polychaeta	Maldanidae								1								1	1	2	2	1	1				
Polychaeta	Nephtyidae	3	1	5	4	1	3	2	1	5	1	2		4	2	2	5	8	12	6	1	10	4	13	7	
Polychaeta	Onuphidae						1															1				
Polychaeta	Ophelidae	1			1	1	1	3															3	20	7	
Polychaeta	Orbinidae									1				1						1			1			
Polychaeta	Owenidae				4	12	1										1		2	1		2	6	1		
Polychaeta	Pectinariidae																							1		
Polychaeta	Phyllodoctidae									1																
Polychaeta	Polynoidae					1		1										1		1						
Polychaeta	Sigalionidae	2	8	5	1			2	9	6	5	4	3	8	6	5	2	2	4		2	4	2	2		
Polychaeta	<i>Spiochaetopterus</i> sp.														2											
Polychaeta	Spionidae	2	11	1	2	5	3	3	5	7	1	5	3		5	2	5	10	4	15	20	20	4	2	4	
Polychaeta	Sternaspidae																1		1		1					
Polychaeta	Trichobranchidae													1		1	2	1				1				

Chlorophyll data analysis

Prepared for Pigeon Bay Aquaculture Ltd

October 2013

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Reviewed by



Jeffrey Ren

Approved for release by



Charles Pearson

1 Introduction

Pigeon Bay Aquaculture Ltd approached NIWA to analyse and interpret chlorophyll-a data that had been collected quarterly since 2010 from sites around a number of mussel farms situated along Banks Peninsula, Canterbury. The purpose of these analyses is to supply the information required for renewal of resource consents for the mussel farms.

The data were provided by Pigeon Bay Aquaculture Ltd in Excel worksheets and are comprised of sets designated as "Control" (C) and "Impact" (I) for each farm (Table 1-1). Samples sites located 50 m from a farm boundary are considered as "Impact" sites and "Control" sites are 200 m from a farm. The sample sites for each farm are shown in Figures 1-1 to 1.4 (supplied by Pigeon Bay Aquaculture Ltd). The data were graphed and subjected to 2 factorial one-way ANOVA to assess significant differences between "Control" and "Impact" sites. Assessing these differences provides an indication of whether mussel filtration has an impact on phytoplankton abundance (measured as chlorophyll-a) at the limit of 50 m from the farm boundary.

Table 1-1: Chlorophyll data from water samples collected since 2010 around mussel farms on the Banks Peninsula, Canterbury. Control (C) sites are located 200m from the farm boundary and Impact (I) sites, 50 m. (supplied by Pigeon Bay Aquaculture Ltd).

Farm	Date	Site	Control (C); Impact (I)	Chl-a (µg/L)
CRC000947	22/02/2010	1	1C	1.83
CRC000947	22/02/2010	2	2C	1.16
CRC000947	22/02/2010	3	3C	1.33
CRC000947	22/02/2010	1	1I	1.52
CRC000947	22/02/2010	2	2I	1.38
CRC000947	22/02/2010	3	3I	1.40
CRC000947	17/05/2010	1	1C	1.08
CRC000947	17/05/2010	2	2C	1.32
CRC000947	17/05/2010	3	3C	1.31
CRC000947	17/05/2010	1	1I	0.93
CRC000947	17/05/2010	2	2I	1.36
CRC000947	17/05/2010	3	3I	1.31
CRC000947	9/09/2010	1	1C	3.02
CRC000947	9/09/2010	2	2C	1.02
CRC000947	9/09/2010	3	3C	1.40
CRC000947	9/09/2010	1	1I	1.88
CRC000947	9/09/2010	2	2I	1.02
CRC000947	9/09/2010	3	3I	1.28
CRC000947	24/11/2010	1	1C	4.05
CRC000947	24/11/2010	2	2C	2.63
CRC000947	24/11/2010	3	3C	3.22
CRC000947	24/11/2010	1	1I	3.69
CRC000947	24/11/2010	2	2I	3.59
CRC000947	24/11/2010	3	3I	3.11
CRC000947	28/03/2011	1	1C	2.46
CRC000947	28/03/2011	2	2C	2.63
CRC000947	28/03/2011	3	3C	2.14
CRC000947	28/03/2011	1	1I	2.98

Farm	Date	Site	Control (C); Impact (I)	Chl-a (µg/L)
CRC000947	28/03/2011	2	2I	2.15
CRC000947	28/03/2011	3	3I	2.03
CRC000947	14/11/2011	1	1C	0.68
CRC000947	14/11/2011	2	2C	0.85
CRC000947	14/11/2011	3	3C	0.97
CRC000947	14/11/2011	1	1I	0.57
CRC000947	14/11/2011	2	2I	0.84
CRC000947	14/11/2011	3	3I	0.89
CRC000947	3/05/2012	1	1C	1.71
CRC000947	3/05/2012	2	2C	1.59
CRC000947	3/05/2012	3	3C	1.56
CRC000947	3/05/2012	1	1I	1.35
CRC000947	3/05/2012	2	2I	1.07
CRC000947	3/05/2012	3	3I	0.84
CRC000947	17/08/2012	1	1C	1.54
CRC000947	17/08/2012	2	2C	1.08
CRC000947	17/08/2012	3	3C	2.63
CRC000947	17/08/2012	1	1I	1.53
CRC000947	17/08/2012	2	2I	1.44
CRC000947	17/08/2012	3	3I	1.41
CRC000947	22/11/2012	1	1C	2.34
CRC000947	22/11/2012	2	2C	2.25
CRC000947	22/11/2012	3	3C	2.37
CRC000947	22/11/2012	1	1I	2.29
CRC000947	22/11/2012	2	2I	2.40
CRC000947	22/11/2012	3	3I	2.03
CRC000947	25/02/2013	1	1C	1.98
CRC000947	25/02/2013	2	2C	1.73
CRC000947	25/02/2013	3	3C	1.87
CRC000947	25/02/2013	1	1I	2.29
CRC000947	25/02/2013	2	2I	1.65
CRC000947	25/02/2013	3	3I	2.28
CRC000947	30/05/2013	1	1C	3.48
CRC000947	30/05/2013	2	2C	2.98
CRC000947	30/05/2013	3	3C	2.62
CRC000947	30/05/2013	1	1I	2.22
CRC000947	30/05/2013	2	2I	2.44
CRC000947	30/05/2013	3	3I	3.62
CRC001853A	3/05/2012	4	4C	1.28
CRC001853A	3/05/2012	4	4I	1.39
CRC001853A	3/05/2012	5	5C	1.54
CRC001853A	3/05/2012	5	5I	1.48
CRC001853A	3/05/2012	6	6C	1.34
CRC001853A	3/05/2012	6	6I	1.41
CRC001853A	3/05/2012	7	7C	1.46
CRC001853A	3/05/2012	7	7I	1.37
CRC001853A	17/08/2012	4	4C	1.39
CRC001853A	17/08/2012	4	4I	1.17

Farm	Date	Site	Control (C); Impact (I)	Chl-a (µg/L)
CRC001853A	17/08/2012	5	5C	1.29
CRC001853A	17/08/2012	5	5I	1.23
CRC001853A	17/08/2012	6	6C	1.25
CRC001853A	17/08/2012	6	6I	1.37
CRC001853A	17/08/2012	7	7C	1.39
CRC001853A	17/08/2012	7	7I	1.46
CRC001853A	22/11/2012	4	4C	1.74
CRC001853A	22/11/2012	4	4I	1.95
CRC001853A	22/11/2012	5	5C	2.25
CRC001853A	22/11/2012	5	5I	1.85
CRC001853A	22/11/2012	6	6C	2.02
CRC001853A	22/11/2012	6	6I	1.84
CRC001853A	22/11/2012	7	7C	2.20
CRC001853A	22/11/2012	7	7I	1.94
CRC001853A	25/02/2013	4	4C	1.38
CRC001853A	25/02/2013	4	4I	1.29
CRC001853A	25/02/2013	5	5C	1.13
CRC001853A	25/02/2013	5	5I	1.37
CRC001853A	25/02/2013	6	6C	1.40
CRC001853A	25/02/2013	6	6I	1.45
CRC001853A	25/02/2013	7	7C	1.37
CRC001853A	25/02/2013	7	7I	1.05
CRC001853A	30/05/2013	4	4C	1.72
CRC001853A	30/05/2013	4	4I	1.48
CRC001853A	30/05/2013	5	5C	1.23
CRC001853A	30/05/2013	5	5I	1.32
CRC001853A	30/05/2013	6	6C	1.58
CRC001853A	30/05/2013	6	6I	1.71
CRC001853A	30/05/2013	7	7C	1.64
CRC001853A	30/05/2013	7	7I	1.43
CRC011429	17/08/2012	8	8C	1.06
CRC011429	17/08/2012	8	8I	1.09
CRC011429	17/08/2012	9	9I	1.02
CRC011430	17/08/2012	10	10C	1.10
CRC011430	17/08/2012	10	10I	0.99
CRC011430	17/08/2012	11	11C	1.33
CRC011430	17/08/2012	11	11I	0.75
CRC011430	22/11/2012	10	10C	1.89
CRC011430	22/11/2012	10	10I	1.92
CRC011430	22/11/2012	11	11C	2.45
CRC011430	22/11/2012	11	11I	1.78
CRC011430	25/02/2013	10	10C	2.82
CRC011430	25/02/2013	10	10I	2.08
CRC011430	25/02/2013	11	11C	2.66
CRC011430	25/02/2013	11	11I	2.20
CRC011430	30/05/2013	10	10C	1.01
CRC011430	30/05/2013	10	10I	1.08
CRC011430	30/05/2013	11	11C	1.33

Farm	Date	Site	Control (C); Impact (I)	Chl-a (µg/L)
CRC011430	30/05/2013	11	11I	0.86

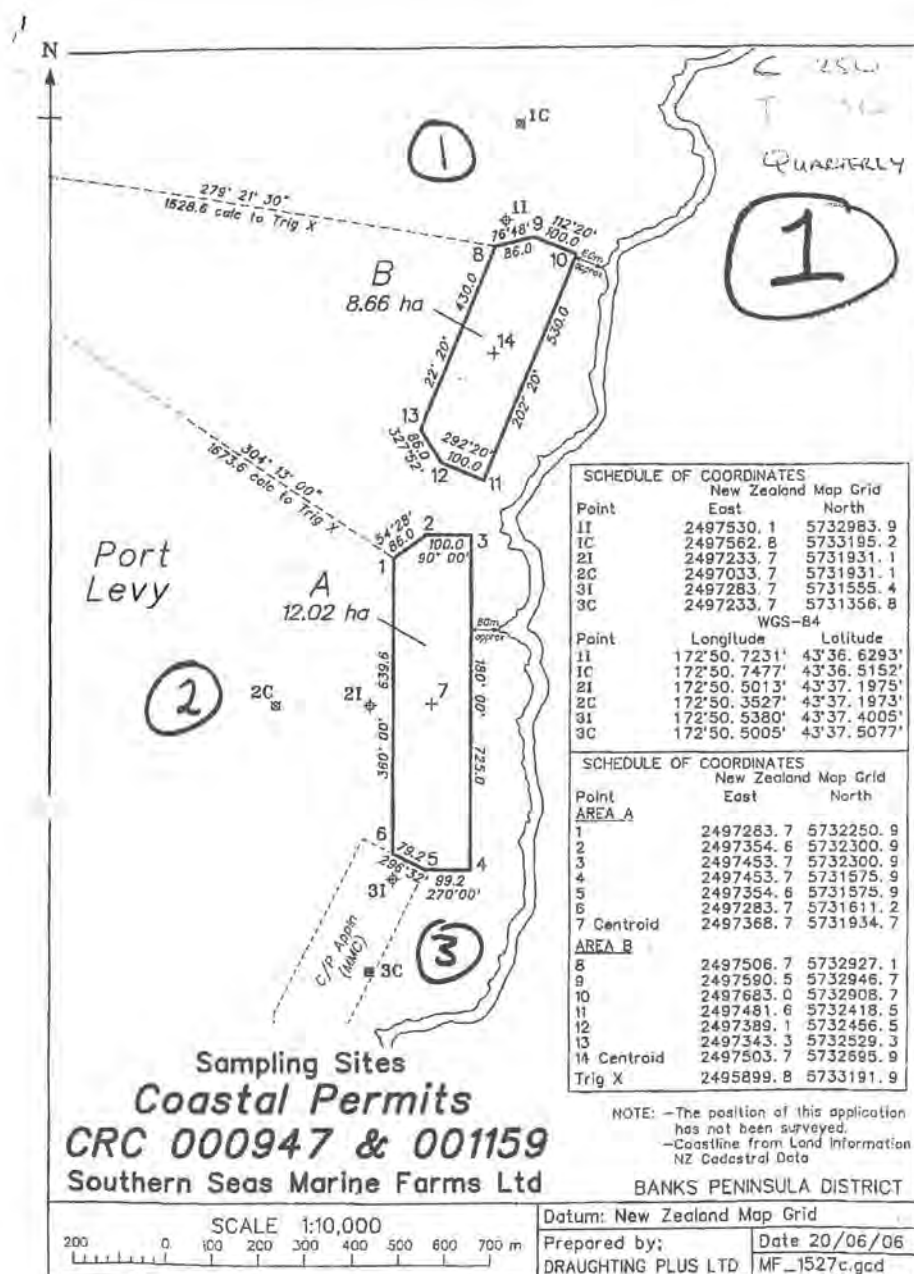


Figure 1-1: Mussel farms CRC00947 and CRC001159 and, "Control" (1C, 2C and 3C) and "Impact" (1I, 2I and 3I) sites from which water samples were collected to assess Chlorophyll-a concentrations. "Controls" are 200m and "Impacts", 50 m, from the farm boundary (See Table 1-1).

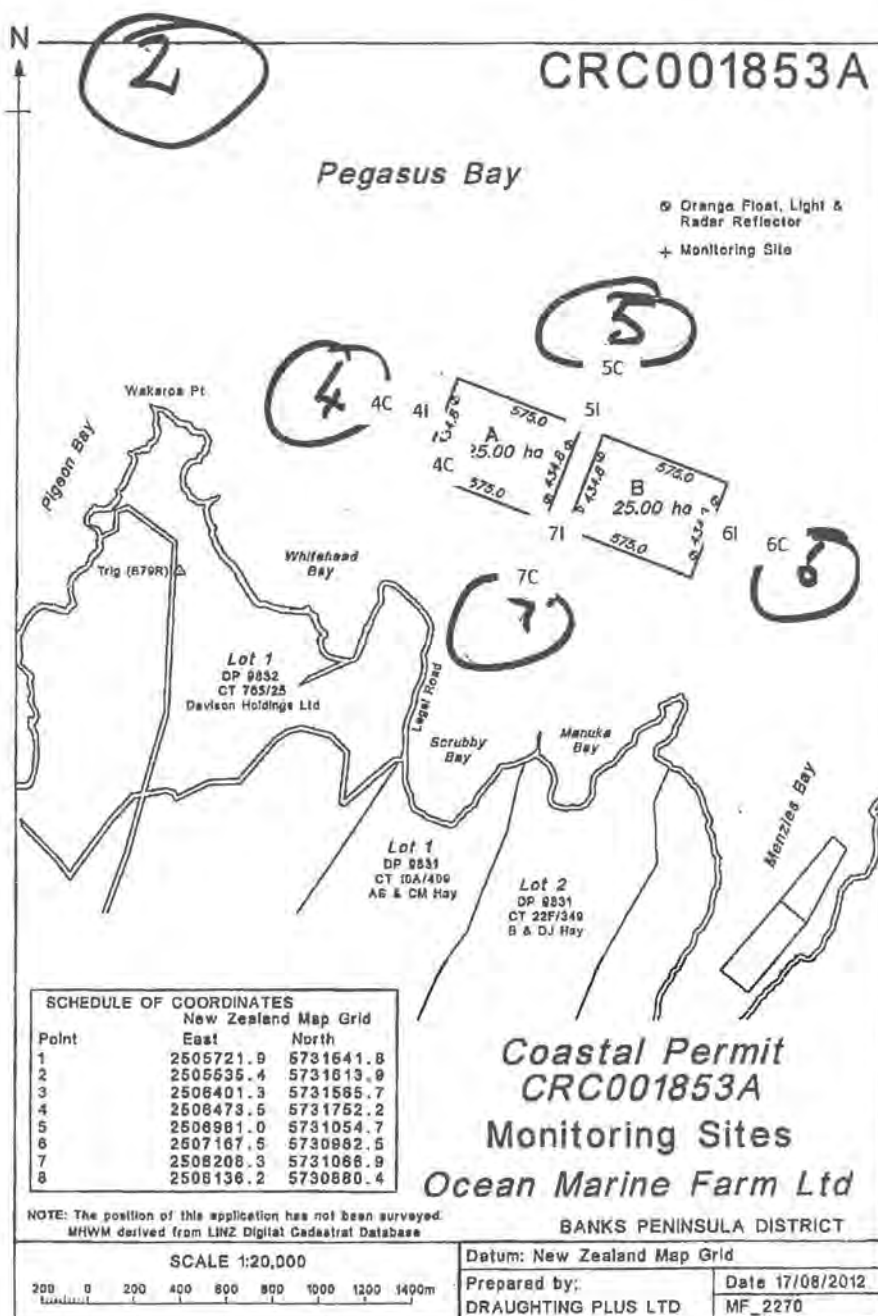


Figure 1-2: Mussel farm CRC001853A and, "Control" (4C-7C) and "Impact" (4I-7I) sites from which water samples were collected to assess Chlorophyll-a concentrations. "Controls" are 200m and "Impacts", 50 m, from the farm boundary (See Table 1-1).

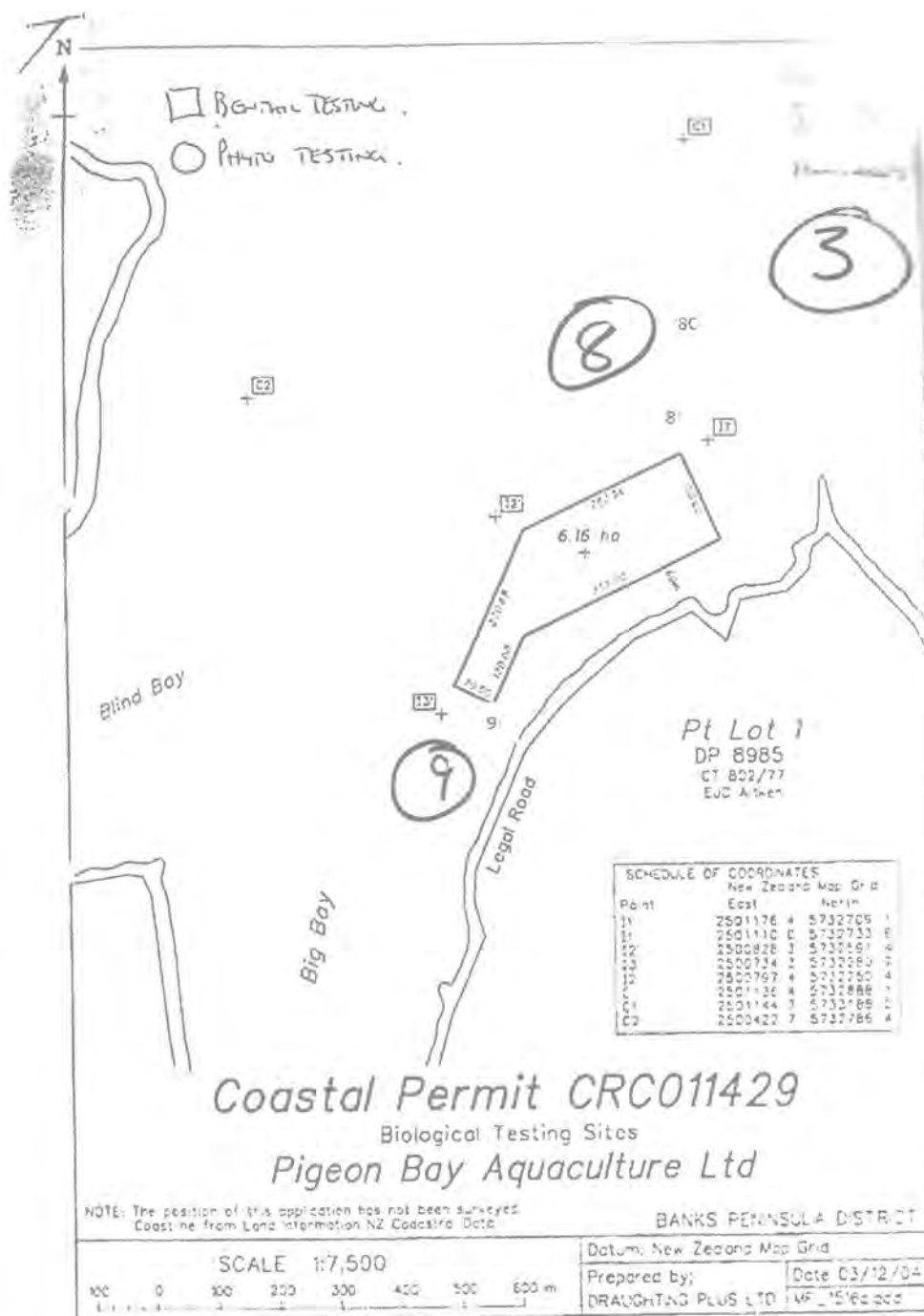


Figure 1-3: Mussel farm CRC001429 and, "Control" (8C) and "Impact" (8I and 9I) sites from which water samples were collected to assess chlorophyll-a concentrations. "Controls" are 200m and "Impacts", 50 m, from the farm boundary (See Table 1-1).

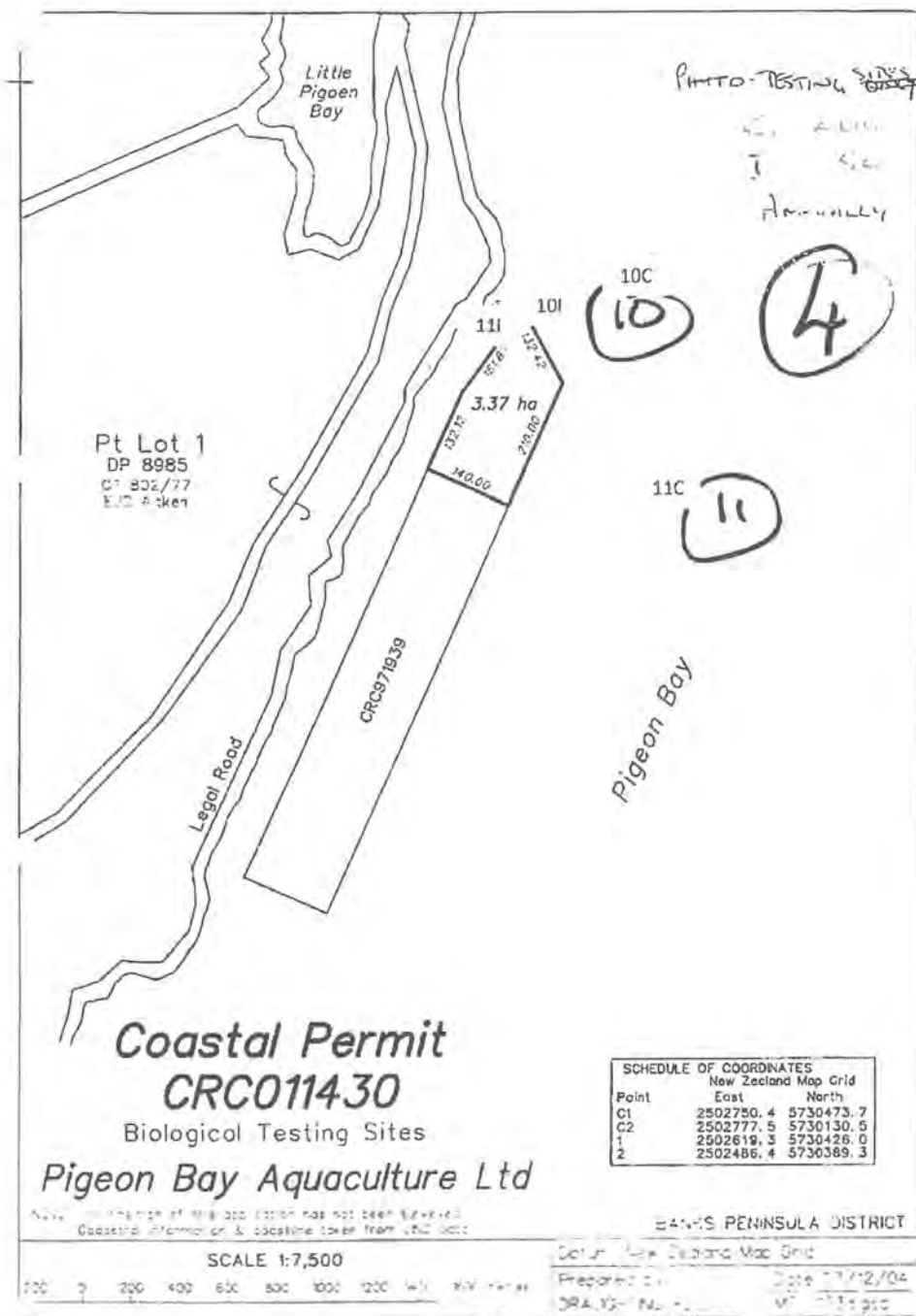


Figure 1-4: Mussel farm CRC001430 and "Control" (10C and 11C), and "Impact" (10I and 11I) sites from which water samples were collected to assess chlorophyll concentrations. "Controls" are 200m and "Impacts", 50 m, from the farm boundary (See Table 1-1).

2 Results

2.1 CRC000947 and CRC001159

These farms are located in Port Levy (Figure 2-1) and the mean chl-*a* levels ($\mu\text{g/L}$) (± 1 SE) for all "Control" (C) and "Impact" (I) sites are plotted against date in Figure 2-1. The C and I data follow the same seasonal trend with peak chlorophyll levels in November 2010, March 2011 and again in May 2013. To test the variation in data and ascertain whether the C and I chlorophyll data were significantly different from each other on any date, a 2 factorial (Date*CON/IMP) one-way ANOVA analysis was undertaken (Table 2-1). Basically this test considers whether there is a chl-*a* difference between C and I sites that could indicate that mussels have depleted or enhanced phytoplankton abundance compared to natural background levels.

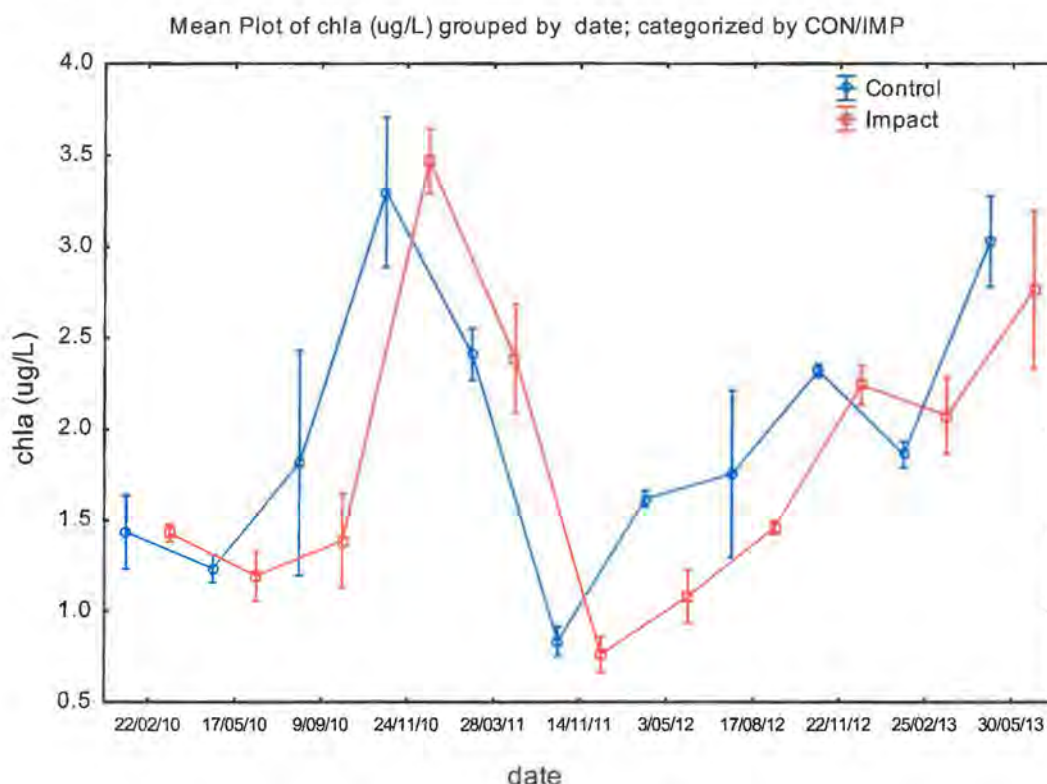


Figure 2-1: CRC000947 and CRC001159: The mean chl-*a* levels ($\mu\text{g/L}$) (± 1 SE) for "Control" and "Impact" sites ($n=3$) on each sampling date from 2010 to 2013. Graphs are misaligned for clarity.

The ANOVA analysis in Table 2-1 indicates that there are statistical differences between dates as may be expected considering the strong seasonal pattern in Figure 2-1, but there are no differences between an interaction of both (Date*COM/IMP) or between "Control" and "Impact" sites.

Table 2-1: CRC000947/CRC001159: Two Factorial (Date*CON/IMP sites) one-way ANOVA analysis of chl-a ($\mu\text{g/L}$) data from sites "Control" (1C, 2C and 3C) and "Impact" (1I, 2I and 3I) sites. Red values indicate a significant different. Univariate Tests of Significance for chl-a ($\mu\text{g/L}$).. ($p < 0.05$).

	SS	Degree of Freedom	MS	F	p
Intercept	238.9596	1	238.9596	1264.343	0.000000
CON/IMP	0.2466	1	0.2466	1.305	0.259504
date	35.6642	10	3.5664	18.870	0.000000
CON/IMP*date	0.8102	10	0.0810	0.429	0.924661
Error	8.3160	44	0.1890		

2.2 CRC001853A

This farm is located opposite Whitehead and Scrubby Bays (Figure 1-2) and the mean chl-a levels ($\mu\text{g/L}$) (± 1 SE) for all "Control" (C) and "Impact" (I) sites are plotted against date in Figure 2-2. Samples were collected quarterly over one year (May 2012 to May 2013). The C and I data follow the same seasonal trend with peak chlorophyll levels in November 2012. The SEs around the means are small which means there is likely to be very little variation between the sites on any one sampling day. To test the variation in data and ascertain whether the C and I chlorophyll data were significantly different from each other on any date, a 2 factorial (Date*CON/IMP) one-way ANOVA analysis was undertaken (Table 2-2).

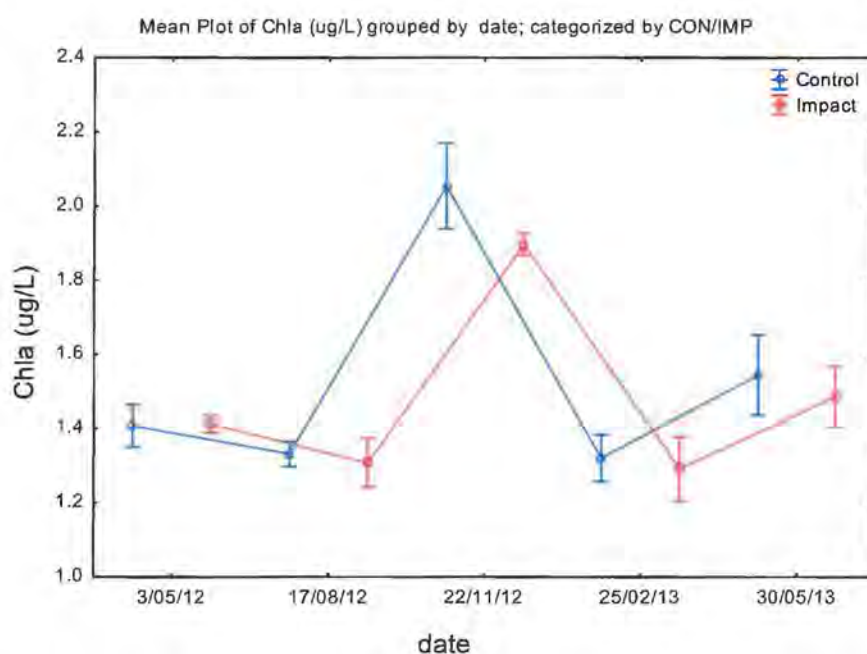


Figure 2-2: CRC001853A: The mean chl-a levels ($\mu\text{g/L}$) (± 1 SE) for "Control" and "Impact" sites ($n=3$) on each sampling date from May 2012 to May 2013. Graphs are misaligned for clarity.

The ANOVA analysis in Table 2-2 indicates that there are statistical differences between dates as may be expected considering the strong seasonal pattern in Figure 2-2, but there are no differences between an interaction of both (Date*COM/IMP) or between "Control" and "Impact" sites.

Table 2-2: CRC001853A: Two Factorial (Date*CON/IMP sites) one-way ANOVA analysis of chl-a ($\mu\text{g/L}$) data from sites "Control" (4C-7C) and "Impact" (4I-7I) sites. Red values indicate a significant different. Univariate Tests of Significance for Chla ($\mu\text{g/L}$). ($p>0.05$).

	SS	Degree. of - Freedom	MS	F	p
Intercept	90.45363	1	90.45363	4240.158	0.000000
CON/IMP	0.02805	1	0.02805	1.315	0.260555
date	2.43232	4	0.60808	28.505	0.000000
CON/IMP*date	0.03115	4	0.00779	0.365	0.831541
Error	0.63998	30	0.02133		

2.3 CRC011429

This farm is located in Big Bay (Figure 1-3) and has three sampling sites, 8C, 8I and 9I. Chl-a data are insufficient for an analysis or interpretation of the possible impact of mussel filtration on phytoplankton abundance (Table 1-1). Samples were collected on only one day (17/08/2012). The chl-a values ranged from 1.02 to 1.09 $\mu\text{g/L}$.

2.4 CRC011430

This farm is located in Pigeon Bay (Figure 1-4) and the mean chl-a levels ($\mu\text{g/L}$) (± 1 SE) for all "Control" (C) and "Impact" (I) sites are plotted against date in Figure 2-3. Samples were collected quarterly from August 2012 to May 2013. A strong seasonal trend is apparent in the data with a peak chlorophyll level in February 2013. The SEs around the means are moderate which means there may be some significant differences within and between samples on any one sampling day. To test the variation in data and ascertain whether the C and I chlorophyll data were significantly different from each other on any date, a 2 factorial (Date*CON/IMP) one-way ANOVA analysis was undertaken (Table 2-3).

The ANOVA analysis in Table 2-3 indicates that there are statistical differences between dates as may be expected considering the strong seasonal pattern in Figure 2-3, but no differences between an interaction of both (Date*COM/IMP). There are differences however between "Control" and "Impact" sites. To determine which pair of "Control" and "Impact" sites show significant differences in chl-a concentrations, a Tukey Post-hoc analysis was undertaken (Table 2-3). This analysis indicated no differences in chl-a at any one farm on any one sampling day (blue demarcated blocks in Table 2-3).

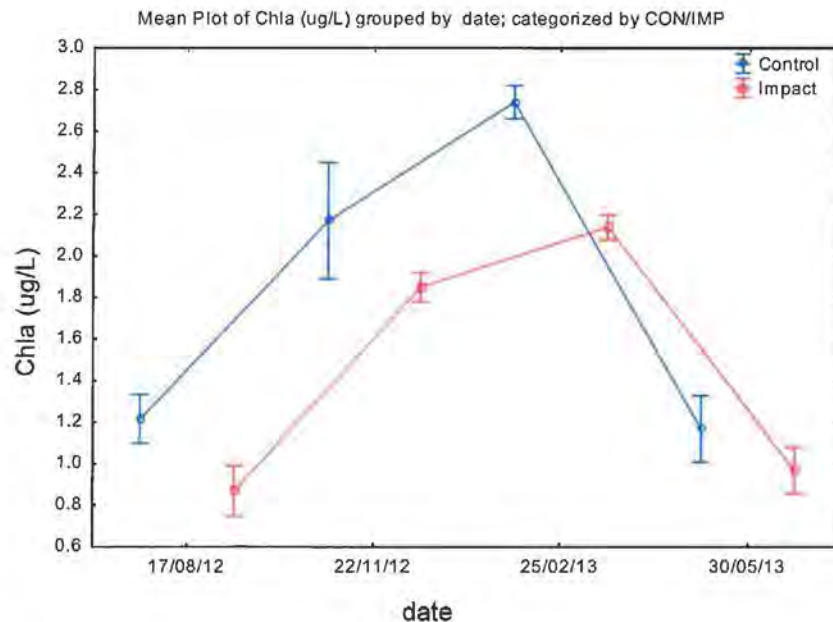


Figure 2-3: CRC011430: The mean chl-a levels (µg/L) (±1 SE) for “Control” and “Impact” sites (n=2) on each sampling date from August 2012 to May 2013. Graphs are misaligned for clarity.

Table 2-3: CRC011430: Two Factorial (Date*CON/IMP) one-way ANOVA analysis of chl-a (µg/L) data from “Control” (10C and 11C), and “Impact” (10I and 11I) sites. Red values indicate a significant difference. Univariate Tests of Significance for chl-a (µg/L) (p<0.05). Tukey HSD test: variable chl-a (µg/L) between MS = 0.04, df = 8. Blue indicates pair-wise “Control” / “Impact” comparison on one date.

	SS	Degree of - Freedom	MS	F	p
Intercept	43.05266	1	43.05266	1074.519	0.000000
date	5.84005	3	1.94668	48.586	0.000018
CON/IMP	0.53930	1	0.53930	13.460	0.006321
date*CON/IMP	0.08423	3	0.02808	0.701	0.577566
Error	0.32054	8	0.04007	0.32054	

Tukey HSD test;

	date	CON/IMP	{1} - 1.21	{2} - .86	{3} - 2.17	{4} - 1.85	{5} - 2.74	{6} - 2.14	{7} - 1.17	{8} - .96
1	17/08/12	C		0.6716	0.0184	0.1370	0.0010	0.0220	0.9999	0.8992
2	17/08/12	I	0.6716		0.0027	0.0157	0.0003	0.0032	0.7877	0.9993
3	22/11/12	C	0.0184	0.0027		0.7416	0.2050	1.0000	0.0140	0.0046
4	22/11/12	I	0.1370	0.0157	0.7416		0.0272	0.8139	0.1023	0.0286
5	25/02/13	C	0.0010	0.0003	0.2050	0.0272		0.1700	0.0008	0.0004
6	25/02/13	I	0.0220	0.0032	1.0000	0.8139	0.1700		0.0167	0.0054
7	30/05/13	C	0.9999	0.7877	0.0140	0.1023	0.0008	0.0167		0.9603
8	30/05/13	I	0.8992	0.9993	0.0046	0.0286	0.0004	0.0054	0.9603	

3 Conclusions

The analyses presented in Section 2 of this report indicate that at any one farm, on any one sampling date, there were no significant difference in the level of chlorophyll between "Control" and "Impact" site. This means that the data indicate that mussels are neither depleting nor enhancing the abundance of phytoplankton in the surrounding water.

There are difference between dates and between one set of farm sites but these differences are related to natural variability in chlorophyll-a and not variations that can be attributed to the impact of mussel filtration.



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17 March 2017

Environment Canterbury
PO Box 345
Christchurch 8140

FILE NO.	
DOCUMENT No.	
21 MAR 2017	
ACTION	INFO

BY COURIER

Re: **Pigeon Bay Aquaculture – Permitted Application for Resource Consent for Renewal and Extension – Big Bay, Banks Peninsula**

We act for the abovenamed.

We attach for filing the following:

1. Application for Resource Consent
2. Information required to accompany the Application in accordance with Schedule 4 RMA
3. Locality Map
4. Area Plan
5. Structures Layout detail
6. Aerial Photograph
7. Series of Photographs (Photos 1 to 11)
8. Benthic Survey
9. Chlorophyll data analysis
10. Adjoining owner consent from Chamberlain
11. Adjoining owner consent from Aitken
12. Application fee \$1,725.00.

Please let us know if there is anything further you require to commence processing the application.

Yours faithfully

WISHEART MACNAB & PARTNERS


.....
DJ Clark
david@wmp.co.nz

Encl

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